

28. *Pushback of Palate with Horseshoe-Shaped Incision*

GEORGE Morris Dorrance of the University of Pennsylvania was a wealthy general surgeon who had inherited the Campbell Soup Company and became director of the Atlantic City branch of the Philadelphia and Reading Railroad. Among his hobbies was the improvement of the quality of tomatoes grown in New Jersey farmlands which supplied the soup canneries of his Camden plant. Once the Campbell Soup Company was sued by a woman who claimed to have opened a can of soup and found a bandaged amputated human finger. Dorrance's investigations revealed that no one in the company was missing a finger, and the suit was dismissed.

Dorrance, who did a lot of head and neck surgery, became interested in plastic surgery, particularly mandibular fractures and cleft palate. In fact, cleft palate became his surgical hobby. In April 1925, at the meeting of the Philadelphia Academy of Surgery, he outlined his "push-back operation" through a horseshoe-shaped incision for palatal lengthening, yet without entitling it "push-back":

The rationale is to displace the velum back to enable it to assist the superior constrictor muscle of the pharynx to close the nasopharynx during speech.

He justified his approach as compared to Veau's procedure thus:

Veau succeeds in getting satisfactory functional speech in his patients with cleft palate in the average case, without backward displacement of the palate. This, unquestionably, justifies his operation, except in cases in which there is a very marked shortening. Here, we must remember that Veau operates in France, and the majority of his patients speak French. The French language,



George Dorrance

unlike the English, calls for more nasalizing sounds, and hence complete velopharyngeal closure is not always necessary. The functional results obtained by Veau are remarkable for individuals who speak French. However, turning to our patients who speak English and to individuals who talk German and Dutch, we find it imperative to perform a "push-back operation" in persons with cleft palate in whom the velum is usually short.

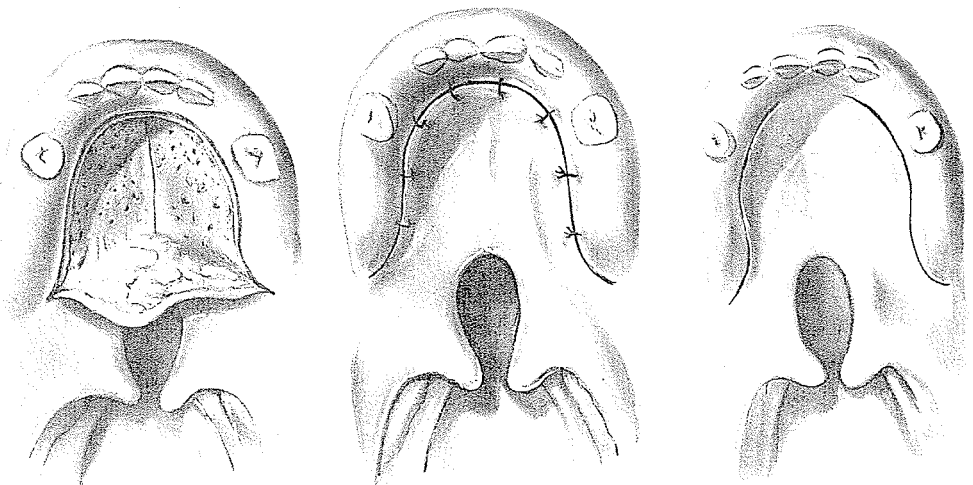
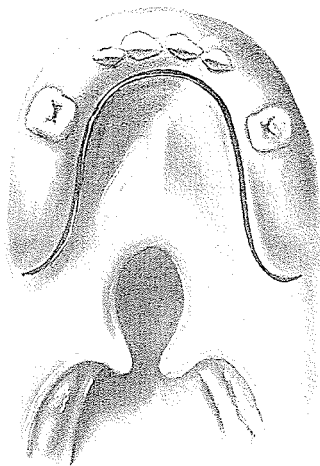
In 1933 in his exhaustive book, *The Operative Story of Cleft Palate*, certainly the palate classic of its time, Dorrance concluded:

From the patient's standpoint, any operation on the palate is judged by the speech result. The secret of obtaining good speech, in cleft palate patients, is to establish complete velopharyngeal closure. This can only be established by an operation which will lengthen the velum sufficiently to meet the pharyngeal wall and to permit the "palatopharyngeal-sphincter" to shut off the nasopharynx.

He was convinced that

Nearly all cleft palate patients have a short palate. . . . It is always necessary to displace the palate sufficiently backward to permit the "palatopharyngeal-sphincter" to function properly. . . . [Thus,] we have developed the "push-back operation."

