Body Contouring After Massive Weight Loss

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Natalie S. Barton, Al S. Aly, and Gregory R. D. Evans

Chapter Objectives

1. Familiarize the reader with the typical presentation of the massive weight loss patient to the plastic surgeon.
2. Review the most common body contouring procedures utilized to improve deformities following massive weight loss.

Introduction

The increase in the number of bariatric surgery procedures over the last decade has led to a large number of massive weight loss patients seeking improvement in their resultant body contour deformities, caused by the process of weight gain and subsequent loss. Caring for the massive weight loss patient requires an understanding of physiologic issues that are relevant for this patient population. In this chapter, the reader will become familiar with the typical presentation of the massive weight loss patient to the plastic surgeon and the most common body contouring procedures utilized to contour the frame by addressing areas of fat deposition and soft tissue laxity.

N. S. Barton
Plastic Surgery, University of California, Irvine, Orange, CA, USA

A. S. Aly
Plastic Surgery, Cleveland Clinic Abu Dhabi, Abu Dhabi, United Arab Emirates

G. R. D. Evans (✉)
Plastic Surgery and Biomedical Engineering, University of California, Irvine, Orange, CA, USA
e-mail: gevans@uci.edu

Presentation of the Massive Weight Loss Patient to the Plastic Surgeon

Most patients seek the care of a plastic surgeon after they have started their weight loss journey. Some patients will choose to consult with the plastic surgeon very early in the process, while others will wait until they have reached their lowest stable weight. During the initial consultation, the patient is familiarized with the potential effects of weight loss on the various areas of their bodies. Patients are also educated on the concept of the skin-fat envelope and how their skin-fat envelope will act like a balloon that has been overinflated for a few weeks and will not likely go back to its original size. This phenomenon often results in areas of tissue laxity and ptosis. In addition, there are known strong zones of adherence which are resistant to expansion. These fascial attachments are appreciated in the sternum, spine, inguinal ligament, hip-lateral thigh junction, and buttock-flank junction. Lateral midline tissues descend the most because they are furthest away from these zones of adherence. This knowledge is helpful in establishing realistic expectations of the resultant body contour.

It is important to understand that body contouring procedures are not weight loss procedures. Thus, they should not be thought of as a way to lose more weight but as a way to improve the contour of various problematic areas of the body.

The patient should also be counseled about the appropriate time to pursue plastic surgery. It is prudent to wait until the patient's body weight has stabilized for 3–6 months and at least 12–18 months post-bariatric surgery. Ideally, the patient should be within 10–15% of their goal body weight. To undertake surgery before weight stabilization is like "tailoring a dress for a mannequin that is changing in size." Post-bariatric patients often present with a number of areas to address required staging of procedures. The patient should be counseled on the inherent changes in the skin elasticity after massive weight loss and expect to require future revi-

N. T. Nguyen et al. (eds.), *The ASMBS Textbook of Bariatric Surgery*, https://doi.org/10.1007/978-3-030-27021-6_51

sional surgery. It is advised to wait at least 3–6 months in between procedures. The patient should also be back to their preoperative health status prior to a second-stage procedure.

An advantage of having the plastic surgeon see the massive weight loss patient early in their weight loss journey is that often body contouring procedures are not covered by insurance and early planning for the potential financial outlay is advised.

Massive weight loss patients are often grouped together with an implication that they are homogenous in their presentation. In reality, the presentation of the massive weight loss patient is quite variable (Figs. 51.1 and 51.2). There are three factors that contribute to this variability:

1. *The weight or BMI at presentation.* The level at which any particular patient presents is dependent on many factors, which the bariatric surgeon is more expert in determining than a plastic surgeon. Thus, whenever possible the plastic surgeon welcomes the bariatric surgeon's advice on this matter.
2. *The patient's fat deposition pattern.* Each individual is born with a genetically determined fat deposition pattern as well as a fat loss pattern. Currently, these patterns cannot be altered. Although there are many variations, the two most common patterns are "apple" and "pear" fat deposition patterns (Fig. 51.2).
3. *The quality of the skin-fat envelope.* The skin-fat envelope will vary in thickness, pliability, and laxity. The variability in quality is based on the genetics of the patient, their age, and the amount of weight loss they experienced.

Because of the variability in the presentation of massive weight loss patients, treating their resultant deformities in the same manner can lead to less than ideal results. Thus, the plastic surgeon must tailor their surgical options based on the individual needs of the presenting massive weight loss patient.

Workup for Post-Massive Weight Loss Plastic Surgery

A complete history and physical must be performed on these patients. The key points of the history that relate to plastic surgery include [1, 2]:

1. Weight loss history. Generally, a 100 lb weight loss is considered the amount of weight lost that is needed to create the usual body contour changes associated with massive weight loss. However, a more accurate way to make that determination is a ten point, or greater, drop in body mass index (BMI).
2. The type of bariatric surgery performed, if the patient lost weight through surgical means. If the patient had a laparoscopic adjustable gastric band, where was the port placed, and how is it accessed?
3. The anatomic areas of most concern and highest priority to the patient.
4. Previous abdominal surgeries.
5. Medical problems, i.e., diabetes, heart disease, high blood pressure, etc.
6. Smoking history.
7. Psychiatric history.

