

Management of early nasal injuries with long term follow up

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SUMMARY

Postnatal nasal injury occurring before full growth results in certain changes in the development of the nose and of the face. An assessment of the role of the cartilaginous nasal septum in this growth has been attempted by observing adults who had dissolution of the cartilaginous septum in childhood.

The immediate management of long term follow up care of patients so afflicted is discussed.

Also observed into adult life were several patients on whom lateral, medial or transverse osteotomies or combinations of these had been performed in childhood to determine if such procedures interfered with growth of the nose and face.

Numerous references and observations show that early nasal injuries are associated with growth disturbances. Most of the attention to this subject has been a consideration of injuries occurring to the nose before and during birth. It is not within the scope of this presentation to review or amplify this type of injury since it is well documented in the literature (Metzenbaum, 1936; Cottle et al., 1954; Kirchner, 1955; Steiner, 1959). The main focus of this paper will be a long term observation of the effects certain injuries to the nasal septum or to the bony pyramid will have on the nose and face when injury occurs some time after birth but before full growth is reached.

An obvious approach is to study patients with injured noses from early childhood to adult life. These clinical observations are difficult to make because of the usual problems with long term follow up such as migration of patient population and the lack of interest and cooperation. These factors have resulted in a paucity of reports.

A review of the literature is somewhat confusing. Experimental procedures on rabbits with extirpation of the septum produced marked disturbance in growth of the face (Sarnat and Wexler, 1966; Wexler, 1971). On the other hand submucous resection of a large portion of the septum in canine pups or septal extirpation of various areas of the septum in guinea pigs failed to alter growth (Stenström and Thilander, 1970; Bernstein, 1973).

Most observers interested in this field believe that nasal trauma may retard growth, may stimulate it, do both in the same patient or have no effect (Jennes,

1964; Farrior and Connolly, 1970; Morrison, 1970; Pirsig, 1977). Mosher (1909), many years ago, described the anatomy of the infant and adult nasal septum in remarkable detail and pointed to the region of the junction of the quadrilateral cartilage, the premaxilla, the maxilla and the vomer as the center of the septum mosaic. A common observation correlates nasal septal disturbances with maldevelopment of the four upper incisor teeth resulting at times in malalignment, malocclusion, diastema and asymmetry. Kemble in 1973 summarized the controversy of nasal septum disturbance in mid-face growth. One concept implicated the nasal septum whereas in another the maxillae were thought to have an inherent potential for growth which did not depend upon outside influences. He reviewed eight cases, some of which were congenital and some not, in which absence of the nasal septum seemed to result in hypoplasia of the maxilla. As will be seen the present study will support this latter concept.

It has been possible to observe patients over a period of years who had injury to the cartilaginous septum secondary to septal hematoma or abscess. Changes may take place immediately following injury or may occur over a period of weeks or months. They may result in some or all of the following as summarized by Cottle (1954).

1. Sagging or saddling of the nasal dorsum
2. Retraction of the columella
3. Widening of the base of the nose
4. Flattening of the tip of the nose
5. Change in the shape of the nostrils
6. Change of the nasolabial angle
7. Changes to the inside of the nose including ballooning of the upper lateral cartilages and the lower lateral cartilages
8. Linea nasalis

These are all stigmata of disturbances of "septum totality" and may increase as growth occurs. At times the bony vault continues to grow and project whereas the lower portion of the nose does not. This results in a disturbance in salience with considerable discrepancy between the bony and cartilaginous vaults and the lobule (Figure 1). If nasal obstruction is present because of injury, then altered facial development may occur as has been shown by Gray (1972) and others. But with or without nasal obstruction mid-face growth may be affected.

Some standards of growth can be judged clinically by certain nasal indices as outlined by Cottle (1946). These are the clinical nasal index, the tip index and measurements of salience.

