

THE POSSIBILITIES AND THE LIMITS OF THE ABBÉ AND ESTLANDER FLAPS IN THE SURGICAL MANAGEMENT OF THE LOWER LIP DEFECTS

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Abstract: *From the morpho-functional point of view, the lips are life indispensable, as complex unit with the main aesthetic role at the level of the face, the lower lip providing the most important part of the oral continence, with psychological rebound. In some lower lip defects, the great challenge is the achievement of a simultaneous reconstruction of the functions and an as natural as possible aspect. The flaps described by Abbé and Estlander, although classics, have maintained further very useful, providing almost perfect aesthetic and functional results. Being almost the same, they are composites, axial flaps, taken from the opposed lip, whose viability is dependent only on the compliance of the patient, which must be psychologically supported. New techniques combined with this type of flaps are welcome especially in the cases when big labial defect could appear. This paper is a review of these reconstructive techniques, described in comparison, also and with other loco-regional flaps. The explanation of their technical limits and disadvantages, led to the conclusion that it is necessary to imagine, especially for large lip defects, of new techniques by including this type of flaps into new combinations as optimized reconstructive versions - engine of the obtaining superior clinical outcomes.*

Key words: *reconstruction, lower lip, Abbé-Estlander, aesthetic, limits.*

1. Introduction

The lips are the main aesthetic and functional unit of the face, providing, through the oral continence, the achievement of the feeding and, through the mimics, of the verbal and non-verbal language in which both lips also participate.

The mobility of the lips confers both the natural aspect of the face and the

possibility to perform their functions, in such a way that the target of the techniques of the defects cancellation, no matter if they are congenital, posttraumatic or post excision (malignant tumors), is even the preservation of the function combined with a quasi-natural aesthetic aspect [6].

In the case of lip structures defects occurrence, it was found that the lower lip has the primordial role in ensuring the oral

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competency, through its specific structural and sensorial features, perfectly adequate to the functions in which they are participating. The restoration of the structural and functional elements, partially or totally lost, through an optimal reconstructive technique, will have, from these reasons, a very important role [18].

The main objective will be always represented by the reconstruction of a normal function, by means of the restoration of the sensitivity, of the muscular function, of the oral competency and the process of obtaining an oral orifice with fine dimensions and proportions. The process of optimizing the aesthetic aspect is rendered by the keeping of the labial symmetry, the absence of vicious scars and the presence of an adequate stomal diameter [8].

The reconstruction of the lips represents a big challenge for the plastic surgeon, indebted to obtain an aesthetic and functional restoration of this structure at the maximum excellence, or at least, of a maximum sufficiency.

The lip flaps are not a new concept, but an ancestral one, dating back before 1000 A.D. in Sushruta's Sanskrit texts [15]. On the other hand, besides these acknowledged techniques, which defeated the temporal element, the plastic surgery is a specialty which is in a constant search and development of new independent or combined techniques and methods, that sequentially contribute to obtain optimized results, leading, inevitably, also to the patient satisfaction on both levels, not only functional, or only aesthetic.

In this paradigm enroll also the effort of Pietro Sabattini, surgeon at the University of Bologna, which in 1837, performed at St. Orsola Hospital for the first time in the world, the reconstruction of a posttraumatic upper lip defect, by an original flap, whose donor area was the patient lower lip. A year later, Sabattini,

published the technique of this flap, in an Italian restricted circulation magazine written in the Italian language, and, for this reason, it was not accepted as having scientific relevance at worldwide level.

In 1868, so 3 decades later, the American surgeon Robert Abbé, describes the technique of the transposition flap from the lower lip to a tissue defect of the upper lip, in a well-known medical journal, written in the English Language, the technique bearing his name even nowadays [1], [15].

In principle, like the Abbé flap, but specially created for the situations that impose the reconstruction of the labial defects which include the oral commissure too, is was described in 1872 in Finland a new type of flap by Jacob Estlander, the flap bearing his name, at this time correctly [17].

2. Defining the concept

The original technique, described by Robert Abbé consists of the total reconstruction of the philtrum with a flap from the lower lip [11], [15] at a patient with cleft lip (Fig.1).

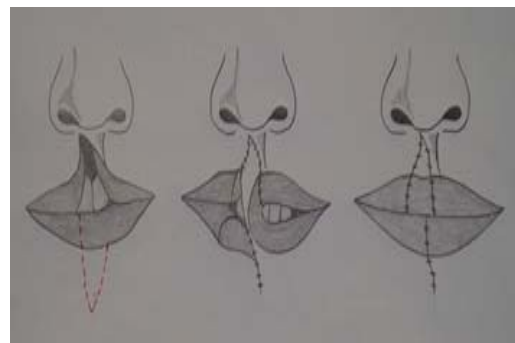


Fig 1. *The flap described by Robert Abbé – for cleft upper lip defect*
(authors drawing)

Subsequently, this technique was liberalized, observing its versatility, that allowed the cancellation of a defect, situated at either of each of the two lips.

