SPEECH RESULTS OF FURLOW’S SOFT PALATE REPAIR

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ABSTRACT

Objective: To evaluate the speech results of Furlows repair in soft palate repair.

Material and Methods: Cleft lip and palate is a common and complex disorder. It is relatively more common in Asians. The functional goals of cleft surgery are to improve speech and hearing and avoid retardation of maxillary growth. These goals are achieved by early cleft palate repair. The patients’ age at the time of surgery in our series was 6-18 months. The timing of cleft surgery is very important optimum speech and hearing. We perform Millard’s repair for unilateral cleft lip at 3-6 months of age and lip adhesion for bilateral cleft lips. Clefts of the soft palate are repaired by Furlow’s double opposing Z-plasty technique at the age of 6-9 months. Hard palate clefts are repaired at the age of 12-18 months by Von Langenbeck’s technique.

Results: Out of 80 patients 57(71.25%) had unilateral cleft lip and palate where as 23(28.75%) patients had bilateral cleft lip and palate. Although Furlow’s repair of the soft palate is considered a difficult technique but we have found that it yields excellent results in terms of speech and hearing, without interfering much with maxillofacial growth. We achieved normal speech results in 78.75% (n=63) cases and normal articulation in 93.75% (n=75), after treatment with Furlow’s double opposing Z-plasty of the cleft soft palate. The fistula rate in our series is 2.26%.

Conclusion: Furlow’s repair is technically difficult procedure, but it yields excellent speech results.

Key words: Furlows repair, Soft palate repair, Speech results.
INTRODUCTION

Cleft palate is a relatively common facial disorder; characterized by separation of the palatal segments and a resultant open communication between the mouth and nose.

Cleft palate can occur in isolation or in combination with cleft lip. It is important to appreciate that isolated cleft palate is a genetically and morphologically separate entity and is different from combined cleft lip and palate.¹

The incidence of isolated cleft palate is 1:1000. Combined cleft lip and palate is more frequent in Asians (1:500 births) and is relatively infrequent in Africans (1:2000).²

The complexity of cleft lip and palate deformity has led to many attempts to devise a system of classification. Recently, there has been a trend towards symbolic classification systems, which allow the members of the cleft team to quickly assess the nature of the deformity.

The first generally accepted classification was developed by Davis and Ritchie.³

Kernahan and Stark's classification came in 1958 and this classification described clefts of the palate in relation to the incisive foramen.⁴

Kernahan further modified the classification in 1971 into the striped Y symbolic classification⁵, which is the classification most often cited in literature.

We prefer to use the Smith's modification of Kernahan classification because it is more users friendly and easily understood.

The functional goals of cleft palate surgery are, normal speech, normal hearing and maxillofacial growth.⁶,⁷

It is generally thought that speech and hearing are improved by early cleft palate repair (i.e. before 24 months of age),⁸ and delayed closure (after 5 years) is associated with retardation of maxillofacial growth.⁹

MATERIAL AND METHODS

All of the 80 patients were referred to plastic surgery unit, Hayatabad medical complex over a period of 15 months (August 97 to October 98). We did not include patients with isolated cleft palate because it is a morphologically and genetically separate entity and to standardize our results, we selected only those patients, who had a combination of cleft lip and palate.

According to the ward protocol, we brief the parents about the congenital anomaly, its incidence, treatment modalities, timing of surgery and importance and efficacy of presurgical orthopedics. We give special instructions to the parents regarding feeding, prevention of repeated chest infection and otitis media etc.

After complete general physical examination, we refer these patients to orthodontist for presurgical orthopedics.

We prefer Millard's repair, for unilateral cleft lip at the age of 3-6 months of age. Lip adhesion is the method of choice in cases of bilateral cleft lip. We perform Furlow's repair for cleft soft palate at the age of 6-9 months and Von Langenbeck's repair for cleft hard palate at the age of 12-18 months.

We use Smith's modification of Kernahan Y classification, for quick assessment and proper description of the palate deformities. It is simple to understand and easily communicable.

The patients were seen regularly at the cleft clinic by a plastic surgeon, ENT surgeon, speech therapist and maxillofacial surgeon.

Speech was classified into three different groups, namely resonance (A), articula-
Modified Smith's classification.

![Diagram of the classification system with letters and numbers representing different categories.]

Resonance was further divided into:

A₁: Normal.
A₂: Mild hypernasality.
A₃: Moderate hypernasality.
A₄: Severe hypernasality.

