Earlobe Rejuvenation: A Fat Grafting Technique

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Abstract
Background: The earlobe demonstrates stereotypical signs of aging, including wrinkles and volume depletion.
Objectives: The purpose of this study is to review the outcome of the earlobe rejuvenation developed by the senior author.
Methods: We describe our earlobe rejuvenation technique refined over 10 years that uses fat grafting to the earlobe. Three raters assessed preoperative and postoperative photographs of 40 earlobes in 20 patients. Each earlobe was evaluated for volume deficiency, number of deep creases, depth of creases, and number of fine wrinkles. Inter-rater reliability was calculated. Earlobe length was also measured.
Results: Seventeen females and 3 males with average age of 63 years were followed for an average of 26 months. Postoperative improvements were observed in earlobe volume deficiency and number of fine wrinkles ($P < .05$). Improvements were seen in number and depth of creases and the earlobe height, but these were not significant ($P > .05$). No complications relating to the earlobe were observed in these patients.
Conclusions: Fat grafting can be an effective means for earlobe rejuvenation.

Level of Evidence: 4

METHODS
Study Design
Institutional Review Board approval was received from University Hospitals Case Medical Center. Informed consent was obtained for all published photographs. Patients who underwent earlobe rejuvenation surgery with the senior author (BG) from January 2004 to December 2014 were identified. Patients who were usually unaware of their aging earlobes, and signs of aging typically were identified by the surgeon. Indication for surgery was earlobe with signs of aging. Patients who had at least 6 months of follow-up, and

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preoperative and postoperative left and right profile photographs were included. Photographs were taken without earrings present at the same distance by the same photographer at preoperative and postoperative visits. All photographs were standardized and cropped to the same dimension in Photoshop CC 2014 (15.0) (San Jose, CA). The earlobe was in-focus and isolated in each photograph without inclusion of the face. Demographic and surgical details were collected.

An assessment system was used to evaluate the earlobes before and after surgery as described in Table 1. Deep creases were defined as folds in the skin. Fine wrinkles were defined as superficial lines in the skin. The senior author (BG), a plastic surgery resident (DEK), and a medical student (HP) independently evaluated the photographs for volume deficiency, number of deep creases, depth of the creases, and number of fine wrinkles. Additionally, earlobe height was measured as a percentage of total ear height. The measuring axis for ear and earlobe height was defined by a line through the helix apex, the antitragus, and the earlobe (Figure 1). The ear height was measured from the helix apex to the base of the earlobe, and the earlobe height was measured from the apex of the antitragus to the base of the earlobe. All the measurements were performed using ImageJ 1.49 (Bethesda, MD).

The average and standard error were calculated for each of the assessment categories. Inter-rater reliability (IRR) using Fleiss’s kappa method was calculated. There is no agreed upon method of interpreting IRR between 3 raters.10 We assumed acceptable IRR with Fleiss’s kappa > 0.4, as described in chapter 6 of the Handbook of Inter-Rater Reliability.11

### Fat Grafting Technique

The procedure is typically performed as part of facial rhytidectomy. Before the ear is reattached during the completion of the repair, 2 single hooks are placed in position, 1 in the cephalic portion and 1 in the caudal portion of the earlobe incision. While these hooks stabilize the earlobe, a pair of baby Metzanbaum scissors is used to create a pocket within the thickness of the earlobe. A piece of fat, usually removed from the cervical region while redefining the mandibular angle, is tailored and placed in the created space within the thickness of the earlobe. The size of the graft will vary dependent on the volume deficiency of the earlobe. Usually, the volume loss is caudal and anterior to the piercing. The objective is to add enough volume for the earlobe to look smooth and rejuvenated. This technique is not any different from other volume replacement technique in its subjectivity. The dissection can be extended around the piercing if needed to provide a more pleasing look.

### Table 1. Classification of Earlobe Rejuvenation Surgical Improvement Based on the Different Measurements Present on the Preoperative and Postoperative Photographs

<table>
<thead>
<tr>
<th>Volume deficiency</th>
<th>(a) 0 = no volume deficiency</th>
<th>(b) 1 = mild volume loss</th>
<th>(c) 2 = moderate volume loss</th>
<th>(d) 3 = severe volume loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of deep creases</td>
<td>(a) 0 = 0 deep creases</td>
<td>(b) 1 = 1 deep crease</td>
<td>(c) 2 = 2 deep creases</td>
<td>(d) 3 = 3+ deep creases</td>
</tr>
<tr>
<td>Depth of deep creases</td>
<td>(a) 0 = no deep creases</td>
<td>(b) 1 = mild</td>
<td>(c) 2 = moderate</td>
<td>(d) 3 = severe</td>
</tr>
<tr>
<td>Number of fine wrinkles</td>
<td>(a) 0 = no fine wrinkles</td>
<td>(b) 1 = 1-3 fine wrinkles</td>
<td>(c) 2 = 4-6 fine wrinkles</td>
<td>(d) 3 = 7+ fine wrinkles</td>
</tr>
</tbody>
</table>

### Figure 1. Assessment of earlobe aging illustrated on this 64-year-old man. 1: Total earlobe height (measured from the apex of the antitragus to the base of the earlobe). 2: Total ear height (measured from the helix apex to the base of the earlobe). 3: Fine wrinkle. 4: Deep crease.
and even rejuvenation to the earlobe. The opening in the earlobe is repaired using a single 6-0 Monocryl suture to avoid dislodgement of the fat graft.

