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**A hermeneutic enquiry into how MSK podiatrists  
interpret and use evidence in practice**

**Andrew David Bridgen**

**A thesis submitted to the University of  
Huddersfield in partial fulfilment of the  
requirements for the degree of Doctor of  
Philosophy**

**July 2017**

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## Abstract

Podiatrists have developed an informal specialism within their profession which enables them to treat MSK injuries with functional orthoses. The podiatric biomechanics theories, on which this treatment is based, have been called into question and may have little scientific basis. Research evidence into functional orthoses suggests they may not be as successful at treating MSK injuries as it first appeared. This has led to debate within MSK podiatry about which theories and orthoses to use in relation to the treatment of MSK injuries. It suggests that podiatrists may be unable to apply easily the principles of evidence-based practice in MSK podiatry.

The aim of this thesis is to explore how MSK podiatrists interpret and use evidence in clinical practice; what influences their beliefs, their perceptions of the interpretation of research and other forms of evidence and it examines their lived experience of using evidence in clinical practice.

A hermeneutic approach was used to conduct semi-structured interviews with seventeen podiatrists who use orthoses to treat MSK injuries in a variety of practice settings. Interpretative phenomenological analysis was utilised to analyse the data. Ethical approval was given by the University School ethics panel and relevant permissions were granted by employers.

The findings reveal there is confusion about evidence in MSK podiatry. The participants understand the concept of evidence-based practice to be the use of quantitative research evidence in practice. In reality there is little definitive knowledge from research and the main source of evidence used in practice is patient feedback supported by a process of active experimentation. Clinical knowledge in MSK podiatry is a form of practical wisdom, gained through the lived experience of practice. The uncritical acceptance of evidence-based practice principles together with an emphasis on randomised controlled trials suggest other forms of evidence are devalued. Thus, MSK podiatrists have fears their practice is based on weak evidence. The discourse of MSK podiatry has changed, participants use a Tissue Stress approach with the biomechanics theories forming a framework to understand gait and as the basis of their active experimentation. The discourse has become more vague and individual. The language used by the participants reinforces the ambiguity, for example there is a wide range of terms to describe orthotic designs and modifications. This could be a way to maintain the status of MSK podiatry.

The concluding discussion examines the findings in the context of current literature that MSK podiatry is a practical and experiential specialism. It could be described as a patient centred approach based in a practical wisdom. The participants are not undertaking EBP as they describe it because the lack of propositional knowledge undermines the research undertaken in this area. Therefore it is recommended that a national outcome study is needed to confirm the effectiveness of orthoses and to gain understanding about the orthoses being prescribed and the MSK conditions being successfully treated. There needs to be further exploration to establish understanding of the language of MSK podiatry . The professional body for podiatrists should consider a mentorship programme for practitioners to allow the individual knowledge of MSK podiatry to be shared and to maintain the community of practice in these changing times for healthcare provision in the UK.

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# Chapter 1 Background To The Thesis

## 1.1 Introduction

This thesis presents an original contribution to the knowledge and understanding within the field of musculoskeletal (MSK) podiatry practice. The participants' beliefs about their clinical knowledge, the interpretation and meaning they give to evidence and the contribution evidence-based practice (EBP) makes to their practice will be examined. The focus of the thesis is on the application and use of research evidence as an element of EBP, though the models of EBP clinical decision making are discussed, and its role in MSK podiatry practice.

MSK podiatry began in the late 1970's with the use of functional orthoses to treat MSK conditions and the biomechanical abnormalities which may contribute to these injuries (Borthwick 1999). It has since progressed into a specialism within podiatry, accepted by the NHS (DOH 2006), despite there being no formal understanding or qualification for the role of an MSK specialist podiatrist.

Exploration of this area is of interest because podiatrists have diversified away from traditional podiatry by using podiatric biomechanics theories, proposed by themselves and other professions, and developed functional foot orthoses to treat MSK conditions, by altering the gait of their patients (Nancarrow & Borthwick 2005). This role has developed despite a paucity of research evidence to substantiate these theories. Though there seems to be some evidence to prove orthoses work for some patients for some MSK conditions, the research evidence gives contradictory results about their clinical effectiveness. Some studies give positive results for the effectiveness of orthoses whilst others show orthoses are not as effective as other treatments. It seems to be a paradox: this area of podiatry has grown into a specialism on the basis of theories which appear to have little evidence to support them. Podiatrists, like other health professions, must undertake EBP as part of their Health and Care Professions Council (HCPC) registration

yet it seems this may be difficult in this area of practice. As the research evidence appears contradictory, this thesis investigates the research which underpins podiatric MSK practice. It explores the clinical knowledge of MSK podiatrists and their beliefs about the evidence they use in practice. How this evidence is used to support and develop their clinical practice is considered.

### **1.1.1. Evidence, knowledge and EBP**

It is important at this point to clarify my interpretation of the following three terms; evidence, knowledge and EBP. I use evidence to mean anything which attests or supports knowledge in practice, rather than a term which only describes knowledge developed from research. Knowledge is used to describe something which is understood or recognised as a state of knowing. The use of the acronym, EBP, represents the original Sackett et al (1996) concept about the use of research evidence in clinical practice and the primacy of quantitative evidence, for which randomised controlled trials (RCT) are considered the best evidence for the effectiveness of a treatment.

### **1.1.2. My journey to this study**

This study utilises a hermeneutic approach to investigate the phenomena of the use of evidence in practice. An essential element of this method is the reflexivity of the researcher. Hermeneutic researchers explicitly engage in this process. They examine their attitudes and beliefs which may affect the research findings. They are continually reflecting on their interpretations of the phenomena being studied and their own experience. Through this process new understanding can occur and the researcher can also gain a better understanding of themselves (Finlay 2013). Gadamer (1976) suggests new understanding can arise because we are able to look at what we have seen freely, not through eyes conditioned by our prejudices, since we understand our prejudices and ourselves as well.

The ideas for this thesis developed over a number of years. Since qualifying as a podiatrist in 1995, I have worked in this area of podiatric practice. Key elements contributed to these ideas.

The podiatric biomechanics theories are the foundations of my practice yet during my career there has been significant change in the theories which are used and discussed in

podiatry. The original basis for podiatric biomechanics is currently referred to as Subtalar Joint Neutral (STJN) theory. However the principles of this theory have been shown to be incorrect despite the devices made using this theory, functional orthoses, being a successful treatment for MSK injuries. I have successfully treated many MSK injuries with functional orthoses. As a consequence further theories were developed but whether these newer theories have a stronger basis than STJN theory is debatable. I take a pragmatic view of the theories; each has some value and I have used them successfully in practice. This can be seen as an approach which is similar to the Unified theory (Harradine & Bevan 2009). However this type of pragmatic approach does not seem to be acceptable to all colleagues. There appears to be a wide range of strongly held views about the theories as demonstrated on the online podiatry discussion sites, e.g. Podiatry Arena. Such sites appear to be a forum for strong opinions and vested interests. The questions surrounding these theories imply the foundations of MSK podiatry are doubtful yet this area of practice continues to thrive.

The problems associated with the podiatric biomechanics theories were brought into sharper focus for myself after I became a University lecturer. Initially I was not involved in teaching MSK podiatry to undergraduates but I was responsible for student work placements within the NHS and I was told in no uncertain terms by the placement facilitators that our teaching of podiatric biomechanics was out of date. My colleagues and I knew we had to respond however this was not straightforward. We teach the students to adhere to EBP principles and it soon became apparent that the research evidence offered no clear guidance about the podiatric biomechanics theories. The research evidence about the effectiveness of functional orthoses could be at best described as conflicting; there is little definitive evidence about whether orthoses are effective or not for MSK conditions. This led me to reflect about the evidence I use in my own practice and whether I was undertaking EBP and then to wider questions about evidence, in all forms, and how it is interpreted and used in practice. It was only later that I realised evidence is inextricably linked to clinical knowledge and that this may also be connected to professional identity and status.

This has been part of the process that has led to the aims and objectives of the thesis and will be examined further in the methodology section.

## **1.2. Aims and Objectives**

The overall aim of this study is to gain an understanding of the use of evidence in MSK podiatric practice. Within the profession and throughout my career, podiatric biomechanics has been subject to a debate centred on the evidence to support the treatment of MSK conditions with functional orthoses. Podiatrists often hold strong views about what may or may not be included in the design of functional devices yet the available evidence to support these opinions is open to interpretation. Despite absence of conclusive proof, MSK podiatry could be seen as consolidating its position as a specialism in podiatry. These podiatrists have moved away from traditional palliative podiatric practice to a role with wider problem-solving and diagnostic skills. MSK podiatry specialisation coincided with the growth of postgraduate education in podiatry and the advancement of EBP in healthcare. These two factors could be seen as enhancing the scientific and rational basis for healthcare and podiatric knowledge. This should have led to better qualified podiatrists using the best research evidence in their practice.

### **1.2.1. Aim**

- To explore how podiatrists who work in MSK podiatry/biomechanics interpret and use evidence in clinical practice and what influences their beliefs.

### **1.2.2. Objectives**

- To explore MSK/ biomechanics podiatrist's beliefs about evidence-based practice in this area.
- To explore podiatrist's perceptions of the interpretation of research and other forms of evidence.
- To examine the lived experience of using evidence in the clinical practice of MSK/ biomechanics podiatrists.

The aims and objectives have not substantially changed throughout this study which may seem to be against the principles of qualitative research. Parahoo (2014) suggests qualitative research is an inductive approach, the objectives of the study should emerge from the data and should not be formulated at the start of the study. However, this study is a hermeneutic inquiry and follows Gadamer's concept of reflexivity, hermeneutic reflection. Through reflexivity, my prejudices are brought to hand so I can be freed from them (Gadamer 1976). Finlay (2003) states new understanding emerges from a complex

dialectic between knower and known and between past pre-understandings and the present research process. Though the aims and objectives may not have changed through this process, my understanding of them has.

### **1.2.3. Structure of the thesis**

In this study I will meet the aims and objectives by examining the participants' understanding of evidence and its contribution to their practice and clinical knowledge. I will focus on EBP and the role of research evidence in MSK podiatry.

The literature review chapter is divided into five parts and sets the context for this thesis. It explores the progression of podiatry as a profession and reviews the biomechanical theories available for use by the participants in their practice to design their orthoses. EBP, as a concept, and the evidence for the effectiveness of orthoses in treating MSK conditions are discussed, including the criticisms of EBP as a model of clinical practice. Finally, alternative models of clinical knowledge are reviewed.

The methodology chapter discusses hermeneutics. This approach was selected because it is an interpretative approach, suited to the concept of evidence since this is an interpretative act. The reasons for choosing interpretive phenomenological analysis (IPA) for data analysis are explained.

The chapter on method describes the working methods of the study. After gaining ethical approval through the sampling strategy, the process of recruiting participants with a range of experience, qualifications, training at higher education institutions and working in different settings is discussed. The data collection technique of in-depth interviewing and the strategy used during the interviews are appraised followed by the data analysis procedure. The final section covers the approach to trustworthiness and conduct of the research through an audit trail and reflexivity.

The findings of this thesis are discussed in the context of the literature. There are three main findings: evidence in MSK podiatry presents a confused picture, patient feedback is the main evidence used and the podiatric biomechanics discourse now lacks clarity. I demonstrate these findings are grounded in the lived experience of the participants.

These findings are placed in context in a concluding discussion which looks at the potential impact for podiatry and healthcare. The contribution of this thesis demonstrates MSK podiatry is based upon the practical wisdom of practitioners, developed through active experimentation and experience in practice. The main evidence used is patient feedback, but this is neither collated nor analysed. The propositional knowledge available to MSK podiatrists is problematic and unreliable. This may indicate the problems of EBP as a concept and its uncritical acceptance by a profession looking to enhance its status as a scientific profession.

The limitations of this study are discussed and I make recommendations for further research and issues which may need to be addressed due to the findings of this study

# Chapter 2 Literature Review

## 2.1. Search Strategy

The search strategy employed in the literature review is based on Aveyard & Sharp's (2013) strategy for a comprehensive literature search. The aim of the strategy is to be as comprehensive as possible but stay relevant to the aims and objectives of the study.

The five main topics of the literature review were used in the search strategy:

- podiatry as a profession,
- podiatric biomechanics,
- EBP,
- criticisms of EBP,
- clinical knowledge.

Each topic area presented problems for a conventional search strategy. Only in the EBP chapter, the section on the effectiveness of orthoses, was I able to utilise PICOT. PICOT is a way of devising a question that can be the basis of a literature search by using the five areas; Population, Intervention/issue, Comparison/context, Outcome and Time. An example of this search can be found in Appendix 1.

Some of the seminal references for podiatric biomechanics cannot be accessed fully via electronic databases. The majority of the references within the chapters on podiatry and podiatric biomechanics were found from hand searching the University's collection of podiatry journals and texts. This was supplemented by electronic searching with the 'Summon' search engine via the University of Huddersfield library and was used to find full text articles. This allows access to the following electronic databases:- BioMed Central, Clinical Knowledge Summaries, Cochrane Library, Cumulative Index to Nursing & Allied Health Literature (CINAHL), Emerald journals, EMBASE, Evidence Search, MEDLINE, PEDro, ProQuest Central, PubMed, RCN, Science Direct, Springer Protocols, TRIP Database. I also have a collection of articles and texts relating to podiatric biomechanics which I acquired for teaching, assignments and my Master's dissertation. Throughout the literature search it was a priority to find the original source rather than use another authors'

interpretation. However some works, for example Root's early works, are no longer available.

EBP was more difficult because it is frequently used in connection with any research in healthcare practice and therefore any search generates thousands of articles. For this reason I read widely at the start of the project, including thousands of abstracts, then selected articles and texts relevant to the topic area. I used relevant sources to find other texts to gain a wider view of EBP. This developed my thoughts that clinical knowledge is difficult to separate from evidence. This led to further searches, using the same strategy, on clinical knowledge and reasoning.

## **2.2. Podiatry as a Profession**

This chapter explores the developments within the recent history of podiatry. This includes the expansion of podiatry from a traditional palliative chiropody background to current specialisms now seen as part of the profession of podiatry. The sociological implications of this expansion on podiatric culture are considered.

### **2.2.1. A brief history of podiatry**

Podiatry is recognised as an allied health profession (AHP). Podiatrists are skilled, trained and educated to assess, diagnose and treat problems of the foot and associated structures (SOCAP 2017). Its history may offer an understanding of the events which have shaped podiatry as profession. Page and Dagnall (1992) and Dagnall (1995a, 1995b, 1995c) outline the history of podiatry to mark the 50th anniversary of the founding of the Society of Chiropodists & Podiatrists (SOCAP). Working under the control of the medical profession in terms of scope of both practice and organisation of training, to gain recognition and status, five chiropody bodies merged together to form the Society of Chiropodists, which was allowed to take control of chiropody education. The Society used their links to the British Medical Association (BMA) to enable them to be the only chiropodists allowed to work in the NHS. The BMA then wanted to use the Cope Report (1951), to restrict AHP's autonomy from the medical profession, so the Society of Chiropodists joined with other AHP professions to negotiate with the government without having to be subservient to the medical profession (Page & Dagnall 1992). The eventual outcome of this working party was the Professions Supplementary to Medicine Act 1960 which led to the formation of the Council of Professions Supplementary to Medicine (CPSM). This council oversaw seven professional boards and its purpose was to maintain a register of practitioners, adjudicate on ethics and define the appropriate curriculum and examinations in education. Chiropody now met the five key stages Colyer (2004) states a profession needs to undergo to establish themselves:

- I. the emergence of an occupational group
- II. establishment of a training and selection programme
- III. formation of a professional association
- IV. development of a code of ethics
- V. political activity to establish recognition and protection of professional work.

These criteria are developed from Wilensky's (1964) trait approach and are not now considered to be relevant. More relevant is Larson's (1977) concept of the professional project; that through collective mobility a profession can maintain and enhance their status through the work they undertake in society. Entwistle & Matthews (2015) describe this as professions using their monopoly of jurisdiction and barriers to entry, as devices to return success in terms of personal autonomy, social status, policy influence and individual remuneration. The professional project for podiatry can be seen as part of a struggle to gain status and remuneration, by using various means and working with or against other professions in this goal. Recently the title was protected by law under the terms of the Health Act (1999) and subsidiary legislation, the National Health Service Reform and Health Professions Act (2002). This gave chiropody closure of the profession and protection of the titles chiropodist and podiatrist.

As the profession looked to establish and maintain professional status, it also developed an educational structure with a growing research culture including Masters and doctoral qualifications in allied health subjects. This occurred, paradoxically, at a time when medical autonomy was under attack from government policy, increased service user rights, increased public awareness of medical knowledge and exposition of fallible medical practices (Whitcombe 2005). Chiropodists worked to gain social closure; they took advantage of social and economic circumstances to gain a position of power, then monopolised this position through restricting entry into the profession and their area of work (Whitcombe 2005). Carrier & Kendall (1995) suggest professional status is actively sought by occupational groups as this allows claims to exclusive areas of expertise and for lengthy periods of training. The distinctive qualities of professional knowledge are functional for the profession, rather than for the client and the wider community. They further propose professions are a form of cartel which hold the exclusive right to offer specific services. Hugman (1995) indicates professionalisation stresses differences rather than similarities between professions. The boundaries between professional groups are developed and maintained through claims of competence when dealing with specific problems. Fournier (2000) states professions also constitute a field of professional expertise to preserve or expand their role. This field can be developed into an independent, autonomous and self-contained area of knowledge, used to form a profession's boundary or jurisdiction. It is assumed to reflect the self-contained nature of this knowledge, but can be seen as a device for establishing the professional project.

In podiatry, the recent history of the profession could be understood as seeking professional status by gaining autonomy from medicine, using their position to gain power with the help of the government and also to claim an area of expertise over the foot and the lower limb.

### **2.2.2. Status of podiatry**

The professional project of podiatry continues despite protection of the profession title. This may link to a perceived lack of status for podiatry and can be recognised in the specialisation of many areas of podiatry. In the UK, the profession traditionally used the term chiropodist but the introduction of podiatric surgery into the UK in the 1970s led to the use of the term podiatrist by those chiropodists undertaking surgery (Farndon et al 2002a). Development of pre-registration training to degree level allowed some simple surgical techniques to be taught, since this change all pre-registration courses lead to a degree qualification in podiatry as opposed to a diploma in chiropody (Page & Dagnall 1992). Consequently, podiatry usually refers to the extended scope of practice whilst chiropody is associated with traditional practice (Farndon et al 2002b). This differentiation between chiropodist and podiatrist appears to encapsulate the concept of moving away from the traditional area of practice, treatment of patients such as the elderly and those in need of palliative care, to specialising in areas with perceived higher status, access to younger patient groups and employing sophisticated technologies and skills directed to curing and problem solving (Borthwick et al 2009).

Studies on attitudes of podiatrists to their own status show a lack of appreciation for their traditional palliative skills. This perceived lack of prestige comes not just from the podiatrists themselves; they feel their value is not always recognised by fellow healthcare professionals, sometimes their patients and the public at large (Mandy 2000, Mandy & Tinley 2004, Vernon et al 2005). This may account for why podiatrists want to diversify and specialise in other areas to extend and develop their scope of practice. Nancarrow and Borthwick (2005) define diversification as identification of a novel approach to practice that has not been claimed by a disciplinary group. They also state that specialisation does not have a clear definition but the authors characterise it as the adoption of an increasing level of expertise in a specific area by a select group of the profession. They differentiate the two by stating diversification should be accessible to the whole profession. However, there is a blurring of these definitions. Groups within professions use these areas of diversification to establish a specialist role and podiatric biomechanics is an example.

### **2.2.3. Expansion of podiatry**

Podiatrists appear to have used a variety of means to expand their professional role. SOCAP worked with the government and the then regulatory body, the Chiropodists Board, to gain approval for the use of local anaesthetics by podiatrists (Lorimer 1995, Dagnall 1995c). This was achieved at a price; the medical profession retained the right to oversee training and guarantees were extracted so these techniques could not be used to facilitate surgical practice (Borthwick 2000). At the same time SOCAP began laying the groundwork to develop a course which met the criteria laid down by the Chiropodists Board (Lorimer 1995). When podiatrists showed they could use local anaesthetics safely, the need for the medical profession to oversee their training was dispensed with. Training in the use of local anaesthetics now forms part of the undergraduate curriculum, is annotated by the HCPC on their register and considered part of a podiatrist's scope of practice.

In more recent times, a similar route was taken to gain non-medical prescribing status. Borthwick et al (2010) suggest podiatrists in the UK took advantage of the neoliberal policies of the government to modernise the NHS workforce; change of professional boundaries, role substitution and autonomy. Together with other professional groups, they worked to achieve full legal status to be annotated as independent or supplementary prescribers after undertaking additional HCPC approved extensive training.

Podiatric surgery took a different route to become a specialism within podiatry. Borthwick (2000, 2001) writes extensively about the emergence of British podiatric surgery to challenge medical dominance for the control of the paramedical professions' boundaries. He describes this as a case of occupational imperialism, an occupation attempting to mould a division of labour to its own advantage to secure income, status and control (Borthwick 2001). A group of London-based podiatrists, initially named the Croydon Postgraduate Group, then the Podiatry Association (Page & Dagnall 1995), were frustrated and concerned that the boundaries of practice were limited by the medical profession (Borthwick 2001). Following the approval of the use of local anaesthetics, the Podiatry Association quickly set itself key goals to develop podiatric surgery in the UK and run a supporting educational programme. They wanted to practice surgery in the private sector, without alerting the medical authorities and SOCAP (Borthwick 2001). The Podiatry Association established rigorous training criteria to ensure finding insurance would not be a problem (Borthwick 2001). It is interesting to note that the standards for practice were

implemented by the Podiatry Association themselves. They had quickly moved the boundaries of their profession without the support of their professional body and the medical profession.

The Podiatry Association also took advantage of the market forces the government imposed on the NHS, to compete for foot surgery contracts from GP fund holders. The principal purpose of the 'managed' market was to establish a competitive marketplace to act as an incentive to service providers. Crucially it allowed managers to employ staff appropriate to meet their patient needs rather than following established professional agendas. The Podiatry Association presented their cost-effectiveness, on the basis of using day-care surgery techniques, and improved quality measures, demonstrating better outcomes and discharge rates through their audit practices. This led to an increasing number of official appointments of podiatric surgeons in the NHS (Borthwick 2000). The Podiatry Association is now part of SOCAP as the Directorate of Podiatric Surgery. Their lobby for acceptance of this expansion led to the HCPC developing standards for podiatric surgery (HCPC 2015). There is still resistance from the medical profession to podiatric surgery; this appears to focus on objection to the use of the title podiatric surgeon and the belief that it misleads the public (Borthwick et al 2015). The significance of the development of podiatric surgery is that it can be seen as a direct challenge to the power of the medical profession.

Nancarrow & Borthwick (2005) describe specialisation as the adoption of an increasing level of expertise in a specific disciplinary area; this can be taken up by a select group of the profession, legitimised through a specific title, allow membership to a closed sub-group and generally involves specific training. In medicine, their formalised structure has led to greater professional autonomy, improved financial rewards and higher social prestige. Nursing and AHP's have less formalised systems. The potential to gain autonomy, financial rewards and prestige suggest the growth in specialisations within health professions is unsurprising. Bacon & Borthwick (2013) outline a range of allied health professions which, through consultant level posts and extended-scope roles, have looked to establish specialist roles. They discuss nursing which has so far failed to achieve formal recognition for their advanced roles despite the existence of these roles in many areas of nursing practice. They neglect to mention the NHS pay structure, Agenda for Change, based on links to the knowledge and skills framework, may also have contributed to this proliferation of specialist roles. In podiatry, the pay bands within this structure

progress from basic level to specialist level then to advanced specialist level; the specialist roles given are diabetes, rheumatology and biomechanics (NHS employers 2016). Thus, formalisation of specialisms is alluded to in the NHS pay structure.

Bacon & Borthwick (2013) study diabetes specialists within podiatry and the use of charismatic authority, by a group of practitioners, to develop the role of a specialist diabetes podiatrist. They conclude the initial success of this process was brought about by this charismatic authority of these individuals. They could legitimate, disseminate and defend a formalised speciality within their own profession, without any formalised qualifications or established career pathways. They were aided by the support of key diabetologists who used these individuals to gain improvements to their own services. This infers charismatic authority may need a powerful sponsoring elite to gain legitimacy. However there has since been a process of routinisation of diabetes podiatry through a bureaucracy of health policy in the form of care pathways. These care pathways, developed by these same podiatrists, are used to shape and direct the clinical activity and referral patterns of other health professionals. A criticism of these conclusions is the authors may underestimate that the implementation and growth of this specialty is supported by clinical, and therefore cost, effectiveness. Like podiatric surgery, the expansion of podiatry into diabetes care as a specialist role was initiated by a group of like-minded podiatrists but the ability to demonstrate its efficacy may have contributed to its success.

#### **2.2.4. Conclusion**

Podiatry has a recent history of improving its status and prestige by expanding its role in healthcare. These specialist skills allow certain groups to discard lower status and 'routine' work for higher status work and the financial rewards this brings. This could be seen initially in the differences between the perceived work of a podiatrist and chiropodist. It illustrates the expansion of podiatry is prodigious in establishing new areas of expertise to broaden their scope of practice.

Podiatry worked with the regulatory bodies, the government and also the medical profession, a more powerful professional group, to gain access to local anaesthetics and independent prescribing, both now formally annotated on the professional register.

Podiatric surgery, though recognised by the government and regulatory body, suffers continued opposition from the medical profession. The strategy employed effectively

outmanoeuvred the complaints of orthopaedic surgeons by appealing to GP fundholders on the basis of cost and clinical effectiveness. A rigorous training programme was developed to ensure insurance cover and to demonstrate levels of competency. This development could be seen as a key moment of podiatry culture in the UK. Less formal specialities, such as diabetes care, have also developed from the professional project of podiatry.

## **2.3. Podiatric Biomechanics**

Podiatric biomechanics is an expansion of podiatry practice and can be described as a less formal specialism. Nancarrow & Borthwick (2005) claim these differentiated roles, following additional (formal or informal) training, do not have the levels of recognition, rewards or protection of medical specialisms. However they do offer some recognition and rewards within each profession as demonstrated by the NHS pay bands (NHS employers 2016).

This chapter discusses the growth of podiatric biomechanics by examining the four major podiatric biomechanics theories, the potential issues of these theories and the evidence to support them. Other related theories are considered along with their implications for podiatric biomechanics. The sociological aspects of podiatric biomechanics and the possible significance this may have on the professional project of podiatry are examined.

### **2.3.1. Subtalar Joint Neutral (STJN) theory or Root theory**

Podiatrists have treated patients with in-shoe appliances and assorted therapies for a variety of conditions since the 18th century (Harradine & Bevan 2009). An American podiatrist, Merton L. Root, introduced the concept of podiatric biomechanics in the late 1950's. He developed a functional foot orthosis to treat and prevent a number of MSK conditions in the foot and lower limb (Borthwick 1999, Harradine & Bevan 2009). In the 1970s these theories were further developed and brought to the UK. Root and his colleagues produced two books (Root et al 1971, 1977), now regarded as seminal works, which form the basis of STJN theory. During gait the subtalar joint moves between pronation and supination, Root theory claims this joint must operate close to the STJN position to limit compensation by the foot for excessive subtalar joint pronation or supination. The focus is on the types of foot that lead to excessive subtalar joint pronation since MSK injuries may occur as the foot tries to compensate. Treatment involves a functional foot orthosis to enable the foot to function closer to the STJN position and stop any compensation occurring. Harradine & Bevan (2009) claim the design of the orthoses

is not clearly described and though many texts and literature claim to use Root theory to design their version of the functional orthosis, it is unclear whether Root would support these interpretations of his theories. In the light of this, the above description of STJN theory is actually my understanding of this theory as it was originally conceived.

Initially these orthoses and STJN theory appeared to offer a highly effective treatment for MSK conditions, early studies about orthoses have excellent results for a range of MSK conditions with high patient satisfaction (Clement et al 1981, James et al 1978, Sperryn & Reston 1983). By the late 1980s Root theory was taught in all UK podiatry schools (Borthwick 1999) and the use of orthoses as a treatment was expanding rapidly. However questions began to be raised about STJN theory from laboratory studies testing the theory. A growth in technology meant biomechanical measurement equipment was more widely available. McPoil et al (1988) showed the foot types described by Root et al (1971, 1977) occur commonly in asymptomatic individuals. Astrom & Arvidson (1995), Pierrynowski & Smith (1996) and McPoil & Cornwell (1996) demonstrated STJN may be unimportant in gait, they found that a large proportion of the population may never actually function in the STJN position. Lee (2001) published a large work of scholarship that called into question the theory underlying STJN. Questions about STJN theory continue. Nigg (2001) suggests it may not be the range of pronation and supination which is important but the body's ability to attenuate ground reaction force in gait. Nester et al (2001) reveal Root theories about the function of the mid tarsal joint were also ill-conceived. This process has continued as a recent study (Jarvis et al 2017) concluded that the assessment protocol using STJN theory should no longer be used in practice. Such studies raise issues about STJN theory yet orthoses are still perceived as a successful treatment and this will be discussed further in the chapter on the evidence for the effectiveness of orthoses. From the literature it is unclear if the problems of STJN theory were well known to podiatrists in general practice. Although colleagues in the 1990s expressed doubts about whether the orthoses actually held the foot in neutral they still worked somehow. Harradine & Bevan (2009) indicate the modifications to STJN theory came from literature about orthotic manufacture and prescriptions such as Anthony (1991) and Philips (1995). Whilst STJN theory was being discredited, there was a growth in developing other podiatry biomechanics theories.

### **2.3.2. Sagittal Plane Facilitation (SPF) theory**

Howard Dananberg focuses his SPF theory on the importance of the 1st metatarsal-phalangeal joint (MTPJ) and ankle joint dorsiflexion during gait. He and his colleagues outline the importance of the foot as a pivot which rocks forward from heel to toe to allow adequate hip extension for propulsion in gait. Restricted dorsiflexion of the 1st MTPJ, termed 'functional hallux limitus', and/or the ankle, 'ankle equinus', lead to sagittal plane blockade manifesting as various MSK conditions (Dananberg 1986, 1993a, 1993b). Functional hallux limitus affects the reverse windlass mechanism of the foot, first described by Hicks (1954). During gait, dorsiflexion of the 1st MTPJ increases tension in the plantar fascia, which raises the arch causing the foot to supinate. Through this mechanism it is believed supination occurs in the propulsive phase of gait. Dananberg (1993a, 1993b) proposes that sagittal plane blockade leads to compensation for the failure of the reverse windlass mechanism which can in turn lead to hip and low back pain. Sagittal plane blockade can be overcome by using an orthosis with a 1st ray cut-out, which he terms a kinetic wedge, in a functional orthosis. The orthotic design was determined by an informed trial and error process viewing the effects of different materials on gait by video gait analysis. Harradine & Bevan (2009) criticise this theory for the unclear description of the prescription method and orthotic design, which has led to variations in orthotic design. Like STJN theory, SPF theory has been subject to little scrutiny outside of podiatry. Dananberg has produced no large scale studies based on his theories, his evidence rests solely on individual case studies (Dananberg 1986, 1993a, 1993b). Welsh et al (2010) undertook a small scale study to look at the kinematic effects of orthoses with 1st ray cut-out on dorsiflexion at the 1st MTPJ. The findings show this orthosis appeared to make little difference to the movement of the 1st MTPJ, however in-shoe kinematic analysis is subject to error. It is unclear how the subjects' gait is affected by altering neoprene boots to allow the sensors to be attached to the subjects' feet and walking with the sensors. This study did show the subjects had reduction of pain at 1st MTPJ after wearing the orthosis for 24 weeks.

Similar to STJN theory, SPF theory appears to have been adapted and used by practitioners despite there being little evidence to support it.

### **2.3.3. Subtalar Joint Axis Location and Rotational Equilibrium (SALRE) theory**

This theory, based on the work of Kevin Kirby, concerns the importance of the location of the subtalar joint axis in relation to pronation and supination moments which occur in gait. Kirby (1989) states that ground reaction force applied medially to the subtalar joint axis causes a supination moment to occur at the subtalar joint whilst force applied laterally to the subtalar joint axis causes a pronation moment. Rotational equilibrium is maintained by structures opposing these moments applying a moment of the same magnitude. Medial or lateral shift in the subtalar joint axis disturbs this equilibrium leading to strain in the structures opposing this moment. Kirby (1989) claims he is applying Newtonian mechanics to podiatric biomechanics. Treatment consists of using orthoses to apply appropriate moments across the subtalar joint axis to allow the opposing structure to rest. For example, a Kirby heel skive applies an increased supination moment to a medially deviated subtalar joint axis (Kirby 1992). Fuller (1999, 2000) added to Kirby's work stating the centre of pressure may also be medially or laterally deviated and affect the windlass mechanism. Kirby (2000) also disputes STJN theory, claiming a normal foot position is slightly pronated. Harradine & Bevan (2009) combine Kirby and Fuller and link them as Tissue Stress theory principles. No study has been undertaken to confirm or test SALRE theory and use rests solely on Kirby's and Fuller's theoretical articles, one reason may be that the subtalar joint axis is not yet accurately measurable. This could accuse SALRE theory of being unscientific. According to Popper, a scientific theory should be subjected to testing to establish whether it can be corroborated or falsified (Couvalis 1997, Popper 1968, Thornton 2015). Presently, there appears to be little chance this theory could be corroborated empirically. It is also unclear if the joint axis is important or constant during gait, further undermining SALRE as a coherent theory.

The supination resistance test is a simple clinical test devised by Kirby to establish if a patient has a medially deviated subtalar joint axis as it takes significant force to re-supinate the foot in gait. Griffiths & McEwan (2012) and Noakes & Payne (2002) show there is some reliability to this test, also the amount of force needed to re-supinate the foot when standing is not directly related to body weight but varies between subjects. However both studies have small population sizes so any inferences made should be treated with caution. They do not validate SALRE as a theory but may demonstrate Kirby has found a test, derived from his experience, which could be important in orthotic design.

SALRE theory appears to be popular within podiatry but in terms of supporting evidence this theory is no better than STJN or SPF. SALRE may not be recognised as scientific since it is untestable at present.

#### **2.3.4. Unified theory**

Harradine & Bevan (2009) attempt to analyse the STJN, SPF and SALRE theories of podiatry biomechanics and develop a theory based on consensus of the outcomes generated. They conclude the three theories agree on key areas of function: stability and maintenance of foot congruency during stance phase, allowing the leg to pivot over the point of ground contact (permitting a normal stride) and allowing internal and external rotation of the leg in relation to the ground via subtalar joint pronation. This theory is a method to describe how orthoses, designed using any podiatric biomechanics theory, may work. It also asks practitioners, due to a lack of evidence, for a less dogmatic approach because it encompasses all of the podiatric biomechanics theories. Harradine & Bevan (2009) view their theory as an inclusive, rather than exclusive, approach to orthotic prescription. However this theory is based on a possibly flawed premise: orthoses designed using these theories are successful in treating patients implies the existence of a common underlying correct mechanism. It may be no theory is correct and orthoses work by another mechanism.

STJN, SPF and SALRE theories have little evidence to support them, consequently a theory to unify them may also have little value; no study has been undertaken to evaluate the Unified theory. This theory highlights one change in podiatric biomechanics; the authors claim they focus on improving symptoms of MSK injuries by normalising foot function rather than looking to limit motion by orthoses to relieve symptoms.

#### **2.3.5. Other theories**

This section discusses theories developed by other professions;

- **Tissue Stress,**
- **High and Low Gear Propulsion,**
- **Shock Attenuation,**
- **Impact Forces and Muscle Tuning.**

These four theories were selected because they contain elements which may be incorporated into the previous podiatric theories and they may offer reasons for the effectiveness or ineffectiveness of orthoses.

**Tissue Stress theory**, first described by McPoil & Hunt (1995), was developed in response to the problems of STJN theory. Essentially, this theory explains how overuse injuries develop. It is logical; tissue becomes injured if it becomes resistant to deformation or if the load/stress becomes too great for the tissue to cope with, the amount varies with the tissue structure. Treatment aims to reduce the stress or load on the injured tissue by facilitating rest through activity modification, taping and orthoses, combined with healing the tissue through medications and physical therapies and then restoring function through rehabilitation. Mueller & Maluf (2002) undertook a review of this theory and conclude this approach should be included into physiotherapy practice. However the studies reviewed in this article are theoretical or laboratory studies across a wide range of MSK injuries and conditions, few concern the effectiveness of treatment using this theory. Laboratory studies appear to show some support for this theory as a cause of MSK overuse injuries. There is little evidence to prove Tissue Stress theory offers an effective treatment or how it actually differs from traditional physiotherapy treatment despite appearing to be a rational and scientific theory. Harradine & Bevan (2009) describe SALRE theory as Tissue Stress theory because Kirby (2000) and Fuller (1999, 2000) focus their treatment on reducing symptoms rather than maintaining the foot in a normal position during gait. I have rejected this link and kept these theories separate because, despite their claims, Kirby and Fuller look to find an optimal foot position to function in during gait. In addition, Tissue Stress theory can be applied to all podiatric biomechanics theories to explain the reasons orthoses may work; for example, STJN devices may not hold the foot in STJN but may allow injured tissues to rest and if made from a material that compresses over time they may gradually allow a return to normal function.

**High and Low Gear Propulsion** was proposed by Bojsen-Møller (1979) from his cadaver work on humans, gorillas, chimpanzees and orang-utans plus 25 living human feet. He concludes high gear propulsion is the optimum position for effective propulsion in gait; it enables the foot to be a rigid lever for propulsion due to close packing of the calcaneo-cuboid joint and good function of the reverse windlass mechanism. Low gear propulsion (using the lesser toes to push off) leads to forefoot pronation, loose packing of the calcaneo-cuboid joint and loss of function of the reverse windlass mechanism. The theory is based solely on this study which implies there is little evidence to support it. It has been suggested this theory gave Dananberg the idea for his SPF theory (Horwood 2016). It

follows that functional hallux limitus may lead to low gear propulsion as lack of dorsiflexion at the 1st MTPJ could necessitate push off from the lesser toes.

**Shock Attenuation theory** is based solely on laboratory work which suggests the magnitude of force during impact is a major contributor to overuse injuries. Orthoses work to reduce this impact force by acting as a cushioning interface between the foot and the ground (Mills et al 2010). Initial work by Bobbert et al (1992) and Nigg (1997) postulate that Shock Attenuation theory could explain the effect of orthoses in improving MSK injuries. However further studies reveal unexpected results about impact forces; there is a variation across populations in the magnitude of impact force and loading rate and the density of running shoe insoles made little difference to this (Nigg 2001). Nawoczenski & Janisse (2004) conclude this variation means it is difficult to determine if a patient needs a high density or low density orthosis. It is clear from the literature there is confusion about understanding the effect of impact forces on injury. Mills et al (2010), in their systematic review of kinematic studies about orthoses, conclude an orthosis which moulds to the foot may improve shock attenuation. However they lament the variability in orthotic and study design which means their conclusions have to be treated with caution. It must also be noted that, since the majority of participants in these studies do not suffer from any MSK injury, it is unclear if such research can prove the effectiveness of orthoses as treatment for MSK injuries.

The unexpected results about impact forces caused Nigg (2001) to hypothesise a new theory about the mechanism of MSK injury and the effect of orthoses, known as **Impact Forces and Muscle Tuning**. Nigg (2001) surmises, in response to impact forces from the previous step, neuromotor control of muscle activity in the lower limb occurs constantly during gait. Wakeling et al (2003) and Nigg & Boyer (2004) study the effects of muscle tuning during running and demonstrate muscle activity dampens impact forces. Mündermann et al (2006) also show orthoses can effect muscle tuning activity and conclude this may be a reason for the effectiveness of orthoses. Murley et al (2009) and Mills et al (2010) review studies about muscle tuning theory and orthoses and conclude although the effects of orthoses on muscle activity appear promising there is too little research in this area to draw any firm conclusions.

These other theories show, as yet, our understanding of gait and establishing an explanation for orthoses as a successful treatment is limited. With little evidence to

support them, as they are based on laboratory studies with small numbers of participants, it is difficult to see how they can be applied as evidence to treat MSK patients. Horwood (2016) shows these other theories are being absorbed and applied within the podiatric biomechanics theories, even though he considers that this is not widespread enough. This suggests podiatrists may value these studies because they suppose they have a more scientific basis than the podiatric biomechanics theories.

## 2.4. Podiatric biomechanics and the professional project

The professional project of podiatry was discussed through analysis of the areas of expansion. This chapter considers podiatric biomechanics, both in terms of its place in the status of podiatry and as a social construct linked to professional identity.

Borthwick (1999) subjects podiatric biomechanics to both Weberian and Foucauldian analysis. Using Weber's theory of social action, podiatric biomechanics can be seen as a tool for the expansion of the profession into MSK practice. This new scientific part of practice has moved the profession away from the palliative care of lower status groups into an area of diagnosis and possibly curing a higher status group of patients such as athletes, sports people and children. However, Weberian analysis is a rationalist view of the motivations of podiatrists to change their scope of practice as it looks at the quest for status in purely economic terms. There is little doubt over the rise in status of podiatry bringing both economic benefits and podiatric biomechanics as part of that. As previously discussed, one way to access a higher pay grade within the NHS is to specialise in biomechanics (NHS employers 2016). Expansion seems to be linked to improved professional status and altruistic reasons, working for the good of their patients. Borthwick's (1999) conclusion, that podiatry's quest for scientific legitimacy may be undermined by research which questions the biomechanical theories, has only come partially to fruition. Podiatric biomechanics appears to have maintained and established its status within MSK practice; it is a recognised specialism within podiatry, despite research questioning the legitimacy of the podiatric theories.

Horwood (2016) shows that the quest for scientific legitimacy for podiatry biomechanics continues and claims no podiatric biomechanics theory has reached the scientific status of a paradigm when matched against Kuhn's definition. Kuhn (1996) defines a paradigm as having two characteristics; the achievement is sufficiently unprecedented to attract adherents away from competing modes of scientific activity and it is also sufficiently open-ended to leave all sorts of problems for a redefined group of practitioners to resolve. Whether or not podiatric biomechanics theories have reached the level of a paradigm may be a moot point. Horwood (2016) may be correct to concur the podiatric biomechanics theories may be unscientific but this may be due to issues outlined in the previous section,

rather than failure to meet Kuhn's criteria. Horwood's attempt to measure these theories against Kuhn is interesting because it highlights the search for scientific legitimacy within podiatry continues. The description of a paradigm cited from Kuhn (1996) is only part of his thesis. Kuhn (1996) defines paradigms as part of normal science; normal science perpetuates the acceptance of a paradigm until practitioners confront an anomaly. It could be interpreted that podiatric biomechanics theories have reached the level of a paradigm and Horwood simply points to problems that need resolving in the second part of the quotation. If the anomalies are not resolved this can lead to a crisis and result in replacement of the older paradigm, either in whole or part, with an incompatible new one (Kuhn 1996). This may be pertinent to the theories of podiatric biomechanics, if they qualify as normal science. Horwood's claim to Kuhn could be seen as an attempt to show the desire to see podiatry accepted as a scientific profession as the theories are measured against criteria from the philosophy of science. Devlin & Bokulich (2015) claim Kuhn's work shaped the history and philosophy of science and popular thinking since its first publication. Within the MSK special edition of Podiatry Now, Menz (2016) discusses issues around epidemiology which may allow podiatrists to better understand foot disorders whilst Landorf (2016) examines research into how orthoses work. Such articles reveal the growth of podiatric research and, through the search for scientific legitimacy, can be seen as a route to improve status. They also highlight some of the issues for podiatry. Horwood (2016) dismisses the podiatric biomechanics theories as unscientific and Landorf (2016) deduces there is no consensus from research on how orthoses work. The conclusion could be drawn that scientific knowledge is the main type knowledge required for podiatry. Yet Landorf (2016) fails to mention that the categories of studies used in his article; motion analysis, plantar pressures, postural sway and muscle activity, are all based on laboratory measurement equipment and the links to MSK injuries are theoretical or unproven. These studies focus more on what can be measured rather than the mechanism of action of orthoses. The reason for the lack of scientific legitimacy may be linked to the podiatry biomechanics theories themselves, as their origins are not based in science.

The other part of Borthwick's (1999) analysis embraces the work of Foucault to examine podiatric biomechanics. This analysis may be more apposite, although the landscape in healthcare has since changed, as this discusses 'gaze'. Gaze is a way of seeing how podiatrists use their own theories to conceptualise their treatments to gain status and create a market advantage in this area of practice. Borthwick (1999) compares podiatric

biomechanics to dentistry through Foucauldian analysis. He concludes the professionalisation of dentistry has been successful partly because of the symbolic significance of the mouth as a possible entry for disease. He rightly determines podiatry could not emulate dentistry as the foot does not enjoy the same significance. He also considers podiatric biomechanics has caused a shift in the gaze of podiatrists to extend their disciplinary power by viewing the foot as the crucial part of the locomotor system and the cause of MSK pathology. This has allowed podiatrists to raise their gaze from the foot to encompass all the lower limb. There may be further significance, perhaps podiatric biomechanics theories are actually products of podiatric gaze. STJN, SPF, SALRE and Unified theories could be regarded as explanations to the problems of practice. They derive from podiatrists' theorising about the injuries seen in their clinics and the treatments they offer, orthoses, to relieve these conditions. They do not have a scientific basis since they are based in and from practice. This may be confirmed by Williams et al (2016) who conclude orthotic prescription is based on clinicians' experience through a process of trial and error which leads to variability in practice. They regret the standard of research surrounding orthoses mean guidelines, for orthotic prescription to help practitioners, cannot be derived. Once again, authors endorse the emphasis on the value of scientific knowledge and infer this will solve the problems of practice. There is no acceptance that the theories behind these orthoses are practically based rather than developed through research and therefore scientific, though they do suggest there needs to be improvement in the outcome measures used in MSK practice.

Nancarrow & Borthwick (2005) examine professional boundaries in the healthcare workforce. Podiatric biomechanics is cited as a form of diversification which has enabled the expansion of professional boundaries. They describe podiatrists as having created a unique discourse around this function and a technology, foot orthoses, to manage the conditions through this concept. The authors believe this granted podiatry the ability to access new patients and widen the services they offer. They do not explore podiatric biomechanics as a specialism, however this diversification created MSK 'specialist' podiatrists as they differentiate themselves from traditional podiatry. Podiatrists could be described as having developed their own form of abstract knowledge to stretch the boundaries of their practice. Abbott (1988) focuses on the nature of professional work and claims of jurisdiction over certain types of practice. He holds the quality which allows a profession to survive in a competitive system, like health, is abstraction. He sees diagnosis and treatment as mediating acts but it is the inferences a professional makes to

link these two that facilitates the abstract knowledge for a profession, thereby enabling them to claim a niche in society. Thus, the podiatric biomechanics theories are the means by which podiatrists make inferences about the diagnosis and treatment of their patients in this area. This may be seen as abstract knowledge but it developed to answer questions which have arisen from podiatric practice. Abbott (1988) also suggests abstract knowledge cannot be too abstract. He indicates there is a polarity between abstraction and concreteness in professional knowledge. He implies an equilibrium between these is the ideal to successfully exercise professional judgement.

Turner (1995) uses a slightly different term to describe this abstract knowledge, indeterminacy, adopted from Jamous & Peloille's 1970 work about doctors working in a French hospital. Indeterminacy is the form of specialised knowledge a profession develops to protect against the 'routinisation' of knowledge. It creates a social distance between practitioners and patients; this indeterminate knowledge is not accessible or usable by the patient without the professional's help. This knowledge can be seen to have a certain mystique and the professional cultivates a hermeneutic basis to use it. The development of interpretation provides a barrier against the knowledge being freely available because it requires distinct professional attitude and competence. Podiatric biomechanics could be seen as abstract knowledge with a high degree of indeterminacy. Gait is a complex process and podiatrists have made the link that foot function can be altered by orthoses to relieve MSK injuries.

Another element to abstract knowledge is that it may not be wholly based in professional work, it must be supplemented by a formal, academic knowledge system to provide the scientific development needed for the legitimacy of the claims (Abbott 1988). Macdonald (1995) claims it is difficult for a profession to maintain knowledge with a high degree of indeterminacy in the face of contradictory scientific knowledge. Aspects of STJN theory have been discredited by research evidence from laboratory studies and this has led to the proliferation of other theories. It has not caused the collapse of this expansion of podiatric practice, in fact it appears podiatry has been able to consolidate its position in MSK practice. This suggests the views of Abbott and Macdonald may be incorrect.

Other factors about healthcare may also lessen the primacy of scientific knowledge and allow podiatry to maintain its position despite this lack of scientific legitimacy. Fournier (2000) sees professional knowledge as being performative and malleable; it should be

considered as an achievement rather than a discovery and reflection of the 'true nature' of some independent reality. This allows the possibility that a profession could utilise knowledge to address the changes and problems which arise from various threats to their position in the field. In context, the author discusses how professionalisation was under threat from the rise of market forces in healthcare. There was a perception these market forces would lead to weakened professional power as they would no longer be able to claim jurisdiction of their field in a complex and turbulent world. She argues this is based on the assumption that professional knowledge is fixed by the reality of the object they profess to know. However this knowledge is a contingent accomplishment sustained by professional practice and knowledge. This can be seen in podiatric biomechanics; SPF theory could be seen to absorb parts of Hicks (1954) and Bojsen-Møller (1979) theories whilst SALRE theory has incorporated Tissue Stress theory principles. Unified theory could be seen as a manifestation of the constitutive nature of professional knowledge as it is an attempt to rehabilitate podiatric biomechanics in the face of a lack of scientific support for each one.

### **2.4.1 Conclusion**

Podiatric expansion can be seen as a struggle to raise the status of podiatry as a profession. Within MSK practice, podiatry has created a professional specialism by developing a discourse around treating MSK conditions using functional orthoses. Some podiatric biomechanics theories, developed to explain the action of orthoses, have either been discredited or appear to have little scientific support and there has been a proliferation of theories to try to explain this. Although the search for scientific legitimacy in MSK podiatry continues, the expansion of podiatry into MSK practice endures.

There may be other reasons why this expansion perseveres and these are explored through the concept of evidence-based practice.

## **2.5. Evidence-based Practice (EBP)**

Podiatry expanded into MSK practice, despite the podiatric theories appearing to have little scientific support. This diversification must be based on evidence to enable podiatrists to gain recognition and status in this area and within healthcare any discussion of evidence must include evidence-based practice. This chapter investigates the development of EBP in the UK, EBP in podiatry and the evidence for orthoses as a treatment for MSK conditions. It explores the criticisms of EBP and the effects of EBP on healthcare including the social significance of its development.

### **2.5.1. Evidence-based medicine leads to EBP**

Evidence-based medicine is a term used by a group of medical academics and epidemiologists from McMaster University in Canada in 1992 to describe 'a new paradigm' for practising and teaching medicine. They proposed to shift medical practice into a culture where unbiased research evidence and patient benefits were valued as much as clinical experience (Greenhalgh et al 2014, Hamer 2005, Straus et al 2011a, Trinder 2000). This group, which became known as the Evidence-based Medicine working group, define evidence-based medicine as the 'conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research' (Sackett et al 1996); this quote outlines the key elements of evidence-based medicine. Described as a 'new paradigm' in 1992, this was probably just the formal launch of a movement which had been growing steadily for a long period of time. A medical epidemiologist, named Archie Cochrane, observed many routine clinical interventions used in the 1970s had never been tested or evaluated. He subsequently developed research tools to systematically collate and review the effectiveness of interventions. The legacy of his work has since been developed into the Cochrane Collaboration (Nettleton 2013). From these beginnings healthcare became evidence-based, implemented across all disciplines (Trinder 2000). Hamer (2005) claims there are four considerations to move forward with EBP; scientific culture, management of knowledge, systems for change and incentives to undertake EBP. Pope (2003) suggests EBP has grown because the movement used a shared sense of purpose to improve practice for patient benefit by advocating the synthesis and dissemination of trial evidence. They also used summaries of evidence in the medical press and developed new journals to support the movement. This allowed the evidence to

be formulated into guidelines which form recommendations and algorithms of good practice. The success of EBP as a movement is based on the simple premise that healthcare practitioners want to give their patients the best treatment and who could be against giving the most effective treatment in an efficient and quality healthcare system (Mykhalovskiy & Weir 2004).

Another element in the development of this 'new paradigm' is the wider availability of computers make results from medical research freely available. Creation of electronic databases of evidence facilitate a 'democratisation of knowledge management' (Fernandez et al 2015) and EBP has global reach in terms of dissemination and production of evidence (Mykhalovskiy & Weir 2004). However this led to an exponential growth in the amount of information available to clinicians. Between 1992 and September 2015 the PubMed database published over 20,000 articles with 'evidence-based' in their title (Fernandez et al 2015). It is impractical for a practitioner to keep up to date with the amount of evidence produced; it is estimated a doctor would have to read 17 journals per day. As a consequence, practitioners rely on guidelines and reviews to find the best evidence (Bluhm & Borgersen 2011).

EBP also had political appeal; it was believed this formulation of guidelines would lead to the end of practice variation and would give a level of transparency to the process of clinical decision making (Lambert et al 2006, Timmermans & Oh 2010). In the US and Canada, no variation was desirable to insurers and regulators as it meant no more under-treatment, over treatment or mistreatment and the expenses incurred (Timmermans & Oh 2010). In the UK, the EBP movement was seen as providing a reliable objective means of informed decision making about resource allocation (Lambert et al 2006). If the NHS was only using effective treatments, guidelines could be generated to limit practice variations and this would allow savings to be made in the health care budget. Consequently the principles of EBP were incorporated into the NHS with the formation of institutions such as National Institute for Clinical Excellence (NICE) and NHS Evidence (Nettleton 2013). EBP has become a cornerstone of the NHS, however there may be a subtle change in government policy. The most recent government initiative, Equity and Excellence: Liberating the NHS (DOH 2011), states the NHS will be held to account against clinically credible and evidence-based outcome measures rather than the best available evidence. As Cochrane outlined, in prescient comments from 1972, the effectiveness of treatment from a randomised controlled trial (RCT) would not equate with greater efficiency within

the healthcare system (Fernandez et al 2015). Indeed financing the bureaucracy (for example NICE, NHS evidence, National Institute for Health Research and NHS ethics services) to support EBP may actually increase NHS spending. In addition, there are claims the pharmaceutical industry has hijacked EBP to furnish its own ends to increase spending on drugs for treatment (Greenhalgh et al 2014, Timmermans & Oh 2011).

### **2.5.2. EBP in podiatry**

In the literature it appears that podiatry has accepted EBP as a model of clinical practice, from within the profession and external bodies. The focus of the profession is to improve the research evidence for podiatric treatments to improve patient outcomes but also to enhance the security and development of their role in healthcare provision (Vernon 2003). Research evidence into podiatrists' attitudes to EBP largely consists of surveys either, of podiatrists alone (Bristow & Dean 2003b) or podiatrists as part of a range of professions usually AHP's (Caldwell et al 2007, McEvoy et al 2010, Metcalfe et al 2001, Upton & Upton 2006). These studies have similar results; there are perceived differences about knowledge of EBP between professions, there are difficulties with interpreting different types of evidence and barriers to EBP include lack of time and resources and professional isolation. A picture of EBP in these professions is presented, focused upon practitioners' knowledge of research evidence. All are based on the assumption that research evidence is the main evidence used in practice and this is the evidence professions must use in practice.

Since the first British Journal of Podiatry issue wholly devoted to EBP in 2003, the focus of articles about this subject has been either calls for more research or to help improve critical appraisal skills to understand research evidence and hierarchies of evidence better (Bristow & Dean 2003a, Vernon 2003). In the recent MSK focused edition of Podiatry Now, Bowen (2016) discusses the impact of MSK podiatry and concludes there is little evidence on which to assess this impact. She considers the impact of MSK podiatry wholly in terms of evidence from quantitative research. Bartold (2016) reviews what research has taught MSK podiatrists in the last 10 years. He focuses on two conditions and demonstrates research has given contradictory evidence. Though he concludes this is positive because it is the nature of research evidence, he highlights the possible impact of these changes to a patient's treatment. Such articles show EBP has been wholly accepted within podiatry. It is depicted as a way to maintain and enhance podiatry's status through claims of scientific legitimacy found through research evidence. By appealing to

the same evidence which has made medicine dominant, since it is perceived as a scientific profession, it subscribes to the view that podiatry can gain prestige, power and rewards (Martimianakis et al 2009).

Research about the use of EBP in podiatry practice is scarce. There have been studies that have investigated how evidence is used in other professions. Broom et al (2009) studied the experiences of evidence and EBP of a group of doctors and nurses who work in the oncology department of 2 hospitals. They determined the doctors had a nuanced, contextualised understanding of evidence-based medicine, which has seen senior consultants using their expertise and experience to establish local 'best practice'. This may reduce individual clinician bias/fallibility and improve patient outcomes. However this systematic approach is perceived as reducing the skill base and critical judgement of junior colleagues leading to a managed de-skilling within oncology. They conclude, although oncology nurses have absorbed EBP principles from medicine, a complex dialectic between the need for scientific based legitimacy and the values, goals and possibly the professional identity of nurses was evident. The identity of nurses as holistic practitioners means they want to incorporate emotional, cultural, spiritual and physiological spheres of patients care into the values of their EBP. In reality this was problematic; these nurses regard qualitative evidence as a key source of evidence to support their holistic practice. This has a lower place within the biomedical hierarchy of evidence of EBP therefore they felt their qualitative evidence would not be accepted in the face of scientific based biomedical evidence.

Berland et al (2012) explored the knowledge that nurses, who work in primary care, use in clinical practice. They undertook focus groups with 20 nurses to discuss the extent that EBP is used in primary care, what kind of knowledge is used in their clinical practice and what are the participants' research skills. They conclude that the participants use other forms of knowledge rather than research evidence in their clinical decision making. These other forms of knowledge include their own and colleagues experiences, knowledge from nursing literature, health laws and guidelines and patient preferences. The participants had a good understanding of research but rarely used this in their clinical decisions.

Marshall et al (2006) had similar findings in their ethnographic study about the use of evidence and knowledge in the interactions between midwives, health visitors and their clients around the topic of breastfeeding. The practitioners used knowledge from a similar

range of sources, clinical experience, research, policies and guidelines, watching or speaking to colleagues and personal experience. Research evidence was used to give maxims for practice but the practitioners looked to tailor their advice to suit the individual clients' circumstances. They made judgements related to these circumstances relying on their experience, clinical or personal, making their practice contextual and individual.

