13. Uranoplasty by Maxillary Compression

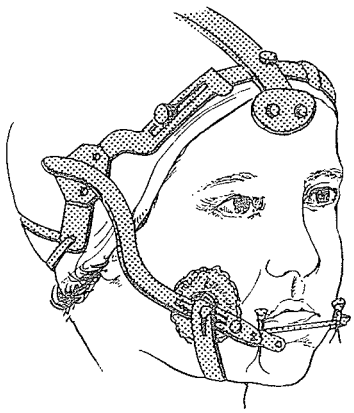
URANOPLASTY or hard palate closure by maxillary compression is a procedure as old as any of the operations suggested for treating cleft palate. This compression has been achieved by three general methods:

1. Gradual external compression, exerted continuously by a truss with arms resting on both sides of the cheek over the maxillary bones until the palate edges are approximated.
2. Forcing the edges of the palate together by pressure, denuding bony borders and then passing wires through the bones to pull and hold them together.
3. Orthopedic appliances placed on the teeth with a crossed palate bar which is narrowed by a jackscrew.

EXTERNAL PRESSURE

In 1772 Levret of Paris elaborated on the importance of an early oral muscle sphincter union, in view of the fact that the edges of the palate are wide apart in adults without lip closure. He observed that in the newborn affected with a complete deformity the maxilla is larger than in the normal. In his opinion the cleft was due, not to a deficit of substance, but to a diastasis of the parts. Brophy, more than a hundred years later, made this the basis for his operation.

In 1836 Montin of Paris described his compression method with newborn children and reported union after three days. The



pressure, he pointed out, could fracture the maxillary bones, an incident he considered of no consequence in the very young. Other external compression appliances were used to push the maxillae together.

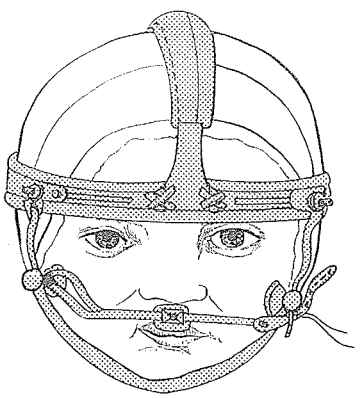
On the other end of the earth, Dr. Ziegler in the *Medical Record of Australia* advocated treating fissures of the palate with pressure. In 1851 he tried the idea on an infant cadaver with a cleft and then proposed:

> The operation should be performed as early as possible after birth, when the bones are in their softest condition. . . . The edges of the fissure having been pared, the superior maxillary bone should be embraced by a horseshoe-shaped clamp . . . padded with India-rubber.

The clamp was set with a joint and screw to exert gradual pressure until the maxillary elements were in apposition.

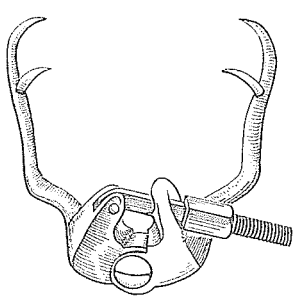
Other "crushers" used ingenious methods to achieve their dastardly deeds. In 1853 Robert illustrated a method of three-point compression of the premaxilla and maxillae. Robert and Bonnafont remarked:

> In effect the method of compression, which we stress, cannot be credited with one author, but as always, sums up the ideas which have preceded us.



Garretson had three ways in 1862: a Hoey clamp, a tight, circumferential rubber band around the head with rubber pads on the maxillae or the maxillo-occipital sling. In a collection of lectures delivered to the Bellevue Hospital, New York, in 1883, Sayre described closing a bilateral lip cleft after birth, and then continued:

> A compress was placed on either side of the superior maxillae, to bring these bones in apposition and close the cleft in the palate. At the time of the operation the fissure in the palate was wide enough to admit the finger. Compression and lip closure by the time of puberty brought these surfaces so close that further treatment was needless.



Then there followed an army of "squeezers." Hammond used a clamp in 1909; Shea used a bar, gaskets, plates and nuts in 1912; Ulrich conceived this crab claw in 1913.