The key points of the plastic surgery physical exam:

1. Weight, height, and BMI.
2. The fat deposition pattern.
3. The quality of the skin-fat envelope.
4. The extent of intra-abdominal/visceral fat content. This is especially important because if there is persistent overabundance of visceral fat, the plastic surgeon will not be able to flatten the abdomen, which is one of the main desires of massive weight loss patients.
5. Abdominal scars and their locations. Old subcostal cholecystectomy scar and "chevron"-type scars can affect vascularity of the abdominal flap during abdominal contouring surgery.
6. The presence and extent of an abdominal pannus. This is important because it is usually the only aspect of the massive weight loss patient's anatomy that may qualify for insurance coverage.
7. The extent of rectus muscles diastasis and presence of hernia. The extent of rectus diastasis and abdominal wall laxity may be confirmed by the "diver's test." Of note, if a female patient has a large fibroid uterus preoperatively, there may be a bulge in the lower abdominal region which may persist after abdominal contouring procedure.
8. The lipodystrophy and ptosis of the lateral and posterior aspects of the trunk.
9. Mons pubis extent of lipodystrophy and ptosis.
10. The location of an adjustable gastric band port if present. Almost all massive weight loss patients present with abdominal wall laxity, treated by plicating the rectus fascia in a vertical fashion, from xiphoid to pubis. Ports located within the extents of the plication will have to be moved during abdominal contouring procedures.
11. The amount and extent of upper arm excess.
12. The presence and extent of upper back rolls.
13. The condition of the breasts. In males, this usually presents as excessive breast tissue. In females, the presentation is quite variable. Some women will present with persistent breast hypertrophy, while others will present

Fig. 51.1 Massive weight loss patients are quite variable in their presentation due to the differences in the presenting BMIs, fat deposition patterns, and the varying qualities of their skin-fat envelopes

Fig. 51.2 The fat deposition pattern of any particular individual is genetically controlled. This figure demonstrates the two most common patterns encountered

with hypomastia, but most often they will present with very ptotic and deflated breasts.

14. The extent of skin and fat content of the thighs.

Laboratory examination of the massive weight loss patient in preparation for plastic surgery is rather extensive compared to other surgical workups. This is because many post-bariatric surgery patients present with nutritional deficits that do not manifest clinically unless stressed by the wound-healing requirements of the extensive body contouring procedures. The preoperative laboratory exams should include CBC with differential, electrolytes (sodium, chloride, potassium, CO, anion gap), albumin, prealbumin, liver function tests, BUN, creatinine, calcium, cholesterol, ferritin, glucose, magnesium, total protein, PT/PTT, vitamin B12, copper, and thiamine.

Post-bariatric patients usually present with predictable body areas of concern. However, it is important to note there are always exceptions and variations in patient desires and priorities. These individual concerns must be taken into account as a treatment plan is formulated for any patient.

Postoperative Management

Most patients are monitored postoperatively in a controlled setting for 1–3 days. Epidural infusion catheters may be used as part of a multimodal approach to pain management. Patients are instructed to maintain a semi-Fowler position while in bed. For the first week, the patient is advised to ambulate, flexed at the waist. Activity is slowly increased as tolerated over the first 3–4 weeks. Abdominal binders may be placed at the initial postoperative appointment, usually 3 days after their procedure. There have been cases of skin flap necrosis after placement of abdominal binders in the operating room. At the second postoperative appointment, the abdominal binder maybe switched to a custom compression garment, typically worn for 6 weeks postoperatively. Large closed suction drains are placed in the suprafascial plane and are removed when output is less than 30 cc a day for 48 h.

Early ambulation protocols are used to reduce the risk of perioperative deep venous thrombosis (DVT) or pulmonary embolism (PE). Prophylactic anticoagulation is often administered 2 h prior to surgery. Sequential compression devices should be placed before induction of anesthesia and maintained during the hospitalization. Chemoprophylaxis using low molecular weight heparin and low-dose unfractionated heparin has been reported to reduce DVT rate by 65% and PE rate by 50% in abdominal surgeries [3]. Chemoprophylaxis is continued for 30 days postoperatively. It is important to ask nursing to avoid administering medications via injection to the abdomen during the perioperative period.

The Lower Trunk

The boundaries of the lower trunk include the abdomen, from inframammary crease and xiphoid to the pelvic rim anteriorly, the mid to lower back posteriorly, and the hip and waist region laterally. The majority of massive weight loss patients experience problems with a hanging pannus. They often complain of recurrent intertrigo, inability to perform certain activities, and other conditions which interfere with their quality of life and should be clearly documented. They will also complain of a ptotic mons pubis, excess skin and fat of the hip and waist region, ptosis of the anterior and lateral thighs, and ptosis of the buttocks.