Different professions may interpret EBP in the light of their professional identity and culture. Nurses and midwives, who may see themselves as patient advocates (Broom et al 2009, Timmons 2010), may tailor their use of evidence in line with patient needs. It may also be adapted to meet their professional aims or, in the case of these nurses, be seen as a threat to these aims if they cannot be aligned with scientific based evidence.

There is a focus within podiatry that research evidence and EBP will enable the profession to demonstrate that its skills are effective in improving patient care. It is not seen as threat to podiatry as podiatrists think they are becoming a more scientific profession and EBP may enable them to maintain and enhance their status. Within podiatric literature, there has been no debate about the criticisms of EBP or even the different domains of EBP. This may suggest podiatrists have a limited understanding of the issues relating to EBP.

### **2.5.3. Hierarchies of evidence**

The hierarchy of research evidence is the first fundamental principle of EBP, developed as an answer to the difficulty of achieving consensus between medical experts. It allows a practitioner to find the best evidence because the evidence is graded (Bluhm & Borgerson 2011, Goldenberg 2012). Sackett et al (1996) define the systematic review of several RCTs, as the gold standard for judging whether a treatment does more good than harm because this method is most likely to inform a practitioner of the effectiveness of a treatment and less likely to mislead due to biases in the method. Although there appears to be an established hierarchy of evidence, there are a variety of hierarchies. Since the advent of the EBP movement, calls were made to broaden the definition of evidence used in EBP from quantitative research evidence to include other forms of evidence (Bluhm & Borgerson 2011, Buetow et al 2006, Lambert 2006). This led to the development of different types of hierarchy, or continuums of evidence, for use in particular contexts, in which qualitative research and clinical experience may be of more value than quantitative research (Aveyard & Sharp 2013). Different hierarchies answer different research questions; for example, treatment studies and prognosis studies test the utility of clinical

decision making. Versions of the treatment hierarchy may be similar but the details vary (Bluhm & Borgerson 2011).

Within the podiatric literature there appears to be little discussion about the variance within hierarchies; this suggests acceptance of a single hierarchy of evidence, as demonstrated in an article by Griffiths (2016) about the evidence for kinesiology taping in MSK practice. Twice within the article, when discussing research evidence, he describes systematic reviews as level 1 evidence but includes no reference to support this. A range of hierarchies of evidence for the effectiveness of treatment exist which vary in detail. Level 1 evidence defined in the hierarchy by Guyatt & Rennie 2001, cited by Bluhm & Borgerson (2011) and Goldenberg (2012), is N-of-1 RCT. Humphris (2005) uses the NHS centre for reviews and dissemination hierarchy of evidence which has level 1 evidence as well-designed randomised controlled trials whilst Moore & McQuay (2006) state level 1a evidence is a systematic review with homogeneity of RCTs. Aveyard & Sharp (2013) list systematic review and meta-analysis as level 1 evidence, in what they describe as a traditional hierarchy of evidence but the Oxford Centre for Evidence-based Medicine (OCEBM working group 2011) levels of evidence, which is a hierarchy of different research questions, has level 1 evidence for treatment benefits as systematic review and N-of-1 RCTs. The most recent of these references cites systematic review and meta-analysis as level 1 evidence so Griffiths (2016) may be following this. However none of the other hierarchies have been withdrawn so there is a lack of clarity in Griffiths (2016).

Highlighting this further is the most recent version of Evidence-based medicine: How to practice and teach it (Straus et al 2011a) which recommends doctors, with no time to appraise the range of research studies published, should take advantage of pre-appraised evidence. Their hierarchy is now the '6S' of pre-appraised evidence and the pinnacle of this, at level 1, is now called 'systems'; a computerised system linked to the patient record which would automatically present an evidence-based summary of treatment options. The authors include this system, though it does not exist at present, and despite little evidence to support or refute their suggestion.

Although no definitive hierarchy of evidence exists, it is clear taking an EBP approach, initially, should start with an evaluation of the research evidence on orthoses. There is some consensus from the principles of EBP that the best research evidence may be linked to RCTs and systematic reviews of this type of study.

#### **2.5.4. Research evidence to show the effectiveness of orthoses as a treatment**

The podiatric biomechanics theories used to design orthoses may not be scientific, but they were formed to answer problems encountered in practice. The success of the expansion into MSK practice is based upon the success of functional orthoses as a treatment for MSK conditions, thus it follows research evidence should demonstrate that orthoses are an effective treatment. Landorf (2016) claims orthoses have been shown to be effective for certain MSK injuries and can prevent some overuse injuries. In contrast, Chevalier & Chocklingham (2012) declare the podiatric biomechanics theories and effectiveness of functional orthoses have been called into question because there is little research evidence to support them. It appears the research evidence does not give a definitive answer.

The 'traditional' hierarchy of evidence from Aveyard & Sharp (2013), which places systematic reviews and meta-analysis at level 1, followed by RCTs at level 2, is used in this study to examine the research evidence for the effectiveness of orthoses. The Cochrane Database of Systematic Reviews offers practitioners high quality systematic reviews and is dedicated to making information about the effects of healthcare available worldwide (Aveyard & Sharp 2013, Noyes 2010). Hawke et al (2008) conducted a Cochrane review into the effectiveness of custom-made foot orthoses for the treatment of foot pain. They conclude for people with pes cavus foot types, juvenile idiopathic arthritis and plantar fasciitis, functional orthoses, when combined with other treatments, are effective in reducing pain. Also they reduce metatarsal-phalangeal joint pain in people with rheumatoid arthritis and pain at the 1st metatarsal-phalangeal joint but this may only work in the short term. The authors state further research is required because at present there is limited evidence on which to base clinical decisions for the prescription of custom-made orthoses. As this is a high quality systematic review, its findings offer some support for the effectiveness of orthoses. The main criticism levelled at these reviews is the external validity has much less rigour, despite high internal validity, because the focus is on the methodological quality of the studies which should eliminate bias. Decisions about the homogeneity of the studies, in terms of the orthoses used, MSK conditions treated and outcomes measured were decided by two authors and if no agreement could be reached a third author had the deciding vote. This must raise questions about the validity of this review as this does not eliminate bias. The review can be challenged on the following issues: the orthoses may not be the same or have the same effects across these studies,

the MSK conditions are not the same and understanding of the cause of these conditions is different, and sham orthoses are used in some studies. This review concludes custom-made orthoses are no more effective than sham orthoses for treating plantar fasciitis yet, since this review, a study has shown commonly used sham orthoses have similar effects on plantar pressure measurements as therapeutic devices (McCormick et al 2013). It is unclear whether sham orthoses affect MSK injuries but this study questions whether they are truly sham orthoses.

Other Cochrane reviews of MSK conditions; patellofemoral pain (Hossain et al 2011), prevention of running injuries (Yeung et al 2011) and Morton's neuroma (Thomson et al 2004) show orthoses have limited effects on these conditions. These reviews all conclude better quality RCTs are required to understand the effectiveness of functional orthoses. There are issues with each of these reviews but the main problem is studies which are well known and used in podiatric literature are often excluded. There are other published systematic reviews about the effectiveness of functional orthoses and although they vary in quality compared to Cochrane reviews they are open to similar criticisms. Collins et al (2007) review the treatment of lower limb overuse conditions using a modified Physiotherapy Evidence Database (PEDRo) scale to review papers and conclude there is limited evidence to support the effectiveness of orthoses. Landorf et al (2004) study orthoses in the treatment of plantar fasciitis and decide orthoses are an effective treatment. They cannot confirm whether pre-fabricated or custom-made orthoses are more effective because of the lack of a control group in the studies covered. It is interesting these reviews include the same studies but differ slightly in their conclusions. Systematic reviews about the effectiveness of orthoses in treating low back pain (Chuter et al 2014) and rheumatoid arthritis (Hennessy et al 2012) have been undertaken. Chuter et al (2014) conclude orthoses are not an effective treatment but suggest this result should be treated with caution due to the lack of homogeneity between studies. Hennessy et al (2012) surmise there is weak evidence to support the use of orthoses in reducing pain in rheumatoid arthritis but again the differences and lack of quality in the studies mean more research is required. A number of issues affect these reviews about functional orthoses: lack of high quality RCTs, lack of trials of any quality, lack of homogeneity with trials due to type of orthoses and sample, low sample numbers and trials included with high internal validity but little external validity. These problems affect all research investigating the effectiveness of functional orthoses and accordingly these reviews and the studies involved are open to interpretation and appraisal by podiatrists.

Systematic reviews are not the only evidence which fail to provide a clear answer about the effectiveness of orthoses; graded as level 2 in Aveyard & Sharp's (2013) hierarchy of evidence are RCTs, where there are insufficient numbers of studies to be able to undertake a systematic review. These RCTs, on the efficacy of orthoses, can be divided into positive and negative groups. Some studies show functional orthoses are a successful treatment for some MSK conditions: medial OA of the Knee (Rubin & Menz 2005), posterior tibial tendinitis (Kulig et al 2009), medial tibial stress syndrome (Loudon & Dolphino 2010), prevention of stress fractures (Finestone et al 1999), treating overuse injuries in runners (Hirschmüller et al 2011) and mid-foot OA pain (Halstead et al 2016). In contrast, other studies suggest orthoses are ineffective in treating medial OA of the knee (Jones et al 2014) and posterior tibial tendon dysfunction (Nielsen et al 2011), orthoses do not prevent stress fractures (Mattila et al 2011) and are ineffective in treating Morton's neuroma alone (Saygi et al 2005). Without appraising the relative merits of the methodologies of each study, there appears to be conflicting evidence about the effectiveness of orthoses from RCTs.

This presents a problem for MSK podiatrists; they should engage in EBP but the best evidence, according to the EBP movement, does not provide a strong endorsement for the use of orthoses in the treatment of MSK conditions. At best, the reviews and RCTs could be said to provide weak evidence to support orthoses for the treatment of certain MSK conditions. It seems difficult for podiatrists to broaden their practice from this position.

Development of the podiatric theories and orthoses as a treatment began before the growth of the EBP movement. Therefore, evidence which led to the advancement of podiatry in this area may now not be considered to be the best evidence. Patient satisfaction surveys provide the bulk of the evidence for the expansion of orthoses as a treatment. Aveyard & Sharp (2013) place surveys at level 4 of their hierarchy of evidence, the middle of the eight levels, below cohort and case-controlled studies and above case reports. Yet, surveys do not appear in the hierarchies of evidence associated with evidence-based medicine (Moore & McQuay 2006, OCEBM working group 2011, Straus et al 2011a). This suggests the evidence to support the use of orthoses has little scientific legitimacy in EBP.

James et al (1978) is an early example of a survey which shows patients feel orthoses are an effective treatment; 78% of the 83 runners treated with orthoses had beneficial results. Sperryn & Reston (1983) present the results of 50 patients treated with functional orthoses at an athletes clinic. They found 64% had no pain or improved symptoms after three years. Blake and Denton (1985) surveyed 180 people with athletic injuries and report 70% felt orthotics had helped their symptoms. Donatelli et al (1988) surveyed 53 patients who had their MSK injury treated with orthotic therapy; 91% were either very satisfied or satisfied with their orthoses due to the substantial reduction in pain which had occurred since using them, 70% had returned to previous activity levels. Gross et al (1991) evaluated 500 recreational runners using orthoses to treat an injury; 90% had great improvement or total resolution of symptoms. Moraros & Hodge (1993) reviewed 520 patients treated with orthoses for 14 weeks; 95% felt their symptoms were completely or partially resolved. Walter Jr et al (2004) undertook a retrospective survey of 600 patients treated with orthoses over a five year period; 75% of the 266 responses report more than 60% relief of their symptoms. Such surveys, though they vary in methodological quality and use different terms to measure patient satisfaction, may account for the expansion of podiatry into MSK practice since the majority of patients perceive orthoses are beneficial.

In the UK, evaluations of orthotic services have been published. Rendall & Batty (1998) conclude orthoses are an effective treatment. Harradine & Jarrett (2001) evaluate the effectiveness of orthoses given by a NHS podiatry team. This study demonstrates changes brought about by the growth of EBP and the emphasis on podiatry becoming a scientific profession. The authors use an entire validated health survey questionnaire, SF-36, although they only analyse the domains about physical function, role limitation due to physical problems and pain as they believe these are most appropriate to assess the effectiveness of orthoses. 30 patients completed the questionnaire and all patient scores improved in the three domains. Statistical analysis indicates orthoses deliver a large clinical improvement for physical function and role limitation due to physical problems whilst for pain they show a moderate improvement. This study discusses its limitations in a different way to other surveys. Harradine & Jarrett (2001) conclude orthoses appear to be an effective treatment but the results must be treated with caution due to the lack of a control group and placebo group as well as the small sample size. They highlight the weaknesses in their study by comparing it with the EBP hierarchy of evidence that places an emphasis on randomisation and controlling bias to ensure the strength of research evidence. This may allude to a growing influence of EBP principles in podiatry.

### **2.5.5. Conclusion**

Research evidence for the effectiveness of orthoses as a treatment shows beneficial effects for some MSK injuries. However, systematic reviews and RCTs, the best evidence in EBP, do not give definitive answers because the results are open to interpretation. The lack of homogeneity between studies makes it difficult to know which orthoses are best for which MSK injury. Thus, the quotes at the start of this section, Landorf (2016) and Chevalier & Chocklingham (2012), could still stand. This may be an issue for MSK podiatrists as it could be said there is limited scientific evidence to support orthoses as a treatment and therefore the claims of podiatry to become a scientific profession may not yet be feasible.

There is, however, plenty of subjective evidence from patients to show orthoses are recognised by patients as an effective treatment for MSK injuries. This evidence may have allowed podiatrists to develop this area of practice and influenced the beliefs of MSK practitioners about the effectiveness of orthoses. In terms of EBP, this evidence is now seen as weak thus the expansion into MSK practice appears to be built on weak foundations. Allied to this is the undermining of the podiatric biomechanics theories by research evidence; this may be a source of uncertainty to podiatrists working in this area. It may also be important that EBP has devalued the main evidence to support the use of orthoses, patient surveys. There appears to be a lack of surveys or evaluations about orthoses published recently.

## **2.6. Criticisms of EBP**

The profession of podiatry seems to be unaware of the criticisms of EBP, indeed there is little coverage of this topic within podiatric literature. However these issues may provide insight into the problems EBP has generated within MSK podiatry. EBP, particularly evidence-based medicine, has always been highly controversial despite becoming extremely influential. A closer look at the issues raised makes the controversy understandable (Bluhm & Borgerson 2011). An interesting and vociferous debate about EBP is ongoing, with one side questioning the limitations of EBP and the other adapting EBP to these criticisms whilst still maintaining fundamental tenets of EBP such as the hierarchy of evidence and primacy of research evidence (Bluhm & Borgerson 2011, Lambert 2006, Noyes 2010). Porter & O'Halloran (2009) call this the postmodernist war

on EBP; both sides resort to claim and counter-claim using acerbic delivery masking the substantive argument taking place. The two sides do not appear to realise they are attacking each other for arguments which no longer hold. Proponents have attempted to update their models of EBP to include clinical judgement and state other forms of evidence can best inform different types of clinical questions (Buetow 2009). Three leading proponents of evidence-based medicine, known as the Evidence-Based Medicine Renaissance Group, published 'Evidence based medicine: A movement in crisis?' (Greenhalgh et al 2014). They outline five key problems; the evidence based 'quality mark' has been hijacked by vested interests, e.g. drug and medicinal devices industries, the volume of evidence has become unmanageable, statistically significant benefits may be marginal in clinical practice, inflexible rules and technology driven guidelines do not produce patient-centred care and guidelines map poorly against multi-morbidity. Thus issues the critics of EBP have been to trying articulate for many years are now being raised by EBP supporters.

### **2.6.1. 'Cookbook' practice and the epistemology of EBP**

EBP, or more correctly evidence-based medicine, is criticised for the following: its narrow view of what constitutes evidence and the assumption that it would lead to 'cookbook' medicine through evidence-based guidelines (Charles et al 2011, Lambert 2006). Critics argue that it was not a paradigm shift and evidence from RCTs is not easily applicable to individual patients (Charles et al 2011, Lambert 2006). The Sackett et al (1996) quote defining evidence-based medicine as 'the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patient', comes from an article trying to answer some these criticisms. Firstly it attempts to dispel the notion that evidence-based medicine is something new. They reinforce the view whereby research evidence will validate effective treatments but acceptance of clinical judgement is also needed. They argue against the notion of cookbook medicine and claim those who fear top down guidelines will find the advocates of evidence-based medicine 'joining them on the barricades in defending clinical expertise'. This article by Sackett et al (1996) could be seen as the start of the evolution of evidence-based medicine as an approach which can respond to issues and assimilate them to answer some of its criticisms. Charles et al (2011) and Lambert (2006) both analyse the models of EBP and conclude there are at least four versions. The most recent version by DiCenso et al (2005), has four domains to be incorporated into clinical decision making, see figure 1. The clinical expertise of the practitioner should balance the merits of each domain to reach a clinical decision. The

authors believe that evidence-based clinical decision making involves integrating knowledge from each of these domains; research evidence, clinical circumstances, patient preferences and healthcare resources. Clinical expertise is used to balance the competing claims of these domains to make a clinical decision that is in the best interests of the patient: this is the basis of EBP.

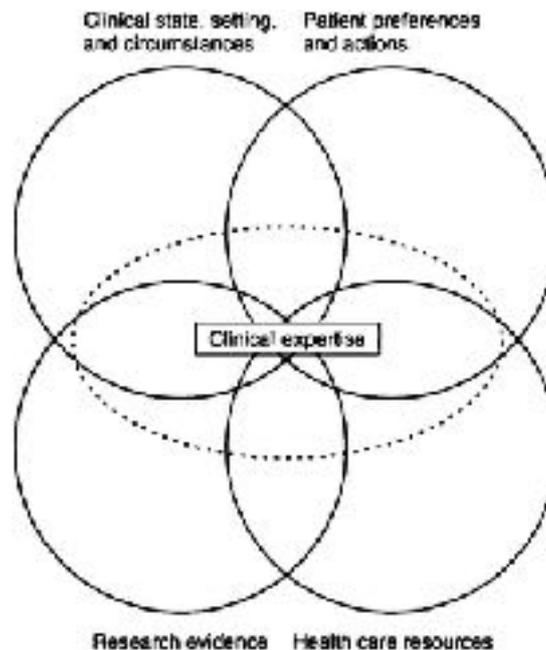


Figure 1 - Version 4 of the EBP model of clinical practice. Source: DiCenso, Ciliska & Guyatt (2005 p. 5)

This model of EBP, which promotes evolving clinical practice rather than answering criticisms, has led critics to conclude the principles underlying this EBP model are confused. The terms used in the model are poorly defined or not defined at all. The components are equal in size therefore it could be argued they are given equal weight in clinical decision-making; thus health care resources, patient preferences or clinical state could be reason for a practitioner to advocate a treatment unsupported by research evidence. If any combination of the model components can be seen as EBP then it is difficult to differentiate between an evidence-based treatment decision and one that is not (Charles et al 2011).

Comments by Greenhalgh et al (2014) about inflexible and technology-driven guidelines suggest, despite the claims of Sackett et al (1996), 'cookbook' medicine has arrived without the erection of any barricades. Differing views exist about whether EBP has

created an approach reliant on guidelines which restrict clinical judgement. The models of EBP suggest clinical expertise is a key element of the clinical decision making process which leaves the clinician free to decide whether to follow clinical guidelines or not. Timmermans & Oh (2010) argue EBP has not led to implementation guidelines which restrict professional practice. They propose clinicians do not follow guidelines because the majority of guidelines do not give clear recommendations, due to the lack of quality evidence and also the fallacy of assuming that a guideline stands for itself. Dopson et al (2003) take the slightly different view whereby implementation is dependent upon the provenance of the guidelines. Professionals may be more likely to implement a guideline formulated by eminent members of their profession rather than one seen as a form of managerial control. They may support guidelines which suit their professional goals and resist those which do not. The weakness of both articles lies with the assumption that guidelines devised from research evidence should be implemented despite the arguments that this task may be impossible.

In contrast, Harrison & McDonald (2008) discuss the rise of the scientific-bureaucratic model in healthcare. They examine this phenomenon in context of four models of EBP, developed by Harrison et al (2002), which are described as areas of valid knowledge within clinical practice in the UK. These models are discussed in the section on Clinical Knowledge. They claim the scientific-bureaucratic model is becoming dominant in the UK. It holds professional practice should be influenced by the systematic aggregation of research findings developed into protocols or guidelines by experts. The authors examine this situation from a political point of view; they consider the government, by moving to this model of EBP and implementing guidelines for professionals to follow, wanted to limit professional autonomy and clinical variation. Ultimately this would make professions accountable and allow patients to compare services to the guidelines. The apparently innocent and widely accepted goals of EBP also means there has been little resistance to this progress. Professional bodies and academia were brought onside by their own vested interests; the income generated from research, the growth of journals in which to be published and formulating guidelines for practice based on this research. Harrison & McDonald (2008) can be criticised in their analysis as they consider this model to be different to the Sackett et al (1996) model, which they term the critical appraisal model. This difference is solely down to the assertions by Sackett et al (1996); they are against 'cookbook' medicine and argue external clinical evidence can never replace clinical expertise. Bluhm & Borgerson (2011) regard this scientific-bureaucratic model as an

extension of the original aims of EBP. The new pre-digested reviews and guidelines are new forms of authority. The experts who develop them serve a similar function as the old, traditional, experienced colleagues in guiding practice. Yet, with claims of scientific objectivity to support them and possible threats of consequences for not following them, they are not a benign influence. They could be viewed as a narrowing and controlling influence. Bluhm & Borgerson (2011) may be taking a naive view of traditional medical practice, in assuming that this hierarchy of medical practice was a benign influence. It may be that one controlling influence has been replaced with another. The latest '6S' hierarchy of evidence (Straus et al 2011a) suggests EBP may be now advocating the sort of top down approach to practice that original proponents were against. It seems 'cookbook' practice has taken over as the scientific-bureaucratic model of practice. Greenhalgh et al (2014) quote an audit from 2005; a 24 hour patient admittance review in an acute hospital included 18 patients with 44 diagnoses and identified 3679 pages of national guidelines (an estimated 122 hours of reading) relevant to their immediate care. This suggests the amount of clinical guidelines could be seen as unmanageable and problematic for practitioners. Clinicians should follow guidelines, as they are seen as best practice, but the complexity of practice has led to a possible excess of guidelines which may be unworkable. In addition, the guidelines are dependent upon the quality of the evidence used to formulate them, as poor quality research may produce poor quality guidelines.

This guideline approach has yet to reach MSK podiatry. Williams et al (2016) found orthotic prescription is based on personal preference rather than research evidence and conclude, that currently, the influence of any guideline would be limited. They imply this may be a problem in MSK podiatry as this shows a lack of EBP. Perhaps this is further evidence of the search for scientific legitimacy within podiatry and the notion that EBP is a route to this. However research evidence about the effectiveness of orthoses, as previously discussed, does not give clear answers and the quality of studies is questionable. Therefore guidelines, based on poor quality evidence, may not provide the answer to the problems of practice.

### **2.6.2. What is the best evidence?**

A recurrent feature within the multitude of hierarchies of evidence available within EBP paradigm is the emphasis on RCTs as 'gold standard' evidence for clinical effectiveness and the subsequent systematic review and meta-analysis of these RCTs as best evidence

(Bluhm & Borgerson 2011, Goldenberg 2012, Pope 2003, Worrall 2010). The perceived strength of RCTs is based on the premise that this method, due to randomisation with blinding of participants and/or researchers, is free from biasing influences. Quantified data from RCTs is considered hard evidence and valued over clinical experience and qualitative measures, which are viewed as biased, subjective and personal and therefore not to be trusted (Goldenberg 2012). Systematic reviews and meta-analysis of RCTs should give the best evidence for the effectiveness of a treatment as the results from RCTs are pooled together. However it may not be so simple. Timmermans & Oh (2010) state clinical guidelines do not offer clear advice due to the lack of sufficient evidence. It appears this lack of recommendations may also affect systematic reviews. El Dib et al (2007) undertook a systematic review of the conclusions of 1016 completed Cochrane reviews. The need for more research was the primary conclusion in 96%. It was the secondary conclusion in 44% of reviews recommending a treatment as likely to be beneficial whilst 47% concluded there was insufficient evidence to make any recommendation for clinical practice and the remaining 9% made no secondary conclusions. The Cochrane reviews which gave clear conclusions without warranting further research, about 4%, were split between beneficial and harmful interventions. This data infers there may be a problem with recommendations taken from systematic reviews. Supporters of EBP, already aware of this problem, formed the GRADE group to improve the quality of recommendations from systematic reviews (Guyatt et al 2008). This was set up in response to the findings of Atkins et al (2004) where the methods for six types of systematic review all had important shortcomings. Results from systematic reviews may not offer definitive evidence for many treatments, including functional orthoses.

Many authors have questioned the privileged position of RCTs (Bluhm & Borgerson 2011). Worrall (2002) outlines the primacy of RCTs within EBP for therapy effectiveness is largely because randomisation is thought to reduce the likelihood of systematic bias and false positive results about efficacy. He goes on to refute this claim since randomisation cannot control all variables. Participants in a study can only be randomised to treatment and control on known factors but results may be subject to unknown, thus unaccounted for, confounders. Worrall (2002) also believes the notion that increasing the number of participants to lessen the potential of these unknown confounders is a fallacy, perpetuated by frequentist statisticians, insofar as probability suggests it would increase the number of confounding factors. These unknown confounders may account for the differing results from functional orthoses RCTs. Gait and biomechanical theories have limited evidence,

orthotic design and material choices are unclear and the mechanisms of MSK injury linked to gait are poorly understood, all of which expose the randomisation of participants into groups for an orthotic trial to unknown confounders.

This issue of unknown confounders may also affect systematic reviews. Cartwright (2011a) does not wholly agree with Worrall (2002) about unknown confounders. She believes enough may be understood about the underlying mechanisms and the study environment to assume there are no unknown confounders, though this is unlikely in MSK podiatry due to limitations in understanding gait. She agrees causal claims about RCTs may be unjustified, a treatment which has worked in one set of circumstances provides no basis for that treatment working in another. However she argues that the capacity of RCTs to be applied across a larger population is the most difficult to support, a similarity in circumstances must exist to infer the same effectiveness, or otherwise, of a treatment. Cartwright (2011a) maintains this similarity is rare and difficult to judge. Yet RCTs must be the same to enable a systematic review to make wider claims on the effectiveness of a treatment. Moore & McQuay (2006) place a systematic review with homogeneity of RCTs at level 1a of evidence. Though Worrall (2002) claims randomisation cannot control for all potential variables, it follows if the studies are comparable then so must the unknown confounders across the RCTs so this form of systematic review should give authoritative evidence. However other hierarchies of evidence do not place any emphasis on homogeneity of RCTs: Aveyard & Sharp (2013), Humphris (2005) and Oxford Centre for Evidence-based Medicine (OCEBM working group 2011). A lack of homogeneity between the RCTs in a systematic review could potentially make it susceptible to different unknown confounders, generating unsound results rather than ensuring a reliable outcome. The Cochrane Handbook for Systematic Reviews for Interventions (Higgins & Green 2011) does not discuss homogeneity of RCT methods at all. It allows authors to set their own protocols using the Handbook as guidance. Heterogeneity of studies is mentioned only as part of meta-analysis. Analysis which makes allowances for heterogeneity of studies exists to enable meta-analysis to take place. The PRISMA statement (Moher et al 2009) also does not mention homogeneity of RCTs in systematic reviews. Both these systems allow inclusion and exclusion to be agreed between at least two investigators. It seems the objectivity of a systematic review rests on the subjective opinions of two or more investigators deciding whether it is appropriate to include the study or not. It appears that a degree of subjectivity exists within systematic reviews around the issue of homogeneity of studies. In MSK podiatry a lack of homogeneity may account for the variations in results

between systematic reviews about orthoses: these studies seem to have more differences than similarities between the assumptions made about orthoses and control between groups rather than in their actual methodologies.

Claims that systematic reviews are level 1 or the best evidence if there is no homogeneity may be unwarranted. The lack of clear evidence from the review of Cochrane reviews by El Dib et al (2007) is understandable, it is unlikely a definite answer will be derived from a mixture of RCT methodologies. Since the level of evidence is determined by the methodology of the study undertaken rather than the quality, this may be a flaw in the EBP hierarchies of evidence. Systematic reviews and RCTs appear to hold privileged positions. But if Worrall (2002) is correct, whereby randomisation must take account of all possible confounders, this strength is perhaps being assumed and taken for granted. This must lead to questions which highlight the imperfection of these hierarchies. For example, does a poorly designed RCT offer better evidence than a well designed cohort study? Does a systematic review of poorly designed RCTs give better evidence than one well designed RCT?

Supporters of EBP attempt to address these issues with initiatives to improve the standard of the various methodologies. The GRADE statement (Guyatt et al 2008) seeks to improve the quality of guidelines produced from systematic reviews. The Cochrane Handbook for Systematic Reviews for Interventions (Higgins & Green 2011) sets standards for Cochrane reviews whilst the PRISMA statement sets standards for systematic reviews (Moher et al 2009). The CONSORT statement (Antes 2010) encompasses various initiatives developed by the CONSORT Group to alleviate problems arising from inadequate reporting of randomised controlled trials. It is unclear if these initiatives have been successful, it could be suggested they have made little difference as they address methodological issues and not the issues concerning decisions made about randomisation. It seems the controversies surrounding EBP continue because the actions to strengthen the various methodologies address different concerns.

The CONSORT statement (Antes 2010) and the Cochrane Collaboration tool for assessing risk of bias (Higgins et al 2011) may have had little effect on reducing bias in trials despite improving the standards of reporting of trials. Worrall (2002) concludes selection bias may be eliminated if the clinician is blinded to treatment and control arms. It is thought that, RCTs are better at controlling this form of selection bias than other forms of study (Bluhm

& Borgerson 2011). However they do not guarantee freedom from bias. The choice of controlling known confounders may also be subject to bias by the studies' designers despite initiatives like CONSORT and the Cochrane Collaboration tool (Bluhm & Borgerson 2011, Goldenberg 2012, Lambert 2006, Worrall 2010). Greenhalgh et al (2014) also agree these initiatives have been unable to prevent more subtle biases in industry-sponsored studies where the drug and medical devices industries set the research agenda. Pearce et al (2015) report industry-funded trials are more likely to give a positive outcome, in favour of the sponsor, than non-profit funders in a series of systematic reviews. Sismondo (2008) outlines the common ways the pharmaceutical companies have influence: design bias, multiple trials with predictable outcomes, scientific misconduct, interpretive effects and publication bias. Pearce et al (2015) give examples of mechanisms still used to circumvent the current tools to reduce bias. This does not mean RCTs have intrinsic limitations and cannot provide valuable evidence but it suggests the claims they are not subject to bias, therefore privileged in evidence terms, may not be supported and are questionable. In MSK podiatry it is difficult to tell if the orthotic industry has had a similar effect on outcomes from research studies about orthoses. However it is important to consider the potential effect of decisions about orthotic design, MSK injury and patient groups on the results of a study.

### **2.6.3. The gap between research and practice**

Concerns that evidence produced from RCTs is not readily usable in practice has been a long standing criticism of EBP. This is linked to the external validity of RCTs and to which settings or groups of patients the study results might be applied. Archie Cochrane appears to have thought, that although RCTs can measure the effectiveness of a treatment, results may not be directly replicable in clinical practice (Goldenberg 2012, Pope 2003). Lambert (2006) describes it as the incommensurability of population evidence to individual patient needs; evidence deriving from RCTs and other studies about the effectiveness of treatment cannot be straightforwardly applied to individual patients. Bluhm & Borgerson (2011) explain that the populations used in trials are often not representative of the general population or, even worse, the target population. Study target populations are often elderly and suffer from multiple illnesses yet such subjects are rarely used because of the difficulty in isolating a cause-effect relationship. Drug trials use young healthy subjects who are less likely to have an adverse drug reaction. Greenhalgh et al (2014) assert evidence-based guidelines map poorly against co-morbidity and are even more problematic for elderly patients with long term multi-morbidity who are open to the perils of polypharmacy.

Two philosophers of science, Cartwright (2011a) and Worrall (2010), question whether RCTs will ever be able to close the gap between research and practice. Cartwright (2011a) maintains RCTs must be supplemented by other forms of evidence to claim effectiveness in treatment. She advocates RCTs answer the claim 'it-works-somewhere' but not the claim 'it-will-work-for-us', which is the claim patients and practitioners want answered. Although knowledge that a treatment reliably promotes an outcome somewhere implies that it may cause this outcome anywhere, she highlights it is only part of an evidential argument. The situation must also contain all requisite helping factors and have no countering causes. Cartwright (2011a) asserts this is the current problem with EBP; evidence-based guidelines rarely mention, never mind discuss, the standards of evidence for a claim yet this information is vital to make any judgement about effectiveness. As previously discussed, she holds similarity in RCTs could help but it is problematic because the amount of similarity necessary is rarely achieved. Worrall (2010) agrees RCTs often test a different theory to the one the practitioner actually wants tested i.e. evidence to support a particular treatment is the most effective, for all patients the practitioner wants to offer it to. In reality, RCTs test the theory that a treatment, administered in a very particular way to a specific set of patients for a particular length of time, is more effective than a comparator treatment, often a placebo. He insists other forms of observational study are more likely to answer the claim the practitioner wants answering. Worrall (2010, 2002) is unsure about the benefits of randomisation and control in studies. He argues randomisation protects against selection bias if the investigator is blinded to the treatment arm of the trial, however the effect of randomising between controls causes concern. He does not consider controlling more variables between groups, in an attempt to increase internal validity, reduces the effect of confounders. In his opinion this makes RCTs less likely to be usable in practice as the external validity is diminished and also the assumptions made about these controls cannot be justified. This appears to be the situation in MSK podiatry; orthoses RCTs are susceptible to the confounders Worrall (2010, 2002) discusses. Knowledge of the causes and development of MSK injuries, links to gait and associated biomechanical problems and the understanding of orthotic design and materials would best be described as limited, despite continuing efforts to improve this knowledge. As a consequence, reliable decisions cannot be made about these issues in a study design. Decisions are based on broad assumptions and prone to both known and unknown confounders and this may account for the variations in results of systematic reviews and RCTs about orthoses. It may also call into

question the objectivity of these studies since they are dependent on the subjective decisions of their designers.

Fox (2003) describes this perceived gap between research and practice as the major barrier to implementation of research evidence in practice. He considers there is a belief that research and practice are different entities with differing claims on truth. Research producing clear, rational, unsullied data with internal and external validity must be used in practice and failure to do so is the fault of recalcitrant or poorly trained practitioners. Practice, on the other hand, is seen as a messy irrational world where research evidence does not really apply to the patient in front of the practitioner and results are achieved through practitioner and patient experiences. Fox (2003) calls for a change in the type of research being undertaken to be led from practice rather than research deciding the questions that need answering in practice. He sets out a model of practice-based evidence, actually a model of practice-based research, based on collaborative action research which includes both quantitative and qualitative approaches. Both practitioners and researchers look at four key moments in a study; setting the research question, research design and validity, data collection and reliability and data analysis and hypothesis testing. The relative merits of the various approaches are then discussed to design a study using the most appropriate method to best answer the research question. There is a paucity of research published using this practice-based approach and the reasons for this lack of success are unclear. It could be because the model is not really workable in practice. Fox (2003) may also have underestimated the strength of opinions on both sides meant neither would give up their positions easily. Perhaps some of the ideas discussed by Fox (2003) have been used in a different form, for example pragmatic study designs (Ioannidis 2016).

There has been a move to improve the implementation of research evidence to try to close the gap between practice and research. Knowledge translation and implementation research are two of the terms used to describe this approach, which appears to be linked to the EBP movement. In the USA and Canada there has been focus on establishing knowledge translation strategies in healthcare and an online journal, Implementation Science, has been launched whilst in the UK research demonstrates that this area is growing (Oborn et al 2013). Scott et al (2012) published a systematic review of knowledge translation strategies in AHPs, with the aim to show how knowledge translation interventions have changed practice. They conclude there is an over-reliance on

educational strategies without clear effect of intended outcomes and recommend researchers establish a clear connection with the intended behaviour change and the knowledge translation intervention. In a similar vein, Straus et al (2011b) produced a narrative review to establish a framework for knowledge translation in health care decision making. They conclude a conceptual framework of knowledge-to-action would be the way forward. In the UK, Wilson et al (2015) discuss their design for a 'before and after' study for Clinical Commissioning Groups to show how research evidence influenced their decision-making processes. The authors claim this approach will generate new knowledge of relevance and value to the NHS. Yet, a major drawback of these studies is the assumption that the knowledge being implemented is correct and usable by practitioners. Also they are motivated by studies which show research is not used in practice but they fail to examine the reasons behind this lack of implementation. Greenhalgh & Wieringa (2011) argue the knowledge translation metaphor should be dropped as it is based on assumptions and offers limited understanding of knowledge itself. The arguments of Worrall (2010) and Cartwright (2011a), discussed earlier, show this is a large assumption to make and highlight many reasons to explain why research is not applicable in practice. It appears the current EBP approach is to look at ways to implement research evidence in practice rather than using Fox's (2003) approach of designing research easily usable in practice. This suggests the proponents of EBP continue to advocate their view as the correct approach since they do not address fully the issues raised by critics.

#### **2.6.4. EBP and patient-centred care**

An increasing aspect of government policy is to place an emphasis on shared decision making within the NHS to improve patient involvement and choice. The policy document, *Liberating the NHS: No decision about me, without me* (DOH 2012) focuses on patients making informed choices and decisions about their care together with the healthcare practitioners. Though it assumes patients will use evidence to choose treatments shown to be the most effective, it does not describe the constitution of this evidence-based information, which types of evidence are acceptable or best. Neither does it offer a resolution to the problem of a patient rejecting a treatment which has evidence to support its effectiveness. This area of patient-centred care remains a source of criticism for the EBP movement whose models of practice have included patient preference since version 2.

Practitioners should consider patient preferences as part of an evidence-based decision making process but there is little guidance on how this can be achieved (Charles et al 2011). Patient preference may be based on anecdotal evidence and therefore the traditional EBP hierarchy of evidence, with the best evidence provided by RCTs, could be displaced by the subjective evidence of the patient in the decision making process. It is unclear in these EBP models whether research evidence or patient preferences takes precedence (Bluhm & Borgerson 2011, Charles et al 2011). Miles (2009), a strong critic of evidence-based medicine, is more scathing, claiming evidence-based medicine codifies scientism in medicine. He feels evidence-based medicine places too much reliance on data derived from RCTs, which he considers to have a methodologically limited design, rather than on the traditional concept of clinical expertise and medicine's core values; to cure sometimes, to relieve often, to comfort always. EBP, he thinks, is a reductionist approach which concentrates on disease mechanisms and algorithmic guidelines rather than on the patient. He rejects the EBP models which pay lip service to patient preferences; as he understands it, these take second place to the narrow view of evidence in EBP. He may have an unlikely ally in Archie Cochrane, who believed care was more widespread than cure and the pursuit of cure at all costs may restrict the supply of care (Fernandez et al 2015). Miles (2012, 2013) has since become more conciliatory, believing it is possible for EBP to become part of a person-centred healthcare approach. He holds that EBP has to move away from the rigid use of hierarchies of evidence which lead to inflexible guidelines to a more person-centred approach where the patient is treated as a person and fully involved in the process of evidence-informed clinical decision making. Person-centred care, he speculates, needs to move away from the aggressive patient-directed, consumerist form of care which has a basis in the world of commerce and economic transaction; he still considers care to be the most important aspect of practice. His framework for person-centred healthcare allows continuing and affordable advances in biomedicine and technology to be delivered to patients within a humanistic framework which recognises the patient as a person and takes full account of their stories. However it appears this complex framework, though admirable in making patients part of decision making, is a theoretical argument short on clear plans of implementation and the changes required of both EBP and person-centred care.

Greenhalgh et al (2014) claim real EBP has the care of the individual patient as its top priority; practitioners and patients are free to make appropriate decisions that may not match the 'best average evidence'. This could be seen as different to the original EBP

model, though Sackett et al (1996), in their explanation of evidence-based medicine, claim the needs of the individual patient is at the heart of their movement. Their view appears to be based on the assumption that a patient will want the best evidence and EBP looks to provide this from systematic research evidence. This is a self-evident truth, patients obviously want the best treatment, but this chapter demonstrates it is not always clear to identify which exactly is the best treatment from the evidence. Also Broom (2005) shows many patients are happy to be led by their clinicians about the best evidence despite being able to evaluate research evidence themselves from the internet.

Greenhalgh et al (2015) also consider EBP to be biased against patients and carers; limited patient input to research design, low status given to experience in the hierarchy of evidence, a tendency to conflate patient-centred consulting with use of decision tools, insufficient attention to power imbalances that suppress the patient's voice, over-emphasis on the clinical consultation and focus on people who seek and obtain care rather than the hidden denominator of those who do not seek or cannot access care. The authors, all healthcare researchers, use their own experiences as patients and carers in this review article. They conclude EBP is not as patient-centred as it assumes; to focus solely on a narrow view of the best evidence does not translate into addressing patients' needs. They hold EBP will have to abandon its principles and assumptions and accept the introduction of new ideas and methodologies from disciplines beyond a scientific approach.

### **2.6.5. Conclusion**

The answers provided by the EBP movement seem to offer no resolution to the criticisms of EBP and there appears to be a lack of understanding on both sides about this so-called postmodern war (Porter & O'Halloran 2009). Dopson et al (2003) may have inadvertently uncovered the reason for the disagreement between the two sides; EBP has been strongly resisted due to a lack of understanding, on the part of the proponents of EBP, to the complex, multi-dimensional nature of barriers to implementation. Proponents of EBP concentrate on the logic of their argument and the evidence to support it. This may highlight the paradox at the centre of EBP. The credibility and legitimacy of EBP is based on the authority of its hierarchy of evidence, with high value on RCTs. The criticisms outlined in this chapter question whether this is appropriate as EBP may lead to restrictive guidelines and the evidence is not always applicable to individual patients so may be unsuited to patient-centred care. Attempts made by the EBP movement to answer these issues include creating methodological improvements and guidelines, implementing

knowledge translation strategies, blaming practitioners, ignoring the criticism or claiming they have been misunderstood. They try to promote a broader view of evidence but the drive within the NHS to implement guidelines based on the hierarchy of evidence suggests this message may be lost. Thus, the war may continue for some time yet. However, it is interesting that criticisms come from within the movement as well as outside (Greenhalgh et al 2014).

Within podiatry these criticisms do not appear to have been raised, yet they present real problems in the profession's search for scientific legitimacy. Scientific legitimacy may not be easy for podiatry to attain and it appears EBP may not be the route to achieve this, particularly in MSK podiatry. The issues outlined in the chapter on the effectiveness of orthoses may have their roots in these criticisms. Practitioners may want to follow EBP principles, as they perceive this benefits the profession, but may be unsure how to do this or have difficulty in doing so. They may feel that the research evidence does not work or apply to their practice. If this is the case then where does a MSK podiatrist's clinical knowledge come from?

## **2.7. Clinical Knowledge**

Using the traditional EBP hierarchy of evidence, there appears to be little evidence to support the use of orthoses as a treatment. However criticisms of EBP suggest this model of practice is incomplete as clinical knowledge is based on more than research evidence. The most recent EBP model of clinical practice (DiCenso et al 2005) shows clinical knowledge and decision-making are not influenced solely by research evidence, other factors contribute to this process. There is agreement that clinical knowledge comprises different factors, it may follow that evidence is the same, as this leads to clinical knowledge. Alternatives to the traditional EBP hierarchy of evidence, which try to offer a broader view of evidence and the types of research that contribute to it, give insight to understanding clinical knowledge.

### **2.7.1. Alternatives to the hierarchy of evidence**

Petticrew & Roberts (2003) discuss a framework to replace the hierarchy of evidence, based on the belief that different clinical decisions and questions require different methods to find the most appropriate answer. They state a single hierarchy of methods is unhelpful; it misrepresents the interplay between the question being asked and the type of research best suited to answering it. They recommend a typology of evidence, a matrix based approach which conceptualises the strengths and weaknesses of different research approaches. It includes a broad range of methodological approaches and discusses using a 'horses for courses' system. However they still hold RCTs are the best method to establish effectiveness. The only approach to be awarded 3 marks in their example of typology is the systematic review, other approaches score 2 or less, which suggests the traditional hierarchy of evidence is still favoured in this system. The authors attempt to address the quality of the approach, for example a poor RCT is not better for effectiveness than a sound observational study, yet this does not appear in their typology. Thus the issue with this framework lies with evaluating the quality of the approaches used and this article offers little concrete guidance on this point.

Noyes (2010) offers an extension to the 'horses for courses' approach; she presents a case for context-specific hierarchies of evidence and also suggests that in some cases no hierarchy is needed. Though it is probably right to assume the outcomes of a trial are central to determining effectiveness, she argues other forms of evidence are required to understand patient concordance with the intervention. She describes a jigsaw of evidence

that contributes to evidence-based healthcare where the onus must be on the value of different types of high-quality evidence in specific contexts. Her context-specific hierarchy of evidence for views and experiences of interventions and service delivery contexts is portrayed as follows:

- I. Evidence from at least one systematic review of well designed qualitative studies.
- II. Evidence from at least one systematic review of well designed mixed-method evidence (qualitative, surveys etc).
- III. Evidence from at least one well conducted qualitative study or qualitative process evaluation published in peer review journals.
- IV. Evidence from well designed research and consumer surveys.
- V. Evidence in the form of opinions from lay people, respected authorities, descriptive studies and reports from third sector public organisations and committees.
- VI. Evidence from both randomised and non-randomised quantitative studies and case controlled studies without embedded qualitative or mixed method process evaluation.

However the question arises, as with Petticrew & Roberts (2003), about the definition of quality, as this hierarchy is dependent on well designed studies in 4 out of the 6 levels. It is unclear how this is defined. Greenhalgh et al (2014) highlight supposedly well designed studies are subject to biases and vested interests. Noyes (2010) attempts to address the complexity of practice and the evidence needed for this but the complexity appears to lead to a lack of clarity. The terminology used does not help; neither intervention nor service delivery context are defined terms. Noyes (2010) and Petticrew & Roberts (2003) concur RCTs are best to measure effectiveness of a treatment but may not be best to understand the process of implementing an intervention. The difference between a treatment and an intervention is not apparent either. For practitioners the effectiveness of a treatment is dependent on whether it will work for an individual patient, something a RCT may not provide because this is context specific (Cartwright 2011a). Despite both these approaches looking to replace the traditional hierarchy of evidence, neither seem easy to implement due to the complexity of the evidence needed for practice. Claims for epistemic privilege of RCTs still persist in these approaches. These alternatives look mainly to include different types of research which have a contribution and value to add to our understanding of clinical practice. They suggest clinical knowledge is generated from a variety of sources and not just research evidence.

## 2.7.2. Four domain models of clinical knowledge

Upshur et al (2001) argue that the EBP approach takes a narrow view of the evidence required for practice and that it neglects and misunderstands clinical knowledge and its generation. Their model is based on the premise that evidence is part of the reasoning process and combines two elements, measurement and meaning, that are codependent parts of empiricism. Measurement is abstract until it is placed in context, therefore given meaning. These elements are linked to clinical knowledge by a practitioner's personal experience and the general experience of healthcare which links communities. These areas are used as vertical and horizontal axes to give the four domains for evidence in health care; qualitative personal, qualitative general, quantitative personal and quantitative general. Each domain has an evidence type, reasoning style and disciplinary manifestation. Their model acknowledges the value of each domain and provides a general framework to understand how each type of evidence can complement another. Like the previous alternatives, it is unclear how this could be implemented in practice but it offers an understanding to the different types of evidence that may contribute to clinical knowledge.

Harrison & McDonald (2008) claim there are four areas of valid knowledge in clinical practice in the UK and suggest them as models of EBP. **Reflective practice model** is based on the individual clinicians' self-critical reflections on their practice, facilitated by audit of the outcomes of practice. **Professional consensus model** is based on bringing together professional elites to discuss published evidence and personal experience on a clinical topic. **Critical appraisal model** accepts the validity of the EBM hierarchy. It uses an approach to research integration from the results of RCTs that rejects the personal experience of the first two models in favour of the aggregation of published research. However it accepts this research evidence cannot be applied unproblematically but needs clinical expertise to apply it to practice. The authors regard this model is closest to Sackett et al (1996) version of EBM. **Scientific-bureaucratic model** also accepts the authority of the hierarchy of evidence but assumes busy practitioners do not have the time or skills to critically appraise the research. Practice should be influenced by the systematic aggregation of research evidence by experts, formulated into protocols or guidelines. The authors believe this to be the dominant model of EBP in the UK. Three main routes institutionalise this model in the NHS; the production of NICE guidelines, with the expectation they will be normally adhered to, the creation of National Service Frameworks

and the new GP contract with its Quality and Outcomes Framework, which links financial rewards to meeting specific performance requirements that are generally 'evidence-based' outcomes. This demonstrates professional knowledge and EBP have become highly politicised in the UK as the government has looked to improve efficiency and reduce costs in the NHS. It could be argued this may have been a logical progression from the growth of EBP. The authors' distinction between the critical appraisal and scientific-bureaucratic models rests on the assertion of Sackett et al (1996) that it is not 'cookbook medicine' and their claims that they see the importance of clinical judgement, produced in response to the initial criticisms of EBM. This model of valid knowledge is the bleakest view of the current situation in healthcare. It presents a narrow view of clinical knowledge and takes little or no account of the variations of practice. It also disregards the criticisms of EBP, particularly the link to patient-centred care. It is unclear how these models of clinical knowledge have become valid. Validity is only discussed in terms of quantitative research validity, it has been previously discussed that such claims may not be as strong as they first appear. This model of EBP may have led Greenhalgh et al (2014) to point out this guideline driven approach is becoming unsustainable due to the amount of evidence produced and it takes little account of individual patient needs.

### **2.7.3. The casuistry model of clinical practice**

Tonelli (2006) developed this model of clinical decision making for medical practice as a response to the EBP approaches which he believes lack clear guidance on the integration of evidence into clinical practice. He considers the EBP hierarchy of evidence places a priority on empirical evidence that cannot be sustained due the lack of applicability of this type of evidence to individual patients. The EBP movement attempts to include other forms of knowledge in hierarchies and models of clinical practice as other forms of evidence. He concurs with Charles et al (2011) when he suggests this makes it difficult to ascertain the 'best evidence' for clinical decision making. Tonelli (2006) concentrates on five topics relevant to any clinical decision; empirical evidence, experiential evidence, pathophysiologic understanding, patient goals, values and system features and the economic, logistic, legal and cultural barriers or facilitators of care. Though this seems similar to the EBP model of clinical practice the difference is Tonelli (2006) regards these topics as warrants for action in a clinical decision that have equal value. The relative weight assigned to each warrant is wholly dependent on the case at hand. It follows this may give a better understanding of the elements that contribute to decision making in clinical practice. His model is for medical practice yet there are parallels for podiatry, in

particular MSK practice. It could be seen as a diagnostic approach so may not be as applicable to professions focused on care. However, this approach seems to be out of step with the changes in healthcare, especially the scientific-bureaucratic model, which assume clinical guideline compliance is the norm and departure from this wholly exceptional. There is also the threat that guideline adherence will become a legal expectation (Harrison & McDonald 2008). This makes Tonelli's (2006) model seem idealistic, impractical and potentially hazardous for professionals even though it offers insight into clinical decision making.

#### **2.7.4. Clinical mindlines**

Gabbay & Le May (2011) undertook an ethnographic study of mainly of general practitioner (GP) practice in the south of England looking at the use of knowledge in practice for doctors and other health care professionals. They supplemented this work by also studying doctors working in teaching hospitals in UK and the USA. They describe the process of doctors using 'knowledge-in-practice-context' as clinical mindlines. These mindlines are individual and are the practitioner's mental embodiment of knowledge-in-practice. They draw on complex and flexible internalised guidelines, which incorporate different kinds of knowledge, explicit and tacit, general and specific, acquired over a lifetime of learning, reading and experience. These mindlines are being constantly updated through written sources of knowledge, research evidence and practice guidelines, but also by reflecting on clinical experiences, individually and also in discussions with peers and colleagues. They also share stories of practice to enable improved understanding of complex issues. Greenhalgh & Wieringa (2011), in their discussion of the different models of clinical knowledge, conclude clinical mindlines are the eclectic synthesis of the models of clinical knowledge, for example EBP, tacit knowledge, language games, cultural capital and communities of practice. The complex structure of clinical mindlines shows the other models of clinical knowledge may be simplistic in their view of knowledge. For this study although an MSK podiatrist's mindlines may not be as complex as that of a GP, this view suggests knowledge-in-practice is based on a complex web of differing sources of knowledge.

#### **2.7.5. Clinical reasoning model**

Higgs et al (2008) provide a clinical reasoning model for AHPs and other healthcare professions, comprehensively describing different forms of clinical knowledge. They begin

presenting clinical knowledge as based on three spheres of knowledge which have their origins in the Ancient Greek philosophy of Aristotle and concern the distinction between theory and practice in the concepts of *episteme*, *techne* and *phronesis*. *Episteme*, likened to scientific knowledge, is more certain or definitive knowledge. *Techne* encompasses the art or craft of practical experience. *Phronesis* is the practical wisdom or moral virtue to enable the right outcome of action in a situation (Parry 2014). Higgs et al (2008) outline the different meanings given to the three spheres and connect them to healthcare practice. They conclude *episteme* refers to propositional knowledge derived through research and/or scholarship, *techne* concerns professional craft knowledge, it can be tacit and is embedded in practice and *phronesis* as individual knowledge which may be collective knowledge linked to community and culture but also knowledge gained from the individual's life experience. They explain propositional knowledge comes from theory and research and continue to discuss the research paradigms which generate knowledge. Higgs et al (2008) divide these paradigms into three categories, devised and adapted from Habermas' (1968:1987) work 'Knowledge and Human Interests', which align themselves to the three spheres of knowledge. Their empirico-analytical paradigm is based on the scientific method and relies on observation and experiment to generate knowledge. They equate the interpretative paradigm with qualitative research in healthcare as knowledge generated through describing and interpreting phenomena in context. The critical paradigm generates emancipatory knowledge which looks not only to generate knowledge but to bring about transformation of themselves, organisations, teams or communities. It should be noted Higgs et al (2008) state this model is only one way of looking at clinical knowledge. The spheres and paradigms are not mutually exclusive but dependent and intertwined. They accept the empirico-analytical paradigm appears to be the most dominant, due to EBP, but they claim it cannot be used in isolation to understand practice nor the knowledge that supports it.

Use of the Aristotelian terms, *episteme*, *techne* and *phronesis* in the contemporary world is difficult; the meaning of these words is not fixed and open to interpretation due to the changes in understanding since Aristotle's lifetime (Parry 2014, Svenaeus 2003, Waring 2000). The main controversy for healthcare centres on whether healthcare practice, especially medicine, is a *phronetic* activity or *techne*. Waring (2000) concludes medicine is not a *phronetic* activity because he interprets *phronesis* as a moral virtue, essentially part of being. It cannot be learnt, unlike *techne*, and used at the technician's disposal. In the use of a craft, there may be virtue or vice but in *phronesis* there is only virtue. Svenaeus

(2003) takes a different view, he believes *phronesis* is practical wisdom not just moral virtue. He regards Aristotle's exclusion of medicine as *phronesis* has more to do with Greek society at that time. Svenaeus (2003) also considers Aristotle regarded health as special because it cannot be produced by a doctor himself and is brought about by the doctor helping to restore equilibrium. He concludes healthcare is a *phronetic* activity as good practitioners know what to do for a particular patient at a particular time with the aim to restore health. It is more than *techne* because it is not simply craft which influences this decision. These views are strongly influenced by Gadamer (1977:1996) in his work 'The Enigma of Health'. Gadamer (1977:1996) takes a slightly different view, he believes clinical encounters between practitioner and patient are hermeneutic. Healthcare is a peculiar practical science because the goal is not to produce something, in this case the end of illness, but to return the equilibrium of health to the patient. This can only ever be uncertain and based on the individual. He sees the *episteme* of medical practice relating to the understanding of diseases, like Tonelli's (2006) concept of pathophysiological understanding. Modern scientific knowledge is a technology, a kind of mechanics that produces, constructs and makes, to help make things easier in the *techne* of practice. Gadamer (1977:1996) holds *phronesis* as a practical wisdom, an awareness appropriate to a particular situation and patient, this allows understanding between practitioner and patient so the 'right thing' can be done. Balancing *episteme* and *techne* facilitates restoration of the equilibrium of health.

### **2.7.6. Conclusion**

There are many different models which look to gain understanding about clinical knowledge. They relate to the connections between knowledge gained from research, theory, experience and the practitioner's ability to balance these and apply them critically to the patient's condition. Through this process clinical decisions are reached.

This study investigates MSK podiatry through the practitioner's understanding of evidence in their practice. MSK podiatry has extended podiatrists' scope of practice. It has allowed them to access a different group of patients and to diagnose and potentially cure their MSK injuries. This expansion has been based on theories devised by podiatrists themselves using a form of treatment, functional foot orthoses, to alter gait and reduce the MSK condition. However the theories used in practice have been either called into question or little research evidence to support them. Added to this the research evidence for the effectiveness of functional orthoses does not offer definitive evidence. As

podiatrists are supposed to undertake EBP, it leads to questions about the research evidence that is used in practice by MSK podiatrists. It appears that there is still a search for scientific legitimacy within MSK podiatry. This may be supplemented by the belief that applying EBP principles within MSK podiatry is the way to gain this legitimacy. It is clear from this literature review that applying EBP principles in MSK podiatry is problematic. There are fundamental issues with EBP as a concept that have not been addressed fully by its proponents, despite its importance to healthcare practice. It appears to be a limited model of clinical practice as there are other models which suggest that clinical knowledge is much more complex than EBP suggests. It is built from the synthesis of various forms and sources of evidence and knowledge.

