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Latissimus dorsi-scapula free flap for reconstruction of defects following radical maxillectomy with orbital exenteration

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Summary A total of 21 patients with latissimus dorsi-scapula free flap reconstruction immediately following radical maxillectomy together with orbital exenteration are presented. Orbital exenteration was performed in all patients due to tumour invasion at the time of diagnosis. There was no total flap failure. Two tissue components subdivided into separate flap units with individual vascular pedicles linked by a single vascular source provide an ideal reconstructive solution for massive defects of the mid-face and orbit. Separate arcs of rotation of each flap unit permit greater mobility necessary for complex three-dimensional reconstruction. A vertically positioned angle of the scapula enables simultaneous reconstruction of the malar eminence and alveolar ridge whereas spontaneous intraoral epithelialisation of the latissimus dorsi muscle requires no additional procedure. For these reasons, in our opinion, combined latissimus dorsi-scapula free flap should be considered the first choice in reconstruction of defects following total maxillectomy with orbital exenteration.
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Radical maxillectomy with orbital exenteration is, by definition, a highly mutilating procedure that carries substantial morbidity as well as functional and aesthetic impairment. Extensive defects following removal of the entire maxilla and orbital contents sometimes together with mid-facial soft-tissues, the ascending part of the mandible and the zygomatic arch present a serious reconstructive challenge. Historically, total maxillectomy defects were reconstructed surgically, using local (forehead, temporalis and pharyngeal)[1—3] and distant flaps (deltopectoral),[4] with or without bone grafts, or prosthetics.[5,6]

With the development of free tissue transfer, successful surgical management of these complex defects evolved from both functional and cosmetic standpoints.[7] Over the years different microvascular reconstructive methods have

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been proposed. Nakayama et al.,[8] Reece et al.[9] and Anthony et al.[10] advocate the use of an osteocutaneous fibula free flap for maxillary reconstruction while Olsen et al.[11] reported excellent results with rectus abdominis free flaps. Others preferred an iliac crest[12] or radial forearm free flap.[13,14] Many studies describe the use of an osteocutaneous scapula free flap as a primary reconstructive option for complex mid-facial defects,[15–17] whereas Shestak et al.[18] reported very good results with a myocutaneous latissimus dorsi free flap.

The combined myocutaneous latissimus dorsi/osteocutaneous scapular-parascapular free flap was initially described in 1984 by Batchelor and Sully for a massive scalp defect reconstruction.[19] Since then, several authors reported successful use of this combined flap for closure of complex mid-facial defects following ablative surgery for maxillary sinus malignancies.[20,21] In 2002 Kakibuchi et al.[22] reported a series of five patients with extended maxillary defects using a combination of these flaps.

This paper represents our experience with microvascular reconstruction of extended radical maxillectomy defects using a combined latissimus dorsi-scapula free flap.

The method was used for immediate defect reconstruction in 21 patients who underwent radical maxillectomy with orbital exenteration.

Surgical technique

The versatility of flaps based on the subscapular artery and its branches is well documented[23,24] and is beyond the scope of this paper.

At the end of resection (Fig. 1a, b) the patient is turned laterally. In all cases the muscle-only latissimus dorsi free flap-subunit is raised first. The scapular part of the flap is raised on angular vessels and bone is harvested together with the teres muscles and only a small part of the infraspinatus muscle (Fig. 2a, b). The exact size of the scapular part of the flap is calculated by measuring the distance from the medial and lateral part of the orbital defect to the remnant of the alveolar ridge. At the end of the dissection, the common pedicle of the flap is ligated and the patient is turned to the prone position. To reconstruct both the malar eminence and alveolar ridge, the scapula is placed vertically (Fig. 3). Bone fixation is performed with mini plates on the lateral orbital rim, medially on the frontal bone and inferiorly on the contralateral alveolar ridge. To re-create the infraorbital rim and floor of the orbit, the upper portion of the scapula is perforated with the burr and infraction is performed (Fig. 4). When reconstruction of the zygomatic arch is needed, a second osteotomy is performed laterally and fixation is made either with a mini plate or non-resorbable suture (Fig. 5). The latissimus dorsi muscle is used for intraoral reconstruction of the defect. The newly formed orbital cavity is packed with an iodoform gauze. One week after surgery, the orbital cavity in unpacked under local anaesthesia and two orbital impressions are taken. The first one is sent to a prosthetic laboratory to create individual eye prosthesis whereas the second one is used to retain the skin or mucosal graft placed over the scapula and remnants of the orbital walls. Five days later the patient is fitted with an individually designed eye prosthesis (Fig. 6). The latissimus dorsi muscle is completely epithelialised within the oral cavity after 3–4 weeks (Figs. 7–11). The arm is immobilised for 4 days after surgery and aggressive physiotherapy is undertaken 2 weeks postoperatively to strengthen the shoulder girdle.

