



Seating Solutions to Support Pressure Care Management

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 Linds Rehabilitation Equipment



The Wheelchair People

Learning Objectives

- Build confidence in assessing pressure injury risks as a Prescribing Therapist and communicating these outcomes
- Increase your knowledge of available resources to assist your evidence-based practices and review what the evidence is focusing on into the future
- Learn practical tips to problem solve common postures that increase the risk of pressure injuries
- Be introduced to the Xsenor pressure mapping system and learn how to analysis the images to assist your clinical reasoning
- Be aware of features of common products to consider in your interventions to reduce risks and assisting in healing of pressure injuries
- Consolidate learning through case study



Definition



“Pressure injuries/ulcers are localized damage to the skin and/or underlying tissue, usually over a bony prominences or related to a medical or other devices, resulting from prolonged pressure or pressure in combination with shear (1). The lesion can present below intact skin or as an open ulcer, which may be painful. Synonyms for this condition include, bedsores, decubitus ulcers, pressure sores and many more (1). Because most of the English-speaking population, including Australia and the United States of America, prefers the term pressure injury (PI), PI is used in this International Clinical Practice Guideline (CPG). In the latest version of the Mortality and Morbidity Statistics provided by the WHO (ICD-11), the official terms is “EH90 Pressure ulceration” including pressure injury, pressure ulcer, and bedsore (2).”

1. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, Alliance PPPI. Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline: The International Guideline; 2019.

2. EH90 Pressure ulceration [Internet]. 2024. Available from: <https://icd.who.int/browse/2024-01/mms/en#455330172>.

How does a pressure injury occur?

- Prolonged mechanical tissue loading on skin and underlying soft tissues
- Damaging loads typically occur at body areas where skin, vessels, subcutaneous fat, or muscle tissue are compressed and sheared between stiff internal structures such as bones or tendon and the adjacent surface such as cushions, mattresses or (medical) devices.
- There are four main pathophysiological theories: localized ischemia, reperfusion injury, impaired lymphatic drainage, and direct cell deformation damage

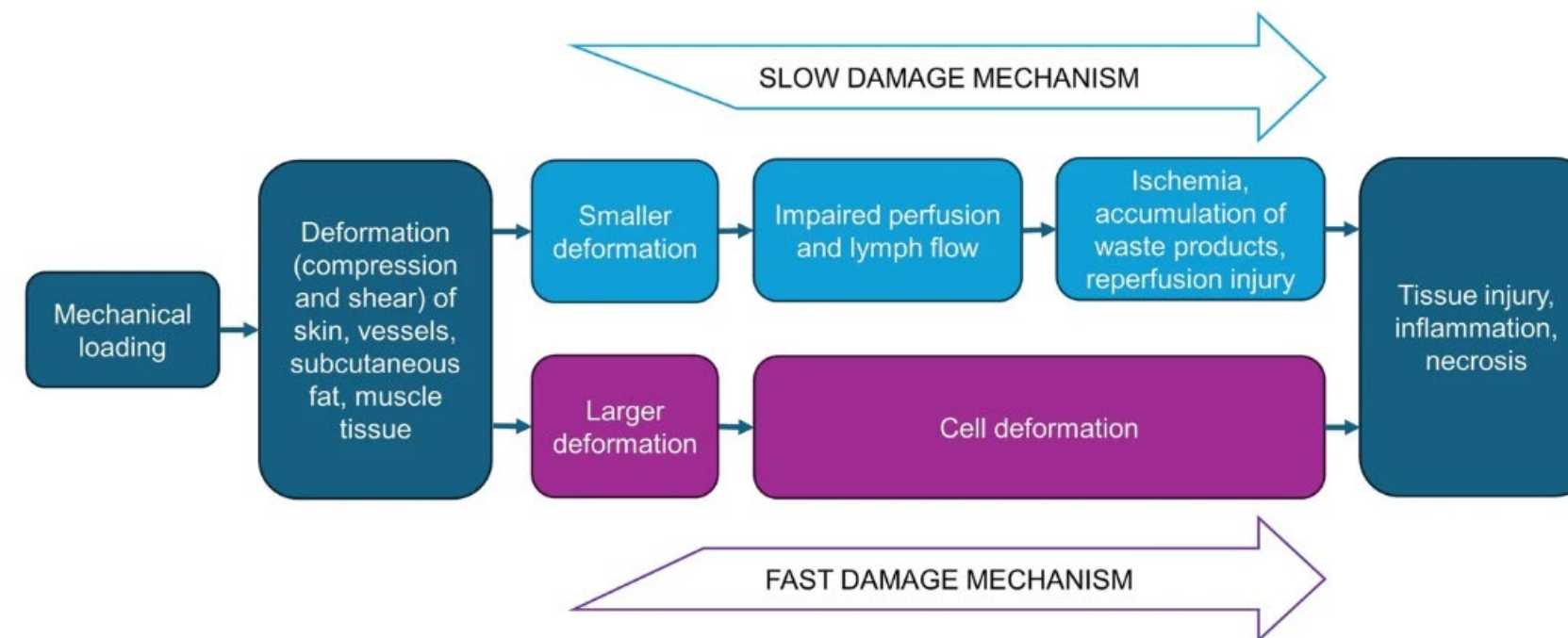


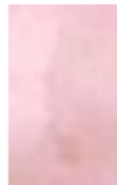
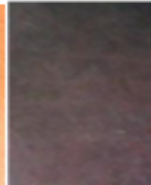
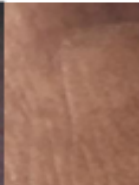
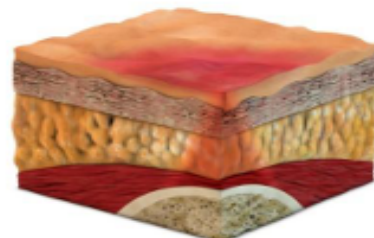
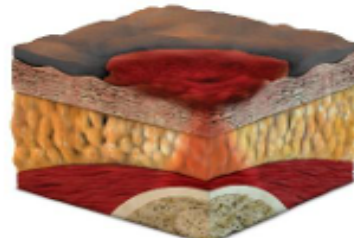
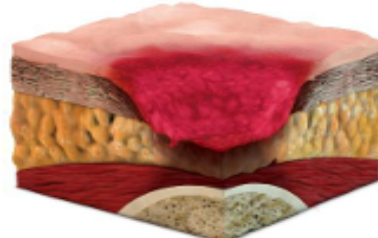
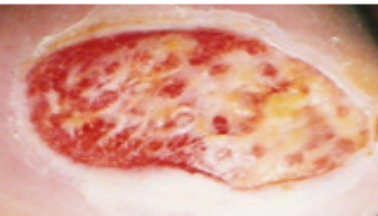
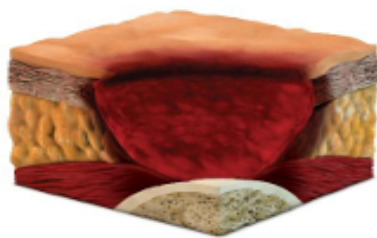
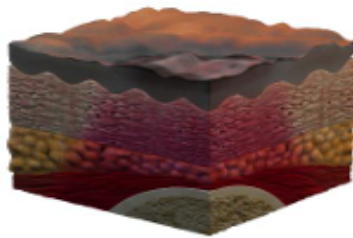
Figure 1. Pathophysiological pathways leading to pressure ulceration

National Pressure Injury Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Pressure Injuries/Ulcers: Definition and Etiology. In: Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline: Fourth Edition. Emily Haesler (Ed.). 2025. [cited: download date]. Available from: <https://internationalguideline.com>

The presence of an injury is then categorised...

PAN PACIFIC PRESSURE INJURY CLASSIFICATION SYSTEM: MULTICULTURAL



Normal skin							Text adapted from: <i>International NPUAP/EPUP Pressure Ulcer Classification System (2009,2014)</i> published in: National Pressure Ulcer Advisory Panel (NPUAP), European Pressure Ulcer Advisory Panel (EPUAP), Pan Pacific Pressure Injury Alliance (PPPIA), Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. 2014: Emily Haesler (Ed.) Cambridge Media: Osborne Park, WA. 3D graphics: Keryln Carville and Emily Haesler, used with permission. Photos: Photos courtesy K. Carville and S. Law, used with permission. Also available in this series: PPPIA Classification System for Adults with Light Skin Tones, PPPIA Classification System for Neonates and Children, PPPIA Classification System for Dark Skin Tones, PPPIA Classification System for Asian Skin Tones, PPPIA Classification System for Older Adults. More information and permission for use: www.pppia.org © PPPIA 2020
Stage 1	Stage 2	Stage 3	Stage 4	Unstageable	Suspected Deep Tissue Injury		
Intact skin with non-blanchable redness of a localised area usually over bony prominences. Darkly pigmented skin may not have visible blanching; its colour may differ from the surrounding area. The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Stage 1 pressure injuries may be difficult to detect in individuals with darkly pigmented skin tone. May indicate 'at risk' individuals (a heralding sign of risk).	Partial thickness loss of dermis presenting as a shallow open ulcer with a red/pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister. Presents as a shiny or dry shallow ulcer without slough or bruising (bruising indicates suspected deep tissue injury). Stage 2 pressure injuries should not be used to describe skin tears, tape burns, perineal dermatitis, maceration or excoriation.	Full thickness tissue loss. Subcutaneous fat may be visible, but bone, tendon or muscle are not exposed. Slough may be present but does not obscure depth of tissue loss. May include undermining and tunnelling. The depth of Stage 3 pressure injuries varies by anatomical location. The bridge of nose, ear, occiput and malleolus do not have subcutaneous tissue and Stage 3 ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep Stage 3 pressure injuries. Bone/tendon is not visible or directly palpable.	Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunnelling. The depth of a Stage 4 pressure injury varies by anatomical location. The bridge of nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow. Stage 4 pressure injuries can extend into muscle and/or supporting structures (e.g. fascia, tendon or joint capsule) making osteomyelitis possible. Exposed bone/tendon is visible or directly palpable.	Full thickness tissue loss in which the ulcer base is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed. Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, (and therefore Stage) cannot be determined. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as 'the body's natural (biological) cover' and should not be removed.	Purple or maroon localised area of discoloured intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue. Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and be covered by thin eschar. Evolution may be rapid, exposing additional layers of tissue even with optimal treatment.		
 	 	 	 	 	 		

Additional pressure injury definitions



- **Medical Device Related Pressure Injury:** This describes an etiology. Medical device related pressure injuries result from the use of devices designed and applied for diagnostic or therapeutic purposes. The resultant pressure injury generally conforms to the pattern or shape of the device. The injury should be staged using the staging system.
- **Mucosal Membrane Pressure Injury:** Mucosal membrane pressure injury is found on mucous membranes with a history of a medical device in use at the location of the injury. Due to the anatomy of the tissue these ulcers cannot be staged.

WHERE DO WE FIT IN THE MULTIDISPLINARY APPROACH TO MANAGING AND TREATING PRESSURE INJURIES FOR OUR WHEELCHAIR END USERS???

