Truncal body contouring surgery in the massive weight loss patient

Al S. Aly, MD, FACS*, Albert E. Cram, MD, FACS, Claudette Heddens, MA, ARNP, CPSN, BSN

Plastic Surgery, University of Iowa, 200 Hawkins Drive, Iowa City, IA 52242, USA

Body contouring of the massive weight loss patient is the newest frontier in plastic surgery. With obesity recognized as a major health risk, there has been a surge in bariatric surgery, which is fast becoming a major component of general surgical training. After massive weight loss, whether through surgery or a change in lifestyle, patients are often disappointed with their bodies. Although body contouring is not new to plastic surgery, massive weight loss patients present with a unique set of problems that require the use of traditional techniques combined with special adaptations to get the best possible results. It is the intent of this article to convey to the reader an overall framework within which to evaluate massive weight loss patients. The circumferential belt lipectomy technique used by the authors in the treatment of those patients is described in detail.

Patient presentation and goals

Massive weight loss patients often will present with complaints of having worked very hard to lose weight but still finding their body contours abnormal. They are often unable to exercise or wear form-fitting clothing because of their hanging excess tissues. They will commonly say, “I still look and feel fat.” If left untreated, many will revert back to unsound nutritional and exercise habits. The deformities with which these patients present vary widely (Fig. 1). They are dependent on many factors, which include the patients’ body types, their fat deposition patterns, and the amount of weight gained and lost. Patients’ weights plateau at different levels during the weight loss process. For some that level is close to their ideal weight, whereas for others it may still be within the obese range. Although these patients can present with a great variety of body contours, generally their truncal tissues have the appearance of an “inverted cone” (Fig. 2). That cone starts superiorly at the relatively narrow thoracic cage and widens as it descends.

Abdomen

The abdomen is usually where the greatest deformity occurs in massive weight loss patients. Excess of skin and fat and abdominal wall laxity will all be present to various degrees. The mons pubis will often present with ptosis as well as horizontal excess. The goals of surgery in the abdomen are to eliminate hanging tissue, flatten contour, and tighten the abdominal wall. The mons pubis should be elevated and widened (Fig. 3).

Waist and hips

Massive weight loss creates a body contour that lacks waist and hip definition. The normal narrowing of the waist and widening at the hips is not apparent in these patients. The anterior, lateral, and back excesses contribute to this lack of definition. The goal of surgery in this area is to help create narrowing at the waist and a smooth natural curve from the rib cage through the waist and down to the lateral thighs (Fig. 4). However, narrowing at the waist is not always attainable, nor desirable. Some patients have
naturally narrow hips, and even after belt lipectomy they cannot attain narrowing at the waist because of their bone structure.

**Back**

Massive weight loss can lead to both upper and lower back rolls. The upper rolls are usually singular and often, but not always, are extensions of lateral breast (Fig. 5). Treatment usually requires direct excision in a separate procedure from the lower truncal belt lipectomy. The lower back rolls may be multiple and can run in a horizontal or upward sweeping direction. Surgery should eliminate as many of these back rolls as possible and create a flat contour of the back (Fig. 6).

**Buttocks**

Like all the anatomic areas of the trunk, the buttocks can present in various ways in massive weight loss patients. In general, the buttocks are lower than is ideal and lack definition, with the back and buttocks often blending together. This lack of definition gives the buttocks the appearance of being long in the vertical direction. The central buttocks’ crease is usually lower than it should be, with less than ideal soft tissue cover over the coccyx. The lateral infrabuttocks creases are more horizontal and less curved than they should be.

If patients are still far from ideal weight and have significant amounts of subcutaneous fat, the buttocks will usually be over-projected. If patients present near ideal weight, the buttocks may be lax and under-projected and lacking in soft tissue cover of the coccyx, and have various degrees of wrinkling inferior to the infrabuttocks creases. Generally, the goals of surgery are to give the buttocks better definition by creating a line of demarcation between the buttocks and back. The overall buttocks and the central crease should be elevated. Soft tissue should be lifted over the coccyx if that area is deficient. If the buttocks are
over-projected, they should be deprojected; if they are under-projected, every effort should be made to avoid decreasing projection further. The infrabuttocks creases should be given an upwardly curved appearance if possible. If wrinkles exist in the infrabuttocks area, they should be eliminated or reduced (Fig. 7).

