

24hr Pressure Management: Preventative Strategies for Reducing Interface Pressure on Sling Users During Hoist Transfers

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Summary:

This poster explores the development of a care strategy for the prevention and treatment of pressure ulcers when transferring patients using a hoist and sling. Transfers are part of a 24-hour approach to pressure care management, which encompasses personal care, bathing, sleep and seating.

Studies have shown that force concentration on a patient's skin can increase by 300%¹ over normal natural body weight force when using a sling. This degree of interface pressure should be guarded against as it can contribute to tissue damage particularly around the sacral area and posterior upper and lower thighs in contact with the edges and seams of the sling.

The project looked at solutions to reduce interface pressure with the aim of reducing potential pressure injuries and improving the comfort of sling users. This included using different moving and handling techniques and applying low-profile silicone gel padding to the sling. A pressure mapping study of a sling user and a clinical case study is featured, which demonstrates how improvements to patient pressure care and well-being can be made using these methods. The pressure mapping study produced a 53.5% reduction in average interface pressure for the sling user.

1 Introduction

Pressure ulcers are a common, costly and physically debilitating health complication, affecting people in both acute care and the community.²

Across Europe approximately 18% of in-patients have a pressure ulcer.³ They are more likely to occur in people with the inability to reposition themselves.⁴ Hence, understanding the particular vulnerability to pressure injuries amongst sling users is key.

Use of slings should therefore be seen as part of 24 hour pressure care management, yet in undertaking this study we found limited academic research or statistics exist to show the effects on patients' skin of the heightened interface pressure they experience, particularly in the vulnerable sacrum and thigh regions, when being transferred by a hoist and sling.

This lack of data is highlighted by the MJ Peterson et al study which in 2015 stated: 'Patient handling slings and lifts reduce the risk of musculoskeletal injuries for healthcare providers. However, no published evidence exists of their safety with respect to pressure ulceration for vulnerable populations, specially persons with spinal cord injury or other physical disabilities.'⁵

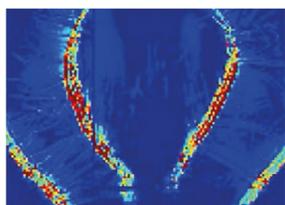
2 Background

In practice, during sling transfers⁵ the core of the body is contained within the sling while the lower limbs protrude from the sling.

The result is that the weight of the lower legs is transferred through bones and tissues to the patient's core in a cantilever like mechanism. This causes high levels of interface pressure in these areas.

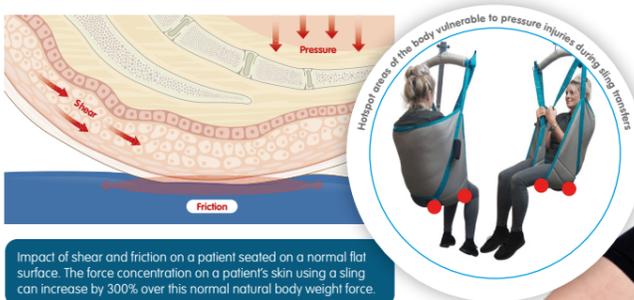
Evidenced by our case studies to introduce the same level of pressure protection for sling users as for those in normal seating, in order to prevent pressure ulcers.

Studies have shown that force concentration on a patient's skin can increase by 300% over normal natural body weight force, when using a sling¹ with pressure to the under thigh area in contact with seams and edges in excess of 200mmHG (Figure b)⁶.



Pressure map of a sling hoist user in seated position: The colour bar represents interface pressure magnitude in millimetres of mercury. Note the high pressure densely localised along seams and edges in excess of 200mmHg⁷.

3 Potential Issues Affecting Sling Users



Impact of shear and friction on a patient seated on a normal flat surface. The force concentration on a patient's skin using a sling can increase by 300% over this normal natural body weight force.

Shear forces have been shown to be up to 8N (0.815773 Kg force) for an adult using a sling and occur both laterally and longitudinally along the thigh. By pulling on the skin, shear forces can cause soft tissue damage.⁸

Inserting and removing slings can also risk causing shear and friction to the skin. Slings can also cause pressure on the soft tissue, especially around the sacrum, coccyx, buttocks and underneath the thighs.