RESULTS

Twenty patients (17 women, 3 men) with an average age of 63 years (range, 47-74 years) were included for analysis of 40 earlobes. Patients had a mean 26 months of follow-up (range, 6 months to 10 years). All 20 patients were Caucasian. Two representative clinical cases are available as Figures 2 and 3.

Twelve of the 20 patients (60%) had concomitant full or limited facial rhytidectomy; 17 patients (85%) received facial fat injection and 9 (45%) received full-face CO₂ laser resurfacing. However, the earlobe was not treated with the laser in any of these patients. No complications relating to the earlobe occurred during or following surgery.

The average of 3 judges’ assessments of each earlobe was used. Averages of each rating category are summarized in Table 2, and inter-rater reliabilities are listed in Table 3.

Thirty-six of 40 earlobes (90%) were found to have improvement, and 4 earlobes had no change in volume deficiency. Overall, there was significant improvement in volume deficiency ($P < .05$).

Twenty-one earlobes (53%) had fewer deep creases than before the surgery. Of these 21 earlobes, 10 (48%) had at least 50% of reduction in the number of creases. Sixteen earlobes (40%) had no change in the number of creases, and

![Figure 2](https://example.com/figure2.png)

**Figure 2.** (A) Preoperative and (B) postoperative earlobe photographs of this 62-year-old woman at 7-year follow-up. This patient’s right earlobe was rated as improvement in volume deficiency, number of deep creases, depth of creases, and number of fine wrinkles, and had 6% increase in earlobe height.

![Figure 3](https://example.com/figure3.png)

**Figure 3.** (A) Preoperative and (B) postoperative earlobe photographs of this 66-year-old woman at 3-year follow-up. This patient’s right earlobe was rated as improvement in volume deficiency, number and depth of creases, and number of fine wrinkles. There was 3% increase in earlobe height. Note, there was a change in piercing in the postoperative photograph.
3 earlobes (7%) had more deep creases after the surgery. Overall, there was improvement in the number of deep creases, but the value did not reach significance \((P = .07)\).

Twenty-one (53%) earlobes had reduced crease depth. Nine earlobes (23%) were rated to have the same depth of creases, and 10 earlobes (25%) had worsening of crease depth. Overall, there was improvement in depth of creases, but the value did not reach significance \((P = .08)\).

Twenty-four earlobes (60%) had improvement in the number of fine wrinkles, with 16 earlobes (67%) demonstrating 50% or more improvement. Thirteen earlobes (33%) showed no change in the number of fine wrinkles. Three earlobes (8%) had an increased number of fine wrinkles. Overall, there was significant improvement in the number of fine wrinkles \((P < .05)\).

Twenty-five earlobes (63%) showed an increase in height (average, +4.7%), four earlobes (10%) had no change in height, and 11 earlobes (28%) had decrease in height (average, −5.3%). Height change ranged from an increase of 12% to decrease of 11%. Overall, there was an average increase of 1.5% in earlobe height, but this was not significant \((P = .10)\).

The IRR for each category is summarized in Table 3. Overall, the 3 judges agreed on the trend of the postoperative change. Fleiss’s kappa for each category was above 0.5.

**DISCUSSION**

Although the earlobe ages with the rest of the face, it is frequently overlooked by cosmetic surgeons and rarely addressed in the literature. We have anecdotally found patients to have great satisfaction after earlobe rejuvenation with our fat-grafting technique, and here, we systematically evaluate our outcomes to find statistically significant or nearly significant improvements in each classic sign of earlobe aging.

Among the 4 categories of earlobe aging, the change in volume deficiency was the most significant with an improvement rate of 90%. The 4 earlobes that did not show improvement were rated to have little preoperative volume deficiency. These results suggest volume deficiency can confidently be addressed by fat grafting.

Fat grafting also proved to be effective in reducing fine wrinkles. Most of the earlobes that did not experience improvement in the number of fine wrinkles had few preoperative fine wrinkles. The surgery’s effectiveness in eliminating fine wrinkles might be related to its effectiveness in improving volume deficiency: as the fat grafting increases the fullness of the earlobe, the fine lines of the earlobe are stretched and eliminated. Some of the patients demonstrated increase in wrinkles or creases due to cephalic rotation of the lobe without a wedge excision. Observation of these suboptimal changes has lead us to our recent approach, which is combination of more aggressive volume replacement along with at least posterior and, on occasions, combined anterior and posterior wedge excision.

