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CASE REPORT

# The island pedicled anterolateral thigh (pALT) flap via the lateral subcutaneous tunnel for recurrent ischial ulcers

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## KEYWORDS

Chronic recurrent ischial sores;  
Island pedicled anterolateral thigh flap;  
Secondary reconstructive option

**Summary** Chronic recurrent ischial sores are an important cause of morbidity in paraplegics and geriatric patients. Compared to sacral and trochanteric ulcers, ischial sores are the most difficult to treat, with a low success rate following conservative therapy and a high recurrence rate after surgical treatment. We report the use of the pedicled anterolateral thigh (pALT) flap for reconstruction of a chronic ischial sore. The free ALT flap has an established role in reconstruction in the head and neck and extremities. However, there are few reports concerning its clinical applications for regional reconstruction. As a pedicled flap, it has been used in the primary reconstruction of the perineum, groin, anterior abdominal wall, thigh and ischium. We present the first reported case of a paraplegic man with a recurrent ischial sore treated successfully with an island pALT flap inset via a lateral subcutaneous approach. We discuss the indications and its role as a simple and reliable secondary reconstructive option in the treatment of recurrent ischial ulcers after first-line loco-regional surgical options have been exhausted.

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The anterolateral thigh (ALT) flap, first described by Song et al. in 1984,<sup>1</sup> has been extensively used in soft tissue reconstruction because of its vascular reliability, long pedicle, versatility and minor donor-site morbidity. It has an established role in free flap reconstruction in the head

and neck and extremities but there are only few reports concerning its clinical applications for regional reconstruction. As a pedicled flap, it has been used in the reconstruction of the perineum, groin, anterior abdominal wall, thigh and ischium.<sup>2</sup> To reconstruct an ischial defect, it can be either rotated medially through the upper thigh or laterally through a subcutaneous tunnel. We present the first reported case of a paraplegic man with a recurrent ischial sore treated successfully with a pALT flap inset via

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a lateral subcutaneous approach. We feel that this approach presents a simple and reliable secondary reconstructive option in the treatment of recurrent ischial ulcers.

### Case report

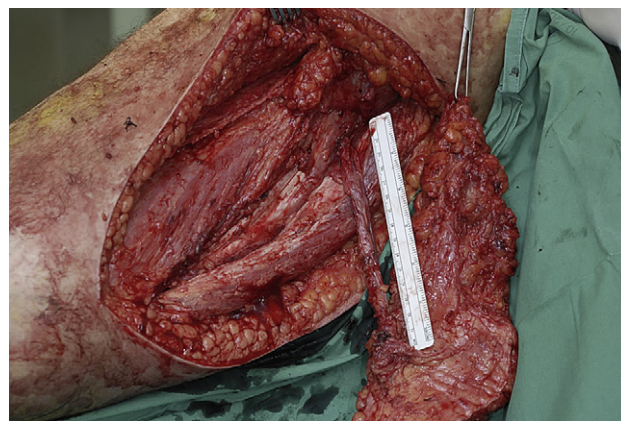
A 27-year-old man, with T10–T11 transverse myelitis, suffered from recurrent ischial sores. A gluteus rotation flap was performed to treat a right ischial ulcer. Suture dehiscence occurred over the medial tip of the flap 10 days postoperatively (Figure 1). Subsequent debridement resulted in significant soft tissue loss over the ischial tuberosity, making it difficult for another immediate rotation flap reconstruction. Using the technique described subsequently, the wound defect was resurfaced with a 14 × 7 cm pALT fasciocutaneous flap (Figure 2). No postoperative complications were noted on follow-up 1 year later.

### Operative technique

The skin perforators were mapped preoperatively with a handheld Doppler and the desired size of the skin paddle was marked with the upper third of the flap centred over the perforators. The pALT thigh flap was raised in the usual fashion and perforators were carefully preserved intraoperatively. Pedicle dissection proceeded to the origin of the main descending branch of the lateral circumflex femoral artery and the flap was inset via a lateral subcutaneous tunnel. Unique to our technique, a collar of vastus lateralis muscle was cut proximally to minimise tension and avoid kinking of the pedicle as the flap was transposed laterally (Figure 3). This simple technique also served to extend the reach of the flap by 1–2 cm. The donor site was closed primarily and the flap was inset into the defect (Figures 4 and 5).

### Discussion

Chronic recurrent ischial ulcers constitute an important clinical problem in paraplegics and geriatric patients as they are a major cause of patient morbidity.<sup>4</sup> Compared to sacral and trochanteric ulcers, ischial ulcers are considered