**Treatment**

Massive weight loss patients can undergo a number of procedures, depending on their presentation and their desires. Overall their deformities are circumferential in nature, and treatment should also be circumferential to address the trunk as a unit [1]. In this article the authors describe what they believe is the most appropriate procedure to use in the massive weight loss patient: the circumferential belt lipectomy [2]. When surgery is limited to the anterior aspect of massive weight loss patients—even in its most extensive form, the inverted-T resection—the results are usually suboptimal, because the back, buttocks, and sides are ignored. The argument for using a T-pattern of excision is that it permits a horizontal reduction of the lower truncal region, which belt lipectomy does not. The excision associated with belt lipectomy eliminates the need for a horizontal reduction, as can easily be explained using the inverted cone analogy. In the massive weight loss patients’ inverted cone shape, the lower aspect of the cone is resected in

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**Fig. 2.** Diagrammatic representation of the massive weight loss patient’s body contour in the form of an “inverted cone.” The outer soft tissues are narrower at the rib cage and wider at the pelvic rim. This diagram illustrates what a belt lipectomy accomplishes. It eliminates the inferior, or wider, aspect of the cone. The glass plane going through the cone represents the level of resection. The remaining superior part of the cone, which is narrow, is stretched down to the wider pelvic diameter and allows the outer skin and fat better to approximate the shape and contour of the inner muscular layer.

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**Fig. 3.** Above, two different patients demonstrate different degrees of abdominal wall laxity, excess skin and fat, and mons pubis ptosis after massive weight loss. Below, the same two patients after belt lipectomy, demonstrating the desired goals of surgery.
a belt lipectomy (see Fig. 2). The diameter of the cone at the superior aspect of the resection is smaller than at the base of the resection. Thus the remaining part of the cone, which is stretched down, is narrow enough to obviate a horizontal reduction.

There are situations where belt lipectomy is not considered an option. Patients who present with persistent excessive intra-abdominal excess despite weight loss are not good candidates for a belt lipectomy, because they are not amenable to abdomi-

Fig. 4. Above, this patient demonstrates the lack of definition of the hip and waist region before belt lipectomy surgery. Below, in the same patient after surgery, we see the desired smooth contour from the rib cage through the waist and down onto the lateral thigh.

Fig. 5. Massive weight loss patient who presented with large upper back rolls before (above) and after (below) direct excision. Upper back rolls, which often extend to the lateral chest wall, are not amenable to treatment through lower truncal surgery.
Fig. 6. Lower back rolls present in various ways (above). The rolls may be singular or multiple, run in a horizontal fashion, or have an upward sweep to them. They should be reduced or eliminated through belt lipectomy surgery, creating a smooth back contour that mimics the underlying back musculature in form (below).

Fig. 7. Three patients with widely variable buttock deformities before surgery (above). The goals of surgery on the buttocks region are highly dependent on the presenting defect. In general, the buttocks should be raised and better defined, and if over-projected should be deprojected (below). Note that in the patient on the right, the subcutaneous fat layer is thin, which allows for improvement of the lower buttocks contour despite the resection’s being at the level of the lower back.
nal wall tightening. These patients would be better served by a traditional panniculectomy or attempts at further weight loss. Another group of patients who may present to a plastic surgeon are massive weight loss patients who simply cannot afford the circumferential excision or who choose not to have it done. Other procedures that can be performed include panniculectomy, abdominoplasty, or an inverted-T pattern lipectomy. The results of these procedures are better than no treatment at all but are generally less than ideal [2].

Circumferential belt lipectomy

Preoperative work-up

Massive weight loss patients should undergo a complete history and physical. A history of the patient’s weight gain and weight loss is especially important. The patient’s Body Mass Index (BMI), or weight in kilograms divided by height in meters squared, is determined. A history of heart and lung disease, diabetes, smoking, and abdominal operations is ascertained. It is important to evaluate the patient’s psychiatric status, because many massive weight loss patients have psychiatric illnesses. As with bariatric surgery, the authors generally require a psychiatric clearance for all patients and a commitment by the psychiatric caregiver to intervene if needed.