This is the reason that makes us to call into discussion the characteristics of this type of plasty with flap also in the case of the lower lip defects. The reconstruction of the lower lip with the Abbé flap has experienced a continued development, especially due the increased number in the appearance of the squamous cell carcinoma cases at this level. It is important to mention the fact that in the case of extensive epitheliomas, sometimes because of the evolutionary aggressiveness, sometimes due to the neglecting this pathological entity - the excision is extended over the commissure, too, and in those cases the flap described by Estlander (Fig.2) in 1872 is indicated [15].

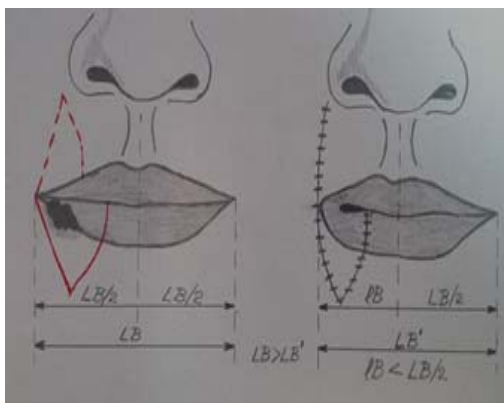


Fig. 2. *The Estlander Flap– Unilateral comisure ablation* (authors drawing)

The Abbé flap and Estlander flap are composite flaps (containing many types of tissue: epithelial, muscular, mucous), full thickness version (including all the structural elements: skin, orbicularis oris muscle, labial/buccal mucosa). In terms of vascularization they are axial flaps, having as vascular pedicle the labial artery and the comitant veins [4], [12].

In the case of a defect which involves the labial commissure, too, especially if it has big dimensions (1/3-2/3 from the lip), it is

often very difficult to cancel the defect. The Estlander (Fig.2) is a safe one, frequently used, even if the movement of the commissure remains one of the problems [20].

Both the Abbé, and the Estlander flaps are denervated after sectioning the sensory nerve fibers. That's why the restoration of the sensitivity is a long process and which, generally, respects the order: painful stimulus – tactile stimulus – thermal stimulus [9]. By the point of view of the location, both are regional flaps included in the cross-type plasty category, following the transfer to the same organ (lip) adjacent located. For this reason, the name cross-lip flap, through the similarity with cross-finger or cross-arm plasty, can be easily accepted as being scientifically sustained.

With regard to the lower lip defects, the Abbé flap is elective used in un-commissural defects with variable extension in according to the lip length (from Romanian $LB = Lungimea\ Buzei = Lip\ Length = 1u$ - Fig.2.), while the Estlander flap is chosen, at the expense of the Abbé flap, in case of the defects that include the unilateral commissure disorganization, especially if these defects have large dimensions, representing from one third to two thirds of the lip length.

3. The achievement technique

The plasty with the Abbé flap, requires initially a correct assessment of the dimensional defect, that must be realized both preoperatively, but, especially after the tumor and peritumoral tissues was ablated. In this context, the Abbé flap is sketched on the free opposed lip as a triangular flap, having the base equal to half of the defect base, and being equal in height with the defect (Fig.3).

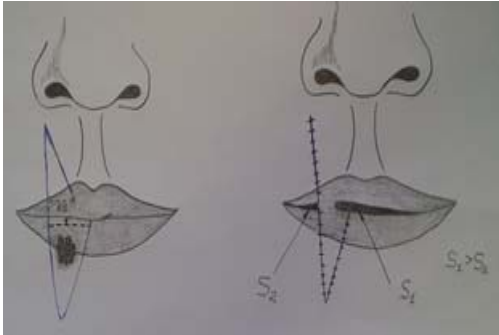


Fig. 3. *Abbé flap technique (attention at the two unequal small stoma $S_1 > S_2$).*
(authors drawing)

The existing defect will be cancelled partially (50%) by supplementing its with the transferred flap, and partially (50%) by suturing the flap edges at the defect edges, under a minimum tension allowed by the peripheral elasticity of the defect tissues. Thus, the labial shortage is symmetrical, not being discrepancies between the dimensions of the two lips [2], [5], [14].

Observation: Although the proportion of the defect cancellation seems to be evenly split between the participation of flap and of the tissue elasticity (50% - 50%), practically the suture cancels only 25% of the defect, the rest actually not being a defect, but only the appearance of tissue elasticity. Finally, inside of the plasty with Abbé flap, the cancellation of defect is distributed 50% - 25%, equivalent to a proportion of $2/3 - 1/3$ of defect.

