

Pressure ulcers – definition, assessment, prevention and treatment
Session 1

Aetiology of pressure ulcers

How they develop.

Heidi Sandoz
Independent Tissue Viability Consultant
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1

Learning outcomes

- To understand how pressure causes skin damage
- To understand the cascade of events that lead to pressure damage

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2

What is a pressure ulcer?

A pressure ulcer is **localised** damage to the skin and/or underlying tissue, usually over a **bony prominence** (or related to a medical or other **device**), resulting from **sustained** pressure (including pressure associated with shear). The damage can be present as intact skin or an open ulcer and may be painful

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NHS Improvement 2018

3

EPUAP/NPIAP/PPPIA 2019 page 16

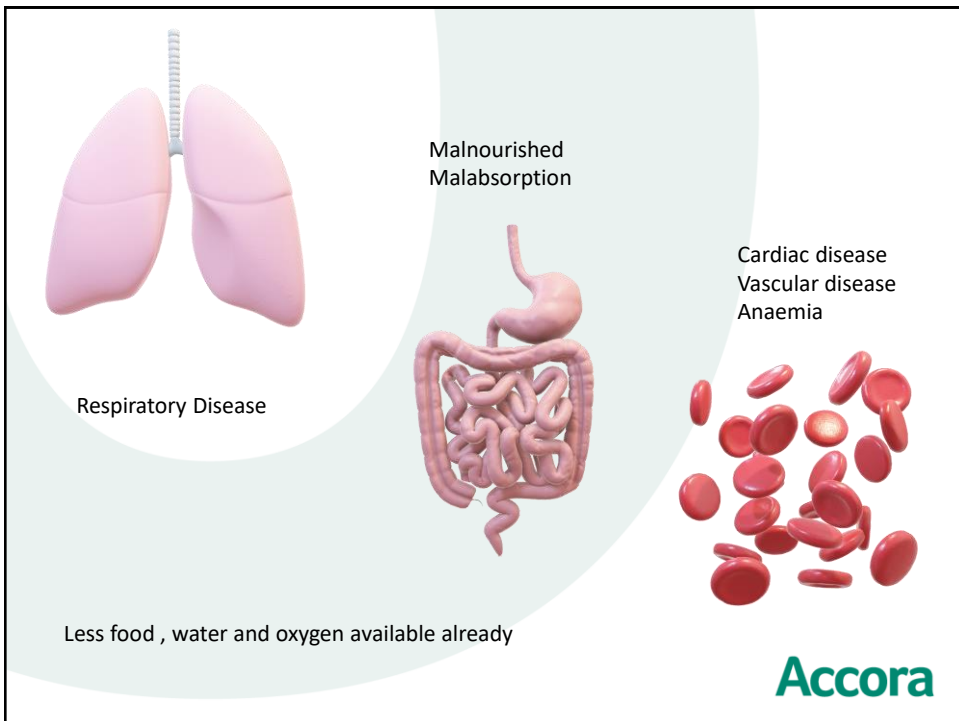
- The tissue damage occurs as a result of **intense and/or prolonged exposure to sustained deformations** in compression (perpendicular to the tissue surface), **tension or shear** (parallel to the tissue surface \leftrightarrow), or a combination of these loading modes. The tolerance of soft tissue for sustained deformations differs by tissue type and may also be affected by **microclimate, perfusion, age, health status** (either chronic or acute), **comorbidities, and conditions of the soft tissues**.
- Sustained deformation of cells, vasculature and tissues are the driving force for
 - cell deformation damage (in single cells)
 - inflammation related damage (in cells and tissues) and
 - **ischaemia** and reperfusion injury (also at cell and tissue levels).
- For example, **deformations** may cause direct **damage** to the structures of cells, but also trigger **inflammation** and development of **oedema**, **distort** the capillary network and reduce supply of **nutrients** to tissues, or cause lymphatic obstructions which will **compromise clearance of metabolic waste** products. Hence, the exposure to sustained cell and tissue deformations directly and indirectly cause formation and progression of cell and tissue damage in these multiple, interacting and escalating pathways.

