

Our Experience in Body Contouring Surgery after Massive Weight Loss: Most Performed Treatments and Complications

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Abstract

Background: After bariatric surgery many patients present with body deformities. Authors analysed data registry of patients who had body contouring surgery to assess most performed surgeries and safety of the different techniques.

Case Report: Authors reviewed all the patients operated in a 37 months period submitted to body contouring surgeries with a maximum body mass index (BMI) $\geq 35 \text{ Kg/m}^2$.

Results: 72 procedures were performed in a total of 41 patients [age, 44.9 ± 8.8 years; BMI reduction, $20.2 \pm 9.4 \text{ Kg/m}^2$]. Most patients had 2 or 3 surgeries and the most performed surgeries were abdominoplasty, body-lift and mastopexy. The overall complications rate was 31.9%. Most frequent complications were seroma and wound problems/dehiscence.

Conclusion: Patients with massive weight loss desire to correct their body deformity especially with trunk and breast surgery. Plastic surgeons, using several techniques, can correct patients body deformity in a safe, reliable and reproducible way.

Level of Evidence: Level III therapeutic study

Introduction

The obesity and overweight are a serious health problem worldwide and according to the World Health Organization are the fifth leading risk for global deaths. Since 1980 the worldwide obesity has doubled and in 2008 more than 1.4 billion adults, 20 years and older were overweight [1]. With the establishment and popularity of safe bariatric surgery techniques, many patients have achieved massive weight loss. After Bariatric surgery patients achieve control or cure of diabetes and decreased pain in their joints but their skin does not contract with the weight loss [2]. Patients present with redundant skin which causes skin infections and secondary self-esteem problems [3]. To correct this issue many patients are referred to plastic surgeons to correct their body deformities. Patients older than 50 years and more than 3 years post-surgery

have a lower desire for contouring surgery [4]. Overall, most patients desire body contouring surgery, especially patients with a body mass index (BMI) change higher than 10 Kg/m^2 and with weight loss over 20 kg [4]. Most patients want to correct the deformities of waist/abdomen (62.2%), upper arm (37.6%), chest/breast (28.3%) and rear/buttock (35.6%) [4]. To correct those deformities, plastic surgeons have to use several procedures but despite important scars, body contouring significantly improves patients satisfaction and health-related quality of life [5]. In this study the authors present their strategy for treating these patients and review their results and complications rates.

Patients and Method

The authors present the results of a Retrospective study about body contouring surgery in patients who previously had massive weight loss. The study included patients who had bariatric surgery and also patients who had massive weight loss through diet and exercise but presented with the same deformities. The inclusion criteria were patients submitted to body contouring surgeries from January 2010 till January 2013 with a BMI max $\geq 35 \text{ Kg/m}^2$ (pre-weight loss). All surgeries were performed by the same team. All patient records

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were reviewed and analyzed by age, sex, co-morbidities, height, maximum BMI, BMI at the time of surgery, weight loss method, procedures submitted and complications.

At consultation patients were informed of their deformities and the number of surgeries needed. The algorithm of the department defines the order of the procedures: trunk surgery is performed first; second surgery includes breast and arm procedure; thigh-lift is the last procedure. After being informed of the algorithm, patients were asked about their priorities and, when desired and manageable, the order of procedures was changed. To diminish the number of surgeries, whenever possible, more than one procedure was performed during the same operating time. Breast surgery and brachioplasty were usually performed in the same operating time. Whenever a patient needed scar revision or other minor procedure, the procedures occurred during a planned major surgery. Our team takes an average time of 4-5 hours to perform a body-lift so we try not to make more procedures when a body lift is performed.

The techniques applied for each deformity vary according to the deformity of the patient.

As general surgical remarks flap undermining was limited to the strictly necessary, pre-operative infiltration of the tissues to be excised was performed and smoking was interdicted at least 3 weeks before surgery.

