Lips contain three types of tissues: skin, muscle, and mucosa. All layers are to be reconstructed in an ideal case.1 Lips provide oral competence, a function controlled by the orbicularis oris muscle. The outer structure of the lips includes prominent landmarks like vermillion border, cupid's bow, philtral columns, commissure, and tubercle. When reconstructing, careful consideration should be taken to prevent any noticeable discrepancy.2

The main principles when reconstructing the lips are to maintain the competence of the oral sphincter, to restore the anatomic landmarks, to provide an adequate oral opening for speech and eating, to preserve sensation by preserving the neurovascular supply during flap mobilization, and to carefully restore the aesthetic appearance.2 The cupid’s bow in the upper lip is an obstacle for flap advancement, as it may cause an obvious asymmetry.1

Lip reconstruction is not always needed. Twenty-five percent of the lips can be excised with intact functional and aesthetic properties. In the elderly, up to one-third can be excised without functional or aesthetic defect due to increased tissue laxity.2

A common and important complication of lip reconstruction is microstomia.2 The main consideration when reconstructing the upper lip is using the lower lip. This is due to the absence of distinguishing features and the ability to sustain greater tissue loss in comparison with the upper lip.2 Common flaps used for lip reconstruction are the Abbe flap, Estlander flap, Gillies fan flap, and McGregor flap. All these flaps are based on the labial artery, either the inferior or superior.2 The facial artery musculomucosal (FAMM) flap is an option in cases of increased scarring that could cause a vertical height defect.1

The tongue flap is commonly used in intraoral reconstruction, including cleft procedures and following pathological excision. It can be based anteriorly or posteriorly with blood supply from the dorsal, ventral, or lateral side of the tongue.3 It was used in some cases to reconstruct full thickness upper lip defects but was combined with cutaneous flaps.4 We aim to reconstruct a full thickness upper lip defect using only a tongue flap with good functional and aesthetic outcome.

### CASE STUDY

#### Case Presentation

This is a case of a 40-year-old male patient who presented with a complication of a 12-year-old road traffic accident. The patient presented to us 2 years ago after another road traffic accident complicated by polytrauma with multiple facial deformities.

To reconstruct his facial injuries, the patient had a forehead flap for nasal reconstruction with a free radial forearm flap and a rib graft. He also had an upper lip full thickness defect that needed reconstruction (Fig. 1).

#### Management

Multiple options were considered, including using the lower lip for a vermilion switch flap, using a FAMM flap, and using a tongue flap. Upon examination, due to the

---

**Disclosure:** The authors declare no financial disclosure. No funding was received for this article.
significant facial scarring, it was not feasible to do the lip switch or FAMM flap.

Procedures
Reconstruction was done in stages, detailed as follows.

First Stage
Under general anesthesia, and after injecting local anesthesia with a vasoconstrictor, the defect was created and measured. An anteriorly based lateral full thickness tongue flap was designed. A diathermy was used to raise the flap, leaving 2 cm from the tip attached. Then, flap insetting was done with the tip of the flap fixed to the lateral aspect of the defect using a 3-0 absorbable suture. The donor side was closed using a 3-0 absorbable suture, leaving about 2 cm from the base of the flap (Figs. 2, 3).

Second Stage
After 2 weeks, the patient was taken for flap division. The tongue was marked to get further length from the base of the flap and add it to the lip. Monopolar was used to divide the flap. Size 4-0 absorbable suture was used to approximate the remaining defect of the lip with the divided end of flap. Then, 6-0 absorbable monofilament suture was used to approximate the tissues.

Follow-up
At 1 week postoperative, the wound was healing with no complications, and the patient was able to use his mouth for oral intake with intact motor functions and no alteration of speech or swallowing.

At the 1 year follow-up, the patient reported intact motor function with an enhanced aesthetic outcome, with no alteration of speech or swallowing (Fig. 4).

DISCUSSION
Early written descriptions of lip reconstruction in Sushruta dates back to as early as 1000 B.C.5
In this study, we reconstruct a full thickness upper lip defect of a 40-year-old man who had multiple facial deformities due to a road traffic accident, using tongue flap only. More than 100 years ago, Eiselsberg first described tongue flaps for intraoral defect reconstruction. According to Minoval and colleagues, the tongue flap has shown good aesthetic and functional outcomes with no major complications.6 Later on, Lexer described using tongue flaps for retromolar trigone and tonsillar defects.7

A tongue flap was the only method used in this study because there was significant facial scarring in which the FAMM flap and vermilion switch flap could not be used. According to Ayad, the FAMM flap should not be used for patients who underwent any procedure or with compromised facial artery.8 The vermilion switch flap was used for reconstruction of full thickness lip defect with intact oral commissure. With the present condition of the patient, these methods were not performed.

The reconstruction of the full thickness upper lip defect was done in two stages. We designed an anteriorly based lateral full thickness tongue flap.

