

The Treatment of the Cleft Lip and Palate Patient

A. JACOBSON, B.D.S. (Rand), M.S. (Orth.) (Chicago) and C. J. DREYER, B.Sc.(S.A.), B.D.S., H.D.D. (Rand.), Department of Dentistry, University of the Witwatersrand.

INTRODUCTION

Children with cleft lips and/or palates are cripples in the truest sense of the word. The physical appearance of these children is unpleasant, mastication and deglutition is upset, and the speech is often unintelligible. As a result of these aberrations the child is likely to become a psychological misfit, yet these children, other than their physical defect, are normal and should become well-integrated and useful adult citizens.

The treatment of these individuals is usually of such long duration and complexity that a co-ordinated treatment plan should be formulated for them by a cleft-palate unit, and not by each individual who happens to be treating such a patient at the time.

The member of a cleft-palate unit will, by virtue of discussion, be able to appreciate all the problems which may be associated with this type of physical deformity.

This paper is designed to present a broad appreciation of the various aspects of the treatment of cleft lips and palates.

INCIDENCE AND CAUSE

The incidence of cleft palate in the White race is approximately one in 800, the incidence being less in Negroes. The figures among investigators vary from 1 in 665 to 1 in 2,000. The causes of this deformity are not fully understood, heredity still being the most significant cause. German measles in early pregnancy is another possible causative factor. Malnutrition in animals has in instances produced clefts.

VARIETIES OF CLEFTS

A cleft lip is the result of the non-fusion of the medial nasal process with the lateral nasal and maxillary process during the 6th to 7th week in utero. A cleft palate results from the lack of fusion of the palatine processes with each other and the nasal septum. Palatal fusion is usually completed at the end of the 4th month in utero. Thus it can be seen that a teratogenetic factor present between the 7th week and 4th month can be responsible for a cleft. Also, the timing of the onset of this teratogenetic influence and its dura-

tion during this period, determines the type of cleft, since fusion of the palate is from anterior to posterior. A cleft through the alveolar ridge does not necessarily pass through the incisive suture²; clefts are present before the ossification of the maxillary elements. The variety of clefts is infinite, but for practical purposes Veau's¹ classification is the most acceptable.

Type I is a cleft of the soft palate or uvula.

Type II is a cleft of the hard and soft palate extending no farther forward than the incisive foramen. The vomer in this type may be suspended from above and free from each side, or attached to either side.

Type III is a complete uni-lateral cleft of the alveolar arch and hard and soft palate (usually associated with uni-lateral cleft lip). In this type the vomer is usually attached to that side of the palate which is opposite to the cleft in the alveolus.

Type IV is a complete bi-lateral cleft of the alveolus and hard and soft palate. The vomer and premaxilla are not attached to either side, but are suspended from above (associated with bi-lateral cleft lip).

It is noteworthy that the width of the cleft is greater, and the shortening and deficiency of the lateral elements are usually more marked in Types I and II than in complete clefts involving the alveolus.

EFFECTS OF THE DEFORMITY

The cleft palate child for obvious reasons is a person who finds social and mental adjustment most difficult. The facial disfigurement is unpleasant and attracts the attention of all. Adults react with obvious pity, especially the parents, who, in an effort to compensate for the deformity, may allow the child to become selfish. This adds to the difficulties of the child when associating with playmates. Children are apt to remark publicly in order to embarrass or ridicule those less favoured than themselves. The nasal speech is imitated by taunting playmates, with the result that the child, in order to disguise his conspicuous nasal tone, may adopt compensatory tongue and lip movements which result in incorrect speech habits.

He dreads ridicule, is sensitive to the extreme and often adopts an attitude of open rebellion. He is unhappy, uncomfortable and at a serious disadvantage in this competitive world.

A cleft extending through the alveolus frequently results in one or more missing or abnormal teeth and a cleft through the palate invariably affects the pattern of eruption and correct positioning of teeth. In the event of a tooth bud being split, two abnormally small teeth or supernumeraries are formed.

The hygiene of the nose and throat is impaired by a cleft in the hard or soft palate thus acting as a predisposing cause to a variety of inflammatory lesions which are readily communicated to the middle ear via the Eustachian tube. All inflammatory lesions of the upper respiratory tract should thus be promptly treated as negligence can cause a loss of hearing.

