The use of free tissue transfer with an anterolateral thigh flap for the treatment of large keloids on the head and neck

Aaron C Van Slyke MD MSc[1], Nicholas Carr MD[1], Andrew Hodges MD[2]

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Keloids are cosmetically, psychologically and functionally debilitating wounds that have proven difficult to treat with surgical excision alone. Large keloids are particularly challenging to treat because many of the current therapies for keloids are unsuitable, and the remaining defect after excision is difficult to close. The authors report a case involving a large disfiguring keloid on the head and neck, which was treated with surgical excision and immediate reconstruction with a free anterolateral thigh fasciocutaneous flap. No further adjuvant therapy was undertaken. At one-year follow-up, there was no recurrence at the recipient site, and the donor site healed without deformity. The free fasciocutaneous anterolateral thigh flap may be effective at treating large keloids in the head and neck region; however, well-controlled clinical studies are needed to establish this.

Key Words: *Anterolateral thigh; Free flap; Keloid; Microsurgery; Scar*

Keloids are an abnormal proliferation of fibrous scar tissue that, while benign in nature, pathognomonically invade the surrounding dermis (1). Clinically, keloids differ from hypertrophic scars in that they surpass the boundary of the original wound, manifest many months after injury, are less responsive to treatment, frequently recur after excision and do not spontaneously regress (2,3). Skin type, as well as location of wound and wound tension, have all been linked to the development of keloids, with the incidence of keloids being as high as 16% in the Black, Hispanic and Asian populations (2,4).

Keloids area assocaited with debilitating cosmetic, psychological and functional morbidity and, despite extensive research, still prove very difficult to treat. Currently, silicone sheeting/gel and compression is considered first-line as a prophylactic and treatment option for keloids, with intralesional injection of corticosteroids being the preferred method of treatment for keloids progressing beyond four weeks to six months (3). At the 12-month mark and beyond, nonresponsive keloids are managed with surgical excision in combination with iridium, localized radiotherapy, intralesional cryotherapy or intralesional corticosteroid injection (3). Unfortunately, many of these treatments are not suitable for large disfiguring keloids.

The use of local perforator flaps and free flaps to treat large disfiguring keloids is an interesting and emerging topic; however, currently there are few examples in the literature and no well-controlled clinical trials (5). Recently, Wang et al (5) showed the use of internal mammary artery perforator (IMAP) flaps and superior epigastric artery perforator (SEAP) flaps to be very promising for the treatment of large keloids in the lower sternum and upper abdomen. There are only two case reports in the literature describing the use of free flaps to treat keloids (6,7).

Figure 1) *Patient with a large keloid measuring 15 cm × 8 cm on the left neck and nuchal region*

The anterolateral thigh (ALT) flap is a reliable fascial or fasciocutaneous flap, based on the perforators of the descending branch of the lateral circumflex femoral artery, which has been used in several applications (8,9). Here, we present a case involving a large keloid in a patient with a delayed presentation and no previous intervention. At one-year postsurgical excision and immediate reconstruction with an ALT free flap, there was no evidence of recurrence.

CASE PRESENTATION

A 29-year-old black man sustained burns to the left side of his face and neck. He presented with keloid scars at the site of injury, including a large keloid of the left side of his neck and nuchal region (Figure 1). He had not received any previous treatments at the time of presentation. On September 26, 2012, the keloid was excised, leaving a 15 cm × 8 cm defect, and immediate reconstruction with a free ALT flap from the left thigh was performed at the Division of Plastic Surgery, Comprehensive Rehabilitation Services in Uganda (CoRSU) Rehabilitation Hospital, Kisubi, Uganda. The free ALT fasciocutaneous flap was selected for reconstruction because of its ability to fill large defects with less bulk, proving itself useful for large defects in cosmetically sensitive regions such as the head and neck (8,9).

