

Anterior wedge excision in deflected nasal dorsum. A pilot study

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SUMMARY

Correction of a deflected nasal dorsum and deviated septum is perhaps the most common problem in daily rhinosurgical practice.

Up till now the basic principle of all surgical methods employed has been total mobilization. However, recurrences are seen. It is difficult to judge the importance of these results as no objective measurements are brought. In a new concept an anterior wedge is removed on the "long" side, leaving the rest of this side as support of the otherwise totally mobilized nose.

In a pilot study of 36 patients the angle of deflection was measured on pre- and postoperative standardized photos. A median undercorrection of 1.5° and 0.5° was obtained for the osseous and cartilaginous dorsum respectively, and the result was stable.

The mean follow-up was 16.2 months (range 9-41 months).

INTRODUCTION

A deflected external nose is a common condition, often considered to be a sequel to trauma. A number of operative methods may be found in the rhinosurgical history. A principle common for them all is total mobilization of the bony nose. This is achieved by different means.

Multiple osteotomies

Already Trendelenburg (1889) recommended lateral and superior osteotomies on both sides. This method is still preferred by Brain (1981), however, supplemented by using paramedian osteotomies as well. He recommends to make the postoperative fixation in an overcorrected position.

Posterior wedge

In 1907 Joseph introduced posterior wedge excision, removing a bony wedge corresponding to the deflection of the nose and mobilizing the remainder of the bony nasal dorsum by lateral osteotomy on the other side, and superior osteotomies on both sides. The principle was later adopted by Fomon (1936). In a follow-up on this method in 1982 Grymer et al. found that out of 64 noses 22% were not quite straight, but only 1.5% of the patients were dissatisfied. This method, also used in two-thirds of Pirsig and Königs' (1988) material of 100 patients, gave 93% good results.

However, none of these studies aimed at an attempt at an objective measurement of the deflection.

Push-down

In 1954 Cottle introduced his "push-down" technique in the presence of a hump. This method could be done asymmetrically on deflected noses. No results have been published and the method seems to have been abandoned.

Double posterior wedge

In 1975 Huizing worked out his double posterior wedge excision technique, primarily as a correction method of a hump, but carried out asymmetrically in the presence of hump and deflection useful in this condition too.

Septoplasty

The problem of maintaining the position following the Joseph technique is apparent from his use of a special redressement apparatus – the Rhinoclast (Joseph, 1931). The reason for this could easily be, that Joseph did not pay any attention to correction of septal deformities. Now, all rhinosurgeons agree about the necessity of septoplasty, introduced by Cottle (1958), or a modification (Jeppesen, 1986). Grymer et al. (1982) emphasized the need for a complete mobilization, also of the bony septum.

MATERIAL AND METHODS*Anterior wedge*

Since recurrences have been reported after all methods using total mobilization, and this has been the experience of this department too, it seemed reasonable to try to develop a method using only partial mobilization, securing adequate support following the necessary correction by wedge excision. The thoughts fell on the possibility of excision of the wedge anteriorly on the "long side" leaving the rest of this side of the bony vault fixed.

The "steep side" should be totally mobilized by lateral and superior osteotomies, and a complete septoplasty should be performed as usual.

At the same time, it was desirable to arrive at a method which could objectively measure the results. The results of a pilot study are presented here.

Technique

The length of the wedge is measured at the caudal edge of the nasal bone on the "long side" as the distance between two lines: one through the middle of the nasal dorsum and one through the median of the face.

In a case of a scoliotic face, however, the median can not easily be found. The line between the middle of glabella and the chin can not be used. Nor can the line perpendicular to the line between the light-reflexes in corneae. In stead the line sharing the angle between these two lines in two equal angles is defined as the ideal position of the midline of the nasal dorsum.

Septoplasty is done, including mobilization of the bony septum. Through an intercartilaginous incision on the "long side", the periosteum is cut above the caudal edge of the nasal bone. A subperiosteal and submucous tunnel is shaped quite medially. The wedge is measured and removed through two osteotomies, one a paramedian one. Through stab incisions percutaneous lateral as well as superior micro-osteotomies are performed by a Tardy chisel (Tardy and Denny, 1984) at the steep side. The osteotomies are shown in Figure 1. Now, the nasal bone on the steep side can be infracted.

