Is it all about pressure?

Reducing friction damage as part of your pressure ulcer prevention strategy
Agenda

- Understand friction and associated shear stress as a physical cause of pressure ulcers
- Consider when and where patients are at most risk of friction damage
- Describe the options for limiting friction damage
- Parafricta® low friction fabric medical devices to prevent friction damage
- Clinical evidence of efficacy and cost-effectiveness
“Pressure” ulcers

Friction and shear are root causes and not only pressure
A pressure ulcer is localized 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 pressure ulcers; the significance of these factors is yet to be elucidated.

Pressure Ulcer Locations

- Elbow
- Inner knees
- Back of head and ears
- Shoulder
- Lower back and buttocks
- Heel
Grading of Pressure Ulcers

Grades 1 and 2 - Superficial

Grades 3 and 4 - Deep
Physical forces leading to PU formation

PRESSURE

Perpendicular force relative to the skin surface
Causes tissue/blood vessel compression and internal shear stress
Is managed by pressure redistribution

FRICITION (AND SHEAR)

Tangential force relative to the skin surface
Causes tissue/blood vessel wrenching/tearing and surface shear stress
Is managed by reducing sources of friction
Friction and shear stress damage
Friction and shear stress damage

- Bony prominence
- Soft tissue
- Blood vessels
- Hypodermis
- Dermis
- Dermal papillae
- Stratum basale
- Epidermis

Resting surface e.g. mattress

Static friction “sticks” skin to surface
Friction and shear stress damage

Pressure and shear compresses blood vessels

Shearing forces tear apart layers of skin

Sudden jolting as static friction overcome

“Snap back” as static friction overcome

Resting surface e.g. mattress
Stage 2 ulcers caused by friction and shear?
Pressure ulcers or Friction lesions?

- The currently accepted definition of a Pressure Ulcer seems to exclude friction as a cause
- Friction (static in particular) is required to cause shear, particularly at the surface
- It is likely that in many cases pressure ulcers caused by friction, shear and pressure*
- Where pressure is controlled without addressing shear it is often noted that category 2 ulcers remain problematic (is this purely friction and associated shear?)
- Pure friction damage (dynamic friction) causing heat and abrasion could arguably cause lesions that cannot be defined as pressure ulcers
- Perhaps the term “Friction lesion” or “blister” or “acute skin trauma” is better, but does that matter to the patient if it is an avoidable harm?

At risk of friction damage
Options for preventative interventions
High risk of friction damage

➢ Where there has been a previous history of a friction related ulcer
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
- Where there is loss of sensation in at risk areas such as the heel or buttocks e.g. due to diabetic neuropathy, stroke or nerve block
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
- Where there is loss of sensation in at risk areas such as the heel or buttocks e.g. due to diabetic neuropathy, stroke or nerve block
- Where patients are particularly immobile for extended periods of time e.g. in intensive care, due to spinal injury or in orthopaedics
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
- Where there is loss of sensation in at risk areas such as the heel or buttocks e.g. due to diabetic neuropathy, stroke or nerve block
- Where patients are particularly immobile for extended periods of time e.g. in intensive care, due to spinal injury or in orthopaedics
- Where patients are difficult to reposition without some dragging on support surface
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
- Where there is loss of sensation in at risk areas such as the heel or buttocks e.g. due to diabetic neuropathy, stroke or nerve block
- Where patients are particularly immobile for extended periods of time e.g. in intensive care, due to spinal injury or in orthopaedics
- Where patients are difficult to reposition without some dragging on support surface
- Where patients’ conditions result in repetitive movements e.g. Huntington’s Disease and Alzheimer’s Disease
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
- Where there is loss of sensation in at risk areas such as the heel or buttocks e.g. due to diabetic neuropathy, stroke or nerve block
- Where patients are particularly immobile for extended periods of time e.g. in intensive care, due to spinal injury or in orthopaedics
- Where patients are difficult to reposition without some dragging on support surface
- Where patients’ conditions result in repetitive movements e.g. Huntingdon’s Disease and Alzheimer’s Disease
- Where patients tend to rub skin against the support surface because of agitation
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
- Where there is loss of sensation in at risk areas such as the heel or buttocks e.g. due to diabetic neuropathy, stroke or nerve block
- Where patients are particularly immobile for extended periods of time e.g. in intensive care, due to spinal injury or in orthopaedics
- Where patients are difficult to reposition without some dragging on support surface
- Where patients’ conditions result in repetitive movements e.g. Huntingdon’s Disease and Alzheimer’s Disease
- Where patients tend to rub skin against the support surface because of agitation
- Where patients use one heel to push themselves up the bed e.g. following hip fracture or knee replacement
High risk of friction damage

- Where there has been a previous history of a friction related ulcer
- Where patients are unable to reposition themselves easily and slide involuntarily down the bed or in the chair
- Where there is evidence of the early signs of skin breakdown e.g. reddened skin, abrasions or blistering
- Where there is loss of sensation in at risk areas such as the heel or buttocks e.g. due to diabetic neuropathy, stroke or nerve block
- Where patients are particularly immobile for extended periods of time e.g. in intensive care, due to spinal injury or in orthopaedics
- Where patients are difficult to reposition without some dragging on support surface
- Where patients’ conditions result in repetitive movements e.g. Huntingdon’s Disease and Alzheimer’s Disease
- Where patients tend to rub skin against the support surface because of agitation
- Where patients use one heel to push themselves up the bed e.g. following hip fracture or knee replacement
- Where there is a particular cause of extreme skin fragility is present e.g. epidermolysis bullosa, burns patients, following plastic surgery or in pre-term neonates
Options for prevention of friction damage

