Immediate Nasal Valve Reconstruction After Facial Nerve Resection

Zachary M. Soler, MD; Eben Rosenthal, MD; Mark K. Wax, MD, FRCS C

**Objectives:** To highlight the problem of valve collapse after facial paralysis and review the efficacy of performing immediate reconstruction at the time of initial oncologic resection, using a suture technique of suspending the soft tissue of the nasal valve to the inferior orbital rim.

**Methods:** A review of all patients undergoing immediate nasal valve reconstruction was undertaken. There was a total of 18 patients, 15 men and 3 women, with a median age of 64 years. All patients had undergone facial nerve resection as part of their initial ablative procedure with immediate reconstruction of the nasal valve. A suture technique was used that secured the nasal valve area to the inferior orbital rim periosteum. These patients were compared with a cohort of 10 patients who underwent similar oncologic and reconstructive procedures but had no nasal valve reconstruction.

**Results:** Patients were evaluated with the Nasal Obstruction Septoplasty Evaluation tool. In patients who underwent reconstruction, there was no evidence of valve collapse on clinical examination. Patients who did not undergo reconstruction demonstrated significantly more symptoms of (1) congestion or stuffiness (1.8 vs 0.4; P < .05), (2) nasal blockage or congestion (2.6 vs 0.3; P < .05), (3) trouble breathing through the nose (2.7 vs 0.3; P < .05); (4) trouble sleeping (2.7 vs 0.3; P < .05); and (5) inability to get enough air during exertion (1.2 vs 0.1; P < .05). Follow-up extended to a median of 2 years. In the reconstructed group, cosmesis was acceptable and there were no instances of suture breakage or granuloma.

**Conclusions:** We propose that the nasal valve should be addressed at the time of initial facial nerve resection if immediate reconstruction is planned. A suture suspension technique is easily used at the time of primary resection and reconstruction.

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to highlight the problem of valve collapse after facial paralysis and review the efficacy of performing immediate reconstruction using a suture suspension technique.

**METHODS**

A retrospective review of all patients who had undergone nasal valve repair at the time of facial nerve resection and immediate reconstruction was performed. Eighteen patients were identified over a 4-year period beginning in 2001. There were 15 men and 3 women, with a median age of 64 years. All patients underwent resection of parotid lesions with removal of the main trunk of the facial nerve. The lesions included 9 primary salivary malignant lesions, 6 skin cancers, and 1 metastatic renal cell cancer. Reconstruction usually included cable grafting of the facial nerve, gold weight placement, and a static sling, in addition to other ablative and reconstructive procedures (Table 1). In all cases, a suture technique was used to suspend the nasal valve. This technique has been described in detail by Panelli. In brief, the procedure begins with a small incision overlying the inferior orbital rim (Figure 1). Dissection is carried down to the level of the periosteum. A straight needle with nonabsorbable, monofilament suture is passed through the subcutaneous tissue to exit endonasally in the cephalic portion of the nasal valve. The needle is passed from the caudal aspect of the valve back toward the inferior orbital rim. The suture is then tightened and secured to the periosteum of the rim. This lateral pull on the valve area serves to stent the region open, counteracting the natural tendency to collapse with inspiration (Figure 2).

During this period, a separate group of 10 patients who underwent similar resections and simultaneous reconstructions and did not have reconstruction of the nasal valve were also examined. Patients in this group underwent similar reconstructions such as, for example, free tissue transfer and facial nerve grafting. Patients were administered the Nasal Obstruction Septoplasty Evaluation (NOSE) tool postoperatively (Figure 3). Due to the retrospective nature of the study, this tool was not used in the preoperative setting.

**RESULTS**

Eighteen patients underwent facial nerve resection with immediate nasal valve suspension. In the preoperative assessment, 2 of 18 patients demonstrated nasal valve collapse. In the follow-up examination, all patients re-

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**Table 1. Associated Procedures in Addition to Nasal Valve Reconstruction**

<table>
<thead>
<tr>
<th>Associated Procedures</th>
<th>No. of Patients</th>
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</thead>
<tbody>
<tr>
<td>Gold weight placement</td>
<td>16</td>
</tr>
<tr>
<td>Tarsal strip</td>
<td>16</td>
</tr>
<tr>
<td>AlloDerm sling</td>
<td>16</td>
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<tr>
<td>Parotidectomy</td>
<td>15</td>
</tr>
<tr>
<td>Free flap reconstruction</td>
<td>14</td>
</tr>
<tr>
<td>Facial nerve graft</td>
<td>13</td>
</tr>
<tr>
<td>Neck dissection</td>
<td>12</td>
</tr>
<tr>
<td>Lateral temporal bone resection</td>
<td>6</td>
</tr>
<tr>
<td>Mandiblectomy</td>
<td>2</td>
</tr>
<tr>
<td>Browpexy</td>
<td>2</td>
</tr>
<tr>
<td>Cervicofacial flap</td>
<td>1</td>
</tr>
</tbody>
</table>

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Figure 1. Small incision overlying site of suture suspension to orbital rim. Note the flaring of the nasal sidewall.

Figure 2. Immediate postoperative picture. Note the patient also underwent gold weight placement, tarsal strip, and AlloDerm (Life Cell Corp, Branchburg, New Jersey) sling procedures.
The internal valve represents the narrowest portion of the nasal cavity and contributes 50% or more to airflow resistance. The borders of the internal nasal valve are well described and include the septum, the caudal border of the upper lateral cartilage, the anterior aspect of the inferior turbinate, and the soft tissues around the piriform aperture. Less well recognized are the muscular contributions to nasal airflow from the nasalis and dilatator naris muscles. The nasalis muscle includes both a transverse and alar portion, from the nasalis and dilatator naris muscles. The borders of the internal nasal valve can be easily incorporated into the greater reconstruction effort. Various procedures have been described to address the nasal valve including spreader grafts, alar batten grafts, and butterfly grafts. However, when immediate reconstruction is planned, suture suspension of the internal valve is the optimal technique. Friedman et al report this procedure to be highly effective with success rates at 90%. They used rhinomanometry to show notable objective improvement in nasal airflow as well as the validated 20-Item Sino-Nasal Outcome Test questionnaire to show improvement in patient quality of life. This technique also adds little to the overall operative time and has a low associated morbidity. Our results are in line with prior studies, with all patients reporting normal or improved airflow and no suture breakage or granuloma formation. As expected all patients demonstrated minimal airway problems following the nasal valve expansion. There is expected widening and asymmetry of the nose; however, considering the patient population, this has not proven a limiting factor.

In conclusion, nasal obstruction is a frequent and bothersome symptom after facial nerve resection. This issue is often overlooked by the clinician as concerns with cosmesis and ocular and/or oral function predominate. We propose that the nasal valve should be addressed at the time of initial resection if immediate reconstruction is planned. Despite the numerous options, we believe that a suture suspension technique is best suited to this situation. This technique is highly successful with little added morbidity and operative time. In our experience, nasal valve suspension provided a patent internal nasal valve in all patients studied. These results proved durable, long lasting, and highly beneficial.
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REFERENCES


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