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# Perfusion Cast Dressing

## A Conservative Means for Treating Cutaneous Ulcerations

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Cutaneous ulcer treatment modalities are as diverse as one's clinical imagination. It is the purpose of this paper to provide an alternative ulcer treatment to those currently being used. Two case studies are presented that describe the application and therapeutic results of utilizing the perfusion cast technique.

Ulcer treatment methods must be modified to suit the individual needs of a given patient. Criteria to be considered prior to treatment must include: 1) proper evaluation of the physiologic origin of the problem (decubitus, diabetic, venous stasis, etc); and 2) the environmental status of the patient (Is the patient hospitalized or not? Can the patient comply with doctor's orders? Can the patient comply with dressing changes?). These questions must be dealt with properly, or one may anticipate unsatisfactory therapeutic results. Perfusion casting is an example of an alternative approach to ulcer management, which provides a constant antiseptic environment that allows the body's own healing process to take place uninterrupted by the trauma and exposure encountered during the common practice of periodic debridement and daily dressing change.

### Materials and Methods

The perfusion cast consists of sterile fluff dressing, wrapped with Kling,<sup>®1</sup> encasing the end of a minicatheter placed within the dressing layers which acts as the route for administering Betadine<sup>®2</sup> solution, all encased in plaster. The minicatheter is obtained by removing the needle assembly from the distal end of a sterile butterfly catheter. The wide accessible ingress opening which easily accommo-

dates a needleless syringe allows the Betadine solutions to be perfused into the ulcer bed. The plaster cast primarily serves to protect the ulcerated lesion from movement, trauma, and pressure.

A typical cast for a decubitus ulcer of the medial malleolus is applied as follows. Debridement of the ulcerated area usually should be performed prior to the application of the perfusion cast. A sterile 4 × 4 gauze is placed directly over the ulcer and the catheter tubing is placed over it (Fig. 1). Six sterile 4 × 4's are opened and utilized as a fluff-type dressing and are positioned directly over the first 4 × 4 (Fig. 2). The entire ankle area is then covered with six additional opened 4 × 4's. Three-inch Kling is then generously wrapped in a figure eight fashion stabilizing the fluff dressing over the ulceration and covering the entire foot and distal one-third of the leg (Fig. 3). Cover this entire dressing with at least three layers of Webril.<sup>®3</sup> Three-inch plaster roll is then applied, covering the entire dressing (Fig. 4). The Betadine-filled syringe is then attached to the ingress opening of the catheter (which is attached to the cast's periphery), and approximately 8 ml of the solution is perfused at the time of original application (Fig. 5). Betadine solution, approximately 4 ml, is then infused into the area twice a day, until healing occurs.

### Results

The two cases presented were patients treated at the Oak Forest Hospital Podiatry Clinic.

**Patient 1.** Patient 1 was a 78-year-old, well developed, but obese, black female with a history of a cerebrovascular accident approximately 6 years earlier. The patient presented with a decubitus ulcer over the medial side of her left heel that was approximately 2 cm in diameter (Fig. 6). Initial treatment consisted of routine weekly gauze dressing changes impregnated with Betadine solution. There was no healing noted after a 1-month inter-