As part of a complete physical examination, the patient’s body contour is circumferentially examined in the standing position. It is important to determine the thickness of subcutaneous fat and degree of mobility of the truncal tissues. In general, the thinner the subcutaneous fat layer, the more mobile the skin, which allows the surgeon to resect more tissue and translate the pull over greater distances away from the

Fig. 8. Diagrammatic representations of the markings. (A) The midline is marked, and the horizontal pubic incision is marked below the natural hairline to allow for elevation of a ptotic mons pubis. The arrows between the two sets of dotted lines indicate that tissues of the inguinal area are elevated superiorly and medially before marking from the lateral edge of the pubis to the ASIS. (B) The superior extent of the anterior resection is marked, and the final position of the inguinal region mark is noted below the ASIS. (C) The midline of the back is marked, and the inferior mark for the midline back resection is marked based on the desired level of the resection. This is an arbitrary point depending on the buttocks deformity. (D) The upper midline mark is made with the patient bent at the waist, using the pinch technique represented by the arrows. This maneuver is important in the prevention of dehiscences. (E,F) The remainder of the lateral and back marks.
areas of resection. All abdominal scars are examined, especially open cholecystectomy scars. With the patient in the supine position, the abdominal wall is examined for hernias and rectus diastases. A clinical determination of the volume of the intra-abdominal contents is made. If the abdominal wall is convex in the supine position and a small amount of manual pressure does not cause it to fall below the level of the rib cage, then the patient is not a good candidate for any procedure that involves rectus fascia plication, including belt lipectomy.

Contraindications

It is not advisable to operate on patients who have not stabilized their weight. If they are still losing weight, it is best to wait until they reach their maximum weight loss. As will be discussed later in this article, the closer a patient is to ideal weight, the better the final body contour attained by surgery. If patients are gaining weight, it is inadvisable to pursue surgery. Ideally the patient’s weight should be stable for 6 months before surgery. The authors do not perform this procedure on smokers or on patients who have significant pulmonary or cardiac disease, diabetes, or active psychiatric difficulties. As mentioned earlier, patients with excessive intra-abdominal content are also not good candidates. Patients who have lymphedema of the panniculi are not candidates for a belt lipectomy because of the certain recurrence of the panniculi after surgery.

Markings

Markings are made with stress on three important considerations, which are based on the authors’ experience of operating on massive weight loss patients [2]:

The anterior resection should receive the highest priority, especially over the back resection. The “money is in the belly.”

The lateral resection should be aggressive to attain the best possible contour.

The back resection, though important, is stressed the least.

The markings are an essential part of the operation, and a great deal of attention should be paid to them. They are usually performed 1 day before surgery, after reviewing the patient’s photographs, particular deformities, and desired goals. It would be convenient to mark all patients in an identical fashion, but this is not possible considering the varied presentations of massive weight loss patients. The following is a general guideline the authors use to perform their markings. Their technique is continually evolving as they face new or previously untreated deformities. Fig. 8 is a diagrammatic representation of the marks.

The anterior midline is marked (see Fig. 8A). If the mons pubis is ptotic, the inferior suprapubic incision is marked 1 cm to 2 cm below the hairline (see Fig. 8A).

At the lateral edge of the pubic hair, the inferior mark ascends toward the anterior superior iliac spine (ASIS). The inguinal tissues lateral to the mons pubis are elevated medially and superiorly just over the ASIS, and the proposed inferior mark is drawn on the tissues while elevated (see Fig. 8A). When the tissues are released, the mark will fall to its normal position below the ASIS (see Fig. 8B). This maneuver helps the surgeon determine the final position of the scar. It should be kept in mind that inguinal tissues do not elevate as much as would be expected, because of fascial attachments overlying the femoral triangle. In patients who have a thick subcutaneous fat layer on the tailored abdominal flap at final closure, the final scar should be above the ASIS, otherwise the thickness of the flap might cause an unattractive bulge at the ASIS.

The superior extent of the anterior resection is determined using the pinch technique, in much the same manner as in abdominoplasty marking. In many patients this level is far superior to the level of the umbilicus (see Fig. 8B).

The midline of the back is marked and the superior and inferior extents of the midline of the back excision are marked. The inferior midline mark is an arbitrary point that is determined based on the desired level of vertical resection (see Fig. 8C). If the buttocks are excessively protruding, then the back resection is more inferior onto the buttocks proper. If the buttocks are flat or there is no need to decrease their projection, then the area of resection is centered more superior. With this in mind the surgeon makes the inferior midline mark. The amount of tissue to be resected in the midline is approximated using the pinch technique. It is important to make the superior midline mark with the patient flexed at the waist, otherwise the posterior wound will be under excessive tension after the abdominal resection and may
dehisce at the completion of the surgery (see Fig. 8D).

