Principles of Pressure Care

and

Mattress Selection
Did you know ..... 

.... pressure ulcers can be fatal

1998: Pressure Ulcers were responsible for, or contributed to, 274 deaths in Australia

Prentice JL & Stacey MC – Prime Intent 2001; 9(30): 11-20

The presence of pressure ulcers has been associated with a two-to-four-fold increase of risk of death in older people in intensive care units

Thomas et al., 1996; Clough, 1994; Bo et al., 2003

On 12 October 2004, Christopher Reeve died after developing a serious bloodstream infection from a pressure ulcer
Pressure ulcers can be fatal
What is a pressure ulcer?

Common Definition of Pressure Ulcers
European Pressure Ulcer Advisory Panel 2009

Localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear.

A number of contributing or confounding factors are also associated with PUs; the significance of these factors is yet to be elucidated.
The largest organ – the skin

**Functions of the skin include:** protection, thermo-regulation, elimination, sensation and synthesis
Normal Physiology

**Short Duration of Pressure** – blanchable erythema

- Normal flow
- Reactive Hyperaemia

**Long Duration of Pressure** – non-blanchable erythema

- Capillary Occlusion (stops blood flow)
Bony prominences at risk

Toes

- Occiput
- Scapula
- Elbow
- Sacrum
- Heel

- Ear
- Upper Humerus
- Elbow
- Trochanter of Femur
- Thigh
- Lower Leg
- Heel

- Lateral & Medial Malleolus

- Elbow
- Rib Cage
- Thigh
- Patella
- Toes
Bony prominences at risk
Most Common Sites

- **49.5% Sacrum, Spine & Natal Cleft**
- **22.6% Heels & Toes**
- **7.5% Buttocks**

3.4% Hips
Other causes of skin breakdown

- Friction
- Moisture Build-Up
- Malnutrition
- Acute Infection
Other causes of skin breakdown

Contributing Factors

- Perspiration
- Urinary incontinence
- Bowel incontinence
Other causes of skin breakdown

**Malnutrition reported to be common**

Stratton et al., 2003

- Free living individuals with severe or multiple disease >10%
- Hospitals 10-60%
- Residential aged care facilities up to 50% or more
Poor Nutrition continued

Economic analysis of malnutrition and pressure ulcers in Queensland hospitals and residential aged care facilities Banks, Merrilyn Dell (2008)

20 Hospitals, 6 AC Facilities, 3047 subjects – single day 2002 & 2003

Findings: Malnutrition in Queensland was associated with

- greater incidence of pressure ulcers (Hosp=2.6, ACF = 1.7-2.8 odds risk)
- greater severity pressure ulcers
- greater number hospital bed day lost due to pressure ulcers = 16,050
- At a cost of AU$ 13 mil 2002/2003 (33% PU costs)
Who is at Risk? - Summary

Persons are at greater risk if ....

- have reduced mobility, including operations
- currently have a PU or had a PU in the past
- over 65 years of age
- low BMI or obese
- weight loss / poor nutrition
- incontinence
- underlying medical conditions
Prevention Strategy

Patient Risk Assessment¹

1. Identify “at risk” patients
   ➢ Upon admission
   ➢ An change in physical status/ability to reposition

2. Intervene IMMEDIATELY

Increase patient mobility²

1. Patient education
2. Self-assisted repositioning
3. Assisted patient repositioning & turning - carer, aids, equipment

Ref: 1: Prevention of Pressure Ulcers 2010; Eileen Wilkins
# Risk Assessment Tools - Waterlow

**WATERLOW PRESSURE ULCER PREVENTION/TREATMENT POLICY**

RinG scores in table, add total. More than 1 score/category can be used.

