SEPTAL FALLACIES.

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After a considerable experience with septal work carried out along lines suggested in my paper on The Cure of Deflected Nasal Septa, and also another entitled The Cure of Nasal Stenosis Due to Deflected Nasal Septum, I have found it wise to modify some of the views then put forth. As a result of wider experience some of the old beliefs are now regarded as fallacies. The first of these relates to the breaking of the triangular cartilage into many fragments by the septal forceps. As a result of teaching operative surgery of the nose on the cadaver, every student being allowed to do a septum operation, I have had occasion to examine many septa operated post mortem and have ascertained the condition of the triangular cartilage. It is my present belief that the theory that the forceps are used by twisting and bending in such a way as to break the triangular cartilage into several fragments enclosed in a layer of mucous membrane is fallacious. I have not found the triangular cartilage broken or twisted by the forceps in any way, nor have I found its resiliency and elasticity diminished by the forceps. On the other hand, I have found that what appears to be a lessened elasticity of this cartilage after use of forceps has in almost every case been the result either of the incision through the cartilage or its separation at the anterior and posterior borders from the bony septum. We must remember that in these localities the upper part of the posterior border of the triangular cartilage is received into a cup-shaped groove on the septal plate of the ethmoid bone while its lower posterior border fits into a Y-shaped groove in the vomer. It is this part which is broken when the forceps are used either by slipping the cartilage out of the depressions or by separating it from the bony septum. Thus the resiliency of the cartilage is lost. If we considered that the triangular cartilage is smashed into a series of minute fragments held in place by membrane, microscopic examination would reveal the fallacy. When sections are made of the fractured septum sometime after healing it is not found that there has been any attempt at the production of new cartilaginous tissue. On the other hand the displaced fragments of the cartilaginous plates remain separated and their fractured edges can readily be made out. Between

these fractured edges as well as in the immediate neighborhood of the *new connective tissue has been formed uniting these fragments*. Further examination of the adjoining perichondrium shows that it has been thickened and that this thickening extends into the submucous tissue of the septal mucous membrane in such a way that this new connective tissue is pressed out between, around and at a considerable distance from the broken edges so as to form a series of fibrous adhesions or a single large adhesion, which is one of the most active factors in keeping the septum displaced. This new fibrous tissue is the part which prevents the replacement of the septum and when replaced tends to reproduce the displacement and draw the septum into the displaced position. Observations along this line have led me to the belief that the only way of dealing with the fibrous bands of tissue formed along the line of fracture is by incision, and I further believe that these incisions should be as few as possible and each made in such a position that it will divide a number of fibrous bands. It follows, then, that incisions intended to correct septal deflections should be made along the entire length of the triangular cartilage and in such direction as to destroy the greatest number of bands, namely horizontal to the nasal floor.

Another modification which I have been forced to make in my septum work is that it is much better *not* to attempt to break the septum into a number of fragments since we have seen this is impossible, and for another practical reason that the constant manipulation of the forceps on the septal cartilage in almost every case tends to strip the mucous membrane and perichondrium away and in some cases to bare the septum. The result of this is almost invariably depressed nutrition with necrosis and finally perforation.

Again, following out the same belief, that it is impossible to break the septum in many fragments, and that the best thing to be done is the separation of the triangular cartilage—I have found it better in dealing with this cartilage to strictly attempt this separation rather than depend upon it as a result of chance.

It is a fallacy to believe that where the septal plate of the ethmoid participates in the deflection it may be straightened by the forceps. I believe that it oftener happens that the cartilage is torn from the ethmoid plate and the deflection of the bony septum remains. It appears to be a rather dangerous, if not impossible performance for the forceps to fracture the bony septum any distance over half an inch behind the articulation with the triangular cartilage. What seems to happen most often is that in the correction of

the deflection the triangular cartilage is replaced in the median line while the bony septum remains in the deflected position. This is apt to leave a space between the cartilage and the ethmoid plate and union is not satisfactory. It also appears to be impossible to shove the septal plate of the ethmoid into the median line if it is not fractured. As soon as the splints which support it are removed it springs at once into its old position. In fact, it often does this even when the surgeon thinks he has corrected the bony deflection by fracture.

Another fallacy in relation to the bony septum is the danger of setting up a meningitis. There does not seem to be a particular tendency to this if care is taken, that the bony septum should not be grasped too high up and if strict antisepsis is observed.

