

# Regional Flaps in Head and Neck Reconstruction: A Reappraisal

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**Purpose:** Starting from our experience with 45 consecutive cases of regional pedicled flaps, we have underlined the effectiveness and reliability of a variety of flaps. The marketing laws as applied to surgical innovations are reviewed to help in the understanding of why regional flaps are regaining wide popularity in head and neck reconstruction.

**Materials and Methods:** From January 2009 to January 2014, 45 regional flaps were harvested at San Paolo Hospital to reconstruct head and neck defects. These included 35 pectoralis major muscular and myocutaneous flaps, 4 lower trapezius island or pedicled flaps, 3 supraclavicular flaps, 2 latissimus dorsi pedicled flaps, and 1 fasciocutaneous temporal flap. The basic literature of marketing regarding the diffusion of new products was also reviewed.

**Results:** Two myocutaneous pectoralis major flaps were complicated by necrosis of the cutaneous paddle (one complete and one partial). No complete loss of any of the 45 flaps was observed. At 6 months of follow-up, 2 patients had died of multiple organ failure after prolonged sepsis. The 43 remaining patients had acceptable morphologic and functional results.

**Conclusions:** Regional and free flaps appear to compete in many cases for the same indications. From the results of the present case series, regional flaps can be considered reliable reconstructive choices that are less expensive than their free flap alternatives. The “resurrection” of regional flaps can be partially justified by the changes in the global economy and the required adaptation of developed and developing countries.

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Free flaps have been considered the reference standard for head and neck reconstruction,<sup>1</sup> even after removal of benign neoplasms.<sup>2</sup> Local and regional flaps, however, are still a safe and useful option. After a period of apparent oblivion, an increasing number of studies have been published, with various investigators inviting surgeons to reconsider the use of these

flaps.<sup>3-5</sup> In some cases, local or regional pedicled flaps represent the best reconstructive option. The mucosal cheek flap, Bichat fat pad flap, buccinator myomucosal flap, facial artery myomucosal flap, and temporalis muscle flap should be the first choice for limited maxillary and mandibular defects (cheek mucosa and Bichat fat pad flap<sup>6</sup>); limited tongue,

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palatal, and oral floor defects (buccinator myomucosal flap,<sup>7</sup> facial artery myomucosal flap<sup>8</sup>); medium size to major maxillary defects in which bony reconstruction is not needed or planned (temporalis muscle flap<sup>9</sup>). The settings in which local or regional flaps will be the preferred reconstructive technique have not been discussed. The aim of the present report was to focus on the indications and results for major regional flaps.

Several factors can result in surgeons choosing a regional flap instead of a free flap. These include severe patient comorbidities, adverse anatomic conditions with a compromised blood supply, and previous radiotherapy, among others. Furthermore, other circumstances, such as the lack of a microvascular surgical team or financial issues, which can be observed in developing countries, can make free flap reconstruction unfeasible. Finally, sensitivity to the economic burden of healthcare could make regional flaps preferable to free flaps in a variety of circumstances.

## Materials and Methods

From January 2010 to January 2014 at San Paolo Hospital (Milan, Italy), 45 regional flaps were used in 44 patients for head and neck reconstruction after tumor resection (Table 1). Of the 45 regional flaps, 35 were pectoralis major flaps, 4 were lower trapezius flaps, 3 were supraclavicular flaps, 2 were latissimus dorsi pedicled flaps, and 1 was a temporalis fasciocutaneous flap. Most of the reconstructions were secondary to squamous cell carcinoma (n = 41), with the remaining including 2 chordomas, 1 mixed cell carcinoma, and 1 basal cell carcinoma. Reconstruction with the buccinator myomucosal, facial artery myomucosal, Bichat fat pad, and temporalis muscle flaps was excluded from the present case series.

A total of 30 reconstructions were necessary to restore intraoral defects, including 21 mandibular, 2 floor of the mouth, 5 partial tongue, and 2 hypopharyngeal defects. Of the 44 patients, 13 required skin reconstruction, including 7 cheeks, 3 scalps (1 patient with a scalp defect required reconstruction of 2 different regions), and 4 cervical-laryngeal fistulas. In 2 cases, pedicled flaps were used in association with a fibula free flap. Both patients had large mandibular defects that required through and through reconstruction. In almost all the mandibular defects (n = 20), 2.4-mm, load-bearing titanium plates were used as fixation devices.

Regional flaps were chosen instead of free flaps for the following reasons. In 3 cases (3 of 4 cases in which a trapezius flap was used), the resection site was the high occipital region. Thus, a lower trapezius flap was harvested simultaneously with the reconstruction, eliminating the need to rotate the patient, perform the reconstruction in a second session, or

perform microvascular anastomoses in a difficult position. The 2 latissimus dorsi pedicled flaps were performed in patients with severe comorbidities to shorten the operative time. The region of resection (wide craniofacial resection) was close enough to obtain safe closure with a pedicled latissimus flap. All the supraclavicular flaps were performed in patients with a vessel-depleted neck from previous surgery and radiotherapy (n = 1) or as autonomized salvage flaps (n = 2) after free flap failure. The remaining patients in the present study underwent reconstruction with pedicled flaps because of severe comorbidities (eg, ischemic heart disease with diffuse atherosclerosis) or a poor prognosis.

This was a retrospective study. As such, it was granted exemption from the local institutional review board. The present study adhered to the guidelines of the Declaration of Helsinki.

## Results

No evidence of complete flap failure was observed. In 1 patient, we observed complete skin loss with survival of the muscular portion of the flap. In 1 case, partial skin loss was detected. One patient required a return to the operating room because of active bleeding after closure of a pharyngocutaneous fistula with a pectoralis major flap. After the thoracic wound had been reopened and a bleeding perforator ligated, he had a full recovery with no additional complications. No fistula was observed in any case. The donor sites were closed primarily in all cases, except for the latissimus dorsi pedicled flap, which required a partial-thickness skin graft harvested from the thigh. A total of 20 load-bearing plates were used to reconstruct the bone mandibular defects. Of these plates, 7 presented with late extrusion (>12 months after the first operation) and required removal. Two patients died of multiple organ failure after prolonged sepsis at 6 months postoperatively.

### CASE 1

The first patient included in the present report was a 55-year-old woman (patient 41, Figs 1 to 6) affected by squamous cell carcinoma of the right border of the tongue. She had severe comorbidities, including ischemic heart disease and diffused arteriosclerotic arteriopathy. Thus, we chose a regional flap for reconstruction. With the patient under general anesthesia, she underwent temporary tracheostomy, right selective neck dissection (level I to III), right partial glossectomy, and reconstruction with a pectoralis major flap. No complications were observed during recovery. The follow-up examination after 1 year showed the patient had good functional and aesthetic outcomes with no evidence of relapse.

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