LINK

COMPENDIUM
of Clinical Cases NPWT

Presented during LINK Congress 2025

www.linkforwoundhealing.info

LINK

Abstracts

NPWT Session

SSI AND THEIR TREATMENT: A COMPREHENSIVE APPROACH

Authors: L. Veverkova [1], P. Doležal [2]
Affiliation: [1] University Hospital Faculty of Medicine of MU Brno, CZ
[2] EFS Masaryk University Brno CZ

Abstract

Introduction

Surgical site infections (SSI) are a significant complication in oncological patients due to immunosuppression, malnutrition, and the effects of cancer treatments such as chemotherapy and radiotherapy. These factors impair wound healing, increasing the risk of infections. Oncological patients often undergo major surgeries, which further complicates recovery. The study aimed to assess the incidence of SSI in oncological patients and identify associated risk factors.

Methods

A retrospective analysis was conducted using data from 38,596 hospitalizations at the First Surgical Clinic of FN USA in Brno between 2013 and 2024. Among these, 2,425 patients underwent surgery for oncological diagnoses under general anesthesia. SSI cases were identified and analyzed. Data was extracted from the clinical information system NISstat, and statistical analysis was performed using R software. Hypothesis testing was carried out using Welch's t-test and Pearson's Chi-squared test.

Results

SSI occurred in 201 out of 2,425 oncological surgeries (8.3%). Statistical analysis revealed that an oncological diagnosis was a significant risk factor for the development of SSI ($p < 0.001$). The median length of hospitalization for patients with SSI was 7 days, while the presence of an oncological diagnosis did not significantly impact hospitalization duration. Negative pressure wound therapy (NPWT) was used in 137 patients and was associated with shorter treatment and hospitalization durations.

Discussion/Conclusion

Oncological patients are at higher risk for SSI, and their treatment requires a comprehensive approach, including advanced wound management methods like NPWT. Early detection and appropriate intervention are essential to improving patient outcomes and minimizing healthcare costs.

SSI and their Treatment: A Comprehensive Approach

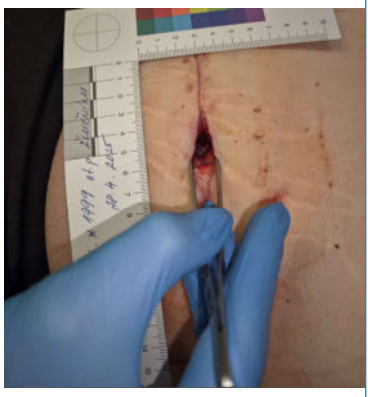
L. Veverkova, [1] *P. Doležal* [2]

[1] *University Hospital Faculty of Medicine of MU Brno, CZ*
[2] *EFS Masaryk University Brno CZ*

Background

- **Definition:** Surgical Site Infections (SSI) are among the most common healthcare-associated infections.
- **Global burden:** Account for up to 20% of HAIs (WHO, 2018).
- **Impact:** ↑ LOS, ↑ costs, ↑ mortality.

Guidelines referenced: WHO (2016, 2018), CDC (2022), ECDC (2023), NICE (2020).



Epidemiology

- SSI incidence worldwide: **2–5% after clean surgery; up to 20%after contaminated surgery**.
- Risk higher in:
  - cancer patients,
  - emergency surgery,
  - abdominal and thoracic procedures.

WHO Global Guidelines, *Lancet Infect Dis* 2022 (Allegranzi). Badia et al., *J Hosp Infect* 2017.

author's archive

FNUSA Cohort 2013–2024

- **Total operated patients:** 27,009
- **Cancer patients:** 2,991 (11%)
- **SSI overall:** 1,037 (3.8%)
- **SSI in cancer patients:** 257 (8.6%)
- **Mean age:** 56.9 years
- **Deaths:** 343 (1.3%)

Discharge Outcomes (FNUSA)

Ambulatory discharge: 84.8%

Transfers (rehab, social, long-term): 13.9%

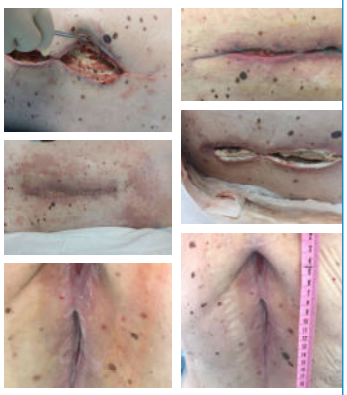
Deaths: 1.3%

Key message: SSI patients disproportionately represented among deaths and transfers.

The term 'difficult to heal' should be used for surgical wounds that are not healing as expected.

Male, 1952
spinal stabilisation, DM, ICHS, Sepsis, secondary healing.

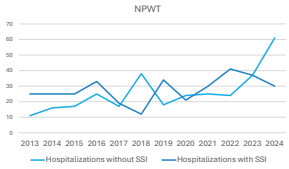
Hospitalised from 24/08/2024 –28/02/2025
Dressings from October 2024 –February 2025, 2–3 times a week.



author's archive

Economic Analysis (FNUSA 2021–2024, CZ-DRG)

- **No SSI (n=1,922)** vs. **SSI (n=212)**
- LOS: 7.6 vs. 20.0 days (2.6×)
- CZ-DRG weight: 4.4 vs. 13.6 (3.1×)
- Operations: 1.2 vs. 2.7 (2.2×)
- OR time: 82 vs. 143 min (1.7×)



NPWT

Year	No without SSI	No SSI positive	SSI %
2013	11	25	69,44
2014	16	25	60,98
2015	17	25	59,52
2016	25	33	56,90
2017	17	19	52,78
2018	38	12	24,00
2019	18	34	65,38
2020	24	21	46,67
2021	25	30	54,55
2022	24	41	63,08
2023	37	37	50,00
2024	61	30	32,97

NPWT Subgroup (2021–2024)

- **Without SSI (n=93):** LOS median 18 d, CZ-DRG median 9.8
- **With SSI (n=97):** LOS median 21 d, CZ-DRG median 14.4
- Difference: LOS +3 d, CZ-DRG +47%
- **Interpretation: SSI cases under NPWT have smaller LOS gap, but higher financial impact.**

FNUSA Cohort 2021–2024

No patient		Min	Q1	Median	Mean	Q3	Max
1922 noSSI CZ-DRG	age	19	43	60	58,1	74	98
	OPtotal	1	1	1	1,2	1	12
	OP min	3	30	63,5	68,9	95	200
	OPmin1st	3	30	65	69,9	100	200
	LOS	2	3	5	7,6	9	73
	CZdrg	0,2	0,46	1,8	4,4	6,6	53,97
	CASEMIX per LOS	0,03	0,15	0,27	0,51	0,72	3,52
212 SSI CZ-DRG	age	19	54	68	64,9	77	97
	OPtotal	1	1	2	2,6	3	14
	OP minavg	10	31,6	54,5	60,2	77,5	190
	OPmin1st	10	33,75	65	72,4	95	200
	LOS	2	10	21	20,0	26	97
	CZdrg	0,3	1,7	8,1	13,5	18,5	170,0
	CASEMIX per LOS	0,02	0,15	0,46	0,62	0,87	4,3

Data collection from the NIS-Hosp hospitalization system of FNUSA Brno, CZ

International Comparison

- **FNUSA:** SSI → LOS 20 d, cost tripled
- **WHO/ECDC:** SSI prolong LOS by 7–14 d, costs +2–5×
- Conclusion: FNUSA results consistent with global evidence.

Both SSI and dehiscence should be considered types of difficult-to-heal wound.

Male, 1960, oncology disease status, diabetes mellitus, amputation of the lower leg,

28 days of hospitalisation, 7 surgeries (1 major, 6 minor)

9 dressings

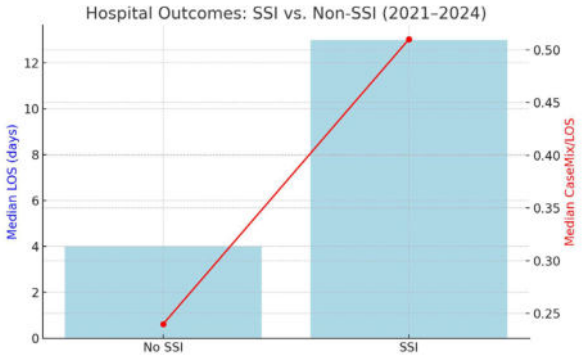
CZ DRG group 09-105-01, CASEMIX 13,4 - 1 075200 Kč

author's archive

Hospital outcomes (2021–2024, CZ-DRG period)

- The patient with SSI is 8 years older than the patient without SSI
- has undergone 1 more surgery than the patient without SSI,
- and had a 9-day longer hospitalization than the patient without SSI.

Group	Median LOS	Median CaseMix/LOS	Median OP time (min)	Median no. of ops
No SSI	4	0.24	65	1
SSI	13	0.51	65	2–3



Key Risk Factors & Prevention

- **Risk factors:** age, cancer, long surgery (>2h), diabetes, obesity, emergency surgery.
- **Prevention (guidelines):**
  - Pre-op antibiotics (timing crucial)
  - Normothermia, glycemic control
  - Minimally invasive surgery
  - **NPWT for high-risk wounds**
  - Strict asepsis and perioperative bundles

Age of patients without and with SSI

Recommendations

- Improve SSI monitoring in hospitals.
- Implement WHO/CDC-recommended evidence-based bundles.
- Focus on targeted prevention in at-risk patients.
- Monitor cost-weighted DRG as a key performance indicator (KPI).

Conclusions

SSI significantly increases morbidity, length of stay (LOS) and hospitalisation costs.

SSI cases consume two to three times more resources.

Prevention is a cost-effective strategy that demonstrably improves outcomes.

ISSUES IN THE NEGATIVE PRESSURE TREATMENT OF NECROTIZING FASCEITIS

Authors: Szentkereszty Z., Zádori G., Győri F., Ditrói G., Tóth D.
Affiliation: University of Debrecen, Faculty of Medicine Inst. of Surgery

Abstract

Aims

Necrotizing fasciitis (FN) is a rare, severe septic soft tissue infection. It most commonly affects the limbs and trunk. It can be caused by monobacterial, polymicrobial, or even fungal infections. The authors describe their experiences with negative pressure treatment of necrotizing fasciitis of the limbs and trunk, and describe the key points of the treatment.

Methods

Four male patients were treated. The average age of the patients was 57.3 years. In two patients, the infection developed in the upper extremities and in two patients in the trunk, lumbar and above the iliac spine. Following the diagnosis, urgent surgical exploration, wide necrosectomy, and fasciotomy were performed. The surgery was supplemented with NPWT. The treatment included broad-spectrum antibiotic therapy. In addition to careful monitoring of the patient (general condition, laboratory tests, secretion management), the sponge was changed every 2-3 days at first and then every 3-5 days. The wounds were gradually narrowed with stitches during the sponge changes.

Results

All patients recovered. In all patients the wound was possible to close primarily, and plastic surgery was not required.

Discussion

Negative pressure therapy is a successful method for the treatment of FN. It is important to carefully monitor the patient's condition during treatment and to gradually reduce the wounds.

Issues in the Negative Pressure Treatment of Necrotizing Fasciitis

Szentkereszty Zs, Zádori G, Győri F,
Ditrói G, Tóth D.
University of Debrecen, Medical Health Center, Inst. of Surgery

LINK for Wound Healing Congress 2025

Necrotizing Fasciitis

- Necrotizing fasciitis (FN) is a rare, severe septic soft tissue infection
- It most commonly affects the limbs and trunk
- It can be caused by monobacterial, polymicrobial, or even fungal infections
- Treatment is radical surgical necrosectomy with negative pressure wound therapy
- Wide spectrum antibiotics are needed
- Reconstruction of the wounds (plastic surgery if needed)

LINK for Wound Healing Congress 2025

Aims

- The authors describe their experiences with negative pressure treatment of necrotizing fasciitis of the limbs and trunk
- Describe the key points of the treatment

LINK for Wound Healing Congress 2025

Patients and Methods

- Four male patients
- Mean age of 57.3
- In two pts. the upper extremities
- In one pt. the trunk
- In one pt. the lumbar and iliac region

LINK for Wound Healing Congress 2025

Patients and Methods

- LRINEC score were 7.25
  (CRP,WBC, Hgb, Sodium, Creatinin, Glu)
- Extremital compartment syndrome in two pts.
- Irresecable sigmoid cancer in one pt.

LINK for Wound Healing Congress 2025

Patients and Methods

- Postoperative management
  - Observation
    - General condition, fever, laboratory
    - ICU monitoring
    - Secretion management
  - Change AB therapy on the basis of bacterial culture and AB sensitivity
  - Changes of sponge in every 2-5 days
  - Wound closure step by step

LINK for Wound Healing Congress 2025

Results

- No mortality
- ICU stay was 5.5 days
- Hospital stay was 16.5 (10-21) days
- „Primary" wound closure
- No need of reconstructive plastic surgery

LINK for Wound Healing Congress 2025

Questions in the Treatment of Necrotizing Fasciitis

- When to start NPWT?
- How to observe the disease?
- What type of NPWT is recommended?
- How to close the wound?
- When to finish the treatment
- Is plastic surgery needed?

LINK for Wound Healing Congress 2025

Questions in the Treatment of Necrotizing Fasciitis

- When to start NPWT?
- As early as it is possible

LINK for Wound Healing Congress 2025

Questions in the Treatment of Necrotizing Fasciitis

- How to observe the disease?
- General condition
  - Fever, sensory, etc.
- Secretion management
- Laboratory
- Antibiogram
- Sponge changes

LINK for Wound Healing Congress 2025

Questions in the Treatment of Necrotizing Fasciitis

- What type of NPWT is recommended?

- First continuous suction with law (<100 Hgmm) pressure
- Than continuous suction with higher >100 Hgmm pressure
- For indicate granulation intermittent suction

LINK for Wound Healing Congress 2025

Questions in the Treatment of Necrotizing Fasciitis

- How to close the wound?
- Step by step as early as it is possible

LINK for Wound Healing Congress 2025

Questions in the treatment of Necrotizing Fasciitis

- When to finish the treatment

- As early as it is possible
- If the wound closure is possible

LINK for Wound Healing Congress 2025

Questions in the Treatment of Necrotizing Fasciitis

- Is plastic surgery needed?

- In most cases not

LINK for Wound Healing Congress 2025

Conclusions

- Negative pressure therapy is a successful method for the treatment of necrotizing fasciitis

- It is important to carefully monitor the patient's condition during treatment and to gradually reduce the wounds.

LINK for Wound Healing Congress 2025

STRATEGY FOR MANAGEMENT OF FOOT SOFT TISSUE DEFECT IN CHILDREN

Authors: Dr. Marie-Christine Plancq
Affiliation: CHU Amiens Picardie

Abstract

Introduction

Severe foot trauma in children is often a therapeutic challenge, with many traumas being caused by lawnmowers or crush incidents. Resulting injuries concern soft tissue with soiled wounds and devitalized tissue.

The principal problem is reconstruction and strategy of coverage procedures.

With an experience of more than 20 years, we develop and evaluate an algorithm for strategy of treatment.

Methods

Retrospective study

Main inclusion criteria: severe foot and ankle trauma with soft tissue defect 2001-2023

Minimum follow-up: 2 years

Injury evaluation:

- mechanism
- site of injury
- presence of amputation
- size of soft tissue defect
- tissue exposed (tendon, bone, joint, cartilage)

Surgical treatment: methods of coverage

Results

Surgical treatment on emergency

- Surgical debridement
- Wound wash
- Bone osteosynthesis with wire
- Antibiotic prophylactic
- Primary closure whenever possible
- Negative pressure wound therapy (NPWT)

Discussion/ Conclusions

Application of NPWT early prepare and optimize soft tissue defect.

The indications of secondary coverage are guided by our protocol based on size of the defect, localization, tissue exposed.

Methods of coverage used different plastic procedures such as flaps, artificial dermis, skin graft.

Choice of coverage procedure for reconstruction depends of the surgeon preference and the department habit's.