- Positioning
- Care when repositioning
- Care of skin condition
- Moisture management
- Prophylactic dressings
- Use of silk-like fabrics
National and International Guidance

**EMERGING THERAPIES FOR PREVENTION OF PRESSURE ULCERS** - “Consider using silk-like fabrics rather than cotton or cotton-blend fabrics to reduce shear and friction”

**NICE Medical Technologies Evaluation Programme (2014)**
“The Committee recognises that Parafricta Bootees and Undergarments show potential to reduce the development and progression of skin damage caused by friction and shear in people with, or at risk of, pressure ulcers.”
Ultra-low friction garments and bedding

Parafricta® Medical Products
Parafricta® Ultra-low friction fabric

POLYCOTTON

PARAFRICTA® FABRIC
Bootees
Undergarments
Protective Bedding
Garments designed for ease of use

- Protect entire foot or trunk from friction
- Easily applied
- Easily removed to inspect ulcer or at-risk skin
- No adhesives
- Can also help to retain wound dressings
- Comfortable and breathable
- Washable at 70°C and reusable
Clinical Evidence

AS REVIEWED BY NICE FOR MTG 20
Results obtained using bootees

Comparative study in a care home setting
Study Design

- 10 residents in a care home setting
- All had initial reddening of the heel (category 1 PU)
- A bootee put only on the right foot
- Assessments made at T-0 of bogginess, redness and oedema using high frequency ultrasound
- Further assessments at 2 and 4 weeks
- Ultrasound measurements considered most objective
Reduction in oedema and redness

Hampton, S et al, “Parafricta material, can it reduce the potential for pressure damage?” Journal of Community Nursing 23(4) (2009) 28-31
Results obtained bootees and undergarments

Cohort study conducted in hospital setting
Study Design

- Study conducted at acute hospital on Isle of Wight
- 369/650 patients Waterlow ≥15 and unable to reposition independently
- First 3 months 204 eligible given standard care (pre-PF cohort)
- Second 3 months 165 given standard care + bootees/undergarments (PF cohort)
- Outcomes – PU incidence, location, grading and outcome of ulcer on discharge, length of stay
369/650 patients at risk outcome study

NO ULCER ON ADMISSION

Developed a PU

P=0.028

16 fewer PU’s per 100 at risk patients

Pre-Parafricta Cohort
Parafricta Cohort

PATIENT ADMITTED WITH AN ULCER

PU stable or improved

P=0.001

21 more PU’s improve per 100 at risk patients

Pre-Parafricta Cohort
Parafricta Cohort

369/650 patients at risk outcome study

PROPORTION (%) OF AT RISK PATIENTS
(ADMISSION STATUS/OUTCOME)

MEAN DURATION OF STAY OF AT RISK
PATIENTS (DAYS)

P=0.019

Smith, G and Ingram, A (2010) original source data reanalysed for NICE MTEP submission
Cost-Benefit Analysis

Smith and Ingram (2010) study showed that the number of days spent in hospital was several days shorter for the Parafricta treated cohort (despite the pre-Parafricta and Parafricta cohorts being comparable by all other measured parameters).

New health economic model estimates that the net saving per at risk patient per hospital stay is £595 (with a range of possible outcomes around the central estimate depending upon number of times each item is reused and other variables)

In the community the savings will be associated with fewer TVN/DN visits to treat ulcers

New health economic model estimated the net saving per at risk patient per year is £2510.

Results obtained with bootees

Used routinely in an acute hospital setting
Implementation at the Trust

- Initial 6 months (2012) on high risk wards (orthopaedic and care of elderly) with 232 bootees
- Expanded to all 26 wards
- Total of 1024 bootees employed by 2013
- All bootees held in central equipment store
- Soiled bootees returned for external laundry (70°C 10 minutes)
- Tracked bootees used at least 10 times
Grade 2 heel pressure ulcer incidence

78% reduction in heel PU incidence

Reduction in ratio of grade 2 heel pressure ulcers to other grade 2 pressure ulcers from 0.67 to 0.24
Cost-effectiveness

- Drug tariff price is £35.14
- Laundry approx 50p per item
- Cost of treating an uncomplicated grade 2 PU is £4399 *
- If the ratio of heel to non heel pressure ulcers had not changed there would have been 26 more grade 2 ulcers in 2012/13
- Implied net savings to the NHS of over £75000
- Direct benefits paid to the Trust through CQUIN goal achievement

Summary

- Friction is an important force at the root cause of skin damage and pressure ulcer formation.
- Silk-like fabrics can protect vulnerable and fragile skin against friction and associated shear damage.
- Parafricta® garments clinically demonstrated to reduce incidence of skin damage and ulceration.
- Parafricta® garments and bedding can also:
  - aid recovery from existing skin damage and ulceration
  - assist retention of wound dressings
  - improve ease of movement and assist repositioning
- Parafricta® products are washable and reusable.
- Easy and instant to use, allow regular skin inspection, no adhesives.
- Bootees and undergarments are listed on the drug tariff and used in NHS hospitals.
- Clinical efficacy and cost-effectiveness reviewed by NICE (www.nice.org.uk/guidance/mtg20).
- A progressive approach to achieving harm-free care targets.
Questions and Discussion

Nick Garner, Commercial Director, Parafricta Medical Products

nick.garner@Parafricta.com

www.Parafricta.com