Pressure mapping case studies shown here indicate that insertion of gel pads into the sling can reduce this excessive pressure on the subject.

(See case study Figure A and Figure B to the right)

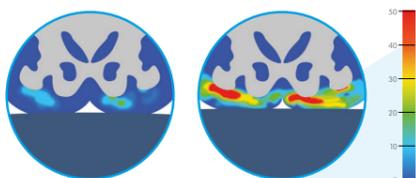
In my experience as an Occupational Therapist over the past decade, clients can find this very uncomfortable and painful, which can make them resistant to being hoisted, or they can become agitated or upset during transfers.

Pressure ulcers can develop extremely quickly. Even though patients may only be in slings for short periods of time, pressure ulcers can be initiated within a matter of minutes. The damage commences at a microscopic level, invisible to even expert experienced clinicians, with the death of a few cells, or small groups of cells⁹.

MJ Peterson et al reported that the duration of time spent in slings, especially while being suspended, should be limited.⁵

Consideration should also be given to the type of sling fabric used, especially if the patient remains seated on the sling between transfers.

A study by Webb a et al amongst wheelchair users concluded that a spacer fabric sling is more likely to reduce the risk of pressure ulcer development over slipfit and polyester.²



Friction: Development of shear strains due to friction during seating, from the time of initial skin-cushion contact (t=0) to full weight bearing (t=1)¹⁰.

4 The Importance of Transfers on Client well-being

A client with pressure ulcers may deter nursing and care staff from transfers and instead advocate bed rest.

This can lead to further complications and negate the advantages of seating a patient out during the day in terms of client well-being and daily living.

Transfers are also an important part of pressure care, with moving and handling aids, such as hoists and slings, being used to reposition the individual.⁸

5 Pressure Mapping of a Sling User

Conducted by Danielle Base

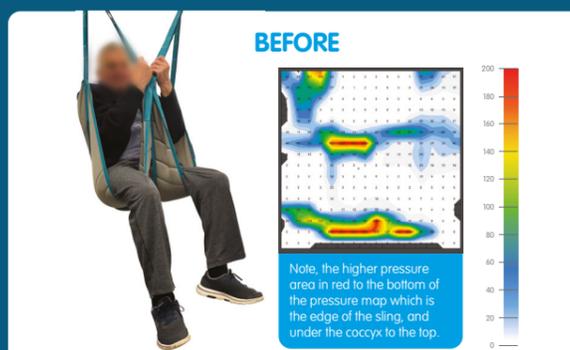


Figure A. Joe shown with no Gel Pads in the sling

In this case, Joe, aged 74, 5ft 9" (175cm) in height and weighing 13 stone (80kg), was hoisted in a universal sling and pressure mapping readings taken.

In each trial, Joe was in the sling for 1 minute 30 seconds, to emulate clinical/transfer conditions.

In part one of the test Joe was hoisted in the sling without any gel protection (Figure A) and the readings were recorded.

Joe was also asked to rate his pain level, using the Likert Scale⁹, a rating between 1-10 with 1 being very uncomfortable and 10 being very comfortable. Without the gel, Joe gave a rating on the Likert Scale of 3.

After the application of the gel, Joe gave a rating on the Likert Scale of 8. With the insertion of the silicone gel padding, these hotspots were significantly reduced.

The pressure mapping test of Joe indicated pressure hotspots impacting on his skin, at the front and rear edges of the sling, showing an average interface pressure of 29.96mmHg.

Following insertion of the silicone gel, these hotspots were reduced to an average interface pressure of 13.94mmHg. Average interface pressure overall was reduced by 53.5%.



Figure B. Joe shown with Gel Pads placed in the sling

Please note that this information is provided as an individual case study only and represents preliminary research. It is based on one individual and was not conducted under laboratory conditions and no scientific claims are made from its inclusion. We have blurred the face of the client to protect their privacy.