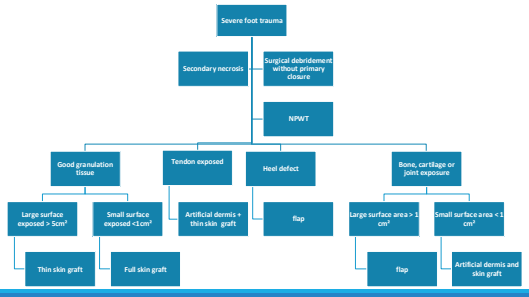
Strategy for management of foot soft tissue defect in children

DR MARIE-CHRISTINE PLANCQ
LINK HARTMAN2025

- Severe foot trauma in children is often a therapeutic challenge
- Many traumas are caused by lawnmowers or crush incidents
- Injuries concern soft tissue with soiled wounds and devitalized tissue
- Principal problem is reconstruction and strategy of coverage procedures
- With The experience of more than 20 years , we develop and evaluate an algorithm for strategy of treatment

- 2 treatments have radically change the strategy of treatment:
  - Negative pressure wound therapy (NPWT)
  - Introduction of artificial dermis (AD)
- Characteristics of injuries determine the choice:
  - Nature of exposed tissue
  - Localization
  - Size of defect

Algorithm for foot wound defect treatment



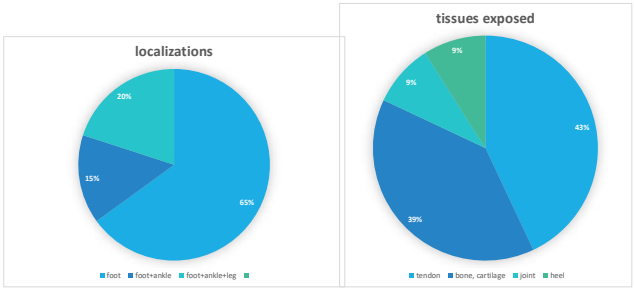
Methods

- retrospective study
- main inclusion criteria: severe foot and ankle trauma with soft tissue defect
- 2001-2023
- minimum follow-up : 2 years
- children < 16 years
- injury evaluation:
  - mechanism
  - site of injury
  - presence of amputation
  - size of soft tissue defect
  - tissue exposed (tendon, bone, joint, cartilage)
- surgical treatment: methods of coverage
- results: kitaoka score

Results

- 20 children
- mean age: 5 years and 4 months (range: 1-11years)
- 10 children < 4 years of age
- majority of boys (13/7)
- mechanism:
  - lawnmower injuries: 15
  - traffic accident 5
- type of injuries:
  - amputations 13: partial often toes (12) total (1)
  - crushed injuries
  - localizations
  - tissue exposed

Results



Results: surgical treatment on emergency

- surgical debridement
- wound wash
- bone osteosynthesis with wire
- antibiotic prophylactic
- primary closure whenever possible
- negative pressure wound therapy since 2003 (15) when first wound defect or secondary after debridement of necrosis

Results
methods of coverage

- **flaps**:
  - free flap with latissimus dorsae (4) before 2003
  - local flaps (4) : sural (3) supramalleolar (1)
- **artificial dermis** (7) with skin graft always after NPWT and sometimes associated
- thin **skin graft** (14) full skin graft (7)

Flaps

- free flaps with latissimus dorsae always before 2003
- local flaps:
  - supramalleolar 1
  - sural 3
- indications:
  - heel defect
  - large surface of bone, joint or cartilage exposed
- limits:
  - experience with microsurgery
  - vascular damage caused by trauma
  - risk of thrombosis with high level platelets

Flap case1

- small girl of 2 years age
- lawnmower accident
- large defect on leg, ankle and foot with partial avulsion of medial malleole
- coverage with latissimus dorsae flap
- distal necrosis on the foot
- secondary application of NPWT and full skin graft (2001)

Flap: case 2

- girl of 7 years and half
- traffic accident :pedestrian/ car
- injuries of ankle and foot with lateral skin defect and joint exposure and partial external malleolar avulsion
- debridement and NPWT d0
- sural flap day 5
- skin graft d 14
- good esthetic and functional result

Flap: case 3

- Lawnmower accident
- Heel defect
- Boy of 3 years , severe behavioral disorders
- D0 debridement and NPWT
- Coverage with sural flap
- Problem of immobilization
- 10 years later: no problem for walking and footwear

Artificial dermis

- Available in France since 1997
- Integra® two-layer (collagen and silicone)
- It acts as a scaffold for regenerating dermal skin and must be completed by thin epidermal skin graft
- Two-stage procedure spaced of 15-20days
- Single layer : Matriderm® Pelnac® one stage procedure
- First developed for treatment of major burns and sequels
- Used for large soft tissue defect

Artificial dermis

ADVANTAGES

- Improvement of scar quality and elasticity
- Rehabilitation of slip plane over tendon
- Coverage of small area of bone or cartilage
- No morbidity on donor site
- Less thick than flap
- Best growth potential

LIMITS

- Vulnerability to infection
- High cost
- Require strict immobility for good integration sometimes difficult in children
- Two procedure for double layer and delay of integration

Artificial dermis and NPWT

- Alternative for coverage even with small surface area of tendon , bone or cartilage are exposed
- But very vulnerable to infection
- Prealable use of NPWT optimize use of AD:
  - Exudate drainage
  - Improve vascularization and granulation tissue
  - Decrease bacterial colonization
  - Facilitate and accelerate AD incorporation

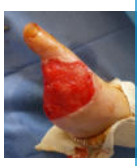
(1)Pu LLQ. An alternative approach for soft-tissue coverage of a complex wound in the foot and ankle with vacuum-assisted closure over artificial dermis and subsequent skin graft. J Plast Reconstr Aesthet Surg. 2009 Dec;62(12):e682–684.

AD : case 1

- Boy of 4 years age
- Lawnmower accident
- Amputation of the four last toes and dilacerations soft tissue
- Primary closure
- Secondary necrosis require debridement and NPWT

AD: case 1

- Continue NPWT 125 mmHg Exposure of small areas of bone and cartilage
- Coverage with AD (Matriderm®) + thin skin graft



AD : case 2

- Boy of 3 years age
- Lawnmower accident
- First ray amputation on foot
- Failure of reimplantation
- Surgical debridement D5
- Local infection with E Coli and Enterococcus
- NPWT with interface UrgotulSAg



AD : case 2

- D20 coverage with AD (Integra®) + NPWT
- Thin skin graft 21 days ago



Skin graft

THIN SKIN GRAFT

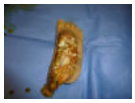
- Alone or with AD
- Morbidity of donor site
- Possibility of large surface covered
- Quick healing
- Poor quality of scar for skin graft alone: hypertrophic scar

FULL SKIN GRAFT

- small size of defect
- Low morbidity of donor site
- Exigence of application
- Difficulties of incorporation
- Quality of the scar

Skin graft

- amputations are common
- important to keep all the skin even on amputated limb
- In this case , we used plantar skin foot to covered the leg


Evolution

Modified Kitaoka score /80

- activity level
- Walking distance
- Limping
- Range of ankle flexion/extension
- pain


- Mean time of Resumption of walking : 57 days (21-91)
- Foot prosthesis: 1
- Orthosis : 11
- Kitaoka score :68 (55-80)
- Complications:
  - Keloid scar (1)
  - Scar contracture (6)
  - Osteotomas (1)
  - Medial translation of toes after hallux amputation
- Secondary surgery: 6
  - often for contracture release 3
  - Defatted of flap 1
  - Stump revision: distal regularization of tibia 1
  - Epiphysiodesis for ankle varus deformity 1

Discussion

- Severe foot trauma always sustained wound defect
- It asks about the best strategy of reconstruction
- Our algorithm seem to be adapted for each situation with good results
- NPWT is always a preliminary treatment before reconstruction
- So the indications of free flaps have decreased
- Indications of flap are still required:
  - Heel defect require local flap because of weight bearing
  - Large defect with exposed bone or ankle
- Artificial dermis is a good alternative for defect with tendon exposed or small surface of bone or cartilage
- None of children need secondary surgery for walking or shoe-bearing problem

Conclusion

- Application of NPWT early prepare and optimize soft tissue defect
- Indications of secondary coverage is guide by our protocol based on :
  - Size of defect
  - Localization
  - Tissues exposed
- Methods of coverage used different plastic procedures: flaps, artificial dermis, skin graft
- Choice of coverage procedure for reconstruction depends of the surgeon preference and the department habit's

USE OF NEGATIVE PRESSURE WOUND THERAPY VIVANO®TEC IN ACUTE PERITONITIS IN A NEONATE. CASE PRESENTATION AND REVIEW OF THE LITERATURE

Authors: George Alin Stoica[1,3], Radu Florin Fruntelata[1,3], Octavian Stoian[1], Adriana Popa[2], Daniela Mititelu[2], Robert Medregoniu[2]

Affiliation: [1] Department of Pediatric Surgery, Emergency County Hospital of Craiova Romania

[2] Department of Pediatric ICU, Emergency County Hospital of Craiova Romania

[3] University of medicine and Pharmacy of Craiova Romania

Abstract

Introduction

Introduction Gastro-intestinal malformations is representing a consistent chapter in pediatric surgery, many of them being diagnosed prenatally of immediately after birth. In some cases, they produce early acute complications, like intestinal perforation complicated with septic shock, requiring prompt surgical intervention and intensive care management.

Methods

The authors are presenting the case of a newborn, male, gestational age 39 weeks, birthweight 3100 grams. In the first 24 hours after birth there was a delay in eliminating meconium, being suspected for Hirschsprung's disease. Initial measures of nursing were started but in the 12th day after birth presented signs of acute abdomen and septic shock. He was operated in the same day for extended necrosis of the left colon, with multiple perforations. 72 hours after initial surgery spontaneous opening of the abdominal wound was encountered with evisceration, requiring reintervention. After redo surgery, the decision to use Negative Pressure Wound Therapy Vivano Tec was made. During the first 7 days after redo surgery the negative pressure therapy was used, followed by complete closure of the abdomen.

Results

After the use of two step pressure wound therapy excellent cleaning of the abdominal cavity was obtained, allowing final closure and uneventful outcome of the patient. Six months after closure of the abdominal wall, a pull through of the remnant colon technique was used, to reestablish the intestinal transit.

Discussion

There is still small experience with negative wound therapy in children [(1)], in treatment of any kind of lesions. In some reports in only 12,4% of patients the NWPT was used for abdominal surgery [(2)], but in all pediatric population almost 40% were in the 0-1 age group2. Since the first use of VAC system in pediatric population in 2000 [(3)], there is no protocol in using the NWPT from the initial surgical procedure in treating an acute peritonitis of any kind in newborn. In our case we choose NWPT for a complication of the disease and of the initial surgery.

Clinical relevance

According to the literature review, there is still small experience in using NWPT in newborn and small babies, concerning the negative pressure values and the duration of therapy. More cases are needed to establish a clinical protocol.

References

[(1)] Negative Pressure Wound Therapy in children: A 25 cases series. La thérapie par pression négative chez l'enfant : série de 25 cas. L. Pouzet, U. Lancien, A. Hamel , P. Perrot , F. Duteille. Annales de chirurgie plastique esthétique (2021) 66, 242-249

[(2)] Negative-Pressure Wound Therapy in Infants and Children: A Population-Based Study. Katherine B. Santosa, Margaret A. Olsen, Alexandra M. Keane, Erika D. Sears, and Alison K. Snyder-Warwick. Journal of surgical research march 2019 (235) 560e568

[(3)] Vacuum assisted closure therapy in children with complicated abdominal wounds, with or without viscero-cutaneous fistulae. Mostafa M. Elghandour, Osama El Naggar, Ahmed Bassiouny Radwan, Mohammed Abdel-Latif . Journal of Pediatric Surgery Open 8 (2024) 100153

Use of Negative Pressure Wound Therapy Vivano ®Tec in acute peritonitis in a neonate. Case presentation and review of the literature

George Alin Stoica[1,3], Radu Florin Fruntelata[1,3], Octavian Stoian[1], Adriana Popa[2], Daniela Mititelu[2], Robert Medregoniu[2]

[1] Department of Pediatric Surgery, Emergency County Hospital of Craiova Romania

[2] Department of Pediatric ICU, Emergency County Hospital of Craiova Romania

[3] University of medicine and Pharmacy of Craiova Romania

Ancient technique of sucking wounds

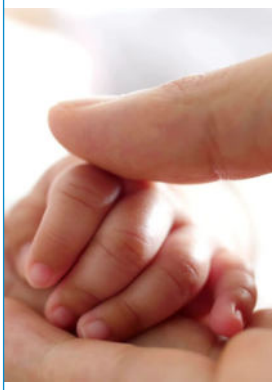
Roman Empire

The historian Suetonius wrote that one of
these healers was ordered to suck the wound of Cleopatra to attempt to revive her from the bite of the asp

Harris T. Poisoned wounds. The Medical Examiner. 1838;1:250-254.

MODERN WOUND THERAPY

- The modern NPWT systems came into being in the 1990's with the use of polyurethane foam and a mechanical vacuum pioneered by Drs. Louis Argenta and Michael Morykwas of Wake Forest University School of Medicine
- IN OUR DAYS



USE OF NPWT IN PEDIATRIC POPULATION

- First reports in adult patients
- Pediatric population-different age groups, from newborn to adolescent
- Premature newborns with extreme low birthweight
- Concerns related to compatibility with materials and value (-mmHg) for the negative pressure
- Duration of therapy

Definition

- **A complex abdominal wound** was defined as complete or partial wound dehiscence combined with one or more of the following: stoma, fistula, bowel anastomosis, tube enterostomy, or patch abdominoplasty.

PROTOCOL

- A pediatric VAC protocol was instituted in 2004

The guidance provided in this document relates the use of V.A.C.® Therapy in paediatric patients, that is in neonates, children, and young people less than 18 years of age.

INDICATIONS

V.A.C.® Therapy is used in a wide variety of acute and chronic wounds to:

- remove exudate and reduce periwound oedema
- increase tissue perfusion
- promote formation of granulation tissue
- reduce the complexity/size of a wound
- optimise the wound bed prior to and following surgery
- create a closed, moist wound environment[1].

PRINCIPLES OF BEST PRACTICE

VACUUM ASSISTED CLOSURE® in paediatrics and young people

PROTOCOL

BOX 1 | Paediatric wound types suitable for V.A.C.® Therapy (adapted from[2])

Superficial/surface wounds	Cavity wounds	Other
■ Trauma (eg degloving injuries) ■ Partial thickness burns ■ Skin grafts ■ Skin or muscle flaps ■ Dermal substitutes	■ Traumatic tissue loss ■ Dehisced surgical wounds ■ Pressure ulcers ■ Diabetic ulcers	■ Heavily exuding wounds ■ Infected wounds* ■ Deep sternal wounds ■ Congenital open abdominal wounds ■ Leg ulcers

*V.A.C.® Therapy is not recommended as a stand-alone treatment for wound infection. It may be used with caution in infected wounds as long as this is in addition to appropriate treatment of the infection[2].