This creates issues for MSK podiatrists as it appears there is little evidence to support the podiatric biomechanics theories. There is also a lack of research evidence to support the effectiveness of orthoses. The research evidence available is open to interpretation, therefore do practitioners interpret this in different ways? A lack of definitive research evidence to help clinical decision making may mean practitioners must use different forms of evidence in their practice. This lack of certain knowledge from the empirico-analytical paradigm may mean that practitioners use their professional craft knowledge to interpret evidence but this may be supported by their critical approach or practical wisdom. This thesis will look to explore this through discussions about the use of evidence in the participants practice.

# Chapter 3 Methodology

This chapter discusses the context of the philosophical positions which underpin this study. It represents the researcher's understanding of what it means to be in the world and how one knows what they know. These epistemological and ontological foundations are fundamental to social scientific inquiry.

This is an exploratory study using a qualitative research design employing hermeneutic inquiry. Semi-structured interviews are used to explore the participants' beliefs about the evidence they use in practice. The aims and objectives of this study concern the complex issue of podiatrists' beliefs and the influences that affect their decision-making about evidence. Higgs et al (2008) describe research paradigms as providing frameworks for generating knowledge and epistemology, at its most basic level, questions how what exists can be known. The epistemological position of this study is constructionism; social constructionism is the view that reality is constructed out of different social perspectives. It recognises knowledge and meaning can be created through the application of social norms. These norms may differ from one social group to another (Avis 2013). Constructionism can also be linked to the notion that there is no objective truth waiting to be found. It requires engagement with the realities that exist in the world. This engagement with the world enables truth, or meaning, to become evident, thus meaning is constructed and not found (Crotty 1998). Evidence for practice has been described as coming from three spheres of knowledge:

- I. *objective knowledge*, representing scientific and theoretical knowledge,
- II. *technical knowledge*, representing experiential knowledge,
- III. *practical knowledge*, representing practical wisdom plus tacit knowledge gained possibly from combining the other spheres in practice (Higgs et al 2008).

Since the knowledge used in practice is not based wholly in objective knowledge, this study is not suited to positivistic epistemology. A positivistic approach assumes a straightforward link between an object and our understanding of it. The truth about this can be explored scientifically and objectively. In contrast, an interpretative approach argues that it is impossible for the researcher to be objective because they are part of the research process. It contends our perceptions are socially, culturally, historically and linguistically produced and our understanding is determined by this place in the world. The

meaning of an object is attributed by the subject so meaning is not influenced by the object but by subjective thinking about that object (Finlay 2006). Denzin & Lincoln (2008) categorise qualitative research as four major paradigms; positivist and post-positivist, constructivist-interpretative, critical-emancipatory and feminist-poststructural. This study is about the interpretation of evidence and practitioners' beliefs about their clinical practice. When explaining the same phenomena these beliefs and interpretations will be constructed in different ways by different podiatrists and therefore are most appropriately situated in the constructivist-interpretative paradigm.

There is a close link between this epistemological approach and the ontology underpinning this study. Ontology is concerned with the nature of being in the world and making sense of our reality. The theoretical perspective serves to inform the selection of the most appropriate methods to gather and analyse the data (Crotty, 1998). This study explores the phenomenon of 'evidence in practice' and it is unlikely participants will have the exact same view. Studying a phenomenon with a constructivist-interpretative approach lends itself to a relativist approach in ontology. This position can be described as acknowledging the diversity of interpretations that can be applied. There is not a single reality about the world, rather experience and meaning are relative and open to considerable variation (Finlay 2006).

Finlay (2006) states there needs to be a coherent route through this myriad of approaches because there is some flexibility to combine approaches. This route must be guided not only by the aims and objectives of the study but also by the researcher's beliefs and values as they are part of any qualitative study. This flexibility in approach can appear to offer the researcher freedom but it also means the scope of choices is large and diverse. Hermeneutic inquiry is concerned with the theory and practice of interpretation (Higgs et al 2008). Consequently it appears to be the most appropriate approach but this is not so straightforward.

Hermeneutics is an approach to philosophy linked to phenomenology. Denzin & Lincoln (2008) place phenomenology in the constructivist-interpretative paradigm along with ethnography and narrative analysis. Finlay (2006) describes phenomenology as part of both critical realist and interpretivist paradigms but she uses phenomenology to show there are many different variants within the broad qualitative methodologies. Descriptive phenomenologists are inspired by the philosophy of Husserl while hermeneutic

phenomenologists follow Heidegger's philosophy to focus on existential dimensions and finally, interpretative phenomenological analysis (IPA) as another hermeneutic variant focusing on an individual's cognitive, linguistic, affective and physical being. Holloway & Wheeler (2010) explain the different paths of phenomenological approach by presenting three examples of these variants used in healthcare research. Descriptive phenomenology, using Giorgi's methods of analysis based on Husserl, has been used to understand the lived experience of massage in breast cancer patients. Existential phenomenology, utilising the work of Merleau-Ponty, explored the embodiment of chronic pain for patients. Hermeneutic inquiry, employing Gadamer's philosophy, examined clinical reasoning and decision making in cardiorespiratory physiotherapy. This final study by Smith et al (2008) demonstrates that hermeneutic inquiry has been used as an approach to investigate practitioners' beliefs about a phenomenon, clinical reasoning, in practice.

The appropriateness of the variant of approach used should be justified. To explain why a hermeneutic approach was chosen for this study the development of this philosophical approach must be explored.

### 3.1. Phenomenology

Phenomenology is a disciplinary field in philosophy. It has been defined as the study of 'phenomena' things as they appear in our experience or the ways we experience things. It studies conscious experience as experienced from the subjective point of view and the meaning things have in our experience (Smith 2013). He states this definition is debatable as phenomenology encompasses a wide range of things known as phenomena. It addresses the meanings of things, such as the significance of objects, events, concepts, the flow of time, self and others, as they arise and are experienced in our own 'life-world'. This debate about the methods and characteristics of the discipline is one of the major debates of modern philosophy (Smith 2013). Moran (2000) states phenomenology has gradually developed into the most important current of European thought as it encompasses a wide range of theoretical outlooks, has been applied across various practices and has developed into a programme which has called into question the future of philosophy. Finlay (2006) describes it as an umbrella term for both a philosophical movement and a wide range of research approaches focused on the way things appear to us through our consciousness or experience.

Phenomenology has its roots in the philosophy of Husserl (1859-1938), regarded as the founder of the movement; it introduces the concept of lived experience and posits that description of these experiences, through a process of reductive interpretation, would reveal the essence of a phenomenon (Moran 2000). Husserl believes pure descriptions of lived experience are possible by getting to 'the things themselves' meaning phenomena are *a priori* essences of whatever immediately appears to consciousness in the manner that it actually appears (Moran 2000). It involves stepping outside of our everyday experience in order to be able to examine that everyday experience. Husserl states adopting a phenomenological attitude requires us to turn our gaze to our perception of objects in the world rather than the objects themselves (Smith et al 2009). He considers a key concept of our consciousness is intentionality, the notion that consciousness is always conscious of something and through our consciousness we experience the world. Intentionality is the relationship between the process occurring in our consciousness and the object of attention in that process. This process of attributing meaning to a situation involves both reflection and recognition (Moran 2000, Smith et al 2009). In this way, we classify, describe, interpret, and analyse structures of experiences in ways that answer to our own experience (Smith 2013).

Another key element of adopting a phenomenological attitude to uncover the pure description of experience involves a method of *epoché* or bracketing. This is the putting aside of all scientific, philosophical, cultural and everyday assumptions to allow us to view the essences of consciousness as if we have come to them as new. This process of reduction allows phenomenology to become a 'pure' science of consciousness (Moran 2000, Smith 2013). This concept of bracketing is fundamental to Husserlian phenomenology (Finlay 2013). In the context of this study bracketing could be seen as a barrier because it would be difficult for the researcher to put aside notions about the phenomena to be investigated. Since this study looks to gain an understanding of meaning of evidence in practice for MSK podiatrists, the researcher will need to use insight into this area to gather rich data from the participants. Bracketing also led to a major split in the phenomenological movement; Heidegger, Gadamer, Levinas, Sartre and Merleau-Ponty, all successors of Husserl, came to believe this concept is impossible, almost absurd, as we are always 'being in the world' therefore we cannot completely put aside our everyday assumptions to view consciousness without context (Smith 2013). These splits between Husserl and his colleagues caused him to say he had become 'a leader without followers' (Moran 2000). The difficulties of a Husserlian phenomenological approach to gain an understanding of podiatrists' beliefs about evidence led me to another branch of phenomenology, hermeneutics.

## 3.2. Hermeneutics

Hermeneutics is the study of theory and practice of interpretation. In Western culture, it stems from Ancient Greek philosophy and through the Middle Ages and the Renaissance it was a crucial branch of Biblical studies. With the Enlightenment, the status of hermeneutics changed to become more philosophical with the work of Friedrich Schleiermacher (1768-1834) and Wilhelm Dilthey (1833-1911) and the question 'how do we read?' became 'how do we communicate at all?' (Ramberg & Gjesdal 2014). Modern philosophical hermeneutics originates from the phenomenological movement and was first developed by Martin Heidegger (1889-1976) as he began to distance himself from Husserlian phenomenology and gave hermeneutics what has been termed its ontological turn. Heidegger, in his work *Being and Time* (1927), came to believe hermeneutics is one of the fundamental conditions of man's being in the world. We are interpretive beings; we reach understanding about the world by interpreting and encountering what has already been interpreted by ourselves and others. Hermeneutics was an existential task (Moran 2000, Ramberg & Gjesdal 2014). Heidegger also separates himself from Husserl as he drops all references to the central concepts of Husserl's phenomenology. He denies phenomenology is a method in any specialised sense, he takes it to be a new way of seeing and understanding rather than a set of philosophical propositions. It links to his concept of *Dasein*, literally being-there, but is understood as human existence and is represented by 'being-in-the-world'. He views phenomenology as being able to understand *Dasein* through a hermeneutic with the intention to deliver an interpretation of being. On the one hand this interpretation is guided by the historically embedded culture we bring to the task and on the other it is open to constant revision and enhancement (Moran 2000, Wheeler 2013).

Heidegger reconsiders the hermeneutic circle as an interplay between self-understanding and understanding in the world (Ramberg & Gjesdal 2014). He also insists all questioning must have some presupposition to formulate the question therefore we can only see the answer in light of what we already know (Moran 2000).

As Heidegger's hermeneutics is an existential, almost metaphysical, task it is difficult to see how this could be applied as an approach to a method. This study focuses on podiatrists' beliefs about evidence for practice and thus appears unsuitable for Heidegger's existential phenomenology. Practice may be an important part of the lived world for

podiatrists but it is unlikely to be an essential essence of their existence as a being. Furthermore, Holloway & Wheeler (2010) describe the fundamental structures which are essential for Heidegger's being-in-the-world as being the way the body occurs, the co-constituting of temporal structures, the meaningful world of place and things and the quality of interpersonal relationships. These structures do not seem to be readily applicable to this study. The existential nature of Heidegger's hermeneutics suggests it is inappropriate for this study.

A student of both Husserl and Heidegger, Hans-Georg Gadamer's (1900-2002) focus of work was to develop and explore philosophical hermeneutics (Ramberg & Gjesdal 2014). Though Gadamer's hermeneutics is fundamentally an extension of Heidegger's work, it also embraces the theory and practice of interpreting texts and conversations converted into text, relevant for the qualitative method of this study. Gadamer's study of hermeneutics is described in his work *Truth & Method* (1960), which took over thirty years to complete (Ramberg & Gjesdal 2014). His work takes a dialogical approach to review classic Greek philosophy and links this to Heideggerian thinking to see interpretation as the central manner of the 'being-in-the-world' and place understanding in the linguistically mediated happening of tradition (Malpas 2015, Moran 2000, Ramberg & Gjesdal 2014). According to Gadamer, hermeneutics is essentially the study of understanding the way meaning emerges, it is an ongoing, never completable process rooted in human existence and located in human language. He furthered Heidegger's concept of the hermeneutic circle, adding the interpreter brings their fore-judgements to any enquiry and therefore can only disclose answer in the light of what is already known. Fore-judgements may distract the interpreter and lead to misinterpretation; therefore, for understanding to take place, the interpreter must focus on the things themselves, in this study the participants' comments on evidence in practice. The circle involves a movement between the specific and the whole, between projection of meanings and anticipation of understanding. The aim of this process is to uncover and explicate meaning so understanding can occur (Gadamer 1975:2012). Gadamer's hermeneutics can be broadly divided into three main sections; the positive use of 'prejudice', the tradition of understanding and the importance of language (Malpas 2015).

### **3.2.1. The positive use of 'prejudice'**

Gadamer does not use the term 'prejudice' in a pejorative sense, as a false judgement, instead he means it as a judgement which is rendered before all the elements which

determine a situation have been fully examined (Gadamer 1975:2012). This links to the hermeneutic circle as the prejudgements are the fore-structures of understandings. Gadamer takes this further in that all interpretation, even of the past, is always linked to present interests and concerns; this allows us to enter into dialogue with the matter at issue (Malpas 2015). Dialogue brings out presuppositions and prejudgements and, though prejudices cannot be eliminated, they can be made visible and can work for us (Moran 2000). Prejudices are not necessarily unjustified or erroneous, but they can inevitably distort the truth. They constitute the initial directness of our whole ability to experience. They are the biases of our openness to the world and are simply the conditions whereby we experience something. These prejudices are the platform from which we launch our attempt at understanding (Gadamer 1976).

Two elements of prejudice affect this study. Firstly I must be aware of any prejudice and use it to grasp meaning from the participants. These prejudices are brought into focus through hermeneutic reflection, by understanding ourselves we can gain a greater understanding of our world (Gadamer 1976). Hermeneutic reflection can be seen as a form of reflexivity as this is positive evaluation of the researcher's own experience in order to understand the fusions of horizons between the participants and the researcher (Finlay 2003). The use of reflexivity in this study will be discussed later in this chapter. Secondly, positive use of prejudice allows insight into the beliefs and prejudices of the participants and the meaning they give to evidence for practice and understanding of podiatric biomechanics. New understandings emerge from a complex dialectic between the researcher's past pre-understandings, the research process and the participants' and researcher's self-interpreted constructions. This development of Gadamer's hermeneutics must be a fundamental element of this approach.

### **3.2.2. The tradition of understanding**

Gadamer links prejudice as the fore-structure of understanding to another concept, that all understanding is supported by 'effective history' (Moran 2000). The tradition and culture an interpreter brings to text or phenomena influences the act of understanding.

Understanding and interpretation always occur within a particular 'horizon' determined by our historically-effected consciousness (Gadamer 1975:2012, Malpas 2015). 'Horizon' is a phenomenological term; Gadamer took this notion from Husserl's horizons in an act of perception (Moran 2000). A work or text cannot be known as it appeared to its contemporaries because it is viewed through the 'horizon' of our culture and tradition. It

does not restrict us but opens up the possibility of gaining new understanding of texts and also ourselves (Ramberg & Gjesdal 2014). Understanding occurs when there is a 'fusion of horizons'; the horizon of the interpreter is open to the horizon of the text so what is unfamiliar, strange or alien can be engaged with. This process is ongoing and never reaches a final completion. Our horizon is constantly changing in the light of knowledge and new understandings (Gadamer 1975:2012). Interpretation can be of conversations as well as texts. Malpas (2015) describes understanding as a matter of negotiation in the hermeneutical dialogue between oneself and one's partner, in this case the participant and myself coming to an 'agreement' about the matter at issue. I have the same professional tradition and culture as the participants and therefore should be able to make sense of the factors which contribute to a podiatrist's 'horizon'. Dialogue allows the fusion of our horizons and subsequently understanding of the phenomenon, the meaning the participants give to evidence, can arise. This process of interpretation is strongly linked to reflexivity; understanding of the phenomenon is achieved by also gaining an understanding of ourselves. This forms the hermeneutic circle, a constant process of gaining knowledge and knowing ourselves (Gadamer 1975:2012, Moran 2000, Ramberg & Gjesdal 2014).

### **3.2.3. The importance of language**

For Gadamer (1975:2012) understanding and interpretation can only be achieved because of language; all understanding of the world is linguistically based and essentially a matter of conceptual articulation. We are 'in' the world as a being 'in' language (Gadamer 1975:2012, Malpas 2015). We learn to know the world by learning to master a language (Ramberg & Gjesdal 2014). Language is the universal horizon of hermeneutic experience; it concerns our fundamental mode of being in the world (Malpas 2015). Language carries the values of the culture and tradition which supports it and brings this culture to life (Moran 2000). Gadamer does not regard language as a constraining force but rather the medium by which we open the world to ourselves. Language is perceived as conversation which allows us to come to an openness with the world and with others (Moran 2000 Malpas 2015 Ramberg & Gjesdal 2014). In-depth interviews are described as purposeful conversations to uncover the meaning of subjects' experiences and their lived world (Kvale & Brinkmann 2009). Analysis of the language of podiatric practice offers the researcher the opportunity to gain an understanding of the meaning of evidence in practice.

### 3.3. Choosing an Approach to Analysis

Holloway & Wheeler (2010) advise researchers to be guided by their philosophical approach in choosing the most appropriate procedural steps in data analysis. They describe two approaches, Giorgi and Colaizzi's procedural steps. Both are examples of descriptive phenomenological analysis which involve the researcher bracketing themselves from their research. They are inappropriate for this study because I am an MSK podiatrist as well as a podiatry academic which renders bracketing problematic and also I take the view that this is not possible. In line with the views of Gadamer and Heidegger, I believe it is difficult to put aside experiences and biases; it is better to address them through reflexivity and use them to gain understanding about the phenomenon being studied.

This study therefore requires a procedure for data analysis based in the philosophical approach used, hermeneutics. Development of these procedures is largely based in psychology rather than healthcare. Finlay (2014) summarises the major procedures for data analysis within hermeneutic and phenomenological approaches with descriptive and interpretative examples. She names two routes as interpretative procedures; Van Manen's hermeneutic phenomenology and Smith et al's Interpretative Phenomenological Analysis (IPA). Many other variations of hermeneutic phenomenology exist but she believes these are the two principle procedures used. The following table outlines the differences between these two approaches.

### 3.3.1. Hermeneutic phenomenological approaches to data analysis

Table 1 - Hermeneutic phenomenological approaches to data analysis

Approach	Philosophical basis	Authors	Method
Hermeneutic Phenomenological - Van Manen's four existentials of temporality (lived time), spatiality (lived space), corporeality (lived body) and sociality (lived relationship to others) illustrate a fusion of the objectivist hermeneutic circle (part-whole) and the alethic hermeneutic circle (pre-understanding).	Heidegger's existential phenomenology	Max Van Manen	The mode of data collection and analysis are considered to be most suitable for their sample and phenomenon of interest. Thematic analysis is conducted on the data and involves some acknowledged interpretation. The findings are viewed to be influenced by the researcher's interpretations.
Interpretative Phenomenological Analysis (IPA) - this is a hermeneutic approach. There is less focus on description and more focus on interpretation and engagement in a wider cultural, social and theoretical context.	Heidegger's/Gadamer's Hermeneutics	Jonathan Smith, Paul Flowers and Michael Larkin	Interviews would be conducted and individual experiences illustrated through thematic analysis. IPA is inductive and grounded in the data, focusing on emergent themes

This table shows IPA uses Gadamer's hermeneutics as part of the philosophical basis. Smith et al (2009) describe it as a qualitative, experiential and psychological approach informed by three key philosophies of knowledge; phenomenology, hermeneutics and idiography. I am not a psychologist nor is this study about the psychological effects of evidence in practice. However, Smith et al (2009) do not regard this approach as exclusively psychological, they assert it can be used by many other disciplines if the study is concerned with examination of the experiential. Pringle et al (2011) consider it an adaptable and accessible approach which enables the researcher to reach, hear and understand the experiences of participants. They conclude analysis should be informed more by a general psychological interest rather than a 'pre-existing formal theoretical position'. This allows different disciplines to draw on theories from a number of sources during a discussion of interpretation, while still grounding the interpretation firmly in the text

of participants' words. Hale et al (2007) maintain IPA is an established method of data analysis in healthcare research. The approach combines description and personal interpretation of experience within the context of the life and surroundings of an individual. IPA has been used in several studies related to professions and professional identity (Chapman & Clucas 2014, Hughes & McCann 2003, Maringer & Jensen 2014). Smith et al (2009) also highlight IPA has been used in studies focused on identity, especially when associated with periods of transition. Although this study is not psychological in origin, it examines MSK podiatrists' interpretation of evidence in practice and links to professional knowledge and identity. It explores the participant's lived experience of practice and how evidence forms part of this lifeworld. Therefore IPA is an appropriate choice to use as a data analysis procedure.

### **3.3.2. Adopting a phenomenological approach**

Finlay (2013) suggests the essence of the phenomenological research approach encompasses the following five mutually dependent and dynamically iterative processes: **Embracing the phenomenological attitude** - This can be seen as 'seeing afresh'. It is important to try to break away from our own 'natural attitude' and find a way to stay open to new understandings. This is most closely associated with the notion of bracketing of descriptive phenomenology. However hermeneutic researchers can use reflexivity to examine their attitudes and beliefs to enable them to move beyond previous understandings. Gadamer (1976) states it is our prejudices which constitute our being, these biases are our openings to the world. We can let them restrict us to a narrow view or we can embrace them and be opened up to the new, the different and the true. In this study, reflexivity and embracing of my prejudices will lead to an understanding of the use of evidence in podiatrists' MSK practice.

**Entering the lifeworld** - Lifeworld is the matrix of meanings inherent in our ongoing relations with our world. It is also linked to our sense of self, which is always in relation to others given through shared language, discourse, culture and history. It would be easy for me as the researcher to look at this lifeworld and claim it is my own, as also being an MSK podiatrist it is my lifeworld too. Yet each individual has a unique vantage point of their lifeworld therefore it is important to link this back to the previous statement about understanding my prejudices and biases and using them to my advantage. It is also vital to remember though my lifeworld may be similar to the participants' lifeworlds, it is not the same.

**Dwelling with horizons of implicit meanings** - It is the researcher's task to engage the phenomenological attitude to go beyond participants' words and reflections in order to capture something of implicit horizons of meaning (Finlay 2013). Smith et al (2009) describe the analysis in IPA as a process of fluid description and engagement with the transcripts. It is multi-directional, there is a constant shift between the different stages, it is open to change and only 'fixed' in writing up. In this study this meant the constant writing up process and multiple versions of the findings section.

**Explicating the phenomenon holistically** - Finlay (2013) claims this stage involves the focus of any explication needs to be on unpicking both manifest and hidden meanings through iteratively examining the data. Smith et al (2009) argue IPA studies become more plausible and persuasive by presenting an evidence trail. The evidence trail for this study is discussed in detail in the methods chapter.

**Integrating frames of reference** - Finlay (2013) believes explication of the phenomena cannot be truly phenomenological without being grounded in the philosophical approach used. IPA is based in the hermeneutic-phenomenological approach of Heidegger and Gadamer (Smith et al 2009). This study is based in Gadamer's hermeneutics and will look to link the findings to Gadamer's work, notably his work the Enigma of Health (Gadamer 1996), and to his connections to Ancient Greek thought, particularly Aristotle (Malpas 2015, Moran 2000). The framework enables explanation of the 'horizon' of podiatrists through the concept of 'verstehen'. This characteristic is concerned with understanding and interpreting the actions of social actors and trying to grasp what those actions mean to them. This is combined with analysis of the social-structure and historical circumstances in context with how these meanings are realised (Layder 2006, Ransome 2010). This study looks at the participants' beliefs about evidence together with the use and interpretation of evidence in their practice. Thus understanding of the participants views can be given meaning in context of their social actions and in the historically situated culture in which they occur. This could be effected by epistemological privilege in that the participants may have been intimidated by my perceived academic knowledge and expertise in MSK podiatry (Griffiths 1998, Janacek 1997). Therefore before each interview it was important to put the participants at ease to ensure they did not view the interview as a test of their knowledge.

### **3.3.3. Hermeneutics in IPA**

Gadamer's hermeneutics, as discussed above, form a crucial part of IPA. Smith et al (2009) also influenced by Schleiermacher, suggest the researcher can offer a deeper

perspective of the interviews than the participants themselves through systematic and detailed analysis of the text. They also regard Heidegger's work, which grounds IPA in phenomenology as an existential task, causes them to re-evaluate the role of bracketing in the analysis of qualitative data. If linked to reflexivity and a cyclical process, then bracketing can never be fully achieved. This led them to develop a more practical interpretation of the hermeneutic circle. Smith et al (2009) contend the hermeneutic circle is concerned with the part and the whole at a series of levels. To understand any given part you have to look at the whole; to understand the whole, you have to look to the parts. The example they use is the meaning of a word can only become clear in the context of a sentence. At the same time, the meaning of a sentence depends upon the cumulative meanings of the words. The circular nature of this process comes from the researcher moving between the parts and the whole and back again to explicate meaning. In this study the parts and the whole are words, sentences, paragraphs, extracts, interviews and this thesis. During analysis I have constantly moved between the parts and the whole to gain an understanding of the participants' beliefs about evidence and practice.

Smith et al (2009) describe IPA as a systematic, flexible, multidirectional analytic process. Researchers engage a 'double hermeneutic' whereby participants are seen to make sense of the phenomena while researchers make sense of the participants' sense making (Finlay (2014). Smith et al (2009) maintain the researcher must combine a hermeneutic of empathy along with a hermeneutic of questioning or suspicion. I should attempt to see it from the participants view and stand in their shoes whilst also stand beside them and look at them from a different angle; the latter uses theoretical perspectives from outside to shed light on the phenomena. Researchers are then advised to explore the semantic content and language used at a number of levels: descriptive, linguistic and conceptual. I have tried to remember these types of hermeneutic during analysis, trying to see things from their viewpoint but also to stand back to make sense of them and their beliefs by questioning and puzzling over the things they say in the context, then using the interpretative work of the researcher to make sense of it.

### **3.3.4. Idiography**

This largely centres on a debate within psychology about whether research should be either nomothetic or idiographic. Nomothetic is concerned with making claims at group or population level and establishing laws of human behaviour. Alternatively idiographic is focused on the individual and the particular (Smith et al 2009). This could be seen as problematic; this study is of the individual and also a group of individuals, MSK podiatrists.

The idiographic elements of IPA are presented on a theoretical level as linked to Heidegger's concept of being-in-the-world in that, though experience is uniquely embodied and seen from an individual perspective, it is also immersed and situated in a world of things and relationships. An essential part of IPA is a commitment to describing the particular by the depth of the analysis to illustrate the phenomena in detail. It is also committed to understanding how particular experiential phenomena is understood by particular individuals in a particular context. This is the idiographic element (Smith et al 2009). In this study analysis must demonstrate the individual views of the participants but set them in context of the current state of podiatric practice.

### **3.4 Reflexivity**

Hermeneutic reflection is a key element of Gadamer's philosophy. It brings awareness of our prejudices and pre-understandings to our conscious so we gain a new understanding of what previously we may only have seen through eyes conditioned by prejudice. He likens this reflection as 'opening up something which would have happened behind my back'. Through hermeneutic reflection, Gadamer's interpretation of the hermeneutic circle comes to life; we come to understand and know the world, texts and discourses through knowing and understanding ourselves and our prejudices (Gadamer 1976). Finlay (2003, 2013, 2014) and Holloway & Wheeler (2010) see this as a form of reflexivity and an essential part of hermeneutics as a method. Reflexivity will be used to demonstrate this self-understanding as Finlay (2003) states reflexivity is the 'process of continually reflecting upon our interpretations of both our experience and the phenomena being studied, so as to move beyond partiality of our previous understandings'. It also allows the reader to gain an understanding of how my understanding, historicity and cultural location have facilitated new understanding about evidence and how it is used in podiatric practice.

During the course of this study I have kept a reflexive journal to allow insight into my thoughts and prejudices. This journal is too large to be practical to add as an appendix but it forms the basis of the sections at the beginning and end of the thesis, entitled journey to this research and how the research has changed me. It also forms the basis of the next two sections about my horizon, which looks at the influences on my beliefs, and my life in podiatry, which looks at my career as a podiatrist and how this may link to my understanding of podiatric biomechanics.

### **3.4.1. My horizon**

The following personal background information may enable the reader to understand me as the researcher, my prejudices and biases and then take a view on whether my interpretations are valid and fair.

I am a middle aged married man and I have lived most of my life in Manchester, with a sojourn of 10 years to Leeds. My father is a teacher, which may have had an influence on my current career. His profession may label my family as middle class but we lived in a strongly working class area. I would describe my politics as broadly socialist but I have not always voted Labour. This may have relevance as this may account for my support of the NHS, as I consider its core value, of providing healthcare on clinical need rather than ability to pay (NHS Constitution 2015), as its greatest virtue. However I understand as healthcare costs rise this principle is under threat. The challenge for the future will be if it is not possible to sustain this principle, then how will fairness and equity be maintained. In terms of this study, my horizon must not allow me to favour the participants who work in the NHS. Also, I need to take care not to make negative judgements about those who work in private practice. I should understand that they may have different priorities and responsibilities, as I have little experience of working in this environment.

One element which must be discussed is that I am a practicing Roman Catholic because it may influence how I feel about science. Science is based on empiricism, which is based on observation and experimentation, whilst I have a belief in the unobservable. This may also seem ironic given my lack of understanding of the dogmatic views previously mentioned. It may also be a simplistic view that Catholicism and science are irreconcilable since there are many scientific discoveries made by Catholics, the Big Bang theory is an example. My beliefs may account for a scepticism about science. I cannot deny a belief in the unobservable is part of a Catholic's life, yet there are also 'social' reasons why I'm a practicing Catholic. I come from a close and happy Catholic family and one of the reasons we believe we are happy is connected to Catholicism. It offers a way to live that if you can follow actually helps you to cope with life's difficulties; it is a tradition, culture and a way of thinking. As it appears to work for my family it is a difficult thing to dismiss for myself. I am not a dogmatic Catholic and I believe, despite many traditions which appear to be contradictory, it is focused on the individual and it is a deeply personal approach to life.

This does not automatically put me in opposition to science. It may mean I consider science has limitations as not everything is observable but common sense informs us science can help to tell us about the world. I have tried throughout this process to have a balanced view about science and the belief in science.

My faith also may account for my interest in hermeneutics as its origins lie in the interpretation of the Bible, though Gadamer's hermeneutics are not religious they could be described as humanist. It is through your upbringing, and the changes which happened during that time, that you recognise that interpretation changes over time. Though Catholic guilt may be a cliché, there is an important element of examining your conscience that I think makes reflective practice and reflexivity feel natural to Catholics. I was also more interested in history than in science at school. This may account for why I find hermeneutics, therefore qualitative research, so interesting though initially I would have said my interests lay in quantitative research. My interest in history rather than science may have influenced my choice of approach. I used hermeneutics as the method for my MSc dissertation and it allowed me to see that this type of research had something important to say. I found phenomenology very interesting but could not quite understand the bracketing and thought that it did not seem possible. This led to me hermeneutics, but then whether to go with Heidegger or Gadamer? Again I made a decision, for non-scholarly reasons than maybe I should have. I rejected Heidegger because I found his links to Nazism unpalatable which left Gadamer, who kept a low profile during the Nazi period. However, after studying both approaches in more depth for this current study, I now consider that Heidegger's concept about hermeneutics are too existential to be used for this type of study, whereas Gadamer's work takes such work and grounds it in a more practical approach. It is also important for me to appreciate that I am a part of this research study and not an objective observer of the process.

It is for the reader that I have added this section, to use Gadamer's phrase, 'to bring from it behind my back where it can be seen and understood' (Gadamer 1976).

### **3.4.2. My life as a podiatrist**

The previous section demonstrates the many beliefs I hold may be influenced by my culture, which in turn may also affect my biases and prejudices. However, this is only part of me. My podiatric career has always involved biomechanics and the use of functional

orthoses to treat MSK conditions. However my development as a podiatrist may have been influenced by the changing culture within podiatry and the events which have occurred during my podiatric career. This links to the chosen approach as allows to the reader to understand my tradition of understanding (Gadamer 1975: 2012) within podiatric biomechanics. These factors may have a strong influence on my interpretation of the literature about podiatric biomechanics and the effectiveness of functional orthoses as discussed in the previous chapter.

I qualified as a podiatrist in 1995, a member of the first cohort to gain honours degrees at the University of Huddersfield. At the time I was unaware of the significance of the awarding of degrees on the status of podiatry as a profession and that I was part of the start of the launch of podiatry's professional project. Podiatrists also began to develop their own research culture to become a more scientific profession (Borthwick 1999). I was fortunate to be taught by Jim Woodburn and Tony Redmond who both became professors of podiatry through their research. Their enthusiasm for research had an effect on me; I wanted to work as podiatrist but also wanted to be involved in research. I believed research would enable us to show podiatry has an important role in healthcare and is an underused and ignored profession. My final year research project was a survey of the patients that had been treated for patellofemoral pain with orthoses. Looking back on it now it was a naive study but it did show 70% of the 35 patients were very satisfied with their treatment using functional orthoses; my first taste of patient satisfaction following treatment with orthoses. These results could be seen as the onset of my view that orthoses are an effective treatment for certain MSK conditions.

My choice of dissertation topic illustrates my interest in podiatric biomechanics from the start. I had a grasp of the basics of Subtalar Joint Neutral (STJN) theory, known at the time as Rootian theory. Some of my colleagues could not fathom this area of practice but I could help them to understand biomechanics which gave me confidence. I now believe we were actually taught a modified version of Rootian theory, to use Rootian theory as a starting point because actually some of the theories expounded by Root could not be seen in practice; it was a guide not a dogma. We learned about the research which called Rootian theory into question. Also we had guest lecturers, including Tim Kilmartin talking about his famous study which shows using orthoses as a treatment does not affect the progression of juvenile hallux abducto-valgus. We were taught to focus on the injury the

patient had rather than the potential biomechanical abnormality. I have since come to appreciate this was probably an unusual grounding in podiatric biomechanics.

During the eighteen months following graduation, I worked for Mancunian Community NHS Trust as a basic grade podiatrist and I learnt a lot about podiatry. I had the opportunity to treat some MSK injuries, then known as biomechanics, but it was on an ad hoc basis. I realised some of my more senior colleagues had differing views to me about biomechanics, following Root theory quite dogmatically, and it led to some interesting conversations about Root theory. I began to appreciate, although my training with regard to understanding research evidence had been different to others, there were plenty of colleagues who used Root theory as a guide not gospel in the light of their experience. I recognised I had little practical experience and that interestingly my colleagues were less concerned with the theories and more concerned with positive outcomes for their patients. Though I had a good understanding of the theories, I realised I had much more to learn about diagnosing MSK conditions and to also develop my orthotic manufacturing skills.

I moved to Harrogate Community NHS Trust for a Senior II post which included some weekly biomechanics sessions to work alongside a colleague who had to treat all the MSK patients. I was fortunate my colleague was very experienced using podiatric biomechanics and was open and considered in his views. I learnt lots from him about the practical aspects of MSK podiatry and improved my orthotic manufacturing skills. At that time, there was a lot of freedom to experiment within the NHS, which is different to how it appears to be now. I maintained my interest in research. Although there was little opportunity for quantitative research, I worked with the clinical governance team undertaking audit and patient satisfaction surveys. I also set up a joint clinic, working alongside a physiotherapist, for cases both departments were struggling to solve.

This was an enjoyable time in my career but two different events had a big influence on my opinions. I was becoming frustrated because, despite spending much of my time treating MSK patients and running the joint clinic, there was no opportunity for promotion to a higher band. With Agenda for Change on the horizon, I decided to enrol upon a Master's programme in an attempt to ensure I would be banded higher. I chose to enrol on the MSc in Sports and Exercise Injury Management course at Leeds Metropolitan University, which was actually a physiotherapy MSc, a choice influenced by the subject matter and the fact that there were no podiatry MSc courses in the Yorkshire region at that time meant I could

get Strategic Health Authority funding for this particular course. Regardless of the slightly mercenary reason for this choice, it had a profound affect on me, taking me outside the world of podiatry, which can be insular at times, and allowing me access to the issues and arguments within another profession. I observed differences between us but realised they were not as great as they first appeared. Also studying research methods made me realise the quantitative research methods had changed, RCTs were now promoted as the best evidence, and I had my first encounter with EBP. I was introduced to qualitative research, an unfamiliar topic that I did not really understand. The difficulties in undertaking any quantitative research about MSK podiatry soon became clear and this was the point when I began to realise that setting up a robust study was not quite as easy as I had thought. Knowing less about qualitative research, I decided to use my dissertation as an opportunity to improve my understanding and I researched how physiotherapists and podiatrists work together in MSK practice.

Another event to affect my opinions, was joining a regional MSK team created to provide CPD for podiatrists working in the Yorkshire region. It soon became obvious that I was in a cocoon in Harrogate with my colleague. I realised the landscape of podiatric biomechanics had altered and more people were very entrenched in their views. The team struggled to work together because of this, though I tried to compromise and understand differing views to allow the group to function. We eventually devised a session we could run as CPD but three members of the team felt unable to put their name to it and left the group. I was shocked and became fascinated with why their views were so firmly held. When the group first began I was unsettled by discussions about Kirby's work, Danenberg's work and the Biomechanics summer school, all of which I knew little about. There was also a strong rejection of Root theory from some members, not the modified version I had learnt but the dogmatic version, an opinion I thought had gone long ago. After that first meeting, I read all the articles I could about these 'new' theories and anything about orthoses. I discussed these with my colleague and we were slightly bemused; after appraising the available research we believed the new theories were complex and interesting but they actually had little patient evidence to support them. People were strong supporters of these theories but, to me, there was little reason for this strength of support. This culture still exists today; online forums such as Podiatry Arena, show strongly held views still abound but few have clear evidence to support them or differentiate them from what has gone before. It appears firmly held views with little

definitive evidence are important in MSK podiatry and I am still intrigued by it. This is one of the reasons I initiated this study.

Running the CPD course, being a placement facilitator and a spell as a clinical demonstrator in the University of Huddersfield clinic led me to realise I enjoyed teaching and was able to communicate with students. When a job at the University of Huddersfield became available in 2004, I applied for it and I have worked at the University ever since. I quickly began to appreciate the teaching of podiatric biomechanics now consisted of a more dogmatic version of Root theories than I was taught as an undergraduate at this University. Also in response to criticism from placement facilitators about how MSK podiatry was being taught, together with my colleagues we began to bring about changes to encompass the other theories and also a problem-based learning approach to applying these in practice. It has been a surprisingly long road because, to teach this subject, there should be supportive research evidence yet the evidence is unexpectedly complex and seems mainly to be based on a podiatrists' opinion of 'it works for me and my patients'. There appears to be lots of conflicting evidence so it still makes me wonder why some podiatrists hold such strong views.

I also firmly believed research was good for podiatry and research should be able to demonstrate that orthoses work as a treatment. It is a source of frustration for me that randomised controlled trials (RCTs) do not seem to mirror the results I get in practice. It is another reason why I wanted to study this area of practice; to try to see if this was the case for other podiatrists.

# Chapter 4 Method

This section explains the working methods used in this study; how decisions were made with respect to accessing participants, recruiting the sample and the difficulties encountered. Methods used to generate and analyse data are detailed along with the fundamental connection this makes with the methodology. Measures taken to ensure the method is credible and valid, as well as the framework used to establish quality are examined.

## 4.1. Recruiting Participants

### 4.1.1. Ethics approval

Ethical approval was granted by the University School Research Ethics Panel. Participants working in the NHS who take part in research are subject to the policies of the Health Research Authority. As they are NHS employees talking about their professional roles, at the time of data collection, it did not require review by regional ethics committee (NRES 2011). An NHS research passport to enable the researcher to interview participants on NHS premises was granted by a local NHS Trust. All participants who work in the NHS were given permission by their Trust Research & Development department and their line manager for the interview to take place. All the private practitioners were self-employed and responsible for agreeing to take part in this study. They were interviewed at their own place of work. The podiatry academics were given permission by their line managers, after checking the study had received the appropriate approval, to enable them to take part in the study. They were also interviewed at their place of work.

The principles of autonomy, beneficence, non-maleficence and justice outlined by Beauchamp & Childress (2013) guided the ethical considerations of this study.

**Autonomy** - Participants make an informed judgement to take part in research. It is the right to self-determination (Beauchamp & Childress 2013, Parahoo 2014, Polit & Beck 2013). All participants were volunteers and gave their consent freely after being informed about the study verbally and in writing. The participants were fully informed about the nature of the study before agreeing to take part and advised they could withdraw at any

time. It was explained if they wished to withdraw after the interview had taken place there would be a discussion about whether data from their interview would still be used in the study. They were instructed it was not automatic their data would not be used in the study. No participant, after agreeing to be interviewed, withdrew from the study.

**Beneficence and Non-maleficence** - These are the closely linked principles of doing and promoting good and not inflicting and preventing harm (Beauchamp & Childress 2013, Parahoo 2014, Polit & Beck 2013). This study may benefit the participants by allowing them to reflect and discuss their use of evidence and may empower them to review their practice. The main focus on preventing harm has two elements; potential damage to the participants' professional reputation and identification of inappropriate professional practice. The participant's reputation can be maintained by respect for confidentiality, protecting anonymity and keeping information secure. The interviews took place in private, in a room of the participants' choice. Transcripts and consent forms were stored in a locked filing cabinet within a locked office. The data was stored on audio files, on paper and on computer in a secure manner. The computer was password protected. The audio files have been kept until the study was completed and then would be destroyed after five years. The transcripts were kept with the study, but every effort was made to protect the participants' and their employers' identity from recognition. Participants have been given pseudonyms and any recognisable reference to individuals, places or organisations was removed. The participants were made aware any disclosure of information in breach of the HCPC standards of conduct, performance and ethics (HCPC 2016) could lead me to report them to the HCPC and their employer. No participant was a cause for concern.

**Justice** - Participants are treated fairly, with equity, and appropriately especially during data analysis and on publication of the research. This linked to beneficence and non-maleficence above, as professional reputations should not be damaged or enhanced at the cost of other participants (Beauchamp & Childress 2013). Parahoo (2014) states there are six ethics principles in nursing research, the four concepts above plus two others, fidelity and veracity. These, I believe, are aspects of justice rather than principles in their own right. Fidelity concerns the trust built between participants and myself. It is my responsibility, as the researcher, to safeguard the rights of the participants and balance this with the needs of the study. Veracity is my responsibility to be truthful with the participants and not be guilty of being economical with the truth. In this study this was difficult during the interviews; it is important to uncover the participants' views and not to influence them with my views. I did not want them to feel their opinion was wrong or change their view to reflect their notion of my beliefs about it. I had to try to conceal my

feelings on evidence for practice, so as to limit my influence. At the same time, I had a responsibility to discuss and challenge views in the interests of fidelity and veracity. This was a constant dilemma during the interviews. Rubin & Rubin (2005) recommend being seen as open, honest and fair demonstrates good faith and a promise of fairness. When gaining consent I took the opportunity to emphasise to the participants it was their opinion and thoughts on evidence I wanted. They would be asked to clarify their understanding of a topic to be sure I could analyse their understanding not mine. Again linking back to the concept of epistemological privilege, I also took time to reassure the participants, at the start of each interview, that it was their view I wanted and that the interview was not a test of their knowledge as they may have been intimidated by my expertise in this area.

During analysis I also ensured my interpretations were grounded in the data to maintain fairness, fidelity and veracity to the participants. This will be discussed further in the section on trustworthiness.

#### **4.1.2. Sampling**

Sampling is the purposeful selection of an element of the whole population to gain knowledge and information. Parahoo (2014) characterises sampling as probability and non-probability. Qualitative inquiry mainly uses non-probability sampling as the aim is to give an understanding of a phenomenon. The sample should be selected to best provide the required data regardless of sampling method. In qualitative enquiry this must be suitable for the specific research question and topic. I needed to gain access to relevant individuals who have this appropriate knowledge and experience (Holloway & Wheeler 2010).

In this study the overall strategy for sampling is purposive, this was supplemented by two types of sampling, maximum variance and snowball (Holloway & Wheeler 2010). The reason for this approach is to access participants who are 'information rich' but also to provide information on the decisions made during this process (Seward 2006). Purposive sampling types are often used in combination to add richness and depth to a study (Emmel 2013). Purposive sampling involves the purposeful selection of an element of a whole population to gain knowledge and information. Participant choice is criterion-based and, in qualitative research, based in the judgement of the researcher. Individuals are sampled on the information they can provide about specific phenomena (Holloway & Wheeler 2010). This type of sampling is frequently used in phenomenological research

because it allows access to the lived experience that the researcher is studying (Parahoo 2014, Polit & Beck 2013). Smith et al (2009) describe sampling in IPA as based on participants being able to grant access to a particular perspective on the phenomenon under study. They represent a perspective rather than a population, this links to the idiographic nature of IPA. The aim of sampling is to try to identify a sample who find the research aims and objectives meaningful, but could be described as a well defined group. I chose podiatrists who use functional orthoses to treat MSK conditions as my primary sample.

The secondary sampling method is maximum variance. This involves selecting participants who fulfil the primary sampling remit but also have a wide variation of experience and knowledge on the phenomenon under study, use of evidence in practice. This approach should increase the chance of gaining an understanding of the factors which may influence podiatrists' view of evidence in practice (Holloway & Wheeler 2010, Polit & Beck 2013). As discussed in the literature review, numerous components may contribute to clinical knowledge and reasoning to enable an understanding of the factors that may influence participants' beliefs about evidence. These components include empirical evidence, experiential evidence, pathophysiologic understanding, explicit and tacit knowledge, propositional knowledge, professional craft knowledge, individual knowledge, EBP, language games, cultural capital and communities of practice (Gabbay & Le May 2011, Greenhalgh & Wieringa 2011, Harrison & McDonald 2008, Higgs et al 2008, Tonelli 2006, Upshur et al 2001). A maximum variance approach allows the purposeful selection of common patterns and experiences including the selection of cases which may also be distinct and varied (Emmel 2013). I wanted to find participants with different experiences which may influence their beliefs but also incorporate the range of roles which exist within MSK podiatry. I looked to recruit podiatrists who had been practising for different lengths of time, who worked in a variety of sectors: NHS, private and academic, who had studied at different institutions, who had gained or not gained postgraduate qualifications and who worked in variety of roles: MSK/biomechanics specialist full-time and using orthoses part-time. This would facilitate a broad range of views about evidence in practice which may illuminate both variation and significant common patterns (Emmel 2013, Holloway & Wheeler 2010). However the choice of using podiatry academics may not have had as much relevance as I thought, as it became clear in the analysis of their interviews that academics may be detached from current practice. Therefore, it may not be necessary to include academics in future research.

Research participants were recruited from the NHS, private practice and higher education institutions for podiatry. Volunteers were sought through a national MSK specialist interest group and branch meetings of the main professional body, the Society of Chiropractors and Podiatrists (SOCAP). Podiatrists who expressed an interest to be involved in the research were contacted via email to arrange an interview and given an information sheet (see appendix 2). Consent, using the form found in appendix 3, was sought before the interview took place. Emmel (2013) holds that any sampling strategy will always be constrained by resources, and by the decisions made by the researcher. The initial strategy of obtaining participants from the MSK group and SOCAP branches only recruited seven participants; five NHS employees, one academic and one private practitioner. The difficulties in recruiting participants meant I had to add snowball sampling to recruit further participants. This is when participants who have already taken part in the study refer the researcher to someone they know with knowledge of the phenomenon in question. The major drawback of this form of sampling is that participants may refer people who have similar experiences, beliefs and knowledge as themselves (Holloway & Wheeler 2010, Parahoo 2014, Polit & Beck 2013).

It is important at this point to discuss the number of podiatrists to be able to set the sampling into context. The most recent statistics, from the SOCAP report 'Developing a Sustainable Workforce' (2013), show there were 13058 HCPC registered podiatrists in the UK. The number of podiatrists who work in the NHS was 3870 in 2010, this means the majority of podiatrists work outside the NHS. No figures exist as to the number of podiatrists who work predominately treating MSK conditions.

The criteria used are based on the range of influences which may affect the use of evidence in practice, the phenomenon under investigation. However the sampling strategy is wholly dependent on my interpretation of the requirements of this study which may be perceived as a weakness. Emmel (2013), Holloway & Wheeler (2010), Parahoo (2014) and Polit & Beck (2013), agree the sampling plan should be able to be judged on its appropriateness and adequacy. This sampling plan was chosen as the participants can best supply information for the aims and objectives of this study which justifies appropriateness. Adequacy of the sample is determined by the sufficiency and quality of rich data generated by the study.

### 4.1.3. Sample size

In qualitative inquiry, though there is an acceptance that studies use small samples, the numbers must ensure adequacy of the sampling strategy (Parahoo 2014). Smith et al (2009) emphasise that in IPA sample size is dependent on gaining a detailed account of individual experience rather than a large sample size. They suggest, for a PhD study, a stratified approach of one central case study followed by a further three detailed cases, then a larger sample of up to eight participants could be seen as adequate. However they precede this illustration by stating this should not be seen as a prescription or a recommendation in any form. Multi-perspective studies, the exploration of a phenomenon from the perspective of a number of participants, are also discussed. This study fits best with this description. The authors do not advocate any numbers for this type of study but reiterate it is the adequacy of population sample in providing rich data that is most important.

### 4.1.4. Sampling criteria

Table 2 - Outline of participants' podiatric experience

Participant	Years Qualified	Work Setting	Qualification completed	Institution UG and PG	FT or PT in MSK
Charlie	28	NHS	MSc	5 and 1	FT
George	26	NHS	MSc	4 and 3	FT
Paul	19	Private	BSc	7	PT
Helen	18	University	MSc	1 and 1	PT
David	16	NHS	MSc	3 and 1	FT
Louis	16	NHS	MSc	6 and 1	FT
Ed	12	NHS	One module at Master's level	3 and 5	FT
Richard	11	University	MSc	2 and 2	PT
Tom	11	NHS	MSc	3 and 1	FT
John	10	NHS	MSc	3 and 4	FT
Izzy	10	Private	BSc	6	PT
Barry	6	Private	BSc	4	FT
Hannah	6	NHS	One module at Master's level	6 and 6	PT
Sandra	3	Private	BSc	2	PT

Participant	Years Qualified	Work Setting	Qualification completed	Institution UG and PG	FT or PT in MSK
Michael	2	NHS	BSc	3	PT
Jack	2	Private	BSc	4	PT
Lynn	2	Private	BSc	3	PT

Table 2 outlines the participants as they match the sampling strategy for podiatric experience, their work setting, their level of qualification, the institutions they studied at and whether or not they worked with MSK injuries full or part time.

The total sample of podiatrists in this study was seventeen; nine work in the NHS, six in private practice and two are podiatry academics. To achieve the maximum variance of experience, I aimed to match similar length of clinical experience across participants who worked either in the NHS or private practice. It was difficult to recruit experienced private practitioners so snowballing was used but this was not wholly successful. There appeared to be reluctance from this group of podiatrists to join the study. Over 15 were contacted through the snowball sample, but Paul is only the participant who works in private practice with more than ten years experience. This may be explained by having to give up their time therefore resulting in a loss of income. It could be these podiatrists trained in the period when EBP was only just beginning to be an integral part of podiatric training and they may not feel confident to discuss it. Their knowledge of EBP will have been gained through continuing professional development, this may also have contributed to their hesitance to join the study. This may be a limitation of the study as the most experienced podiatrists have seen the changes and development of podiatric biomechanics. There may be differences in the evidence used in practice between the NHS and private practitioners which are not revealed because of the low number of experienced private practitioners in this study.

Postgraduate qualifications appear to link the participants employed by the NHS and in the higher education institutions. Most of the NHS practitioners in this study with over 10 years experience have an MSc; Ed is the exception, he has 12 years experience but has taken only one postgraduate module. Both podiatry academics have an MSc. None of the participants who work in private practice have any postgraduate qualifications. This may be as a consequence of the same problems in recruiting experienced private practitioners for this study, as discussed above. However it may be a reflection of the current picture of

podiatric practice in that postgraduate qualifications have more importance in the NHS. The difference in postgraduate qualifications may affect the findings relating to the understanding of EBP and research evidence as postgraduate education focuses on improving critical appraisal skills and knowledge of research evidence.

I attempted to recruit participants who completed their training at a wide range of academic institutions as this may be an influencing factor in their understanding of EBP, research evidence and also podiatric biomechanics. Undergraduate qualifications were gained at seven of the nine English education institutions which provide podiatry training. In the table 2, each institution was assigned a number to maintain anonymity. Perhaps a drawback to using the snowball strategy, six of the participants trained at University three. It is a limitation of this study; this institution may influence the findings more than the other institutions. However the participants graduated from this institution over a period of 14 years and there may have been sufficient changes within this institution during this time to lessen its influence on the findings. Though a broad range of English institutions are covered, the four institutions from the rest of the UK are not represented.

The identification numbers allocated to the postgraduate institutions do not match the undergraduate institution numbers, for example Helen attended undergraduate University one and postgraduate University one and these are not the same institution. Postgraduate education was split between four of the previous group of English institutions. One institution, which provides only postgraduate podiatry education, was attended by four of the participants whilst one participant, John, had undertaken a healthcare Master's at another institution. The ten participants who have studied at postgraduate level demonstrate the postgraduate qualifications were attained from a broad range of postgraduate institutions

The column marked FT or PT in MSK indicates the amount of time the participants spend in their role treating MSK conditions. A patient caseload wholly related to the treatment of MSK conditions is denoted by FT (full time). A patient caseload split between MSK conditions and traditional podiatric complaints is denoted by PT (part time). In this study the participants who work in the NHS as MSK specialist podiatrists appear to treat only patients suffering from an MSK condition. In private practice it seems it is not as easy to solely treat MSK/podiatric biomechanics patients. The two most experienced private practitioners, Paul and Izzy, also undertake routine podiatry. Only Barry, who employs

other podiatrists to provide palliative podiatry care, is able to concentrate full-time on MSK patients. Within this cohort there is a good range of experience in treating MSK patients.

The sample of participants offers a range of experience, the areas in which they work, the institutions they attended, the length of time in podiatric practice and their time spent treating MSK patients. Despite the lack of experienced private practitioners, the sample does offer a diverse enough range to generate rich data. The limitations of the sample mean this study may not be able to gain meaningful understanding of the influence of individual factors. For example two institutions, one undergraduate and one postgraduate, educated most of the participants so to establish if institutions have an influence on beliefs about evidence, may not be clear.

## **4.2. Data Collection**

### **4.2.1. In-depth interviews**

In-depth, semi-structured interviews were conducted with the 17 participants, in private, at a venue of their choice. The interviews were audio recorded. The data was transcribed by a professional transcription service. Interviews lasted between fifty-nine minutes and one hour and thirty-six minutes. The length of interview was determined by the participant and the time it took to cover all the topics in the interview guide.

Seward (2006) outlines the considerations needed to ensure an appropriate form of data collection is used. The chosen method must: be justified and trustworthy, match the methodology and offer a fair and full opportunity for the participants to provide information relating to the research aims and objectives. Further consideration must be given to the form of the selected method, in this case the type of interview.

Holloway & Wheeler (2010), Kvale & Brinkmann (2009) and Polit & Beck (2013), agree interviews are the main method of collecting data for phenomenological research, with a unique potential for obtaining access to and describing participants' lived experiences. Smith et al (2009) affirm the preferred means for collecting data in IPA is a one-to-one interview because it allows rapport to develop and gives the participant the chance to think, speak and be heard. They go further to propose these interviews should be in-depth to allow entrance in to the participants life-world and oblige the participant to recount their

life experience. In-depth interviews are a way to uncover and explore the meanings which underpin people's lives, perceptions and behaviours (Kvale & Flick 2007).

This form of in-depth interviewing has been described as a purposeful and meaningful conversation, even though this may be an artificial conversation brought about by the research study. As a conversation, this calls into question whether the interview should be structured (Kvale & Flick 2007, Smith et al 2009). There is a view that qualitative interviews should always be unstructured as to facilitate free expression on behalf of the participants and allow the data to contain thick description (Parahoo 2014). Smith et al (2009) also reject the notion that an in-depth interview should be rigidly structured as this will lead to data too thin for analysis. However, they see the advantage of utilising an interview schedule to enable the researcher to set a loose agenda and frame their questions in an open form. The schedule is almost a virtual map of the interview, which can be drawn upon if conversation stalls.

One advantage of this semi-structured approach is that it enabled me to ensure that I covered similar topic areas in the interviews. It also allows the participants and myself to have a purposeful conversation about evidence. In addition it supports flexibility; being a conversation means I cannot control and dictate completely the topic areas but must listen to the participants to enable the conversation to continue. The interview guide is a framework on which the interview is based and Brinkmann (2013) emphasises listening as an important element of qualitative interviewing. He refers back to Mayo's famous 1933 study of the Hawthorn factory for his advice to interviewers; 'give the interviewee your full attention, listen - don't talk, never argue, listen to: what they want to say, what they do not want to say and what they cannot say without help and as you listen, plot tentatively your next questions and summarise to clarify, not to add or distort'. Rubin & Rubin (2005) advise interviewers to not only ask about what they have just heard but also about any gaps and omissions. The aim should be to listen for what is not being said as well as what is being said.

These ideas influenced me during the in-depth interviews. I also used a metaphor from Kvale & Flick (2007), the interviewer as the traveller, which takes its origin from the Latin meaning of conversation 'wandering together with'. As an interviewer I walk along with the participants who are local inhabitants and ask them questions to encourage them to tell their own stories of their life world. This journey may not only lead to new knowledge,

the traveller may change as well. This metaphor fits well with Gadamer’s view of the hermeneutic circle, as I attempt to gain understanding of the participants I also gain a better understanding of myself. It is important again to refer back to the possible power imbalance there may be between the participants and myself, so that we may not be wandering together, I may be leading them. It was important to stress to the participants that I was not testing them, that I wanted to hear their opinions and they should not try to give opinions that they think I want to hear. This is to ensure that we are equal partners in these qualitative interviews (Brinkmann 2013)

#### 4.2.2. Interview guide

The interview guide (see Appendix 4), based upon the aims and objectives, was designed using the sequence suggested by Smith et al (2009) for use in a study using IPA. Table 3 shows the process which led to the finished guide. The interview guide was revised after discussions with two colleagues, both podiatry academics who specialise in MSK podiatry, and my supervisors.

