Surgical Techniques for the Correction of Postrhinoplasty Depressed Scars on the Nasal Tip

Dong Hak Jung, MD, PhD; Gaurav S. Medikeri, MS(ENT); Guen-Uck Chang, MD; Sang Min Hyun, MD

IMPORTANCE  Augmentation rhinoplasty is common in the Asian population and the lack of suitable autologous material for augmentation has led to the use of alloplastic materials. Many of these patients develop complications, including a depressed dimple-like scar of the nasal tip. Causes of such dimpling include the use of large implants, infection, extrusion, and surgeon incompetence.

OBJECTIVE  To describe the various techniques that can be used to correct dimpling of the nasal tip.

DESIGN, SETTING, AND PARTICIPANTS  Data were retrospectively reviewed from 28 patients who had undergone surgical procedures from January 1, 2013, through July 31, 2014, in a rhinoplasty clinic in Seoul, Korea, for the correction of a contracted nose with nasal scars secondary to previous rhinoplasties. Data analysis was conducted from August 1, 2014, through February 16, 2015.

INTERVENTIONS  Before surgery, a complete rhinological examination was conducted, digital photographs were taken, and an assessment was made regarding the severity of the dimpling, the condition of the nasal skin, and the underlying supporting structures. Based on these factors, the appropriate type of procedure was planned.

MAIN OUTCOMES AND MEASURES  Patient satisfaction with change after surgery was assessed using a 3-point Likert scale (3 indicates satisfied; 2, fairly satisfied; and 1, dissatisfied). Outcomes were also reviewed by 2 surgeon-peers who gave an outcome score ranging from 1 to 10 (1 indicates a poor cosmetic outcome; 10, the best possible outcome).

RESULTS  The nasal contour and tip symmetry were restored to aesthetic standards with these relatively simple techniques. Eleven patients (39.2%) were treated with unilobed flap, 4 (14.2%) with a bilobed flap, 3 (10.7%) with Z-plasty, 9 (32.1%) with soft-tissue interposition, and 1 (3.5%) with a transposition flap. Twenty-four of the 28 patients (85.7%) were satisfied with their outcomes and 4 (14.3%) patients were dissatisfied and were given a revision procedure, following which they were satisfied with their outcomes. The follow-up period ranged between 6 to 32 months (mean, 12.3 months). The mean surgeon-reviewed outcome score for soft-tissue interposition procedure was 8.0 of 10; for the unilobed flap, 8.0 of 10; for the bilobed flap, 7.5 of 10; for the transposition flap, 8.0 of 10; and for Z-plasty, 7.8 of 10.

CONCLUSIONS AND RELEVANCE  These techniques are reproducible and the choice of the technique depends on the shape, size, and location of the scar; skin condition; patient expectations; and the surgeon’s experience and comfort level with the procedure.

LEVEL OF EVIDENCE  4.
The relatively flat nasal profile of the Asian population requires considerable material for augmentation of the nose. This has led surgeons to use alloplastic materials, such as polytetrafluoroethylene or silicon, which are relatively easy to use and readily available. Complication rates with allografts vary, with some authors reporting rates just higher than 5%, while others have reported complication rates of more than 20%.1,2 In some patients, there are complications such as implant extrusion, infection, and thinning of the skin of the nasal tip.3 These, in turn, lead to many complications. Here we describe some of the techniques we have used at Shimman Rhinoplasty Clinic to correct a common consequence of augmentation rhinoplasty—the retracted and depressed nasal tip scar, which gives the appearance of dimpling of the nose (Figure 1). 4 These scars tend to persist despite formal revision rhinoplasty addressing the underlying cartilaginous factors because the problem in most cases is with the skin, which must be corrected specifically. Creating an aesthetically acceptable nasal tip is one of the key factors that define the success of a rhinoplasty procedure, and such dimpling is not only annoying for the patient but difficult for the surgeon to treat. A substantial portion of our practice comprises revision and secondary rhinoplasty cases from all parts of East Asia; over time, we have successfully reproduced some of these techniques and obtained satisfactory results. Here we attempt to establish criteria on which surgeons may base their choice of procedure.

Methods

Institutional review board approval was waived for this retrospective study. Procedures were performed from January 1, 2013, through July 31, 2014, and data analysis was conducted from August 1, 2014, through February 16, 2015. We searched patient records for individuals who had undergone revision surgery for complaints of depressed nasal scars secondary to previous rhinoplasties and reviewed the electronic medical records from 28 patients (6 men and 22 women; mean age, 40.4 years; range, 19-71 years). All 28 patients provided written informed consent and were assessed regarding their satisfaction with the cosmetic outcomes at 6 and 12 months after surgery.