BOX 2 | Contraindications and cautions for V.A.C.® Therapy in paediatric patients (adapted from[2])

Contraindications	Cautions
■ Treatment is refused ■ Untreated osteomyelitis ■ Wound contains: – exposed blood vessels or organs – open joint capsule – fistula (unless enteric) – malignancy – active bleeding – necrotic eschar	■ Close proximity to vital structures: ensure these are adequately protected with overlying fascia, tissue or other protective barriers ■ Anticoagulant therapy ■ Enteric fistula ■ Pain score above a threshold determined by local guidelines) (see page 11) ■ Healthy periwound margin <2cm (see page 7)

PRINCIPLES OF BEST PRACTICE

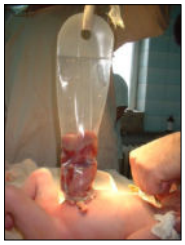
VACUUM ASSISTED CLOSURE® in paediatrics and young people

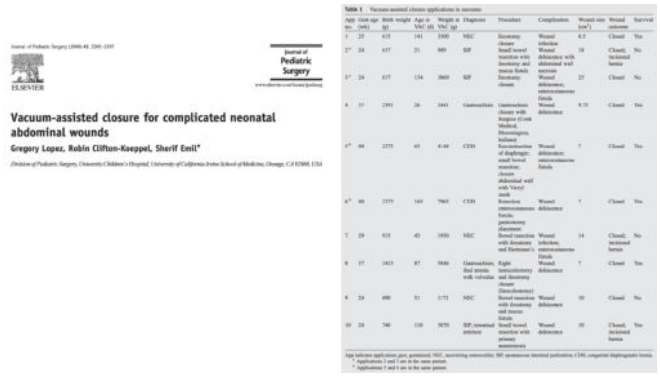
SPECIFIC FOR PEDIATRIC SURGERY

- Congenital abdominal wall defects (omphalocelle, gastroschisis)
- Postoperative complications after thoracic, abdominal or perineal surgery
- (ex. Anorectal malformation surgery-PSARP)
- Burns
- Trauma

SPECIFIC FOR PEDIATRIC SURGERY

- Congenital abdominal wall defects (omphalocelle, gastroschisis)





Journal of Pediatric Surgery

Vacuum-assisted closure for complicated neonatal abdominal wounds

Gregory Lopez, Robin Clifton-Koeppel, Sherif Emil*

Table 1 Vacuum-assisted closure applications in neonates

Case no.	Gest age (wk)	Birth weight (g)	Age at VAC (d)	Weight at VAC (g)	Diagnosis	Procedure	Complication	Wound size (cm²)	Wound outcome	Survival
1	25	615	141	1300	NEC	Ileostomy closure Small bowel resection with ileostomy and mucus fistula	Wound infection Wound dehiscence with abdominal wall necrosis	8.5	Closed	Yes
2*	24	617	21	869	SIP	Ileostomy closure	Wound dehiscence, enterocutaneous fistula	18	Closed; incisional hernia	No
3*	24	617	134	2065	SIP			25	Closed	No
4	37	2295	28	3441	Gastroschisis	Gastroschisis closure with surgeon (Cook Medical, Bloomington, Indiana) Reconstruction of diaphragm; small bowel resection; closure abdominal wall with Vicryl mesh	Wound dehiscence, enterocutaneous fistula	9.75	Closed	Yes
5*	40	2275	65	4140	CDH		Wound dehiscence, enterocutaneous fistula	7	Closed	Yes
6*	40	2275	165	7965	CDH	Resection enterocutaneous fistula, gastrostomy placement	Wound dehiscence	7	Closed	Yes
7	28	915	42	1950	NEC	Bowel resection with ileostomy and Hartmann's closure	Wound infection, enterocutaneous fistula	14	Closed; incisional hernia	No
8	37	2415	87	5046	Gastroschisis; ileal atresia with volvulus	Right hemicolectomy and ileostomy closure	Wound dehiscence	7	Closed	Yes
9	24	690	51	1172	NEC	Ileostomy closure; bowel resection and ileostomy and mucus fistula	Wound dehiscence	10	Closed	No
10	24	740	118	3870	SIP; intestinal stricture	Small bowel resection with primary anastomosis	Wound dehiscence	10	Closed; incisional hernia	Yes

App indicates application; gest, gestational; NEC, necrotizing enterocolitis; SIP, spontaneous intestinal perforation; CDH, congenital diaphragmatic hernia.
* Applications 2 and 3 are in the same patient.
† Applications 5 and 6 are in the same patient.

Division of Pediatric Surgery, University Children's Hospital, University of California Irvine School of Medicine, Orange, CA 92868, USA

Journal of Pediatric Surgery

Vacuum-assisted closure for complicated neonatal abdominal wounds

Gregory Lopez, Robin Clifton-Koeppel, Sherif Emil*

The VAC therapy has been reported in several series in adults and children, but the experience is still relatively limited in the neonatal and low-birth-weight populations.

We have shown that VAC for complicated abdominal wounds is safe and successful in neonates of any gestational age and birth weight. It provides effective wound management, even in the presence of enterostomies or enterocutaneous fistulae.

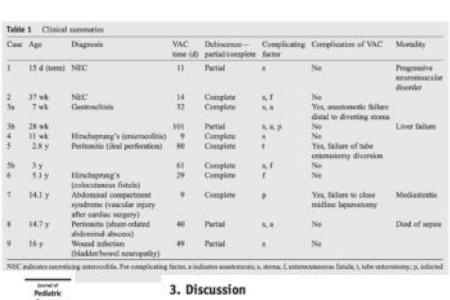


Table 1 Clinical summaries

Case	Age	Diagnosis	VAC time (d)	Dehiscence—partial/complete	Complicating factor	Complication of VAC	Mortality
1	15 d (term)	NEC	11	Partial	s	No	Progressive neuromuscular disorder
2	37 wk	NEC	14	Complete	s, f	No	
3a	7 wk	Gastroschisis	32	Complete	s, a	Yes, anastomotic failure distal to diverting stoma	
3b	28 wk		101	Partial	s, a, p	No	Liver failure
4	11 wk	Hirschsprung's (enterocolitis)	9	Complete	s	No	
5	2.8 y	Peritonitis (ileal perforation)	80	Complete	t	Yes, failure of tube enterostomy diversion	
5b	3 y		61	Complete	s, f	No	
6	5.1 y	Hirschsprung's (colocutaneous fistula)	29	Complete	f	No	
7	14.1 y	Abdominal compartment syndrome (vascular injury after cardiac surgery)	9	Complete	p	Yes, failure to close midline laparostomy	Mediastinitis
8	14.7 y	Peritonitis (shunt-related abdominal abscess)	40	Partial	s, a	No	Died of sepsis
9	16 y	Wound infection (bladder/bowel neuropathy)	49	Partial	s	No	

NEC indicates necrotizing enterocolitis. For complicating factor, a indicates anastomosis; s, stoma; f, enterocutaneous fistula; t, tube enterostomy; p, infected

Journal of Pediatric Surgery

Vacuum drainage in the management of complicated abdominal wound dehiscence in children[☆]

Satu-Liisa Paunfoho*, Janet Costa, Carole Boken, Rick Turnock, Colin Y. Baillie

3. Discussion

This report represents the largest series of children treated with VAC therapy for complex abdominal wounds. It confirms that abdominal VAC therapy can be used successfully in premature neonates [17,18]. A recent study has outlined experience with 10 episodes of VAC therapy in neonates with complicated abdominal wounds [18].

Association for Academic Surgery

Negative pressure wound therapy in infants and children: a single-institution experience

Our review is the latest among many reports describing the successful use of NPWT application in infants and children. Despite the warnings from the FDA about the use of this modality of wound care in this population, situations occur in which alternatives simply do not exist or are inferior to NPWT. We believe that the present review, along with the numerous published reports, argue for the safety and efficacy of NPWT in the pediatric population. We have demonstrated that the complication rate with NPWT can be low in infants and children if care and caution are exercised.

Table 4 – Wound types in newborns and infants (age < 1 y).

Wound type	Patients (n)
Open abdomen	15
Soft tissue infection	14
Soft tissue defect	13
Open chest	7
Wound dehiscence	5
Nonhealing wound	3
Pressure ulcer	1
Burns	1
Gastrocutaneous fistula tract	1
Total	48

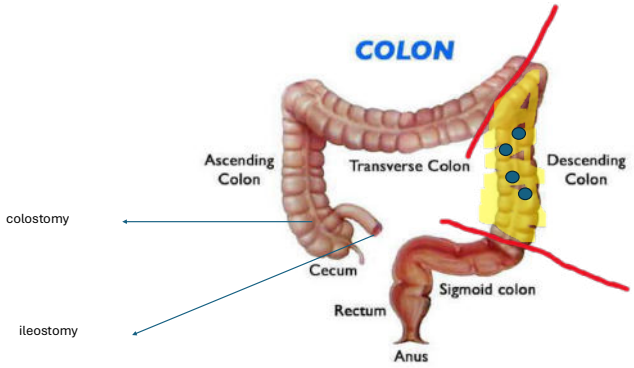
Table 1 – Demographics stratified by age and weight.

Age	Patients (n)	Weight (kg) Median	Interquartile range
<1 mo	3 (1.0)	3	2.98–3.56
1 mo to 1 y	45 (14.8)	3.7	3.14–7.20
2–11 y	104 (34.2)	29.9	18.7–40.0
12–18 y	138 (45.4)	64.8	55.9–81.8
Total	290 (100)	—	—

Data in parentheses are percentages.

Our case

- newborn, male, gestational age 39 weeks, birthweight 3100 grams.
- In the first 24 hours after birth there was a delay in eliminating meconium, being suspected for Hirschsprung's disease.
- Initial measures of nursing were started but in the 12th day after birth presented signs of acute abdomen and septic shock.
- He was operated in the same day for extended necrosis of the left colon, with multiple perforations.

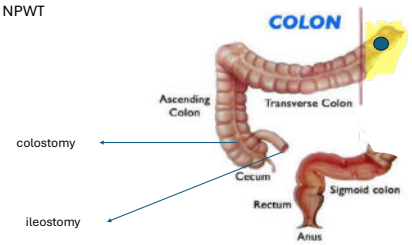


Our case

- 72 hours after initial surgery spontaneous opening of the abdominal wound was encountered with evisceration. The decision to use **Negative Pressure Wound Therapy Vivano ®Tec** was made -30 mmHg

Our case

- After 48 hours in ICU we've changed the abdominal dressing of the NPWT- stool evacuation through abdominal wound, requiring reintervention.
- Redo surgery- partial colectomy and closure of the transverse colon wall in double layers.
- Restarting NPWT



OUR CASE

2 days after re-do surgery

6 days after re-do surgery

OUR CASE

Complete closure of the abdominal wall

8 days after re-do surgery

Results after 45 days follow-up

- 3 mo after abdominal closure- stenosis of the ileal stomy and symptoms of intestinal obstruction
- Revision of stomy and extended viscerolisis

OUR CASE-final results

- 5 months after complete closure of the abdominal wall
- **Ileo-colonic reimplantation**
- **Pullthrough** of the transverse colon, Duhamel technique and
- **Colo-anal anastomosis**
- We have noticed during surgery a **mild adhesion syndrome** in the abdominal cavity

- Normal wight acquisition and development

5th of July 2025

Our preliminary conslusions

- Small series presented in the literature regarding the us of NPWT in newborn, premature infant of small babies
- According to actual publications and experience NPWT is a safe method to treat severe abdominal or thoracic complex wound in children
- In pediatric surgery NPWT can be an option to treat from the beginning large congenital abdominal wall defects (NEW PROTOCOL)
- In our Department NPWT is now the first intention therapeutic method for complex thoracic, abdominal and limbs wounds
- It helps to control sepsis in severe cases
- **Vivano ®Tec** is a safe and easy to use system

MANAGEMENT OF A YOUNG WOMAN WITH OPEN BILATERAL LOWER LEG AND LUMBOSACRAL FRACTURES FOLLOWING SUICIDE ATTEMPT: A CASE REPORT

Authors: P. Szkutnik, Prof. M. Domżalski,
Affiliation: USK nr 2 Uniwersytetu Medycznego w Łodzi, Poland

Abstract

A 26-year-old female was transferred from the ICU following a high-energy suicide attempt with resultant open, comminuted bilateral tibia and fibula fractures and lumbosacral spine fracture. Referred initially for bilateral lower limb amputation, she was re-evaluated and met criteria for limb-salvage therapy on the basis of young age and overall stabilization. Surgical management involved radical debridement with excision of dead tissue, intramedullary nailing for fracture stabilization, and application of vacuum-assisted closure (VAC) therapy. Reconstructive flap surgery, as planned, was postponed due to ongoing psychosis and lack of transfer of the patient to psychiatric services. VAC therapy became the mainstay of wound management.

The patient was treated with 6 weeks of hospitalization, with VAC dressing changes and wound care on broad-spectrum antibiotic coverage and protein supplementation on a weekly basis. There was notable granulation and epithelialization. Near complete healing, she was discharged to psychiatric services for ongoing treatment.

Discussion/Conclusion

This case demonstrates the challenge of managing complex orthopedic trauma in the setting of profound psychiatric comorbidity. It emphasizes the value of a multidisciplinary approach between trauma, orthopedic, plastic, and psychiatric services. The decision not to amputate and to pursue functional reconstruction was successful and indicated.

VAC therapy played a crucial role in promoting granulation, controlling infection, and as a temporizing wound modality when definitive surgical procedures were delayed. Its application in the treatment of large contaminated wounds with the additional benefit of psychiatric stabilization is a valuable adjunct in the staged management of these injuries. This case supports the use of VAC therapy in the multidisciplinary management of open bilateral lower limb fractures in psychiatrialy compromised patients.

Management of a Young Woman with Open Bilateral Lower Leg and Lumbosacral Fractures following Suicide Attempt: A Case Report

Patrycja Szkutnik, Wioletta Trela, Prof. Marcin Domżalski

26-year-old female patient after a suicide attempt under the influence of alcohol on 19.02.2025. Past medical history: bipolar affective disorder, alcohol and psychoactive substance dependence, nicotine addiction.

Mechanism of injury: fall from the 4th floor. Multiple trauma sustained:

- Traumatic shock
- Pulmonary contusion
- Pulmonary parenchymal laceration
- Respiratory failure
- Burst fracture of the L5 vertebral body with spinal canal compromise
- Sacral fracture
- Coccygeal fracture
- Open comminuted fractures of both lower legs and both feet

Management:

- Mechanical ventilation (respiratory therapy)
- Initially admitted to a trauma center, where external fixators were applied for fracture stabilization, debridement was performed, and open wounds were sutured.
- Postoperatively, the patient remained in the ICU.

Further course:

Due to the extent of the lower leg injuries, the patient was qualified for bilateral below-knee amputations with subsequent secondary prosthetic fitting. However, given preserved peripheral sensation, adequate perfusion, and intact tendon function, the patient categorically refused amputation.

After an agreement between the heads of two centers, following a one-month stay in the ICU, the patient was transferred to the Department of Orthopedics, University Clinical Hospital No. 2 in Łódź, for an attempt at limb salvage.

The patient was thoroughly informed that, in the event limb salvage was not feasible, amputation would be necessary. The attempt was undertaken due to the patient's young age, as well as preserved limb perfusion, innervation, mobility, and tendon function.

During hospitalization, the patient was under continuous psychological and psychiatric care.

Upon admission, preoperative optimization was initiated: nutritional support with supplementation of protein and albumin, psychiatric preparation, comprehensive microbiological cultures, and a control CT scan to exclude sources of infection. Additionally, dental and gynecological consultations were performed.

Initially, the right lower limb was in worse condition, with more extensive fractures, whereas the left lower limb presented with better soft tissue status and less severe tibial fractures, though with more complex foot fractures.

The surgical procedure was performed on 12.03.2025 and lasted approximately 9 hours. The operative team consisted of 5 orthopedic surgeons, 3 scrub nurses, and 2 anesthesiologists.
The patient was operated under general anesthesia.
Bilateral lower limb surgery was performed under intraoperative fluoroscopic guidance.

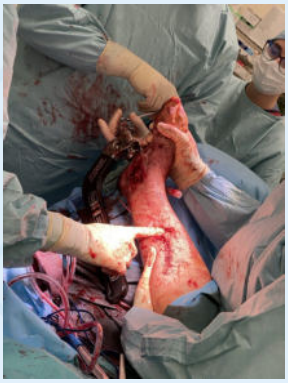
The procedure was initiated on the right lower limb.

Sutures were removed, necrotic tissue excised, microbiological cultures collected, followed by extensive debridement and copious irrigation.

Bone defects and free bone fragments were removed, as well as irreparably damaged tendon remnants.

Fracture reduction and closed stabilization were performed due to the condition of soft tissues. Stimulan beads with vancomycin were implanted, and fixation was achieved with an intramedullary nail and Kirschner wires.

After re-draping, the same steps were repeated on the left lower limb.

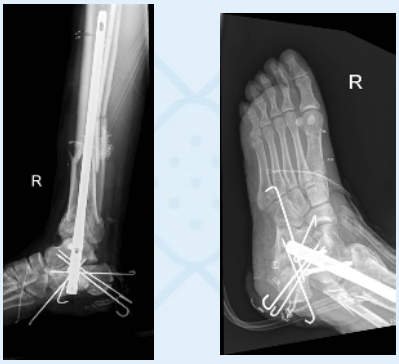


At the end of the surgery, negative pressure wound therapy (VAC) was applied simultaneously to both lower limbs, with a pressure setting of 125 mmHg. Postoperatively, upon emergence from anesthesia, peripheral perfusion and sensory function of the lower limbs were verified. Sensation was preserved, and oxygen saturation in both lower limbs was 98%.


The postoperative X-ray results were satisfactory.

I was aware that it would not be possible to achieve perfect reduction of the fractures and dislocations, considering the time elapsed since the injury (4 weeks) and the condition of the soft tissues.

However, my priority was to achieve fracture reduction and fixation sufficient to restore weight-bearing function; therefore, stabilization arthrodesis of the major joints of the lower leg was performed.

Postoperatively, the patient was transferred to the ICU for 24 hours.

Subsequently, after returning to the ward, a schedule for dressing changes was established — performed every 7 days. Nutritional support was continued with protein and albumin supplementation, along with adequate hydration. The patient was also evaluated by neurosurgery regarding potential stabilization of the fractured L5 vertebra; it was determined that surgical management would be possible after the healing of lower limb wounds.

Microbiological cultures revealed *Staphylococcus epidermidis* (MRCNS) and coagulase-negative *Staphylococcus* (MRCNS). In view of the presence of implants, intravenous therapy with vancomycin and rifampicin was initiated, planned for at least 6 weeks, supported by concurrent probiotic prophylaxis.

