

# Management of Soft Tissue Edema in the Lower Extremity using Complete Circumferential Closed Incision Negative Pressure

## Wound Therapy: A Case report

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### Background

➤ Posttraumatic injury to extremity tissue can result in swelling and edema which is commonly observed following surgery and is classified as a physiologic reaction that results in an abnormal excess accumulation of serous fluid in soft tissue. Extremity soft tissue edema resulting post-trauma or post-operatively can result in a significant delay in wound healing and can increase the likelihood of complications. Soft tissue edema is susceptible to opportunistic infection by pathogens that can lead to an increase in postoperative complication rates. Negative pressure wound therapy (NPWT) has demonstrated its impact in acute and chronic wounds and in the post-operative setting. We present the successful application of circumferential negative pressure wound therapy (NPWT) over a closed incision and soft tissue to manage severe lower extremity edema following orthopedic surgery.

### Patient

➤ A 52-year-old male presented to the hospital with a closed tibial plateau fracture of the left lower extremity resulting from a motor vehicle accident. Comorbidities included high cholesterol, kidney stones, sleep apnea, and benign prostatic hyperplasia. His prior surgeries were two previous cardiac catheterizations, cystoscopy, and kidney stone removal

### Problem

➤ The patient underwent open reduction and internal fixation (ORIF) of tibial plateau fracture; the incision was closed with surgical staples (**Figure 1**). The patient was placed in a standard postoperative splint with a soft cotton wrap (Jones bandage). On postoperative Day (POD) 7, the surgical dressing was removed, and 300 cc of seroma fluid was aspirated from the left knee (**Figure 2**). The patient was then placed in a knee immobilizer. The patient complained of severe left leg edema. Clinical assessment found no indication of deep vein thrombosis or compartment syndrome. Dorsalis pedis and posterior tibial pulses were 2+. There was no open wound, and the incision was healing well, but concern for significant edema remained.



### Application of ACTIV.A.C.™ Therapy System

➤ The decision was made to apply incisional negative pressure therapy to cover the soft tissue circumferentially from the mid-thigh down to the ankle incorporating the entire soft tissue in the lower extremity. The skin was protected with Xeroform® Occlusive Petrolatum Dressings (**Figure 3**), followed by V.A.C.® GRANUFOAM™ Dressings applied circumferentially (**Figure 4**). A seal was created over the dressings using V.A.C.® Drape and Ioban™ 2 Antimicrobial Incise Drape. Negative pressure was applied at -125 mmHg using an ACTIV.A.C.™ Therapy System. During therapy, the distal circulatory status was monitored (eg, distal pulses were palpated) to ensure uncompromised perfusion.



### Results

➤ NPWT was removed POD 12 and circumferential measurements of the lower extremity at the thigh and calf were compared between prior to circumferential NPWT application (POD 7) and removal (POD 12). Calf circumference decreased 4cm and thigh decreased 4 cm post removal of circumferential NPWT (**Figure 5**). Within one week of discontinuing NPWT, left lower extremity edema had subsided and maintained similar dimensions to uninjured right leg. Within 1 week of discontinuing incisional negative pressure therapy, the edema in the left leg had subsided and maintained similar dimensions to the uninjured right leg (**Figure 6**).



### Conclusion

➤ Use of incisional negative pressure therapy is a simple and noninvasive tool for controlling soft tissue edema following surgery. This method can facilitate edema resolution and diminish high rates of wound complications in the lower extremity. There were no apparent disruption of normal perfusion to the distal aspect of the leg when applied circumferentially, and there were no postoperative complications.