The Wheelchair People

Initial Ax Identify Occupational Performance Issues:

- Referral to assess for a pressure reduction equipment; goal in NDIS plan, concerns raised by HCP
- Collaboration with the client, family, treating health professional and support workers

Standard initial assessment practices help to identify:

- Medical Hx (clinical condition, comorbidities, acute, progressive or palliative)
- Physical, cognitive and sensory symptoms
- Level of independence (pre-morbid, current, foreseeable)
- Assistive technology used
- Their life roles and responsibilities
- The environments they frequently interactive in

Plan to assess deeper through specifically targeted assessments as identified through this process...



Understanding Pressure Injury Screening



- 126 risk factors for developing a pressure injury were discovered through the review process to develop the International PI Clinical Guidelines 2019.
- DO MORE GOOD THAN HARM
- Previous history of skin health (e.g. Hx of PI, edema, aged frail skin...)
- The most commonly used and recommended PI risk assessment tools for adults remain:
 - Braden Scale for Predicting Pressure Sore Risk (Braden Scale)
 - Waterlow
- Pressure Management Assessment Tool - PMAT developed by Jennifer Birt, OT Reg (MB), Specialized Seating and Mobility Clinical Specialist Rehabilitation Day Program, Health Sciences Centre, Winnipeg, Manitoba ©Jennifer Birt 2011
- Pressure Injury Toolkit For Spinal Cord Injury and Spina Bifida – ACI 2017

WATERLOW PRESSURE ULCER AND MALNUTRITION SCREENING TOOLS

WATERLOW PRESSURE ULCER AND MALNUTRITION SCREENING TOOL

Sex/Age	BMI
Male	1 Average 20-24.9 0
Female	2 Above average 25-29.9 1
14-49	1 Obese >30 2
50-64	2 Below Average <20 3
65-74	3
75-80	4
81+	5

Mobility	Continence
Fully mobile	0 Complete/Catheterised 0
Restless/fidgety	1 Urine Incontinence 1
Apathetic	2 Faecal Incontinence 2
Restricted	3 Double Incontinence 3
Bed Bound	4
Chair Bound	5

Medications	Skin Type
Cytotoxics	Healthy 0
Steroids	Tissue Paper 1
Anti-inflammatories	Dry or itching 1
Anti-coagulants	Oedematous 1
	Clammy/Pyrexia 1
No to all above	0 Discoloured stage 1 2
Yes to ANY	4 Pressure Ulcer Stage 2-4 3

Neurological Deficit
Diabetes, MS, CVA, motor/sensory paraplegia
Maximum 6 for this category

Special Risks
Terminal Cachexia
Multiple organ failure
Single Organ Failure
Peripheral Vascular Disease
Anaemia (Hb<80)
Smoking

Major Surgery/Trauma
Ortho/Spinal
On table >2hrs in past 48hrs
On table >6hrs in past 48hrs

MALNUTRITION SCREENING TOOL

A. Has the Patient lost weight recently without trying?
Yes - Go to Question B
No - Go to Question C
Unsure - Score +2 and go to Question C

B. How Much Weight has the Patient Lost?
0.5-5kg
5-10kg
10-15kg
>15kg
Unsure

C. Has the patient been eating poorly due to decreased appetite?
No
Yes

TOTAL NUTRITIONAL SCORE:
If score is 2 or more refer them to dietitian

Understanding Pressure Injury Screening

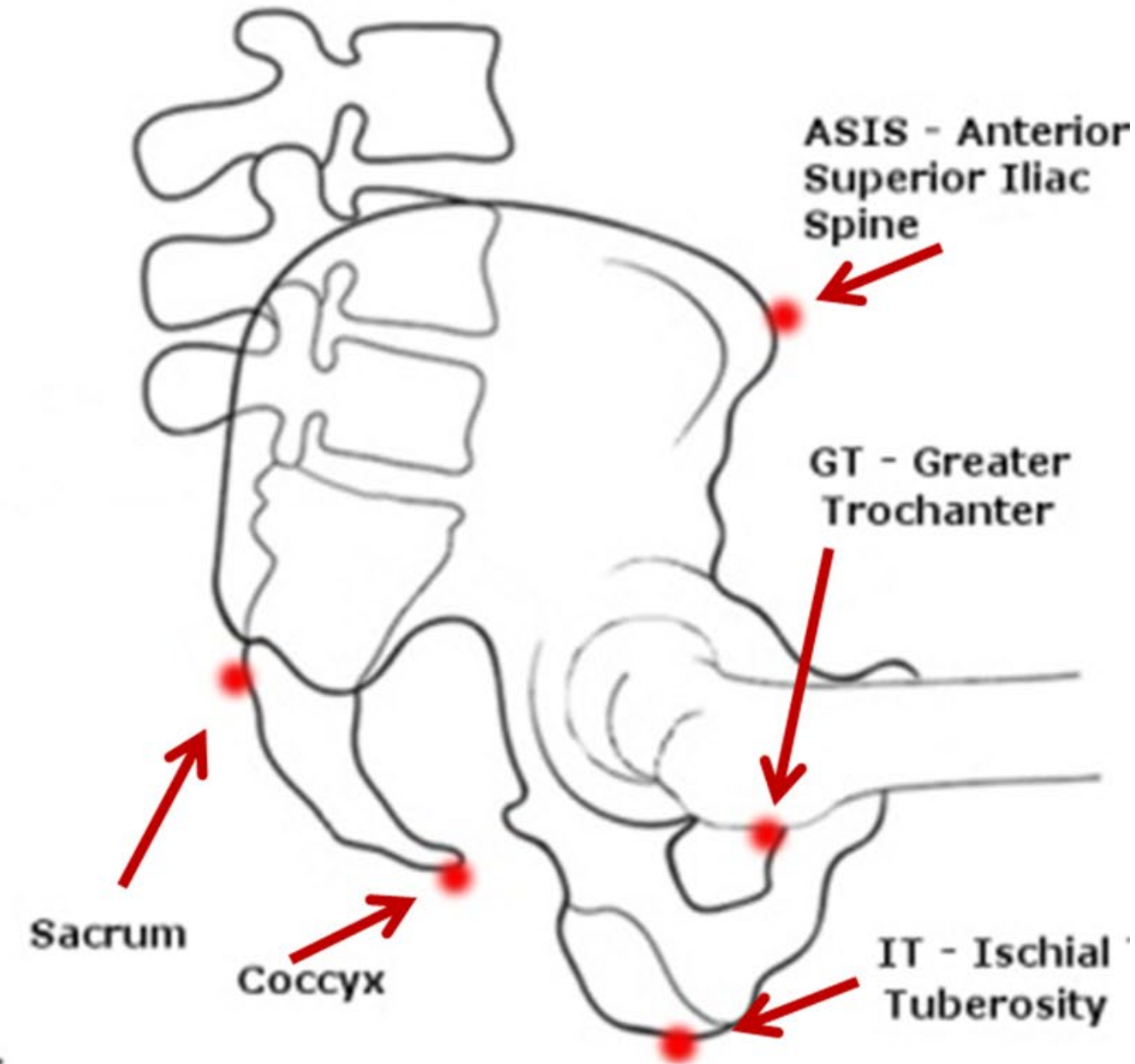
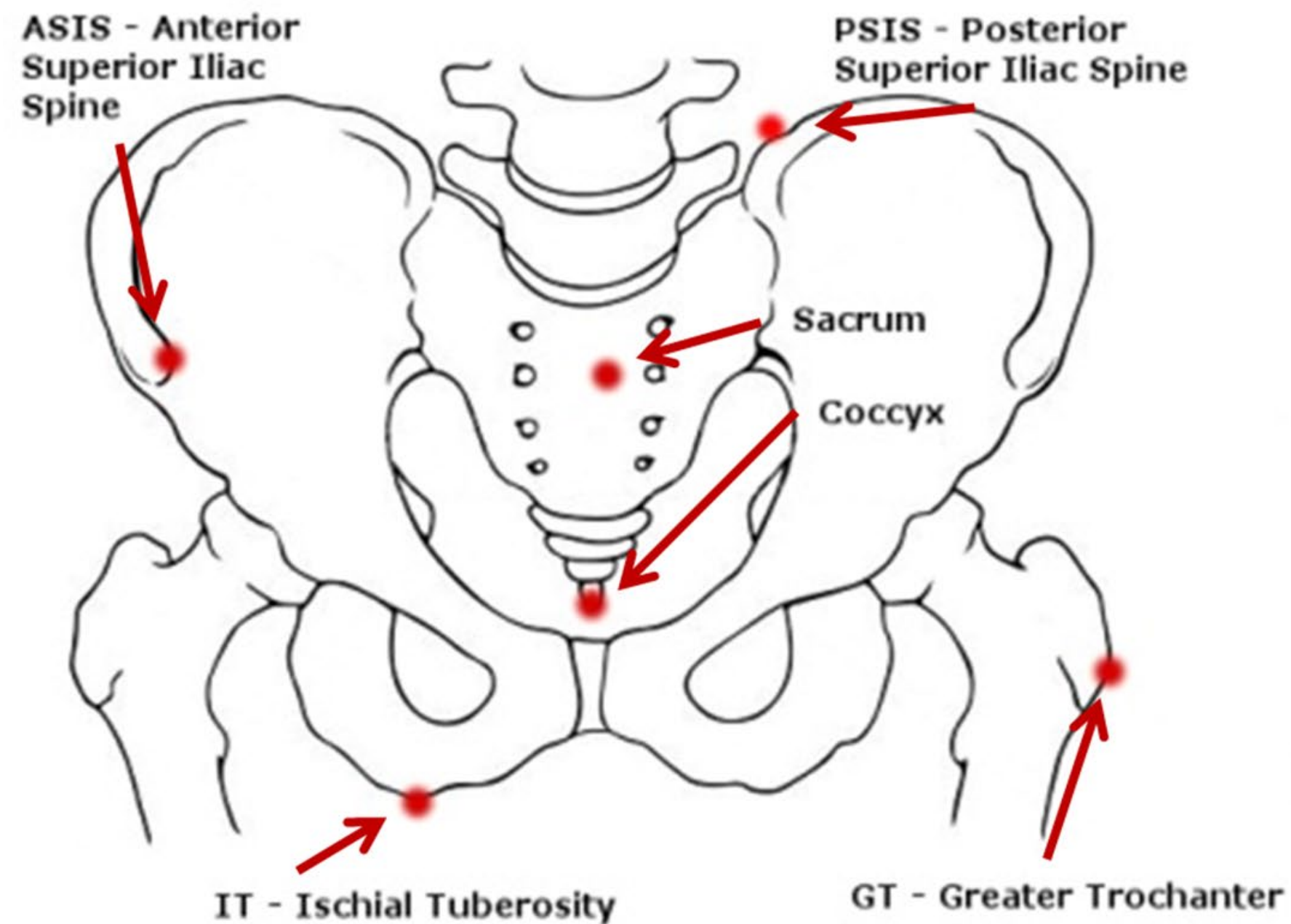


Pressure care is more than just surfaces and peak pressures; pressure areas occur for many reasons, and all areas need to be addressed:

- decreased mobility
- shear and/or friction
- age and medication related changes
- poor nutrition
- chronic disease
- incontinence
- skin microclimates
- psychosocial impacts
- restraint



HOW CAN WE BETTER ASSESS THESE RISK FACTORS AFTER THE PRIMARY SCREENING WITHIN OUR SCOPE OF PRACTICE?



