



One-Way Slide Sheet Implementation - Addressing Concerns and Providing Solutions

ABSTRACT

This review explores how Glide & Lock repositioning systems can support safer seated posture, patient comfort and reduced manual handling strain across healthcare settings.

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Background/Introduction

Slouching increases the frequency and risk of injury by raising intradiscal pressure in the spine [Nachemson, 1976] [Dolan & Green, 2006] [Dolan et al. 1988]. Previous research has shown that slouching in a seated position produces the highest relative change in pressure and load in the third lumbar disc when compared to other standing and seated positions [Nachemson, 1976]. This compromised posture can lead to cumulative compounding damage over time and raises the risks of acute injury.

Any movement performed while slouched, especially movement involving weight bearing, significantly heightens risk of injury. If not addressed properly, especially in a health care setting where patients may be at a greater risk to injury, significant reductions in quality of life can occur. Therefore, addressing and mitigating instances of a slouched position is needed to reduce this risk and potential occurrences of injury.

The Glide and Lock/One way slide sheet patient handling system can be used to reposition patients in a seated setting, from a slouched position to an upright one. This therefore reduces the risk of injuries associated with slouching. The simplicity and ease of use of the system makes it an excellent choice for both staff to implement and patients to use, with and without assistance.

However, while the glide and lock one way sheet systems (and other similar products) work great as a repositioning aid, the implementation of such a system has created some concern within the healthcare sector due to a potential increased risk of shear within patients over time. Shear is a phenomenon by which tissue layers laterally shift in relation to each other; as when bone and deep tissue layers move in opposite directions. Skin is then at a high risk of developing damage on a deep level, with deformation occurring within these tissues in parallel planes [Wert et al., 2015].

This phenomenon can be amplified in end-of-life care settings within frail patients who present with muscular weakness, pre-existing injuries and compromised posture. The conditions for enabling an environment for skin shearing to occur has the potential to be exacerbated, in theory, by (but not limited to) one-way positioning aids.

In addition, patients with significant pelvic or spinal deformity may not fit the neutral alignment the sheet enforces, risking further discomfort or malalignment when using positioning aids which hold the patient in place.

Therefore, presented and explored herein are solutions for using the glide and lock one way sheet system, while reducing the risk and occurrence of skin shearing within patients, and assessing the appropriate application of the system with supporting evidence.

Solutions

Glide and Lock Variants

The standard glide and lock system provides support to users by helping to position themselves comfortably while seated such as in chairs and wheelchairs. The one-way slide sheet enables users to slide from the front to the back of a chair or wheelchair and adopt a good seating position without sliding down. This is well established. However, it is recognised that patients who needed frequent repositioning or are significantly vulnerable may require additional padding to avoid the occurrences of associated potential shear with prolonged use.

Concerns regarding potential skin shear have been addressed via the introduction of multiple variants of the glide and lock system. One such padded version offers much more comfort and support than the basic system, reducing the risk of skin shear occurring. In addition, other variants of this system also exist which accommodate the use of a pressure reducing cushion, further reducing the risk of pressure-based injury.

This variant of the basic glide and lock product ensures a pressure cushion does not slip from beneath a patient when sat on, therefore maintaining their seated position and protecting patients. The introduction of this system allows carers and patients to use pre-existing and custom-built pressure cushions, reducing additional cost via the integration of existing equipment.

The non-slip cushion aid comes with handles as standard to allow carers to re-position patients at the back of their chair. Alternatively, patients with more mobility can use the anti-slip cushion support to position themselves. Either way, patients can improve their posture and comfort when sitting in chairs or wheelchairs. This ensures that the risk of injury is mitigated via both addressing slouching, potential skin shearing and other related pressure-based injuries.

While these other variants are sufficient in offering a significant solution to the skin shear phenomenon, it is recognised that a padded, pressure mapped variant of the glide and lock without the need to integrate a pre-existing pressure cushion would offer further convenience for those who are susceptible to injury. While the padded variant offers pressure relief to a great degree already, an official standalone pressure mapped version of the glide and lock system would offer superior efficacious solutions to the significantly vulnerable and concerned. This is a potential avenue to explore for future product development.

Education

There remains a lack of awareness within some health care sectors regarding the variants of the glide and lock one way slide system. Addressing this lack of awareness by educating individuals who purchase and use these systems such as carers, therapists, and procurement would help address the skin shear question and re-educate those who are hesitant to use these systems due to potential injury concerns.

The frequency, and duration of use must be first considered before and during implementation of glide and lock systems (and other related systems) especially within novel situations where complex patients are involved. Specific health care plans may be required. Health care workers would benefit from this consideration before discontinuing the use of the positioning aid, when usually implementation would stop.

Distributors could benefit by making an intentional focus on glide and lock variants during online and in person demonstrations and launch online marketing campaigns addressing these preconceived notions in a friendly approachable manner.