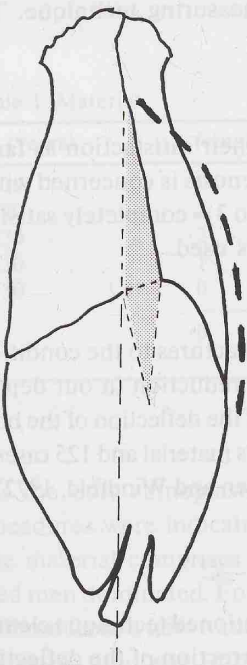


Figure 1. The principles of anterior wedge excision.

A wedge is removed anteriorly on the "long" side through two osteotomies, one a paramedian one, corresponding to the size of the deflection. The steep side is infracted following mobilization by lateral and superior, percutaneous micro-osteotomies. Wedge excision in the upper lateral cartilage on the "long" side can be considered in adults.

If this does not render the position completely median, a corresponding, but shorter wedge may be excised from the upper lateral cartilage, except in children where this is a hazard to the normal growth of the cartilaginous nose. Suture in periosteum or perichondrium is done whenever possible. Postoperative treatment is by dressings and respiratory tubes as well as a dorsal plaster for seven days. So far, I have also used a dorsal plaster for another three weeks, but only during the night. I have not dared to stop.

Follow-up

All patients were planned to be seen at at least two postoperative controls, one and nine months postoperatively. A later follow-up was carried out whenever possible.

Photodocumentation

Pre- as well as postoperative photos have been taken on all occasions under exactly identical conditions. On the en face photo (90 x 130 mm) the angulation was measured in degrees by drawing one line between the light reflexes in the corneae and one along the middle of the nasal dorsum (Figure 2a). The deflection was calculated as the deviation from 90°. In scoliotic faces the under technique mentioned line was used as the ideal position in stead.

To check the surgeon's measurement, copies of all photos from the first 22 patients were given, in random order, to a radiologist and to a senior ENT registrar who were instructed in the drawing and measuring technique. The results were compared statistically.

Questionnaire

All patients were asked to fill in a questionnaire on their satisfaction as far as correction of the deflection and complaints of nasal stenosis is concerned with a possibility of grading from 0 = completely unsatisfied to 3 = completely satisfied with the result. The result from the latest follow-up is used.

Aetiology

In order to investigate the importance of former nasal fractures to the condition, 100 consecutive cases of nasal fractures all treated by reduction in our department in 1989 and 1990 were analysed as far as direction of the deflection of the bony dorsum is concerned and compared with the results of this material and 125 cases of dislocation of the septal cartilage in the newborn (Jeppesen and Windfeld, 1972).

MATERIAL

Inclusion criteria

In order to be able to analyse the effect of the above mentioned technique clearly, patients were allowed entry to the study only, if the correction of the deflection

