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# Assessment of a Technique of Cleft Lip Closure

OM Oluwatosin*

**Summary**

**Oluwatosin OM. Assessment of a Technique of Cleft Lip Closure.** *Nigerian Journal of Paediatrics* **1999; 26: 10.** The rotation advancement technique of closure of cleft upper lip was assessed by comparing values obtained pre and postoperatively from eleven cleft lip patients with those in age-matched children with normal lips. Intercommissural distance (CID) was significantly greater in patients with unilateral cleft lip than in normal children. This distance, though reduced at six months after surgery, was not totally corrected by the technique of closure. The average height of the lip was insignificantly smaller in cleft lip patients preoperatively than that in children of the same age group with normal lips (9.7±2.0mm compared with 10.4 ± 2.3mm; $p > 0.1$). Postoperatively however, it was found to be slightly higher (11.3 ± 1.3mm in those with cleft lip compared with 10.4 ± 2.3mm in normals), the difference being similarly insignificant ($p > 0.1$). The coefficient of upper lip curvature, higher in cleft lip patients than in normals, was reduced postoperatively to significantly lower values also when compared to normals. The rotation advancement technique achieves cleft lip closure though not perfectly. Evaluation of the correction of lip and nose anomalies based on measurements is recommended.

Key Words: Cleft lip, Intercommissural distance, Lip Measurements, Cheilon, Subnasale, Vermilion.

## Introduction

HISTORICALLY, repair of incomplete cleft lip using a horizontal incision cephalad to the cleft, with closure in a vertical manner, advancing the vermilion to its proper anatomical position,[1] as well as excision of the cleft with straight line closure, resulted in whistle deformities. Such repairs also produced straight flat lips on profile view[2] whereas a normal lip bulges forward at or just above the vermilion border. Methods that have been designed to produce this bulge include those that make use of the vermilion bounding the cleft to provide extra tissue in form of a triangular[3] or quadrangular[4] flap. Although this is the aim in most cases, this goal (bulge) is sometimes not achieved. A means of assessing the adequacy of closure techniques in producing this bulge is therefore required and the rotation advancement method of Millard[5] was used as a model.

University College Hospital, Ibadan

**Department of Surgery**

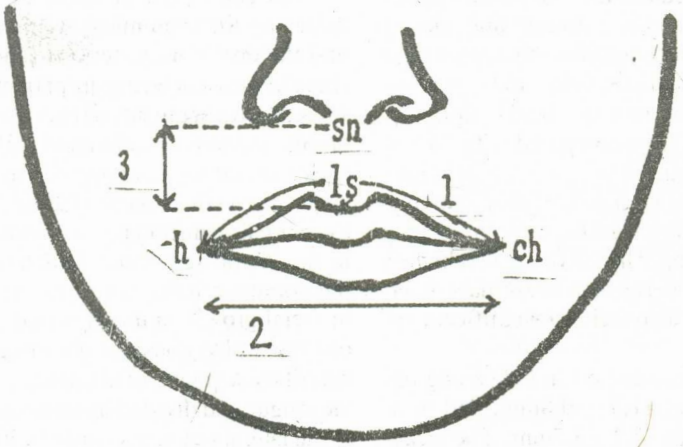
* Senior Lecturer

## Subjects and Methods

Twenty children, with no noticeable lip anomalies, aged below two years, and selected by a multistaged sampling method[6] from amongst babies in the labour ward, and children's outpatient clinic of the University College Hospital (UCH), Ibadan, had their weights and heights taken. Also measured were their intercommisural distance (CID), with lip relaxed, measured both along upper lip curvature (cheilon-labiale superius-cheilon; ch-ls-ch) and in a straight line (cheilon-cheilon; ch-ch) (Fig 1). Upper lip height was taken as the distance between the base of the columela and peak of Cupid's bow (subnasale-labiale superius; sn-ls). All measurements were taken using vernier calliper, except in the case of ICD, along lip curvature (chi-ls-ch) in which a tape measure was draped along the upper lip. The coefficient of upper lip curvature was determined from the appropriate measurements. This was: $\frac{\text{ch-ls-ch - ch-ch}}{\text{ch-ch}}$.