Brachioplasty

Brachioplasty was performed as previously described by Dr. Pascal and Dr. Le Louarn [6]. The surgical technique consists in exhaustive liposuction of the arm, mainly in the flap that is going to be excised (in the inner region of the arm). After liposuction, the skin is excised preserving nerves and lymphatics [Figure 1] [6].

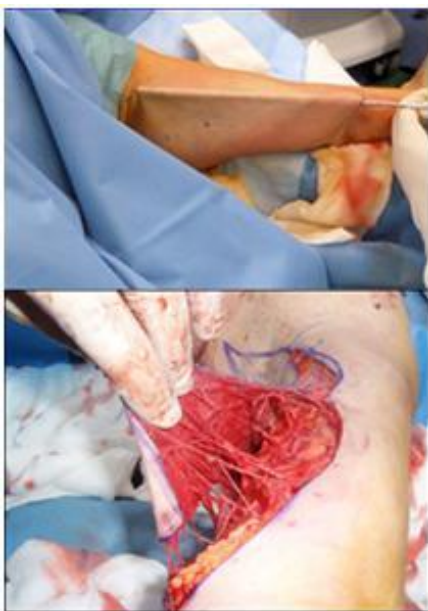


Figure 1: Liposuction of the arm (upper photo) and excision of skin only (lower photo) preserving the lymphatic system.

Breast Surgery

The deformities presented by the patient determined the technique to be used. Most patients presented with breast ptosis with few glandular tissue. In the authors opinion one technique that efficiently address this deformity is the Mastopexy described by Rubin. It consists in a mammoplasty where all the wise pattern skin is deepithelialized and used for breast reshape. In this technique the lateral areas of the wise pattern that usually are discarded are used for auto-augmentation and to create an “internal brassiere” [7] [Figure 2]. Despite the preferred procedure there isn't one procedure that fits every patients deformity/desire. In some cases the team option was a simple breast reduction (postero-inferior or superior pedicle) or augmentation mastopexy.



Figure 2: The photos show the breast mastopexy surgery as described in the text. The Breast is de-epithelialized (on top) and the breast is mounted like an “internal brassiere” (bottom)

Abdominoplasty vs Body-lift

The trunk deformities differ between patients as well as the chosen surgical technique. In patients with anterior and posterior deformities that have managed to loose massive weight, usually the chosen procedure was the body lift. In patients who were overweighted or had deformities restricted to the anterior area the choice was an abdominoplasty.

The body lift procedure used was selected according to the deformity presented. Most patients were treated with a circumferential bodylift with gluteal augmentation using an autologous dermal-fat flap [8-9] [Figure 3].

When the choice was the abdominoplasty the technique used consisted in a traditional abdominoplasty but, in some patients, the abdominoplasty followed a “fleur-de-lys” pattern.



Figure 3 : The photos above show a 47 years old female who lost 38 Kg (BMI change of 16.9 Kg/m²). The 3 images on the left show the intra-operative sequence of the gluteal augmentation: in the upper image the flaps have been de epithelialized; in the middle left image the flaps are rotated inferiorly to simulate the future position; in the lower image the immediate post-operative result; the images on the right show the pre-operative (on top) and post-operative with 6 months (on the bottom).

Thigh Lift

The preferred thigh lift procedure is similar to the arm procedure as described by Dr. Pascal and Dr. Le Louarn [6]. The surgical markings are made as in a regular vertical thigh lift but the flap to be excised is exhaustively liposuctioned previously to the skin excision. With the skin excision the nerves and lymphatics are preserved.

