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### A Study of the Treatment of the Child with a Cleft Lip or Palate

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A STUDY OF THE TREATMENT OF THE CHILD WITH A CLEFT LIP OR PALATE

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A Research Paper

Presented to

Professor T. O. Watson

Ouachita Baptist University

# 150

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In Fulfillment

of the Requirements for the Course

Special Studies in Education

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by

Charolette Duckett

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## A STUDY OF THE TREATMENT OF THE CHILD WITH A CLEFT LIP OR PALATE

The elementary teacher will encounter many children in her experiences. Some of these will be handicapped; she will face the problem of helping these students adjust to regular classroom activities under her guidance. These handicapped children may have a wide range of mental, psychological, and physical disadvantages and may demand a little extra attention and ingenuity. This paper is a discussion of one possible type of physical handicap which causes secondary problems that may be encountered.

The purpose of this study is to explore the characteristics, problems, treatment, and speech education of the cleft palate or cleft lip child. While most regular classroom teachers will not be expected to have a large part in the therapy of such individuals, it would be beneficial to understand the extent of the handicap and what has been and could be done to aid the child with a cleft. It is hoped that through insights into the nature of the problem, she may be better equipped to help him to mingle and live successfully with his peers.

Perhaps the first question that should be answered concerning this handicap is, "What is a facial cleft?" A cleft is an opening which may extend through the uvula, soft palate, hard

palate, premaxilla, upper lip, and into the nostril or sidewise beyond the corner of the lip into the cheek. A study of how the face and mouth of the embryo develops will show the reason that these areas are effected.

If the processes, muscles, and tissues of the face and mouth do not unite according to schedule in the earliest months of pregnancy, almost before the mother is aware that she is with child, a cleft will result. This development, so complex, involves several interdependent parts; it is a part of the miracle of birth that the rigid timing of growth does not more often go wrong, and that the palate and lip cojoin in the midline without mishap.

The oral cavity, of ectodermal tissue, develops from a depression on the underside of the head section of the tiny embryo called the stomodeum. (Picture A) As the depression deepens, this ectodermal tissue unites with endodermal tissue. When the embryo is four weeks old, the oral plate which was formed by the union of these tissues ruptures, thus making an opening. Surrounding structures encircle it and form the oral cavity. There are five of these surrounding processes; these all will eventually unite to compose the face. The frontonasal process is a projection from under the forebrain. The other four processes are lateral. They are a right and left maxillary process and a right and left mandibular process.<sup>1</sup> (Picture B)

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<sup>1</sup>Mildred F. Berry and Joh Eisenson, Speech Disorders. (New York: Appleton-Century-Crofts, Inc., 1956), p. 310.

By the end of the fifth week the frontonasal process will be divided into three sections: the middle sections and two lateral sections. These will eventually become the nostrils. While this is happening, the two mandibular processes are fusing. From the dorsal ends of these mandibular processes, two extensions will grow forward to separate the eye from the oral cavity; these are the maxillary processes. About the sixth week, they will approach the center and will meet to fuse with the lateral nasal processes. They continue to grow until they meet the globular processes that extend from the median nasal process. In these globular processes the primitive palate will originate. The mesoderm of the maxillae will make up the floor of the nose, the upper lip and philtrum, and the cheeks.<sup>2</sup> (Pictures D and E)

The emergence of the palatine processes at eight weeks marks the beginning of the second stage. (Picture F) They grow as an extension from the inner sides of the maxillary processes. At this time, the tongue is a large organ in comparison to the other parts. It is between the palatine processes and almost touches the nasal septum which is developing from the frontonasal process and the mesoderm of the maxillary processes. As the jaw grows ventrally, this causes the tongue to drop down so that the palatine processes can meet in the middle at the free border of the nasal septum.

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<sup>1</sup>Ibid.,

At about nine weeks, the final stage begins. The primitive palate becomes partially ossified and is covered with a membrane. This triangular wedge is now called the premaxilla. The palatine processes begin to fuse from the premaxilla backward. (Picture G) As these continue to grow back along the sides of the pharynx, they form the soft palate. By the twelfth week this union of soft and hard palates should be complete.<sup>1</sup>

The development and union of these facial processes, however, may encounter a period of interference. The length and gravity of this interference determines whether it will be only a cleft in the velum or soft palate. There are basically, then, four types of facial clefts: cleft of the soft palate, cleft of the soft and hard palate, cleft of the soft and hard palate and one side of the premaxilla, and cleft of the soft and hard palate and of both sides of the premaxilla. (Pictures H, I, J, K)<sup>2</sup>.