With the midline of the back excision marked and the anterior excision marked, the remainder of the superior and inferior extents of lateral and back excisions are marked using the pinch technique (see Fig. 8E,F).

The patient is put through the eventual surgical positions, which are the supine and both lateral decubitus positions. Pillows are placed between the knees in the lateral positions, as will be done in the operating room. The amount of resection in each position is checked and adjusted.

Vertical marks are made from the superior to the inferior horizontal marks to help align the tissues at closure. The vertical marks on either side of the midline anteriorly are made a greater distance from the midline on the superior marks than they are on the inferior marks (Fig. 9). This is done to stretch the mons pubis tissues laterally as well as to elevate them at surgery. The distance increase on the upper mark is a judgment call and should be re-evaluated at closure to make sure that the lateral advancement of the mons pubis does not cause a vertical crease on either side of it.

The lateral thighs are marked for liposuction in a traditional fashion.

Surgical technique

Belt lipectomy is an extensive surgical procedure. At the authors’ institution it is performed by a two-surgeon team (the authors) to keep operating time as low as possible. What follows is the authors’ current surgical technique, which, like the markings, is continually being adjusted and refined. All patients are operated on under a general anesthetic. The authors find that the addition of an epidural catheter before surgery greatly facilitates postoperative pain management, so it is offered to all patients. A study critically evaluating the risks and benefits of epidural catheter use in belt lipectomy patients is underway.

The authors’ current surgical sequence of body positioning stresses the anterior and lateral resections, as previously mentioned. The anterior resection is performed first in the supine position. The patient is then placed in the lateral decubitus position, and the resection from the lateral edge of the anterior resection to the midline of the back is accomplished first on one side, then on the other. The lateral positioning allows for maximal resection of the lateral excess and access to the lateral thighs for liposuction.

Relevant details

1. The patient is placed on a beanbag in the supine position first.
2. Sequential compression foot pumps are placed on the feet and a urinary bladder catheter is inserted.
3. The umbilicus is circumferentially incised and left in place.
4. The lower abdominal incision is made and an abdominal flap is elevated up to the level of the xiphoid and the costal margins. Laterally the dissection is more extensive than a traditional abdominoplasty to allow for the lateral tightening that is needed in the massive weight loss patient.
5. The rectus sheath is vertically plicated in two layers. The infraumbilical plication is performed first in each layer because it is the area of greatest laxity.
6. The abdominal flap is redraped and tailored to the lower incision with the patient flexed at the waist.
7. An umbilicoplasty is performed.
8. Lateral to the ASIS a large dog-ear is created after the anterior resection, which is stapled temporarily.
9. Closed suction drains are used to drain the anterior resection.
10. Closure of the abdominal wound is accomplished with reapproximation of the superficial fascia (Scarpa’s) using permanent suture [3].

Fig. 9. Vertical marks on either side of the anterior midline. The superior marks are wider than the inferior marks made at the pubic level, so that the mons pubis is not only elevated but also stretched horizontally at closure. Patients will need this to a greater or lesser extent, and the marks should be adjusted at surgery.
11. The dermis is approximated with interrupted subcuticular sutures. Medical grade glue is applied to the skin.

Infrequently patients may have a supraumbilical midline vertical scar that prevents the abdominal flap from redraping inferiorly. In this situation the scar is excised and a midline incision is closed around the umbilicus. It is important, in these cases, to decrease tension on the horizontal closure by being less aggressive in tailoring the abdominal flap. Vascular compromise may occur in tissues below the umbilicus on either side of the midline when tension is excessive.

12. The patient is turned to one of the lateral decubitus positions and has three to four pillows placed between the knees to flex the hip and allow for the greatest possible tissue resection from the sides. It is very important that the patient’s waist and knees be kept in a flexed position during the turn to prevent dehiscence of the abdominal closure.

13. The lateral thigh area is liposuctioned if necessary.

14. The superior mark of the proposed lateral and back excision is incised down to the level of back muscle fascia.

15. An inferiorly-based skin and fat flap is elevated at least to the level of the inferior marks. This undermining may need to be carried more inferiorly to reduce tension, as shown in Fig. 10.

