

Cleft Palate Management : A Review—Part I

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I. HISTORICAL

SURGERY of the cleft palate seems to be undergoing a change during the last decade, yet the fundamentals that were developed by the pioneer workers in the field remain the same. Passavant in 1862 drew attention to the lack of improvement in speech, usually with the Von Langenbeck type of operation that was in vogue during those days. From then onwards attempts are being made to devise operations to improve the functional results. To the release incisions of Von Langenbeck it was Billroth who in 1889 advocated the fracture of the hamulus not only to take away the tension from the suture line of the soft palate but also to convert the tensor into an additional levator of the palate. Passavant and Ruttenberg drew attention to bringing forward the posterior wall of the pharynx. Shortness and the rigidity of the soft palate were realised and J. C. Bond in 1893 published in the *Lancet* the first detailed account of speech defects. He emphasised the need for some speech training. In order to improve speech, credit goes to him for advocating passive massage of the soft palate, i.e., mechanical gentle stretching of the velum by the finger; and active exercises, i.e., forcible blowing with the mouth closed, succession of quick deep inspirations with the mouth open and whistling and blowing

games. In 1920 Ganzer designed a method to produce a longer soft palate by a V-Y procedure which was to be the forerunner of the pushback operation.

Sir Harold Gillies in 1921 drew attention to the teeth deformities produced after operation on the hard palate. While working with Kelsey Fry, he advocated closure of the soft palate at the expense of the hard palate, and the hard palate defect to be covered with a dental plate. Their observations were based on the fact that in unoperated cases involving the hard palate the occlusion of the non-involved teeth is normal, while after operation on the hard palate nearly all patients had malocclusion of non-involved teeth. It also resulted in narrowed features and the nasal passages also got narrowed giving rise to nasal intonation in speech. They also thought that most cases needed dental plates for covering the resultant fistulae. It will be pertinent, therefore, to quote the recommendations of Sir Harold and Kelsey Fry: Gillies recommended that:—

1. The soft palate should be detached from the hard palate and sutured as far back as possible in the pharynx thus making the hard palate defect greater.
2. The hard palate defect should be closed by an appliance from earliest infancy.
3. The operation on the lip should be

carried out as soon after birth as possible, and the operation on the palate before the development of speech.

The aims put forward by Kelsey Fry for the dental treatment were as follows :—

1. To assist in the feeding of the child before the operation is advisable.
2. That the appliance made should maintain the soft palate in its correct position, preventing any tendency for it to be drawn forward by contraction, and if necessary to stretch it backward to enable it to make contact with the posterior pharyngeal wall.
3. To construct a permanent prosthetic appliance to compensate for the deficiency in the hard palate, and if necessary, the anterior part of the soft palate.

In 1925 Dorrance published the details of the pushback operation on the principles of Ganzer. By this time assessment of speech results were made and in 1927 at a meeting of the Royal Society of Medicine, George Gray Turner laid stress on the fact that it was not sufficient merely to have complete roof and movable velum, but the whole palate must be of normal length, and must suffice either by itself or together with the pharyngeal muscles to close completely the route between the mouth and the nose. Thus far only one layer closure was being practiced and Victor Veau at the same meeting was the first to describe the resultant shortening of the soft palate due to scar tissue contraction. He advocated repair in layers. In 1933 he analysed his speech results and classified them. Modern workers all over the world today quote a

figure of 35% to 40% bad speech results; but Victor Veau's figures of normal speech were 75% to 70% if the operation was done in the 1st year or between the 1st and 2nd year of life. At the same meeting W.E.M. Wardill described his simple pharyngoplasty of stitching a transverse cut in the posterior pharyngeal wall vertically. This could be added to any kind of operative procedure. In order to gain more length and adequate push back, Dennis Brown in 1932 advocated repair in a second stage after doing a preliminary ligation of the posterior palatine artery. And in 1934 he advocated his purse string suture with spring wire in the line of the sphincter.

