Contouring the Gluteal Region With Tumescent Liposculpture

Gamaliel Avendaño-Valenzuela, MD; and José Guerrerosantos, MD

Abstract

Background: For quite some time, plastic surgeons have experimented with novel techniques for enhancing the gluteal region. However, all of the previously-described techniques have the disadvantage of postoperative scarring, most of which is visible. As an alternative, fat injection in the gluteal region has been shown to have permanent and satisfactory results.

Objectives: The authors discuss the results of liposuction and lipoinjection in the gluteal region.

Methods: Between March 2000 and March 2007, 300 female patients who presented with lipodystrophy of the gluteal and paragluteal regions underwent liposuction with a modified tumescent technique. The treated sites were classified into six anatomical zones, and the patients were retrospectively grouped into types based on the frequency of treatment in each zone.

Results: The patients ranged in age from 16 to 54 years. The follow-up period ranged from six to 36 months. Fifty percent of patients underwent liposuction in Zone I, 90% in Zone II, 0% in Zone III, 40% in Zone IV, 30% in Zone V, and 75% in Zone VI. The largest percentage of patients underwent treatment in Zones I, II, and V, with subsequent lipoinjection. Comparison of pre- and postoperative photographs and measurements revealed gluteal lifting in all patients at the point of greatest projection. Improved contour was shown in Zones I, II, and IV when all zones were treated in a combined form.

Conclusions: The concept of refining techniques for liposuction and lipoinjection according to individual anatomical zones is essential to the evolution of the procedure. In this series, the results indicated that improving the intraoperative treatment of the hip region resulted in improved aesthetic contouring. Therefore, the authors believe that this technique can reduce the need for more aggressive surgical procedures, which thereby decreases the risk of complications, recovery time, and sequelae.

Keywords

liposuction, body contouring, buttck augmentation, fat injections, autoaugmentation, liposculpture

Accepted for publication May 4, 2010.
treatment for each of these zones, discussing tumescent liposuction and fat injection into these gluteal and paragluteal regions as a treatment for lipodystrophy. With this method, we avoided the placement of large incisions, decreasing the sequelae and increasing the patient satisfaction associated with this type of treatment.

**METHODS**

Between March 2000 and March 2007, 300 female patients were enrolled in this prospective, observational study. For the purposes of this study, we divided the potential treatment areas into six zones: Zone I corresponded to the sacral region and lower back, Zone II corresponded to the upper-lateral gluteal region and flank, Zone III was the medial-external zone, or the area of muscle insertion, Zone IV corresponded to the external part of the greater trochanter, Zone V corresponded to the internal and posterior sides of the thigh, and Zone VI corresponded to the gluteal projection (Figure 1). On the basis of the frequency of treatment in each of these areas, we then divided patients into treatment groups (or types). Type I included patients who underwent treatment for lipodystrophy in Zone II; Type II, Zones I and II; Type III, Zones I, II, and V; and Type IV, Zones I, II, IV, and V. Type V included patients who had a congenital deformity or injury that resulted in gluteal deformity in any zone. An additional “A” with any of the types indicated poor projection of the gluteus.

The planned treatment zones were marked preoperatively with the patient standing (Figure 2). Preoperatively and at each follow-up visit (for comparison), patients were marked according to the 2-to-1 measurement described by Cuenca-Guerra and Quezada. Point A was marked at the most prominent part of the greater trochanter, Point B at the greatest projection of the symphysis pubis, Point C at the greatest projection of the buttock, and Point D at the anteroposterior iliac spine. A line was then drawn in the axis of gravity of the body, with another line parallel to the line that ran over Points A, C, and B.
Each patient was treated with liposuction, applied with the tumescent technique. The infiltrated liquid was modified to include 1 liter of saline solution and 1 mL of adrenalin. Liposuction was carried out with 2.5-, 3-, and 4-mm cannulae that were entirely round or round with a flat end and three orifices. We performed liposuction on both the deep and superficial adipose tissue of the back and the hip. The suctioned volume contained 70% fat, with 30% infiltrated solution and red cells. Strict control was maintained over intravenous liquids and discharges, including intraoperative measurements for infiltration, aspiration, and urinary output. Depending on each patient’s needs, the intravenous liquid administered ranged from 200 to 300 mL per hour, with urinary volumes from 0.5 to 1 mL per kg per hour.