No one is sure what causes clefts, but theories emphasize the interruption of the nutritional or oxygen supply to the embryo. This may be due to extreme malnutrition in the mother, vitamin A or B deficiency, the RH factor, or to an atypical or inefficient circulation in the embryo. Another theory is that mechanical obstructions in the uterus may cause clefts. These may include uterine tumors, cord interference, pressure of the lower jaw, and the interference of tongue and of hands and feet when the fetus is curled up. Many doctors feel that hereditary factors may also cause clefts.<sup>3</sup>

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<sup>1</sup>Ibid., 312.

<sup>2</sup>Ibid., 308.

<sup>3</sup>Ibid., 315.

The next part of this study that will be covered is how these clefts may be corrected. The decision on what would be the best course to follow in correction rests nowadays with a team of people. The method most often used is that once a month this team meets for a cleft palate and lip clinic to see, examine, and discuss the clefts in the children which come to them. The group which meets is composed of the children's parents, a pediatrician, a plastic surgeon, a prosthodontist, an audiologist, and a speech therapist. The first step these experts usually recommend is surgery.

Surgical repair of cleft lip and palate involves much more than just "closing the hole." The plastic surgeon must make the closure in such a way that the tissue will not tear out, nor will it be the cause of stresses and strains on the normal growth processes, for even at its best, surgery cannot give the muscles the mobility nor the mouth the structure it would have had, had it been normal in its development. Dr. Jim G. Duckett, a noted plastic surgeon, tells of these basic techniques he uses in working to help correct the cleft palate or lip.

For a child with a cleft lip, surgery is done at about three months or ten pounds. This first operation, the restoration of the lip, is done for the muscular realignment; it also is a cosmetic improvement which will later become very important to the individual's self-concept. The surgeon takes a piece of skin from the lip on the side of the cleft and places it in the middle of the cleft to connect the disjoint parts. He uses a zig zag line in doing this because using a straight suture would cause notches and scars. If the alveolar ridge is effected, as it



usually is, it is often necessary to expand the palate behind it with a prosthetic appliance and, perhaps, later, to use a bone graft to fill in this space. This molds the dental arch and helps to narrow the alveolar and palatal cleft. It prevents the collapse and non-alignment of teeth which would cause problems in the individual's eating.

It is also important to note that surgery of the lip often involves manipulation of the tissues of the nose--such as the septum, the vomer, and the columella. Usually it is necessary to re-operate on the nose at a later time, perhaps at 14 or 15 years of age, in order to achieve a reasonably satisfactory result in both the internal and external regions of the nose.

These two surgeries, however, do not take care of the closure of the hard palate and velum. Although each surgeon is aware of individual differences in cleft palate patients, there is a basic procedure for closure. At about 18 months of age, hopefully before the speech of the child has time to be irreparably adversely affected, the child has this surgery. The doctor makes an incision behind the alveolar ridge, cutting three layers, the mucoperiosteum, the muscle, and the mucous membrane of the mouth, loose. Thus, it is attached to the back of the mouth by the velum. The two parts are then pulled together, making a closure. The suture causes these mucous and muscle layers to heal together. From the gum, or alveolar ridge, to the newly-freed palate, tissue grows and heals and thus causes the palate to be attached anteriorly once again. This healing takes a period of about 12 to 17 days. This is usually

the standard operation (although cleft palate patients of the past have had operations in which the bony substructure of the palate was moved and fixated, this is not often done now.) However, if the soft palate, or velum, is too short, it is necessary to do a secondary operation, called a pharyngeal flap operation, at a later time, about eight years of age. In this procedure, the tissue is taken off the back of the throat, or the pharynx. The soft palate is freed and sewn to the soft palate, thus causing the palates to be held posteriorly; this enables the child to close the posterior nares, or nasal openings, which are in the back of the throat.