Slowly and gradually Wardill improved upon the Veau flaps by devising repair by 4 flap method. T. Pomfret Kilner further standardised this technique. Muriel E. Morely the pioneer speech therapist in England has beautifully summarised the chief points in her book on cleft palate and speech as :

1. The two halves of the palate are sutured in such a way that the muscles are united as in the normal palate, and the length of the soft palate increased as far as possible.
2. The suturing of the soft palate must be done without tension and for this purpose structures such as the hamular processes and the posterior palatine artery may be destroyed, care being taken that blood supply to the palate is maintained or the tissues will not survive.
3. Suturing is carried out so as to avoid as far as possible the formation of scar tissue on both the nasal and oral surfaces. This would otherwise cause

thickening and lack of flexibility in the soft palate.

4. If there is scarcity of tissues, the hard palate is sacrificed for the benefit of the soft palate. The hard palate defect being closed later by a dental plate.

Since then the Kilner Wardill flap procedures have been followed as standardised technique in most centres of the world. From 1953 onward this technique had its impact on the few centres that were established in this country.

II. THE MANAGEMENT

INTRODUCTION

In an advancing country like ours one has to modify the management of cleft palate to suit the requirements of the Milieu. From 1953 onwards over a period of more than 12 years we have rigidly followed Kilner Wardill procedure for the repair of the palate.

In complete clefts, the anterior third of the palate has been repaired by a Veau flap along with the repair of the lip. Due to the lack of facilities of followup it is not possible to give an assesment of speech results. Out of a total of 410 lip and palate clefts of various varieties the repairs were completed within 18 months to 2 years of age in 111 (27.19%) of our series.

AGE OF OPERATION

In the field of cleft palate surgery, the modern workers in the world have realised the importance of speech. Efforts are being directed to repair the soft palate within the first year of life. For instance Morley in 1962 advocated that the soft palate should be closed surgically immediately after birth.

This will not only restore the normal function for sucking and swallowing, but subsequent development of the movements of co-ordination and articulation will develop. Otherwise the compensatory patterns will develop which then influence the production of consonent sounds used in speech. Defective articulation will, however, develop if special corrective speech training is not undertaken. If it is a complete cleft some workers advocate primary repair of the lip also at birth or soon after birth to do away with psychological stigma of the parents from the society.

CRITERIA FOR OPERATION

In keeping with the modern advances we now advocate different regimes at different age periods. At birth the infants in our country are substandard in health and weight. Unless they are gaining weight, are well above 9-10 pounds, and whose horemoglobin must be near 12 gm%, no operative correction is possible.

The earliest age at which we have done lip and repair of the alveolus is 4 months, and the palate repair is completed wherever possible by the 14 to 16 months of age.

TESTS FOR PHARYNGEAL COMPETANCE

Calnan (1958—61) has been doing extensive radiographic studies and he showed that shorter the effective length of the soft palate the greater will be its lengthening after operation. He admitted that there is no practical method available to predict the effective lengthening of the soft plate after operation.

HISTOGRAM

His histographic studies showed that the Passavant eminence may be minimal even in the normal people. Our studies on the subject also confirm to his view (Fig. 1).

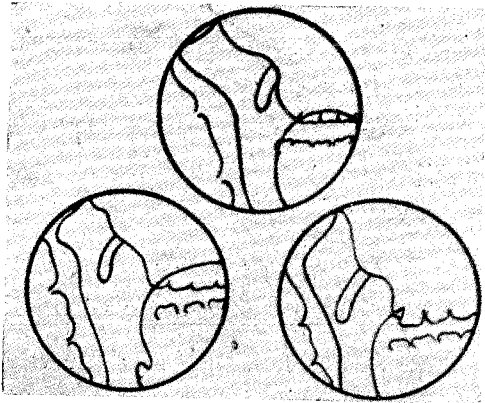


Fig. 1 Histogram of a Normal Person, saying 'DAAH'

He also showed that in speech there are rapid tonic contractions and the soft palate meets the posterior pharyngeal wall at a higher site. It meets the eminence only when clonic contractions occur during the act of deglutition and blowing.

