

# Using polylactic acid dermal matrices over wound avascular structures

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## Background

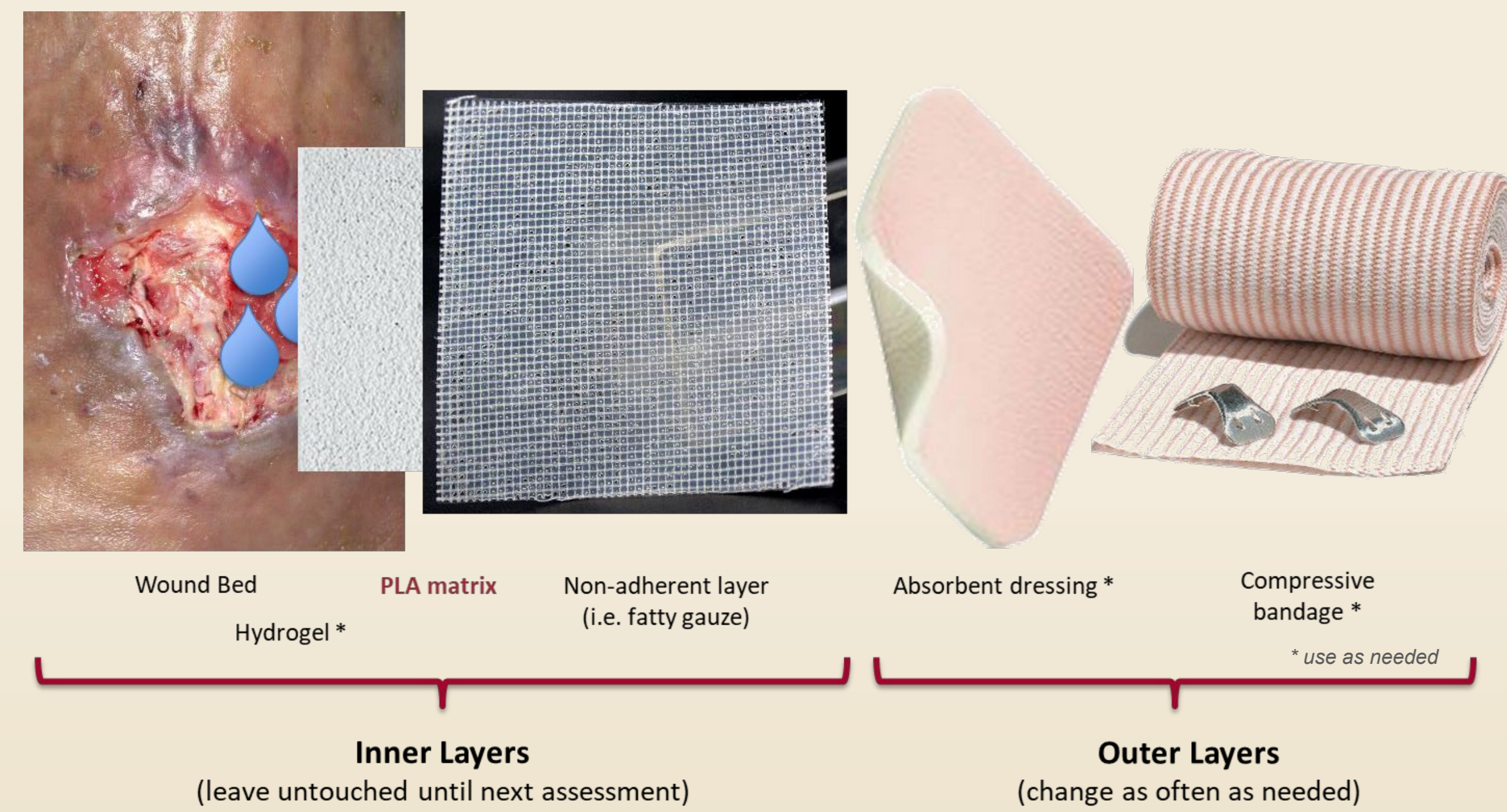
### Objective:

- Here, we present a case series of patients treated with a **novel poly-lactic acid (PLA) dermal matrix** to promote wound repair over **avascular structures**.

### Background:

- Wounds with avascular components are a challenge in wound care, as they **lack blood flow and the potential to heal**. Typical avascular structures include **tendon, bone without periosteum, joint surface, and osteosynthesis hardware**.
- PLA closure matrices are **fully synthetic** products that have demonstrated excellent closure outcomes for patients with challenging wounds by **restoring the interplay of the key elements of wound healing**.
- This is achieved because the **lactate** released by the PLA matrix acts as a paracrine agent (lactormone) with potent signaling effects that include:
  - Hypoxia mimicking** and triggering of **neo-angiogenesis**
  - Cell survival and proliferation**
  - Anti-inflammation**
  - Wound pH acidification**

## Application Protocol



- Our **management protocol** for treating avascular wounds is as follows:

- Complete clinical history and wound history → medication and/or nutritional status adjustments
- Assessment of the vascular pathology by infrared thermography, ABI and/or Doppler US
- Assessment of bacterial contamination or infection by auto-fluorescence and/or tissue biopsy

- Once the wound has been **“prepared to repair”** <sup>1</sup>:

- Debride the devitalized tissue and refresh the wound with cross hatching as needed
- De-attach any rolled edges and bring to hemostasis

- The application of the PLA membrane is done with a **“sandwich technique”**:

- Application of the PLA matrix in intimate contact with wound bed
- Hydrogels can be used for maintaining a moist environment if needed
- Application of a non-adherent dressing
- Application of an outer layer of absorbent dressings as needed and a compression bandage

- The **outer layers can be changed as often as needed** without disturbing the inner layers.

- Assessment of the wound’s evolution and application of PLA matrices is performed weekly until healing.

## Case 1



- Patient 1 is a 55-year-old male without comorbidities who suffered an exposed tibial fracture and a subsequent surgical site infection. The wound bed was highly necrotic and sloughy, with exposed osteosynthesis material.
- Following abscess drainage and debridement, PLA matrices were applied.
- Within 5 weeks, granulation tissue covered the metal implants and the wound completely healed without major scarring.

## Discussion

- PLA matrices are a suitable material for covering avascular wound components.
- This material produces an intense neo-vascularization and granulation response in the wound bed that helps preserve tissue viability and integrity, leading to secondary closure or conditioning of the wound bed for definite repair with surgical techniques.

### References

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## Case 2



- Patient 2 is a previously healthy 24-year-old male who had a motorcycle accident with an exposed tibial fracture.
- His leg was fixed with an intramedullary nail; however, due to bone and soft tissue loss, a large defect extending into the medullary canal was left behind.
- The wounds were treated with PLA matrices and the defect was also packed with the material. Two weeks later, the defect was filled with granulation tissue and most of the most superficial skin wounds had completely healed. By the third week only the area surrounding the tissue defect remained open but filled with adequately vascularized granulation tissue that received a skin graft for definite closure.

## Case 3



- Patient 1 consists of a 57-year-old female with a history of uncontrolled diabetes and lupus erythematosus.
- Following a fall, she presented an ulcer on her right leg with exposed bone. The ulcer failed to heal with the standard of care, and due to intense pain and concerns over more tissue damage, the patient refused any surgical procedures.
- PLA matrices were used to cover the defect. Granulation tissue and epithelium started growing from the wound’s edges, fully covering the defect and promoting full healing within 5 weeks.