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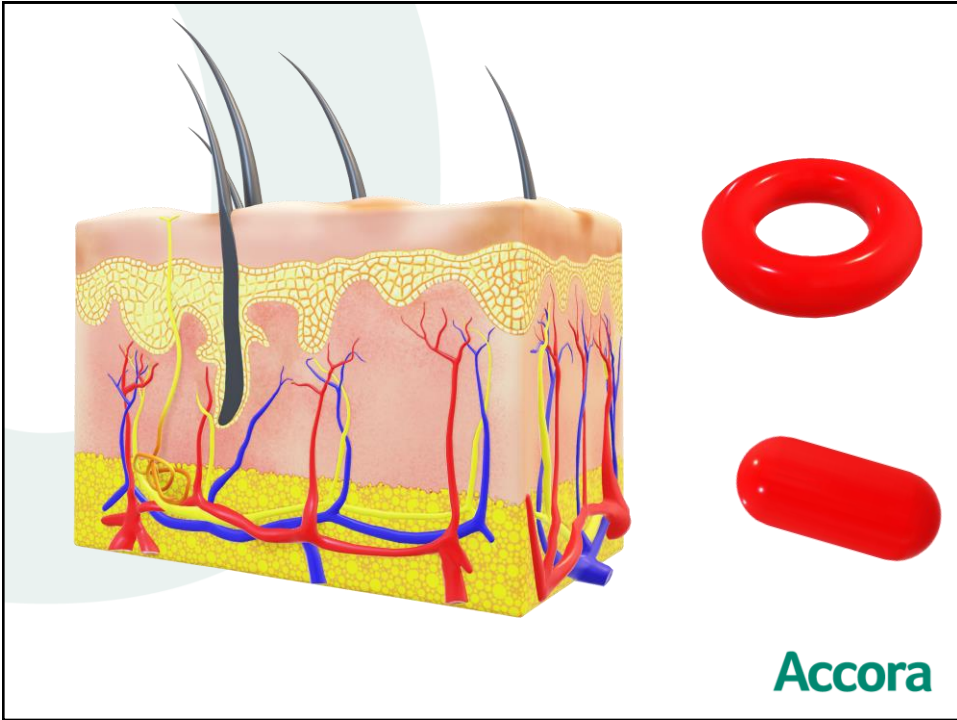
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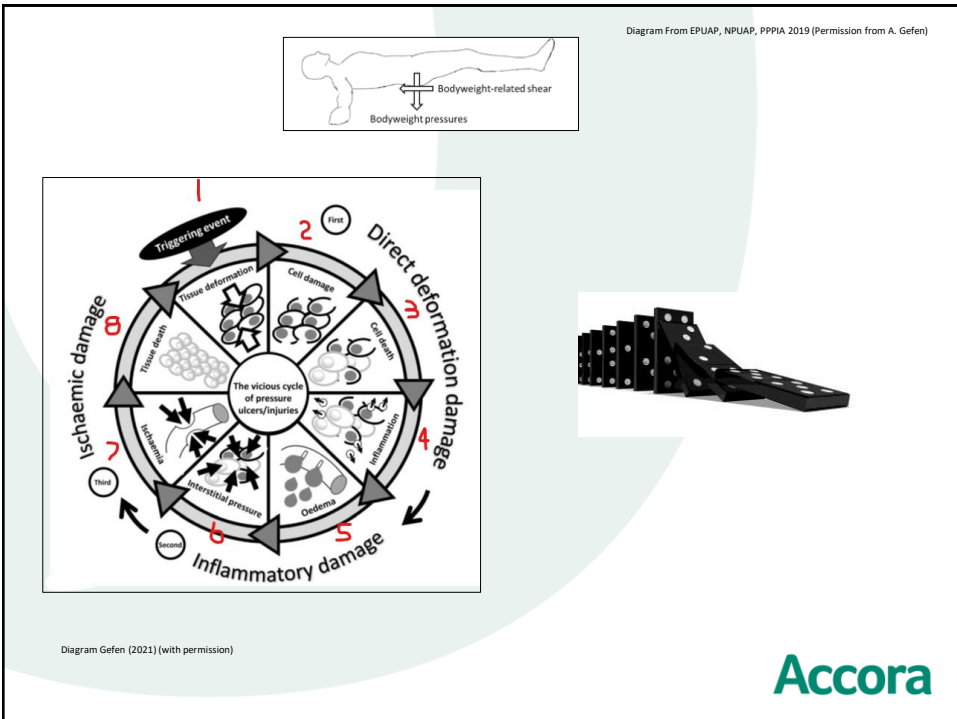
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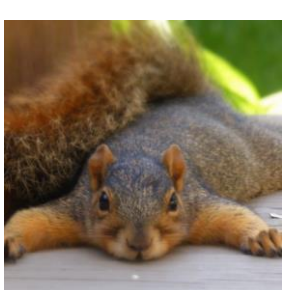
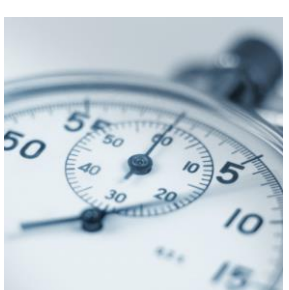
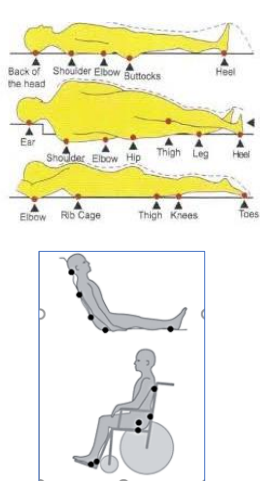