OTHER TESTS—BLOWING ETC.

Therefore, the blowing and manometric tests undertaken for the velopharyngeal sphincteric competence may be fallacious. But the Passavant's eminence and the hypertrophic adenoids help in compensating the deficiency in speech.

CEPHALOMETRY

Owsley et al in 1967 studied the cephalometric film tracings for the evaluation of palatal dysfunction in 40 patients without cleft palate. They found neuromuscular palatal dysfunction in 19, short soft palate in 5, excessive depth of the nasopharynx in 6, and abnormal measurements of naso-

pharyngeal air space or the pharyngeal wall thickness in 10. Similar work has been recently undertaken in our unit on patients of cleft palate and the normals. No assessment can be given as yet.

At the time of primary repair of soft palate additional lengthening can be obtained by doing a 'z' plasty on its nasal layer as advocated by Dr. Widmaier (Fig. 2). Dr. Schuchardt advocated 'z' plasty of both the oral and the nasal mucosa. We are utilising this procedure now whenever feasible. Prof. Kilner who developed the Wardill's four flap procedure recommended extensive mobilisation of nasal layer from the posterior border of the hard palate, internal pterygoid plates and the lateral pharyngeal wall. For wider clefts, he

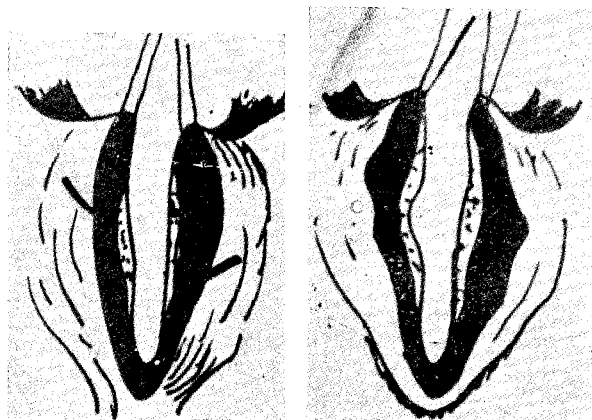


Fig. 2 (a)

Fig. 2 (b)

Dr. Widmaier's Technique of 'Z' Plasty on the Soft palate devised flaps from the vomer also to close each nostril (Fig 3).

He could definitely display the effective lengthening that is obtained by this extensive mobilisation (Fig. 4). Nothing but the posterior palatine artery held the mobilised flaps. But even in his own hands in certain instances the nasal layer used to

break at the junction of the soft and the hard palate. In our hands too, in certain varieties of unilateral complete clefts and the wide clefts of the palate, the nasal mucosa

adequate pushback will not be obtained without breaking the nasal mucosa deliberately at that point. Reidy in 1962 while analysing long term results of Kilner's series

