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Long term results of reconstruction of the septum in the acute phase of a septal abscess in children

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SUMMARY

The long term results of our two first cases of septal reconstruction in the acute phase of a septal abscess in childhood are described. Follow-up periods were 19 and 17 years respectively.

The development of the nasal pyramid was normal apart from a slight to moderate sagging of the cartilaginous dorsum. Length, width and prominence developed within normal limits and nasal function remained undisturbed. Reconstruction of the septum in the acute phase of a septal abscess seems also on the long term effective in preventing the well known disturbance of growth, form and function of the nose.

INTRODUCTION

The disastrous effect of a septal abscess in childhood on the form and the function of the nose is well known. The resulting nasal deformity and concomitant functional disturbances are due to the short and long term effects of three processes (Table 1).

1. Loss of mechanical support of the cartilaginous pyramid and the lobule;
2. Retraction and atrophy of connective tissue, skin and mucoperichondrium in the septum, dorsum and valve area;
3. Disturbance of growth of the nose and the midface.

Table 1. Processes involved after a septal abscess and their effects and nasal form and function.

process	effect	form	function
1. loss of support	immediate (1 wk)	-	normal.
2. retraction and atrophy	short term (1-6 m)	cart. pyramid and lobule broad + sagging	inspiratory obstruction.
3. growth disturbance	long term (yrs)	total ext. pyramid and midface underdeveloped	inspiratory obstruction, dryness, crusting.

Loss of mechanical support of the cartilaginous vault and the lobule is an immediate effect which occurs instantly after the abscess. It does not lead to much changes however, particularly not in the beginning. Except in cases with a very large destruction nasal form and function is practically undisturbed when the patient leaves the hospital. The loss of support is only evident in palpation.
Within the following weeks the nose gradually collapses, however. This is due to the retraction of connective tissue, skin and mucosal lining of the septum, the dorsum and the valve. This process is secondary to the loss of support and infection. It is this short term effect which is mainly responsible for the sagging and broadening of the cartilaginous pyramid and lobule and the impairment of breathing.
Disturbance of growth of the septum and consequently of the nasal pyramid and the midface region are long term effects of septal destruction. These effects are less known. It is likely that they depend on the stage of development of the nose at the time of the abscess, the size of the defect and the amount of infection and necrosis of the adjacent structures.
In the last 20 years several investigators have carried out experiments in rabbits, rats and guinea-pigs in order to determine the effects on nasal and facial growth of all kinds of septal resections (Sarnat and Wexler, 1966; Stenström and Thilander, 1970; Verwoerd et al., 1979). The results of these experiments are not consistent in all respects. The work of Sarnat and Wexler (1966) and more recently that of Verwoerd c.s. (1979) in rabbits however, has clearly demonstrated that septal defects brought about at young age severely inhibit nasal and maxillary outgrowth. Their investigations have supported systematically the old clinical observation that the nasal pyramid remains underdeveloped when a submucous septum resection is carried out in childhood. A striking illustration of the long term effects of a septal trauma in childhood on human nasal-facial growth was shown by us in 1966 in a 14 years old male identical twin of which one boy suffered from a septal trauma and infection when 8 years old. Recently Tucker (1984) reported upon the long term surgical results in four children with a septal injury and in two children with a septal abscess.
The deformity and the functional disturbances by a septal abscess can only partially be corrected in adult life. The most appropriate method seems to be total reconstruction of the septum, if necessary in combination with valve reconstruction and implantation of cartilage into the dorsum as much as required for an acceptable cosmetic result. The best therapy would undoubtedly be to prevent the deformity and the inhibition of nasal growth, if possible.
It has been one of the merits of Cottle (1960) and his coworkers (e.g. Joseph, 1972) to point out that the retractive process which is secondary to the loss of support and infection can be counteracted by an immediate or early repair of the septal defect. In pursue of his method to reconstruct the septum when resections

have been made, he also advocated to implant cartilage into the defect produced by a septal abscess at an early stage (Cottle, 1960). This technique has been applied by us and others since. Good short term results have been described by Masing (1965), Hellmich (1974) and Vase and Johannessen (1981). In this paper the long term results will be shown and discussed in relation to the follow up of our first two patients.

