

Preventing Pressure Injuries: Intervention with the Adjunctive Treatment of a Textile Friction Reduction Material

Frank Aviles Jr.
PT, CWS, FACCWS, CLT
Wound Care Service Line Director

Natchitoches Regional Medical Center
Natchitoches, LA

PURPOSE

The purpose of this case series is to initially determine the effectiveness and multiple applications of an ultra-low friction textile material as an adjunct therapy to prevent pressure injuries. Prior testing of the double-layered low friction material has demonstrated that it reduces friction and shear and that it is gas-vapor permeable, therefore, supporting a physiologic microclimate.

METHODS

Prior to beginning a complex and expansive study format, a smaller observational review was conducted so that the author could develop both confidence in the product and an understanding of the group of individuals that would benefit from the therapy. Chosen individuals agreed to use the (FDA registered, marketed) products. Products designed as a sock or underwear were provided to volunteers. The author followed the volunteers closely during the use and noted subjective comments regarding the benefits. Objective measurements were also noted as a support for the findings.

RESULTS

All subjects reported significantly improved outcomes. The volunteers using the low-friction undergarment for prevention of ongoing pressure related injury did not develop complications. The product allowed the wounds to either decrease in size, or assisted in the healing process by protecting from friction and shear. They allowed the user to maintain or increase their active lifestyle, and to return to work. Blisters/calluses were resolved. The users commented that the socks reduced further complications, which they experienced on opposite extremity. Others reported resolution of pain when using the socks.

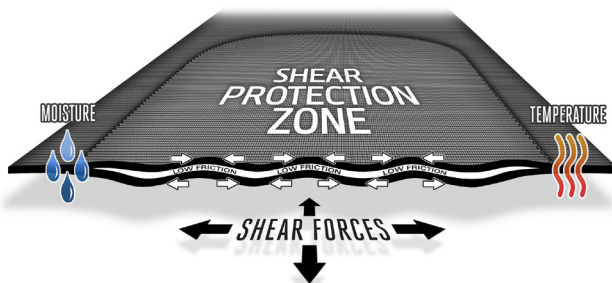
CONCLUSIONS

This small case series on low friction textile interfaces in garments provided some objective “before and after” measurements, as well as subjective user feedback. It served as a pilot and provided the author with confidence to engage in a more expansive study in the future.

In the cases observed, the double-layer low friction textile (“GlideWear[®]”) as applied, demonstrated friction and shear reduction and seemed to have an influence on moisture reduction.

It maintained the integrity of wound dressings for an extended period of time. Users reported the new textile interventions to be “comfortable”, repeatable (wash-able and re-useable) and easy to maintain.

One user entitled them as “healing-wear”, when comparing with other types of advanced wound management interventions used before.



Dual layer, breathable fabric glides smoothly against itself absorbing friction-induced shear stress to prevent tissue damage in at-risk areas

CASE STUDY #1

HISTORY: 32 year old male paraplegic (T6-T7); complete spinal cord injury 1997; pressure injury onset at greater trochanter (right) first documented in **2004**.

A variation of advanced wound management methods and interventions was applied for a period of **13 years in personal home care - with no significant progress**.

Older measurements (see below) and condition are reported by the wife (wound care nurse). Measurements worsened from 7/20/16 (see existing photo documentation below) prior to using low friction textile garment. “GlideWear[®]” garment application started 11/1/2016.

FINDINGS:

- Patient reported longer lasting dressing (less destruction). Keeping dressing longer maintains a constant temperature for physiologic cellular and enzymatic activity.
- The increased dressing survival approximates to a cost savings of \$7 per dressing.
- Patient did not report any problems with excoriation or increased moisture.
- GlideWear appears to manage former moisture problems.
- Wound surface area decreased approx. 90% within 3 months of product application and for the first time within 13 years observed.
- Resolution of an undermined wound border measuring 5 cm of length.
- Patient's activity remained the same between November 2016 and February 2017.

This patient is being treated by a family member trained with CWCA credentials through the ABWM. Even though the patient received qualified care, the pressure injury had not improved, most probably due to significant friction and shear during his routine adl. Now both, the caretaker and patient call GlideWear “the healing under-wear” as both noted progress seen, which was not experienced with other interventions before.