It has been possible to follow four patients. Using Cottle's criteria diminished salience has been apparent in all (Figures 1, 2, 3b, 3c). Disproportion between the clinical nasal index and the tip index was present in all (Table 1). Disturbances in function were also noted and recorded by rhinomanometry. In three patients

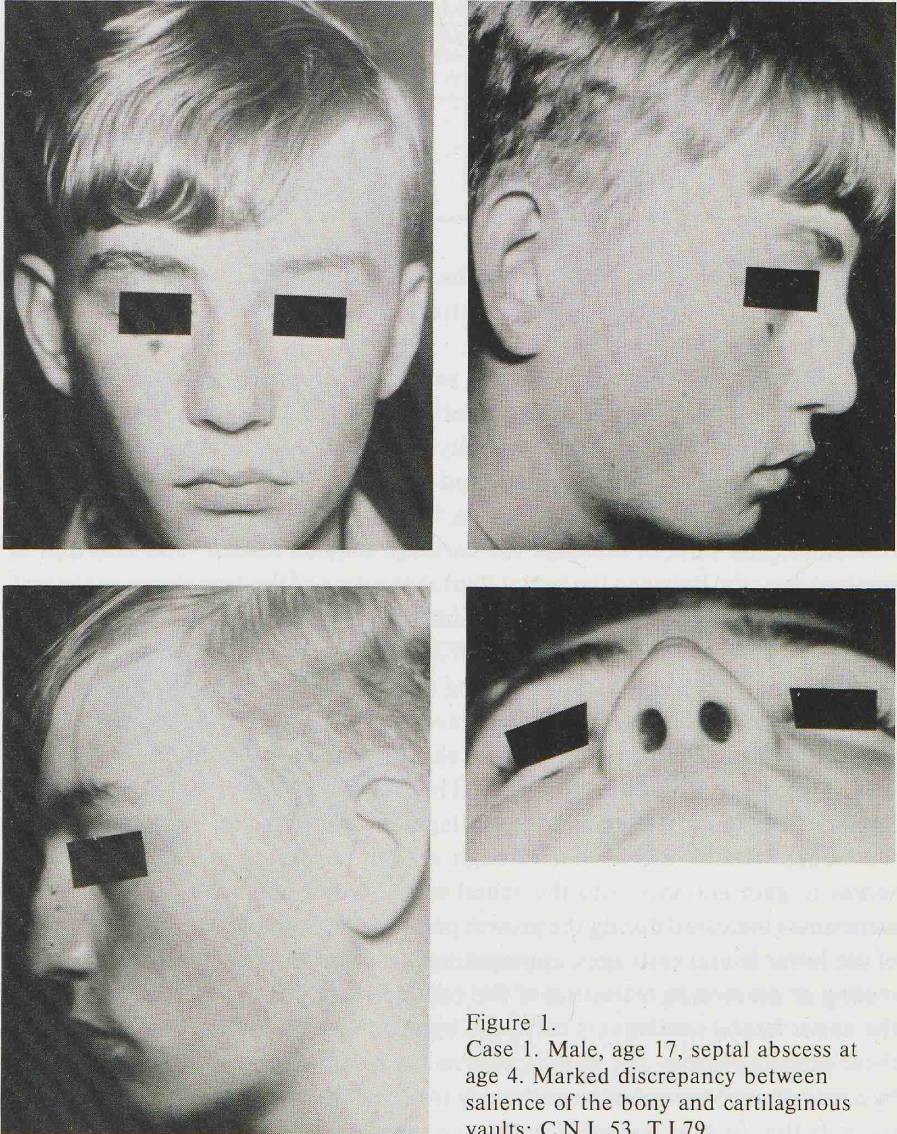


Figure 1.
Case 1. Male, age 17, septal abscess at
age 4. Marked discrepancy between
salience of the bony and cartilaginous
vaults; C.N.I. 53, T.I.79.

marked obstruction was present due to a distorted nasal septum and in one low pressures and low resistance seen commonly in the wide nose were present. What can be attempted to alter the course of a severe septal injury such as may result from a hematoma or abscess? The goals should be a stiff nasal septum, an adequate bilateral nasal airway along with aesthetic considerations. A flaccid septum results in turbinate hypertrophy and eventually atrophy with all its disturbed

Table 1. Clinical Nasal Index and Tip Index (Cottle) in 4 adult patients who had septal hematoma in childhood. The C.N.I. is normal but the T.I. is high in all cases.