16. The inferior flap is tailored to the upper incision, and a closed suction drain is placed to drain the back.

17. The closure is accomplished in a similar manner to the anterior incision, but the permanent sutures that approximate the superficial fascia are also placed through the fascia of the underlying muscle to reduce dead space.

18. Liposuction is used to smooth out contour if needed after closure.

Generally an upper back flap is not elevated, because this is associated with a high rate of seroma formation [4], and lower back rolls are eliminated or reduced without the need for upper back elevation [2].

19. The patient is turned to the other lateral decubitus position, and the same procedure is performed.

20. The patient is transferred to an appropriately flexed hospital bed in the operating room, under the guidance of the surgeons.

A number of patients will present with open cholecystectomy subcostal scars. The pattern of resection is altered in these patients to avoid loss of tissue inferior to the scar. Their initial incision is made at the level of the subcostal scar, and abdominal flaps are elevated both superiorly and inferiorly. The inferior flap is then tailored. This procedure may lead to a more superiorly placed final scar, a possibility that must be discussed with the patient before surgery. Because these patients usually have a significant amount of excess, the scar will most likely still be within the underwear/bikini boundaries. Another method of avoiding tissue loss below the subcostal scar is to use an inverted-T pattern with the subcostal scar as one side of the vertical aspect of the excision. The initial subcostal scar needs to be more vertically oriented for this technique to be successful.

Postoperative care

Because patients are unable to sense tension on their wounds until completely awake, a large sign is placed on their hospital beds to prevent caregivers from altering their position till they are awake, alert, and able to sense tension. This is an essential precaution for the prevention of dehiscences. All patients are required to ambulate with assistance the night of surgery. Compression garments are not used for fear of causing tissue necrosis secondary to circumferential pressure. The epidural catheter and a narcotic pain medication pump are used to control pain. The epidural catheter infusion is titrated to reduce pain but not affect motor function, so that the patient can ambulate. It is usually stopped within the first 24 to 48 hours, and patients are switched to an oral pain

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Fig. 10. This diagram demonstrates the extent of direct undermining (light gray) and the extent of indirect undermining, which is accomplished with a large liposuction cannula that is not connected to vacuum (dark gray).
medication. Four hours after the removal of the epidural catheter the urinary catheter is removed, and the patient can be discharged with a full complement of drains. The average patient stays in the hospital between 2 and 4 days.

The patient is required to walk in the mildly flexed position for 1 week and then allowed to straighten up over a few days. Currently the authors’ drain management protocol is to remove a drain if it has produced less than 40 mL in a 24-hour period. Any drains still present 2 weeks after surgery are removed, even if they do not meet the criteria. If a seroma develops, it is managed with serial aspirations. The average patient will take 4 to 6 weeks to recover fully and return to a normal preoperative daily routine. Swelling above the circumferential scar will persist for 2 to 4 months. Final body contour will usually require 12 to 24 months to mature.

**Expected results**

Patients come to surgery at different levels of weight loss. Some present with their weight still within the obese range. Others present with their weight close to ideal body weight. Still others present in a range between these two extremes. It is possible to predict the degree of improvement based on the immediately preoperative weight status. Lower weights are usually associated with less subcutaneous fat, greater tissue mobility, and better results. Occasionally one encounters a patient who has a better result than one expected based on his or her weight status at presentation. This result is usually due to the patient’s having excellent tissue mobility despite a thick subcutaneous fat layer, which is caused by a very large drop in weight.

**Massive weight loss—still obese**

This group of patients still has a thick subcutaneous fat layer, which reduces skin mobility and prevents the skin from revealing the shape of the underlying muscular structures. This phenomenon is similar to that of thick skin in rhinoplasty surgery. Although these patients can attain a remarkable improvement with surgery, their body contours are not ideal. Many other parts of their bodies, especially the thighs, will maintain significant lipodystrophy and will impede the appearance of a normal body contour (Fig. 11).

Fig. 11. This patient’s photographs demonstrate results typical of patients who are still significantly overweight, with thick subcutaneous fat. Above, preoperative views; below, postoperative views. The improvement is significant, but the patient does not attain near-ideal body contour, especially because the thighs still contain a remarkable amount of lipodystrophy.
Massive weight loss—near ideal body weight

This set of patients will attain a remarkable improvement in their truncal contours, which in many cases will approach normal. In the case of patients whose thighs do not have an overabundance of lipodystrophy, the contour may be considered quite attractive (Fig. 12). The amount of fat at the subcutaneous level in this group of patients is small, allowing the translational pull on the skin to improve skin contour at a distance from the actual resection (see Fig. 7).