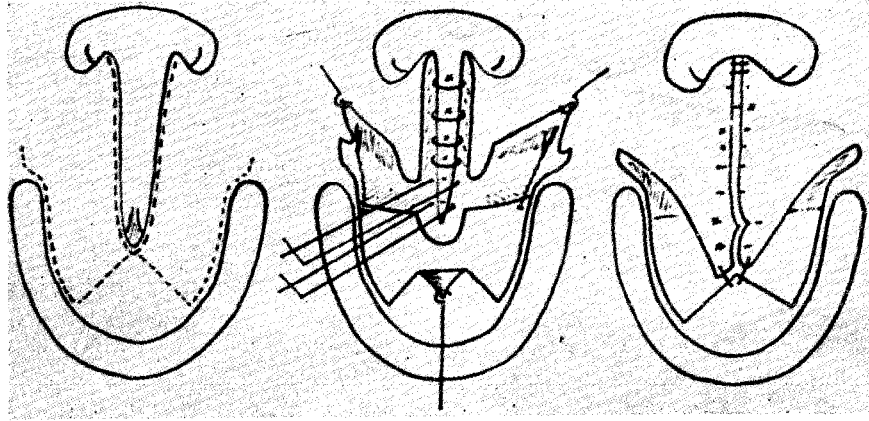


Fig. 3 (a) 3 Flap Method of Repair in a long Post Alveolar Cleft

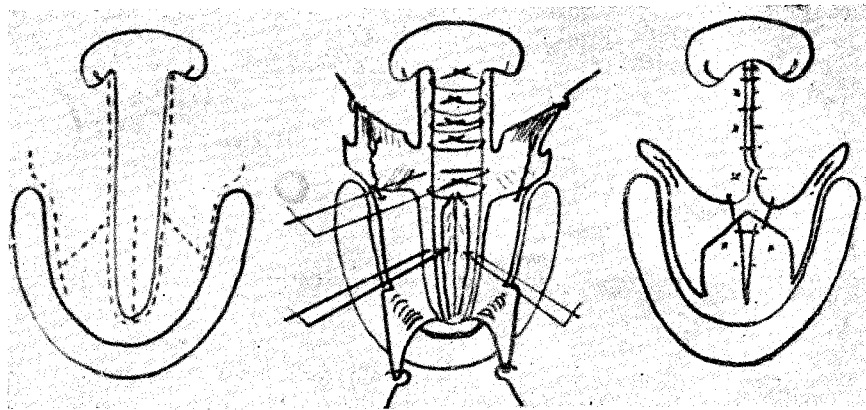
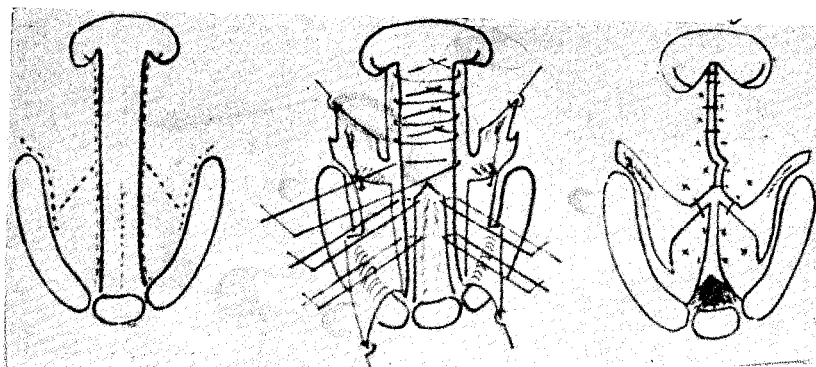


Fig. 3 (b) 4 Flap Method of Repair in a long Post Alveolar Cleft



breaks at the junction of the soft and the hard palate, and in certain instances one feels that

again reiterated the undoing effect on the lengthening if the nasal mucosa breaks and

the healing occurs by fibrosis on the nasal surface.

We also now doubt the utility of extensive mobilisation because all the packed cavities ultimately heal by fibrosis that may adversely affect the function of the palate muscles.

ADVANCEMENT IN TECHNIQUES

Whenever, it is not possible to obtain adequate length and where a deliberate pushback if done, a triangular fourth flap as described by Gibson can be utilised. Uni or bipediced island flaps as described by Millard (Fig. 5) can also be used in such