The suctioned fat was prepared without washing; separation from the liquid occurred through gravity. Subsequent lipoinjection was performed only in the intramuscular zone with 3-mm cannulae. Following completion of the procedure, drains were placed and patients were given a compression dressing to wear over the treated area, which they were instructed to keep in place for four to six weeks postoperatively.

**RESULTS**

The 300 patients included in this series were all female, between 16 and 54 years of age (median, 32 years). The follow-up period ranged from six to 36 months.

The infiltration required to achieve tumescence ranged between 1000 and 9000 mL of saline solution. The fat volume extracted ranged from 2000 to 8000 mL. No patient required a blood transfusion.

Fifty percent of patients underwent liposuction in Zone I, 90% in Zone II, 0% in Zone III, 40% in Zone IV, 30% in Zone V, and 75% in Zone VI (Table 1). Most patients (75%) underwent subsequent gluteal lipoinjection (Table 1). Based on our analysis of treatment trends and frequency, the patients were also divided into five types (Table 2). The full results are presented in Table 3, but the highest percentage of patients (35%) underwent liposculpture in Zones I, II, and V, along with gluteal lipoinjection (Type III-A).

In patients who received lipoinjection, the total amount of infiltrated fat ranged from 180 to 380 g for each buttock. Augmentation was readily observed intraoperatively (Figure 3). In all patients, augmentation of the gluteal region was...
observed when the point of greatest projection was marked and compared to the preoperative measurement (Figure 4). Lifting and shape improvement was observed in patients who underwent treatment in Zones I, II, and IV, after treating all zones in a combined form (Figure 5).

During follow-up, 90% of patients showed no loss of gluteal projection or volume (Figures 6-11). The remaining 10% of patients who did show loss of adipose tissue were estimated to have lost only 15% of the total volume injected. This amount was estimated by measuring each patient’s hip circumference with the points of reference described earlier and by comparing the preoperative and postoperative patient photographs. During postoperative follow-up, 25% of patients (n = 75) experienced a weight increase between 5 and 10 kg and an associated increase in gluteal projection.

Of the total, 0.6% (2 patients) experienced fat necrosis, which was surgically drained without sequelae. No major complications occurred and there was no need for gluteal implants. Patients were able to return to their normal activities in four to 14 days.

### DISCUSSION

Among the previous publications related to surgical treatment of the buttocks, there are some techniques with suitable results and limited scarring, such as those published by Pitanguy and Regnault et al. These techniques improved the gluteal shape by resecting the tissue around

---

Table 1. Lipodystrophy Zones and Gluteal Lipoinjection

<table>
<thead>
<tr>
<th>Operated Zones With Liposculpture</th>
<th>%</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone I</td>
<td>50</td>
<td>159</td>
</tr>
<tr>
<td>Zone II</td>
<td>90</td>
<td>270</td>
</tr>
<tr>
<td>Zone III</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Zone IV</td>
<td>40</td>
<td>120</td>
</tr>
<tr>
<td>Zone V</td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td>Zone VI</td>
<td>75</td>
<td>225</td>
</tr>
<tr>
<td>Gluteal Lipoinjection</td>
<td>%</td>
<td>Patients</td>
</tr>
<tr>
<td>Yes</td>
<td>75</td>
<td>225</td>
</tr>
</tbody>
</table>

Table 2. Lipodystrophy Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Lipodystrophy Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Lipodystrophy Zone II</td>
</tr>
<tr>
<td>II</td>
<td>Lipodystrophy Zones I, II</td>
</tr>
<tr>
<td>III</td>
<td>Lipodystrophy Zones I, II, and V</td>
</tr>
<tr>
<td>IV</td>
<td>Lipodystrophy Zones I, II, IV, and V</td>
</tr>
<tr>
<td>V</td>
<td>Congenital deformity or injury to any area resulting in gluteal deformity</td>
</tr>
<tr>
<td>A</td>
<td>Poor projection of the gluteus</td>
</tr>
</tbody>
</table>

