

Technical Note

Casting Technique for Off-Loading of Posterior Heel Pressure Ulcerations

Bennett J. King *  and Lawrence A. DiDomenico

NOMS Foot and Ankle Center, Boardman, OH 44512, USA

* Correspondence: bennett.james.king@gmail.com; Tel.: +1-920-810-2762

Abstract

Introduction: Posterior heel pressure ulcerations are a common problem seen both in the clinic and in the hospital setting. This type of ulceration can cause necrosis of soft tissue and bone to the posterior heel, which can have devastating consequences. We believe that this technique provides an effective adjunctive treatment for posterior heel pressure ulcerations. **Methods:** In this paper, we present a casting technique to provide intrinsic off-loading to the heel while maintaining optimal soft tissue and bone positioning. **Discussion:** The primary author and senior author have had success employing this technique in patients that suffer from posterior heel pressure ulcerations. Applying maximal plantarflexion allows for relaxation of the soft tissues to the posterior heel and reduces tension on wound edges. This technique also allows for the correction of combined soft tissue and bony pathology, increasing stability and reducing the progression of deformity. This technique may in turn offer an approach to reduce the risk of osteomyelitis of the calcaneus, reducing the risk of higher-level amputation and ultimately reducing morbidity and mortality rates in our wound care patients.

Keywords: pressure ulceration; off-loading; biomechanics

1. Introduction

Posterior heel ulcerations are a common problem seen both in the clinic and in the hospital setting. Posterior heel ulcerations are the second most common type of pressure ulceration [1]. The population that is at most risk of developing pressure ulcerations is patients with impaired mobility or sensation who are bed-bound or wheelchair-bound [2]. These ulcerations typically develop secondary to prolonged pressure on the posterior heel combined with the lack of cushioning soft tissue in the area. Prolonged pressure above the pressure of arterial inflow and venous outflow causes local tissue necrosis [2–4]. In our institution, we commonly see osteomyelitis associated with this type of injury. Osteomyelitis of the calcaneus is often associated with higher-level amputation. A report by Faglia et al. found that patients with osteomyelitis of the calcaneus succumb to below-knee amputation over 50% of the time [5]. Below-knee amputation carries a grim five-year survivability rate of approximately 47.9%, surpassing that of many cancers [6]. Previously described techniques for treating posterior heel pressure ulcerations include intrinsic off-loading via a posterior splint technique [7]. We believe that the technique described below not only offers intrinsic off-loading but also allows for optimal soft tissue and bone positioning. This is accomplished by keeping the foot and ankle in maximal plantarflexion, allowing relaxation of the soft tissues to the posterior heel.



Academic Editor: Warren S. Joseph

Received: 10 February 2025

Accepted: 21 April 2025

Published: 8 October 2026

Copyright: © 2026 by the authors.

Published by MDPI on behalf of the American Podiatric Medical

Association. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\) license](https://creativecommons.org/licenses/by/4.0/).

2. Methods

Technique

First, the posterior heel pressure ulceration is appropriately debrided of any non-viable soft tissue and an environment with a granular, bleeding wound base is created. Next, the primary author applies topical medication based on the patient's most recent culture result. This commonly is 2% Mupirocin Ointment for wounds that involve Methicillin-Resistant *Staphylococcus Aureus* or 0.1% Gentamicin Cream for resistant species of *Pseudomonas Aeruginosa*. Once the appropriate topical medication has been applied, gauze is applied followed by gauze roll. Next, a pyramid of gauze rolls is created proximal and distal to the posterior heel ulceration. This involves placing two unrolled rolls of gauze rolls perpendicular to the long axis of the leg or foot directly adjacently to each other (Figure 1). This is then covered with gauze roll to keep it in place. This is followed by an additional unrolled roll of gauze roll placed in line and in the center of the two unrolled rolls (Figure 2). Again, this is covered with gauze roll to hold the entire construct in place. Gauze roll is laced in between the toes to prevent interdigital maceration and infection. Ample gauze padding is applied to the anterior ankle, tibial crest and first and fifth metatarsal heads (Figure 3). Next, a stockinette is placed over the off-loading dressing (Figure 4). Cast padding is then placed over the stockinette with ample padding on every bony prominence (Figure 5). Overlying plaster or fiberglass cast tape is then placed over the cast padding ending just distal and proximal to the ends of the cast padding. First, one roll is placed over the entirety of the foot. Next, one roll is placed over the entirety of the lower leg. The proximal end of the stockinette is then pulled distally and the proximal rim of the cast padding is rolled over itself. The distal end of the stockinette is then pulled proximally and the distal rim of the cast padding is rolled over itself. This allows only smooth proximal and distal edges with only cast padding and stockinette in contact with skin. Next, at least two additional rolls are placed over the entirety of the already placed fiberglass or plaster cast tape. Next, the ankle and foot are held in maximal plantarflexion and any structural deformity is corrected to create a neutral foot. This may be a valgus force for a varus deformity or a varus force for a valgus deformity. The cast is then allowed to harden with reduction held in place (Figure 6). Maximal plantarflexion relaxes soft tissues to the posterior heel and reduces tension on wound edges. Reducing deformity increases stability and maintains adequate bone and soft tissue positioning. At least three total cast tape rolls are generally utilized. Once the cast material dries, overlying coban can then be placed over the off-loading cast. Upon completion, the posterior, proximal pyramid should come in contact with the ground and the posterior heel should be elevated with the patient supine (Figure 7).



