

12. Primary Osteotomies

A most important aspect of the cleft deformity which influences the dental occlusion and maxillary platform for the face is the presence of a cleft of the alveolus extending through the hard palate. If the cleft does not go through the alveolus, there is usually enough buttress in the anterior bony arch to maintain occlusion with the mandible and resist distortions caused directly by the surgery or secondarily by postsurgical contracture.

The discrepancies in the maxillary and premaxillary segments associated with clefting present varying degrees of distortion. It is the nature of a surgeon to take up the scalpel or chisel to correct deformity, and, although many were content to use the compression of bandages or lip closure to mold the premaxillary protrusion, some were stimulated to take more radical action.

EXCISION OF PREMAXILLA

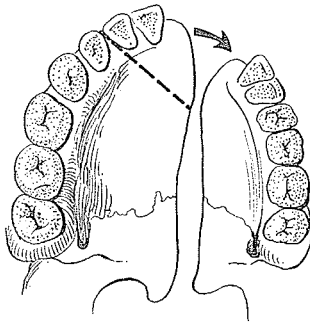
In 1814 Xavier Bichat noted that P. J. Desault had removed the projecting bony prominence of the premaxilla in bilateral clefts and by three months all had healed. He also observed:

But the transverse diameter of the upper jaw, diminished by the whole width of the projecting button, did not correspond any more to the lower jaw, and as is often observed in old persons, there supervened a setting of the upper in the lower jaw, which was extremely inconvenient for mastication. This inconvenience, being the obvious result of loss of substance in the superior maxillary bone, changed the practice of Desault on this point.

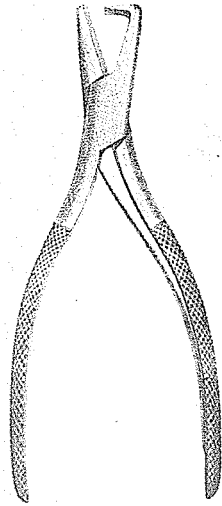
He turned to external pressure against the premaxilla (presurgical orthopedics) with linen cloth bandages.

OSTECTOMY AND OSTEOTOMY IN UNILATERAL CLEFTS

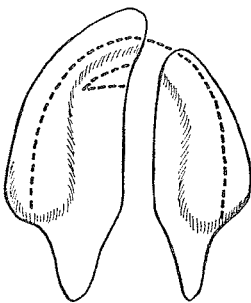
In 1864 Dambre of Conrai closed the breach in the alveolar ridge in a patient with a left unilateral lip-jaw-palate split by pushing the projecting premaxilla into place after extracting the right second maxillary incisor. To promote healing between maxilla and premaxilla, he cauterized the edges with silver nitrate and fixed the parts with an ivory plate and T-shaped rod. In 1873 Duplay closed a unilateral alveolar cleft by pushing the projecting premaxilla into place after sectioning the bones subperiosteally from the right maxilla. He denuded the edges and, after wiring the bone, sutured the mucoperiosteum.



As noted by Conway and Stark in *Plastic Surgery . . . One Hundred Years Ago*, Gurdon Buck described osteotomy for unilateral clefts of the lip and palate in 1876:

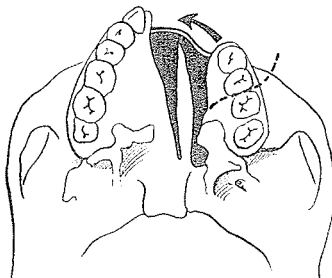


The bony prominence formed by the anterior extremity of the right segment of the alveolar arch was first broken down and reduced into position by the application of Butcher's bone pliers. . . . The prominence, after it was reduced, bridged over and filled up the cleft in the alveolar arch. By previously paring the confronting edges bony consolidation was secured. The removal of this prominence also facilitated the approximation of the two halves of the lip.



In June 1882, in St. Paul, Minnesota, at the Dental and Oral Surgery Section Meeting of the A.M.A. Goodwillie described his method for correcting discrepancy in maxillary alignment in cleft palate:

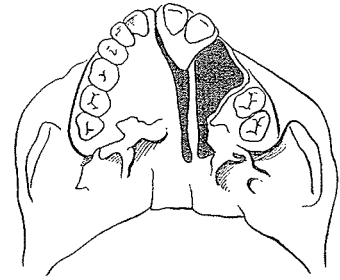
By means of a small revolving knife and surgical engine, a V-shaped section was removed inside the alveolar process of the intermaxillary. . . . Just enough was taken away by the V-shaped section to allow the alveolus of the intermaxillary to resume its normal position.