SURGICAL TREATMENT

The cleft lip can only be effectively treated by means of surgical repair, but the cleft of the palate may either be treated by means of surgical procedures and/or by means of a prosthetic appliance. The former has, in latter years, become the method of choice due to vastly improved surgical techniques and the great advances in anaesthesia, both of which have contributed to the low mortality rate and improved end result. Surgical treatment has, however, not supplanted the use of all prosthetic appliances.

The earlier routine practice of indiscriminate placing of surgical wires through the cleft segments, thereby forcing or holding the jaw together, has fallen into complete disfavour. The effects of cicatrix contraction is also well recognised, so much so that at one period surgeons were moved to postpone closure of the hard palate until school age. This postponement was based on the assumption that any operations on the hard palate would retard the normal growth process of the maxilla. Investigations by means of cephalometric roentgenograms have shown that people with cleft palates exhibit the same stability of skeletal pattern as individuals with no such deformity. The jaw relationships remain the same as do their rates of growth.

Investigations have shown that there are cases in which the hard palate has been operated on at an early age without any deleterious effect to the ultimate growth of the jaws, but this area involves one of the principle growth centres of the face and interference with the regional blood supply, particularly the posterior palatine vessels, tends to inhibit growth. Brodie and Slaughter³ studied the results of 1,349 surgically treated cases and concluded that surgery does inhibit normal growth. They claim that the interference is directly

proportional to the amount of injury to growth centres and to the diminution of blood supply to the parts concerned. They strongly suggest that there be no unwarranted trauma to soft tissue and no interference with its blood supply.

The object of the modern surgical procedures employed for the treatment of cleft palates is to restore continuity between the two portions of the hard and soft palate and still to preserve a normal palatal and dental arch form with a flexible soft palate of sufficient length to effect velopharyngeal closure. This closure is essential for normal speech.

Most children with Type III or IV clefts have their initial operations during their first three months of life. In a uni-lateral cleft, Type III, the adjacent parts of the upper lip are brought together in order to establish the integrity of the lips thereby establishing the proper labial forces on the denture. This lip musculature will assist in bringing the displaced anterior segments of the upper jaw together. Repair of the bi-lateral cleft lip, type IV, is usually carried out in two stages: the one side is first repaired and at a later date in the first year the opposite side is treated in a similar manner. The soft palate is usually also operated on during this early period. Some surgeons prefer to repair the hard and soft palate simultaneously, while others prefer to postpone the operation on the hard palate. The premaxillary segment is kept intact whenever possible. The approach and differences of opinion to this problem are beyond the scope of this paper.

PROSTHETIC TREATMENT

The earliest problem confronting the prosthodontist may be the construction of a temporary obturator to facilitate feeding prior to the surgical treatment.

The patient with a type III and IV cleft usually has one or more teeth absent in the line of the cleft. Rudimentary teeth or those in poor occlusal relationship to the rest of the arch are frequently removed; a prosthetic appliance in these cases carries the necessary dental replacements. This appliance is essential for aesthetic reasons, the production of proper speech sounds and the support of the labial musculature.

One of the most important functions of a prosthetic appliance is, however, the substitution for an ununited hard or soft palate by means of a suitable material when surgical treatment is contraindicated.

An efficient prosthetic appliance will subserve speech, improve the appearance and assist the patient in obtaining some degree of oral resonance. It is necessary for the prosthetic

appliance to cover the extent of the cleft laterally and antero-posteriorly. It should be sufficiently long antero-posteriorly to enable comfortable contact with the pharyngeal muscles during contraction. Care is taken to see that these muscles approximate the appliance with sufficient pressure to establish a proper air seal. Too forceful a contact on the other hand will cause an irritation of the muscular tissue and also tend to dislodge the appliance. The prosthesis should be just wide enough to permit easy and comfortable soft palatal movement without loss of contact of the tissues with the prosthesis during speech activities and deglutition.

The prosthesis is vaulted as much as is anatomically desirable in order to provide the oral spaciousness necessary for free tongue movements. Reduction of this oral space by an insufficiently vaulted palate will create further unnecessary speech obstacles.

After orthodontic treatment a dental prosthesis is frequently used to act as a retaining appliance, particularly in the prevention of a collapse of the buccal segments.

A prosthetic appliance should be comfortable, of light weight, tissue tolerant, smoothly finished to facilitate cleaning, and above all, correctly planned. Since alterations become necessary during growth, it is desirable that the appliance be easily modified by extensions or reductions to it. Acrylic

resins satisfy most of these requirements and is consequently the material of popular choice.

