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gone dental restoration with osseointegrated implants and can tolerate a regular diet. Five additional patients are awaiting implant placement.

For extensive palatomaxillary defects, obturator rehabilitation may not be an option because of overly heavy prostheses with poor retention, particularly in edentulous patients.^{2,3} Microvascular free flaps have largely replaced local and regional flaps, which are limited by their small size, short pedicle length, and frequent need for staging of procedures.⁴ Although a number of free flaps have been suggested,^{4,5} a standard reconstructive technique has not emerged, partially because none of these flaps resembles the complex shape of the maxillae in their native form.

Our technique for shaping the fibula osteocutaneous free flap mimics the configuration of the midface, restoring midfacial height, width, and projection; prevents palatal incompetence; and can accommodate osseointegrated implants for dental restoration. We recommend this reconstructive technique for all patients with extensive unilateral or bilateral maxillectomy defects, as consistently good aesthetic and functional results can be achieved with minimal morbidity in appropriate surgical candidates.

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Acute Pain Management during Facial Injection of Botulinum Toxin: An Evidence-Based Systematic Review

Sir:

Botulinum toxin injection is one of the commonest procedures in plastic surgery, with the American Society of Plastic Surgeons' statistics review for 2007 reporting a 7-year 488 percent increase in the number of procedures performed.¹ Indications for toxin injection have also increased substantially. Despite this huge popularity, several authors² have identified pain as a common significant adverse event possibly resulting in acute discomfort, reduced compliance, and therapeutic failure. Some studies³ report that practitioners perceive this pain as unworthy of treatment, introducing the potential for inadequate pain management. The increasing demand for and applications of botulinum toxin require that the potential for inadequate pain management is addressed.

We evaluated the current evidence to identify how the potential for inadequate acute pain management could be addressed in patients undergoing facial injection of botulinum toxin with an electronic and manual search using the search string "botulinum AND toxin AND pain." The electronic search included PubMed, PubMed Central, Cochrane Database of Systematic Reviews, ACP Journal Club, Database of Abstracts of Reviews of Effects, Cochrane Central Register of Controlled Trials, Cochrane Methodology Register, Allied and Complementary Medicine, CINAHL, EMBASE, and Ovid-MEDLINE In-Process & Other NonIndexed Citations. To avoid the language bias observed in the identified studies, articles in English, Italian, French, and Spanish were included. The literature identified was critically evaluated based on the Rees (1997) framework for quantitative research, the Critical Appraisal Skills Program's (2006) framework for qualitative research, and the AGREE (2001) framework for guideline appraisal. The "hierarchies-of-evidence" framework by Phillips et al. (2001) was also used in the analysis. A "literature map" of the studies appraised is shown in Figure 1.

Topical anesthetic pretreatment and toxin reconstitution were two identified critical areas that could lead to inadequate acute pain management in patients undergoing facial botulinum toxin injection. Acute pain during facial injection of botulinum toxin is a common adverse event, and good practice requires adequate pain management. It is recommended that eutectic mixture of local anesthetics cream should be applied, which has been shown to

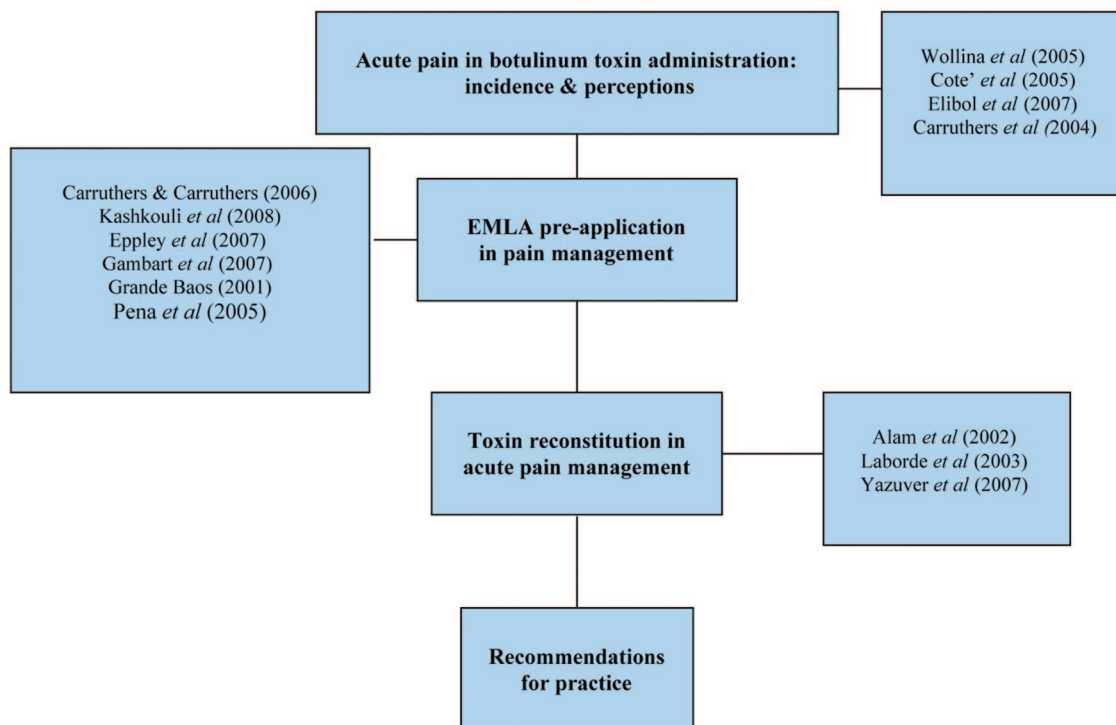


Fig. 1. A “literature map” of the studies appraised. EMLA, eutectic mixture of local anesthetics.

