

THE DEPRESSOR ANGULI ORIS FLAPS NEITHER WITH THE MENTAL NERVE NOR THE MARGINAL MANDIBULAR NERVE

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SUMMARY: A series of 25 cases of lower lip reconstruction with flaps including depressor anguli oris muscle were presented. Depending on the general conditions of each patient, operations were performed under local or general anesthesia. In 4 of the patients, by elevating the flap bilaterally a complete lower lip reconstructions were performed. In three cases, since the defects existed without mucosal involvement, the flaps were elevated only as musculocutaneous flaps. The other cases were repaired by a flap including three layers of skin-muscle and mucosa. In some cases, full thickness skin grafting were necessary, as the mucosa with the flap was not enough for lining. Although not seen in all cases, some fatty appearance on the flap peninsula was observed following the reconstruction. No attempts were made to preserve the so-called flap and mental nerve relationships, except for the first three cases among this series. No patient suffered from any sensorial loss on the newly reconstructed lower lips. Taking into consideration the oral sphincteric functions, although the new oral sphincter was not competent as much as a healthy one, no patient showed incompetence. On the last 5 patients, the flap peninsula was elevated by direct cutting without caring the so-called motor nerve of the flap, too. In an earlier short article of us, it was argued that the depressor anguli oris flap's sensorial innervation did not come from mental nerve but buccal nerve. Now, I would like to add one more discussion about the flap anatomy and this is to say that the flap can be elevated without any attempts to protect neither mental nor marginal mandibular nerve since it may have some cross innervations. This conclusion may make us think that the depressor anguli oris flap is an easy flap to elevate with very little morbidity and can be useful to reconstruct the lower lip defects, except those that are located centrally.

Key words: Lower lip cancer, depressor anguli oris muscle, oral commissure, oral sphincter, buccal nerve, marginal mandibular nerve.

INTRODUCTION

Many aspects should be considered when choosing a method of lower lip defect, wound or deformity repair and those are size of the problem, thickness, location and health of adjacent tissues. Besides these

the following points should also be taken into consideration: the sphincter function; the sensation, opening for the mouth; appearance. Any available local tissues including all of three layers of the lower lip including muscle, mucosa and skin may be used to achieve a result meeting these points when they are transferred

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Figure 1: A lower lip carcinoma involving more than half of the lip.



Figure 2: Appearance of the defect following resection.



Figure 3: Three months postoperatively after unilateral depressor anguli oris muco-musculo-cutaneous flap reconstruction.



Figure 4: A basal cell carcinoma of the lower lip primarily located outside of the vermilion.

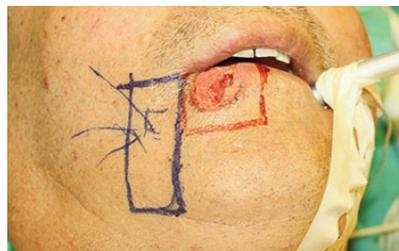


Figure 5: Planning of the resection margins and the flap.



Figure 6: Lower lip mucosa was protected.

preserving their motor and sensory nerve supply. However, somewhat confusing descriptions exist about anatomical relationships among the muscles, nerves and skin innervation.

MATERIAL AND METHODS

Different depressor anguli oris flaps being used in reconstruction of the lower lip defects for the last 20 years were evaluated retrospectively.

Technique

Three different techniques were used in three different periods:

Early period: Both the mental and marginal mandibular nerve were looked for and preserved during flap elevation. Local anesthesia was used.

Middle period: No efforts were shown to protect the mental nerve during flap elevation. The procedure was started by cutting the nerve directly. On the other hand the marginal mandibular nerve was tried to be protected under direct vision. In order to accomplish that, blunt dissection was done under skin incision. Both the general and local anesthesia were used in the operations.

Late period: Neither the mental nerve nor the marginal mandibular nerve were tried to be protected. A flap including the muscle and available coverage tissues with it was elevated

by cutting leaving a peninsula or an island with a subcutaneous pedicle. All the patients in this group were operated on under general anesthesia. The skin component of the flap could be elongated as much as mandibular lower edge as needed. The mucosal component could be included up to buccogingival sulcus. When the mucosal coverage was not enough to inlay the flap or defect around it we transferred a full thickness skin graft.