This ulceration was documented on **9/12/2008** as 2.4 cm x 3.3 cm



Low friction garment wound coverage area here demonstrated on left

On **7/20/2016** it was 2.8 cm x 3.0 cm (no photo documentation available)

In **November of 2016**, it was still in the identical range. (No photo documentation available)

2/3/17 – 2 cm x 0.4 cm, Result 3 months after using GlideWear[®] low friction undergarment.

The GlideWear[®] application was started 11/1/2016 and it was the only change in protocol.



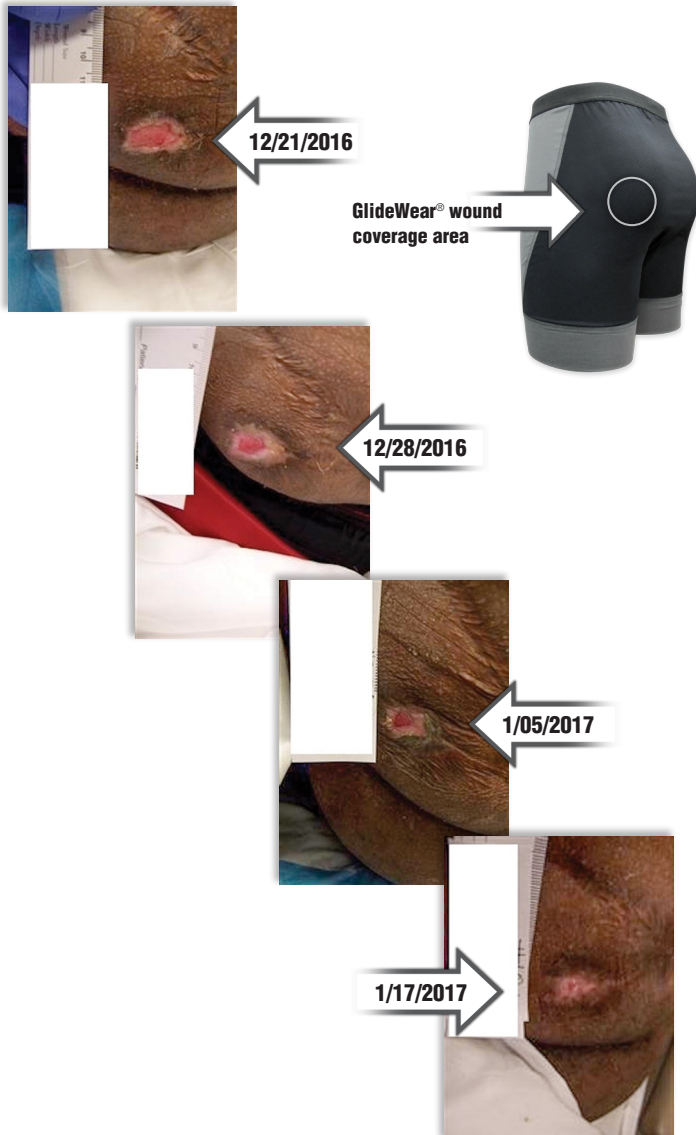
CASE STUDY #2

HISTORY: 27 year old, male paraplegic (T-11-L4); incomplete spinal cord injury. History of recurrent pressure injuries in the buttock area (3/2011, 6/2013, flap 1/2014). Sustained a left buttock wound re-injury on 12/16/16. The patient started wearing GlideWear® underwear towards the end of December 2016. Skin closure two weeks later, on 1/12/17.

In December the patient began wearing GlideWear® underwear as an adjunct to current standard treatment. Intent was/is to prevent further trauma while tissue maturation occurs. No other treatment protocol alterations (except GlideWear low friction application) at this time.

FINDINGS:

- Moisture problems - as experienced prior - are significantly reduced.
- Patient continued being employed and resumed active workout schedule.
- Today, 6 weeks post closure, no tissue breakdown .
- Continues to report significant improvement of prior moisture concerns.



CASE STUDY #3

HISTORY: 35 year old female with diabetes & lower extremity neuropathy. History of a prior right foot metatarsal head wound, caused by friction from improper shoes. Patient stated that the wound took 1.5 years to heal.