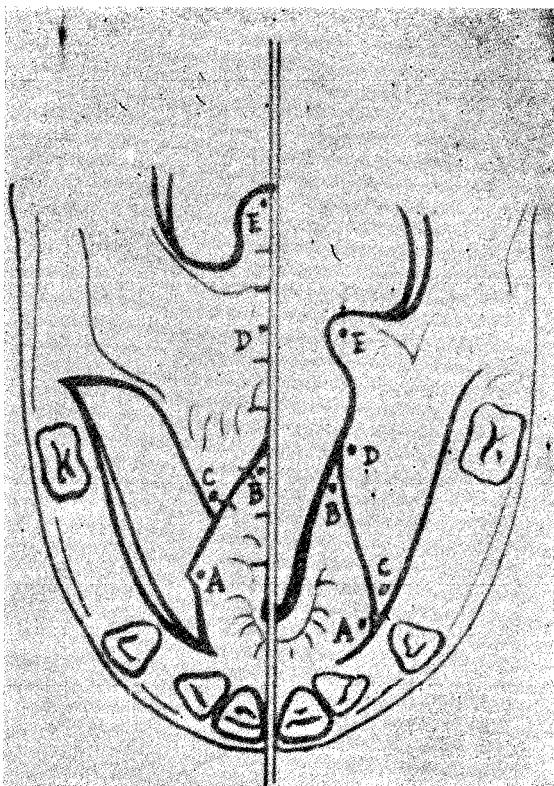


Fig. 4. Kilner's display of lengthening of palate after mobilisation.

a situation. When the push back is done as a secondary procedure or for wider clefts two island flaps based on the artery of either side can be used both for the lining and the cover. Our experience on the island

flaps is very limited and we are not in a position to comment on this procedure. Dr. Trauner uses a cranially based pharyngeal flap to cover the defect in the nasal mucosa. The choice of closure by a particular technique therefore will remain the prerogative of the surgeon who has considerable experience in the field. But those who wish to utilise these island flaps later are advised to do the primary repair of soft palate as advocated by Widmaier (Fig. 6) while designing the repair of soft palate by flap method. Widmaier saves the posterior palatine artery feeding the mucoperiostcum anteriorly on either side (Fig. 7).

PHARYNGOPLASTIC PROCEDURES

Pharyngoplastic operations are not usually recommended as primary procedures. They not only increase the operative hazards but may scarify the pharyngeal musculature unnecessarily. Workers like Stark from New York described in 1964, a series of primary pharyngeal flap operations at the time of initial Von Langenbeck palatoplasty. His series are yet small and correct assesment of long term results is still awaited.

Hyne's pharyngoplasty as a primary procedure may be considered in elderly age groups. However, majority of the Canadian and the American Surgeons prefer a flap pharyngoplasty as a secondary procedure in the other 30—40% in whom the speech results are bad. Over the last 14 years we did not perform pharyngoplasties in more than 4 patients as a primary procedure who came to us within the age group of 13 to 35 years.

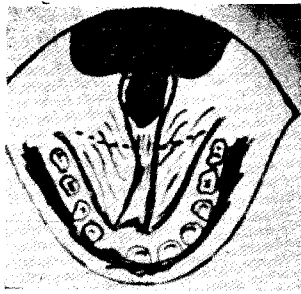
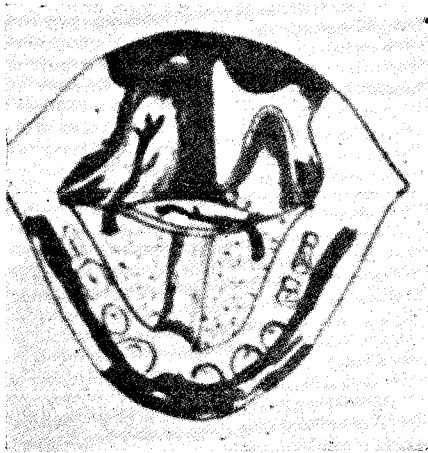


Fig. 5 (a)



5 (b)



5 (c)

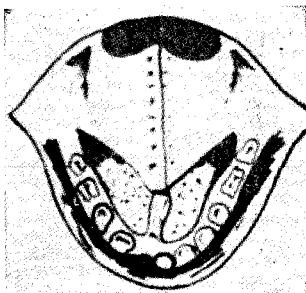


Fig. 5 (d) Island flap technique for combating the deficiency in the nasal layer or to obtain adequate push back.

