A Practical Classification of Septonasal Deviation and an Effective Guide to Septal Surgery

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The conventional designation of septal pathology is a deviated septum, and the common treatment of choice is submucous resection of the septum. These limited generic terms leave the surgery open to frequent failure and render the education of this topic suboptimal. During 1224 septal surgeries, we have observed six different categories of septal deviation requiring different surgical treatments. A study was conducted to investigate the frequency of different classes of septal deviation and to develop guidelines for a more successful surgical correction of each category.

Ninety-three consecutive patients who underwent septoplasty were carefully evaluated for the type of septal deformity, age, gender, history of trauma, and previous septal surgery. The surgical technique was reviewed for each category of the septal deformity.

Of the 93 patients, 71 were women and 22 were men. Ages ranged from 13 to 76, with an average age of 31.5. Most patients exhibited a "septal tilt" deformity (40 percent; 37 of 93) or a C-shape anteroposterior deviation (32 percent; 30 of 93). The other deformities were C-shape cephalocaudal (4 percent; 4 of 93), S-shape anteroposterior (9 percent; 8 of 93), S-shape cephalocaudal (1 percent; 1 of 93), or localized deviations or large spurs (14 percent; 13 of 93).

Each of the six categories of septal deviation requires specific management. If a single procedure is selected for all of the septal deformities, disappointing results may ensue. (*Plast. Reconstr. Surg.* 104: 2202, 1999.)

Searching for the reasons for the common failures and disappointments following the correction of the deviated septum and nose, keen observations were made during 1224 septoplasties. It was concluded that septal deviation and septoplasty are generic terms that do not sufficiently define the pathology, correction of which may provide consistent successful surgical outcomes. There are a variety of septal deviations that require specific management to achieve predictable results. The purpose of this study was to examine the types of septal deviation, the frequency by which they occur, and to introduce a problem-oriented classification of septal deviation along with guidelines for correction of these deformities.

Patients and Methods

Consecutive patients undergoing primary septoplasty were included in this study to identify the frequency of each septal deviation category. The type of deviation, age, gender, and history of trauma were recorded. The method of surgical exposure of the septum was documented, as were the surgical techniques used to correct the different deformities.

Results

There were 93 patients, 22 male and 71 female. Ages ranged from 13 to 76, with an average of 31.5. Six classes of septal deviation were identified that were corrected through three types of surgical exposures. Table I summarizes the types of deformities. The septal tilt (Fig. 1, *above, left*) was described as a septum that had no curve, yet it was tilted to one side of the nose anteriorly and to the opposite side posteriorly in relation to the sagittal plane as the maxillary crest remained straight. This type of deformity occurred in 37 patients (40 percent), with three patients exhibiting a right tilt internally (3 percent) and 34 demonstrating a left tilt (37 percent).

The second most common deformity was a C-shaped anteroposterior deviation (Fig. 1, *above, right*), which was observed in 30 patients

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TABLE I
Type of Deformity

	Septal Tilt 40% (37 of 93)	C-Shape Anteroposterior 32% (30 of 93)	C-Shape Cephalocaudal 4% (4 of 93)	S-Shape Anteroposterior 9% (8 of 93)	S-Shape Cephalocaudal 1% (1 of 93)	Localized Deviation of Spurs 14% (13 of 93)
Approach	Anterior, Killian, or transfixion	Anterior open	Anterior open	Anterior open	Anterior open	Killian
Scoring the concave side	−	+ horizontal unilateral	+ vertical unilateral	+ horizontal bilateral concave site	+ vertical bilateral concave site	−
Reposition of caudal septum on nasal spine	+	+	+−	+	+−	−
Osteotomy of the nasal spine	−	+	−+	+	+−	−
Nasal osteotomy—straighten the septum	+−	+−	+	+−	+	−
Stent or splint	Doyle	Simple stent × 3 weeks	Simple stent × 3 weeks	Simple stent × 3 weeks	Simple stent × 3 weeks	Overnight packing
Spreader graft	+−	+−	+	+−	+	−

(32 percent). The difference between this and the previous category was that the septum had a curvature rather than being tilted. The external evidence of this deformity was similar to a septal tilt. Furthermore, the maxillary crest and nasal spine were also deviated. This deformity could also be seen on patients with a totally straight external nose. Type three was a C-shaped cephalocaudal deformity (Fig. 1, *center, left*), which was observed in four patients (4 percent). The curve in the septum was similar to the previous category, except it was in the anteroposterior direction.

