

Protocol 12 · Skin-graft bolster, and wound-bed preparation before grafting

SA evidence position: **Moderate** · Source: NPWT Evidence Library, www.wondsortg.co.za/NPWT.html, content as at 2026-10-04

Indication

Skin-graft bolster, and wound-bed preparation before grafting.

What this means

A split-thickness skin graft is a thin shaving of skin moved from a donor site to cover a wound. It survives only if it is held still and in close contact with a healthy bed, and if fluid does not collect under it. NPWT has two uses here: preparing the wound bed so it is ready to accept a graft, and acting as a bolster (a gentle even pressure dressing) over the fresh graft to hold it in place, especially on awkward, mobile or curved sites.

Why NPWT is used here

A pooled analysis of 16 randomised trials (812 patients) found graft take improved by 8.3 percent overall, and by 10.0 percent at minus 80 mmHg with no heterogeneity; graft loss was halved (odds ratio 0.44) and reoperation cut by two-thirds (odds ratio 0.31). Graft take exceeded 95 percent at every bolster pressure from 50 to 125 mmHg in one series, and an independent 2026 consensus reports that minus 125 mmHg does not give the same benefit as minus 80. The one trial that isolated the suction (the same foam bolster, tube left unconnected, assessors masked) found median graft area lost 0 versus 12.8 percent and a second procedure in 17 versus 40 percent. For bed preparation in the diabetic foot, one trial reached a graftable bed in 7.2 versus 13.6 days with graft survival 100 versus 76 percent.

Patient selection

- Bolster: a fresh split-thickness graft on a site where a tie-over dressing would be difficult (joint, contour, perineum, large area), or where fluid collection is likely.
- Bed preparation: a clean debrided wound that needs granulation before it can be grafted.
- For tendon or bone exposure, an artificial dermis under NPWT followed by a staged graft is recommended (level I).
- After cancer excision: only once complete resection has been confirmed on histology.

For all NPWT

- The patient must be compliant and compos mentis: able to understand what the device does, keep the seal, protect the tubing and pump, report bleeding, pain or alarms, and attend or receive dressing changes.
- The patient's circle of care must be included: family, carers, home-nursing service or ward team, whoever will be present when the seal fails at night. Document who was told what and who is responsible for the device between visits.

Contraindications

Specific to this indication

- Instillation NPWT over a graft: never; the fluid lifts the graft.
- A bed that is still infected, sloughy or bleeding: prepare it first.
- Cancer not yet confirmed as completely removed.

For all NPWT: do not apply if

- Active bleeding beyond capillary ooze. Stop it first; NPWT does not control bleeding.
- An uncorrected clotting disorder.
- An exposed vessel, graft, anastomosis, organ or nerve with no barrier between it and the foam.
- Dead tissue not yet debrided, untreated bone infection, or cancer in the wound bed.

Proceed with caution and record the decision

- Blood thinners: a caution, not a bar. Lowest effective pressure, barrier over any vessel, inspect at every change, record the decision.
- Pacemaker or defibrillator: the PICO pump holds a magnet. Keep it 10 to 15 cm from the device, away from the chest, and record where it sits.
- Fragile surrounding skin or adhesive allergy. Children: no NPWT system was cleared for them as at 2011; treat as a hard limit unless current labelling says otherwise.

Potential risks and side-effects

- Graft shear if the dressing is disturbed or pressure cycles: use continuous mode only over a graft.
- Graft loss on take-down if the foam has adhered: always use a non-adherent layer between graft and foam.
- Higher pressure and deeper foam both increase tissue contraction in bench studies; a graft needs apposition without deformation.
- Bleeding: the serious harm. All six deaths in the regulator's first two-year series, and nine of twelve overall, were bleeds in patients whose bleeding risk had been missed (12 deaths, 174 injuries).
- Skin blistering: about 3.5 times more likely than with an ordinary dressing (risk ratio 3.55, 95% CI 1.43 to 8.77).
- Pain at changes (pre-medicate; soak a stuck sponge with saline) and anxiety in the first days, which settles. Say so beforehand.
- Retained foam, the regulator's commonest injury: count every piece in and out, and never cut foam over the wound. Adhesive damage to skin.

Treatment protocol

Bolster pressure	Minus 50 to minus 80 mmHg continuous. Minus 80 mmHg is the setting with a matching effect estimate; 50 mmHg has two independent sources. Do not exceed minus 125.
Bolster interface	A non-adherent contact layer (paraffin gauze or silicone) directly on the graft, then PVA (white) foam or a thin black foam over it.
Bolster duration	Leave undisturbed four to five days before the first take-down. Do not change earlier unless the seal fails or there is bleeding.
Bed preparation	Standard open-wound NPWT (minus 80 to minus 125 mmHg, changes every 48 to 72 hours) until the bed is red, flat and granulating.
Mode	Continuous only over a graft.