Most massive weight loss patients have circumferential excess involving the lower trunk. An extended abdominoplasty with liposuction may be performed to address the circumferential nature of the deformity (Fig. 51.3). A circumferential dermatolipectomy otherwise known as belt lipectomy [4], body lift, circumferential abdominoplasty, and torsoplasty may also be considered. This fairly complex procedure involves excision of a circumferential wedge of tissue in the shape of a "boxing championship belt," wide anteriorly and narrow posteriorly.

The belt lipectomy performed as a single stage requires multiple intraoperative positional changes. Figure 51.4 shows the preoperative markings, which should be performed with the patient standing upright. The skin-fat envelope is removed from the superior to inferior horizontal line markings. The vertical lines are placed for alignment during closure.

The belt lipectomy accomplishes the following in most patients:

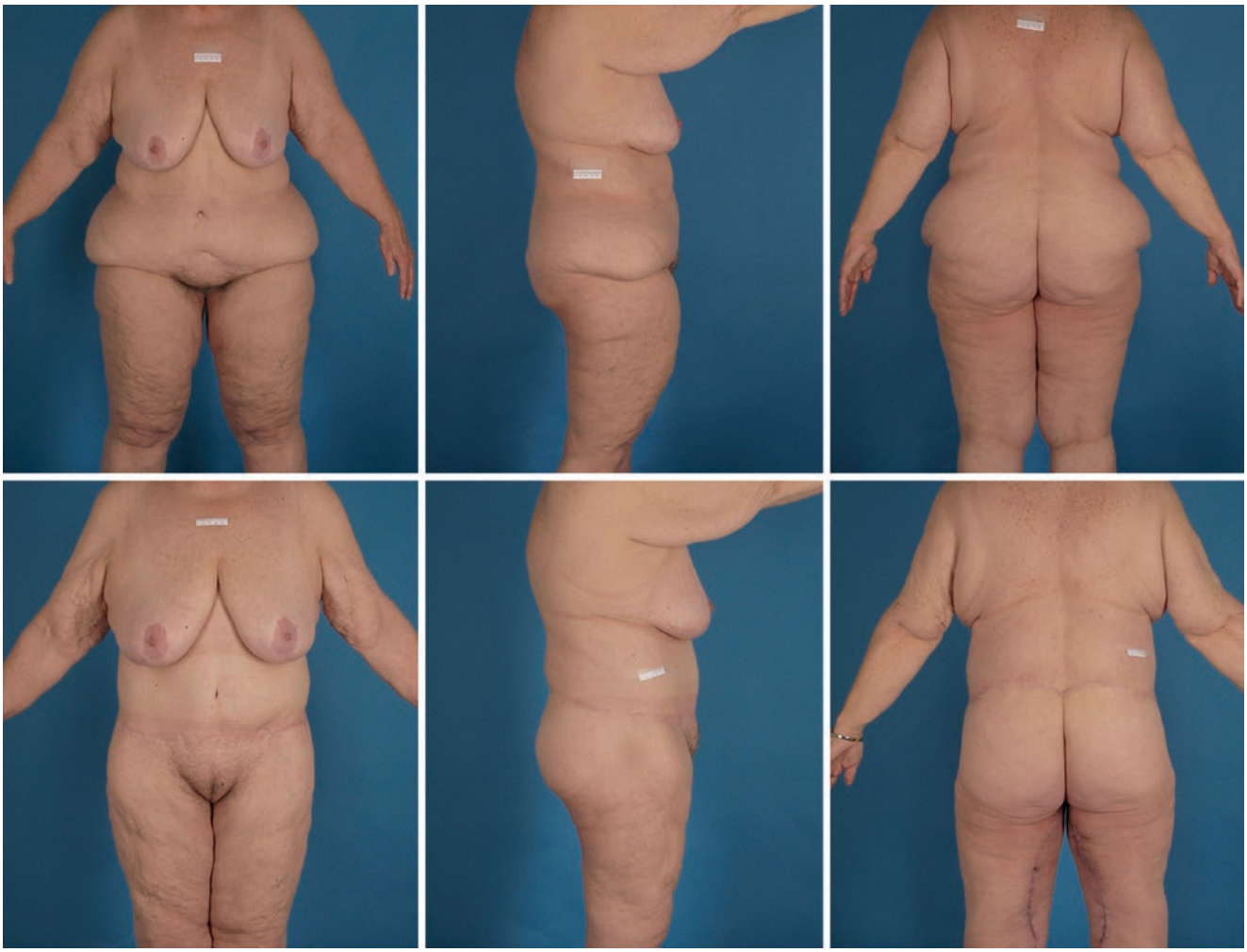

Fig. 51.3 *Top row*: a massive weight loss patient after undergoing a traditional abdominoplasty. Note that the patient at this stage has persistent anterior excess, lateral "dog ears," inadequate elevation of the mons pubis, lack of waist definition, and no improvement in buttocks contour. *Bottom row*: The three matched figures show the same patient after undergoing a circumferential belt lipectomy, which demonstrate flattening of the abdomen, improved mons pubis position and contour, creation of waist definition, and significant improvement in buttocks contour

1. Lifts and shortens the ptotic mons pubis
2. Flattens the abdomen
3. Creates waist definition
4. Eliminates lipodystrophy from the flanks and lower back
5. Lifts the anterior and lateral ptotic thighs
6. Lifts the ptotic buttocks

In general, the results of circumferential dermatolipectomy correlate with the patients' presenting BMIs, with higher BMIs leading to less impressive results (Figs. 51.5 through 51.7).