ORTHODONTIC TREATMENT

The orthodontist often only sees the cleft palate patient after the lips, soft palate and frequently hard palate have been repaired. Surgery to the lip re-establishes the bucco-labial muscular band which exerts a constricting effect on the two maxillary segments. Pre-surgically the segments of the maxilla are often widely separated. After surgical treatment of a type III cleft the patient presents an arch form of a fairly typical nature. There is an approximation of the alveolar segments anteriorly, the smaller segment usually being over-rotated to become contained within the premaxillary alveolar section of the larger segment. There is some concomitant narrowing of the posterior portion of the palate. The effect on the maxillary alveolar process is such that it is now lingually positioned in relation to the mandibular arch, particularly in the anterior region. The deficiency of the upper jaw frequently gives the patient an appearance of having a lower jaw prognathism.

Laminagraphy⁴ has shown that the moulding action of a repaired lip and palate is not necessarily confined only to the alveolar bone; the arrangement of the trabeculae of the whole maxilla is affected. In many cases an approximation is established between the turbinate and the nasal septum. This has been postulated as a possible explanation for the distorted nasal speech sounds described as hyponasality superimposed on the hypernasal quality. This construction of the maxilla may also be present before any surgical intervention of the palate.

The prime objective in orthodontic therapy in these cases is the establishment of correct arch form and occlusion and thus the improvement of appearance, mastication, deglutition and speech. To achieve this the orthodontist has to expand the maxillary arch in such a way that the maxillary teeth will articulate correctly with the mandibular teeth.

The effect of an expansive force to the cleft palate differs radically from the effects in non-cleft cases. Ordinarily, expansion in the non-cleft involves the movement of individual teeth through bone, but the same expansive forces, when applied to the cleft palate does not move the teeth through bone per se, but actually moves the two segments of the maxilla apart. Tooth movement is minimal, the entire maxillary bone housing the teeth becomes repositioned. For this reason the type of expansion in cleft palate cases frequently improves nasal ventilation in that the turbinates are moved away from the nasal septum, particularly in the anterior region. The expansive phase can be completed rapidly in 2 to 3 months

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In the type IV clefts of the lip and palate, the buccal segments are usually collapsed and the premaxillary segment is located well ahead of the maxillary arch. It is suspended from the cartilaginous nasal septum which Scott⁵⁶ claims to be one of the cardinal growth centres for the face. This anterior segment consists of teeth and alveolar bone; no muscular tissue is attached. The size of the segment varies, the larger the segment the more teeth it accommodates. Surgical repair of the lip envelops this protruding maxillary mass retarding its forward growth and this helps to establish a more normal relationship with the two buccal segments of the maxilla after they have been expanded. The teeth in the anterior segment are usually severely lingually inclined and malformed and may have to be extracted.

Further Orthodontic treatment is usually necessary at about 12 years of age when most of the permanent teeth have erupted, to align the teeth and establish an occlusion. A prosthetic appliance with the necessary tooth replacements is frequently used as an orthodontic retaining device.

Early treatment is almost always indicated because the deformity is less in younger patients and results are obtained more rapidly. If the maxillary teeth are aligned and repositioned, the mandibular arch tends to accommodate itself to the upper before severe mandibular deviations are allowed to become established. Unfolding the maxillary arch at an early age allows for the normal function and development of the jaws, prevents the perverted forces of crossbites to distort the growth pattern and aggravate the condition. The psychological advantages must naturally not be overlooked. It may be correct to assume that early correction will assist with the normal development of the functions of speech. If the deformity is slight it may be advisable to postpone treatment until the eruption of the permanent teeth.

Apart from cleft-lip-palate problems, cases are frequently complicated by antero-posterior skeletal dysplasias. These are readily diagnosed by means of cephalometric roentgenology and will require additional treatment for these malocclusions.

PROBLEMS OF THE SPEECH THERAPIST

The first problem a child with a cleft palate encounters is that of feeding. With co-operation and advice this is not an unsurmountable problem. The second is one of making himself understood through the use of speech. This is more complex in that the ability of being able to express one's thoughts in a language takes time, and involves the ultimate in neuro-muscular control of the speech mechanism.

Speech is usually not established until the end of the second year of life, but the actual sounds used in speech are acquired very much earlier. Speech is at first confined to vowel sounds, but at about the 10th week the lips and tongue begin to play their part and consonant sounds make their appearance. The change from vowel sounds to the use of sounds which more nearly resemble language is a gradual and complicated process involving observation, initiation, imitation, repetition, association of ideas and images, ability to understand and the precise control of the speech apparatus.