If the team decides to delay palatal surgery, the prosthodontist may construct a temporary prosthetic appliance. Such an appliance has been successfully used even with very young children, two and a half years old. Usually the appliance is worn until the child is seven or eight years old, when the team makes a final decision between surgery and a permanent prosthetic reconstruction of the palate. It is possible, too, that the surgery will not completely correct the cleft palate and that a prosthetic appliance may be added to aid in the production of speech. Basically, a cleft palate speech-aid is a device which, when worn in the mouth, makes it possible for the speech organs, even though deformed, to meet the physiological and acoustic requirements for speech production. These speech aids must satisfy three conditions: (1) it must be possible to wear it comfortably in the mouth, (2) it must cover the cleft in the palatal vault, and (3)

it must provide assistance to the muscles of the valve that allows air into the throat, nose, and mouth. These aids are attached to the teeth. Each aid is individually molded and must be adjusted or changed as the individual grows.<sup>1</sup> (Picture 1)

Besides the considerations of surgery and prosthodontia, orthodontia holds an important place, not only because of the cosmetic considerations, but also because of the importance of the teeth in speech production. This treatment should be begun at an early age. In many cases, orthodontic devices are incorporated into speech aids so that a child may have early speech help while undergoing oral orthopedic treatment.<sup>2</sup>

Because cleft palate individuals, due to the close connection between the mouth and ears, are so susceptible to ear trouble and hearing loss, the audiologist is also important. He will give the individual tests with the audiometer and speech comprehension tests to be sure the child is normal in this respect. He will work with the child's pediatrician in devising a program of prevention of the infections that these children are so prone to contract. (Even colds and sore throats are dangerous for these children because they may lead to otitis media, or inflammation in the middle ear.) Close co-operation between these specialists and the parents can prevent much illness and can minimize the effects of what does occur (by prompt and careful treatment).<sup>3</sup>

<sup>1</sup>Lee Edward Travis, Handbook of Speech Pathology (New York: Appleton-Century-Crofts, Inc., p. 590.

<sup>2</sup>Ibid., p. 593.

<sup>3</sup>Wendell Johnson, Speech Problems of Children (New York: Grune and Stratton, 1950), p. 127.

Middle ear diseases in cleft palate children tend to run their course before these individuals reach adulthood, so the early period of the life of the individual must be closely watched.

All these members of the team which have been mentioned have tremendous import for the child with the cleft lip or palate. However, after (and, often, during) their work, the speech therapist must teach the child to use the advantages he has gained the help he has been given. In order to understand the enormity of the therapists' tasks, a brief look at the characteristics of the speech of a person with a cleft will follow.

Some statements can be made concerning the development of speech in cleft palate children. These children have some of the characteristics of later cleft palate speech in their pre-verbal vocalizations. Cleft palate babies are slow to develop clear sounds and to use words. These children are more inclined than normal children to use the back of the vocal tract rather than the oral cavity, especially the front of the tongue. Later, they correct the gross error sounds to some extent and move the speech toward the front of the mouth, so that the articulatory movements are more nearly normal, although there may still be too much air escaping nasally. There will also continue to be distortions of the speech sounds.<sup>1</sup> The speech of the older cleft palate individual most often has the following nonstandard elements: the glottal stop, a strong nasal fricative, and facial grimaces associated with this speech.

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<sup>1</sup>Harold Westlake and David Rutherford, Cleft Palate (New Jersey: Prentice-Hall, Inc., 1966), p. 100.

The glottal stop is also called the glottal catch, glottal click, glottal shock, or glottal plosive. Even persons with normal speech use these inadvertently at different times. The simplest way to recognize this sound is to notice it in a combined action or operation of the muscles of the throat, as in coughing. When a person coughs naturally, the abrupt initiation of the cough is the glottal plosive sound. This sound is often substituted for voiceless plosives in cleft palate speech.

By closing the lips and forcing a blast of air through the nose, a nasal fricative is produced. When a person with a cleft palate attempts to produce the fricative sounds, this nasality occurs because so great a part of the air stream is directed through the nose, due to the fact that the velopharyngeal valve works inadequately; it may be made more prominent by atypical positioning of other articulators. This sound is heard during the production of  $f$ ,  $v$ ,  $\theta$ ,  $\delta$ ,  $s$ ,  $z$ ,  $\int$ , and  $\mathfrak{z}$ . This is termed a sound substitution because it takes the place of voiceless fricatives; it is considered an earmark of cleft palate speech.<sup>1</sup>

The facial grimaces that are often associated with cleft palate speech are due to the effort on the part of the speaker to compensate for the failure to direct the air stream through the mouth.<sup>2</sup>

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<sup>1</sup>Robert West, The Pathology of Speech and the Rationale of Its Rehabilitation (New York: Harper and Brothers Company, 1957), p. 452.

