A NEW PRINCIPLE ESSENTIAL TO CORRECT SPEECH IN THE TREATMENT OF COMPLETE CONGENITAL CLEFT PALATE

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The subject of defective speech due to congenital defects of the lips and palate claimed the attention of surgeons as early as the beginning of the Christian Era, the lip being operated upon by Celsus, who lived during the period of 42 B. C. to 37 A. D., but history does not record any operation on palatal deformities until 1764 when La Monier, a French dentist, performed the operation.

There is no more prevalent misunderstanding of the functions of the various organs of the body than regarding those which enter into the production of speech. It is almost universally believed that the tongue is the principal organ of speech. On the contrary, while the tongue, lips, teeth, cheeks, vocal cords, pharynx and palate are all important vocal organs and do their part in clarifying enunciation, in the distinct articulation of consonant sounds, in the perfection of vocal resonance, the *palate* is supreme. In 1887, the late Dr. G. V. Black said: "There is a peculiar fact in connection with the phenomenon of cleft palate. We may cut away the lips, the teeth and the tongue and the patient may talk plainly after all, but if we cut away the soft palate, it seems to be utterly impossible for the patient to speak perfectly."

To corroborate the above, I quote from the late Dr. G. Hudson-Makuen: "The vowel sounds may be articulated when the palate is defective, but their resonance is so much impaired that they are scarcely recognizable and their pitch cannot be changed with any degree of accuracy. It is in the articulation of consonant sounds, however, that the palate is especially essential.

"Of the twenty-three consonant sounds, only two, the "m" and "n", can be given intelligibly when the palate is not intact, and even in these the resonance is somewhat impaired. All those consonant sounds in the enunciation of which the tongue is a conspicuous factor, as s, z, t, d, l, etc., as well as those in which the lips and

teeth are used—the p, b, w, f, etc., are impossible to a person with a defective palate. This is true because, in the enunciation of these sounds, the palate is necessary to confine the breath to the oral channel and to prevent it from passing up through the nasal chambers.

"It will be borne in mind that the consonant sounds are made by impeding the moving column of breath at certain points above the larynx. The points at which the impediment takes place have been called the stop positions. These have been divided into the anterior, the middle and the posterior stop positions. * * * For all these sounds requiring an impediment in the outgoing column of breath, whichever stop position may be used, it is necessary to have a freely movable and normal palate.

"The soft palate has a wide range of movement. Its function in vocalization is to assist in controlling the action of the vocal cords and regulating the size and shape of certain important resonance chambers, and its function in articulation is to shut off the nasal from the oral cavity during the emission of the explosive and fricative sounds, and to form contacts with the tongue in the formation of the so-called posterior linguo-palatal sounds." Again he says: "Not only are the tongue contacts important, but in the production of many of the consonants there is a damming up, so to speak, of the breath in the mouth and a slight explosive effort as the sound is emitted. When this takes place in the normal mouth, the velum rises and shuts off completely the oral from the nasal cavities, and this is one of the things which the velum of a cleft palate cannot do and which it must be made to do before we can get the best results from the standpoint of speech. The velum of a cleft palate, therefore, must be united in such a manner that it will be as large and as loose as possible with its muscles in their normal positions and relations, and then the patient should be given such exercises as will have a tendency to develop in these muscles their normal physiological functions."

A thorough understanding, not only of the importance of speech, but of its mechanism is most essential to suc-

cess in palatal surgery. The surgeon must have always in mind the goal of correct speech and he must know how that speech is attained by normal organs so that he may use every means to conserve and build up a normal mechanism from the defective parts which he finds in a cleft palate.

All surgery of cleft palate should have for its ultimate object perfect function, which is perfect speech. The test of success is the quality of enunciation resulting. Two phases of palatal surgery have especially to do with this: the union of the separated bones of the palate, including the management of the premaxillae; and the control of the tuberosities in their relation to the soft palate. Without a proper conception and execution of these fundamentals in palatal surgery, there is small hope of securing satisfactory form or function. I wish today to emphasize the control of the tuberosities.

I present to you briefly the course which I am convinced gives the nearest approach to normal form and function in the palate. That course provides for operation in early infancy; it contemplates the establishment of a normal palatal arch and the prevention of the spreading of the tuberosities; it calls for three stages in the treatment of typical double cleft of the lip and palate, and sometimes four, if complicated by protruding premaxillae. These stages are as follows:

1st. The freshening, approximation and immobilization of the cleft bones so that union may take place.

