

## Functional aspects in septal plasty

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### SUMMARY

*Some remarks are made about the statical and dynamical function of the septum. Septum corrections should be carried out according to the complaints and to the clinical findings in the nose. Septum surgery can never be a routine procedure like the classical submucous resection. The pathological symptoms are outlined related to deformities in different septal areas.*

THIS paper is summarizing what is known about the function of the septum. The septum fulfills a statical as well as a dynamical function in the nose. The statical function is mainly determined in the cartilaginous part where the septum is building the cartilaginous dorsum in conjunction with the upper lateral cartilages. In the same way the septum supports the framework of the nasal tip. Also the position of the columella depends highly on the caudal border of the septum. Any extended surgical procedures in this area may change the profile line and the nasolabial angle.

On this reason the submucous resection is unsuitable for the deformities of the septum. The cartilaginous framework which is left behind after the resection is no assurance against saddling and sagging of the dorsum or retraction of the columella if the structures are under tension, or in a growing stage (Figure 1). In case necessary to remove some cartilage a sufficient reconstruction of this area seems to be absolutely necessary (Arbour, 1970; Elsbach, 1946; Ersner, 1944; Hinderer, 1970; Huizing, Sedee and Wentges, 1973; Stoksted and Kjellerup, 1977).

Many surgical procedures are described since Metzenbaum (1929) in order to reconstruct the caudal border of the septum. These techniques will not discussed here in detail.

On the other hand an extended projection of the septum may cause tension in the nose (Cottle, 1955, 1960). The alae are collapsing in the airstream due to the increased nasal inspiratory resistance. In such cases the structure of the cartilaginous vault should be corrected by lowering the dorsum (Figure 2).

The dynamical function of the septum is obvious in all cases of septum deformities or septum loss where the aerodynamic is disturbed. In dividing the nose



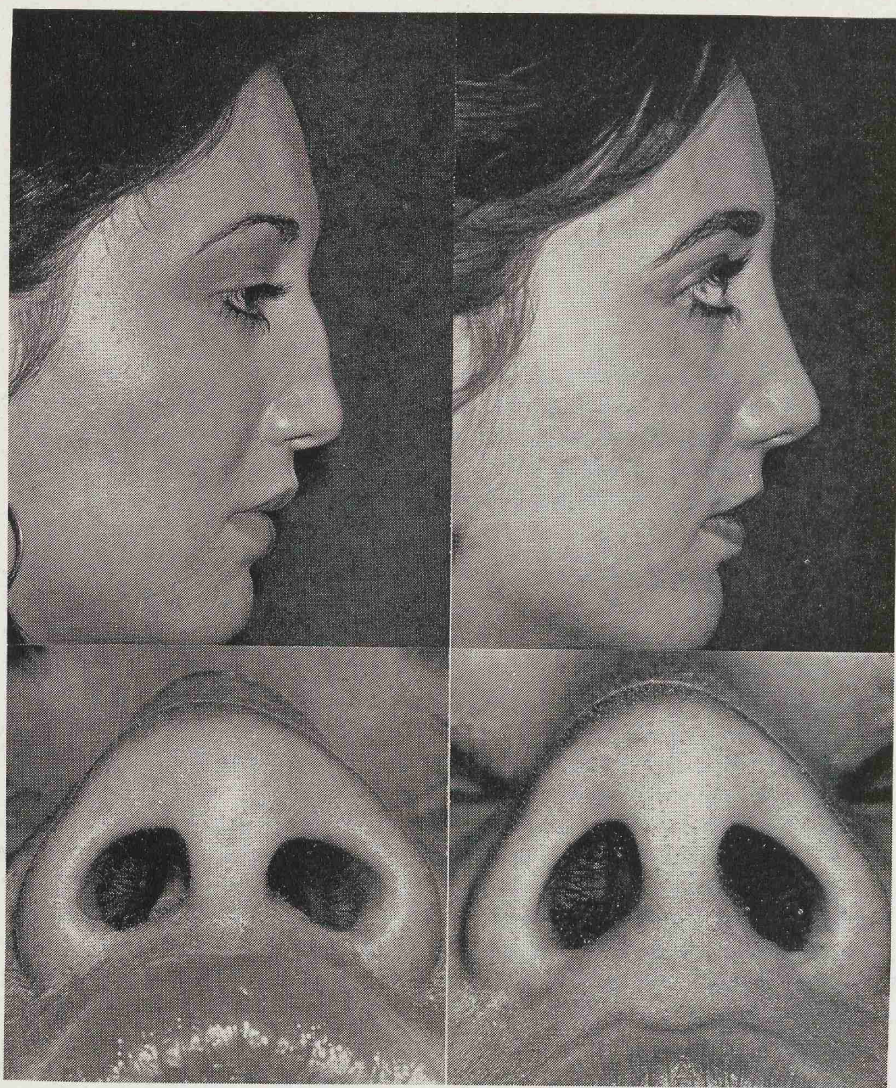


Figure 1. 16-years old girl with previous submucous resection of the septum and loss of the static function before and after Septo-Rhinoplasty with reconstruction of the caudal border of the septum.

