Septoplasty—a new technique

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Introduction

During past 20 years there has been a steadily increasing interest on the part of otolaryngologists, in the correction of dislocated and deviated nasal septum. The reason for this interest is undoubtedly the realization that there are available techniques which can not only serve a cosmetic and psychologic purpose, but can also correct faulty function at the same time.

The lower anterior end of the nasal septum, with its many bizarre contours has long been a medical and surgical problem. Most of the suggested procedures to correct this deformity have not proved adequate. Obviously no single technique is ideal in every case. After careful study of techniques, comparisons and revision of details a technique is evolved which is simple and gives very satisfactory results both cosmetically and functionally.

Historical review

In the past 50 to 60 years during which time both septal and cosmetic surgery have really developed, culminating in the present era of rhinoplasty based on physiology. Modern rhinoplasty is a blending—or marriage—of functional and cosmetic surgery. Ingals of Chicago in 1882, was the first to describe submucous resection approach to the deviated septum. Krieg in 1886, and Boenninghaus in 1895, described more extensive resection than Ingals. From this beginning many distinguished persons in the past have grappled with the problem and have contributed much that we can use and apply today. Under the leadership of Dr. Cottle, we have learned that good septum surgery is the foundation of a good nose both cosmetically and functionally. Mosher displayed the disturbed anatomy of the pre-maxilla and the association with other septal deviations and obstruction. Metzenbaum demonstrated a method of surgical correction applicable to many deformities of the caudal portion of the septum. More recently Klaff, Freer, Fomon, Becker, Cottle, Goldman and others have added to the mounting knowledge, but the problem is still with us.

Surgical anatomy

The sound knowledge of anatomy of the cartilaginous septum, particularly the caudal end of the septum is essential. The nasal septum is the

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supporting armature of the nose, particularly from the nasal bones to down between the domes of the alar cartilages where the lower points of the upper lateral cartilages also terminate. Inferiorly the septum rests on the vomer and nasal crest of the maxilla and anterior nasal spine (Figs. 1, 2).

The narrow portion of the lower end of the septum lying between the cartilaginous septum and columella is called membranous septum or the septum mobile nasi. As the name suggests, it is the most mobile part of the septum. It is formed by a union of the septum mucous membranes

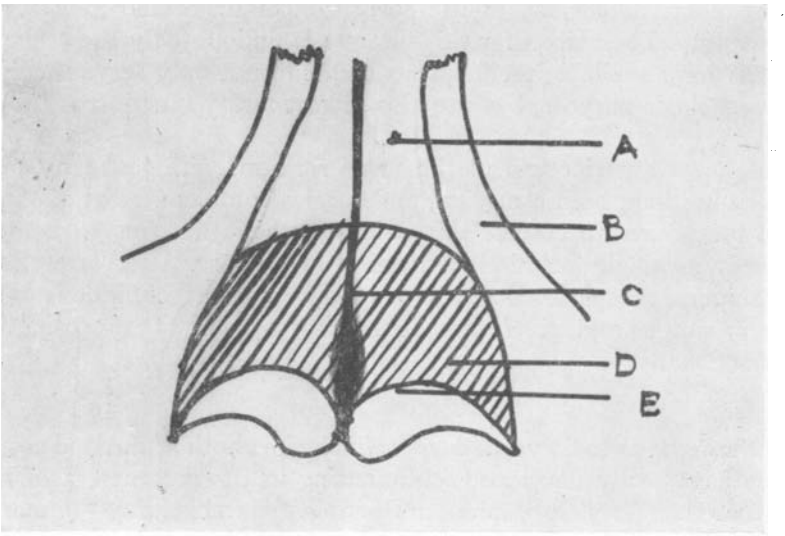


FIG. 1.

A. Nasal bone.
B. Fronto-nasal process of maxilla.
C. Dorsum of septum.
D. Upper lateral cartilage.
E. Alar cartilage.

immediately below their envelopment of the septal cartilage. This united membrane in turn blends with the skin of the columella. It acts as a buffer between columella and septum softening blows to the lower nose.

