ORIGINAL ARTICLE

Assessment of Speech in Primary Cleft Palate by Two-layer Closure (Conservative Management)

Harsha Jain, Dayashankara Rao[1], Shailender Sharma[1], Saurabh Gupta[2]

Departments of Oral and Maxillofacial Surgery, Sharda Dental College, Greater Noida, [1]SGT Dental College, Gurgaon, [2]Ambedkar Dental College, Bangalore, Karnataka, India

ABSTRACT

Treatment of the cleft palate has evolved over a long period of time. Various techniques of cleft palate repair that are practiced today are the results of principles learned through many years of modifications. The challenge in the art of modern palatoplasty is no longer successful closure of the cleft palate but an optimal speech outcome without compromising maxillofacial growth. Throughout these periods of evolution in the treatment of cleft palate, the effectiveness of various treatment protocols has been challenged by controversies concerning speech and maxillofacial growth. In this article we have evaluated the results of Pinto's modification of Wardill–Kilner palatoplasty without radical dissection of the levator veli palitini muscle on speech and post-op fistula in two different age groups in 20 patients. Preoperative and 6-month postoperative speech assessment values indicated that two-layer palatoplasty (modified Wardill–Kilner V-Y pushback technique) without an intravelar veloplasty technique was good for speech.

Key words: Cleft palate, palatoplasty, speech assessment

INTRODUCTION

The history of treatment of cleft palate deformities can be traced back many centuries. The variety of techniques used in palatoplasty have grown considerably from ancient times to the new millennium. Since the beginning of the 20th century, the treatment objective in palatoplasty has not only been simple closure of the soft and hard palate but also improvement in speech and avoidance of abnormal maxillofacial growth after repair. Today, the surgical management and outcome evaluation of cleft palate deformities have become a complex and intricate art. The condition called cleft lip and palate has been known for a long time but without any indispensable therapeutic solution. Isolated archeological evidence from the ancient Schönwerda and Peruvian civilizations has described persons with untreated cleft deformities who lived until they were adults.[1] For many centuries, cleft palates were often confused with a more common condition caused by tertiary syphilis and this deformity was not addressed surgically because of this association. For many centuries, the only method used to close palatal fistulae was the application of an obturator. It was Ambroise Paré in 1564 who first used the term "obturateur" to describe the plates of gold and silver used to occlude palatal clefts. In ancient times, the operative treatment for cleft palate was not only technically demanding but also painful due to the absence of anesthesia. The advent of chloroform anesthesia permitted a quantum leap in cleft surgery and thus allowed the first known cleft palate surgery to be performed in the early 19th century.[2,3] Surgical correction of the cleft palate has the functional objective of achieving optimum results in the development of speech, hearing, swallowing, dental arch formation, and facial growth. Of these normal speech is the most important and most difficult to obtain. The paramount issues involved into the treatment of cleft palate are to achieve normal speech without incurring maxillofacial growth disturbances and to minimize hearing loss and middle ear complications.[4] The aim of this study is to evaluate the results of Pinto's modification of Wardill–Kilner palatoplasty without radical dissection of the levator veli palitini muscle on speech and post-op fistula in two different age groups.

Access this article online

Quick Response Code:

Website: www.jstcr.org

DOI: 10.4103/2006-8808.100344

Address for correspondence: *Dr. Harsha Jain, Department of Oral and Maxillofacial Surgery, Sharda Dental College, Greater Noida, India. E-mail: surgeon_harsh@rediffmail.com*

MATERIALS AND METHODS

This study included a consecutive series of 20 children in the age group of 18 months to 3 years who underwent cleft palate repair in the Department of Oral and Maxillofacial Surgery, SGT Dental College and Research

Centre, Gurgaon between 2007 and 2010. They were further divided into two groups based on their age. Sub group – (a) included 11 patients within age group 18–24 months, and sub–group – (b) included 09 patients within age group 25–36 months. Informed consent was obtained from all participating adult subjects, and parents, guardians of minors or incapacitated adults. None of the children were known to be mentally retarded or have associated syndromes. Exclusion criteria were submucous cleft palate, identified syndrome, and hearing loss (sensorial or persistent conductive hearing loss despite tympanostomy). Data collected included date of birth, sex, cleft palate type (classified according to Veau's I-soft palate, II-hard/soft palate extending to the incisive foramen, III- unilateral complete cleft lip/palate and IV – bilateral complete cleft lip/palate), age at palatoplasty, preoperative and post operative assessments. Palatal fistulas were recorded – both anterior and posterior fistulas. All pre- and post-operative examinations were carried out by the same surgeon, otolaryngologist, and speech therapist. A total of 20 patients underwent Pinto's modification of Wardill–Kilner palatoplasty without radical dissection of the levator veli palitini (LVP) and tensor veli palatini (TVP) muscle.