The fourth and fifth categories consisted of S-shape septal deviations. This deformity was either anteroposterior (Fig. 1, *center, right*), which was observed in eight patients (9 percent), or cephalocaudal (Fig. 1, *below, left*), the least common deformity observed, which was found in one patient (1 percent). In the S category, the septum had two curvatures next to each other in opposing directions. Localized deviations (Fig. 1, *below, right*) or spurs were observed in 13 patients (14 percent). Invariably, the inferior turbinate adjacent to the curved side of the septum was found to be abnormally large.

Surgical Management

The surgical correction of the septal tilt encompassed the removal of the posterocaudal portion of the cartilaginous septum, complete separation of the septal cartilage from the maxillary crest, along with partial mobilization of the cartilaginous septum from the perpendicular plate (Fig. 1, *above, left*). The enlarged inferior turbinate ipsilateral to the external deviation may have to be reduced. The quadrangle cartilage was commonly found to have dislodged to one side of the maxillary crest, necessitating removal of the overlapping portion and repositioning and fixation of the remaining septum using a "figure 8" suture (Fig. 2).

The C-shaped anteroposterior deviation was corrected through posterocaudal resection of the septum leaving an L-shape frame, partial mobilization of the junction of the quadrangle cartilage with the perpendicular plate, osteotomy of the remaining portion of the maxillary crest and nasal spine, and cephalocaudal scoring of the concave side of the remaining septal cartilage (Fig. 1, *above, right*). A Doyle stent or bilateral extramucosal "simple stents" (both

