

# Delayed Application of Negative Pressure Wound Therapy Promotes Healing in Dehiscenced Surgical Wounds

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## Abstract

### Introduction

Post-operative wound dehiscence triggers a variety of complications, including infection, wound chronicity, and fistula formation. While prevention is optimal, it is not always possible. Variables including peri-wound anatomy, tension or underlying joint movement, insufficient clinic follow-up, and non-adherence to recommendations increase wound dehiscence. Negative effects of surgical wound dehiscence include infection, delayed wound healing, increased devitalized tissue, hospital readmission, and return to operating room (OR). Negative pressure wound therapy (NPWT) is a well-documented advanced wound treatment that stimulates granulation and reduces inflammatory drainage (1). There is inconclusive evidence regarding the benefits of immediate post-operative NPWT placement on the prevention of surgical incision dehiscence (2). However, we demonstrate here the positive outcomes of delayed NPWT to promote swift wound healing after unexpected surgical wound dehiscence has occurred.

### Methods

Three patients underwent primary surgical wound closure in the OR, but later dehiscenced unexpectedly. Patients were referred to our clinic at least one week post-operatively, and NPWT was initiated at that time to promote closure by secondary intention following incision failure. Wound care was provided with NPWT re-application one to two times weekly in clinic.

### RESULTS

Here, we demonstrate that even when applied greater than one week post-operatively, and in the setting of complicated wound dehiscence, delayed NPWT significantly improved wound granulation and closure progress, and prevented OR revisions and antibiotic necessity.

### DISCUSSION

Mismanagement of dehiscenced surgical wounds causes significant post-operative complications, including infection, long term hospitalization, increased OR efforts, patient inconvenience, and death. The cases presented here demonstrate a positive response to delayed NPWT in dehiscenced surgical wounds. NPWT is accessible and accommodates many wound anatomies and treatment plans, including application over advanced primary dressings, and irrigation and debridement settings. Treating dehiscenced surgical wounds with delayed NPWT improves surgical outcomes, lowers post-operative costs, and increased patient satisfaction by swiftly promoting wound healing at the bedside after incision failure.

## Wound Care Challenges

Post operative surgical wound dehiscence is a significant obstacle to overcome. Many times, these patients are medically complex, further impeding wound healing. It is common for wound care teams experience delays in consultation, at times, days to months after completion of the surgery. Dehiscenced surgical wounds can present with varying severities of deterioration. In the interim between surgical closure and wound consultation, wound mismanagement can further complicate the wound by introducing necrosis, infection, or widening dehiscence.

We have found that negative pressure wound therapy (NPWT) promotes healthy wound healing in surgically dehiscenced wounds, even when applied days to months after the completion of surgery. Reducing peri-wound edema and decreasing tension at incision edges can speed wound healing in these patients. In the appropriate setting, combining NPWT with advanced primary dressings has promoted a synergistic affect on our treatment plans.

## Case Reports

### PATIENT 1

63 year old female

#### SIGNIFICANT HISTORY:

- Hidradenitis Suppurativa
- Type 2 Diabetes Mellitus, poorly controlled
- Distant history of necrotizing fasciitis and osteomyelitis pubic symphysis, resolved
- History of frequent recurrent abscess formation throughout the body
- Obesity, BMI 39.41
- Hypertension
- Colon adenocarcinoma s/p recent partial colectomy + incision dehiscence, periwound infection
- Active chemotherapy during wound healing

#### WOUND HISTORY:

63 year old patient known to our wound care team for previous infectious abscesses with delayed healing, presented with colon cancer, s/p laparoscopic partial colectomy. On POD10, veteran was consulted to wound care team for dehiscenced surgical incision at the LUQ trocar site. There were two distinct areas of incisional dehiscence, separated by central areas of approximated incision. There was a subcutaneous communicating tunnel between the two openings. Wound draining malodorous, purulent drainage. There was a 6cm diameter, well circumscribed local area of mild erythema, edema, warmth, and tenderness to palpation lateroposterior to the lateral aspect of the incision, communicating subcutaneously. Due to dependent positioning, the abscess could not drain to gravity, was painful to manually pack, and previously required 3+ dressing changes daily through the wound dehiscence for heavy drainage. The patient was treated systemically for infection by the medical team. An irrigating NPWT system was initiated while inpatient to encourage drainage of the subcutaneous abscess, and transitioned to continuous NPWT after discharge home with 1-3 times weekly and PRN dressing changes. 2-3 times weekly MIST ultrasound therapy was also employed to the skin overlying the closed abscess and incision. Various advanced primary dressings, including non-human collagen, synthetic fiber matrix, and human skin substitutes, were utilized underneath the NPWT. Veteran reported improvement in pain with NPWT in place, preferred this to frequent local packing. During wound care, necrotic tissue and retained, non-resorbed, resorbable sutures were debrided at bedside, promoting wound improvements. Veteran initiated adjuvant chemotherapy regimen at 2 months and continued beyond wound closure. The NPWT dressing was discontinued at 3 months, and the wound closed completely at 6 months.

### PATIENT 2

44 year old female patient

#### SIGNIFICANT HISTORY:

- Vitamin D Deficiency, 21.93
- Recreational cannabis use
- Overweight, BMI 27.20
- Otherwise healthy

#### WOUND HISTORY:

44 year old patient in good health consulted to our wound care team s/p abdominoplasty at outside facility 3 months prior. Patient reports the incision was approximated for several weeks. A small area of dehiscence appeared. Patient was instructed wet to dry dressings daily and PRN drainage outside provider. Over time, the dehiscence advanced along a large portion of the incision. The wound was draining heavily in a high mobility area along the lateral hip. There was significant undermining. Continuous NPWT was initiated immediately at first visit, with rapid wound improvement, and discontinued to local dressing after 1 month. Standard wound care, including sharp debridement and non-human advanced primary dressings were used in tandem. Wound completely closed after 2 months. Patient satisfied at no OR return, decreased pain, faster wound healing.

## Case Reports



POD 10 – VAC Day 1



POD 14



POD 30



POD 180

**Patient 1** Complicated 63 year old patient with significant co-morbidities, including h/o multiple chronic recurring abscesses. Presented with colon cancer s/p resection with incisional dehiscence POD10, associated with communicating subcutaneous abscess. Patient initiated regular chemotherapy regimen 2 months into wound care. Wound closed after 6 months.



POD 90  
Wound Care Day 0



POD 98  
Wound Care + 8 days



POD 109  
Wound Care + 19 days



POD 144  
Wound Care + 54 days

**Patient 2** 44 year old otherwise healthy patient seen for 3-months history of surgical incision dehiscence s/p abdominoplasty. Prior to wound clinic consultation, previously instructed wet to dry daily and PRN, noted enlarging area of dehiscence. At initial wound consultation, NPWT immediately applied x 1 month. Standard wound care including serial sharp debridement, and non-human advanced primary dressings were employed in tandem. Complete wound healing 2 months after initial wound care consultation.

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## References

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