<sup>2</sup>Ibid., 454.

These characteristics of cleft palate speech make the person conspicuous; They often cause the speaker to be the brunt of teasing and cruel jokes that may have a disastrous effect on the person with a cleft. Thus, not only must the physical condition of the person be treated, but also the emotional condition.

The phase of work, then, which should now be considered is the speech rehabilitation program. The objective of such a program is the same as that which is applied to any other person having poor speech: to try to attain either normal speech or the closest approach to it which can be accomplished with the mental and physical limitations present. This involves these aims in cleft palate cases:

- "(1) a systematic step-by-step training for articulatory skill beginning with the most open vowels and the consonants which require least intra-oral pressure.
- (2) elimination of facial grimaces.
- (3) guidance for socialization."<sup>1</sup>
- "(4) ear training.
- (5) improvement of voice quality."<sup>2</sup>

When clinical instruction is available, children of even pre-school age should be taken to these centers for instruction. Speech therapists are most often found in this environment. Often parents can carry out instructions at home to complement the therapist's work.

For example, as soon as the palate has been repaired, the muscles of the soft palate should be trained to function. One

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<sup>1</sup>Ibid.

<sup>2</sup>Johnson, Op. cit., 152.

exercise that is useful in developing this is gargling. The parents can teach the child to do this by imitation. Clear warm water can be used first, then a mild mouth wash.<sup>1</sup>

In order to help the child learn to direct the breath stream through the mouth, simple blowing exercises may have value. Parents may encourage and praise the child when he is able to blow candles out, to ruffle feathers with his breath, and to push ping pong balls with the breath. Most children enjoy blowing a harmonica and find that it helps them to sense good palatal action and direction of the breath stream. Speech therapists feel that exercises such as these are most valuable when they are directly correlated with the production of speech sounds.<sup>2</sup>

Because the work of therapists must vary with the individual, many exercises are used; these are modified and varied to fit the needs of the person with the cleft. Most are concerned with bringing strength and co-ordination to the poorly formed or surgically repaired musculature of the lips, velum, mandible, and pharynx. Often, the persons under therapy must be taught to use their pharyngeal muscles in order to make the prosthetic appliance they have been fitted with work to close off the nasal passage from the oral cavity.

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<sup>1</sup> Johnson, Op. cit., 155.

<sup>2</sup> Berry, Op. cit., 327.

Besides these exercises, many articulatory skills must be improved. This is done through drills involving practice with the sounds and words necessary to speech correction. A therapist finds that achieving voluntary control involves not only developing skill in producing speech, but also developing skill in the ability to listen and discriminate between normal and defective sounds. Many cleft palate people report that although they know they must talk differently from other people, still their speech sounds the same as everybody else's sounds to them. The speech therapist will provide much opportunity for the child to listen to sounds and words in their context. He may use a tape recorder and ask the child to contrast his own speech with the proper sound. Many methods of stimulation are used. The work must be accompanied from the first by instruction in how to produce correct speech sounds and patterns. In cases where there is a hearing loss, training should include sound amplification.<sup>1</sup>

In helping the child to bring facial grimaces under control, the speech clinician may use these methods: (1) holding the cheek muscles (with the fingers) so they cannot contract; (2) voluntary relaxation and contraction of the cheeks; (3) pushing the lips outward slightly so that the upper lip cannot be pulled down in order to assist in alar contraction, and (4) mirror checking.<sup>2</sup>

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<sup>1</sup> Johnson, Op. cit., 152.

<sup>2</sup> Berry, Op. cit., 329.



