

A Retrospective Comparison of Healing Rates of Two Total Contact Cast Systems

C. FRANKLIN, DPM • R. CORNELL, DPM • J.D. LEHRMAN, DPM, FACFAS • CROZER-KEYSTONE HEALTH SYSTEM

Statement of Purpose

Diabetic foot ulcerations develop from a combination of factors, most notably neuropathy, peripheral vascular disease, foot deformities, and pressure. Foot ulceration precedes 85% of diabetes related amputations^{2,3,6,7}. Reducing pressure (offloading) at the wound site is widely accepted as being critical for healing. Currently, the rigid total contact cast (TCC) remains the gold standard for healing non infected plantar foot ulcerations¹. The originally described cast has been proven to promote ulcer healing by reducing high foot pressures by redistributing pressure to the plantar surface of the foot². However, the cast as originally described can be difficult to apply as well as time consuming. Custom molded inserts, shoes, removable cast boots, as well as traditional casts have and are currently being used to offload plantar ulcers with varying success^{4,5}.

The purpose of this study was to retrospectively compare healing rates of plantar foot ulcers utilizing the Sleeve Roll-on TCC* and the Traditional TCC**.

Literature Review

Recent studies on healing diabetic foot ulcerations have compared the efficacy of the TCC to other modalities such as removable cast boots, orthotics, below knee fiberglass casts, and custom shoes⁴. There is not a study we are aware of comparing healing rates between these two total contact cast models.

Methodology

Criteria for Patient Selection

The medical records of two podiatrists at two separate wound care centers within one health system were retrospectively reviewed by an independent examiner. A search of the CPT code 29445, the code used for “application of a rigid total contact cast, half leg, adult,” was completed and yielded a result of 77 patients between 2009–2012.

53 patients were excluded from this study because they were lost to follow up, evolution to another offloading modality, changes in the wound to warrant different treatment, such as infection, as well as those who succumbed to proximal amputation, or death. Twenty-four patients were included in this study. Healing was defined as “complete closure of plantar ulceration.”



Figure 1: Traditional TCC



Figure 2: Sleeve Roll-On TCC

Procedure/Materials

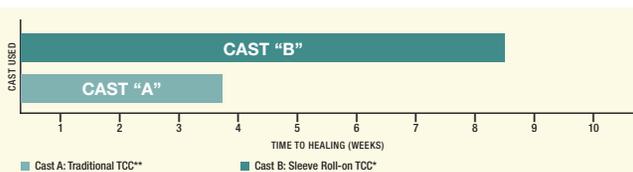
Sleeve Roll-on TCC Group:

Patients with plantar diabetic foot ulcers had Sleeve Roll-on TCC applied at week one. All patients had this first Sleeve Roll-on TCC removed after 3 days and another one applied at the same visit. The second Sleeve Roll-on TCC stayed on for one week and then was changed weekly until ulcer was healed. Time to healing was recorded. All patients were also given a boot to be worn with the Sleeve Roll-on TCC as illustrated in Figure 2.

Traditional TCC Group:

Patients with plantar diabetic foot ulcers had Traditional TCC system applied at week one. All patients had their cast removed after one week and another re-applied weekly until ulcer was healed. Time to healing was measured. All patients were also given a velcro cast shoe to be worn with the TCC.

Ulcers in both groups also received supportive care as needed and indicated including sharp debridement, hyperbaric oxygen, dressings to assist with moisture balance, and in some cases cellular and/or tissue-based products.



Results



Figure 3: Week 1.



Figure 4: Week 4, healed after 3 applications of Traditional TCC.

A total of **24** patients with plantar foot ulcerations were healed.

18 patients healed with use of the Traditional TCC. The average healing time for the Traditional TCC was **3.75** weeks. (2 of these patients required additional TCC applications after they re-ulcerated as a result of insufficient offloading following healing of their original wound. 1 patient went through 3 rounds.)

6 patients healed with use of the Sleeve Roll-on TCC. The average healing time for the Sleeve Roll-on TCC was **8.5** weeks. (2 of these patients required additional TCC applications after they re-ulcerated as a result of insufficient offloading following healing of their original wound.)

* Sleeve Roll-on TCC = TCC-EZ

** Traditional TCC = Cutimed® Off-Loader Select

TCC-EZ is a registered trademark of Derma Sciences, Inc. Cutimed is a registered trademark of BSN medical GmbH.

Discussion/Considerations

To the authors' knowledge, there is no study that has compared time to healing of two different types of total contact casts. The authors admit this study would benefit from a larger inclusion pool as well as a longer period follow-up. The authors realize that one casting group having three times as many patients achieve full healing as the other may affect the time to healing results. Both groups' results are also slightly skewed for extra rounds of casting. The extra casting for these patients reflects the need for readily available offloading shoes or boots after wound closure.

The low number of patients included in this study also reflects the authors' belief that despite high healing rates, total contact casting is underutilized. A major obstacle in the acceptance of total contact casting in the outpatient setting has traditionally been the labor-intensive nature of the procedure as well as the perceived need for specialized training¹.

To determine application time, two physicians applied five of each cast according to the manufacturer's instructions. Both types of cast took slightly less than 10 minutes to apply.

Conclusion

All patients included in this study went on to heal with exclusive use of a streamlined version of the total contact cast as an offloading modality. Other modalities used with the casts for the purpose of the project included debridement, hyperbaric oxygen therapy, silver alginate products, and skin substitutes.

This study demonstrated that wounds treated with the Traditional TCC healed faster than those treated with the Sleeve Roll-on TCC.

References

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