Palatoplasty technique

Twenty patients in the age group of 18–36 months underwent Pinto's modification of Wardill–Kilner two-layer palatoplasty without radical dissection soft palate musculature. The Hamular process was fractured in all these patients to free the tensor veli palatine tendon to facilitate the posteromedial displacement of velar muscles and the mucoperiosteal flaps. Anchoring sutures-nasal layer was closed using 3–0 catgut sutures. The same sutures were passed through the oral layer later as anchoring sutures. This minimized the dead space and prevented the falling of the flap. At the end 1 or 2 stay sutures were placed for the lateral releasing incision. All the patients were given postoperative Amox-clav antibiotics for 7 days and discharged after a week. All the children were regularly seen at 1-month interval for 1 year by the surgeons and the speech therapist. All the children underwent speech assessment and the counseling. In all the patients following variable were determined: quality of speech, incidence of fistula, and age at the time of surgery. Clinically significant fistulas were determined by the presence of either hypernasal speech, articulation problem or fluid regurgitation from the nose. Speech was classified into three different groups, namely (A) nasality, (B) articulation, (C) intelligibility, each of which is further subdivided by numbers. Nasality was divided into A1 normal, A2 mild hyper nasality, A3 moderate hyper nasality, A4 severe hyper nasality. Articulation was divided into B1 normal, B2 one to two consistent errors only with no deterioration in speech, B3 one to two consistent error with deterioration in connected speech or three or more errors but intelligible, B4 multiple errors, frequently unintelligible. Intelligibility was graded into- C1 intelligible at all times, C2 sometimes unintelligible, C3 unintelligible most of the time. Velopharyngeal incompetence was diagnosed clinically by the surgeons and the speech therapist.

RESULTS

Twenty patients were enrolled in the study, and all attended regular follow-up till 6 months postoperatively. There were 12 males and 8 females. The age at repair ranged from 18 months to 36 months (mean age 27.7 months). No major perioperative or postoperative complications occurred throughout the study except in one patient who had secondary bleeding after 48 hours of the surgery. Speech assessment parameters of all the patients were recorded [Tables 1-3]. Many patients showed improvement in their 6-month postoperative speech in both groups. The preoperative values of speech assessment (all three parameters, i.e., nasal resonance, articulation, and intelligibility) when compared with 6-month

Table 1: Speech result

Speech assessment	Group Ia		Group Ib	
Nasal resonance	Pre-op	After 6-month	Pre-op	After 6-month
A1	00	00	00	0
A2	00	08	01	05
A3	02	03	01	04
A4	09	00	07	00

A1 - Normal; A2 - Mild hyper nasality; A3 - Moderate hyper nasality; A4 - Severe hyper nasality

Table 2: Articulation

Speech assessment	Group Ia		Group Ib	
Articulation	Pre-op	After 6-month	Pre-op	After 6-month
B1	00	02	00	00
B2	01	08	00	06
B3	04	01	06	03
B4	06	00	00	00

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

Table 3: Intelligibility

Speech assessment	Group Ia		Group Ib	
Intelligibility	Pre-op	After 6-month	Pre-op	After 6-month
C1	00	03	00	01
C2	03	08	03	07
C3	08	00	06	01

C1 – Intelligible at all times; C2 – Sometimes unintelligible; C3 – Unintelligible most of the time

postoperative values of speech assessment gave a statistically significant value [Figure 1]. The value indicated that two-layer palatoplasty (modified Wardill–Kilner V-Y pushback technique) without an intravelar veloplasty technique was good for speech. A specific statistical test (*N-Par test and Wilcoxon signed rank test*) was used to detect significant differences for comparisons as listed below: nasal resonance P=0.004, were considered statistically significant, articulation P=0.006, were considered statistically significant, intelligibility P=0.002, were considered statistically significant. Postoperative palatal fistulas were encountered in four patients in the study.