Table 3 - Development of the interview guide

Interview guide design steps	Guide developments
Formulating the guide from the aims and objectives	Beliefs about EBP Interpretation of research evidence Using evidence in practice
Range of interviews topics	Introduction - building rapport EBP - their understanding of this concept Interpretation of research evidence Evidence they use in practice Future practice
Sequence topics and funnel towards main topic	Introduction - building rapport Their podiatry experience EBP - their understanding of this concept Interpretation of research evidence Evidence they use in practice Future practice
Formulating questions for topic areas	Introduction - building rapport Their podiatry experience EBP - their understanding of this concept Interpretation of research evidence Evidence they use in practice Future practice

Discuss guide with colleagues and reformulate	Introduction - building rapport Their podiatry experience Podiatric biomechanics they use Access to evidence Evidence they use in practice EBP - their understanding of this concept Future practice
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As a result of this process some important changes to the interview guide were made. For example, the order was changed to build up to the main topic area rather than start with it. Using a form of funnel shaped interview, with a broad, indirect approach to the main topic area, allows the participants to relax and acclimatise to talking whilst being recorded (Kvale & Flick 2007, Smith et al 2009). It also allows time to build rapport with the participant. Discussions with my colleagues highlighted obvious differences in our understanding of podiatric biomechanics theories. This meant in each of the interviews, I discuss and clarify the participants' understanding of all theories mentioned by the participant in comparison to my understanding to establish we are talking about the same theory. As hermeneutic enquiry is an iterative process then each interview informs the next as a picture begins to build of the topics that are of importance to the participants (Finlay 2013, 2014). For example it became clear after the first five interviews that the future of practice was not as important as what the participants thought about the evidence they would need to justify their practice in the future. It also became clear that the differences between the formation of clinical knowledge and knowledge generated from research were much wider than I first thought and this became a focus for the interviews.

## 4.3. Data Analysis

### 4.3.1. Using IPA

Data were analysed using IPA. This approach examines how people make sense of their life world and their experiences. It is concerned with exploring experience on its own terms which gives it a phenomenological view but it is mostly influenced by hermeneutics as it is interpretive (Smith et al 2009). Finlay (2006) states that the method of analysis must be linked to the philosophical approach used to support the epistemology and ontology of any study. This was discussed in Chapter 3. Finlay (2013, 2014) discusses the variations of analysis used in phenomenological research and concludes that hermeneutic variations have a choice between IPA and Van Manen's hermeneutic

phenomenological analysis. Van Manen's hermeneutic phenomenological analysis was rejected because this is based in Heidegger's existential philosophy and is more suited to dealing with illness and its effects on the being of participants. IPA was chosen as it links well to Gadamer's hermeneutics, but also is best suited to meet this study's aims and objectives. Based upon the hermeneutic circle, it is an iterative process in which the researcher must move back and forth through the data interpreting both 'the part' and 'the whole' as well understanding themselves and their relationship with the data (Larkin et al 2006, Smith et al 2009). Rather than phenomenological description, IPA is more focused on interpreting the data in a wider social, cultural and theoretical context (Finlay 2013, Larkin et al 2006).

The steps of IPA analysis were followed (Smith et al 2009). Analysis began with listening to the audio files, followed by analysis of each individual transcript by reading then re-reading and re-listening. Throughout this process I referred back to the field notes of the interviews, an example can be seen in Appendix 5, to revisit my thoughts and impressions from the original interviews. Next, each transcript underwent a process of initial noting, where I highlighted participant statements that may be important to this inquiry (Smith et al 2009). From this, significant statements were extracted and then analysed to give brief initial themes. A significant statement form for each participant was created and an example, Hannah's form, can be found in appendix 6.

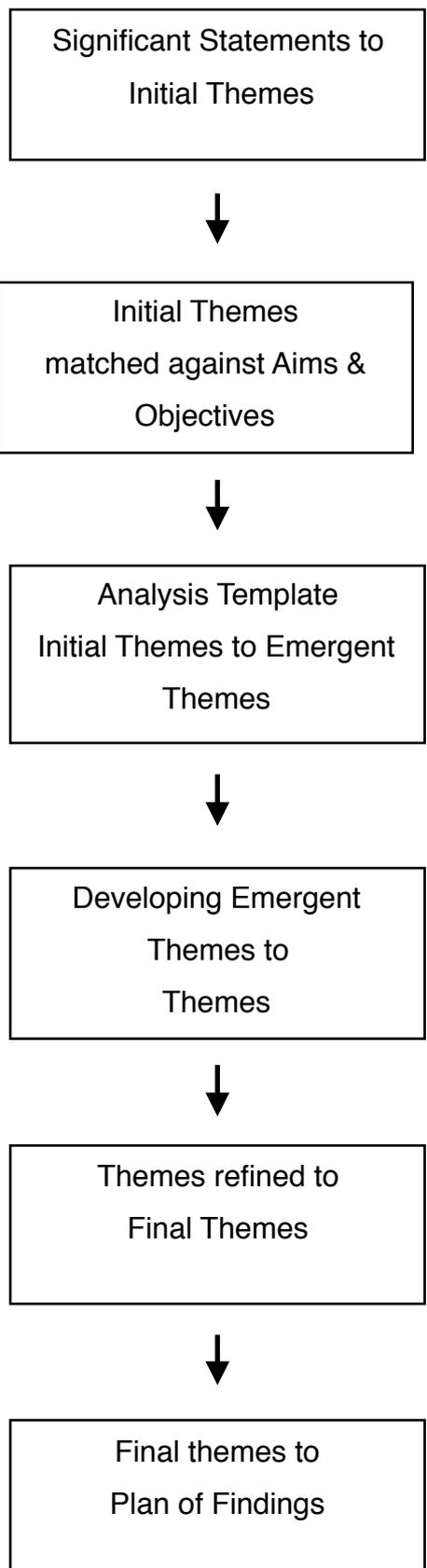
Smith et al (2009) suggest the initial themes can be analysed into emergent themes by looking at the comments in different ways; descriptive, linguistic, conceptual and deconstruction. Through this process emergent themes develop. For each participant, the emergent themes were matched against the aims and objectives of the study, as shown in the example of Hannah's form (appendix 7).

The next stage involved input of this data into analysis templates for each topic. These analyses are part of the audit trail and are approximately 90 pages in length thus an extract from the analysis for EBP forms is presented in appendix 8. The analysis templates were used to further explore the emergent themes and match themes across the interviews to make connections between the participants. Each topic area was crosschecked back to the participant through the emergent themes.

The analysis template also allows me to look at the emergent themes and analyse them as descriptive, linguistic, conceptual and deconstructed comments. Through this iterative process I constantly moved back and forth between the findings and the interview data, thus the emergent themes can be developed (Smith et al 2009). For each statement used in the study I re-read and re-listened to the statement in context, interpreting the part and the whole. I then repeated the analysis process to check my interpretations treated each participant with justice.

The next step was to develop the emergent theme into the themes (see Appendix 9), which are then refined into the final themes (see Appendix 10) to form the basis of the findings chapter. Smith et al (2009) describe this step as bringing it all together. They admit, though there is not one clear strategy for this step, it is the most important section in IPA. Larkin et al (2006) explain this step as how both cumulative themes, meaning generated from one transcript, and integrative themes, meaning across the participants, are brought together into a plausible thematic account. Within the literature, it is agreed this writing up is a discursive process; the findings are drafted and redrafted as themes come to the foreground or fade to the background as the process continues (Larkin et al 2006, Smith et al 2009, Van Scoy & Evenstad 2016). The form used to develop the emergent themes into a narrative plan is located in Appendix 10. The final themes were revised to form the plan of the findings chapter, this can be found at beginning of chapter 5 (Table 4).

Figure 2 - Diagram of data analysis process



## 4.4. Evaluation of Method

Debate surrounds the best way to evaluate the methods used in qualitative research studies but it is clear all research should demonstrate it is credible, valid and has quality (Holloway & Wheeler 2010). There appears to be three positions of evaluation related to beliefs about qualitative research:

- I. quantitative and qualitative research should be judged by the same criteria,
- II. qualitative research should be measured by criteria developed specifically for it,
- III. each piece of research should be assessed on its own merits not external criteria (Ballinger 2006, Holloway & Wheeler 2010).

In nursing research, it seems the second option has become the strategy of choice, based on Lincoln & Guba's framework of trustworthiness including credibility, dependability, confirmability, transferability and authenticity (Holloway & Wheeler 2010, Parahoo 2014, Polit & Beck 2013). Consensus in the literature suggests the method should be evaluated by criteria pertinent to the methodology and approach (Ballinger 2006, Holloway & Wheeler 2010, Parahoo 2014, Polit & Beck 2013, Yardley 2000). Holloway & Wheeler (2010) construe this framework of trustworthiness may be problematic with approaches such as phenomenology, in which researchers transform data by interpreting the ideas of the participants. This framework may not be the most suitable since this study is a hermeneutic inquiry. It explores podiatrists' interpretation of evidence from a relativist position which lends itself to the third position above; it should be assessed on its own terms.

Ballinger (2006) proposes considerations for evaluation of qualitative research for allied health professionals which cover the three main positions, including the relativist position. She defines her considerations as falling into four areas; coherence, evidence of systematic and careful research conduct, convincing and relevant interpretation and the role of researcher being consistent with the methodology. These areas are similar in approach to Yardley's (2000) four principles of quality in qualitative research in psychology; sensitivity to context, commitment and rigour, transparency and coherence and impact and importance. Ballinger (2006) does not reference Yardley but both authors are influenced by Potter and Wetherell (1987) who look to establish criteria for validating qualitative research in psychology based around discourse analysis. Smith et al (2009), in their chapter on assessing validity in IPA, use Yardley's (2000) principles to illustrate how they add rigour to an IPA study. I opted to use Ballinger's four considerations because she

focuses on healthcare research rather than psychology and she provides examples for both interpretative and descriptive phenomenology.

**Coherence** - This involves matching the research aims, view of research endeavour and the researcher's role to the chosen epistemological approach. As a hermeneutic inquiry which tries to stay close to the philosophical writings of Gadamer, this study is based in a constructivist-interpretive paradigm therefore it is subjective. The interpretations of the interview are constructed from the double hermeneutic of IPA. I aim to make sense of the participants making sense of evidence. Through the reflexive elements of this study, the reader can gain a sense of my horizon to understand my interpretations. In the quest for coherence I rejected two strategies to improve trustworthiness, member checking and peer review, for similar reasons. The participants were sent their transcripts to view, but I did not invite them to comment on my interpretation of their interview or for them to clarify their comments. Member checking is the process of obtaining participants feedback about emerging interpretations so they can assess if my interpretations are valid (Polit & Beck 2013). This study is about the interpretation of evidence and in healthcare this is linked to the concept of EBP. I wanted to capture participants' lived experience of using evidence and EBP. Therefore allowing them to give feedback on the emergent themes might make them want to revise their position and to revisit any research evidence they may have missed in the interview. I also wanted the interview transcript to be the text for the hermeneutic inquiry. Similarly, peer review is the process of having peers re-analyse raw data (Holloway & Wheeler 2010). My peers may have fixed ideas about evidence and EBP or may defer to my expertise in this area which would devalue their input. Smith et al (2009) do not recommend either as a strategy for improving validity. It is for these reasons that these strategies were rejected.

**Evidence of systematic and careful research conduct** - The methods chapter details the clear and systematic approach taken on sampling, recruitment, data collection and data analysis and is the audit trail for the study. Smith et al (2009) emphasise this approach as a powerful way to ensure rigour. The analysis of the data follows their principles for IPA. The appendices provide detail about data analysis (Appendices 7-10) and allow the reader to view examples of the various processes undertaken, they also provide evidence about the conduct of the research process.

**Convincing and relevant interpretation** - Ballinger (2009) claims it is difficult for the researcher to assess the thick description essential in this approach and to ascertain if the account is credible and compelling. It should be clear the findings are grounded in the data and my interpretations are based on the participants' experiences and beliefs. I must demonstrate my use of the IPA hermeneutic circle by constantly moving between the findings, analysis and the raw data. The example of the analysis template for EBP (Appendix 8) demonstrates the emergent themes are based in the raw data in the transcripts. The analysis template form, together with the significant statements form, allowed me to utilise the IPA hermeneutic circle. Smith et al (2009) outline this as moving back and forth between data and analysis whilst searching for meaning. To understand any part you have to look at the whole; to understand the whole you have to look at the part. This is fundamental to hermeneutic inquiry but has always been open to the question of whether my interpretation is valid. The philosopher, Paul Ricoeur (1913-2005), may have answered such criticisms of the hermeneutic approach. Validation of an interpretation is not to verify it empirically but to vindicate against competing interpretations. It may be possible to find criteria for determining which interpretation is more likely. An interpretation is more probable in the light of what we know rather than showing a conclusion is true (Ricoeur 1976).

**The role of the researcher** - This concerns whether the researcher has acted consistently within their chosen approach and is a key element of Gadamer's hermeneutics; the interpreter is involved in hermeneutic reflection. The reflexivity sections throughout the study demonstrate this; firstly in how the study came about, then the review of the reflexive journal and the changes to myself which this research has brought about. They show I am an integral part of the research process and reflexivity has added to the findings of the study. It is here that the hermeneutic of questioning becomes important; to look at things from the participant's point of view but also stand alongside the participant and question their point of view. It is finding a balance between the hermeneutic of empathy, especially with views which are similar to my own, and the hermeneutic of suspicion, reporting views with which I do not agree (Larkin et al 2006, Smith et al 2009). This was important during the interviews as well as during data analysis. The field notes show I questioned myself during data collection (see Appendix 5 for an example). The continual moving back and forth through the data to the original transcripts allows this questioning approach to ground the analyses in the data. It is my interpretation of the participants' comments and beliefs but it is based on their comments.

#### **4.4.1. Conclusion**

The details of the method provided show the decisions taken and the process followed to ensure the quality of study. The rigour of the methods is recounted and framework used to establish credibility, validity and quality. Hermeneutic inquiry depends heavily on the researcher's use of their own historicity and cultural location to explicate meaning that can form new understandings (Finlay 2013). My presence as a researcher in the data means my interpretation may differ from that of another investigator. However, using Ricoeur's (1976) criteria, the reader should be able to look at this section and conclude the interpretation is based in the data generated therefore the findings are probable in the light of what is shown here.

# Chapter 5 Findings

The aim of this study is to explore the beliefs shared by MSK podiatrists regarding evidence used in their practice. This chapter discusses the findings in relation to the literature and presents the themes which emerged from analysis.

The findings chapter is separated into three parts; evidence in MSK podiatry, MSK podiatrists use their experience in practice and MSK podiatry is in a state of change.

The first section evidence in MSK podiatry explores participants' understanding about evidence and the themes which link to EBP. It begins with discussion about EBP and the importance of research evidence within practice. It is apparent that research evidence in MSK podiatry presents a complex, possibly confusing, picture. The participants show concern about the lack of quality research evidence in MSK podiatry. There are differences between the participants about the use of and value placed on research evidence in their practice. Participants are focused on research about orthoses mechanism of action rather than their effectiveness as a treatment. Research evidence appears to be utilised or ignored on the basis of the participants' lived experience.

The second section focuses on the evidence participants use most in their practice. However, since research evidence is often difficult to apply in practice, participants actually use their practical experience as evidence for practice. Their experience is developed from active experimentation, supported by patient feedback. This patient feedback is collected and used by the participants but not always collated. This has led to fears about whether MSK podiatrists can prove that orthoses are an effective treatment, especially since this study shows the main evidence used in MSK podiatry is patient feedback.

The final section discusses the issues surrounding the podiatric biomechanics discourse. A range of different approaches are used. There is a lack of clarity pertaining to the language of podiatric biomechanics. Like any language, it is in a constant state of change. This presents problems in gaining understanding about MSK podiatry as it is difficult to compare the participants' practice for similarities. This ambiguity may also have the effect of maintaining social distance between MSK podiatrists and their patients.

Table 4 - Structure of Findings chapter

Findings	Themes	Headings
<b>Evidence in MSK Podiatry</b>	<p>Participants believe EBP is about using research in practice.            Research evidence is important because it gives strength to practice. Some consider science is important for maintaining podiatry status in MSK practice.            There may be confusion about using research in practice.            Critical appraisal of research evidence is important.            Research evidence is not important to all participants in their practice. Evidence from their own practice is important.            There are differing opinions about the research evidence because of a lack of quality.            There is a focus on how orthoses might work rather than if they work. Participants lived experience influences their interpretation of research.</p>	<p>True evidence-based practice is where research has been done on a treatment            That probably gives us the best chance if we do randomised control trials            Evidence is when somebody has scientifically proved something            Even though that's good evidence, it's how I relate that to that particular patient            So that's my personal evidence that my treatment is working for that patient            I think it tells us that obviously the foot orthoses work            I think that's an example where again my practice has changed            Participants' lived experience affects their use of research evidence            Evidence in MSK podiatry a complicated picture</p>
<b>MSK podiatrists use their experience in practice</b>	<p>Research evidence is not always easy to apply to patients.            Research evidence does not provide answers for practice.            MSK podiatry is based on practical experience.            Participants use patient feedback to reinforce their view.            Some collect patient feedback but do not collate it. Others do not collect it.            Practitioners have developed their knowledge through testing in practice not research.            Practice is more influenced by lived experience than by research.</p>	<p>A clinical trial will never mimic, exactly what your patient's got            We know what works or we think we knows what works            You need to make that jump sometimes to connect everything up            Our own patient feedback. Rightly or wrongly            Ah Thin ice            Patient feedback is the main evidence</p>
<b>MSK Podiatry is in a state of change</b>	<p>Approach to biomechanical theories has changed.            Root theory replaced with Tissue Stress and combined approach.            Biomechanical language is changing.            Lack of clarity in podiatric biomechanics.</p>	<p>Tissue stress is, is central to my practice            Use the stress free theory more than anything            Shaft extensions.....plantar flex first rays arch supports, a lot of lateral wedging, well actually not a lot but it's more common than you think..... heel raises, tarsal platforms, things like that.            The podiatric biomechanics discourse lacks clarity</p>

## 5.1. Evidence in MSK Podiatry

### 5.1.1. 'True evidence-based practice is where research has been done on a treatment and said whether it works or not'

In the interviews the participants were asked to discuss EBP and what it meant to them. A common view amongst all participants is that EBP is closely linked to the application of research to practice. The following quotes are representative of the participants' views and could be described as the traditional views of the concept of EBP (Bury & Mead 2000, Hamer 2005, Moore & McQuay 2006, Reynolds 2000, Sackett et al 1996, Strauss et al 2011a). Despite this understanding of EBP as a concept, when participants discuss what constitutes EBP the complexity emerges.

*True evidence-based practice is where research has been done on a treatment and said whether it works or not and it's been done under a proper trial.....I think that's true evidence-based practice - Hannah*

Hannah states EBP relates to research undertaken on a treatment in a trial. This description links EBP to demonstrating the effectiveness of treatment by testing in a RCT. This could be seen to represent a narrow view of EBP, at odds with the wider view of evidence coming from different types of research more popular in current literature (Aveyard & Sharp 2013, Humphris 2005, Noyes 2010). However this may not be the point Hannah is making; she discusses EBP as a concept and appears to understand EBP, as a narrow view of evidence. She perceives EBP offers strong evidence because trials are done in a controlled setting; controlling variables ensures a proper trial thus the evidence from this type of research is more reliable. Her use of the word 'true' suggests Hannah may have a different view to what constitutes the evidence she uses in practice.

Barry holds similar views to Hannah, he also discusses EBP in terms associated with quantitative research.

*The evidence is something where people have studied something and worked out how it works, why it works, and if it does work and what doesn't work.....so if someone has looked at a variable and had a look at the outcomes of changing those variables.....it depends on what it is.....they've looked at, at lots of different scenarios or situations with.....different variables..... and tried to eliminate other extrinsic factors, so they've..... tried to make it as clear as possible that it's this variable has had one cause or one effect that's, that's what I view evidence as. - Barry*

He attempts to explain what constitutes evidence in EBP, his perception of the complex nature of evidence and what the concept means to him. He does not offer a short definition of evidence and appears to find different levels of complexity behind his initial statements. Barry starts to describe evidence as a process of establishing a simple cause and effect between variables but realises it is much more intricate to explain. The terms he uses are associated with clinical effectiveness; this may suggest the focus for MSK podiatrists is, understandably, on the effectiveness of orthoses as treatment. He views the strength of this type of evidence is that it gives clear results linked to one cause and one effect. The difficulty Barry has in explaining about how research evidence looks at simple cause and effect highlights a criticism of EBP; quantitative research evidence, particularly RCTs, give results about one set of scenarios but they may not be applicable in different contexts (Cartwright 2011a Worrall 2010, 2002). At the end of his quote, Barry seems to return to his original position, describing evidence as when a variable has one cause or effect. Barry's quote may encapsulate the issues surrounding EBP. Though to use the best evidence appears to be simple and possibly what participants need for practice, it may be more complex than this.

Richard initially wants to talk about evidence from published trials but, as with Barry, complexities about evidence emerge.

*Well the evidence from, trials that have, that have been published but obviously you need to be really careful depending on whether it's just, one article that's come out or whether it's RCTs or, or reviews, what population that was on and how you can, equate that to the population that you're seeing, so the different levels of evidence up to RCTs but you've also got the expert opinions as well which tends to be which is another form of evidence. - Richard*

Richard suggests that though RCTs or reviews may be the best evidence he cannot rely on this; he has to take care that the evidence isn't just from one study and that the evidence is applicable to his practice. It follows, though using evidence seems to be a simple concept it may not be easy to apply in practice. He talks about the hierarchy of evidence in his understanding of EBP. He explains the different levels of evidence and describes the hierarchy of evidence in terms associated with the traditional view of EBP (Aveyard & Sharp 2013, Humphris 2005). Richard adds another dimension of EBP, the practitioner must critically appraise any published research evidence; just because the research is published is not enough for a practitioner to rely on it, you must be certain that any research evidence is applicable to your patients. He speaks about expert opinion, this

may be important for podiatric biomechanics. SPF, SALRE and Unification theories could be said to be based on expert opinion (Dananberg 2000, 1993a, 1993b, 1986, Fuller 2000, 1999, Harradine & Bevan 2009, Kirby 2000, 1992, 1989) rather than research evidence. Richard appears to support EBP as he understands an RCT as the best level of evidence.

David also wants to discuss the EBP levels of evidence but he emphasises another element, using the best available evidence.

*I think looking at evidence as a scale you've got different grades of evidence so with evidence-based practice you've gotta use the best available evidence to.....do your treatment, and looking at how you would grade a paper, or grade research, you'd look down at sort of personal perceptions, case studies, and work up to, to control trials, randomised control trials, things like that and systematic reviews and so looking at evidence you've got to look at what available evidence there is in practice to, to back up the treatments that you're using I suppose. - David*

David outlines the traditional hierarchy of evidence with systematic reviews at the top, but adds other important elements. He states it is about using the best available evidence in practice, which implies he may be unable to use RCTs and systematic reviews, the best evidence, in his practice. He utilises a wide range of evidence from the lower levels of the hierarchy. David names personal perceptions as a level of evidence and this is linked to the critical appraisal of research, or grading as he describes it.

Louis raises another influence on the evidence he uses in practice which suggests peers and their experience may influence clinical decision making in MSK podiatry.

*There's different sort of levels of evidence...it could be colleagues, and sort of peers informing it can be just the sorta low level case studies up to your sort of analysis of..... RCTs...- Louis*

Louis also wants to discuss EBP in terms of the hierarchy of evidence, again linked to the traditional hierarchy. He introduces another form of evidence, the experiences of colleagues and peers, which he suggests is a lower level of evidence. This is interesting because it is not included in the hierarchies of evidence in the literature (Aveyard & Sharp 2013, Noyes 2010). However, it is found in some clinical reasoning and knowledge models; professional consensus in Harrison & McDonald (2008), Tonelli's (2006) experiential evidence. His quote indicates knowledge in practice may also be partially

formed from a community of practice (Gabbay & May 2011). It also hints that the EBP model of clinical practice is not complete.

Richard, David and Louis all appear to have a good understanding of EBP, they understand the hierarchy of evidence and highlight one of the key issues raised about EBP; research evidence is not always applicable to the patient in front of you (Cartwright 2011a, Fox 2003, Worrall 2010). Therefore, it appears, these participants have to use, according to the traditional hierarchy of evidence (Aveyard & Sharp 2013), weaker evidence in their practice. Richard indicates expert opinion can help him, this comes second from bottom on traditional hierarchy of evidence. David refers to personal perceptions, probably equivalent to anecdotal evidence, which are bottom of the above hierarchy. Louis mentions the importance of the opinions of his peers and colleagues as evidence, which does not appear in traditional hierarchies of evidence.

George offers a slightly different view, in that evidence is information, either good or bad, which must be critically appraised before use in practice.

*It's a difficult one because there's good evidence and bad evidence, evidence isn't necessarily a good thing because if the evidence is weak, it's still evidence but you can put too much emphasis on it, my feeling of good evidence would be things like Cochrane studies, it would be peer reviewed papers, it would be evidence which has been tried and tested but the, the danger is you get given evidence and you run on it and it might actually be poor evidence so ask me to define evidence, evidence is just information, it's where somebody's done a piece of research but I've still got to question that evidence. - George*

George points to critical appraisal as being a key skill for practitioners. He seems to feel evidence is just information to be used in practice. He talks about evidence being good or bad and he looks to use only the best evidence in his practice. Evidence must be appraised by the practitioner to facilitate the knowledge of whether they are using strong or weak evidence. When he defines good evidence, George describes systematic reviews so he may support the current hierarchies of evidence. He also considers Cochrane reviews are good evidence but this does not guarantee quality; the individual should question the evidence. This appears to point to the suggestion by Greenhalgh et al (2014) that the quality mark of EBP has been misappropriated by vested interests and strategies to improve methodological quality, such as CONSORT, PRISMA and Cochrane Handbook of Systematic Reviews, do not ensure value for practice. George still must question them.

Such extracts demonstrate these practitioners have a good understanding of the basic principle of EBP: using the best evidence in practice. They also show the focus in MSK podiatry for evidence is on clinical effectiveness and indicate the apparently simple premise of using the best evidence is actually more complex. There is an understanding of the hierarchy of evidence but there also appears to be a focus on critically appraising evidence. This is linked to clinical reasoning; the different levels of research evidence and different forms of evidence must be assimilated to treat a patient.

### **5.1.2. 'Probably gives us the best chance if we do randomised control trials'**

The participants use mainly positive language to describe quantitative research evidence: 'strong', 'hard', 'difficult', 'robust', 'substantial', 'good', 'proper'. This data may suggest the participants believe this type of evidence accordingly gives such qualities to their practice. The language used demonstrates participants place a value judgement on quantitative research evidence, bringing both credibility and positive strength to their practice (Punch 2008). However in this area of practice the participants appear to be concerned that there is a lack of the best evidence.

David was asked to explain why he considers RCTs are the best evidence.

*I would take 'em both but papers that I've read from RCTs that are well documented from a good paper and with a large client base, I would take those on-board much more than I would an audit or a case study or a case series because I feel that if it's a good paper it's gonna have more.....more stand, more weight, - David*

David discusses the different grades of evidence and why he values an RCT above case studies or an audit because he appreciates it lends more support to his treatment. He also has to be convinced that it is a good RCT, tested in a controlled environment so he can be more certain the outcome is as a result of the intervention studied. David knows he is providing the best treatment if the evidence he uses is based on the best evidence from the hierarchy of evidence. David shows support for the premise of EBP to use the best research evidence to improve the quality of treatment and he agrees RCTs are the best way to make judgements on the effectiveness of a treatment (Mykhalovskiy & Weir 2004, Pope 2003).

Richard is concerned that, in MSK podiatry, there is lack of this type of evidence, good robust RCTs.

*Probably no, not robust as in RCTs or prospective research out there, so, no.....So you've got your RCTs which are ... supposed to be the gold standards - Richard*

Richard, when asked about the podiatric biomechanics theories and the evidence to support them, replies there is little robust scientific evidence. He describes robust scientific evidence as RCTs, the gold standard, and prospective research. He regards this as a weakness for the podiatric theories as it means he must rely on other evidence, from his previous quote, such as expert opinion. Richard also adds another dimension because his quote pertains to research evidence for the podiatric biomechanics theories, not to the research evidence for the effectiveness of functional orthoses. There is some evidence to show orthoses may be an effective treatment for some MSK conditions (Hawke et al 2008, Landorf 2016), though it is not definitive or clear evidence whilst the podiatric biomechanics theories have little research evidence to support them (Chevalier & Cocklingham 2012). This may be a source of confusion within MSK podiatry; practitioners may assume the research evidence which confirms orthoses are an effective treatment also determines that the podiatric biomechanics theories are correct. In fact, research evidence from RCTs about the effectiveness of orthoses does not establish if the biomechanics theories used in their design is also correct, the orthoses may work due to a different mechanism which is not yet understood.

Tom is concerned about the lack of substantial research to support orthoses as treatment.

*That probably gives us the best chance if we do randomised control trials .....so in terms of the research then reducing bias that might be the best way to make the research as substantial as possible - Tom*

Tom feels podiatry must undertake substantial robust quantitative research, in the form of RCTs, to enable podiatry to have the best evidence. He perceives RCTs give the best evidence because they are objective, free from bias and therefore accurate and this appears to be the prevailing opinion within podiatry. Bowen (2016) and Bartold (2016) state RCTs will allow podiatrists to gain the evidence to maintain their position and status in MSK podiatry. Yet this may be a misunderstanding; supporters of EBP claim the view that EBP only accepts evidence of RCTs is mistaken and that different types of study can

answer different questions for practice (Djulbegovic et al 2009). Tom's view about bias is at odds with Worrall (2002, 2010), who believes RCTs only lessen selection bias as oppose to limiting all biases. There are also claims that RCTs are subject to their designers' biases (Greenhalgh et al 2014, Pearce et al 2015) so they may not be objective. Tom appears to be concerned that without this type of research the status of podiatrists will be at risk since his role will not be supported by, in Tom's words, 'the most scientific evidence'.

Louis takes a similar view to Tom; to improve the level of evidence, more robust studies to raise the level of evidence in MSK podiatry are required.

*Well the only way you can increase the level of evidence is to conduct studies on patients that have a particular problem and offer them treatment and having the other arm of the study to.....compare the two interventions.....and it's only through that evidence, with any form of treatments you need to actually gain, have the best there'll be some level of evidence or to actually become a study...someone has to try. - Louis*

Louis states studies to compare two treatments for a particular MSK condition would increase the level of evidence to support the use of orthoses as a treatment. Though he isn't as focused on reducing bias as Tom, Louis implies, that at present, MSK podiatry does not have the best evidence and there is a paucity of RCTs undertaken in this area. He also appears to suggest this is the only way for the situation to improve, thus the traditional hierarchy of evidence is the only option to improve clinical effectiveness. This represents the narrow view of evidence, long criticised by the critics of EBP, (Bluhm & Borgerson 2011, Goldenberg 2012, Lambert 2006), appears to be still present in MSK podiatry. The broad view of evidence, which supporters of EBP like Noyes (2010) suggest, which appears to have made little impact in podiatry. Louis implies a level of evidence to support the effectiveness of orthoses already exists and which he considers to be from an adequate level of evidence. He may be alluding to the patient satisfaction survey evidence (Blake & Denton 1985, Donatelli 1988, Gross et al 1991, James et al 1978, Moraros & Hodge 1993, Rendall & Batty 1998, Sperryn & Reston 1983, Walter Jr et al 2004) or evidence from his own practice from his own patients. Both Louis and Tom appear to understand that to design this type of study and undertake it with a high level rigour may be problematic, due to the differences between patients, MSK injuries and orthoses. However, the latter part of Louis' statement suggests he believes such problems should not prevent high quality research studies being attempted to provide MSK podiatry with robust evidence for practice.

John wants evidence, which he considers to be proven, to support his practice to come from research evidence.

*I think research if they say, we've proven this or this is proven and, and you go down those lines and you can justify it, then it just makes you safer sort of thing - John*

John adds another aspect to the importance of research evidence. A treatment supported by research evidence offers a stronger defence should the practitioner be sued. This is an important extract as John hints, not only is quantitative research evidence the best evidence, not to use it is dangerous; as a practitioner you may be unable to defend your clinical decisions without it. This may be a manifestation of the scientific-bureaucratic model of practice in which evidence-based guidelines should be used in practice and use of a treatment not based on research evidence may be a risk. However Harrison & McDonald (2008) claim guidelines are not applicable to all patients or determine clinical action completely and there is still scope for clinical discretion. John suggests, unless he has research evidence to give proven evidence, he may be leaving himself open to question if a patient complains. Timmermans & Oh (2010) describe this as the loss of trust in practitioners by patients and link this to the rise of patient consumerism, where patients can choose between different healthcare providers for their treatment.

Helen, a podiatry academic, outlines her support for the traditional hierarchy of evidence and describes the research evidence she would like to take place in MSK podiatry.

*I'm not saying that, we should only be using RCTs and I think there is a place for, case control studies and for just case study type research but I think we need to get the balance right.....Some of it is about the difficulty I think of setting up RCTs for the type of practice we do, so people tend to go for the sort of softer option I suppose in terms of hierarchy of research - Helen*

Helen tries to give a balanced view of the level of podiatry research but the underlying message of this extract is the opposite of this. She says there is a place for the other forms of evidence in research terms, not just RCTs. But she implies, to get the balance right, more RCTs must be done and not case control or case studies as these are softer options. She only discusses quantitative research methods, there is no mention of qualitative methods. She also lays out the, much criticised, narrow view of evidence where quantitative research evidence is the best evidence and other forms of evidence are not as good (Bluhm & Borgerson 2011).

Lynn offers an interesting opinion on the value of qualitative research.

*Lynn: Well you've got systematic reviews on the top.....and I'm trying to think of what the others are, and then you've got double-blind reviews, that, down to, I think the worst ones from what I and I can't remember what the technical term is where you're just listening to people's opinions on things...*

*Interviewer: Expert opinion?*

*Lynn: No, not expert opinion. What is it called? God, isn't it terrible how your memory goes. Where you listen to people and their experiences and then extract information from what they say, a bit like what we're doing now...*

*Interviewer: What, a qualitative...*

*Lynn: That's it, that's the word I'm looking for, thank you [laughs].*

*Interviewer: Qualitative research.*

*Lynn: Yeah, sorry, I'm being cruel to you ...*

*Interviewer: No, no you're not. So evidence-based practice is about research...*

*Lynn: Yeah.*

Lynn is forthright in her opinions about research, she worked as research assistant in one of the natural sciences, before training to be podiatrist and had only qualified two years before her interview. Although there is an element of humour in her comments, she clearly makes a joke at my expense, the underlying sentiment is qualitative research is the worst type of research as it focuses on people's opinions whereas quantitative research is the best type because it is unbiased and provides proof for treatments. This may suggest that Lynn sees quantitative research as being more scientific as qualitative research is influenced by opinions. This may derive from her previous career as a research assistant, as she may see her earlier work as being scientific in that she conducted controlled experiments which delivered a clear answer.

These extracts are from participants who mainly work in the NHS, in specialist MSK posts at level 7 and above, the exceptions being Helen and Richard, who have a background in MSK podiatry but are currently academics teaching podiatry, and Lynn, who has a background in research in the natural sciences. This study suggests that, within the NHS, there is a belief that quantitative research evidence adds strength to practice and is the only way for MSK podiatry to prove its effectiveness in MSK practice. This view may also be a reflection on the podiatric literature about EBP which emphasises that research evidence will enable podiatrists to prove their worth (Bristow & Dean 2003a, Vernon 2003); this view has been repeated recently in Podiatry Now (Barthold 2016, Bowen 2016, Horwood 2016, Landorf 2016 and Menz 2016). Another finding of this study seems to be

the belief that the research evidence required for EBP is high quality RCTs, as this will raise level of evidence or offer a practitioner proven treatments to use.

The majority of this group of participants have an MSc, only Lynn does not have one.

Perhaps this further study influenced their view; to achieve their qualification, quantitative research evidence is the type of research they critically appraised to complete their assignments and a research project. This group is also critical of other forms of research evidence which may indicate the growth in Masters qualifications makes quantitative research desirable. This may have fostered the belief whereby the status of MSK podiatry depends upon it becoming more scientific.

### **5.1.3. 'Evidence is when somebody has scientifically proved something'**

Both John and Lynn introduce the concept that evidence is about proof. It suggests some of the participants perceive quantitative research is the best evidence because it offers proof for practice. These participants also appear to be the strongest supporters of the traditional view of EBP practice which places an emphasis on quantitative research methods, particularly RCTs, and systematic reviews of this type of evidence (Bluhm & Borgerson 2011, Goldenberg 2012).

John links research evidence to proof during his interview on numerous occasions. When he mentions research evidence he talks only in terms of quantitative research evidence.

*I think it's giving the most appropriate treatment from the evidence from research basically, what is proven, to be appropriate for certain conditions. So, the practice is influenced by the evidence from research basically. - John*

John presumes evidence comes from research and this gives the most appropriate treatment for certain conditions, a view akin to Sackett et al (1996) who hold EBP as using the best current evidence to help individual patients. He also uses the term 'proven' to describe the evidence from research. This suggests he considers this evidence has been confirmed and validated and therefore should be used in practice. John wants to emphasise the influence of research on his practice and he infers practice is changed by this 'proven' research evidence. He seems to be unable to directly answer when research evidence becomes proven, but proposes not just one study but a collection of studies would lead to proof. John appears to have the view that quantitative research evidence delivers proof for practice. Miles (2009) has described this view as a form of scientism associated with EBP; it places systematic review of RCTs in a privileged position at the top

of the hierarchy of evidence above all other types of clinical knowledge. John, as his lack of a clear definition as to when something becomes proven suggests, may not fully understand the implications of his discussions about proof. He may just assume the principles of EBP are correct without questioning them further.

Lynn also describes evidence as being related to proof but she appears to be a little more flexible than John; for EBP there needs to be some proof.

*It's basically published research. I mean you're thinking you've got a hierarchy obviously and, the Cochrane Reviews are obviously the top of the list for those..... evidence-based practice is where there's been some proof and it's been published and it's been peer reviewed. - Lynn*

She qualifies proof comes from the hierarchy of evidence, with Cochrane reviews being the best. Proof is related to published research since this has been reviewed by people who understand the subject. Accordingly, this gives the research strength as it has to be confirmed by experts. Cochrane reviews follow a clear process and in health care they are acknowledged as high quality systematic reviews (Aveyard & Sharp 2013). Lynn uses 'obviously' twice in this extract, when describing the hierarchy and systematic reviews. This suggests her belief that systematic reviews constitute the best evidence is not open to question. Lynn's background in scientific research may have an influence on her opinion; she holds EBP as a scientific approach to practice therefore to follow this is obvious. However, her view may not be as rigid as first appears because Lynn states EBP is having 'some proof'. She may have come to realise the evidence in healthcare is not as definitive as it may be in the natural sciences.

Tom does not link research evidence with proof but he emphasises the importance of the scientific element of EBP and research evidence.

*In terms of when I think of something that's evidence-based I will tend to think of something that's been written scientifically I suppose rather than just being anecdotal from what I've gleaned from my experiences - Tom*

Tom is clear about the differences he sees between types of evidence. He stresses the evidence in EBP is based on science and implies this should be published and written from a scientific perspective. He does not think his own experiences are evidence-based or part of evidence-based practice. Tom perceives the strength of RCTs lies in their ability

to reduce bias as they are objective studies. His own experiences are subjective and therefore unscientific. The claim RCTs are free from bias is controversial. Djulbegovic et al (2009) insist RCTs are still the best form of evidence for testing clinical effectiveness because they are an objective observation of measurable entities. Worrall (2010) disagrees claiming the only bias RCTs can confidently reduce is selection bias if the investigator is blinded to whether or not the participants are receiving treatment. He suspects the privileged position of RCTs in evidence terms is not warranted. Worrall (2010) also considers the decisions made in RCTs about the variables they are controlling are subjective. He regards this as a step away from the scientific method as it is not objective observation. Greenhalgh et al (2014) complain the EBP quality mark has been taken over by vested interests which suggests the design of RCTs is open to manipulation. It follows the claims of objectivity and unbiased nature of this method may also be questionable. Tom takes the opposite view but this may point to the complexity of the issues involved that he may not have taken into account . It may also highlight the lack of discussion about the limitations of RCTs and the hierarchy of evidence within MSK podiatry.

Charlie describes evidence as a combination of science and proof.

*Evidence is when somebody has scientifically proved something beyond a shadow of a doubt.....and, and if somebody else does that same experiment somewhere else and gets the same results and, then that's what evidence is - Charlie*

Charlie applies a strict definition to his view of evidence. He holds the evidence in EBP must be scientifically proven beyond a shadow of a doubt. Out of context, this extract seems to show Charlie has a strong belief in science associated with the positivistic view of evidence. However in context, the picture is more complex; Charlie is discussing what he believes scientific evidence to be. Humphris (2005) defines this as the belief that science is the only way to prove facts about the world that may come from the natural sciences. It is dependent on the success and repeatability of the scientific method. Charlie describes why he attends a biomechanical conference but has stopped going to the Biomechanics Summer School that was influential in his early career before he started doing an MSc.

*It's science there, it's not hearsay, it's not somebody's opinion, it's not.....you might have this, you might have that, it's cold, hard facts and papers and science and,... which is great. - Charlie*

This quote illustrates his beliefs about science dealing in 'cold hard facts'. Charlie compares this to evidence in podiatry which he considers is influenced by opinion and hearsay. It seems he regards his own profession as unscientific because a more scientific approach in podiatry, he thinks, would gain respect. Perhaps Charlie expresses the reason why EBP has become widely accepted across health professions. He suggests research papers are scientific and since they produce 'cold, hard facts' then this must be the strongest evidence for use in practice. The EBP hierarchies of evidence have studies with the most scientific merit, RCTs, at the top (Aveyard & Sharp 2013) therefore the best evidence should come from scientific studies. Consequently it is understandable why the participants in this study assume research evidence offers strength to their practice. Charlie suggests that to allow podiatry to progress, evidence should be more scientific and not based upon opinion and hearsay. Yet Charlie, in the first extract, describes scientific evidence as being something proven but that practice is not like this, it is about clinical effectiveness not proof. However, this second extract and other things Charlie says hint he wants to be seen as taking a scientific approach.

Charlie's view, like Tom's, is that science is not about opinions therefore it is free from bias. His claim about 'cold hard facts' could be seen as a form of scientism. Loughlin et al (2013) define scientism as a view that only science can yield true knowledge; it produces objective facts not subjective claims. Charlie does not fully support his comment in the second extract and may be guilty of some hyperbole in making his point to the interviewer. His comments suggest EBP is linked to taking a scientific approach to practice. They may also be an expression of the search for scientific legitimacy that is linked to the status of podiatry in MSK practice. Borthwick (1999) claims podiatric biomechanics reflects the desire within British podiatry for a scientific and rational basis for their professional knowledge. Barthold (2016), Bowen (2016), Horwood (2016), Landorf (2016) and Menz (2016) demonstrate that in MSK podiatry the belief still remains that podiatrists can maintain and improve their status by proving their value through scientific evidence. This may account for the comments in these initial sections. Across this group of participants there is a sense that a scientific approach would lead to improvements in evidence for practice and improve the profession as a whole. They also give the impression podiatry cannot advance further without a scientific base for its theories. This view of science has strong support amongst the participants and engenders the belief that quantitative research evidence gives strength to practice.

Charlie's opinion that science produces facts is open to question. Postmodern social scientists are suspicious of claims to unmediated truths about the world; it is likely as we gain more knowledge about the world that there are a number of truths which are historically and setting contingent (Fox 2003). Nettleton (2013) describes scientific facts as products of social processes and such ideas are contingent upon the scientific communities which produce them. Charlie may consider podiatric biomechanics theories are a product of podiatric practice rather than scientific inquiry. Podiatrists may be able to explain why they believe orthoses work but this does not make the theories scientific. Nettleton's quote becomes more apposite if the word scientific is replaced with podiatric.

It is not just from a sociological perspective that Charlie's view of science can be questioned. Karl Popper (1902-94), the philosopher of science, claims scientific knowledge is provisional, conjectural, hypothetical, 'we can never finally prove our scientific theories, we can merely (provisionally) confirm or (conclusively) refute them' (Popper 1968, Thornton 2015). In his discussion of evidence-based medicine from the Popperian perspective, Shahar (1997) concludes scientific hypotheses are forever conjectures about the truth, they might be conjectures that have passed many tests but it does not change their conjectural status. This contradicts Charlie's opinion that science produces cold, hard facts. Charlie could be making a point about the proponents of the various podiatry biomechanics theories and standard of research within podiatry; that expert opinion carries more weight than research evidence. However Charlie's view may fall into scientism and remains disputed since science may not produce facts only conjectures that are products of the social world of science.

In this study, the emphasis on science and methods which give scientific results appears to be common amongst the specialist and academic MSK podiatrists, therefore the elite of the profession in this area. The prevailing opinion is EBP provides strength to practice as it is a scientific approach. The search for scientific legitimacy in MSK podiatry continues and EBP, seen as the approach to gain this legitimacy, may have led to a form of scientism within podiatry. Yet these participants may have a misguided view of science: it provides facts when it may only produce conjectures or beliefs contingent on the podiatric gaze.

#### **5.1.4. 'Though that's good evidence, it's how I relate it to that particular patient'**

However the previous view was not universal because not all the participants link evidence to science. Some participants are less forthright about research evidence being strong evidence linked to proof. They focus on the quality of research evidence, the applicability to the patient and appear to follow the main tenets of EBP.

George, as previously discussed, thinks of evidence as information, good or bad, but it also appears to be part of his clinical reasoning.

*You know, I'd probably be looking, if I wanted really good evidence at things like RCTs or systematic reviews but then again, even though that's good evidence, it's how I relate it to that particular patient. - George*

George declares good evidence comes from RCTs and systematic reviews. Importantly, he understands it must be appraised by the practitioner to see if the research evidence is applicable to the patient. George, though supportive of the EBP hierarchy of evidence, places a value on his ability to appraise and apply research evidence and implies his reasoning discerns which evidence can be utilised in practice. This suggests George is adhering to version 4 of the model of EBP: the clinical expertise of the practitioner balances the demands between the different sources of evidence (DiCenso et al 2005). He also proposes research evidence is only one part of his clinical reasoning and this links to other models of clinical knowledge (Gabbay & LeMay 2011, Higgs et al 2008, Tonelli 2006). However, George may point to another criticism of EBP; research evidence delivers results which are not easily applied to patients (Bluhm & Borgerson 2011, Goldenberg 2012, Lambert 2006).

Barry, who works in private practice, discusses conflicting evidence from research studies. He demonstrates practitioners must make judgements about conflicting evidence.

*Stretching.....for plantar fasciitis...there is a whole host of evidence out there from systemic reviews that one of the beneficial modalities of treatment for chronic plantar fasciopathies is stretching the intrinsics in the foot and... there is also evidence out there which lets you know that the plantar fascia doesn't really have elastic properties and there's an argument out there that if you're stretching it you're only going to further irritate at its attachment.....[sighs]. There is a lack of evidence for stretching the intrinsics alone so you're left in these positions where you're left with a judgement call - Barry*

Barry talks about the research evidence for stretching as a treatment for plantar fasciitis. He knows research high in the hierarchy of evidence shows stretching is an effective treatment for this condition but this evidence is not from studies about this treatment alone. Other studies, to which Barry gives a similar weight, undermine the rationale for this treatment. He knows a clinical judgement must be made whether to use the treatment because the evidence is unclear and he relies on his colleagues to help with this. This highlights the conjectural nature of the evidence gained from research evidence (Shahar 1997). It also illustrates a different aspect to research evidence to provide proof to practice. Barry must use his clinical reasoning and knowledge to make a judgement call.

Practitioners must make judgements about research evidence and this requires a certain level of knowledge about research evidence. If George is correct then practitioners also need experience to be able to apply research evidence to individual patients. Michael works in the NHS and, at the time of interview, had been qualified for two years. Thus he has limited clinical experience but has some understanding of research evidence from his undergraduate education to help make these calls. However Michael's discussions about research evidence lack clarity.

*It's the quantitative evidence I think which has sort of driven my practice mainly in the assignments that I'm doing, I didn't seem to come across more quantitative ones than qualitative...research, and that's mainly probably because I'm more familiar with that than I am any of the others...- Michael*

Michael has embarked on an MSc, as he believes it will help to further his career in MSK podiatry. He considers quantitative research evidence is the strongest form of evidence because it is the evidence he uses in his assignments. He also comments he understands this type of evidence more than any other because he has used it before.

*I think, yeah there's a lot of research in orthoses about that and...Not necessarily, I think a lot of it's an individual's point of view as I was saying the earlier,.....about it's mainly individual's own personal views. There is some, but I think they're more, out there at the moment but it may be their own personal views rather than solid backing behind what, in terms of what they are saying. But I'm not saying that there isn't, I'm sure there is but not that I have come across 'em(sic) but not to that extent. - Michael*

Michael tries to discuss that some of the evidence about orthoses is based on personal or expert opinions rather than research studies. He has difficulty articulating exactly what he

means but perhaps this is because he lacks confidence to discuss research evidence or it could be down to nervousness in his interview. However, it may suggest he wants there to be research evidence to support orthoses but he is not sure there is. He is demonstrating one of the barriers to EBP and using research in practice. The basis for the use of an EBP approach is having the appraisal skills to be able to make judgements about research evidence (McEvoy et al 2010). It is unclear if Michael has the requisite skills to appraise evidence and make judgement calls.

Hannah, in contrast to Michael, has a good grasp of research evidence and is able to discuss this evidence well. She shows she understands what makes RCTs a strong form of evidence.

*Because it's controlled. You know who you're treating and what you've done and, and the patients have probably been, they've been randomly selected or, or maybe not randomly selected [laughs].....it, the whole thing is more controlled and so the evidence it can be specific to those conditions that you've set, those parameters that you've set. - Hannah*

She agrees with George in that the difficulty lies in the application of research evidence to individual patients. Hannah indicates the controlled nature of RCTs give them strength but this same strength could also be a weakness as your patient has to meet those parameters. Cartwright (2011a) agrees this is a main weakness of RCTs; they declare how a treatment works in a very particular set of circumstances that may not match the circumstances of the patient in front of you so therefore the treatment may not be applicable to that patient. Hannah uses her own personal evidence of whether the treatment has worked to the research evidence to help her to make her clinical decisions.

*But for me it's whether the treatment that I've used has worked and what, whether the patient is better and that's evidence that, that's the evidence that you're looking for. - Hannah*

She opens up the concept of evidence to a broader view, it is not just about the research evidence it is also about being effective in practice. Here she implies the evidence which she uses in practice, her own evidence, is based in her experiential or professional craft knowledge. This links back to the models of clinical knowledge which acknowledge the importance of this type of knowledge (Gabbay & LeMay 2011, Higgs et al 2008, Tonelli 2006). This is interesting; Hannah may not regard her own individual experience and evidence to be as strong as research evidence but she ends this quote by saying this is

the evidence she wants in practice. Despite this, she considers EBP to be about research evidence and not about her own evidence. This may be connected to her first quote earlier in the chapter in which Hannah defines 'true' EBP as when research has been done on a treatment.

In a similar way to Hannah, Jack claims that, though other practitioners think of evidence as being related to research studies and published work, he looks more to his personal evidence.

*I think the evidence that people tend to look at more than anything else is, is research studies and written published papers.....that's the main area. Journal articles, that kinda thing...and I think that's predominantly where most people would stop I think... as far as evidence, if it's published and it's out there in the public domain that's classed as evidence...what I'm talking about may not be classed as evidence because there's only me that's hearing it.....so that's my personal evidence that my treatment is working for that patient. - Jack*

Jack starts by describing research studies and published papers as the main parts of EBP but discusses this is not used in his practice. He emphasises his own personal experience and personal evidence from PROM's and feedback from patients about his treatments, including his orthoses, are more important than a research study. However, Jack works in private practice having taken up podiatry after working for an orthotic manufacturer. There may be less emphasis on research evidence in private practice, Jack seems to concentrate more on ensuring his patients receive effective treatment. This statement is almost a paradox as there are many examples of research evidence in EBP improving the effectiveness of clinical treatments (Djulgovic et al 2009, Dopson et al 2003, Greenhalgh et al 2014, Pope 2003). Jack appears to prioritise his own effectiveness in clinical reasoning over research evidence. This may be linked to the problems with research about orthoses discussed previously. However Jack can see the value of research evidence linked to a hierarchy of evidence; when discussing the best way to confirm which type of orthoses, either hard or soft shell, are the best treatment for MSK conditions, the following exchange took place.

*Jack: I think it'll be very expensive [laughs]. Definitely. It'll probably take years as well. It wouldn't be a quick study. Especially 'cos in that sort of tiered format, you'd be looking at eighteen months or something.....minimum...I think proving it is the difficult thing...*

*Interviewer : Right. So it'll have to be an RCT then?*

*Jack: I think that type of study has possibly got the best chance of coming up with the results if you do it in the right way...*

This exchange from Jack's interview shows implicit support for quantitative research evidence. Jack discusses his ideas to prove orthoses are a successful treatment for MSK injuries and concludes that an RCT would be best. This may reveal, despite Jack's previous assertion that his personal evidence was his focus, there is an underlying belief that the strongest type of evidence is quantitative research evidence. Alternatively, it may be Jack realises this form of evidence offers the best chance to get his evidence widely accepted. It was clear from his interview Jack thinks this type of study would have commercial benefits if the results were positive. It seems, in evidence terms, the traditional hierarchy of evidence in EBP is embedded in MSK podiatry.

There is confusion about the concept of EBP; some aspects of the concept and epistemology of EBP are not fully understood by all the participants. Supporters of EBP, DiCenso et al 2005, Djulbegovic et al (2009), state EBP is not just about research evidence. It is also about using clinical judgement of the best research evidence to inform your practice, EBP is dependent on the quality of the research evidence and its appropriateness for the patient. Critics of EBP, Bluhm & Borgerson (2011), Goldenberg (2012), Lambert (2006), agree with George stating it is difficult to apply research evidence to individual patients. Also there are barriers to implementing EBP. Some practitioners, for example Michael, may not possess the requisite skills to appraise the evidence (McEvoy et al 2010). EBP is dependent upon practitioners deciding between differing elements to make a clinical decision, to use Barry's words 'a judgement call', about the research evidence and its applicability to the patient. Indeed Charles et al (2011) complain that research evidence can be ignored if patient preferences or economic reasons can be used to reach a decision. Such criticisms may contribute to Hannah's view that EBP is about research evidence but it is not the same as her own evidence that she uses in her practice. Jack, like Hannah, uses his own personal evidence but he also gives implicit support to EBP which links back to Louis' and Tom's view that RCTs are the best way to get evidence accepted. But this begs the question, is this because they are the best evidence or just perceived to be the best evidence?

A more complex picture about evidence in practice is emerging. On the one hand, there seems to be practitioners who are strong supporters of using research evidence in practice

which has led to a form of scientism. On the other, there are practitioners proposing that research evidence is not easily used in practice. Difficulties can arise when practitioners do not have the requisite appraisal skills because it is apparent practitioners must make judgement calls about research evidence.

### **5.1.5. 'I'm gonna say of a research setting you know, outside of normal everyday clinical practice'**

In contrast to the group who place an emphasis on research evidence and those who are accepting of EBP but are not sure about the applicability of research evidence to their patients, some participants also talk about personal evidence being important. There is also a further group of participants, for whom research evidence seems to be less of a priority.

Ed works as an MSK specialist in the NHS and does not have an MSc, though he has completed one module at Master's level. Throughout his interview he looked to myself for confirmation and seemed less confident than his peers to discuss research evidence. He appears to be uncertain about the effect of research evidence on practice.

*It's researched evidence in a controlled setting which either, backs up, supports your treatments or gives you another way of thinking that perhaps the treatments you're offering may be not as effective as you thought they are or were - Ed*

Ed discusses research evidence in terms associated with quantitative research studies. He does not hold that research studies give a practitioner definitive evidence, as he implies even if a study shows a treatment may not be effective he may still continue to use it. It is not an endorsement of EBP. From his interview it is unclear if research evidence has much effect on his practice. He outlines some issues he has with studies in MSK podiatry; the small participant numbers and the lack of control of variables in these studies linked to variations in patients, MSK conditions and orthotic design. Such concerns, also discussed in the literature review, may hamper understanding of the evidence for orthoses as these studies are susceptible to a range of confounders (Worrall 2010). Ed appears to place significance on research taking place in a controlled environment which may also add to his skepticism about research studies.

*I think just the term itself lends itself to more ... of, I'm gonna say of a research setting you know, outside of normal everyday clinical practice so I think the term itself leads me to think that it's a lot more controlled - Ed*

Ed portrays EBP as being about research evidence and outside his normal practice. He proposes the controls studies use to establish the independent variable to be examined mean research is complex to apply in practice. Ed outlines the difficulties of translating evidence into practice, a well documented criticism of EBP (Fox 2003, Lambert 2006, Bluhm & Borgenson 2011, Goldenberg 2012). He demonstrates one of the main reasons suggested for why research evidence is not implemented in practice; practitioners are unconvinced by research findings they believe have little or no context within their practice (Fox 2003). He appears to separate research evidence from his patient evidence. It may suggest Ed does not use research evidence in his practice, instead the evidence he uses is his patient feedback which initially he does not regard as part of EBP.

*Yeah. But when I meant research... a lot of research tends to be around, certain symptoms does tend to be around pain levels, am I reading the wrong one [laughs]..... reading the easy ones... so yeah I didn't mean that, pain levels for example wasn't evidence ... I just meant that, when I said, researched evidence, was on the assumption that a lot of what research evidence is based.....eventually the outcomes - Ed*

Ed explains he uses his patient feedback, in the form of visual analogue scales (VAS) of pain levels, in his practice. At first he does not consider this as evidence but, during the discussion, he begins to realise this is actually a type of evidence he uses. He also tries to link this back to research, he attempts to point out some research studies are based on VAS scores of pain. Ed demonstrates his lack of confidence about research evidence here, as he looks to me to affirm he is reading the right standard of research. He is actually voicing a difficult question about patient reported outcome measures (PROMs) and evidence. It is unclear whether PROMs are classed as research evidence in the literature; they do not neatly fit into the traditional hierarchy of evidence (Aveyard & Sharp 2013), the newer broader hierarchies (Noyes 2010) or typographies (Pettigrew & Roberts 2003). Black (2013) suggests the routine use of PROMs has the potential to transform healthcare, as they help patients and clinicians make better decisions. They are evidence for practice and were developed for use in research. The literature does not clearly affirm Ed's belief that PROMs are the basis for a lot of research, though they are part of the overall results in some studies.