in two cavities the septum distributes the airstream in a proper way on both sides. The distance between the septum and the lateral wall is well defined and the ventilation disturbed when the airspace seems to be too wide or too narrow (Masing, 1970). In both cases the mucosa is unable to fulfill the protective functions like cleansing, warming and moistening of the air. In case of a septum



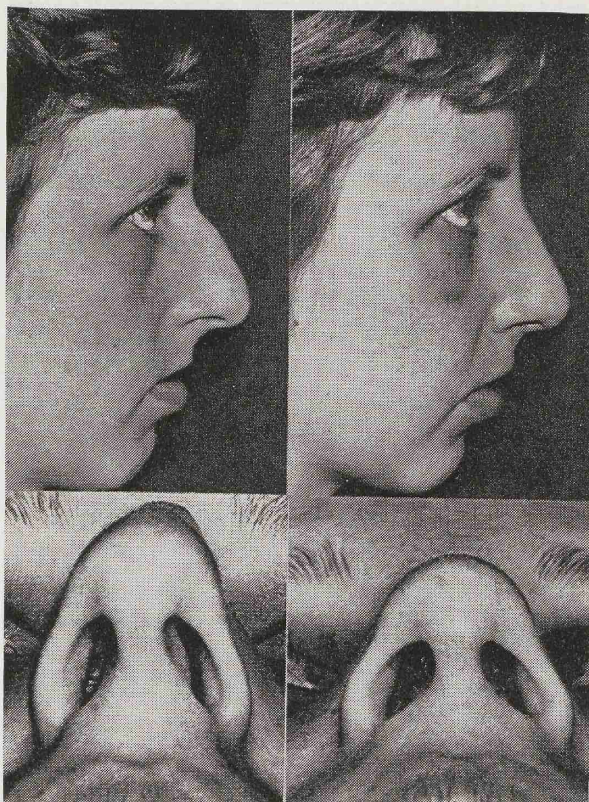


Figure 2. Tension nose with severe breathing difficulties before and after correction. Notice the shape of the nasal base in Figures 1 and 2.

perforation the pathological conditions are summarizing each other where the restmucosa of the septum has to dry out.

The aerodynamic in the nose is closely related to an undisturbed turbulent air-stream in which the border layers are permitting a sufficient contact between the mucosa and the flow like shown in the larynx and trachea by Ingelstedt and Toremalm (1960).

To describe the severity of the septal deformities Cottle offered the following classification which seems to be very useful in evaluating dynamical function disturbances:

1. Deviation — a mild deflection of the septum.
2. Obstruction — a more severe deviation in which the septum may reach the lateral nasal wall. On vasoconstriction the turbinates shrink away from the septum.
3. Impaction — a marked angulation of the septum or a septal spur pushes against the lateral nasal wall. Vasoconstriction does not relieve this condition. Obviously an obstruction and impaction of the septum should be removed. But in case of a mild deviation the correction seems to be necessary only in a critical

region like the valve area. More attention should be paid to the correlation between the septum and the lateral nasal wall, particularly to the turbinate function. More than 50% of the caucasian race are showing septal deformities (Gray, 1974). In this way every rhinologist has had occasion to observe a patient with a marked septal deflection which caused no disturbance whatever.

In case of a unilateral obstruction of the nose the physiological cycle of the turbinates is often destroyed. In these cases patients are often unable to realize the pathophysiological situation in the nose by complaining of stuffiness and congestion on the temporarily closed side which was described as a paradoxal obstruction by Arbour and Kern (1975). Also the unilateral obstruction creates an overexposing of the mucosa to the airstream on the still working side which in turn reacts in a kind of selfprotection like compensatory hyperplasia. This phenomenon can be explained as an additional resistance to the airflow.

The air ventilation might be disturbed in case of an obstructed valve area even the lower pathway in the nose seems to be sufficiently open. This observation was made already by Zarniko (1925). On this reason rhinomanometrical measurements do not always reveal partial obstruction in our experience and should be evaluated always in conjunction with the clinical findings.