It was anticipated that wound healing would be prolonged and that portions of the tissue might undergo necrosis during the process.

Therefore, during VAC dressing changes, prior to application of a new VAC system, mechanical wound debridement was performed under local anesthesia and analgesia in order to stimulate perfusion and remove residual necrotic tissue and fibrin.

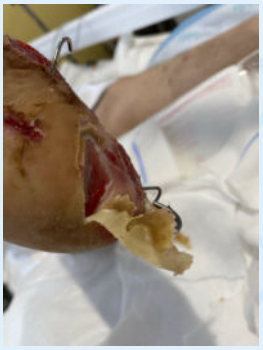
The patient also received pharmacological agents aimed at improving tissue perfusion. Additionally, she was maintained on long-term anticoagulant prophylaxis.

The first VAC dressing change was performed 7 days after surgery. Considering that Kirschner wires remained in place for 8 weeks during the dressing application period, it was initially necessary to reinforce the seal with surgical drape.

After 2 weeks, additional sealing was no longer required, and the standard drapes provided in the VAC set were sufficient.

This was most likely attributable to the stabilization of the patient's condition, adequate nutritional status, and the near resolution of postoperative wound drainage.

2 weeks after...



4 weeks after...

6 weeks after...

4 months after...

After a two-month stay in the Department of Orthopedics, the patient was transferred to the Psychiatric Ward for further treatment of her underlying psychiatric disorder.

She was managed with specialized dressings, initially changed every two weeks, later every 7 or 5 days. The patient attended follow-up visits at the Orthopedic Clinic every 2–3 weeks.

Intravenous antibiotic therapy was switched to oral administration and extended to a total duration of 3 months. Anticoagulant prophylaxis was continued until the patient achieved full mobilization.

Unfortunately, during her stay in the psychiatric ward, the patient resumed cigarette smoking (whereas she had not smoked at all during her orthopedic hospitalization). This resulted in one episode of wound leakage, which was successfully managed with a short course of additional oral antibiotic therapy.

After repeated counseling regarding the high risk of limb amputation associated with smoking a pack of cigarettes per day, the patient agreed to cease smoking once again.

At 6 months, the surgical outcome is very satisfactory:

the right lower limb has fully healed, without excessive scarring, and X-ray results are favorable.

on the left foot, a residual wound of approximately 0.5 cm in diameter remains, without discharge. Based on X-ray findings, this is related to prominence of the intramedullary nail (although the nail does not extend beyond the subcutaneous tissue).

The patient is able to fully bear weight on both lower limbs, with intermittent pain in the left foot; the left tibia is painless.

The right lower limb is completely pain-free.

It was discussed with the patient that, should the wound on the left foot fail to heal, removal of the intramedullary nail from the left tibia will be necessary. The right tibia currently requires no further intervention. At present, the wound is slowly healing, and the patient has decided not to undergo additional surgery.

THE USE OF NPWT IN COMPLICATIONS AFTER RECONSTRUCTIONS WITH THE USE OF SKIN FLAP

Authors: Marek Smolár[1], Diana Musová[1], Lenka Juríčková[1], Branislav Kolarovszki[2], Juraj Miklušica[1]

Affiliation: [1] Clinic of general, visceral and transplant surgery, Jessenius faculty of Medicine, University Hospital Martin, Slovakia,
[2] Neurosurgery Clinic, Jessenius faculty of Medicine, University Hospital Martin, Slovakia

Abstract

Skin flap is a unit of tissue that is transferred from one site of the body (donor site) to another (recipient site) while maintaining its own blood supply. Flap surgery is a subspecialty of plastic and reconstructive surgery. Various types of flaps are performed, and the indications for them are even more diverse. Despite precise surgical technique, various complications of flaps can occur, the treatment of which is very complicated and often long-term. The most common complication of the flap is necrosis and dehiscence with secondary infection. The treatment of these complications requires repeated wound care with debridement, elimination of infection and subsequent secondary closure. The authors present individual cases of the therapeutic use of NPWT for complications after skin flap reconstruction in breast surgery and spondylosurgery. They demonstrate the use of this therapy, tips and tricks, as well as the most common problems that a surgeon may encounter when treating complications of flap surgery.

Keywords
breast cancer surgery; spondylosurgery; musculocutaneous flap, negative-pressure wound therapy; radiointerventional embolization

MARTIN UNIVERSITY HOSPITAL

JESSENIUS FACULTY OF MEDICINE IN MARTIN

The use of NPWT in complications after reconstructions with the use of skin flap

Marek Smolár

Clinic of General, Visceral and Transplant Surgery, Jessenius Faculty of Medicine, Comenius University in Bratislava, University Hospital Martin, Martin, Slovak Republic

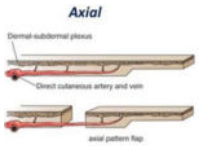
LINK for Wound Healing Congress 2025
23rd - 24th October, Berlin

Skin flap reconstruction

- Transferring of healthy tissue from one part of the body to another area
- Tissues used: skin and fat, muscle, fascia, bone (or combinations = composite flaps)
- Used in **reconstructive surgery** after trauma, cancer resections, or congenital deformities
- Goal: Restore both function and aesthetics
- Performed: mainly by plastic surgeons, sometimes by other surgical specialists
- Perfect anatomical knowledge is essential!!

Blood supply of flaps

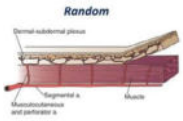
- Generally divided into "axial" and "random" categories according to blood supply
- Axial flaps: blood supply from a named artery that courses longitudinally within the flap (+ venous drainage)
- Pedicle and free flap



Mikami T, Kagimoto S, Yabuki Y, Yasumura K, Iwai T, Maegawa J, Suganuma N, Hirakawa S, Masudo K. Deltopectoral flap revisited for reconstruction surgery in patients with advanced thyroid cancer: a case report. BMC Surg. 2017 Sep 15;17(1):101.

Blood supply of flaps

- Random flaps: perfusion from the subdermal vascular plexus
- a low-pressure system vulnerable to compromise under excessive twisting or stretching
- due to the tenuous blood supply - flaps with a length-width ratio not exceeding 3:1 (typical mistake with subsequent complication)

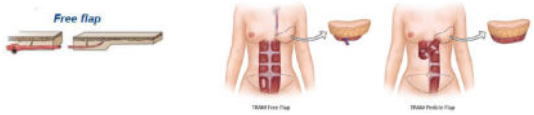


Etzkorn JR, Zito PM, Hohman MH, Council M. Advancement Flaps. 2024 Jan 29. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan

Distance from donor site to defect

- Important factor in the development of complications
- 3 types: distant, regional, local

- Distant: "Free" or "microvascular" flaps harvested from distant sites, removed entirely and transplanted into defects (vascular supplies reconnected through microsurgery)



Distance from donor site to defect

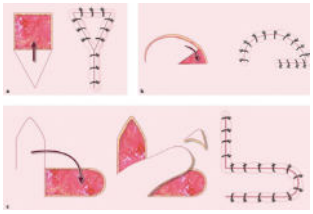
- Regional: harvested from the same region as the defect (e.g. same limb)
- Don't directly border the defect

Pedicled gracilis flap (anal sphincter reconstruction)

Wolff KD. New aspects in free flap surgery: Mini-perforator flaps and extracorporeal flap perfusion. J Stomatol Oral Maxillofac Surg. 2017 Sep;118(4):238-241.

Distance from donor site to defect

- Local: "Local" flaps originate from donor sites directly adjacent to the tissue defect, incorporating the donor site into the closure process



Skin flap complications

- Hematoma/seroma
- Infection
- Wound dehiscence
- Donor site morbidity

- Partial or total flap necrosis – worse complication (problem with healing)

- Oncosurgery: Prolonged healing - late start of oncological therapy !!

Risk factors for complications

- Poor vascularity (e.g. smokers, diabetics)
- Previous radiation therapy (breast cancer surgery)
- Inadequate flap design or tension
- Technical errors in microvascular anastomosis
- Patient comorbidities

NPWT in skin flap surgery

- Risk vs. benefit
- Prophylactic use: decreasing the venous congestion in microsurgical procedures in free flaps
- Application of NPWT peripherally to the pedicled flap
- Duration of NPWT – 5 days; continuous pressure of - 100 mm Hg[1]
- The negative pressure increases the vascularization and decreases the edema – better integration of tissue[2, 3, 4]

[1]Suarez, Maria & Latorre, Luis & Quintero, Jorge. (2024). Use of Negative Pressure Wound Therapy in Pedicled Flaps can Improve Graft Integration and Minimize Complications. Journal of Reconstructive Microsurgery Open. 09. e64-e68. 10.1055/a-2287-6535.
[2]Pilkaitis CM, Molnar JA. Subatmospheric pressure wound therapy and the vacuum-assisted closure device: basic science and current clinical successes. Expert Rev Med Devices 2006;3(02):175–184
[3]Gabriel A, Pfaffenberger M, Eldenburg E. Successful salvage of a lower extremity local flap using multiple negative pressure modalities. Plast Reconstr Surg Glob Open 2020;8(06):e2801
[4]Moellhoff N, Demmer W, Pistek S, Wachtel N, Bodenschatz K, Lui L, Alfertshofer M, Frank K, Giunta RE, Ehrl D. Impact of Negative Pressure Wound Therapy on Perfusion Dynamics in Free Latissimus Dorsi Muscle Flaps. J Clin Med. 2024 Sep 5;13(17):5261.

Risk of using NPWT

- Ischemia/necrosis of the flap - main vascular pedicle and the microcirculation of the subcutaneous and subdermal regions can be compressed under relatively high negative pressure[1]
- Compression of the vessel if the main flap pedicle is within 1 cm of the absorbent foam[2]
- Problem with visual control of the flap under the foam (late detection of complications)

[1]Bi H, Khan M, Li J, Pestana IA. Use of Incisional Negative Pressure Wound Therapy in Skin-Containing Free Tissue Transfer. J Reconstr Microsurg. 2018;34:200–205.
[2]Kairinos N, Solomons M, Hudson DA. The paradox of negative pressure wound therapy--in vitro studies. J Plast Reconstr Aesthet Surg. 2010;63:174–179.

Therapeutic use of NPWT (Case reports)

- Case report No. 1
- Advanced breast carcinoma with skeletal metastases
- 70-year-old woman
- Personal history: "she took care of her sick husband and neglected herself„
- Tumor diagnosed during hospitalization in traumatology for a leg fracture
- Biopsy - confirmed carcinoma NST, indicated neoadjuvant oncological treatment (CHT + RT)

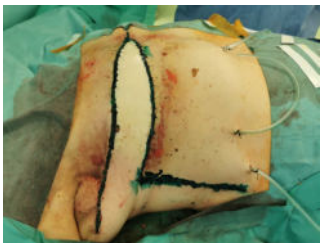
Case report No. 1

- Initial finding:
- Smelling, oozing tumor, ulcerated, infiltration of pectoral muscles
- Metastases in axillary LNs

Case report No. 1

- Surgery:
- Modified radical mastectomy with axillary dissection and resection of pectoralis major muscle
- Without the possibility of primary wound closure

Case report No. 1



Closure of the defect with rotation flap

Case report No. 1

- Postoperative course:
- Necrosis of the flap on the 6th postoperative day, reoperation required
- Applied Vivano NPWT system
- 4 changes (every 3 days)

Case report No. 1

- NPWT and definitive wound closure:
- Gradual reduction of the wound using a skin fold in the axilla
- Definitive wound closure on the 15th day

Case report No. 2

- Locally advanced breast carcinoma without distant metastases
- 63-year-old woman
- She felt a lump in her right breast (BSE)
- A biopsy confirmed cancer, NST, triple-negative, T2 (3 cm)
- Indicated neoadjuvant chemotherapy (NAC)
- Despite NAC - tumor progression on the skin (chemoresistant tumor)

Case report No. 2

- Surgery:
- Modified radical mastectomy with extensive skin excision
- Large defect, impossibility of primary suture
- In cooperation with a plastic surgeon – skin flap + skin graft

Case report No. 2

- Plastic surgeon:
- Rotation flap + free skin graft (harvested from the thigh)

Case report No. 2

- Postoperative course:
- On the 6th day, initial necrosis of the upper flap with the need for revision
- Nectrectomy and application of Vivano NPWT
- 3 changes every 3 days and then a new application of skin graft

Case report No. 2

- Final finding:
- Re-epithelialized wound with healed flaps and skin grafts

Pre-operative condition

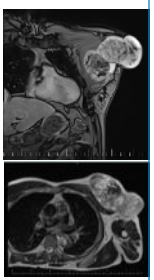
Definitive condition (7 weeks after surgery)

Case report No. 3

- Extensive mastectomy for breast fibromyxoid sarcoma in man
- 70-year-old man
- Large tumor on left breast growing for 6 months
- MRI revealed a tumor infiltrating major pectoral muscle and deltoid muscle on the left
- Histology: high grade pleomorphic fibromyxoid sarcoma
- Neoadjuvant RT: 30 gray in 5 fractions - progression of the lesion (12x15 cm)
- New lesion (7 cm in diameter) + radiation dermatitis

Case report No. 3

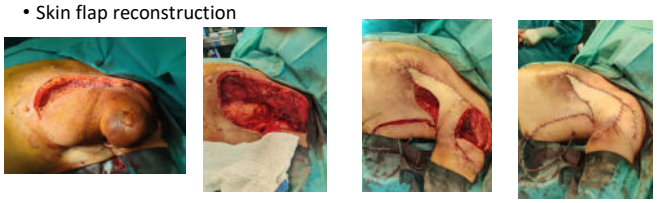
Two large tumorous lesions. Skin on the left side of the chest with radiation dermatitis



MRI pictures

Case report No. 3

- Surgery:
- Extensive radical mastectomy with extensive skin excision
- Partial resection of major pectoral muscle and deltoid muscle
- Skin flap reconstruction



Case report No. 3

- Postoperative course:
- 5th postoperative day – epidermolysis of larger flap
- Oxygenotherapy in hyperbaric chamber – progression – necrosis and infection
- Nectrectomy and application of Vivano NPWT, ATB
- 3 changes every 3 days and then moist wound therapy (healing with secondary intention)
- 9 weeks after NPWT almost the entire defect was reepithelialized

Case report No. 3

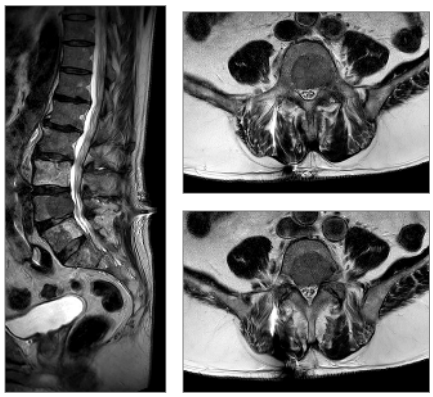
NPWT on the main flap

1 week after NPWT

4 months after NPWT
(residual wound 2,5x1 cm)

Case report No. 4

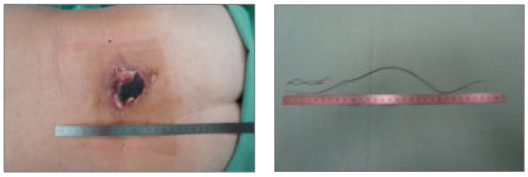
- Corpectomy of the L4 vertebra in a patient with metastases of renal carcinoma
- 65-year-old man
- He felt radicular pain in his spine shooting into his left leg
- CT scan revealed a tumor of the left kidney with a solitary metastasis in L4
- The patient was indicated for nephrectomy and total L4 corpectomy
- Embolization of the vascular supply of L4 before spondylosurgery



Author: Prof. Jan Štulik, MD., PhD.
Center for Spinal Surgery, University Hospital Motol, Prague

Case report No. 4

- Surgery:
- Nephrectomy without complications
- Embolization before corpectomy - leak of embolization material - skin necrosis



Author: Prof. Jan Štulik, MD., PhD.
Center for Spinal Surgery, University Hospital Motol, Prague

Case report No. 4

- Complicated surgical approach with wound closure using a skin flap

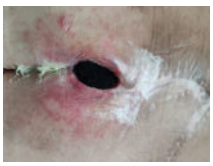

- Massive blood loss during surgery (4 liters)

Case report No. 4

- 14th postoperative day – partial dehiscence and infection


Case report No. 4

- Postoperative course:
- A total of 12 NPWT sponge changes every 3 days
- Skin irritation
- Using of stoma paste for intergluteal space



Conclusion

- Another area for the application of negative wound pressure therapy – skin flap surgery
- Preventive use (negative pressure 100 mmHg) – reduction of seroma formation, decreasing of venous congestion and edema – better integration of tissue
- Therapeutic use (negative pressure 125 mmHg, multiple changes) – complications (flap necrosis, infections), large wound areas
- Beneficial effect of NPWT on healing duration and cosmetic result compared to the conventional method

INTEGRATING NPWT MODALITIES AND MODERN WOUND CARE IN A COMPLEX CASE

Authors: Bence Marschall, MD[1], Istvan Masszi, MD[1]
Affiliation: [1] Buda Hospital of the Hospitaller Order of Saint John of God, Department of Surgery

Abstract

Introduction
This case report presents a complex scenario where multiple types of Negative Pressure Wound Therapy (NPWT), and modern wound dressings were applied. The aim is to highlight the clinical considerations in dressing selection based on wound status.