	C.N.I.	T.I.
Case 1 - male	53	79
Case 2 - female	50	75
Case 3 - male	53	78
Case 4 - male	46	77

function. This was one of the faults of the "Killian-type" of resection of the nasal septum. As noted previously, nasal obstruction may also lead to disturbances in facial development.

Early diagnosis and drainage of a nasal septal hematoma or abscess is of utmost importance. If treatment is carried out early, the septal cartilage may be saved and the perichondrium may retain its capacity to nourish this cartilage or to form new cartilage or at least to nourish damaged cartilage. Under these circumstances growth may proceed in the usual fashion. Unfortunately early diagnosis is not the rule and at the time of drainage the cartilage may be absent. The insertion of implant material between the septal flaps at the time of the hematoma or abscess helps to create a fibrous layer which facilitates surgical entry into the septal space later (Cottle and Loring, 1946; Pirsig, 1977). This may be performed repeatedly as growth occurs, the goal eventually being a firm septum. The sequelae of lack of septum "totality" may sometimes be prevented or corrected. Due to saddling of the nasal dorsum and contraction of the skin in this area, the stimulus for the skin to grow and stretch may be diminished. This can be aided by repeated insertion of implants between the skin and cartilaginous vault in the saddled area, a manoeuvre readily carried out through a hemitransfixion incision which also serves to gain entrance into the septal space. Other operative procedures are sometimes indicated during the growth period and consist of breaking the spring of the lower lateral cartilages, augmenting the anterior nasal spine area and correcting or preventing retraction of the columella. In like manner, ballooning of the upper lateral cartilages is corrected by additional surgical techniques. All of these procedures may not be indicated in any particular case but a selection can be made depending upon the pathology involved. It is always emphasized to the patients that further operative procedures may be necessary.

Two case reports representing treated and partially treated septal abscess with long term follow up are presented.

Case 1 had a septal abscess at age six drained with complete dissolution of the cartilaginous septum found (Figure 1). Six months later material was replaced between the septal flaps at which time the caudal end of the cartilaginous septum was found to be absent. He was then lost to follow up for ten years, at the end of which time marked changes were noted. Disproportion between the bony arch