<https://aci.health.nsw.gov.au/networks/spinal-cord-injury/spinal-seating/module-3/the-mechanical-assessment-tool-mat#:~:text=The%20MAT%20is%20a%20musculoskeletal%20examination%20of%20the,noted%20as%20they%20affect%20posture%20and%20muscle%20length>

The importance of mapping the base of support in sitting



- Feel/map the following:
 - ASIS
 - Posterior Aspect of the GT
 - ITs
 - Distal aspect of the femur
 - PSIS
 - Sacrum and Coccyx if indicated
- What areas are taking the load?
- Can you improve the distribution of load with the current seat surface? Reduce peak mechanical tissue loading and improve the area of distribution.
- How does function impact the risk of internal shear forces?

Decreased Mobility:

- Details of physical capabilities in standardised assessments

Which should include a functional ROM Ax and analysis from seat posture

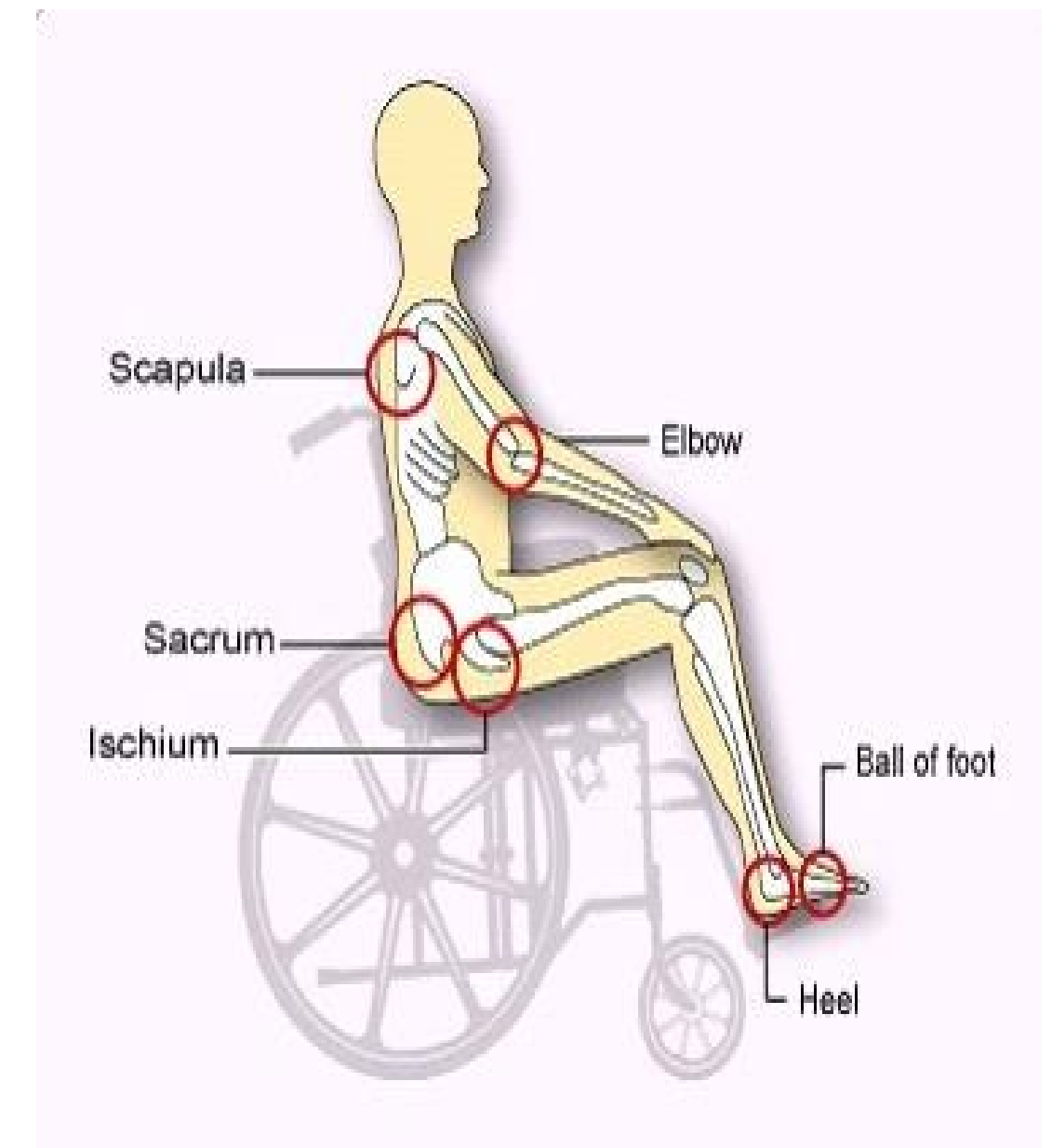
- Why is decreased mobility an indicator of high PI risks?

Increased sustained forces distorting skin tissues, often without reprieve to return blood rich in oxygen and nutrition back to the cells leading to cellular death. Increased risk of sustained postures leading to peak pressures around bony prominences.

- Map out a typical 24hr period of physical functioning and mobility

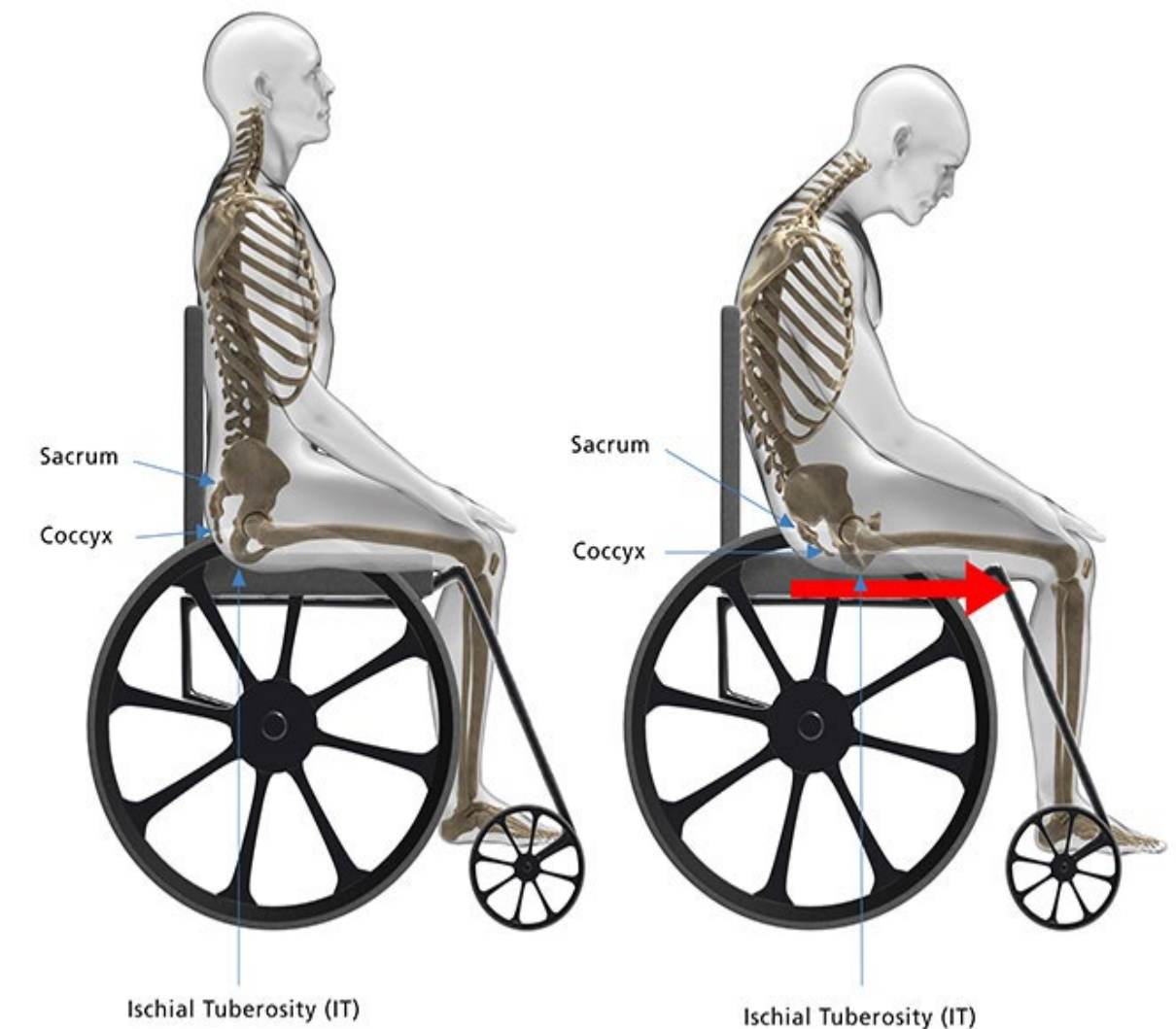
e.g. Barry wakes and is assisted out of bed 8am. He transfers using the bed mechanics and assistance of 1 support worker. He transfers using a standing machine onto mobile shower commode where he attends to personal care with assistance for 45mins on average. He transfers into his wheelchair around 9am for independent mobility around the home foot propelling until after lunch around 12:30pm he transfers into his recliner lounge chair for the afternoon. Barry is toileted once before transfer into the recliner. He will nap in his recliner and wake around 4pm to be transferred back into his wheelchair. He remains in the wheelchair until dinner time, being toileted twice during this period before being transfers back into the recliner around 7pm. Barry is transferred out of the recliner, to his wheelchair, he mobilises to the bedroom, is toileted on the mobile shower commode and assisted into bed around 9pm. Barry cannot independently change positions in bed.

- How much of their restricted mobility is a static posture vs a dynamic posture?
- Capture changes in posture and their potential causes e.g gravity, function, movement disorders, spasticity and other reflexes...