A 3-point Likert scale for change in appearance was used to determine whether the patients were satisfied (a score of 3), fairly satisfied (a score of 2), or dissatisfied (a score of 1) or observed no change in appearance. An outcome score ranging from 1 to 10 (1 indicates a poor cosmetic outcome; 10, the best possible outcome given the other variable factors, eg, number of previous surgical procedures, previous material used, and type of present scar and deformity) was also given by 2 surgeons (peer surgeons for a more objective evaluation of the outcome. Peer 1 was an ear, nose, and throat surgeon with a rhinoplasty fellowship who has performed rhinoplasty for more than 10 years. Peer 2 was a plastic surgeon who has performed rhinoplasty for 30 years. The preoperative and follow-up images were shared with the surgeons along with a history of the materials used in previous surgical procedures, the number of previous rhinoplasties, previous infections, and the techniques used. Patient satisfaction results were not revealed to the surgeons to avoid a biased scoring. Both surgeons were asked to give their respective scores; the average of their scores was documented and results were tabulated. Here we discuss some of the techniques used for the correction of postrhinoplasty depressed scars on the nasal tip.

The techniques used were soft-tissue or cartilage insertion, local flap (unilobed or bilobed), supratip transposition flap, and Z-plasty.

Soft-Tissue or Cartilage Insertion

In cases in which the skin does not have any epidermal injury and the cause of the dimple is a lack of underlying tissue support, the severity of the depressed scar is not gross. Hence, simple dissection underneath the scar and placement of soft tissue or a solid support, such as a small piece of cartilage, is apt (Figure 2). This technique will help elevate the depressed scar and support the overlying skin, preventing contraction of the skin and irregular contour.

The procedure can be performed using either an open or closed approach depending on the amount of tissue to be grafted and other procedures needed to enhance the aesthetic outcome. The area of the dimpling is first marked with ink to determine the amount of tissue to be used. A 6-0 nylon suture is passed through the outer surface of the skin at one end point of the dimple and then passed in and out of the graft material to secure it (Figure 2).

The suture is then passed through the other end point of the dimpled area and back to the outer surface of the skin where it is loosely tied over a small piece of gauze. Grafting materials commonly used are the retroauricular soft tissue6 or perichondrium, which is harvested along with the rib cartilage for correction of the other deformities. Other options include the...
septal, auricular, or rib cartilage. Three days later, the suture is cut and removed. By that time, the graft will have been secured by fibrous tissue.

If cartilage has to be used, it is recommended that auricular, rib, or septal cartilage in soft tissue is used with the same technique of securing the graft. In our experience, we used cartilage more often when the tip needed to be enhanced along with management of the dimpling.

**Local Flaps**

**Unilobed Flap**

In some patients, especially those who have experienced graft extrusion or impending extrusion, the skin is too damaged to be of aesthetic use. In such cases, it is pertinent to excise the skin and use a local rotation flap.

Most of these cases were associated with a pseudohump just above the dimpled area as a consequence of scar contraction (Figure 3). To reduce the pseudohump as well as replace the scar tissue, we used a unilobed rotation flap.

In this procedure, the area of dimpling is measured and then marked with ink and an area of corresponding size is marked just above the dimple to be used for the flap. Local infiltration is then performed to reduce the amount of bleeding and create a plane. First, the dimpled area is excised up to the supraperichondrial plane with a surgical scalpel No. 15 blade, keeping at least 2 mm of the pedicle intact. The donor site is then excised to the same thickness as the recipient site (Figure 3). The donor site is trimmed to the dimensions of the recipient area and secured with 6-0 nylon sutures to hold the skin in place, and the rest of the linear wound is sutured with 7-0 nylon. The flap is then sutured with 7-0 nylon to the recipient site.

**Bilateral Unilobed Flap**

In cases in which the depressed scar is present bilaterally, we use the unilobed flap on both sides to obtain optimum results. The same principles of the unilobed flap are followed in this case, although the flaps are used on both sides (Figure 4). This technique helps avoid the forehead scar and multiple procedures required with the paramedian forehead flap, which is usually used for these deformities.

**Bilobed Flap**

In cases with deep scars but absence of the pseudohump, the preferred method is a bilobed flap (Figure 5). The 2 principle advantages of this flap are that it reduces the skin tension by...
using 2 flaps and, in the absence of a pseudohump, it prevents donor site depression, which may occur with a unilateral flap. These flaps can be used for defects of up to 1.5 cm.6

The bilobed flap is an exemplary technique for transposing skin from an area of laxity and excess to an area of deficiency. Owing to the lack of a named large-bore blood vessel at the base of the flap, the bilobed flap is classified as a random pattern flap.

