



## THE USE OF A TARGETED SHEAR REDUCTION PATCH TO INCREASE PROSTHETIC SOCKET COMFORT.

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### INTRODUCTION

Shear within a prosthetic socket is oftentimes problematic for prosthetic users of all activity levels. If shear is not addressed, it can cause skin integrity disruption or breakdown, limiting overall function. The use of advanced prosthetic componentry allows amputees to function at higher levels, but often fails to address the skin trauma associated with aggressive or prolonged prosthetic use. As a result, increased function and activity can often lead to skin integrity breakdown.

Prosthetists have used techniques such as lubricated gels, socks, or sheaths beneath interface liners to address areas of concern. Some of these areas of most concern include the patella during knee flexion, the fibular head during ambulation and the distal anterior tibia. Most interface liners are fabricated in a linear fashion but undergo multiple plane disfigurements during dynamic prosthetic use. This pushing and pulling between the skin, liner, and socket can create areas of shear strain, leading to skin disruption. Ultimately, any disruption or breakdown of the skin can result in reduced prosthetic use and function. Although lubricated gels, socks, and sheaths can be helpful when used beneath the liner, they do not always provide adequate relief. Even though these methods can help to reduce the contact area of the suspension liner and the skin, they can also cause distal migration of the liner and possible loss of suspension.

### METHOD

Tamarack Habilitation Technologies, Inc. has developed a dual layer low friction textile technology called GlideWear that is successfully being used by individuals in wheelchairs to reduce prevent tissue breakdown beneath the ischial tuberosities. This technology has also been developed for use by prosthetic wearers to reduce shear on affected areas of the residual limb. The patch is placed between the skin and prosthetic liner to spot reduce shear by creating a gliding motion between the two layers of fabric that otherwise cause the skin to absorb the motion and disrupt skin integrity. This Patch has been used on all areas of potential breakdown of the residual limb. Patients have been sampled from different geographic areas of the United States to validate non geographic results. The results have been documented using photographic documentation with survey materials provided to both the patient and prosthetist.

### RESULTS

This study has helped to substantiate those areas of shear within a prosthetic socket which limit function and that reducing shear through the use of a textile patch helps amputees to resume their desired activity. Prosthetic users are functioning at higher activity levels than ever before. However, the limiting factor of skin trauma still remains. No matter how well prosthetic sockets and components function, skin integrity breakdown can develop during prolonged or aggressive prosthetic use. Simple solutions like the use of a targeted low friction interface can allow amputees to gain the full benefit of their advanced prosthetic componentry by allowing them to spend additional time in their prostheses without the incidence of skin breakdown.

### DISCUSSION

The results of this study will demonstrate that providing patients with a simple tool to spot reduce areas that are susceptible to skin breakdown will allow them to function at the highest desired level with reduced incidence of skin integrity disruption or breakdown.

### CONCLUSION

New innovations in prosthetic componentry have allowed amputees to achieve higher functional levels than ever before. Increased activity oftentimes creates unwanted shear within a socket interface limiting further functional activity and necessitating time out of the prosthetic limb. By spot addressing the damaging shear forces within a socket, prosthetists and prosthetic users can utilize the advanced prosthetic componentry to the fullest potential for longer periods of time.

### CLINICAL APPLICATIONS

The use of a targeted shear reduction patch placed between a prosthetic liner and skin tissue will allow amputees to function for longer periods of time with reduced risk of skin integrity disruption secondary to shear. This simple solution allows the amputee to spot manage many areas of concern without the need for episodic follow up with the clinical prosthetist for socket adjustments.

**American Academy of Orthotists & Prosthetists  
41st Academy Annual Meeting &  
Scientific Symposium  
February 18 - 21, 2015**