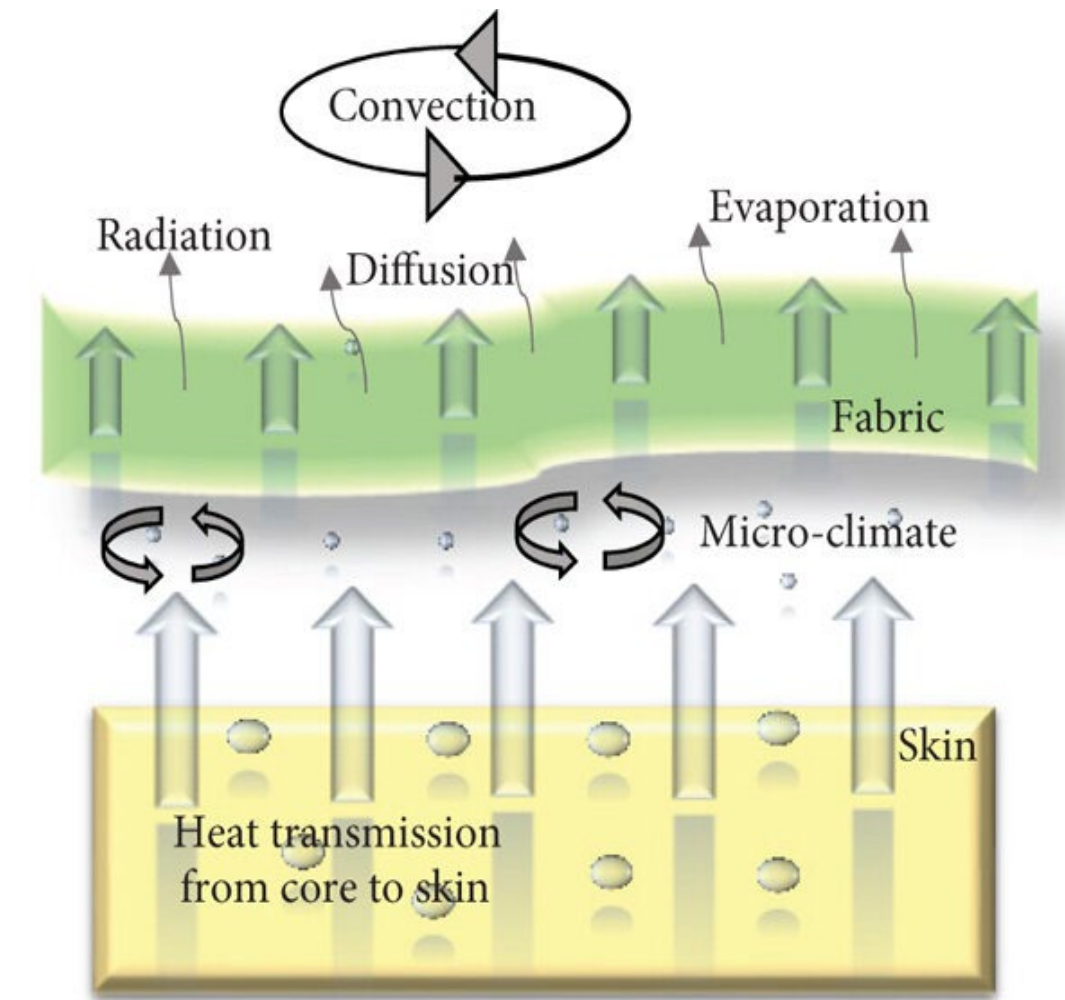
Shear and/or friction

- Shear is emerging as one of the most important risk indicators in the new evidence. Shear diminishes circulation to tissue, damaging blood vessels and cellular integrity.
- When a shear force occurs when the bone moves but the skin remains fixed to the surface. It is internal tissue layers sliding against two solid surfaces; bone and the external surface.
- Friction is the external force that resists motion between two surfaces. Damage occurs to the outer layer of the skin promoting skin ulceration.
- Assessing the impact of shear and/or friction on your client is best achieved completing analysis of at-risk movements and postures over time. E.g. When assessing Barry, capturing any postural displacement in bed, on the mobile commode, in the wheelchair and in his lounge recliner are required to identify risk.
- How do you capture 24hr data within 1.5hr appointment?



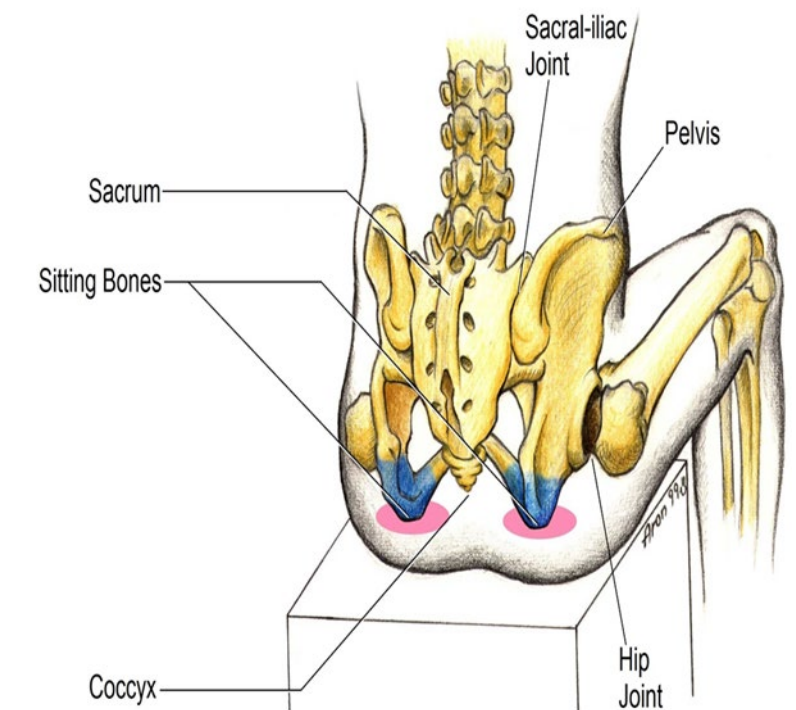
Skin Microclimate

- Skin microclimate is the term used to describe the interaction between skin temperature and moisture at the skin surface. When skin is wet, the outer most layer of the epidermis becomes softer, more permeable and skin pH moves away from its normal acidic range into an alkaline state. Normal acidic pH is necessary for skin barrier function and repair! Wet skin is more likely to sustain mechanical damage from friction. This happens because the attachments between skin cells are weakened and frictional forces are increased in the presence of moisture. As a result, cells are more easily separated from each other. Heat is created and epidermal cells are rubbed away, triggering inflammation and repair.
- It is important to understand your client's continence management plans. Refer onto a continence specialist nurse with any history of PI around fecal and urinary incontinence.
- Know your client's response to heat. Are there temperature regulation concerns? Do you need to flag materials that may conduct heat for clients with sweating concerns?



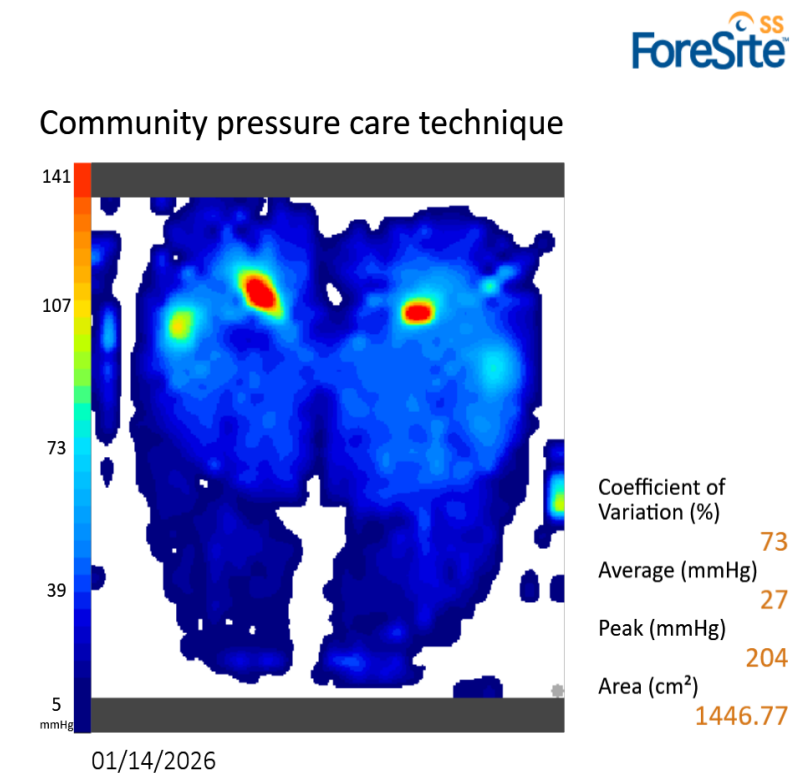
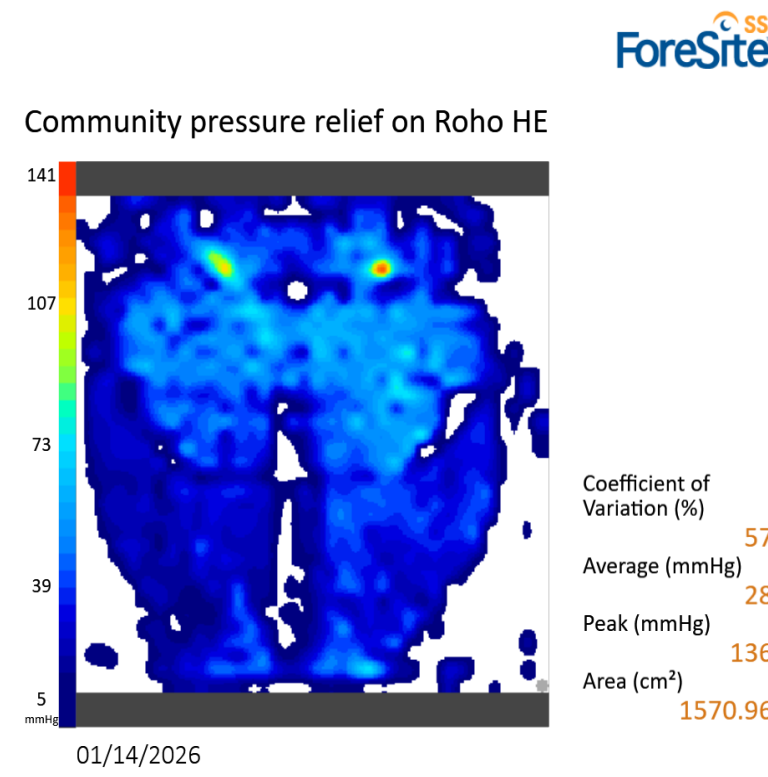
What can other assessments tell us?

- Assess all current surfaces used. List their good qualities and bad qualities for current function and pressure care management. TAKE OFF COVERS and RECORD THE AGE OF THE EQUIPMENT. If pressure management equipment is currently in place, how are they maintaining the product?
- Complete a MAT evaluation. As a part of this process map out the bony prominences on that person that you can feel. Visually check a persons skin (with permission) and record this also. Record atrophy. This is often best achieved in the side lying position
- Use a slide glove to observe pressure in seated and supine postures.
- Take the time to analyse transfers and manual handling.
- Use a pressure mapping device to better understand how mechanical load is spread on existing surfaces and later in the intervention phase to compare products. This can also be used to record pressure during mobility, functional task and postural changes.