#### DYSFUNCTION OF THE NOSE RELATED TO DIFFERENT SEPTAL AREAS

Cottle divided the septum in 5 areas causing different pathological symptoms:

Area I (Caudal border of the septum).

Subluxation of the caudal border is shifting the airstream to the opposite side. The exposed mucosa may react with dryness, bleeding and crusting (Figure 3).

Area II (Valve area).

The valve area creates the most resistance (van Dishoeck, 1942). Mild deviations in this area may cause severe breathing difficulties. Most attention should be paid to this region.

Area III (Attic and premaxilla).

Extended deformities are creating breathing difficulties. But the premaxillary wings belong to the physiological resistance not necessary to be removed (Cottle, 1955, 1960).

Area IV (Perpendicular plate).

A deviated or thickened (sometimes pneumatized) perpendicular plate is often responsible for poor ventilation in the olfactorial area, in the sinuses, the Eustachian tube including the middle ear ventilation. Headache in the forehead is noticed.

Area V (Vomer and choana)

Deviations are creating disturbances of the nasal cycle with congestion and stuffiness of the nose. Postnasal drip is observed. In case of a crest or spur headache and facial pain are complained (Figure 4).

The extended resection of the vomer may create also a flaccid septum which is changing its position during in — and expiration, a very unpleasant phenomenon



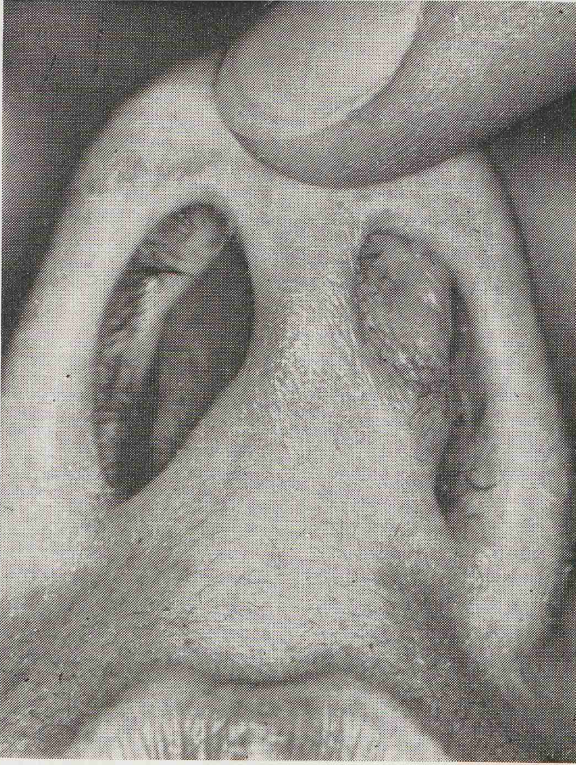


Figure 3. Luxation of the caudal septal border to the left. The overexposed mucosa on the right side reacts with dryness and bleeding.

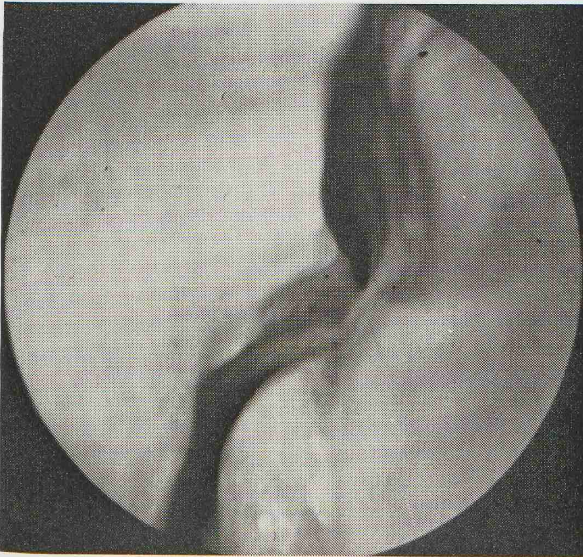


Figure 4. A vomer spur which pushes against the lateral nasal wall causing headache, facial pain and stuffiness. The symptoms disappeared after correction.

for the patients. In order to avoid such a dynamical dysfunction the resected bone is crushed and replaced as suggested by Cottle.

#### RÉSUMÉ

L'auteur note d'abord quelques données sur les fonctions statique et dynamique de la cloison. Les corrections septales devraient se faire selon les plaintes du patient et selon les faits cliniques. La chirurgie septale ne sera jamais un procédé de routine comme la résection sous-muqueuse classique. L'auteur souligne enfin les symptômes pathologiques en rapport avec les difformités des différentes zones de la cloison.

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