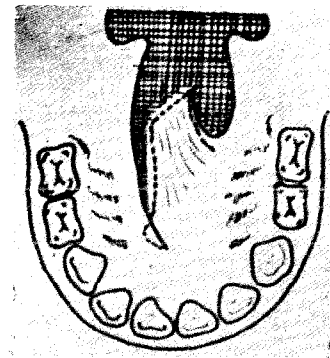


Fig. 6 (a)

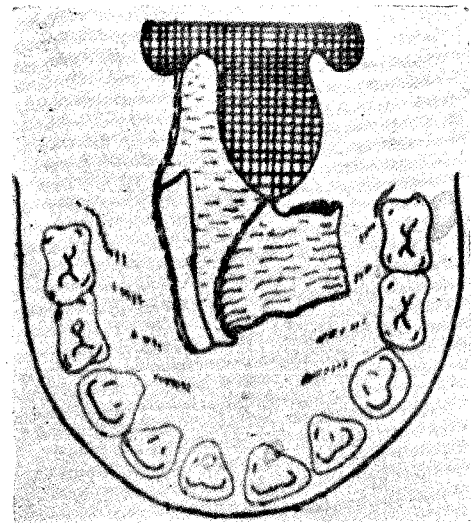


Fig. 6 (b)

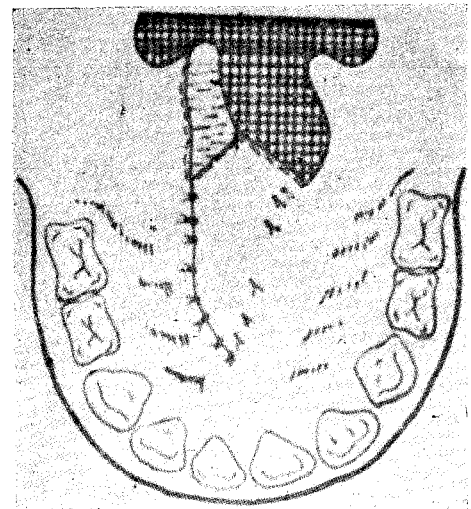


Fig. 6 (c) Closure of the soft palate by Widmaier technique without disturbing the posterior palatine artery and the mucoperiosteum.

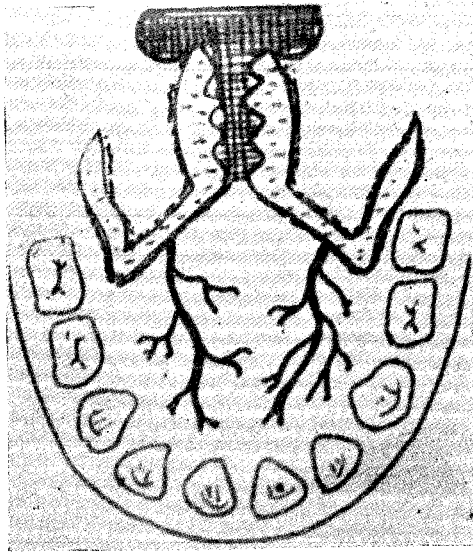


Fig. 7 (a)

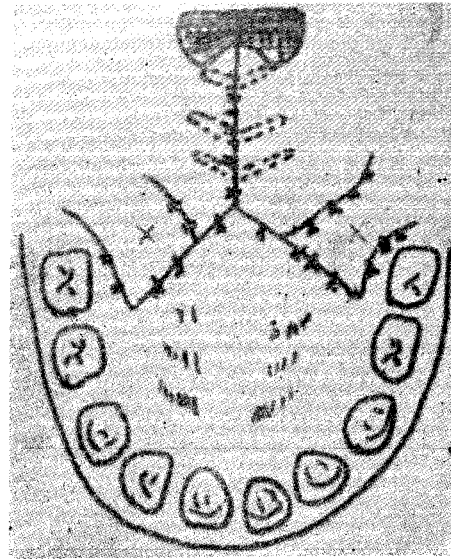


Fig. 7 (b)

Widmaier technique of closure. The last figure shows that the raw defect created by V-Y Procedure marked X has been covered by two Buccal Flaps thus obviating any chance of healing by fibrosis.