The Upper Arms

The post-bariatric patient often complains of fairly deflated upper arms and a large amount of excess skin (Fig. 51.8). These patients are ideal candidates for excisional brachioplasty procedures. It is advised to mark the patient with arms at the patient's side to avoid malposition and visibility of the incision. The final incision should be placed posterior to the bicipital groove. An extended incision involves extension to the inframammary crease in the midaxillary line.

Other patients will present with significant excess fat in the upper arms, at weight stabilization. Often, preliminary liposuction procedure is performed on these patients to deflate the arms and subsequently perform an excisional brachioplasty 3–6 months down the line. Some plastic surgeons prefer to combine the liposuction procedure with the excisional brachioplasty at one stage. Figure 51.9 shows the results of brachioplasty [5]. Complications include infection, bleeding, sensory loss, seroma, unattractive scarring, and inability to close the arm.

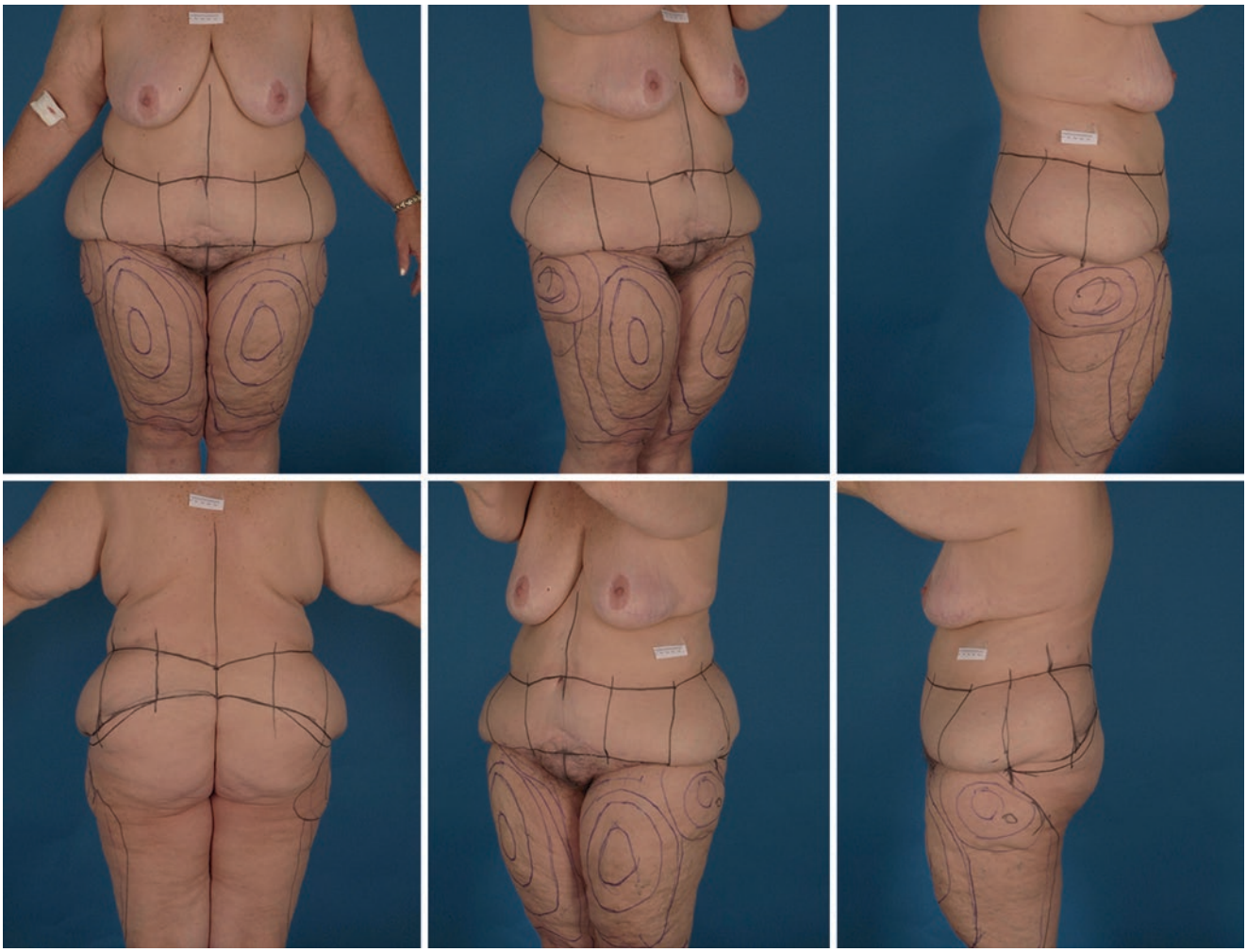

Fig. 51.4 This figure demonstrates a typical set of markings as performed in the patient shown in Fig. 51.3. The skin-fat envelope between the superior and inferior horizontal markings is eliminated at surgery. The lines drawn on the thighs are utilized as guides for concomitant liposuction of the thighs, which was performed as a preliminary procedure for a subsequent thigh reduction procedure