Case Presentation
The patient, with a history of Crohn's disease and ileocecal resection, developed an abdominal wall hernia. He presented with an incarcerated hernia, resulting extensive soft tissue infection and sepsis. Emergency surgery revealed bowel perforation, extensive infection, and necrosis of the abdominal skin and subcutaneous tissue. Bowel resection with ileoileostomy, hernia repair, and abdominal necrosectomy were performed, and NPWT was initiated due to concerns about skin flap perfusion.

On following dressing changes, wound edge necrosis was observed, leading to further necrosectomy. A week later the patient developed abdominal distension and elevating inflammatory markers, prompting conservative therapy.

On postoperative day 11, enteric leakage from the wound was noted. However, as the patient's condition already improved, we opted for NPWT-assisted management of the low-output enteroatmospheric fistula. Later, a decision was made to operate, as the enteric leakage was deemed an absolute surgical indication. During reoperation, severe adhesions and tissue inflammation prevented bowel mobilization, leading to lavage, drainage, and catheter jejunostomy placement.

The patient was managed in the ICU, continuing NPWT with regular debridement. The abdominal defect gradually epithelialized. HydroTac foam dressing was applied for a month, followed by RespoSorb Silicone for increased exudate. The jejunostomy catheter was removed, and the patient returned to work, using preventive dressing for irritation under the binder.

Conclusion
This case demonstrates the decision-making processes in evolving patient conditions. It suggests the effectiveness of NPWT in managing traditionally surgical indications in subacute settings. It also underscores the importance of proper wound bed preparation and adapting dressing changes to the evolving wound status.

INTEGRATING NPWT MODALITIES AND MODERN WOUND CARE IN A COMPLEX CASE

Bence Marschall, MD
István Masszi, MD
Buda Hospital of the Hospitaller Order of Saint John of God, Department of Surgery

LINK for Wound Healing Congress 2025

Who **had or lost** a patient because of a **wound infection**?

LINK for Wound Healing Congress 2025

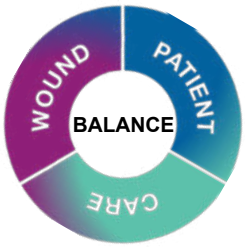
AGENDA

- Wound Balance concept
- Complex case of my patient
- Healing journey
  - NPWT modalities
  - Wound dressing selection
  - TIMERS framework

WOUND BALANCE

CONCEPT

- Patient centred
- Multifactorial approach
- WOUND HEALING



WOUND BALANCE

IN MY PRACTICE

WOUND BALANCE

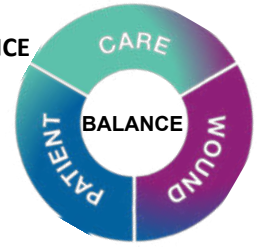
- Debridement
- Exudate management
- Maintain healing trajectory

WOUND BALANCE

IN MY PRACTICE

CLINICAL PRACTICE BALANCE

- Early intervention
- Address challenges
- Continuity of care

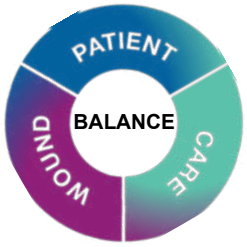


WOUND BALANCE

IN MY PRACTICE

PATIENT CARE BALANCE

- Patient-centred assessment
- Shared decision making
- Quality of life



THE PATIENT

Z. M. - 51 yrs, male

Crohn's disease

Ileocecal resection

Stoma closure

PATIENT

THE PATIENT

Z. M. - 51 yrs, male

7 days of complaints

Hemodynamically stable

Elevated inflammatory markers

Incarcerated abdominal wall hernia

PATIENT

THE PATIENT

Preserved epithelial integrity

Bullous skin necrosis

Soft tissue infection

Scar tissue

Incarcerated abdominal wall hernia

WOUND

EMERGENCY SURGERY

FINDINGS

Extensive soft tissue necrosis

Small bowel perforation

CARE

EMERGENCY SURGERY

FINDINGS

Extensive soft tissue necrosis

Small bowel perforation

CARE

EMERGENCY SURGERY

RESOLUTIONS

Small bowel resection

Radical necrosectomy

CARE

EMERGENCY SURGERY

RESOLUTIONS

Small bowel resection

Radical necrosectomy

Abdominal wall reconstruction

CARE

WOUND HEALING

EARLY POSTOPERATIVE STAGE

Oversized skin flap

Poor tissue perfusion

Closed-incision NPWT

CARE

WOUND HEALING

EARLY POSTOPERATIVE STAGE

Oversized skin flap

Poor tissue perfusion

Closed-incision NPWT

CARE

WOUND HEALING

4TH POSTOPERATIVE DAY

Wound edge necrosis

WOUND

WOUND HEALING

4TH POSTOPERATIVE DAY

Wound edge necrosis

Necrosectomy

CARE

WOUND HEALING

4TH POSTOPERATIVE DAY

Wound edge necrosis

Necrosectomy

CARE

WOUND HEALING

4TH POSTOPERATIVE DAY

Open wound

Undermined wound edge

Conventional NPWT

CARE

WOUND HEALING

4TH POSTOPERATIVE DAY

Open wound

Undermined wound edge

Conventional NPWT

CARE

WOUND HEALING

8TH POSTOPERATIVE DAY

Conventional NPWT

Abdominal distension

Rising inflammatory markers

PATIENT

WOUND HEALING

8TH POSTOPERATIVE DAY

Conventional NPWT
Conservative treatment

CARE

WOUND HEALING

11TH POSTOPERATIVE DAY

Conventional NPWT
Conservative treatment

Improving symptoms

PATIENT

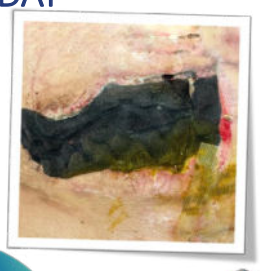
WOUND HEALING

11TH POSTOPERATIVE DAY

Conventional NPWT
Conservative treatment

Improving symptoms

Enteric leakage



PATIENT

WOUND HEALING

11TH POSTOPERATIVE DAY

Improving symptoms

Enteric leakage

Fistula isolation with NPWT

CARE

WOUND HEALING

11TH POSTOPERATIVE DAY

Improving symptoms

Enteric leakage

Fistula isolation with NPWT

CARE

WOUND HEALING

12TH POSTOPERATIVE DAY

Surgical

indication

Enteric fistula

CARE

WOUND HEALING

24TH POSTOPERATIVE DAY

REOPERATION

Subacute situation

Catheter ileostomy

CARE

WOUND HEALING

12-29TH POSTOPERATIVE DAY

Intensive Care Unit

Combined

intensive care

Conventional NPWT

CARE

WOUND HEALING

26TH POSTOPERATIVE DAY

Granulation

Slough

Minimal necrosis

WOUND

WOUND HEALING

26TH POSTOPERATIVE DAY

Granulation

Slough

Minimal necrosis

Debridement

CARE

WOUND HEALING

39TH POSTOPERATIVE DAY

Good general condition

Granulating wound

Skin grafting

Modern wound dressing

CARE

WOUND DRESSING

SELECTION

WOUND

TIMERS

FRAMEWORK

T	I	M	E	R	S
Tissue	Infection	Moisture	Edge	Repair	Social

WOUND

WOUND TISSUE TYPES

DRY NECROSIS HUMID NECROSIS SLOUGH	Necrolysis Debridement Wound bed preparation
GRANULATION	Exudate management
EPITHELIZATION	Promote epithelial migration

WOUND

WOUND DRESSING
SELECTION

WOUND DRESSING
SELECTION

Well-known

Balanced dressing

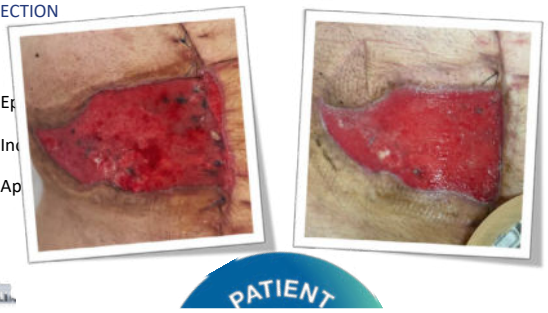
Moist wound management

WOUND DRESSING
SELECTION

Ep

In

Ap



WOUND DRESSING
SELECTION

Better exudate management

Good contact layer

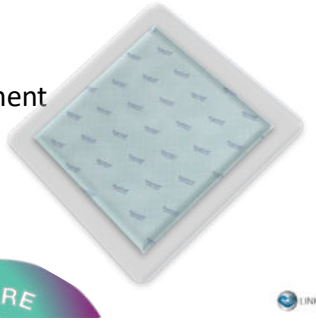
Easy application

WOUND DRESSING
SELECTION

Better exudate management

Good contact layer

Easy application



WOUND DRESSING
SELECTION

Better exudate management

Good contact layer

Easy application

WOUND HEALING

45TH POSTOPERATIVE DAY

Clean, epithelializing wound

Good general condition

Educated

Emission

CARE

WOUND HEALING

OUTPATIENT MANAGEMENT

WOUND

WOUND HEALING

OUTPATIENT MANAGEMENT

Healed wound

Abdominal binder

Returned to normal activity

WOUND

WOUND HEALING

OUTPATIENT MANAGEMENT

Abdominal binder

tivity

PATIENT

WOUND HEALING

OUTPATIENT MANAGEMENT

Abdominal binder

tivity

CARE

WOUND HEALING

OUTPATIENT MANAGEMENT

Abdominal binder

CARE

CONCLUSIONS

CONCLUSIONS

IMPORTANCE OF DEBRIDEMENT

CONCLUSIONS

DIFFERENT NPWT MODALITIES AND MODERN WOUND CARE

CONCLUSIONS

NPWT AS A SALVAGE OPTION

REFERENCES

- Editor: Szentkereszty Zs, Pellek S, Tóth Cs - **Negatívnyomás-terápia Elméleti ismeretek és gyakorlati alkalmazás**
  Available at: https://npwt.hu/szakmai/szakmai-anyagok
- Garten A, Smola H, Blome C, Carr M, Dumas F, Schäfer J, Trouth S, Veiga Marques M, Williams L G - **Wound balance: achieving wound healing with confidence**
  In: Wounds International (2023), London. Available at: www.woundsinternational.com
- Bueno-Lledó J, Martínez-Hoed J, Pous-Serrano S - **Negative pressure therapy in abdominal wall surgery**
  Available at: https://doi.org/10.1016/j.cireng.2022.05.017
- Singh D - **The Role of Closed Incision Negative Pressure Therapy in Abdominal Wall Reconstruction: A Current Review of the Evidence**
  Available at: https://doi.org/10.1097/PRS.0000000000004872
- Pauli E M, Krpata D M, Novitsky Y W, Rosen M J - **Negative pressure therapy for high-risk abdominal wall reconstruction incisions**
  Available at: https://doi.org/10.1089/sur.2012.059
- Tavusbay C, Genc H, Cin N, Kar H, Kamer E, Atahan K, Haciyanli M - **Use of a vacuum-assisted closure system for the management of enteroatmospheric fistulae**
  Available at: https://doi.org/10.1007/s00595-014-1020-3

TREATMENT OF A SEVERE CRUSH INJURY OF THE FOOT WITH SKIN AVULSION, MULTIPLE FOOT BONE FRACTURES, USING NEGATIVE PRESSURE WOUND THERAPY, DERMAL MATRIX, AND A PEDICLED FLAP

Authors: Kornelia Pruchnik-Witosławska, Krzysztof Małecki
Affiliation: Polish Mother's Memorial Hospital - Research Institut in Lodz, Poland

Abstract

Introduction

This case describes a 9-year-old (pedestrian) patient who sustained a severe crush injury to her foot after being hit by a truck. Severe foot injuries pose a therapeutic challenge, often requiring complex reconstructive interventions to preserve limb function and prevent amputation.

Case Description

The patient was admitted with a extensive crush injury to the foot, including soft tissue defects, multiple foot bone fractures, and complete degloving of the foot. In the initial phase of treatment, negative pressure wound therapy was applied to prepare the soft tissues. Subsequently, the soft tissue and skin defect was covered with a pedicled flap from the contralateral lower leg. A dermal matrix was used for the dorsum and lateral aspect of the foot. After successful engraftment, the flap was detached, and an intermediate-thickness skin graft was placed on the dorsum and lateral aspect of the foot.

Discussion/Conclusion

This case highlights the significant challenges in treating severe crush injuries of the foot in children, necessitating a multi-stage reconstructive approach. The strategic application of dermal matrix and skin grafts provided robust skin coverage, crucial for successful limb salvage. This complex pathway underscores the importance of staged, well-planned interventions to preserve function and prevent amputation in such devastating injuries.

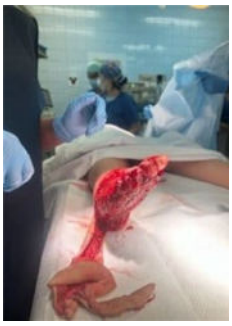
Treatment of a severe crush injury of the foot with skin avulsion, multiple foot bone fractures, using negative pressure wound therapy, dermal matrix and a pedicled flap - case report

About the patient

- ❑ 9-year-old girl Weronika with a crush injury to her right foot and degloving, hit by a truck.
- ❑no other accompanying injuries of body in trauma scan.
- ❑Previously healthy, without comorbidities
- ❑Hospitalization from 09.09.2024 to 24.10.2024 (46 days)

The picture shows skin loss starting at the level of the ankle joint, with partial amputation of the phalanges of toes III, IV, V and great toe.

Lack of the plantar surface.



Long segment of skin from the plantar surface.

Treatment of a severe crush injury of the foot with skin avulsion, multiple foot bone fractures, using negative pressure wound therapy, dermal matrix and a pedicled flap - case report

Discussion

- ❑ how to preserve limb function
- ❑ how to prevent amputation

and challenges

- ❑ lack of skin
- ❑ loss of protection:
- ❑ lack of proper support
- ❑ future

Treatment of a severe crush injury of the foot with skin avulsion, multiple foot bone fractures, using negative pressure wound therapy, dermal matrix and a pedicled flap - case report

Treatment plan

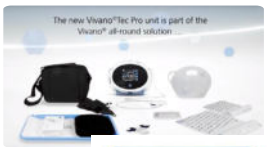
- NPWT
- BMT + CROSS- LEG FLAP
- DETACHMENT OF A CROSS- LEG FLAP + SKIN GRAFT

NPWT

At this stage plantar skin graft was utilized as a biologic cover

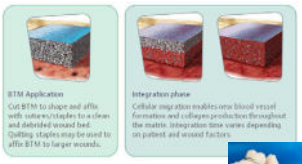
Stage I- NPWT

- ❑ First time- continuous NPWT (- 125 mmHg)
- ❑ Next - intermittent NPWT (- 125 mmHg- 5 minutes and - 80 mmHg- 2 minutes)
- ❑ Dressing change every 3-4 days



The photo shows the foot following the final NPWT application

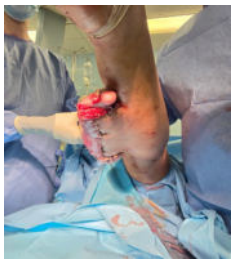
Stage II – cross leg flap + BTM



NovoSorb- It is a biodegradable temporary matrix (BTM) in the form of a polyurethane foam covered with a sealing membrane.