Results

Over the 37 month period a total of 41 patients were submitted to surgical management (mean age of 44.9 ± 8.8 years; mean BMI reduction of 20.2 ± 9.4 Kg/m²) in a total of 72 procedures (Table 1 and 2). Most patients (85%) had bariatric surgery previously to consultation (mean BMI reduction of 21.4 ± 9.53 Kg/m²) but 15% lost weight through diet and exercise only (mean BMI reduction of 13.2 ± 3.38 Kg/m²). Most patients had 2 or 3 surgeries (average of 1.8) and the sequence of the procedures was chosen according to the deformities and desires of the patients [Figure 4], keeping in mind to correct the deformities in the minimum number of surgeries. The overall complications rate was 31.9%. The most

common complications occurred after the abdominoplasty/bodylift procedure. Fifteen patients had complications after the abdominoplasty/bodylift procedure: 6 seromas, 4 dehiscence, 3 skin necrosis, 1 infection and 1 haematoma. After breast surgery, one patient had an haematoma and one had surgical wound dehiscence. Two patients had surgical wound dehiscence following brachioplasty (Table 3). Only the patient that developed haematoma after body-lift surgery had to be reoperated. All the other patients were treated conservatively. Regarding dehiscences that occurred frequently in arm and thigh lift, most were minor problems and only one patient had resuture of the dehiscence. The surgeries performed in patients that lost weight through exercise and diet consisted in abdominoplasty, mastopexy, thigh lift and brachioplasty. In this group of patients (6 patients and 8 procedures) the only complication was a minor dehiscence after a brachioplasty. The procedures performed in patients that previously had bariatric surgery had more complications (34% of the procedures had complications versus 12.5% of procedures performed in patients that achieved weight loss through diet and exercise).

N	41
Age	44.9 ± 8.80 (28-64)
Female ratio	37/41 (90%)
BMI Max	49.3 ± 11.3 (35.1-96.6)
BMI at surgery	29.1 ± 5.25 (19.4-47.0)
BMI _{max} -BMI	20.2 ± 9.4 (7.7-54.7)
Weight Reduction	54 ± 23.97 (19-133.0)

Table 1: Patient demographics

Procedures	
Brachioplasty	6
Mastopexy	15
Aug. Mastopexy	2
Mastectomy	2
Abdominoplasty	22
Bodylift	18
Thigh Lift	7

Table 2: Procedures Performed

Complications per procedure	
Trunk Surgery (n=40)	
Dehiscence	4 (10 %)
Skin Necrosis	3 (7.5%)
Seroma	6 (15%)
Infection	1 (2.5%)
Haematoma	1 (2.5 %)
Breast Surgery (n=19)	
Haematoma	1 (5.2%)
Dehiscence	1 (5.2%)
Arm Lift (n=6)	
Dehiscence	2 (33.3%)
Thigh Lift (n=7)	
Dehiscence	3 (42.8%)
Seroma	1 (14%)

Table 3: Complications per procedure



Figure 4: The photos on the left show the deformity presented by a 39 year old patient who lost 79.5 Kg (BMI change of 34.4 Kg/m²). On the right the photos show the postoperative result after 3 months of her breast mastopexy and 5 months after bodylift procedure.

Discussion

With the development of bariatric surgery many of the comorbidities affecting the obese patients are being controlled. The massive weight loss brings many advantages for the patients but the changes in body contour are a relevant problem. The complete treatment of the deformities presented after massive weight loss patients is a challenge for the plastic surgeons. The deformities presented are varied but most patients complain about skin excess and laxity in the abdominal wall, breast, thigh and arms.

In our department, we believe that is crucial to understand the patients desires and expectations. Only then the treatment plan is decided taking care to correspond, when possible, to the patients priorities. Most patients needed more than one surgery (average of 1.8 surgeries). In our series 98% (40/41) of the patients had surgery to correct their trunk deformity. The priority to correct the trunk deformity has been quoted by several articles [4-5]. The second area with more surgeries performed was the breast (46%) with the thigh (17%) and arm (15%) being the areas less requested by the patients [Figure 5].

In our series we had an overall complications rate of 31.9% with three patients developing more than one complication. We only had one (1.4%) major complication that needed surgery intervention. The table 4 shows some complications reported in literature. Most authors refer that the overall complication rate stands near 30-40% with wound dehiscence and seroma being the most prevalent complication [10]. Van der Beek et al. also report an overall complication rate of 27.9% with a major complication rate of 8.8% [11].