XSensor Pressure Map

- A pressure mapping system is a device that measure distribution of pressure between the user and the support surface
- Provides real time data to measure pressure, interface surface tension and area of pressure distribution.
- XSensor wheelchair mat
- Comparative image data:
 - On transfer
 - Repositioning
 - After 5-10mins
 - Active mobility
 - Active functioning
 - Pressure relieving positions
- Video capture of activity
- Comparative products



Interventions for Pressure Injury Management



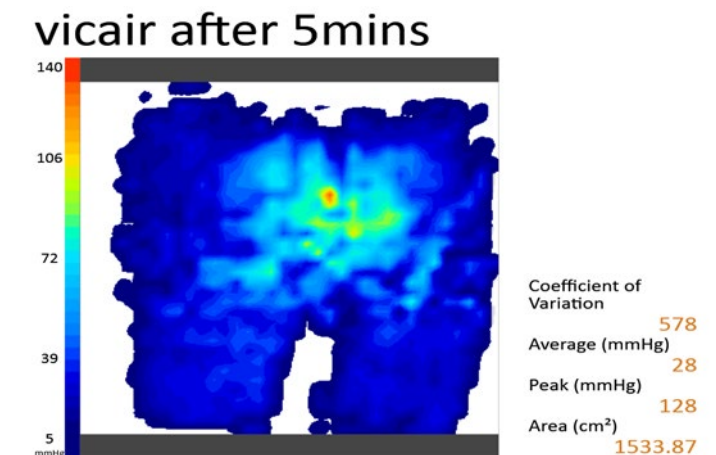
- Collaborating as a part of the multidisciplinary team: Wound specialist, GP, continence nurse consultation, support workers and other nurse practitioners, physiotherapists, dieticians...
- Education: on PI and the client risk based on the assessment findings; to support workers to improve manual handling techniques; on the impact of different materials and surfaces; on maintenance of existing equipment...
- Making changes to current manual handling practices: reduce/stop the client being pulled up the bed or into the wheelchair; what is the position they are transferred into, does this need manual handling once in the bed/chair; change of sling materials or positioning.
- Managing 24hr postural needs: musculoskeletal supports, using TIS to fight gravity, bed positioning wedges, back recline and leg elevation for pressure relieving positions, managing micro movements as well as full pressure relieving off loading.
- Using AT and support surfaces through to distribution mechanical load, have moisture permeable surfaces that induce air flow and support stable postures.

Wheelchair Pressure Injury Interventions



Cushion and back support review

- Pressure care ratings : High, Medium and Low
- Moving towards standards ISO 16840 <https://wheelchairstandards.com/>
- Maximise surface area contact
- Reduce peak pressures - Reactive surfaces use envelopment and immersion to increase surface area, reducing interface pressure.
- What material is best??? Foam, gel foam, visco foam, memory foam, gel, fluid gel, elastomer and neoprene air/ medical grade silicon air, redistributing air vessel
- Maintenance, Maintenance, Maintenance
- Provide stability for function
- Immersion and envelopment qualities of materials
- Points for postural control e.g IT shelf, GT shelf, Distal thigh loading, PSIS control, position belt direction of pull
- Temperature Regulation and moisture wicking properties.



Wheelchair Pressure Injury Interventions



Wheelchair configuration

- Manual wheelchair access to self propulsion
- Seat depth and seat width are wrong
- Maximise transfer supports e.g. tilt in space, floor to seat height support, seat rake consideration
- Foot Propeller support
- Access to arm supports
- Access to foot plates
- Access to functional surfaces
- Power wheelchair controller access



The Wheelchair People

Supporting reducible posture with 3 points of control PPT & Kyphosis

Pelvis + L/E

Increase GT Loading

Support immersion and envelopment of IT's

IT shelf in cushion (POINT OF CONTROL)

PSIS Firm Support (POINT OF CONTROL)

Distal femur loading (even base of support)

Correct foot plate placement

Correct seat depth

Point of stability – Seat rake, tilt, positioning belt forward mount (POINT OF CONTROL)

Control hip alignment – ABDuct / ADDuct

Shear reduction supports – Gel over air, Anti shear manual handling pads, grip zone

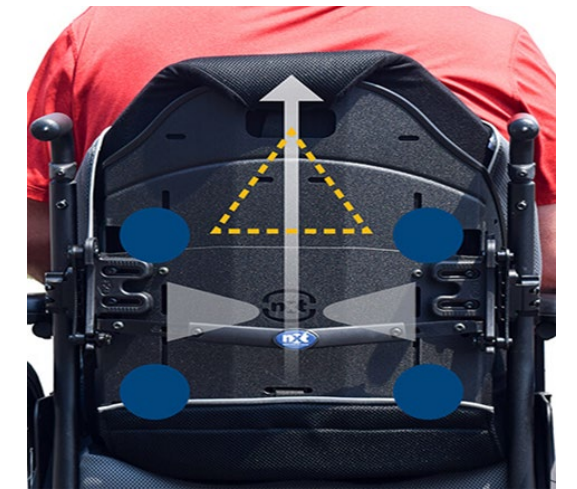
Trunk + U/E

Promote spine extension – forearm support; thoracic positioning foam (POINT OF CONTROL)

Promote neutral shoulder – clearance in back support, chest harness, shoulder straps, tilt, open recline (POINT OF CONTROL)

Head support – Sub Occipital support, tilt, open recline (POINT OF CONTROL)

Promote movement – Change of position, function, Epic seating system



The Wheelchair People

Supporting non-reducible postures with 3 points of control PPT & Kyphosis



Pelvis + L/E

Increase surface area contact

Support immersion and envelopment of sacrum
/ provide cut out

IT shelf in cushion (POINT OF CONTROL)

PSIS Firm Support from back support OR cushion
(POINT OF CONTROL)

Distal femur loading (Increased)

Correct foot plate placement/ beware calf pads

Correct seat depth/ contracture management

Point of stability – Seat rake, tilt, positioning belt
60degree support (POINT OF CONTROL)

Control hip alignment – ABDuct / ADDuct

Shear reduction supports – Control gel and air
mediums, grip zone

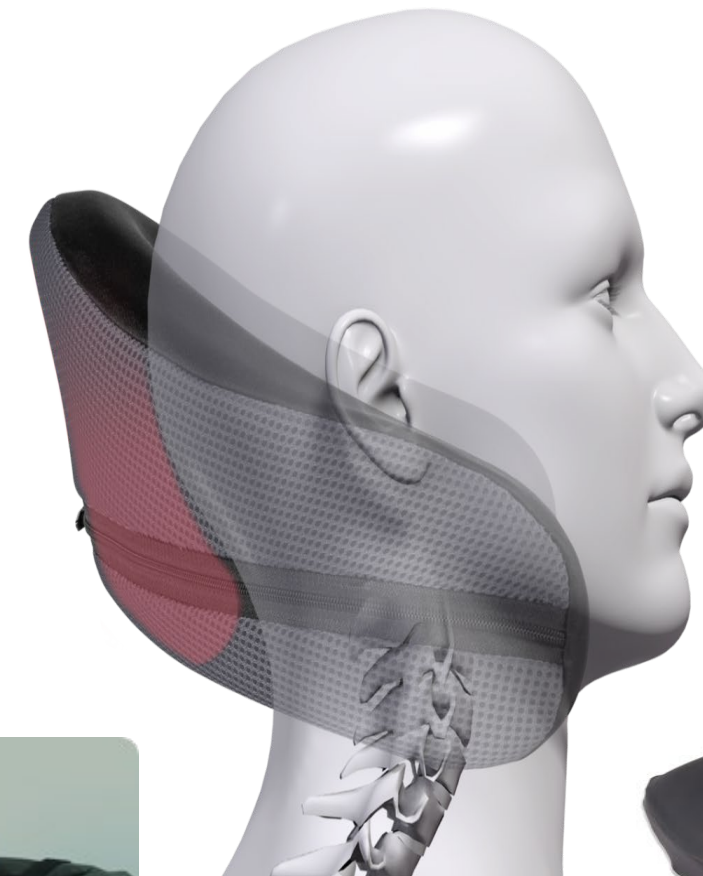
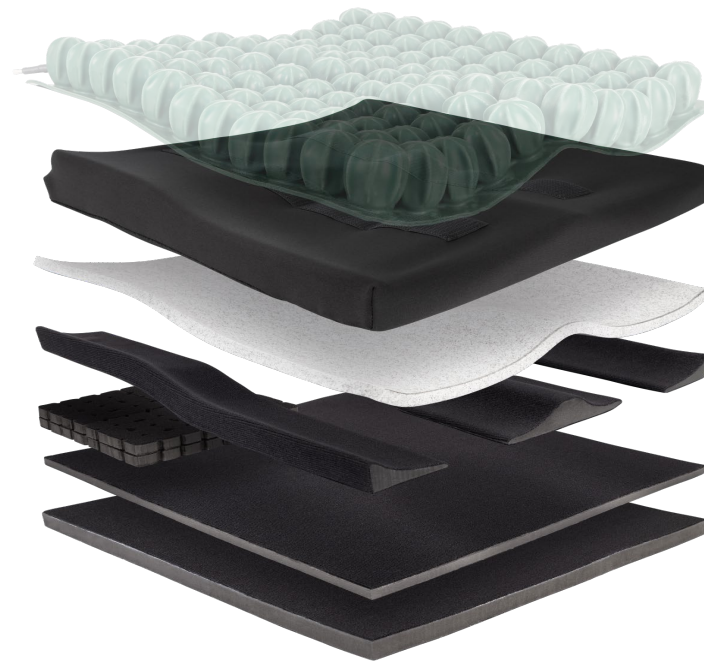
Trunk + U/E

Promote even distribution of back support –
solid PSIS contact and lumbar spine lift can occur
from the obliques (POINT OF CONTROL)

Support shoulder position– back rest, forearm
support, chest harness, shoulder straps, tilt,
open recline (POINT OF CONTROL)

Head support – Sub Occipital support where
available, contour support, anterior support, tilt,
open recline (POINT OF CONTROL)

Promote movement – Change of position,
extension through function



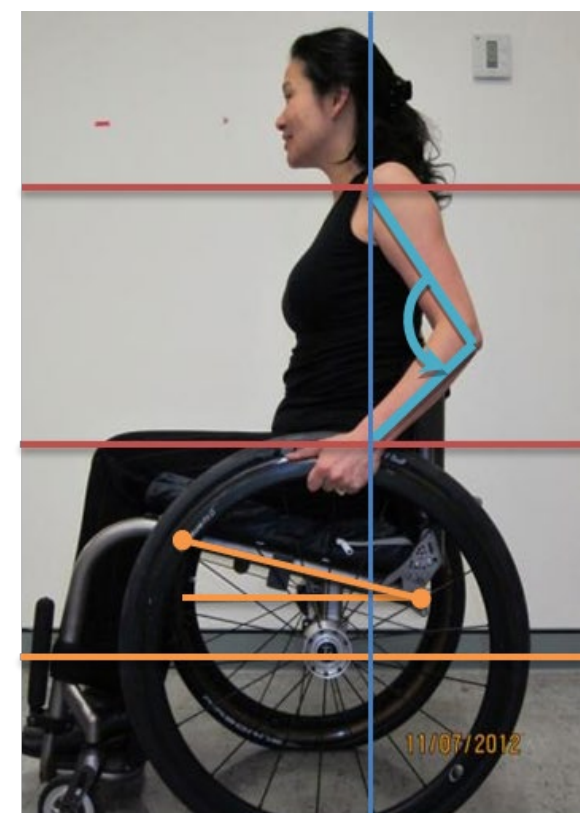
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Supporting reducible posture with 3 points of control APT & Lordosis