RESULTS

The patients were evaluated after the operations by aesthetic appearance, whistling, sensation of new lower lip tissues, enclosing the air in their mouth and to puff their cheek. No patient complained from anything. Even they never asked a defatting for a bulky flap. As a surgical point of view, existing hairs on the new lower lip's vermilion-like place was the worst complication requiring to shave very unusual part of the body. Of course this was seen only on the male patients. Taking into consideration the oral sphincteric functions, although it never became like its healthy days, incompetence was not observed (Figures 3 and 12).

The number of the patients in the first period was three. On the last patient in this period, we realized that



Figure 7 and 8: Late postoperatif results with only mucocutaneous depressor anguli oris flap.



Figure 9: Another case of lower lip squamous cell carcinoma located primarily on the vermillion including less than half of the lip tissue.



Figure 10: Following proper resection, appearance of the defect area and an elevated muco-musculo-cutaneous flap.



Figures 11 and 12: Early postoperative results demonstrating the oral closure.

the greatest obstacle in front of the flap transfer was to try to protect any connection existing between the flap and the mental nerve. We were not able to transfer the flap without cutting the connection. So we did it and observed that there was no sensorial loss on the new lower lip. Then by searching the related literature we gained some more information about the relationship.

In the middle period, we operated on 12 patients by direct cutting the medial side of the flap without any consideration about the mental nerve and the flap tissue connections. Only we tried not to cut directly the marginal mandibular nerve. We did not experience any difficulties on the meaning of flap transposition. How-

ever, it could not be said that in every case the nerve was visible. We just did not make sharp dissection under the skin. Instead a blunt dissection was done parallel to the nerve if existed.

In the third period, a muscle and skin flap with or without mucosal part based on the cephalically was elevated by direct cutting around its peninsula. When we faced with the facial artery and vein, if it was possible, we protected them; otherwise it was ligated. In the last period we had 7 patients and no complication existed. In the cases requiring the submental lymph dissection, the incisions were elongated up the submentum and the lymph dissection was completed.



Figure 13: Main disadvantage of the flap abnormal hairy lower lip appearance on a male patient is seen.

DISCUSSION

Since 1993, I have used the depressor anguli oris flap for the reconstruction of lower lip defects (1). During the early years of its use, I elevated the flap with the mental nerve as described by Tobin (2). Two years later from the first cases, a 43 year old man with a unilateral lower lip defect was admitted. He had been operated on twice, had failed to heal with some wound dehiscence. I elevated the depressor anguli oris flap without the mental nerve, because the nerve was already damaged. Fortunately, the late result of the sensorial innervation was uneventful. This outcome stimulated me and, when I searched the literature, I realized that in fact the lower cheek area including the flap had nerve fibers from the buccal nerve (3-5). After initial obligatory experience by the flap without the mental nerve, I operated successfully on twelve more cases in the same way. Among the patients that treated with the depressor anguli oris flap but without the mental nerve preservation, there were the cases in which I could not observe the marginal mandibular nerve during the dissection as well. This observation caused some new questions in my mind. Although I did not cut the connection between the muscle and the marginal mandibular nerve under direct vision on purpose, I could not argue that in all cases marginal mandibular nerve could be protected. When I searched once more the related literature, I realized again that there were some discussions over the depressor anguli oris muscle and the marginal mandibular nerve, too. That is to say at last, transection of the marginal mandibular nerve did not induce complete denervation of the muscle implying that the depressor anguli oris muscle was co-innervated by a different branch of the facial nerve (6).

The surgical literature did not have plenty of papers about the depressor anguli oris muscle and related flaps. However, there are certain researchers especially keen on this topic. Among them, Denewer et al presented 66 cases. It is too strange for me that in their paper there was no single statement about the nerve and the flap relationships. Even by writing something about the Tobin's original description, still they did not write anything about the innervation of the flap (7). How can we be silent about the nerve on the lower lip reconstruction by doing 66 cases, I do not understand. In my mind to do more than 50 cases of lower lip reconstruction with depressor anguli oris flap is somewhat great experience. In the past by having only less than 30 cases I faced with some new questions and some difficulties. Then I wrote a letter to editor about it. But even that new question looks like did not attract their attention. There was only one report in the literature taking into consideration our earlier letter and it was Moschella et al's report in 2005 by stating with a very simple one "If the mental nerve is removed, sensitivity remains thanks to the branches of the buccal nerve" (8). What is more interesting is that this last paper was in the reference list of the article of Denewer et al with the number of 11 (7). It is too difficult to understand for me someone that ignores a very simple question about the technique, which was used in 66 cases by them.