Figure 1. Two unrolled rolls of cast roll perpendicular to the long axis of the leg or foot directly adjacently to each other proximal and distal to the heel.



Figure 2. Additional unrolled roll of cast roll placed in line and in the center of the two unrolled rolls.



Figure 3. Cast roll is then placed to hold the construct in place with additional gauze padding over all bony prominences.



Figure 4. Stockinette placed over the off-loading dressing.



Figure 5. Cast padding is then placed overlying the stockinette with ample padding on every bony prominence.



Figure 6. The ankle and foot are held in maximal plantarflexion and the cast is allowed to harden.



Figure 7. Coban can then be placed over the hardened cast material. The posterior, proximal pyramid should come into contact with the ground and the posterior heel should be elevated with the patient supine.

3. Discussion

The above technique describes an approach to off-load common posterior heel pressure ulcerations. Previous techniques have described posterior splinting techniques which offer intrinsic off-loading [7]. Applying a cast technique as described above offers intrinsic off-loading while maintaining optimal soft tissue and bone positioning. This has the added advantage of relaxing soft tissue at the posterior heel, potentially further expediting healing and creating less tension on wound edges. Advantages of this technique include its economic benefits. This technique utilizes common dressing supplies that are found in almost any clinic. Other advantages include the ease of the technique and the fact that patient compliance is not required. The disadvantages include the somewhat time-consuming nature of applying the dressing and the inability to evaluate the wound without removing the cast. However, in our institution we routinely evaluate wounds weekly and

perform cast changes weekly. Further prospective, comparative studies are needed to fully evaluate the outcomes of this type of dressing versus other off-loading modalities.

Author Contributions: Conceptualization, L.A.D.; methodology, B.J.K.; validation, B.J.K. and L.A.D.; investigation, B.J.K. and L.A.D.; resources, L.A.D.; data curation, B.J.K.; writing—original draft preparation, B.J.K.; writing—review and editing, L.A.D.; visualization, B.J.K.; supervision, L.A.D.; project administration, B.J.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Ethical review and approval were waived for this study as it is a technical note describing a casting technique and does not constitute human subjects research. No experimental interventions were performed, and no patient data were collected or analyzed for research purposes.

Informed Consent Statement: Patient consent was waived due to this study being a technical note describing a casting technique. No identifying patient information is disclosed.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Vangilder, C.; Macfarlane, G.D.; Meyer, S. Results of nine international pressure ulcer prevalence surveys: 1989 to 2005. *Ostomy Wound Manag.* **2008**, *54*, 40–54. [[PubMed](#)]
2. Mervis, J.S.; Phillips, T.J. Pressure ulcers: Pathophysiology, epidemiology, risk factors, and presentation. *J. Am. Acad. Dermatol.* **2019**, *81*, 881–890. [[CrossRef](#)] [[PubMed](#)]
3. Kosiak, M. Etiology of decubitus ulcers. *Arch. Phys. Med. Rehabil.* **1961**, *42*, 19–29. [[PubMed](#)]
4. Gefen, A. The biomechanics of sitting-acquired pressure ulcers in patients with spinal cord injury or lesions. *Int. Wound J.* **2007**, *4*, 222–231. [[CrossRef](#)] [[PubMed](#)] [[PubMed Central](#)]
5. Faglia, E.; Clerici, G.; Caminiti, M.; Curci, V.; Somalvico, F. Influence of osteomyelitis location in the foot of diabetic patients with transtibial amputation. *Foot Ankle Int.* **2013**, *34*, 222–227. [[CrossRef](#)] [[PubMed](#)]
6. Subramaniam, B.; Pomposelli, F.; Talmor, D.; Park, K.W. Perioperative and long-term morbidity and mortality after above-knee and below-knee amputations in diabetics and nondiabetics. *Anesth. Analg.* **2005**, *100*, 1241–1247. [[CrossRef](#)] [[PubMed](#)]
7. Hussain, F.; Lenz, R. Heel Offloading Posterior Splint for Treatment of Heel Ulcerations. *J. Am. Podiatr. Med. Assoc.* **2024**, *114*, 22–131. [[CrossRef](#)] [[PubMed](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.