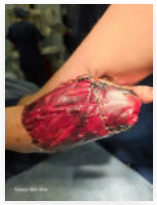
Stage II - suturing the right lower limb to the left lower limb - cross-leg flap

The skin defect on the dorsum of the foot was covered with skin matrix



The skin defect on the sole of the foot was covered with a cross-leg flap from the contralateral limb

Stage III - detachment of the flap with coverage using split-thickness skin grafts



After three weeks, we divided the flap and removed the outer layer of BTM

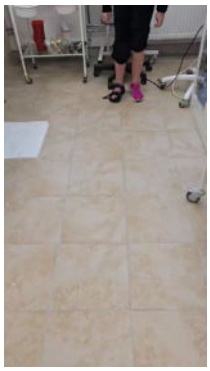
Stage III - detachment of the flap with coverage using split-thickness skin grafts (STSG)

The recipient site of the flap and the dorsum of the foot were covered with a split-thickness skin graft

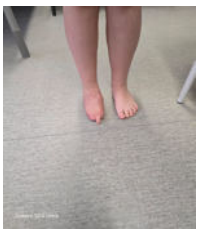
Slow-healing wound- hydrocolloid dressing

46th day post-injury

after 3 months post- injury
-scar mobilization and massage
- laser theraphy



- walk with discrete limp
- orthostatic hiperpigmentation



after 1 year post – injury
- walk independently whitout limp
- no problem with the shoe fitting
- cosmetic orthosis
- flexibility of scar
- good proper support function

Summary

NPWT:	Effective Debridement & Cleansing Promotes granulation tissue
Cross leg flap:	Transfers healthy, good-quality tissue from the uninjured leg Available where microsurgery is not Leaves a visible donor site
BMT:	High resistance to infection Promotes true neodermis generation Minimizes scarring and contracture

NPWT USE IN LOWER LEG SURGERY

Authors: Ann-Kathrin Balk
Affiliation: Kreiskliniken Reutlingen, Clinic of General, Vascular & Endocvascular Surgery, Germany

Abstract

NPWT is primarily used for preventing surgical site infections and promoting wound healing in complex wounds, particularly those resulting from lower limb revascularization procedures. In endovascular surgery NPWT supports healing of venous ulcers as the applied vacuum system helps remove excess fluid and debris and stimulates tissue growth.

In our clinic we are constantly using NPWT with the VivanoTec Pro and this presentation will demonstrate the application on awkwardly located areas, such as ulcerations caused by vascular disease or diabetic foot syndrome, and, as well, how surgical therapies, such as mesh graft transplantation, can be supported by vacuum therapy.

Two critical clinical cases, one of a 65-year-old male patient with a first-time infection of diabetic foot syndrome and deep plantar resection and a second case of an 85-year-old male patient with persistent ulceration of the dorsum of the foot and mesh graft transplantation will confirm the effectiveness of NPWT with VivanoTec Pro.

Conclusion
NPWT improved wound healing and it is considered as optimal treatment for complex leg ulcers and diabetic foot ulcers addressed in vascular surgery departments.

Keywords
Negative pressure wound therapy, diabetic foot ulcer, graft transplantation.

NPWT use in lower leg surgery

Introduction

1 clinical case, 65y, m , diabetic foot ulcer

2 clinical case, 85y, m , graft transplantation

3 clinical case, 91, f, necrosis following hematoma

4 clinical case, 55y, m, diabetic foot with necrosis

Conclusion

SEITE 2

Introduction

VivanoTec Pro

- We use NPWT since at least 2006
- We use VivanoTec Pro since 2020
- Promoting wound healing in complex wounds
- Remove excess fluid / reduced secretion

KREISKLINIKEN REUTLINGEN 30.11.2025

SEITE 3

1 clinical case, 65y, m , diabetic foot ulcer

Diagnosis
- Acute infection of a diabetic ulcer
- Type II diabetes 10/2023
- Art. hypertension

KREISKLINIKEN REUTLINGEN

Admitted to the emergency room with :
- 5 x 3 cm plantar ulcer on the right foot
- Ferver
- Redness and heat up to the ankle
- Swelling up to the knee

SEITE 4

1 clinical case, 65y, m , diabetic foot ulcer

Diagnostics:
- Ultrasound revealed medial sclerosis
- ABI both sides 1
- Laboratory results:

- Leukocytes 12,9 G/l
- CRP 322mg/l
- HbA1c (IFCC) 113 mmol/mol


plantar ulcer


dorsal abscess

KREISKLINIKEN REUTLINGEN

SEITE 5

1 clinical case, 65y, m , diabetic foot ulcer

- Progress after 4 days with iv antibiotics and deep incision
- Decision to perform surgical wound cleaning


plantar ulcer


dorsal abscess

KREISKLINIKEN REUTLINGEN

SEITE 6

1 clinical case, 65y, m , diabetic foot ulcer

- 2 day after Wound debridement and D3 transmetatarsal amputation on the right side
- 2 days after surgery decision to start NPWT

plantar ulcer

dorsal abscess

KREISKLINIKEN REUTLINGEN SEITE 7

1 clinical case, 65y, m , diabetic foot ulcer

- 5 days of NPWT

plantar ulcer

dorsal abscess

KREISKLINIKEN REUTLINGEN SEITE 8

1 clinical case, 65y, m , diabetic foot ulcer

- Granulation tissue after 5 days of NPWT
- Wound therapy with alginate dressing and discharge

plantar ulcer

dorsal abscess

KREISKLINIKEN REUTLINGEN SEITE 9

2 clinical case, 85y, m , graft transplantation

Diagnosis

- Ulcus after acute infection of the dorsla foot
- Peripheral arterial disease
- Art. hypertension

Admitted to the emergency room with :

- Multiple abscesses
- Ferver
- Redness and heat up to thigh
- Swelling up to the knee

KREISKLINIKEN REUTLINGEN SEITE 10

2 clinical case, 85y, m , graft transplantation

Diagnostics:

- Ultrasound revealed peripheral arterial disease
- Laboratory results:

- Leukocytes 15,6 G/l
- CRP 135mg/
- ABI not possible due to pain

Therapy:

- Percutaneous transluminal angioplasty
- Antibiotic therapy

first examination

after progress

KREISKLINIKEN REUTLINGEN SEITE 11

2 clinical case, 85y, m , graft transplantation

- Wound therapy with alginate dressing and discharge

Foot at discharge day

KREISKLINIKEN REUTLINGEN SEITE 12

2 clinical case, 85y, m , graft transplantation

Re-Admitted to the emergency room , after tow months, maggots

- Swelling up to the ankel
- Redness

Diagnostics:

- Laboratory results:

- Leukocytes 9,6 G/l
- CRP 120mg/l

- MRI shows a local infection

2 days after admission

KREISKLINIKEN REUTLINGEN SEITE 13

2 clinical case, 85y, m , graft transplantation

Therapy:

- Antibiotic therapy
- Mesh graft transplantation with NPWT application

KREISKLINIKEN REUTLINGEN SEITE 14

2 clinical case, 85y, m , graft transplantation

- After 4 days NPWT
- Wound therapy with alginate dressing and discharge 8 days after surgery

after 4 days NPWT

foot at discharge day

KREISKLINIKEN REUTLINGEN SEITE 15

3 clinical case, 91, f, necrosis following hematoma

Diagnosis

- Necrosis following a hematoma
- Critical bleeding after PTA/ aneurysma spurium
- Peripheral arterial disease
- Art. hypertension

Shown a critical bleeding after crossover PTA from left to right.

Diagnostics:

- Laboratory results:

- Leukocytes 12,9 G/l
- Hb 6,7 g/dl
- CRP 39mg/l

Therapy:

- Emergency surgery on the left inguinal region, suturing of the common femoral artery, hematoma removal in the adductor compartment

SEITE 16

3 clinical case, 91, f, necrosis following hematoma

after 2 weeks

- skin necrosis in the area of the hematoma in the adductor compartment

after 1 week

after 2 weeks

KREISKLINIKEN REUTLINGEN SEITE 17

3 clinical case, 91, f, necrosis following hematoma

Therapy:

- Necrectomy with NPWT application
- Change of wound dressing after 3 day and 8 day after application
- End of NPWT after 13 days

after 13 days NPWT

KREISKLINIKEN REUTLINGEN SEITE 18

4 clinical case, 55y, m, diabetic foot with necrosis caused by infection

Diagnosis
- Acute infection after a blister
- Type II diabetes 2005
- Art. hypertension

Admitted to the emergency room with :

- Infection of a opend blister on the plantar foot
- Fever
- Redness and heat up to thigh
- Swelling up to the knee

KREISKLINIKEN REUTLINGEN

SEITE 19

4 clinical case, 55y, m, diabetic foot with necrosis caused by infection

Diagnostics:
- Ultrasound revealed medial sclerosis
- ABI both sides 0,8
- Laboratory results:

- Leukocytes 15,5 G/l
- CRP 220 mg/l
- HbA1c (IFCC) 67 mmol/mol

necrosis after 5 days

KREISKLINIKEN REUTLINGEN

SEITE 20

4 clinical case, 55y, m, diabetic foot with necrosis caused by infection

Therapy:
- Transmetatarsal D1 amputation

1 day after Surgery

aplication of NPWT

KREISKLINIKEN REUTLINGEN

SEITE 21

4 clinical case, 55y, m, diabetic foot with necrosis caused by infection

- Granulation tissue after 5 days of NPWT
- Wound therapy with alginate dressing and discharge

after 5 days of NPWT

KREISKLINIKEN REUTLINGEN

SEITE 22

Conclusion

NPWT improved wound healing and it is considered as optimal treatment

Remove excess fluid

Vital wound edge with granulation tissue

Rosy wound bed with granulation tissue

Remove debris

KREISKLINIKEN REUTLINGEN

SEITE 23

Posters Overview

NPWT Session

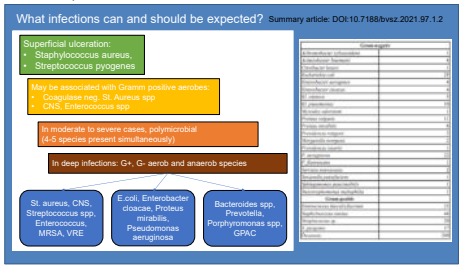
Comparison of different culture results after mesh abdominal wall reconstruction in NPWT treatment

Szabóné Erzsébet Révész[1], Áron Altorjay[1], Valéria Montskó[2], László Hangody[3,4]

1. FV St. György EOK, General Surgery Department, Székesfehérvár
2. FV St. György EOK, Septic Department, Székesfehérvár
3. Uzsoki Utcai Hospital, Traumatology-Orthopaedic Department, Budapest
4. Semmelweis University, Faculty of General Medicine, Department of Traumatology, Budapest

After laparotomy, the incidence of postoperative abdominal wall hernias is 11-20%, most commonly after median laparotomy.
Causes: collagen formation disorder + accompanying diseases + wound healing disorders + surgeon
Development of hernias:

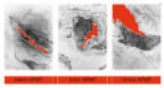
1. Paradoxical breathing – the abdominal phase of breathing is impaired
2. Due to a decrease in intra-abdominal pressure, the pressure in the visceral organs changes
3. Due to a shift in the body's centre of gravity, lumbar lordosis increases, and static problems arise



Negative pressure wound therapy is one of the most modern therapeutic methods in wound treatment. It essentially involves sealing the wound bed and wound edges with air and applying negative pressure. During treatment, the wound cavity is filled with a special foam sponge and sealed airtight with a transparent film dressing. After connecting the device to the negative pressure unit, the system sucks the air out of the wound, creating negative pressure. The device creates a vacuum and draws the exudate through the tube into the container.
Advantages:

- increases local blood flow
- reduces oedema
- promotes granulation tissue formation
- facilitates cell proliferation
- removes soluble substances from the wound that inhibit wound healing
- reduces bacterial load
- brings the wound edges closer together

Biological effects: Microdeformation caused by shear forces on the cell surface induces cellular changes at the interface between the uppermost cell layer and the foam dressing, which directly stimulates cell proliferation.



- The signal transduction pathways used by Integrin are activated and mechanical stress is transmitted.
- Structural changes occur in the cytoskeleton.
- Downregulation of cell cycle inhibitors can be observed.
- The G1/S phase genes are activated.
- Fibroblast proliferation and angiogenesis are initiated.

The treatment of infected wounds of various origins with negative pressure wound therapy is equally effective regardless of the cause of the wound. For this reason, we examined the
bacterial load and its changes during wound healing using NPWT treatment with various culture sampling methods. When comparing the results of swab and sponge cultures, differences in the bacterial composition of the wound were found between traumatology-orthopaedic, surgical and vascular surgery patients. We compared the bacterial load during
the wound healing process by specialty.
Results: Based on swab and sponge culture results, differences were found in 39% of traumatology and orthopaedic patients, 53.1% of surgical cases, and 66.7% of vascular surgery cases. Considering the differences in culture, wound closure or implantation with skin was possible in 85.6% of traumatology and orthopaedic patients, in 62.5% of surgical cases, and in only 33.3% of vascular surgery cases. In the remaining cases, open wound treatment was performed.

Our results

	stick (30)	sponge pattern (15)	fabric cylinder
St. Aureus, MRSA	20/2	7/2	7/2
Streptococcus	8	5	4
Enterococcus	10	7	7
PS. aeruginosa	5	4	4
Serratia	-	2	2
Proteus mirabilis	4	4	3
Fungus	-	2	2
Other	19	6	7

Summary:

- During negative pressure wound therapy, multiple culture samples were helpful in selecting antibiotics.
- Vacuum therapy used for mesh repair reduces bacterial load and accelerates granulation.
- Hernia recurrence and mesh removal are significantly reduced.
- Since NPWT treatment can be performed while wearing an abdominal binder, this provides additional protection against hernia recurrence.
- With NPWT treatment, wound closure can be performed after a minimum of 15-20 days, whereas open wound treatment can take months.
- It provides greater comfort for the patient and greater protection against infection. It ensures better healing than open wound treatment or the possibility of recurrence after mesh removal and another surgical procedure.

	Small, e.g. inguinal hernia (diameter < 3 cm)	Medium-sized hernia (diameter 3-15 cm)	Large hernia (diameter > 15 cm)
Surgery	Duplicating Suture	Laparoscopic reconstruction: • obesity • In case of recurrence Open reconstruction: • lateral hernia • open wound • poor skin quality • other abdominal surgery	Open reconstruction: • mesh implantation in sublay position
		If there are any lesions on the skin above the hernia that would interfere with mesh implantation (trophic ulcer, eczema, etc.), it is advisable to excise these during the first session and implant the mesh during a subsequent operation.	
		In an infected environment, the use of autologous tissue (skin flap, musculocutaneous flap, etc.) or, more recently, mesh made of biological material (e.g. Surgisis) may be considered.	

Causes of hernia formation: surgical technique
Incorrect incision

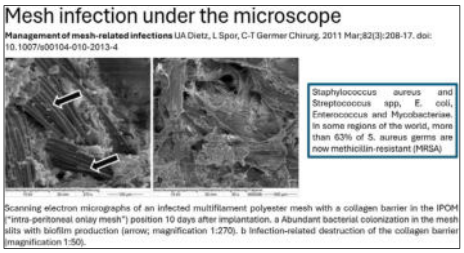
- Disrupts the biomechanics of the abdominal wall
- Damages blood supply and innervation

Abdominal wall closure

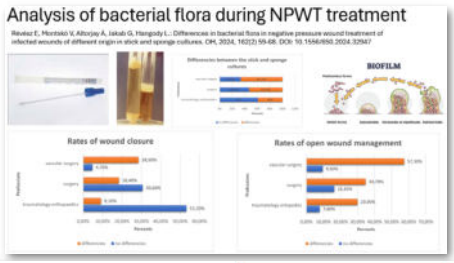
- Closure of all three layers of the abdominal wall
- Median laparotomy, interposition

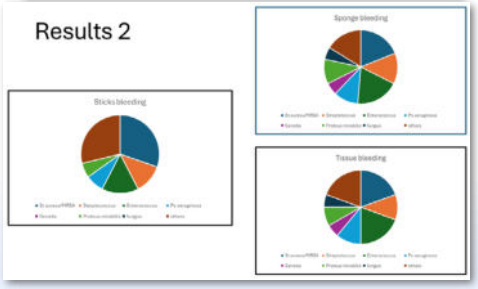
Locally developed and untreated problem

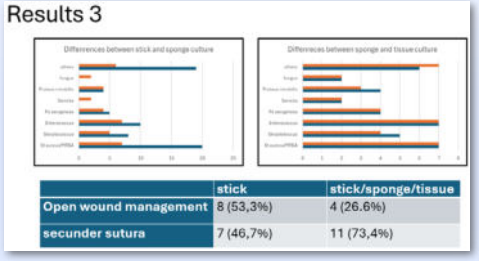
- Haematoma
- Seroma
- Infection



Hernia repair with negative pressure wound therapy:
In our study, a total of 30 patients underwent mesh hernia repair surgery between 2015 and 2023, in which wound dehiscence occurred. In all cases, wound culture and negative pressure wound therapy were performed. In 15 patients, rod sampling was performed, while in the other 15, rod sampling with sponge and tissue roller sampling was performed.







	stick	stick/sponge/tissue
Open wound management	8 (53,3%)	4 (26.6%)
secunder sutura	7 (46,7%)	11 (73,4%)

Treatment of a retroperitoneal abscess at the site of a pressure ulcer with NPWT

Szabóné Erzsébet Révész[1], Áron Altorjay[1], Valéria Montskó[2], László Hangody[3,4]

1. FV St. György EOK, General Surgery Department, Székesfehérvár
2. FV St. György EOK, Septic Department, Székesfehérvár
3. Uzsoki Utcai Hospital, Traumatology-Orthopaedic Department, Budapest
4. Semmelweis University, Faculty of General Medicine, Department of Traumatology, Budapest

Definition:

A pressure ulcer is a localised injury to the skin and subcutaneous tissues, or tissue necrosis caused by prolonged pressure, shear, friction or a combination of these. It occurs most often during the care of patients who are bedridden for long periods of time. Closed bedsore is when the deeper tissues have died but a very thin layer of skin still covers the wound. This type of bedsores is most common in operations under long anaesthesia.