The inferior border of the lower end of the septum has well developed processes (laterales ventrales) and rests on the correspondingly flared out wings of the premaxillary bones (Fig. 3). This rather broad cartilage footplate and its appropriate bony pedestal are held in close approximation by fibrous tissue but are not fused into a single unit. The cartilage is enveloped by a perichondral and submucosal fascial sheath which extends around and under the cartilage from one mucosa to the other.

This sheath therefore separates the cartilage completely from its bony support inferiorly and also from a too intimate connection with the mem-

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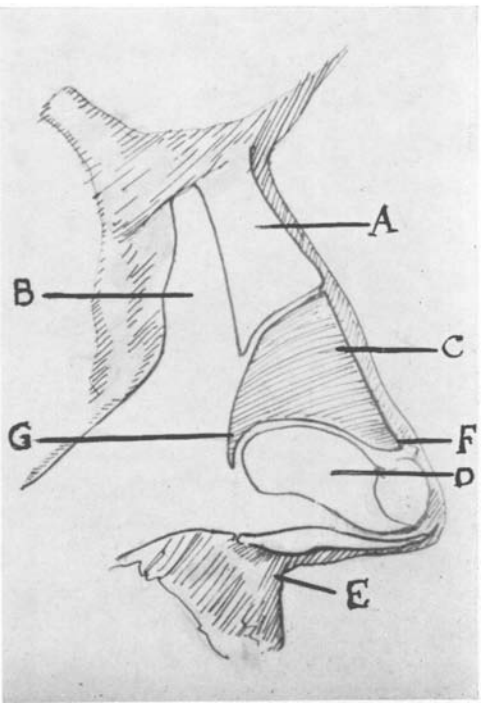


FIG. 2.

A. Nasal bone.
B. Fronto-nasal process of maxilla.
C. Upper lateral cartilage.
D. Alar cartilage.
E. Nasal spine of maxilla.
F. Dorsum of septum.
G. Pyriform ridge.

branous septum proper. The premaxillary and the maxillary crest are similarly covered by fascia consisting chiefly of periosteum and supporting connective tissue. Some fibres of each envelope do cross over to join with adjacent fibres to make a joint-like capsule. The terminal 6–10 mm. of the upper lateral cartilages are attached to the septal dorsum by soft tissues lined by the nasal mucosa, thus allowing for valve action of the upper laterals and freedom of movements of the septum.

Etio-pathological considerations

The caudal end of the septum is only loosely placed in the vomerine groove for many years, while quite early even in embryologic life the posterior portion of the septum is rigidly fixed. This explains why when trauma is inflicted to the nose in early life the septum is dislocated anteriorly out of the vomerine groove and so rarely posteriorly.

Most of these cases with deviated and dislocated septum, are due to

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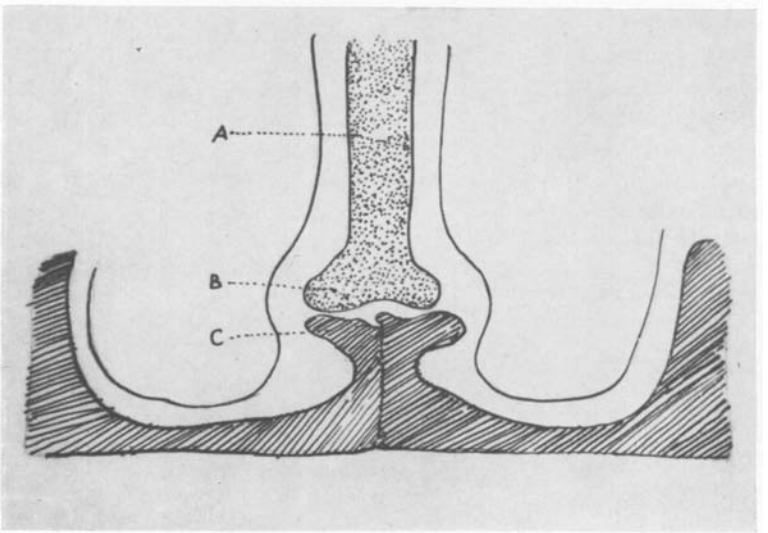


