

## Superior Gluteal Artery Perforator Flap: A Reliable Method for Sacral Sores

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### Abstract

**Background:** Despite advances in reconstruction techniques, the treatment of sacral sores remains challenging to plastic surgeons. Perforator-based fasciocutaneous flaps for reconstructing pressure sores can achieve good functional results. **Methods:** We performed a retrospective review of 12 patients who underwent SGAP flap reconstruction at SGRDIMSAR over a 1-year period. **Results:** There were 8 men and 4 women in the study. All reconstructed flaps survived completely with no mortality or major donor site complications. Three patients had a minor infection and wound dehiscence that healed spontaneously. **Conclusions:** These observations suggest that the SGAP flap is a relatively easy flap to raise, with good reliability and minimal complications, and is therefore highly recommended for the reconstruction of the sacral pressure

**Keywords:** Perforator; Fasciocutaneous; SGAP (Superior Gluteal Artery Perforator).

### Introduction

A pressure ulcer is an area of localised damage to the skin and underlying tissue caused by pressure, shear, friction and or a combination of these. Pressure sore reconstruction has always been challenging. Immobile patients are prone to develop pressure sores from unrelieved pressure on tissue over the sacral area. Up to one-third of immobilised patients in long-

term care facilities will develop pressure sores [1,2]. These defects have traditionally been reconstructed with gluteus maximus musculocutaneous flaps. However, there has been a change from the musculocutaneous flap to the fasciocutaneous flap, with the pedicled superior gluteal artery perforator (SGAP) fasciocutaneous flap adapted for sacral pressure sore reconstruction.

Frequency of occurrence of pressure sores region wise is as follows:-

- Ischium
- Greater Trochanter
- Sacrum
- Heel
- Malleolus (Lateral Then Medial)
- Occiput

The hip and buttock regions account for 67% of all pressure sores, with ischial tuberosity, trochanteric, and sacral locations being most common.

NPUAP (National Pressure Ulcer Advisory Panel) Staging Criteria

- *Stage 1 Pressure Injury:* Non-blanchable erythema of intact skin
- *Stage 2 Pressure Injury:* Partial-thickness skin loss with exposed dermis-wound bed is viable, pink or red, moist. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present.
- *Stage 3 Pressure Injury:* Full-thickness skin loss-adipose (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and

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tunneling may occur. Fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed.

- *Stage 4 Pressure Injury:* Full-thickness skin and tissue loss.

Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer. Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur.

- *Unstageable Pressure Injury:* Obscured full-thickness skin and tissue loss.

Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar. If slough or eschar is removed, a Stage 3 or Stage 4 pressure injury will be revealed.

## Method

The present study was retrospective observational study conducted at Sri Guru Ram Das Institute of Medical Sciences and Research, Vallah, Sri Amritsar.

Twelve patients with diagnoses of sacral pressure sores were taken for study from April 2016 to March 2017.

Gluteus superior perforator fasciocutaneous flap (SGAP) were used in all cases.

- 8 male patients and 4 female patients were taken for the study.
- Average operation time – 90 minutes.

Minimum and maximum size of sore was 6cm by 8cm to 17cm by 10cm.

- Flap was based on the perforator nearest to the sore which was confirmed by hand held doppler and marked preoperatively.
- The SGAP flap is marked based on the superior gluteal artery as it emerges at the border of the sacrum at the junction of the medial one third and lateral two thirds of a line drawn between the posterior superior iliac spine (PSIS) and the apex of the greater trochanter of the femur.
- The artery supplies the supra-piriformis part of the gluteus maximus muscle. The surface marking of the piriformis muscle is by a line from the top of the greater trochanter of the femur to a point midway between the PSIS and the coccyx.
- The incision goes down at ninety degrees through skin, fat and fascia to the muscle.

- The flap is raised off the muscle until the chosen perforator is found.
- This vessel is slowly dissected out by splitting the muscle fibres rather than cutting, and by ligating small muscular side branches.
- The inferior border of the flap is then incised and the flap is raised away from the muscle fully. The dissection of the pedicle continues until near the origin of the superior gluteal artery or until the pedicle length is sufficient to transpose the flap into the defect without tension.
- The donor defect is closed primarily after minimal undermining and the flap inset with drains inserted to both areas.

## Results

The donor site was closed primarily in all the cases without using skin graft.

All flaps showed 100% take up except for a few complications as follows:-

- Heeling by secondary intention- 1 case
- Partial flap necrosis – 1 case

None of the case showed any seroma or hematoma formation.



Fig. 1:



Fig. 2:



Fig. 5:



Fig. 3:



Fig. 6:



Fig. 4:



Fig. 7:



Fig. 8:



Fig. 11:



Fig. 9:



Fig. 12:



Fig. 10:



Fig. 13:



Fig. 14:



Fig. 17:



Fig. 15:



Fig. 18:



Fig. 16:



Fig. 19:



Fig. 20:

### Discussion

Hospitalised surgical patients, immobilised patients in long-term care facilities with neurological or cardiovascular diseases, and paraplegics have a high risk of developing pressure sores. A conservative approach still remains the first line of management. Pressure relief, daily wound dressing, and optimising the patient's nutrition aim at prevention of infection and enhancing wound healing. Conservative treatment is mostly effective in stage 1 and 2 pressure sores. Stages 3 and 4, as well as failure of conservative treatment in treating stage 1 and 2 sores, require surgical management. Common options include primary closure, skin grafting, local random flaps, muscle flaps and the recently developed pedicled perforator flap.

The most commonly used method of sacral pressure sore reconstruction is the gluteus maximus musculocutaneous flap, which has a good reliable vascularity and greatly reduces postoperative wound complication. However, because this flap may cause gait disturbances in ambulatory patients, Ramirez et al. reported the sliding gluteus maximus flap, whereby structural and functional integrity of the muscle was preserved [3]

In 1993, Koshima et al. described the gluteal artery perforator flap based on parasacral perforators [4]. The pedicled SGAP fasciocutaneous flap evolved on further development of the work of Koshima et al [4] and Kroll and Rosenfield [5].

The pedicled SGAP flap is muscle-sparing and therefore beneficial in ambulatory patients. Higgins

et al. suggest that muscle sparing should be considered not only in ambulatory and sensate patients, but in paraplegic patients as well [6]. Muscle sparing is also advantageous in that future reconstructive options still exist in the case of failure of the perforator flap or recurrence.

In this series, no major complications were encountered. One case had partial flap necrosis for which minimal debridement was done and it healed and in one another case healing by secondary intention occurred.

After a mean follow-up of 10 months, there were no recurrences.

### Conclusion

Complete flap survival with stable wound coverage, musclesparing properties for future reconstructive options, minimal intra-operative blood loss and minimal donor site morbidity make the pedicled SGAP flap a reliable option for sacral pressure sore reconstruction.

In this era of minimally invasive procedures, perforator flaps take their own position and provide new solutions for complex wounds with the least possible donor-site morbidity.

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