Causes:

Old age, diabetes, increased sweating, limited mobility, multiple sclerosis, paralysis, stroke, cardiovascular disease, prostheses, wheelchair users.

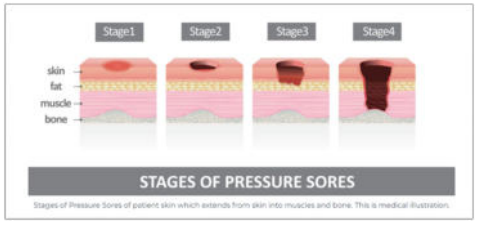
Development:

The development of pressure ulcers occurs at points of prolonged pressure on the recumbent surface, where the vessels are compressed for prolonged periods. The pressure causes the body to be unable to adequately perfuse blood to deeper tissues, resulting in a lack of oxygen. Toxins are produced in this area, leading to the proliferation of pathogens, which ultimately results in partial or complete cell and tissue death.

The most common sites are the shoulder, sacrum, hip, elbow and heel.

The most common complications of bloating are cellulitis, septicaemia, arthritis, osteomyelitis, necrotizing fasciitis, gas gangrene. (1)



Source: (2)

Stages:

The picture shows the stages of lumbar ulcers (pressure ulcers), classified according to the degree of damage to the skin and deeper tissues:

Stage 1:

Mild redness that persists but the skin is still intact.

Stage 2:

Partial thickness skin damage that may appear as a blister, bruise or shallow ulcer.

Stage 3:

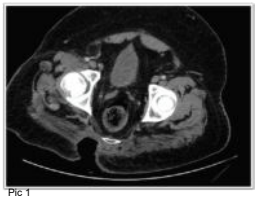
Full-thickness skin damage, which appears as a deep crater and may involve fatty tissue but does not yet reach muscle or bone.

Stage 4:

The most severe stage, involving full thickness tissue loss, which may involve muscle, bone or joints.

Case report:

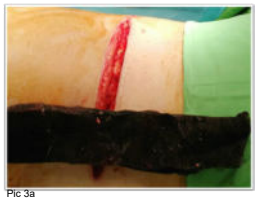
65-year-old male patient admitted as an emergency in septic state. His medical history included dilated cardiomyopathy, obesity, hypertension, diabetes mellitus, chronic obstructive pulmonary disease, 2 months of pneumonia, respiratory failure, intensive care unit (ICU), where he developed stage III-IV sacral pressure ulcer. With the help of a physiotherapist, he can move around his home with a walker. Although his pressure ulcer began to heal, he became superinfected. She was admitted acutely in septic condition. Labs showed CRP: 356, PCR: 5.6, WBC: 20.2, Hgb: 89. On admission BMI: 47 (153 kg and 180 cm tall), total protein and albumin levels were low, CT confirmed her sarcopen obesity. In addition, an acutely performed abdominal and pelvic CT scan confirmed a large retroperitoneal abscess along the right psoas, associated with sacral pressure ulcer, extending to the diaphragm. (Pic 1) The size of the wound was 30x20x20 cm from the skin. (Pic 2a-c)


Pic 1


Pic 2a


Pic 2b


Pic 2c


Pic 3a


Pic 3b


Pic 4


Pic 5


Pic 6

Therapy:

Five sessions of negative pressure wound therapy (NPWT) under anaesthesia, with white and XL black sponges lining the wound cavity. The white sponge was inserted to protect the retroperitoneal vessels. The black sponge was first placed in 5 layers in the wound cavity and treated with -125 mmHg continuous pressure and then intermittent pressure after the third exchange. (Pic 3a-b) Sponge exchange was performed every 5 days and samples of both tissue and sponge were taken for culture each time. In addition to vacuum treatment of the retroperitoneal cavity, the sacral pressure ulcer was also treated with a Y-connector. (Pic 4) When the wound cavity was elevated to fascia, the fascia could be closed above the fold. The number of days of hospitalization was 35 days. (Pic 5) Culture results: Staphylococcus aureus, Streptococcus hominis.

The sacral pressure ulcer was also completely closed within 3 months. (Pic 6) During treatment, the patient lost 40 kg with the help of a dietician and received nutritional therapy. With the help of a physiotherapist, he was able to completely abandon medical aids. BMI reduced to 34.8 (180 cm and 113 kg)

Conclusion:

NPWT treatment can also provide effective wound care in situations that seem hopeless. Its early application in the treatment of pressure ulcers provides an innovative, fast, cost-effective and quality patient care even in such rare cases. It also helps in complex patient management such as patient exercise.

References:

1. Kadota H, Miyashiata K, Fukushima S et al: Successful Management of a Severe Sacral Pressure Injury Penetrating to the Retroperitoneum. Wounds 2021 Mar;33(3):E24-E27.
2. Pressure ulcers. Alzheimer's Los Angeles. https://www.alzheimersla.org/for-families/caring-for-a-person-with-memory-loss/basic-activities-of-daily-living/pressure-ulcers/#:~:text=Stages%20of%20Pressure%20Ulcers%20*%20Stage%201:,the%20skin%2C%20presenting%20as%20a%20deep%20crater.

Diverse Wound Management in Rehabilitation Practice – Results and Lessons Learnt

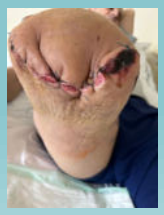
Semmelweis University – Rehabilitation Clinic, Hungary

Authors: M. Fehér, E. Boros, M. Fórián-Szabó, D. Szabó, A. Markotics, P. Farkas, Á. Jancsó, I. Hernáth, P. Cserháti

Multi-causal leg ulcer in a lymphoedema patient (1)


Diabetic foot ulcer (2)


Amputation stump healing disorder (3)




Sacral pressure ulcer (4)



Septic spinal complication with multiple pressure sores (5)






BACKGROUND

Wound management is a crucial aspect of rehabilitation, as wounds often hinder movement therapy. Advancing beyond traditional methods is essential for professionals dealing with complex cases.

PROGRAMME DESCRIPTION

A specialized training program on advanced bandages was conducted at the Semmelweis University Rehabilitation Clinic, in collaboration with the Hungarian Rehabilitation Society and Hartmann-Rico Hungary Ltd.

Five departments participated, each presenting a typical patient case:

- Multi-causal leg ulcer in a lymphoedema patient (1)
- Diabetic foot ulcer (2)
- Amputation stump healing disorder (3)
- Sacral pressure ulcer due to sensory impairment (4)
- Septic spinal complication with multiple pressure sores (5)

METHODS

The five-week program included theoretical sessions, bedside observations, and interdisciplinary discussions.

OUTCOMES

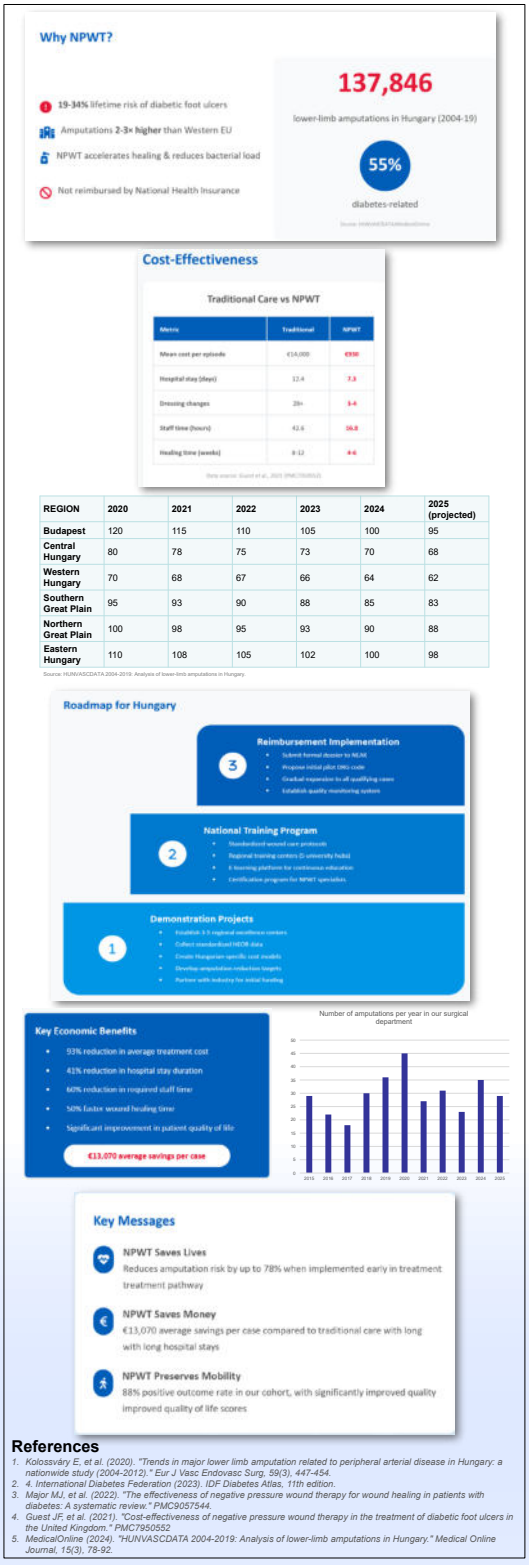
Participants gained hands-on experience with advanced wound care techniques. Advanced bandages supported wound healing, reduced complications, and improved patient outcomes. The interdisciplinary approach facilitated effective knowledge exchange.

CONCLUSIONS

Modern wound care significantly improves both outcomes and quality of life. Rehabilitation professionals must continuously update their knowledge to effectively manage complex wounds and optimize rehabilitation success.

NPWT therapy options in diabetic foot treatment in Hungary. “How to swim against the flood”

Dániel Ádám, Barabás Loránd
Hungary, Észak-Budai Szent János Centrumkórház Surgery



REGION	2020	2021	2022	2023	2024	2025 (projected)
Budapest	120	115	110	105	100	95
Central Hungary	80	78	75	73	70	68
Western Hungary	70	68	67	66	64	62
Southern Great Plain	95	93	90	88	85	83
Northern Great Plain	100	98	95	93	90	88
Eastern Hungary	110	108	105	102	100	98

Source: HUNVASCDATA 2004-2019: Analysis of lower-limb amputations in Hungary.

References

1. Kolossváry E, et al. (2020). “Trends in major lower limb amputation related to peripheral arterial disease in Hungary: a nationwide study (2004-2012).” Eur J Vasc Endovasc Surg, 59(3), 447-454.
2. 4. International Diabetes Federation (2023). IDF Diabetes Atlas, 11th edition.
3. Major MJ, et al. (2022). “The effectiveness of negative pressure wound therapy for wound healing in patients with diabetes: A systematic review.” PMC9057544.
4. Guest JF, et al. (2021). “Cost-effectiveness of negative pressure wound therapy in the treatment of diabetic foot ulcers in the United Kingdom.” PMC7950552
5. MedicalOnline (2024). “HUNVASCDATA 2004-2019: Analysis of lower-limb amputations in Hungary.” Medical Online Journal, 15(3), 78-92.

Introduction

The use of negative pressure wound therapy (NPWT) in the treatment of diabetic foot has become routine. Numerous studies have been conducted on its effectiveness.
In Hungary, this therapeutic option is being used more frequently; however, it is still not state-funded, which poses multiple challenges.
Its use in primary care largely depends on the persistence of the applicant, the goodwill of senior management, and the generosity of the funding company.
In clinical practice in Hungary, approximately one-third of diabetic patients are expected to develop diabetic foot syndrome. According to data from the National Health Insurance Fund, around 15,000 diabetic foot amputations were performed in 2023, while NPWT therapy was applied to less than 10% of affected patients.
A Hungarian study suggests that the use of NPWT could reduce the healing time of ulcerative wounds by 40% and decrease the need for amputation by 30%. In this patient population, the use of NPWT could save 120 daily dressing changes nationwide.

Our Hospital oppurtunites

Our Surgical Department currently has 3 Vivano devices available, which belong to the company. We mainly use these for the treatment of open abdominal wounds. For the authorization process, five different documents must be submitted to the Health Authority. An order for consumables is placed with the company according to the demand. Only after responses to these can the therapy begin. The turnaround time averages 1–2 weeks. Modifications to the therapy or repeated requests likewise complicate ongoing care.
Our nurses, thanks to continuous education, are familiar with the therapy processes. However, it is a fact that NPWT therapy in many cases (fistulas, wounds around stomas) requires exceptional attention and patience, which is often limited. After the care is completed, a lot of paperwork also awaits us, which could deter the attending physician from starting new care.
The above confirms that end-dwelling NPWT therapy was present in our department only occasionally. At the same time, data also show that there was no significant increase or decrease compared to national or global averages

Conclusion

The NPWT therapy has today become an indispensable tool in wound care. Its outstanding role in wound healing and its cost-effectiveness have been supported by numerous studies. Its availability is already an expected baseline for every department that deals with wounds.
In our country, unfortunately, its utilization is not yet full. It is generally used as a last resort when traditional wound care no longer yields results.
Daily use and maximizing its utilization are, however, not ensured in almost any domestic institution. One side of this is the high one-time cost. The other is the procurement process, which too often acts as the main barrier to immediate usability due to availability.
Currently, it can be procured on a per-person basis, which officially starts only weeks after planning the therapy. Yet those days are precisely the crucial ones in wound treatment. This is where we can truly leverage its advantage. And that is exactly why most therapies fail, especially in the diabetes-related foot therapy. In a few days, these wounds can progress to a trajectory toward major amputation.
Our goal, therefore, is to make NPWT therapy immediately available as a “traditional” tool in every Surgical Department, thereby reducing major amputations!

Negative pressure wound therapy in case of pediatric patients

Gergo Jozsa, Eniko Molnar, Tibor Molnar, Anna Lamberti

Department of Pediatrics, Clinical Complex, University of Pécs, Hungary

Introduction

The treatment of complex soft tissue defects, which have different etiologies occur in various anatomical regions, remains a challenge and requires complex management to this day. In current pediatric surgery and pediatric traumatology, Negative Pressure Wound Therapy (NPWT) is widely used.

Case I

A seven-month-old infant who developed extensive skin necrosis on both lower limbs as a result of Meningococcal sepsis. After necrectomy, NPWT was initiated, because of the treatment, a well-granulating wound bed was achieved, and split-thickness skin grafting (STSG) was performed.

Case II

The 7-year-old boy with an old burn injury on his right tibia. After necrectomy the NPWT was initiated, and satisfactory granulation of the wound was observed during dressing changes. Following this, STSG was performed.

Case III

A 6-year-old girl was injured in a car accident. She was treated for an open fracture of the left tibia, classified as a Grade III injury. The fixation of long bone fractures complicated by soft tissue injuries can be performed using an external fixator and NPWT. The simultaneous use of both methods presents several challenges.

Case IV

A 12-year-old boy was attacked by a dog and was treated for severe, large soft tissue injuries affecting all four limbs. NPWT can help promote wound closure and granulation of the wound bed.

Conclusion

NPWT can be effectively used in pediatric wound care with good results. It has numerous indications, playing a significant role both in the surgical preparation of traumatic and pediatric soft tissue defects and in the acceleration of healing for pressure ulcers arising from immobilization.