Table 3. Frequency of Lipodystrophy

<table>
<thead>
<tr>
<th>Lipodystrophy</th>
<th>%</th>
<th>Patients</th>
<th>Primary Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>4</td>
<td>12</td>
<td>Liposculpture Zone II</td>
</tr>
<tr>
<td>Type I-A</td>
<td>6</td>
<td>18</td>
<td>Liposculpture Zone II and gluteal lipoinjection</td>
</tr>
<tr>
<td>Type II</td>
<td>5</td>
<td>15</td>
<td>Liposculpture Zones I and II</td>
</tr>
<tr>
<td>Type II-A</td>
<td>22</td>
<td>66</td>
<td>Liposculpture Zones I and II and gluteal lipoinjection</td>
</tr>
<tr>
<td>Type III</td>
<td>10</td>
<td>30</td>
<td>Liposculpture Zones I, II, and V</td>
</tr>
<tr>
<td>Type III-A</td>
<td>35</td>
<td>105</td>
<td>Liposculpture Zones I, II, V and gluteal lipoinjection</td>
</tr>
<tr>
<td>Type IV</td>
<td>5</td>
<td>15</td>
<td>Liposculpture Zones I, II, IV, and V</td>
</tr>
<tr>
<td>Type IV-A</td>
<td>8</td>
<td>24</td>
<td>Liposculpture Zones I, II, IV, and V and gluteal lipoinjection</td>
</tr>
<tr>
<td>Type V</td>
<td>1</td>
<td>3</td>
<td>Liposculpture peripheral to the deformity and/or rotation flaps, tissue expander</td>
</tr>
<tr>
<td>Type V-A</td>
<td>4</td>
<td>12</td>
<td>Liposculpture peripheral to the deformity, gluteal liposculpture, and/or rotation of flaps, plus tissue expander</td>
</tr>
</tbody>
</table>

Figure 3. Immediate augmentation can be observed intraoperatively.
the greater trochanter and the gluteal fold. González-Ulloa\textsuperscript{17} and Lockwood\textsuperscript{6} obtained a better shape by completely lifting the gluteal region. Tumescent liposuction has also been shown to allow a sufficient retraction.\textsuperscript{14}

Fat injection in the gluteal region, when possible, is also an effective method of providing augmentation and improved contour to the gluteal region. If applied appropriately, the results are excellent and, furthermore, permanent.\textsuperscript{12-14} Similarly, procedures combining liposuction and lipoinjection,\textsuperscript{18} or implants and liposuction,\textsuperscript{15,19} have yielded satisfactory results.

One remaining challenge, though, involves creating a well-defined hip with sufficient projection but minimal scarring (ie, through small incisions). By combining liposuction and lipoinjection, we can obtain suitable results such as those described by Cárdenas-Camarena et al,\textsuperscript{18} but better definition of the gluteal structure is required. The placement of gluteal implants provides acceptable results only for the gluteal projection; in the posterior view, hip definition is still unfavorable with that technique. The combination of implants and liposuction described by some authors\textsuperscript{15,19} offers adequate results, but the adjacent structure of the buttock is not properly defined.

It is worth mentioning that liposuction scarring is very different from scars produced by procedures with larger incisions. The healing in liposuction is based on retraction, which causes a scar between the skin and underlying tissue (whether that is fat, aponeurosis, or muscle). This has been confirmed by specific studies of the buttocks, which have described elastic structures in the subcutaneous tissue of the buttocks that hold this zone. When we stimulate a healing scar after liposuction of this zone, we initiate a real lifting and a greater support of tissues.\textsuperscript{20}

The goal of this study was to evaluate the success of fat

Figure 4. A, This 32-year-old woman presented for treatment of her gluteal region. Preoperatively, the area of greatest projection was marked. Her lipodystrophy and skin excess are clearly evident. B, Eighteen months after treatment with the authors’ technique of liposuction and lipoinjection, the patient’s gluteal region is reshaped and the point of greatest projection has clearly been raised.
grafting to the buttocks. Our results showed that the fat placed at the intramuscular space had a long-term survival capacity and was able to grow even when changes in weight occurred. The incidence of complications was lower than with techniques, regardless of the volume of fat injected. As previously demonstrated in the abdomen,21 the capacity for hip-skin retraction was satisfactory, even in patients older than age 50. When the skin readjusted during healing, reshaping occurred in the tissues surrounding the operated zones, resulting in total rejuvenation of the hip area. We observed that, despite the large amount of fat in zones around the buttocks, retraction occurring after liposuction was adequate because the skin experienced traction from fat suction prior to formation in the new site. This is a function of the internal scar, which gives support to the skin at muscle-aponeurotic levels.