Alternatives

The integration of padded one way slide sheets and variants of such equipment addresses the risk of pressure related injury for those specific patients who require greater support. However, in the case where staff are hesitant to use such equipment for fear of chronic compounding pressure related injuries, staff are reduced to a few alternative solutions.

The first solution is to manually reposition the patient. Of course, although this is more cost effective in the short term, the drawback to this method is the increased the risk of injury to occur. This is because, 'Repositioning is a high-risk activity, frequently causing occupational injuries' [Weiner et al., 2015] as there is physical contact between the carer and patient. This is usually due to the excessive physical demands on carers due to patients' weight and awkward nurse postures to facilitate the repositioning [Weiner et al., 2015]. Musculoskeletal disorders (MSDs) are the leading cause of work disability [Bevan, 2015].

Musculoskeletal disorders (MSDs) remain the most common work-related health problem in the European Union (EU) [Jan de Kok et al., 2019]. Nurses have one of the highest rates of work-related musculoskeletal injury of any profession [Nelson et al., 2006]. 'Over the past 30 years, efforts to reduce work-related musculoskeletal disorders in nurses have been largely unsuccessful' [Nelson et al., 2006]. Taking away a positioning aid which has been proven to help with reducing the risk of developing injuries for staff (and which provides needed effective assistance to patients), is counter intuitive. This is even more apparent when considering that the one-way repositioning aids can be used with patient specific readjustment plan for complex patients.

The Burden of Cost

While acknowledging the effects of MSDs on workers themselves, the additional effect of such conditions leads to high costs to enterprises and society [Jan de Kok et al., 2019]. Although EU-wide data on the costs and burdens of musculoskeletal disorders (MSDs) are limited, available EU figures measured in DALYs (Disability-Adjusted Life Years) reflect their impact on quality of life and mortality. While DALYs don't directly represent economic costs, they correlate with productivity losses. MSDs account for 15% of these losses. At the national level, some studies do quantify the economic impact. In Germany alone, MSDs led to €17.2 billion in production losses and €30.4 billion in lost gross value added in 2016 which is an equivalent to 0.5% and 1.0% of GDP [Jan de Kok et al., 2019].

Previous medical related reports and research including 27 long-term studies relating to workplace injury incidents [Andersen, 2020], investigated patient handling interventions to address musculoskeletal injuries within the health care work force [Teeple et al., 2017]. The core of these interventions was to reduce (if not completely eliminate in some circumstances) manual lifting by providing appropriate education, training, and equipment.

The results reported from one study related to this investigation and implementation of patient handling aids was shown to reduced patient-handling injuries by 60 %, days of injury related work absence by 87 % and compensation costs related to workers by 91% over a time period of a 3 to 5 years follow up after the initial interventions were implemented within healthcare institutions [Garg & Kapellusch, 2012] [Andersen, 2020].

Across the different studies included within the systematic review, the safe patient-handling programme reduced the prevalence of injuries by about 50% [Teeple et al., 2017]. Importantly, the programme was especially effective in high-risk departments, i.e. intensive care units, where patients require substantial assistance [Teeple et al., 2017] [Andersen, 2020].

While there is currently no research relating specifically to the glide and lock system and its impact on reducing cost within the healthcare system, this previous literature demonstrates the importance of using such devices. This demonstrates that patient handling systems are not only key for the prevention and mitigation of injuries for both staff and patients involved but also in reducing cost.

Neglecting such an important asset to healthcare system not only impacts the staff and patient health negatively but also bares a costly burden which contributes systemic economic pressure, further exacerbating an already strained system.

Product Development

The second solution to using alternatives to the glide and lock, is instead to use a form of temporary glide system, whereby the patient is adjusted into an upright system, and then the sheet is removed until it is needed to be used again, where it would then slide under the patient once again, and used to readjust the patient. This is an answer to both improving posture in patients, enabling ease of use and safety for staff, while reducing potential chronic shear from developing by preventing prolonged use.

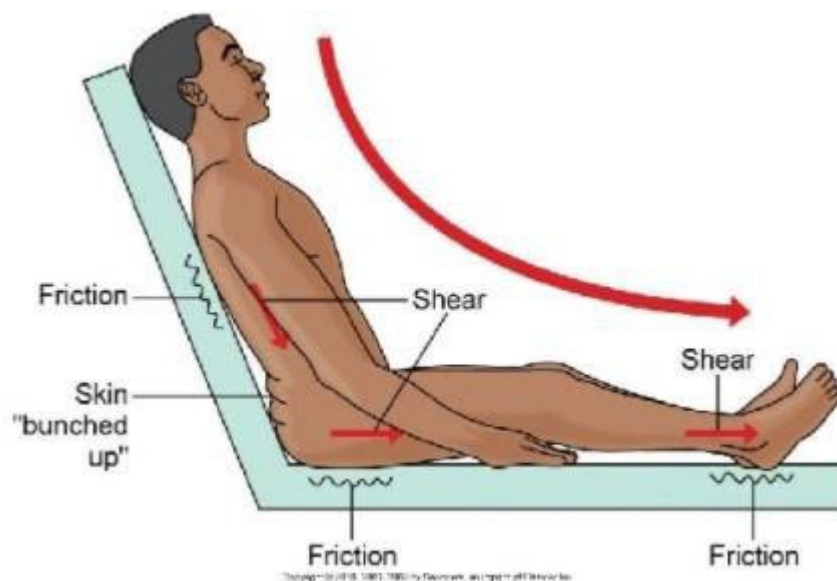
However, the drawbacks of this using this yet to be developed product, are that staff would always need to be present to re-adjust the patient, as the slide sheet could not be applied and removed by the patient themselves like the glide and lock can. Furthermore, reapplying the glide sheet after every use would prove to be a laborious procedure when compared to the use of the already existing glide and lock system.