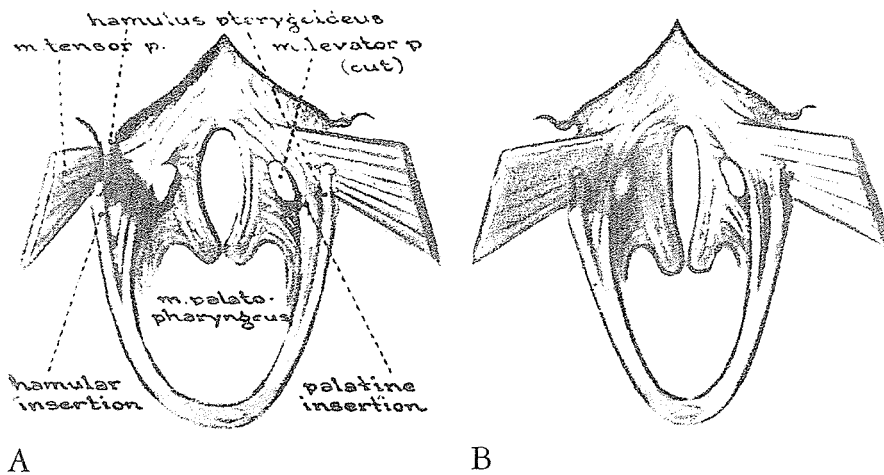
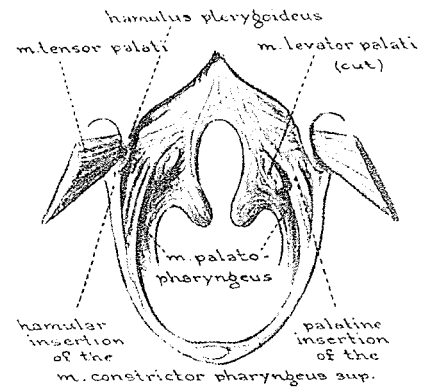
Dorrance set the operation at 5 years of age because of less mortality and less chance of failure. In his first stage, he used the horseshoe-shaped incision with elevation of the mucoperiosteum from the bone back to the attachment of the palatal aponeurosis.



The posterior palatine arteries were divided, and the flap was replaced and sutured. If there was an inadequate blood supply to the palate, Dorrance left an anterior attachment over the incisive foramen as a precautionary delaying measure and dissected the mucoperiosteal flaps and divided the vascular bundles from the sides.

Three months later, in the second stage, the lateral incisions were extended backward around the maxillary tuberosity and over the pterygomandibular fold to obtain sufficient mesial displacement of the muscular tissue. The mucoperiosteal flap was reelevated down to where the nasal mucosa could be divided from its attachment to the posterior edge of the hard palate in a true pushback maneuver. The hamular processes were divided with a chisel, for Dorrance noted that the anatomical investigations of Wardill and Whillis were similar to his own. He too felt that

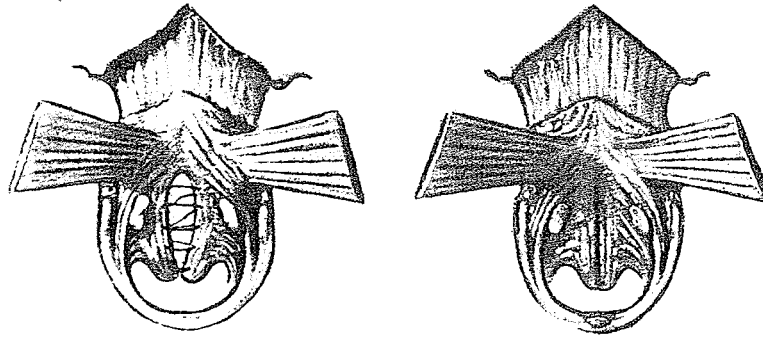
It is this palatal insertion of the superior constrictor muscle of the pharynx which completes the pharyngeal ring.



A, Division of the hamulus on one side removes tension of tensor palati muscle in a case of cleft velum.

B, Division of hamulus on both sides removes tension of tensor palati muscles in a case with split velum and places palatal insertion of superior constrictor muscle in desired position to close nasopharynx.