On October 21, 2016 patient developed a blister on the left great toe caused by a friction injury, which progressed to a Wagner grade III ulceration.

Patient was referred to a wound care center in January, 2017. The wound was treated by standard wound care, including load-bearing relief and advanced modalities.

Patient also demonstrated a stable callous on the right great toe, medial aspect.

In order to prevent tissue trauma, as had developed on the left toe, patient was prescribed a GlideWear® forefoot sock for the right foot starting 1/10/17 (not prescribed for left foot because of load-bearing relief treatment).

FINDINGS:

- Decreased friction on the right great toe was observed. It resulted in callous reduction, which proposes a risk reduction for tissue injury.
- Patient commented that the sock was comfortable and provided improved moisture control compared to other socks worn in the past. Moisture management reduces the coefficient of friction. Coefficient of friction for GlideWear® = 0.18*

*Tamarack test labs



REFERENCES

Publication References

- 1 International Review: Pressure Ulcer Prevention; pressure, shear, friction, and microclimate in context – A consensus document - Wounds International 2010
- 2 Stekelenburg A, Strijkers GJ, Parusel H, Bader DL, Nicolay K, Oomens CW. Role of ischemia and deformation in the onset of compression-induced deep tissue injury: MRI-based studies in a rat model. J Appl Physiol. 2007 May;102(5):2002-11.
- 3 Bennett L, et al. Shear vs pressure as causative factors in skin blood flow occlusion, Arch Phys Med Rehabil. 1979; 60:309-314.
- 4 Ceelen KK, Stekelenburg A, Loerakker S, Strijkers GJ, Bader DL, Nicolay K, Baaijens FP, Oomens CW. Compression-induced damage and internal tissue strains are related. J Biomech. 2008 Dec 5;41(16):3399-404.
- 5 Cottenden AM, Wong WK, DJ Cottenden DJ, and Farbroth A “Development and validation of a new method for measuring friction between skin and nonwoven materials”. Proc Inst Mech Eng [H] 2008;222(5):791-803.

Case Report References

- 6 “Able to heal a wound that didn’t heal in 15 months prior” Sara Stover RN DON, Villa Manor Care Center
- 7 “Using Strategic Friction Reduction to Prevent and Treat Pressure Injuries” Sheila Howes Trammel MSN. APRN, FNP-BC, CWCN, CCCN, CFCN, CLCN, Hennepin County Medical Center, Minneapolis MN
- 8 “Wound Healing Improvement with Low Friction Seat and Back Rest Cover in Wheelchair”; Jan Chevrette, MSN, FNP-C, RN, Regions Hospital St. Paul MN
- 9 “Friction Wound Healing Improvement at W/C Alignment Support Pad with Textile Low Friction Interface”; Julie Roskamp, RN, CWCON, Twin Cities Wound and Ostomy Associates Inc., Lakeville, MN
- 10 “Wound Healing Support in a Quadriplegic Individual using bilateral Low Friction Textile Leg Sleeves”; Adam Reed Johnson, DPM, Medical Director, Center for Wound Healing, Hennepin County Medical Center
- 11 “Skin Healing in IAD in a bed-bound Individual through Application of a Textile Low Friction Interface”; Rosie Jovane, CPO, Troy MI
- 12 “Heel Decubitus Ulcer Healing support by Application of Low Friction Textile Custom Sock”; Adam Reed Johnson, DPM, Medical Director, Center for Wound Healing, Hennepin County Medical Center
- 13 “Three Cases of Transtibial Amputation Wound Healing under Weight Bearing Conditions (Prosthetic Use) in a Prosthetic Socket”; Charles Kuffel, CPO and Kevin Hines CPO, ARISE Orthotics & Prosthetics, Blaine MN

ACKNOWLEDGEMENT & CONTACT

No external funding was received for this case series.

The investigator retained full independence in the conduct of this study.

“GlideWear” garments provided by Tamarack Habilitation Technologies, Inc.
1670-94th Lane NE, Minneapolis, MN 55449
email: info@tamarackhti.com

Author contact: Frank.Aviles@NRMChospital.org