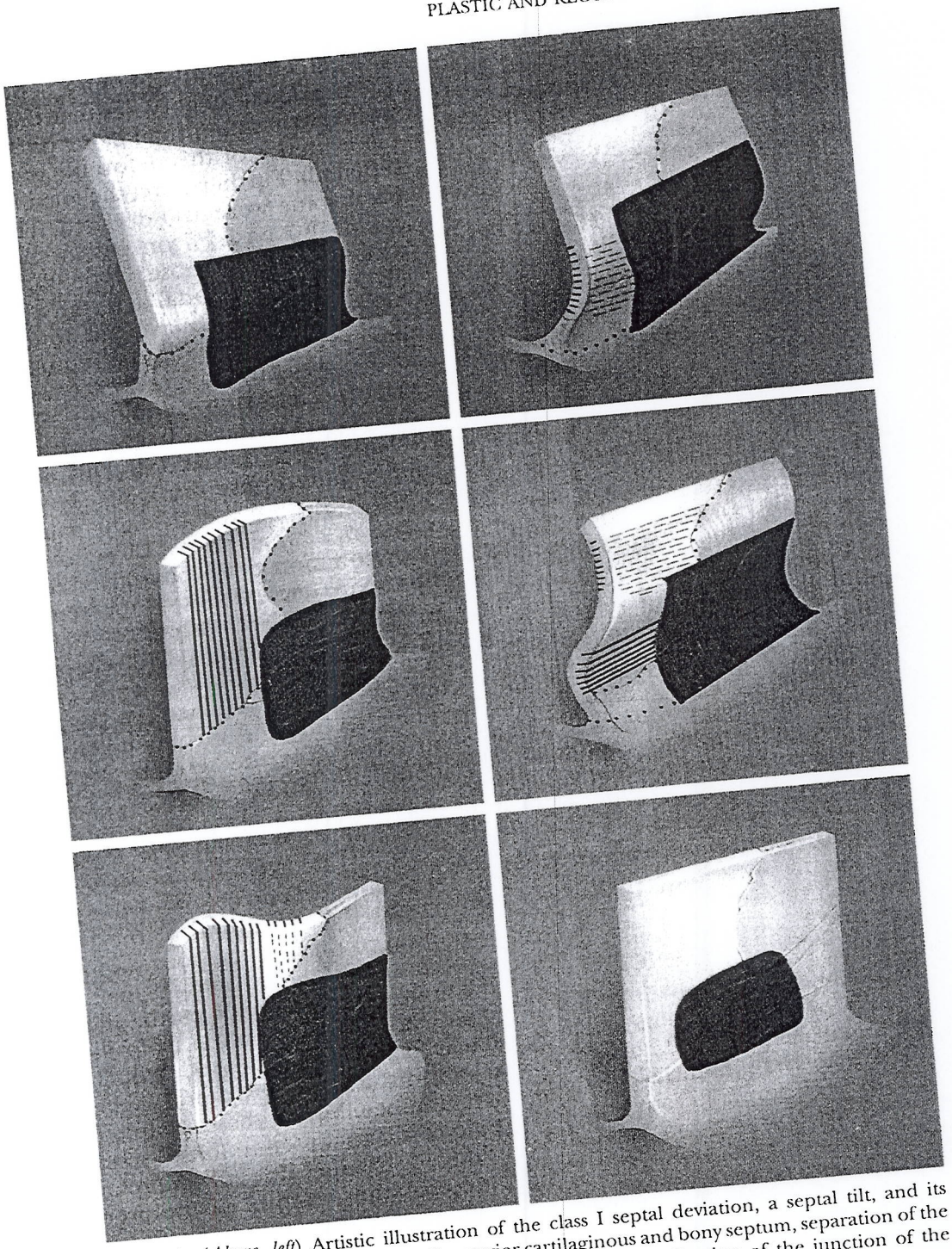

FIG. 1. (*Above, left*) Artistic illustration of the class I septal deviation, a septal tilt, and its proposed correction with resection of posterior cartilaginous and bony septum, separation of the posterocaudal septum from the vomer plate, and partial mobilization of the junction of the perpendicular plate with the quadrangle cartilage. (*Above, right*) Depiction of the class II, C-shape anteroposterior deformity and correction of it with resection of the posterocaudal septum leaving an L-shape frame, osteotomy of the nasal spine and residual vomer plate, partial disjunction of the quadrangle cartilage from the perpendicular plate, and cephalocaudal scoring of the cartilage. The cartilage memory will then be guided with bilateral extramucosal stents. (*Center, left*) Class III septal deviation, C-shape cephalocaudal. This deformity is corrected by resection of the posterocaudal septum, anteroposterior scoring of the concave side, complete freeing of the junction of the cartilaginous septum and maxillary crest, as well as partial release of the cephalic portion of the quadrangular cartilage from the perpendicular plate and nasal spine osteotomy. The cartilage memory will then be guided with extramucosal stents posteriorly and a spreader graft anteriorly. (*Center, right*) Class IV septal deviation, S-shaped anteroposterior, which is