On this basis Dorrance defended his sectioning of the hamulus, suggesting that it helped to restore the palatopharyngeal sphincter. Even after complete freeing of the mucoperiosteum from the bone, he pointed out, the tensor palati muscles hooking

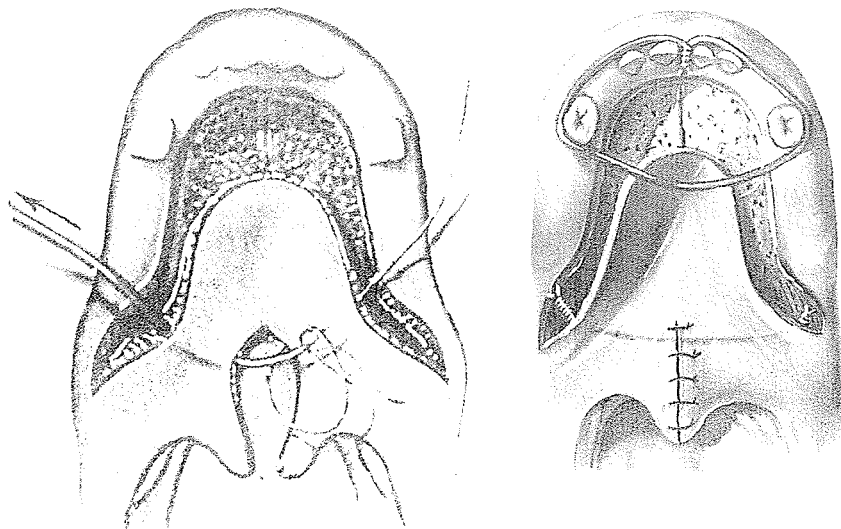
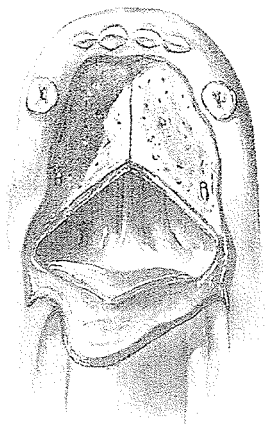


around the hamular processes prevent palate retropositioning. Correction is achieved by sectioning and mesial displacement of the hamular processes, which then lengthens and converts the tensor muscle into a synergist with the levator palati muscle. He also noted:

This also displaces inward and backward that portion of the pterygo-pharyngeus which inserts into the hamulus thereby reducing the abnormally increased diameter of the nasopharynx which occurs in cleft palate.

Dorrance felt too that division of vessels was important and as late as 1946 insisted:

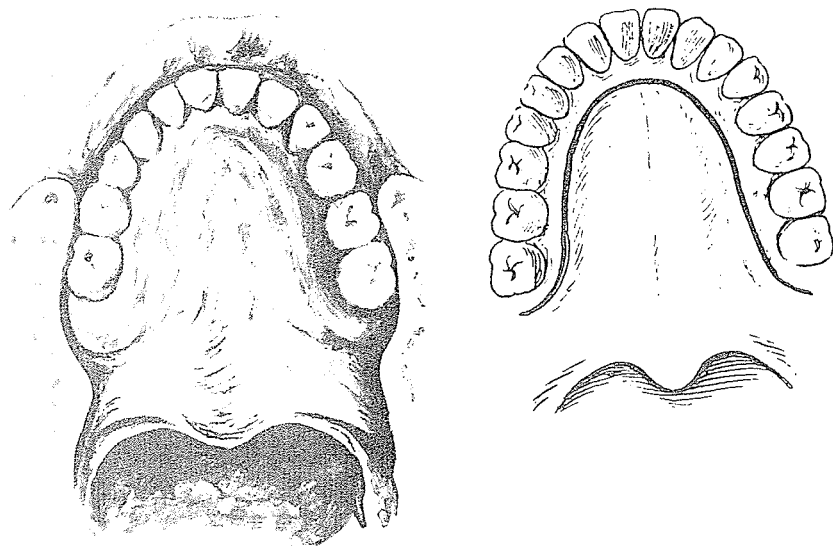
It is next to impossible to obtain the necessary length of the palate without cutting the posterior palatine vessels.



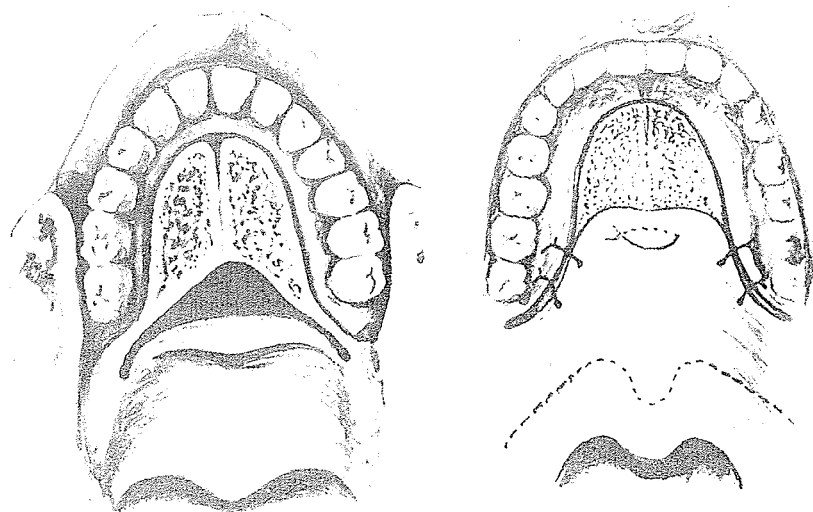
He believed that all these maneuvers achieved an effective posterior retropositioning of the palate. The edges of the cleft were then denuded, the intramuscular wire suture of Veau was

inserted with a Reverdin needle and the cleft was closed with a layer of sutures in the nasal mucosa and another in the oral mucosa.