The remaining participants, all private practitioners, take account of research evidence but it is unclear how much emphasis they place on this. Izzy appears to be concerned she does not focus enough upon research evidence.

*Well, I'd say controlled trials really that you.....that we read about, obviously some are published in the Society magazine. Other than that I would feel I would have to go on the internet and actively look for studies.....to find the evidence. Yeah I would say so Occasionally but I would say not enough if I'm.....being honest. [Laughs]. 'Cos I probably should be looking at more. - Izzy*

Izzy discusses the concept of EBP and, in common with other participants, she talks about quantitative research. She states her main source to find the results of these trials is Podiatry Now, the professional journal for members of the UK professional body for podiatrists. Though it is a peer-reviewed journal, it contains reprints of some research studies and review articles as well as discussion pieces and news of interest to podiatrists. Specialist editions, for example the 2016 edition about MSK podiatry, are published and it provides a regular pull-out CPD section which reviews evidence on a particular area of podiatric practice. Perhaps it is these pull-out sections that Izzy is discussing. Her quote implies she does not regularly read research evidence. Izzy admits she should use the internet to find the research articles in these reviews, but she rarely does, and she feels she should look at research evidence more. There may be barriers to this; she has already highlighted concerns regarding her understanding of research evidence and she admits she lacks confidence to critically appraise research evidence. Like Jack, Izzy knows the importance of research evidence but the role it plays in her practice is unclear.

Sandra also places an emphasis on her personal evidence rather than, as she terms it, formal evidence. In contrast to Izzy, she does not appear to be concerned about this.

*Formal evidence. Well, ... I mean its peer-reviewed journals and, and.....articles and...Formal evidence.....is there? And then isn't everybody different, so you could get two patients with exactly the same foot problem and insoles might work for one but not for the other. So, even the evidence, when you read papers that say we had a hundred participants with..... plantar fasciitis and we've split them into two groups, I don't even think that's particularly significant, those results aren't always that significant are they? - Sandra*

She acknowledges she mainly relies on her own evidence and rarely uses research evidence. Sandra details some of the problems with the research evidence about orthoses and complains about the amount of research published. Though her study

appraisal reveals she does not consider the number of subjects in a study to be significant, she highlights the difficulty of applying research evidence to practice. She supposes data raised from RCTs and systematic reviews cannot be routinely applied to individual patients (Miles & Loughlin 2011). Sandra, akin to Ed and Jack, concentrates on her patient feedback.

Paul is explicit about the fact he does not see the point in using research evidence in practice and is reluctant to discuss EBP as a concept. However, he fails to adequately justify the reasons behind his decision. Initially it appears he does not refer to research evidence because his patients are symptom free; thus, research evidence cannot add anything extra to his practice. Paul left the NHS after 15 years to set up his own practice, open for 4 years at the time of interview. He considers his move to private practice directed him away from the academic, research element of podiatry, possibly the scientific part, to concentrate on his practice and patients.

*Which is why I've sort of regressed back into the non-academic part of it. It's more like an art, an orthotic, to me. - Paul*

Paul claims podiatric practice is an art and not a science so he does not look at research evidence, instead his practical experience is the evidence he uses. He describes his orthosis design as an art possibly to indicate that it is based on his professional craft knowledge (Higgs et al 2008). I attempt to challenge this view suggesting Paul might be left behind in practice if he does not use research evidence. He reluctantly admits he reads Podiatry Now and occasionally looks at research evidence on the internet.

*But the evidence I look at is only what comes in a journals and what I, you know, see at the conferences. Yeah. I, now and again I'll look at something to refresh my mind on Google, that's about it though. Because if they're symptom free it really doesn't matter what you've done, does it. Because what you have done has worked - Paul*

Paul admits to reading journals and going to conferences but adds the research evidence may be immaterial because if a patient is symptom free the treatment has worked. This points to a possible difference in how healthcare works between the private sector and the NHS, when the patient is also a customer. Perhaps Paul, as a private practitioner, perceives his patients place a value judgement on his individual ability rather than his profession, which relies on research evidence for proof of effectiveness. In order for a private practice to be a successful business, customers must be satisfied they are

receiving the best treatment. Cartwright (2011a) and Worrall (2002) suggest a criticism of EBP is that RCTs provide information on the best average treatment in certain conditions rather than the best treatment for the patient in front of the practitioner.

Paul only mentions evidence in his interview because he is specifically asked if he ever looks at evidence. Concurring with other participants, he associates evidence with research evidence in journals, conferences and on the internet and talks in terms associated with quantitative research evidence. However, Paul appears to have a different view of EBP and regards it in a purely negative sense; at best, he feels EBP is some kind of audit mechanism for the NHS, at worst detrimental to practice.

*In the NHS and it was all about evidence but that is all about actively quantifying, all the details about, the condition, the orthotic and everything, isn't it. It's about dates, it's about an audit trail isn't it.....you can't have evidence-based practice without an audit or a study. And I don't do any of that - Paul*

Paul suggests EBP is a defensive strategy; ensuring documentation is correct and proving the clinical decisions taken are supported by evidence. This criticism of EBP, that it is about audit and defensive practice as opposed to improving treatment for patients, has been made before. Lambert (2006) claims EBP is putting clinical effectiveness and cost effectiveness over patient perceptions. The final part of his statement shows Paul, now he is working for himself, perceives he has freed himself from his perception of the culture of the NHS. It also implies he doesn't need research evidence or audits in his practice. This comment, when viewed in isolation, is at odds with HCPC standards of proficiency for a podiatrist (HCPC 2013). Section 12 addresses assurance of quality in practice and states podiatrists should be able to engage in EBP and participate in audit procedures. Possibly Paul is attempting to provoke a response from me, there are other instances in the interview when a controversial comment is followed by a clarification to lessen the effect of the original comment. In context, this statement illustrates Paul wants to highlight he does things differently to other podiatrists, he does EBP but in 'his own way'.

*I mean we used to do that in the NHS, try to strive for evidence-based practice and, but that's all about reading what works and then just doing it. But I don't, I think that's a responsible way,..... this person with that condition has that orthotic and here's the proof, I've done it. And then you prescribe it and stick to that procedure and the patient is unhappy with it or gets worse and the symptoms don't go. Then how can it be worth it. - Paul*

Further discussion reveals his experience of trying to utilise research in practice and the difficulties which can follow when using this approach. Paul states adhering to research evidence can give poor patient outcomes. His understanding of EBP, as he used it in the NHS, is to stick rigidly to specified treatments for certain conditions and follow guidelines. Paul concludes this is almost unsafe practice and definitely not the way forward. He is expressing support for a criticism of EBP, that it is about the production of formulaic guidelines that limit patient choice and reduce clinical skills at the expense of strict application of research results (Lambert 2006). His reaction is against the scientific-bureaucratic model of practice (Harrison & McDonald 2008). Whilst some participants could not see ways to apply research evidence in practice, they still want to try. However, Paul states it is not worth trying to close this gap. Again, taking a contrarian view of the applicability of research evidence could be an attempt to shock. Alternatively he could be more honest than the other participants who may be fearful to admit they do not really use research evidence in practice; this would suggest they have no scientific basis to their claims that orthoses are a credible treatment for MSK conditions and goes against the prevailing opinion of the benefits of research for podiatry (Barthold 2016, Bowen 2016, Horwood 2016, Landorf 2016 and Menz 2016). The expansion of podiatry into this area of practice, based upon the scientific and rational knowledge of podiatric biomechanics (Borthwick 1999), could be undermined if this were true, there may only be anecdotal evidence that orthoses are an effective treatment.

Further exploration during Paul's interview and subsequent analysis of the transcript reveals, although provocativeness and a willingness to be honest may contribute to the statements he makes, there looks to be an underlying loss of faith. Throughout the interview there is a sense Paul perceives the current NHS is more focused on meeting targets, controlling practice and following guidelines as a defence against litigation than achieving the best outcome for the patient. He may be justifying his reasons for leaving the NHS by emphasising its worst points and the reasons for his associated unhappiness. He gives the impression he now works in private practice to allow him to do things 'his own way'.

These participants, Ed, Sandra, Izzy and Paul, place less emphasis on the importance of research evidence in their practice, in contrast to the opinions expressed in previous sections. The majority of this group did peruse research evidence as part of their practice but how much they use it is questionable. They focus on their patients and patient

feedback more than research evidence. This was not limited to the private practitioners. Ed works in the NHS and concentrates on the evidence from his patients. However, three of the four participants work in private practice which suggests research evidence may be less prominent in private practice than in the NHS. This finding may be significant as discussions about EBP have focused on the NHS, for example Harrison & McDonald's (2008) four models of EBP in Britain. Changes to government policy mean more healthcare professionals providing NHS services are now employed by private companies (Waring & Bishop 2011). However this is not the case for podiatry, which has a long history of working in the private sector. Most recent figures show the NHS estimates there are 3050 FTE podiatry posts in the UK yet there are 13058 podiatrists registered with the HCPC (SOCAP 2013). Paul is glad to have left the NHS audit culture behind, which he identifies is about following guidelines rather than doing what is best for the patient. The movement of healthcare professionals from the NHS to other employers or private practice may place EBP down the list of priorities and patient satisfaction may become paramount.

#### **5.1.6. 'I think it tells us that obviously the foot orthoses work'**

The participants voice a wide range of views about using evidence in their practice. This led to questions about the research evidence for orthoses and if the participants consider there is evidence in support of the effectiveness of orthoses.

David explains he thinks there is some research evidence to support orthoses but in combination with other treatments.

*As an individual treatment, I don't think there's much. I think there are for specific conditions such as plantar fasciitis and conditions like that there's been quite a few studies to show that insoles alongside stretches work better than stretches alone and such like that. I'd give insoles out for a lot of patients but it's difficult to know which of those patients it's definitely just the insoles that're working 'cos I don't tend to often just do that as an isolated treatment. I think I get better results now that I give out more treatments such as stretches and injections and things like that alongside the insoles, but when I first qualified and just tended to give out insoles I still got reasonable results. - David*

David knows research has shown orthoses are an effective treatment for certain MSK conditions when used in combination with other treatments, for example combined orthoses and stretching appears to work better than stretching alone to treat plantar fasciitis. David does not cite specific studies but these results are similar to those presented in the Cochrane review about orthoses (Hawke et al 2008). This suggests

David has a good knowledge of research evidence about orthoses. Being a Cochrane review, this should ensure quality (Aveyard & Sharp 2013, Noyes 2010) though, as discussed in the literature review, the homogeneity between the studies in this review is lacking which may weaken its findings. David continues to say he is unsure whether insoles work by themselves as he tends to use them in combination with other treatments. There is a subtle but possibly important difference; the research David talks about states insoles and stretching are better than stretching alone, not as his next statement suggests, that insoles and stretching are better than insoles alone. It is interesting David notes before he started to use a combination of treatments he thought he achieved reasonable results using orthoses alone. Perhaps the lack of definitive evidence has led to practitioners combining treatments.

Louis, in his previous quotes, talks about needing to improve the level of evidence within podiatry. He confirms, although the patient satisfaction evidence about orthoses is a low level of evidence, it suggests patients have good outcomes with orthotic treatment in the majority of cases.

*I think it tells us that obviously the foot orthoses work and that's the general finding throughout a lot of styles and foot orthoses of all different types, it's sixty, seventy, eighty percent of patients seem to get better with insoles, foot orthoses of all different types - Louis*

The evidence Louis cites appears to be the patient satisfaction surveys and service evaluations discussed in the literature review (Blake & Denton 1985, Donatelli 1988, Gross et al 1991, James et al 1978, Moraros & Hodge 1993, Rendall & Batty 1998, Sperryn & Reston 1983, Walter Jr et al 2004). Louis thinks orthoses work because these studies conclude patients believe they work but this does not appear to be the evidence which counts, as Louis goes on to discuss.

*yeah, with most of the evidence to support insoles, foot orthoses, it is the case that the level of evidence is usually at a pretty low level because it's pretty difficult to do a good quality randomised control trials.....on foot orthoses...there's problems but to actually perform one for foot orthoses it's difficult because of the fact that you could basically study one particular type of insole and then say this insole's what we would recommend from the study but there's so many different types of insoles - Louis*

Though Louis regards this evidence as weak evidence, he acknowledges it would be very difficult to do a quality RCT about orthoses; he perceives the main reason for this is the

variation between orthoses in terms of material and design. Louis contradicts the supporters of EBP who claim EBP does not promote a narrow view of evidence and does not give preference to certain types of study, RCTs, above other types of study and evidence (Djulbegovic et al 2009). He implies, despite the positive patient evidence collected about orthoses, good quality RCTs are still needed. However, Cartwright (2011a, 2011b) argues RCTs only form part of the evidence base for predicting effectiveness and a range of different sources of evidence provide a fuller picture of the standards of evidence required to prove effectiveness. Thus, studies exist to show orthoses can be an effective treatment but it seems RCTs are desirable to demonstrate they are more effective than other treatments.

The conflicting evidence about the effectiveness of orthoses from RCTs and systematic reviews has led some participants to take the opposite view to David and Louis.

*It's sketchy, there's not an awful lot out there that we can say is solid , empirical ... quality evidence I don't think. I think there's quite a lot of published stuff out there about various different theories but I'm not sure we've got very, very good evidence on the efficacy of what we do - Helen*

Helen considers there is not much quality evidence about the efficacy of orthoses. She comments on the quantity of published data about the podiatric biomechanics theories but she is unsure about the quality; Helen wants good quality evidence to come from studies. She offers a broader view of evidence than just RCTs but she values RCTs as the best form of evidence. It is interesting Helen feels there is insufficient evidence to support orthoses as a treatment, unlike David and Louis. This may be because Helen, working as a podiatry academic, has an interest in developing research and places value on its importance. She may also undertake less practice than David and Louis so may not have as much experience of the effectiveness of orthoses in practice. Tom has similar practical experience to David and Louis but takes a different view to the evidence for orthoses.

*There's not enough out there at the minute within our profession that can prove something's right or wrong. If.....someone could produce enough evidence-based practice and that we could all follow and that, I'm probably being a bit cynical really because every time something comes out you often read it and you'll appraise it yourself like you say, ... but there's just probably not enough at the moment that would make me read something and say oh yeah, I'm gonna do that tomorrow. - Tom*

Tom is also concerned about the quality of the research evidence in MSK podiatry. He agrees with Helen that there is not enough evidence to prove anything about orthoses and appreciates proof must come from good quality RCTs. Tom's extract may reinforce the idea that some participants have an unrealistic view of the nature of the knowledge created from research evidence. Tom gives the impression he is waiting for research evidence to prove which orthoses are right or wrong to prescribe. Perhaps he also expresses a desire for more solid foundations to his practice in MSK podiatry, evidence he can follow and put into practice. Although he wants to undertake EBP, he perceives there is not enough research evidence for this yet. He claims he may be cynical because, after appraising research evidence, he has not changed his practice; possibly he is doubtful about the standard of studies conducted within podiatry. This extract may also betray a naivety about the knowledge created from research evidence, suggesting Tom thinks the results of a study could alter his practice from one day to the next. His belief in the nature of research evidence has fostered an unrealistic view of how change occurs in healthcare practice. It is improbable one study design could change our understanding of functional orthoses as surely there would need to be further studies to confirm this. Cartwright (2011a) argues the power of RCTs appears to be that they produce 'clinchers' in evidence; they seem to give evidence which clinches the causal claims measured in a RCT, therefore things should be changed on its results. Furthermore, she explains this is not a complete picture, as really the claims of RCTs can only be a clincher for the circumstances which occurred in the study. Usually, in RCTs, these are a set of very special circumstances and as soon as a patient does not match these exact circumstances then the causal claims may not be supported. Therefore RCTs should only be considered with all the available evidence, they should not clinch decisions on their own. This suggests Tom may not have understood that the results an RCT produces are only part of the evidential claim. It may also be reflection of a view within MSK podiatry; practitioners are waiting for study to provide answers for practice because at present there is a perceived paucity of strong research evidence to support practice.

David, Louis, Helen and Tom demonstrate they support the EBP concept of using the best research evidence in practice, but they do not concur about the evidence for the effectiveness of orthoses. Izzy, by her own admission, perceives she has a limited understanding of research evidence and needs to improve her critical appraisal skills.

*It seems very contradictory and confusing actually. You read some studies and they say that they're helpful and then others seem to suggest that there's not, there's so much evidence out there.....so it's very contradictory - Izzy*

Izzy finds the research evidence about orthoses confusing and contradictory. This may be why she does not use research evidence in her practice. The lack of critical appraisal skills has long been considered a barrier to achieving EBP (Hamer 2005). Podiatrists, when surveyed, agree (Bristow & Dean 2003b, Caldwell et al 2007, Metcalfe et al 2001, McEvoy et al 2010, Upton & Upton 2006). Izzy doesn't know where to seek help to improve these skills, perhaps because she works in private practice. Mandy & Tinley (2004) state isolation may be an important contributor to occupational stress for both UK and Australian podiatrists. Research evidence which suggests orthoses may not be an effective treatment may contradict her lived experience of using orthoses. Izzy also highlights the amount of evidence out there, agreeing with Greenhalgh et al (2014) who claim the amount of evidence has become unworkable. She may realise her lack of appraisal skills is the reason she finds the evidence confusing. It may also be that the results from research about orthoses does not correspond with Izzy's experience in practice. Patient satisfaction surveys show that between 65% and 80% of patients are satisfied with orthoses (Blake & Denton 1985, Donatelli 1988, Gross et al 1991, James et al 1978, Moraros & Hodge 1993, Rendall & Batty 1998, Sperry & Reston 1983, Walter Jr et al 2004). If these results are representative of Izzy's practice, then the majority of her patients will be satisfied with orthoses. Therefore when she reads research which claims orthoses are not an effective treatment she may be confused as it contradicts her lived experience.

Lynn is clear about the problem which has caused the lack of definitive research evidence about orthoses; it is the standard of study undertaken and the number variables which need controlling.

*I think there's so many conditions of the foot, and variations of, that to actually get a research paper that does one specific thing with enough number to get any decent result from it is quite difficult to do.....and from what I've read, I seem to think that seems to be the general idea. There's not enough numbers, from my point of view, to say, this works or this doesn't work. - Lynn*

*I think it's probably the same with a lot of research anyway but it does, it drives me round the bend when I'm trying to find something that [laughs] I think will work.....with research. Particular, and from my other research background I know that was a sort of*

*vague area but podiatric biomechanics does seem to be, there's too many noddy papers around when I look at them they don't really give me the answer [laughs] - Lynn*

Lynn's previous experience as a research technician in the natural sciences has left her disappointed in the standard of research within podiatric biomechanics. She explains variations between MSK conditions, patients and orthoses are cited as reasons for the lack of good research studies. This common finding amongst the participants in this study results in these research studies being regarded as not applicable in practice. However, Lynn appreciates such variations mean the studies do not have enough participants to be able to make any claim about the effectiveness of orthoses; she claims they are underpowered. Worrall (2002) and (2010) thinks the claims that randomisation accounts for both known and unknown confounders in a RCT are unsustainable. When there is little agreement on the significance of these confounders then any RCT is susceptible to bias and is unlikely to give a true result. Ioannidis (2005) takes this a stage further, he argues the probability that a study will give a true result can be ascertained by working out the positive predictive value (PPV). An underpowered, poorly performed RCT with a 1:5 probability the relationship being tested is true has a PPV of 17%, therefore it has a 17% chance of the results being true. In studies about orthoses the relationship being tested can be affected by orthotic design and materials, MSK condition and cause, the patients' age, weight, activity levels and footwear, just to mention a few and all will affect the results. This means the probability the relationship being tested is true is greater than 1:5 therefore the PPV is even less than 17%. It is unsurprising Lynn is scathing about papers in MSK podiatry, describing them as 'noddy papers'. She acknowledges her previous experience in research was simpler because the relationship being investigated was clear. The variations in studies plus the social aspects of healthcare make research evidence difficult to undertake in this area. For Lynn this is a source of frustration, she believes research evidence should provide practitioners with answers about treatment but for orthoses the research evidence is of such poor quality that it cannot.

George raises another issue which may cause confusion about research evidence in MSK podiatry. Evidence from the top of the hierarchy of evidence may be subject to bias.

*The evidence base, and I think it's a little bit weak, I'd quote Torkki et al, who did a paper who compared surgery with orthotics and he reckoned that orthotics only give benefit for about six months. But having said that though, in my own mind, having reading that paper, that paper is subject to limitations. Like he did surgery on all his patients afterwards, it was his own patients he looked at so there might be an element of bias*

*there.....but I'll work with that, the paper has been quoted in the Cochrane database on orthotics by Hawke so it, it was good enough to get in there but even though it's in there, I would still be a bit wary of it. - George*

George agrees, though the evidence about orthoses is weak, it can still be used in practice. He emphasises his point about good and bad evidence and quotes an example, Torkki et al (2001), to show his belief that practitioners must interpret research evidence whatever the source, which confirms he has a wide view of evidence. He may also reveal a fundamental flaw in the traditional EBP hierarchy of evidence; he considers this study has significant weaknesses yet it is included in a Cochrane review about orthoses, Hawke et al (2008). He implies evidence from Cochrane reviews may not be relied upon despite being renowned as high quality systematic reviews (Aveyard & Sharp 2013). The basic EBP principle that systematic reviews offer the best evidence for effectiveness of a treatment may not be so straightforward (Djulbegovic et al 2009, Petticrew & Roberts 2003) because the results of systematic reviews are dependent upon the quality of the studies reviewed. It has been discussed previously that standards in systematic reviews focus on the internal validity and neglect to address the external validity of the studies included in the review: GRADE statement (Guyatt et al 2008), The Cochrane Handbook for Systematic Reviews for Interventions (Higgins & Green 2011), and PRISMA statement (Moher et al 2009). Torkki et al (2004) has high internal validity as an RCT despite being unable to achieve any form of blinding, the nature of the study renders blinding difficult. In this study, patients with 1st MTPJ pain are randomised to either surgery, orthoses or placed on a waiting list for surgery, in effect a control group receiving no treatment. Ignoring whether these are even comparable treatments, the information about the treatment with orthoses weakens the external validity of this study. Participants are randomised to one of the three groups, based on the assumption the 1st MTPJ pain has a biomechanical cause yet the study protocol contains no evidence to establish if the patients have biomechanical factors. Also the patients are given polypropylene orthoses, but the exact orthotic design is unclear from the protocol. This raises two issues. Firstly polypropylene is a high density material that attenuates little shock but, if Nawoczenski & Janisse (2004) are correct, patients require different material densities depending on the level of shock attenuation they can manage. Therefore some patients in Torkki et al (2004) may have received orthoses which were unsuitable for them. This shows achieving methodological rigour by receiving the same treatment may undermine the results. Secondly, there is no mention of the orthoses having a 1st ray cut out in the design; weak evidence from Welsh et al (2010) suggests this design can reduce pain in such patients.

These may be reasons why George is wary about the external validity of this study. It also reveals the decision of Hawke et al (2008) to have two authors, or a third if the first two could not agree, make clinical decisions about which studies to include introduces an element of bias and questions the objectivity of this review. Such issues may lead to the lack of clear advice found in Cochrane reviews as described by El Dib et al (2007).

In this study, MSK podiatrists depend upon their critical appraisal skills to review research evidence, despite belief in the hierarchy of evidence. David and Louis hold there is enough evidence to support orthoses yet Helen and Tom take the opposite view from the same evidence. It is unsurprising Izzy, with weak appraisal skills, is confused about research evidence. Lynn thinks the problems lies with the quality of the research studies and there are too many variables in MSK podiatry to enable the quality of study to improve. George, with his wide view of evidence, knows he must appraise all evidence to use it in practice. He also highlights issues with quality, even with evidence from the top of the EBP hierarchy of evidence.

#### **5.1.7. 'I think that's an example where again my practice has changed'**

As there was little agreement about research evidence to support orthoses, the participants supportive of EBP were asked about the research evidence which has affected their practice. No participant cites a study about the effectiveness of orthoses as an example of EBP working successfully in MSK practice which may point to issues with the evidence for functional orthoses. David and Helen have different views about the evidence for orthoses but speak about the same study when discussing the research evidence which has affected their practice.

*Well the Achilles tendon there's a lot of evidence on the Achilles tendon with eccentric loading so everyone's taking on eccentric loading as a pathway because there's been some good papers to suggest that a cohort study improved, sixty to eighty percent of the study improved just with eccentric exercise programme. So that got taken on-board in clinical practice, so that was a reasonable control trial and that's been brought forward and the majority of clinicians now use that as a treatment plan. - David*

*For example, you know particularly for things like Achilles tendon problem on the back of the fairly good evidence on the Alfredson's stuff for eccentric exercise programmes for example so I would much more do that as a first line approach rather than go straight down the orthotic prescription road which I might've done - Helen*

David and Helen quote the research evidence based upon Alfredson et al (1998) and subsequent studies which show eccentric loading is an effective treatment for chronic Achilles tendinopathy. A systematic review for the treatment of Achilles tendinopathy concludes eccentric loading is an effective initial treatment (Sussmilch-Leitch et al 2012). David feels it also proves that experimental studies about tendon and muscle repair are correct. Helen discusses how her practice has changed and she gives a range of treatments as well as orthoses. It also adds another aspect; the expansion of podiatrists into MSK practice. The treatment of Achilles tendinopathy has historically been classed as part of a physiotherapist's role but here two podiatrists discuss it as part of their role. Podiatry has looked to podiatric biomechanics to give it scientific legitimacy (Borthwick 1999) and it appears this search continues (Horwood 2016). However this may not be wholly positive for the status of podiatry. Research evidence makes knowledge available to anyone, including another profession so it may also be a way of diminishing professional power and status. Physiotherapy cannot claim ownership to this research evidence, the study method should be clear for any professional to utilise the information. Thus any ownership or legitimacy claim is unsustainable (Macdonald 1995). David and Helen show the expansion of podiatry into MSK podiatry may have come at the expense of physiotherapy through horizontal substitution (Nancarrow & Borthwick 2005). Treatment of Achilles tendinopathy may be a manifestation of this.

John professes research has changed his practice and claimed he had a good understanding of EBP and the component parts. However, despite claiming to use research, he seems unaware of any systematic reviews about orthoses.

*Interviewer: And, do you know of any systematic reviews.....that show that for orthoses...work*

*John: Not off top of my head, no.*

This exchange occurs during a discussion about strong evidence and John cites systematic reviews as an example. Perhaps he feels under pressure in the interview and cannot bring any reviews to mind although he probably would have said, 'I can't remember any'. This may suggest he doesn't actually know of any. Questioned further, John knows how to access these systematic reviews. He may lack the ability to connect understanding the concept of EBP and actually finding and using research evidence, he may be dependent on expert or colleagues opinions to form his opinions about research evidence. John's choice of research having had an effect on his practice also reveals confusion

about research evidence regarding the type of studies which provide evidence about orthoses.

*The research out there is suggesting that a lateral wedge is gonna take the load off that as opposed to before even a pronated foot type they would tend to get a anti-pronatory device which the research has actually shown increases the load on a medial knee OA whereas the lateral wedge decreases the load on it, so I think that's an example where again my practice has changed because now I'm not gonna medially wedge someone with medial knee OA. - John*

John discusses the research evidence about the treatment of medial knee osteoarthritis (OA) with orthoses as an example of research evidence which has changed his practice. Conventional treatment in MSK podiatry for this condition involves treating the underlying biomechanical issue, for example if the patient has excessive pronation then they are given an anti-pronatory device to see if this improves the patient's pain. However, Miyazaki et al (2002) show patients with medial knee OA have an increased knee adduction moment in gait and also increased load on the medial knee. Nester et al (2003), conclude medial wedging increases the knee adduction moment whilst lateral wedging decreases it, suggesting lateral wedged insoles would be an effective treatment for medial knee OA. These studies led to speculation that a medial wedged orthosis would increase the risk of medial knee OA. John has changed his treatment regimen on the strength of this, as he sees, strong, scientific evidence. However, no study undertaken on this topic is about clinical effectiveness. The knee adduction moment is a finding from kinematic data generated by video analysis of gait (Nester et al 2003). Using a lateral wedge orthosis as a treatment assumes the increased knee adduction moment contributes to medial knee OA which, though a logical conclusion, is far from proven. It may not be a contributor to medial knee OA but a sequela of having the condition which could actually lessen pain during gait. In fact an RCT into the effectiveness of lateral wedged orthoses as a treatment, by Jones et al (2014), concludes that lateral rearfoot wedging has little effect on the pain levels of patients with medial knee OA. (This was published after John's interview.) The type of study which seems impressive to John, laboratory based, randomised and controlled, with high internal validity, may be the most difficult to apply in practice. Often, they focus more on the theoretical reasons for the aetiology of injuries as oppose to the efficacy of treatment. It appears John assumes they are good evidence because these studies are RCTs; he has missed that the underlying premise may not be strong. This suggests that John may not have fully appraised these studies.

John is not alone to focus on this type of quasi-experimental study; other participants, particularly specialists in the NHS, also discuss laboratory studies based more on improving biomechanical function than the effectiveness of orthoses. The focus seems to be on trying to understand how orthoses work rather than whether they work.

*Shall I say, people have done bone-pin studies where we've been able to take the feet and measure movements in joints et cetera.....I think that makes us understand how things interact better which may make you think about how you use foot orthoses more. If you understand the mechanism of how something works then that might make you think more about how you treat a, finding that a tablet did something to reduce blood pressure by, I don't know, thinning the blood let's say then at least we know that that's what takes place by that action. - Tom*

Tom tries to explain there is more critically relevant research evidence in MSK podiatry than ever before; he uses the example of bone-pin studies to understand joint movement. Nester et al (2007) tried to establish the movements of the foot bones in gait by inserting bone-pins into the feet of 6 participants and collecting kinematic video gait analysis during their gait using the bone-pins as markers. Tom views this study as having given some insight into foot function. When asked about the clinical relevance of this study, he considers understanding foot function will facilitate improvements to orthotic design and enhance podiatric treatment. He compares this to the advances in the treatment of hypertension but Tom uses an example which does not bear full comparison. The mechanisms used to establish anti-hypertensive therapy are vaguely similar to Nester et al (2003) in the broadest of principles, in that laboratory hypothesis testing may lead to a new treatment. The Nester et al (2007) study, putting aside ethical considerations, can tell us little about gait due to the small number of participants. The main conclusion, by the authors, is unsurprising; more research is needed because we may not be able capture the movement of individual foot structures yet. It was unclear exactly how this evidence has affected Tom's practice. It suggests Tom wants to understand how orthoses work so he can make better orthotic prescriptions, which attracts him to this type of study. He may not have taken account that evidence from this type of study may always be speculative.

Both Helen and Richard, podiatry academics, also focus on these laboratory based studies; they infer improving the knowledge of foot function will improve their treatments, like Tom.

*How do you assess for the position of the transverse axis of the subtalar joint, in reality, you know there isn't a method for doing that and there's been a variety of different*

*ways of trying to justify with very small sort of samples so I would...like to see something, you know, maybe it has to start off in a sort of lab-based situation under controlled conditions to actually see okay well let's see if we can develop a way of measuring that and let's see whether it does lead to those characteristics that are suggested... - Helen*

*Yeah looking at orthoses and ... the technology, force plate and things like that I suppose are better so allowing more accurate data collection...orthotic reaction forces and ground reaction forces and...what a orthotic may be changing with gait - Richard*

Helen laments the standard of research in MSK podiatry. She wants there to be more quantitative data produced which is directed at understanding and justifying the podiatric biomechanical theories. The example she uses tries to explain SALRE theory; yet as discussed previously, this theory may be untestable. It is clear Helen perceives an increase in this type of research will help establish the status of podiatry as a profession. She is reinforcing the view that podiatric biomechanics must have an established scientific basis. Richard outlines some of the equipment which could be used in these studies to gain more appreciation of the mechanisms by which orthoses work. He holds this equipment will allow better RCTs to take place in MSK podiatry, therefore generating quantifiable evidence about the action of orthoses. Since both these participants work in a University, they may concentrate on laboratory based studies because they feel there is an expectation, both from their institutions and the profession in general, to undertake this kind of study. However there is an issue; this equipment produces reliable results but the effect of force, pressure and other kinematic measurements on the cause of MSK injuries is unclear, therefore inferences drawn from this type of study must be treated with care. It is not always easy to establish links from this type of research to clinical practice in this area. In medicine, one of the criticisms of the EBM movement is that it seeks to diminish the importance of laboratory research in favour of RCTs about the effectiveness of treatments (Bluhm & Borgerson 2011). In MSK podiatry, it may be the opposite has occurred; these participants concentrate on laboratory research rather than research to prove the effectiveness of orthoses.

Charlie also cites an example of a laboratory study as research which proves something known in MSK podiatry.

*'Cos that's what it's doing, and insoles without arch supports don't work, you know, if you just put some wedging in a shoe it doesn't work...it's not as effective. Tony Redmond, 1999 or was it 2000, he won a Stickell award for his paper on that, he looked at.....people with, so arched insoles versus just flatbed and showed that there were definite differences in the mechanics of the foot and different points in the gait cycle*

*because of those way the forces were changed. So, it's there in a paper it's kind of.....and that's why I love papers 'cos you can say things like that. - Charlie*

Charlie talks about an experimental study by Redmond et al (2000) which examines the effects a custom moulded orthosis, a flat insole with rearfoot medial wedging and no insole have on the plantar pressures of a group of 22 participants. Charlie states he knows wedging alone is not an effective treatment because there is a paper which tells him this. Charlie draws an inference about this study, the same inference the authors made at publication, but we cannot be certain this inference is correct; it may be a logical conclusion but it may also be incorrect. This paper actually concludes wedging alone does not affect plantar pressures as much as a custom moulded device. It cannot give any information about the effectiveness of wedging as a treatment since the participants of the study were described as healthy and, it can be inferred, they did not have MSK injuries. Perhaps his own experiences of using this type of orthosis confirm his acceptance of this study's inference. Consequently, Charlie's lived experience may have more influence on his practice but because this study has reinforced his view and given him confidence, he can express this as a fact.

The research which has affected these participants' practice raises concerns which may contribute to the general confusion about research evidence in MSK podiatry. To describe definitive evidence, David and Helen discuss evidence unconnected to orthoses regarding the treatment of Achilles tendinopathy. Laboratory based studies are seen as important in the quest to understand the mechanism of how orthoses work as a treatment. Further analysis shows the examples given of studies which have changed and affected practice may not actually provide evidence to change practice.

There are problems with using evidence from this type of study. It is unclear where laboratory based studies fit into the hierarchy of evidence. Aveyard & Sharp (2013), in their traditional hierarchy of evidence for effectiveness of treatment, place RCTs at the second level but laboratory studies do not look at the effectiveness of treatments. Noyes (2010), in describing different hierarchies of evidence for different types of question, does not include a question about understanding a mechanism of action. Pettigrew & Roberts (2003) in their typology of evidence describe quasi-experimental studies as being useful for questions of effectiveness, safety and acceptability to patients; it is unclear from their description if laboratory studies are included. Ioannidis (2005) is particularly severe on laboratory studies; he contends hypothesis-generating experiments would have an

extremely low PPV, he estimates this could be less than 0.01%, so the likelihood that the relationships in these studies are true is very small. It appears some of the participants maintain that RCTs provide good scientific evidence for practice so therefore laboratory based studies, which are randomised and controlled, must be strong evidence. This may be a common misconception in podiatry. Bartold (2016) discusses the changes research has brought about in MSK podiatry. He uses the role of inflammation in tendinopathy to show research has brought us full circle. He bases this evidence on the kind of experimental studies the participants discuss. He concludes research can be a cruel mistress as she can change her mind. This reinforces the view that there may be a lack of understanding about science in MSK podiatry. Also, there appears to be no account of the philosophy of science, particularly Popper's theories about the speculative nature of scientific knowledge and the conjectural status of this type of knowledge (Popper 1968, Shahaar 1997, Thornton 2015). Coupled with Ioannidis' (2005) view that proving relationships are true in this way is extremely difficult, it would suggest the participants should treat this evidence with caution. It seems there may be a form of scientism in MSK podiatry which is focused on the methodological quality of a study rather than the external validity of that study (Habermas 1968:1987). The methodology of the study influences its status, for some participants, rather than the quality of the study.

### **5.1.8. Participants' lived experience affects their use of research evidence**

Charlie's extract raises the possibility that participants view research, and whether to use it or ignore it, in the light of their experience. Fox (2003) argues this is a reason why research is not implemented in practice; practitioners only use research evidence if contextualised within their own practical experience. Timmermans & Oh (2010) suggest practitioners conduct their own trials to confirm or refute research findings. Jack, Barry and Hannah come to contradictory conclusions about the same research evidence.

*If we look at things in isolation like the evidence which tells us that off-the-shelf orthotics are as successful as custom-made orthotics of which there's a number of studies recently which come out and tell us that, does that sway my practice massively, have I suddenly said to everyone oh well you can all just go with, well no I haven't because there is always that evidence which isn't directly conflicting to that but which give me an evidence base to have, a great degree of confidence to offer patients a custom-made orthotic which is a reported comfort of an orthotic has an influence on the outcome. A massive influence. Because the more comfortable you can make an orthotic...the better the outcomes and, and certainly that's something I've found in my own practice on reflection that certainly.....has happened quite a lot - Barry*

*There's lotsa that sort of evidence out there that says that custom are a waste o'time. You can get just as much effect from a cheap off-the-shelf insole...and equally there, it's fifty-fifty, I really do believe that a lot of this evidence plays into the hands of things like the NHS who wanna spend less money on things.....it does to some extent just come down to the cash at the end of the day.....and how much people can get away with spending, but the evidence is there to show that these pre-formed insoles are just as effective as a custom.....but in my personal experience the evidence I've seen from patients is yes, in some cases they are, but in a lot of cases they're not. - Jack*

*And there are papers out there that, about the, which orthoses like, where they use a cast of ... what they called..... the off the shelf ones, or, or ones that are made particularly for them and that the off the shelf ones are just as good so there's.....those sort of papers out there that's evidenced... - Hannah*

Hannah mentions studies which show prefabricated, or Hannah's description 'off the shelf', are as effective as custom made devices in the treatment of MSK injuries which she uses to justify using these devices in her practice. Studies, including Rome et al (2004) and Ring & Otter (2014), about plantar heel pain conclude prefabricated devices are as effective as custom-made orthoses. Landorf et al 2004, in a systematic review about orthoses in the treatment of plantar fasciitis, reach the same conclusion. Redmond et al (2009) show prefabricated devices of a similar design to custom-made devices have comparable effects on force and pressure within the foot. These research studies have led to an increased use of prefabricated devices within the NHS, where Hannah works, as they are more cost effective than custom-made devices. Hannah explains she has access to manufacture custom-made devices but she hardly ever makes them because she concludes she gets good results with prefabricated devices. Her experience is reinforced by the research evidence.

Barry states there is research to support his use of custom-made devices. Though he knows of the research which says prefabricated orthoses are as effective as any other, he quotes research to show patient comfort has an impact in the outcome of treatment with orthoses. Barry was not specific about the exact research; he may be referring to a study by Hirschmüller et al (2011) on custom-made devices which concludes the high satisfaction rates with orthoses is due to patient comfort. The conclusions of this study seem to be obvious; subjects value orthoses which are comfortable to wear, the alternative is wearing uncomfortable orthoses which is unlikely. Barry may be looking for research to support his position. In this case, it appears Barry reaches his conclusion about this

evidence from his reflections on his practice rather than the relative merits of these studies.

Jack intimates his use of custom-made orthoses is based on his experience and he is making a conscious decision to ignore the research which says prefabricated devices are as effective as custom-made. He implies these studies are designed to support NHS cost cutting rather than to improve patient care. However NHS practitioners may take the opposite view, Jack gives out custom-made devices because he can charge a premium for this service. Prefabricated orthoses cost less to buy and take less time to modify than custom-made, therefore they cost less to buy privately. Jack may have rejected this evidence because it does not support his views as opposed to his appraisal of the evidence concluding it as weak or doubtful.

The three participants appraise the same research yet draw different conclusions. Hannah accepts it and uses it. Barry prefers to use contradictory evidence to justify his use of custom-made devices. Jack ignores this evidence because of his own practical experience and also he suspects it suits the interests of the NHS. It must be noted the studies being discussed are not high quality. Hirschmüller et al (2011), Ring & Otter (2014) and Rome et al (2004) are RCTs but with small numbers of participants and methodologies based on assumptions about the MSK conditions and orthoses. The Landorf et al (2004) review consists of six studies with little homogeneity. There is little evidence to demonstrate that plantar pressure and force link to MSK conditions of the foot which may question the conclusion of Redmond et al (2009). This lack of definitive evidence may contribute to this contradictory use of research evidence.

Ed gives another example of research evidence being ignored on the basis of practitioner experience. Ed speaks about the care pathway in his Trust for plantar heel pain. He mentions therapeutic ultrasound and is asked if he knows of any research evidence to support it.

*I think as I said the ultrasound evidence, written researched evidence for ultrasound I believe is not very good....., but we're fortunate to have the facility in our department where we 'ave it available... and historically we've always had ultrasound clinics.....so, we've 'ad the facility, easy access to it so a lotta places, what's it based on ... again through personal experience, it's been used in our department, we've found it has worked, as I say without a proper audit being carried out but personal feeling is that it does help, so we, the protocols never altered..... - Ed*

From his reply it is clear he is aware of the research study by Crawford & Snaith (1996) which demonstrates, for this MSK condition, therapeutic ultrasound is no better than a placebo. Ed did not specify the standard of this evidence but he declares this evidence does not 'bode well' for ultrasound as a treatment. He supposes it works on his patients for psychological reasons and justifies why ultrasound is still in their care pathway; this seems to be based on his experiences of ultrasound as a successful treatment and the availability of the equipment. He appears not to attempt to critically appraise this study as his justification for not using it. This study could be described as a seminal study for podiatry which appears to have had an effect on the use of ultrasound to treat plantar heel pain. It is a well designed single blinded RCT and the lead author is a podiatrist, although there are weaknesses with this study: it only includes 19 patients, lasts for four weeks and there is no long term follow-up. The most recent systematic review, Shanks et al (2010), concludes there is no strong evidence for the use of therapeutic ultrasound in podiatry. This conclusion is based on evidence gathered mainly from other MSK conditions, the Crawford & Snaith (1996) study appears still to be the only study about plantar heel pain and therapeutic ultrasound. The authors bemoan the lack of methodological quality of the studies reviewed and this may reflect the standard of evidence the participants have to deal with.

The phenomenon to ignore research evidence may be widespread across the profession of MSK podiatry, both in the NHS and private sector. Participants appear to prefer to use their experience to make clinical decisions. This may be due to a lack of critical appraisal skills but could also be related to the standard of research evidence in MSK podiatry. Ed may have poor appraisal skills but there appears to be only one study, with a weak method, to say it is an ineffective treatment. His belief that this treatment helps his patients is his justification for his continued use of therapeutic ultrasound for plantar heel pain.

This last section seems to put some participants at odds with EBP principles, certainly with Sackett et al's (1996) original concept of using the best evidence from research. However it may suggest Charles et al's (2011) criticism is correct; it is difficult to tell an EBP decision from one that is not. The participants use their clinical expertise to make judgements about the research evidence, healthcare resources and patient preferences so their

decision is evidence-based, just not based on research evidence. It would appear the evidence used in MSK podiatry may not be based on research evidence.

### **5.1.9. Conclusion: Evidence in MSK podiatry is a confused picture**

This first chapter demonstrates the complexity of the participants' understanding of evidence. EBP practice is understood by most participants as the use of research evidence in practice. Some participants are supportive of the traditional hierarchy of evidence. This may be linked to the search for scientific status of MSK podiatry; one group of participants assert the status of podiatry can only be enhanced with evidence from RCTs. Such opinions may have led to a form of scientism in MSK podiatry which places great store on scientific research evidence. Yet research evidence must be appraised and it can be difficult to assess the quality of studies.

Participants profess that they want to use research evidence, however it is unclear how much they do use it because it appears that evidence is not easily applicable in practice. This may link back the criticisms of the EBP models of clinical practice with applying research evidence to individual patients if it is at odds with patient preferences and healthcare resources (Charles et al 2011). Questions were also raised about the quality of the research evidence about MSK podiatry from the top of the EBP hierarchy of evidence. RCTs in MSK podiatry are subject to issues raised by Worrall (2010, 2002) of possible confounders and Cartwright (2011a) who states evidence a treatment works somewhere does not mean it can be used on an individual patient.

The participants do not agree on whether there is enough evidence to support the use of orthoses. This may be complicated further by the focus on laboratory studies which, though they are RCTs, are a more speculative form of study. These are also focused on the theories about the action of orthoses in gait rather than the effectiveness of orthoses as a treatment. This suggests, using the terms of Higgs et al (2008), there is little *episteme* in MSK podiatry and the knowledge generated from the empirico-analytical sphere in MSK podiatry is unclear.

Research evidence is used or dismissed on the basis of the participant's experience, therefore the interpretative sphere appears to be the most important in this area of practice. This is almost the opposite to the initial findings in this chapter. The belief in EBP principles suggests a scientific veneer in MSK podiatry but the reality in practice

indicates experience may be more important than research. It is difficult to determine the exact impact of research evidence on MSK podiatry, particularly regarding orthoses.

## 5.2. MSK Podiatrists Use Their Experience in Practice

Findings in the previous chapter demonstrate that there is considerable confusion about evidence in MSK podiatry. Support for EBP principles is apparent but it seems research evidence may only be used in the light of the participants' experience. The applicability of research evidence, due to the quality of studies, is also questioned. Participants indicate their personal clinical experience may be more important than results from research evidence. This suggests knowledge from professional craft, *techne*, may be important in MSK podiatry.

### 5.2.1. 'A clinical trial will never mimic exactly what your patient's got'

For participants, their lived experience of practice is a place that seems at odds with the controlled world in which research evidence is conducted (Fox 2003). Ed, who did not appear confident when talking about research, succinctly outlines the reasons for the lack of applicability of RCTs to his practice.

*No because the general population... what the idea of research is aimed at....., the treatment of the general population is variable... we're not all the same so ... I can see a conflict where you're trynna prove something in a very, over-controlled setting but applying it to a population which is varied - Ed*

Ed explains why he maintains it is difficult to use research evidence in MSK podiatry. He highlights variations in patient populations and differences in biomechanical factors which he suggests may contribute to MSK conditions. He presents these as the reasons why he cannot apply the research evidence in his practice. This is in line with the literature which criticises EBP; evidence from RCTs is not easily applicable in practice (Bluhm & Borgerson 2011 Goldenberg 2012, Greenhalgh et al 2014, Pope 2003). Ed also points to a conundrum which may be a problem for EBP; one perceived strength of RCTs, that they assess a treatment in a controlled setting, is the reason he cannot apply them in his practice. This is agreement with Ioannidis (2016) and Cartwright (2011a) who advocate for more pragmatic approaches to clinical research which reflect real-life. They suggest evidence other than RCTs can deliver this information.

Sandra discusses similar issues to Ed, about the barriers to using research evidence in practice.

*This is a really difficult topic because there isn't that much evidence out there, there's so many different components to it isn't there. I mean there are hundreds of papers aren't there... Yeah but there isn't any one, because the foot and patients are all so different, there isn't one thing that is always right for everybody. I don't think there's an answer to that, is there? There can't be because if there was an answer then it would be easy wouldn't it, everybody could do it. - Sandra*

Despite the amount of research, it seems Sandra cannot find any which is applicable in her practice. She outlines the limitations in our understanding of how the foot functions in gait and the differences between patients, similar issues to those raised by Ed. She acknowledges the issues preventing her from using research evidence are complex, as are the MSK injuries she treats, thus a simple answer is unlikely. Greenhalgh et al (2014) contend this is one of the issues which has put EBP in crisis; the amount of evidence is unmanageable and unfathomable but also that complex issues need to be addressed by different types of study. It has already been discussed that there is little clear evidence from systematic reviews and RCTs which is applicable in practice. In MSK podiatry, the limits of the knowledge we have about gait, MSK conditions and the quality of these studies is poor therefore they cannot be relied upon in practice. The gap between research and practice may call into question Djulbegovic et al's (2009) assertion that practitioners can use EBP as a heuristic approach to clinical practice: the use of practical rules to find the best evidence, based on the premise that systematic reviews and RCTs give the best evidence for effectiveness. In practice practitioners may have to use different types of knowledge to solve the problems of practice (Gabbay & LeMay 2011, Greenhalgh & Wieringa 2011, Higgs et al 2008).

Hannah agrees RCTs are not easily applicable to her everyday practice.

*Yeah.... because a clinical trial will never mimic exactly what your patient's got. It can change your approach to tackling the problem and give you different ways of tackling the problem but the clinical trial doesn't cure the patient or correct the patient's problem. - Hannah*

Hannah does not state there is no point to health research, but expresses that she does not believe RCTs can give the answers required for practice or be applied easily to her patients. She offers a different use for research evidence, as knowledge for practice; research evidence provides an overview which affects her overall approach to practice rather than something which is applied to individual patients. This idea seems to differ from the knowledge translation strategies associated with EBP which suggest practitioners

need help to use research evidence in practice (Scott et al 2012, Wilson 2015). Hannah may be using the clinical reasoning model (Higgs et al 2008) to balance the propositional knowledge from the empirico-analytical research paradigm with her professional craft knowledge which informs her that patients do not match easily to research studies.

Hannah's view is supported by some of her more senior colleagues who work in the NHS. There is the same recurring theme: the complexity of the foot means research evidence is not easily applicable to individual patients.

*That the foot's incredibly complicated, the body's incredibly complicated and that everybody's individual. That's, the big thing, so you get two people who look exactly the same, their joints feel the same, their ranges of motion feel the same, they look like they walk the same, you put the same thing in and different things will happen, one person will do something different to the next person. - Charlie*

Charlie, who describes evidence as being something scientifically proven and claims science produces facts, also maintains the complexity of the foot and the differences in patients mean we know very little. He explains research evidence gives the best average treatment but because patients are individuals, they may not derive any benefit from this treatment. He implies practice is unpredictable due to the range of issues which affect gait and MSK injury. Charlie wavers from his previous statements about evidence and science; now he suggests this unpredictability and lack of research evidence means he must rely on his experience.

*I think it, the gap's there because of the complexity of the foot. We spend a lot of time doing care pathways and it's almost trying to create a perfect pathway for a specific patient but it doesn't always work that way because there's so many different types of patients out there, and I think it's very, very difficult for researchers to apply randomisation it's quite difficult to always apply that to your own patient group. - George*

George concurs with Charlie. Previously he states research evidence is only one part of his overall evidence and it must be appraised, regardless of the provenance of the research. He declares a clinical judgement is made about which orthosis to prescribe, dependant upon the differences between patients. This complexity creates problems for researchers as it makes randomisation difficult, which supports Worrall's (2010) complaints about RCTs. George highlights this complexity also creates a problem for care pathways as they almost have to become individual pathways. This appears to put him at odds with the scientific-bureaucratic model of practice which uses guidelines and care pathways

formulated by experts from research evidence (Harrison & McDonald 2008). Williams et al (2016) agree guidelines have little influence on orthotic practice. George acknowledges currently there is insufficient evidence to produce appropriate care pathways. Any care pathway in MSK podiatry would not be applicable to all patients due to the limitations in the knowledge of these conditions and their causes.

The most experienced practitioners working in the NHS in this study all affirm research evidence is not easily applicable in practice; quotes from Tom, John, David and Louis are interchangeable with those of Charlie and George. Richard and Helen, the academics in this study, also express similar views. This concurs with the findings of Williams et al (2016), however their suggestion that future research should favour laboratory research over 'practice relevant' research seems hard to support; these issues mean any research would have to be based on assumptions therefore susceptible to confounders which would in turn undermine its validity. Ioannidis (2005) demonstrates the likelihood of this type of study being able to show relationships are true is very small. The complexity and variation in MSK injuries, the differences in orthotic design and materials and the variation between patients mean, in this area of practice, a podiatrist can look at any study and find reasons why it may or may not be applicable to their practice. This also links back to Fox (2003) who sees this as the major barrier to implementation of research evidence in practice. It seems this problem is not easy to overcome; the strength of research evidence, according to EBP principles, comes from the controls placed on a study yet these same controls are reasons for the lack of applicability to practice. This appears to encapsulate the view of the participants in this study. Fox (2003) suggests the way to bridge this gap is his concept of practice-based evidence in which research ideas are generated from practice. However this concept seems not to have been accepted, Greenhalgh et al (2014) and Ioannidis (2016) still call for research evidence which is usable and applicable in practice. This may be due to the EBP focus on methodology as a sign of quality, internal validity, which may be in conflict with making research applicable in practice, external validity. It may also demonstrate the differences between the life-world of practitioners and researchers. It is clear the participants do not feel research evidence to be easily employed in practice.

There is also a paradox here: this group of participants, apart from George, place a great emphasis on the importance and use of research evidence in MSK podiatry. They could be described as the strong supporters of EBP principles. Previously, I described their

focus on research evidence as a possible form of scientism (Loughlin et al 2013, Miles 2009) within MSK podiatry. Yet now they claim the complexity of the foot and other issues mean it is difficult to apply research evidence in practice. They are supporting the gap between research and practice at the same time as being forthright about the importance of research evidence. There are several possible reasons to explain why this paradox has occurred. These include some participants want high level research evidence to be the evidence to support their practice so they may be constantly searching for this type of evidence to support their practice. Alternatively, as discussed in my reflective piece, I have met podiatrists who work in MSK podiatry who have forthright views about podiatric biomechanics theories and blunt opinions abound in this area of practice. Therefore participants, in line with their peers, feel they must also be categorical in their support of research. It could also be that the participants consider there is insufficient strong evidence from research to support podiatry's expansion into MSK practice so they overemphasise their support for research to mask their fears about this lack of research evidence.

### **5.2.2. 'We know what works or we think we know what works'**

The lack of usable research evidence implies practice is based on other evidence. In the clinical reasoning model created by Higgs et al (2008), this suggests *episteme* or propositional knowledge is not definitive. The podiatric biomechanics theories are unproven and evidence from the empirico-analytical research paradigm does not provide clear answers to the problems faced in clinic. An answer to this dilemma is reliance on clinical experience to establish their beliefs about the best type of orthoses to use for a particular MSK condition. Thus, the participants look to *techne* or professional craft knowledge based in their clinical experience .

Paul, who alleges he has rejected EBP, explains further about the art of his practice.

*Well I mean it is learning about why you're doing it in the first place, but then after that, the changes you make, the subtle changes and the way you shape things are more an art I think. Yeah, that set up the boundaries and the framework that I.....work from and then I go off at a woolly edge and improvise on it. - Paul*

*So I'm quite lucky in private practice it's 'cos I can make as many reviews as I want, whereas the NHS may have to issue a device and never see the patient again. I think it's the key. I never have someone in for a review expecting it to be absolutely perfect.....but the review is about adjusting what you've done. Making the modifications until it's right.*

*Shaving bits off. Putting bits on. But I don't measure what I've done.....it's documented... - Paul*

As previously discussed, Paul claims he left the constraints of EBP behind when he left the NHS. The extracts above emphasise the constant theme where Paul refines his practice and orthoses by a continual process of adjusting his devices to suit his patient. He implies he is an improviser on the established frameworks and this leads to the conclusion he is constantly testing and trying things in his practice. This could be seen a form of trial and error. Williams et al (2016) conclude MSK podiatrists use a form of trial and error, based on their clinical experiences, due to the variations in practice. However this may be a simplification of the process of learning through experience. Paul may claim he is ensuring the comfort of his patients, which links back to Hirschmüller et al (2011) and the importance of patient comfort in functional orthoses. Paul, in his first extract, claims his practice is based more on art than science. Gadamer (1977:1996) discusses the concept of *techne* in relation to health. To describe *techne* as an art is a misreading of Aristotle, it denotes a practical skill. In healthcare, it is the skill of restoring the patient to the equilibrium of health. Higgs et al (2008) link this to experiential knowledge which becomes your professional craft. This may be closer to Paul's description, as he uses his patient reviews to gain knowledge and to improve his treatments.

Jack describes his actions in practice which could be seen as confirming research by his own experience.

*It doesn't necessarily mean it's as effective as they're saying it is until you've tried it for yourself.....I don't really just take everything at face value..... if I get a paper that's extolling the virtues of hard shell or soft shell or whatever.....I wouldn't necessarily go oh yeah that's the way forward, I'd have to try it first and see if I got on with it and see if it was.....something that I could.....do effectively. - Jack*

Jack reads many research papers but cannot always use them in his practice. He explains the lack of applicability of research evidence to his patients leads to him to test the research evidence himself. Fox (2003) describes this as practitioners contextualising research findings within their own practical experience. Jack claims research evidence must be tested in his practice before being accepted. This seems to be closer to trial and error, to test something for yourself to see if it works in practice. It could be described as a form of observational study and the simplest form of an empirical study. It implies Jack has little trust in the research evidence; the results of these studies may not be same in his

practice. He is also pointing to his own experience as being more important than research evidence for his practice.

Louis perceives the lack of knowledge about the effects orthoses have on gait means practitioners must try things.

*But it sometimes can go the other way as well, you give somebody an insole and they'll be really happy with it and maybe they probably could do with a little bit more control and you give them that little bit more and then they don't like that at all, but the next person you'll give that extra bit of control to and they will like it so again it's horses for courses and it's often trial and error. - Louis*

He speaks about the changes he makes to orthoses which work sometimes but not every time. Louis specifically named trial and error as a regular part of his practice. Trial and error, in this instance, can be described as using practice to repeatedly test the efficacy of biomechanics theories, designs of orthoses and treatments for MSK injuries. This appears to be a constant process for the participants in this study and may be a way to close the gap between research and practice. It seems to support Williams et al's (2016) conclusions and may be a consequence of the lack of propositional evidence in MSK podiatry.

It appears this form of trial and error has a long history within this area of podiatric practice.