FIG. 3.
A. Septum—cartilaginous part.
B. Inferior border of septum.
C. Bony part of septum.

trauma either in early childhood or later on. Out of 30 cases which I operated upon, 17 cases have a definite history of trauma. In six cases, there was a history of difficult labour. This proves that nasal trauma is the commonest cause for dislocation. Deviations can be hereditary but certainly not the dislocations. Dislocations of the septum are much more common in men than women and in boys than girls and this also suggests a traumatic origin. In my series of 30 cases, 26 cases were males.

Very frequently the joint capsule is ruptured in part or completely and the septum cartilage broken and/or dislocated downward. This dislocation is often accompanied by fracture displacement of premaxillary wings or body and maxillary crest (Fig. 4a, b, c, d). If the original injury was sustained in infancy or early childhood there will often be seen an asymmetry of the floor of the pyriform aperture. Another occasional finding is a long narrow segment of curled cartilage lying on one or both sides of the lower part of the septum.

Submucosally the injury has also exacted its toll. Fibres enveloping cartilage and bone are torn, resulting in bleeding. This gives rise to fibrosis, which makes surgical separation increasingly difficult.

The structures, which are in intimate relationship are also affected, in lesser or greater extent depending upon the impact of the trauma, original position of septum and resulting fibrosis. Structures which are affected are alar cartilages, producing various deformities; upper lateral cartilages are carried away with the septum and are deformed, and also bony pyramid of the nose.

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To simplify the matter I have classified dislocated septum in three groups.

Group 1

Pure dislocation of the septum.—In this group only inferior and caudal end of the septum is dislocated without causing much deviation and deformity. Usually it is due to slight injury.

Group 2

Dislocation with deviation of septum. This results from a more severe trauma. Here the septum is not only dislodged from anterior nasal spine but, it is also fractured, both in cartilaginous and bony parts, creating thick areas of spurs in the septum. Slight deformity of the tip may be present in these cases.

Group 3

Dislocation of septum with deviation and external deformity. In severe injuries, the lower as well as upper part of nose may be affected leading to crooked nose, deviation of tip of the nose and 'C' or 'S' shaped curves of the dorsum.

Review of treatment

The Killian's operation was unsatisfactory for dislocated septum because the ventral part of cartilage was left for supportive purpose and to maintain profile. The deflection of luxated triangular cartilage, where the anterior edge appears in vestibule could not be corrected, because of support it gives to the tip and columella.

Metzenbaum's procedure was the first advance in reconstructive surgery of the caudal deflection. It was a 'Swinging door' variety of operation, in which the cartilage was incised at the angle of deflection, producing a mobile segment for replacement in the columella. The operation was limited in scope because the mucoperichondrium was liberated only on one side and the tension of the unfreed side was prone to cause recurrence of deflection. The presence of an uncorrected deviated anterior nasal spine, upon which the swung caudal segment rested, prevented it from maintaining the reset position.

The next significant advance in septal surgery was made by Fomon. The septum was completely resected and replaced in part. This step was based on 'Tie-in' of the upper lateral cartilage with the septum. Fomon believed that the former structures alone could support the cartilaginous nasal dorsum because they were an integral part of the septum with which they are and were attached to the nasal bones and frontal process of maxilla. Nevertheless after removal of the cartilage he reinserted strips of resected cartilage only to prevent secondary cicatricial contraction.

