



# **IAD: Can Reducing Friction and Shear Heal and Prevent Recurrence?**

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## Abstract

**Purpose:** Incontinence Associated Dermatitis (IAD) can be a difficult problem to resolve and then is prone to frequent recurrence due to subjecting fragile skin to ongoing friction and shear. What if there was an interface material that significantly reduced the shear and friction factor?

**Method:** In addition to normal wound care protocols, patented two-ply textile low friction interfaces were used with three patients to determine if improvements to wound closure would result.

**Results:** The researcher found that patients using the low friction interface experienced quicker wound closure than would normally be expected when using normal wound care alone.

**Conclusion:** Adding a friction reducing interface to normal wound care regimen shows promise to assist wound closure, and may be able to prevent wound recurrence.

## Background

Friction causes shear stress and strain in the load-bearing tissue and leads to increased risk of skin trauma – both at the surface and in deep tissues<sup>1,2</sup>. Wound care protocols do not currently include any means for reducing friction other than to suggest avoiding dragging or sliding across surfaces<sup>3</sup>. The few interventions clinicians are aware of that address friction and shear are intended for assisting transfers. The author found a new dual ply textile friction reducing technology having an extremely low static coefficient of friction (CoF) located in a specific portion of a garment, cushion cover or a prosthetic socket component. This technology employs a concept referred to as “Strategic Friction Reduction” (SFR). SFR targets the wound area, or the area known to be at risk, and reduces local friction only in that area. This preserves neighboring higher friction loads which cause no harm to the skin and are needed for traction and stability. Because devices and support surfaces function to manage pressure, they should also manage friction to reduce shear stress on the skin and extending into the deeper tissue<sup>4</sup>.

<sup>1</sup> Thies Berke, C. Pathology and Clinical presentation of friction Injuries. Case Series and Literature review. 2015 J Wound Ostomy Continence Nurs. 42(1):47-61. Lippincott Williams & Wilkins

<sup>2</sup> Linder-Ganz E, Gefen A. The effects of pressure and shear on capillary closure in the microstructure of skeletal muscles. 2007 AnnBiomed Eng. Dec;(12):2095-107

<sup>3</sup> National Pressure Ulcer Advisory Panel (NPUAP) and European Ulcer Advisory Panel (EPUAP). (2014). Prevention and treatment of pressure ulcers: Clinical practice guideline. Washington, DC: National Pressure Ulcer Advisory Panel.

<sup>4</sup> International review. Pressure ulcer prevention: pressure, shear friction, and microclimate in context. A consensus document. London: Wounds International, 2010

## Methods

Strategic friction reduction (SFR) devices were employed in addition to all usual wound treatment protocols in three patients with Incontinence Associated Dermatitis (IAD). The SFR garment device used is the GlideWear® Shear Protection Underwear.

## Case #1 Incontinence Associated Dermatitis

AH is a 44 y.o. male nursing home patient that has a history of Status Epilepticus, Seizure disorder, Herpes Encephalitis, Encephalopathy. He has G-tube for tube feeding. He is Incontinent of bowel and bladder. AH sits in a geri-chair for 1-2 hours at a time and then has mattresses on the floor due to constant moving and crawling. Most of the day he is in constant movement back and forth while in his chair and on the mattress. He responds to pain but does not communicate verbally. The IAD was a very painful condition for this patient. He would cry with skin care treatments and often become combative because of the pain when he was sitting in the chair. He required pain medications during his shower due to the pain.

BMI 19, Weight 137, PreAlbumin: 40, Braden Scale 14, Hgb 15.1

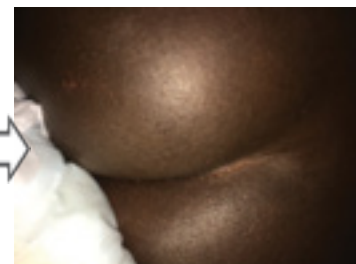
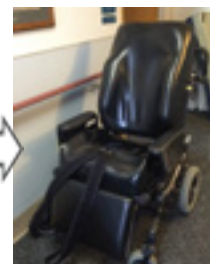


### Wound Measures:

3cm X 10 cm

Perianal area with linear denudation due to moisture from urine and fecal incontinence. Multiple different forms of moisture barrier ointments were used without complete resolution. This area was open for over a year. This area is recurrent and only resolves for 1-5 days at a time before opening up again.

The patient wears a diaper. The SFR pair of underwear was applied over his diaper using the same skin care products. Within one week he was completely healed.



### Intervention:

GlideWear®  
Shear  
Protection  
Underwear



A pair of SFR underwear was placed over his diaper and used 24/7. The IAD resolved in 1 week and the skin resolution of IAD has had no recurrence for 7 months. This is a picture of his skin 5 months later.

**Results:** The introduction of the pair of SFR underwear worn over the diaper was the intervention that eliminated friction and is what healed his IAD and maintained his skin for 7 months. He is no longer requiring pain medications for showering. He is able to sit up in the chair without crying or becoming combative with cares.

## Case #2 Incontinence Associated Dermatitis

A 81y.o. Female Nursing home resident with Chronic IAD and intertrigo, CAD, COPD, CKD, obese, Anticoagulated for A-Fib. Bowel and bladder incontinence. Medically stable but recurrent IAD. Transfers with mechanical lift to the wheelchair.

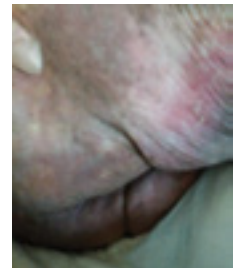
Able to assist with bed mobility. Use of barrier product with every incontinent episode. Wears adult briefs, SFR worn over the briefs



**Intervention:**  
GlideWear®  
Shear  
Protection  
Underwear



Two weeks after the use of normal tx protocols and GlideWear® with no recurrence and skin intact.