*When I started I was actually doing two days a week biomechanics of which one day was seeing patients, taking casts and things .....I was basically just taking a neutral cast of foot and putting a medial wedge on it 'cos it seemed to work.....and that was so I kinda learned on the job, learned which feet not to do that to 'cos they came back and complained... there was no formal thing behind it at all, I was just kinda thrown in at the deep end 'cos nobody else wanted to do it there, nobody was interested in it... - Charlie*

Charlie, the most experienced practitioner in this study, explains how he came to be a MSK podiatrist. Treating MSK conditions with functional orthoses was growing rapidly in the UK during this period, when Charlie began using orthoses in his practice, as it appeared to be a highly effective treatment with high patient satisfaction (Clement et al 1981, James et al 1978, Sperryn & Reston 1983). It also afforded practitioners the opportunity to develop wider problem-solving and diagnostic skills with the expectation of curing patients in contrast to 'traditional' podiatric practice associated more with long-term

support or palliative care (Borthwick 1999). It is evident Charlie has always used trial and error to make decisions about his orthotic designs. He emphasises he has learnt on the job, after 'being thrown in at the deep end', which suggests his clinical skills developed through experience. He adds another important aspect; he realised his devices did not work for all patients and states he began learning from his mistakes. It is not simple trial and error, Charlie could be described as improving his professional craft, his *techne*, through his experience. Yet this may demonstrate the arbitrary nature of Higgs et al (2008) division of spheres of knowledge, Charlie improves his craft, in the sphere of professional knowledge, but this is done through his personal experience, in the personal knowledge sphere. The two spheres overlap because personal and professional knowledge are linked and this allows knowledge to grow. It is clear Charlie thinks his experience grows through experimentation because of the lack of applicability of research to individual patients.

*There's you pick up things and you try them and if it works then you, ... Well you get a feel for it with patients, so my favourite little thing for heel pain and plantar fasciitis is a little strap around the heel that, that pulls the fat pad under, I think that's how it works, and patients love it. You know, there's a million things you can throw in the air isn't there. - Charlie*

*...so what do you do you pick the one that makes sense to you and you devise a treatment around that and then see if that treatment works. - Charlie*

These two extracts show Charlie still experiments with his treatments which suggests there is little research evidence to add to the propositional knowledge in this area of practice. Practitioners rely on different evidence in practice, their own experience underpinned by some experimentation, a form of trial and error. These extracts have greater significance when compared to Paul's. Charlie could be said to support the scientific approach to MSK podiatry, indeed his earlier extracts suggest his view on science could be viewed as scientism (Loughlin et al 2013), yet he mixes this with an understanding that practice is not as clear cut as research makes out. In his interview he expresses his frustration with colleagues who do not read scientific papers. In contrast, Paul claims to have rejected the tenets of EBP and reads few research papers. His focus is on his patients, he uses his experience and professional craft to form his treatment plans. However their extracts suggest a similar approach; Paul has a framework he improvises from whilst Charlie picks things up and then tries them. This could lead to the conclusion that research evidence in MSK podiatry has little effect on practice. Charlie may disagree with this conclusion as he maintains he uses research evidence to improve

the decisions he makes. However, his comments indicate in reality his use of this evidence may not be as much as he considers. As shown in this study previously, his lived experience may influence his belief that he uses evidence. It could also be argued that Paul has not completely rejected research evidence since he still reads some papers and uses a small network of ex-colleagues to keep up with changes in MSK podiatry. It appears the participants' clinical reasoning is based more in their experience rather than research evidence, even though it may contribute to some decisions. Higgs et al (2008) may have understood this in developing their model, as propositional knowledge is not dependent solely on the empirico-analytical paradigm of research knowledge but from other sources of scholarship as well. It appears clinical knowledge has developed from professional craft in MSK podiatry. This is a common finding in healthcare as the models of clinical knowledge include clinical experience and expertise, even those based on EBP principles (Di Censo et al 2005, Gabbay & LeMay 2011, Harrison & McDonald 2008, Higgs et al 2008, Tonelli 2006, Upshur et al 2001). Though their craft is supported by experimentation both Charlie and Paul suggest this is based in a framework.

John also uses his colleagues' experiences to improve his professional craft.

*We know what works or we think we know what works and then if it does then we continue to use it, and then we also have our own meetings between ourselves, discuss cases and things just formulate things from there really. - John*

The above extract from John, 'we know what works', demonstrates this belief in clinical reasoning and experience. He qualifies it by adding 'we think' which shows some awareness that his initial statement could be construed as arrogant. He seems to accept this is just his perception and may be incorrect. Perhaps confidence in ability as a practitioner and belief in expertise as a specialist podiatrist are linked. It is also interesting John talks about how his team share information. This appears to be positive; knowledge is pooled to build a better service and the whole team can develop from this knowledge sharing. However, there could be issues with this process. It is unclear how evidence is gathered about these cases. It may lead to an insular approach if there is not a full and frank discussion within the team, strong and confident voices may suppress less confident team member views. This could lead to a lack of change and reinforcement of old practices. There is an underlying suggestion that not just John's own lived experience is involved, he is assimilating other's experiences into developing his own craft. This suggests personal knowledge is also linked to professional craft knowledge (Higgs et al

2008). A practical wisdom or *phronesis* may be more important than lived experience for clinical knowledge. This is the ability to apply general rules to different situations to solve different tasks, to judge the right course of action and make a wise choice (Higgs et al 2008, Svenaeus 2003, Gadamer 1977:1996). The participants may be trying to explain their tacit knowledge, based on the work of Polanyi (1966), *The Tacit Dimension*. He distinguishes between explicit knowledge or 'knowing what' and tacit knowledge or 'knowing how'. Explicit knowledge can be codified and transferred in the form of propositional knowledge, textbooks and research evidence. Tacit knowledge is intuitive, acquired through practical experience and as such, is personal and contextual and cannot be readily made explicit or formalised. It led to the famous quote 'we know more than we can tell' (Polanyi & Sen 2009). This prompted the belief that practitioners cannot fully describe what they know; this knowledge is only revealed through the action itself (Greenhalgh et al 2008). This also links to Schön (1991) and his concept of 'knowing-in-action'. This is a tacit form of knowledge to answer the gap between formalised professional knowledge and the demands of real-world practice. It is supported by the practitioner's critical reflection upon their own practice which can foster this belief in their own expertise. The process of making a clinical decision appears to rely on more than just experience.

### **5.2.3. 'You need to make that jump sometimes to connect everything up'**

This study suggests experience is only part of the clinical reasoning process. Tom regards experience as important but so is appraising the evidence.

*I think a lot of it may be what we do is probably through experience as much as anything else, there's often things that are brought out that you look at and you read and you think, does that have any impact on what we're trynna do treatment wise and then you take that on board and you might try it and see if it is successful and I think you then move on from your own possible experiences rather than necessarily it always being a research based theory - Tom*

Tom initially interprets research evidence through his lived experience and then tests whether it will work on his patients. This process appears to be more than just professional craft knowledge, it is the process of building this type of knowledge. This suggests Higgs' et al (2008) clinical reasoning model does not fully explain how knowledge in practice works. Tom appears to view both propositional knowledge (research evidence) and professional craft knowledge (his experience) as things he must appraise. Personal knowledge of the unique knowledge gained from lived experience does not seem to be

appropriate for this process. Practical wisdom or phronesis, as described by Svenaeus 2003, Gadamer 1977:1996, partially covers this description of the process. This appraisal seems similar to Schön's (1991) concept of 'reflection-in-action' which shows practitioners use their experience in new situations and actively experiment in practice to answer complex problems. Tom makes judgements about evidence from the different spheres of knowledge and then tests them in practice. This process then provides him with more clinical knowledge.

Louis tries to explain his clinical reasoning strategy in practice. It is more than just experience, it is using evidence but he has to determine which evidence is appropriate.

*It's just not knowing with the experience that you gain just knowing how to use the evidence and when it's appropriate to use it and knowing when some things works or, doesn't work. What evidence do I use? Yeah, no, it's, something like, well not a gut feeling but it's just, the number of years of doing the same thing, you get a hunch don't you... - Louis*

He repeats a similar comment to John, knowing when something works or doesn't work and adds he uses intuition, 'a hunch not a gut feeling'. Louis uses this to balance the different evidence: from research, from his experience and from the biomechanics theories. It could be described as practical wisdom or phronesis (Svenaeus 2003, Gadamer 1977:1996) but there may be other elements. Higgs et al (2008) link this practical wisdom to personal knowledge in their model. This aligns with the critical paradigm of research knowledge, which allows researchers to bring about transformation of themselves, individuals, teams, organisations or communities (Higgs et al 2008). This is an interesting interpretation of Habermas (1968:1987); the authors apply his view that his critical theory has an emancipatory effect which can transform knowledge. Higgs et al (2008) relate this to research, however doing this possibly limits its scope. This mode of inquiry is critical reflection, it is through this cognitive interest that we can transcend the limitations of empirio-analytical and historical-hermeneutic paradigms to free ourselves and gain new understanding (McCarthy 1978). Habermas (1968:1987) considers that through critical self-reflection we can free knowledge which determines practice and our conception with the world through autonomy and responsibility. He was beginning to formulate his theory of communicative action, a broad philosophy about the social action in society. He was not considering healthcare practice at all. This links to Gadamer (1976) and the importance of hermeneutic reflection, it is through this we gain improved understanding by knowing ourselves better. Higgs et al (2008) apply this critical paradigm

to research but it may also apply to practice. Perhaps Louis is describing this critical paradigm, not as research, but as a part of his practical wisdom. It is not just knowledge gained from clinical experience, there is something else. Louis calls it 'a hunch' but it may be linked to a self-reflective, critical, clinical approach which forms a practical wisdom. His insight may be the critical approach to practice which links different evidence to design an appropriate treatment for the patient.

George also stresses the importance of his clinical judgements as evidence.

*And I'd argue that when, when gathering evidence it, it comes from lots of different areas, it's not just purely about gathering information from RCTs and surveys et cetera, it's from other things, it's about tried and tested. There's so many different conditions and treatments out there, if we were purely to rely on pure research based evidence I think we'd struggle to do our treatments, so we take evidence from where we can find it. And it might be from anecdotal evidence, it might be from the responses from patients, it might be just from your own clinical judgements. - George*

George has a broad view of evidence, he lists research in its various forms and 'other things'. The term 'tried and tested' is used to define treatments grown from his clinical experience. He maintains if MSK podiatry was based on research evidence alone there would be no treatments to use. This comment illustrates the problems with research evidence in this area, as previously discussed, which mean practitioners must look for evidence in other areas: colleagues' evidence, patient feedback, one's own experience. George also considers his clinical judgements as a form of evidence. Further discussion led him to describe this judgement as a pragmatic, flexible approach to practice.

*It is a good approach. It depends on how it's used.....you need to make that jump sometimes to connect everything up but when you do it, you have to be aware that you're filling that space, it is a good use, it shows good emotional intelligence and to do those leaps of faith but you've got to realise that... you can't necessarily back that up with evidence. So.....you might be doing a treatment and you might make a decision to do something slightly different.....you might not be able to back that up but, but you'll justify that and say well we're gonna try this... - George*

George explains this process of his clinical reasoning as connecting everything up, filling that space and a leap of faith. He speaks about how he uses his clinical judgement to account for the gaps in knowledge he perceives exist in this area of practice. In terms of EBP, George understands this cannot be supported by evidence but it appears his patients consent for him to try things. It is active experimentation and George considers this a

good approach which shows emotional intelligence. MSK podiatry is low risk area of practice and he seems to understand the possible consequences of moving away from the evidence but it shows at present there are still gaps in the knowledge. In line with Louis and Tom, he describes something more than pure experience, possibly a practical wisdom, but again it is linked to professional craft. George's description seems to link with this critical paradigm; it appears to be transformative in that it allows him to solve the problems in his practice. Higgs et al (2008) recognise clinicians rely on their professional judgement in practice because, in part, healthcare relies on inexact science which provides only limited 'hard' evidence for the grey areas. It could also be similar to 'reflection-in-action'; George is aware of the limitations of his actions but understands it is necessary to answer the problems of real world practice (Schön 1991). This has links to Habermas' (1968: 1987) critical self-reflection and Gadamer's (1976) hermeneutic reflection. Alternatively it may be a clinical mindline, as described by Gabbay & Le May (2011); practitioners draw on complex and flexible internalised guidelines, which incorporate a wealth of different kinds of knowledge, explicit and tacit, general and specific, acquired over a lifetime of learning, reading and experience. Sufficiently broad and malleable to deal with individual patient needs and the multiple factors which must be balanced when making a clinical decision, they can be adapted as needed.

It is clear the most experienced practitioners, both NHS and private practice, in this study acknowledge their clinical reasoning has developed from their experience. They utilise a critical approach which may represent a practical wisdom. In MSK podiatry, the perceived problem of insufficient propositional knowledge to support practitioners means they rely on professional craft and personal critical knowledge. But if a practitioner does not have this knowledge, how can it be gained? Hannah and Michael learn from their more senior NHS colleagues.

*Mainly from seeing other practitioners and how they work.....that's the main one. But I have seen it on training days as well , there's the management group of practitioners that set up training for my area and they've given information out on that to say well perhaps you shouldn't be based on Root..., but mainly, but also from my own practice, knowing what works and what doesn't work - Hannah*

Hannah is discussing how she has changed her practice since her graduation. At the time of her interview, though not an MSK specialist, she works one day per week in the MSK team. Her Trust provides training with more senior members of the MSK team and she has shadowed the MSK specialists in her team. This suggests Hannah works for a Trust

which invests in its staff and succession planning to improve their MSK team. It may highlight Hannah is learning her professional craft and developing experience from her colleagues; she is gaining their practical wisdom.

Michael, a podiatrist for two years, also uses his colleague's experiences to develop his practice. He can gain an understanding of the podiatric biomechanics theories and their assessment techniques.

*Just other practitioners who have got a bit more experience than I have, as I say I've only been graduated two years so...practitioners who've got much many years behind 'em, to see they've said it's always good to check that out as well. But coming back to the assessment just seeing just feeling the subtalar joint for example or the MTPJ joint if we were talking about the first-ray and about Dananberg's thing what works well from just asking 'em what works well for you and what wouldn't - Michael*

It appears this is not formal training but, like Hannah, he has had the opportunity to shadow more experienced colleagues. He also uses them as a resource to check his decision making. This seems to be a logical approach, due to lack of propositional knowledge, a practitioner would attempt to learn from their experienced colleagues. It is interesting how both these extracts end with remarks very similar to comments made by MSK specialists, about knowing what works and what doesn't. This may illustrate it is not only experience senior colleagues pass on, they also pass on a way of clinical reasoning linked to this practical wisdom. Gabbay and Le May (2011) describe this as a clinical apprenticeship, linked to the community of practice. They found trainee GPs, still learning to apply their technical knowledge, also develop a form of action learning which means they gain knowledge and craft from their senior colleagues. It also appears to initiate them into a way of thinking about their practice. Michael and Hannah look to be engaged in this form of apprenticeship.

In private practice the infrastructure may not be available to facilitate learning from more experienced colleagues. Paul gained experience working in the NHS before starting his private practice. Jack worked for an orthotic manufacturing company and perceives this offered him plenty of knowledge about orthoses. In contrast, Lynn, though she qualified about the same time as Michael, does not have a network of support in her private practice to help answer the problems she encounters in practice and this has become a source of frustration to her.

*That is a real conundrum isn't it, because I need lots of biomechanical patients and ... practice, 'cos the more practice you have the more understanding you get of things and it's very difficult..... I do rely on some NHS friends that can give me some pointers in the right direction that have been qualified for a lot longer than I have, if necessary, so I'm using their experience to influence my practice...that's quite useful.....but again ... it's just their opinion rather than evidence. - Lynn*

Lynn describes her concerns about developing practical experience especially for the MSK conditions she sees. The only way to develop, Lynn appears to believe, is to treat more patients with orthoses. She must learn from her own experiences and trial and error, the active experimentation approach. This is very difficult because she perceives the knowledge she learnt at University has left her unprepared for the variations in practice. Using friends who work in the NHS to discuss the issues she encounters is not ideal because they are not instantly accessible, she must wait to contact them out of her and their working hours. The final part of part of her extract shows more disappointment as she adds this help is just their opinion, not evidence; this may be linked to Lynn's previous career as a researcher in a natural science. She appreciates practice is based on experience more than research evidence. To gain experience she must treat more MSK patients and though Lynn realises the limitations of this approach she cannot see an alternative. Sandra also works in private practice. Qualified for two years, she also depends on the information and knowledge gained at University though Sandra has the support of a more experienced colleague who works at her practice one day a week to enable her to learn from his experience. Sandra is concerned this is a weak base for practice but, like Lynn, she cannot see any alternative to gain knowledge except through experience and treating more patients.

Izzy, who has been qualified for more than ten years, has a similar strategy to Sandra; she has a colleague who works with her full time. They discuss their MSK patients thus gaining experience from each other. Izzy accepts there are limitations to this approach: they do not broaden their horizons in practice, they are dependent upon each other for experience and also on past learning. Like Lynn, Izzy feels it is difficult to find help in private practice.

*It is and people are friendly but we do tend to find in private practice that people can be very secretive, about what they're doing in their clinic.....especially if you're in a similar area [laughs]. 'Cos we don't wanna share [laughs]. I think people don't wanna share the services that they're offering erm, or the prices that they're charging and all these kinds of things.....you know, maybe they're not happy to...There's not as much openness. - Izzy*

Izzy considers competition between private practices prevents open discussion about treatments provided, which also implies orthosis design. Izzy regularly attends a group for private practitioners which is supposed to help with continuing professional development but she perceives this has not helped her to understand biomechanics theories, improve her treatment plans or raise her critical appraisal skills. She is concerned because, in contrast to some participants, she can see the limitations in trying to develop her practice just from her own clinical experiences. This highlights the main flaw with learning from experience; it is limited by the scope of the experience and help may be needed to expand the experience. Barry agrees with Izzy, competition prevents podiatrists sharing knowledge in private practice, particularly locally, but he has found a way round this. He has formed a network of colleagues online, through a private area in a podiatry forum, thus Barry is able to discuss his own clinical issues and research evidence too. He realises this has helped him to gain from their experience and also have more confidence in appraising research evidence. This apparent lack of cooperation in private practice may have implications in the future for the NHS. Waring & Bishop (2011) propose the increasing private involvement in the NHS may hamper co-operation and sharing of knowledge.

Despite her concerns, Izzy shows confidence from running a successful private practice for ten years. She has a practical wisdom born from her experience, however limited that may seem, and evidence to support this from her patients.

*But the reality is in everyday practice when someone's coming in with a problem, I'm looking at them, deciding what I think they need, popping it in and then they're coming back a couple of, later and it's improved, the fact that I can't pull apart a trial that I potentially don't completely understand how they've done it properly doesn't seem to affect me, if that makes sense - Izzy*

Izzy demonstrates faith in her clinical reasoning skills which enables her to decide what her patient needs and offer a successful treatment; her perceived inability to evaluate research evidence seems unimportant. Izzy implies she is aware she treats patients successfully and she uses this to gain her experience. In Izzy's case, practical wisdom is not influenced by research evidence.

The experienced practitioners within this study appear to have confidence in their clinical judgements. They balance the research evidence, the theoretical framework of biomechanics, a range of orthotic designs and materials, a spectrum of MSK conditions

and a variety of patient factors and preferences to form a treatment plan. It takes more than just experience to balance these differing elements and this could be known as practical wisdom or phronesis (Svenaeus 2003, Gadamer 1977:1996). Even in the small area of practice that is MSK podiatry the EBP model of clinical reasoning, from DiCensa et al (2005), seems inadequate in describing the components of clinical expertise. Greenhalgh & Wieringa (2011) describe this expertise as the ability to know 'what is best to do, for this individual, at this time, given these particular circumstances'. It draws on complex and flexible internalised guidelines which incorporate a wealth of different kinds of knowledge. It is proposed as knowing-in-action (Schön 1991) or clinical mindlines (Gabbay & Le May 2011). Paterson & Higgs (2008) explain it as professional artistry, a uniquely individual view of practice within a shared tradition, concerned with practical knowledge, skilful performance and knowing is doing. It is developed through acquisition of a relevant knowledge base and extensive experience. These may be better descriptions of the practical wisdom the experienced practitioners exhibit in this area of practice. In the NHS it appears less experienced practitioners learn this skill from their colleagues. In private practice it is more difficult, various strategies are used to help acquire this skill but it appears to mainly develop from practical experience.

#### **5.2.4. 'Our own patient feedback. Rightly or wrongly.'**

Izzy knows her patients improve because that's what her patients tell her. This evidence, from patients, underpins practical wisdom. It is how participants gain experience and it confirms their beliefs about the theoretical framework which supports MSK podiatry.

*The evidence.....is that the patient is symptom free.....that's the only thing that counts as evidence. Surely. - Paul*

Paul claims he uses his patient reviews to improve his orthoses and it is patient feedback which affects his practice most. Previously, he suggested research evidence does not give information to help reduce patient symptoms. This extract is Paul's reply when asked what evidence he has to show his review process is effective. He makes the point EBP should be about improving patient symptoms and is the only evidence that truly counts. This is a continuation of his loss of faith with the NHS and EBP which Paul feels is more focused on following research evidence rather than ensuring a patient's health improves. Paul's view is in direct opposition to the claims of EBP; EBP is about using the best research evidence to give individual patients the best treatment (Bury & Mead 2000, Hamer 2005, Moore &

McQuay 2006, Reynolds 2000, Sackett et al 1996, Strauss et al 2011). His opinion may be a reflection of the standard of the research evidence in podiatry MSK practice. Perhaps since Paul regards orthoses as an effective treatment, research evidence which does not agree has led him to think the problem is with the research evidence. Paul's stance may also be related to his practice being wholly private; the success of his business is dependent upon positive patient feedback, therefore it is unsurprising he concentrates on obtaining the best results for his patients. The other participants who work in private practice also focus on their patient feedback.

*Well it's got to be because that's the only thing, I mean you can do these things on cadaver's and things like that, can't you, but the only evidence is the patient's response to it, isn't it.....it's got to be, because that's what we're doing it for. So what, what other evidence could there be? - Sandra*

Sandra endorses Paul's opinion; patient response to treatment is the only real evidence and the main evidence needed for practice. She thinks research evidence should be based on patient response to treatment. This may be the reason she highlights cadaver studies in her extract, as these can have no real relationship to patient outcomes.

*Our own patient feedback. Rightly or wrongly. - Izzy*

Izzy answers the question, what is her main source of evidence? Her response links back to her previous extract, she does not see how research fits in to her practice. Further discussion reveals a potential limitation of patient feedback as a form of evidence; it is only applicable to a specific practice, yet she perceives positive patient feedback is partly why her business is successful. As mentioned earlier, a difference between private and NHS practice may be whether the practitioner treats customers or patients.

*I like to work on what my patients are telling me more than what you a paper tells me I should be doing.....I would use a paper or a research as a starting point but if that doesn't work for my patients then I'm not just gonna routinely say this is what the paper says therefore I'm doing it. I'd be able to work around that and maybe take what they've done and adapt it for my own purposes to some extent. - Jack*

Jack understands the limitations of patient outcome data and illustrates the link between patient feedback and the process of gaining practical experience from active experimentation. This extract shows Jack holds research evidence informs his practice,

but he may use patient feedback more than research; he routinely adapts his treatment plan as a result of the patients' response rather than research evidence.

*The value of patient feedback as evidence though, it may be lower. The value judgement is on the size of the study. One patient says to me those insoles are absolutely fantastic. It doesn't mean I'm gonna give every patient that pair of insoles because I can understand the limitations of that evidence.....If patient feedback tells me if I have heard six thousand times over the past five years that when you took that corn out the pain went, I don't need to go and look for research that tells me that enucleating corns reduces pain in patients,.....for an RCT on it.....because I can give enough weight to that evidence, ..... it becomes valuable by the very nature of the size of it - Barry*

Barry outlines reasons why patient feedback is not as powerful as research evidence. He suggests research evidence has a strength patient feedback may not achieve and delivers a rational argument of how patient feedback can be used well but also misused in practice. On the surface it is difficult to disagree; Barry encapsulates the issue that the evidence of patients getting better is regarded as less valuable than research evidence, perhaps something brought about by the growth of EBP. Barry also considers if the outcome data are positive there may be nothing research can add. He is confirming patient feedback gives weight to a practitioner's experience.

The participants who work in the NHS also use patient feedback as their main source of evidence but it was clearer they employ a patient reported outcome measure (PROM).

*Yeah when they feedback, a lot of your practice is based on what they tell you because you want to know whether it's worked or not. And what they, 'cos er, I'm looking to get somebody out of pain ...or discomfort ... and if they're out of pain then that's the evidence that it's worked. - Hannah*

Hannah states much of her practice is based upon the feedback she receives from patients. She uses visual analogue scales (VAS) scores to determine if the patient's pain level has decreased as a result of her treatment. VAS could be described as the simplest form of PROM. It has been shown to have validity for measuring pain at one point in time, therefore it may be an appropriate measurement for clinical practice. However the validity of using VAS in research studies is questionable since repeated VAS measurements may not behave linearly (Kersten et al 2014).

*I'd say it's the best and the easiest. I think it's difficult..... 'cos the majority of patients that come to see me the reason that they come is because they're in pain.....*

*That tends to be in most cases the only reason they come to see me as a podiatrist ..... straightaway that's what you're aiming to improve and therefore if you're improving the reason they've come to you that would be the best way of measuring your outcomes. - Ed*

*Er, patient report outcomes..... that should be hugely important, I think yeah, that, that's the most important part of, or one of the most important parts of auditing and, and seeing if your device works. - Richard*

Ed, as discussed earlier, uses VAS to measure the effectiveness of his orthoses in reducing his patient's pain. He describes this type of evidence as the easiest and best evidence for practice; patients come in pain and he sees it as his job to reduce this pain. Patient reported outcomes are hugely important in Richard's opinion too. However, Ed and Richard fail to mention patient feedback as a form of evidence at the start of their interviews when discussing EBP. It appears they view EBP as being about research and not part of practice yet both understand the effectiveness of orthoses is connected to the patient feedback received in practice.

*Patients who, I've seen who haven't had insoles and had very similar treatments, or patients who've come in with conditions for a number of years or a number of months and then we've given 'em insoles and they had good results. - David*

David also declares he knows orthoses work for MSK conditions because his positive PROM's, audits and his experience of podiatry practice prove that orthoses work for his patients. He also obtains verbal feedback from the patient which is not quantifiable. Though he uses the term good results to describe the outcome for the patient, David does not clearly define this term.

The extent to which patient feedback influences their beliefs about their practice is important.

*Yeah, I think that's where the experience comes from, absolutely, and how they get on with treatment so in the case of foot orthoses, I think it comes down to how they respond to what you're trynna do, yeah, so that then, tailors probably what you do clinically and gives you that experience to do or look at what you're doing next. - Tom*

Tom describes how his clinical experience develops through patient feedback and the adjustments he makes to his functional orthoses are led by the patient's response. He illustrates patient feedback is directly linked to the process of testing orthoses designs by trial and error.

In this study, both NHS and private practitioners rely on patient feedback to inform their practice. In one respect this is unsurprising; healthcare practitioners should respond to the feedback of their patients. This shows the MSK podiatrists focus on their patients and their response to treatment and could be termed a patient-centred approach. If the expansion of podiatry into MSK practice is based upon this approach then the claims of legitimacy from podiatrists over this area of work do not have a scientific basis. The claim to this area of practice by the participants is based on trial and error and patient feedback, therefore clinical experience, linked to a practical wisdom which allows them to make clinical decisions about treatment. The podiatric biomechanics theories could primarily be described as having developed from their proponents' clinical practice. STJN, sagittal plane and SALRE theories (Dananberg 2000, Kirby 1989, 1992, Root et al 1977) all derive from attempts to explain the perceived success of orthoses in their clinical experience. Therefore the Unified theory (Harradine & Bevan 2009), which looks for commonality between the other theories and is based the authors' experiences of using them in practice, is also based in practical experience. As previously discussed, there is evidence in the literature to show patients like orthoses as a treatment (Clement et al 1981, Harradine & Jarrett 2001, Hirshmuller et al 2011, James et al 1978, Moraros & Hodge 1993, Rendall & Batty 1998, Saxena & Haddad 2003, Sperryn & Reston 1983, Taunton et al 2003, Walter et al 2004). This process may have transformed the authors' professional craft knowledge into propositional knowledge. Thus, the propositional knowledge of MSK podiatry is based in experience and practice rather than scientific knowledge.

Greenhalgh et al (2008) describe PROMs as a form of encoded knowledge as they represent an attempt to standardise patient's subjective opinions about their treatment or condition; they can be used to show how a particular dimension of health should be judged across different populations. Their study of the use of PROMs in an in-patient neurorehabilitation team found clinicians used tacit knowledge, their clinical experience, to assess a patient's abilities and this is then converted into a score; thus, a clinician's subjective opinion can be changed into a fixed and objective score. A further study by Greenhalgh et al (2013) looks at the role of PROMs in exploring patient concerns in oncology consultations. However though treatment regimens are not routinely changed as a result of a patient's request, clinicians use them to legitimise changes to regimens. Both studies suggest the use of PROMs can be complex. Black (2013) states PROMs could transform the way healthcare is delivered in the UK. He sees them as a way to offer patient-centred care, assess and compare the quality of providers and provide data to

evaluate practices and policies. Yet there are disadvantages: cost of implementation, achieving high rates of patient involvement, patient fatigue with PROM's and attributing outcomes to the quality of care. In MSK podiatry it appears PROMs, however simple, are the key evidence to have driven practice. This may show MSK podiatry has a patient-centred approach which may have allowed podiatry to expand in to this area of practice.

### **5.2.5. 'Ah. Thin ice.'**

Other participants mistrust patient feedback. Louis implies psychological factors influence patient feedback and so it cannot be fully trusted.

*.....and there is probably a psychological element to that, patients say oh he knows what he's doing so I'm gonna get better, when you get, a clinician who'll say this is what the problem is we've got different ways of maybe treating this and we're gonna try this and we'll try this there's a large psychological element to, to both a patients' beliefs of treatments and yeah of the foot orthoses it's psychological and.....placebo. - Louis*

He suggests patients are affected by their faith in the orthoses and the practitioner who makes them. He quantifies this through anecdotes about patients who have orthoses replaced; if the orthoses differ in any way, the patient is not happy with them unless you convince them they are same as the previous devices. Louis mentions an element of placebo effect with orthotic treatment. Further discussion reveals this is linked to his belief that we do not understand how orthoses work as the theories are unproven or unscientific. When challenged about the placebo affect he agrees many, possibly all, health treatments are affected by the placebo effect. Gadamer (1977:1996) discusses the enigmatic nature of health as a phenomenon which occurs to the individual, therefore illness manifests itself in each person in an individual way. It is a complex condition which affects an inner accord, as we feel ill. There is a psychological element to these feelings, both in illness and health, therefore any treatment is subject to psychological effects.

Charlie admits his experience is founded on his patient feedback. His view slightly differed from Louis; the psychological aspect is to obtain the patient's trust.

*And also explaining one of these to a patient, drawing the diagrams, getting them on your side, I've had patients come to me with insoles that've been fine from the community, I don't like 'em, they don't work, I say okay I'll look at 'em, I'll look at their foot and I say well this is what they're trynna do and I'll draw it out and you can see them going, aww, oh that's why, oh okay, yeah, well fine, I'll give 'em a try. And then you've gotta*

*get somebody on your side, ... There's a huge amount of psychological, that whole thing of experience and being confident... - Charlie*

Charlie thinks the ability to gain patient confidence is a key skill for the practitioner. Based on his own experiences as a patient, the clinician should appear confident but not arrogant. The ability to confidently discuss the treatment with the patient and make them feel part of the process, in his experience, has a positive effect on the psychology of the patient and improves the outcome. This is a difficult thing to assess and suggests Charlie, who has a good knowledge of the research evidence for orthoses, thinks there is not enough research evidence to explain how orthoses work so there may be some other unexplained reason for their success which he attributes to psychological effects. Being susceptible to these psychological effects implies patient feedback is to be mistrusted. Lynn outlines why she mistrusts health care research; humans try to please the researcher/practitioner therefore it is untrustworthy evidence.

*I think it is because you can't standardise things. You can to a certain extent but people are individuals and you've got to take that into account with any of the research you do. If somebody comes back and tells you oh this orthotic was absolutely fantastic..... you've only got their word for it and they might be just trying to please you. There's a placebo effect. Whereas you don't tend to get that with animals.....they're either in pain or they're not in pain.....and they don't lie to you - Lynn*

This, possibly more extreme, view probably reflects Lynn's background in the natural sciences. She discusses the differences between human and animal reactions to pain and concludes animals don't lie to you. The implication is patients may lie to her about her treatments; this may reflect the lack of confidence in her own practice and skills at present. It appears she has almost forgotten one role as a practitioner is to lessen patient pain. This mistrust of patient evidence may be a product of the view that patients produce 'weak' subjective evidence or it may suggest a deeper issue; patient evidence cannot be trusted unless measured, quantified and converted into objective data, therefore made reliable. Perhaps such doubts about patient evidence led to the growth of PROMs. Jenkinson & Morley (2016), in their review of PROMs, suggest that, far from being unreliable, patient evidence can be an important source of reliable information. They consider PROMs can provide more meaningful assessments of patient health, and the benefits and harms that may result from treatment, to give a thorough evaluation of care. Greenhalgh et al (2015) give the example where patient reports of headaches and other side effects, when taking selective serotonin re-uptake inhibitors for depression, were ignored until the numbers of reports became too numerous to ignore. Lynn may be making the point that this evidence

should be used with caution since it is not always clear the patient and clinician have the same treatment aims and objectives.

It is interesting, whilst some participants doubt patient evidence and others think it is susceptible to psychological effects, it seems to be the main form of evidence in support of orthoses as treatment.

*From a commissioning point of view we would struggle backing up the treatments that we offer because we would have no evidence or proof that what we're doing is working other than perhaps discharge policy which is not very measurable really for patient outcomes so from a commissioning point of view, we would struggle to back ourselves up...- Ed*

Ed accepts the lack of analysis of patient outcome data in his Trust means they have no evidence to show commissioners their service is effective. He has a conversation with his patients then makes a note of their comments, Ed is the only NHS practitioner in this study not to use any form of outcome measure. In his Trust, there does not seem to be any collection or collation of outcome data nor do they appear to use any PROMs. It not just from a commissioning point of view this could be seen as a threat to podiatry; lack of evidence to support a treatment must call the treatment into question. His Trust has no evidence to support its use of orthoses for MSK conditions so it may be understandable why Ed is worried.

Ed may also be referring to the lack of strong research evidence for orthoses to support podiatrists on the treatments they offer. John and Hannah have a fear they may be called to account for their clinical decisions and would not have good research evidence to support them; they are reliant upon their practical wisdom, clinical experience and patient feedback.

*Because there may be something more appropriate out there that I don't know about for one thing.....and again...it's quite subjective really is patient feedback in terms of actually measuring it and being appropriate and I think one thing is you're always worried that if what you've done is deemed to be inappropriate by someone else you're always at risk from, well 'specially nowadays, being sued or something like... - John*

*But that's not controlled and you couldn't... I don't know, would you stand up in court, I don't know [laughs], if it came back to that.....whereas, a decision based on a clinical trial is very sound. If it's been done properly. - Hannah*

John perceives research evidence is not always relevant to practice and he admits, reluctantly, he mostly uses his experience based on patient responses in addition to colleague and expert opinions as evidence. He considers patient feedback is subjective and this leaves him vulnerable to being sued, a fear he has already mentioned concerning the lack of proven research evidence for practice. John demonstrates he wants his practice to be based on the best evidence which he considers to be research evidence. As previously shown, following research evidence, for example about lateral wedging for knee pain, may make him undertake treatments with limited efficacy. Hannah also exhibits a fear of her practice ending in court action, although it may be more remote than John's. She discusses the reasons RCTs are considered to be at the top of the hierarchy of evidence and why evidence from colleagues is weak evidence; she perceives she would not want to defend herself on evidence provided by colleagues, despite using this evidence more than research.

These extracts reveal a 'risk from being sued' culture within the NHS participants but in reality the risk of their actions leading to court action can only be very small. This fear may be a manifestation of the frustration that MSK podiatry is not supported by strong research evidence or a consequence of MSK podiatry not following EBP principles. The fear of being sued is not explicitly discussed by any private practitioners in this study. It seems these participants view treatment as a business transaction; therefore, should orthoses not work for the patient, they would happily refund their money to satisfy them. The need to quantify practice with research evidence may be less since their practice is more dependent on good patient feedback.

Michael expresses another fear; if patient feedback is the main evidence to support MSK practice then podiatrists may be unable say they are undertaking EBP.

*Michael: But then as podiatrists what we're supposed to do is evidence-based practice...*

*Interviewer: Right. Can you see where I'm sort of going with this though...*

*...is that the evidence is actually patient feedback. So where d'you think that leaves us as a profession in terms of our evidence base?*

*Michael: Ah. Thin ice. [Laughs].*

*Michael: No. I wouldn't. I think my understanding is more with the patient feedback to say that's what's worked well for 'em...*

*Interviewer: ...why are we on thin ice if patient feedback is good?*

*Michael: Because there's no sort of evidence to, yes that is a form of evidence but there's no sort of research, it's just again one individual's opinion of if their symptoms have gone away or it's gotten worse but there's no sort of research behind there is there...*

He perceives podiatry is on thin ice because patient feedback is probably the main evidence to support the biomechanics theories. He thinks the use of orthoses as a treatment should be justified by robust research evidence. I suggest, since this research evidence is not available, that may be gathering patient feedback together would help. However Michael considers, though he uses this evidence mostly, its individual nature makes it weak when compared to research evidence. These extracts highlight a criticism of EBP; a high regard is placed on one form of evidence, quantitative research evidence, to the exclusion of all other forms of evidence through its hierarchy of evidence (Goldenberg 2006, Miles 2009). It may also demonstrate that MSK podiatry may not be using EBP principles, thus be in opposition to the scientific-bureaucratic model of practice which suggests research evidence should be used to make clinical guidelines that practitioners must follow. In the future this may become a legal expectation for clinical practice (Harrison & McDonald 2008). Yet Williams et al (2016) already show clinical guidelines have little influence on decision making in orthotic practice. It also appears the participants do not feel safe relying on evidence from their practical experience and patient feedback, they want the support of research evidence.

These fears will not be addressed in the foreseeable future because there is, at present, a lack of definitive research evidence to support the biomechanics theories used in practice. Consequently, the participants base their decisions on clinical experience because the patient's subjective experience appears to be the most widespread evidence for orthoses.

It was not always clear which outcome measure some participants employ, if any, but the remaining practitioners use VAS as their main source of patient feedback. There is a variance across different NHS Trusts.

*Yeah when they feedback, a lot of your practice is based on what they tell you because you want to know whether it's worked or not. And what they I'm looking to get somebody out of pain ... and, or discomfort ... and if they're out of pain then that's the evidence that it's worked. - Hannah*

*Health outcomes measures.....as well as VAS scores essentially so that you can compare the two. So that's, and possibly some qualitative measures which is not something that you tend to find a lot..... personal perspectives - David*

*Basically the patient coming back and telling me, looking back at the NHS so not great outcomes so there, there should've been better outcome measures for what we were using in the NHS purely patient reported, visual analogue scales say but not much more than that - Richard*

Hannah uses patient pain levels to decide if her treatments are effective. She recognises, like Paul, practice is based upon this evidence. David prefers to use an additional outcome measure to VAS and talks about the Manchester-Oxford Foot Questionnaire (MOXFQ) however this outcome measure is only validated for foot and ankle surgery, not for the treatment of MSK injuries (Morley et al 2013). When Richard worked in the NHS he used VAS but he senses these are not the best patient outcome measures to use.

In private practice it appears VAS are also used widely.

*We always review our patients.....two if not three times.....we tend to ask them their pain, you know discomfort levels between one and five and record that..... on the record.....obviously we look at their gait again, but I do think that at the moment we feel like we've not got enough evidence apart from what they're telling us discomfort-wise - Izzy*

*By results I suppose. So whether or not I've got it right or whether or not a patient is better, and it doesn't always have to be a cure but an improvement in their pain score for example.....so I always ask for a visual analogue score, I always say out of ten what's the worst pain you've had with this and then try and get it to get better, so that's what I use... - Sandra*

*I do on my biomechanical assessments and then when they come back for review again we see if there's been an improvement either standing on the orthotic and standing on the floor...but a lot of it is ... the reduction in the symptoms that they came in with initially.....is really what I'm looking at. Just like a VAS scale, how much pain they're in, erm, that sorta thing. - Jack*

These private practitioners emphasise the differences between themselves and NHS practitioners. They feel, like Paul, they can review their patients more often and give more attention. Sandra only uses VAS, she trusts this is the only measure she needs. Izzy disagrees, she uses VAS but would also like an objective measure to show her orthoses have altered foot function and the patient has improved. Jack reviews his orthoses visually but also uses VAS. This widespread use of VAS to measure patient pain levels shows MSK podiatrists look to quantify their patient's reduction in pain. Kersten et al

(2015) show there is some validity to VAS scores for pain. This is a positive development in podiatry; the belief the participants have in the effectiveness of orthoses appears to be based on the measured evidence of reduced patient pain. However some participants feel this data can be improved.

*yeah, I mean again, I think that's an emerging area for us, I don't think, if I'm honest, I think it's poorly executed. I don't think we collect really good outcome data.* - Helen

*Then it comes down to organisation of collecting that data.....you know, maybe that's where it should, but we do that in a way, by doing our audits but they're on a small scale...* - George

Helen implies podiatrists can improve on the outcome data they collect but it is unclear from her interview if Helen considers VAS a poor outcome measure. This suggests the same mistrust of subjective information as previously shown. George is concerned the data are collected but not collated unless a specific audit is taking place. He considers these audits to be small scale and only relevant on a local level. Participants use VAS to obtain patient outcome data but it is unclear, despite the participant's dependency upon this information, how this data is collated and analysed.

It would seem, in MSK podiatry in the NHS, analysis of patient outcome data is done on an ad-hoc basis either to develop new services or when practitioners feel it is right or timely.

*It's probably well we could be better with audits and, for example one of the things that we do at the minute is with plantar fasciitis is we have used night splints with the treatment of plantar fasciitis and I've just been thinking recently, we're giving a lot of these out and we're not really auditing what impact these are having on patients, we ask the clinicians are these working, they say oh yeah they seem to be working okay, but there's no evidence to say that and it was quite a few years ago since I did a lit review on that treatment for.....foot orthoses, for night splints...* - Louis

*I'm auditing my practice at ..... 'cos I'm developing a new service. We audit things like injection therapies to look at effectiveness and contraindications and stuff here and we just look at we do patient satisfaction surveys, which, part of this, are you happy with your treatment. But, that is.....the type of audit we do, not necessarily the audit of the specific treatments that we're doing.* - David

Louis discusses the need for an audit of night splints for the treatment of plantar fasciitis. David implies he audits his own practice only when he develops a new service. There may also be some confusion over terms within this area. Tom uses the term audit in discussions about how patient feedback can be measured to improve the knowledge on

the effectiveness of functional orthoses as a treatment. He agrees, after prompting, even though these are a lower level of evidence than quantitative research, they could give important information about the effectiveness of orthoses. Louis, David, Tom and possibly George speak about audit when it transpires they may mean service evaluations; clinical audit is a cyclical process where current practice is measured against set standards whereas service evaluations measure the effectiveness of a service (Foley 2006).

In private practice the need for evaluation and audit appears to be less of a priority and it is not obvious what these participants do with the data they collect. Patients are customers so the successfulness of their practices may also lessen the need for evaluation of this data. Two private practitioners are explicit about their data. Barry, who claims patient feedback is the biggest driver for his practice, collects outcome data but has not, as yet, reviewed or analysed it.

*It's collected on the system for outcomes it's the only thing that's measured so for pathology type outcomes and it's a someday exercise for me, I'll have a look back at that 'cos we use digital notes here so it'd be possible to do that but I've not currently done it, no. But it's.....it's an intention for the future to do that. Is, yes to look at the outcomes..... because, when it was set up on the system it was probably five or six years ago I wanted it kept as simple as possible just so it, it would have some value rather than take it, and so I could use it across different pathologies as well. - Barry*

*Not yet, when you say measurement, you mean like a Likert Scale or something? I don't measure it at the moment. I possibly might. Well as I'm going paperless, I mean I could put it on there, and it'd be easy to put a Likert scale or something like that, but I've [phewww] I don't know, I'm not really happy unless that is a zero at the end of it.....that's what my job is as a podiatrist...I mean it's hard to, to actually tell someone it's never gonna get better, or you're gonna have to live with it, and I rarely have to say that. - Paul*

Paul does not collect any outcome data. He is the only participant who explicitly states there is no benefit to using research evidence as the only evidence required is the patient gets better. He justifies this implying his perfectionist character would be dissatisfied with any result other than zero. This could be seen to be disingenuous; he does not record any outcome data because being imperfect may cause anxiety to himself rather than measure the success of his treatment.

Some NHS participants demonstrate patient feedback can be viewed as positive without any evidence to confirm this.

*Er, 'cos most of the patients I provide orthotics for which is perhaps eighty or ninety percent of the patients.....improve with the use of orthotics.....on their own, either one because they never come back to me and most patients in the NHS if they're still in pain will come back to me ...and the ones that I do review most of 'em report that they're, again it tends to be pain levels has improved... - Ed*

*There was a number of patients who never came back to those three months reviews... now one could assume that it's because it's working and they're happy and they continue to go through, the other reason could've been the fact that the problem was very small, an issue came in and it's just, it's gone away itself or they're still in pain. Well I like to assume that the fact that the symptoms have gone away, they're in much better position that they were three months ago. Anyone, to my understanding, in continuous pain I would assume they would come back to the clinic to see what else can be done rather than just let it be. - Michael*

Ed claims he has a high success rate for treating MSK conditions with orthoses. However it is not obvious if he actually collects or evaluates any data to determine this success rate. He shows patient information can be distorted in a positive way; Ed thinks patients who do not attend review appointments do this because they must be pain free, he assumes if they were still in pain they would return to him. Michael holds a similar view but admits he is working on assumptions and outlines alternative reasons why a patient may not attend a review. He projects his own feelings onto his patients; if he was still in pain then he would return for review therefore his patients would do likewise. Practitioners can misinterpret patient actions to achieve a positive outcome for the patient and themselves. It also highlights the importance of not just collecting outcome data but reviewing and analysing it, non-returning patients would be excluded from this data, to give realistic evidence of the effectiveness of their orthoses as a treatment. Williams et al (2016) agree with this finding. They conclude patient outcomes is an area devoid of quality and coherent approaches and is in urgent need of attention.

### **5.2.6. Conclusion: Patient feedback is the main evidence in MSK podiatry**

The participants appear to undertake a process of trial and error with orthotic design, materials and other treatment options because there is no clear research evidence to guide these choices. The trial and error process, part of podiatric MSK practice for many years, is supported by patient feedback; the participants claim to achieve good results for their orthotic treatment. This is the main evidence used by participants; some consider it is weak or untrustworthy evidence whilst others consider it the most importance evidence for practice. It is unclear how patient feedback is collected although some participants

regularly use patient related outcome measures, mainly VAS. It emerged that although this data is collected, it is not always collated, reviewed and analysed; this data is used for audits and evaluations but not in a systematic way.

The participant's consensus that patient feedback is essential for podiatrists to develop their MSK practice highlights a way for the profession to improve the evidence for the use of orthoses. It should be possible to collate patient feedback to show orthoses are a successful treatment for MSK conditions and patient related outcome measures could be a way to demonstrate success. Williams et al (2016) maintain this should be a priority for MSK podiatry plus patient satisfaction surveys about orthoses show good patient outcomes (Clement et al 1981, Hirshmueller et al 2011, James et al 1978, Moraros & Hodge 1993, Saxena & Haddad 2003, Sperryn & Reston 1983, Taunton et al 2003, Walter et al 2004). Evaluation of orthotic services also show orthoses are an effective treatment (Harradine & Jarrett 2001, Rendall & Batty 1998). However, these positive results are not always carried over into RCTs; results from systematic reviews do not give the same clear and definitive results as patient satisfaction surveys though they offer some evidence that orthoses work for some MSK conditions (Collins et al 2007, Chuter et al 2014, Hawke et al 2008, Landorf et al 2004). This suggests orthoses do not give the same results when measured objectively as they do subjectively. Yet, it is difficult to draw this as a thorough conclusion. The standard of RCTs in this area can only be described as weak due to the lack of homogeneity of method, orthosis design and the nature of MSK conditions. Also, this high level of patient satisfaction, if it is replicated in their practice, will influence the participants' view of their treatment success rate.

## 5.3. Discourse of Podiatric Biomechanics Has Changed

The previous chapter shows participants use active experimentation with patient feedback in MSK podiatry as there is little definitive research evidence for them to use. Podiatric biomechanics appears to be based in the professional experience of the participants. This must have implications for the podiatric biomechanics theories which are being used in practice. Borthwick (1999) first pointed to the podiatric biomechanics discourse as a way to establish a rational scientific basis for podiatric knowledge. Nancarrow & Borthwick (2005) describe the podiatric biomechanics discourse as a concept which has allowed podiatry to move into MSK practice. This discourse seems to be a form of propositional knowledge for MSK podiatry. The participants use it as a framework to understand gait and the way orthoses work in practice.

### 5.3.1. 'Tissue stress is, is central to my practice'

Discussions about which podiatric biomechanics theories the participants use in practice demonstrate how the discourse of podiatric biomechanics has changed. The participants are keen to emphasise the flexibility of some theories and the differences from how things were done in the past.

*We now try and treat the actual pathology, well not regardless of but dependent on what the foot position is like. - Tom*

Above is a typical example of the participants' comments. Tom describes how he now primarily treats the patient's pathology and implies he is unconcerned whether or not his patients function in a better biomechanical position. Tom appears to believe there are podiatrists who treat patients with functional orthoses on the basis of their foot type rather than a diagnosed MSK condition, a conclusion derived from the prevailing view when he first qualified. In fact, apart from Paul, all participants qualified for 6 years or longer make it clear their approach has changed from improving the patient's functional position to treating the MSK injury. It also differs from my experience, as I was taught to focus on treating the injury and its biomechanical cause not just solving the biomechanical issues. It appears that after I graduated that there may have been a return to a more dogmatic teaching of STJN theory, focused on biomechanics not injuries. Michael, Lynn, Sandra and Jack, the most recently qualified, also focus on treating on the patient's injury but did not emphasise this change. This suggests students are now taught to focus on the patient's

injury rather than the patient's biomechanical position. It also implies that only in the last three years have podiatrists moved away from correcting biomechanical function to actually treating the MSK injury. The discrediting of STJN theory may have had a profound effect on the views of MSK podiatrists. The goal of STJN theory is to return the patient to the optimal functioning position of the foot, Subtalar Neutral, to help heal MSK injuries (Root et al 1977) but initial research evidence showed some foot types described by Root were present in a population asymptomatic for MSK injuries (McPoil et al 1988). Further research revealed that during gait, the foot may be in a pronated position and may not even function in STJN (McPoil & Cornwell 1996, Pierrynowski & Smith 1996). This evidence, though almost twenty years old, still appears to be important to some participants. John is explicit in his criticism of practitioners who still treat patients this way.

*Well I think a lot of it has been through research, I think the old theories basically were challenged, and people were finding that new research had come out and people then go on from there, I think a lot of the time originally people just accepted what we were told and taught and to be fair we still get that now, even from existing practitioners who maybe haven't had the exposure that we've had, even people that have been qualified a long time, well particularly people that have been qualified a long time and they still try and prevent pronation and it's seen as a sort of all-evil - John*

John explains the reasons why he now focuses on his patients MSK injury not getting them to function in a better biomechanical position. He goes on to discuss how this change has been changed by research, yet he still comes across practitioners that believe in STJN theory literally, looking to make a patient function in STJN. I have to be careful in analysing this quotation. John is expressing an opinion that conflicts with my experience. I have been qualified longer than John but was taught about the issues regarding STJN theory at University so do not subscribe to his view. It would be easy to dismiss his view as just wrong, as mentions that research brought about this change. Previously it has been shown that John's knowledge of research may not be as good as he thinks it is. However this quote may demonstrate how practitioners distance themselves from the past and other practitioners. This may be an illustration of practitioners wanting to differentiate themselves from their colleagues. As MSK podiatry is an informal specialism within the profession (Nancarrow & Borthwick 2005, Bacon & Borthwick 2013), then practitioners many feel they have to justify their differences to their colleagues. In John's case that he has used research evidence to move away from discredited theories.

Tissue Stress theory appears to have strong support amongst the participants as this is seen to be a theory that has a scientific basis.

*Tissue stress is, is central to my practice.....that's the actual central point. - Barry*

This study contradicts Horwood (2016) who claims the Tissue Stress theory is largely ignored in podiatry. All participants, apart from Paul, either explicitly express they use Tissue Stress theory like Barry or infer they use an amalgamation of theories to allow the injured tissue to rest, an implicit use of the Tissue Stress theory linked to the Unified theory (Harradine & Bevan 2009); the participants apply anatomical knowledge to their patient's injury together with their knowledge of biomechanics theories and clinical experience to make an orthosis to allow the injured tissue to rest. The Tissue Stress theory was proposed by McPoil & Hunt (1995) as an answer to the issues which discredited the main tenets of STJN theory; however the original article is based not on the efficacy of orthoses as a treatment but on the research evidence which discredited STJN theory. Both this evidence and other study evidence about the possible cause and effect of MSK injuries on tissues are used to formulate an approach to treat such injuries. It is open to adaptation; a podiatrist can use any theory but claim they use this approach. Such flexibility, simplicity and the origin in explaining how orthoses work in a logical way may make the Tissue Stress theory easy for podiatrists to accept and utilise.

*The main thing like the tissue stress, which there's evidence to, there's a scientific background to that which is why I like that and that's one of the theories that I tend to have taken on board with the Masters work 'cos of the Tissue Stress theory was based on mechanical theories... - David*

David expresses the opinion he uses Tissue Stress theory because it is scientific and applies mechanical principles to the body. This may tell us podiatrists believe a scientific basis for a theory gives it strength as it can be seen as a logical theory. It could be linked to the casuistry model of practice (Tonelli 2006) as one of the topics is pathophysiological rationale. Tissue Stress theory is based on a physiological theory relating to MSK injury and healing (McPoil & Hunt 1995) and the evidence to support it is based on laboratory or theoretical studies (Mueller & Maluf 2002). Further discussion reveals David understands this basis is weak; these principles are gathered largely from cadaver work and this cannot replicate movement of live participants. He appreciates mechanical principles are difficult to apply because the body does not function like a machine. David believes a theory based on scientific principles, however weak, is better than the alternative, theories based on clinical observations.

Subtle differences between the participants' approaches to podiatric biomechanics are evident. Some, reticent to dismiss the podiatric theories, take a flexible approach better described as an inclusive approach.

*I quite like the Paul Harradine approach which is an amalgamation of everything 'cos I don't want to sort of fix on one particular theory 'cos I think you miss a lotta things then so, you've got your Tissue Stress theory and Dananberg and all that kinda thing, and I quite like the way that Paul Harradine brings all that together.....- Jack*

Jack uses Unified theory because it brings everything together to ensure his patients get the best treatment since he does not exclude anything in his clinical reasoning. However these are theoretical articles with little research evidence to support them.

*it would be based around, a sort of tissue-stressed type of model.....try and use an amalgamation I suppose of everything that's out there, and try as far as possible tune in to the evidence base - Helen*

Helen teaches podiatric biomechanics to undergraduate podiatrists though it was not discernible from her interview what approach she teaches her students. She perceives there is not enough research evidence to support any of the podiatric biomechanics theories; Helen explains her approach is to use her anatomy knowledge to amalgamate the Tissue Stress theory with the other theories. Perhaps this shows not all podiatrists dismiss the discredited podiatric biomechanics theories, instead they take a more pragmatic approach and claim to use parts of all theories in their practice.

Louis also uses a tissue stress approach linked to parts of the other podiatric biomechanics theories. He highlights many variations in clinical approach exist which deliver the same end point.

*I suppose it's similar to physios there's different sort of paradigms that they can use and.....they all seem to work so,.....there's not one one approach, somebody might use another approach but they get to the same goal of.....the treatment. And it's similar with foot orthoses as well we do make it as scientific as possible but because of the fact that with Chris Nestor's studies looking at the kinematics of the feet they realise that the feet just function so differently and there's so much variation between individuals... - Louis*

Again, he highlights the lack of knowledge about the variations in gait between individuals. He points to Nester et al (2014), a laboratory study with strong scientific credentials but which demonstrates the lack of propositional knowledge in podiatry and the limits of the

kinematic equipment used. He compares podiatry to physiotherapy, a good example of a profession which uses different paradigms and also achieves good patient outcomes. This may be the conundrum of practice; many approaches can work for patients.

It was difficult to get Paul to explain exactly which podiatric biomechanics theories he uses. He claims he uses his own biomechanical assessment which, though based on the STJN theory he was taught at University, has evolved from his own practice and his 14 year NHS experience as an MSK specialist podiatrist making 2000 pairs of orthoses per year. Paul has moved away from utilising the theories because his patients do not fit discretely into these theories. He states his devices have not changed much over the years.

*No, well you can have like fashionable changes [laughs]. Well there doesn't have to be new theories does there.....Because someone might do something completely different and never report it. Like me - Paul*

This statement demonstrates Paul views the newer theories as transient 'fashionable changes' rather than adding anything substantial to practice; this implies Paul does not take much notice of them. Paul may not feel Root theory has been fully discredited, the theory he uses most could be described as modified STJN theory in the light of his clinical experiences. However further discussion reveals Paul uses SPF theory in his practice, thus his claim not to be influenced by trends within podiatry is not strictly true.

*Paul: Oh I must've read about the instance of osteoarthritis if you were not allowing the first to plantarflex on it.*

*Interviewer: That's actually sagittal plane theory...*

*Paul: Well there you are then, see. So I've subliminally picked up all this stuff.....*

He explains he accepts SPF theory as a useful addition to his assessment because it is something he can see and thinks obvious. This shows theories can be accepted if they link to the practitioner's experiences in practice. It suggests Paul is making judgements about the newer theories, including some into practice whilst dismissing others as fashionable and wrong. This may be true for all participants; they are constantly modifying their practice in relation to the theories in the light of their own experiences. He also considers high and low gear push off (Bojsen-Møller 1979) when assessing his patients and formulating his orthoses, a theory which has been revived and linked to SPF theory (Dananberg 2000). When asked about how he uses high and low gear push off he initially

dismisses it as academic talk. Further exploration led him to admit he has read about the potential for osteoarthritis at the 1st MTPJ and to combat this he uses an orthotic modification called a 1st ray cut-out, which is part of the Sagittal Plane theory. He claims the main reason he incorporates this orthotic modification into his current treatment is because of his NHS experience following the evidence about osteoarthritis. However the research evidence to show this is an effective treatment, Welsh et al (2010), was published whilst Paul has been in private practice. The extract also highlights he wants to reject the notion that he follows research evidence.