The greatest fallacy in septal work is the belief that it is necessary to make many mutilating incisions, especially the crucial incision, in the triangular cartilage. There must be good reason for believing that many incisions in septal work is not good surgical procedure, and particularly that cross-incisions in the septum should be abandoned. Many incisions in the nasal septum certainly impair its healing, and although the septum is abundantly supplied with blood vessels and receives nutrition from almost every direction, it still follows that many incisions must interfere with the blood supply, besides giving opportunity for less perfect adaptation of the cut surfaces as well as more chance for septic infection. It is much better to make a single incision running along the line of greatest flexion extending throughout the entire length of the triangular cartilage in such a way as to divide it into two fragments than it is to make an incision following a specified model or a cross incision. It cannot be denied that every angle from a cross incision in the triangular cartilage leaves a greater tendency to perforation and interference with nutrition. This applies to any cross incision and is not restricted to the so-called crucial incision where the lines cross at their median points. It seems fair to state it as a positive fact that every angle made by an incision in the triangular cartilage is a dangerous point since it facilitates septic absorption, increases the tendency to displacement of the fragments and leaves a tendency to perforation.

The incision which should be made in the triangular cartilage for correction of deflection should not be made according to any fixed rule or in any pre-determined direction, but its length, direction, inclination and position should be determined by the character, extent and location of the principal line of deflection. This may not

seem very clear at once, but will be more easily appreciated if a few examples are given.

There is, for instance, a form termed bowed deflection. In which case the septum is simply convex on the one side and concave on the opposite. There are no particular thickenings. There is no line of deflection unless we regard as such the line of maximum convexity. In such cases the fibrous bands which give the most trouble would be found at the point of greatest deflection and on the opposite surface, at the point of greatest concavity. The object of the incision is to diminish the resiliency of the fibrous bands rather than to lessen the tendency of the cartilage to curl. The operation would be successful if a single incision be made through the cartilage of the nasal septum directly backward along the line of greatest convexity. When this is done there are no angles to be displaced and when both fragments of the triangular cartilage are restored to the median line the edges approximate satisfactorily if certain details are carried out.

A more complicated case would be one in which the septum had been broken and folded upon itself in such a way as to leave a sharp ridge of deflection running backward and upward near the line of articulation with the vomer. We may also imagine in this case that another deflection extends from the main line obliquely upward and back along the cartilage of the septum below the ethmoid. If we followed out the usual rule it would be necessary to make an incision along the line of deflection and cross this at the middle with another, making a cross incision. In such a case after the septum is thoroughly broken a careful approximation of the cut angles becomes impossible. If, instead of this, we incise the septum along its greatest deflection backward to the bony septum and in order to correct the second deflection we will make an incision parallel to the first and about $\frac{1}{2}$ inch above, extending as far as the first if necessary, we have the septum divided into three parts, the nutrition for each being received from its uncut sections and no angle has been made which will in any way favor the production of perforations.

It has seemed to me that the greatest success in my nasal work has been determined by the recognition of the part played by the superior maxillary spine. It will be remembered that this is located at the point where the two maxillæ come together, forming the floor of the nose and along this line of junction a ridge extends from the palate process of the superior maxilla forward to its anterior edge, where this ridge becomes thicker and higher and quite

pointed, forming the spine. This spine receives anteriorly the triangular cartilage and posteriorly the anterior edge of the vomer. Sometimes the triangular cartilage occupies more than half the surface, sometimes less, the vomer occupying the remainder.

The spine can easily be felt at the floor of the nose. We have found by experience that the septum may be incised in a variety of ways, that the forceps may break the triangular cartilage from its attachment and that the vomer may be fractured and separated from the superior maxillary ridge and if one or all of these things are done and the triangular cartilage is not separated from the superior maxillary spine the result in many cases will not be the attainment of a perfectly perpendicular septum, but even after the septum is broken this point will act as a drag to pull it back into its deflected position. In many cases we may be fortunate enough when the forceps are used with force to break the triangular cartilage from this spine. I succeeded in doing this in a case and recognized as a result of its breaking that I had obtained a more mobile septum and this led me to adopt the procedure of breaking the superior maxillary spine in operations for deflected septa as a matter of routine.

The relation of the septum to the superior maxillary spine is somewhat analogous to the main sheet of a sail. If the sheet is regarded as analogous to the septum it will be seen that it is free to move except where the sail is attached to the mast, like the septum to the nasal bones and at the point where the main sheet is attached, this point being analogous to the superior maxillary spine. By means of the forceps we can break it so that it will move in all directions except at the attachment to this spine and we are now forced to meet the situation where the sail is kept taut by the main sheet. If this is cut the sail immediately falls in any direction and if the spine of the superior maxilla is cut the septum will be found freely mobile and can be placed and retained as desired. So important is this spine in septal work that I have found when it has been completely severed it is often unnecessary to make any cut in the septum or to use forceps to break the septum from the ethmoid.