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Despite the inadequacy of the operation, it was a distinct step in the right direction. He was the first who emphasized, the significance of the anatomy and physiology of the septum and upper lateral cartilages. Goldman (1956), based his operation on the principle of mobilization of the caudal end of the septum to the midline by utilizing pedicle flaps of the caudal deflection and central replacement of the deviated posterior osteo-cartilaginous parts.

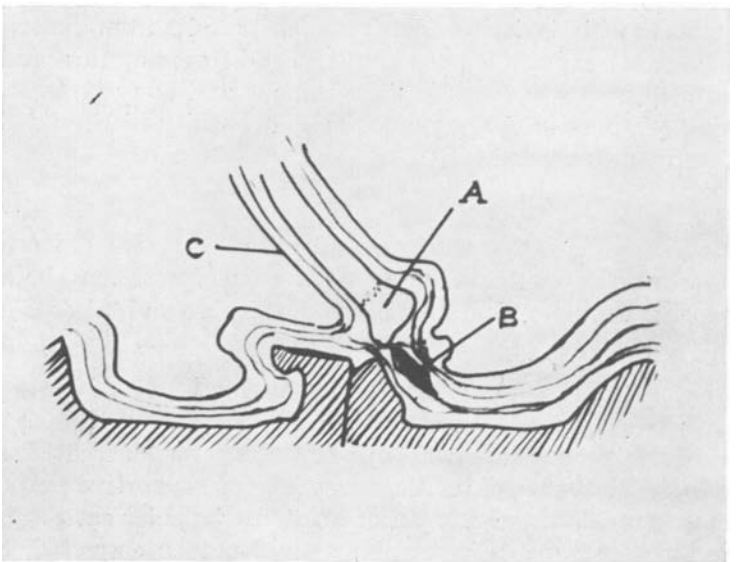


Fig. 4a.

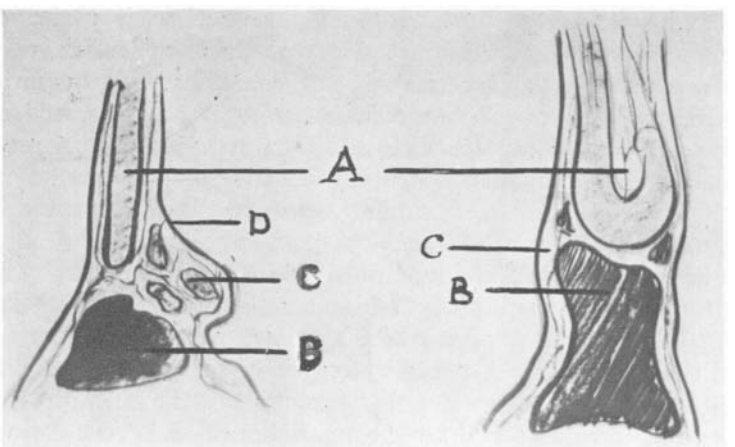


Fig. 4b.

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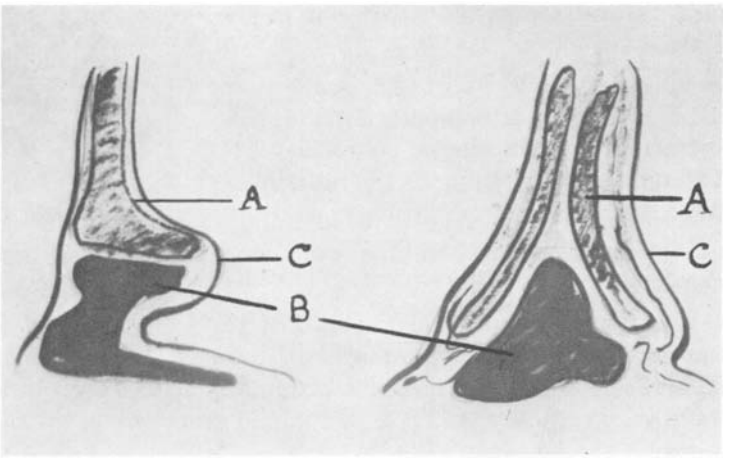


FIG. 4c.

