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NOVEL SURGICAL TECHNIQUE FOR
COMPLETE LOWER LIP RECONSTRUCTION:
TWO LIPS OUT OF ONE

NOVA HIRURŠKA TEHNIKA ZA POTPUNU
REKONSTRUKCIJU DONJE USNE:
DVE USNE OD JEDNE

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Abstract

Key words

total lower lip defect, repair method „two
lips out of one”

Ključne reči

potpuni defekt donje usne, metoda rekon-
strukcije „dve usne od jedne”

The lips are of the utmost importance for vital functions such as speaking, as well as food and liquid intake. Deformities, particularly of the lower lip, can cause serious problems for the patient during speaking and alimentation. Such defects also jeopardize self-confidence and various aspects of social life. The aetiology of lip lesions may include acquired defects, consequences of trauma and infection, or congenital naevi, such as vascular anomalies and clefts. Nevertheless, the most common lesions that require reconstruction of the lip are consequences of tumor excision (among which squamous cell carcinoma is the most abundant). Large defects of the lower lip represent a challenge to the reconstructive surgeons. The reconstructed lip should retain muscle function, allow sufficient mouth opening, have adequate sensory function and an acceptable aesthetic appearance.

The purpose of this article is to evaluate the newly designed flap „two lips out of one”) for reconstruction of extensive lower lip defects regarding the degree of mouth opening, commissure shape, oral competence, lip sensation and aesthetic appearance.

INTRODUCTION

According to the currently used TNM classifications (JJC, AJC and UICC), T3 tumours (with N0 or N1 and M0) are the absolute indication for complete lower lip resection (1). Therefore, after the removal of T3 tumour that creates total lower lip defect, it is necessary to reconstruct the lower lip. The most common type of tumour is squamous cell carcinoma, approximately 4 cm large, being sufficient to occupy the whole lower lip. It usually originates from the vermilion where is also most frequently located. The T4 tumour of lower lip requires more extended surgical removal accompanied by neck dissection and/or bone cutting. The biggest difficulties that occur after the complete removal of the lower lip in T4, N1, M0 and also in T4, N0, M0 patients are caused

by loss of lip's mobility, flexibility and holding ability. On the other side bilateral modified fan-flap, revascularized and two pedicle flaps also provide effective reconstruction and repair. The patients are submitted to the series of reconstructive and reshaping plastic surgeries aimed to improve aesthetics and function of the new lower lip.

*DESCRIPTION OF THE OPERATIVE
TECHNIQUE (Case report)*

The first step includes estimation of the extent of tumor excision and repair planning (Fig.1, scheme B). Full thickness of the whole lower lip has to be restored (Fig 2, scheme C). It is strongly advised to preserve at least small part of mouth angle (angulus oris), particularly muscular/tendon



Fig. 1: T3 Squamous cell carcinoma of lower lip. Excision and repair of lower lip are designed



Fig.2: Total lower lip resection, postoperative defect



Fig. 3: Surgical specimen for histology



Fig.4: Reconstruction by flap „two lips out of one”



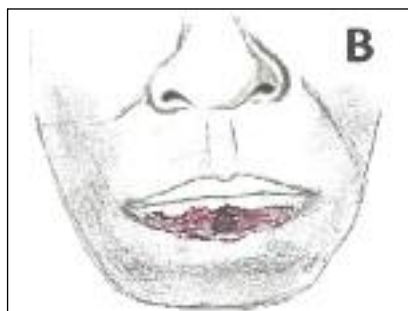
Fig.5: Patient one week after surgery



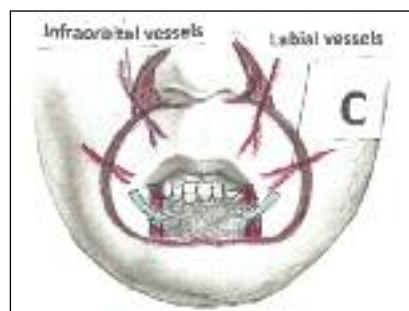
Fig.6: Aspect of lips two months after surgery



Scheme A: Muscle of facial expression in contact with lips: 1.Risorius mayor; 2. Risorius minor; 3.Levator Labii superioris; 4. Orbicularis oris; 5.Risorius; 6.Buccinator; 7.Masseter; 8. Depressor labii inferioris; 9. Depressor anguli oris; 10. Mentalis



