Case Report

Modified Bilateral Neurovascular Cheek Flaps: A New Technique for Reconstruction of Difficult and Extensive Lower Lip Defect

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The reconstruction of the extensive lip defects after surgical resection of tumors is challenging. Various methods have been used for reconstruction of these defects, however, the ideal functional reconstruction of these lip defects are difficult to achieve. The author describes a modified bilateral neurovascular flaps technique which provide a satisfactory cosmetic appearance and good functional results.

Keywords: *extensive lip defects, modified bilateral neurovascular flaps, functional reconstruction*

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The reconstruction of extensive lip defects after resection of tumors is challenging. Various methods have been used for reconstruction of these defects[1-3]. Ideally reconstruction of lip defects should restore an adequate oral aperture bounded by a lip capable of sphincteric activity, possessing acceptable sensation and having satisfactory appearance. To achieve these objectives, each layer of excised tissue should be replaced[4].

Chowchuen described a modified "bilateral neurovascular flaps technique" for lower lip reconstruction in 1996[5] and again for upper lip reconstruction in 1997[6] and 2001[7]. The technique allows easier flap design and produces better aesthetic and functional outcomes. This case report describes the reconstruction of a difficult, total lower lip defect caused by resection of recurrent carcinoma of the lower lip that had been previously resected and reconstructed using the Karapanzic fan flap[2].

Case Report

In July 2001, a 66-year-old female presented at a university hospital with recurrent carcinoma of the lower lip. The patient had been aware of the carcinoma for four months. Five years earlier (February 1996), the patient presented with a $T_2N_0M_0$ squamous cell carcinoma of the lower lip and underwent resection and Karapandzic fan flap reconstruction[2] with good results. In August 2001, she was readmitted for surgery of the recurrent carcinoma, which involved almost the entire lower lip (Fig. 1).

Resection of the tumor resulted in a total lower lip defect requiring reconstruction (Fig. 2). The circumferential scarring of the lip from the previous Karapandzic fan flap compounded the reconstruction plan.

Operative technique and the evaluation of the results

A modified bilateral neurovascular cheek flaps

Fig. 1 A recurrent carcinoma involving almost the entire lower lip

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technique was chosen for the reconstructive method. The surgical technique of the flaps for the lower lip reconstruction was similar to that used for upper lip reconstruction described by Chowchuen (2001)[7]. However, some modifications were necessary for use in lower lip reconstruction, such as: 1) designing the lower line of resection parallel to the vermilion border; 2) avoiding an incision in the mental skin area; and 3) designing part of the mucosal flap lateral to the oral commissure, which was then incised slightly higher than the commissure for the purpose of resurfacing the vermilion of the lower lip. Details of the technique are presented in Fig. 3.

Fig. 4 illustrate the design of the skin and mucosal flaps. Fig. 5 shows how to advance the skin and mucosal flap for reconstruction of the lip defect. Fig. 6 show the final intraoperative closure of the lower lip.

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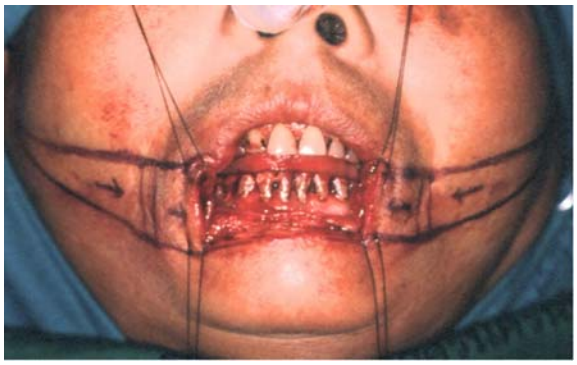

Fig. 2 The total lower lip defect left for reconstruction after resection of the tumor