Massive weight loss—intermediate weight

This is a group of patients that constitutes a continuum between the two groups described above. Their overall improvements are intermediate and highly dependent on the amount of lipodystrophy of the thighs and the thickness of the remaining subcutaneous fat (Fig. 13).

Complications

Circumferential belt lipectomy is an extensive procedure that has many potential complications. Table 1 lists the complications encountered in 50 consecutive patients operated on over a 6-year period. Seromas were the most frequent complication. They most commonly occurred in the posterior aspect of the wound, which is consistent with a well-known preponderance for seromas after back surgery [4]. In an effort to reduce the incidence of seromas, the authors have recently begun using the deep tacking sutures described in the surgical technique section during the back closure. There has been a concomitant decrease in the number of posterior seromas, but an increase in anterior seromas. This experience leads the authors to conclude that the back's tendency to accumulate fluid is due to gravity: if posterior dead space is obliterated, fluid will accumulate anteriorly. It is possible that if posterior tacking sutures are combined with anterior tacking sutures of the abdominal flap, seromas will be significantly reduced. The

Fig. 12. This patient’s photographs demonstrate results typical of patients who present near ideal weight. Above, preoperative views; below, postoperative views. Because the subcutaneous layer is thin, aggressive skin resection is possible and the overlying skin can take the shape of the underlying muscular structure.
authors are in the process of investigating this technique. Other investigators have used compression garments to reduce seroma formation [5]. The authors feel that circumferential compression is dangerous in belt lipectomy patients, because the abdominal flap has a significant reduction in blood supply due to the extensive lateral dissection. Incidental minor compressions of the abdominal flap have caused small but permanent marks on the skin.

Over the course of their series, the authors have tried different drain management protocols to reduce seroma formation but have noted little difference between them. They manage seromas with serial aspirations and find that they sometimes require a fairly large number of aspirations before resolution. Occasionally it is necessary to reinsert a drain in a persistent seroma.

Dehiscence is a problem in belt lipectomy patients because there is concomitant opposing tension on both the anterior and posterior aspects of the wound. Minor dehiscences are common, and it is not unusual for patients to have a small area where the wound separates for a short distance before healing without permanent sequelae. One way to reduce the likelihood of dehiscence is to mark the patient’s midline back resection with the patient flexed at the waist, thus reducing tension on the anterior closure. This measure also allows patients to come to a sitting position more easily after surgery, enabling them to use a commode. The authors had only one major dehiscence early in their experience, before it was recognized that patients have to be completely awake in order to sense tension. Once patients can sense tension, they can help protect themselves. The authors recommend that patients be instructed before surgery on their ability to sense tension and that all

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**Table 1**

Complications associated with belt lipectomy surgery in 50 consecutive patients operated on over a 6-year period at the University of Iowa

<table>
<thead>
<tr>
<th>Complication</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Seroma</td>
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</tr>
<tr>
<td>Dehiscence</td>
<td>6</td>
</tr>
<tr>
<td>Psychiatric difficulty</td>
<td>5</td>
</tr>
<tr>
<td>Infection</td>
<td>4</td>
</tr>
<tr>
<td>Pulmonary embolus</td>
<td>3</td>
</tr>
<tr>
<td>Unscheduled hospitalization</td>
<td>2</td>
</tr>
<tr>
<td>Deep venous thrombosis</td>
<td>1</td>
</tr>
<tr>
<td>Superficial vein thrombosis</td>
<td>1</td>
</tr>
<tr>
<td>Skin necrosis</td>
<td>1</td>
</tr>
<tr>
<td>Restricted pulmonary expansion</td>
<td>1</td>
</tr>
<tr>
<td>Transient stress incontinence</td>
<td>1</td>
</tr>
<tr>
<td>Pneumomediastinum</td>
<td>1</td>
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caregivers be prevented from moving patients till they are completely awake. Fortunately, epidural catheter postoperative pain management has not reduced the ability of patients to sense tension.

Psychiatric difficulties in the postoperative period are not unique to belt lipectomy patients, but they do seem to occur with enough frequency to warrant attention. Many massive weight loss patients have lifelong histories of psychiatric problems. In the authors’ series of patients, postoperative psychiatric difficulties occurred more frequently in patients with higher BMIs. The authors do not operate on patients with active psychiatric difficulties, but the fairly long recovery period after surgery may play a role in activating quiescent problems. Currently the authors require a preoperative psychiatric clearance for most of their patients.

