

## Case Report

# Reconstruction of the Inferior Labial Sulcus with A Prelaminated Flap: Case Report

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## Abstract

Reconstructive microsurgery represents the standard of care in multiple head and neck situations. Prelaminated flaps (the placement of tissue grafts in a flap weeks before the transfer of the flap) have been proposed for specific indications. A complex post oncological lower labial sulcus reconstruction with secondary drooling was successfully reconstructed by means of a prelaminated radial forearm free flap after a previous conventional radial free flap. In our experience, depth of the sulcus is lost even in folded thin free flaps. Only prelaminated thin flaps can solve the problem in these complex situations as it has been demonstrated in this case.

**Keywords:** Free flap; Labial sulcus reconstruction; Prelaminated flap

## Introduction

Reconstructive microsurgery has become the standard of care in reconstruction of multiple head and neck conditions. The myriads of possible donor sites throughout the anatomy allow for a variety of combinations of tissues to fit the reconstructive needs in most cases. There are, however, situations and defects that cannot be satisfactorily reconstructed with any native combination of tissues. Flap prefabrication and prelamination are two technical resources that help overcome these difficulties [1,2].

There has been some terminological confusion in the past. The term "prefabrication", was originally described by Khouri et al, in 1991, included a variety of tissue manipulations, like pre-grafting, vascular induction through pedicle implantation, tissue molding and tissue pre-expansion [1,2], although the idea of vascular implantation into a tissue to secondary free transfer has

been previously published [3,4]. The term prelamination was introduced by Pribaz et al., in 1994, to describe the placement of tissue grafts in a flap (pre-grafting) weeks before the transfer of the flap [5]. The healing or "take" of these grafted tissues was allowed before the actual transfer of the composite flap. The term prefabrication is now restricted to the vascular induction through pedicle implantation, basically a process in which a vascular carrier, i.e., a subcutaneous flap, is used to recapture the overlying specialized skin and transfer it once cross circulation has been established [6,7]. Although the term prelamination seems to convey the meaning of placing a lamina of tissue (skin or mucosa grafts) on to the flap, any tissue (cartilage, bone, tendon, etc) can be pregrafted in a prelaminated flap.

The case presented was a complex post oncological case in which a deep lower buccal sulcus was needed to avoid drooling. In the senior author's experience, folded thin free flaps tend to lose the shape and do not hold well the dihedral angle shape. A prelaminated flap was used for this reconstruction.

## Case Report

A 54-year-old female patient with a history of intraoral Squamous Cell Carcinoma (SCC), presented with a radiation necrosis of the mandible and local recurrence of the SCC. She was treated with wide resection and reconstruction with a standard osteocutaneous Free Fibular Flap (FFF). After a successful reconstruction, the patient complained of drooling because of obliterated lower buccal sulcus. An attempt at correction was made using a two-skin-paddle Radial Forearm Flap (RFF) to increase the height of the lower lip did not improve the depth of the sulcus, because the folded intraoral part of the RFF progressively lost the shape and resulted in a recurrent obliterated sulcus (Figures 1 and 2). The decision was made to create a narrow dihedral epithelial surface to recreate the depth of the labial sulcus using a prelaminated RFF (Figure 3). In the first stage, a pocket was created suprafascially in the distal volar wrist, ulnar to the septal perforators of the radial vessels. A thick split thickness skin graft (STSG) was inset to line both surfaces (fascia and subdermal fat) and secured with resorbable sutures (Figure 4). A bolus of vaseline gauze was placed to exert gentle pressure to the graft and to prevent shearing from the raw surfaces. The wound was closed and allowed to heal for eight weeks. Prophylactic antibiotic (amoxicillin 875mg and clavulanic acid 125mg/8h) was administered for 10 days and then discontinued. The wound was re-opened and the integrity of the STSG on both surfaces was checked (Figure 5). A skin island was harvested overlying the prelaminated part of the flap for monitoring and to increase further the height of the lower lip. Figures 6a and 6b show the free flap prior to transfer, with the deep dihedral angle covered with the skin graft and the skin island, based on the radial vessels.