Similarly, 11 children aged below two years, with unilateral cleft lip selected by the convenience method of sampling[6] from the population of patients attending the plastic surgery clinic of UCH, had their defects corrected surgically. Preoperatively, their weights and heights as well as the previously mentioned lip parameters were obtained. All the chil-

**Figure 1**




1. **ICD, along upper lip curvature (ch-ls-ch)**
2. **ICD, in a straight line (ch-ch)**
3. **Upper lip height (sn-ls)**

**Table I**

*Comparative Preoperative Parameters of Cleft and Normal Lips*

| *Parameter* | *Normal lip n=20* | | *Cleft lip n=11* | | *t* | *p* |
|---|---|---|---|---|---|---|
| | *Mean* | *SD* | *Mean* | *SD* | | |
| Weight (kg) | 6.2 | 3.1 | 7.1 | 1.9 | 0.93 | >0.1 |
| Height (cm) | 64.5 | 15.1 | 69.5 | 8.2 | 0.98 | >0.1 |
| ICD (ch-ls-ch) (mm) | 37.7 | 6.1 | 46.0 | 6.6 | 4.5 | <0.001* |
| ICD (ch-ch) (mm) | 29.8 | 5.1 | 34.9 | 3.7 | 3.36 | <0.005* |
| Lip height (sn-ls) (mm) | 10.4 | 2.3 | 9.7 | 2.0 | 1.05 | >0.1 |
| Coefficient of lip curvature | 0.31 | 0.14 | 0.36 | 0.16 | 1.54 | >0.05 |

* = significant value

dren then had lip closure using Millard's rotation advancement technique. Stitches were removed on the 5th or 6th postoperative day. Similar measurements were again obtained from each patient six months after surgery. Mean values and standard deviations were calculated for each parameter. These values were compared with those from children with normal lips matched age for age, using student's "t" test. Level of significance was taken to be $p<0.05$.

## Results

The mean weight of the babies with normal lips was $6.2 \pm 3.1$kg and that of babies with cleft lip was $7.1 \pm 1.9$kg. The mean height of the babies with normal lips was $64.5 \pm 15.1$cm, while that of babies with

cleft lip was 69.5 ± 8.2cm. The differences between these mean weights and heights were not significant ($p>0.05$).

The preoperative mean ICDs both along upper lip curvature (ch-ls-ch) and in a straight line (ch-ch) in babies with cleft lip were significantly higher than those in babies with normal lips, being 46.0 ± 6.6mm compared with 37.7 ± 6.1mm ($p<0.05$), along lip curvature and 34.5 ± 3.7mm compared with 29.8 ± 5.1mm ($p<0.05$), in a straight line. Upper lip height (sn-ls) was shorter in cleft lip patients preoperatively than in normals though not significantly, ($p>0.05$); while the coefficient of upper lip curvature was higher in those patients (0.36 ± 0.16) than in normals (0.31 ± 0.14), the difference also being insignificant ($p>0.05$).

Six months postoperatively, mean ICD along lip curvature (ch-ls-ch), was 41.3 ± 0.8mm, and in a straight line (ch-ch), it was 34.3 ± 3.7mm. The mean ICD along lip curvature (ch-ls-ch), was still significantly higher in babies with cleft lip (41.3 ± 0.8mm), than in babies with normal lips (37.7 ± 6.1mmm), ($p<0.01$). Upper lip height (sn-ls) increased from 9.7 ± 2.0mm to 11.3 ± 1.3mm by corrective surgery. This postoperative value was not significantly different from that of normals. The coeficient of upper lip curvature was reduced to 0.22 ± 0.16; a value that was significantly lower than the 0.31 ± 0.14, in normal babies ($p<0.025$).

## Discussion

The cleft in the upper lip accounts for the greater ICD values in cleft lip patients as compared to normals of the same age group. The cleft not only represents a deficiency of tissue but also a separation of the edges bounding the cleft. This point is buttressed by the fact that the columela is deviated to the opposite side of the midline, and also by the fact that there is an alar flare[7] at the upper end of the cleft.