Charlie is the only participant to describe his use of the Impact Forces and Muscle Tuning theory (Nigg et al 2001) in practice. He suggests the podiatric biomechanics theories are incorrect, unproven or discredited and an over simplification of a complex problem.

*I think they're very clever. They great for explaining things to students and they're great for explaining things to patients but it's not how it is, - Charlie*

*.....you just talk about this one joint and this one position of either is it flat or is it high-arched and it's kind of, it just so over-simplifies it that it's untrue. - Charlie*

He holds, though they are great as an explanation during training and for patients, they cannot be scientifically proven and therefore cannot be true. He also feels, to simplify the process to gain understanding, podiatry is focused on small parts of the foot and gait cycle whereas the complete foot in the whole gait cycle must be studied. This interpretation may be fair as these theories are explanations of problems encountered by clinicians in practice. He appreciates this is complex but he believes keeping up to date with research evidence can move understanding forward.

*So you read something like a Benno Nigg's paper where he talks about wobble mechanics,.....when a foot hits the ground the force that comes through, the muscle's job is to dampen it down and.....and yet the force comes through quicker than the muscles can react so actually.....you're reacting to the step after,.....each time. Shoes change this wobble, but do you want a hard shoe to make the frequency higher or do you want a soft shoe to make the frequency lower. And again it's individual. The only way you can tell that is by putting 'em in a soft shoe or a hard shoe. - Charlie*

This theory, developed from laboratory based experiments with a clear scientific basis, could be said to originate from a 'pure' biomechanics background. It aids the understanding of how the body reacts to impact forces during gait and how orthoses may improve this response but the link to injury is unclear. The practitioner uses active

experimentation, trial and error, to find out whether a patient needs a hard or soft insole which suggests such laboratory studies reinforce the message that experimentation in practice is the best way forward. It is interesting Charlie replaces the podiatric biomechanics theories with these biomechanics theories because they have a greater scientific basis, yet they are not easily applied in practice. Although he did not explicitly express support for Tissue Stress theory, he focuses on using his anatomy knowledge to establish which tissue is injured and the mechanism for injury. This suggests Charlie uses a modified Tissue Stress theory linked to knowledge amassed throughout his biomechanics career.

It appears the podiatric discourse has changed. In Borthwick (1999) the discourse is based around STJN theory, even though the flaws in this theory were already apparent. Now the discourse appears to focus upon a tissue stress based approach which can be applied to any MSK injury. Yet this approach, though logical, may not have any greater scientific basis than the traditional podiatric biomechanics theories. It is based largely on laboratory studies which look at the mechanical properties of tissues. Some participants link Tissue Stress theory to the Unified theory and claim to employ the best bits from the podiatric biomechanics theories. Using an amalgamation of these theories, together with other treatments in addition to orthoses, means there is a lack of clarity to exactly how these theories are used in MSK practice. The biomechanics theories, podiatric or others, are used in the orthotic design but it appears clinical judgements are based on experience often developed through trial and error and from experienced colleagues who pass on their practical wisdom to less experienced colleagues. This may mean the application of these theories, therefore the discourse, is almost individual.

### **5.3.2. 'I use the stress free theory more than anything'**

The lack of clarity in both the discourse and the application of biomechanics theories in practice may make it difficult for inexperienced practitioners to establish the framework required for the basis of their practice. This may be compounded by a lack of propositional knowledge in this area. Four participants, on their own terms as well, could be described as inexperienced MSK practitioners. Hannah, Michael, Lynn and Sandra struggle defining the podiatric biomechanics theories and appear unsure which parts of these theories to use and which to discard. However, all use a form of Tissue Stress theory with parts from other podiatric biomechanics theories.

*Allsorts and I can't remember any, what's the chap, that uses all who blends all the assessment,... unified theory is it called? What's he called? It begins with an 'H'. Anyway, that, but I use the stress free theory more than anything. Just that, taking them out of, the extreme range that their foot's in, that's causing the problem, I won't correct it fully so that's probably a lot of the, the way I think of it, if the foot is out of posture then I will correct it a little bit and see if that's enough to get it right. - Hannah*

During her interview, there are times when Hannah speaks freely but she struggles with any issue related to biomechanics theories. Perhaps she is fearful of exposing a lack of understanding or she could not find the correct words because she felt under pressure. Hannah has only worked one day a week for the MSK team for the last 3 years; in MSK terms she could be said to be inexperienced. Hannah attempts to explain the biomechanics theories she uses in practice which include Harradine's unified theory and Tissue Stress theory. She also reveals she has moved away from STJN theory, as she corrects the foot position only enough to rest the injured tissue rather than fully. She has been influenced by her colleagues to adapt her practice because she thinks they achieve good results using a tissue stress approach. Possibly her lack of understanding about the biomechanics theories means Hannah accepts her colleagues preferences for practice. This may highlight why Hannah does not call herself a specialist; she does not feel confident that she has enough experience of practice.

Michael demonstrates the same lack of confidence when describing the podiatric biomechanics theories and which approach he uses.

*I think the theories are good to be fair, as I said it gives you a start point when assessing patients, I said we don't use Root in practice as much but I think we do to be fair,.....what in essence you are trying to do is gain that sort of neutral position for that patient, and that comes back to Root theory so I think we do use a lot of theories. Not just particular one, but a combination of 'em. - Michael*

Michael could not decide whether or not he uses STJN theory and concludes he uses a combination of all theories. However, his description of Tissue Stress theory could at best be described as confused and further discussion in the interview seemed to faze him more. He shows a better understanding of sagittal plane theory. His confusion could be a manifestation of his nervousness or feeling under pressure to give the correct answers in the interview. Michael is aware of his inexperience and his grasp of the issues could be described as developing. He graduated with a limited knowledge of podiatric MSK practice and now works with colleagues who have their own understanding of the podiatric

biomechanics theories. It appears he is yet to assimilate this information into a coherent form; he seems to answer without thinking and then qualify his comments after some thought as shown in his extract. Perhaps he exposes a common problem for newly qualified podiatrists who want to work in MSK: to comprehend the propositional knowledge learnt at University may not be easily applicable in practice. Michael's strategy to make sense of this is to rely on his colleagues' knowledge and experience and to enrol on a Master's course to improve his critical appraisal skills. His podiatric biomechanics discourse has similar elements to other participants, probably because he follows his colleagues since, presently, he is unable to rely on his own experiences.

Sandra has her own private practice and Lynn works at a practice which is part of a larger group. Compared to Michael, both participants have a good understanding of the podiatric biomechanics theories but they too appear uncertain about some aspects. They accept orthoses work as treatment but imply they are unsure about which theories justify their use. Their cautious approach mean they choose familiar treatments which have been shown to be safe.

*When you say the theories you're talking more about not just Root, all the other theories.....I think basically it's 'cos I haven't got enough experience to go back to use those but I need to do more biomechanics to get the confidence to sit and think about things a bit more - Lynn*

*Probably because I'd be too frightened to alter somebody's foot function that much. I'd be too worried to do it. In private practice, as a fairly newly qualified podiatrist I'd be a little bit too nervous. Well, just causing more problems. I am a little bit frightened to correct people. I am a little bit frightened. I always go less. I'll always give them less correction than I, than I think and then...get them to come back. - Sandra*

Lynn uses a simplified form of STJN theory linked to a tissue stress approach. Though uncertain if this is the best approach, her undergraduate training shows this to be a safe and effective treatment despite the theory being discredited. Lynn expects her confidence will grow by gaining clinical experience and she can then expand her use of other theories. She expects, if her treatments are successful, she can obtain this experience in her current role. However, she is concerned there is no support network within her practice group to help her learn from colleagues and improve her practice.

Sandra is happy to use STJN and sagittal plane theories linked to a tissue stress approach but in her opinion SALRE theory leads to the manufacture of orthoses which are too

severe and a risk for her business. She is cautious about using these orthotics as a treatment; her business is based on her personal reputation and if her orthoses create other MSK problems this would have an adverse effect on her business. She admits her minimal experience of this type of orthotic device may contribute to this fear. Sandra is concerned she may be unable to develop her practice further unless she obtains help to understand and experience using these theories successfully in her practice.

These inexperienced practitioners seem unsure about the biomechanics theories because they may understand that their colleagues use these theories in combination. Therefore they find it difficult to explain but appear to take a cautious approach with their patients. Hannah and Michael, who work in the NHS, seem also to use their colleagues' knowledge and experience to help them in practice which suggests that in MSK podiatry that knowledge may also be gained through a form of community of practice (Gabbay & Le May 2011). For colleagues in private practice it may be more difficult to find help from more experienced colleagues so they appear to take a cautious approach and rely on theories and devices that worked successfully in the past.

### **5.3.3. 'Shaft extensions.....plantar flex first rays arch supports, a lot of lateral wedging..... heel raises, tarsal platforms, things like that.'**

The participants use language which may exacerbate the vagueness of the podiatric biomechanics discourse. The extracts so far give a flavour of the language used in podiatric biomechanics. Throughout the interviews it was frequently necessary to pause and establish whether our understanding of the topic under discussion was consistent. At times I perceived some participants deliberately used unclear language as a way to prevent me questioning them in depth about the theories. The language also created a difficulty for me in the interviews; trying to gain comprehension of the participants' knowledge and understanding within a purposeful and meaningful conversation, without interrupting the flow by asking for clarification. A fundamental part of Gadamer's hermeneutics is the importance of language in the process of understanding and interpretation. He asserts language is not just an instrument we use to engage with the world, it is the medium for our engagement with the world. It is the medium where I and the world meet (Gadamer 1975: 2012). We are 'in' the world through being 'in' a language (Malpas 2014). Therefore, understanding the podiatric biomechanics discourse must be related to the language used by MSK podiatrists. Understanding their life-world of practice

is manifest in the language they use, thus the language used may give an insight into to the culture of podiatrists.

All current biomechanics theories seem to be given a technical name and are associated with technical jargon. When participants use one of these terms they are asked to explain the theory as they understand them, to ensure mutual agreement between the participant and myself about the understanding of these terms. It is clear the podiatric biomechanics discourse has a language to describe this element of their practice. This may be an element of the diversification of podiatrists into MSK practice. Firstly they developed a new technology, functional orthoses, and then adopted a new language to describe this treatment; both could said to be forms of professional diversification (Nancarrow & Borthwick 2005).

It is apparent some participants did not always have a full understanding of the terms they use. Ed, Hannah, Michael, Lynn, Sandra and Izzy to varying degrees acknowledge their lack of confidence in understanding biomechanics theory. This lack of self confidence manifests in the interviews as an absence of the language of theories, the inability to remember names and details or seeking reassurance from myself that their explanation is correct. If the reason for adopting technical jargon is to make the theory easy for practitioners to understand then these participants suggest this has failed although some participants did understand them. A more cynical view is these acronyms and names are attempts to legitimise the scientific claims of these theories. These terms demonstrate their innate complexity and therefore understanding them implies intelligence. The use of these terms by the participants may be a way to demonstrate their technical knowledge of these theories and their expertise in this area as well as self-confidence.

In contrast the more experienced participants have a good comprehension of the biomechanical terms but this did not necessarily translate into a mutual understanding between the participant and myself.

*I used to give talks about, in the eighties to physios about orthotics and my big thing was, I don't give out arch supports, I give out functional foot orthoses, and now I say I give out arch supports, I've come round [laughs], come round full circle.....'cos that's what it's doing, and insoles without arch supports don't work, you know, if you just put some wedging in a shoe it doesn't work...it's not as effective. - Charlie*

*I do a little bit because having treated a lot of patients what works for one doesn't necessarily work for another.....and, you can apply the same principles to two patients and get different results. I think that's because there's so many other factors acting upon that patient that just by having a simple statement that a particular posting or orthotic will help, it's great in theory but in practice you have to work with the patients' needs as well. - George*

Using the above extracts as an example, two words, one from each extract, pinpoint the differences in language to demonstrate the potential for confusion which exists in this area of practice. Charlie speaks about 'wedging', to describe a device thicker on the medial side to limit the movement of the heel in gait, and his belief that this alone does not make an effective orthotic; it needs an arch filler to be an effective device. George uses the term 'posting', also to describe a device thicker on the medial side, but his extract implies he may still use this alone because he adds 'or orthotic' suggesting that an orthotic is posting and an arch filler. This may mean George takes a different view to Charlie or perhaps he just slips up in conversation and does consider posting is just part of an orthotic and he never uses it alone. It is unclear if they are talking about the same thing as posting and wedging, though similar, could have different meanings to Charlie and George.

Charlie's extract also points to the use of language as a way to promote status as a practitioner. He implies he enhanced the complexity of his devices in talks to physiotherapists in the past; he now declares he gives out arch fillers, which may signify he sees his devices as less complicated or he is perhaps just more confident in his status. Charlie also claims he has 'come around full circle' which suggests he considers his opinions about podiatric biomechanics have changed over time and reverted back to something simpler. This may show the propositional knowledge in MSK podiatry is in a state of flux, a view echoed by Bartold (2016) who states research evidence can lead to changes in treatment and this sometimes leads back to the original treatment. However if Popper (1968) is correct about the conjectural nature of scientific knowledge then this may always be the case.

Jack illustrates the intricacies of the language used by practitioners.

*I relate to tissue stress, it's all about resting damaged tissues to.....allow 'em time to repair, so adding support to the foot stops the foot from collapsing and over-stressing.....the soft tissue on the medial side of the foot for instance.....And then you've got the Dananberg theory, just about the three rockers.....and maintaining those three rockers through the gait cycle to allow you to propel effectively..... so not blocking, or if you have got a blockage in one rocker then how it affects the rest of your gait cycle. I tend*

*to pick and choose bits out of the Dananberg theory and, when I'm making an insole. I wouldn't say I just target that hundred per cent. And that's why I like the unified theory as well... - Jack*

He explains his use of SPF theory as part of his overall strategy of using Tissue Stress theory and the Unified theory. He talks about the three rockers which implies Jack may have a good understanding of both SPF and Unified theories. However, on reviewing the extract Jack does not really explain any of the terms he uses. He adopts the language of SPF theory when he talks about blocking, as Dananberg (1993a, 1993b) describes functional hallux limitus as stopping the forefoot rocker functioning properly causing sagittal plane blockade. This could be described as a manifestation of the abstract knowledge deployed by the participants in this study. Abbott (1988) focuses on the nature of professional work and claims of jurisdiction over certain types of practice. He argues the quality which allows a profession to survive in a competitive system, like health, is abstraction. He sees diagnosis and treatment as mediating acts but it is the inferences a professional makes to link these two that facilitates the abstract knowledge for a profession to claim a niche in society. Thus, the language of podiatric biomechanics is the means by which podiatrists make inferences about the diagnosis and treatment of their patients in this area. Jack demonstrates the abstract knowledge of both SPF and Unified theories. Welsh et al (2010) show orthoses, designed using the principles of SPF, are successful at reducing pain in the 1st MTPJ but they are unable to establish that these orthoses affect the movement of the 1st MTPJ using kinematic analysis; as previously discussed this may be due to the limitations of the equipment used in kinematic analysis. This has implications for SPF as a theory as it makes the theory not only abstract but also indeterminate. Turner (1995) describes indeterminacy as a way a profession can maintain a social distance between their patients and themselves and protect against other professions being able to access this knowledge and skills. The biomechanics theories highlight the difference between abstract and indeterminate knowledge. SPF theory, like most theories, is abstract in that it is an idea, a concept, not something concrete. Welsh et al (2010) prove this abstract idea can be used to treat patients successfully but also help maintain the indeterminacy because it does not disprove SPF theory. Macdonald (1995) states claims of indeterminacy cannot be sustained in the face of contradictory scientific knowledge. STJN theory, like SPF, was abstract and was shown to treat patients successfully but research evidence (Astrom & Arvidson 1995, McPoil et al 1988, McPoil & Cornwell 1996, Pierrynowski & Smith 1996) determined the principles of the theory are incorrect, hence why some participants emphasise they have moved away from this

theory. The other theories they use: SALRE, Tissue Stress, Unified, Impact Forces and Muscle Tuning, are both abstract and indeterminate, therefore help MSK podiatry maintain its status in this area of practice.

The next two extracts indicate other changes to the discourse to maintain professional status.

*Well you'd a lot of what I get is shaft extensions.....plantar flex first rays arch supports, a lot of lateral wedging, well actually not a lot but it's more common than you think..... heel raises, tarsal platforms, things like that. Not many cut- outs though. Wedging. Medial wedging. Which people seem to do a lot but it's not always that necessary. Well I think, it depends on the talar inclination angle. Sometimes it's very difficult to control if you've got a low angle then you can, you can put as much arch support in as you want and it hardly makes any difference. But if you've got a high one then you're just gonna tip 'em over and give an ankle strain aren't you [laughs]. - Paul*

*When I want to use different materials than are available, because the reality with an orthotic is, there's three features isn't there, there's the topography, there's the stiffness and there's the friction coefficient. That's all there is to an orthotic, it's only those three elements, there can not.....be anything else - Barry*

Paul uses different language to the other participants. He mentions the 'talar inclination angle' when asked to describe the types of orthotic devices he prescribes. I was unfamiliar with this term; presently it is not commonly used in association with podiatric biomechanics. Paul may have used an incorrect term, calcaneal inclination axis and talar declination axis are radiological terms associated with trying to establish if a patient has a cavus or planus foot type from taking measurements on an x-ray (McCarthy 2009), but such terminology reinforces the view that the language used in this discourse may be individual and add to the lack of clarity about the differences between practitioners. Furthermore, Paul names some of the elements incorporated into his orthotic designs: shaft extensions, tarsal platforms; these could be described as old fashioned terms as they are associated with padding and strapping in addition to orthoses. In contrast to Charlie, Paul uses wedging but does not specify whether it is always used in conjunction with an arch support. He explains why medial wedging is unsuitable for some patients, which implies he has moved away STJN theory. It is unclear if the research evidence changed his view, he hints it developed through his experience which may account for his use of different terminology.

Barry claims three aspects can be altered on an orthotic. The terms he chooses are interesting examples of possible complications of language in this area. Barry was asked

to clarify his terms. Topography describes the shape and design of the orthosis and is used by other participants in this way. Stiffness denotes whether the material an orthosis is made from is hard or soft. Indeed, material stiffness is a term related to the rigidity of a material, the extent it can resist deformation to an applied force. Friction coefficient is also related to material properties and describes the ratio of the force of friction between two bodies. Barry defines this term as the resistance of the orthosis material to the foot. Further discussion establishes stiffness and friction coefficient cannot be measured in practice and thus Barry cannot and did not measure them in his practice yet they are the terms he uses when designing an orthosis. The end of his extract shows Barry seems to believe what he is saying and there cannot be any questioning of this statement. The terms he uses are associated with a podiatrist named Simon Spooner, a regular speaker on podiatric biomechanics, and his research mainly uses kinematic and kinetic data to understand gait. Spooner outlines this view, the only elements to change an orthotic, in a discussion article about foot orthoses (Kirby et al 2012). From this article, it is uncertain how Spooner arrives at these terms or if they are based on any evidence, research or otherwise. It appears some practitioners now use these terms in practice. Charlie suggests there is some debate about whether patients need hard or soft materials in an orthotic. This would equate with material stiffness. It also seems obvious that the fit and comfort of an orthotic is important to a patient who will have to wear it: the topography and friction coefficient. Such terms could be described as making a simple concept more complicated and possibly sound scientific. Barry's extract seems to support Abbott (1988) and Turner (1995) who claim abstract and indeterminate knowledge are deployed to maintain professional status and carve out a role for a profession within society. Barry's extract may point to this being the case for MSK podiatry. An important point to add is that both Abbott (1988) and Turner (1995) do not discuss that health is also abstract and indeterminate. Therefore though healthcare professions may utilise this type of knowledge to maintain status, it is because in the area of their practice this type of knowledge may always be present. In MSK podiatry that status has been maintained with patient consent, as they consistently report orthoses improve their MSK injuries. Turner (1995) argues that professions can resist routine and systematic procedures by maintaining space for interpretation. MSK podiatry does appear to be interpretative at present.

These two extracts also support Fournier's (2000) opinion that professional knowledge is performative and changeable to a profession's needs and the challenges they face; it is liable to adjustment and refinement due to changes in professional practice and

knowledge. Paul uses familiar language, though his knowledge and experience has changed over time. Barry absorbs new language into his practice but, whether this is due to new understanding in practice or it is an attempt to over complicate simple concepts to maintain a social distance with patients and be able to charge a premium for his services, is not clear.

#### **5.3.4. Conclusion: The podiatric biomechanics discourse lacks clarity**

The podiatric biomechanics discourse, since first described by Borthwick (1999), has changed. The major podiatric biomechanics theory STJN has been called into question. This appears to have led to a more flexible approach utilising the different podiatric biomechanics theories and also has seen other theories absorbed into practice. The main theory used by the participants is Tissue Stress supported by Unified theory. Rather than making the discourse definitive it seems to be more vague and individual. The participants appear to take bits from any of the theories to use depending on their own experience. There is little clarity about whether the participants apply the theories in the same way or completely differently. It is clear STJN theory is no longer used, in response to research evidence which discredited this theory. The language used by the participants reinforces the ambiguity, for example there is a wide range of terms to describe orthotic designs and modifications. This may be seen as way to maintain the status of MSK podiatry. There could be elements of this in the language of podiatric biomechanics. However there is the issue that the knowledge in this area used is abstract and indeterminate therefore it will not always be clear. Professional knowledge is also malleable and contingent and not fixed.

# Chapter 6 Concluding Discussion

This chapter presents the overall conclusions which emerged from the findings, drawn from the 'lived experience' of the participants and their beliefs about evidence. It explores the culture within MSK podiatry and the possible implications for the profession, its status, the understanding of EBP and its effect on practice. It presents the complications of the research agenda within podiatry, and possibly other areas of health, which may be further affected by the growth of private providers within the NHS since the emphasis between research evidence and patient satisfaction may change. It cites this study's contribution to knowledge about MSK podiatry and the culture within podiatry in England.

I discuss the limitations of the study as this thesis is used in a subjective paradigm and framework. I reflect on the changes this study has brought about in myself. I also make recommendations for further research and discussion within podiatry and other healthcare professions.

## 6.1. MSK Podiatry is a Practical and Experiential Specialism

### 6.1.1. Participants are not undertaking EBP as they describe it

I conclude the section on evidence in MSK podiatry by describing it as a confused picture because of the issues surrounding EBP as a concept and also because of the lack of propositional knowledge in this area of practice. I use Higgs et al's (2008) definition of propositional knowledge but also refer to the knowledge generated from the empirico-analytical research paradigm. The participants understand EBP as the application of research evidence. However it is unclear if, and how, this takes place. Most of the participants hold a traditional view of EBP, in that there is general support for the traditional hierarchy of evidence. This suggests, along with evidence from the literature, there is a form of scientism within podiatry which has fostered the belief, that to maintain status, podiatry must prove itself through research evidence obtained from the top of the traditional hierarchy of evidence. A manifestation of this scientism is some participants express opinions about science being about facts and proof, which are at odds with views

from the philosophy of science, particularly Popper's view that scientific hypotheses are forever conjectures about the truth (Shahar 1997).

The participants rightly consider research must be appraised before it can be applied in practice which relates to a major criticism of EBP; research produces evidence that isn't easily applicable in practice (Charles et al 2011, Lambert 2006). This relies upon the appraisal skills of the participants and their understanding of research methods. It appears research evidence has less impact on private practitioners. Participants from this group also seem to be less confident in their appraisal skills. One participant, Paul, claims he does not use research evidence and implies it has little use in his practice.

The participants who suggest using the evidence from the traditional hierarchy of evidence in EBP is the best way to improve practice further contribute to the complicated picture of evidence in MSK podiatry. They did not agree about the evidence for the effectiveness for orthoses. Some participants maintain there is enough research evidence to support their use in practice, others are concerned the evidence to support them is weak whilst the rest do not think there is enough and more research is required. It is unsurprising Izzy, a private practitioner with limited appraisal skills, is confused about the evidence from research. This debate can be seen as an expression of the scientific belief within podiatric culture. It shows these participants may hold a narrow view of evidence; it must come from RCTs and systematic reviews. This narrowing of the view of evidence is a criticism of EBP that still persists because proponents are still unable to endorse an expanded definition of evidence (Buetow 2014). In expanded hierarchies and alternatives (Aveyard & Sharp 2013, Noyes 2010 Petticrew & Roberts 2003), RCTs and systematic reviews are cited as the best evidence for effectiveness despite the concerns expressed in the literature review. It appears some participants accept EBP uncritically. There is also a sense that some participants are waiting for research to prove, what they already understand, that orthoses are an effective treatment yet they cannot see a way to facilitate this in a RCT. This further confirms a narrow view of the evidence to demonstrate the effectiveness of orthoses exists within MSK podiatry. Other evidence for the effectiveness of orthoses is regarded as weak and subjective.

The desire for strong research to show orthoses are an effective treatment may have consequences that the participants did not anticipate. In discussing research evidence which has affected their practice, David and Helen choose an example which may have been historically described as part of a physiotherapist's role. This research enables other

professions to access and use the knowledge within it to encroach on the professional boundary of physiotherapy. Scientific knowledge can be seen as a way to routinise knowledge and as the basis for de-skilling and horizontal substitution of a profession (Nancarrow & Borthwick 2005, Turner 1995). This need for strong evidence may also be lip service to support EBP, since it appears at present to be difficult to design a high quality randomised controlled study to show the effectiveness of orthoses. The examples of research evidence used in practice also highlight the importance some participants place on laboratory studies. This adds further confusion as, though these studies appear methodologically strong, their application in practice is less clear. John's example further demonstrates the conjectural nature of knowledge generated from this type of research. The participants interpret research evidence through their lived experience. Charlie's claim of proof from a laboratory study could have only come from his experience in practice. There are more examples of participants either using or rejecting research evidence on the basis of their own practical experience.

The confusion surrounding evidence in this area may have arisen as a consequence of the participants' view of EBP; certain types of research evidence, for example RCTs, are the best evidence and generate knowledge which should be transferred to practice. Critics describe this as the real view of EBP as a concept. There appears to be an inclination within podiatry to subscribe to this traditional view, perhaps because it is a way to maintain and develop professional status.

Another element of EBP is the drive for knowledge translation, the attempt to bridge the perceived gap between knowledge from research evidence and knowledge from practice (Salter & Kothari 2016). Greenhalgh & Weiringa (2011) state this metaphor should be used with caution as it does not describe the nature and application of knowledge within clinical practice. In this study, the participants do not accept research evidence can easily be applied in their practice, this is a consequence of the lack of propositional knowledge in this area which can be reliably used in practice. The participants appear to want to use research evidence in their practice but they are unable to do so due to the lack of reliable research evidence. They also consider the best evidence is linked to the hierarchy of evidence which places a primacy on systematic reviews of RCTs, yet the evidence they have is not from this source. This has led to this confused view, as the evidence they base their practice on goes against the tenets of EBP in that it is about using the best research evidence in practice as long as this evidence is from the top of the hierarchy of evidence.

### **6.1.2. Reasons for the lack of propositional knowledge in MSK podiatry**

The participants want to undertake EBP as they wish to offer their patients treatment based on the best evidence. They use their own experiences to make judgements about research evidence but in their opinion, they cannot easily apply the research evidence to their patients. Lynn, with her background as a research assistant, is scathing about the lack of quality in studies relating to MSK podiatry and George discusses a piece of research (Torkki et al 2001) which he considers is a poor study, despite being included in a Cochrane review about orthoses (Hawke et al 2008). These two extracts highlight why the participants cannot rely on evidence from the top of the EBP hierarchy. Flaws in the concept of EBP related to the hierarchy of evidence and in the philosophy of EBP contribute to the confusion about evidence in MSK podiatry. Perhaps supporters of EBP could dismiss this as a problem unique to functional orthoses and MSK podiatry; indeed it is true that there are unique elements about MSK podiatry which lead to the complexity about evidence in this area. The participants want the research evidence to answer two questions: are orthoses an effective treatment? If so, what is the mechanism for this effectiveness? Some of the participants merge these two subjects, they place a value on laboratory studies based on EBP principles for effectiveness which adds to the confusion about evidence. By separating these issues it is possible to show EBP contributes to the misunderstanding surrounding research evidence which could be transferable to other areas of healthcare, whereas the issues about mechanism of orthotic effectiveness lie within MSK podiatry.

The EBP hierarchies of evidence for effectiveness of a treatment place systematic review of RCTs as the best evidence followed by evidence from well-designed RCTs (Aveyard & Sharp 2013, Noyes 2010 Petticrew & Roberts 2003). Logically, systematic reviews depend on the quality of the RCTs included in them for their strength. Combining the results from various RCTs in a systematic way is more likely to inform us than mislead us (Sackett et al 1996), this is a reasonable assumption which still retains currency. However this study demonstrates that some issues with this view are, as yet, unresolved.

The strength of an RCT hinges on the quality of the design used in the study. The EBP focus to ensure quality is on the methodological quality of studies, with the CONSORT guidelines for RCTs (Antes 2010) being the latest. This is an admirable advance to ensure studies adhere to strict standards and can only be commended. However it only partly

addresses the quality issue, due to assumptions made about this methodological strength. Worrall (2010) contends that randomisation only gives strength regarding selection bias, though it is assumed this mechanism means both arms of a study are controlled. It is not possible to control the confounders which may affect the outcome of a study though a reasonable judgment may be made on decisions taken to decide the controls for the differences between the participant groups. However Ioannidis (2016) states that useful clinical research should add to what we already know. This means, first, we need to be aware of what we already know so new information can be placed into context. This is the problem in MSK podiatry as there is little definitive propositional knowledge about orthoses, MSK conditions and contributing patient factors. Thus the controls used in studies about orthoses are most likely to be subject to bias and are unlikely to produce clinically useful results. This may question the privileged status of RCTs in the hierarchy of evidence as it depends on the current state of knowledge in an area of practice. The participants expect an RCT to be a strong study yet despite a good methodological design, possibly following CONSORT guidelines, to raise internal validity, an RCT may still have no value clinically as there is no guarantee the study has external validity due to the lack of propositional knowledge.

Systematic reviews are also subject to the problem of a lack of propositional knowledge. As discussed in the literature review, the Cochrane review of functional orthoses (Hawke et al 2008) is subject to bias despite following the guidelines for Cochrane reviews and having a sound method. The standard of studies included questions this review, as George notes. Ioannidis (2005) indicates that meta-analysis and systematic reviews from inconclusive biased studies are likely to be false. Together with how the studies are selected on homogeneity, on the preferences of the three authors, this highlights a problem which affects the strength of this systematic review. Cartwright (2011a) maintains the most difficult part of making judgements about RCTs is whether the population and intervention have similarity with our own patients and interventions. Thus, a lack of similarity also affects systematic reviews. In fairness to Hawke et al (2008) the following detail about the studies in the review is clear but it serves to demonstrate the lack of similarity between the studies included in the review. Eleven trials are included in the review on the strength of their methodological quality, the internal validity of the review, but my argument is that the lack of similarity between the studies questions the external validity of the review. Only the age and gender of the participants in the studies are reported therefore no judgement can be made about the similarity of activity level or

weight, both of which may have an effect on orthoses as a treatment. There are five different MSK conditions covered by these trials but their aetiologies and mechanism for generating foot pain are not the same. Orthoses are compared with sham orthoses in one trial; it has been shown there is uncertainty about whether sham orthoses actually have no effect on gait (McCormack et al 2013). Just three studies report their orthotic prescription, so the orthotic designs either differ or are unclear. Across the eleven studies, the orthoses are made from seven different materials with four studies using one material and two using the same, the only similarity of material choice across the review. It is hard to appreciate the value of this review when each of these elements adds a potential confounder. Such issues support why the participants do not see the applicability of research evidence in their clinical practice and also show the principles of EBP add to the culture of confusion about evidence in MSK podiatry.

Cochrane reviews are widely considered to be the gold standard approach for the synthesis of quantitative evidence to determine intervention effectiveness (Noyes 2010) because the detailed description of the methods used is easily accessible. It enabled my critical appraisal of the studies included in the review. However, this view is potentially called into question by reviews such as those by Hawke et al (2008). The power of systematic review is that it combines results to give an overall view of effectiveness. Yet Hawke et al (2008) could be better described as a collection of individual studies that, though reviewed in a systematic way, there is too little similarity between the studies to draw overall conclusions. Using Hawke et al (2008) as an example also suggests Cochrane reviews may concentrate on internal validity for their strength but the judgements made about external validity are weak. El Dib et al (2007) conclude there is a lack of clear guidance from Cochrane reviews and low homogeneity of studies may be a contributory factor. Though it should be noted that Hawke et al (2008) may not meet the current Cochrane standards, homogeneity of studies does not appear to be a priority at present (Higgins & Green 2011).

These problems with external validity may account for the contradictory results from RCTs about orthoses; the differences are also the same confounders in Hawke et al (2008). The lack of propositional knowledge may have a detrimental effect on the design of studies and reviews considered strongest in the EBP hierarchy of evidence, therefore the participants who want to use research evidence cannot easily do so due to a lack of external validity within these studies. Participants with good critical appraisal skills have an advantage in

that they can make judgements about the standard of a review or RCT, those participants who lack confidence in appraising research struggle to know which research evidence to use and which to ignore. The EBP hierarchy of evidence does not help them because studies using methods from the top levels can still be poor as only weak inferences can be drawn for practice. This shows the assertion by Djulbegovic et al (2009) where EBP can be used as a heuristic structure for clinical practice is not supported by this study. It appears there is a need for a different way to appraise evidence other than the hierarchies and typographies of evidence. Cartwright (2011a) discusses the capacity claims of RCTs on effectiveness and states often there is not enough similarity between studies to warrant direct extrapolation. This led her to conclude that knowledge claims, including effectiveness predictions, are warranted by good arguments that are valid and sound. RCTs do not have an automatic right to this, they may need other evidence to warrant their claim for effectiveness (Cartwright 2011b). Cartwright & Munro (2010) claim external validity may not be the right way to look at this and it may be better to establish if a study has the stable capacity to warrant a claim to effectiveness in a larger population. This stable capacity claim can be supported in an overall judgement about evidence for other sources. In the case of functional orthoses, I discuss the limitations of Hawke et al (2008) which demonstrate that, on its own, this review does not have the stable capacity to make any claims about effectiveness. However, together with the patient satisfaction evidence previously discussed, it is possible to make a valid argument to say, despite its weaknesses, Hawke et al (2008) does support the effectiveness of orthoses for certain MSK conditions. It is not the method used which gives this review this capacity but because it adds to the overall evidence about orthoses. This same reasoning can be used for the individual RCTs; they can be accepted or dismissed in the light of the overall evidence about orthoses. They can be used as warrants for action. This links back to Tonelli (2006) and the casuistry model of clinical practice as he concludes clinicians must balance the competing claims from the five topic areas to arrive at a presumptive conclusion for the patient-at-hand before deciding on the warrants for action.

The biomechanics theories, podiatric or otherwise, used to explain the mechanism of action of orthoses, are often supported by laboratory studies and this adds another element which contributes to the lack of propositional knowledge for MSK podiatry. Though the most difficult to apply in practice, laboratory studies are important for some participants; they suggest this type of study facilitates an understanding of how orthoses work and thus they can treat their patients more effectively. The increased importance of

laboratory studies for the participants may be a consequence of this being the kind of study utilised to question the principles of STJN theory (McPoil et al 1988, Astrom & Arvidson 1995, Pierrynowski & Smith 1996 and McPoil & Cornwell 1996). The participants perceive laboratory studies have strength because they are RCTs. Yet, they do not fit into the EBP hierarchy of evidence; this may be due to a misunderstanding about these studies within podiatry. Many of the respected names in MSK podiatry: Simon Barthold, Karl Landorf, Hylton Menz, Chris Nester, Tony Redmond, Simon Spooner, built their research profiles from laboratory studies before moving on to more epidemiological studies. This finding is in contrast to medicine where EBM is seen as a way to move from an over-reliance on laboratory research to use epidemiology as a resource for clinical decision making (Bluhm & Borgerson 2011). In MSK podiatry these two traditions seem to be regarded as part of the same scientific approach to practice.

It is my belief that there are key issues relating to drawing inferences from this type of study. Laboratory studies can only give fragments of understanding about gait due to the lack of propositional knowledge which means the design of any study design is subject to high levels of bias. The equipment used in kinetic and kinematic analysis is reliable but its validity is unknown and may be operating at its limits; Welsh et al (2010) could not see any movement at the 1st MTPJ kinematically but patient pain reduced when wearing orthoses. The authors infer orthoses do not alter the function of MTPJ but appear to resolve patient pain. However there is little discussion of the limits of the equipment and protocol used. There are population issues with this type of study which also make drawing inferences difficult. Across the five studies about the Impact Forces and Muscle Tuning paradigm, a total of 65 participants took part according to Mills et al (2010). Nester et al (2014) undertook analysis of 100 participants but none were over 45 years of age. The equipment used in this type of study is very expensive and because MSK conditions are not serious or life threatening this area may not be considered a priority for research funders. Also universities are often the institutions to own this equipment thus recruitment tends to be from student populations. Ioannidis (2005) regards this type of laboratory study as biased and estimates the probability of the hypothesis being true to be very small indeed. Such issues suggest the participants should treat these results with caution and the example of John and lateral wedging for medial OA knee confirms this. The problems with laboratory studies also affect RCTs exploring the effectiveness of orthoses: they only give fragments of understanding and contribute to the confounders which affect the validity of these studies. For example, the Impact Forces and Muscle Tuning theory suggests

some people need soft insoles and others need hard insoles but clinical decisions about this cannot be made without trying different materials. Therefore in a study using hard insoles there may be participants who cannot tolerate them or be injured by them, which will affect the results on effectiveness. The same issues also affect the understanding of some MSK conditions since these are also based on small laboratory studies, Bartold (2016) demonstrates the lack of understanding in this area. The lack of stable capacity claims for all these studies implies they are not warrants for action although they do offer potential insights into the effect of orthoses and how MSK injuries develop.

Williams et al (2016) find practitioners have difficulty in applying research in practice due to a lack of reliable research outcomes rather than because practitioners ignore evidence. The lack of propositional knowledge undermines the research evidence from the top of the hierarchy of evidence and the participants should treat this evidence with caution, be it positive or negative. It follows that any guidelines based upon such research evidence would be unworkable in practice and most likely be incorrect. Williams et al (2016) conclude practitioners should become more involved in the planning and implementation of research; this seems to be a reasonable suggestion but it may highlight a conundrum which is not easily rectified. I contend it is the confounders, known and unknown, which render the numerous attempts at RCTs about orthoses undertaken to be unreliable. Including practitioners in research may address some of these confounders but it follows the study design must become more complex. However, Ioannidis (2005) suggests the complexity of research design regarding the selection of relationships makes it less likely to establish if the research findings are true. At present, this conundrum is difficult to solve but it may involve considering alternative evidence to RCTs. One possible source could be the use of action research, as this approach has been described as cyclical, dynamic, collaborative and participatory. Its aim is to devise solutions to practical problems and generate theory that could be used in a wider context (Holloway & Wheeler 2010). Action research is based upon Lewin's theory of change. This theory comprises of a number of different concepts, action research is only one element; *field theory*, to understand the status quo is necessary to recognise the totality of influences that have formed in a field of practice, *group dynamics*, how the group respond as a group not as individuals, and *three-step model of change*, freezing, moving and re-freezing (McGarry et al 2012). This could be seen as a way to allow MSK practitioners to be involved in research that would enable them to devise studies that would be truly applicable in practice. However there are issues with this form of research, as there are with all types of research. Action

research has been shown to work to overcome issues in practice, however it appears to work within the unique context of that specific practice setting and there does not seem to be any way to generalise about a wider view of practice. Holloway & Wheeler (2010) conclude that action research is of most use when a local problem needs a solution or where actions need improvement. Also the issues raised here about the confounders that affect RCT's would also affect any action research study. It is difficult to see how an action research study would be able to generate any transferable knowledge that is of greater use than a large outcome study about orthoses.

Some participants appear to believe they must use evidence from the top of the EBP hierarchy to maintain their status in MSK podiatry. Also, particularly amongst the participants working in the NHS, there is a belief that podiatry must be a scientific, research based profession following EBP principles. Though this is the attitude they present, in reality this evidence is not easily applied in practice and therefore they use evidence from other sources of knowledge. It may help to look at evidence as part of an overall picture of evidence, not just in terms of the hierarchies; to consider the capacity of the evidence to warrant its use, no matter the perceived strength of the method.

### **6.1.3. MSK podiatry is a person-centred approach**

The participants of this study actually use the evidence from their patients as the main evidence for practice and from this source of evidence they develop their professional craft knowledge. This is unsurprising and an obvious conclusion given the lack of propositional knowledge as a result of the confusion concerning the reliability of research evidence. There is a body of evidence from patients that show orthoses are effective in treating a range of MSK injuries (Clement et al 1981, Harradine & Jarrett 2001, Hirshmuller et al 2011, James et al 1978, Moraros & Hodge 1993, Rendall & Batty 1998, Saxena & Haddad 2003, Sperryn & Reston 1983, Taunton et al 2003, Walter et al 2004).

Some NHS participants, though aware patient feedback is the evidence they use most in practice, are fearful to admit this is the basis of their practice. The fears pertain to being called to account and being unable to say their services work but it may also be they worry their status will diminish if MSK podiatry is not based on research evidence. Yet there is research evidence to support orthoses as cited above, it is just not clear definitive evidence from systematic reviews and RCTs. It is apparent some participants regard this evidence as weak and susceptible to 'psychological issues'. This suggests a mistrust of

patient feedback; it is considered subjective and therefore untrustworthy. This seems to be an unlikely complication of the rise of EBP, patients cannot be trusted to simply state whether they feel better or not; it must be converted into some kind of objective measure to be useful. Such opinions have led to a growth in PROMs as it is seen as a way to incorporate patient views, firstly in research and now more widely in practice (Black 2013). There was a definite split between participants; the use of patient feedback does not appear to create the same fears for private practitioners. These participants appear to believe having a successful business shows their patient needs are being met.

The reliance on patient feedback in MSK podiatry demonstrates the importance of reviewing patients and their treatment. In private practice, the participants emphasise the significance of these reviews to ensure good service. Since the interviews took place, I have learnt that patient review of orthotic therapy has been abandoned in some NHS trusts, instead it is left to the patient to decide whether or not they need to return for review. This may make economic sense but the findings of this study imply it is short sighted; due to a lack of reliable propositional knowledge, patient feedback appears to be the major source of evidence within MSK practice. Perhaps it is even more fundamental, since patient feedback also facilitates the development of the professional craft knowledge of the practitioners.

Despite the importance placed on patient feedback as evidence for practice, the use of PROMs is mixed. It appears, though some participants widely use VAS, no other PROMs are routinely used and VAS seems to be employed only when a service is being reviewed. In private practice perhaps PROMs are not used because the evidence of a successful practice is sufficient for the participants in this study. It seems strange, given their reliance upon patient evidence and fears concerning the weakness of this evidence, that the participants reveal there is little collation or analysis of patient evidence in any form across NHS trusts and private practice, though this echoes the findings of Williams et al (2016). It seems to be remiss of the participants to neglect analysis of the results from their practice and it leaves them open to the accusation whereby practitioners overestimate their success in practice. It appears PROMs may become much more significant in the future, possibly as important as research. Black (2013) states, in USA and Sweden, PROMs are used to measure the performance of private providers and to make comparisons between them. As the NHS opens up to more private providers, PROMs may be used to measure their performance. This may be of note for MSK podiatry; there may be little definitive

research evidence to support the effectiveness of orthoses but there seems to be plenty of patient satisfaction with orthoses. It appears MSK podiatry may have little to fear from the introduction of routinely used PROMs.

Practice based upon patient feedback could be described as a person-centred approach. This approach developed in this area of podiatric practice not by any great design, but by practitioners looking to address issues about propositional knowledge. The focus on patient needs drives them, through active experimentation and patient feedback, to try to solve the problems of their practice. Throughout the transcripts from every interview there are many examples where the participants demonstrate the care of their patients is what informs their practice most. This persuades me to conclude MSK podiatry has a person-centred approach.

Patient-centred care (PCC) has become a major goal of health care policy in the UK and USA and can be commonly understood by three maxims: 'The needs of the patient come first.', 'Nothing about me without me.' 'Every patient is the only patient' (Buetow 2014). Berwick (2009) outlines a radical view of this concept in which the healthcare system would truly address the needs of patients and put this before the needs and wants of practitioners in all cases. He notes this may mean EBP is in conflict with patient needs and wants and may have to take a back seat; he adds this would be the case only after mature dialogue between practitioner and patient, both having explored the evidence before them. It can be seen as a process of shared decision making. Buetow (2014) acknowledges there are difficulties as it is unclear how to fully implement this approach and critics dismiss it as overly individualistic and focused on caring rather than the science of healthcare, particularly medical practice. Miles (2012, 2013) proposes another model called person-centred medicine which looks to combine the science of EBP with the caring framework of PCC. It offers a central focus to meet not only the patients' needs and wants but also the practitioners' needs and wants since the interests of both parties are irrevocably linked. It concentrates upon the person of the patient and the clinician(s) engaged in the mutual and dialogical process of shared decision-making and focuses on the patient's best interests, within a relationship of equality, responsibility and trust. This links to Gadamer (1977: 1996) who claims the healthcare encounter is a hermeneutic act in which clinician and patient look to restore the equilibrium of health. This sounds very worthy, if complex, as are the challenges of medicine. From this study, use of this approach is not obvious yet two elements of this person-centred approach are apparent

within MSK podiatry; it is informed by evidence, in all forms, not based on it and the clinicians learn from their patients (Miles 2012). The participants demonstrate in MSK podiatry a key part of their development as a practitioner is learning in practice from their patient's experience. This also suggests MSK podiatry can be credited as using a person-centred approach.

#### **6.1.4. Clinical knowledge in MSK podiatry: a practical wisdom**

This study explores how clinical knowledge is formed using Higgs et al (2008) spheres of knowledge: propositional knowledge or *episteme*, professional craft knowledge or *techne* and individual knowledge or *phronesis*. As discussed previously, the main reasons for the lack of propositional knowledge in MSK podiatry comprise of the unreliable evidence from systematic reviews and RCTs and only fragments of understanding from the laboratory studies about gait. Professional craft knowledge is formed in MSK podiatry from patient feedback evidence and this is how practitioners gain their clinical experience. However, the lack of propositional knowledge creates another element to aid the formation of professional craft knowledge: active experimentation or the use of trial and error, an essential part of MSK podiatry since podiatric biomechanics is a product of this. STJN, SPF and SALRE theories all developed from their authors' experiences in clinical practice and their theories are attempts to explain their understanding of their observations about gait and injury. Unified theory is based upon the experiences of Harradine and Bevan (2009) combining the parts of these theories supported by some research evidence. All these theories are empirical, in that they are based on observation and experience, but they may not be scientific as they have not been tested through experiments and research (Couvalis 1997). The fragments of understanding gained from laboratory studies also contribute to this active experimentation. The participants all appear to engage in this process of trial and error in their practice yet the extent to which they are willing to experiment seems to be determined by their confidence and experience. It transpires that something more than professional craft knowledge is necessary to link propositional knowledge to individual knowledge; a practical wisdom to be able to do the right thing for the right patient in a given situation. It is linked to the concept of *phronesis* of doing the right thing for the patient at that time (Gadamer 1977:1996, Svenaeus 2003). I use the term practical wisdom and not *phronesis* for two main reasons; there is no substantial moral element which means the argument about *phronesis* being a moral virtue (Svenaeus 2003, Waring 2000) does not need to be addressed and knowledge in podiatric

biomechanics is based and developed from practice. The main theories in podiatric biomechanics are developed by practitioners to address the problems seen in practice.

Bringing these different elements together to design an appropriate, relevant treatment plan is not just about experience, though obviously this helps. This practical wisdom is also supported by the practitioner's ability to be reflective about their practice, to have a critical understanding of their practice. This links back to Higgs et al (2008) clinical reasoning model as individual knowledge. At present in MSK podiatry, knowledge could be best be described as individual due to the lack of propositional knowledge and the use of active experimentation. There also appears to be a critical element Higgs et al (2008) connect to the research knowledge paradigms but it may link more closely to this individual knowledge, practical wisdom. This requires a critically reflective approach to practice and there are several different forms: Habermas' (1968:1987) critical self-reflection, Gadamer's (1976) hermeneutic reflection and Schön's (1981) reflection-in-action. During their interviews, Charlie, George, David, Tom, Louis and Paul all demonstrate a questioning attitude about their practice which implies this critical or reflective element. As George, Tom and Louis describe, there is not enough definitive knowledge in this area: about orthoses, MSK conditions and the patient factors which contribute to this lack of knowledge, so they must use their experience and 'make leaps of 'faith' or 'hunches' which I describe as a practical wisdom. This practical wisdom may form the framework for active experimentation.

Some participants without experience use a form of community of practice to enable them to build up their knowledge and gain this practical wisdom. In the NHS, it appears to be easier to access if part of an MSK team. Ed, though experienced, has his colleagues' knowledge to make up for his lack of postgraduate study. Hannah and Michael are learning from their colleagues in addition to gaining their own experience. Although Barry is content to have built up an online network of practitioners to utilise, other participants within private practice find it more difficult to access this kind of support. Izzy perceives it is a weakness to have only one colleague to help her but she struggles to make contact with other practitioners in her position. Sandra and Lynn have a sense of frustration with their weak network of colleagues, and think they can only gain knowledge from their own experience and this may be an unreliable source.

Another barrier to building a community of practice relates to the change in the podiatric discourse to encompass a flexible approach, centred around the Tissue Stress theory and linked, by some, to the Unified theory. This approach facilitates the active experimentation described in practice as practitioners can use any part of the podiatric and other biomechanics theories in the design of their orthoses. However a flexible approach also generates a lack of clarity as it is unclear exactly which parts of which theory are being utilised. This is further compounded by the language used in this area which, like all languages, is forever changing; it is difficult to find common ground and be certain that you are discussing exactly the same thing. Perhaps this reticence to be definitive stems from a fear of being told they are doing or using something which has been proved incorrect. This may be due the discrediting of STJN theory. It may also be due to the nature of debate which takes place within MSK podiatry, the emphasis that is placed on EBP research as being the only way for podiatry to prove its value.

This finding, that MSK podiatry uses this practical wisdom or individual knowledge in practice, is similar to the findings of other studies about different healthcare professions that suggest clinical knowledge is formed from different forms of knowledge not just research evidence. Gabbay & May (2011) in their ethnographic study of doctors in general practice show that they use a complex web of various forms of knowledge in practice that are synthesised into, what the authors call, clinical mindlines. Berland et al (2012) found that nurses in primary care also use individual knowledge in their clinical decision making. They also use the experiences of their colleagues, knowledge from their colleagues experience, nursing literature and education and patient preferences. Evidence from research is seldom used in their practice. Marshall et al (2006) conclude that midwives use similar forms of knowledge when supporting women who are breastfeeding. Research evidence is used in indirect ways and provides maxims for practice. Kothari et al (2011) also suggest that for public health nurses and managers tacit knowledge is important in the implementation and interpretation of research findings. It appears that a broad range of different forms of knowledge coexist to deal with the complicated demands of everyday practice (Greenhalgh & Wieringa 2011). More than just clinical pattern recognition, practical wisdom incorporates the wider aspects of practical knowledge to address the messy realities of the problems encountered by practitioners (Gabbay & LeMay 2011). MSK podiatrists may not have the complex clinical 'mindlines' of a GP but they have a practical wisdom. This practical wisdom utilises the available propositional knowledge, appraised through experience, together with evidence developed from clinical experience

which is affirmed by patient feedback. Both professional craft knowledge and this individual knowledge are reinforced by critical reflection and by knowledge from a community of practice through an informal mentorship. This practical wisdom is individual and this makes it difficult to establish exactly the differences between practitioners. MSK podiatry has flourished because it responds to patient needs and appears to give a bespoke individual service. However, this seems to be endorsed with discourse which maintains complexity through ever changing jargon as the lack of clarity between the participants of this study demonstrates. Charlie and Paul could be considered opposite ends of the spectrum. Both are very experienced practitioners who care about their patients, use active experimentation, reflect on their practice and have developed their practical wisdom. Yet Charlie thinks he utilises research evidence in his practice and Paul feels he rejects this type of evidence. Their orthotic designs could have little in common but, due to the lack of clarity in this area of practice, they could also be the same. It appears individual practical wisdom is the basis of MSK podiatry not research evidence.

## 6.2. Contribution

To summarise, the findings and contribution to knowledge of this thesis are:

- MSK podiatry is based in a practical wisdom, individual knowledge, not scientific knowledge. This individual knowledge is used to formulate treatment plans combining information from various sources.
- Research evidence regarding functional orthoses is difficult to apply in MSK podiatry practice due to a lack of propositional knowledge.
- To compensate for this lack of propositional knowledge, participants use active experimentation to solve problems in practice.
- MSK podiatrists use patient feedback as their main source of evidence.
- There is confusion about the best evidence in EBP, though some participants want it to be research evidence it seems other forms of evidence are used more in practice.
- The discourse of podiatric biomechanics is based on this practical wisdom as participants use parts of various theories linked to a tissue stress approach.

It explores in depth MSK podiatrists' beliefs about evidence and tries to establish how they use this evidence in practice. It also looks at the development of their clinical knowledge. It adds to the work of Williams et al (2016) and updates Borthwick's (1999) seminal work on the podiatric biomechanics discourse. It gives an insight into the problems that there are with the current biomechanics theories, particularly the theories that have been developed by podiatrists. Therefore practitioners are left with little alternative to active experimentation, informed by patient feedback, on which to base their practice. The knowledge that MSK podiatry is dependent on this practical wisdom has implications for practice. This knowledge is developed through reviewing patients and their treatment plans and also through a community of practice in the NHS. However both these mechanisms may be under threat; there has been a reduction or cessation of review appointments in NHS MSK podiatry services to reduce costs and the fragmentation of MSK podiatry services into multi-disciplinary teams, sometimes by private providers, may mean that this community of practice could be lost. There is also a difference between the NHS and private practitioners in regards to this community of practice. Some of the private practitioners in this study had difficulty in obtaining help to develop their knowledge from other practitioners and courses to consolidate their practical wisdom. They feel that their knowledge can only develop from their own experience with their patients and they are aware of the limitations of this. The MSK podiatry area of practice would benefit from

more research evidence, particularly qualitative research, because, despite attempting to establish a scientific basis, the podiatric biomechanics theories are based in practical experience.

This study explicates the possible reasons for this reliance on practical wisdom. The propositional knowledge from research evidence and professional theories should be the basis of practice but this study suggests in this area it is only a small part of the knowledge used in practice. The review of the literature shows the propositional knowledge of MSK podiatry is problematic and may be unreliable. This leads practitioners to use patient feedback as their main source of evidence in conjunction with active experimentation and clinical experience, both their own and that of their colleagues. This study highlights MSK podiatry is based mainly in practical experience which has led to fears that podiatry will not be able to maintain its status as it may only have 'weak' evidence to support it.

It underlines the difference in viewpoint about such fears between the NHS and private practice. The private practitioners do not have concerns about using patient feedback as evidence because patient satisfaction is vital for the success of their business. For them, this patient evidence appears to be more important than research evidence. They were content that they were mainly using this evidence though they did recognise the importance of research though they could not always apply this in practice. In contrast, the participants from the NHS appeared to have a greater focus on research evidence, even though they may not have utilised this any more than the private practitioners. It was also NHS practitioners that appeared to fear being called to account for not using research evidence. This may have significant implications for the NHS since private providers now supply more clinical services. Providers in the future may focus more on patient satisfaction as oppose to research evidence; they may want to measure achievable goals rather than try to solve complex research problems. This study demonstrates PROMs are used but not consistently and the information generated is not routinely collated or analysed.

In order to advance as a profession, the culture of podiatry demands a scientific basis and, what appears to be an uncritical, acceptance of EBP. This study demonstrates this outlook has led to confusion within MSK podiatry. Following EBP principles, the participants focus on research considered to be the best evidence from the traditional hierarchy of evidence: systematic reviews and RCTs. The lack of propositional knowledge related to gait,

biomechanics and some MSK injuries in MSK podiatry means there is a shortage of reliable evidence. The strength of RCTs, and thus systematic reviews of this type of study, lies in that by separating participants into treatment and control groups these groups can be matched for all plausible confounders in the light of background knowledge (Worrall 2010). However in MSK podiatry, the inadequate background knowledge means the controls matched in RCTs about orthoses are subject to bias and possible confounders. Subsequently their results are unreliable and so MSK podiatry research evidence is often contradictory and confusing which means practitioners struggle to discern the good evidence from the poor. This attitude also marginalises evidence from all research other than RCTs; such evidence is considered to be weak and subjective which implies it is of little value. It exposes a major problem within EBP and the many variations of the hierarchy of evidence which rank studies on their methodological quality. Though the RCTs in MSK podiatry have sound methods internally, the decisions about the controls are weak due to the external issues. This does not appear to be accounted for within the hierarchy of evidence. It leads to the following questions. Are poorly designed RCTs still the best evidence for effectiveness? If not, where do these studies fit into the levels of evidence? Which evidence is best in the absence of any quality RCTs? Djulbegovic et al (2009) claim EBP is a heuristic approach to provide practical rules for practice. However if the hierarchies of evidence are included in this heuristic approach, this study suggests it may be considered a questionable approach which confuses practitioners about the best evidence.

### 6.3. Limitations of the study

The limitations to this study relate to the method and the sample population.

The study has 17 participants. Though I attempted to achieve a sample representative of the podiatry population this was not possible, due to difficulties in recruiting private practitioners as discussed in Chapter 4. Only six of the participants work in private practice, yet the majority of podiatrists in the UK are employed within the private sector. The private practitioners seem to hold different views about the evidence they use in practice. They also appear to differ in their opinions about the podiatric biomechanics theories to the participants who work in the NHS. If there were more private participants in this study it may have been possible to establish if the differences were widespread. Consequently, this discrepancy may have influenced some of the key findings of this study.