This temporary/short term glide sheet alternative may also resort to becoming obsolete when addressing patient repositioning for complex patients and those who are in intensive care units and other related individuals, as they may need more frequent repositioning.

Wedge Tilt Integration to Reduce Shear Force

As previous research has shown, in deep, skin shear occurs when a downward force is maintained on the skin against another surface which pushes the skin in the opposite direction.

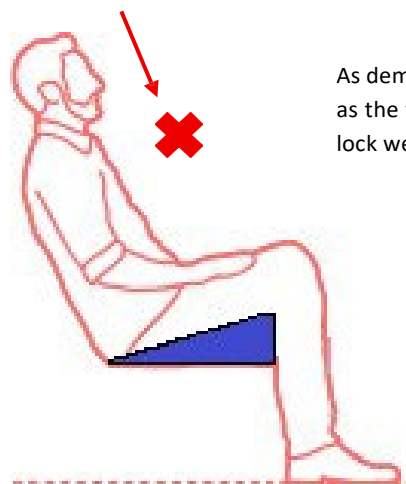
Figure 1: A Demonstration of Both Friction and Shear Pressure Points.



As Figure 1 shows, when the patient is seated in place the chain of shear and friction force is maintained and potentially exacerbated when introducing one way slide systems.

Of course, in the application of one-way glide systems, the patient is often seated with the legs down (as in a chair position). However, the introduction of an elevated knee position to keep the patients' legs elevated while securing the patient with a one-way glide system may prove to be advantageous in further reducing shear forces. This could be integrated by creating a padded wedge like shape on top of the existing glide and lock system such as is demonstrated below:

Figure 2: The components and theory of a glide sheet-wedge system:



As demonstrated, the shear force chain is broken as the force dissipates into the padded glide and lock wedge system (in theory). ✓

This would work in theory by via tilting the individual on the sagittal axis at the hips, cushioning the individual, and at the same time breaking the chain of shear/friction forces on the patient. The reason a padded wedge could not be used on its own without the glide and lock system, is because without the one-way slide feature being implemented, the wedge alone will not be sufficient in holding a patient in a good posture who is prone to slouching. An alternative to using the gliding and lock as a base, would be to fix the padded wedge in place by other means, such as using either a strap or another method to lock it in place.

The glide and lock system as a foundation, in theory, would prove to be the most effective locking method. This is because of how the wedge and Glide and Lock fabric could be developed to complement each other by creating friction for a locking

mechanism such as how a wedge systems work with satin in bed assistant sheets (SIBA), and in part due to familiarity for both the patient and staff. This wedge-base-fabric friction relationship would not affect the patient as it acts solely as a force to keep the wedge in place.

Alternatively, an additional compartment could be created within the base fabric, and the wedge could be placed inside the glide and lock system or fixed on top by other means for a more secure placement. The benefit of having the system able to be taken apart and put back together, is that the system can be repurposed for other means for other patients who may need each constituent part separately. While it is recognised this proposal requires further consideration; the theory remains promising as a solution for carers and patients.

Conclusion

It may be suggested therefore to conclude that there remains no current superior alternative to using a one-way sheet system, especially when considering the glide and lock padded variants for complex patients when tailored care is required. Educating staff members as to how, why and when to apply these specific variants of the glide and lock remains advantageous for everyone involved in the healthcare system. When considering cost efficiency, ease of use, and reduced risk for all parties involved within repositioning procedures, one way glide systems statistically remain a key solution.

If slumped patients are not addressed by the glide and lock or related one way slide sheet systems, then either manual adjustment, hoists or a temporary use of a slide sheet system for infrequent adjustments is required. It may also be suggested that the rejection of the glide and lock system out of concern for shear to occur, as discussed, can potentially pose a greater risk of injury for both the staff and the patient over time.

This is in part due to the involvement of manual contact being required after rejection of one-way slide sheet systems by occupational therapists, physiotherapists and other staff related to manual handling, when instead a tailored, patient specific implementation could otherwise be used. The frequency, and duration of use must first be considered before and during implementation of one-way slide sheets for these scenarios.

Furthermore, the development of an ergonomic glide and lock systems specifically to combat shear force further, remains a promising avenue of development for all parties involved in healthcare who require novel patient handling aids.

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