To obtain the triangular Abbé flap, a transfixiant incision of the lip (skin, muscle, mucosa) must be performed on the opposite part of the vascular pedicle. The incision will initially be perpendicular to the lip length on the vermillion, then immediately turning it in an oblique incision that will outline the top corner of the flap. This incision has also the role for better marking of the labial artery path, from the thickness of the marginal fibers of the orbicular [11]. Later, the flap is rotated 180° toward the lower lip and sutured in

anatomic plans to the defect edges from this level [3]. The sutures will provide two small stoma, usually unequal, of which the big one will be used to feed patient, directly or through a tube.

Protecting the plasty and thus, the pedicle, this situation will stand typically about three weeks, during which the alimentation will be a liquid and/or semi-solid one, and the movements of opening the mouth in a brusque and powerful being prohibited, although actually quasi impossible. These movements will only causing tensioning of the sutures and elongation of the pedicle elements, that can cause the failure of the plasty.

The sectioning of the pedicle is usually realised after this period, the key of success being offered exactly by the necessity of the patient's compliance and of the physician-patient communication [2], [5].

The Estlander flap technique, resembles very much with the Abbé flap plasty, being different from the first one only by using it in the quasi-commisural defects, by the absence of the second surgery time (the section and the individualization of the pedicle) and the necessity of the commissuroplasty [19].

3. The indications and contraindications of the Abbé/Estlander flaps

The defects of the lower lip can be classified according to more criteria:

- depending on the involved labial structure volume/anatomic layers – partial (involving only the skin or the mucosa) or full thickness (mucosa, muscles and skin).
- depending on the dimension of the defect, taking into consideration the total length of the lip ($LB=1u$) defects can be: up to $1/3 LB$; between $1/3-2/3 LB$; over $2/3 LB$ and total defects ($3/3 LB$)

c) depending on the affecting or not the commissure: commissural and un-commissural.

To make a decision on the reconstructive technique which must or could be chosen, is extremely useful, even mandatory, to be consulted the internationally developed classification criteria [12], [14].

The main indications of the Abbé flap according to this are:

1. cancellation of the defects which are between 1/3 and 2/3 of the lower lip that do not affect the commissure [2], [5], [9], [12], [14], [20];
2. cancellation of the philtrum defects of the upper lip;
3. cancellation of the defects of the lower lip, secondary to a method of circumoral reconstruction (e.g. Karapandzic, Fig.4) applied for the cancellation of some big defects, resulting in the massive reduction of the lower lip being in misbalance with the superior one [5], [10].

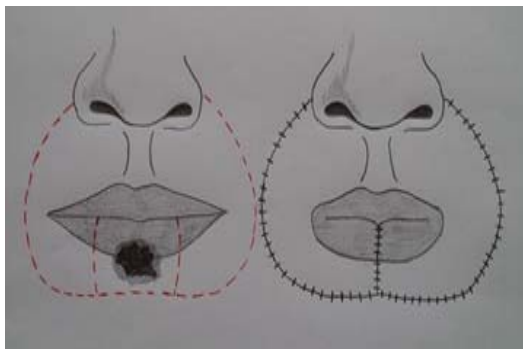


Fig. 4. *The technique described by Karapandzic (authors drawing)*

The technique described by Estlander has indications the defects of 1/3-2/3 from the length of the lip, but strictly involving the commissure [13].

The main contraindications of the Abbé flap according to these criteria are:

1. the existence of some very big lower lip defects, more than 2/3 – 3/3 from the lip length;

2. the insufficiency of the labial tissue with normal structure and elasticity in the donor area, which after the transfer of the flap could not accomplish a reasonable function (the donor lip that has already suffered another excision, an injury, an irradiation or has scarring sequelae);
3. the donor lip that was irradiated previously;
4. the central defects of the inferior lip (so as the creation of the flap from the philtrum level implies the destruction of the principal aesthetic unit of the superior lip, in this case the circumoral flaps technique, described by Karapandzic is indicated) [7].

The contraindications of the Estlander flap overlap the ones described by Abbé [13].

4. The advantages and disadvantages of the Abbé/Estlander flap plasty

The advantages of the lower lip reconstruction with the Abbé flap:

- the defect is reconstructed with a structurally identical tissue (complete lip, full thickness), the functional and aesthetic results being very good, according to the universally valid precept in plastic and reconstructive surgery, that the best way to achieve optimal aesthetic results is the use of similar tissue;
- the restoration of the motor sensory innervation, with an almost complete recovery after 12 months from the surgery, even obtained only through randomised mechanism [7], [12], [13];
- the anatomic remaking of the orbicularis oris muscle and the preservation of the modiolus, with the restoration of the perioral function;
- the preservation of the labial commissure because of an unnecessary surgical disorganization;
- the equal shortage of the lips, getting a finally symmetrical stomal orifice [12], [13].