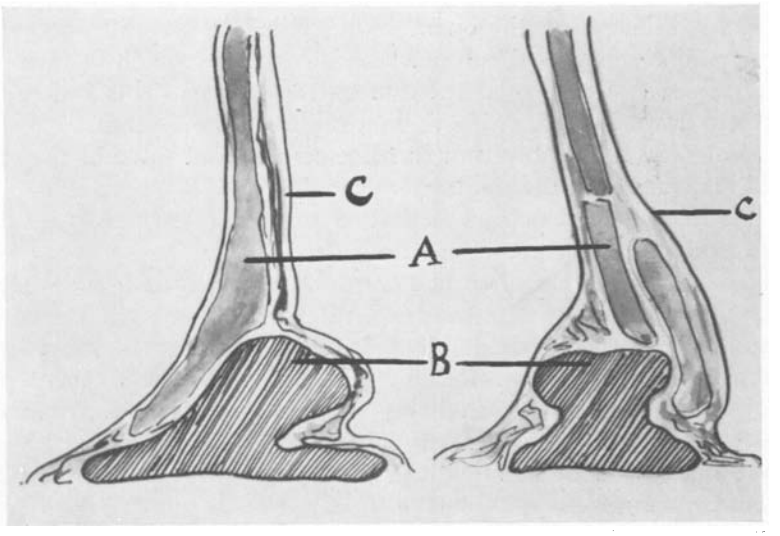


FIG. 4d.

A. Cartilaginous part of septum.
B. Bony part of septum.
C. Mucoperichondrium.
D. Mucous membrane.

Principles of treatment

The main object of the treatment should be the restoration of normal anatomical relationship of the deflected septum with only minimal sacrifice of its structures. When the very essential task of correcting the anterior deformity seemed to be under control it was soon learned that the very correction produced complications and sequelae of import-

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ance equal to and sometimes greater than the original problem. Some of these are:—

1. Sagging of the lower part of nose.
2. Saddling of the cartilaginous dorsum.
3. Retraction or collapsing of columella.
4. Widening and flattening of the nostrils.

All these points should be kept in mind in treating the deflected septum at the caudal end. My technique of operation is based on the following principles:—

1. Restoration of normal relationship of the caudal end of septum, which has been distorted by trauma, with the nasal spine of maxilla.

2. Triangular caudal end of the septum, which has been dislocated, is preserved very carefully, and is used to build up the nasal tip and lower part of nose.

3. Relationship of the upper lateral cartilages with the superior border of septum is most important. In all the operations of the dislocated and deviated nasal septum, the operator has failed to take into account the associated deformity of the upper lateral cartilages which in their action as guy ropes, exert unequal traction on the septum. This action should be broken down by separating them away from the septum.

4. Not only the septum but in some cases, nasal spine of the maxilla should be brought in the midline.

5. As long as the incision is limited to one side, there is no danger of post-operative contraction of columella.

6. The spring action of caudal end of the septum is broken down by one small incision at the 'L' shaped bend. In acute or right angled bends a triangular piece of cartilage is removed. The base of the triangle is the inferior border of septum. I think it is not necessary to have pedicle flap of caudal end of the cartilage, because by doing this, chances are there that the strength of the caudal end of septum is reduced and will not be sufficient enough to hold the tip up, which is so essential for good cosmetic appearance.

7. The caudal end of septum should be properly fixed just behind the columella and in between the alar cartilages.

8. The correction of deviation should also be achieved simultaneously.

Technique of operation

Thirty cases have been operated by a new technique which I am going to describe. These cases have been carefully followed for two years.

Anaesthesia

Children below the age of 13, were operated under G.A., while adults were operated under L.A. To adults who were operated under L.A.,

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pethidine and largactil was given as premedication. It must be emphasized that throughout the operation, haemostasis is essential for a smooth technique.