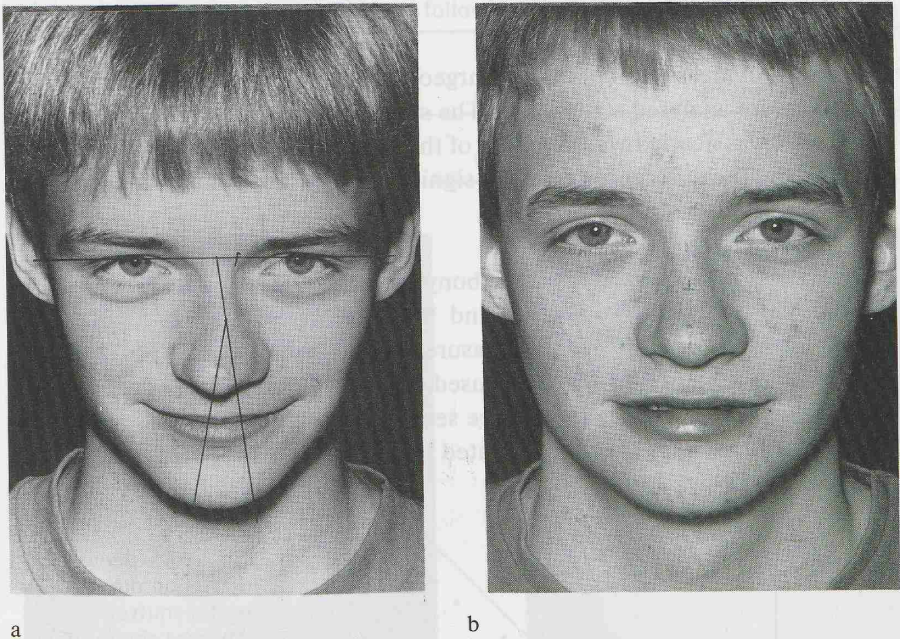


Figure 2 a, b. Preoperative (a) and postoperative (b) photos from a patient demonstrating the median result of the material.

Table 1. Material.

age (years)	female	male
≤ 10	1	0
11-20	2	12
21-30	2	11
31-50	1	3
> 50	0	4
	6	30
	36	

was the only rhinoplastic wish of the patient. If supplementary rhinoplastic procedures were indicated, the patient was disclosed.

The material comprises 36 consecutive patients (Table 1). Young and middle aged men dominated. Four patients were only seen one month postoperatively or suffered from a new trauma and were disclosed from the calculations. The mean follow-up time was 16.2 months (range 9-41 months).

RESULTS

Photodocumentation

The results of measurements by the surgeon, the radiologist and the senior ENT-registrar were analysed statistically. The standard deviation of the mean of the radiologist was nearly twice, and that of the senior registrar 1.5 times that of the surgeon, but the differences were not significant. Therefore the latter were used.

Degree of correction

Figure 3 sets out the results for the bony deflection, and Figure 4 that for the cartilaginous. A difference was found between the result one month post-operatively and the most recent measurement, but it was not significant, and therefore the most recent value was used. Ideally, all the results ought to be on the 45° line. Mean and median can be seen from Table 2. The median osseous undercorrection of 1.5° is demonstrated in Figure 2b. Other cases are demonstrated in Figures 5 and 6.

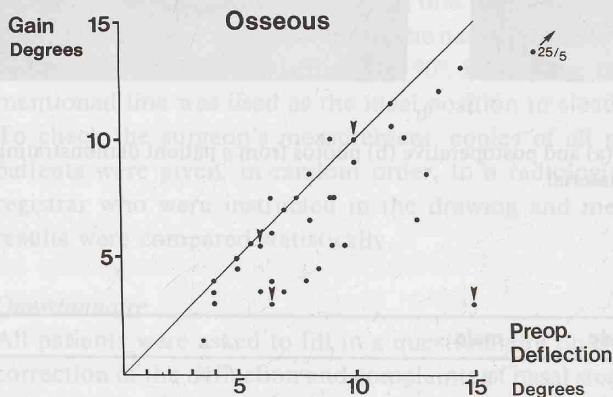


Figure 3.
Angle of osseous deflection pre- and postoperatively. Abscissa shows the preoperative deflection in degrees, the ordinate the degrees by which this deflection could be corrected. Arrowhead: patient is excluded from calculations due to new trauma or a follow-up of only one month.

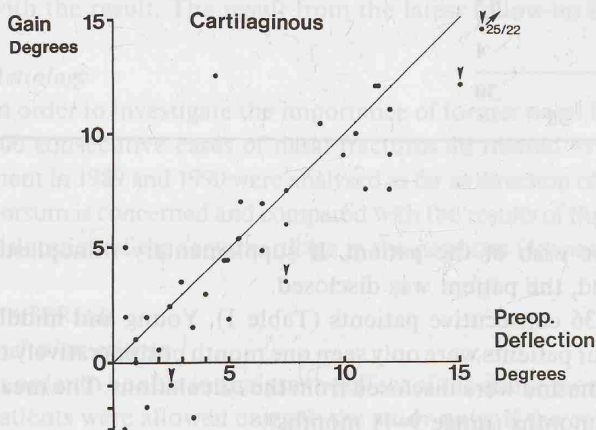


Figure 4.
Angle of cartilaginous deflection pre- and postoperatively. Same signature as in Figure 3.