Articulation was graded by the number of consistent error, namely

B₁: Normal consistent.
B₂: One or two consistent errors only with no deterioration in speech.
B₃: One or two errors with deterioration in connected speech or three or more errors but intelligible.
B₄: Multiple errors, frequently unintelligible.

Intelligibility was graded in three ways

C₁: Intelligible at all times.
C₂: Sometimes intelligible.
C₃: Unintelligible most of the time. 

Velopharyngeal incompetence was diagnosed clinically by the surgeon and speech therapist.

We started proper follow-up of these patients for the assessment of speech at the age of 3 years because this is the age at which a child starts to speak properly and can be easily understood.

We also recommend to the parents to hire the services of a certified Qarri, to train the child in proper pronunciation of words.

RESULTS

Out of the 80 patients, 68.75% were male while 31.25% were females. Consanguinity of parents was found in 41.25% patients. Family history of cleft lip and palate was present in 20% patients. History of drug intake during pregnancy was positive in 6.25% patients. Patients' age at the time of repair ranged from 6 months to 18 months (mean age 10.12 months). Cleft palate associated with unilateral cleft lip was observed in 71.25% patients, while in 28.75% cases it was associated with bilateral cleft lip. Cleft lip and palate may occur in association with other congenital anomalies. Table 1

CLEFT LIP AND PALATE WITH ASSOCIATED ANOMALIES

<table>
<thead>
<tr>
<th>No.</th>
<th>Associated anomalies</th>
<th>n</th>
<th>%</th>
<th>age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Umbilical hernia</td>
<td>2</td>
<td>2.5%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Hypospadias</td>
<td>3</td>
<td>3.7%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bilateral tellipes equinovarus</td>
<td>1</td>
<td>1.25%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Congenital band syndrome</td>
<td>1</td>
<td>1.25%</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 1

The degree of hypernasality, articulation and intelligibility are recorded in table 2.

We achieved normal results in 78.75% patients with Furlow's double opposing Z plasty. Gross hypernasality was observed in
SPEECH ASSESSMENT

<table>
<thead>
<tr>
<th>Hypernasality</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (A₁)</td>
<td>63</td>
<td>78.75%</td>
</tr>
<tr>
<td>Slight (A₂)</td>
<td>12</td>
<td>15%</td>
</tr>
<tr>
<td>Medium (A₃)</td>
<td>3</td>
<td>3.75%</td>
</tr>
<tr>
<td>Gross (A₄)</td>
<td>2</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Articulation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None (B₁)</td>
<td>75</td>
<td>93.75%</td>
</tr>
<tr>
<td>Slight (B₂)</td>
<td>2</td>
<td>2.5%</td>
</tr>
<tr>
<td>Medium (B₃)</td>
<td>2</td>
<td>2.5%</td>
</tr>
<tr>
<td>Gross (B₄)</td>
<td>1</td>
<td>1.25%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intelligibility</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligible at</td>
<td>73</td>
<td>91.25%</td>
</tr>
<tr>
<td>all times (C₁)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td>5</td>
<td>6.25%</td>
</tr>
<tr>
<td>unintelligible</td>
<td>2</td>
<td>2.5%</td>
</tr>
<tr>
<td>Always</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unintelligible (Cₑ)</td>
<td>2</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

TABLE-2

2.5% patients. Normal articulation was achieved in 93.75% patients.

The distribution of patients and the Veau classification for clefts in each of the four types are given in table-3.

VEAU'S CLASSIFICATION

<table>
<thead>
<tr>
<th>No.</th>
<th>Veau cleft type</th>
<th>n</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type I</td>
<td>6</td>
<td>7.5%</td>
</tr>
<tr>
<td>2</td>
<td>Type II</td>
<td>9</td>
<td>11.75%</td>
</tr>
<tr>
<td>3</td>
<td>Type III</td>
<td>48</td>
<td>60%</td>
</tr>
<tr>
<td>4</td>
<td>Type IV</td>
<td>17</td>
<td>21.25%</td>
</tr>
</tbody>
</table>

TABLE-3

The most common complications observed in our series are given in table-4.