Except the commissure disorganisation and, implicitly, of the modiolus, the advantages of the Estlander flap, are the same with the ones of the Abbé flap [21] to which we can add the absence of the adhesion period until the section of the pedicle, and the absence of the second surgical time.

The disadvantages of the Abbé flap method:

- the necessity of the two surgical time, at an interval of 21 days;
- the three weeks time when the labial adhesion is maintained, and it can validate the risks of the flap failure;
- the reduction of the oral aperture in different proportion (relative microstomia);
- the temporary denervation [13];
- the inequality between the height of the vermilion at the level of the suture part of the donor area and the defect, as aesthetic finesse defect [5];
- the risk of damaging the flap through the process of opening the mouth in a brusque manner, within the three weeks [7].

In the case of the Estlander flap, the commissuroplasty is one of the main disadvantages [16], to which the microstomia and the temporary denervation is added.

5. The main complications

The most frightening complication is represented by the necrosis and the destruction of the flap through the traumatic injury, by traction or elongation of the labial artery, primarily in the process of individualization the flap, or after the first part of the intervention, due to the incompliance of the patient [2].

On a long term, the labial asymmetry and the depressing vermilion scars can appear, but they can be avoided by means of a precise approximation of the vermilion

edges and of a careful alignment of the vermilion-skin border ("white roll") [13].

An important complication is the psychological depression of the patient, especially to the young or female patients, due to the appearance of one of the complications quoted previously.

The occurrence of major depressive disorders is potentiated also by the three weeks period in which the patient feeds with difficulty and is "conditioned" to reduce to a minimum its communication with the others, both because of the labial adhesion, as well as following the medical indications. In this context the need of psychological support through psychological interventions is mandatory for avoiding the appearance at the patient of the posttraumatic (postoperatively) stress disorders. To provide a maximum effectivity of the postoperatively interventions, it is mandatory that the intervention of the psychologist must be early prepared, prior to surgery, and maintained permanently during the healing (6 – 9 months). Also, the role of the speech language pathologist can be extremely important postoperatively in order to prevent depression caused by a faulty pronunciation, which would be the engine of a new possibility of developing physical disorders to this type of patients.

Thirdly, the psychologist's role is extremely important also in the context of tumoral pathology whereof the patient is certainly informed, but that, until the communication of the histopathological result, surely could lead to experiment a lot of anxieties, related to the stress generated by the possibility of a life-threatening result.

Because of these reasons the patient has to be very well informed and trained from the psychological point of view, since the beginning of the cooperation with the treating physician, concerning the complications and the risks of the incompliance.

It can be found in the literature tables illustrating [7], [13], the possibilities to choose the right procedure which could provide a better understanding of the described ideas, and also for the argumentation of making a right decision on the technique, the indications, the advantages of the Abbé flap, dependent on the characteristics of the defect and in comparison with the other methods, used in the reconstruction of the lower lip defects.

6. Actual limits and perspectives – personal considerations

From a technical point of view, the Abbé and Estlander flaps are indicated, according to many authors and to the actual level of knowledge, in the cancellation of some defects of the inferior lip with the dimensions between $1/3 - 2/3$ from the dimension (length) of the lip.

Mathematically speaking, the realisation of the flaps is possible in this interval of length of the defect. The problems begin to appear when the defect tends to get to the superior limit of the interval for example, $1/2 - 2/3$ of the lip, situation when we wonder if it is worth taking the risk, cancelling this defect by means of one of the classical Abbé/ Estlander flaps.

The risk is determined, mainly, by the probability that any flap, in its natural evolution to get integrated, to not achieved its randomised vascular connections and than to get necrosed, fact which could lead to the creation of a bigger defect, situation that is wanted neither by the doctor, nor by the patient.

Thus, either an adjustment of the defect dimension, restraining the interval, or the innovation of some combinations of adjuvant techniques to the traditional ones, which allow both the excision of a big defect, and its cancellation in much safer conditions, are considered by us o

necessary perspective, both for the surgeon and the patient.

Such a method has already been imagined, through it caning achieve an efficacy in terms of already described surgery method, that is already subject of a scientific work which complements this one.

7. Conclusions

The Abbé and Estlander flaps, by means of their morphostructure – own labial tissues – offer a good functionality to the reconstructed lips and, more than that, an aspect as close as possible to the natural one, demonstrating in this way their utility and versatility that have been kept unaltered during the time.

The preservation of a symmetrical stomal orifice, associated with the aesthetic aspect and with the functionality, provides safety and satisfaction to the plastic surgeon and to the patient, when this type of method is chosen.

The reconstruction of a defect of the lower lip, no matter what the cause is, especially when it has big dimensions, still remain a challenge for the plastic surgeons in order to obtain superior clinical outcomes.

For us, this challenge was partially solved by the innovative combination that we immaginate and which will be presented in a future paperwork.

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