The participants' training may affect some of their beliefs about evidence. Six of the 17 trained at the same undergraduate institution but the significance of this influence is unclear. As there is a range of 14 years between the most experienced, David, and newest qualified, Michael and Lynn, it is unlikely the courses remained exactly the same; changes will have occurred in light of the growth of EBP and the change in the biomechanical discourse for example. It may be more significant with postgraduate institutions, because five of the ten participants attended one institution. These five, Charlie, Helen, David, Louis and Tom, all express strong opinions about the importance of scientific methods in practice. Perhaps the way EBP is taught at this institution is a major influence yet further exploration of their views shows differences in opinion amongst this group. A more balanced distribution of participants across the educational institutions to eliminate the risk of any influence on the participants' beliefs about EBP would have been preferable.

The strength of using hermeneutics as a method lies in the researcher using his or her beliefs and biases about the topic being studied to gain insight and understanding of the participants beliefs (Finlay 2013). However, the double hermeneutic approach could generate confusion about whose belief it is (Smith et al 2009). It may be considered this method is subjective, individual and the researcher may have undue influence upon the outcome but the audit trail should confirm the views of the participants are clear throughout the study. Also, I would argue this is a problem for all research; the researcher always

influences the research study despite claims of objectivity within the scientific method. This view of objectivity has been challenged in the philosophy of science; observations are not givens but the product of interpretation in the light of our background assumptions (Goldenberg 2006).

The data were collected through in-depth, semi-structured interviews and the advantages and disadvantages are discussed in Chapter 4. The quality of the data is dependent upon my skills as an interviewer to clarify and verify the understanding between the participants and myself (Kvale & Brinkmann 2009, Rubin & Rubin 2005). This may have been more evident during the early part of the interview but to reduce the effect of this I tried to ensure we revisited these early topics later in the interview. There is a risk of undue interviewer influence since the accuracy of the conversations is dependent upon my ability as an interviewer to allow the participants to relax and assert their true opinions. There is also the possibility that the participants may have been reticent in the interviews as they may felt that as a podiatry academic I would have more knowledge than them about EBP and podiatric biomechanics. I tried to reassure them, at the start of the interview, that I was interested in their opinions and the interview was not a test. However the chosen methodological approach acknowledges that I am part of the process of the study. Though the interviews are artificial they are also a purposeful conversation. They can provide, through the personal perspectives of the participants and me, a distinctive and receptive understanding of the participants life-world (Kvale & Brinkmann 2009).

## 6.4. How this research has changed me

This study has been part of my life for six years and, though it has been tough and stressful at times, I have enjoyed it immensely. I had an insular view of podiatry and had not appreciated the problems with research evidence in MSK podiatry. These issues also affect other professions and were not uncommon in other areas of practice. Similarly I also thought EBP was good and though I still maintain it is, I see there are issues with it that are much bigger than I realised. I had not recognised that an increasing reliance on EBP principles could be problematic as guidelines based on them are not as reliable as they first appear. I thought the problems would lie within MSK podiatry and not with EBP as a concept.

The other area which has been a source of reflection is the concept of practical wisdom in MSK podiatry. Perhaps this may be something I was looking for to justify my own practice and compensate for the lack of use of research evidence in MSK podiatry. But the concept came from the data and literature. The lack of definitive evidence and propositional knowledge in MSK podiatry means active experimentation is required for patients. This may make MSK podiatry interesting as it turns a patient into a problem to be solved and each one could be different. There is something else, what I term practical wisdom, which provides the framework for active experimentation. It is not just gained from experience or using the limited propositional knowledge. I think perhaps it is being critically reflective, either formally or informally, about practice. This appeared to be the difference between the participants that I saw in their interviews, in questioning their practice.

My understanding of clinical knowledge has improved, which will help with my teaching. The models all give an interesting insight into clinical practice and I realise none are perfect. I confess a little embarrassment in that previously I had not really considered how I use research evidence in my own clinical practice. In the interviews it became clear, despite the discussions about EBP, that research evidence does not really affect practice greatly. My perception was that research evidence within MSK podiatry is contradictory and does not seem to match my experience in practice. However, I had not fully realised the reasons for this. I was a whole hearted supporter of EBP and believed the research agenda in MSK podiatry was a good way forward. Having completed this research, I am now unsure and I cannot shake the feeling that there are issues with EBP as a concept

that may be difficult to resolve and that may have led to guidelines that are not warranted by the evidence. My in-depth study has led me to conclude that the main principles seem to rest on a self-evident truth; practitioners should use the best evidence to treat patients. Alas, further examination does not show exactly what the best evidence is. I remain unconvinced MSK podiatry at present could construct a good RCT about orthoses because it would be too expensive due to the many confounders and there are much more important areas in healthcare to study that require the limited available resources. Therefore podiatry must find evidence from elsewhere but I am skeptical how well this sits within the current research agenda. I believe podiatry needs to use all types of evidence to increase understanding of our practice and its place within the healthcare system.

## 6.5. Recommendations

This section lists recommendations for further research and also issues which need to be addressed but not necessarily through research at this stage.

1. The evidence about the effectiveness of orthoses as a treatment requires improvement but at present further RCTs can add little. To increase this evidence, a large scale evaluation of orthoses should be undertaken using a mechanism to collate and analyse the patient feedback, the evidence that practitioners use most. It should be based on a valid PROM and be open to both NHS and private practitioners in the UK. There is a domain in PASCOP, the audit tool used successfully by podiatric surgeons to demonstrate their clinical effectiveness, for podiatric practice which has the potential to be used for this.
2. This study has shown the language used within MSK podiatry is complex and potentially confusing, thus an ethnographic study of MSK podiatrists to explore the language in this area is needed. Again it should attempt to recruit NHS and private practitioners. In addition, this could establish the differences and similarities between the orthoses actually produced by practitioners. Such a study, together with the PROM evaluation mentioned above, would provide clear evidence about orthoses and their designs to facilitate better RCTs design. It would appear to be preferable to the many standalone surveys frequently undertaken to establish the orthoses used in practice, I have taken part in two already this year. At present these surveys are subject to same confusion about language discussed, usually are not directly comparable, often remain unpublished, or are not shared with the profession as a whole, thus the information gathered may be limited in the quest to provide evidence for the use and effectiveness of orthoses.
3. The findings of this study highlight that the importance of reviewing patients must be acknowledged. These reviews contribute to the development of the clinical knowledge of practitioners and are essential given the lack of propositional knowledge in this area of practice.
4. Awareness that MSK clinical knowledge is supported by a form of community of practice must be raised. It appears in the NHS mentorship can often be easily

accessed however in private practice it is more problematic to find good mentorship. This position may change if a range of different providers undertake NHS podiatry. The podiatric professional body may want to consider organising a formal mentorship programme for MSK podiatry between private practices.

5. Some of the private practitioners lacked confidence about their critical appraisal skills of research and are unsure where to seek help to develop these skills. A mentorship programme, again the podiatric professional body could help in this area, but it will need the support of practitioners in the NHS. It could also demonstrate the relevance of research evidence, in all of its forms, to private practitioners.
6. A debate within podiatry about the evidence used for practice is called for to consider the evidence which research can provide. It would also facilitate critical discussion of EBP principles to highlight not just the benefits but the issues related to this concept since the main evidence for podiatry may come from PROMs not RCT's.
7. This study highlights the problems which arise from how the various hierarchies of evidence rank studies on their methodological quality. The hierarchies are a simple heuristic tool to grade studies but external validity is not easily graded. However it may be better to take the views of Cartwright (2011a) and Worrall (2010) and look at all the types of evidence we have to create a full evidence base. We can then look to this evidence base to become a warrant for action (Tonelli 2006). More exploration is needed to develop sound warrants for action in different areas of practice. This may be a way for MSK podiatry to use a larger range of evidence to formulate treatment plans.

## **6.6 Dissemination Strategy**

The main dissemination of this thesis will be from three articles derived from the major findings of the thesis. An article about the problems of applying EBP principles, related to the hierarchy of evidence, when there is a lack of propositional knowledge, as there is in MSK podiatry. This should be of interest to all healthcare professionals therefore it will look to be published in an international health journal, for example *Social Science & Medicine*, *Health & Social Science* or *Journal of Evaluation of Clinical Practice*.

The other two articles are more likely to be of interest mainly to podiatrists, therefore would look to be published in the Journal of Foot & Ankle Research. An article about the use of practical wisdom and individual knowledge in MSK podiatry and how this knowledge is developed through clinical experience, active experimentation and the community of practice. The final article would focus on the changes that have occurred in the discourse of podiatric biomechanics relating to the use of Tissue Stress theory and parts of other biomechanics theories. These changes have added to a lack of clarity about MSK podiatry practice that is further compounded by the language of podiatric biomechanics. There is little certainty about the terms used in this area of practice. It appears that the language, like any language, is constantly changing which may be linked to the performative and malleable nature of professional knowledge and its role in maintaining status.

The other strand of dissemination is to contact the College of Podiatry through the Directorate of Professional Practice to share the findings about the difficulties that private practitioners have in developing their MSK practice and the importance of patient reviews in developing practical knowledge. The lack of a community of practice in private practice could be resolved through a mentorship scheme that could use experienced practitioners to share knowledge and guide less experienced practitioners to improve their skills in MSK practice.

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# Appendices

## Appendix 1: Example of literature search

### Effectiveness of functional orthoses

The following example demonstrates this strategy for the effectiveness of functional orthoses.

### Focus of search strategy

This search strategy was focused on finding RCTs which assess the effectiveness of functional orthoses on a range of MSK conditions using PICOT.

- Population - This is difficult for this search as a range of populations are needed. Populations need to be compared for age, gender and activity levels. Similarity is essential between groups. Studies of children will be excluded.
- Intervention - Orthoses, either casted or non-casted, must be an intervention in the study looking at the effectiveness as a treatment.
- Comparisons - Orthoses would be compared against: control group, receiving no treatment, another intervention/s or different orthoses. Studies should include randomisation to groups if possible and attempts at blinding both participants and researchers.
- Outcome - This would be outcome measures related to pain, function, functional ability and health-related quality of life.
- Time - Studies should have a minimum treatment length of one month and no maximum length, as long term studies may be important for orthoses.

### Inclusion and Exclusion criteria

The studies included systematic reviews of RCTs plus RCTs or controlled trials not included in the systematic reviews about the effectiveness of orthoses. There must be a comparison of participants between interventions and/or control, randomisation is desirable but not essential. Blinding is not essential as this is problematic for orthoses.

Studies about effectiveness of orthoses without controls and studies with populations below the age of eighteen were excluded.

## **Search terms**

The following search terms were used, in combination or alone: podiatry, biomechanics, podiatric, medicine, orthoses, functional, orthotics, insoles, innersoles, in-shoe, heel-pad, musculoskeletal, injury, foot, feet, lower limb, leg, thigh, condition, diabetes, surgery, chiropody, foot injuries, heel, plantar fasciitis, sesamoid bones, osteoarthritis, metatarsalgia, tendinopathy, tendonitis, tendinitis, fractures, stress fracture, neuralgia, neuroma.

## **Databases searched**

The 'Summon' search engine via the University of Huddersfield library was used to find full text articles. This allows access to the following electronic databases:-

BioMed Central, Clinical Knowledge Summaries, Cochrane Library, Cumulative Index to Nursing & Allied Health Literature (CINAHL), Emerald journals, EMBASE, Evidence Search, MEDLINE, PEDro, ProQuest Central, PubMed, RCN, Science Direct, Springer Protocols, TRIP Database.

Hand searching of the podiatric literature that is not included in the above databases was undertaken.

## **Results**

Electronic resources retrieved 423 citations for potentially relevant trials and systematic reviews. 57 studies were available as full-text or found through hand searching. Most of the studies were included in the 8 systematic reviews, including 4 Cochrane reviews, about functional orthoses. There were 10 studies not included in these systematic reviews, due to either taking place after these reviews or being excluded due to methodological quality.

## **Appendix 2: Participant information sheet**

### **How do podiatrists who work in MSK/Biomechanics interpret evidence and use this evidence in clinical practice?**

#### **INFORMATION SHEET**

You are being invited to take part in this study about podiatrists and the interpretation and use of evidence in clinical practice. This study is part of a PhD by the researcher at the University of Huddersfield. Before you decide to take part it is important that you understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with me if you wish. Please do not hesitate to ask if there is anything that is not clear or if you would like more information.

#### **What is the study about?**

The purpose of this study is to gain understanding of the interpretation and use of evidence in clinical practice by podiatrists who treat musculoskeletal conditions with functional orthoses. As this is an area of practice where there is lack of definite evidence it may give insights into how podiatrists use different types of evidence in clinical practice. As part of this study you will be asked about the evidence you use in practice and your beliefs about evidence.

#### **Why I have been approached?**

You have been asked to participate because you are podiatrist who treats musculoskeletal conditions with functional orthoses.

#### **Do I have to take part?**

It is your decision whether or not you take part. If you decide to take part you will be asked to sign a consent form, and you will be free to withdraw at any time and without giving a reason. Data collected from you may still be used in the study results. A decision to withdraw at any time, or a decision not to take part, will not affect you.

#### **What will I need to do?**

If you agree to take part in the research you will be interviewed by the researcher for up to an hour about your views on evidence and evidence-based practice. The interview will be recorded using a digital recorder. If you agree to take part in the study the researcher will contact to arrange the date, time and place of the interview at your convenience. If you work in the NHS and wish to use NHS premises then permission will sort from your line manager and your Trust R & D department.

#### **Will my identity be disclosed?**

All information disclosed within the interview will be kept confidential, except where legal obligations would necessitate disclosure by the researchers to appropriate personnel. This study has received ethical approval from the University research ethics panel.

#### **What will happen to the information?**

All information collected from you during this research will be kept secure and any identifying material, such as names will be removed in order to ensure anonymity. It is anticipated that the research may, at some point, be published in a journal or report. However, should this happen, your anonymity will be ensured, although it may be

necessary to use your words in the presentation of the findings and your permission for this is included in the consent form.

**What would happen if I became distressed or upset by topics discussed in the interview?**

If you did become distressed then researcher would discuss the matter with yourself. If the matter could not be resolved then it may appropriate for you to contact your GP or some counselling.

**Who can I contact for further information?**

If you require any further information about the research, please contact my research supervisor or myself on:

**Researcher**

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## Appendix 3: Consent Form

### CONSENT FORM

**Title of Research Project:** How do podiatrists who work in MSK/Biomechanics interpret evidence and use this evidence in clinical practice?

It is important that you read, understand and sign the consent form. Your contribution to this research is entirely voluntary and you are not obliged in any way to participate, if you require any further details please contact your researcher.

I have been fully informed of the nature and aims of this research

I consent to taking part in it

I understand that I have the right to withdraw from the research at any time without giving any reason and unless specifically stated otherwise previously collected data will be used in the study

I give permission for my words to be recorded and quoted (by use of pseudonym)

I understand that the data collected will be kept in secure conditions for a period of five years at the University of Huddersfield

I understand that no person other than the researcher/s and facilitator/s will have access to the data provided and that audio files will be deleted following data analysis.

I understand that my identity will be protected by the use of pseudonym in the report and that no written information that could lead to my being identified will be included in any report or publication arising from this research.

If you are satisfied that you understand the information and are happy to take part in this project please put a tick in the box aligned to each sentence and print and sign below.

Signature of Participant:

Signature of Researcher:

Print:

Print:

Date:

Date:

## Appendix 4: Interview guide

**Introduction** – Building rapport and establishing participants' experience

**Podiatry Experience** - What does your current role entail? How are your orthoses manufactured? Training and experience - How long have you been qualified (as a podiatrist)? Where did you train? Have you done any postgraduate study? Have you done any other qualifications? How do you meet your CPD requirements?

**Podiatric Biomechanics** – Discussion of their use of podiatric biomechanics theories in the past. What biomechanics did you learn at University? What do you think of these biomechanics theories? Do you still use them? If not why not? What brought about this change? What have you replaced them with? Why do you still use this/these theories? Discussion of their current practice on the treatments they use. What treatments do you use in practice? Why do you use these treatments? How would describe your role in practice? Can you think of any patients or case studies you have treated that could illustrate your role?

**Access to evidence** – Discussion of influences that may have brought about change in their practice and the finding of evidence  
What evidence is there for the theories you use? What evidence is there for this/these theories? How do you apply these theories in practice? What do you think of the evidence for podiatric biomechanics and functional orthoses? How has this evidence influenced or changed your practice?

**Evidence they use in practice** – Discussion of their understanding and the meaning of evidence. What are the different types of evidence? Do you think some evidence is more important than others? Is there a hierarchy of evidence? Which types of evidence have changed podiatry/your practice? How do you decide what to use and what to ignore? Have any people influenced your practice? Are there any colleagues/podiatrists who have affected your practice? What other professions have you worked closely with? Has this affected your practice? How do you find information that affects your practice? Which information is most important?

**Evidence-based Practice (EBP)** – Discuss their understanding of this concept  
What would you say EBP is? How do this concept affect your practice? How do you think this concept affects podiatry?

**Future Practice** – Discussion of the meaning for future practice  
What evidence do you think we need in podiatry? What types of evidence do think that will be? How do you think this is going to be provided? How you do think evidence will be found to change practice? Are you involved in research? Have you formulated care pathways? What evidence did use to formulate the pathway? Do you audit your practice? What do your patients contribute to your evidence? Are there any economic factors in that affect this?

**Conclusion** – Recap and thank participant

## Appendix 5: Field Notes

### Interview 8 with Hannah

**Introduction** – Hannah works part time in MSK and the rest in community podiatry. Interview started well, seemed relaxed initially. I think I established rapport easily, she asked me to clarify questions initially so seemed relaxed.

**Podiatry Experience** - She has some postgraduate training but also has done some CPD. She did not seem to be bothered about gaining further qualifications. She seems to defer to hear more experienced colleagues. Not sure this section had relevance. She discussed the conditions she season practice and the treatment she gives. I used this to lead into the biomechanics theories

**Podiatric Biomechanics** – She seemed unsure about the details and names of the theories. She described Root well but other theories seemed vague. She needed help to describe other theories. Will have to check if I lead her to them? 'We know what works and what doesn't'

**Evidence-based Practice (EBP)** – Good understanding of EBP 'true' EBP is very sound. Possible fears that not using EBP would stand up in court. Have to use research evidence its reliable. RCT changes your approach not treatment. She went quiet here. Questioning too severe?

**Evidence they use in practice** – Uses her own evidence and her colleagues. Relies on colleagues experience but also clinical experience from practitioners giving courses and research. Patients' tell her that orthoses have worked. Her orthoses work mostly. Did I lead her to health outcome measure? She seemed nervous about relying patient evidence. Trials may not work in practice. Patients are not cured by trials! Trail and error with the patient works. Colleagues affect her practice also physios not from trials. Surgeon the other day she would not take his advice. So does not use all colleagues

**Access to evidence** - Problems with getting hold of papers. Not sure she's current. Reading research is done in own time. Needs CPD to get time and University systems. A problem long term. Uses colleagues advanced research. Relies on your own time and digging. Its problem patients that you need it for

**Future Practice** – Need more research done and better. Does not know what research needs doing. She is not confident about the amount of evidence there is. Again colleagues influences this. Need to use outcome measures more. Not sure how? Foot is complex too many variations. Not sure trials will give an answer. Different things seem to work. Changing foot function works. Not sure that outcome measures will give us answers

**First listening** – Initial thoughts are that it went well. She was very considered in her answers. I did not seem too severe on her. There were plenty of silences. I let her consider the questions. So pleased with that. She gave considered answers to the questions she did not always find the right words. I didn't lead her to them but I did go back about unified and she remembered Harradine. Not sure how much she uses research evidence but she wants to. Not sure questions about future practice are always useful. She has good knowledge of EBP but was vaguer about theories she used. Root is not used, it is a start but stress theory and unified are used more. Colleagues and patients are her main

sources of evidence. Colleagues were mentioned on numerous occasions and their importance. Patients are the most important. Questions seem to be right. I'm getting better at letting the participants speak. I allowed her to consider her answers and then used this to lead into other areas. That is good. I think overall interview technique is getting better. Not sure about future practice questions always. Colleagues and patient feedback are the most important to her. Problems of access to evidence raised. Might have to ask others about this. Listened well in this interview and went back to topics she had raised. Summed up ok and she agreed with that summing up.

## Appendix 6: An analysis form for one participant - Hannah's form

Comment	Significant Statements	Emergent Themes
<p>not done any further study at Master's level just CPD</p>	<p>Generally CPD? so we have training days we'll have two ordinary training days and another training day where we have people coming to talk to us about different subjects and we also run it ourselves, so we'll be doing presentations from different departments. MSK always have a section.....and it'll be a, a talk and then a practical session to get people up to speed with different skills. we go on CP day, days, like this year I went to Kettering there to do one on rheumatology, I do your biomechanics one was it the September ones that you have, I didn't see it this year, but I've done some biomechanics at Huddersfield. (35-51)</p>	<p>Self development through CPD given by her colleagues and practical experience</p>

<p>Confusion about the podiatry theories</p>	<p>Allsorts and I can't remember any who's, no, no one's what's the chap, who, who, what's the chap's name that uses all who blends all the assessment, all the ... unified theory is it called? What's he, what's he called. It begins with an 'H'. Anyway, that, but I use the stress free theory more than anything. Just that, the, if you take them out of their range, the full range motion and just take, taking them out of the, the, the extreme range that their foot's in, that's causing the problem, I won't correct it fully so that's, that's probably a lot of the, the way I think of it, if it's, if the foot is out of posture then I will correct it a little bit and see if that's enough to get it right. (102-116)</p> <p>You explain it much better. (130)</p> <p>Right you start off by putting their foot into a neutral position which is the neutral position in gait, so it's never actually, in gait it will never actually be in neutral but you, you put [laughs], ca, can't I just do it...</p> <p>A: Yeah! Although you're gonna have to tell me [laughs] 'cos I'm not filming it.</p> <p>I: [Laughs]. Oh dear.[sighs], I can't remember the words.</p> <p>A: Okay. So. So you, you're trynna position...</p> <p>I: Try, trying to pos, position the foot into its nat, natural position with the talus and [tut] ... no, I can't remember the word now.....[laughs]. Can't I go and look it up. (145-157)</p> <p>That rotational theory.....Don't ask me to explain it [laughs].</p> <p>A: Right. Why, why, why shouldn't I ask you to explain [laughs]?</p> <p>I: [Laughs]. 'Cos I can't. But it's a bit, all I remember from it is that it's the rearfoot, and, if you alter, slightly then you're gonna, you're altering the forces the way they're walking at heel strike you're gonna get different forces so in a small amount of change, you'll, you'll achieve the change in the foot position it, through, from their normal. (223-234)</p>	<p>Inability to articulate podiatric theories</p> <p>Lack of confidence to explain theories</p> <p>Possible gaps in knowledge</p>
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<p>Does not use Root theory anymore replaced with a form of tissue stress theory</p>	<p>I don't, I don't put an orthotic in to achieve the neutral position in stance. I might go to I'd, try towards it but I won't put it in, I'm not trynna fix it in neutral because the foot's never in neutral in gait.....so it might be in stance, I might, I could possibly get it in stance but I wouldn't put the foot in, that, that's not what I'm trying to do, I'm actually just trynna get them so that they're no longer in pain. It's, tends to be done on pain...(164-175)  It's a good way of it's a good way of assessing the foot and knowing what foot type you've got in front of you.....and what their natural foot position would be..... compared with the neutral compared with Root and that will give me an idea whether it's, if it's a forefoot problem or a rearfoot problem that I'm looking at, and then.....I will correct it so that I, sufficiently to get them out of their stress range.....and then, so that's how I tend to do it. (181-194)</p>	<p>Practice has changed due to the influence of colleagues  This has led to a revision of Root theory</p>
<p>Change has come about from watching other practitioners, CPD and her own experience</p>	<p>Mainly from seeing other practitioners and what they, how they work.....that's the main one. But I have be, seen it on, on training days as well we do there's the manage,... can't think what it's called, management group of practitioners that set up training for my team.....area and they've done training days as well and on, and they've given information out on that to say well perhaps you, it shouldn't be on, on, based on Root..., but main, but also from my own practice, knowing what works and what doesn't work. (199-209)</p>	<p>Practice has changed due to the influence of colleagues  Adapted theories to suit results from patient feedback</p>

<p>Evidence has affected practice indirectly, but it is patient feedback that changes practice</p>	<p>Evidence. I've been thinking about this and ... because each, each foot that you treat is diff, I don't use the one thing for each foot, it depends what's presenting with me, presented to me as to what I'm gonna do.....so I don't just use one thing and I certainly, and I don't mentally think these days this is what I'm using to assess the problem, evidence has changed the way I look at things, like when we went to the Paul Harradine talk that changed slightly the way I did my orthotics and that all he, and his was based on evidence ... but I don't ... [sighs], but when I'm assessing, when I'm treating a patient I'm going by their pain levels, distance that they can walk without pain, their endurance, the location of the pain, all that, those are the things that I use for, for, for evidence in terms of has it worked or not...(238-253) The treatment's worked, so I don't tend to think oh well has this theory worked it's, ... because it's such a dynamic process I can only assess something statically really, I can't really see what that insole's doing so I don't think ... so if I change it, I'll start off with one orthotic and then they come in and say oh well it's, it's no better or it might be a bit better but it needs a little bit more tweaking to it, but, and at a greater angle to the foot, to the posting that I've done. And that's not based on any theory, that's just based on their, their evidence of their.....their pain. (255-267)</p> <p>But it's like, the other day though when I was treating somebody for sesamoiditis and I was a bit concerned about which way I should be going with that. Well I asked another clinician what they had used, what they found the most effective way of treating it.....and they told me and that was my bit of, I suppose that was my [laughs] getting a bit of evidence in that, it, I was learning from their experience. (336-344)</p>	<p>Patient feedback is the most important effect on practice Other forms of evidence are less important than patient feedback</p>
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<p>There is research evidence to show that orthoses work</p>	<p>Yes work. Yeah. And there are papers out there that, about the, which orthoses like, where they use a cast of ... what they called..... the off the shelf ones, or, or ones that are made particularly for them and that the off the shelf ones are just as good so there's.....those sort of papers out there that's evidenced...(274-281) There's a few [laughs].....but not many. But we use them. [Laughs]. (330-334)</p>	<p>Orthoses work and there is evidence to show this Understanding of research may be limited</p>
<p>True EBP is quantitative research evidence but I use patient feedback</p>	<p>True evidence based practice is where research has been done on a treatment and said whether it works or not and they've, it's been done on a, under a proper trial.....I think that's true evidence based practice....But for me it's whether the treatment that I've used has worked and what, whether the patient is better and that's evidence that, that's the evidence that you're looking for. (209-307) Why. Because it's, because it's ... because it's controlled. You know what's, who you're treating and what you've done and, and the patients have probably been, they, they've, they've been randomly selected or, or maybe not randomly selected [laughs]..... it, erm, yeah, the whole thing is more controlled and so the evidence it can be specific to those conditions that you've set, those parameters that you've set. (319-327) But, but it's not, but that's not controlled and you couldn't... I don't know, would you stand up in court, I don't know [laughs], if it came back to that.....whereas, a decision based on, on a clinical trial is very sound. If it's been done properly. (346-353)</p>	<p>Quantitative research is evidence. EBP is understood and other forms of evidence are seen as important Hierarchy of evidence is understood but not questioned</p>

<p>Individuals have to critically appraise the evidence</p>	<p>You do when you read it. 'Cos you've been taught [laughs] at university how to read a clinical, how to read a piece of research. Yeah. So I suppose they're not all sound. (358-360)</p> <p>It's only, it's used in terms of if I change the way I approach something, it's usually, it come, that comes from CPD and when learning about it, what have they based, they're telling you on.....has it come out of thin air or has it, that, has it come from either from their work their,.....broad experience.....or it's been done on a trial so you're judging whether, what you're learning on CPD is worth incorporating in your practice. (399-411)</p>	<p>Critical appraisal is important but reliant on others for this appraisal</p> <p>Unsure about own skills in appraisal</p>
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<p>Clinical experience is a form of evidence</p>	<p>Ha-ha. I think I mean for the verbal evidence it is, as I was saying before, from experience it, it's, it's from people's experience and what they pass on... Yeah, clinical experience...(369-371)</p> <p>But the day-to-day thing I think still comes from when you're learning the job, is your own clinical practice and those others within the team and their clinical practice.....and I might learn from like I might send somebody off to what we called the CATS service who've got more who've got experienced podiatry clinicians there and they've got access to ultrasound and x-ray and information like that about what's wrong with, so we can forward them on and then that sometime, that increases your experiences and practice as well because you're learning from.....them or their greater knowledge.(416-424)</p> <p>Two things. Other clinician, clinical experience from other clinicians within the Trust.....and ... working alongside physios as well. And seeing what benefits that they've got from using the physio, from, from using exercise but it's not, I haven't done it that I haven't got from a trial. I haven't, yeah, I haven't done that because I've read something. I've done that because I've spoken to other clinicians and they're saying that it's, you know, that it works well if you strengthen, and... (558-568)</p>	<p>Clinical experience is more important than research Inexperience might lead to reliance on more experienced colleagues</p>
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<p>Patient feedback is very important it is what affect her practice most</p>	<p>Yeah when they feedback, a lot of your practice is based on what they tell you because you want to know whether it's worked or not. And what they, 'cos er, I'm looking to get somebody out of pain ... and dis, or discomfort ... and if they're out of pain then that's, that, that's the evidence that it's worked. (429-435)</p> <p>From the patient and what they, again it's the pain levels. Well when they fir, when they first come in to clinic I'll ask them whether on a visual analogue scale..... what level of pain they have and the type of pain they have.....and how often it happens and does it happen every day or does it once a week so, and it's the pain pattern as well are they having, what, does it happen with activity or is it at night or that sort of thing, so that will give me an idea of where they're sitting and what...their problem is and when they come back that's what I'm assessing, that's the evidence that I'm.....assessing. (442-460)</p> <p>Well for that, the patient, that is the most reliable because they're, that, their judgement of their discomfort is the main thi, that's what brought them to you so you'll know where they're, that that's, whether you've got the outcome you wanted is dependent on what they've said. And some are better than others at judging at describing their pain and pattern...but they'll all know whether it's got better or worse, depend the mark that they're say, that they put down as to describing their pain...might be variable but they'll know whether it's got worse or better when they come to see you. (470-484)</p>	<p>Patient feedback is the most important effect on practice Other forms of evidence are less important than patient feedback for her practice Trial and error is widely used</p>
<p>This is as reliable as a trial individually</p>	<p>Yeah. I suppo, well yes, because that's ... because a clinical trial will never mimic, it, exactly what your patient's got. It, it can change your approach to, to tackling the problem and give you different ways of tackling the problem but it won't the clinical trial doesn't cure the patient or correct the patient's problem. (487-492)</p>	<p>Research terms applied to practice Gap between research and practice Justification for not using research</p>

<p>There are problems in getting hold of research papers</p>	<p>It stops, well ... it would make it easier to read them if it were, if we could get hold of them easier it'd be much, it'd be better to know what was going on the current thinking that's going on and the current research ... but it would still be what works best for the patient. (575-579)</p> <p>We don't have ti, we don't, it would, the, reading research is done in my own time because there isn't time at work to do it so it's what you pick up from, I find that it, the only way I pick it up is t through CPD events, that's.....where the research comes from and if something really stands out.....from that then I will read it but it tends to be from CPD days 'cos there isn't the time. I know when I was, the only time that I seemed to be able to get hold of research papers is if I, if I'm doing a course and you get your login and you can, can access the University's.....erm, access that way. But otherwise it's, it's a nightmare. (587-602)</p> <p>Long term is it, yeah. It's okay if, you know, keep, keep going [laughs] on courses and finding out what they're saying what's going on but as far as your own research it is difficult. (615-617)</p> <p>That it might not be reliable research, you're, you're going on their, their, their assessment of the research and not your.....assessment. (636-639)</p> <p>Two things would have to [laughs] to have to change would be the access, would be the access at work to get hold of information, access from home actually would be the best because that's the time that you, that's the only time that you really get to, to do any digging.....erm, or they changed it at work, they gave you time to do some research but that would never happen. (643-651)</p> <p>...but as soon as you come out of the research institutions you lose the, the ability to.....to keep up with it. (668-671)</p>	<p>Barriers to using research in practice</p> <p>Lack of support for accessing information in NHS</p> <p>Reliance on employer to provide access</p> <p>Lack of motivation</p>
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<p>Trials don't help patients individually but help with your approach</p>	<p>No. No. I think ... yes, I think, they're reliable for, for changing your approach, but they're not reliable in terms that they won't sort the patient's problem out (497-499)</p> <p>was talking about assessing the line of the subtalar joint.....and pressing on either side when it's relaxed and you can see where, which way, where that line is and that will tell you where how effective your posting can be and whether it's even worth bothering posting medially or laterally..... and I remember that changed a bit, that changed the way I was doing my orthotics. But I've still, but that doesn't mean that it's going to work for the patient because there's other things going on in that foot other than the subtalar joint.</p> <p>And you're only assessing the subtalar joint in one, you're not, you, you weren't assessing weight-bearing at that point, that was a non-weight-bearing, so you might be using all those different evidence to, to assess it but actually what you do in the end because it's dynamic is still trial, trial and error with that patient because you don't know specifically, you don't know that it's gonna work in the long run. (507-528)</p>	<p>Gap between research and practice</p>
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<p>Podiatrists are not good at keeping up with research</p>	<p>Well it's been good in that a lot of them have done MSC advanced research so they've had, they've had recent access to the latest .....information but we were only talking the other day about how to keep up, up with latest research and erm, they were talking about going to the MSK UK talks in Leeds.....Yeah. at ..... and going to, to some of those and perhaps that way we could keep up with some, some of the advances...(656-666)</p> <p>No. It because you don't know what's going to come in through the door and what their specific problems are and you might want to, and it's those patients that you hit a brick wall with and you think well I don't know how else to move on from here and perhaps I ought to do a bit more digging round the problem. (686-691)</p> <p>I don't know 'cos I don't know how much is out there now [laughs], there might be loads, I don't know. I do, it is a bit odd because we send them up to the, to the CATS service to have injections done but how useful are the injections, I was told the other day that as long as I'd done if they do the stretches and do a lot of the plantar fascia stretches and the calf stretches and they've done that full regime then it works a lot better doing injections on those patients.....but that's, that's word of mouth now but I do, but that's changed my practice 'cos I wouldn't even dream of sending them up to the CATS service until we'd done the full orthotic treatment and the exercise regime and done all we could before they were sent for an injection. But I don't know what research out there is about the cortisone injections and that's my, I should know. [Laughs]. (747-763)</p>	<p>Lack of motivation Does not want to challenge colleagues on evidence Lack of self confidence and reliance on colleagues experience</p>
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<p>We need to do more research in podiatry</p>	<p>Well there'd have to be lot more [laughs], there'd have to be a lot more research done anyway in podiatry 'cos we're not brilliant at doing.....research that would be pertinent to us, I don't know how much we're missing, how much am I missing not being able to have that access or is there just not the same amount out there to look at anyway. (701-709)</p> <p>Well you could probably pick any condition tha you could take plantar fasciitis and I mean there has been some research done on it but I, is there enough out there because plantar fasciitis is so, such a complex, that, you might get plantar fasciitis for allsorts of different reasons. (734-739)</p> <p>It's possible but I don't, er, I don't know how you get over the problem of, there's so many variations in, in what we do. (871-872)</p> <p>Yeah. Well even [sighs] ... 'cos you could say what orthotic, you could say what orthotic you'd had and, and, and you could put the prescription down couldn't you..... as to what, what you'd done. And you could have a ticky box to say what condition it was ... but I don't know how you'd ever [laughs] ... the, the, even the variations in the prescriptions would vary, I don't know if they would vary too much for you to ever be able to say this, this, <u>this</u> actually works for this condition because the foot is so complex.....it, the foot's complex to start with and then it's complex when it's moving. (875-887)</p>	<p>Desire to prove theories and understand foot function will lead to better treatment</p>
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<p>If she doesn't agree with colleagues then she doesn't change her practice</p>	<p>Probably the surgeon the other day when he was saying send us all your diabetic patients and we'll cut the flexors to get rid of the apical, calluses and I'm thinking well no, I'm not doing that because I don't. I might send if there was a particular case and I'm thinking well it might possibly work in the future and maybe, and it was er, a real threat to their foot health and I need to get rid of this aprical callus because it is a threat then I would consider it. But he was wanting to see them, just if there's a minor problem let's see them now before they get, before they get worse and I'm thinking well, no, because I don't know what the affect it's gonna have on the rest of the foot.....and he had no evidence to say whether it was gonna work or not. (791-807)</p>	<p>Covert refusal of colleagues ideas if not agreed with</p>
<p>Patient feedback is not collated by podiatrists</p>	<p>Yeah it is. It is only used by me. There was a colleague's research wasn't there and his plantar fasciitis clinics and that worked well because he was doing his MSc so they could [laughs], so that was collected, collated and assessed as to whether the fast track clinic worked or not and we don't do enough of that erm, we were gonna do one on a bunion clinic but that I think that was, there was too many variations as to why people had the problems with the bunions and so.....that was proved more difficult. But I don't know how you could collect, 'cos it would be nice to be able to assess our, our outcomes and use that information as a collective, as a department to use that information in a more structured way, but that would be a huge amount of work wouldn't it. (818-834)</p> <p>It could be, that could be but I don't know how you'd only be able to say how many treatments have worked and how many haven't, I don't know if you wouldn't be able to then, we don't tick boxes to say this was a plantar fasciitis problem and.....we don't say, we don't specify the problem other than in the written, you know, in the subjective and objective it's not a ticky box sorta thing so you wouldn't be able to particularly audit it. (852-861)</p>	<p>Patient feedback needs to be collated could lead to better evidence for orthoses Lack of motivation to change Barriers are given not to change</p>

<p>Orthoses are complex but we worry about that more than patients</p>	<p>Yeah, because [laughs] you might, 'cos I'm sure we all, have a ... we all have a particular way ... we've all been taught slightly differently.....and I think we use different materials like I know I quite often use Poron as a dampening effect..... for their mets and, whereas another clinician she uses cork a lot for the support and doesn't use the cushioning, but she still gets good effects and I get good outcome, but we've used quite a different method of treating this foot and I don't know how, you know, everybody would, I don't know how the different ways (898-911)</p> <p>the prescription's not that critical, it, there's certain things that you have to do with an orthoses to help the foot, but how you do that could be, you can do it in different ways. I sometimes think it's just the fact that you've changed the foot that helps the foot function, the pain.....and it doesn't really matter how much you've changed it, it doesn't matter how you change it, the fact that you've changed it is the fact, is the difference, it's not actually what you've, what you've done.....so it is, it is the, it comes back to that stress theory that as long as you're changing, you're getting it out of the range of, the end range that's causing the problem, it doesn't in a way it, because it's such a complex beast it doesn't really matter how you [laughs], how you do it, but, as a very generalised thing, there are.....obviously there's a specific problem that you need to offload then you're going to do that but it's these smaller changes, these, these metatarsalgias, these medial arch problems, you know, does it matter how, how much we're changing the, don't know. (916-940)</p>	<p>Deeper understanding of issues within MSK podiatry Orthoses may not be as different as we think</p>
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## Appendix 7: Emergent themes and objectives form for one participant

Participant	Objective 1	Objective 2	Objective 3	Others
Hannah Podiatrist 8	<p>Orthoses work and there is evidence to show this. Quantitative research is evidence. EBP is understood and other forms of evidence are seen as important</p> <p>Hierarchy of evidence is understood but not questioned</p>	<p>Self development through CPD and practical experience</p> <p>Patient feedback is the most important effect on practice</p> <p>This has led to a revision of Root theory</p> <p>Other forms of evidence are less important than patient feedback</p> <p>Critical appraisal skills are not developed</p> <p>Understanding of research may be limited</p> <p>Critical appraisal is important but reliant on others for this appraisal</p> <p>Unsure about own skills in appraisal</p> <p>Research terms applied to practice</p> <p>Gap between research and practice</p> <p>Justification for not using research</p> <p>Covert refusal of colleagues ideas if not agreed with</p>	<p>Practice has changed due to the influence of colleagues</p> <p>Adapted theories to suit results from patient feedback</p> <p>Clinical experience is more important than research</p> <p>Inexperience might lead to reliance on more experienced colleagues</p> <p>Trial and error is widely used</p> <p>Does not want to challenge colleagues on evidence</p> <p>Lack of self confidence and reliance on colleagues experience</p> <p>Desire to prove theories and understand foot function will lead to better treatment</p> <p>Patient feedback needs to be collated could lead to better evidence for orthoses</p> <p>Lack of motivation to change</p> <p>Barriers for change given</p>	<p>Inability to articulate podiatric theories</p> <p>Lack of confidence to explain theories</p> <p>Possible gaps in knowledge</p> <p>Barriers to using research in practice</p> <p>Lack of support for accessing information in NHS</p> <p>Reliance on employer to provide access</p> <p>Lack of motivation</p> <p>Deeper understanding of issues within podiatry</p> <p>Orthoses may not be as different as we think</p>

## Appendix 8: An analysis template for one topic

### Analysis using IPA

Emergent Themes	Analysis	Podiatrists
<b>Emergent Theme about EBP</b>	Evidence is about quantitative research	Helen, Richard, Tom, John, Ed, George, David, Hannah, Charlie, Louis, Barry, Lynn, Michael, Sandra, Paul, Jack, Izzy
<b>Descriptive</b>	EBP is understood to mean the application of quantitative research to practice	Helen(3,4),Richard (5,6) Tom (8,10),John (2,3) Ed (10,11) George (7) David (4,7) Hannah (7,8) Charlie (11,12,15,18) Louis (7,20) Barry (7,11) Lynn (3,5) Michael (6,13,15) Sandra (11) Paul (16) Jack (6,9,16,20) Izzy (5,8)
<b>Linguistic</b>	Language used about quantitative research - positive e.g. strong, hard, difficult, robust safer, substantial, good, proper, properly - other research- soft psychosocial, weak Jargon about science and research	Helen(3,7),Richard (5),Tom (8,10) John (2,3) David (4,5,7) Hannah (8), Charlie (11,15,18) Louis (20) Barry (7) Lynn (2,3,5) Michael (6,13) Jack (6,16)
<b>Conceptual</b>	This type of evidence will help us find the answers to practice problems	Helen (14),Richard (5),Tom (8,9,10,14) David (4,5,7) Charlie (11,12) Louis (20,21) Barry (11) Lynn (3,5) Michael (6,13) Jack (6,9,16)
<b>De-construction</b>	The evidence for orthoses does not fit into this hierarchy well, so EBP may be difficult for these podiatrists this may lead to fear. Quantitative evidence is the best evidence.	Helen (13,14),Richard (6),Tom (15),John (14) George (7), Hannah (7,8) Charlie (11,12) Louis (21) Barry (19) Lynn (3,4,5) Michael (6,13,15) Sandra (9,11) Jack (9,16,20)
<b>Emergent Theme</b>	EBP is about using research in practice	Helen, Richard, Tom, John, David, Hannah, Charlie, Louis, Barry, Lynn, Michael, Jack, Izzy
<b>Descriptive</b>	Treatments given must be supported by quantitative research evidence. This is best practice.	Richard (4,5),Tom (11),John (10) David (2,4,5,7) Hannah (7,8) Charlie (15) Louis (20) Barry (19) Lynn (3,4) Izzy (5)
<b>Linguistic</b>	True EBP A clinical trial is very sound. If it's been done properly. the best available evidence that's good evidence, accurate as possible proven to be appropriate	Helen (8)Richard (5,6) Tom (8,11) John (10) David (4,5) Hannah (8) Louis (20) Lynn (4,5) Michael (13) Jack (16)

<b>Emergent Themes</b>	<b>Analysis</b>	<b>Podiatrists</b>
<b>Conceptual</b>	Quantitative research evidence is the best evidence to use in practice. This hierarchy of evidence is fully accepted. It is through this type evidence that orthoses will be accepted as a good treatment	Helen (7)Richard (5),Tom (8,10) John (3,4,5) 6,David (5,7,21) Hannah (7), Charlie (15,16,18,19) Louis (7,20,21) Barry (19) Lynn (3,4,5) Michael (13) Jack (6,9,16)
<b>De-construction</b>	This evidence about orthoses is contradictory. The best evidence for orthoses is not there. Confusion about how the best evidence can be found	Helen (4,14) Richard (5,12) Tom (13,15) John (4) David (11,17),Hannah (16), Charlie (15,19) Louis (9,21,22) Lynn (5,6,8) Michael (14,17) Jack (16,21)
<b><u>Emergent Theme</u></b>	Good understanding of EBP	Helen, Richard, Tom, John, Ed, George, David, Hannah, Charlie, Louis, Barry, Lynn, Sandra, Jack, Izzy
<b>Descriptive</b>	Critical appraisal by the practitioner of this evidence is important	Richard (7,11),Tom (12),John (8,9,10) Ed (10,11) George (5,7,10) David (4,5,7) Hannah (8),Charlie (10,12) Barry (17) Lynn (3,4) Sandra (12) Jack (20)
<b>Linguistic</b>	you need to look at the evidence and critically evaluate it I've gotta weigh up what they're presenting.  I would have to be completely happy that the research was done I'd become more discerning then or maybe more critical about what I would accept	Richard (10) Tom (12,13) John (9,10),George (5,10) Lynn (4)
<b>Conceptual</b>	The concept of EBP is understood and accepted yet this may superficial. Differences in the depth of understanding about evidence for orthoses between podiatrists. Good articulation of what evidence is. Mixed articulation of what evidence is. Poor articulation of what of evidence is  Research evidence may not be easily applicable to practice	Helen(3,4,14),Richard (6),Tom (15) John (11,18),Ed (10) George (5,10) David (4,5,7) Hannah (6) Charlie (11,12,13) Louis (5,6) Lynn (3,4) Sandra (12) Jack (16,20)
<b>De-construction</b>	The best evidence on these terms for orthoses is not there. Yet these podiatrists know that orthoses work for patients so possible yearning for evidence to prove what orthoses do Repudiation of podiatric biomechanics theories has impacted on podiatrist's beliefs	Helen (8),Richard (11),Tom (13), John (10,18) George (5,10),David (11,14) Hannah (19), Charlie (12,13,14) Louis (5,7,20) Lynn (5) Jack (3,16)

<b>Emergent Themes</b>	<b>Analysis</b>	<b>Podiatrists</b>
<b>Emergent Theme</b>	Confusion about what is evidence	Helen, Richard, Tom, John, Ed, Hannah, Charlie, Louis, Barry, Lynn, Michael, Sandra, Jack
<b>Descriptive</b>	Patient feedback is not seen as evidence There is an emphasis on lab based experiments as being important	Helen (3,4,13,14) Richard (11,12) Tom (15,17,18) John (10,12,17) Ed (10) Hannah (8), Charlie (15,19,23) Louis (5,7) Barry(18) Lynn (6,8,17) Michael (17) Jack (6,7,8)
<b>Linguistic</b>	to the design of the study doesn't it, how do you assess for the position of the transverse axis of the subtalar joint, patient reported outcomes or clinical measurements you're using is, in the first instance, ... more important than, than research going back to using a randomised control trial so we're reducing the bias as we can to make it clinically relevant, or to make it scientifically relevant. True evidence based practice is where research has been done on a treatment and said whether it works or not under a proper trial Evidence is when somebody has scientifically proved something beyond a shadow of a doubt	Helen (3),Richard (5),Tom (15,17) John (10),Ed (10,11) Hannah (8),Charlie (18) Louis (7) Lynn (3,4) Jack (16)
<b>Conceptual</b>	Patient feedback and outcome measures are not seen as evidence in EBP Podiatrists want the biomechanics theories proven to help them with orthosis prescription	Helen (8),Richard (12,13) Tom (15,17,18) John (12,17) Charlie (23) Louis (8,21) Barry (18) Lynn (16,17) Michael (19,20)
<b>De-construction</b>	Patient feedback is subjective and unreliable Podiatrists know that orthoses work for patient but need to know how they work	Helen (8,13),Richard (13),Tom (15) John (12),Hannah (16) Charlie (23) Louis (21) Barry (19) Lynn (18,21) Michael (19,20)

## Appendix 9: Emergent themes to Themes

Emergent theme headings	Emergent Themes	Themes
EBP	<p>Quantitative research is the best evidence</p> <p>Gap between research and practice</p> <p>Evidence is quantitative research.</p> <p>Qualitative research is the worst</p> <p>EBP as concept is understood but it is evidence that is not understood.</p> <p>Evidence is linked to hierarchy and must be scientific</p> <p>Evidence that has discount theories is used more than other evidence</p> <p>Support for hierarchy of evidence.</p> <p>Evidence is ignored if clinician beliefs do not agree with conclusions.</p> <p>EBP is understood and other forms of evidence are seen as important</p> <p>Qualitative research is the worst</p> <p>Evidence for orthoses is conflicting</p> <p>Weakness in interpreting evidence</p> <p>Confusion about evidence for practice</p> <p>Patient feedback is not as good as research evidence</p> <p>Strong belief in science and what it means</p> <p>Understanding of qualitative evidence</p> <p>Evidence in podiatry is generally weak</p> <p>Questions the hierarchy of evidence as RCT's may not be best</p> <p>Hierarchy of evidence is understood but not explicitly</p> <p>Research does not give applicable results due to variability in patients</p> <p>Desire to prove theories and understand foot function will lead to better treatment</p>	<p>EBP is using research evidence in practice</p> <p>Research evidence in MSK podiatry should be quantitative</p> <p>Using research strengthens the participants' practice</p> <p>Podiatrists are more interested in how orthoses work than whether they work</p> <p>Participants believe that EBP is about using evidence in practice</p> <p>Research evidence is important because it gives strength to practice.</p> <p>Some believe that science is important for maintaining podiatry status in MSK.</p> <p>There might be confusion about using research in practice.</p>

Emergent theme headings	Emergent Themes	Themes
<p><b>Other sources of evidence</b></p>	<p>Patient feedback is the most important effect on practice  Patient feedback important for improving clinical experience but this is psychological  Patient feedback shows that orthoses work  Trial and error is widely used  Other forms of evidence are less important than patient feedback  Respected practitioners opinions and knowledge of evidence are used to help interpret evidence  Patient feedback is not seen as evidence  Inspired by these people to keep trying new things  Evidence from experiments about gait and orthoses is contradictory  Unsure what type of evidence patient feedback is  Patient feedback must be controlled only validated health outcome measures are evidence  Practice has changed due to the influence of colleagues  Adapted theories to suit results from patient feedback  Orthoses work and there is evidence to show this  Patient feedback needs to be collated could lead to better evidence for orthoses  Clinical experience is the most important to change practice  Colleagues experiences can also influence practice  Scientific method may not appropriate for health  Initially influenced by 'star' podiatrists.</p>	<p>Research evidence is not easily applied in MSK podiatry  The gap between research and practice.  Differences in MSK injuries, potential biomechanical causes and orthotic design and materials.  Trial and error is used  Patient feedback supports this process  Inconsumerability of research evidence. MSK podiatry is based on practical experience  They use patient feedback to reinforce their view  Some collect patient feedback but do not collate it. Others do not collect it.</p>

Emergent theme headings	Emergent Themes	Themes
<b>Biomechanics theories</b>	<p>Understands the podiatry theories and uses them all in practice. A flexible approach is best</p> <p>Tissue stress theory is main theory used</p> <p>Theories about or orthoses design based on little evidence are used in practice</p> <p>Language is used to give pseudo-science explanations of orthoses</p> <p>Lack of confidence to explain theories</p> <p>Inability to articulate podiatric theories</p> <p>Gaps in knowledge</p> <p>Deeper understanding of issues within podiatry</p> <p>All the podiatry theories are unproven or disproved</p> <p>Need to use other skills to assess patient</p> <p>Patient feedback and research evidence has confirmed beliefs</p> <p>Possible disconnect with the effectiveness of orthoses</p> <p>The scientific method may not have all the answers for podiatry</p> <p>There's more we do not know than we know about biomechanics orthoses work but it is not clear how they work and probably not because of the theories.</p> <p>Believes orthoses work but it is not clear how they work and probably not because of the theories.</p> <p>Orthoses don't always work but we don't understand why</p> <p>Orthoses may not be as different as we think</p> <p>Uses Root theory</p> <p>Uses different language to describe his orthoses</p> <p>No need to use theories</p> <p>Denial of theory but uses them</p>	<p>We do more treatments than orthoses</p> <p>Approach to biomechanical theories has changed</p> <p>Tissue stress and combined approach</p> <p>Biomechanical language is changing</p> <p>Different names for the same thing</p> <p>Diversification continues with horizontal substitution of physiotherapy</p> <p>Basis from Root theory replaced with other theories that are more difficult to disprove</p> <p>Language may change to explain gait in a complex way -</p> <p>MSK podiatry may not have changed as much the participants believe</p>

Emergent theme headings	Emergent Themes	Themes
<p><b>Clinical experience</b></p>	<p>Clinical experience and the experience of others affects practice.  Clinical experience is the most important form of evidence for practice  Trial and error is used to confirm beliefs  Patient feedback and clinical experience are what affect practice  Clinical experience has changed practice  Patient feedback reinforces the practitioner's opinions on evidence  Experience means you look at different treatments rather than just orthoses  Clinical experience is about being flexible and using all the good parts of theories  Practice has changed due to trial and error from trying to see which orthoses worked  Practice is complex because of the complexity of patients  Interprets the theory that makes most sense then use this in practice  Clinical practice is not a perfect world you have to make compromises. It knowing how make the right compromises that is clinical experience  There is gap between research and practice related to the differences between the different worlds.  Developed by not thinking in compartments.  Inexperience might lead to reliance on more experienced colleagues  Trial and error is used constantly in practice  Clinical experience has developed out of this process</p>	<p>They utilise experience more than research  We know what works and what doesn't  Practical wisdom balances research, patient feedback and experience  Practitioners have developed their knowledge through testing in practice not research  Practice is more influenced by lived experience than by research</p>

Emergent theme headings	Emergent Themes	Themes
<p><b>Critical appraisal skills</b></p>	<p>Critical appraisal is the most important skill for podiatrists            Critical appraisal of quantitative research papers most important            Interpretation is an important skill for a practitioner            Negative comments about podiatrists            Negative views of podiatrists who don't read papers and who make poor orthoses            Critical appraisal skills are not developed            You make decisions about evidence but evidence about negative effects is most important            Developed through doing the Master's course            Questioned everything previously been taught            Understanding of research may be limited            Research evidence is vague and should not need interpretation            Health research is complex because of the population studied            Cautious about change and using evidence not understood</p>	<p>Critical appraisal is the most important skill for podiatrists            Specialists may have the ability to be critical about evidence from research or experience.            Inexperienced practitioners are searching for this            Masters are important for development            Specialists are better than others            Disillusionment with the profession and colleagues</p>

Emergent theme headings	Emergent Themes	Themes
<p><b>Personal development</b></p>	<p>Research evidence and clinical experience have changes practice but orthoses are simple not complex  Master's developed understanding of research but also made him look at other theories  Lack of motivation to change  Barriers are given not to change  Not to do harm is key part of practice  Podiatrists do not work together because they believe they are in competition  Podiatrists are attacked verbally for their beliefs  Did understand biomechanics theories at University but didn't think teachers did either.  Taught how to make orthoses no connection to injury  Development has been really important  Barriers to using research in practice  Lack of support for accessing information in NHS  Reliance on employer to provide access  Does not want to challenge colleagues on evidence  Lack of self confidence and reliance on colleagues experience  No need for postgraduate qualifications  Developed due to his own ability to treat patients  Emphasis on that he is different and special  Fear of being sued motivates the use of new theories  Always looking for self development and something new  Personal ethics are important  Unsure how these came into practice  Developed due to his own ability to treat patients</p>	<p>Clinical experience is the most important for practice  Gap between research and practice  Masters are important for development  Develop through practice  Lack of help in private practice  Learn from colleagues in NHS  Barriers to development</p>

## Appendix 10: Themes to Final Themes

Themes	Final Themes
<p>EBP is using research evidence in practice            Research evidence in MSK podiatry should be quantitative            Using research strengthens the participants' practice            Podiatrists are more interested in how orthoses work than whether they work            Participants believe that EBP is about using evidence in practice            Research evidence is important because it gives strength to practice.            Some believe that science is important for maintaining podiatry status in MSK.            Critical appraisal is the most important skill for podiatrists            Specialists may have the ability to be critical about evidence from research or experience.            Inexperienced practitioners are searching for this            There might be confusion about using research in practice.            Research evidence is not easily applied in MSK podiatry            Practice is more influenced by lived experience than by research</p>	<p>Participants believe EBP is about using research in practice.            Research evidence is important because it gives strength to practice. Some consider science is important for maintaining podiatry status in MSK practice.            There may be confusion about using research in practice.            Critical appraisal of research evidence is important.            Research evidence is not important to all participants in their practice.            Evidence from their own practice is important.            There are differing opinions about the research evidence because of a lack of quality.            There is a focus on how orthoses might work rather than if they work.            Participants lived experience influences their interpretation of research.</p>
<p>The gap between research and practice.            Differences in MSK injuries, potential biomechanical causes and orthotic design and materials.            Inconsumability of research evidence.            MSK podiatry is based on practical experience            Trial and error is used            Patient feedback supports this process            They use patient feedback to reinforce their view            Some collect patient feedback but do not collate it.            Others do not collect it.            They utilise experience more than research            We know what works and what doesn't            Practical wisdom balances research, patient feedback and experience            Practitioners have developed their knowledge through testing in practice not research</p>	<p>Research evidence is not always easy to apply to patients. Inconsumability of research evidence.            MSK podiatry is based on practical experience.            Participants use patient feedback to reinforce their view.            Some collect patient feedback but do not collate it.            Others do not collect it.            Practitioners have developed their knowledge through testing in practice not research.            Practice is more influenced by lived experience than by research.</p>

Themes	Final Themes
<p>We do more treatments than orthoses  Approach to biomechanical theories has changed  Tissue stress and combined approach  Biomechanical language is changing  Different names for the same thing  Diversification continues with horizontal substitution of physiotherapy  Basis from Root theory replaced with other theories that are more difficult to disprove  Language may change to explain gait in a complex way - MSK podiatry may not have changed as much the participants believe  Masters are important for development  Specialists are better than others  Disillusionment with the profession and colleagues</p>	<p>Approach to biomechanical theories has changed.  Root theory replaced with Tissue Stress and combined approach.  Biomechanical language is changing.  Lack of clarity in podiatric biomechanics.</p>