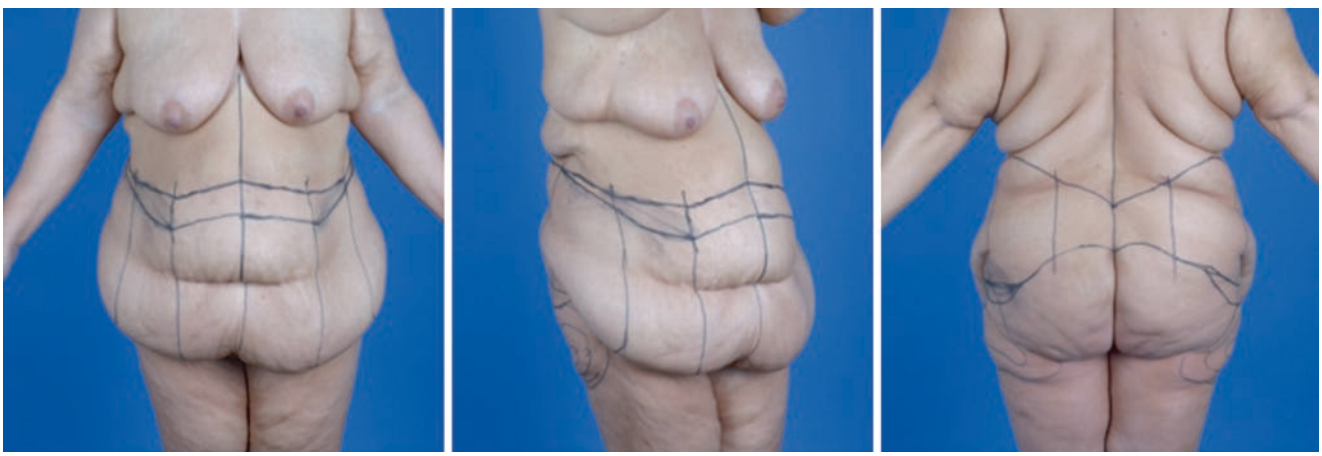

Fig. 51.5 A high BMI, greater than 35, massive weight loss patient before (*top row*) and after (*bottom row*) a belt lipectomy. Although the improvement of the lower trunk in this patient is significant, it is not as remarkable as the lower BMI patients shown in Figs. 51.6 and 51.7

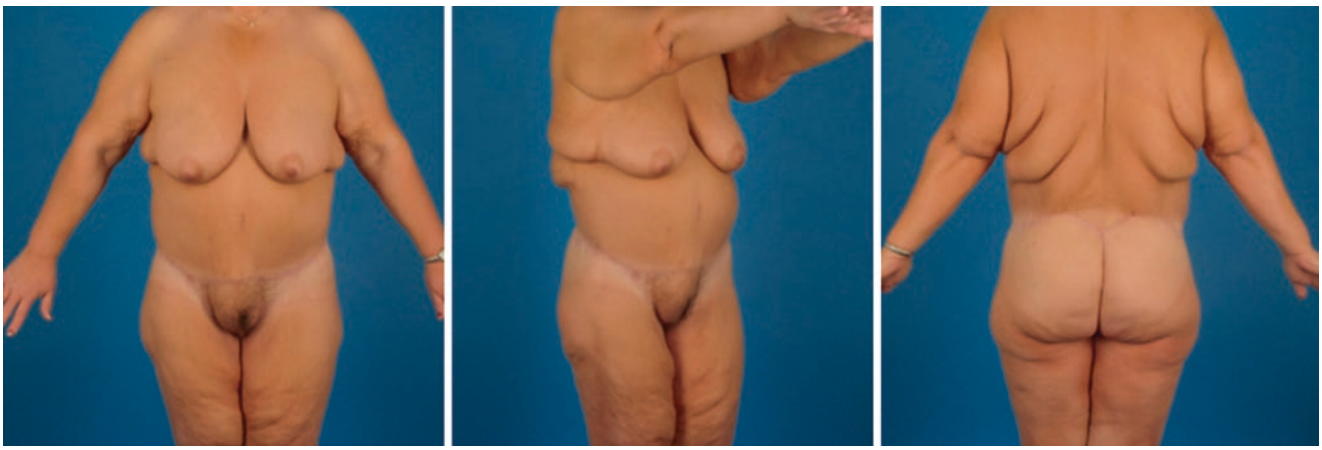

Fig. 51.5 (continued)

