Tolerate more pain while you're on the run or pushing iron and you'll make bigger gains faster

Written by: Jonathan Flynn, Senior Lecturer in Physiotherapy – University of Huddersfield

A word of caution!

As a physiotherapist I have spent oodles of time working with people in pain. The first thing I would say about 'training and pain' is to know your pain. An easy way I find to categorize this is to use a traffic light system.

Red Pain – This is a sudden onset of severe pain probably without a trigger or mechanism and if you don't act quick it might be dangerous to life. A heart attack is a primary example and you need medical attention so get to accident and emergency or call an ambulance. Left arm, chest tightness, shortness of breath and radiating neck and back pain are all signs to look out for.
Amber Pain - This means you need to be cautious and seek professional medical attention, e.g. if you have ripped or torn something such as your bicep tendon, realistically you probably would not be able to train through it anyway and training is only going to make things worse.
Green Pain - This is important but you can manage this with some training strategies. This type of pain is more related to overtraining, delayed onset muscle soreness (DOMS) and fatigue. In reality, its about being selective and sensible about your next training session.

Predominantly this piece is going to refer to advice when you are in the **Green Pain** category.

Is pain all in your head?

The first thing you need to understand about ***'PAIN'*** is it's an output, which is only possible when an executive decision from your brain is issued, e.g. if you brain does not say so, you don't have pain, so YES it's all in or at least all controlled by the super computer in your head, the brain.

When you injure yourself, electrochemical Impulses from the injury site are conveyed on fibres through a process we call ***'nociception'***, its just a Latin term for pain detection. Nociceptors are specialized cells that live in all tissues and are activated when a threshold for potential or actual damage is reached. Broadly this is detected as chemical changes (e.g. the reaction you get when you sting yourself with a nettle), mechanical changes (e.g. crushing skin, muscle or bone to hard) or thermal changes (e.g. picking up something that's too hot or less likely to cold). They transmit messages from our joints, ligaments, capsules, muscles and organs and these electrochemical messages go through a complex relay system from the injured part to the spinal cord and then upwards to the many decision making centres of the brain before a the command, ***'feel pain'*** or ***'don't feel pain'*** is issued by the cortex, the higher control centre of the brain.

Your actually transmitting these signals all the time but the spinal cord and brain is adept at filtering these out and deciding what's important and what's not. This filtering is called; ***'modulation'*** and importantly this can be influenced by you. A classic example is the tale of the nettles and dock leaves. Remember when you were child out playing and you managed to sting yourself on a nettle and you remembered what mum had told you which was to rub it with a dock leaf. The nettle has triggered off chemical nociception and messages are travelling at a steady rate to the brain, the brain is giving you pain for two reasons, 1. to stop you doing it again 2. and to get you to do something about the irritation. You pick up a dock leaf and rub the area you stung, it starts to feel better and you're ready to go again. There is no special soothing chemical in the dock leaf, it's simply the action of rubbing which stimulates a positive blocking or filtering system at the spinal cord. We also give this a fancy term, ***'mechanoreceptor stimulation'.*** These are the good guys when it comes to pain. They are the really good at blocking painful signals in the spinal cord and even influence how we perceive pain higher up in our brain. They effectively work by flooding the spinal cord with good signals so the painful signals have less opportunity to synapse and make their way to the brain. This is often referred to as 'pain gating' and the original theory although its been redefined since was postulated back in 1965 by Melzack and Wall.

The second major way of dealing with pain is the release of naturally occurring endorphins (serotonin and dopamine). These are the bodies natural pain killers and are released by the brain as a response to certain stimuli. Exercise is one of the major stimuli, hence the term exercise or runners high. You have a good session and you feel euphoric and pleased with yourself afterwards. That's because these psychoactive naturally occurring chemicals are heavily linked to our pleasure circuitry, other examples include, food and sex.

Strategies for working through the pain

1. More Understanding leads to greater cognitive power

Understanding pain and how it works is the first in several ways in which you can work along side pain and see it as a friend rather than problem. Like anything in life, the more you understand the better you are empowered to deal with it. Get the traffic light system above into your head and make sure your in the green pain category. If you are, its unlikely you are going to do anything serious to yourself. Be selective on a day to day basis and mix up your routines rather than doing the same exercises just because your comfortable with them. This will allow your joints, ligaments and muscles time to recover and your pain perception will drop.

2. Get warm and stay warm

Warming yourself up properly and crucially staying warm will help you avoid injury and keep pain levels down. Pain likes a cold interface, e.g. a muscle or

joint. Its not rocket science, its more related to movement selection and patterns. If your warmed up and stay warm your much more likely to be able to perform that lift, that sprint or that extra push as you near the finish line.