Figure 5: Patient who had a 40 Kg weight loss (BMI variation of 16.6 Kg/m²) and was submitted to brachioplasty. On top we can compare the pre-operative (on left) and the post-operative result with 2 months (on right). We can also see the result with 4 weeks (bottom left) and with 2 months (bottom right).

Comparing the results of our series with others we find that achieving overall complication rate might mislead the readers because there are no uniform series. Usually the series with more percentage of trunk surgery tend to have higher complication rates. The complication rate seems to increase with maximum BMI and higher weight loss and for that reason, series with patients with lower body mass indexes might have less complications than other series [11-12].

The complications occurred mainly after the trunk surgery with the most prevalent complication being Seroma that occurred in 15% (6/40) of patients, followed by skin necrosis (7.5%) and dehiscence that occurred in 10% (4/40). One patient had haematoma and was the only complication that needed surgical intervention. The literature has some articles that addressed the complications following abdominoplasty and body lift. Nevertheless some articles state the complications of the procedures ignoring if the patients were previously obese or not. That's an important marker as complications of these procedures tend to be higher in patients that had massive weight loss [3, 11-12].

In our series 34% of the procedures performed in patients who lost weight through bariatric surgery had complications while that only happened in 12.5% of the procedures performed in patients who lost weight through diet and exercise. It's a fact that more complications occurred in patients who lost weight through bariatric surgery but these patients usually had higher

Complications	Michaels et al review [13]	Shermak et al [14]	Our Series
Overall complication rate	42%	36.70%	31.90%
Wound problems/dehiscence	30%	14.40%	13.90%
Seroma	15%	12.90%	9.70%
Haematoma	1-5%	1.40%	2.80%
Infection	7.70%	2.90%	1.4%
Skin and fat necrosis	6-10%	not published	4.20%

Table 4: Complication rates comparison.

higher weight losses and frequently, had deformities that were addressed with more invasive surgeries (like body-lift surgeries).

With this study the authors have realized that some techniques must be followed to avoid complications. To diminish seroma, wound healing problems and skin fat necrosis is important to avoid undermining of the flap. Another important technique is to pre-operatively infiltrate the tissues to be excised with epinephrine solution as it will lower the blood loss and diminishes the need for transfusion. Another important marker is to get the patients out of smoking before surgery.

Before this study the techniques of arm and thigh lift utilized by the senior author had a high rate of seroma and wound healing problems. With the adoption of the technique as previously described [6] the wound healing problems have decreased and the seroma rates is near zero. The wound healing problems are frequent but all of them were minor and were treated conservatively.

In our department we believe that body contouring surgery complications increase with long lasting procedures. Those facts have been pointed by some authors [11]. Our average time to perform a body lift is someway near 4-5 hours. To avoid the surgery time increase we postponed other procedures. Even so, when possible we try to do breast and arms surgery together to avoid more treatment delays for the patients.

There are many useful studies addressing body contouring after massive weight loss and reporting their complications. Nevertheless most of the studies refer the overall complication rates without discriminating the complication rate per procedure for the same group of patients. This is a problem that the current study try to address. Future studies should address this issue and not only the overall complications rate.

One of the major limitations of the current study is the small number of surgical interventions due to department characteristics that needs to respond to all plastic and reconstructive demanding

Another limitation of this study is the heterogeneity of the surgical techniques utilized for each body region (abdominoplasty versus body-lift) caused by different patient deformities. Future studies should address the complications rate for each procedure..

Conclusion

The body contouring surgery after massive weight loss is technically demanding but allows surgeons to correct patients deformities. The most performed surgeries are the body-lift and abdominoplasty followed by mastopexy or other breast surgery. This study shows that the body contouring surgery is safe and, with good technique selection, the patients can achieve an improved body contour with few complications.

Conflict of interest

The authors have no disclosures or conflicts of interest.

Consent to participate

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study formal consent is not required.

Informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.

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