After the ostectomy the premaxilla was bent and wired. Goodwillie operated "as early as the twelfth hour after birth."

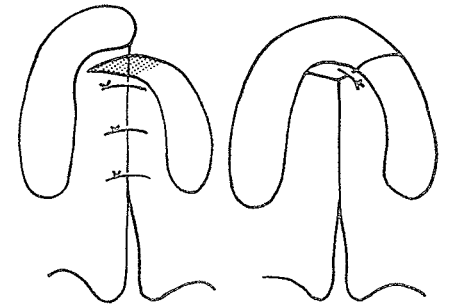
In 1892 von Esmarch and Kowalzig passed a chisel through the intermaxillary union so that the premaxilla could be turned on its axis and pressed into the cleft with closure of the soft tissue at the same time.

In 1893 Wyeth used an osteotomy to correct the continuity of the alveolar ridge in cases of unilateral lip-jaw-palate clefts when the premaxillary portion on the cleft side was absent. He fractured a segment of the maxillary bone distal to the cleft, moving the fragment forward to fill the gap and fixing it with wire sutures passed through the bone.



Wyeth

In 1896 Julius Wolff emphasized that, in cases of unilateral projecting premaxilla, normal pressure of the surgically united lip sufficed to restore the breach in the alveolar ridge. This same view was championed by Blair in the 1930's.



Schoemaker

Yet others continued to correct the premaxillary asymmetry in the unilateral alveolar cleft surgically. Schoemaker removed a horizontal wedge behind the projecting premaxilla in 1911.

In 1912 the gentle James Berry, with T. Percy Legg, suggested that minor unilateral projection could be ignored and the lip closed over it. Nevertheless, for cases in which they recognized that the projection was so great as to make lip closure impossible, they offered two alternatives:

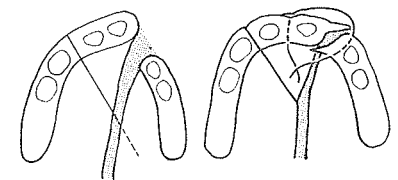
1. Pressure by strapping for long periods, which they dismissed as "slow and not altogether satisfactory."
2. Partial separation and crushing (with a pair of bone forceps) of the conjoined premaxillary bones from the maxilla in order to press the premaxillary bones back into the cleft.

In a typical example of his sensitive approach to this kindred deformity, Berry stated:

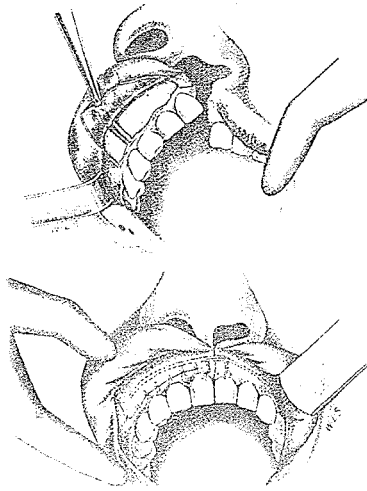
It is not desirable to effect complete reposition of the premaxillary bones. They should, however, be repressed sufficiently to enable the harelip to be closed over them. . . . The subsequent pressure of the lips and the growth of the maxilla will eventually correct the remaining deformity of the alveolar border.

He had a cleft himself and he was ahead of his time.

In 1923 Ombrédanne sectioned the premaxilla with a broad, short-handled chisel. He showed some sophistication in his procedure by the way he lifted the mucoperiosteum of the edges of the alveolar cleft to prepare them for apposition and healing. He fixed the new position of the premaxilla with a wire suture passed through the bone.