Dorrance advocated use of his pushback in congenitally short palates and for reclaiming failures by other methods.



He diagramed the lengthening of the congenitally short palate by a horseshoe-shaped incision, elevation of the mucoperiosteum and release from the edge of the hard palate.



The dotted line shows the previous length of the short palate, but the length gained is not assured because of the large raw area on the nasal side.

Dorrance was one of the few cleft palate giants of the 30's and 40's whom I did not get to know. According to McDowell, he was indeed a giant,

a very large man—tall, with broad shoulders, a large head, and large hands.

He died in 1949 while I was in England with Gillies. Because of his impressive book, a cleft palate bible which he left behind and which has been vital in helping to trace the evolution of cleft craft, I have inquired about him from several people who had the privilege of knowing or working with him.

The late Robert Ivy, then in his 90's, came to Miami twice as visiting professor, and each time we would project portraits of various plastic surgeons no longer alive and urge him to reminisce. I flashed Dorrance several times, and although Ivy always gave a fair account, he would never wax eloquent, revealing the slightest suggestion of resentment. He noted:

Dorrance was not popular among the leaders because he was aggressive. He always spent lots of money on art, had diagrams of the palate operations but *never* a photographic record, not a picture.

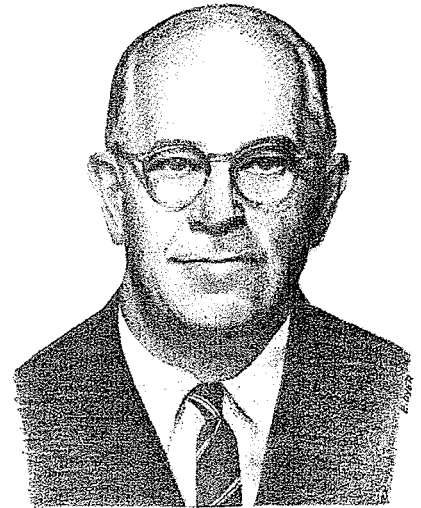
Dorrance trained Arthur Dick of Washington, D.C., and must have towered over him. Dick recalled some interesting aspects of his teacher:

George Dorrance was a big man, over 6 feet and 200 pounds. He was domineering, demanding complete loyalty from his associates. Those who worked for him for years were necessarily quiet and docile like surgeon Bransfield and artist McNett. Having had contact with some of the "needlers" of plastic surgery, I can say from first-hand experience that Dorrance was a needler, a sort of minor-league Pete Moran! He was also a good technician. In spite of his large hands, he could get into a palate and complete a pushback in 20 to 25 minutes.

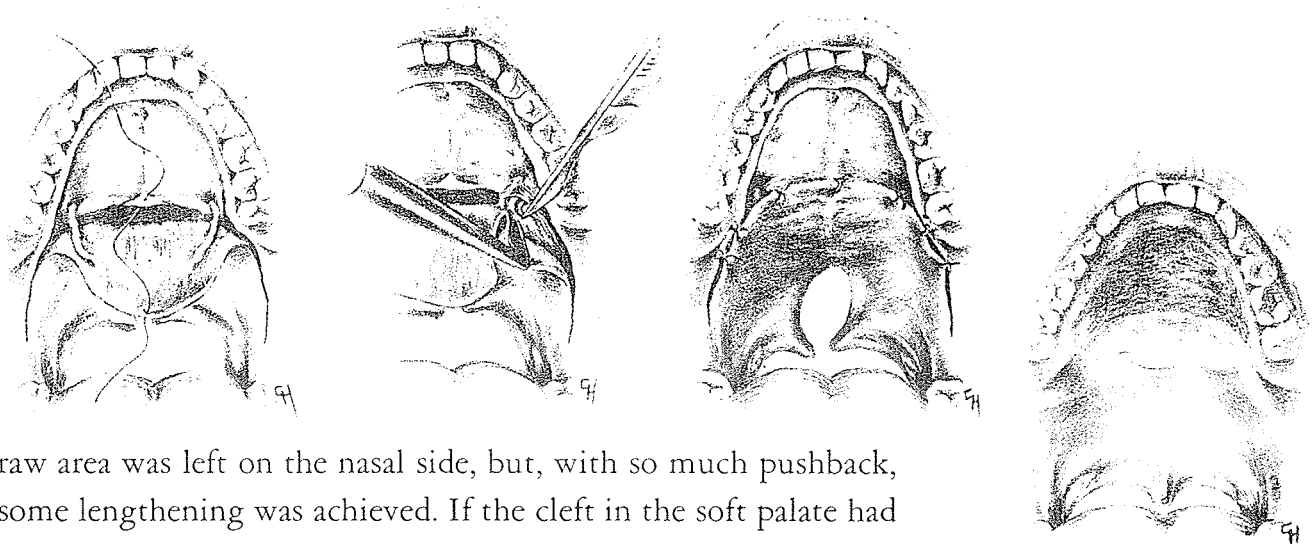
In Philadelphia in 1926 an important International Dental Congress was held in the convention hall, and such famous palate surgeons as Brophy, Gilmer, Ivy and Blair were there. Dorrance presented his pushback, and Limberg from Leningrad first presented his palatal lengthening procedure. Blair had an exhibit in the hall, and a young man named Brown, who had joined him just two years before, was in charge of it.