By applying our classification system based on anatomical zones in the buttock region, we believe that surgeons will obtain more reliable results, specifically when the contour of the hip is an issue. Classifying a patient’s needs by zone allows us to provide that person with treatment that is individual and specific to each patient’s deformity.

We also observed that suitable handling of the fat, during both preinjection preparation and intraoperative modeling, yielded satisfactory and permanent results. We were unable to find any prior studies discussing the effect of retraction and reshaping of the hip or the peripheral zones with any long-lasting results, so we believe this study will be helpful to surgeons performing this type of treatment.

Implant techniques obviously remain beneficial for some patients, but in patients who present with an excess of fat, we believe that most deformities of the hip can be corrected with liposuction and lipoinjection. We suggest that our zone classification can be useful in the initial evaluation of patients, particularly for surgeons who are just beginning to treat this type of deformity, and that it can help avoid the sequelae of more extensive operations, which are often difficult to correct.

Figure 5. A, This 38-year-old woman presented for treatment of her gluteal region. B, Fifteen months after liposuction and lipoinjection, the superior gluteus has been reshaped (1), and skin adjustment is evident in Zones II and IV (2), as well as in Zones I and II (3).
Figure 6. A, C, This 28-year-old woman presented for treatment of her gluteal region. She was classified as Type II-A (lipodystrophy in Zones I and II, with poor projection). B, D, Two years after liposuction and lipoinjection, improvement can be seen in the patient’s hip contour.
Figure 7. A, C, This 30-year-old woman presented for treatment of her gluteal region. She was classified as Type III-A (lipodystrophy in Zones I, II, and V, with poor projection). B, D, Two years after liposuction and lipoinjection, improvement can be seen in the patient’s hip contour.
Figure 8. A, C, This 36-year-old woman presented for treatment of her gluteal region. She was classified as Type IV-A (lipodystrophy in Zones I, II, IV, and V, with poor projection). B, D, Three years after liposuction and lipoinjection, improvement can be seen in the patient’s hip contour.
Figure 9. A, C, This 45-year-old woman presented for treatment of her gluteal region. She was classified as Type III (lipodystrophy in Zones I, II, and V). B, D, Eighteen months after liposuction and lipoinjection, improvement can be seen in the patient’s hip contour.
Figure 10. A, C, This 45-year-old woman presented for treatment of her gluteal region. She was classified as Type IV (lipodystrophy in Zones I, II, IV, and V). B, D, Two years after liposuction and lipoinjection, improvement can be seen in the patient’s hip contour.
Figure 11. A, C, E, G, This 34-year-old woman presented for treatment of her gluteal region. She was classified as Type V (congenital deformity or injury to the gluteus, resulting in contour deformity). B, D, F, H, Two years after liposuction and lipoinjection, improvement can be seen in the patient’s gluteal contour.
This 34-year-old woman presented for treatment of her gluteal region. She was classified as Type V (congenital deformity or injury to the gluteus, resulting in contour deformity). Two years after liposuction and lipoinjection, improvement can be seen in the patient’s gluteal contour.
CONCLUSIONS

On the basis of our results in this series of 300 patients, we posit that most patients who present for gluteal work can be treated with liposuction and lipoinjection to the whole gluteal region. Combined liposculpture conditions an internal remodeling of the muscle-skeletal structures, allowing a readjustment of skin before the new contour forms, thereby reshaping adjacent structures. Treatment should be individualized based on the anatomic zones that require treatment in each patient, to ensure the best possible result. To that end, we provide a description of six zones and five types of corresponding treatment. Our results demonstrated that in the 25% of patients in whom we observed weight increase, the infiltrated fat has the capacity to grow. The incidence of complications observed in our study was no larger than those observed in surgeries with implants or surgeries with larger incisions. As we demonstrated in this study, effective classification and individualized treatment for the zones around the hip result in improved contouring of the gluteal region.

Disclosures

The authors declared no conflicts of interest with respect to the authorship and publication of this article.

Funding

The authors received no financial support for the research and authorship of this article.

REFERENCES