Another important task to discuss the depressor anguli oris related flaps is that how much skin or mucosa should be added to the flap. The muscle itself can be added totally. However, when it comes to the external or internal lining, it is impossible to add them always in the equal amount. The mucosa that can be add is limited between the base of the flap superiorly and buccogingival sulcus inferiorly. Although the upper end of the flap for the skin is the same level, the lower end of the flap's skin tissue can be reached up to the lower end of mandibular edge. There will be a gap always these two lower endings. Therefore to close that gap, in some cases it would be necessary skin grafting to cover mucosal lining. As a conclusion about the mucosa and skin that can be added to the flap, it can be said that if the lower lip defect is lesser than the 50 % of the lower

lip, available mucosal tissue is enough; if it is larger than 50%, some full thickness skin grafting from an unhairly site will be necessary. By using that principle up to the 75% of lower lip defects one sided depressor anguli oris flap would cover the defect (Figures 1, 2 and 3), in the defects larger a bilateral depressor anguli oris muscle-mucosa-skin flap will be obligatory.

A 90 degree rotation and transposition should be done by transferring the flap (Figures 3 and 10), otherwise a whistling deformity is unavoidable. The flap donor area should not be closed by using flap tissue itself. When you think that it would be an obligation to use the flap itself to close the donor area, that means there are still some chances to transpose the flap more up to the 90 degree mentioned above. In general meaning there will be no flap that is elevated to close its donor area except the bilobed flap. But the bilobed flap as its name implies is a two lobed flap and a second flap is elevated on purpose to help to close the donor area. The donor area belonging to the depressor anguli oris flap should be closed with the buccal tissues and sublabial left tissues following lower lip resection.

Another important point is that the distal skin part of the flap should not be designed as triangular shaped to sake for closing easier the donor area, just opposite it should be better to design it even in a dumbbell shaped. Otherwise it would cause a whistling deformity on the lip. Planning the flap should be done according to the requirements of the defect site not the closing problems on the donor site (Figure 5).

A very visible disadvantage of the flap was that it changed the locations and directions of the hairy buccal part to the hairless lower lip area (Figure 13). In the first session it was unavoidable. We planned to replace the abnormally hairy new lower lip by a hairless full thickness skin grafting, however, no patient came for it up to now. In female patients, there is no such a disadvantage.

Another important complication that existed was the bulky appearance of the new lower lip in some cases. Especially in older patients it did not happen. However, I think it is impossible to close any discussion

about the depressor anguli oris flap without mentioning it (Figures 3, 7, 8).

We had have some basocellular carcinoma cases on the lower lip in this series and all of them was located outside of the vermilion (Figure 4), that is to say they appeared only on the white skin area.

Only in two patients we elevated the flap as an island flap. There was no flap viability problem in these two cases and that may show that the flap has its blood support not from its paninsular base instead from some perforators coming from facial artery.

The incision line was distended bilaterally up the submental region in one of the last cases, in which tumor invaded almost nearly whole lower lip. By doing so we were able to access easily to perform lymphadenectomy in the suprahyoid area. In the literature it has been stated that suprahyoid dissection may be helpful to prevent cervical lymph node infiltration later (9).

As a conclusion I would like to say that the flaps including depressor anguli oris muscle should always be kept in mind. More complicated flaps should not be considered as much valuable just for their complexity. It is well known that in reconstructive surgery adjacent tissues are more akin than the remote tissues. Although it can not be considered just a replica the skin-muscle and mucosal interconnected structures for the lower lip reconstruction, it may have some value. No tissue in the body has the features that exactly provides what we need after removing the lower lip totally or subtotally. Furthermore, in the cases in which the pathologic tissue invades to the depressor anguli oris muscle and adjacent area, some distant flaps' usage such as radial forearm flap might be an obligation (10).

Authors using the flaps including depressor anguli oris muscle should share their observations that does not fit with the original description of the flap. In my mind there is only one obvious thing and it is certainly not that the original description of the flap included everything about the flap. The obvious thing is that the depressor anguli oris muscle and related flaps can be used in the reconstruction of the lower lip defects (Figures 1 to 13).

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