Table 1. Summary of Evidence and Recommendations for Future Practice Based on the Evaluation of Available Evidence

- Acute pain is a common adverse event during facial injection of botulinum toxin. This should be acknowledged by the expert community and adequately managed.
 - Supporting evidence: one study at level 2c; one study at level 4; two studies at level 5
 - Level 2c: Cote et al., 2005
 - Level 4: Elibol et al., 2007
 - Level 5: Wollina et al., 2005; and Carruthers et al., 2004
- Application of a EMLA before the procedure is recommended to decrease acute procedural pain.
 - Supporting evidence: one study at level 1b; three studies at level 4; two studies at level 5
 - Level 1b: Kashkouli et al., 2008
 - Level 4: Grande Baos., 2001; Eppley, 2004; Elibol et al., 2007
 - Level 5: Carruthers et al., 2004; Wollina et al., 2005
- The use of sterile saline-containing preservative (benzyl alcohol) is recommended as a reconstituting agent, as it has been noted to significantly decrease pain scores.
 - Supporting evidence: Two studies at level 2b; one study at level 5
 - Level 2b: Van Laborde et al., 2003; Alam et al., 2002
 - Level 5: Wollina, 2005
- Sterile distilled water should be avoided as a reconstituting agent.
 - Supporting evidence: one study at level 5: Yavuzer and Demirtas, 2003

EMLA, eutectic mixture of local anesthetics.

lead to a significant reduction in acute procedural pain and to be preferred by patients. Addition of nitrous oxide in oxygen may avoid the use of general anesthetic in pediatric patients.⁴ The reconstituting agent has similarly been shown to have a significant effect on acute pain. Sterile distilled water should be avoided because it may induce an increase in pain perception. Ideally, normal saline-containing preservative (benzyl alcohol) should be used. Based on the evaluation of available evidence, recommendations for future practice are summarized in Table 1. DOI: 10.1097/PRS.0b013e3181d45ce0

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The Scapular Tip Osseous Free Flap as an Alternative for Anterior Mandibular Reconstruction

Sir:

Anterior segmental mandibular defects resulting from oncologic resection are reconstructed with vascularized bone whenever possible. For anterior mandibular reconstruction, the fibula free flap is the method of choice for many surgeons. In patients who are not candidates for a fibula free flap caused by injury or stenosis of the lower extremity vessels, the iliac crest free flap is advocated by some but can only be used for defects smaller than 12 cm, and its blood

supply may also be compromised in patients with vascular disease.

We have successfully used the scapular tip osseous free flap for anterior mandibular reconstruction in seven patients with peripheral vascular disease precluding fibula free flap harvest. These cases are novel in that the inferior angle of the scapula is oriented transversely and used to recreate the anterior mandible, obviating the need for bony osteotomies. This flap is based on the angular branch of the thoracodorsal artery rather than the circumflex scapular artery, which is the traditional blood supply of the scapular flap.^{1,2} The angular branch can reliably supply up to 20 cm of bone from both the medial and lateral scapula, compared with 12 cm of bone in the traditional scapular flap.³ The pedicle length can reach 17 cm if the subscapular vessels are included, which is considerably longer than the length of pedicle in the traditional scapular free flap (approximately 6 cm).^{3–5}

The flap is harvested with the patient in the lateral position. The angular branch pedicle originates from the thoracodorsal artery and lies within a submuscular fat pad beneath the latissimus dorsi and teres major muscles (Fig. 1). To increase the pedicle length and incorporate other free flaps (e.g., parascapular, latissimus dorsi myocutaneous, and/or serratus anterior muscle/myoosseous) as part of a chimeric, the dissection may extend to the subscapular artery and vein.

The rhomboid major and teres major muscles are partially released from the medial and lateral borders of the scapula, respectively. The infraspinatus muscle

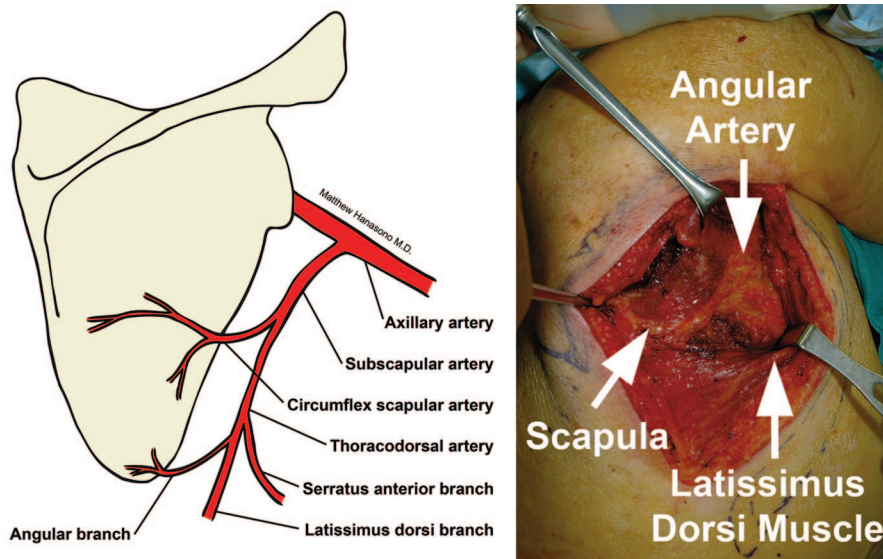


Fig. 1. (Left) Diagram showing the blood supply to the scapular bone, including the angular branch of the thoracodorsal artery. (Right) The right scapula and angular branch of the thoracodorsal artery exposed after retraction of the latissimus dorsi muscle inferolaterally. The forceps points to where the angular branch vessels enter the inferior angle of the scapular bone.