Fig. 51.6 An intermediate BMI, between 30 and 35, massive weight loss patient before (*top row*) and after (*bottom row*) a belt lipectomy. The change of the lower trunk in this patient is better than that attained in Fig. 51.5, but not as impressive of improvement shown in Fig. 51.7

Fig. 51.7 A low-BMI, below 30, massive weight loss patient before (*top row*) and after (*bottom row*) a belt lipectomy. The change of the lower trunk in this patient is better than that attained in Figs. 51.5 and 51.6

The Upper Trunk

The boundaries of the upper trunk start superiorly at the base of the neck and span to the inframammary crease anteriorly and the upper back posteriorly. The deformities that present in this area include upper back rolls, lateral breast rolls, and a variety of breast abnormalities (Fig. 51.10). They are caused by the interaction of lax tissues and the zones of adherence located over the sternum and the spine. In most patients, the inframammary crease is displaced inferiorly and laterally [6]. If the inframammary crease is the base upon which a breast is built, it must be in the correct position and shape to return patients to normal anatomy of the breast. The upper body lift addresses the entire upper truncal unit: breast, upper back/breast rolls, and upper arm excess. Figures 51.11 and 51.12 demonstrate upper body lifts of various types. Complications of the upper body lift include infection, bleeding, wound dehiscence, and most commonly a relaxation of breast contour in females requiring revision surgery.

Characteristic features of the breast following massive weight loss:

1. Volume deflation
2. Stretched skin envelope
3. Significant ptosis
4. Flattening of shape
5. Medialized nipple areola complex
6. Lateral chest wall

Traditional breast reduction involving Wise pattern or vertical mastopexy using a variety of pedicles to carry the nipple areola complex (inferior, lateral, superior, and medial), augmentation with implant, and augmentation mastopexy may not adequately address the massive weight loss patient breast deformity. Several methods have been described

Fig. 51.8 This figure demonstrates the excess in the upper arm as it crosses through the axilla onto the lateral chest wall at the posterior axillary fold

involving reshaping the breast and often include dermal suspension techniques. There are also techniques which recruit local tissues for autoaugmentation, including lateral chest wall-based flaps. Hurwitz et al. describe the spiral flap with an upper body lift, which has been shown to effectively address all the components of the upper torso deformity [7]. The patient should be counseled on postoperative pigmentary changes, poor scarring, poor nipple position, asymmetries, loss of sensation, and possible nipple loss. Caution must be used when considering breast implants for augmentation of the breast as the skin envelope has poor elasticity and may cause worsening ptosis and implant descent.

Changes in the male post-bariatric chest may include severe skin and soft tissue redundancy, descent of the lateral inframammary crease, lateral chest wall rolls, nipple descent, and medialization. Excisional procedures that remove skin and soft tissue while resizing and repositioning the nipple areola complex are required. The nipple position is determined at the intersection of a horizontal line from the fifth rib to the lateral border of the pectoralis major muscle. A 2 cm diameter areola cutout may be made at this position. Large distances of repositioning of the nipple areola complex in patients with more severe deformity may be accomplished through elevation on a dermoglandular pedicle or by free nipple grafting. A compressive chest wrap is often placed and left in place until the first postoperative appointment. An elastic compression garment is suggested for 8 weeks afterwards.

Thighs

The thighs of massive weight loss patients are often problematic at weight loss stabilization [8]. The presentation is quite variable, with some patients presenting with deflated skin-fat envelopes, while others retain a tremendous amount of fat and skin. All patients present with anterior and lateral thigh ptosis as well as redundant medial thigh excess. Traditional thigh lifts that were utilized prior to the massive weight loss era were designed for fairly thin patients with mild amounts of excess skin of the medial thighs. This type of thigh reduction/lift had limited success in the appropriately selected patient. However, when utilized in patients with large massive weight loss thigh deformities, they were met with significant complications including labial spreading and scar migration outside normal swimwear lines. With few exceptions, these techniques are not utilized for massive weight loss patients.

The excess in the large thighs is mostly horizontal in nature, and a vertical incision may address the thigh excess safely. Thus, a variety of vertical thigh excisions are utilized by plastic surgeons today, with or without horizontal medial thigh extensions. With the popularization of vertical thigh reductions spanning from the perineal crease superiorly to the medial knee inferiorly, a new potential complication is permanent lymphedema. Techniques that reduce the risk of permanent lymphedema involve utilizing liposuction to deflate the area of the thigh to be resected, presumably eliminating the fat but leaving as many lymphatics intact as possible. Despite these efforts, this is still a potentially dangerous complication of thigh reduction surgery in the massive weight loss patient.