BROWN

James Barrett Brown of St. Louis was one of the important forces who created the American Midwest mecca for cleft lip and palate surgery. Cases were referred from all parts of the country, and in 1936 Brown published his modification of the Dorrance pushback. In 1940 in *Surgery, Gynecology and Obstetrics*, with lovely illustrations by G. Hance, he described various ways of gaining extra length. He preserved the posterior palatine vessels, sectioning the tensor tendon in one stage. He left a small section of mucosa at the edge of the hard palate to which to suture the tip of his mucoperiosteal advancement flap. Brown kept it optional, depending on blood loss, as to whether or not the cleft in the palate should be closed during the lengthening or at a second stage. He reported 25 excellent results out of 32 patients. A large



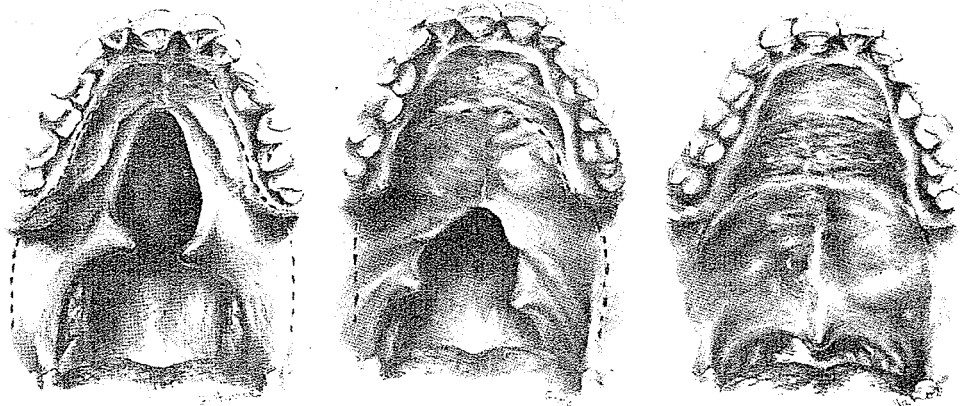
Barrett Brown



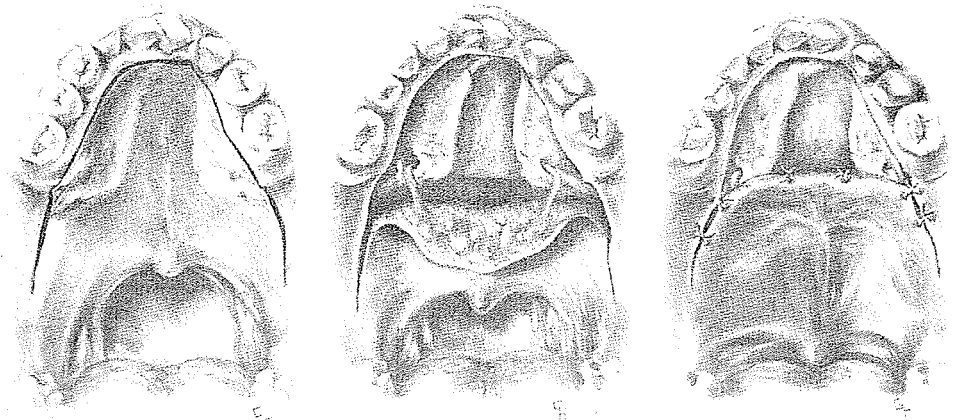
raw area was left on the nasal side, but, with so much pushback, some lengthening was achieved. If the cleft in the soft palate had not been closed during the first operation, it was quite easy to close it in the second stage.

