The Effect of Spreader Grafts on Nasal Dorsal Width in Patients With Nasal Valve Insufficiency

The use of spreader grafts is a common procedure in rhinoplasty. Originally they served to widen the nasal valve, but they also proved to be very helpful in aesthetic corrections and repairing of the middle nasal vault. Especially in nasal surgery, changes in function often imply a change in outer appearance as well. It is supposed that a nasal valve angle narrower than 10° to 15° will cause inspiritional obstruction. A positive Cottle sign is considered to be suggestive of nasal valve insufficiency.

Because spreader grafts are placed between the caudal end of the nasal septum and the upper lateral cartilages, they are supposed to widen the nasal valve. To our knowledge, there are no studies that can clearly demonstrate this mechanical theory, but general agreement exists about their positive effect on nasal patency. Objective evaluation of the function of the nasal valve is difficult because any alteration in the contour of the vestibulum by a measuring device, and thus the caudal end of the upper lateral cartilages, will change the function of the valve. Therefore, rhinomanometry is hardly reliable. The use of a visual analog scale (VAS) provides a simple subjective method for evaluating nasal obstruction.

In theory, spreader grafts used for improving the nasal valve function might be visible on the nasal dorsum. Although Faris et al showed that placement of spreader grafts does not result in a subjective change in aesthetic outcome, possible change of the dorsal width owing to placement of spreader grafts has never been objectified. The aim of this study was to investigate whether nasal spreader grafting influenced the outer appearance of the nose.

Methods. All cases of patients who had undergone a primary rhinoplasty and had been treated with bilateral spreader grafts because of bilateral nasal valve insufficiency from 1998 to 2002 were extracted from our rhinoplasty database and included in this study. The causes of nasal valve collapse were situated in the area of the distal end of the upper lateral cartilages that comprise the internal nasal valve (eg, the upper lateral cartilages were weak, there was too sharp an angle between the septum and the distal end of the upper lateral cartilages, there was a long “returning” or “curling” of upper lateral cartilages). Patients who had undergone other procedures during the same operation (eg, placement of alar battens, hump reduction) were excluded. This rhinoplasty database contains all rhinoplasties performed at our institution with a detailed description of the indications, a detailed operation report, and preoperative and postoperative pictures. Standardized postoperative pictures were taken 6 months after surgery. Too narrow a nasal valve and a positive Cottle sign were indications for surgery. The same surgeon (K.J.A.O.I.) operated on all patients. Using an external approach, the upper lateral cartilages were separated extramuscosally from the septum. Spreader grafts were harvested from the posterior part of the cartilaginous septum, leaving the L-shaped continuity of the cartilaginous nasal dorsum intact. Two grafts were made out of this transplant and sutured bilaterally between the septum and upper lateral cartilages with 2 mattress sutures (Figure 1).

Patients were asked to fill out a questionnaire with a VAS score concerning nasal patency before and after surgery. They were also invited to report eventual changes in the outer appearance of their noses and in particular the nasal dorsal width (NDW).

The objective NDW was measured based on standardized preoperative and postoperative frontal pictures. All pictures were compared with commercially available digital imaging software (Adobe Photoshop, version 5; Adobe Systems Inc, San Jose, California) as has been described elsewhere. With this photo-editing program, an intercanthal line was drawn and measured. After enlargement of the picture, by zooming in, the width between...
the 2 eyebrow-tip aesthetic lines of the cartilaginous nasal dorsum was measured at a level precisely between both alar roots (Figure 2). Nasal dorsal width was expressed in a relative way by the ratio:

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\text{Dorsal Width} \times 100 = \text{NDW}.
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This ratio was determined using the preoperative and postoperative (6 months) photographs and comparing them. Both objective and subjective results were analyzed using the paired t test. The same blinded investigator performed all measurements and analyses (ie, was unaware of which picture was taken preoperatively and which picture was taken postoperatively).

**Results.** Fifteen patients were selected, 14 of whom reported an increase of nasal patency. The mean (SD) subjective patency increased from 3.2 (2.7) preoperatively to 6.6 (2.2) postoperatively \((P < .02)\). None of the patients reported a change in breadth of the supratip region. No one mentioned a subjective, definite increase in the width of the nasal dorsum or any other changes to the outer appearance of the nose. The mean (SD) NDW of the intercanthal distance increased from 27% (7%) preoperatively to 33% (7%) postoperatively \((P < .01)\). A preoperative and postoperative example of a patient with bilateral spreader grafts and little supratip widening of the dorsum is shown in Figure 3.

**Comment.** There is no agreement on the subject of how spreader grafts contribute to a better patency, but generally they are considered to be effective.\(^5\) This study demonstrates a subjective positive effect on nasal patency, as analyzed by a retrospective VAS score. In fact, patients expressed the feeling that their nasal airway had doubled, from 3.2 to 6.6 on a VAS. However, it is not clear whether this was caused by a widening effect in the valve area rather than by the fact that spreader grafts and scar tissue, as a result of the procedure itself, had caused increased resistance against negative inspirational pressure. The latter effect should then avoid alar and valvar collapsing. Our results are in accordance with the findings of Khosh et al.\(^9\) They found their spreader grafts highly effective in 89% of their patients with internal valve dysfunction. Apparently, functional spreader grafts were not “seen” or noticed by patients in our study, although a widening of 6% in the supratip region can be measured. This again is a confirmation of the saying that form follows function. It is clear that when spreader grafts are used in aesthetical
indications, with a visual effect as a surgical goal, like lengthening of the nose, crooked middle nasal vault, masking graft, or (limited) cartilaginous saddle nose, this will more easily be noticed by the patient. Correcting nasal valve insufficiency, however, did not alter the patient’s self-appearance; nevertheless, it was demonstrated when the NDW was measured with Adobe Photoshop.

In this series of patients, spreader grafts were sutured through an open approach after separating the upper lateral cartilages from the septum. These grafts, however, can also be placed through an endonasal rhinoplasty, without division of the upper lateral cartilages. One can imagine that placement of spreader grafts under the cartilaginous dorsum will hardly be visible in outer appearance. The need for grafts, however, is one of the main indications for an external approach. Therefore, it is important to know what the aesthetic repercussions will be. Because spreader grafts are hardly noticed by patients, but only can be measured, our favored approach still is an external rhinoplasty.

In conclusion, nasal spreader grafts improve breathing and objectively widen the middle third of the nose. This widening is not noticed by patients seeking breathing improvement. This should be discussed with the patients beforehand to prevent dissatisfaction with the aesthetic appearance of the nose after surgery.

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**Figure 3.** A patient with nasal valve inspiratory obstruction. A, Before surgery. B, After surgery, a little widening of the nasal dorsum owing to bilateral spreader grafts can be seen.

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