Gergo Jozsa MD, PhD, Associate Professor, dr.jozsa.gergo@gmail.com

Managing Gynecological Oncological Postoperative Wounds with Negative Pressure Therapy: Clinical Case Studies

Author: Dr. Judit Kerepesi, Dr. Júlia Kőrösi, Szilvia Czémán, Dr. Zoltán Novák

Department of Gynecology, Hospital: National Institute of Oncology, Country:Hungary

Case I.




Case II.




Case III.




Introduction

In this poster, we present three clinical cases in which NPWT was successfully applied to address postoperative wound healing disturbances after vulvar tumor resections. These cases highlight the versatility and efficacy of NPWT in gynecological oncological settings, particularly in managing flap-related complications, fistulas, and delayed healing.

Case I.

A large pubic tumor resection with a V-Y flap resulted in a rectovaginal fistula and sepsis. A diverting stoma was placed, and NPWT was initiated while the patient was in a septic condition.

NPWT was applied not only to the vulvar region but also to a secondary wound in the right inguinal area. A total of five NPWT dressing changes were performed, each under general anesthesia.

The therapy stabilized the patient's condition and led to the spontaneous closure of the rectovaginal fistula.

Case II.

Following wide vulvar excision for Paget's disease, a Singapore flap reconstruction was performed. Postoperative wound healing was complicated by partial flap dehiscence and exudation.

Negative pressure wound therapy (NPWT) was initiated at the flap site. A total of three NPWT dressing changes were performed. In this case, the dressing was successfully applied while bypassing the anus, allowing the patient to defecate spontaneously without pain or contamination of the dressing.

The application of NPWT resulted in progressive improvement, and the wound eventually closed successfully without the need for further surgical intervention.

Case III.

The patient underwent surgery for a pubic tumor with bilateral inguino-femoral lymphadenectomy and subsequently developed significant wound healing complications in the inguinal region. Negative Pressure Wound Therapy (NPWT) was instituted to enhance wound healing and manage these complications. As the contralateral inguinal site was not severely infected, NPWT was not applied on that side. Following the discontinuation of NPWT, a reduction in lymphatic leakage was observed on the treated side. Overall, NPWT contributed to improved wound healing and resolution of postoperative complications related to the lymphadenectomy.

Conclusion:

NPWT effectively managed complications in all three cases. It promoted healing in oncological wounds, including fistulas and tissue defects. Proper NPWT application was key to achieving wound closure and resolving complications.

Clinical Relevance:

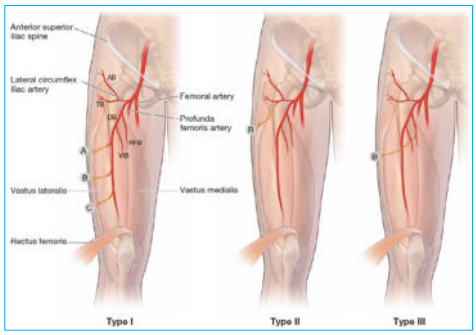
NPWT may accelerate recovery, reduce infection risk, and improve outcomes in oncological wound management, particularly in cases involving complex fistulas, healing disturbances, and inguinal wound complications following lymphadenectomy.

Reference:

Qiu L, Wu X, Wang X. *Application of Negative-Pressure Wound Therapy in Patients with Wound Complications after Flap Repair for Vulvar Cancer: A Retrospective Study.* Adv Skin Wound Care. 2025 Apr 1;38(3):142-147.

Case: Optimizing Wound Healing in Complex Plastic Surgery: A Case Report on the Role of Negative Pressure Wound Therapy in the Treatment of Fournier's Gangrene

Zoltan Klarik
Department for Surgery, Transplantation and Gastroenterology, Semmelweis University, Budapest, Hungary



Introduction

Fournier's gangrene is a rare but life-threatening necrotizing soft tissue infection that requires prompt surgical debridement and advanced wound management. Negative Pressure Wound Therapy (NPWT) plays a critical role in optimizing wound healing and reducing complications in extensive soft tissue defects.[1,2]

This case report highlights the use of NPWT in the post-debridement management of a patient with Fournier's gangrene.

Case

A 68-year-old male with no known chronic illnesses was admitted on an emergency department due to septic shock secondary to perianal necrotizing soft tissue infection, which extended to the right scrotum and inguinal region.

Urgent surgical intervention was performed with extensive necrectomy and the placement of a deviating sigmoideostomy. Initial postoperative management included intensive care support, infection control, and regular wound debridement.

Despite serial debridements and standard wound care (irrigation, alginate dressings), the wound showed slow granulation. A plastic surgery consultation recommended the use of NPWT to optimize wound bed preparation before definitive closure.

NPWT was applied, resulting in significant granulation tissue formation and improved wound conditions. Following appropriate surgical preparation, defect coverage was achieved using an anterolateral thigh (ALT) musculocutaneous flap, with the donor site closed primarily.

Postoperatively, minimal wound edge necrosis was observed, but no major complications occurred. The patient remained afebrile and was mobilized with physiotherapy support. Notably, newly diagnosed diabetes mellitus was identified during hospitalization, requiring medical management.

Conclusion

NPWT proved to be a valuable adjunct in the management of extensive soft tissue loss following Fournier's gangrene, enhancing granulation tissue formation and expediting wound closure. [1,2]

This case underscores the importance of multimodal treatment approaches, including early surgical debridement, NPWT, and reconstructive plastic surgery, in optimizing outcomes for patients with severe necrotizing infections. Additionally, this case highlights the need for vigilance in identifying underlying conditions, such as diabetes, that may impact wound healing and overall prognosis.

References

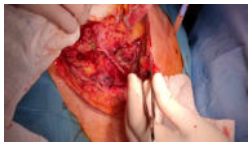
1. Altomare M, Benuzzi L, Molteni M, Spata G, Portaluri M, Gianni AB, et al. Negative Pressure Wound Therapy for the Treatment of Fournier's Gangrene: A Rare Case with Rectal Fistula and Systematic Review of the Literature. J Pers Med. 2022;12(10):1695.

2. Khan MU, Sajjad S, Almatroudi R, Khatri IA, Baig S, Al-Ahdal TMA, et al. Evaluation of Negative Pressure Wound Therapy in the Management of Fournier's Gangrene. Cureus. 2023;15(11):e48140.

Case: Usage of NPWT in obstetric complications – case report

Gábor Tóth-Várady, Tamás Csabai
Department of Obstetrics and Gynecology, BAZ County Central Hospital and University Teaching Hospital, Hungary

First treatment:

Further treatments:






Wound closure:

Introduction

Negative Pressure Wound Therapy (NPWT) usage was started independently at our department 4 years ago, as a routine treatment for post-operative infected wounds. Since then, better and better results have been achieved.

Case

- 24 years old female
- Hospital admission: 08/10/2023 (5th day postpartum)
- Febrile, inflamed, partially necrotised surgical wound
- Surgeon suggestion: wound exploration, drainage
- ObGyn decision: necrectomy, placement of NPWT

Microbiological results:

- Haemoculture: negative
- Cervical discharge: negative
- Wound secretum: Enterococcus faecalis, E. coli, Pseudomonas aeruginosa

First treatment:

- 09/10/2023
- Complete dehiscentia
- Intact fascia
- Extensive necrosis
- Extensive necrectomy
- NPWT placement

Second treatment:

- 11/10/2023
- Demarcating necrosis
- Clearing wound bed

Further treatments:

- 13/10/2023- 17/10/2023
- Repeated surgical exploration
- Opening of abscess cavity
- Cleaned up, healing wound bed

Wound closure:

- 19/10/2023 (10 days after the first treatment)
- Donati skin suture
- Redon drain

Follow up:

- Per primam healed laparotomy scar
- No further treatment required

Conclusion:

Although only small amount of possibilities of NPWT therapy is used in our everyday work, the post-operative wound care results were improved.

The treatment takes great burden off the caregivers, significantly improves the patient's well-being and recovery conditions, and last but not least, significantly reduces treatment time and associated costs.

Clinical case series: Management of Complications After Abdominal Wall Reconstruction Using Negative Pressure Wound Therapy: A Single-Center, Retrospective Pilot Study

Nóra Suszták[a,b], Gábor Ordasi[a] , Gáborné Szabó[a] , György Herczeg[a] , Miklós Máté[a]
[a] *Department of Surgery, St. Imre University Teaching Hospital, Budapest, Hungary.*
[b] *Faculty of Medicine, Semmelweis University, Budapest, Hungary*

Introduction
Serious complications of mesh-based abdominal wall reconstruction include surgical site infection and mesh infection, with reported incidences ranging from 1% to 10%, depending on mesh type, surgical technique, and patient comorbidities. Negative pressure wound therapy (NPWT) is increasingly being utilized as a strategy to preserve the implanted mesh following infection.

Methods
We conducted a single-center, retrospective pilot study at the Department of General Surgery, South Buda Center Hospital – St. Imre University Teaching Hospital, between 2020 and 2023. The study population included patients who had undergone abdominal wall reconstruction and were readmitted due to wound suppuration or mesh infection. Patient comorbidities, details of the primary surgical procedure, and mesh characteristics were analyzed in relation to NPWT outcomes. Primary endpoints included the number of NPWT dressing changes, length of hospital stay, and wound status at discharge and during follow-up. Secondary endpoints were recurrent wound suppuration or mesh infection, and hernia recurrence.

Results
During the study period, 11 patients were included. The cohort consisted mainly of elderly, obese women. The mean number of NPWT dressing changes was 3.0±1.7. In all cases, meshes had initially been implanted in the onlay position. Following wound infection, more than half of the meshes were completely salvaged. After a median hospital stay of 1 month, all patients were discharged with granulating wounds. During follow-up, the majority of patients achieved complete wound healing. One patient required reoperation due to recurrent hernia.

Discussion
Despite the limitation of small sample size, our findings, in line with existing literature, suggest that NPWT may represent an effective salvage strategy for managing wound suppuration and mesh infection after abdominal wall reconstruction, with the potential to preserve the implanted mesh. Larger prospective randomized studies with long-term follow-up are required to confirm these results.

Clinical relevance:
We aim to evaluate the use of negative pressure wound therapy (NPWT) as a strategy to preserve implanted mesh following infection.

Example: 43 y male, T2DM, smoking, BMI: 35,8 kg/m²
- SSI 15 day post prior operation
- 6 NPWT changes
- LOS: 30 days, emission: granulating, long term: healed

Table 1. Clinical characteristics of the patients included in the study (n=11)

Parameter	Value
Age (years, median ± IQR; min–max)	65.6 ± 12.3 (40.7–77.4)
Female sex (n, %)	9 (81.8)
BMI (kg/m², median ± IQR; min–max)	34.5 ± 7.6 (21.3–45.1)
Body mass index classification:	
- *Normal weight (BMI: 18.5–24.99) (n, %)*	2 (18.2)
- *Obesity class I (BMI: 30.0–34.99) (n, %)*	4 (36.4)
- *Obesity class II (BMI: 35.0–39.99) (n, %)*	2 (18.2)
- *Obesity class III (BMI >40) (n, %)*	3 (27.3)
Smoking (n, %)	5 (45.5)
Diabetes mellitus (n, %)	3 (27.3)
Cardiovascular disease (n, %)	3 (27.3)
Pulmonary disease (n, %)	3 (27.3)
Primary hernia type (n, %):	
- *Umbilical hernia*	3 (27.3)
- *Epigastric hernia*	1 (9.1)
- *Postoperative hernia*	6 (54.5)
- *Combined (umbilical and epigastric hernia)*	1 (9.1)
Largest diameter of primary hernia (cm, median ± IQR; min–max)	15 ± 8.4 (3.5–30)
Primary mesh implantation (n, %)	8 (72.7)
Onlay technique (n, %)	8 (100)
Largest diameter of mesh (cm, median ± IQR; min–max)	17.5 ± 6.8 (6–20)

Table 2. Surgical outcomes and infection-related parameters

Parameter	Value
Time from abdominal wall reconstruction to onset of wound suppuration/mesh infection (days, median ± IQR; min–max)	18 ± 1229.3 (9–3939)
CDC surgical site infection classification:	
- Superficial incisional SSI	9 (81.8)
- Deep incisional SSI	2 (18.2)
Surgical intervention (n, %):	
- Local intervention	4 (36.4)
- Surgical intervention	6 (54.5)
- Multiple surgical interventions	1 (9.1)
Mesh removal at reoperation (n, %)	
- No mesh present	3 (27.3)
- Complete removal	1 (9.1)
- Partial removal	2 (18.2)
- Not removed	5 (45.5)
Antibiotic therapy (n, %)	10 (90.1)
Number of NPWT set changes (median ± IQR; min–max)	3 ± 1.7 (2–7)
Length of hospital stay (days, median ± IQR; min–max)	29 ± 10.6 (14–42)
Success of NPWT therapy at discharge (n, %):	
- Improved/granulating	11 (100)
Success of NPWT therapy during follow-up (n, %):	
- Healed	8 (72.7)
- Improved/granulating	3 (27.3)
Follow-up period (months, median ± IQR; min–max)	4.1 ± 6.3 (0.47–22.7)
Recurrent wound suppuration/mesh infection (n, %)	0 (0)
Hernia recurrence (n, %)	1 (9.1)

Before NPWT | **After 1st change** | **After 2nd change** | **After 3rd change** | **After 4th change**

References
1) Mavros MN et al. Risk factors for mesh-related infections after hernia repair surgery: a meta-analysis of cohort studies. World J Surg. 2011;35(11):2389-98.
2) Bueno-Lledó J. et al. Mesh Infection After Hernia Repair and Negative Pressure Wound Therapy. A Systematic Review. World J Surg. 2023;47(6):1495-1502.
3) Li J et al.The salvage of mesh infection after hernia repair with the use of negative pressure wound therapy (NPWT), a systematic review. ANZ J Surg. 2022;92(10):2448-2456.

Application of NPWT in Severe Fasciitis of Rare Etiology

Gábor Ditrói[1], Dávid Kovács[1], Gergely Zádori[1], Péter Kolozsi[1], Zsolt Varga[1], Klaudia Balog[1], Tamás Felföldi[1], Csaba Ötvös[1], Gergely Kóder[1], Ferenc Győry[1], Dezső Tóth[1], Zsolt Szentkereszty[1]

[1]Department of Surgery, University of Debrecen Clinical Center

Initial condition
- **Compartment syndrome**
- **Deep venous thrombosis**
- **Sepsis**

Acute surgery
- **Fasciotomy**

NPWT

Wound closure

Wound healing

Introduction

Negative pressure wound therapy (NPWT) offers significant advantages in managing severe infections and complex wounds by reducing bacterial load and promoting granulation. We report a rare case of necrotizing fasciitis secondary to septic microembolization, successfully treated with NPWT.

Case Presentation

A 41-year-old male developed right-sided abscessing pneumonia complicated by septic microembolization, causing compartment syndrome in the right lower limb. This led to extensive deep vein thrombosis and pulmonary embolism. Emergency fasciotomy was performed, followed by NPWT. The infection extended from the inguinal region to the chest wall. Postoperatively, the patient was managed in intensive care with antibiotics, antifungal agents, and therapeutic anticoagulation. CT imaging ruled out cranial complications. Multiple bronchoalveolar lavages were required. Inflammatory markers gradually decreased, and anemia was corrected with transfusions. NPWT maintained clean wounds and accelerated granulation. After stabilization, low-molecular-weight heparin was replaced with aspirin. When adequate granulation was achieved, NPWT was discontinued, and primary closure was performed. Complete wound healing followed, supported by physiotherapy. Follow-up chest CT confirmed regression of the pulmonary abscess, and Doppler ultrasound showed venous recanalization. At one year, post-thrombotic syndrome persisted but improved with rehabilitation.

Discussion and Conclusion

NPWT proved essential in this multi-morbid patient, facilitating infection control and wound closure while reducing the risk of complications. This case underscores the value of NPWT as part of a multimodal strategy for necrotizing fasciitis, even in rare and complex presentations.

References

1. Huang C, Leavitt T, Bayer LR, Orgill DP. Effect of negative pressure wound therapy on wound healing. Curr Probl Surg. 2014;51(7):301–331. doi:10.1067/j.cpsurg
2. Cwaliński, J., Paszkowski, J., & Banasiewicz, T. (2018). New perspectives in the treatment of hard-to-heal wound. Negative Pressure Wound Therapy Journal, 5(4), 10-12. https://doi.org/10.18487/npwtj.v5i4.45
3. Robert N. Negative pressure wound therapy in orthopaedic surgery. Orthop Traumatol Surg Res. 2017;103(1S):S99–S103. doi:10.1016/j.otsr.2016.04.018

LINK

www.linkforwoundhealing.info