<table>
<thead>
<tr>
<th>BUILD/WEIGHT FOR HEIGHT</th>
<th>SKIN TYPE VISUAL RISK AREAS</th>
<th>SEX</th>
<th>AGE</th>
<th>MALNUTRITION SCREENING TOOL (MST)</th>
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<tbody>
<tr>
<td>AVERAGE BMI = 20-24.9</td>
<td>HEALTHY</td>
<td>0</td>
<td>1</td>
<td>MALE</td>
</tr>
<tr>
<td>ABOVE AVERAGE BMI = 25-29.9</td>
<td>TISSUE PAPER</td>
<td>1</td>
<td>1</td>
<td>HAS PATIENT LOST</td>
</tr>
<tr>
<td>OBESITY BMI = &gt; 30</td>
<td>DRY</td>
<td>1</td>
<td>1</td>
<td>WEIGHT RECENTLY</td>
</tr>
<tr>
<td>BELOW AVERAGE BMI &lt; 20</td>
<td>OEDEMATOUS</td>
<td>1</td>
<td>1</td>
<td>YES - GO TO B</td>
</tr>
<tr>
<td>BMI = W(Kg)/Ht (m)</td>
<td>CLAMMY, PYREXIA</td>
<td>1</td>
<td>1</td>
<td>NO - GO TO C</td>
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<tr>
<td></td>
<td>DISCOLOURED</td>
<td>2</td>
<td>2</td>
<td>UNSURE - GO TO C</td>
</tr>
<tr>
<td></td>
<td>GRADE 1</td>
<td>2</td>
<td>3</td>
<td>AND SCORE 2</td>
</tr>
<tr>
<td></td>
<td>BROKEN/SPOTS</td>
<td>2</td>
<td>3</td>
<td>C - PATIENT EATING POORLY OR LACK OF APPETITE</td>
</tr>
<tr>
<td></td>
<td>GRADE 2-4</td>
<td>3</td>
<td>5</td>
<td>‘NO’ = 0; ‘YES’ SCORE = 1</td>
</tr>
<tr>
<td>CONTINENCE COMPLETE/ CATHETERISED</td>
<td>FULLY RESTLESS/FIDGETY</td>
<td>0</td>
<td>1</td>
<td>NUTRITION SCORE</td>
</tr>
<tr>
<td>URINE INCONT.</td>
<td>APATHETIC</td>
<td>1</td>
<td>1</td>
<td>If &gt; 2 refer for nutrition</td>
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<tr>
<td>Faecal incont.</td>
<td>RESTRICTED</td>
<td>1</td>
<td>1</td>
<td>assessment / intervention</td>
</tr>
<tr>
<td>Urinary + faecal</td>
<td>BEDBOUND e.g. TRACTION</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>incontinence</td>
<td>CHAIRBOUND e.g. WHEELCHAIR</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>MOBILITY</td>
<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>NEUROLOGICAL DEFICIT</td>
</tr>
<tr>
<td>SCORE</td>
<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>DIABETES, MS, CVA</td>
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<tr>
<td>10+ AT RISK</td>
<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>MOTOR/SENSORY</td>
</tr>
<tr>
<td>15+ HIGH RISK</td>
<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>PARAPLEGIA (MAX OF 6)</td>
</tr>
<tr>
<td>20+ VERY HIGH RISK</td>
<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>MAJOR SURGERY or TRAUMA</td>
</tr>
<tr>
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<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>OTHOPAEDIC/SPINAL</td>
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<tr>
<td></td>
<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>ON TABLE &gt; 2 HR#</td>
</tr>
<tr>
<td></td>
<td>TISSUE MALNUTRITION</td>
<td>0</td>
<td>1</td>
<td>ON TABLE &gt; 6 HR#</td>
</tr>
<tr>
<td></td>
<td>MEDICATION - CYTOXICS, LONG TERMINAL DOSE STEROIDS, ANTI-INFLAMMATORY</td>
<td>0</td>
<td>1</td>
<td>MAX OF 4</td>
</tr>
</tbody>
</table>

© J Waterlow 1995 Revised 2005

Obtainable from the Nook, Stoke Road, Henlade TAUNTON TA3 5LX

* The 2005 revision incorporates the research undertaken by Queensland Health.

www.judy-waterlow.co.uk
Treatment - Assessing the ulcer

Evaluating pressure ulcers includes describing & documenting them and tracking their progress.

Grading scales provide a guide to identifying ulcer stage and help determine the best treatment plan.

Under the Norton Grading/Staging Scale:
- **Superficial ulcers** – Stage 1 and 2
- **Severe ulcers** – Stage 3 and 4
- **Deep Tissue & Ungradeable**
Stage I Pressure Ulcer

Intact Skin

Skin surface is:
- unbroken but inflamed
- painful and warm to touch
- spongy or firm in texture
Stage II Pressure Ulcer
Partial Thickness or Blister

Skin surface is
• broken, red and painful
• blistering, with possible drainage
• without slough
• tissue may be pale, red, swollen, hardening & warm
Stage III Pressure Ulcer
Full Thickness (Fat Visible)

Ulcer:
- extends to underlying tissue – depth varies by location
- may not be painful at its base
- white to black in colour – sloughing may be present
- may have foul smelling drainage
Stage IV Pressure Ulcer
Full Thickness (Muscle/Bone Visible)

Ulcer:
- extends to muscle, tendon or bone
- is white to black in colour
- may be painful if bone is infected
- slough or eschar
- foul smelling drainage possible
“Deep Tissue” & “Ungradeable”