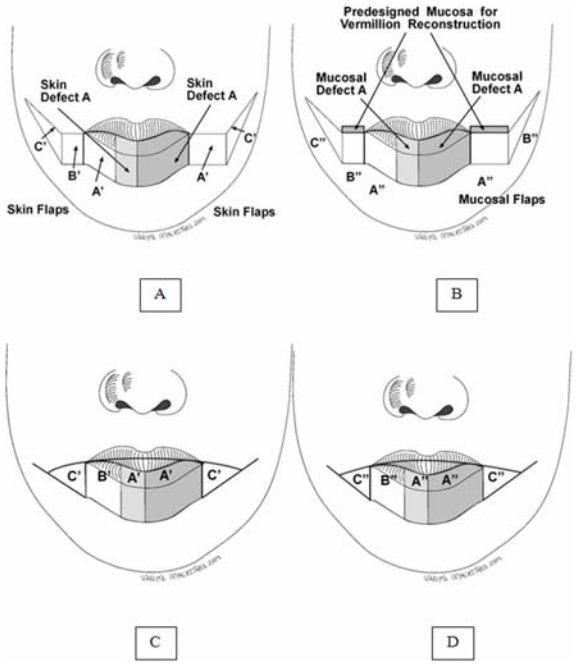

Fig. 3 Detail of the modified bilateral neurovascular cheek flaps technique for lower lip reconstruction
A. Design of the skin flap
B. Design of the mucosal flap
C. Closure of the skin flap
D. Closure of the mucosal flap

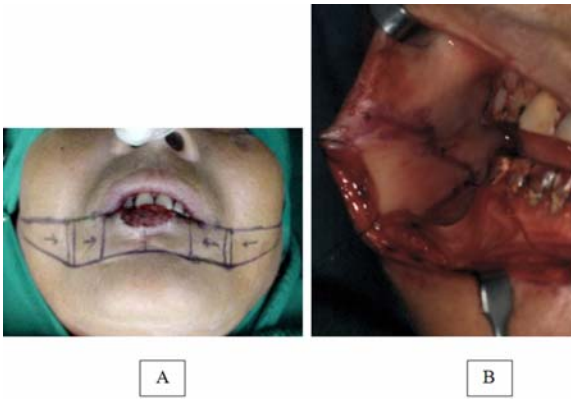

Fig. 4 Intraoperative photographs of the design of the skin and mucosal flaps

Fig. 5 Intraoperative photograph show the advancement of the skin and mucosal flap

Fig. 6 Intraoperative photographs show final intraoperative closure of the lower lip

Stranc (1984)[8] and Strance (1987)[9], an evaluation of the reconstructive surgery was performed 6 months after surgery (*i.e.* February 2002) (Fig. 7). From a cosmetic standpoint, there remained a noticeable scar from reconstruction of the lip and cheek, but this was considered acceptable by both the patient and clinician, especially since good oral competence was experienced and observed.

The intercommissural distance was 4.7 cm-*i.e.* the width of the lip at rest, when measuring the distance between the commissures while the patient swallows. The soft tissue gap was 2.5 cm-*i.e.* the straight line distance between the wet-dry line, in the center of the upper lip, and the wet-dry line in the lower lip when the mouth is opened as wide as possible. The sulcus depth was 1.6 cm-*i.e.* the distance between the bottom of the labio-gingival sulcus and the wet-dry line of the vermilion. Lip sensitivity, using the two-point discrimination test, was 1 mm in all quadrants.

Fig. 7 Postoperative results six months hence
A. Frontal view, close mouth
B. Frontal view, open mouth
C. Lateral view, left side
D. Lateral view, right side

The protocol of the present study was reviewed and approved by the Ethics Committee of Khon Kaen University, based on the Helsinki Declaration and written informed consent was obtained from the patient.

Discussion

The recontruction of extensive lower lip defect remained challenges for both cosmetic and functional outcome.