Pelvis + L/E
Increase distal femur loading (POINT OF CONTROL)
Support immersion and envelopment of IT's
PSIS Firm Support (POINT OF CONTROL)
Medial control of the thighs
Posterior GT loading
Correct foot plate placement/ foot plate angle
Correct seat depth
Point of stability – Seat rake, tilt, positioning belt rear mount (POINT OF CONTROL)

Trunk + U/E
Promote trunk midline positioning – even lateral support in back support shell, mild - mid - deep contour solid back support, forearm support; PSIS prompting positioning foam (POINT OF CONTROL)
Provide opportunities to rest out of gravity – open thigh to trunk angle, teach repositioning strategies, 24hr positioning, tilt, chest positioning supports (POINT OF CONTROL)
Provide forearm support – armrest position, residual limb support, midline tray support (POINT OF CONTROL)
Head support – midline mount, lateral rest opportunities
Promote movement – thoracic extension opportunities, promote ergonomic power zone



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Supporting non-reducible postures with 3 points of control ATP & Lordosis



Pelvis + L/E

Build up distal thigh loading to support hip flexion (POINT OF CONTROL)

Increase IT well length, ensure immersion and enveloping surfaces

Medial thigh support and/or internal hip rotation (POINT OF CONTROL)

Correct foot plate placement; support heights and foot plate angles

Point of stability – Seat rake, tilt, positioning belt across ASIS if tolerated (POINT OF CONTROL)

Trunk + U/E

Promote coccyx protection, ensure PSIS control

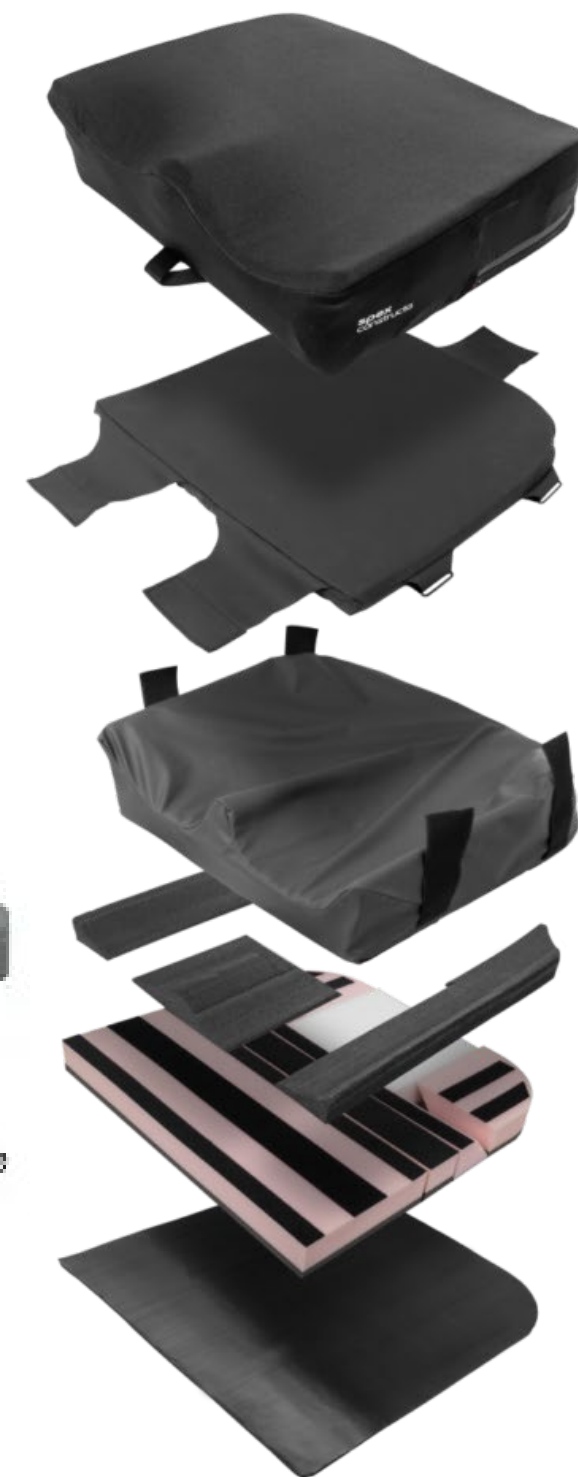
Promote lumbar curve support, provide a positive lift at the posterior/mid aspect of the thorax (POINT OF CONTROL)

Anterior control of the thorax at diaphragm level – tilt, chest strap, curved lateral supports (POINT OF CONTROL)

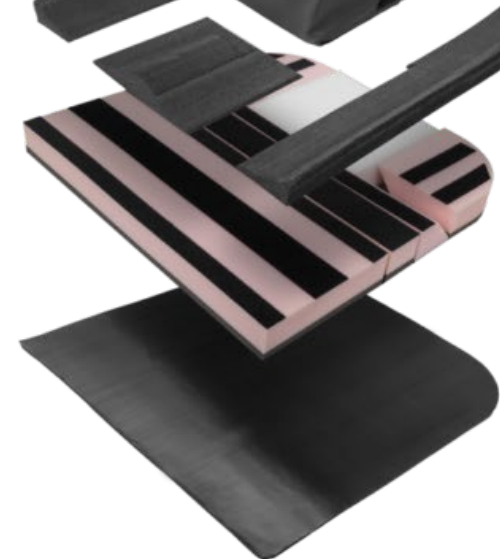
Provide forearm support – positive armrest position, midline tray support (POINT OF CONTROL)

Head support – Sub Occipital support with lateral contour support, anterior support, tilt

Provide opportunities to rest out of gravity



1 1/2" Jay Wedge



Supporting reducible posture with 3 points of control Obliquity & Scoliosis



Pelvis + L/E	Trunk + U/E
Increase/ Provide Posterior GT Loading (POINT OF CONTROL)	Promote trunk midline positioning – even lateral support in back support shell, mild - mid - deep contour solid back support, forearm support; lateral prompting positioning foam (POINT OF CONTROL)
Support immersion and envelopment of IT's	
Build up for presentation of hemi atrophy – low side build up	
Lateral control of the thighs, proximal support (POINT OF CONTROL)	Provide opportunities to rest out of gravity – open thigh to trunk angle, teach repositioning strategies, 24hr positioning, tilt
PSIS Firm Support	Provide forearm support – armrest position, residual limb support, midline tray support
Distal femur loading (even base of support)	Head support – midline mount, lateral rest opportunities (POINT OF CONTROL)
Correct foot plate placement	Promote movement – left and right function opportunities, promote ergonomic power zone, reduce repetitive awkward postures
Correct seat depth	
Point of stability – Seat rake, tilt, positioning belt forward mount (POINT OF CONTROL)	
Control hip alignment – ABDuct / ADDuct	



8oz Fluid Supplement
Size: 5" x 10.5"



Supporting non-reducible postures with 3 points of control Obliquity & Scoliosis



Pelvis + L/E

Build up high side posterior GT support and envelopment to IT – increase overall surface area contact **(POINT OF CONTROL)**

Support uneven thigh to trunk angles

Lateral control of the thighs, hip block high side – thigh support distal on low side **(POINT OF CONTROL)**

Correct foot plate placement and support heights

Point of stability – Seat rake, tilt, positioning belt 90degree support **(POINT OF CONTROL)**

Control hip alignment – internal / external rotation

Trunk + U/E

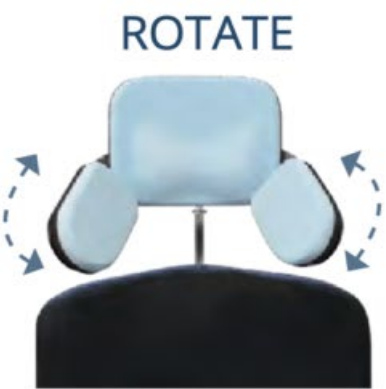
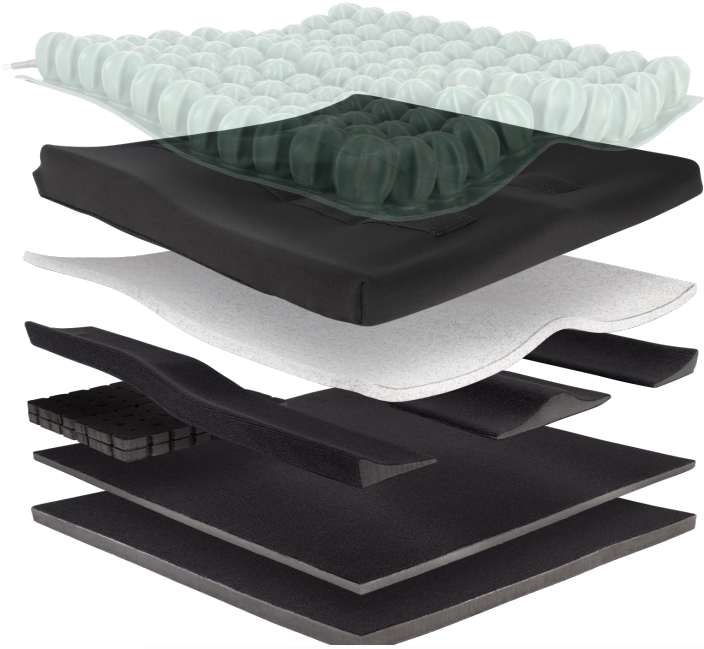
Promote even distribution of back support – Accommodate rib hump, ensure PSIS control

Off set lateral support with even distribution to control apex of convex side and prevent collapse on concave side **(POINT OF CONTROL)**

Provide forearm support – armrest position, residual limb support, midline tray support

Head support – Sub Occipital support with lateral contour support, anterior support, tilt, open recline **(POINT OF CONTROL)**

