

21. *Standard Lip and Palate Closure*

and Let the Segments Go Where They May

LONG, long before presurgical orthodontics and alveolar bone grafting, lips were closed in the early months and the palate at about 1 year. In 1787 Gerard, comparing the effect of lip closure upon the palatal cleft in a 9-year-old and a 30-year-old patient, advocated that closure of the lip be done "at a tender age" to bring forward apposition of the cleft palate edges. The early lip closure served for Gerard as an orthopedic device to narrow the palatal cleft. Subsequently many surgeons were enticed by the possible advantages of more sophisticated presurgical orthodontics and primary bone grafting into the cleft. Some who ventured into these new vogues were later to return to the standard approach. Others never left and were not afraid to admit it.

HARDING

Robert Harding, in his typically quiet, sincere, effective way, presented his findings:

In following our patients quite closely it has been our feeling that most of our patients would benefit little, if at all, from a primary bone graft.

He explained that he was not opposed to maxillary orthopedics and bone grafting but looked at these as a secondary or later procedure. Harding considered that a child with cleft palate, which in itself varies in each case, has the potential for "normal"



Robert Harding

growth within the limits of his own genetic heritage and metabolic environment. He expressed far more concern about avoiding raw areas with scar contracture by conservative surgery and waiting for subsequent gentle molding by united muscles, for, as he said,

Growth is a gentle force and can be contained by an equal and opposing force.

When the patient attained 10 pounds, Harding simply closed the lip, unwilling "to dilute his attention" to other surgical procedures. He reported good results with a modified quadrilateral flap, a triangular flap or the rotation-advancement method, but warned:

The first surgeon has the best chance!

oops! Then, slightly out of character, he slipped the baby a nipped bottle for the first feeding two hours after surgery!

a raw area? At the time of palate surgery, Harding reported 50 percent of patients with maxillary segment collapse, the other half showing resistance due to end-to-end contact of segments, a large inferior turbinate or the size and shape of the nasal septum and palatal shelves. At present Harding closes the palate at 1 year in two stages, the hard palate with a one-layer vomerine flap leaving the alveolar cleft open and, four months later, simple approximation of the soft palate, accepting a short palate primarily. In his series are palate cases which were closed at 6 months and others in the older age periods. Without adequate statistical data, he expressed a general feeling that his "early" surgery did not cause any more maxillary growth disturbance but did seem to improve speech results. His final defense of the conservative stand included "both the patient and the surgeon do better" and "our complications are minimal with no mortalities in 2000 cases."

MAZAHERI

Harding's orthodontic teammate and co-captain, Mohammad Mazaheri, backed his surgeon's conservative stand and outlined his figures following this sound treatment in unilateral cleft lip and palate cases:

1. Seventeen percent of all cleft samples were found to have some kind of transverse crossbite.

2. A large majority of the crossbites discovered involved only the anterior region.

3. The incidences of crossbite, either anterior, posterior or both, in unilateral and bilateral cleft lip and palate are:

unilateral: deciduous 47.5 percent; mixed 60 percent; permanent 17.2 percent.

bilateral: deciduous 20 percent; mixed 40.9 percent; permanent 26.7 percent.



Mohammad Mazaheri

Mazaheri concluded:

Treatment of these cases is no real orthodontic problem to us.

In 1972 Harding and Mazaheri repeated their conservative stand in reference specifically to 80 bilateral clefts, stating:

We decided to repair bilateral clefts of the lip and palate by as simple a procedure as possible, and to leave the alveolar clefts open so that the maxillary segments would be relatively free to mold and adapt. . . .

Repair of the lip with good restoration of the functional muscle matrix reduced the subsequent width of the cleft in the maxillary segments—as we had expected. . . . For example, a Simonart's band is often all that is needed to contain the maxillary segments. . . . The difference in the maxillary widths between the bilateral and the unilateral cleft lip and palate groups, although great at birth, became less significant after repair of the lip. . . .