Pressure Mapping: BodITrack Pressure Mapping System by Vista Medical

Hoist used: Forta floor-standing Lifting Hoist

Sling used: Forta Universal Medium Sling

6 Case Study in Clinical Practice

Edith is a 78 Year old Lady, 5ft 4" tall, weighing 8 stone 9lb with Vascular Dementia.

Assessment

Edith lives with her husband and receives care four times a day. She is hoisted between her hospital bed and specialist comfort chair using a portable hoist and universal sling to have her meals with her husband.

However, after losing weight and recovering from a chest infection Edith developed redness and marking on her inner thighs caused by the sling when being transferred. She became very agitated during transfers and uncooperative with the care team.

From the Occupational Therapy and District Nurse Assessments, it was identified that the sling was causing shear, friction and pain for Edith, and was the cause for her skin break down and her increased agitation and aggression during transfers.

Intervention

The following interventions were provided:

Low profile silicone gel pads (SlingGel) were inserted between the legs and sling to provide pressure relief and comfort for Edith when being hoisted. This eliminated the sling rims shearing on her skin and improved comfort straight away reducing her agitation.

Loops of the sling were adjusted to recline Edith in the sling to reduce pressure from underneath her legs and improve her comfort. Her specialist chair was put into further tilt for transfers.

A ceiling track hoist was installed to make transfers more timely. As a result, transfers became much quicker and smoother.

A new sling was prescribed, a Deluxe Leg with extra padding, which provided more support, comfort and improved positioning for seating.



Low profile Silicone Gel Pads shown inserted into a sling

The pads are made of medical grade silicone gel which emulates the characteristics of human fat tissue to protect sling users from skin damage.

Review

After two weeks of using the SlingGel inserts and reclining the sling, the redness and marking completely cleared.

Edith was more settled and happier being hoisted. After 3-4 weeks a new ceiling track hoist and sling were provided to further improve transfers and seating.

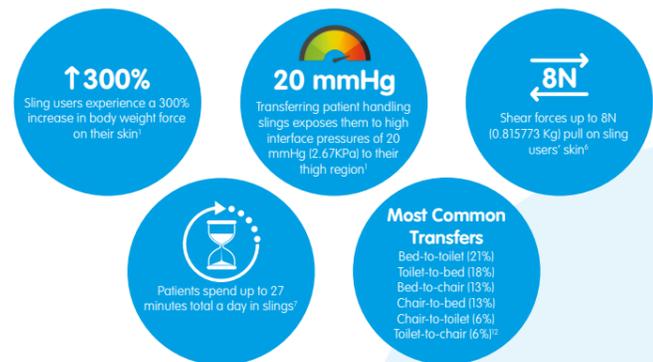
The new sling worked well, and the sling gel continued to be used to prevent any further pressure injuries and maintain Edith's skin integrity.

Edith is back to sitting out in her specialist chair daily and enjoying her meals with her husband. Her nutrition, fluid intake and weight has improved.

7 Future Skin Care Strategies to Consider

- Education and training within the health and social care sector of the importance of increased patient skin protection during transfers using a hoist and sling.
- Use of low-profile silicone pads (SlingGel) to protect the skin to reduce the risk of shear, friction and pressure.
- Education and training to improve knowledge and skills with prescribing appropriate sling size, shape, support and fabric and a suitable hoist.
- Assessment and intervention to reduce the number of transfers (if possible) and length of time being hoisted/suspended in the sling.
- Implement and promote best practice moving and handling techniques, including changing sling loop combination to recline the sling to reduce pressure underneath the thighs. Seating will need to be considered within this.
- Good posture and positioning in a sling is essential to seat the client correctly, comfortably and safely.
- Greater awareness of transfers as part of patients' 24-hour postural care.

8 Sling Pressure Statistics



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¹² Kristen L Kucera, Ashley L Schoenfish, Jennifer McVaine, Lori Becherer, Tamara James, Yeu-Li Yeung, Susan Arent, Hester J Lipscomb, "Factors associated with the lift equipment use during patient lifts and transfers by hospital nurses and nursing care assistance a prospective observational cohort study," International Journal of nursing studies vol 90 pp. 35-46 March 2019

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