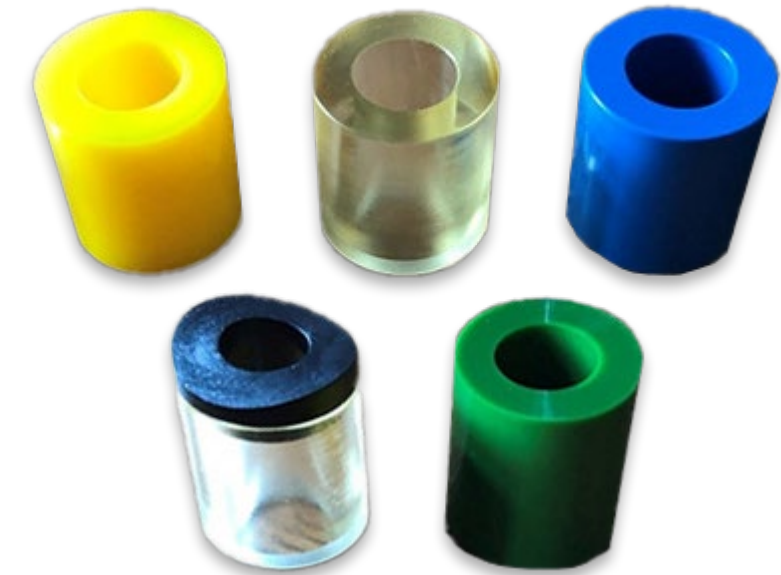
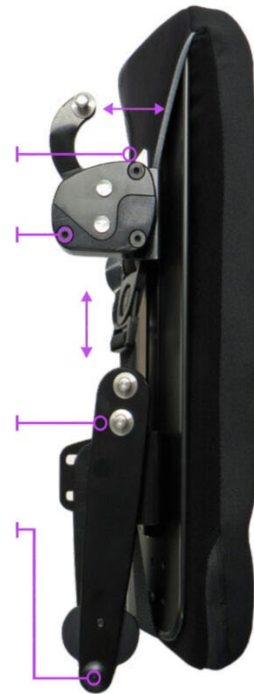
Provide opportunities to rest out of gravity – posterior tilt, lateral tilt



Dynamic Options



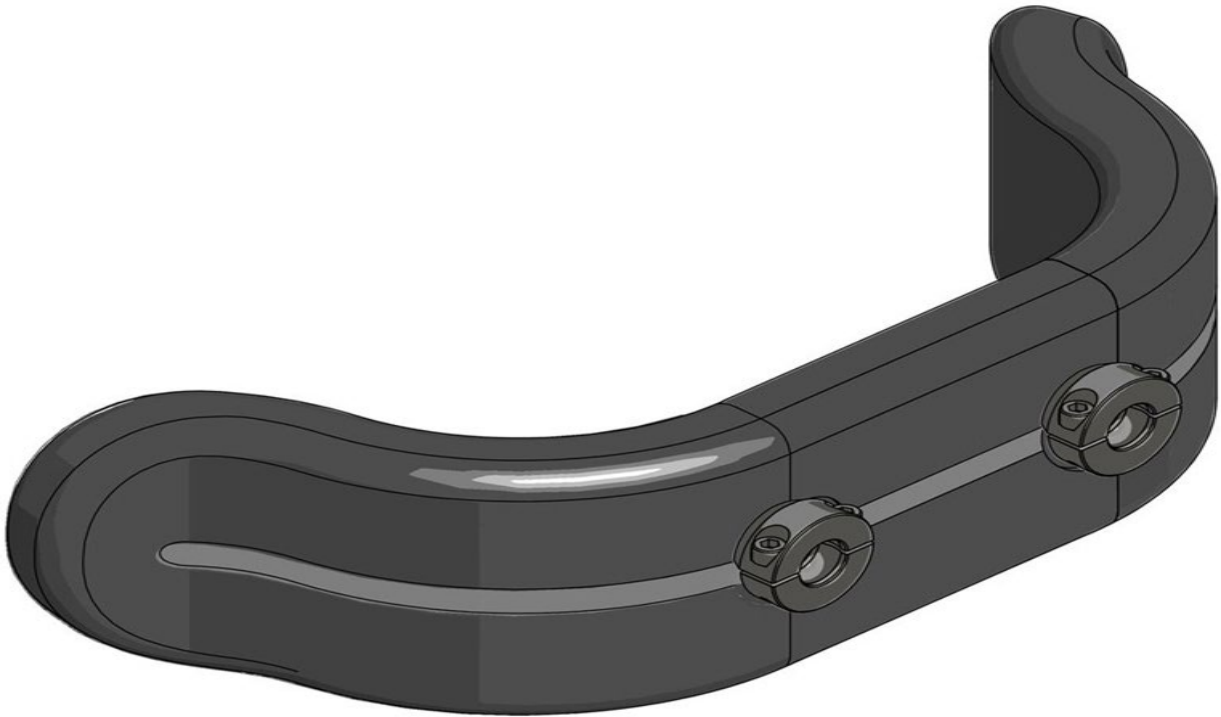
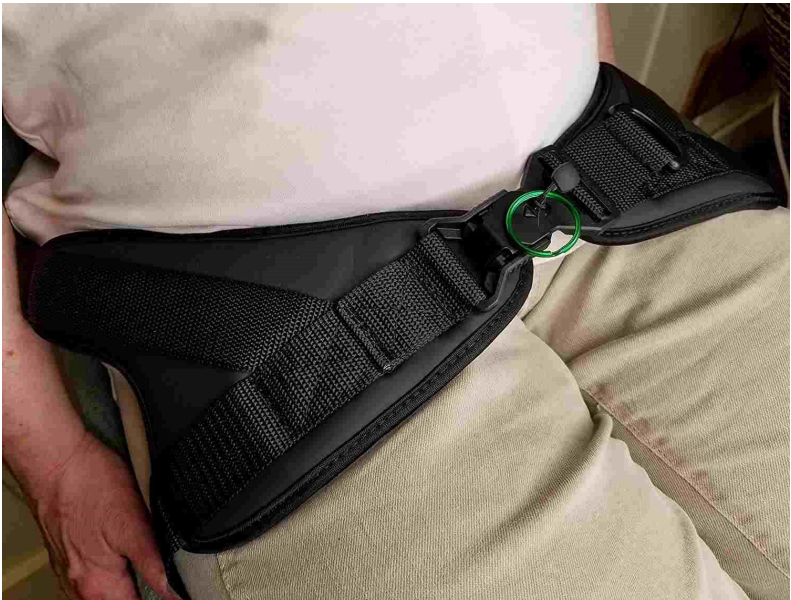
- 2" (5cm) of suspension travel
- Travel and tilt lock
- Interchangeable elastomer pads
- Height adjustable top mount
- Quick release 4-point attachment
- Adjustable height pivot point at the base of the backrest for natural hip movement



Reenforced Considerations



LINDS[®]
REHABILITATION
EQUIPMENT



Wheelchair Pressure Injury Interventions

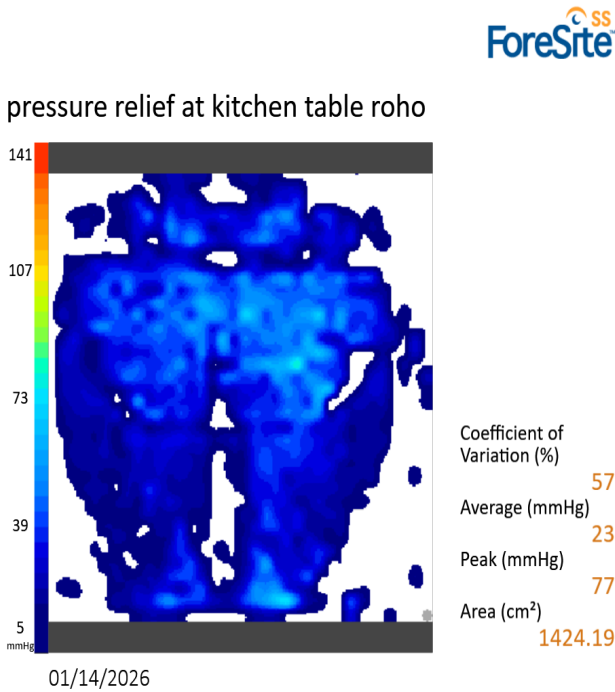
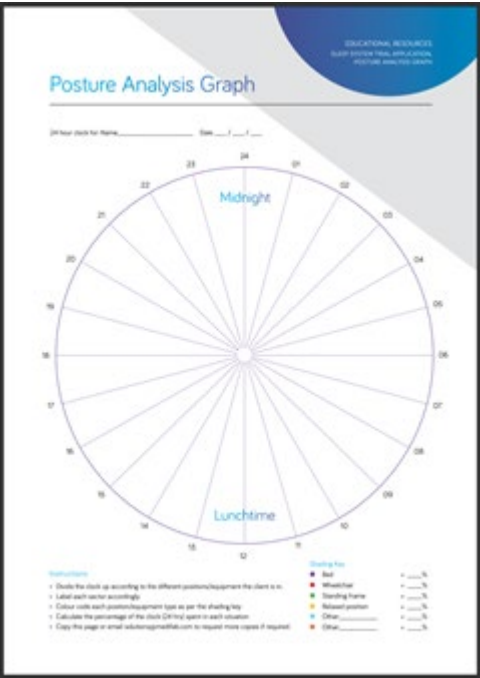


Change in position

- How often do you move in the wheelchair?
- What does pressure relief look like?
- How effective if this?
- How often does it occur?



- Degree of Tilt
- 5- 20 positioning tilt
 - 0- 10 swallow and/or communication positioning
 - 30 weight shifting posture and improving the effects of gravity
 - 45-50 pressure reliving tilt cellular profusion (the vital process
 - Client specific transfer assist, mobility support, manage tone and abnormal reflexes



Complimenting AT



Anatomic Contour Seat and Universal Positioning bases; layered support under immersive and enveloping surfaces



GlideWear/ Parafricta Pressure Sore Protection Underwear

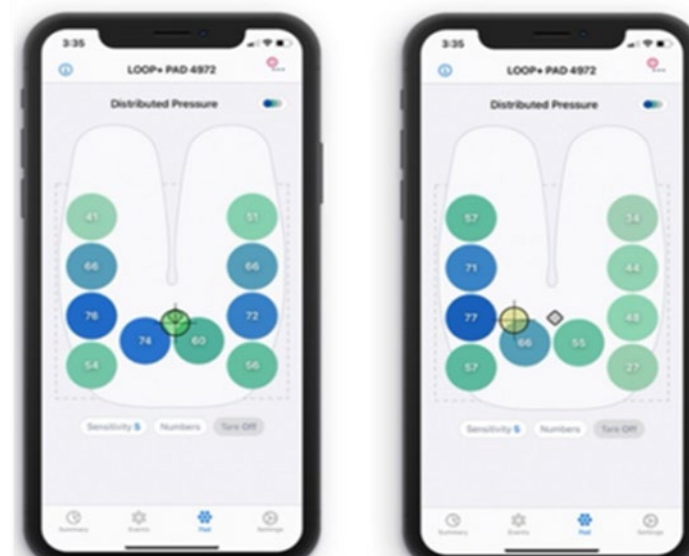
WheelAir

One Way slide tubes

CG Air GripZone

Booster by Kalogon

Loop+ Activity tracker



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Have you met John McKenna (he/him)?