There was a constant change in the segmental relationship of the premaxilla and the lateral segments during various stages of the arch development. In most patients in whom an overlap of the premaxilla over the lateral segments was present both before and after lip surgery, the segmental relationships began to change prior to 3 years of age and terminated with an end-to-end relationship after eruption of the deciduous dentition. Evidently spatial relations will improve with dento-alveolar adaptation, provided the segments are not locked in by a surgical design or by fibrous tissue, and provided the tongue is normal. . . . Underdevelopment of the mid-face with retrusion of the maxilla is, we think, the result of the individual's genetic heritage or of a false maxillary ankylosis secondary to surgery. Considerable progress has been made in cleft palate surgery in providing anatomical restoration which will restore function. It appears that we should revise our emphasis in favor of a better balance between effects on growth and early function, because the two will ultimately be interdependent.

good!

In 1976 Mazaheri made a pertinent observation:

In patients we have followed longitudinally over the past 14 years, we have found that the #1 major variable in acceptable oralfacial growth pattern is the surgeon. Of course, besides the surgeon, the type of surgery also has a great effect on this pattern of growth. Yet the type of surgery does not mean much if the surgeon does not do his job well.



Wilton Krogman

K R O G M A N

Wilton M. Krogman, anthropologist and director of research at H. K. Cooper Institute, Lancaster, Pennsylvania, recalled:

My concern with bones and growth stems from early childhood. At the age of nine while playing "buried treasure" with my twin brother, I struck bone in one of our random holes in a vacant lot. Further digging uncovered a skull which turned out to be that of a horse, followed by its entire skeleton more or less as articulated in life, lying on its side. . . . Time passed and in my Freshman-Sophomore high school years, I grew 8 inches at a greatly accelerated rate to 6 foot, 4½ inches. Thus a fast grower grew into a growth student.

I am, I think, the only active craniofacial growth researcher who spans the total progress in the field: craniometry (skull); cephalometry (head); roentgenographic cephalometry (x-ray head film). This trilogy of research methodologies is basic to the knowledge and interpretation of craniofacial and cephalofacial growth and development, both normal (non-cleft) and abnormal (cleft).

The increase in size and change in proportions, the maturational age-changes, the sex differences, and the racial differences of the human skeleton have been combined by me into a sub-specialty, "Forensic Anthropology." My *The Human Skeleton in Forensic Medicine*, 1962, is on the shelves of every law enforcement agency in the world. I am known as "the bone detective." In the 1930's, I was consultant to the Scientific Crime Detection Lab of the Cleveland Police Department, and still have my Police Card, signed by Eliot Ness (of TV "Untouchables" fame), who was Director of Public Safety. As a lab-man, I was never on the "firing-line."

In 1975 Wilton Krogman, with Mazaheri, Harding, Ishiguro, Bariana, Meier, Canter and Ross stated:

It has been our feeling, here at Lancaster, that conservative surgery (properly timed, and offering a minimum of mucoperiosteal involvement) should not result in deviant and/or dysplastic maxillo-facial growth.

After 24 staggering pages filled with numerical tables and charts on growth measurements, they concluded simply:

On the basis of our two serial samples, CP and unilateral CL(P), we have observed that there is a general *post-operative catch-up growth in both cleft types*, more so in CP. It is our conclusion that conservative surgery has facilitated rather than inhibited or deviated growth in both the maxillofacial skeletal complex and the soft tissues of the labiofacial complex. In the data presented in this study, our hypothesis has been sustained.

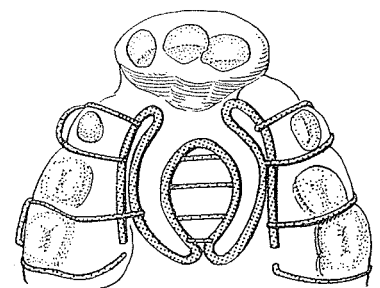
If we swing from the conservative unit in Lancaster, Pennsylvania, to one in Sussex, England, the report is similar.

GLASS

Orthodontist Denis Glass reported in 1970 with C. R. McLaughlin as the surgeon:

At the East Grinstead Centre, no primary bone grafts are carried out as the cleft lip and palate team feel that the benefits, if any, . . . are out of all proportion to the severity of the surgical procedure involved.

So at East Grinstead, the "merry ol'" standard approaches are used, with conservative vomerine resection for setback of the premaxilla in severe protrusion and lip closure at 3 months, and the palate closure at 18 months. The only treatment then is speech therapy until, at 4 years, when the anterior arch collapse and premaxillary protrusion receives dental orthopedic treatment to realign the segments of the maxilla in three to four months. This rapid expansion is accomplished with a CC spring appliance of two acrylic segments anchored to the lateral teeth with Adam crib and cap splints. It is designed for anterior, and not the posterior, expansion by a heavy stainless steel wire bent into the form of a double C. No bone grafting is used.



