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Technical Note
Reconstructive Surgery

The fat–fascia paddle only with a composite fibula flap: marked reduction in donor site morbidity

A. Mohindra, S. Parmar, P. Praveen, T. Martin
Department of Oral and Maxillofacial Surgery, University Hospitals Birmingham NHS Foundation Trust, Edgbaston, Birmingham, UK

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Abstract. Fibula free flaps are used widely in head and neck reconstruction, primarily for their versatility and contribution to aesthetic and functional outcomes. The literature suggests that early complications such as wound dehiscence and skin graft loss can occur in up to a third of patients. The healing of these donor sites can be prolonged, and in certain cases may require an operative intervention. A method to overcome this problem is described herein. In raising the skin paddle, a standard lateral approach to the fibula harvest is used. The skin paddle is not isolated and the posterior margin of the paddle is maintained. The skin paddle epithelium is separated with a small cuff of adipose tissue from the underlying fat–fascia layer. This fat–fascia paddle is then raised with the fibula as normal and tacked to the margins of the recipient soft tissue defect. The fat–fascia paddle heals, resulting in a thin mucosal covering for prosthetic dental rehabilitation. This technique can reduce the incidence of donor site wound complications when raising a composite fibula flap.

Key words: fibula composite flap; morbidity; donor site.

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The free fibula flap has become one of the preferred methods of bony reconstruction following segmental resection of the mandible or maxilla, due to its well-documented advantages.[1,2] The flap, however, does have limitations. The skin paddle is often hair-bearing. It can also be of variable thickness and is sometimes bulky. This can have an impact on dental rehabilitation. Additionally it is also associated with donor site morbidity.[1–5] Complications can occur, such as sensory deficit, ankle instability, and reduced power and range of movement, as well as the development of a claw toe.[3] Wound dehiscence and skin graft loss is a more common complication associated with this flap.

Shindo et al., in a retrospective study, noted that 15 of their 55 patients had donor site wound complications.[1] A prospective cohort study of 157 patients by Momoh et al. found an incidence of donor site wound complication of 31%.[4] Although not necessarily needing an operative intervention, healing was prolonged and limiting (up to 32 weeks).

A systematic review by Ling and Peng demonstrated a wound complication rate of 19% when the donor site was closed with a split skin graft (SSG).[3] Where primary closure was undertaken, donor wound site complications fell to 9.9%. However, tight primary closure for larger skin paddles (width up to 6 cm) was noted to have a detrimental effect on healing, causing long-term morbidity with sensory or motor deficits.[1]

A method of minimizing wound healing complications secondary to donor site skin

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grafting by raising a fat–fascia only paddle is described herein. As the skin is not taken with the flap, the leg can be closed directly and no skin grafts are required.

Materials and methods

The patients were identified based on their need for a composite fibula flap. Over a 6-month period, eight patients underwent surgery with a fibula reconstruction for a mandibular pathology. Five of these patients were deemed eligible for a fat–fascia paddle. The defects required bony reconstruction of the mandible but also extended to the surrounding soft tissue involving the floor of the mouth, buccal vestibule, retromolar region, and lingual gutter. The other three patients required either restoration of a through-and-through defect, or there was a large mobile soft tissue attachment such as the tongue or cheek that required reconstruction. The skin paddle was preserved in those cases.

The standard protocol at the authors' institution for patients undergoing fibular composite reconstruction is to image lower-limb vessel flow with magnetic resonance angiography. Intraoperatively, the perforators to the fat–fascia paddle were identified using a hand-held Doppler. When planning for the fat–fascia paddle, the donor site dimensions were matched to the anticipated defect at the recipient site. Therefore the skin markings were the same as if the skin paddle were to be taken with the fibula.

The standard lateral approach to raising a fibula flap was used. Rather than making the posterior cut in the skin paddle, the skin was undermined in the paddle region leaving a small cuff of subcutaneous fat attached to the skin. This ensures that the subdermal plexus is preserved with the skin paddle whilst the paddle fat protects the fascia (Fig. 1).

The fat–fascia paddle was then raised in a traditional manner and the flap detached. As no skin was taken, the leg was closed primarily with a drain in situ. The skin in the region of the fat–fascia paddle was then tacked to the underlying muscle to improve healing. The leg was then dressed in a standard manner (paraffin-impregnated mesh, wool and crepe).