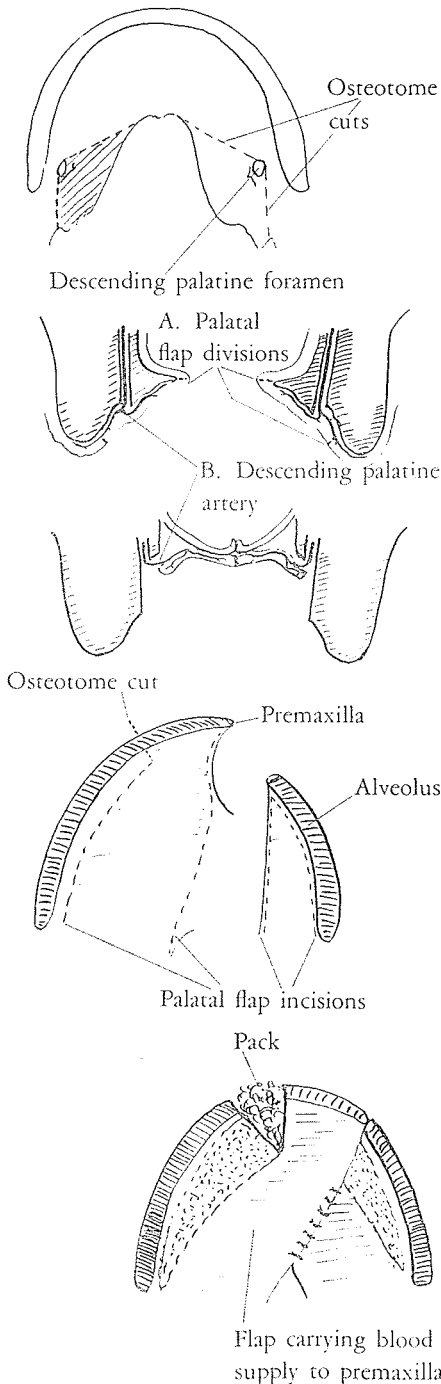
Ombrédanne



Also in 1923, Truman Brophy of Chicago, in his book *Cleft Lip and Palate*, mentioned a patient who unfortunately had reached an age where the maxillary bones could not be easily bent and brought into proper relation.

At least the patient was thus saved from suffering the crushing transmaxillary wires over silver plates, a technique into which Brophy directed so much energetic force. In a modification of a method by W. L. Shearer, Brophy divided the

external plate of the bone with a chisel, with a greenstick fracture of the internal plate, with the osteotomized fragment reduced into proper position with wires.



MODERN OSTEOTOMIES IN UNILATERAL CLEFTS

John Grocott of Stoke on Trent, England, in the 1973 *British Journal of Plastic Surgery*, reported 25 years of experience with primary maxillary osteotomies in clefts of the palate. Using an osteotome, he cut through the bone of incomplete clefts with the descending palatine foramen as the apexes of the triangle and removed the free bone (shaded). This maneuver allowed freeing of the arteries and also upward motion of the flaps, so that the soft palate reached a position much higher in the nasopharynx than it did with the conventional closure.

Grocott claimed flexible soft palates with minimal fistulae and no need for later pharyngeal flaps.

In complete unilateral clefts, to obtain greater symmetry he used an osteotomy to detach the premaxilla from the maxilla, and by prising it he displaced it across the midline, packing the defects with gauze soaked in Whitehead's varnish. The raw bony edges made contact, and the anterior palate was closed with a von Langenbeck procedure. This technique has been used in only a few patients, but the results after two years seemed promising to Grocott. He was pleased with the symmetry of the premaxilla with the maxilla on the cleft side, and the area of the osteotomy has smoothed out, presenting a good alveolar arch.

OSTECTOMY AND OSTEOTOMY IN BILATERAL CLEFTS

Surgical correction of the projecting premaxilla by Franco in the Middle Ages involved its total excision. Similar drastic action was employed by Dupuytren, Sims, Rose and others. Kilner preferred to keep it as a rack to support the middle third of the face, and if it remained wobbly at age 5 to 7 years he excised it and had the child fitted with a denture.