Methods of cutting the spine of the superior maxilla.—A general anæsthetic is not necessary but if used our preference is for nitrous oxide. The anæsthesia may be carried out by injecting a 2% solution of cocaine to which adrenalin chloride or suprarenal has been added, in four places. Five drops should be injected each side of the labial raphe of the upper lip. This will reach the parts adjacent to the nasal spine. Three or four drops should be introduced into the nose just at the point of junction of the epithelium and membrane

on each side. Sometimes it is better to inject the upper lip as previously described and apply a stronger solution of cocaine on cotton to the inner nares. If one expects to crush the septum the entire septal mucous membrane should be treated with a 10% solution of cocaine mixed with the proper amount of adrenalin chloride. The advantages of this method of anæsthesia are the gaining of the co-operation of the patient, the erect posture with marked diminution of bleeding, and the much easier use of instruments. After anæsthesia is induced the spine may be cut either through the lip or nose in the following manner:

Through the upper lip. The lip is raised and the knife plunged to the right or left side of the raphe. This makes an incision to the spine large enough to admit a chisel 5 m. m. wide. The chisel is introduced into the cut and one finger placed in the nostril to determine the position of the chisel and the spine, the proper position being attained the chisel is gently forced through the bone by light blows. If this is carefully done the mucous membrane of the floor is not broken through. The instrument is then withdrawn and the edges of the wound collapse so that stitches are seldom necessary. If examination shows that the septum is not free enough it is wise to grasp it in the usual way with the forceps and fracture some part of the vomer from its attachment. Sometimes it is well not to use the forceps but to detach the vomer by the chisel. The septum may then be placed in position and retained.

The advantages of the mouth operation are that the wound heals quicker, the pressure of the lip keeps the edges approximated and the field of operation is more easily cleansed. The only disadvantage is the excitation of hemorrhage.

In operating through the nose, after cocainization and preparation, the incision is made just behind the vestibule on the floor of the nose where it joins the septum. This incision should be made down and toward the median line to reach the spine. The spine is cut by the chisel as before. The wound is more apt to gape in the nose. The spine is generally cut off at a higher level than in the mouth operation and the mucous membrane more apt to be perforated. These disadvantages may be overcome by delicacy of touch and experience. The rest of the procedure is similar to that in the mouth operation.

After Treatment.—Various methods for support have been devised; metal and rubber splints, gauze, cotton, dental gum, have all been tried. It may be said that there seems to be a comfortable percentage of operators in favor of the use of Simpson's nasal tampon,

made of Bernay's sponge. To attain the best results the Bernay's sponge of compressed cotton should be cut into small strips and not used in the form sold by Johnson & Johnson as "Simpson's tampons." These small strips can then be packed side by side or one after the other and experience will enable us to accurately gauge the amount of pressure which will be made by the expanded fibre. The pressure should be just twice as much on the formerly deflected side, but both sides must be packed so that counter pressure may be obtained, to prevent over-correction. With these strips packed one upon the other an even pressure can be obtained upon the upper part of the triangular cartilage and the septal plate of the ethmoid bone as well as lower down. With no other form of nasal splint is it possible to get an even pressure over so large an area.

The disadvantages of this form of splint are: 1. That they act as collectors of septic material and also prevent proper aeration of the naso-pharynx and Eustachian tubes; 2, that they require almost daily removal. They do not favor hemorrhage, as has been claimed, if they are soaked *in situ* with some cleansing solution and removed piecemeal. If hemorrhage still occurs the piece placed next to the septum may be covered by a bit of rubber gauze to prevent the granulations sticking to the cotton. If the splints are not removed there will result a septic cellulitis, which is liable to spread to surrounding parts, which danger is not greater in the case of these splints than in any other form if not removed at the proper time.

Formerly it was necessary to wear a splint at least two weeks or even three, and in a few cases I have found it necessary to retain them six or eight weeks, one case with a very thin septum required splints for twelve weeks. Since the method of cutting the superior maxillary spine has been tried in many cases it is possible to remove the splints in five days. This is only possible, however, where all the elasticity of the septum has been destroyed.

These are some of the modifications which I have found it wise to introduce in my septum work in order to meet the requirements of the cases as they presented themselves.