The surface may not show the whole picture
(Depth Unknown)
# Australian Statistics

## PRIME Trial results 2005


## Study Population:
1,956 Residents from 23 Aged Care Facilities in 4 states

## Pressure Ulcer Prevalence:
25.9% (42% in some studies)

<table>
<thead>
<tr>
<th>Primary Causes</th>
<th>Stages of Ulcers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>Stage 1 44.1%</td>
</tr>
<tr>
<td>Shear</td>
<td>Stage 2 43.9%</td>
</tr>
<tr>
<td>Friction</td>
<td>Stage 3 5.5%</td>
</tr>
<tr>
<td>Unknown</td>
<td>Stage 4 6.5%</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pressure ulcers...

... are a burden on healthcare providers, as they

- increase demand on nursing care
- increase morbidity
- prolong hospitalisation
- increase patient/carer complaints
- unnecessary additional costs
- can incur litigation

novis

bringing you the world in health
Financial Implications

- Estimated costs to the Australian economy\(^1\) = $350 million per year
- Average cost per patient\(^2\) > $11,000 per year
- Extreme case (Tasmania)\(^3\) = $61,230
- Avoidable nursing home to hospital admissions, partly contributed by PU\(^4\)

27,000 admissions a year

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1: Wooldridge M. Address at St Vincent’s Hospital, Melbourne, 2 July 1997
2: Davenport J. Journal Stomal Therapy Australia 1999; 17(2): 5-9
3: Young C. Prime Intent 1997; 5(4): 24-31
4: Kevin Rudd AAP NewsWire 13 April 2010
95% of all pressure ulcers are preventable!
Mattress Selection

Foam or Alternating Pressure Mattress?
Prevention strategy
Low/Medium Risk – Reduce / Relieve Pressure

Static surfaces = Pressure Redistribution

but DO NOT REMOVE pressure

Relieve up to 32 millimetres of mercury – suitable for use with those who are at low/med risk & can reposition self at least every 20 mins
Foam Mattress Considerations

The Patient
• Pressure point vulnerability
• Ability to move
• Weight & BMI

The Mattress
• Grade – heavy duty & high resilience
• Depth – 125mm /150mm
• Support – hardness / density (130/35)
• Weight distribution - Interface pressure 30-50mmHg
• Comfort – side walls

The Cover
• Stretch / low shear
• Waterproof
• Vapour permeable
• Fire retardant

2: VQC STATE-WIDE PUPPS REPORT-2003
Who Needs a Dynamic Surface?

1. Any person who can not reposition themselves and lower limbs every 20 – 30 minutes, awake or asleep¹
   - Unconscious, including during operation
   - Paralysed
   - Confused
   - Restricted movement due to
     - Pain
     - Breathlessness

2. Any person considered at “High Risk”² ³

Ref: 1: 2000 Pressure Ulcer Prevention Guidelines; Ramstadius B, Sharp CA, Carter R & Cavanagh J
2: NHS Pressure Surface Recommendations, 1995
Prevention /Treatment Strategy

Medium/High Risk – RELEASE/REMOVE Pressure

**Dynamic pressure RELEASE** through the use of alternating air overlays & mattresses

Pressure alternation OR the periodic application & removal of pressure encourages **REACTIVE HYPERAEMIA**
Active alternation assists healing
How alternation works
The benefits of alternating pressure and encouraging REACTIVE HYPERAEMIA include:

- normal physiological response
- removal of toxic waste
- reperfusion of previously ischaemic tissue
- increased blood supply
- increased oxygenation
Alternating Pressure Mattress Considerations

**The Patient**
- Risk rating – prevention or treatment
- Current pressure ulcer
- Weight
- Bed/chair bound

**The Mattress**
- Overlay or mattress replacement
- Cell height
- Cycle time
- Noise level
- Special needs

**The Cover**
- Stretch / low friction
- Waterproof
- Vapour permeable
- Cleaning/replaceable

2: VQC STATE-WIDE PUPPS REPORT-2003
Fact or Fiction?

1: All air mattresses alternate  X

2: APMs (Alternating Pressure Mattress) with foam overlays/inserts offer the same therapeutic benefit  ✔️ X

3: The movement of the APM will keep the patient awake  X

4: “Bubble Mats” are considered to be APMs  X

5: The more litres of air that’s pushed through an APM pump, the better the mattress  X

6: It is OK to use an electric blanket/heat pad on top of an APM if the user is complaining of the cold  X
In summary

95% of all pressure ulcers are preventable!......

...... prevention is the best cure of all!
... every person has the right to movement, dignity & protection,

especially when in the care of other
THANK YOU