In the operating theatre, the keloid was completely excised down to normal unscarred tissue and the facial vessels were exposed. The perforator of the anterolateral thigh flap was detected by Doppler and a template of the defect was transferred to the anterolateral thigh and

[1]*Division of Plastic Surgery, Department of Surgery, University of British Columbia, Vancouver, British Columbia;* [2]*Division of Plastic Surgery, Division of Plastic Surgery, Comprehensive Rehabilitation Services in Uganda (CoRSU) Rehabilitation Hospital, Kisubi, Uganda*

Correspondence: Dr Aaron Van Slyke, Division of Plastic Surgery & Burn Unit, University of British Columbia & Vancouver General Hospital, 2nd Floor, JPP, 855 West 12th Avenue, Vancouver, British Columbia V5Z 1M9. Telephone 604-837-8770, e-mail vanslykeaaron@gmail.com

Figure 2) *One-year follow up. No recurrence at recipient site* (**A**)*, and no significant deformity at donor site* (**B**)

centred on the perforator for determination of flap and skin paddle size. The ALT was raised in standard fashion based on one perforator: the descending branch of the lateral circumflex femoral vessels (8,9). Microanastamosis of the perforator to the facial artery was performed in an end-to-end fashion, whereas the first donor vein was anastamosed end-to-side onto the external jugular vein and the second donor vein end-to-end to a branch of the external jugular vein. The flap was sutured into position and good flow through all vessels was confirmed via Doppler. The flap remained well perfused.

The donor site was closed using a split-thickness skin graft from the left thigh, and all wounds were dressed with standard gauze dressings. The patient did not receive any adjuvant therapy. At one-year follow up, there was no evidence of recurrence at the recipient site and the donor site healed without deformity (Figure 2).

DISCUSSION

While there is a significant body of evidence in the literature directed at treating keloids (3), effective treatments of large disfiguring keloids are still being explored. We are only aware of two case reports in the literature that have reported the use of free tissue transfer to treat large keloids. Economides and Ferrell (6) reported the use of a free TRAM without adjuvant therapy to treat a large recurrent keloid in the lower neck suprasternal area that underwent two previous excisions; there was no recurrence at two-year follow-up and the donor site healed without deformity. Chen et al (7) used a lateral arm free flap to treat an infected, recurrent large keloid in the midline of the lower neck, and then administered four sessions of adjuvant radiotherapy; there was no recurrence at 18-month follow up and the donor site healed without deformity.

Here, we present a case of a large uncomplicated keloid that has shown good response to surgical excision and immediate reconstruction with an ALT free flap. At one-year follow up, there was no recurrence at the recipient site and no development of keloid at the donor site. The present report is the first to describe the use of an ALT free flap to treat large keloids. We chose the ALT fasciocutaneous free flap because it affords sufficient tissue to close large defects without significant tension, it has low donor-site morbidity, and the relative lack of bulk enables a more cosmetic result in a visible area such as the head and neck (8,9).

The present case provides further evidence to suggest the use of free tissue transfer to treat large keloids that are unsuitable for local perforator flaps such as the SEAP and IMAP flaps (5). The present case is the first in which a microvascular free flap was chosen to treat an uncomplicated keloid that was not infected, recurrent and had not received any previous interventions (6,7). Furthermore, unlike the case presented by Chen et al (7), here we show that free tissue transfer may be successful in treating keloids without the use of adjunctive radiotherapy. This finding is significant given the risk for recurrence of keloids treated with surgical excision alone has been reported to be 50% to 100% (3). In fact, we would have expected some keloid recurrence around the edges of the flap and, would thus, prefer to follow our patients closer and administer intralesional triamcinolone injections postoperatively. However, due to constraints of cost of travel for the majority of our patients in Uganda, we were unable to see this patient before one year. We postulate that the use of immediate reconstruction with a free flap after surgical excision may afford excess laxity to the wound margins, minimizing wound tension and, perhaps, negating the need for adjuvant radiation or intralesional therapy.

We provide additional evidence for the use of microvascular tissue transfer to treat large keloids. Free tissue transfer may serve as an additional and reliable tool for the plastic surgeon attempting to treat disfiguring keloids that present late and are not amenable to the current treatment recommendations (3); however, well-controlled trials are needed in this area.

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INFORMED CONSENT: Written consent for release of the patients' historical and photographic information was unable to be obtained at the time of the study. As such, the authors made their best attempts at removing any identifying information from the text and photos.

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