Offloading Diabetic Foot Ulcers with the Use of an All Fiberglass Total Contact Casting System

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Introduction

The effectiveness of total contact casting in offloading the neuropathic foot is well established [1,2] yet is only utilized by a small percentage of wound care practitioners. [3] It is also well established that time-to-healing is directly related to limb salvage success. [4] To that end, it has been documented that the more total contact casting and other standard of care interventions become utilized, the less incidence there will be of lower extremity amputations and the lower the cost of care becomes for patients with diabetic foot ulcers. [5]

There are several different methods of total contact casting. The most common utilize either a combination of plaster and fiberglass or fiberglass only. It has been documented that the outcomes between the two methods are comparable. [6] That said, benefits to the all-fiberglass method include decreased drying time, less cast weight, less mess with assembly and better resistance to environmental moisture. Presented here are three case studies detailing the use of a commercially available, all-fiberglass, total contact cast (TCC) kit*, modified with a built-in walking surface, for the treatment of diabetic foot ulcers.

Methods and Materials

Three patients, who presented to the clinic with diabetic foot ulcers, were evaluated and worked up to ensure adequate blood flow and absence of clinical infection. Lower extremity edema was treated with compression. When all of these prerequisites had been satisfied, total contact casting was initiated. * This was changed in two to three days and then weekly. The patients were given detailed instructions regarding total contact cast care and safety. Wounds were assessed on a weekly basis. Once wound closure was achieved the patients were transitioned into appropriate accommodative footwear.

Results

Patient #1 had a 2 month h/o DFU, starting at 1.3 cm length x 0.8 cm width x 0.1 cm depth, with complete closure within 3 weeks of TCC. Patient #2 had a 2 ½ month h/o DFU, starting at 0.9 cm length x 0.7 cm width x 0.4 cm depth, with complete closure within 2 weeks of TCC. Patient #3 had a 3 week h/o DFU before starting TCC. Within 9½ weeks the wound went from 4.3 cm length x 3.1 cm width x 0.6 cm depth to closure.

Discussion

Each of these patients had significant barriers to healing. All had poorly controlled DM, absent protective sensation, poor compliance with offloading, histories of recurrent ulceration and, in two cases, previous amputation. One had severe Charcot deformity. Good local wound care, attempts at offloading and advanced dressings had been attempted without attaining wound closure.

Each of the patients had been treated with a plaster / fiberglass TCC, with built-in walking surface, in the past. Patients either reported no difference in the way the cast felt or they preferred the all-fiberglass cast because it “felt lighter”. No adverse events were encountered in these three cases.

Considering the possible loss of function, monetary cost and increasing risk of complications associated with delayed wound closure, the rapid resolution of difficult to heal, diabetic foot ulcers, while maintaining ambulation and mobility, is significant.

Conclusion

Total contact casting utilizing an all-fiberglass kit* produced favorable results in three members of a difficult to heal population.

References

3. Fife CE; Carter MC; Wasko R, Why is it so hard to do the right thing in wound care? Repair And Regeneration: Official Publication Of The Wound Healing Society (And); The European Tissue Repair Society; World Union: Repair Regard, 2014; 10(5) 100-8
6. The effects of total contact casting materials on plantar pressures. (English) By: Hartwell HD; Brand RA; Frantz RA; Baltzmann CL; Foot & Ankle International / American Orthopaedic Foot and Ankle Society [Ank] Swiss Foot & Ankle Society [Ank] Swiss Journal of Foot and Ankle Society (Joint) published online: February 25, 2013

* TCC is a generic reference to Offload Cruiser lesion, Bioderm medical inc., 6865 Carriage Blvd, Classified. 34741 USA-6055

PATIENT 1

Day 1

PATIENT 2

Day 1

PATIENT 3

Day 1

PATIENT 1

Day 21

Day 10

Day 17

Day 17

Day 70

Day 9

Day 9

PATIENT 2

Day 10

PATIENT 3

Day 70

Day 41

APPLICATION

The method of TCC application is: First, very dry, thick dressings were applied over the entire ulcer base and rolled back over the tip of the foot. 1/8” adhesive backed foam was placed over the bone prominences and the edges trimmed. Two to three layers of cotton padding were applied from the proximal portion of the 1/8” to approximately 2” below the talus bone. With two layers of the foam and the skin allowed to ensure a soft edge. An adhesive was utilized to hold the patient’s shoe and in a medially positioned pressing up the ulcer surface. The foam was cut to the MTP joints. Layers of fiberglass were applied from this border of the foot just below the edge of the cast pocket, in a spiral fashion. The shoebox and the talus and fibular bone were covered with the edging of the fiberglass. A check and adjustment of foot and ankle correlates was completed. This final positioning was held by the casting assistant as needed. Two posterior splints were made by four folding fiberglass rolls. The posterior splints were cut to allow loading of a calf walking surface. The other splint was applied first, covering the toes, the posterior foot, the lateral plantar ulcer off area. The end of the toes was used to fill any void area on the plantar ulcer. The splint containing the walking surface was placed over the same area, positioning the walking surface in the posterior foot area, just distal to the toes. A fiberglass roll was wrapped around the back of the foot, around the toes, around the posterior heel and back to the toes. It was then brought around in a spiral fashion, enveloping the distal calf area and proximal edge of the walking surface and continuing posteriorly to just below the edge of the cast. The walking surface was inspected to ensure neutral positioning of surface in relation to the leg.