TECHNIQUE

Reconstruction of the septum in the subacute or acute phase of a septal abscess has been applied by us since 1963. In the beginning the operation was carried out in two stages: 1. drainage and 2. reconstruction a few days later. Later drainage and reconstruction was carried out in one procedure. At first homologous bank septum cartilage preserved in alcohol was used, later homologous rib cartilage stored in Cialit® 0.2‰. Rib cartilage is preferred because of its greater stiffness. The technique is as follows:

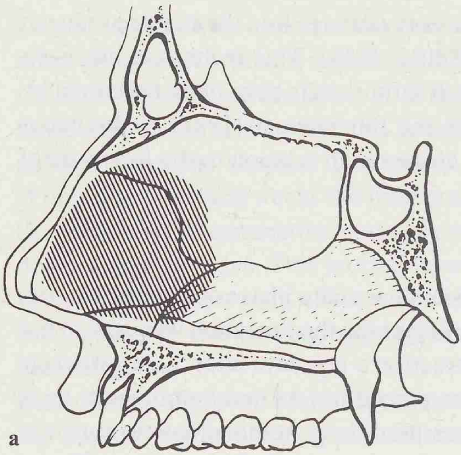
The swollen mucosa is shrunken by a cocaine-adrenaline solution. The abscess is first punctured for culture. A right hemitransfixion is made and a mucoperichondrial tunnel is elevated until the abscess is reached. Pus and necrotic material are removed. Diseased but not yet necrotized is left in place. The defect is measured and a piece of cartilage of corresponding form is cut from the center of homologous rib cartilage preserved in Cialit® 0.2‰. The implant is inserted and fixed by means of a carefully applied 2 cm dressing soaked in saline. The hemitransfixion is left open for drainage. The operation is carried out in general anaesthesia in children, in local anaesthesia in adults. A broad spectrum antibiotic is given systematically. The nose is daily inspected and cleaned. The dressings are removed after 2–3 days and new dressings are applied if required.

SHORT TERM RESULTS

The short term results of the technique i.e. after 3–6 months are completely satisfying. Sagging of the dorsum is prevented, retraction of the columella does not take place and normal function is maintained. Nevertheless, stifness and mechanical support of the cartilaginous vault and the lobule are diminished. When the septum is reopened hardly any cartilage is found back. This is understandable as the implanted material is non-vital. This observation throws doubt on the long term results of this operation, as it does not seem realistic to expect any positive effect of the implanted material on further nasal growth.

LONG TERM RESULTS

In order to study the long term results of the technique we have reexamined our first two patients. Of both cases drawings of the septal defects made at surgery were available. Follow-up took place after 5–6 months, 2–4 years and 17–19 years.



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a. septal defect drawn at surgery;
b–d. 5 months later, slight sagging of cartilaginous dorsum;
e–g. 4½ years later, 13 years old; apart from slight sagging normal nasal growth and function;
h–j. 19 years later, at the age of 27; normal length, width and prominence of external nasal pyramid, normal adult configuration of lobule, external and internal ostia. Slight sagging, oblique columella. Normal function.

Figure 1. Case 1. Follow-up (1963–1982) after reconstruction of a subtotal defect of the cartilaginous septum in the acute phase of a septal abscess in a boy of 8 years of age.

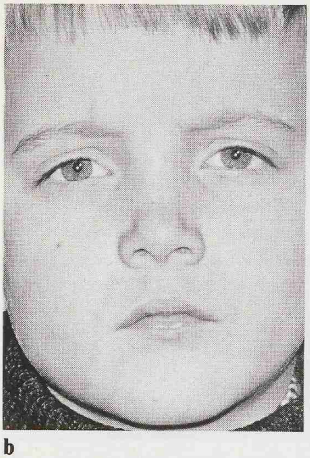
Case 1, a boy of 8 years of age was seen in 1963, because of a large septal abscess which had developed some days after a small nasal trauma. The abscess was opened and drained through a hemitransfixion and all necrotic material was removed. The abscess had produced a subtotal defect of the cartilaginous septum (Figure 1a). Cloxacilline was administered systematically. Three days later the defect was reconstructed by implantation of homologous septal cartilage preserved in alcohol. Healing was uneventful.

On examination five months later some sagging of the dorsum at the K-area had occurred. Otherwise no deformities developed and breathing was unimpaired (Figure 1b-d).

Follow-up 4½ years later showed a normal nasal growth in accordance to age. Length and prominence of the external pyramid have clearly augmented, which is particularly evident from the side and base views. The slight sagging did not increase and nasal function remained normal (Figure 1e-g).