Figure 1



Figure 2

**Figures 1 and 2:** Preoperative view of the patient with an obliterated inferior buccal sulcus and severe drooling.

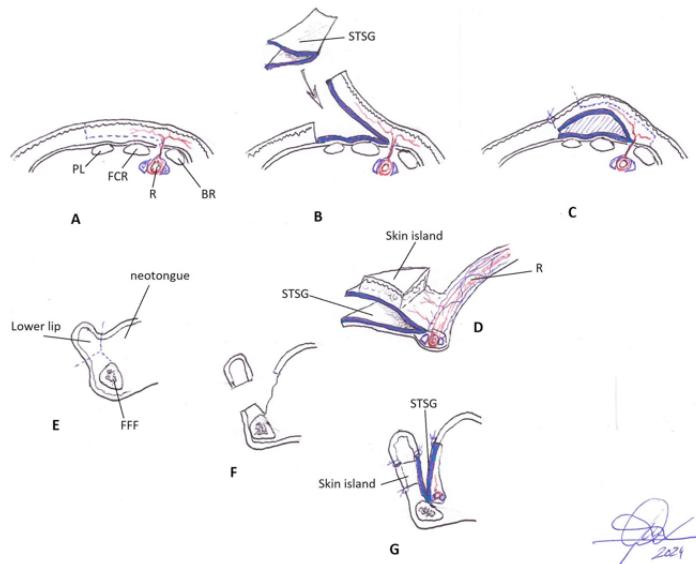
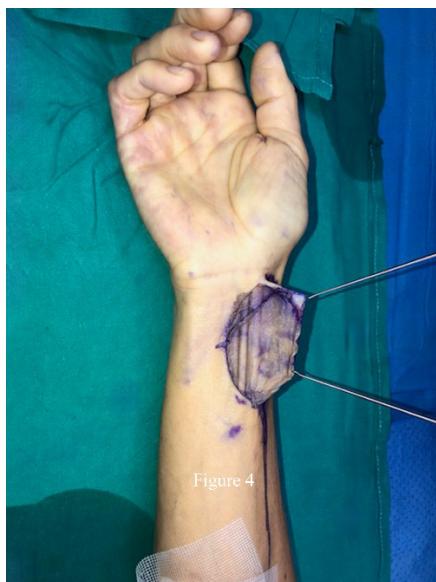


Figure 3

**Figure 3:** Drawing of the procedure. **A:** cross section of the distal forearm showing (dotted line) the suprafascial dissection plane, ulnar to the septal perforating branches from the radial vessels. (PL: palmaris longus, FCR: flexor carpi radialis, BR: brachioradialis, R: radial vessels). **B:** the plane is dissected and a split thickness skin graft (STSG) is applied to the dihedral pocket. **C:** the wound is closed with a bolus of vaseline gauze and the graft is allowed to take and heal for two months (dotted line indicates the plane of subsequent flap dissection). **D:** the flap elevated including the grafted opposing surfaces and a skin island. **E:** sagittal sketch of the obliterated inferior sulcus. The dotted line indicates the

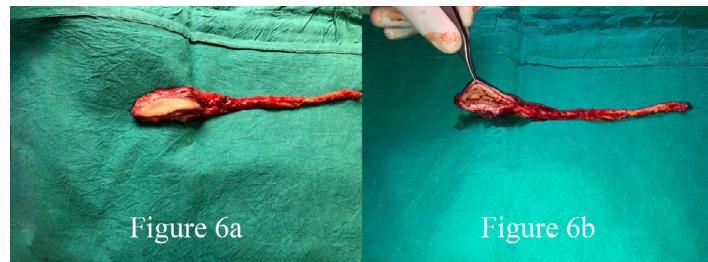
incisions in the lip and the neotongue. (FFF: free fibular flap). **F:** the flap has been inset with the prelaminated part intraorally and the skin island extraorally.



**Figure 4:** Intraoperative image of the STSG being placed in the pocket. Note the oversized pocket to allow for retraction.



**Figure 5:** The skin graft healed at two months, during flap elevation.



**Figures 6a and 6b:** The flap elevated and ready for transfer. Note the deep dihedral prelaminated angle.

The defect was created in the mouth and the flap was inset (Figure 3). The anastomoses were performed to the pedicle of the previous RFF (end-to-side the artery and end-to-end the veins). The postoperative course was uneventful without significant loss of depth in the inferior labial sulcus at 1 year follow-up (Figures 7a and 7b). The drooling improved significantly. Occasional drooling occurred with neck flexion, because of the damaged orbicularis oris muscle of the lower lip and incomplete lip competence. The donor site could be closed primarily.



**Figures 7a and 7b:** Postoperative image at one year with a stable inferior buccal sulcus.

## Discussion

Although the idea of vascular implantation into a tissue to secondary free transfer has been previously reported in the eighties [3,4], the established concept of flap pregrafting was described in the nineties and reported in clinical cases and short series [1,2]. In 1994 Pribaz et al., coined the term prelamination to refer to this same process of grafting tissues into flaps, allowing for wound healing to occur for a few weeks and then transfer the flap in a

second stage with the grafted tissue already taken [5]. The main advantage of this procedure is that it allows the transfer of stable combinations of tissues that do not occur naturally in the anatomy. The obvious disadvantage is the staged nature of the procedure. Prelamination seems to imply that the grafted material is a layer (lamina) of epithelial tissue (skin or mucosa), but it can also be cartilage, bone or any other tissue [6,8-13]. Prelamination has been reported in case series, especially as mucosal pregrafting of flaps for intraoral reconstruction in oncological patients [14-17]. Although the principle of replacing like with like makes sense, the advantages of mucosal pregrafted flaps over standard thin skin flaps for intraoral reconstructions are weak [18].

The case presented herein represents a different indication of prelamination. The concept was to create a relatively stiff, narrow dihedral structure lined with epithelium that would maintain the shape, based on a reliable vascular pedicle. Apart from the digital commissures and the postauricular crease, there is no thin dihedral skin structure in the anatomy, and the size limitation precluded their use in this case. It has been the experience of the authors that folded skin flaps, although thin, when used to recreate a sulcus, tend to lose the shape and result in a poorly defined reconstruction. Drooling is a major social problem for oncological patients. Stensen duct transposition or botulin toxin injection of the parotid glands may help [19,20]. In this patient, because of extensive surgery and radiation therapy, Stensen duct transposition was impractical and botulin toxin injection did not improve drooling.

