



**Review Article**

# **Surgical Techniques for Cleft Lip Repair - A Review**

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## **Abstract**

Cleft lip and palate are the most common development disturbances in the head and neck region. It occurs as a response to a stimulus during intra uterine life that affects all aspects of life of the child. Quite often, it poses a challenge to the team of clinicians and surgeons to restore and rehabilitate the normal functioning and appearance. In order to improve the outcome of the procedure, the clinician must have a thorough knowledge and understanding about the surgical procedure undertaken. This article reviews all such techniques available so as to compare their shortcomings and advantages and utilize it to improve the quality and standard of treatment given to our patients.

*Keywords: Cleft lip, primary repair, orofacial defect, congenital deformity, consanguineous marriage.*

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## **INTRODUCTION**

Cleft lip and palate is the most common congenital orofacial defect and the second most common in the human body after clubfoot [1]. It may occur individually or as a part of a syndrome. The first literature about surgical management of cleft lip dates back to a Chinese work in the 4th century AD [2]. The initial repair of cleft lip was done by a linear excision of the defect margins and subsequent closure using 'hare lip' clips. However, in the 19th century, Malgaigne and Mirault managed cleft lip using straight line excisions to improve the precision [2].

The surgical management of a cleft is necessary to restore form, function and aesthetics in the child. Another important aspect of the repair of cleft is to prevent any disturbance to the development of the mid face. Several approaches have been proposed to repair a cleft lip. This article reviews the various techniques known and their advantages and disadvantages.

### **Embryological Basis and Classification of Cleft Lip**

A cleft lip is formed during the embryogenic intra-uterine development due to the failure of the fusion of the median nasal process with the lateral nasal processes and maxillary process. This development usually takes place around the 4th to 8th week of IUL [3]. The development of the primary palate also occurs during the same intra-uterine period. The fusion of the primary palate is completed prior to the development of the secondary palate. The secondary palate develops during the 8th to 12th week of IUL by the fusion of the medial projections of the maxillary processes. Cleft lip may or may not be accompanied by a cleft palate due to the difference in their developmental timings. The severity or degree of cleft depends upon the timing and extent of disturbance in the embryonic development.

Cleft lip may be classified into a unilateral and a bilateral cleft or a complete and an incomplete cleft [4]. An incomplete unilateral cleft is that which presents as a complete cleft of the inferior portion of the lip without affecting the superior part of the lip on one side of the lip. On the other hand, a complete unilateral cleft is that in which the defect involves the entire length of the upper lip. A bilateral cleft lip is a result of the non-fusion of the processes on both sides. A complete bilateral cleft causes a separation between the premaxilla and then palatine processes.

### **Timing of Repair**

Numerous factors are involved in deciding the timing of repair. In 1966, Wilhelmssen and Musgrave [5] proposed the preoperative requirements in their "rule of 10":

Weight—10 lbs

Haemoglobin—10 g

White blood cell count—less than 10,000/mm<sup>3</sup>

In 1957, Millard [6] proposed the "rule of order 10":

Weight—over 10 lbs

Haemoglobin—over 10 g

Age—over 10 weeks

Even today, in spite of several researches and advancements, the rule of 10 is still being followed. Generally, moderate cleft lip can be operated at the age of 3 months but this can change depending on several variables such as the health condition of the child. Another exception would be complicated cleft lip that cannot be corrected with a single surgery. In such cases, the primary repair can be carried out at 3 months and the secondary definitive repair can be done at the age of 5 to 6 months.

### **Surgical Techniques**

The most important objective of cleft lip repair is to improve the appearance, feeding, speech and psychological development of the child. It is an inter disciplinary management that involves a team of a oral and maxillofacial surgeon, an orthodontist, a paediatrician, a speech pathologist, a plastic surgeon and a social worker, working together to rehabilitate the child with the best possible function and form [7].

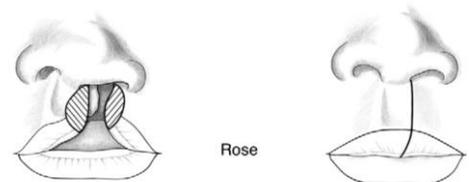
#### **Lip Adhesion - Randall-Graham Technique**

In case of a severe cleft lip, a primary repair of the lip adhesion is necessary to be able to completely repair the defect in the second surgery. This technique helps to modify the existing deformities in the premaxilla and to correctly position the displaced soft tissues adjacent to the defect. If carried out correctly, this technique is usually devoid of disadvantages. However, the scar thus formed may cause a hindrance during the second surgery.