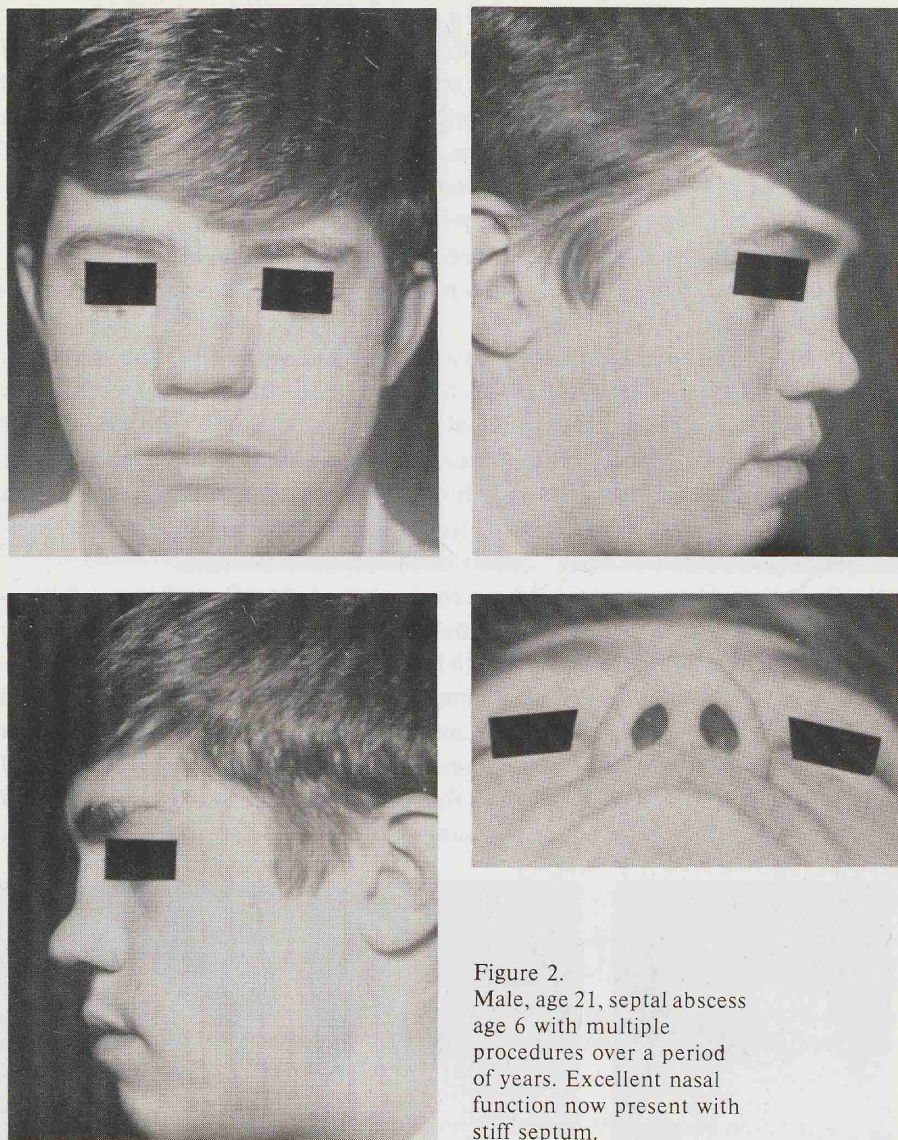


Figure 2.
Male, age 21, septal abscess
age 6 with multiple
procedures over a period
of years. Excellent nasal
function now present with
stiff septum.

and the cartilaginous vault and the lobule were noted as well as a high tip index. A flaccid caudal septum was present but it was possible to separate the septal mucosal flaps with some difficulty. The perpendicular plate of the ethmoid was found to be intact. A portion of this was used to reconstruct the caudal septum. Extensive surgery to the base of the nose, the lobule and the nasal dorsum was necessary.

Case 2, a six-year-old white male had a septal abscess explored eight days after the original injury (Figure 2). Complete dissolution of the quadrilateral cartilage was noted. Over the next fifteen years several operative procedures were carried out in an attempt to guide proper growth and support. It was always possible to enter the septal space readily and the eventual result was a nose with a stiff septum and close to normal function as determined by rhinomanometry. Diminished salience of the mid-face was not prevented.

The two remaining patients in the group are shown in profile (Figure 3b-c) compared with what may be considered a patient with normal salience of the mid-face, (Figure 3a).

A study of this nature does not lend itself readily to controls because of genetic and other factors, the variability of which are numerous. Occasionally a fortuitous circumstance arises as reported by Huizing (1966). An identical twin, observed at age fourteen had a septal hematoma seven years previously (Figure 4). Changes in his nose and face compared with his brother are evident with many of the stigmata of interference in growth and lack of septal support. Although "one swallow does not a summer make" this evidence seems convincing.

Another clinical observation has been the long term recording of growth following osteotomies in children. This has been mentioned in the literature on occasion but there are very few reports with follow up into adult life. The exact location of growth centers in the nasal bones and in the ascending process of the maxilla have not been determined but in some instances lateral osteotomies have been performed with no obvious retardation in growth pattern. The youngest of these, age four-and-a-half, had a nasal fracture which was badly comminuted on one side and in order to obtain symmetry it was necessary to perform lateral

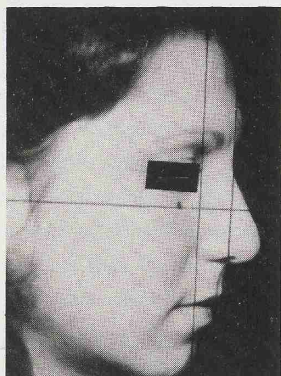


Figure 3a.
The usual relationships of the brow, mid-face and chin.