The process involves skin marking and local infiltration, after which the scar tissue is excised and the appropriate incision area is prepared for the primary and secondary lobes of the flap, which fill the recipient site and the primary lobe donor site, respectively. The secondary lobe can be smaller than the primary lobe but must be at least 50% of the size of the primary lobe.7 However, the primary lobe must be the same size as the defect. The secondary lobe donor site is closed by primary intention with 6-0 nylon sutures, after which the secondary and primary lobes are sutured, in that order, to reduce the skin tension on the recipient area (Figure 5). One must perform adequate dissection to increase skin laxity and avoid sequela such asalar or tip retraction, which can occur due to postoperative wound contraction.8

Supratip Transposition Flap

In cases in which we found an associated polybeak deformity of the supratip area, we used the transposition flap.4 In this technique, the skin was separated from its surrounding margins except for a thin pedicle of subcutaneous tissue containing fat and the vascularity to the flap. The difference between the unilobed flap and the transposition flap is that the unilobed flap has a skin and subcutaneous-tissue pedicle, whereas the transposition flap has only a subcutaneous-tissue pedicle. The flap is then rotated downward and, keeping the subcutaneous-tissue pedicle intact, the margins of the flap are sutured to the recipient area with 7-0 nylon sutures (Figure 6).

Z-Plasty

Dimpled scars were associated with linear scars; in these cases, the use of Z-plasty was appropriate. The principle of a Z-
plasty involves arranging the scar along the relaxed skin tension lines and changing the direction of the scar, thus making it less obvious. With this technique, a dimpled scar can be made flat but at the expense of a longer scar, which is relatively inconspicuous nonetheless. In one case, this procedure was used as a revision for a bilobed flap procedure that was initially performed to correct the dimpled deformity of the nose with alar discrepancy (Figure 7). The following 4 geometrical variants can be used: classic Z-plasty, mirror-image Z-plasty, compound Z-plasty, and double Z-plasty in series. A mark was made with ink, keeping the central limb parallel to the scar line and the other limbs at an angle to the scar line. Incisions were made on the marked sites and the flaps were transposed and then sutured with 7-0 nylon sutures. Angles of 45° to 60° are preferred because angles of more than 60° result in increased tension of the skin, leading to scarring. The success of a Z-plasty procedure depends on the length of the flap. Facial scars are best treated with Z-plasties with a length of less than 1 cm.9

Results
We reviewed the outcomes and surgical techniques for 28 patients (6 men and 22 women) who had undergone previous rhinoplasty procedures and had depressed scars on the nasal tip. The age of the patients ranged from 19 to 71 years (mean age, 40.4 years). The patients had undergone 1 to 8 procedures (mean, 3.7 procedures). Of the 28 patients, 23 had previous surgical procedures in which silicone was used, whereas polytetrafluoroethylene had been used in 4. Other materials used were dermofat, fat, fascia lata, costal cartilage, donated rib, filler, and high-density polyethylene. Eleven patients (39.2%) were treated with unilobed flap, 4 (14.2%) with a bilobed flap, 3 (10.7%) with Z-plasty, 9 (32.1%) with soft-tissue interposition, and 1 (3.5%) with a transposition flap.

Follow-up periods ranged from 6 to 32 months after surgery (mean, 12.3 months). In the immediate postoperative period, the scars were visible in 2 cases, but in 2 to 3 months’ time, they became discrete. Twenty-four of the 28 patients (85.7%) were satisfied or fairly satisfied with their outcomes. The 4 patients who were dissatisfied (14.3%) were given a revision procedure at least 6 months after the previous procedure.

The mean surgeon-peer-reviewed scores for the 22 patients who were satisfied with the cosmetic outcome of the procedures was 8.2 of 10; for the 2 patients who were fairly satisfied with the outcome, 6.5; and for the 4 patients who were dissatisfied with the outcome, 7.0 (Table 1). In one dissatisfied patient, the technique used was soft-tissue placement under the skin. This technique was later revised to a unilobed flap, after which the patient was satisfied with the outcome. In a second patient, a bilobed flap was used. Although the result was better than the preoperative status, the patient was given Z-plasty to reduce the scarring of the flap margins. After the revision procedure, the patient was content with the result. In a third patient, a unilobed rotation flap was used and there was a tiny projection of skin jutting out above the skin’s surface. This tissue was excised and primarily sutured; when followed up, the result was satisfactory. In another patient, despite the scar excision and use of a unilobed flap, the dimpling persisted. To correct this dimpling, we used another unilobed rotation flap but from the opposite side of the dimple. However, there was a thin layer of soft tissue in the recipient area bed, so we rotated the flap to bring the surface on par with the surrounding skin. The result was satisfactory (Table 1).