In 1940 Brown described a double elongation in partial cleft palate where only a narrow band of bone and soft tissue is present anteriorly. He set the palate back once and then, by splitting the palatal mucoperiosteal flap, set it back on itself in a second pushback.

This much lengthening necessitated sacrifice of the arteries. The completed "double set-back" and closure of the cleft gained in length about the distance from the hard palate edge to the incisors and without any opening into the nose. The raw surface closed over in two to four weeks.



Brown also used this principle of splitting the mucoperiosteal flap in complete clefts of the palate after the cleft closure had been accomplished in a previous procedure. Hance's drawings show the procedure clearly.



In reference to the denuded area of the anterior hard palate, Brown reported that complete healing occurred in 20 to 30 days and was practically normal in appearance except for the absence of rugae. He acknowledged a humping from side to side of the mucoperiosteal flap at the edge of the bone where the excess was folded on itself. He considered the actual lengthening to be the difference between the tissue in the humping and the distance the edge had been set back. Brown admitted:

A possible objection to this procedure is that the resulting raw nasal surface may contract and shorten the palate secondarily, but so far we have not noted this as being important enough to try to cover the raw surfaces with skin grafts. These palates usually appear excessively long on inspection and the surface nearly always smooths out.

As already mentioned, St. Louis was a great cleft center during the 1940's, and many visitors from all over the world came to watch the Big Three B's, Blair, Brown and Byars. Then as now, visitors were prone to ask some unessential questions, such as "What kind of suture are you using?" This sort of thing used to send Barrett Brown up the wall! Edgerton recalled an incident that occurred while he was assisting Brown:

Dr. Brown had carried out one of his pushback operations on an incomplete cleft of the palate. He had closed the muscle layer and the nasal mucosa, and was in the process of putting in a row of interrupted sutures along the oral mucosa. As was his custom, he would rapidly run down 8 or 10 knots with each suture, to avoid having the patient's tongue successfully untie the suture in the post-operative period. A French surgeon who had been leaning over his shoulder all morning finally asked his first penetrating question of the morning:

"Dr. Brown, how many knots do you tie on each of those sutures?"

Barrett replied without hesitation:

"Seventeen."

and from that moment, by exact count, tied 17 knots on all of the remaining sutures.

It is possible that there is a surgeon somewhere in Europe today still throwing 17 knots on every palate suture in the hope of attaining a Brown result.

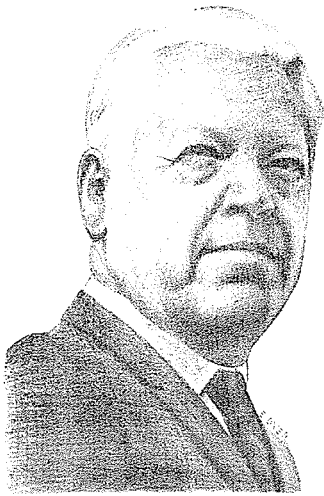
Controversy is the spice of life, and there was some "spice" between Brown and Dorrance. As assistant resident on Brown's and Byars' services at Barnes Hospital in St. Louis, I once asked the chief resident if a Dorrance pushback was to be used in a certain case. The loyal resident asked:

What is a Dorrance procedure?

Naively, I rose to the bait and told him in detail with dates. It was soon after this and several similar such slipups that Brown called me to his office and requested me to complete my last three months of required residency training somewhere else. I followed his suggestion, which turned out to be such a good one that I extended it to 18 months in Detroit and Houston.

There is always more than one side to every controversy, so I asked Josh Jurkiewicz what he remembered. He is a product of the Brown, Byars and McDowell school and is a smart, gentle but honest surgeon who cuts as deep as is required. He recalled in 1976:

About all I can remember was that Brown had little use for Dorrance or the Dorrance procedure. He felt that Dorrance was given credit for the pushback operation when, in fact, he should have been, i.e., Dorrance's two-stage preliminary ligation of the descending palatine vessels was followed by the pushback and a skin graft to the palate, whereas Brown's procedure was a straight-forward pushback. . . . Erle Peacock might have a story or two about Brown. He worked with Brown a great deal more than I did. I had a tendency to spend all of my time with Byars. Brown knew this and it annoyed him. Consequently, I was not one of his favorites.