The coefficient of upper lip curvature is determined by the anatomical architecture of the maxilla and the dentition posterior to the lip.[8] The cleft in the alveolus occurring in patients with cleft lip allows the two segments of maxilla to separate considerably and to take individual paths of growth.[8] The lesser lateral segment appears to lag in forward and vertical growth, collapsing towards the midline while the medial segment appears to grow forward relative to the lateral segment.[9] This tendency is related to the dominant influence of the nasal septal cartilage in facial growth in the first year of life.[10] However, one must also consider the effect on the separated maxillary segment, of abnormal pressures exerted by the tongue and divided lip musculature. The collapse of the lateral segment coupled with a medial segment forward growth are factors which are likely to have contributed to greater value of coefficient of upper lip curvature obtained preoperatively in the cleft lip patients when compared with normals.

After lip closure, coefficient of lip curvature reduced and was found to be significantly smaller than normal. This is due to modulation of the alveolar arch in response to postoperative lip strain. This strain draws the maxillary elements together on many occasions, the response being dependent on the initial size and position of the bony segments, on the method of assembly of the lip and nostril floor, and on the age of the patient. Tight lip closure will therefore give rise to post operative lip strain[11] which will in turn, lead to a flattened profile view of the upper lip. The effect of such strain will not be noticed until several months after lip closure. It is therefore, advisable to defer assessment of techniques till at least, six months

**Table II**

*Six-month Postoperative Parameters of Cleft lip Patients compared with those in Normal Children*

| *Parameter* | *Normal lip n=20* | | *Cleft lip n=11* | | *p* | |
|---|---|---|---|---|---|---|
| | *Mean* | *SD* | *Mean* | *SD* | | |
| ICD (ch-ls-ch) (mm) | 37.7 | 6.1 | 41.3 | 0.8 | 1.94 | <0.01* |
| ICD (ch-ch) (mm) | 29.8 | 5.1 | 34.3 | 3.7 | 2.98 | <0.01* |
| Lip height (sn-ls) (mm) | 10.4 | 2.3 | 11.3 | 1.3 | 1.35 | >0.1 |
| Coefficient of lip curvature | 0.31 | 0.14 | 0.22 | 0.16 | 2.55 | <0.025* |

* = significant value

post operatively as has been done in this study.

Claims such as the adequacy of rotation advancement technique in the anatomical assembly of the components of cleft of upper lip[5] require substantiation. Therefore, objective assessment of the size of the lip[12] and evaluation of correction of lip and nose anomalies based on measurements, is recommended.

## References


1. Still NM, Georgiade NG. Historical review of management of cleft lip and palate. In: Georgeiade NG, Hagerty RF, eds. Symposium on Management of Cleft Lip and Palate associated Deformities. St Louis: CV Mosby Company 1974: 13-5.
2. Brown JB, McDowell F. Simplified design for repair of single cleft lips. *Surg Gynecol Obstet* 1945; **80**: 12-26.
3. Blair VP, Brown JB. Mirault operation for single hare lip. *Surg Gynaec Obstet* 1951; **51:** 81-98.
4. Le Mesurier AB. The treatment of complete unilateral hare lips. *Surg Gynaec Obstet* 1952; **95:** 17-27.
5. Millard RD Jr. Complete unilateral clefts of the lip. *Plast Reconstr Surg* 1960; **25**: 595-605.
6. Abdella FG, Levine E. Methods of collecting and processing data. In: Abdella FG, Levine E, eds. Better Patient Care through Nursing Research. New York: Macmillan 1979: 314-62.
7. Byrd HS. Cleft lip 1: Primary deformities (overview) *Select Read Plastic Surg* 1991; **6**: 1-31.
8. Oluwatosin OM, Oluwatosin OA. Orofacial indices: a study in Nigerian children. *Afr J Med med Sci* 1981; **27**: 39-42.
9. Dixon DA. Abnormalities of the teeth and supporting structures in children with cleft lip and palate. In: Drillien CM, Ingram ITS, Wilkinson EM, eds. The Causes and Natural History of Cleft Lip and Palate. Edinburgh and London: E and S Livingstone Ltd 1966: 178-205.
10. Latham RA. The pathogenesis of the skeletal deformity associated with unilateral cleft lip and palate. *Cleft Palate J* 1969; **6**: 404-14.
11. Bardach J, Bakowske J, McDermott-Murray J, Mooney MP, Dusdieker LB. Lip pressure changes following lip repair in infants with unilateral cleft of the lip and palate. *Plast Reconstr Surg* 1984; **74:** 476-81.
12. Fasika OM. Lip parameters in Nigerian children. *Plast Reconstr Surg* 1993; **91**: 446-9.