**Results:** Skin intact and no recurrence

## Case #3 Incontinence Associated Dermatitis

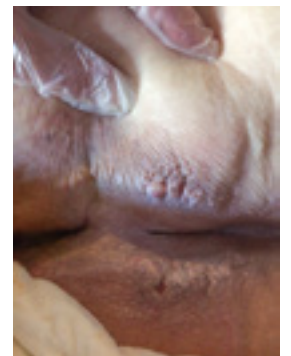
A 77y.o. Male nursing home resident with IAD, Parkinsons, increased incontinence related to progressive Parkinsons disease. Mechanical lift to transfer to wheelchair. Up in wheelchair for no more than three hours at a time. Skin had several denuded areas and lichenification on bilateral buttocks.

Treatment was barrier product with each incontinent episode for two weeks prior to use of GlideWear®. Wears adult briefs, SFR underwear worn over the briefs.

**Intervention:**  
GlideWear® Shear  
Protection  
Underwear



One week after use of SFR underwear



**Results:** Superficial denuded areas healing and decrease in the area of lichenification. Decreased pain over the week.

## Results

**Case #1** - A SFR device (GlideWear Shear Protection Underwear) was used in addition to all normal wound care protocols. This patient had recurrent IAD for over one year and was never able to maintain intact skin until using SFR underwear, which was applied over the diaper. IAD is resolved with no recurrence for 7 months with continued use of the SFR underwear.

**Case #2** - Skin is intact and patient has experienced no recurrence (two week treatment period - SFR underwear use will be continued)

**Case #3** - Superficial denuded areas healing and decrease in the area of lichenification. Decreased pain over the week SFR underwear use will continue.

## Limitations

Compliance with the products

## Discussion/Conclusions

As clinicians we have implemented interventions to eliminate or reduce friction and shear in our practices. These interventions have been limited to reducing friction when moving patients onto or off of a seat or bed support surface by instructing the patient and caregivers to avoid dragging and to lift when transferring and by suggesting the use of transfer aides. There are low friction transfer aids available and they work well for assisting transfers, but are not functional as a contact loading solution. Transfer aids are expressly task oriented and should not be left in place while a person is sitting or lying for stability/safety reasons. However, we have not had a product that uses SFR technology for contact loading available to us until now. We have three IAD case studies that had dramatic improvement in very short periods of time when intervening with this simple SFR technology.

I believe that we have underestimated the effect friction has on the wound healing process. There have never been products, until now, that directly reduce the friction when sitting or lying. The principal theory behind SFR recognizes two things; 1. Friction is the force, coupled with pressure, that results in shear stress (distortion) in tissue. Both forces always present, pressure and friction, are available to mitigate. 2. Applying a low friction interface focusing on the area of the body where skin damage is, or is at risk of occurring, preserves the otherwise helpful friction in the other areas where skin can tolerate the forces and derive stabilizing benefits or traction. The interface may be worn by the patient, or function as a component of a support surface cover. The SFR approach should not be thought of as a transfer aid to perform a transfer more easily, however, SFR provides very important protection during transfer activities if worn by the patient.

Microclimate is another pressure injury causal factor that deserves to be recognized and mitigated, whenever it is a practical possibility, to facilitate air exchange to help control moisture and temperature on the skin surface at the contact interface. The SFR technology used with these cases has properties friendly to microclimate issues.

Therefore, the negative effect of friction has never been fully appreciated until the SFR products were utilized in conjunction with our current standards of practice in wound/skin care. I have found that the SFR devices are a crucial intervention to the wound healing process. The response that was demonstrated in these cases has been reproduced numerous times in my clinical practice and the technology will become part of our standard of practice when dealing with pressure injuries and Incontinence Associated Dermatitis.

### The Technology

Friction causes shear stress in the load-bearing tissue, and along with pressure and microclimate, is known to cause skin damage. GlideWear®, a dual ply textile technology, places a very low friction interface into a specific portion of a garment, support surface cushion cover or as a prosthetic liner component. This technology employs a concept referred to as "Strategic Friction Reduction" (SFR). SFR targets friction reduction to only the wound area, or the area known to be at-risk, providing a more favorable healing and prevention environment. Targeting the area of reduced friction preserves the relatively higher normal friction loads in the other areas where skin can tolerate the stress. This is necessary for retaining positing, stability, and traction.

### Applications using Strategic Friction Reduction (SFR) technology include:

- Socks with forefoot, partial foot, or heel/ankle low friction technology installed in at-risk areas
- Undershorts with low friction technology installed in at-risk areas
- Wheelchair cushion covers with low friction technology installed in at-risk areas
- Trans-tibial prosthetic liner patches and trans-femoral prosthesis brim sheaths
- Pillowcase component

For Neuropathic Foot Conditions, Amputees, Wheelchair Users, Bed Surface Users, IAD, and other conditions where support surfaces are necessary

GlideWear® is made by Tamarack Habilitation Technologies, Inc. Minneapolis, Minnesota, USA

#### References:

Thies Berke, C. Pathology and Clinical Presentation of Friction Injuries. Case Series and Literature Review. 2015. J Wound Ostomy Continence Nurs. 42(1):47-61. Lippincott Williams & Wilkins  
Linder-Ganz E, Geller A. The effects of pressure and shear on capillary closure in the microstructure of skeletal muscle. 2007 Ann Biomed Eng. Dec;35(12):2095-107  
International review. Pressure ulcer prevention: pressure, shear, friction and microclimate in context. A consensus document. London: Wounds International; 2010.



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