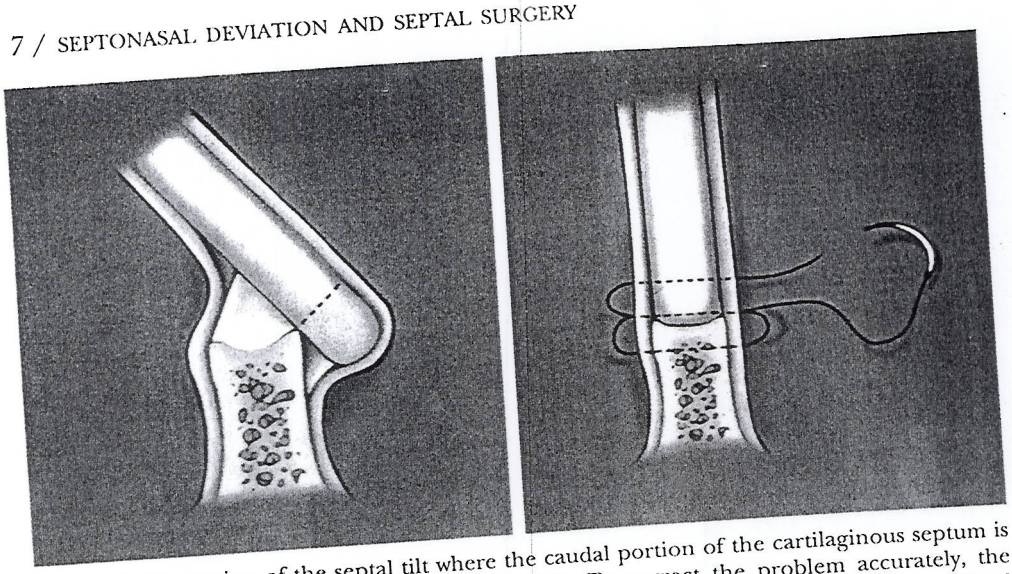

FIG. 2. Illustration of the septal tilt where the caudal portion of the cartilaginous septum is dislodged to one side of the maxillary crest (*left*). To correct the problem accurately, the overlapping portion of the cartilage is resected. The septal cartilage is then repositioned and fixed properly using a "figure 8" suture (*right*).

from Xomed, Jacksonville, Fla.) is then applied.

The C-shaped cephalocaudal deviation was corrected by resection of the posterocaudal septal frame, anteroposterior scoring of the concave side, complete freeing of the junction of the cartilaginous septum and maxillary crest, as well as partial release of the cephalic portion of the quadrangle cartilage from the perpendicular plate and osteotomy of the nasal spine (Fig. 1, *center, left*). This type of deviation was also corrected by addition of a spreader graft at least on the concave side anteriorly or bilaterally along with a temporary extramucosal stent (Fig. 3).

The S-shaped anteroposterior deviation was corrected with removal of the posterior portion of the cartilage, bilateral cephalocaudal scoring of the cartilage on the concave areas, and osteotomy and repositioning of the maxillary crest (Fig. 1, *center, right*). The external reflection of this deviation, which was usually a nasal tilt to one side without a cephalocaudal curve, was automatically eliminated by correction of the internal deformity. Spreader grafts were placed when necessary. The anterior septum was rarely found to be at the midline.

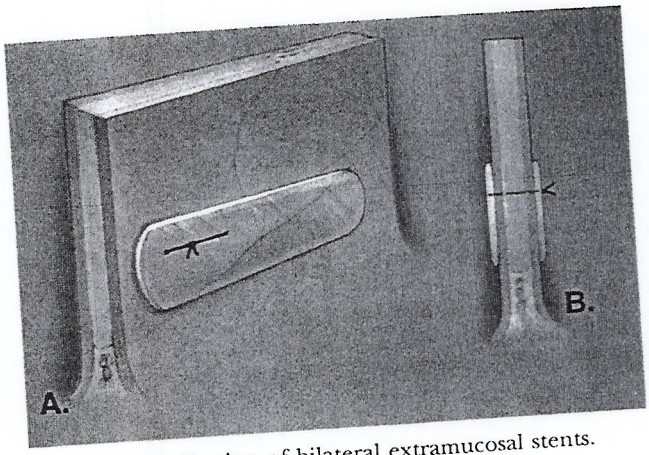

FIG. 3. Application of bilateral extramucosal stents.

The S-shaped cephalocaudal deviation was corrected by removal of the posterocaudal portion of the septum, bilateral anteroposterior scoring of the concave portion of the cartilage on both sides of the septum, total release of the septum from the maxillary crest, and partial release from the perpendicular plate (Fig. 1, *below, left*). The anterior portion of the septum was then supported with bilateral spreader grafts. This was further stabilized with a simple (extramucosal) stent.

corrected by removal of the posterior portion of the cartilage and bone, bilateral cephalocaudal scoring of the cartilage on the concave areas, and osteotomy and repositioning of the nasal spine and vomer bone. The cartilage memory will then be directed by positioning extramucosal stents and spreader grafts anteriorly, if necessary. (*Below, left*) Class V septal deviation, S-shaped cephalocaudal, which is corrected by removal of the cephalocaudal portion of the septal frame, bilateral anteroposterior scoring of the concave portion of the cartilage, release of the septum from the maxillary crest, and partial release from the perpendicular plate. The anterior portion of the septum is then supported with bilateral spreader grafts, and the cartilage memory is guided by the use of bilateral extramucosal stents posteriorly. (*Below, right*) Class VI deformity, the localized deviation, which is corrected with the removal of the deviated portion of the cartilage and bone and application of Doyle or simple stents.