Table 2. Undercorrection at the latest follow-up

	undercorrection in degrees		
	mean	median	interquartile range
osseous deflection	1.6	1.5	0-3.5
cartilaginous deflection	0.5	0.5	0.5-2

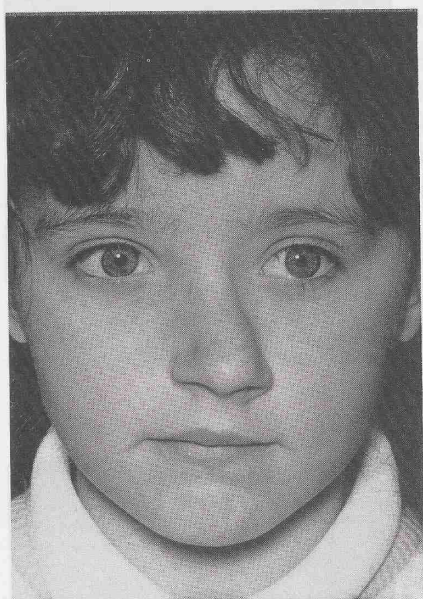


Figure 5a. Preoperatively.

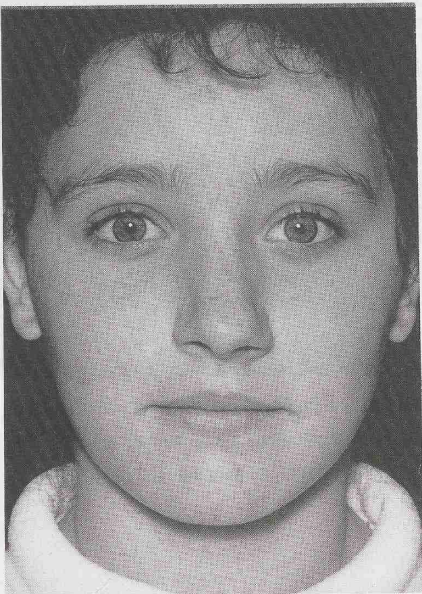
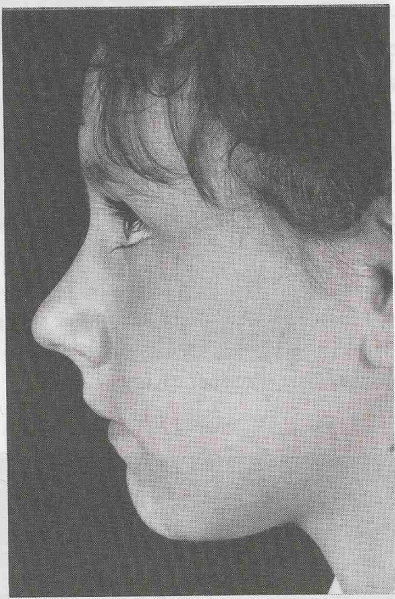
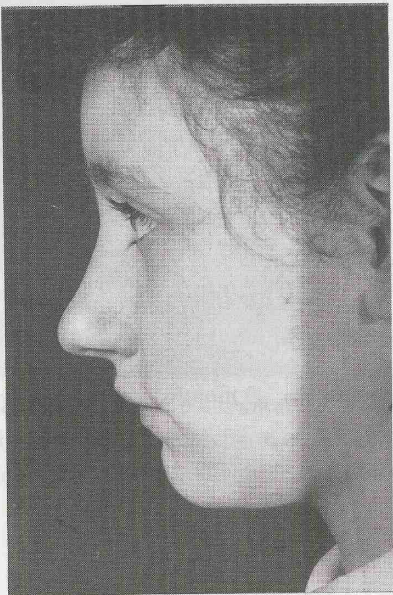


Figure 5b. 3 years postoperatively.