In this report, the functional impairments seen on the patient before the surgery were halitosis and dental problems. In terms of speech and swallowing, no problem was observed. After the operation, it was observed that there was no dryness or crustiness. After reconstruction, follow-ups were done to assess any possible functional and aesthetic impairments. The patient did not experience alteration of speech or swallowing, and no wound complications were observed. Although the main concern with tongue flap is alteration of speech and swallowing, and

Fig. 1. Preoperative image showing total full thickness upper lip defect.

Fig. 2. First stage intraoperative image showing flap raising.
some surgeons fear that removal of the tongue tissue may interfere with articulation, these are not observed in our patient.3,10–14

Complications were cited in previous studies.4,15 Most experienced minor and temporary complications including pain, swelling, bleeding, hematoma, infection, and temporary loss of taste perception. According to Strauss and Kain, potential complications include speech alteration, deformity of donor site, and premature flap detachment.4 In our case, there were no complications observed after 1 year postoperatively. To achieve better aesthetic outcome, further procedures could be done.

Tongue flap types include dorsal anterior, posterior, or transverse flaps; dorsal tongue tip flaps; and ventrally orientated perimeter flaps and ventral tongue flaps. Anteriorly based dorsal tongue flaps are used for palatal defect closure. Tongue flaps from the tip are used for lip and floor of the mouth reconstruction.3,10–14

The dorsal and lateral tongue flaps, though limited by their short arch of rotation, are reliable options for reconstructing defects of palate, floor of mouth, and buccal mucosa. Even though complications are rare, airway management should be planned out, especially in second stage procedures.16

Tongue flaps are an alternative to free flaps in cases where the patient is not fit for other procedures. It costs less, as it does not require a microsurgery set or microscope and usually requires a shorter operative time. Another advantage is tissue quality, as it is similar to recipient tissues.2,17

**CONCLUSIONS**

Using tongue flaps for total thickness defects of the upper lip can yield a fully functional and aesthetically acceptable result. Although we had the proper setting and training to perform a free flap for our patient, he requested a local and less aggressive option as he had undergone multiple surgeries in the past. We encourage more research to compare such an approach with previous approaches.

**Felwa A. AlMarshad, MBBS**

Plastic and Reconstructive Surgery Section
Department of Surgery
King Faisal Specialist Hospital & Research Centre
P.O. Box 4909, Riyadh 12381
Saudi Arabia
E-mail: felwa.almarshad@gmail.com

**REFERENCES**

1. Lubek JE, Ord RA. Lip reconstruction. Oral Maxillofac Surg Clin North Am. 2013;25:203–214.
2. Weinzweig J. Plastic Surgery Secrets Plus. 2nd ed. Maarsen, the Netherlands: Mosby; 2010.
3. Sessions DG, Dedo DD, Ogura JH. Tongue flap reconstruction in cancer of the oral cavity. Arch Otolaryngol. 1975;101:166–169.
4. Strauss RA, Kain NJ. Tongue flaps. Oral Maxillofac Surg Clin North Am. 2014;26:313–325.
5. Hessler F. Commentarii et annotationes in Susrutae Ayurvedam. Fasciculus secundus continens Notas ad totum Susrutae Ayurvedam. Erlangen: Enke; 1855.
6. Minovi A, Ural A, Kollert M, et al. Lower lip reconstruction with the tongue flap: Surgical technique and long-term results. B-ENT. 2007;3:73–78.
7. Lexer E. Wangenplastik. Dtsch Z Chir. 1909;100:206–211.
8. von Domarus H. The double-door tongue flap for total cheek mucosa defects. Plast Reconstr Surg. 1988;82:351–356.
9. Ayad T. Facial artery musculomucosal (FAMM) flap. Oper Tech Otolaryng Head Neck Surg. 2019;30:112–119.
10. Calcaterra TC. Tongue flap reconstruction of the hypopharnyx. Arch Otolaryngol. 1983;109:750–752.
11. Carreirão S, Lessa S. Tongue flaps and the closing of large fistulas of the hard palate. Ann Plast Surg. 1980;4:182–190.
12. Jackson IT. Use of tongue flaps to resurface lip defects and close palatal fistulae in children. Plast Reconstr Surg. 1972;49:537–541.
13. Jackson IT. Closure of secondary palatal fistulae with intra-oral tissue and bone grafting. Br J Plast Surg. 1972;25:93–105.
14. Steinhauser EW. Experience with dorsal tongue flaps for closure of defects of the hard palate. *J Oral Maxillofac Surg.* 1982;40:787–789.

15. Johnson PA, Banks P, Brown AE. Use of the posteriorly based lateral tongue flap in the repair of palatal fistulae. *Int J Oral Maxillofac Surg.* 1992;21:6–9.

16. Comini LV, Spinelli G, Mannelli G. Algorithm for the treatment of oral and peri-oral defects through local flaps. *J Cranio-maxillofac Surg.* 2018;46:2127–2137.

17. Lam DK, Cheng A, Berty KE, et al. Sliding anterior hemitongue flap for posterior tongue defect reconstruction. *J Oral Maxillofac Surg.* 2012;70:2440–2444.