BROPHY'S COMPRESSION BY WIRING

Truman Brophy

Truman W. Brophy, D.D.S., M.D., professor of oral surgery at the Chicago College of Dental Surgery, was a forceful, dogmatic leader. He was so dynamic that he managed to be president of the American Association of Plastic Surgeons for 1921, 1922 and 1923, arranging for the meetings to be held in his hometown of Chicago two times out of the three years. Interestingly, in 1904 Brophy attributed to Sayre the following statement:

> Gentlemen, you see I am able to almost approximate the edges of the cleft palate. If we had some plan by which we could bring the tissues in contact and hold them there until nature united them we would be able to cure this defect. But we cannot do it.

Evidently Brophy was challenged by this admission. He was also confident in the misapprehension that all necessary tissue was present in each cleft. Thus the persuasive Brophy championed the *gradual compression by wiring* method. As early as 1904, in a plea for palate operations in early infancy, he declared:

> Cleft palate is not the result of arrested development or insufficient tissue to form a normal palate.

Years later Sir Arthur Keith wrote to Truman Brophy:

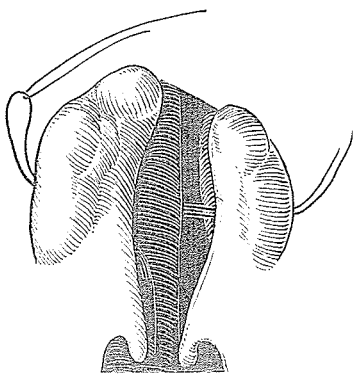
> I agree with you in the majority of cases of complete cleft of the palate there is no deficiency of tissue at birth nor for some time after birth. I also agree that the cleft, however wide, is not due to a deficiency of tissue in the several elements which form the palate, but is entirely due to the fact that when the various embryonal parts are developed and come together in the second month of development, the process of union is delayed and does not take place, hence . . . [they] tend to separate as growth occurs, the cleft increasing during each month of growth. The exact cause of the separation of parts and the enlargement of the cleft is probably due to several factors, tongue pressures, muscle tractions and also the independent process of growth in each part. Theoretically, the best treatment ought to be to bring union at the very earliest date, but theory and practice may not be easily harmonized. Although you [Brophy], Arbuthnot Lane and James Berry have reached diametrically opposite conclusions as to which is the best time to operate, that still does not influence me in agreeing with you that to secure a good palate the sooner the cleft is remedied in complete cases the better the result ought to be.

In 1923 Brophy repeated his stand:

I am sure that anyone interested enough to enter into careful investigation of this subject, no matter what his previous opinions may have been, will be convinced that at birth a cleft palate, with rare exceptions, has in it sufficient tissue to form a normal palate and that the abnormality is only a separation and elevation of well-developed parts.

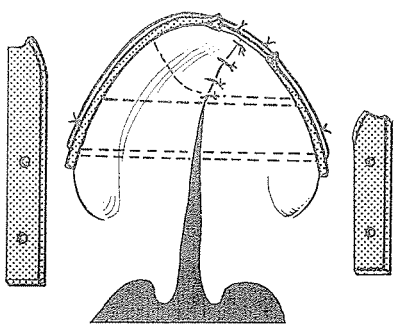
Having launched a direct attack, Brophy then reinforced his position against any doubters:

I have no doubt that an adult, growing up with a cleft palate, has not the full complement of tissue that forms a perfect palate since this tissue has failed to develop in proportion to other parts, as it has not been subjected to the uses for which it was intended.



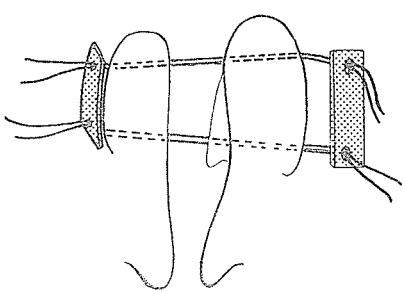
In his 1923 book, *Cleft Lip and Palate,* he explained his pressure technique:

The bones of the hard palate are not crushed together or broken but they are bent and moved into correct relation and united.



He suggested that one operate in early infancy on the bones of the hard palate, then, as soon as expedient, upon the lip and finally, when the child is 16 to 22 months old, upon the soft palate.