Empowerment Advocate

63 years of living experience having a physical disability

Unique experiences and positions held in the industry

Founder of Independent Living Equipment (Central Victorian Rehabilitation equipment business) -no longer operating

Process of exploring a new wheelchair through in collaboration with Linds Rehab



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Goals for the new AT

Continue to keep living
Review for seating system supports to reduce
further postural deviations
Manage existing chronic pressure wound
Review the latest advances and models available
in power wheelchairs for compatible features to
enhance occupational performance



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What is Important to John



- Any postural supports could not be too intrusive and to minimise the impact on his independence.
- Balance the need of deliberate movement in wheelchair with movement that created sheer. Getting the balance right not always easy.
- Manage my emotional resistance about the acceptance that modifications are needed for me to maintain my independence
- Since having disability from birth there are still stages of acceptance that need to be respected and managed by me as an individual and the practitioner

How did Lauren Approach Assessment?



- Importance on capturing a functional profile
- Learn from methods John has adapted in transfer and ADL function to link it back to current features used on the wheelchair and features that could be prescribed in the new equipment
- Use of hands-on MAT evaluation and pressure mapping to deeper understand weight distribution and surfaces for support
- Education and inclusion in assessment outcomes, and choices in intervention outcomes

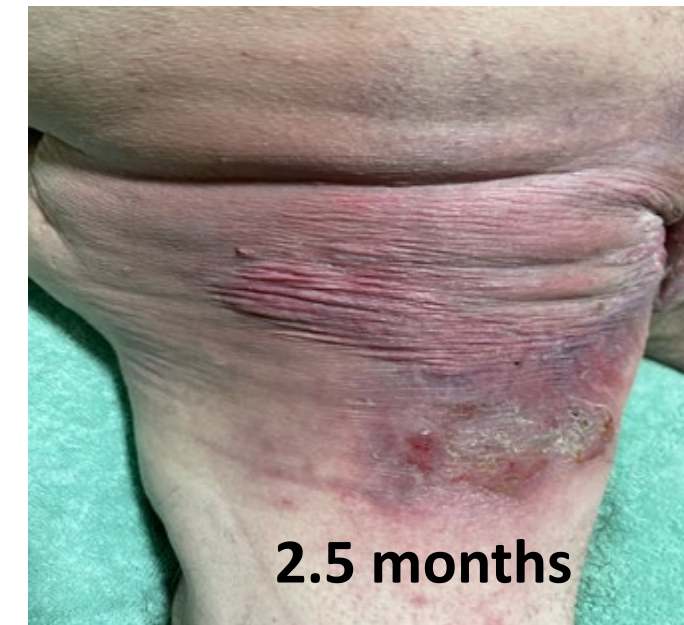
Review of postural supports

Team involved:

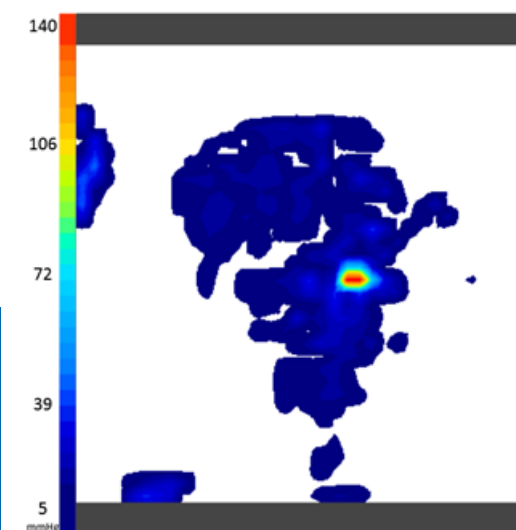
- Robyn McKenna – John's wife
- Xinxin – Support worker
- Melinda Brookes – Wound Care Practitioner
Founder of wound wise
- Craig Lindqvist – general manager

Outcomes:

- Education and assessment on base of support carried over
- Education and assessment mechanical tissue loading, sheer, friction and skin microclimates
- Design and implementation of custom supports under the cushion to increase surface contact



wound area

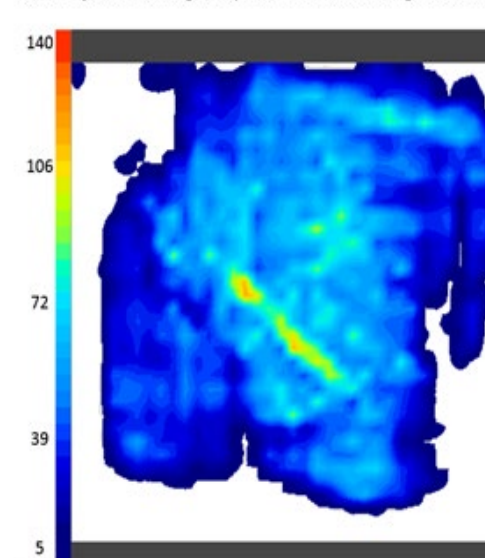


ForeSite

Coefficient of Variation 240
Average (mmHg) 13
Peak (mmHg) 158
Area (cm²) 437.10

02/15/2022

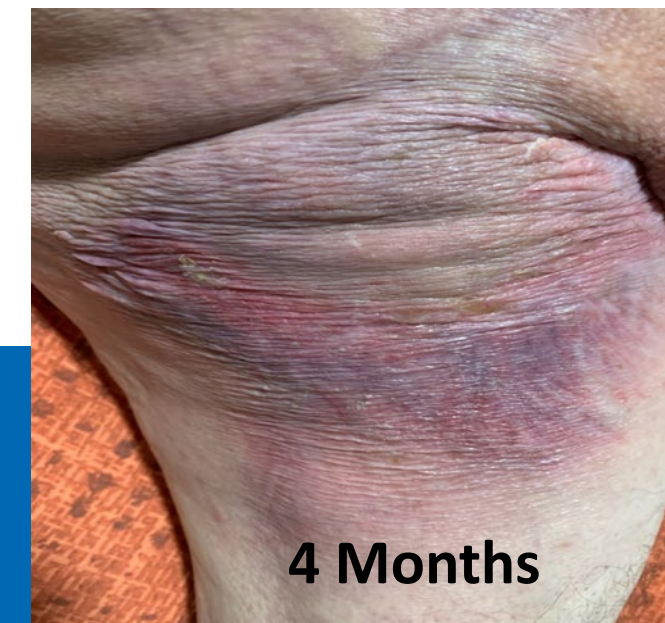
CG Air adjusted with wedges, no pants, line indicates bandage and testicals



ForeSite

Coefficient of Variation 569
Average (mmHg) 37
Peak (mmHg) 111
Area (cm²) 1448.38

02/15/2022



Implementing Balance



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Features for a New Wheelchair



Team involved:

Robyn McKenna – John's wife

Xin Xin – Support worker

Josh Allred – workshop manager

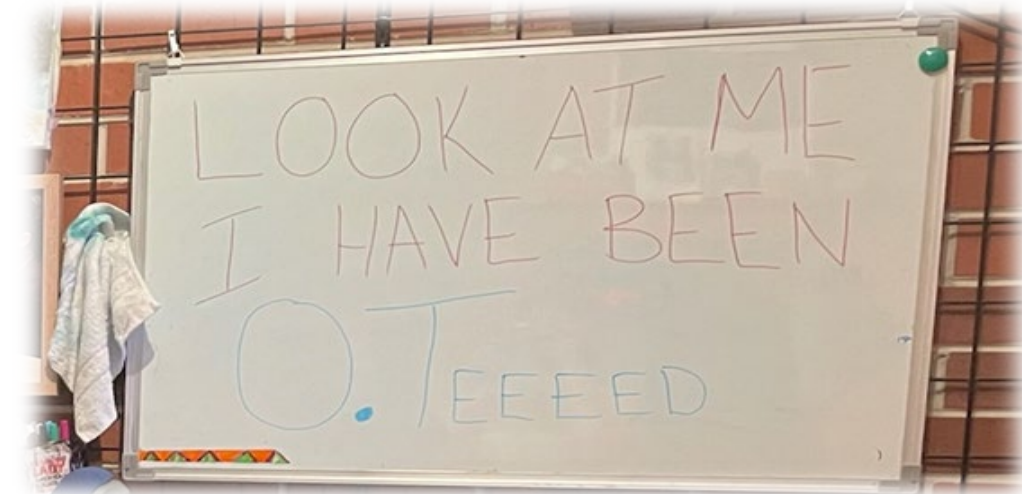
Craig Lindqvist – general manager

Sam Watson – engineering, design and metal work

Sam Pisani – custom upholstery

Outcomes:

- Keeping the features of the previous wheelchair that worked well and resulted in function
- Adaptable power base where it is possible to shift center of gravity and change suspension loading springs to balance weight over the base
- Positing chest strap and “belly bra” to support stability during mobility
- Education of use of features during functional task



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Topics and clinical questions under development

1. Skin and Tissue Assessment:

Clinical Questions: What usual bedside techniques should be used when assessing the skin and tissues (e.g. visual and tactile assessment techniques)? What is the impact of technology-assisted bedside skin and tissue assessment techniques (e.g., detection of focal edema/moisture, infrared thermography)? When should a skin and tissue assessment be conducted? Status – currently considering the stakeholder comments before finalization.

2. Classifying Pressure Injuries: The pressure ulcer/injury classification systems commonly used throughout the world are very similar. The various system definitions will be updated as needed. Illustrations and photos will be updated. Good Practice Statements will address differential diagnosis and health professional education to ensure reliability and validity of pressure injury classification across the continuum of skin tones.

3. Treatment of Pressure Injuries – Priority Topics and Approach (GRADE recommendation or GPS)*

- Nutrition to support healing (GRADE)
- Support Surfaces to facilitate healing in bed: bed systems, mattresses, overlays (GRADE)
- Support Surfaces to facilitate healing in chair (GRADE)
- Repositioning methods to facilitate healing (GRADE)
- Principles of chronic wound management including wound assessment, wound bed preparation (debridement and cleansing), assessment and management of infection, wound dressings and topical agents), preventing and treating wound-related pain (GPS)
- Biophysical agents to support healing: electrical stimulation, negative pressure wound therapy, low frequency ultrasound therapy, high frequency ultrasound therapy (GRADE)
- Preparing and managing individuals undergoing surgical treatment of PI (grafts, flaps) (GPS)

National Pressure Injury Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure

Injury Alliance. Prevention and Treatment of Pressure Ulcers/Injuries: Quick Reference Guide. The International Guideline: Fourth Edition. Emily Haesler (Ed.). 2026. [cited: download date]. Available from: <https://internationalguideline.com>

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Take home messages:



- Allied health professionals specialising in wheelchair prescription and interventions have a major roll to play in the prevention and management of all types of pressure injuries.
- There is still more research required into the impact of shear forces during function, especially in community settings.
- Hands on surface mapping and boney prominence awareness are a must in a complete wheelchair pressure injury prevention approach.
- The Xsenor pressure mapping system is available to help with deeper understanding of mechanical tissue loading and surface area distribution.
- Surfaces that provide solid frameworks for stability, along with immersive and enveloping surfaces will provide optimal pressure injury protection.
- Team work makes the dream work!

Thank you!

Any questions?



References/ Resources



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 - <https://www.sunrisemedical.com.au/education-in-motion/resources/cushion-material-selection>
 - <https://www.sunrisemedical.com.au/education-in-motion/resources/cushion-properties-1>