Preventing Pressure Injuries in AFO Users: A Novel Use for Liquid Cyanoacrylate Polymer Skin Protectant

Quality Grant

Total Budget Requested $14,510

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Background, Significance, and Implications

Pressure injury prevention and reduction in acquired pressure injuries remains a key goal for the entire interdisciplinary team at Shirley Ryan AbilityLab. Historically, our efforts have often focused on relieving pressure in bed or in the wheelchair. Examples include things like pressure mapping, floating heels, establishing turning schedules, restricting total time spent in the wheelchair, and using specialty pressure-redistribution surfaces, among others. These efforts remain important, but they leave out the root cause of a significant portion of our facility acquired pressure injuries. From February 2020 through December 2020, over 50% of our acquired injuries at SRAlab were considered "device related". Of these injuries, the most common associated device was the ankle-foot orthosis (AFO). Hand splints, Cam Boots, Cervical Collars, and other types of braces and immobilizers were also implicated, though not as frequently as ankle-foot orthoses. In recent years we have increasingly seen patients with insensate limbs participating in gait training, especially high intensity gait training, which may also contribute to this issue. When patients develop an injury underneath their AFO or other orthotic, this may result in short or long term discontinuation of the device to allow for wound healing. When these devices are required for functional ambulation or to participate in high-intensity training, the patient's ability to achieve goals may be reduced.

Solutions to reduce or eliminate friction that may occur underneath an orthotic device are limited. Products commonly used to protect the skin such as silicone based dressings and hydrocolloid dressings cannot be safely used under many orthotics because they add bulk on top of the skin and may cause an increase in pressure under a tightly fitted device, effectively worsening the problem rather than improving it.

Polymer skin protectants have shown utility in preventing the skin breakdown and irritation that occurs in cases of incontinence-associated dermatitis. These skin protectants form a film barrier over intact or denuded skin that protects from moisture, bacteria, and other irritants (Brennan, Milne, Agrell-Kann, & Eckholm, 2016; Stoffel & Bernatchez, 2016; Been, Bernatchez, Conrad-Vlasak, Asmus, & Eckholm, 2016). We already use this type of product at SRAlab for this purpose.

There is also some evidence to suggest this type of skin protectant may also reduce friction & shearing forces and reduce the likelihood of skin tearing (Lee & Gibson, 2020, & Bernatchez, Mengistu, Ekholm, Sanghi, & Theiss, 2015). This project would explore a novel use of this kind of product – using it to form a protective barrier reducing friction between the skin and the orthotic. If this quality improvement project is successful at reducing pressure injuries occurring underneath AFOs, it has the potential to have a significant impact on the facility's overall pressure ulcer incidence rate.

Specific Aims

To implement a quality improvement project, using barrier forming cyanoacrylate polymer skin protectant underneath rigid orthoses with the goal of reducing acquired pressure injuries.

Methods, Timeline, & Outcomes Measured

We will design this as a quality improvement project, providing the same standard of care to all patients. We plan to apply through the IRB for an exemption and letter stating that this project does not qualify as human subject research. The cyanoacrylate polymer product to be used is the Cavilon Advanced Barrier Wand by 3M. This product has already been accepted as safe for use and is already in use throughout the facility.

The team will collaborate with Nursing Informatics Coordinator, and/or other appropriate members of the IS team to create a Cerner order for Cavilon Advanced Barrier Wand Application. The order will be placed at the time an AFO is issued, or at the beginning of the stay (if patient admits with an AFO). This does not require physician order. This order will automatically trigger a timed nursing task to alert the RN to reapply the product every 7 days. No other changes to the patient's plan of care are required.

Members of this team, or other designated nursing and/or P&O staff will run regular reports throughout the duration of this project to confirm that appropriate orders are being placed on all patients with issued AFOs. If lapses are identified, orders will be placed at that time.

Total acquired/worsened pressure injuries at the facility level will be tracked on an ongoing basis, with totals reported monthly, with a drill down tracking the number that are occurring under AFOs. We expect to run this project for 1 full year before making final conclusions.

Deliverables

We will plan to present results to internal audiences at SRAlab (example – Annual Quality/Safety Fest). We will plan to complete a manuscript at the end of the project, appropriate for submission to an appropriate wound care focused journal. We will consider submission as a poster or manuscript at a national conference.

References

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