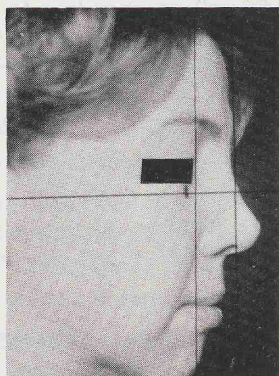


Figure 3b.
Case 3. Female, age 26, septal abscess age 5; salience of the nose and face has been corrected surgically.

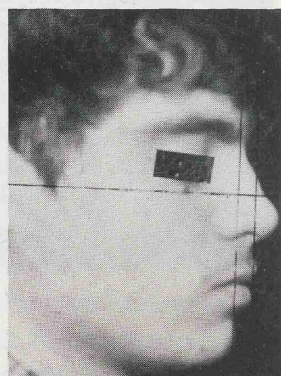


Figure 3c.
Case 4. Male, age 17, septal abscess age 3; note diminished salience of mid-face and nose.

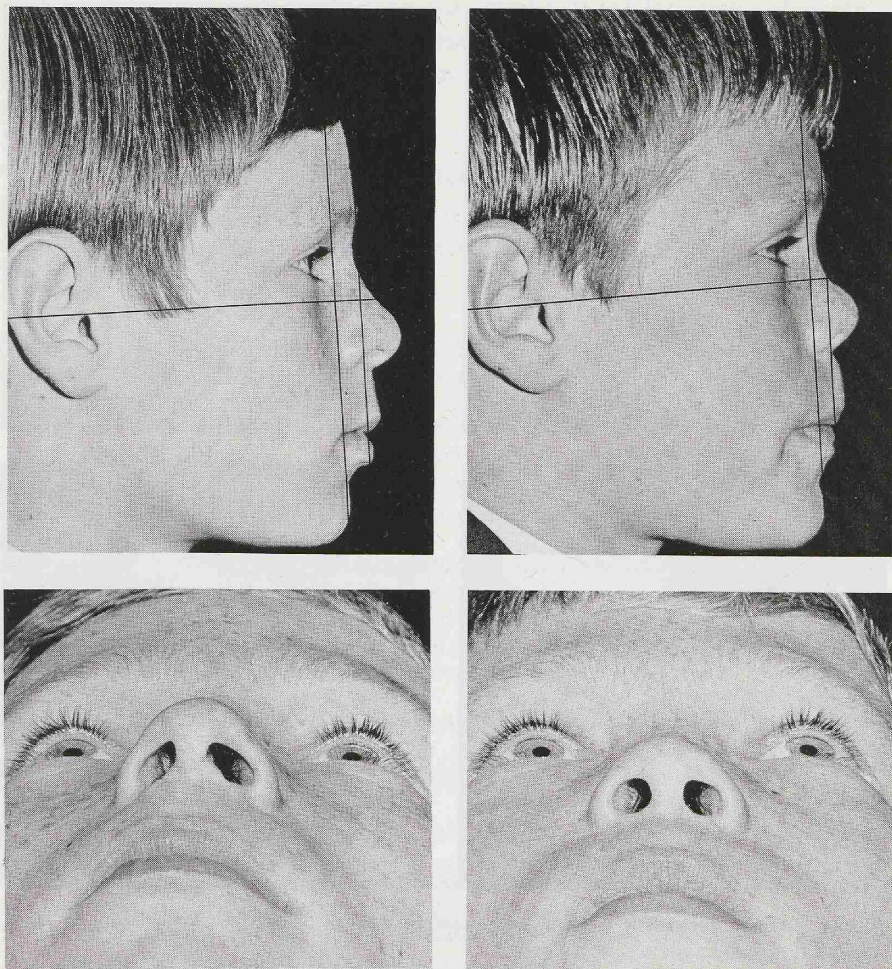


Fig. 4. Identical twins, age 14, one of whom had a septal abscess age 7. Multiple changes in the type and amount of nasal and facial growth are apparent. (Reprinted with permission from Huizing, 1966).

osteotomy on the opposite side. Measurements of the clinical nasal index, tip index and salience have in general been within normal limits.