DISCUSSION

In 1828, Johann Friedrich Dieffenbach, the director of the Clinical Institute of Surgery at Charite Hospital in Berlin, first described closure of the hard palate by mucosal elevation. In 1837, he advanced palatal surgery even further with the introduction of relaxing incisions to ease palatal closure. After his death in 1847, Dieffenbach was succeeded as the director of the Clinical Institute of Surgery by Bernhard von Langenbeck, who also became a leading innovator in cleft repair.[5] In 1859, von Langenbeck introduced his bipedicle mucoperiosteal flap, further advancing hard palate repair. In the early 1800s, soft palate closure was also being studied.[6] However, it was not until Kriens described the intravelar veloplasty that soft palate repair took its next major step. Dr. Leonard Furlow later advanced cleft palate repair surgery with the introduction. The major criteria for determining the success of cleft palate repair are subsequent speech development, maxillofacial growth, and complete closure of palatal defect. There is no question that speech development is the major goal of palatoplasty and therefore success or failure of this operation is usually measured by the proportion of patients with normal speech versus patients with remaining hypernasality. The question which persists is the timing of palatoplasty and its correlation with normal speech production. There is evidence that the earlier the palatal repair is performed the better the speech result one can expect. However there are objections to palatoplasty because of the previously mentioned concept that cleft palate repair is the major cause of mid-facial growth inhibition and secondary maxillofacial deformities. Bardach's and Salyer's[7] long-term clinical observation indicate that palatoplasty cannot be considered the only cause of mid-facial growth aberrations and inhibition. Cleft palate surgery is one of the greatest challenges for oral and maxillofacial surgeons. A good result requires an esthetic functional closer without impairment of facial growth, allowing normal speech development. Speech is a complex phenomenon that is best learned once and the younger the better. There are still no standard protocols to address the issues of ideal timing for cleft palate repair to attain optimal speech and to avoid abnormal maxillofacial growth after repair. While there are many controversies on the timing of cleft palate surgery, the current debate concerns how early palatal repair should be performed. The ideal timing of cleft palate closure should depend upon the type of cleft involved, the patient's condition and the capabilities of the cleft team to manage associated morbidities. Because some cleft patients have associated anomalies and syndromes, the timing of palatoplasty should be tailored individually after thorough clinical evaluation.[8] Surgery should be delayed in cleft patients with airway problems or cardiac anomalies because the timing of cleft repair changes with these comorbidities.[9] Sommerlad *et al*.[10] questioned whether velar surgery was worthwhile for submucous cleft palate (SMCP) and evaluated whether results were dependent on the degree of the anatomical abnormality. They concluded that there was highly significant improvement in hypernasality, nasal emission, and velopharyngeal closure. Severity of the SMCP did not correlate with the degree of preoperative speech abnormality but was a significant predictor of outcome of surgery, with less severe (total SMCP score of 0–3) having less satisfactory end results and lesser degrees of improvement. In our study the Wardill–Kilner technique gives satisfactory results in

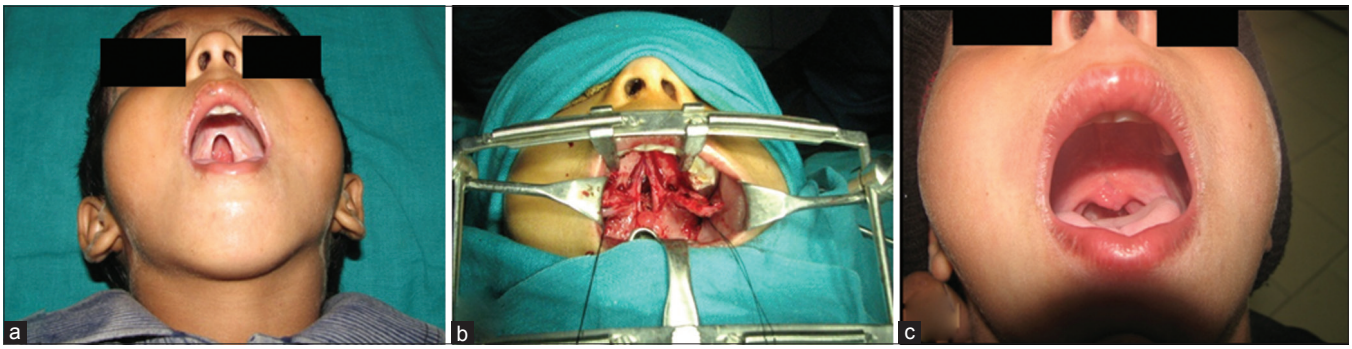

Figure 1: (a) Pre-operative cleft palate; (b) Pinto's modification of Wardill-Kilner two-layer palatoplasty; (c) Post–operative 6 weeks