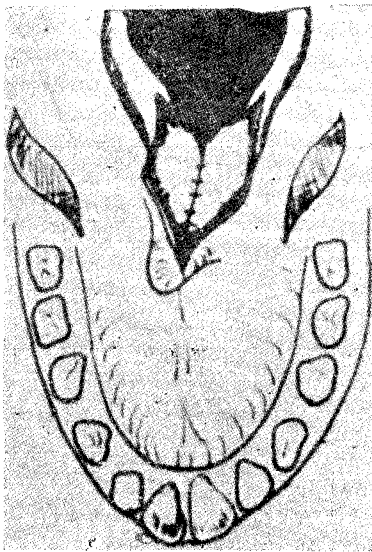


Fig. 8 (a)

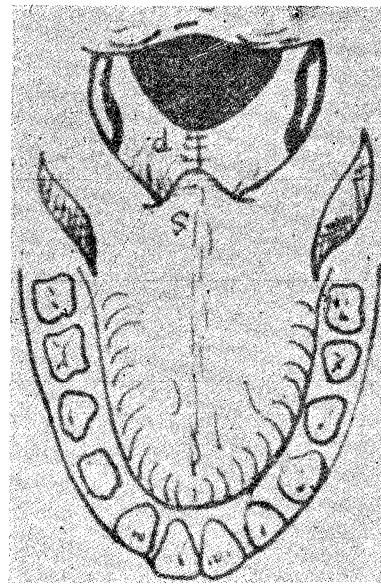


Fig. 8 (b)

Method of secondary lengthening of the palate by suturing the posterior pillars as advocated by Rosselli. S (Soft palate), P (Posterior pillars)

SPEECH RESULTS

Dr. Skoog from Uppsala evaluated the speech results having used superiorly or inferiorly based pharyngeal flaps in two types of patients. First group consisted of primary flap pharyngoplasties combined with palate repairs who came for the first time at the age of 5 years or above. The second group consisted of patients with incompetent palatopharyngeal function inspite of previous cleft palate surgery. Because the flap cannot be a substitute for the soft palate tissues great variations in the results were found. In an immobile palatal membrane to reduce the nasal escape of air to the desired degree thus making speech acceptable but certain qualities of normal speech were found to be deficient in such cases. In mobile and good muscular soft palate it definitely improves the speech to near normal. So long the pharyngeal flap by its based attachment does not restrict movements of the soft palate to any considerable degree, there is no difference whether it is based superiorly or inferiorly. There are, however, technical indications and contra-indications for each method according to Skoog.

Dr. Rosselli has also discussed at length the causes of bad speech but a short velum despite all operative corrections remains an unsolved problem according to him. He advocates that the elongation can be obtained by doing secondary suture of the posterior pillars, i. e., the two pharyngopalatine muscles they contain (Fig. 8). By this simple procedure there can be positive improvement in the functional value of the soft palate. This is a very old idea indeed

on which he has worked propounded by Passavant as early as in 1865. When the posterior pillars are too distant than he advocates superiorly based pharyngeal flap which can also be utilised for residual defects at the junction of hard and soft palate.

SPEECH THERAPY

For a continuous speech therapy programme in Uppsala these children can stay for long periods in a red cross hospital. Even in the advanced countries it becomes difficult to impart continuous speech therapy unless such similar arrangements are made for the continued stay of these children where they can receive education, and secondary corrective procedures in addition to speech training. Much will depend on the cooperation of the parents. For instance, in Germany as in Hamburg, the parents also receive the training as an out-patient in order to practice it on their defective children. In India, it is a dream as yet. But in a socialistic society there is no reason why such children be not rehabilitated. Small kindergarten and primary schools can be attached to the plastic surgery centres in each state with proper arrangements of boarding and lodging, so that speech training be imparted to the defective children under our constant guidance. In the absence of this arrangement I have found a very useful method. I advocate the parents to teach their children classical Indian Music on Harmonium. This method initiates the interest in normal children and when the defective child sings in chorus, the elderly ones themselves give the corrective training to the defective child.