At the age of 23 he consulted his local ENT surgeon of an irregularity in the left vestibule produced by a dislocated remnant of the caudal end of the septum. A minor surgical correction was carried out.

In 1982, at the age of 27, he was reexamined. The external nasal pyramid had developed normally and proportional to his face. The clinical nasal index, tip index and prominence were within normal range. The slight dorsal sagging still existed. The lobule had a normal adult configuration. The oblique position of the columella appeared to be produced by a still existing dislocated cartilaginous remnant. Nasal function was undisturbed.



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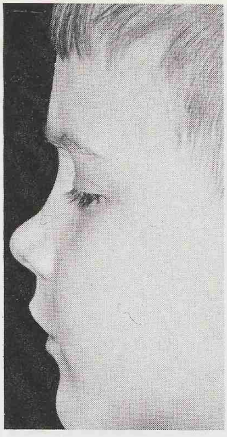

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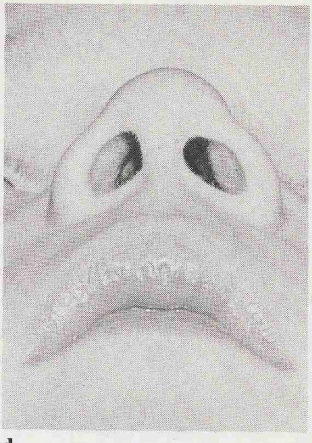

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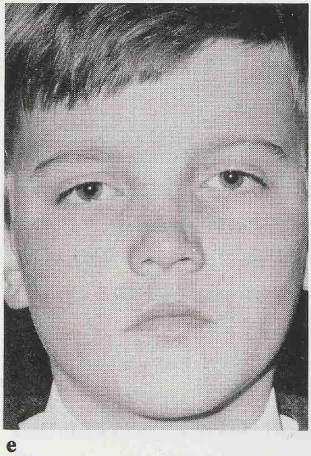

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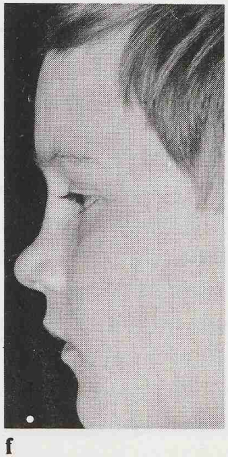

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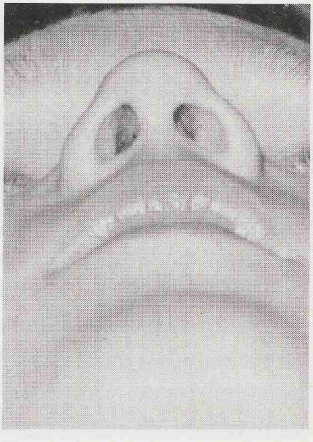

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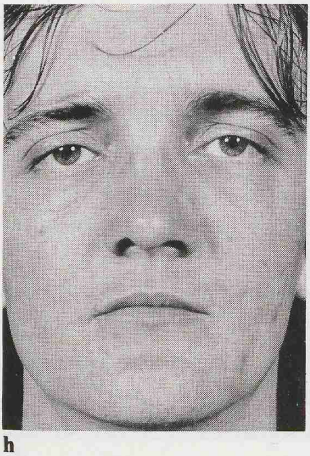

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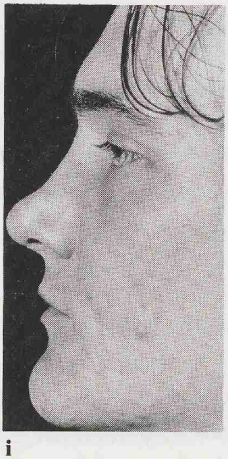

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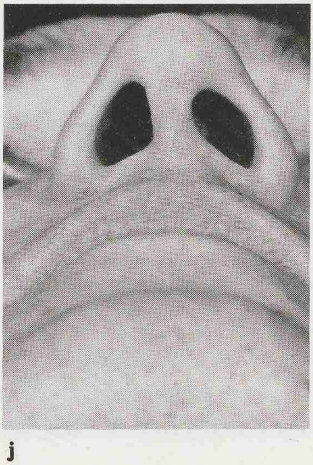