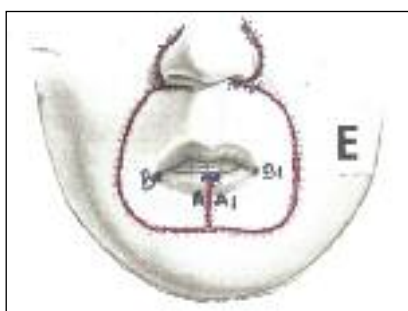
Scheme B: Drawing of appearance of: T3 N0 M0, Squamous Cell Carcinoma of lower lip



Scheme C: Resection complete of lower lip. Excision of triangle shaped skin and subdermal tissue with base about 1 cm in order to make surgical defect smaller. Blood supply is preserved through labial arteries as well as terminal branch of infraorbital artery.



Scheme D: The defect is ready to be repaired. If it is possible preserve terminal branches of facial nerve.



Scheme E: Repair of lip by suturing both anguli oris in middle of lower lip and forming rima oris with new anguli oris resulting in microstoma.



Scheme F: Microstoma is resolved by well knowing simple technique: excision skin and sub dermal tissue about 1 cm in triangular shape and suturing buccal mucosa in the skin defect.

layer (knot), to preserve the place for insertion of the facial expression muscles (m. orbicularis oris, mm. zygomatici mayor et minor, m. risorius, m. buccinator and m. depressor labii inferior). All the above mentioned muscles are not inserted into the angulus oris, but are also innervated by the VII cranial nerve (n. facialis). Surgical specimen is then sent for histopathological examination (Fig 3). The next step involves sharp (knife) resection of skin and mucosa, and a blunt cut to separate the rest of upper lip (upper part of m. orbicularis oris). It is performed approximately 2cm distant from the angulus oris, throughout nasolabial fold toward the columella and philtrum, taking care to preserve all blood vessels (both lip arteries and veins, as well as terminal part of lower infraorbital artery (scheme C). Also, it is very important to preserve the terminal parts of facial nerve branches, buccal branch especially and, if possible, marginal mandibular branch. The triangular excision of tissues is performed in the paranasal region, bilaterally, in order to make outer perimeter defect smaller and easier to repair (scheme C). The upper lip is almost floating (scheme D). It is stretched to approximately 55 mm in length. In this procedure rima oris is 27.5 mm, which is creating a micro stoma (scheme E). New angulus oris is marked in stretched position, creating a gap of 27.5 mm between angulus oris and upper lip. The closure of the triangular gap is performed by paranasal approach (Fig.4). The next step is to bring together two angulus oris, joining them firmly in the middle of the lower lip. This is followed by suturing of the skin stretched laterally to the maximum possible extent together with muscle and mucosa. Three-layer sutures are used for flaps. Thereby, the defect is completely covered with the same structure, of the same texture, but with micro-stoma of about 27.5 mm. Afterwards, triangular skin excisions around new angulus oris are made bilaterally, and mucosa is sutured to the skin at the most distant lateral point of skin excisions (scheme F). In that way rima oris is bilaterally extended to almost 1 cm. This makes a gap of more than 35 mm, which is quite acceptable to start with. Patient must carry nasogastric tube until the sutures are removed, preferably for 10 days (Fig. 5). The final appearance is quite acceptable (Fig.6).

DISCUSSION

The most frequent cutaneous area affected by the dermatological tumors is the lower lip. Therefore, there is a high interest in developing advanced lower lip reconstruction techniques. Currently, subtotal-to-total lower-lip repair is still mainly based on the procedure described by Camille Bernard in 1853 (2), with successive modifications, notably including those described by Fries and Webster (3, 4). The Bernard technique utilizes full-thickness flaps harvested bilaterally from the cheeks (2).