PRUZANSKY DEFENDS THE STANDARD APPROACH

Partially discounting the Graber, Slaughter, Brodie and Subtelny scare of years before, Sam Pruzansky balked at delaying palate

surgery pending completion of a major portion of maxillary growth. He stated:

It has become increasingly clear that the damage to maxillary growth lamented a decade ago was largely the byproduct of surgical practices no longer in vogue in the larger centers. The present generation of treated patients does not present the maxillary deformity that was untreatable by conventional orthodontic means.

He favored early lip closure with maxillary molding and standard, atraumatic palate closure with orthodontia available to correct any discrepancies in the adult dentition. He later elaborated at the 1969 Second International Symposium on Early Treatment of Cleft Lip and Palate, held in his hometown of Chicago. Having controlled his emotions through the afternoon of the second day, he finally rose, mentioned that the *Proceedings* of the First Symposium in Zurich had recorded a "Tower of Babel" and questioned whether this second symposium was not a repetition of the first! He then dropped a Pruzansky "cocktail":

One fact is inescapable. That is, whether you use maxillary orthopedics and/or bone grafting, or whether you do not, some cases succeed and some fail. . . . Why? Never mind the percentages. Everyone knows that you do not achieve 100% success. What are the mechanisms for success and failure? Is it in the kind of surgery? Is it in the age at which you operate? Where is the difference?

Pruzansky concluded:

Let me summarize by stating that a survey of our cases indicated that, in the present practice of plastic surgery, the following variables inherent within the patient dictate whether the arch will collapse or not:

1. Size and shape of the alveolar processes adjacent to the cleft.
2. Size of the palatal processes.
3. Geometric relationship of the palatal processes.
4. Size and slant of the nasal septum.
5. Size and shape of the inferior turbinate on the side of the cleft.



Howard Aduss

Howard Aduss, orthodontist of Chicago, once played running guard in Big Ten football at Purdue University weighing only 175 pounds. Later he was trained by Sam Pruzansky and again proved his toughness by continuing to work closely with him

while maintaining his own identity. In 1964, and again in 1967 and 1968, he co-authored papers on the cleft palate with Pruzansky and twice was senior author. At the Cleft Palate Symposium at Duke University in 1973 Aduss pointed out:

Initial State

Among unoperated infants with complete unilateral cleft lip and palate, excluding those with Simonart's bands, there is considerable variation in presurgical morphology and the spatial interrelation of the cleft segments. Longitudinal studies, utilizing dental casts and cephalometric radiographs, have demonstrated that these differences often predict the effect of lip repair on the shape or form of the arch as follows:

1. The size and shape of the alveolar process adjoining the cleft is determined by the number of developing teeth at the margins of the defect. The presence of well-formed or even bulbous alveolar borders acts as a buttress to prevent "collapse" of the segments.

2. The size and shape of the inferior turbinate on the side of the cleft also determines the amount of medial movement that may occur. Where the turbinate on the cleft side fills the nasal chamber, contact between the deviated septum and turbinate may also prevent approximation of the segments.

3. The size, inclination, and degree of deviation of the septum, coupled with its relationship to the turbinate, may limit medial movement.

4. The size and spatial relation of the palatal shelves to each other have been shown by stereophotogrammetry to be highly variable. When the shelves are displaced "horizontally" toward each other, the tendency toward medial movement will be more inhibited than if the shelves are at a more acute angle.

Subsequent State

Repair of the lip allows the previously defined morphologic variables to interact as determinants of arch form.

A review of ninety infants at the University of Illinois has shown that after lip repair, three types of arch form were discernable: (1) symmetrical (. . . 35.5%), with approximation of the segments and a butt-joint at the alveolar border; (2) overlap, or "apparently collapsed" arch form (. . . 43.3%); and (3) symmetrical arch form, but without contact at the alveolar border (. . . 21.1%).

Aduss noted the similarity of the crossbite reported at the University of Illinois and that reported by Bergland in Oslo.

Neither had used presurgical orthopedics or bone grafting but had relied upon standard closure of the lip and palate. He also noted that there was less crossbite (less collapse) in these groups than in those using presurgical orthopedics and primary bone grafting.