The Karapandzic flap[2] produces a functional oral sphincter and is a good choice for lower lip reconstruction. The usefulness of this flap was confirmed by the functional results enjoyed by the authors patient. Notwithstanding, the extensive reconstruction often results in microstomia, which compounds the difficulty of any future resection and reconstruction[10].

The use of blunt dissection kept intact the neurovascular structures necessary for functional lip reconstruction. Importantly, the oral commissure was in its original position because the reconstructed lip used tissue from the lateral cheek region thanks to the design and advance of rectangular and triangular flaps. Similarly, the technique provided red vermilion for mucosal reconstruction, derived from the designed mucosa above the oral commissure in the mucosal flap. This report confirms the usefulness and functionality of the modified bilateral neurovascular cheek flap technique[7] for use in total lower lip reconstruction. Both oral competence and retention sensitivity corroborate this conclusion.

Summary

A successful reconstruction of a difficult total lower lip defect using modified bilateral neurovascular cheek flaps technique is presented. The defect was previously resected and reconstructed. Acceptable cosmetic and good functionality support the adoption of this technique for a near total or total lower lip reconstruction. Some defects or a previously reconstructed lower lip might give rise to microstomia.

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Potential conflicts of interest

None.

References

1. Bernard C. Cancer de la levre infererieure opere par un procede nouveau. Bull Mem Soc Chir Paris 1853; 3: 357-64.
2. Karapandzic M. Reconstruction of lip defects by local arterial flaps. Br J Plast Surg 1974; 27: 93-7.
3. Panje WR. Lip reconstruction. Otolaryngol Clin North Am 1982; 15: 169-78.
4. Mazzola RF, Lupo G. Evolving concepts in lip reconstruction. Clin Plast Surg 1984; 11: 583-617.
5. Chowchuen B. Cancer of the lip: surgeons comment. J Plast Reconstr Aesthetic Surg Thai 1996; 2: 53-9.
6. Chowchuen B. Modified bilateral neurovascular cheek flaps: functional reconstruction of major upper lip defects. J Plast Reconstr Aethetic Surg Thai 1997; 3: 33-47.
7. Chowchuen B, Surakunprapha P. Modified bilateral neurovascular cheek flaps: a new technique for reconstruction of extensive upper lip defects. Ann Plast Surg 2001; 47: 64-9.
8. Fogel ML, Stranc MF. Lip function: a study of normal lip parameters. Br J Plast Surg 1984; 37: 542-9.
9. Stranc MF. Lip reconstruction. In: Stark RB, editor. Plastic surgery of the head and neck. Vol. 2. New York: Churchill Livingstone; 1987: 1242-57.
10. Zide BM. Deformities of the lips and cheeks. In: McCarthy JG, editor. Plastic surgery. Vol. 3. Philadelphia: W.B. Saunders; 1990: 2009-56.

แผ่นเนื้อคงหลอดเลือดและเส้นประสาทจากแก้มสองข้างแบบประยุกต์: เทคนิคใหม่ในการเสริมสร้างความบกพร่องที่ยากและขนาดใหญ่ของริมฝีปากล่าง

บวรศิลป์ เชาวน์ชื่น

การเสริมสร้างความบกพร่องขนาดใหญ่ของริมฝีปากหลังการตัดเนื้องอกออกเป็นความท้าทาย ถึงแม้ว่าในปัจจุบันได้มีวิธีการต่างๆหลายอย่างได้ถูกนำมาใช้ แต่ก็ยังไม่สามารถให้ผลการเสริมสร้างในอุดมคติที่ให้การทำหน้าที่ของริมฝีปากที่ดี ผู้นิพนธ์นำเสนอวิธีการใช้แผ่นเนื้อคงหลอดเลือดและเส้นประสาทจากแก้มสองข้างแบบประยุกต์ ซึ่งสามารถให้ผลการผ่าตัดในด้านความสวยงามที่เป็นที่พึงพอใจ และด้านหน้าที่การทำงานของริมฝีปากที่ดี