Steps of operation

A. *Incision* (Fig. 5a, b).

Incision is taken on the dislocated border of the septum, by retracting columella on one side. The upper end of the incision extends up to the superior border of the septum, while lower end extends to the nasal spine of maxilla.

B. *Separation of flaps*

Flaps on either side of the dislocated septum are separated carefully. By repeated small strokes of the knife the submucosal fibres are freed until the cartilage has been reached. It was observed that the flaps covering the dislocated part of septum were very adherent, and ordinary elevators were of no use. Best way of separating these flaps was with a knife. It is absolutely essential that the elevation of the mucosa be done definitely under the perichondrium. Care is taken not to traumatize the dislocated part of the septum. Once the triangular dislocated part of the septum is separated, there is no difficulty in separating the flaps, covering the rest of the septum. Separation should be done as high as possible and also to the floor of the nasal cavities.

C. *Exposure of nasal spine of maxilla*

To accomplish this small curved Knapp scissors are placed into the incision and with small mincing spreading movements the membranous septum is gently separated. A little lateral separation is also necessary. The fascial fibres which hug the maxillary spine are connected to the sub-mucosal fibres of the septal mucosal flaps and must be separated on each side of the midline. The fascia immediately in front of the spine is still held fast and is separated from the bone by Mackenty elevator.

At this stage relationship between the inferior border of the septum and nasal spine of the maxilla is studied. Usually the inferior border of the septum is shifted on one side and is thick, while sometimes the whole component including nasal spine and septum is shifted away from the midline particularly in severe dislocation.

D. *Shifting of the inferior border of the septum to midline*

The infericr border of the septum is separated by ordinary elevators, from the bone base as far back as possible. The pre-maxillary bones may not be in the midline but may be found dislocated, or one or both wings may be found to be exceedingly flared. With a bone forceps, the pre-

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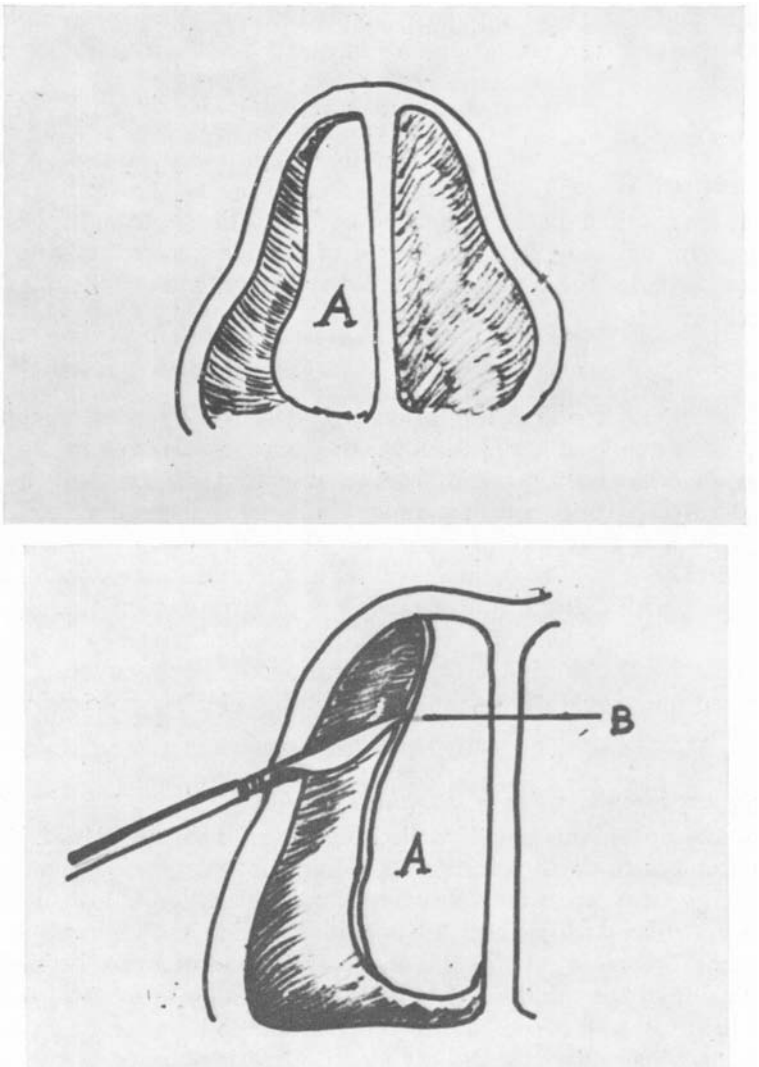