3. Stay hydrated and give your body the correct building material it needs to create the optimum energy and repair environment

I am sure I am preaching to the converted but pain likes nothing better than a body which is under nourished and dehydrated. Corticol stress hormones rise and your pain mechanisms are alight. Seek out a registered dietician or nutritionist who has a penchant for sport not just regular nutritional requirements. Get yourself tested, fat percentage, muscle percentage and hydration levels, its really easy to do these days. Start by taking on more fluid. Get yourself a 1 Litre water bottle and mark the sides with some tape and put the hours of the day on it. This way you wont miss your quota. As a general rule you probably need to be consuming at least 2 litres a day. However the harder you work the more you will need to replace. There are so specialised products on the market which can sweat test you and tell you precisely what you need, see http://levelen.com/sweat-testing/why-do-sweat-testing/

4. Sleep hygiene

Pain likes a tired and lethargic body. Sleep hygiene is a term that refers to optimising your sleep rhythms and practices to maximise recovery. There are lots of strategies you can do to achieve this. The first one is to limit your toxins, caffeine and alcohol are the main ones and should be avoided but nicotine inhalation is also associated with disruptive sleep. You should also try and hit a fast time in the early evening so your body can settle and not have to concentrate on breaking down food late at night. You can then break your fast, ‘breakfast’ and really enjoy your morning meal. Your bedtime routine should be regimented. Same time each night in as dark a room as possible, invest in a quality pillow and to avoid running things through your mind, keep a notebook and pen at the side of the bed. This will help you dump your thoughts and empty the grey matter so it can also sleep as well as the body. This might seem obvious but you need to maintain this routine when you go away, if your off on holiday, take your own pillow with you and set your routine up the same as when your at home. Its really easy to get out of sleep hygiene.

5. Imagery

This is nothing new, its been used for years to suppress feelings and anxiety. A recent study involving Catholics and atheists demonstrate that pain levels are reduced if you concentrate on a picture that has meaning and significance to you, (Wiech et al, 2008). In this study the participants were shown a picture while receiving electrical shocks, the Catholics were shown a picture of the virgin Mary and the atheists a classic but unrelated image. Not surprisingly the Catholics reported less pain. You don’t have to be religious, a picture of your first born, your dad or a person that inspires you will I expect do the trick.

6. Music

Hook up your ipod and listen to some tunes that again have significance to you. Research in this area shows that music can reduce discomfort and pain significantly and drive you on further. This is probably not that surprising to most but what is probably unknown is how it works. Significant music, the stuff that means something to you, tells your story, relates to important moments in your life or gives you something you can aspire to triggers off neuronal interference at the spinal cord and causes a distraction of sorts which essentially blocks the transmission of the bad stuff, pain receptors. This is not that dissimilar to the dock leaf scenario I penned earlier. Additionally music of significance is also attributed to influencing the release of those endorphins (serotonin and dopamine) discussed above. So whether it's 'Gonna Fly Now' composed by Bill Conti or Eminem's, Lose Yourself' its doesn't matter, listen to what works for you!

7. Charge up your mechano receptors

If you are going for a big lift or about to do a final set that you know is going to be painful try firing up your mechano receptors. These are the good guys in pain modulation and will help you achieve you goal. Simply rubbing your arms or slapping the skin gently will start bombarding the spinal cord and brain with other sensations other than pain. This is the gating theory I talked about earlier. It works a treat but you need to act fast, i.e. start the lift or set straight after the stimulation.

8. Gain some respect for pain and change the way you think about it

Changing your mind-set around pain and learning to work with it is probably one of the best strategies I know. Pain is often referred to as a negative but in reality, it is also our friend and can be viewed as a marker of how well you are doing or that you are simply training hard. Far to often pain is used as a 'stop' indicator but if you are experiencing the Green Pain category discussed above. This type of pain is more related to overtraining, delayed onset muscle soreness and fatigue. In reality, its about being selective and sensible about your next training session.

9. Support Mechanisms

Training with a partner creates a positive environment to suppress painful feelings. They can use encouragement and positive reinforcement to push you that be further. Importantly they may also be able to spot when you have pain that is not in the green pain category! Having positive family support mechanisms also creates an environment where you can recover and prepare yourself for the next training session keeping pain in perspective.

10. Work Hardening

In rehabilitation therapists use work hardening which is a way of introducing gradual exposure to different tasks following injury and therefore pain. Training is similar in that your body a natural level it is happy to work. In order to improve you need to push yourself outside of this level and this usually is accompanied by pain. The body is more resilient and adaptable than most people realise, therefore to reach your best you need to train with pain but in a respectful way. This means a graded increase and not a sudden increase in intensity and frequency of training.

Conclusion - *"You cannot eat a whole Elephant"*

I love this expression that my colleague uses when she is teaching students how to complete a task. Its essentially saying break the task down into small stages and tackle each task in sequence and you will reach your end point. So, training and pain is no different, consider the points above and start to sequentially add them into your training regime. Eventually you will able to munch on the whole elephant.

References

Melzack, R. & Wall, PD. (1965) Pain mechanisms: a new theory. *Science.* 150 (3699): pages 971-979.

Wall, PD. (1978) The gate control theory of pain mechanisms. A re-examination and re-statement. *Brain.* 101: pages 1-18.

Wiech, K. Farias, M. Kahane, G. Shackel, N. Tiebke, T. & Tracey, I. (2008) An fMRI study measuring analgesia enhanced by religion as a belief system. *Pain.* 139: pages 467-476.

Woo, C.W. Koban, L. Kross, E. Lindquist, M.A. Banich, M.T. Ruzic, L. Andrews-Hanna, J.R. & Wager, T.D. (2014). Separate Neural Representations for Physical Pain and Social Rejection. *Nature Communications.* pages 1-12.