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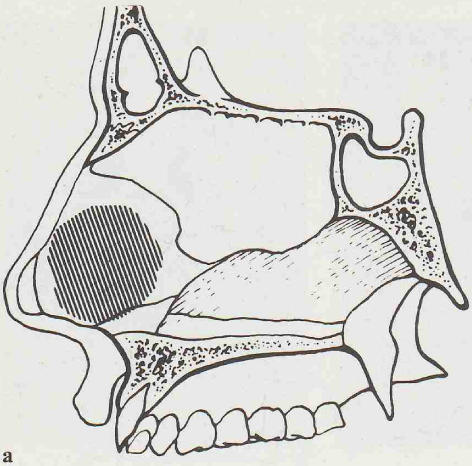

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a. septal defect drawn at surgery;
b-d. 6 months later; normal form and function;
e-g. 3 years later, 10 years old; normal nasal development;
h-j. 17 years later at the age of 24; normal lengh, width and prominence of external nasal pyramid, normal lobule, ostia and columella. Limited supra-tip sagging. Function unimpaired.

Figure 2. Case 2. Follow-up (1965-1982) after reconstruction of a large defect of the cartilaginous septum in the subacute phase of a septal abscess in a girl of 6 years of age.

Case 2, a girl, suffered from a nasal trauma at the age of 6 and was referred because of a septal abscess five days later. The abscess was drained and cleaned, cloxacilline was given systematically and the defect was reconstructed five days later by implantation of homologous septal cartilage. A drawing of the defect was made (Figure 2a). Follow-up after six months and after three years showed a normal nose with undisturbed development and function (Figure 2b-d).
At reexamination 17 years later, at the age of 24, the nasal pyramid appeared to have developed normally. All indices were within normal limits. Function was undisturbed. A slight sagging of the cartilaginous dorsum was the only abnormality.

DISCUSSION

In both patients a septal abscess resulted into a large defect of the cartilaginous (and bony) septum. Because of the magnitude of the defects a collaps of the cartilaginous pyramid and the lobule with saddling, broadening and distortion of the vestibule and valves had to be expected. In both patients the defects were reconstructed in the acute phase of the abscess by reimplantation of homologous septal cartilage. At follow-up after 5-6 months and 3-4 years an almost normal nose with an undisturbed growth according to age was seen. The only noticable abnormality was a slight sagging of the cartilaginous dorsum especially in case 1 in which a subtotal defect of the cartilaginous septum was present. The classical sagging and broadening of the cartilaginous vault and lobule did not occur. It is most likely that this has to be ascribed to the acute reconstruction of the septum

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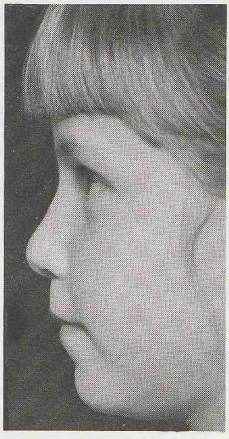

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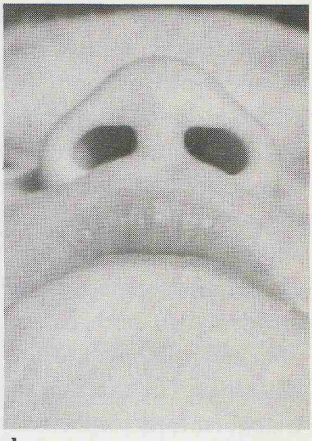

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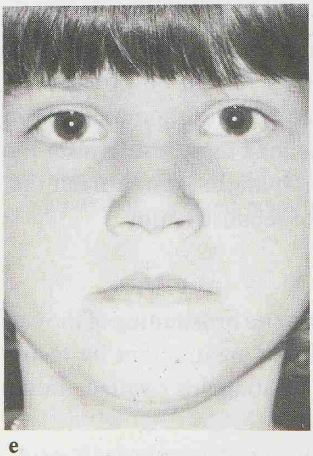

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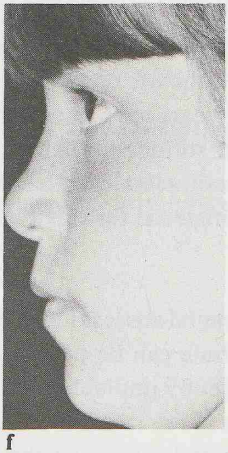