The development of speech in the cleft palate child is for a time similar to the normal, but since the oral and nasal cavities remain undivided, there is a distinct nasality in all sounds. A form of speech which has a marked deviation from the normal begins to develop. The child is becoming accustomed to the sound he hears himself producing. Unfortunately these abnormal auditory images are associated with the normal speech sounds he hears and is attempting to imitate. The child is invariably not conscious of the fact that his speech is any different from that of his associates. Some time later he begins to realise that it is only with difficulty that he is able to make himself understood. Frequently it is when his playmates ridicule his attempts at speech that he begins to appreciate that he is different from others. Faulty speech habits are being developed and these habits are difficult to eliminate in later years.

The production of normal speech in the cleft palate patient is the ultimate objective of the speech therapist. The ability of the therapist to attain this goal depends largely on the success of the earlier treatment. The degree of nasality is usually proportionate to the efficiency of the palato-pharyngeal sphincter, nasality being absent in the highly successful surgical cases having a completely functional soft palate. In cases where an anatomical deficiency remains and normal physiological function is impossible, the speech therapist is obliged to make the best possible use of the existing musculature by means of exercise. Perseverance and co-operation of the patient are of major importance in the establishment of modified speech habits. Obturators are fitted to patients where surgery is either contraindicated or where secondary operations are deemed inadvisable. This will assist in the separation of the oral and nasal cavities. Where neither of the above alternatives are possible, the only course a therapist can adopt is to train the patient to direct his voice and breath in a manner that the maximum amount possible passes through the mouth and minimum through the nose.

The intelligence quotient of a patient likewise plays an important role in effecting a good result; the more intelligent the child, the greater the like-

likelihood of the therapist achieving a result. If intelligence is decidedly below normal there is every likelihood that the child's speech will remain defective despite the ability of the patient to correctly articulate individual sounds and also to seal the nasal cavity from the pharynx thereby preventing any nasal escape. Where operative procedures have not been entirely successful, the prognosis in the mentally retarded is poor; the ability to co-operate and/or concentrate make the elimination of faulty habits particularly difficult, if not impossible.

Since children with cleft palates are prone to inflammatory lesions of the pharynx, the middle ear is frequently infected. Infections of the ear, if neglected, frequently lead to deafness, which in turn hinders speech re-education. In many instances the patient is obliged to make use of a hearing aid.

The age at which the cleft palate is repaired is important. In cases operated on between one and two years of age, before the production of consonant sounds are learnt, provided the result of surgery is successful, normal speech may be attained without the aid of special training. The bad habits acquired before operation may not have had a chance to obtain a persistent hold. These defects are not lost immediately after the operation, the change and loss of nasality is gradual. The longer the operation is delayed, the more difficult it becomes for the patient to rid himself of his acquired faulty speech habits.

Conscientious effort on the part of the therapist and patient alike is usually sufficient to overcome most of these difficulties. Where an incompetent palato-pharyngeal closure persists, the patient is taught to make the best possible use of the artificial and anatomical structures at his disposal.

Among other factors that influence the result of speech therapy is the personality of the patient, his or her environment and of course the therapist patient relationship.

DISCUSSION AND CONCLUSION

The problems involved in the treatment of a cleft palate individual are obviously vast. Only the surgical, prosthetic, orthodontic and speech problems have been mentioned, but the psychologist, otorrhinolaryngologist, dentist, pediatrician and sociologist may also have to play an important part in the treatment of these unfortunate individuals. A cleft palate patient is, therefore, not a dental problem, neither is he a surgical problem, nor is he a speech problem or a psychological problem; he is an individual and a personality and should be regarded as such. The most efficient and satisfactory method of treating every variety of cleft palate is through a group of people adequately prepared by close professional association conducting a truly integrated and co-ordinated care programme. Ideally, the patient should be jointly examined by this clinical team and the total care programme fully outlined. Full records should be kept and the patients recalled from time to time and the problems jointly re-evaluated.

These multi-professional teams are not easily organized, neither are they easily managed. A suitable alternative however, particularly in a region or country where no such clinical team exists, would be the formation of a discussion group, where a single case is examined and the records studied by all. Each member should be called upon to present his aspect of the case and the difficulties he expects to encounter. In this way each member of the group would glean an understanding or appreciation of his colleagues' difficulties and likewise the possibilities of therapy.

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