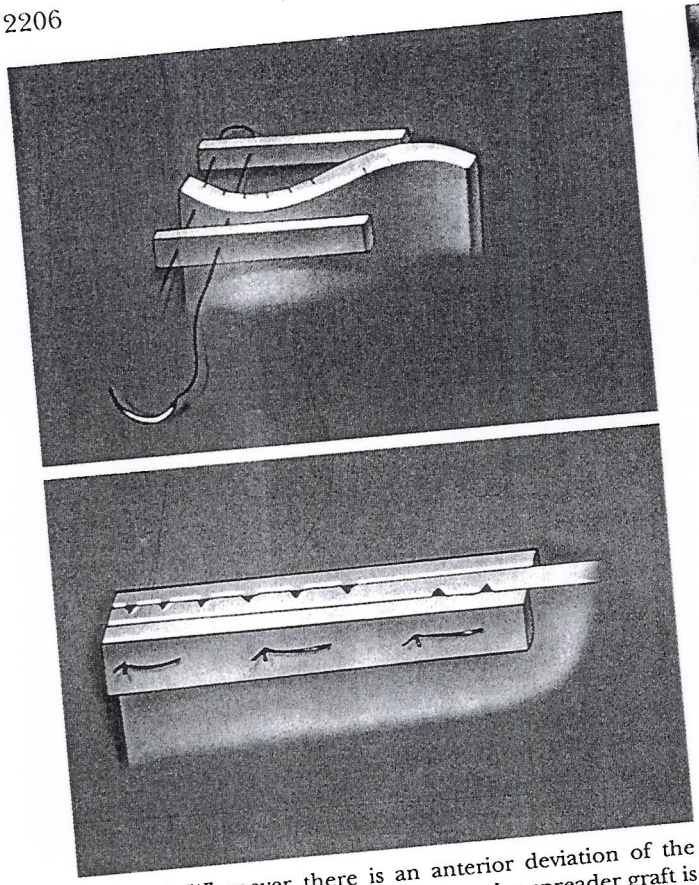

FIG. 4. Whenever there is an anterior deviation of the septum or a significant hump is removed, a spreader graft is applied on one side or bilaterally (*above*) and fixed in position with three sutures going through the cartilages in the cephalic, mid, and caudal portions of the spreader graft (*below*).

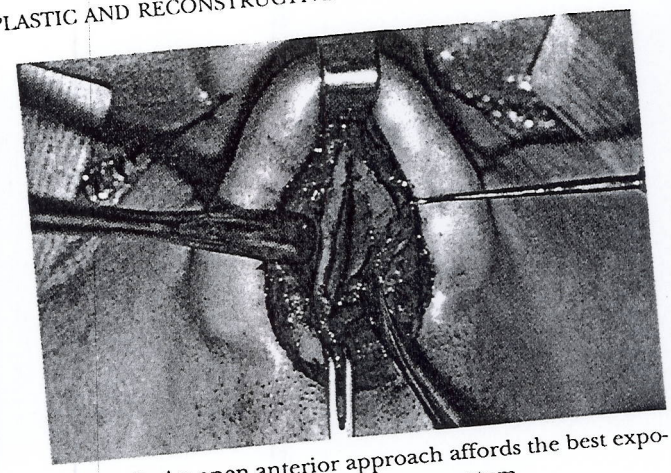

FIG. 6. An open anterior approach affords the best exposure to correct the deviated anterior septum.

Finally, the localized deviation was corrected with removal of the deviated portion and application of a Doyle stent (Fig. 1, *below, right*). Whenever the turbinate was found enlarged, it was reduced enough to allow for repositioning of the septum.

Whenever there was an anterior deviation of the septum or a significant hump was removed, a spreader graft was applied on one side or bilaterally and fixed in position with at least three sutures going through the cartilages in the cephalic, mid, and caudal portions of the spreader graft (Fig. 4). This eliminated the curvature in the anterior septum. When the caudal septum was found to be shifted to one side following the placement of a spreader graft, the upper lateral cartilage opposite the deviated side was used to reposition the septum. To accomplish this objective, a suture was first passed through the upper lateral cartilage using a 5-0 nylon and then through septal-spreader graft composite further caudally (Fig. 5, *left*). As the suture was tied (Fig. 5, *right*), it repositioned the caudal septum.