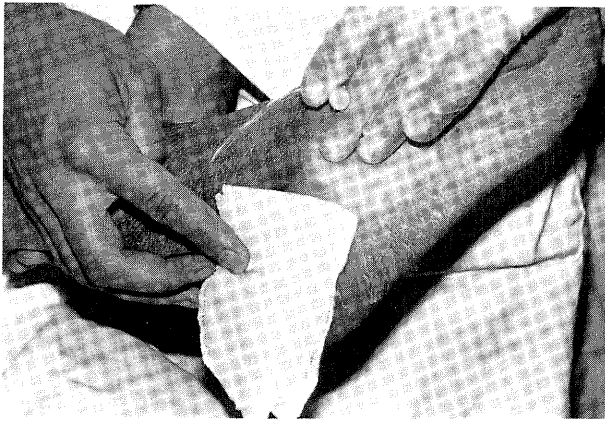
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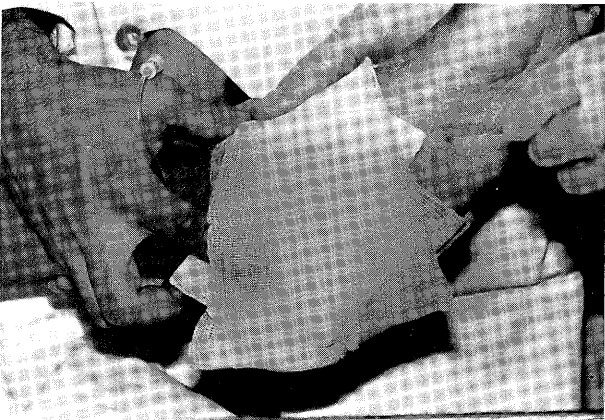
<sup>®1</sup> Johnson & Johnson, New Brunswick, N.J.

<sup>®2</sup> Purdue-Frederick, Norwalk, CT.

<sup>®3</sup> Kendall Hospital Products, Chicago, IL.



**Figure 1.** Place the sterile butterfly catheter tubing, (without needle) approximately 6 inches in length, on top of one sterile 4 × 4 gauze which is placed directly over the ulcer.



**Figure 2.** Place six sterile opened 4 × 4's as a fluff dressing directly over the area.



**Figure 3.** Wrap Kling generously in a figure eight fashion, covering the entire foot and distal one-third of the leg. Be sure then to stabilize the ingress opening of the catheter tubing outside of the Kling fluff dressing.

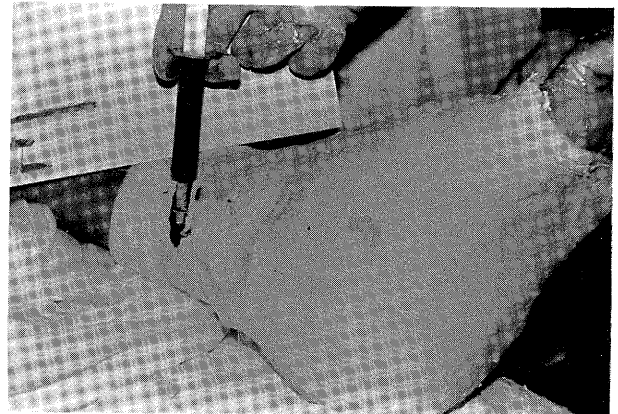
val, and at this time a perfusion cast dressing was applied, using the technique described previously. The cast was changed at weekly intervals in order to observe progress. By the end of the first week,

considerable progress was noted, and, at the end of 5 weeks, the ulcer was completely healed (Fig. 7).

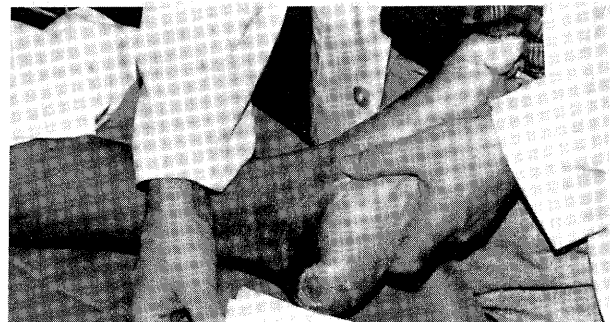
**Patient 2.** The second patient was a 56-year-old, well developed, well nourished, Caucasian male who had originally suffered exposure with resultant frostbite of both feet, that was treated at Cook County Hospital. The patient underwent forefoot amputation at the distal metatarsal joint region of the right foot, and amputation across the metatarsal bases of the left foot by the end of 1 month's