Another problem which may be present is a hoarse, ventricular voice. Usually, very young cleft palate children do not have this characteristic, but nine-to-twelve-year-olds often do. The causes for this may be any of a number of things: (1) the chronic inflammation of the nose and pharynx so that the secretion drains into the pharynx; (2) the excessive tension in voice production which may cause nodules on the vocal folds; (3) the rebound of pharyngeal resonance upon the larynx vibration, producing injury to the vocal folds. The therapist must seek to correct the voice quality which is produced by the rough, jagged and irregular vocal folds. He does this by (1) changing the focus of tension and inducing complete relaxation of the larynx, and (2) raising the pitch and lowering the intensity of all speech sounds.<sup>1</sup>

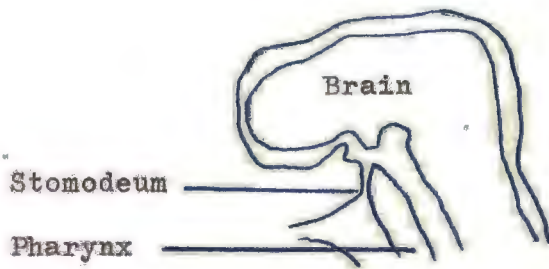
The speech therapist will be an important figure in his patient's life. This means that he will know most of the emotional problems he has, and that wise counsel is necessary. He must listen patiently and try to encourage the individual to live up to his capabilities by being well-groomed, courteous, and outgoing. He may suggest that his student participate in athletics or music in order to have an avenue in which he can excel. He must, however, try to remain primarily a speech therapist. If psychological aid is a necessity, he will direct the individual to a trained counselor who may better help the individual to overcome his problems.

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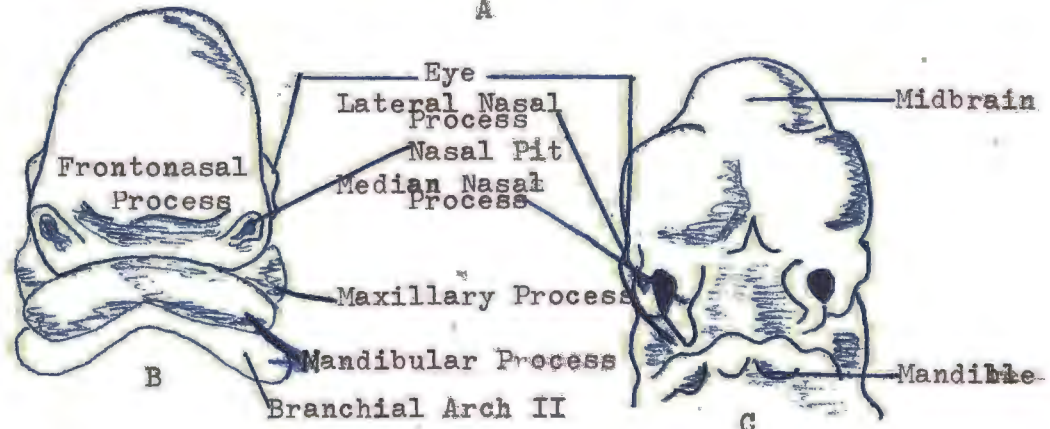
<sup>1</sup>Ibid., 330.

We have seen what various specialists can do. There are a few, basic ways a classroom teacher can help. One of these is to have a speech improvement program for all the pupils in her classroom. This may include drills in listening and articulation; it may take only a short time. She must also co-operate with the therapist in carrying out any exercises the therapist suggest to her and in recording the child's speech behavior in the classroom or any psychological problems he demonstrates. She must see that the classroom atmosphere gives the child a sense of well-being and security. If the child is not being helped, she should recommend that the parents seek aid from the American Speech and Hearing Association and from the National Crippled Children's Association.

It is easy to see that this problem of clefts is a complex one and needs the attention of many specialists. These children also demand, however, the kindness and love of parents and the wise guidance of the classroom teacher. The most important aspect of this handicap seems to be that the child must be treated, not the isolated deformity.

