Something to think about
New knowledge – An example: Aetiology & Prevention of pressure injuries.

dequiv
dd The tree of knowledge
Cellular deformation

Sustained deformations of soft tissues may lead to individual cell death

- Alteration in intracellular concentrations of cell metabolites that occur due to local plasma membrane stretches.

Cellular response

Loading the tissue
- Aerobic to anaerobic respiration
- Decreased oxygen tension
- Increase in lactate levels
- Increase in purines

Keratinocytes
- Increase cytokine production
  - Interleukin IL-1a

Clinical application
- Measure lactate & purines in sweat as a marker of skin damage

Omen C., Early detection of pressure ulcers, EPUAP, 2017
Sub Epidermal moisture reaction

The amount of tissue and fluid in an area of skin

Inflammation = Higher fluid to tissue ratio
Objective predictors of pressure injuries

SEBUTAPE ® measurement of lipids, lactate and purines
Objective predictors of pressure injuries

Sub Epidermal moisture measurement – SEM scanner
New dressing materials
Matrix
Wound matrix

Normal skin contains an extracellular component (ECM)

ECM is composed of a variety of polysaccharides, water and collagen proteins

Provide tensile strength, flexibility and protection of the cells
Wound matrix dressings

Naturally derived structure that facilitates normal healing processes
Usually basement membrane and collagen
  - Bovine
  - Porcine
  - Synthetic
Provide structure for cells to implant
Bind MMPs
Potential to release molecules
  - Antimicrobials
  - Micronutrients
Smart dressings – currently experimental only
Photochromic materials

Colour changes with light intensity

- Infection indicator
- Dressing performance
  - Saturation
  - Pt tampering


University of Bath

http://www.bath.ac.uk/research/news/2013/12/05/smart-wound-dressing-mrsa/
Thermochromic

Materials that are temperature sensitive

- Infection ‘hot spots”
- Vascular flow
- Pressure

thermochromic liquid crystalline fibres

Shaped memory alloys

Materials that can return to their original shape

- Usually using heat

Current uses in surgery

- Sutures
- Intramedullary inserts
- Possible uses
  - Compression therapy

Spacesuit developed at MIT

Jennifer Chu | MIT News Office September 18, 2014
Phototonic textiles

Flexible textile substrate with light emitting or light manipulation functions

- Possible uses
  - Pressure injury prevention
  - Exudate levels
  - Topical negative pressure
  - Compression levels
Other SMART textiles

Changes colour when pH is too high

https://www.compamed-tradefair.com/cgi-bin/md.compamed/lib/pub/tt.cgi/Smart_sensor-based_textiles__Lab_coats_or_textile-based_wound_dressings_are_possible_areas_of_application%22.html?oid=23234&lang=2&ticket=g_u_e_s_t
Smartphone controlled bandage to deliver topical medication

Breathable suites - ? burns

3D printing

Nanocellulose
Delivery drugs
Adhesive bandage

Biopens
Self care technologies – wearables
Smart Compression stockings

https://spinoff.com/footfallsandheartbeats
Pressure mapping suites

Colour changing smart tattoo inks to monitor health

Dehydration
BSL – diabetics

https://www.printedelectronicsworld.com/articles/12891/colour-changing-tattoos-monitor-health
Robotics- Is this the new Jan Rice?
What will be the effects?
New ways of working
Challenge the status quo
In summary

- The foundations don’t change
  - Therapeutic relationship
  - Wound bed preparation
  - Exudate & infection control
  - Pain relief

- BUT the technologies and processes DO
  - Be open minded but reflective
  - Be prepared to challenge the status quo
  - Be prepared to fail
  - Disseminate the successes
Thank you

Do we have a decision???