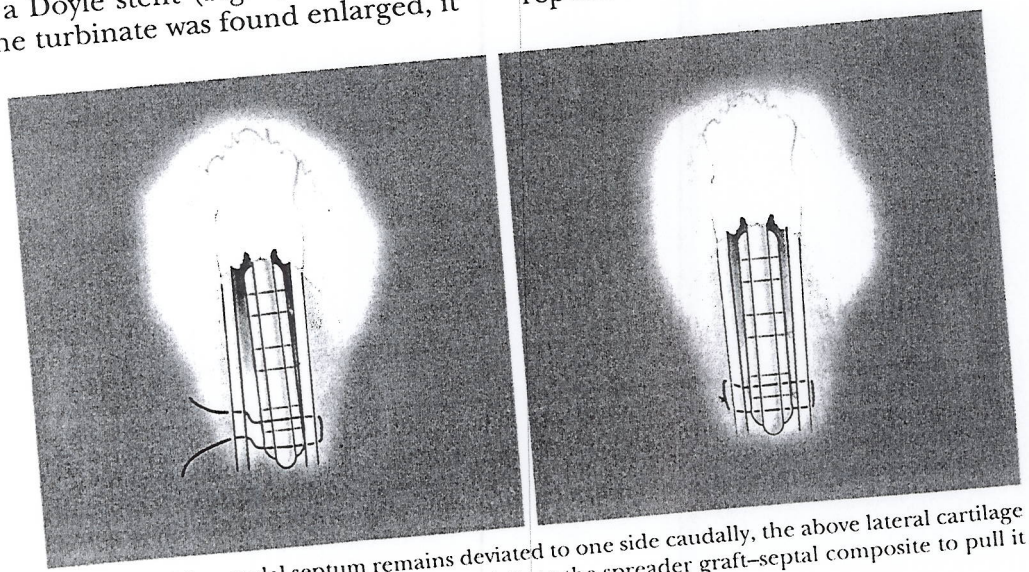

FIG. 5. If the caudal septum remains deviated to one side caudally, the above lateral cartilage opposite the deviated side is sewn differentially to the spreader graft–septal composite to pull it to the midline.