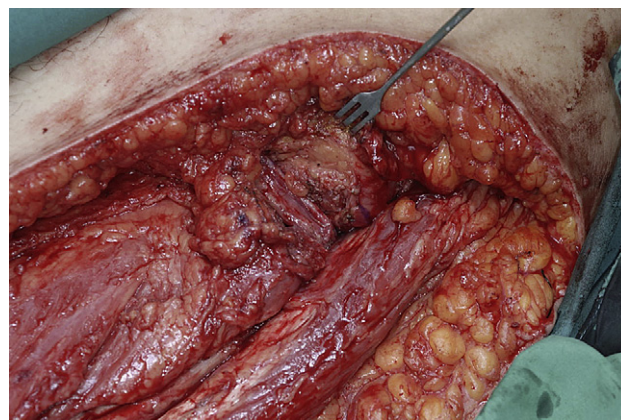


**Figure 2** Island pedicled ALT fasciocutaneous flap elevated.

the most difficult to treat, with a low success rate following conservative therapy and a high recurrence rate after surgical treatment. Recurrence rates have been reported to exceed 50%<sup>4</sup> after surgical treatment because motion over the ischium is greater than other sites and there is considerable pressure exerted on the region when sitting. Foster et al.<sup>4</sup> advised that proper flap selection and the appropriate sequence of flap use significantly improved the success rates of reconstruction. Disa et al.<sup>5</sup> emphasised the flap requirements for the management of pressure sores; namely, adequate bulk to obliterate dead space, a well-vascularised flap and good transposition to allow for tension-free closure. The gluteus maximus myocutaneous flap, inferior gluteal thigh flap, V–Y hamstring flap and tensor fascia latae flap are common first-line options for ischial coverage.<sup>6</sup> Other options include the gracilis, biceps femoralis, hamstring, double adipofascial, inferior gluteal artery perforator and vastus lateralis flaps. However, there is no current definitive surgical method. In our centre, the gluteal rotation flap is the first-line surgical option for ischial ulcers as it allows for repeated surgery to treat ulcer recurrence.<sup>6</sup> However, in situations when re-rotation is not suitable due to early partial breakdown or a large soft tissue defect, we feel that the pALT flap via a lateral subcutaneous tunnel presents a simple and reliable secondary reconstructive option for ulcer recurrences.



**Figure 1** Suture dehiscence of medial tip of buttock rotation flap directly over previous recurrent ischial ulcer site.



**Figure 3** A cuff of vastus lateralis muscle was excised to extend the reach and prevent kinking of the pedicle.



**Figure 4** Flap inset and wound closure.

The pALT fasciocutaneous flap has several advantages as an effective secondary option for recurrent ischial ulcers. It provides sufficient bulk to obliterate significant dead space often left after aggressive debridement of pressure sore. Depending on the bulk requirement, it can be harvested as a fasciocutaneous or myocutaneous flap. It has a reliable blood supply which is usually preserved despite failure of other local flaps.

There were previous reports of ischial ulcer reconstruction using the vastus lateralis myocutaneous flap.<sup>7–9</sup> In these cases, the authors elevated the complete vastus lateralis muscle as a vehicle of the skin island and used the skin paddle at the distal third of the thigh in order to reach the ischial wound through a lateral subcutaneous tunnel. Lee et al.<sup>3</sup> subsequently reported the use of pALT flaps for the treatment of recurrent ischial sores in 15 patients via a medial intermuscular passageway, while Yu et al.<sup>10</sup> reported its use in one patient via a medial subcutaneous approach. We feel that both methods incur a risk of pedicle constriction if the passageways were not dissected generously. There is also a risk of injuring the perforator vessels of the adductor magnus and the sciatica nerve under the long head of the biceps femoris during dissection of the tunnel. Moreover, it is technically difficult to transpose a large flap through this passageway.

The lateral subcutaneous route for inset of the pALT offers a few advantages over the previously reported route.



**Figure 5** Long-term outcome (13 months post-operation).

It is a more direct route from the lateral aspect of the thigh to the ischial tuberosity. There is better visualisation and easier haemostasis. After generous dissection, it allows easy passage of a large flap. The proximal and middle portion of the pALT, which has more reliable vascularity, can also be inset over the ischial region via this route. Lastly, although we were able to inset the flap with adequate pedicle length, we realised that by cutting a small 1 cm trough in the vastus lateralis, we managed to decrease tension in the flap pedicle and increase its reach by about 1–2 cm. This is an optional manoeuvre and the amount of muscle to be excised depends on the situation. This simple manoeuvre provided better pedicle reach and minimised tension from pedicle stretching as a result of postoperative oedema. The trough also provided a protective recess which would shelter the pedicle from postoperative compression.

The island pALT fasciocutaneous flap, inset via a lateral subcutaneous route, is a reliable option for the treatment of recurrent ischial pressure sore when primary loco-regional options have been exhausted.

### Conflict of interest statement

All the authors have no conflicts of interest that could inappropriately influence the above work.

### Acknowledgements

None.

### References

1. Song YG, Chen GZ, Song YL. The free thigh flap: A new free flap concept based on septocutaneous artery. *Br J Plast Surg* 1984; **37**:149–59.
2. Ng RW, Chan JY, Mok V, et al. Clinical use of a pedicled anterolateral thigh flap. *J Plast Reconstr Aesthet Surg* 2008; **61**: 158–64.
3. Lee JT, Cheng LF, Lin CM, et al. A new technique of transferring island pedicled anterolateral thigh and vastus lateralis myocutaneous flaps for reconstruction of recurrent ischial pressure sores. *J Plast Reconstr Aesthet Surg* 2007; **60**:1060–6.
4. Foster RD, Anthony JP, Mathes SJ, et al. Ischial pressure sore coverage: a rationale for flap selection. *Br J Plast Surg* 1997 Jul; **50**:374–9.
5. Disa JJ, Carlton JM, Goldberg NH. Efficacy of operative cure in pressure sore patients. *Plast Reconstr Surg* 1992 Feb; **89**: 272–8.
6. Wong CH, Tan BK, Song C. The perforator-sparing buttock rotation flap for coverage of pressure sores. *Plast Reconstr Surg* 2007 Apr 1; **119**:1259–66.
7. Drimmer MA, Krasna MJ. The vastus lateralis myocutaneous flap. *Plast Reconstr Surg* 1987; **79**:560–6.
8. Waterhouse N, Healy C. Vastus lateralis myocutaneous flap for reconstruction of defects around the groin and pelvis. *Br J Surg* 1990; **77**:1275–7.
9. Schmidt AB, Fromberg G, Ruidisch MH. Applications of the pedicled vastus lateralis flap for patients with complicated pressure sores. *Spinal Cord* 1997; **35**:437–42.
10. Yu P, Sanger JR, Matloub HS, et al. Anterolateral thigh fasciocutaneous island flaps in perineoscrotal reconstruction. *Plast Reconstr Surg* 2002; **109**:610–6.