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The future of wound measurements - 3D printing and scanning

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The future of wound measurements

ISiIP

3D - Technologies

The challenge of measurement

Overview

- Technologies
  - Textiles
  - Multi-disciplinary Innovation
  - 3D printing product
- Innovation – prototypes, innovation, projects/research
  - Wiggle bag
  - Paxman cooling cap
  - 21st Century Medical Bag
- TSB project (Orthox, 3T, Cardiff University)

Harness to improve well-being of children with cancer

- Ergonomically designed
- Comfort / functionality/ dignity
- Stylish
- Antibacterial

Cartilage repair

TSB project (Orthox, 3T, Cardiff University)

"Development of single protein fibre matrix composites for high performance cartilage repair devices" Silkworm silk technologies for cartilage repair

The knitted structure lays in the device to enable sutures to be anchored through the textile structure to the bone.
Why is measurement important?

- Assessing functionality and performance
  - Wound healing
  - Integrity
  - Risk
  - Device development
- Barrier
- Contact
- Support
- Delivery

Measurement of Skin Integrity

- Contact – Pressure, area
- Condition – Texture, moisture, temperature, integrity
- Performance – Hydration, absorption, elasticity, strength
- Interaction – Pressure, shear, friction, temperature

Measurement

Measurement of skin texture

Average roughness $S_{a} = 92\mu m$
Functional pore volume $V_{vc} = 42\, mL/m^2$

Average roughness $S_{a} = 65\mu m$
Functional pore volume $V_{vc} = 25\, mL/m^2$

Assessing Pressure Care

Stiletto vs Elephant

$3000\text{kg}/m^2$:
$0.001\,\text{m}$
$= 3000,000\, \text{N/m}^2$

$3000\text{kg}/m^2$:
$0.1\,\text{m}$
$= 300,000\, \text{N/m}^2$
Challenges of measurement for Skin Integrity

- Integrity of the system
- Scale of the accuracy
- Repeatability
- Reliability
- Non-standard geometry (free form surfaces)
- Varying textures
- Hydrated surfaces
- Infection prevention
- Standardisation
- ............etc