Like abdominoplasty, belt lipectomy causes an increase in intra-abdominal pressure secondary to the rectus sheath plication. This pressure can lead to increased risk of deep venous thrombosis and pulmonary embolus. Although the authors’ series contained three treated pulmonary emboli, only one was radiologically confirmed. The other two were treated presumptively because of the dangerous nature of the complication. The authors have also had one deep venous thrombosis and one superficial thigh vein thrombosis. All patients are fitted with sequential compression garments and required to ambulate the night of surgery. Since the authors instituted the use of epidural catheter postoperative pain control, they have found it much easier to get patients ambulating early, and there have been no thrombotic complications.

Aggressive rectus fascia plication is required in almost all massive weight loss patients. In patients who still have a fairly large amount of intra-abdominal volume, the plication may lead to the abdominal contents being pushed up against the diaphragm, giving the patient a restrictive lung disease picture. In most patients the respiratory pressures before and after plication increase a few millimeters of water. In one of the authors’ patients who had a generous amount of intra-abdominal content, the plication caused 15 mm to 20 mm of water rise in respiratory pressure. Preoperatively the patient had a mild degree of restrictive lung disease, which was worsened by the plication. Her restrictive lung disease was medically treated and her symptoms resolved, probably because of her body’s ability to adapt to her new intra-abdominal volume. It is best to recognize patients with excessive intra-abdominal content before surgery by performing the supine abdominal examination described in the work-up section earlier in this article, and to avoid operating on them till they have lost enough weight.

Skin necrosis of the suprapubic region occurred in one patient. She had a hypertrophic vertical midline supraumbilical scar that prevented the abdominal flap from being advanced inferiorly during the tailoring process of the anterior aspect of the belt lipectomy. The scar was resected and vertical closure was accomplished around the umbilicus. Postoperatively the tissue on either side of the midline, below the umbilicus, necrosed over an area of a few centimeters bilaterally. This necrosis was allowed to heal by secondary intention and required a revision a few months later. The blood supply of the abdominal flap is greatly reduced in a belt lipectomy, especially in the inferior midline because of the extensive lateral undermining. A midline incision on the abdominal flap further decreases the number of dermal collateral vessels that cross the midline. To prevent necrosis in this situation, it is important to reduce the tension at closure to prevent further reduction in blood supply. Thus, whenever a midline supraumbilical scar is excised, a less aggressive tailoring of the abdominal flap should be performed.

One female patient who presented with mons pubis ptosis developed stress incontinence after her belt lipectomy. This result was transient in nature and probably due to some underlying problem with incontinence, which was exacerbated by the physical elevation of the mons. Other patients with much greater degrees of ptosis and postoperative elevation did not develop this problem, so it is difficult to discern the cause or to know how to avoid this outcome. A male patient developed a pneumomediatinum, but it is believed that this was an anesthetic complication rather than a surgical one.

Further evaluation of the complications in this series of 50 consecutive belt lipectomy patients revealed that the risk of complications rises with the patient’s BMI. This observation is consistent with many studies indicating that obese patients have more complications with any surgery. The authors are currently critically evaluating their complications and comparing them to historical studies performed on abdominoplasty patients to gain a perspective on where belt lipectomy fits among other large body-contouring procedures.

Summary

Massive weight loss patients are an increasing segment of the population with a growing need for body contouring. It behooves us as plastic surgeons...
to be familiar with their problems and how to solve them. The authors hope to leave the reader with the following points:

Massive weight loss patients can present with widely variable body contours and at different levels of weight loss.

It is important to recognize the patients’ particular deformities, diagnose them, and treat them appropriately.

Massive weight loss patients present with circumferential excess, and their treatment usually requires circumferential excision, or belt lipectomy.

The markings and surgical technique of belt lipectomy should stress attaining maximum improvement in the anterior and lateral aspects of the trunk. The posterior aspect is also important, but it should not jeopardize the antero-lateral contour.

Results can often be predicted based on how close patients are to their ideal weight before surgery. Subcutaneous fat thickness and skin mobility are also important factors.

Belt lipectomy is a procedure that is associated with many possible complications and should only be undertaken by patients who are physically and mentally capable of handling an arduous process.

References