#### **Linear Excision - Rose-Thompson Technique (1891,1912)**

This technique is employed in case of minor or incomplete clefts. In this technique, the vertical length of the lip is increased by using curvilinear incisions [8]. It is a relatively easier technique that overcomes the disadvantage of the earlier technique in that it forms a scar along the natural lines of the skin. The drawback of this technique is that it requires sacrifice of a lot of tissue which might require additional management and that the Cupid's bow might flatten out [9].

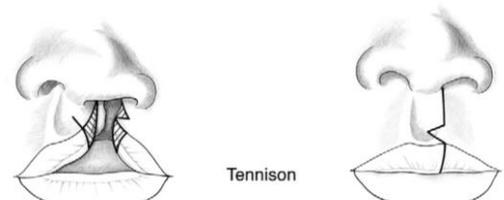
#### **Incision for Rose-Thompson repair of cleft lip**



#### **Z Plasty Triangular Flap - Tennison Technique (1952)**

It is indicated in wide clefts with severe loss of tissues. It involves using an inferior back cut above the peak of the cleft side of the cupid's bow of the medial lip [10]. This technique preserves the cupid's bow thus reproduces the natural lip contour and fullness at the vermilion-cutaneous junction. It is superior to other techniques as it causes minimal distortion of tissues. Though it has the afore said advantages, an important drawback is the tendency to form a visible scar at the philtrum region.

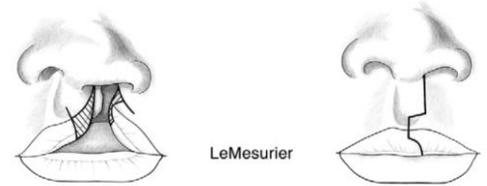
#### **Incision for Tennison repair of cleft lip**



### **Rectangular Flap - Lemesurier Technique (1955)**

The rectangular flap is less technique sensitive than the triangular one and also preserves the vermillion contour. It also uses a back cut above the Cupid's bow and an inferior rectangular or quadrangular flap to fill the defect [11]. However, like the triangular Tension technique it also can form obvious scar and may cause a disproportionality in growth. It also poses a difficulty in secondary revision procedures.

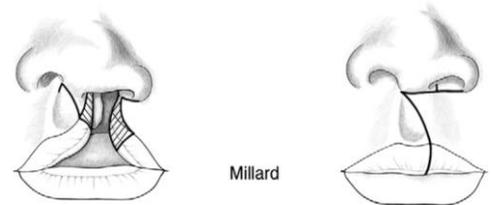
### **Incision for LeMesurier repair of cleft lip**



### **Rotation Advancement Flap - Millard Technique**

This is most commonly employed technique that provides most reliable and satisfactory results for mild to moderate clefts. This technique can be modified while performing the procedure to better suit the needs of the child. It retains the natural Cupid's bow and vermillion border and produces scar in the natural skin creases that are barely visible [12]. A second surgery for lip revision can also be carried out easily. The only disadvantage of this technique is the difficulty in obtaining the lateral flap in wide clefts that may cause an asymmetry in the Cupid's bow due to excess sacrifice of the vermillion.

### **Incision for Millard repair of cleft lip**



### **Post-operative Care**

In addition to the surgical procedure, the post-operative care is of utmost importance for a better outcome. During the first ten days, oral feeds must be given only with the help of a catheter-tip syringe. The repaired muscular tissues and sutures must not be strained by any activity and hence nipping is to be avoided. Maintenance of proper oral hygiene is also advocated to prevent infection. Arm restraints of any kind are used to keep the hands of the child away from the surgical site. Strict adherence to post-operative care is necessary to improve the efficiency of the treatment [13].

### **CONCLUSION**

Cleft anomalies have a great impact on the psychological and functional development of a child. Choosing the correct surgical technique is dependent on the severity of the defect, the requirement of the patient and the timing of repair. The clinician must analyze the child and formulate a suitable treatment plan to best meet their needs. Therefore, it is imperative for the clinician to know in detail about the various available options. Currently there is no clear classification of the surgical approaches and usually a combination of two techniques is used to obtain maximum results.

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