7



8

Pressure X Time ÷ Surface



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9



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10

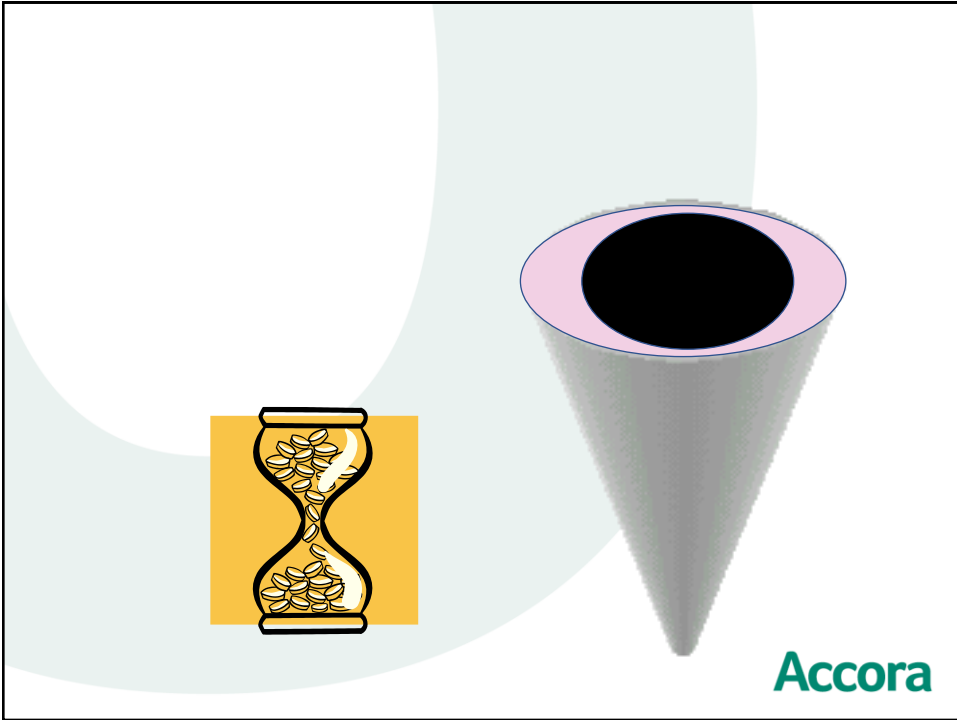


11

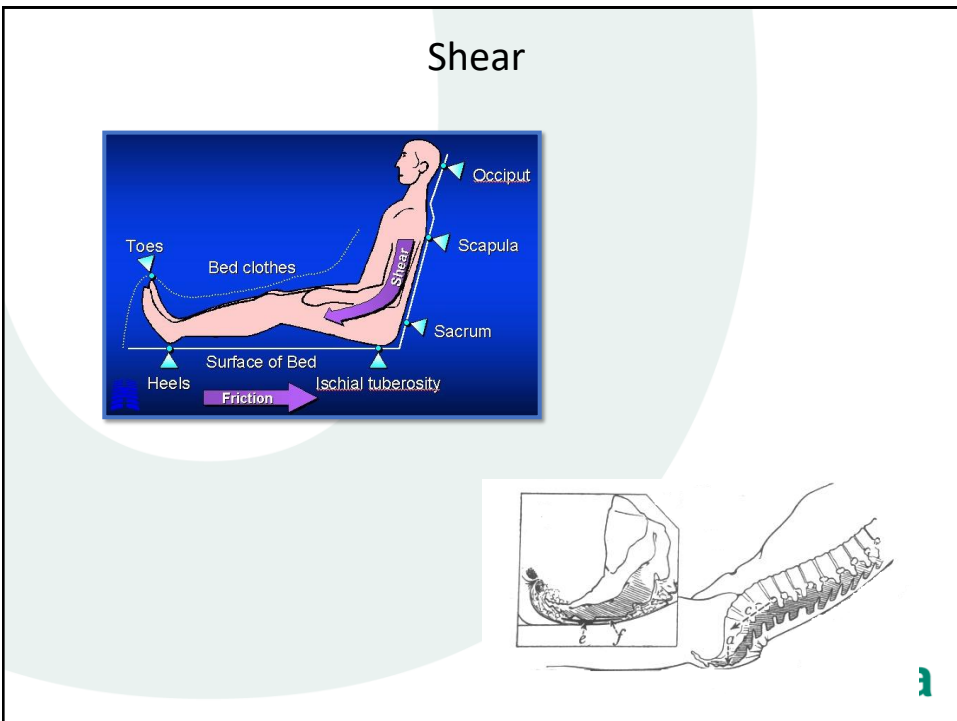
The central graph plots 'Tissue damage' on the y-axis against 'Time (Hour)' on the x-axis. Two curves represent different patients: Patient A (top curve) and Patient B (bottom curve). Vertical lines indicate 'Viable tissue' levels for each patient. Annotations include: 'Patient B can sustain food for less time' (red box) and 'Patient A can sustain food for more time' (green box). The x-axis is marked with 'Approx. 1' and 'Approx. 3'.

(Gefen, 2008)

12



13



14

Device
Related
Pressure Ulcer

- Noses
- Ears
- Catheter tubing
- Splints
- POP
- Other

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15

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16



17



18

References

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance (2019). *Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline*. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA

Gefen (2008) How much time does it take to get a pressure ulcer? *Ostomy Wound Manage.* 2008;54(10):26-35.

Gefen et al., (2021) Our contemporary understanding of the aetiology of pressure ulcers/injuries *International Wound Journal* DOI: 10.1111/iwj.13667 link to abstract <https://onlinelibrary.wiley.com/doi/full/10.1111/iwj.13667>

NHSI (2018) *Pressure ulcers: revised definition and measurement* https://improvement.nhs.uk/documents/2932/NSTPP_summary_recommendations_2.pdf



19

Accora

Charter House, Barrington Road,
Orwell, Cambridge SG8 5QP

T: +44 01223 206100

E: info@accora.care

W: www.accora.care



20