terms of velopharyngeal function, so velar surgery was always worthwhile for cleft palate repair. Improvement was nondependent variable with regard to cleft types. In the study continued by Grobbelaar *et al*.[11] they stated that the speech result was better when the palate was operated before or by 6 months of age compared to older age. Similarly in our study the speech results were significantly much better in the younger age group (18–24 months) than our older age group (24–36 months). Heliovaara *et al*.[12] in 1993 evaluated and compared long-term operative results of one-stage closure of isolated cleft palate with either the Veau—Wardill–Kilner V-Y pushback procedure or the Cronin modification. They compared incidence of palatal fistula in their patients who had undergone palatoplasty. They concluded that the incidence of fistula in both the groups was similar (10%). In our study we found an 8.3% fistula rate. Postpalatoplasty speech results can be affected by the length of the palate, the active mobility of the palatal muscles, the depth of the nasopharynx, the presence of adenoidal tissues, and the occurrence of palatal fistulae or gapping. The incidence of palatal fistulas after cleft repair ranges from 3 to 45%;[13-15] in our study we found 8.3% fistula rate.

CONCLUSION

The art of cleft palate repair has enjoyed considerable development over many years. Although the controversies regarding the timing and closure of a cleft palate seem to have been resolved, with a consensus for surgery being completed at 18 months, there are still many issues which need to be resolved by well-controlled, randomized, prospective clinical trials to ascertain the optimal timing of palatoplasty, and its long-term relationships with speech development and maxillofacial growth. Results from our study indicate that two-layer palatoplasty (modified Wardill–Kilner V-Y pushback technique) without an intravelar veloplasty technique was good for speech.

REFERENCES

1. Bill J, Proff P, Bayerlein T, Weingaertner J, Fanghänel J, Reuther J. Treatment of patients with cleft lip, alveolus and palate – a short outline of history and current interdisciplinary treatment approaches. J Craniomaxillofac Surg 2006;34 Suppl 2:17-21.
2. Rogers B. History of cleft lip and palate treatment. Grabb WC; 1971.
3. Rogers B, McDowell F. Cleft palate surgery prior to 1816. Source Book of Plastic Surgery; 1977.
4. Grabb W. General aspects of cleft palate surgery. Cleft Lip and Palate Boston: Little, Brown; 1971.
5. May H. The classic reprint. The palate suture. A newly discovered method to correct congenital speech defects. Dr. Carl Ferdinand von Graefe, Berlin. Plast Reconstr Surg 1971;47:488-92.
6. Morel-Fatio D. Observation on a congenital division of the soft palate and the uvula cured by means of an operation similar to that for a hare-lip. Plast Reconstr Surg 1971;47:180-3.
7. Bardach J, Kelly KM, Salyer KE. Relationship between the sequence of lip and palate repair and maxillary growth: An experimental study in beagles. Plast Reconstr Surg 1994;93:269-78.
8. Jones MC. Etiology of facial clefts: Prospective evaluation of 428 patients. Cleft Palate J 1988;25:16-20.
9. Dell'Oste C, Savron F, Pelizzo G, Sarti A. Acute airway obstruction in an infant with Pierre Robin syndrome after palatoplasty. Acta Anaesthesiol Scand 2004;48:787-9.
10. Sommerlad BC, Fenn C, Harland K, Sell D, Birch MJ, Dave R, *et al*. Submucous cleft palate: A grading system and review of 40 consecutive submucous cleft palate repairs. Cleft Palate Craniofac J 2004;41:114-23.
11. Grobbelaar AO, Hudson DA, Fernandes DB, Lentin R. Speech results after repair of the cleft soft palate. Plast Reconstr Surg 1995;95:1150-4.
12. Heliovaara A, Rintala A, Ranta R. One-stage closure of isolated cleft palate with the Veau-Wardill-Kilner V to Y pushback procedure or the Cronin modification. I. Comparison of operative results. Scand J Plast Reconstr Surg Hand Surg 1993;27:49-54.
13. Andersson EM, Sandvik L, Semb G, Abyholm F. Palatal fistulas after primary repair of clefts of the secondary palate. Scand J Plast Reconstr Surg Hand Surg 2008;42:296-9.
14. Muzaffar AR, Byrd HS, Rohrich RJ, Johns DF, LeBlanc D, Beran SJ, *et al*. Incidence of cleft palate fistula: An institutional experience with two-stage palatal repair. Plast Reconstr Surg 2001;108:1515-8.
15. Lu Y, Shi B, Zheng Q, Hu Q, Wang Z. Incidence of palatal fistula after palatoplasty with levator veli palatini retropositioning according to Sommerlad. Br J Oral Maxillofac Surg 2010;48:637-40.

How to cite this article: Jain H, Rao D, Sharma S, Gupta S. Assessment of speech in primary cleft palate by two-layer closure (Conservative management). J Surg Tech Case Report 2012;4:6-9.

Source of Support: Nil, **Conflict of Interest:** None declared.