FIG. 5.

A. Dislocated part of nasal septum.
B. Knife seen on the dislocated border of the septum.

maxillary compound may be modified. The wings may be compressed or the bones mobilized and moved back into the midline.

E. *Exposure of the upper part of the septum* (Fig. 6).

This is done by extending the upper end of the incision and by retracting the alar cartilages. At this stage relationship between upper lateral cartilages and septum will be seen. With a sharp pair of scissors upper

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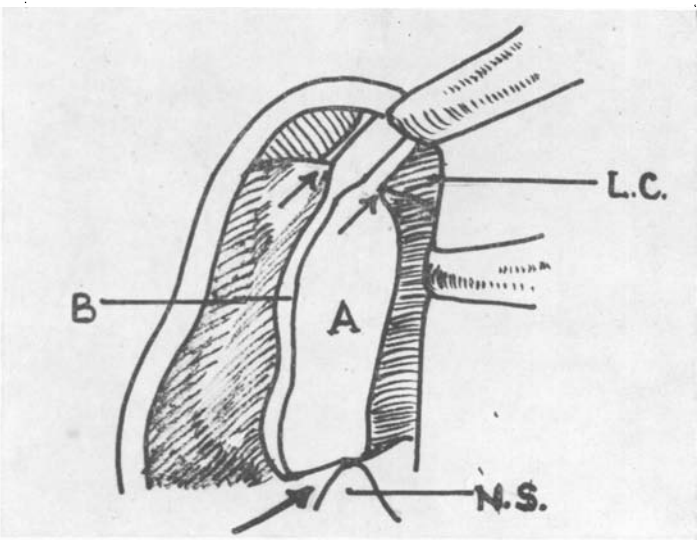


FIG. 6.

A. Dislocated septum.
B. Border of dislocated septum.
N.S. Nasal spine of maxilla.
L.C. Lateral cartilage (upper).
Arrow—above shows separation of upper lateral cartilage from dorsum of the septum.
Arrow—below shows separation of inferior border of cartilage from nasal spine of maxilla.

lateral cartilages are cut without cutting the underlying mucosa. This manoeuvre will free the superior border of the septum which will help further in correcting the dorsal line of the nose.

F. *Separation of the cartilaginous septum from perpendicular plate of ethmoid*

At this stage cartilaginous part of septum is separated from its bony attachments. When this is done septum lies in the flaps with a bend in the anterior part of septum.

G. Next step is to make a cut at the bend (Fig. 7a, b) to break the spring action. This cut should not extend up to the superior border of septum, but it stops a few millimetres away from it. In acute bends a triangular piece of cartilage was removed—base of triangle is at inferior border of septum.

H. For the reception of triangular anterior part of septum which is dislocated, a bed is prepared in the membranous septum and columella. At the same time, the two alar cartilages are separated away with scissors which helps later on to hold upper part of cartilage, giving a nice tip.

