The L-extension Deltopectoral Flap for Reconstruction of Maxillofacial Defect

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Abstract

Radical ablation of facial cancer has been an increasingly difficulty in reconstructive surgical procedure. In the past, the defect is repaired, by using a forehead or temporal flap combined with a split-thickness skin graft. Over the long-term observations show that patients must live with a scarred forehead or temporal contour deformity. Nowadays, the microvascular flap is a popular choice for facial reconstruction. However, we can't ignore the morbidity of donor and receipt sites after flap harvest. Although the deltopectoral flap is still an old technique, it remained a useful method for head and neck reconstruction. This case used a modified L-extension deltopectoral flap technique, which may extend as high as the orbito-zygomatic level of the face in the external reconstruction.

Key words: L-extension deltopectoral flap, maxillofacial defect, head and neck reconstruction.

INTRODUCTION

Use of a deltopectoral flap for nasal reconstruction was first described by Aymard in 1917. However, it was not until Bakamjian's description of the medially based DP flap in 1965 that widespread use of this versatile flap in head and neck reconstruction began. The DP flap is a fasciocutaneous flap which is composed of fascia, subcutaneous tissue, and skin. The blood supply from the perforating branches of the internal mammary artery (especially the 2nd and 3rd perforators) and venous drainage are reliable. The deltoid portion of the DP flap is usually not hair bearing and the donor site is usually covered by clothing and is thus cosmetically acceptable.

Since the 1980s the pectoralis major myocutaneous (PMMC) flap and the microvascular flap have gained greater popularity than the DP flap in head and neck reconstruction. However, we believe that the modified technique may enhance and renew the application of the DP flap.
**CASE REPORT**

A 65-year-old female was referred to our department for reconstruction of a postoperative defect on the left side of face (Fig 1). She was diagnosed with basal cell carcinoma and treated with the Mohs’ technique by her dermatologist. Under general anesthesia, the margin of defect was further excised with frozen sectional control. The facial defect was measured to be about $5.5 \times 4.5$ cm including the partial maxillary antrum.

The length and extent of the flap are designed on the basis of the size of the postoperative defect. The distance from the tip of the L-extension DP flap to the medial base was measured with a long gauze and this gauze was rotated to determine if the flap length will be suitable. The superior border of the L-extension DP flap was outlined using a curveliner guide just below the clavicle. An inferior border ran along the width at the base encompassing the four interspaces (Figure 2). The incision was made above the nipple crossing on to shoulder at the deltoid region, extending down the tip further anterolaterally around the upper arm. After the flap was outlined, these incisions were then carried down through the skin and subcutaneous tissue to the fascia overlying the deltoid and pectoralis major muscles. The flap elevation was performed with a sharp dissection from the deltoid to the pectoral region in a subfascial plane. As the dissection proceeded into the parasternal region, it was stopped within 2 cm of the parasternal region to avoid injury to the perforating vessels which lay deep inside the subcutaneous tissues. The elevated flap was then transferred onto the recipient site of the surgical defect. The base of this flap was tubed exterior to the cervical skin. The donor site was then covered with a splitting thickness skin graft harvested from one side of the leg.

Two weeks postoperatively, the flap was carefully examined by ligating a tourniquet for 10 minutes around the midpoint of the flap. After 10 minutes, no cyanosis was noted on the distal tip of the flap, so it was considered safe to divide the flap. The unused portion was returned back to the chest wall in the second stage. After 6 months of follow up, the patient was seen without complications (Figure 3).

**DISCUSSION**

The PMMC flap is now the workhorse regional flap in the head and neck reconstruction. The PMMC flap is not only a reliable flap but also a versatile flap for immediate head and neck reconstruction. The PMMC flap can be used for repairing the defects including the oral cavity, neck, maxilla as well as temporo-orbital area. However, complication of the pectoralis major myocutaneous flap is its bulkiness scarring and causes distortion of nipple position and thereby resulting in cosmetic problem. Therefore, the PMMC flap was not recommended to our patient.

Another technique, the so called the microvascular technique has nowadays allowed the surgeons to transfer tissue to repair the distant defects. The microvascular flap is not only a reliable flap but also a pliable flap. The microvascular flap such as the radial forearm flap is more popularly used for reconstruction of the head and neck region. There are some drawbacks in the donor and receipt sites after the microvascular flap transfer. The complications of the radial forearm flap donor site include poor aesthetics, morbidity, reduced strength and sensation.
Fig. 1. After initial exploration by Mohs’ technique, the left orbital–maxillary resection included skin of the cheek and the anterior wall of the maxillary sinus.

Fig. 2. Note the solid line showing the traditional DP flap design; the broken line indicating the L-extension DP flap design.
The deltopectoral flap had been introduced for head and neck reconstruction for 40 years. The outcomes of the deltopectoral flap transfer were reliable. The donor site morbidity was usually cosmetically acceptable. However, the DP flap has its shortcomings that its reach was limited by its pedicle. In our patient, we maintained a wider base, including 3 intercostal vessels to improve the vascularity to extend the length of flap harvest. The L-extension DP flap is readily accessible as the DP flap, with a large amount of versatile tissue available within the prepared operative field. This provides enough flap length to the orbito-zygomatic level for external coverage of the face.

The L-extension DP flap can also be transferred without delay and is relatively hairless and non-bulky. The donor defect on the anterior shoulder does not appreciably hamper function or morbidity, and scarring is easily masked by normal clothing. The cosmetic appearance was acceptable in this patient without surgical complications including partial necrosis, wound infection, fistula formation, or separation. In our previous experience, the L-extension DP flap can be folded under the tip end of the flap provides the two layers required for repairing a large through and through cheek defect without a preliminary delay procedure.

The successful use of the L-extension DP flap modified technique highlights its versatility, high reliability, time-saving and ability to be performed independently by an oral and maxillofacial surgeon.

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使用L延伸式肩胸肌皮瓣來重建顎顏面的缺損—病例報告

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摘要

當顎面區惡性腫瘤經手術廣泛性切除後，會增加重建手術之困難性。早期顎面缺損的修補，多採用前額皮瓣或顳肌皮瓣合併裂層皮膚移植。而這類的病人在前額留下永久性的疤痕或顳部變形。現今，顳頸皮瓣手術對於顎面缺損的修補，是一種常用的重建手術。然而，我們並不能忽略游離皮瓣手術對於皮瓣供給區和接受區，所可能造成的併發症。雖然肩胸肌皮瓣是一種舊有技術，但它對於頭顱部的重建，依然是非常有用的方法。本病例使用改良型L延伸式肩胸肌皮瓣，使頭顱部重建的範圍可以延伸至眼眶顱骨區。

關鍵詞：L延伸式肩胸肌皮瓣，顎顳面缺損，頭顱部重建。