When staging procedures, the belt lipectomy is often performed first, lifting the anterior and lateral thighs. This

Fig. 51.9 A patient's preoperative (*top*) and postoperative photograph (*bottom*) after brachioplasty

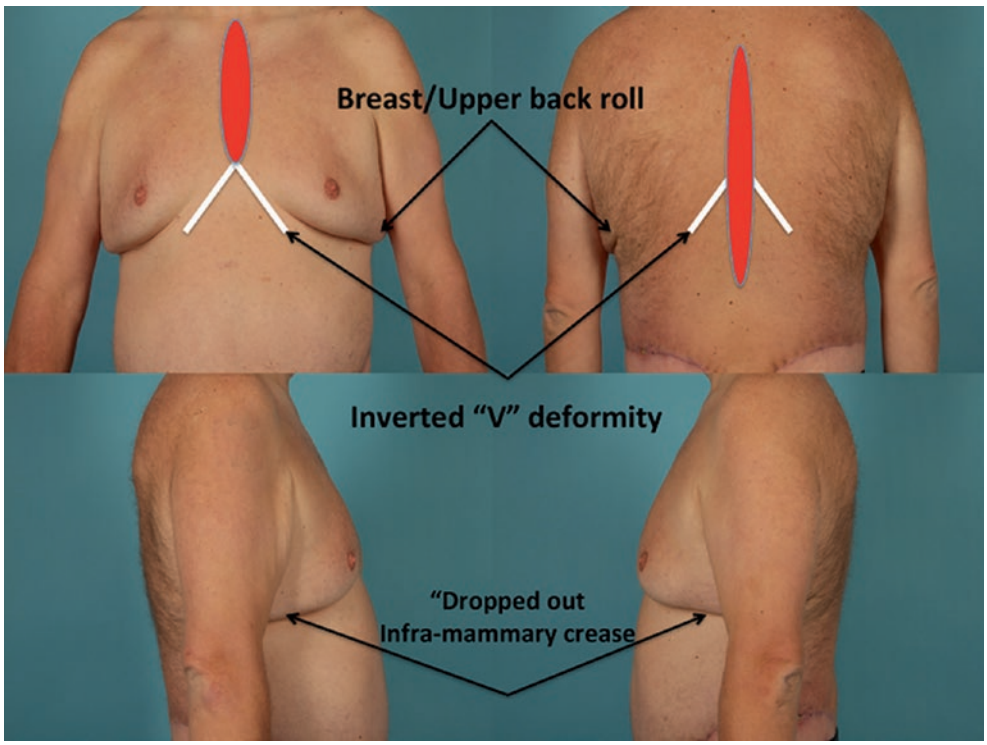

Fig. 51.10 Typical deformities of a massive weight loss patient. The *red marks* are the "zones of adherence," which act like hooks to prevent tissue descent centrally and lead to the typical abnormalities demonstrated

Fig. 51.11 A male patient before (*top row*) and after (*below row*) an upper body lift. Note that the patient's inframammary crease is returned to its normal position, the breasts are reduced, and both upper arm excess and upper back rolls are eliminated

sometimes eliminates the need for a thigh reduction and lift needed to improve thigh contour. This operation is performed through vertical wedge excision of the medial thighs while avoiding perineal scars, eliminating the risk of labial spreading and scar migration onto the thigh (Fig. 51.13).

Miscellaneous Regions

Areas that are less involved with deformities after massive weight loss include the face, forearm, and the calves/ankles. Although these areas are routinely handled by plastic surgeons, they are often low on the list of priorities of most patients and may be pursued during later stages of body contouring.

Important Issues for the Bariatric Surgeon/Plastic Surgeon Interaction

- An open line of communication is ideal between the bariatric surgeon and the plastic surgeon, as part of the multidisciplinary approach to obesity care.
- Many patients have questions about how their bodies will change with weight loss. Patients should be educated about the potential resultant deformities and how these areas may be addressed surgically.
- Ideally, in lap band patients, the plastic surgeon would prefer that ports are placed as lateral as possible so that when abdominal wall plication is performed, to tighten abdominal wall laxity, the port does not have to be moved. However, if the port is placed centrally, it would be ideal if the bariatric surgeon is available to help move the port in case the plastic surgeon has difficulty with moving it.
- The plastic surgery procedures utilized on massive weight loss patients require excellent nutrition to heal complex closures. Thus, patients whose nutritional parameters are closely and routinely followed will often present fewer obstacles to the plastic surgeon.
- Staging offers a viable alternative for patients who are not ideal candidates for combined procedures or who desire combinations that cannot be safely performed.