<table>
<thead>
<tr>
<th>Complications</th>
<th>n</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Wound dehiscence</td>
<td>2</td>
<td>3.25%</td>
</tr>
<tr>
<td>2 Infection</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>3 Palatal fistulae</td>
<td>1</td>
<td>2.26%</td>
</tr>
</tbody>
</table>

TABLE-4

DISCUSSION

Speech is medium of communication by words. The acquisition of speech sounds is quite a complex and lengthy process, and takes place in a series of stages or levels. During the first 12 to 18 months of age, a child acquires about 50 words, after which vocabulary begins to grow very rapidly. There is a universal order for the acquisition of consonants, although there is a wide variation between children or speed at which different sounds are acquired. The timing of cleft surgery is very important in achieving excellent functional and aesthetic results. The primary goal in the timing of cleft palate surgery is to provide adequate palatal function for the development of normal speech without interfering significantly with maxillofacial growth.

Early cleft repair increases the likelihood of normal speech development. Delayed treatment may interfere less with maxillofacial growth but speech development tends to be poor.

Most of the physiological functions of the palate are optimally learned at an early age, so it is logical that speech is also best learned early. It is thought that this occurs before 2 years of age. Therefore, speech pathologists recommend early palatal closure to restore the normal velopharyngeal mechanism and to enhance the chances of normal speech.

Kaplan suggests that the ideal age for palatal repair is 3-6 months. This recommendation is based on the theory that the palate must be functional when palate related sounds are first learned to avoid poor speech development and integration. The repaired palate has limited functional mobility for an additional 3-6 months because of the postoperative edema. Therefore, it is recommended to repair the palate at 3 to 6 months of age, so that the palate can
function normally at 9 to 12 months of age. The palatal length in cleft palate patients is also an important predictor of speech outcome. Veau’s classified the palate according to its length.

**Veau’s classification of cleft palate.**

Type I: The distal tips of both uvulae easily reach the posterior pharangeal wall.

Type II: One or both the uvulae, only reach the posterior half of the adenoid pad.

Type III: One or both sides of the uvulae reach only the anterior half of the adenoids.

Type IV: One or both sides do not even reach as far as the adenoids.

A number of studies have confirmed that the type IV palates are very likely to have velopharangeal incompetence, where as those with type I palates probably will not. For years, surgeons have been aware that a short palate after initial repair is often associated with speech problems. In 1877, Passavant and Simon stated, “the nasal twang in speech was due to shortening of the palate.”

Many have suggested steps to lengthen the palate as part of the initial repair. Successful soft palate repair depends on two factors:

2. Velar stretch/length.

Furlow’s repair addresses both these factors, essential for a successful soft palate repair. Furlow’s repair has a “built in” levator repositioning and has the added advantage of eliminating midline mucosal scar.

The Z plasty design of the furlow’s repair provides better velar stretch/length in the zone between the muscle sphincter and hard palate.

An early two-stage palate repair is advocated in the management of patients with cleft lip and palate. The recommended sequence involves closure of the soft palate at 3 to 6 months of age, with secondary closure of the residual hard palate at 15 to 18 months of age. This sequence takes advantage of the early physiology and growth that occurs in the soft palate, which is vital in the development of speech. Furthermore, it avoids the potential pitfalls of growth disturbances related to early periosteal undermining of palatal and vomerine tissues.

The timing and technique of cleft palate repair is an important variable affecting speech. Other studies have also shown that speech intelligibility, articulation and resonance were worse where delayed palatal repair was performed.

Our study confirms previous reports that the Furlow’s repair yields excellent speech results. Furlow’s double opposing Z plasty technique is ideal for cleft soft palate. Transposition of the Z plasty produces a sling in which the levator muscles overlap and there is no dissection of the hard palate leading to less malocclusion and less inhibition of maxillofacial growth.

A straight midline scar is also avoided with the Z plasty technique, which reduces postoperative shortening in the anteroposterior direction. The fistula rate after Z plasty in our series is 2.26%, which is less than that with the other techniques (3.5% with Dorrance and 3% with Wandill-Kilner techniques). Z-plasty is the procedure of choice for cleft of the soft palate. Timing of repair is an important factor affecting speech. Clefts of the soft palate repaired at the age of 6-9 months led to satisfactory speech results.

Furlow’s double opposing Z-plasty is the preferred technique because it yields excellent results without encroaching on the hard palate.
CONCLUSION

It is generally thought that Furlow's repair is a technically difficult procedure, but it yields excellent speech results, so we recommend that it should be the method of choice for cleft soft palate repair.

REFERENCES

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