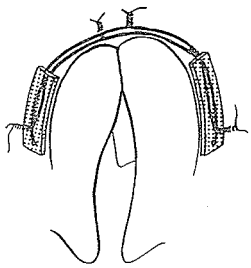
In describing his method of closing the hard palate, he explained how his pilot sutures of silk guided 20-gauge wire through the maxilla above the hard palate and crossing the fissure. These through-and-through wires were passed through lead plates laterally so that with twisting of the wire the maxillary elements moved together. The mucosal edges of the cleft were split so that a nasal and oral layer of sutures could be accomplished as the bony elements were bent together by wire compression.



UNDER THE BROPHY SPELL

In 1909 Vilray Blair of St. Louis described his method of narrowing lip-jaw-palate cleft by forced compression. He passed wires through the maxillae at the level of the floor of the orbit to

avoid penetrating the tooth germs and safeguard them from sloughing. After narrowing the cleft, he closed it by displacing mucoperiosteal flaps mesially.

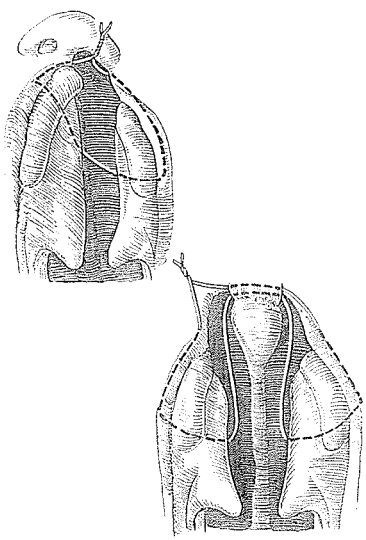


In 1914 Eastman was using malleable iron wire twisted over aluminum plates cushioned with rubber pads. In 1921 Thompson was using lead plates and silver wire.

To emphasize again the breadth of Brophy's influence, here is a quote from an article by Sterling Bunnell of San Francisco in 1927, long before he became infatuated with the hand-and-tendon pullout wires:

> Brophy, whose experience is great, stresses the need of closing the cleft early. . . . Soon after birth the alveolar processes are pressed into alignment and held there by Brophy's method of wires and plates.

Bunnell then devised a perforated silver plate with extensive wires fixed to a plaster headcap to act as a false palate and protect his mucoperiosteal flap closure of the cleft.



As late as 1930 Ritchie used thumb pressure to take the spring out of the bone and then with a Brophy awl and No. 20 silver wire he encompassed the wayward maxillae, bringing the wire ends out in front of the cleft. With a few good twists of the wire he forced the bony parts into so-called normal position. He modified his wiring for unilateral and bilateral clefts.

Gerald O'Connor of San Francisco, aged 71 and not long before his death, wrote this of Brophy:

> He was a very forceful man, gave many lectures, wrote books, did about 5 to 10,000 cases himself. Dentists, surgeons, and orthopedists, almost everyone fell into line with him and it took about 25 years before the damage was recognized. William Shearer (Omaha), Al Davis (San Francisco), Warren Pierce (San Francisco) were using his method as late as 1930–1935.

REACTION AGAINST COMPRESSION BY WIRING

In 1905 the perceptive Sir James Berry scored another victory as he ruled out closure of cleft palate in infants by forced compression:

The violent operations upon the maxillary bones themselves, I think, may reasonably be left to those who prefer to overcome difficulties by force than by craft.

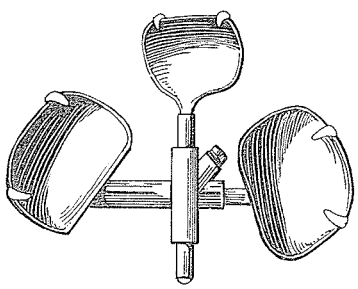
In 1914 Drachter stopped guessing and got out his calipers. Comparing extensive measurements of the normal and cleft palates of the same age, he showed by these measurements the fallacy of closing the cleft palate by forced compression. Drachter pointed out that, in unilateral and bilateral lip-jaw-palate clefts, adjustments of the projecting premaxilla and closure of the lip cleft sufficed to place the palatal plates at the optimal stage of approximation.