Step by step

1. Bed preparation: debride, apply standard NPWT, and review at each change until the bed is ready. Book the graft when it is.
2. In theatre: harvest and lay the graft, mesh if needed, and secure the edges.
3. Place the non-adherent layer directly over the graft, then the foam, extending slightly beyond the graft edges.
4. Seal and set minus 50 to minus 80 mmHg continuous. Confirm draw-down and that the graft has not shifted.
5. Leave four to five days. At take-down, remove slowly, soaking with saline. Record percentage take.

When to stop and call for help

- Fresh bleeding into the canister or dressing: pump off, pressure on, call the surgeon.
- New or rising pain, spreading redness, fever or a foul smell: review the same day.
- A seal that cannot be held for more than two hours.
- No progress at four weeks: stop and re-plan.

Outcome measures

- Percentage graft take at first take-down (day four to five) and at two weeks.
- Graft loss needing re-grafting; return to theatre.
- For bed preparation: days from first NPWT to graft.
- Complications: haematoma or seroma under the graft, infection, shear.
- Donor site healing is recorded separately.

What to document at every change

- Indication; which contraindications were checked and excluded.
- Pressure, mode, interface, and the number of foam pieces placed and removed.
- Wound length, width and depth, a dated photograph, exudate, any bleeding, and the pain score.
- The planned review date and the endpoint (closure, graft or flap).

A point worth knowing

Lead a funding request with reoperation avoided, not with graft appearance: it is the outcome with no heterogeneity across trials and the one a funder can price. Do not claim healing time, scar quality, quality of life or cost: the pooled review states all four are absent from the literature.

Funding note (South Africa)

ICD-10: Code the underlying wound being grafted, not a graft-complication code. **PMB:** Via the underlying wound's pathway.

References

1. Lee SYC, Bayan L, Sato A, Vankayalapati DK, Antoniou V, Shami MZ, et al. Benefits of negative pressure wound therapy in skin grafts: a systematic review and meta-analysis of randomised controlled trials. *J Plast Reconstr Aesthet Surg* 2025;102:204-217. doi:10.1016/j.bjps.2025.01.036
2. Evangelista MS, Kim EK, Evans GR, Wirth GA. Management of skin grafts using negative pressure therapy: the effect of varied pressure on skin graft incorporation. *Wounds* 2013;25(4):89-93.
3. Nakamura Y, Fujisawa Y, Ishitsuka Y, Tanaka R, Maruyama H, Okiyama N, et al. Negative-pressure closure was superior to tie-over technique for stabilization of split-thickness skin graft in large or muscle-exposing defects: A retrospective study. *J Dermatol* 2018;45(11):1207-1210. doi:10.1111/1346-8138.14536
4. Greater Bay Area Chronic Wound Care Standardization Alliance; Huang GT, Wei YT. Consensus guidelines on negative pressure wound therapy for wound repair (2025 version). *Regenes Repair Rehabilitation* 2026;2(1):73-79.
5. Wu Y, Shen G, Hao C. Negative pressure wound therapy (NPWT) is superior to conventional moist dressings in wound bed preparation for diabetic foot ulcers: A randomized controlled trial. *Saudi Medical Journal* 2023;44(10):1020-1029. doi:10.15537/smj.2023.44.20230386
6. Mowers CC, Hilsman JH, Dhodapkar MM, Shuler MS Jr, Fleming JC, Sarraj M, et al. Performance of a Novel Negative Pressure Wound Therapy Filler in Wound Contraction. *Wounds* 2026;38(8):201-207. doi:10.25270/wnds/26050
7. Bruwer FA, Kairinos N, Adams K, Weir G, Sander J. The use of negative pressure wound therapy: Recommendations by the Wound Healing Association of Southern Africa (WHASA). *Wound Healing Southern Africa* 2021;14(2):40-51.
8. Kim PJ, Attinger CE, Constantine T, Crist BD, Faust E, Hirche CR, et al. Negative pressure wound therapy with instillation: international consensus guidelines update. *Int Wound J* 2020;17(1):174-186. doi:10.1111/iwj.13254
9. Maeda T, Murao N, Hayashi T, Funayama E, Osawa M, Ishikawa K, et al. Application of Negative-pressure Wound Therapy after Radical Excision of Soft Tissue Malignancy: To Obtain a Better Esthetic Result with a Less Invasive Reconstructive Technique. *Int J Surg Wound Care* 2020;1(2):47-52. doi:10.36748/ijswc.1.2_47
10. 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.2014.04.001
11. Llanos S, Danilla S, Barraza C, Armijo E, Piñeros JL, Quintas M, et al. Effectiveness of negative pressure closure in the integration of split thickness skin grafts: a randomized, double-masked, controlled trial. *Ann Surg* 2006;244(5):700-705. doi:10.1097/01.sla.0000217745.56657.e5