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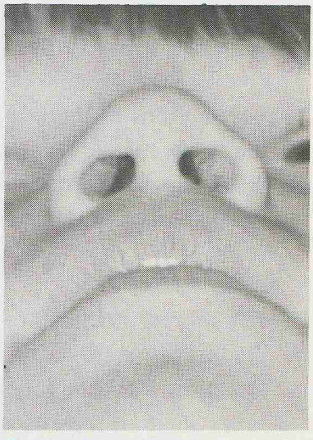

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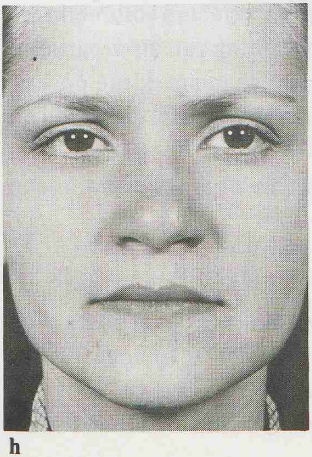

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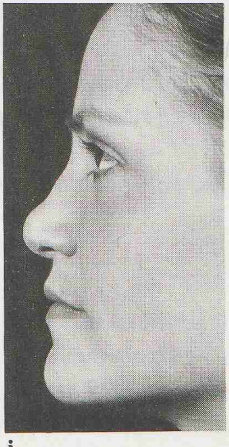

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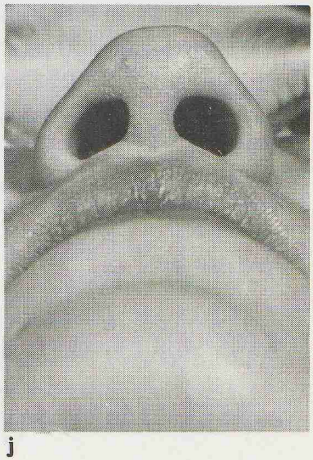

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which has probably prevented the process of retraction which is secondary to septal destruction and infection. This is an agreement with the observation of others who also reported good immediate and short term results of acute reconstruction of the septum in septal abscesses in children.

So far no long term results of this technique have been published. These are even more important and interesting than the short term effects, as it is well known that septal defects produced in childhood highly retard nasal and midface growth and lead to increasing functional disturbance. The late results in adult life (after 19 and 17 years respectively) obtained in our two first cases have to be judged positively. In both patients the external nasal pyramid developed to normal dimensions. Length, width and prominence of the pyramid were within the normal range. The external and internal ostia developed to their normal oblique, and triangular form respectively, and nasal function was unimpaired. The only abnormality was a slight to moderate sagging of the cartilaginous dorsum which increased slightly during growth.

It has to be stressed that in both cases homologous septal cartilage was used. Since long we have abandoned the use of septal cartilage for this purpose and all reconstructions in the last 15 years have been carried out with homologous rib cartilage because of its greater stiffness. Whether the long term results after the use of this material are better still remains to be seen. It might even turn out that bone appears to be the best material for this type of reconstruction.

CONCLUSIONS

1. The short term effects of a septal abscess i.e. sagging and broadening of the cartilaginous pyramid and lobule can be prevented to a great extent by reconstruction of the septal defect by implantation of homologous cartilage in the acute stage of the abscess.
2. The long term effects of a septal abscess i.e. disturbance of nasal growth resulting into a short, broad and low pyramid with saddling, retracted columella and round external and internal ostia with impaired breathing can also (partially) be prevented by acute septal reconstruction. The mechanism of the positive effect of septal reconstruction by homologous material on nasal growth is not clear.
3. So far no conclusions can be drawn as to the best material for septal reconstruction.

RÉSUMÉ

Description des résultats à long terme de nos premiers deux cas de reconstruction septale effectuée lors de la phase aiguë d'un abcès septal dans l'enfance. Ces cas ont été suivis pendant respectivement 19 et 17 ans.

Le développement de la pyramide nasale a été normal, à part un abbaissement

léger du dorsum cartilagineux. Longueur, largeur en proéminence se sont développées dans les limites normales et la fonction nasale n'a pas été pertubée. A long terme, la reconstruction du septum effectuée lors de la phase aiguë d'un abcès septal, paraît donc une façon efficace de prévenir la perturbation classique de la croissance, de la forme et de la fonction du nez.

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