2nd. The closure of the lip.

3rd. Operation upon the soft palate.

4th. Elevating the nose which may have become flattened by the moving backward of the premaxillae.

The first step should be taken as soon after birth as expedient,—the 4th to 10th week, or after the functions of the body have become well established.

The second step, the closing of the lip, should be done in from 6 to 10 weeks after the union of the bones.

The third step, the closing of the soft palate, should be deferred until just before speech is attempted, usually about the 18th month.

The fourth step is to elevate the nose, if necessary.

The progressive surgeon no longer waits until a child is from 3 to 12 years of age before operating, or after bad habits of speech have been acquired, but now agreement is fairly general as to the wisdom of early operations. Closing the lip first, depending upon the traction of the orbicularis oris muscle to approximate the bones, or passing a single wire through the anterior part of the separated maxillae and bringing them together thus, cannot produce the best results.

The closing of the lip and the resultant traction of the orbicularis oris muscle *will* gradually move the anterior part of the cleft bones into contact, but the bones will not, as a rule, be normally approximated nor united. The bone carrying the premaxillae protrudes beyond the maxilla of the opposite side, leaving an ugly malformation of the nose and arch. Besides, there cannot be union of the bones with the muco-periosteum intervening. They only meet, remain malposed and leave the patient deformed throughout life.

I have time here only to say, with regard to the premaxillae, that they should always be preserved and utilized to maintain the normal dental arch, the facial contour and the full complement of teeth. They should *never* be excised, for an irreparable deformity is the unfailing result.

SPREADING OF THE TUBEROSITIES

I have spoken of the closing of the lip first, as a means of approximating the separated bones of the palate. When the anterior part of the cleft is brought together by the lip traction plan or by the single wire, the surgeon fails to give consideration to the consequent separation of the bones posteriorly. Every surgeon experienced in this work realizes that oftentimes these bones are widely separated posteriorly, due to the moving together of the anterior part of the cleft and the action of the muscles; and they cannot assume a normal position unless measures are employed to overcome this separation. With muscular force applied anteriorly and with no restraining force posteriorly, the maxillae act as levers, the malar processes becoming the fulcra; and as the anterior ends

of the maxillae are drawn together the posterior ends, aided by the upward pressure of the mandible, move apart.

Unless steps are taken in early infancy to prevent the tuberosities from spreading (which is accomplished by the use of wires not only anteriorly but posteriorly), the bones will separate widely and the palate will be shortened to such an extent that perfect speech will seldom be secured. When the tuberosities are abnormally separated the soft palate, when united, will be put on the stretch and consequently shortened so that it cannot reach the post-pharyngeal wall; it will be like a drumhead, without flexibility or resilience. If lateral incisions are made through the soft palate in an attempt to relieve tension, a great mass of cicatricial tissue will result which makes it thick, unwieldly and inflexible.

The horizontal plates of the palate bones are elevated; the tuberosities are widely separated; consequently the hemispheres of the soft palate are also widely separated. The soft palate may be to some extent atrophied for want of normal use, but the width of the cleft is not due so much to atrophy as to the malposition of the parts.

It must be remembered that lateral incisions oftentimes divide the fibers of the tensor palati-muscle, which has a two-fold function—to make tension on the palate and to dilate the pharyngeal orifice of the Eustachian tube. The division of this muscle leads to early defective hearing, due to the destruction of the continuity of the muscle and consequent failure of the normal dilation of the pharyngeal orifice of the Eustachian tube. When introducing the posterior wire in operating on the soft palate, it should be passed as nearly as possible through the center of the tensor palati muscle as it swings around the hamular process, thus suspending the contraction of the muscle until the hemispheres of the palate unite.

I regret that I have not time to discuss the treatment of the defective lip and nose, for this phase of plastic surgery is most important in rounding out the work of making normal these patients who come in such distressing condition. But what does it avail, to produce the most careful and painstaking operation on the lip, if under-

neath there is an improper foundation for this superstructure? There must be first provided a normal, well-rounded arch upon which to build a well shaped lip, and there must be a normal position of the tuberosities of the maxillae in order that a flexible, resilient soft palate may be produced, to carry out this "New principle essential to correct speech in the treatment of complete congenital cleft palate."