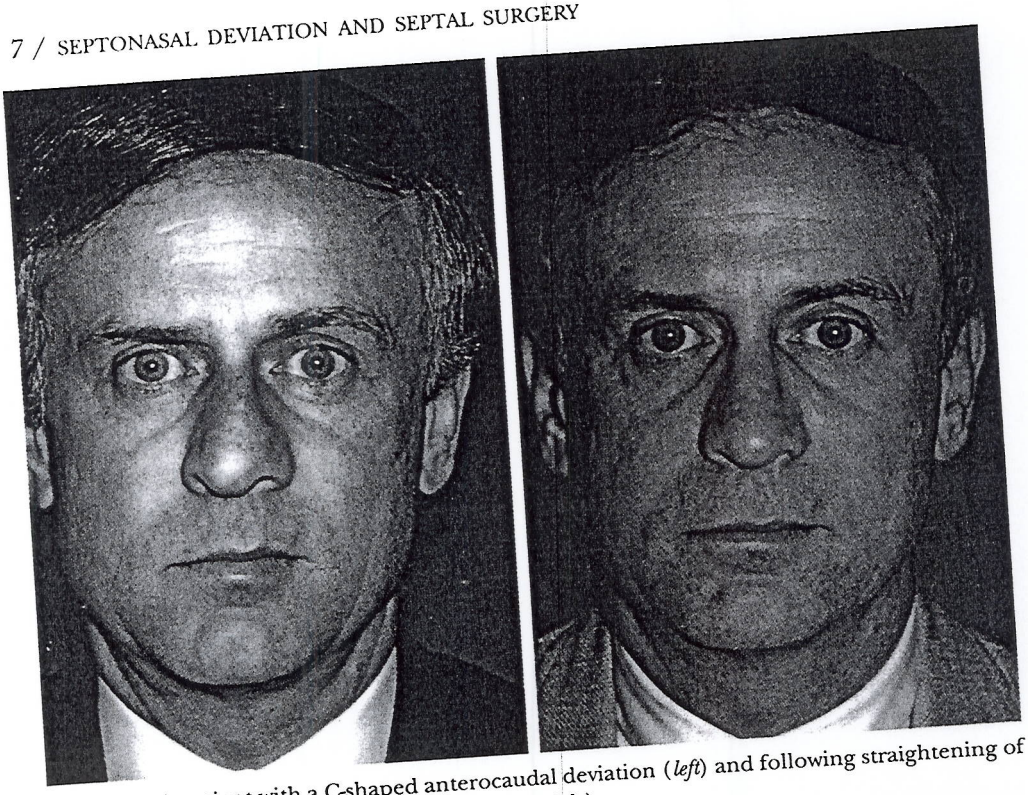

FIG. 7. A patient with a C-shaped anterocaudal deviation (*left*) and following straightening of the nose using the techniques described here (*right*).

FIG. 8. A patient with an S-shaped anteroposterior deviation (*left*) and following the correction described (*right*).

Exposure was obtained through an open technique anteriorly whenever there was deviation of the anterior nose and septum. Although this correction could be achieved through a transfixion incision, it was seldom used because of the limitation of the exposure. A left-sided L-shaped incision was only used for the localized deviation. As illustrated (Fig. 6),

FIG. 9. A patient with septal tilt (*left*) and following correction of the deformity (*right*).

the anterior open approach provides an excellent exposure, whereby the deviated septum can be repositioned, and spreader grafts can be applied more readily. The simple stents were used when the septum was scored, and these were kept in position for 3 weeks, whereas Doyle stents were retained in position for 8 days.

DISCUSSION

Correction of a deviated nose is one of the most challenging aspects of rhinoplasty. This deformity has humbled even the most experienced surgeons. The glut of publications germane to this topic introducing different techniques is puissant testimony for the complexity of this problem.[1–8]

Frequent failure to achieve complete elimination of external nasal and septal deviation prompted a more in-depth study of factors contributing to these discouraging outcomes. This inability to achieve consistent and total correction of the septal deformities was not only observed in the author's practice, they were also noted in the cases seen for consultations for a secondary rhinoplasty, even when the primary procedure was performed by a reputable and experienced surgeon. This trend was also seen in cases presented during the national meetings and in publications.

The approach may seem somewhat radical. On careful appraisal, however, it becomes clear that the approach is logical, as in every step the maneuver is merely being used to correct a specific problem that otherwise would remain unresolved. In reality, it is the conservatism that often has plagued the surgeon in the past, necessitating repeated surgeries with longer accumulated recovery period, more time lost from work, and greater economic consequences for the patients.

The methods described here are problem-oriented. The pathology is defined first, the exposure that will yield the highest potential for elimination of the entire septal deviation is chosen, and finally the surgical technique that will correct all aspects of the extant deformity and offer the highest chance of success is selected (Figs. 7 through 9). This approach is in contrast to a cookie-cutter type submucous septal resection. The latter does not truly address the curvatures, anterior deviations, and caudal displacements.

Scoring alone is unpredictable as there are no guidelines as to how much scoring will result in straightening of a given septum. How-

ever, when the scoring is combined with placement of a spreader graft anteriorly and bilateral extramucosal stents posteriorly, the cartilaginous memory is properly influenced to achieve more predictable outcomes.

Reduction of the inferior or middle turbinates is a crucial step for successful straightening of the septum. Contrary to some beliefs, leaving the turbinates intact to react to the change of septal position is absolutely erroneous. The fact is that if the turbinate is not reduced, there is not sufficient space to reposition the septum, and the excess bulk of turbinate will push the septum away from the midline.

When the bony pathology is considered, combining the osteotomy and repositioning often provides the necessary straightening. However, unilateral depression of the nasal bone can be corrected with either an osteotomy or an onlay cartilage graft.

In conclusion, a single septoplasty procedure will not sufficiently correct all of the pathology. There are six different types of septal deviations, and each one requires a specific correction to achieve satisfying outcomes. This problem-oriented classification will aid in understanding the pathology and the maneuvers necessary to correct it.

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