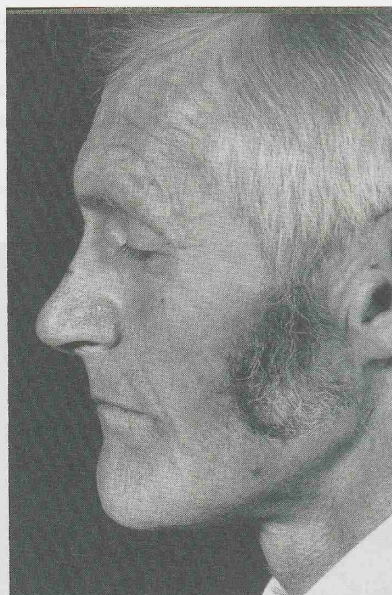
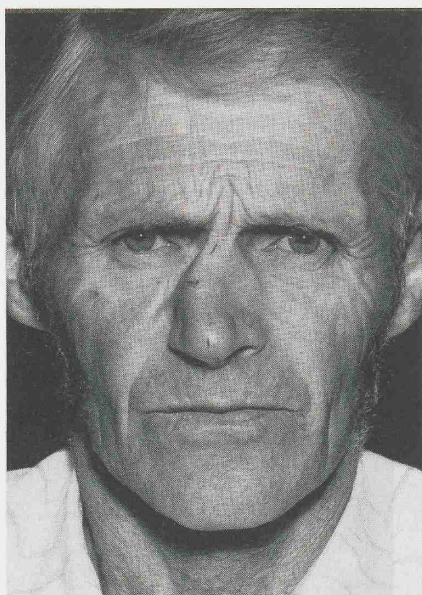


Figure 6a. Preoperatively.

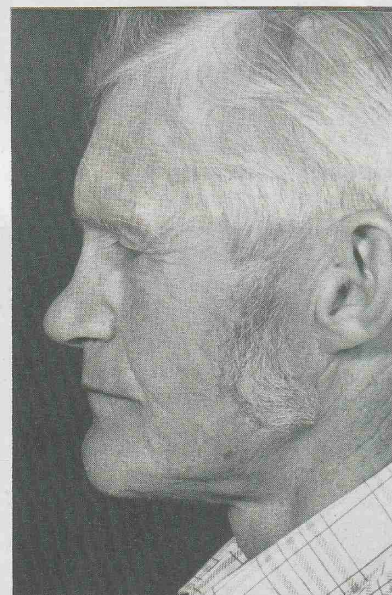
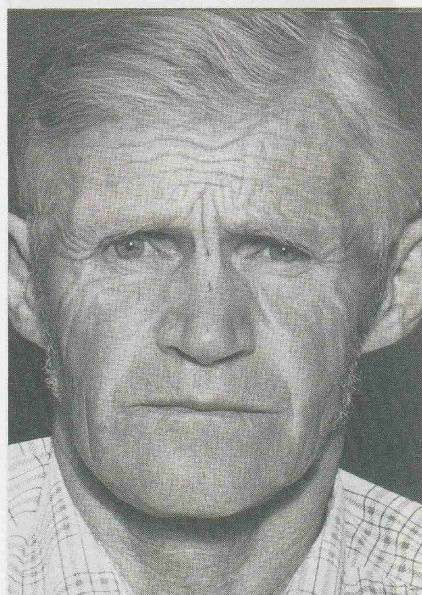


Figure 6b. 10 months postoperatively.

The osseous and cartilaginous undercorrection was compared in an analysis of correlation, but none was found.

Questionnaire

Aesthetics: the questionnaire concerning the patients' satisfaction about the correction of the deflection gave a mean of 2.4 points out of a maximum of 3 possible. Three patients were not satisfied giving only 1 point. However, one had 11.5°, the other 9° deflection preoperatively, and both ended up with 1° post-operatively. This leaves one with a dissatisfaction having a 15° deflection before and 12° at the one month follow-up, leaving a percentage of unsatisfied patients on 3.1%. This patient denied a new trauma before the one month follow-up. He entered the hospital with a deflection of 15°, left, however, the hospital with a rather straight nose. He showed up at one month with a deflection of 12°. One year later he was reoperated upon. It was astonishing easy to restore midline position by repeating the lateral osteotomy on the steep side.

Function: as far as the satisfaction with the function concerns, a mean of 2.3 points out of 3 possible was found in 27 patients complaining of nasal stenosis preoperatively.

