

Reconstruction of Stage IV Pressure Ulcers Using Delayed Flaps in a Pediatric Patient with Spinal Cord Injury: A Case Report

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Introduction

Pressure ulcers are a major complication in patients with spinal cord injury (SCI), leading to increased morbidity, prolonged hospitalizations, and diminished quality of life. Surgical intervention is often required for deep, non-healing wounds, but traditional muscle flaps may compromise essential muscle function, particularly in paraplegic patients.

Delayed flap techniques, originally utilized in breast reconstruction, have demonstrated improved vascularization and reduced complications in reconstructive surgery. This case presents the successful use of a delayed pedicled SIEA flap for a stage IV pressure ulcer in a pediatric SCI patient, emphasizing its role in preserving muscle integrity while achieving durable wound closure.

Case Presentation

A 7-year-old female with T3-complete SCI developed bilateral stage IV pressure ulcers over the anterior superior iliac spine (ASIS) due to improper positioning during spinal surgery. After one year of failed treatments, she was referred for reconstructive evaluation.

- Right hip wound: 13 cm × 9 cm × 5.5 cm
- Left hip wound: 9 cm × 7.5 cm, previously treated with a rectus femoris muscle flap but with delayed healing at the superior aspect

Given the need to preserve core function as well as CT angiography exhibiting osteomyelitis and necrosis of lower extremity muscles attached at the ASIS, a delayed pedicled SIEA flap was chosen for the right hip. The flap was delayed for 4 days with a 5 cm distal bridge, ensuring robust vascularity confirmed via Doppler ultrasound before inset. The left hip wound underwent wound bed preparation and skin grafting to enhance closure.

Postoperative Outcomes:

- Right hip flap showed excellent vascular signals and complete integration within weeks
- Left hip skin graft integrated well, except for a small area of hypergranulation, treated with silver nitrate and doxycycline
- Minimal post-op complications, with no significant functional compromise

Pre-Surgical Status



Figure 1: Initial Presentation of Pressure Injury on the Right Anterior Lateral Hip over the Anterior Superior Iliac Spine, measuring 13 cm x 9 cm x 5.5 cm.

Post-Surgical Status



Figure 2: Post-surgical Presentation of the Right Anterior Lateral Hip Pressure Injury after Pedicled SIEA flap reconstruction with a 4-day delay. Photo on the left indicates immediately post-op; photo on the right indicates one-week post-op.

Conclusions

This case underscores the efficacy of delayed fasciocutaneous flap techniques for complex pressure ulcer reconstruction, particularly in pediatric SCI patients where muscle function preservation is paramount. The 4-day delay method enhanced vascularization through angiogenesis, flap viability, and overall wound healing, while avoiding the morbidity associated with traditional muscle flaps.

The left hip, treated with wound bed preparation and skin grafting, also showed successful integration, albeit with a minor area of hypergranulation.

Despite this, the approach successfully achieved durable coverage and wound closure. This case highlights delayed pedicled SIEA flaps as a valuable reconstructive option in cases where vascular compromise and anatomical constraints limit traditional techniques.

The patient's progress highlights the importance of individualized treatment plans. It also emphasizes the need for multidisciplinary management and ongoing monitoring to address any complications that may arise. Moving forward, further studies are necessary to assess the long-term functional and aesthetic outcomes of delayed flaps in pediatric SCI patients, which will contribute to optimizing strategies for pressure ulcer management and improving patient quality of life.