Objective Assessment of Tip Projection and the Nasolabial Angle in Rhinoplasty

Susanne Spo¨rri; Daniel Simmen, MD; Hans Rudolf Briner, MD; Nick Jones, MD, FRCS

Objective: To provide an objective method to measure the extent of nasal tip projection and the nasolabial angle.

Design: We retrospectively studied preoperative and postoperative images using a novel approach. The constant position of the cornea in lateral views and the diameter of the iris in frontal views were used to standardize and compare digitalized images of patients before and after surgery. We tested this objective assessment technique using the digitized slides of patients with saddle nose deformities and measured changes in their nasal tip projection and nasolabial angle. We included 63 patients who had undergone an open rhinoplasty with the I-beam technique by the same surgeon over a 7-year period. We tested the reproducibility of these measurements with 10 independent investigators. We also determined whether the measurements using this objective technique correlated with the surgeon’s or patients’ subjective assessments of the outcome.

Results: We were able to use the objective measurement technique in 42 patients (67%). It was not possible to use the technique in 21 patients (33%) because the photographic conditions had not been fulfilled. The measurement variability of 10 different investigators expressed as standard deviations in percentage of the mean value was 6.7% for nasal tip projection and 1.3% for the nasolabial angle. The surgeon’s subjective assessment of the outcome correlated with the objective changes of nasal tip projection (P=.045) and the nasolabial angle (P=.045). There was no correlation between the patients’ assessments and the objective measurements.

Conclusions: The objective measurements tested were easy to use and investigator independent. They also correlated with the surgeon’s assessment of outcome.

Arch Facial Plast Surg. 2004;6:295-298

See also page 299

From the Department of Otorhinolaryngology, Head and Neck Surgery, University Hospital (Ms Spo¨rri), and the Center for Otology, Skull Base Surgery, Rhinology, and Facial Plastic Surgery, Klinik Hirslanden (Drs Simmen and Briner), Zurich, Switzerland; and the Department of Otorhinolaryngology, University of Nottingham, Nottingham, England (Dr Jones).
Figure 1. Lateral view. Rhinoplasty assessment technique and photographic conditions illustrated by 4 lines superimposed on the face. A indicates the lateral canthus; B, the nasal frontal angle defined by a line from the superior aspect of the tragus through point A extended on to the nasal root; C, the vermillion cutaneous junction of the upper lip; D-E, the line that is perpendicular to B-C, extending to the most projecting part of the nasal tip; and F-G, the line that follows the columella. The length of D to E is used as a determinant for nasal tip projection. The angle between lines B to C and F to G determines the nasolabial angle.
ences in photograph size do not affect the measurements, as every distance is standardized. The technique is easy to use and can be applied to most existing photographs that fulfill limited photographic criteria. Using computer technology is preferable to using manual measurements with callipers and rulers (eg, nasal tip projectometer) or measurements taken from the life-size projection of slides because the results are more reproducible. Given the current excellent image quality and ongoing refinements in digital photography, converting to digital photography is fast and cost-effective, especially when the cost of digital photography is compared with the cost of serial cephalometric studies. Furthermore, cephalometric studies are laborious and are associated with radiation exposure.

Instead of nasal tip projection being expressed as a ratio of midface length, the technique described herein expresses measurements in absolute values based on iris-dependent calibration, which allows a more accurate comparison for future studies.

We analyzed interinvestigator variability, and although the different investigators were only briefly introduced to the technique, the interinvestigator variability was less than 10%. We conclude that this method is easy to learn and provides reproducible results. The objective values correlate with the subjective assessment of the experienced surgeon; therefore, the technique can also be used to rate the success of rhinoplasty. To our knowledge, this correlation has not been demonstrated with any

<table>
<thead>
<tr>
<th>Investigator No.</th>
<th>Age, y</th>
<th>Profession</th>
<th>Nasal Tip Projection, mm</th>
<th>Nasolabial Angle, Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>41</td>
<td>Physician</td>
<td>18.40</td>
<td>99.91</td>
</tr>
<tr>
<td>2</td>
<td>39</td>
<td>Photographer</td>
<td>19.06</td>
<td>99.29</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>Secretary</td>
<td>18.28</td>
<td>98.73</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>Secretary</td>
<td>17.12</td>
<td>97.26</td>
</tr>
<tr>
<td>5</td>
<td>39</td>
<td>Secretary</td>
<td>16.80</td>
<td>99.17</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td>Nurse</td>
<td>17.95</td>
<td>101.40</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>Nurse</td>
<td>20.07</td>
<td>101.20</td>
</tr>
<tr>
<td>8</td>
<td>26</td>
<td>Nurse assistant</td>
<td>19.58</td>
<td>100.20</td>
</tr>
<tr>
<td>9</td>
<td>42</td>
<td>Nurse</td>
<td>20.47</td>
<td>100.45</td>
</tr>
<tr>
<td>10</td>
<td>33</td>
<td>Physician</td>
<td>17.55</td>
<td>101.18</td>
</tr>
</tbody>
</table>

*All 10 investigators were female.
†Mean, 26.
‡Mean ± SD, 18.53 ± 1.24; SD%, 6.7.
§Mean ± SD, 99.88 ± 1.30; SD%, 1.3.
other measuring technique. The surgeon’s assessment did not correlate with the patients’ assessment probably because of the small number of patients involved and because patients are usually satisfied more easily than surgeons.2

Accepted for publication December 11, 2003.

This study was presented in part at “The Nose 2000 . . . and Beyond”; September 20-23, 2000; Washington, DC; and at the 89th Spring Meeting of the Swiss Society of Otorhinolaryngology; June 20-22, 2002; Pontresina, Switzerland.

Correspondence: Daniel Simmen, MD, ORL-Zentrum, Klinik Hirslanden, Witeilikerstrasse 40, CH-8029 Zurich, Switzerland (simmen@orl-zentrum.com).

REFERENCES