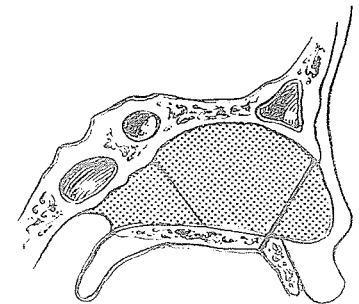
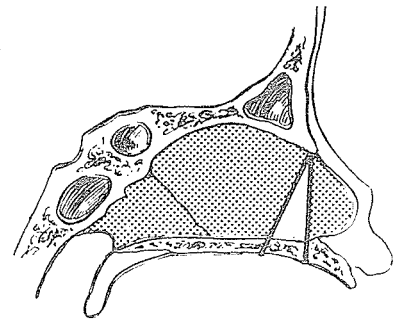
There have been a few surgeons on occasion who have been willing to scrap the tooth buds and part of the premaxilla and keep one bony plate covered with mucoperiosteum to wedge between the maxillary segments to achieve continuity of the alveolar arch. Gillies and Potter used this approach, and Masters added bone chips to bolster the arch.

Numerous surgeons, among them Gensoul, Pancoast and Innis, have carried out compression fractures of the vomer to force the premaxilla back and allow lip closure.

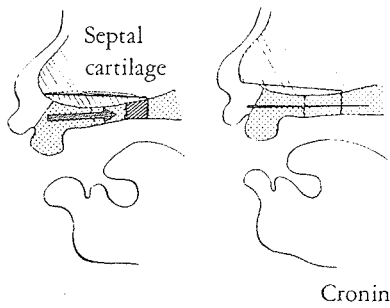
Then there were the multitude of surgeons who carried out vomer resection in various ways to allow setback of the premaxilla into the maxillary arch prior to lip closure. Blandin resected a pie wedge. Von Bardeleben divided the vomer and forced the ends to overlap. Variations of this approach were used by Pichler, Federspiel, Vaughan and Schultz. Denis Browne resected what he referred to as the "bony overgrowth" between the premaxilla and the vomer and held the premaxilla back in the maxillary arch with a toothed bar wired into position. He claimed a high percentage of bony or fibrous union across the clefts.

In reference to the Browne-type "set-back" of a projecting premaxilla, Matthews of London justified his small concern about this maneuver if bone grafts were added:

The surgeon can be reassured that in the very severe case where there is virtually no alternative, the end-result is not prejudiced by this radical operation. This observation is only pertinent, however, when these set-backs have been accompanied by bilateral grafts. . . . It is doubtful whether a "set-back" operation without bone grafts would produce a similar result. If this is true, it follows that if a set-back is done, a bone graft is obligatory.



Blandin



Brown, McDowell and Byars resected a portion of vomer, pushed the premaxilla back and held it with a transfixion Keith needle. Cronin also resected the vomer, divided the septum and fixed the bones in setback position with a Kirschner wire.

Kernahan and Burston modified Cronin's procedure by freeing the septum along the vomerine groove to achieve the premaxillary setback.

There is an esteemed Spanish plastic surgeon who favors setback of the projecting premaxilla, considering this the greatest problem in cleft surgery. In 1971, B. Vilar-Sancho Altet of Madrid wrote:

My opinion in connection with surgical retropositioning of the projecting premaxilla is, for the time being, favourable. I consider that those who detract the importance of these techniques, overvalue the surgical action of the anomalous caudal apophysis of these protruding premaxillae, overlooking the fact that the real cause of the retrusion of the middle third is due to hypoplasia of the maxillae.

Most surgeons today avoid vomer resection for premaxillary setback when possible, or at least postpone it until it is absolutely necessary. Clarence Monroe of Rush Medical College, Chicago, avoids resection when possible but has no great concern when he feels it is indicated. In October 1971 he was accosted with:

You remain one of the most radical surgeons when dealing with a projecting premaxilla. In what cases do you set it back, by what approach, and how do you justify this with so much dental "flack" flying at you?

This was Monroe's answer:

In those rare cases—I haven't had to do one in a long time—when the lateral lip elements are so far back of the prolabium I cannot bring them together with my fingers, then in my clinical judgment, the success of bringing them together with surgery is in danger. I am willing to resect 8 to 10 mm. of septum and vomer in the posterior region of the bulge right up to the root of the nose. I stay away from the area just behind the premaxilla which Denis Browne resected as an "overgrowth."