The mean outcome scores for each technique are provided in Table 2.

Discussion
Reconstruction of postrhinoplasty nasal scars is always a challenge, not only because of the prominence of the nose but also because of the varied skin texture and thickness throughout the nose. The best results are obtained with local flaps because they provide the best match for color and contour. In this article, we describe some of the most common techniques we have used to treat these depressed scars, which are frequently seen after augmentation rhinoplasty with alloplastic materials.

Soft-tissue or cartilage interposition is the simplest of the techniques that can be used to treat such complications. However, we do not recommend its use as a stand-alone procedure in all cases of dimpled deformities. It can be used in deformities in which the depth of dimpling is more superficial and can be supported with underlying tissue to push the dimpled area outward. However, if the skin is less pliable
Table 1. Characteristics of Cases, Including Techniques, Details of Follow-up, Patient Satisfaction Scores, Peer-Review Outcome Scores, and Revision Procedures

<table>
<thead>
<tr>
<th>Patient No. / Sex/Age, y</th>
<th>Location</th>
<th>Technique</th>
<th>Previous Rhinoplasties, No.</th>
<th>Reason for Present Scar Surgery (Time After Surgery)</th>
<th>Follow-up, mo</th>
<th>Patient Outcome Score (Likert Scale)³</th>
<th>Peer-Review Outcome Score³</th>
<th>Mean Peer-Review Outcome Score³</th>
<th>Revision Procedure³</th>
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<tbody>
<tr>
<td>1/F/20s</td>
<td>Supratip</td>
<td>Unilobed flap</td>
<td>3</td>
<td>Protrusion (5 y)</td>
<td>16</td>
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<tr>
<td>2/M/20s</td>
<td>Alar crease</td>
<td>Bilobed flap</td>
<td>3</td>
<td>Infection (1 y)</td>
<td>12</td>
<td>Satisfied</td>
<td>8</td>
<td>9</td>
<td>8.5</td>
</tr>
<tr>
<td>3/F/30s</td>
<td>Tip</td>
<td>Soft-tissue interposition</td>
<td>3</td>
<td>Infection (2 y)</td>
<td>32</td>
<td>Dissatisfied</td>
<td>8</td>
<td>6</td>
<td>7.0</td>
</tr>
<tr>
<td>4/M/60s</td>
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<td>Cartilage interposition</td>
<td>2</td>
<td>Infection (2 y)</td>
<td>19</td>
<td>Satisfied</td>
<td>7</td>
<td>9</td>
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<td>5/F/50s</td>
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<td>Z-plasty</td>
<td>4</td>
<td>Contraction</td>
<td>10</td>
<td>Fairly satisfied</td>
<td>5</td>
<td>8</td>
<td>6.5</td>
</tr>
<tr>
<td>6/F/30s</td>
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<td>Soft-tissue interposition</td>
<td>4</td>
<td>Infection (3 mo)</td>
<td>18</td>
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<td>8</td>
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<td>Z-plasty</td>
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<td>Infection (3 y)</td>
<td>12</td>
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<td>8</td>
<td>9</td>
<td>8.5</td>
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<td>Unilobed flap</td>
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<td>Satisfied</td>
<td>9</td>
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<td>Soft-tissue interposition</td>
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<td>Protrusion (4 y)</td>
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<td>Satisfied</td>
<td>9</td>
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<td>8.5</td>
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<td>10/M/20s</td>
<td>Tip and dorsum</td>
<td>Unilobed flap</td>
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<td>Contraction</td>
<td>14</td>
<td>Satisfied</td>
<td>8</td>
<td>8</td>
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<td>Bilobed flap</td>
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<td>12</td>
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<td>10</td>
<td>9</td>
<td>9.5</td>
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<td>Infection (20 y)</td>
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<td>Satisfied</td>
<td>7</td>
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<td>3</td>
<td>Infection (1 y)</td>
<td>20</td>
<td>Dissatisfied</td>
<td>7</td>
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<td>Unilobed flap</td>
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<td>6</td>
<td>Infection (1 y)</td>
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<td>Satisfied</td>
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<td>9</td>
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³Ages given in decades.

²Collected 6 months after surgery.

³Score range is 1 (a poor cosmetic outcome) to 10 (the best possible outcome).