Prelaminated flaps include scar tissue resulting from wound healing of the grafts, resulting in relatively stiff flaps that are more difficult to inset. Enough healing time should be allowed between stages to allow maturation of the scar tissues. Two to three months are the most frequent interval in the literature.

As stated before, no advantages have been demonstrated of mucosal pregrafted flaps over standard thin skin flaps for intraoral reconstructions [18].

## Conclusion

In this case, flap prelamination allowed the creation of a dihedral epithelial structure within a free flap with a thick split thickness skin graft that successfully reconstructed the inferior labial sulcus in an oncological patient. This concept of dihedral fashion prelamination flaps could be an excellent option in reconstruction of an postoncological and/or posttraumatic obliterated lower buccal sulcus.

## References

1. Khouri RK, Upton J, Shaw WW (1992) Principles of flap prefabrication *Clin Plast Surg.* 19: 763-771.
2. Khouri RK, Upton J, Shaw WW (1991) Prefabrication of composite free flaps through staged microvascular transfer: an experimental and clinical study *Plast Reconstr Surg.* 87: 108-115.
3. Yao ST (1981) Vascular implantation into skin flap: experimental study and clinical application: a preliminary report *Plast Reconstr Surg.* 68: 404-410.
4. Yao ST (1982) Microvascular transplantation of prefabricated free thigh flap *Plast Reconstr Surg.* 69: 568.
5. Pribaz JJ, Fine NA (1994) Prelamination: Defining the prefabricated flap-A case report and review *Microsurgery* 15: 618-623.
6. Guo L, Pribaz JJ (2009) Clinical flap prefabrication *Plast Reconstr Surg.* 124: e340-e350.
7. Pribaz JJ, Fine N, Orgill DP (1999) Flap prefabrication in the head and neck: a 10-year experience *Plast Reconstr Surg.* 103: 808-820.
8. Collar RM, Byrne PJ (2013) Images in clinical medicine. Prelaminated free flap for auricular reconstruction *New Engl J Med.* 369: 1151.
9. Kilinc H, Aytekin AH (2014) Prelaminated calvarial osteofascial flap for palatal reconstruction *J Craniofac Surg.* 25: e365-e368.
10. Sadigh PL, Jeng SF (2015) Prelamination of the anterolateral thigh flap with a fibula graft to successfully reconstruct a mandibular defect *Plast Reconstr Surg Glob Open.* 3: e497.
11. Schlenz I, Korak KJ, Kunstfeld R, Vinzenz K, Plenk H Jr, et al (2001) The dermis-prelaminated scapula flap for reconstructions of the hard palate and the alveolar ridge: a clinical and histologic evaluation *Plast Reconstr Surg.* 108: 1519-1524.
12. Upton J, Ferraro N, Healy G, Khouri R, Merrell C (1994) The use of prefabricated fascial flaps for lining of the oral and nasal cavities *Plast Reconstr Surg.* 94: 573-579.
13. Wolff KD, Ervens J, Hoffmeister B (1996) Improvement of the radial forearm donor site by prefabrication of fascial-split-thickness skin grafts *Plast Reconstr Surg.* 98: 358-362.
14. Chiarini L, De Santis G, Bedogni A, Nocini PF (2002) Lining the mouth floor with prelaminated fascio-mucosal free flaps: clinical experience *Microsurgery.* 22: 177-186.
15. Rath T, Tairych GV, Frey M, Lang S, Millesi W, et al (1999) Neuromucosal prelaminated flaps for reconstruction of intraoral lining defects after radical tumor resection *Plast Reconstr Surg.* 103: 821-828.
16. Rath T, Millesi W, Millesi-Schobel G, Lang S, Glaser C, et al (1997) Mucosal prelaminated flaps for physiological reconstruction of intraoral defects after tumour resection *Br J Plast Surg.* 50: 303-307.
17. Rath T, Millesi W, Millesi-Schobel G, Lang S (1997) Mucosal prelamination of a radial forearm flap for intraoral reconstruction *J Reconstr Microsurg.* 13:507-513.
18. Fermi M, Bassano E, Molinari G, Alicandri-Ciufelli M, Scarpa A, et al (2021) Prelaminated flaps in head and neck cancer reconstructive surgery: A systematic review *Microsurgery.* 41: 584-593.
19. Lim M, Mace A, Nouraei SA, Sandhu G (2006) Botulinum toxin in the management of sialorrhoea: a systematic review *Clin Otolaryngol.* 31: 267-272.
20. Taib BG, Williams SP, Sood S, Ung K, Nixon PP, et al (2019) Treatment of sialorrhoea with repeated ultrasound-guided injections of botulinum toxin A into the parotid and submandibular glands *Br J Oral Maxillofac Surg.* 57: 442-448.