Improvements were seen in depth of deep creases and number of deep creases, although these were not significant. Deep wrinkles and creases on the face following relaxed skin tension lines typically fall perpendicular to the direction of muscular contraction. However, in the earlobe, there is no muscle, and the deep creases are likely the result of gravity and the weight of earrings. It is possible that in some patients these deep creases are actually fibrous adhesions that result from the aforementioned downward stresses. Therefore, if fat injection were used, the fat may settle around these adhesions and amplify crease depth. If fat injection had been elected rather than fat graft, we would have undermined the crease using an 18-gauge needle. We believe that small-segment fat grafting is more reliable than fat injection, and during creation of a pocket for the fat graft, the fibrous bands are released. We believe our occasionally suboptimal results are the product of inadequate fibrous band release and perhaps conservative fat grafting.

The height of the earlobe has previously been shown to increase with aging, while the rest of the ear height remains stable. \(^{12}\) In this study, we found that fat grafting the earlobe caused a slight increase in the earlobe height, although this increase was not statistically significant. While we have reported elongation of the earlobe as a consequence of inflation, this was not observed routinely and occurred in only 63% of the earlobes. We believe this did not alter the ear aesthetics. Considering the average earlobe to be 2 cm, \(^{13}\) a 4.7% average increase in earlobe height correlates

### Table 2. Analysis of the Effects of Earlobe Rejuvenation Surgery Based on the Categories in Table 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Volume Deficiency</th>
<th>Number of Creases</th>
<th>Depth of Creases</th>
<th>No. Fine Wrinkles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced</td>
<td>36</td>
<td>21</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>No change</td>
<td>4</td>
<td>16</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Increased</td>
<td>0</td>
<td>3</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>(P) value</td>
<td>&lt;0.01</td>
<td>0.07</td>
<td>0.08</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

### Table 3. Inter-Rater Reliability for the Subjective Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Volume Deficiency</th>
<th>Number of Creases</th>
<th>Depth of Creases</th>
<th>Number of Fine Wrinkles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fleiss’s kappa</td>
<td>0.739</td>
<td>0.642</td>
<td>0.573</td>
<td>0.629</td>
</tr>
</tbody>
</table>
with a 0.94 mm increase, which is insubstantial. During the routine reattachment of the earlobe, the senior author rotates the lobe cephalically almost routinely to shorten the earlobe, and if needed, a wedge of earlobe can be excised as described by Brunno Ristow to prevent pixy earlobe (personal communication). A wedge resection, specifically posteriorly, is a very common component of our earlobe rejuvenation technique, especially for patients with preoperative elongation of the earlobe. While the pixy earlobe was not observed in any of the studied patients, this cephalic rotation of the earlobe could account for the deepening of the crease in a small percentage of the patients.

The IRR assessed by Fleiss’s kappa for all 4 categories were calculated to be above 0.5, showing at least fair to good agreement. However, this study has limitations. Although the research team rated the earlobes as improved on several measures, we did not assess patient satisfaction, which would provide further insight into the technique’s success. Patient satisfaction was not prioritized because most patients are not aware of their earlobe deformities. Anecdotally, patients’ rare preoperative complaints pertinent to the aging earlobe often relate to the length of the earlobe.

This study highlights how fat grafting is an effective and long-term treatment for the aging earlobe. It addresses the importance of volume augmentation in terms of improving deflated and wrinkled earlobes. Fillers and fat injections may also be appropriate in select cases, but we prefer fat grafting for ease of harvest, low cost, and high survival. We believe there is no reason for a patient undergoing surgery to be dependent on fillers for better outcome postoperatively. Additionally, we believe that fat injection and fillers without subcision may result in migration of the volume on either side of the deep crease and deepen the crease, as was mentioned earlier. We are reluctant to use laser on the earlobe because of paucity of the dermal appendages.

A comparative study with fat injection would have been scientifically superior. However, based on our extensive experience with fat grafting and fat injection for augmentation of small deficiency, there is no question that fat graft is superior technically. There is plenty of extra fat during a rhytidectomy and thus no need for harvesting and preparing (spinning) fat for this purpose. Additionally, grafting avoids the need for overcorrection, which is often necessary for the fat injection and prevents the patient from experiencing an overinflated earlobe until the injected volume settles.

CONCLUSIONS

The technique developed by the senior author improves earlobe volume deficiency and may improve other elements of aging. It can be conducted with or without rhytidectomy and is a fast, easily adoptable technique with minimal risk.

Disclosures

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REFERENCES