The composite fibula flap with its fat–fascia paddle was inserted into the defect once contouring osteotomies had been made. Adjustments to the thickness of the fat–fascia paddle could be made to ensure volume-matching to the defect. The fibula bone was placed in the bony defect and the fat–fascia paddle sutured to the edges of the soft tissue defect (Fig. 2).

Patients could bear weight from day 2. They were fed via a nasogastric tube for 5–7 days and were started on clear fluids after that, progressing to a free diet. The dressing was taken down at 10 days for review. This was the standard protocol in the unit even when the fibula was raised with a traditional skin paddle.

Monitoring of the flap was straightforward, as the fat–fascia paddle behaves in a predictable manner. The paddle forms a fibrin layer and swells up slightly. When the paddle is rubbed, it also bleeds. The paddle starts mucosalization at days 2–3. The fat–fascia paddle slowly shrinks down and by approximately 1 month has healed to provide a good peri-implant environment (Fig. 3).

Results

Thus far this technique has been utilized in five patients. The demographics, pathology, and reconstruction details, including complications, are listed in Table 1.

There were no flap failures in this group. One patient returned to theatre for revision of the venous anastomosis following venous congestion, but there was no further flap compromise. One patient underwent a simultaneous reconstruction with both a fibula composite flap and an anterior lateral thigh (ALT) flap. She had extensive bone involvement from squamous cell carcinoma. She had a bony resection from the right angle to and including her left condyle. Given this large bony defect, a fibula was chosen over alternative composite flaps for its length. The fat–fascia flap covered the bony reconstruction. However she required soft tissue bulk to compensate for the resection of both the masseter and medial pterygoid muscle, which had invasion from the ramus. She returned to theatre twice for partial soft tissue loss at the junction of both flaps. The underlying bone was adequately perfused. This was subsequently packed intraorally and the patient was fed

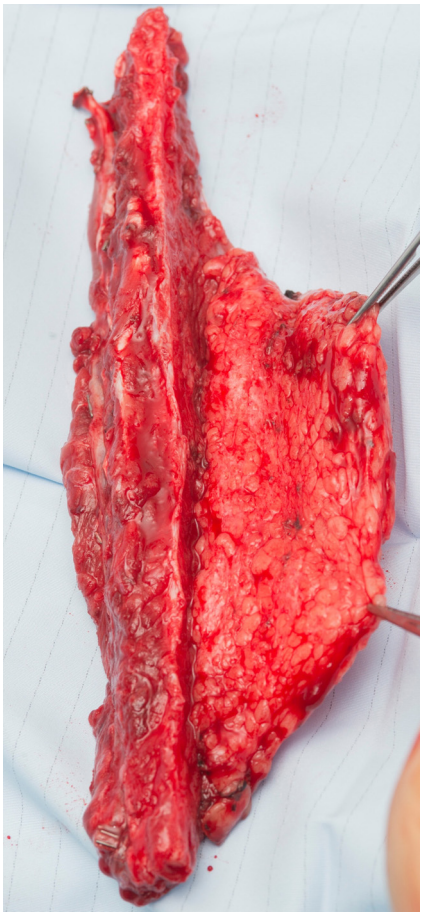

Fig. 1. The fat–fascia paddle attached to the fibula after being raised.

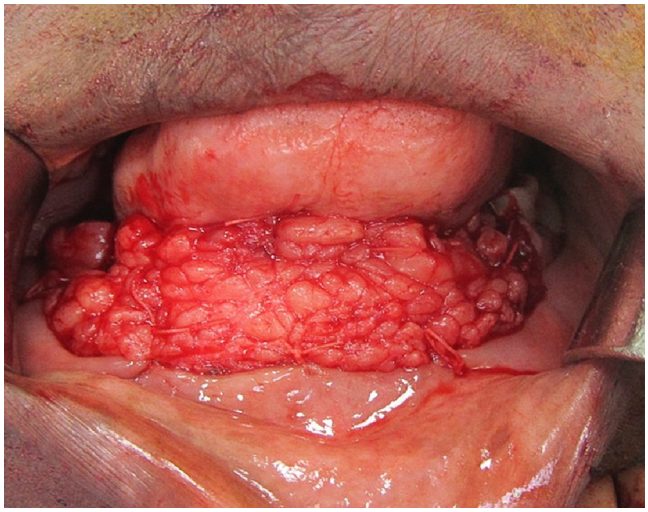

Fig. 2. The fibula has been inset, with the fat–fascia paddle secured intraorally.