



Novel Approaches for Accelerating Wound Healing

Negative Pressure Wound Therapy in Accelerating Wound Healing

Telemedicine

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Negative Pressure Wound therapy: VAC Cleanse Choice

Foam-Tissue Interaction is key to inducing macrostrain and microstrain

With foam mattress, tissue is stretched laterally and, at foam contact, compressed locally.

Macrostrain

- Visible alteration of form or shape
- Applied negative pressure pulls the deficit up, providing tension on the wound, and draws the wound edges together

Microstrain

- Induces tissue deformation at a cellular level leading to cell stretch
- Induces cell proliferation and angiogenesis

Interaction between foam and tissue helps with healing and quick granulations of tissue formation

The pore size is very important

Micro-deformation directly stimulates cellular proliferation.

Proliferating fibroblast and endothelial cells form granulation tissue

Integrin activated signaling pathways and transmission of mechanical stress



Forces transmitted to cytoskeleton lead to:

- Structural changes to cytoskeleton
- Down-regulation of cell cycle inhibitors
- Activate genes required for G1/S transition

Which lead to:

- Fibroblast proliferation and angiogenesis

Types of foam:

- Granufoam
- Silver foam
- Vac veraflo
- VAC cleanse choice

VAC Veraflo Cleanse

It's a tool for mechanically extracting sloughy tissues from the wound and assisting in loosening, detaching and removing viscous exudate, dry fibrin, wet slough and infectious material.

It also has an added capacity of stimulating granulations tissues formation in difficult wounds that normally need surgical debridement.

"Novel Foam Dressing Using Negative Pressure Wound Therapy (NPWT) with Instillation to Remove Thick Exudate"

study conducted on 21 patients, mean age was 55 years

- Patients had large complex wounds, areas of devitalised tissue and/or yellow fibrinous slough
- Observed a reduction of black non-viable tissue - less than 10% in 18 of 21 wounds
- Yellow fibrinous slough - less than 10% in 12 of 21 wounds
- Average of 1–3 applications (3–9 days)

Conclusion: use of NPWTi-d with cleanse choice is suitable for wound cleansing



Advantages of portable negative pressure wound therapy:

- Comfort of the patient
- Better tolerance of the pump and weight of the dressing
- Easy to use
- Unrestricted mobility
- Preserves social interactions

The Nanova Therapy System

System consists of:

- Single use sterile and absorbent dressing
- Single use GranuFoam(TM) for cavitory wound
- Portable, not motorized negative therapy unit

Dressing is composed of different layers:

- PU film
- Air transfer port
- Absorptive core
- Pressure transfer layer
- Silicon wound contact layer
- Silicon adhesive

Even if vacuum is lost, the dressing continues to absorb exudate

Important: the negative pressure is distributed to the wound on all external layers

Internal layer: it will maintain liquid

Observational study to evaluate Nanova™ Therapy System as an alternative of classical NPWT to heal superficial wounds with moderate exudate

- 16 patients, mean age 43
- Time of use: 33 days
- Results - Complete healing, 5 patients (31%); favorable results (wound reduced in size), 9 patients (56%)
- Problem: difficulty to adhere to the skin in 44% of the patients

Clinical case -



Post radiotherapy wound on spinal area (through day 4):

- Skin graft incompletely taken
- Wound exposing deep structures
- Good adaptability of the Nanova™ Therapy System
- Slow progression of granulation tissue

Post radiotherapy wound on spinal area (days 7-21):

- Temporary skin intolerance
- Stop Nanova Therapy for one week
- Reapplication of the device
- Wound area reduction and granulation tissue
- Ready for skin grafting

Tips for use:

- Move the port out of skin folds or joint area to avoid shearing force
- Apply the dressing off-center
- Diamond shaped when cylinder wound (lower limb)
- Do not use on feet

Key points:

- Less deep wounds than standard NPWT
- Low to moderate volumes of exudate
- No tunnel or deep underminings
- Two dimensions of NPWT
- The Granufoam provided in the kit is thin and not capable of three-dimensional contraction

SNaP™ Wound care system

Device characteristics:

- Light-weight NPWT
- Utilizes specialized springs to generate a preset (-75, -100, and -125 mmHg) continuous negative pressure level to the wound bed
- Cannister : 60cc
- Proprietary hydrocolloid dressing offers periwound protection
- Bridge Dressing Kit allows use on complex wounds and DFUs
- Comes in different sizes



Two Randomized Controlled Trials:

Armstrong:

59 SNAP vs. 56 VAC in lower extremity diabetic and venous wounds

Results:

- No inferiority of SNAP system
- No difference in how fully wound heals
- Less interruption of regular life
- Initial wound size was greater in VAC group

Marston:

19 SNaP vs. 21 VAC in venous leg ulcers

Results:

- Greater wound size reduction using SNAP
- Initial wound size was greater in VAC group

Conclusion: Portable NPWT are safe and easy to use, reduce cost and impact on quality of life

Telemedicine:

More and more old patients with low mobility that need to be treated for wounds, but same number of rehab centers. So, there is a need to treat them as outpatients.

Domoplaies system

Images pass from a patient though a smart phone or tablet device to a call center that delivers them to an expert in one of 7 centers across France

When the tablet is connected to Wifi or 3G, the background color is green

Secured through a personal health card inserted into the tablet

Produces video that's powerful enough for doctors to assess the wound

When tablet is not connected, the background color is red

Protected with a password



Images sent with the code Wound

Transmit when tablet is connected

Improves picture quality if image is too dark to assess wound

Telemedicine is cost effective.

Cheaper than regular medicine, even when not calculating travel costs

With travel expenses added, comes to about half of costs of care in France

Study looked at three different groups:

1. Telemedicine group
2. Expert sent to home
3. Expert consultation at clinic

Objective: to assess healing

Results: no difference between the three groups in healing

Biggest difference was transportation costs, especially for patients in remote locations.

Concluding thoughts:

- Creative solutions are possible
- Telemedicine is wave of the future
- Requires will to expand 4G technology to remote areas
- Every patient should have WiFi accessibility
- Cultivate willingness to change

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