**Figure 4.** Apply 3-inch plaster roll over the previously applied Webril dressing.



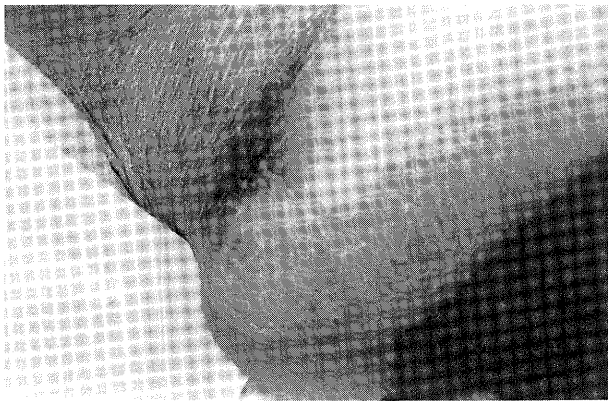
**Figure 5.** A syringe, without needle, is then connected to the ingress opening of the catheter tubing to allow the Betadine solution to be perfused into the cast dressing.



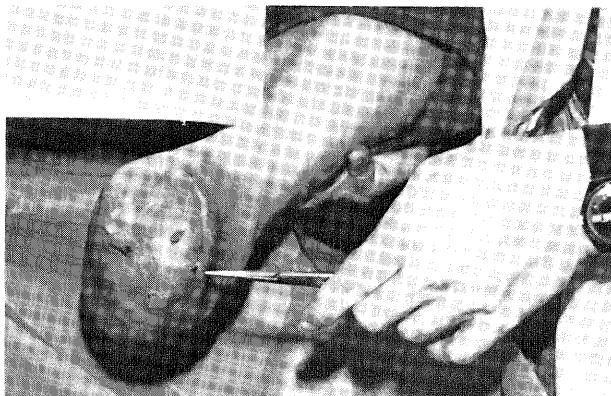
**Figure 6.** First case study presenting a decubitus ulcer 2 cm in diameter over the medial aspect of the left heel.

hospital stay. On the left foot, the remaining bony prominences of the second, fourth, and fifth metatarsal bases caused skin breakdown and wound dehiscence. The patient also developed ulceration of these areas (Fig. 8).

By the end of the third month's hospital stay, the patient was transferred to Oak Forest Hospital for supportive care and orthotic-prosthetic follow-up therapy. Initial treatment consisted of daily dressing changes utilizing Betadine impregnated gauze dressings. This routine was utilized for approximately 4 months, with no improvement noted during this period of treatment. By the end of this 4-month period, it was decided to apply a perfusion cast. The cast was changed at weekly intervals for observation purposes, and at the first cast change much improvement was noted. By the second cast change, one of the ulcerations was completely healed. After 4 weeks, bony spicules were removed through the two remaining lesions, the remaining bone was curetted down to a somewhat smoother surface, and a perfusion cast was reapplied. Again,



**Figure 7.** After 5 weeks of treatment with the perfusion cast dressing, the decubitus ulcer was completely healed.



**Figure 8.** Second case study presenting cutaneous ulcerations overlying the bony prominences of the second, fourth, and fifth metatarsal bases of the left foot.

after 1 week of treatment, great improvement was noted. Three weeks after removal of the bony spicules, the ulcerations were completely healed. The patient was then ready for evaluation for prosthetic restoration.

## Discussion

This is an excellent method of treatment for diabetic ulcers, as well as decubitus ulcers. It prevents the patient with the insensitive foot from traumatizing the area unknowingly. Protection of the ulcerated part, as well as convenience and versatility, offer the perfusion cast technique as a viable means toward ulcer management. In the noncompliant patient, the perfusion cast not only offers the patient a much greater convenience than daily dressing changes, but also provides a good antiseptic environment. For hospitalized patients, the perfusion cast offers the nursing staff convenience and less chance for improper application of dressings as well. Of primary significance, the method of application is dynamic, and can be modified to suit almost any indicated foot and lower leg ulcer. The perfusion cast technique should be considered a new addition to the podiatric regimen of ulcer treatment, as it has provided us and other colleagues with gratifying results.

## Summary

This paper presents an additional means of therapy for treating cutaneous ulcerations of the lower extremity. The method of application of the perfusion cast was described in detail, illustrating the fundamentals necessary to perform this technique. Two case studies are presented which utilize the perfusion cast technique as a means of therapy.

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