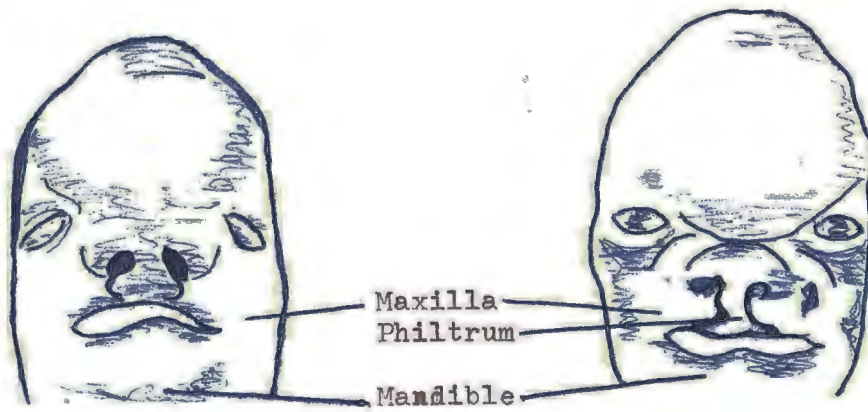


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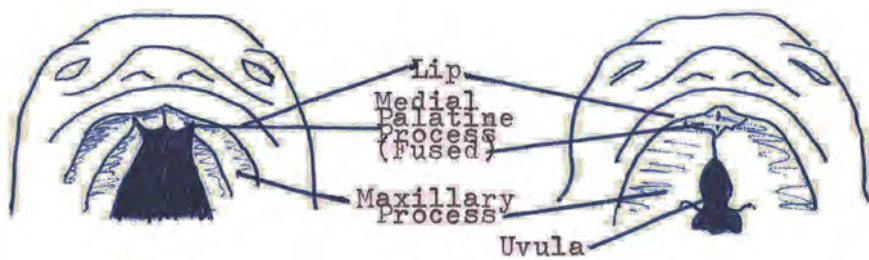
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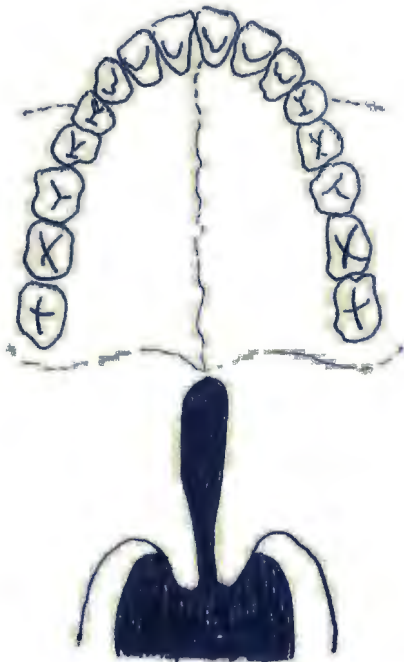


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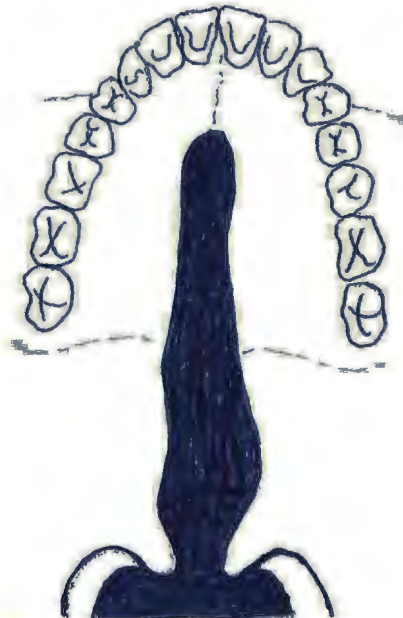
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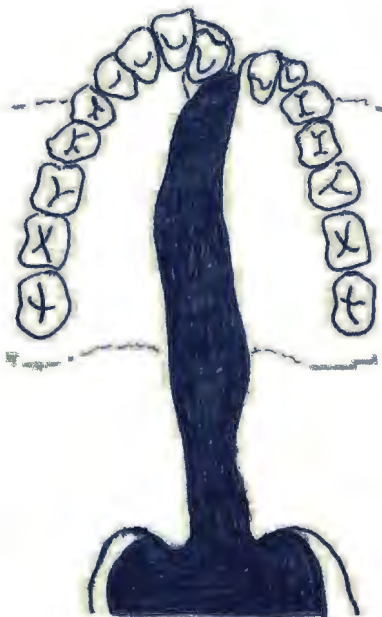
H

Cleft of the soft palate



I

Cleft of the soft and hard palate



J

Cleft of the soft and hard palate and one side of the premaxilla



K

Cleft of the soft and hard palate and of both sides of the premaxilla

L



Side view

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