Aetiology:

The results of the analysis can be seen from Table 3.

Table 3. Direction of deflection of the bony nasal dorsum in different materials.

material	dislocation to		
	right	none	left
anterior wedge n=36	13 (36.1%)		23 (63.9%)
nasal fracture n=100	54 (58.7%)	8	38 (41.3%)
hypothetical influence on the osseous dorsum			
dislocation of septal cartilage in newborn n=125	56 (45%)		69 (55%)

DISCUSSION

Photodocumentation

The analysis is based on the results of the measuring technique using photographs. As ever in documentation of rhinoplastic results a high quality of the photographic technique is mandatory. So all photos were checked for really being precise en face pictures, and all met this demand. The precision in drawing the lines will increase with practice and interest as has been demonstrated.

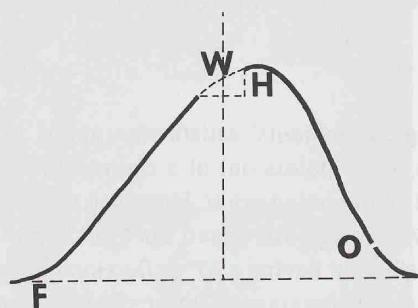


Figure 7.
 Transversal diagramme of the technique.
 F : facial plane
 W: removed anterior wedge
 O : osteotomy
 H : theoretical loss of height.

Through the use of independent control measurers it has been proven, that the surgeon has not biased his measurements, and that they can be considered reliable. The results demonstrate a median osseous undercorrection of 1.5° . This demonstrates that the ability for the tissue to close the gap following wedge excision is not complete. The magnitude of this ability is not known from earlier studies. This study can through tangent calculation tell, that the median undercorrection corresponds to a 0.6 mm broader wedge in a case of 20 mm long nasal bones. This supplementary 0.6 mm broader wedge and/or a regular use of wedge excision in the upper lateral cartilage except in children should be considered.

The method does not solve the problem of an accentuated curving either longitudinal ("banana deformity": Mackay, 1986) or transversal. This deformity calls as ever before on supplementary intermedian osteotomies. It is obvious that this method only allows supplementary osteotomies to be done at the steep side. From Figure 7 it can be seen, that a slight lowering of the height of the dorsum should be expected. From Figures 5 and 6, which demonstrate the two worst cases in the material, it can be seen, that this lowering only occur in monstrous cases (Figure 6). The patient did not complain of the saddle, nor did he suffer from functional disorder caused by it.

Questionnaire

The degree of cosmetic and functional satisfaction seems to be similar to that found by Grymer et al. (1982) and Pirsig and Königs (1988), although a scale of four points has been used in this study against only two in the other studies.

Aetiology

The distribution between deflection to the right and left showed that left dominated by 2 to 1. This is surprising as a sequel to nasal fractures should be expected to be dominated by cases deflected to the right following fist fights, the trauma of which will hid the left side of the nose in most cases, while all other traumas must

be equally distributed to right and left. The analysis of the material of nasal fractures confirms this. The aetiology, therefore can not be fractures alone. Changed growth patterns following minor traumas could be a reasonable explanation. The only known sort of trauma which might cause a preponderance of deflection to the left are dislocations of the septal cartilage in the newborn. Here the dominating dislocation of the cartilage is to the right (Jeppesen and Windfeld, 1972). It is combined with a deviation of the cartilage in the opposite direction more posteriorly (Klaff, 1963), to the left. This must be considered to exert a pressure at the osseous structures, which might very well in the long run cause a deflection. Figure 5 demonstrates a case of an eight years old girl suffering from no observed trauma with an early deflection and severe nasal stenosis. A connection of some of the early cases with dislocation of the cartilage in the newborn can not be totally rejected, although never proven. The preponderance could finally be an incidental result of too little a material.

CONCLUSION

Attempts on objective measurements are not seen in publications on earlier methods, so comparison between this and other studies can not be done. This pilot study demonstrates, that the anterior wedge excision technique is a reliable method. This study ought to be followed by real randomised studies with this layout comparing two of the methods at a time. At the same time a longer follow-up would be appropriate.

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