A case report of such a patient follows: S.W. (Figure 5) had medial, lateral and transverse osteotomies at age six and observation at age sixteen revealed good nasal growth of the bony vault.

There is a clinical impression that progression of salience may be interrupted when the nasal septum is interfered with as it might be at surgery. In some children with lack of salience, age seven to ten, Cottle suggested many years ago that lateral osteotomies may free up the bony pyramid from the face permitting for-

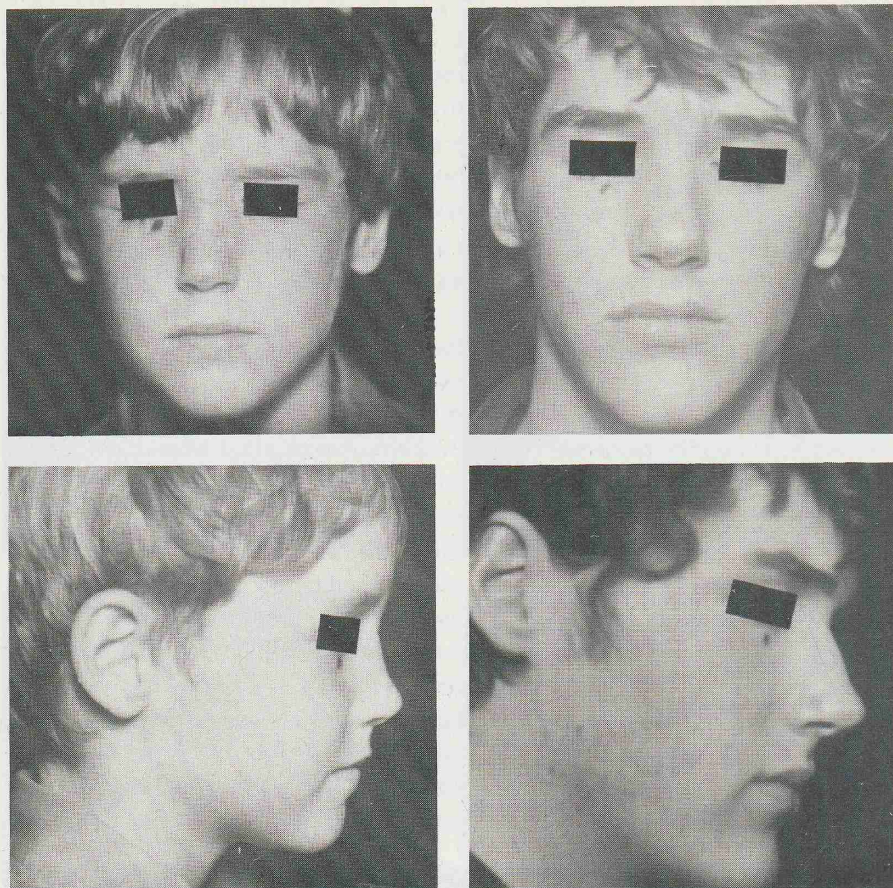


Fig. 5. S.W. Male, age 18; medial, lateral and transverse osteotomies performed at age 6; nasal indices and salience now normal.

ward growth of the nose, a disimpaction as it were. On two occasions in the author's experience salience seemed to increase rapidly following such a procedure during an age when nasal growth should not have been particularly active. This is an observation which needs confirmation by others. The variability of genetic and other factors precludes all but a passing observation.

RÉSUMÉ

On connaît mal de rôle que jouent la cloison et la pyramide nasale osseuse dans le développement du nez et de la face.

A l'aide de divers indices, l'auteur a eu l'occasion d'observer le développement du nez et de la face chez quatre adults ayant subi une destruction de la cloison nasale en bas âge.

Il décrit succinctement la conduite à tenir, immédiate et à long terme, dans le cas d'hématome et d'abcès de la cloison nasale, et il rapporte l'effet de l'ostéotomie faite en bas âge dans le développement du nez et de la face.

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