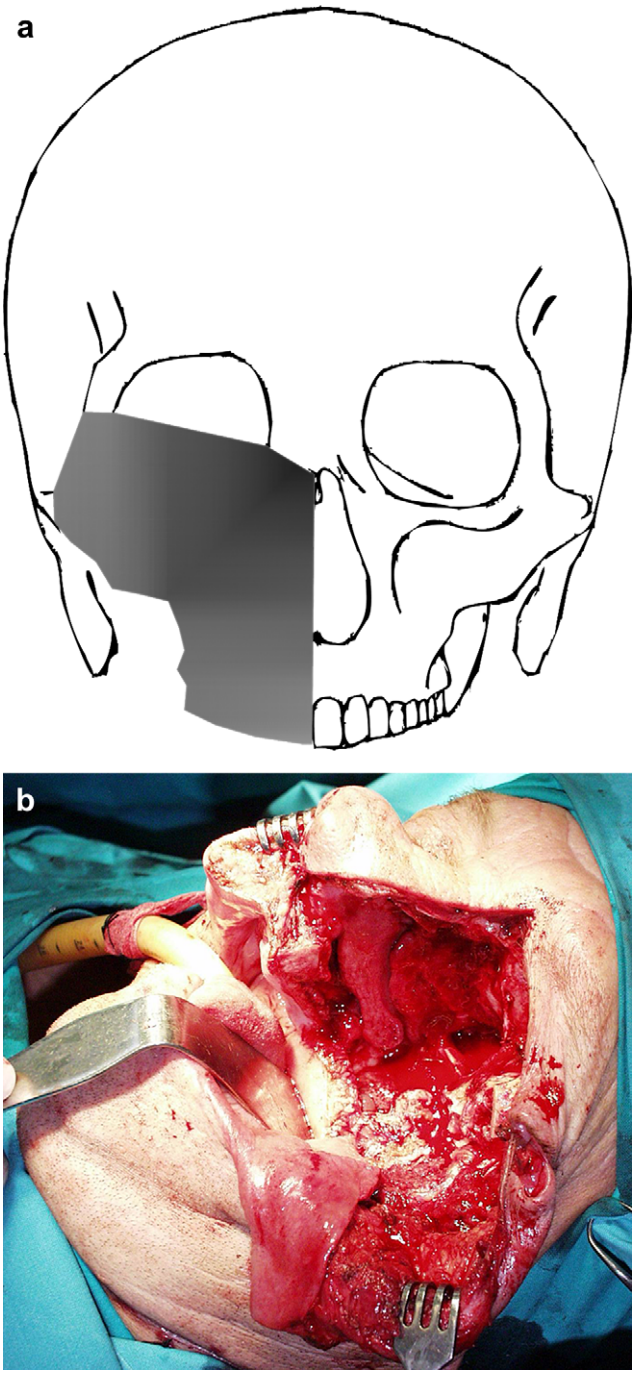

Figure 1 (a) Schematic diagram of radical maxillectomy defect. (b) Radical maxillectomy with orbital exenteration.

Results

There were 17 male (81%) and four female (19%) patients with ages ranging from 14 to 68 years (mean 54 years).

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