Frank McDowell

Then I turned to one of the famous Missouri Four—Frank McDowell, who was there through most of it. In spite of his affection for Brown, he calls it as he saw it and possibly sheds some light on Ivy's reluctance to reminisce on Dorrance:

Blair and Brown were good friends of Dorrance and good friends of Ivy, but there were some local frictions between Dorrance and Ivy—precipitated probably by the situation whereby Ivy was Chief of Plastic Surgery in the School of Medicine of the University of Pennsylvania, whereas Dorrance could not get an appointment in that school and had to be satisfied with being Chief of Maxillo-Facial Surgery in the School of Dentistry of the University of Pennsylvania. This was particularly abrasive to him because it was Ivy who had a dental degree, not Dorrance—whose background was in general surgery and who did a lot of big head and neck cancer surgery at the American Oncologic Hospital in Philadelphia. The whole business was the height of irony. Dorrance probably could not escape the feeling that if Ivy had tried harder, he could get Dorrance a position on the medical faculty; Ivy, on the other hand, told me that he did try hard, but the general surgeons who were in control of the Department of Surgery in the medical school didn't want Dorrance because they viewed him as a threat to some of the head and neck cancer work they wanted to do. Dorrance's first paper on his pushback was published in 1925 in *Annals of Surgery*. He thought he would have to make the mucoperiosteum of the hard palate a delayed flap to keep it from sloughing, so he did a preliminary operation to raise this area and to cut both palatine arteries and tie them off. He also thought that it was difficult to raise the palatine flaps satisfactorily without tearing the

arteries, and if this was successful, the intact arteries would inhibit the retrodisplacement of the palate.

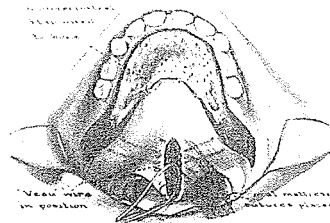
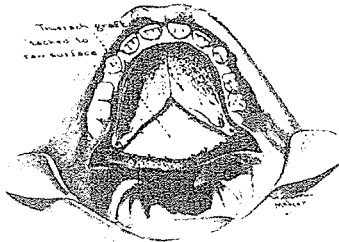
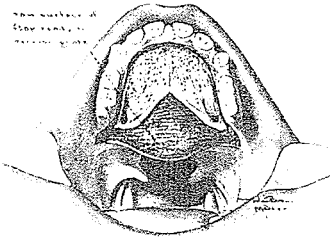
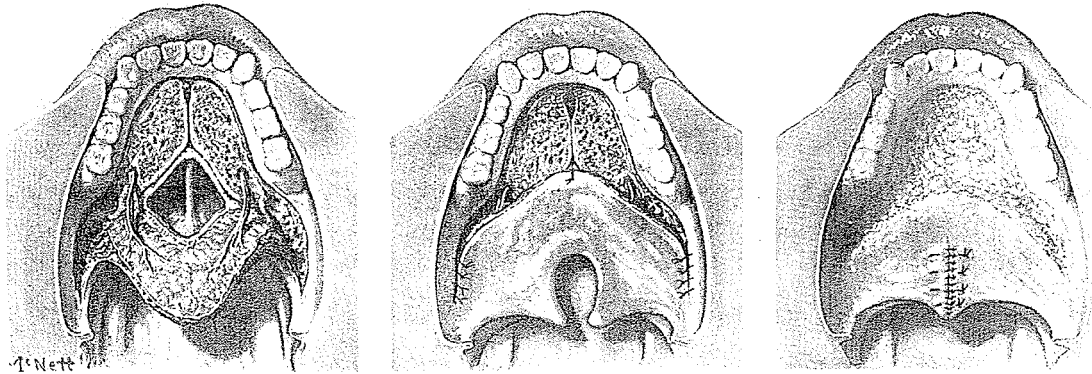
Brown devised a technique for "stretching" the arteries out of their foramina and elongating them while raising the palate, and then for cutting them loose from the palate flap for one or two cm. forward from the bony foramina—so that he had more than enough length to the arteries to set the palate back as far as it would go, with the arteries which were formerly running in an anterior direction now running in a posterior direction part of the way. He thought the advantages to this were: (1) it required one operation instead of two, and (2) if the palate were raised only once and set back at the same time, there would be less scarring in the anterior part of the soft palate than if it were raised twice.

Dorrance was at first a little resistant to this, and he had some feeling that Brown's calling his operation an "elongation" or "setback" implied that the whole concept was a new one. However, Brown explained to him that he used the new words so that the delayed flap would continue to be known as a "pushback" and the direct flap would be known as an "elongation" or "setback." Rather than insisting that Dorrance was wrong, he wanted to present his operation as an alternative for those who thought they had the technical skill to do it.

Dorrance came out to St. Louis and watched Barrett and watched me do this procedure several times. He came to believe in it and (about 1940) he told me at the operating table, "If I were your age and had your hands, this is the way I would do it."

In our experience, the procedure worked much better for partially cleft palates than for complete clefts—and it worked much better when it was done at the same time the partial cleft palate was closed (preferably around the age of 18 months). When the combined procedure was done at this age, it was almost unheard of for the child to require any speech training whatsoever, or to have anything other than the spontaneous development of perfect speech. Sometimes, there was some scar pull medially on the canine or bicuspid teeth, usually resulting in the medial displacement of one or two teeth from the arch—rather than contracture of the whole arch, which also occurred on rare occasions. We did not see retrusion of the upper jaw in these patients.