It is well known that substantial problems during lip cancer surgery are occurring when bigger amounts of lost tissues are being repaired (total lower lip defect). In these cases, there are reconstructive problems, with unsatisfactory aesthetic and functional outcomes if only Camille Bernard's procedure is performed (2). On the other side, there are several others good, almost perfect, methods of total lower lip

reconstruction (usually after cancer resection). Namely, Von Bruins (3, 5) was a pioneer in lower lip reconstruction, creating a foundation for more sophisticated methods developed by Gillies (5), Karapandzic (6), Johanson (7) and Stranc (8). However, the total lower lip reconstruction is usually performed according to Bernard (modified) (2), Webster (4), Fries (7, 9), Fujimori (9), McGregor (3) and Nakajima (10) methods. The visor frontoparietal bi-pedicle flap is being used also. Finally, due to the progressive development of microsurgery, radial forearm free flap is used as well during the lower lip reconstruction. Overall, if the surgeon masters ten or more techniques, then the full set of labial defect reconstruction procedures could be performed.

Before making the final decision which procedure is the most suitable for each patient there are indications that need to be evaluated. Namely, specific indications are drawn up for treatment of labial defects, same as there are indications for all head and neck defect repairs (11). Therefore, it is very important to refer to these indications in order to provide appropriate treatment that should consist of two essential elements: good aesthetic appearance of the lip and recovery of labial function (12, 13). The oral competence is of primary importance, as it enables the patient to feed normally (without dribbling saliva or food), and to speak easily (14, 15, 16). It is especially significant to know and understand all indications, as there are various alternative techniques, each with its pros and cons. Circumstances have to be explained to the patient, so he can contribute in the deciding what is the optimal solution referring to the demands of working activities and social life, having in mind period with jaws immobilized, and the number and duration of the procedures needed for complete repair.

The „two lips out of one” is the latest of lower lip repair techniques. It is a very suitable, if not the best, method for complete lower lip defect reconstruction. Good sides of this technique include carefully marked landmarks, precise technique, sutures in three layers (mucosa, muscle and skin) as well as gradual postoperative recovery during 2-3 months. The complete recovery of opening, stretching and overall movement of lips together with the preserved sensibility of skin, mucosa, and most importantly the vermilion, make this technique one of the golden standards in lower lip repair. All above-mentioned effects are evident immediately after the surgery and are permanent.

CONCLUSIONS

This technique has several significant improvements compared to the other methods:

- No muscle destruction;
- Muscle/tendon point (hipomoclon, fulcrum of a lever) is preserved, and
- All muscles required for facial expression sustain their function.

It should be noted that there are several other benefits from using this method. These include following:

- Vermilion is not changed neither anatomically nor histologically during this procedure. Also, there are no changes in its sensibility or the skin sensibility;

- Micro-stoma is closed during the same act;
- Vocalization is excellent; Alimentation is not affected;
- Aesthetic effects are significantly improved compared to the other methods for total lower lip repair.

Finally, this method shortens the duration of surgery, as there are already both lips from the habitual tissue, and functions and sensitivity of the lower lip are rapidly restored as

well. Altogether, we propose this method („two lips out of one”) as currently superior compared to the other methods for the reconstruction of lower lip after total resection.

Sažetak

Usne su od ključnog značaja za vitalne funkcije kao što su govor i unos tečne i čvrste hrane. Deformiteti, posebno donje usne, mogu pacijentu da uzrokuju ozbiljne probleme tokom govora i ishrane (unos hrane i pića). Ovi deformiteti takođe utiču na samopouzdanje pa tako i na socijalne aspekte. Uzročnici oštećenja usne mogu biti defekti stečeni, nastali usled traume ili infekcije, ili su urođeni, kao što su vaskularne anomalije i rascepi. Ipak, najčešći uzročnici zbog kojih je potrebna rekonstrukcija usne su posledica odstranjivanja tumora (među kojima je najčešći skvamocelularni karcinom). Veliki defekti donje usne predstavljaju izazov za rekonstruktivnu hirurgiju. Rekonstruisana usna treba da zadrži mišićnu funkciju, da omogući dovoljno otvaranje usta, oblik ivica usana, kao i da ima dovoljnu senzornu funkciju i prihvatljiv estetski izgled.

Svrha ovog rada je da prikaže novodizajnirani režanj („dve usne od jedne”) za rekonstrukciju obimnog defekta donje usne, uzimajući u obzir obim otvaranja usta, oblik komisure, očuvanost usne duplje, osetljivost usne i estetski izgled.

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