⁴Empty cells indicate that no revision procedure was performed.
is not being elevated by any underlying tissue support, then excision of the deformed skin and replacement with a local flap would be more advisable. The advantage of this technique is that it can be and is usually used in concordance with the other flaps mentioned in this article. In our series, we used it in 9 patients as a stand-alone procedure. We obtained satisfactory results in 8 patients (88.9%), but 1 patient (11.1%) was dissatisfied and received a unilobed flap procedure after 6 months. The patient was satisfied after the revision procedure. The mean peer-reviewed outcome score in this category was 8.0 of 10 (Table 2).

The unilobed flap is another technique used to correct smaller dimpling deformities in which the defect remaining after the removal of the dimple is not large enough to cause tension at the edges of the wound. This technique is also useful when a pseudohump deformity is adjacent to the dimpling so that a smooth nasal contour line is established by transposing the excess tissue onto the dimpled area. This technique was used in 11 of our patients, with a mean peer-reviewed outcome score of 8.0 of 10. In this category, 9 of the 11 patients (81.8%) were satisfied with the outcomes using this technique and 2 (18.2%) were dissatisfied.

The bilobed flap, which is based on a simple principle of Zitelli and Fasios’s design, is a single-stage procedure that has proved effective in treating these dimpled deformities. The only drawback with this procedure is the possibility of alar retraction and distal tension owing to the limitation of the available skin. The mean outcome score for the 4 patients in whom this technique was performed was 7.5 of 10, with 2 patients (50%) being satisfied, 1 (25%) being fairly satisfied, and 1 (25%) being dissatisfied with the outcome. This patient was then given a Z-plasty for scar revision; the patient was satisfied with the results.

Z-plasty is an effective technique that can be performed in cases in which the length of the dimpling is much greater than the depth. This technique, however, requires adequate planning to place the scar along the relaxed skin-tension lines.

This technique was carried out in 3 patients, with a mean outcome score of 7.8 of 10. Of these 3 patients, 2 (66.7%) were satisfied and 1 (33.3%) was fairly satisfied with the outcome.

The transposition flap was performed for 1 patient who was satisfied (100%) with the outcome; it had a peer-reviewed outcome score of 8.0 of 10.

There is a discrepancy between the patient satisfaction and the peer-review scores, probably owing to the higher expectations of the patients who were dissatisfied with the outcome. Documenting patient’s expectations in such cases is important and it is imperative to attain the patients to the factors that affect outcomes and help them have realistic expectations.

### Conclusions

Postrhinoplasty scars on the nasal tip are common in the field of plastic surgery. The difficulty with managing revision cases is not only the disruption of the framework or the loss of tissue plane and excessive blood loss but also the change in the skin elasticity and contour, which remain despite the surgeon’s best efforts to correct the structures draped by the skin. In such situations, it becomes mandatory to address the skin specifically. A definitive analysis has to be made regarding the cause of the depressed dimpling deformity before proceeding with the surgery to avoid another scar-revision surgery.

Knowledge of the biodynamics of the skin as well as creative insight into the possibilities of local flaps is essential for the modern rhinoplasty surgeon to deliver the best results, especially in revision rhinoplasty cases.

Simple procedures, such as soft-tissue or cartilage placement, may work for shallow dimpled scars. For deeper scars with poor skin condition, one of the flaps mentioned is a better option. These simple procedures can enhance the results by a large margin. Appreciation of the difference of skin thickness and contour in different areas is vital to match the donor and recipient sites of the flap.

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**Table 2. Patient Satisfaction Scores and Peer-Review Scores for Each Technique**

<table>
<thead>
<tr>
<th>Technique</th>
<th>Patients, No.</th>
<th>Patient Satisfaction With Outcome, %</th>
<th>Mean Peer-Review Outcome Scorea</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Satisfied</td>
<td>Fairly Satisfied</td>
</tr>
<tr>
<td>Soft-tissue interposition</td>
<td>9</td>
<td>88.9</td>
<td>0</td>
</tr>
<tr>
<td>Unilobed flap</td>
<td>11</td>
<td>81.8</td>
<td>0</td>
</tr>
<tr>
<td>Bilobed flap</td>
<td>4</td>
<td>50.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Z-plasty</td>
<td>3</td>
<td>66.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Transposition flap</td>
<td>1</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Score range is 1 (a poor cosmetic outcome) to 10 (the best possible outcome)*.

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**Author Contributions:** Drs Jung and Medikeri had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

**Study concept and design:** Jung, Chang.

**Acquisition, analysis, or interpretation of data:** Jung, Medikeri, Hyun.

**Drafting of the manuscript:** Jung, Medikeri.

**Critical revision of the manuscript for important intellectual content:** All authors.

**Statistical analysis:** Medikeri.

**Administrative, technical, or material support:** Medikeri, Chang, Hyun.

**Study supervision:** Jung, Chang.

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REFERENCES