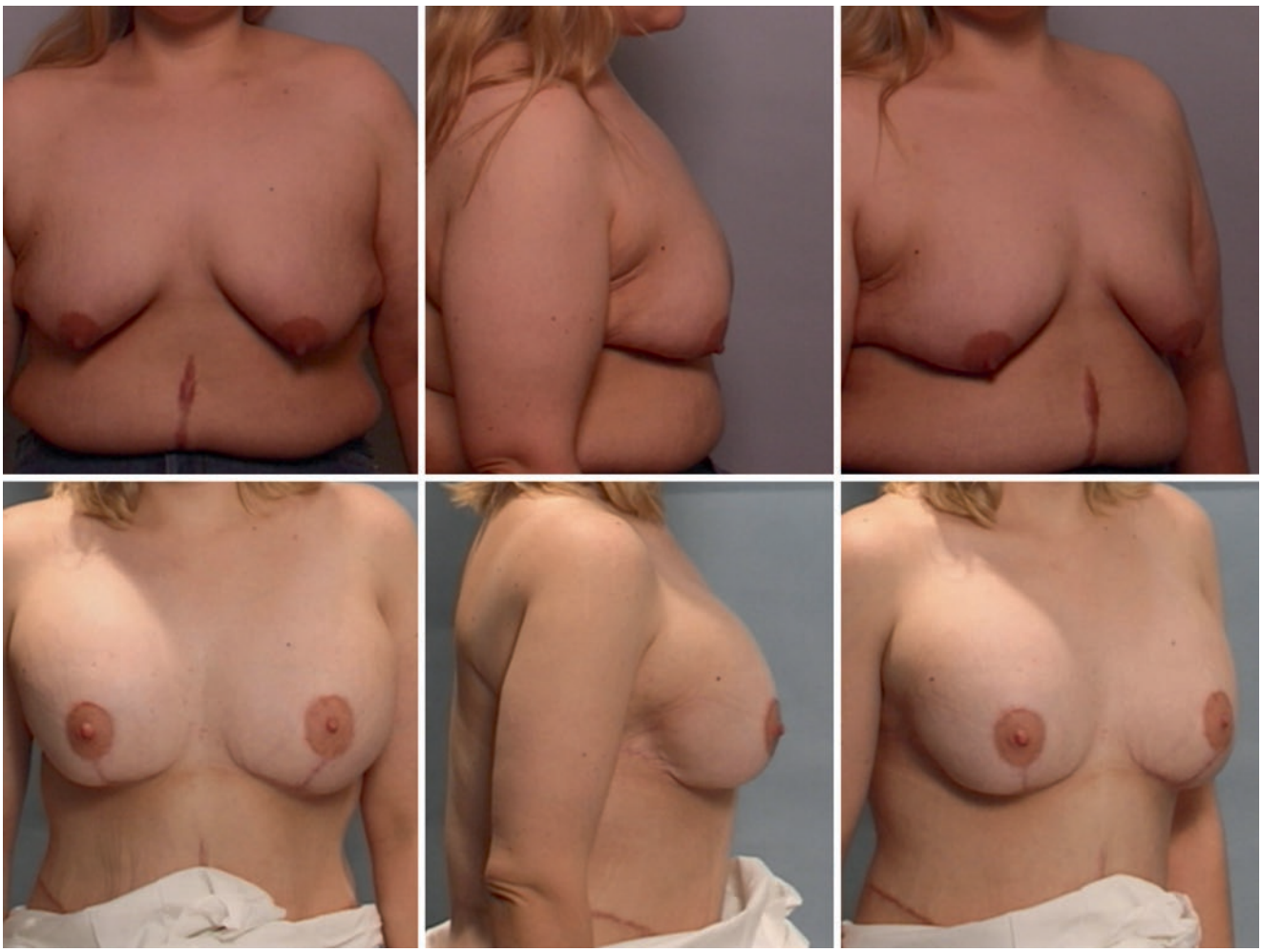

Fig. 51.12 A female patient before (*top row*) and after (*bottom row*) an upper body lift. Although this is a very different operation than the one shown in Fig. 51.11, the basic principles are the same. The inframammary crease was inappropriately positioned inferiorly prior to surgery, especially in its lateral extent, and it was replaced in its proper anatomic location before the breast surgery was undertaken. In this case the breasts underwent augmentation/mastopexies, while in the male patient, a breast reduction was performed. In both cases, the upper arm excess and upper back rolls were eliminated

Conclusion

Massive weight loss body contouring surgery involves multiple areas of the body. With the increase in surgical experience, there is an increase in focus on patient safety and improving aesthetic and technical approaches. The procedures utilized in one form or another include belt lipectomy or lower body lift for the lower trunk, a brachioplasty for upper arm excess, an upper body lift for upper truncal deformities of the breasts, upper back and arms, and thigh reductions for thigh excess.

Question Section

1. The best time for a massive weight loss patient to undergo body contouring procedures is:
   A. When the patient feels that they have almost reached their weight loss goal so that the excisional procedures contemplated will help them reach that goal
   B. While they are losing weight quickly, in the hope that this will psychologically aid them in losing more weight

Fig. 51.13 (*Left*) A patient is shown before undergoing any surgery and (*right*) after undergoing two separate procedures: a preliminary belt lipectomy and a subsequent thigh reduction 6 months later

C. Once their weight loss has stabilized for an extended period of time
D. Always at 2 years out from bariatric surgery

2. Lower truncal deformities in massive weight loss patients:
   A. Are most often circumferential in nature
   B. Are very similar from patient to patient
   C. Usually spare the mons pubis
   D. Do not usually include rectus diastasis
3. Upper arm excess in massive weight loss patients:
   A. Is always limited to the proximal third of the upper arm
   B. Is located in the posterior fold of the arm and goes onto the lateral chest wall
   C. Distally never spans past the elbow

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