Monroe was then asked:

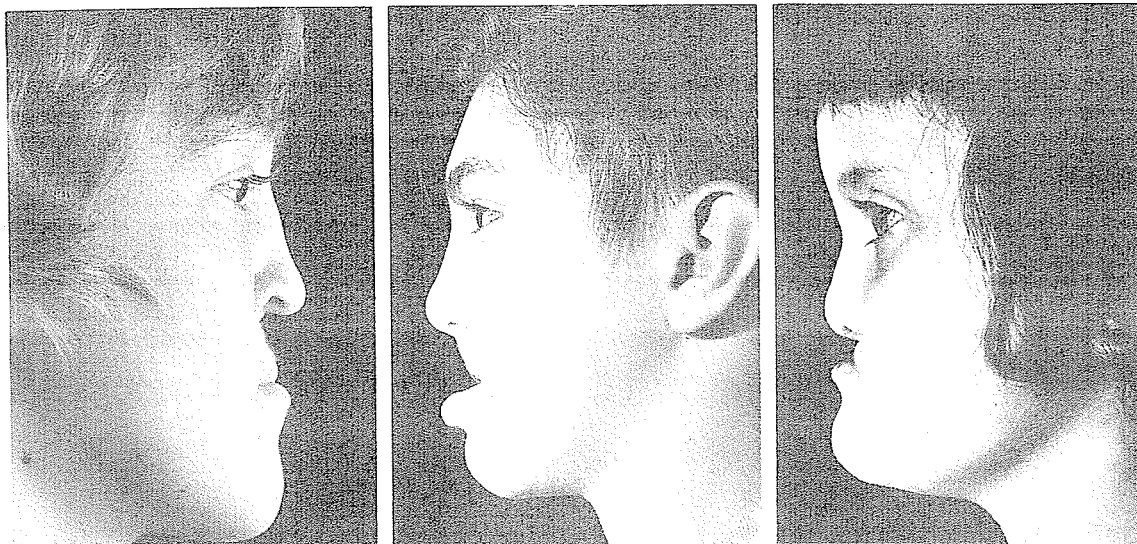
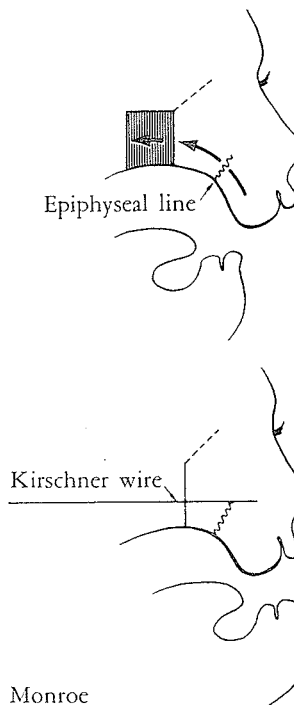
Even Pruzansky and Burston will tolerate later premaxillary setback in certain cases. When do you execute your resection?

And replied:

In the first 3 months of age at the same time as the lip closure. The setback is in undercorrected position by 2 to 4 mm. and the premaxilla is fixed with a pin as Brown described. It is often tempting to set the premaxilla back into contact with the maxillary elements. I have done this in the past but was sorry. With this undercorrected setback at 3 months, only one out of 20 has shown similar losses. Then, too, twenty cases with premaxillary setback have been comparable in growth and development with twenty cases in which the premaxilla was not set back.

William H. Olin of the University of Iowa wrote in 1978 of his opposition to surgical setback of the premaxilla:

While reading *Cleft Craft II*, I came across your report of the 1949 paper by Huffman and Lierle (page 66) in which they routinely surgically repositioned the premaxilla in infancy.



I observed these patients while they grew and followed them to adulthood and would like to report that they all have a serious mid-third of the face growth problem, as demonstrated in the cases enclosed. Lierle and Huffman recognized this severe underdevelopment and changed their technique.

OSTECTOMY AND OSTEOTOMY SELDOM INDICATED

Early rubber band traction attached to a headcap will usually restrain premaxillary projection enough so that after a few weeks

the lip can be closed over the premaxilla. In a few cases, even with the lip closed over the premaxilla, the projection will continue to be too much, necessitating a resection of the vomer at 5 to 6 years for setback of the premaxilla in undercorrected position. Rarely will the premaxilla project so severely that the lip cannot be closed over it. In such a case, early conservative setback is justified if undercorrected and retropositioned only enough to allow lip closure.