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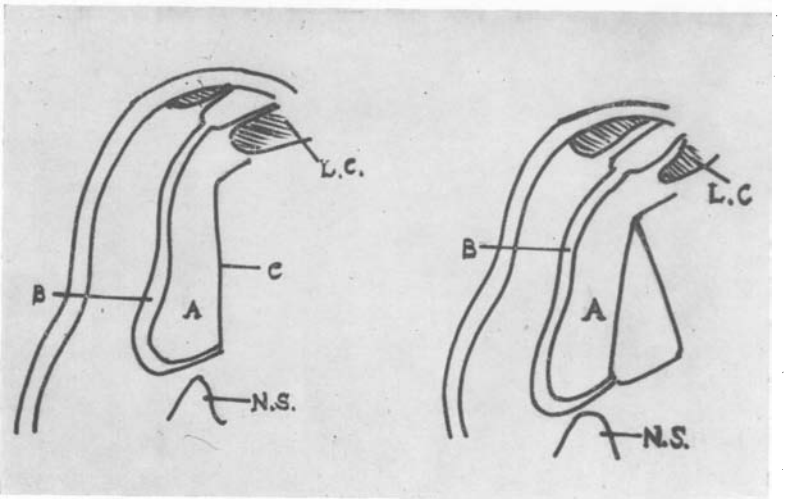


FIG. 7.

C. Incision at the bend.
In adjacent figure triangle is cut at the bend.
Other letters as in Fig. 6.

I. *Fixation*

Fixation of anteriorly dislocated part of septum is important. After making a tunnel in membranous part of septum and columella three zero plain catgut is taken. One suture of this is taken through the superior part of cartilage and passed in between the alar cartilages through the tip of nose. Second suture is passed from lower dislocated part of cartilage through columella. These two sutures are then tied on a small rubber tube, or gauze, in front of columella. These two sutures act as stay sutures which helps in keeping dislocated cartilage in the membranous part of septum and in between alar cartilages. Behind the dislocated part of septum at the incision line three through and through sutures of catgut are taken to prevent shifting back of the dislocated cartilage. The sutures on the columella can be removed on the fourth day, to prevent damage to the columella of nose.

The above steps of operation are useful for a pure and simple dislocation or group I cases. For group II and III cases, before fixing the septum further steps are carried out.

A. *Correction of deviation*

If the deviation of the septum is in the cartilaginous part, only deviated part of cartilage is removed behind the cut in the bend. Care is taken to preserve the dorsal and anterior limb, i.e. 'L' shaped cartilage intact. Bony spurs and deviations can be removed easily without hesitation.

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B. *Correction of deformity*

If this condition is associated with deformity either of the tip, or bony vault of the nose, the incision is modified.

Additional modifications are necessary depending upon the nature of deformity.

Post-operative care

Same care is taken as for septum surgery.

Conclusions

1. This technique is useful in all types of dislocations with deviation of septum.

2. It is particularly useful in children, where preservation of cartilage is most essential for the normal growth of the nose.

3. It obviates the need of free graft, camouflage or support, thereby preventing the further deformities, resulting from absorption or contraction of replaced part.

4. It restores not only the normal anatomy of the septum thereby improving the function of nose, but also it helps to improve the shape of nose.

5. No deformities occur after this operation as nothing has been sacrificed.

6. The separation of the septal cartilage from the nasal spine and from upper lateral cartilages, which act as guy ropes, releases the tension and helps in bringing the septum to central position. As a result the tip of nose was also carried into a more normal position. This clearly illustrates one of the close relationships between the septum and external nose. The pathology of these two structures is so closely related that one could not be corrected without attention to the other. It demonstrates the fallacy of attempting to disregard one of these structures in the correction of the other.

Summary

Thirty cases of dislocated septum have been operated with this technique. Out of these, 26 were males. Cases were followed up to one year. There was no case of recurrence of dislocation. In cases where dislocation was associated with deformity of nasal tip, remarkable improvement was found after correction of dislocated septum. There was no deformity after operation.

Correct analysis of the deformity and pathology of the structures involved plus gentleness in the handling of tissues were rewarded by pleasing results.

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