In the early part of the twentieth century Vilray Blair made regular trips to Chicago to observe the work of Brophy and Gilmer. After using the Brophy procedure for some years he became disenchanted and in 1923 dealt the principle a blow with the typical poignant clarity which always set him above his peers. He said, simply:

Wiring of the maxillae is sometimes followed by most distressing distortion and lack of development of the upper jaw. The changes are rarely very evident in early childhood, but when seen at the age of 12 or 15 years may cause the operator to regret that this particular child was not one of those infants the angels had chosen for their own.

According to Sarnat,who was one of his students, Blair eventually turned to the Dieffenbach-Warren operation.

William H. G. Logan of Chicago, Brophy's son-in-law, at first embraced Brophy's method but later dared to abandon the compression method and turned to the von Langenbeck procedure.



the power of Brophy

In 1927 Ernst pointed out that forced compression of the split maxillae as done by Brophy was the most unphysiological cleft palate operation. He designed a kinder appliance.

As one of Brophy's early pupils, Bill Shearer of Omaha, to the end of his days, was an ardent proponent of Brophy's theory and techniques in clefts and hotly defended them against all critics. At a meeting of the Association in Boston in 1929, one year after Brophy's death, Robert Ivy recalled that Shearer, after listening to several rather severe judgments on the Brophy method, was so overcome with emotion that he actually broke down and cried.

Victor Veau in his 1931 book, *Division Palatine,* spoke against closure of the split palate by forced compression. In 1932 Ruppe, while writing about Veau's approach to cleft palate, said that Brophy's compression principle in split palate,

in which the two upper maxillaries are approximated, has no anatomical basis. Suitable measurements have shown that division of the hard palate is not due to abnormal separation of the upper maxillaries.

Gerald O'Connor of San Francisco, who trained with Gillies in the late 1920's, reported:

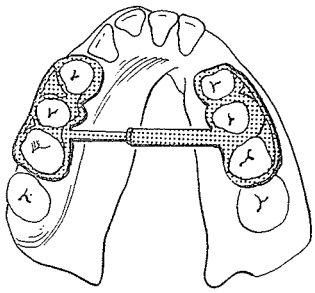
Pierce and Davis finally changed from the Brophy wire compression after I returned home in 1930 and reported the world-wide feeling against the procedure. In the meantime I had taken out many plates and wire with the usual result of great gaps in the palate with loss of tissue.

ANOTHER STUDENT WHO BROKE THE SPELL

With the help of Robert Ivy, I located oral surgeon J. Orton Goodsell in Pompano Beach. He had trained with New, Figi and Lyons in the early days and later served as director of the Saginaw General Hospital Oral Cleft Habilitation Center. In 1972 Goodsell recalled, 50 years ago, holding retractors around the "oral hole" for Chalmers J. Lyons, professor of oral surgery at the University of Michigan, Ann Arbor. Lyons had trained with Truman Brophy and was doing a large volume of work. While on a European trip, he mentioned in Vienna that he did two or three hundred oral cleft operations annually. This caused an Austrian surgeon, who was certain Lyons was overstating his experience, to follow him back to Ann Arbor, but after several months he returned to Austria convinced and impressed. Goodsell remembered:

Chalmers Lyons

Our surgery was the Brophy "silver wire" compressor of the maxillary components that succeeded in destroying dentition and making an inverted "V" instead of a "U" out of the alveolar arch. One of the first innovations by Dr. Lyons was discarding the silver wire technique and, as far as I know, he was the first one to bury submucous sutures in the soft palate muscle. . . . Some of your very competent men—Reed Dingman, Bob Harding and Cliff Kiehn—trained in our University Hospital Oral Surgery program.



The third and most sophisticated dental method for moving the maxillary elements together was achieved with orthopedic appliances attached to the teeth. In 1918 G. V. I. Brown developed a cap splint type of appliance which he cemented to the teeth to pull the maxillary elements close enough so that he could accomplish a von Langenbeck palate closure. He used a maxillary osteotomy to aid the shifting of the bones.

Of course, we know now that all these compressions were being exerted in the wrong direction. Surgeons obsessed with closing the hole stayed awake at night dreaming up ways of collapsing the maxillae to ease their palate closure. Thus, the normal arch was being destroyed, with resultant crossbite and other deformities of malocclusion. Since Brophy's empire was centered in the Chicago area, it is logical that surgeons and dentists continually facing these collapsed arches would sooner or later begin to react against the principle that had caused such dental disasters, and finally they did!