In his 1958 book, *Reconstructive and Reparative Surgery*, Hans May had Dorrance's great artist McNett sketch Brown's setback modification of the pushback with preservation of the vessels and secondary cleft closure, which was an interesting switch in itself. The drawings were so superb that they have been included for extra clarity.



GRAFTING NASAL RAW AREA

Eventually the raw nasal side of the pushback began to get attention and then coverage. In 1942 Hamilton Baxter of Montreal began to apply split-skin grafts to the raw surface. In 1943 George Dorrance and John Bransfield of Philadelphia were also covering the nasal raw area in their pushback operation with skin grafts as shown!

A USEFUL PRINCIPLE

The horseshoe-shaped incision incorporates all anterior mucoperiosteum in one unit for a pushback in a most efficient manner. Of course it is only available in incomplete palate clefts or sometime after anterior closure of complete palate clefts. I favor the method quite often and, as will be described later, like to take a bipedicle island flap off the anterior portion of it to line the nasal defect of the pushback.

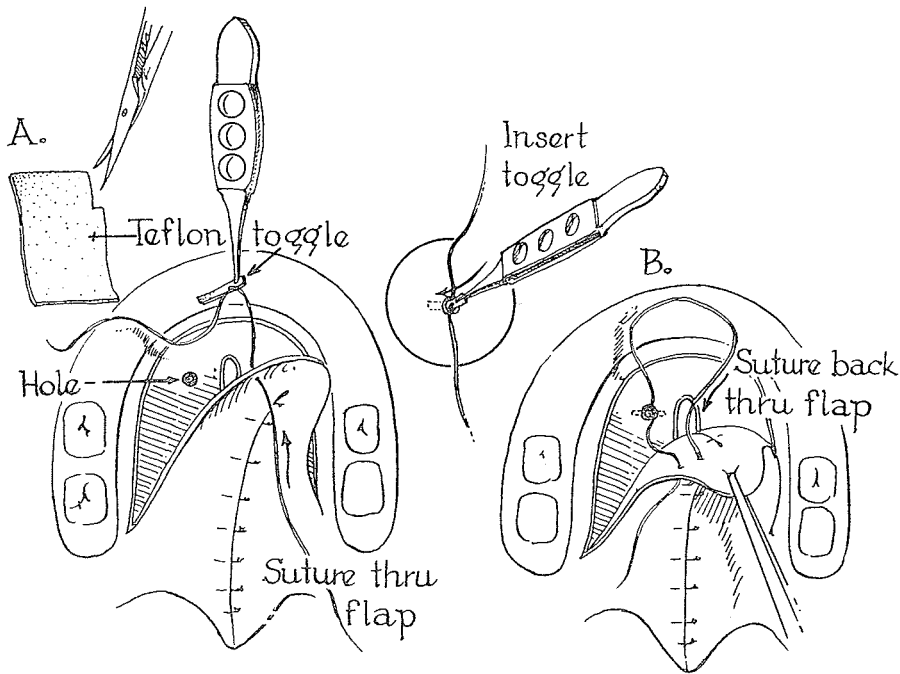


David Furnas

TOGGLE TACKING

When mucoperiosteal flaps have been elevated during palate surgery, especially in the horseshoe flap of Dorrance, the surgeon often has difficulty reattaching these flaps to the bare bone to prevent them from flopping about. This can be quite a "sticky" problem.

In 1976, in the *British Journal of Plastic Surgery*, Dave Furnas, with Myron Bloom of the University of California, Irvine, exer-



cising the ingenuity of the human fly clinging to a wall, described a clever way to fix palate flaps to the inscrutable flat surface of the denuded hard palate. A single hole is drilled through the bone. A small rectangle of Teflon, 1.5×5 mm., is cut from (John Dore Co.) 0.38 mm. sheeting. A suture is passed through the flap, through the Teflon crosspiece and back through the flap. The toggle is inserted through the hole and locked, and the suture is tied. Two toggle ties are shown in the diagrams. If greater strength is needed, the toggle can be made of stainless steel or titanium. Furnas noted:

This toggle is particularly useful in cleft palate surgery; a Dorrance or Veau flap can be secured to bone as readily as a Wardill or a Langenbeck, and dead space is eliminated.

He added later:

This is a homely little contribution, but it does give the surgeon endless flexibility in cutting and positioning the palatal flaps, in that anchoring points can be completely disregarded. The Teflon toggle can secure the soft tissues to any point on the bone.

