The Fleur-De-Lis Abdominoplasty



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KEYWORDS

• Fleur-de-lis abdominoplasty • Vertical abdominoplasty • Abdominal contour abnormalities

KEY POINTS

- Vertical abdominoplasty is a safe and effective procedure to correct abdominal contour abnormalities in individuals with excessive soft tissue in both the vertical and transverse orientation.
- The literature, although limited, supports the effectiveness of this procedure in addressing this clinical scenario.
- The complication rates are comparable to a standard transverse abdominoplasty.

BACKGROUND

A difficult aspect of abdominal contouring is the management of patients with excessive epigastric laxity. Once a unique clinical entity, this patient presentation has been on the rise.1-4 As more and more individuals undergo bariatric-assisted weight loss, the acuity and severity of the associated weight reduction results in patients who are burdened by a pendulous pannus, rashes in skin folds, and chronic skin irritation or breakdown.^{4–7} Further, changes to skin elasticity prevent retraction of the skin envelope, often seen in individuals with less severe weight loss associated with diet and exercise.⁸ Unlike the typical abdominoplasty patient who has excessive skin and fat in the vertical orientation with minimal redundancy in the transverse direction, individuals with massive weight loss have excessive laxity in both the vertical and transverse axes. A common misconception is that the excessive laxity in the transverse axis will resolve with redraping of the abdominoplasty flap in a standard procedure. However, this is often underpowered and fails to address the redundant tissue of the upper abdomen, does not improve contour to the hip and flank region or narrow the waist, and often leaves behind surgical dog-ears at the extent of the transverse incision.^{2,6,9,10} Since its early description in 1967,¹¹ and subsequently popularized by Dellon in 1985,¹² the vertical abdominoplasty has remained a valuable tool in the armamentarium for body contour surgery. The inclusion of a vertical component to the resection pattern allows the surgeon the ability to directly excise the redundant soft tissue in the midline while simultaneously contouring the lateral hips and flank. Although there have been minor modifications to the classic description of the vertical abdominoplasty, the general principles of the procedure have stood the test of time.

To prevent both the patient and surgeon from being displeased with the outcome of an abdominal-contouring procedure, a comprehensive preoperative examination is essential to identify the degree of redundancy in the transverse axis. Further, this physical examination also identifies any preexisting abdominal scars that may potentially be excised within the vertical extension of the procedure.

PATIENT SELECTION

The ideal patient is often one who has undergone significant weight loss in a short period of time,⁹

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manifests skin redundancy as a result of multiple pregnancies,¹³ or has preexisting widened midline scars.¹⁴ The speed and magnitude associated with massive weight loss secondary to bariatric procedures results in a moderate to severe excess of skin and epigastric laxity in the vertical and transverse axis. Further, the presence of preexisting abdominal scarring allows the surgeon an opportunity to revise (midline vertical scar) or completely remove the scar (eg, subcostal or port site).^{14,15} However, as with all body-contouring procedures, the patient must be aware of the tradeoff of scar burden with effective contouring, and this procedure should be considered contraindicated in individuals who are unwilling to accept a midline vertical scar. Further, the additional scar poses concerns regarding wound healing in poor candidates. Care needs to be taken with individuals who have preexisting medical comorbidities, such as smoking, diabetes, immune compromise, and morbid obesity. The main concern regarding the vertical abdominoplasty is the potential for wound compromise at the intersection of the vertical and transverse extension of the resection margins, commonly referred to as the T-junction. In a prospective review of individuals with massive weight loss (more than 50-pound weight loss) undergoing abdominal-contouring procedures, 31% underwent a vertical component to the procedure.³ There was a statistically significant difference (P = .03) in the number of men (18%) versus women (33%) who underwent this approach.

The preoperative assessment is broken down into 2 separate visits. In the initial visit, a thorough medical history and physical examination is conducted. Medical comorbidities pertinent to the procedure are documented both before and after the significant weight loss. The mechanism of weight loss is obtained, as is the highest, lowest, and current body mass index (BMI). The duration of the stability of the patient's current weight is noted, as is its deviation from the goal body weight. A physical examination noting the pattern and distribution of adipose tissue, the quality of the overlying skin, and the laxity of the surrounding soft tissue is performed. After consideration of all these factors in conjunction with the patient's own wishes and desires, a surgical recommendation is made. The patient is then given time to reflect on the surgical plan. As needed, the patient also has the opportunity to further reduce his or her BMI, trial topical therapies for persistent rashes, and stop tobacco use. The patient is brought back for a second consultation where any additional questions are answered and the informed consent is discussed at greater length. Potential complications are discussed, including

injury or loss of the umbilicus, malposition of the umbilicus, numbness in the lower and midline abdomen, wound separation, skin loss, change in pubic hair shape and/or hair loss, abdominal tightness, prolonged pain, presence of surgical "dog-ears," contour irregularity, failure to relieve symptoms of back pain or rashes, seroma formation, visible scars in the vertical and horizontal position, and extension of the scar superiorly onto the chest.

SURGICAL TECHNIQUE

The initial approach to the vertical abdominoplasty is similar to that of the traditional procedure. The inferior incision is marked 6 cm cephalad from the anterior vulvar commissure with the tissues on stretch. A midline reference mark is placed extending from the sternum to the inferior incision. The right and left lateral extent of the skin roll is identified and the lateral extent of the excision is marked. This mark is placed on the apex of the lateral hip roll to prevent dog-ear formation in the subsequent closure. The preoperative marks at the midline and lateral extents are connected to form the full extent of the inferior incision (Fig. 1). In the population with massive weight loss, this mark is often inferior to the inguinal ligament lateral to the mons; however, with resection of the overhanging pannus, the final position of this scar is pulled to a more superior position as a result of tensile forces from the abdominal closure. A pinch



Fig. 1. Preoperative markings for the fleur-de-lis abdominoplasty. The area of resection is estimated and then confirmed during the procedure.

test in the vertical axis is marked as an estimate for soft tissue resection.

In the operative room, the patient is placed in the supine position and the abdomen is prepped and draped. 1 mg of 1/1000 epinephrine is diluted in 100 mL of saline, and 20 to 40 mL is injected along the preoperative markings. In the mons region, the incision is carried down directly down to the deep fascia. Laterally, the superficial inferior epigastric artery and superficial inferior epigastric vein vessels are identified and ligated. As the incision is carried out laterally, care must be taken in the population with massive weight loss, particularly when the preoperative marking is inferior to the inguinal ligament. In this situation, dissection is carried superficially in the cephalad direction beyond the inguinal ligament. Once this level has been reached, the plane of dissection is deepened to the muscle fascia. If plication is indicated, the dissection is carried in the fascial plane centrally. If plication is not warranted, subcutaneous fat may be preserved over the rectus fascia at the discretion of the surgeon. Lateral abdominal flap dissection is conducted to allow for adequate redraping of the abdominal flap for an esthetic contour. Care is taken not to undermine beyond the level required to accomplish this, as it adds to the degree of surgical dead space, increases the potential for seroma formation, and increases the potential for wound complications as a result of disrupted cutaneous perforators. If further undermining is required, this can be carried out indirectly through the use of discontinuous undermining via a blunt liposuction cannula. The umbilicus is dissected free of the abdominal flap, taking care not to denude the fat from the umbilical stalk. The operative table is then placed in a flexed position and the superior extent of the resection is determined with a flap marking technique; an inverted towel clip placed on the inferior incision edge can be transposed under the flap and palpated. Final scar placement is checked for symmetry and the transverse component of the abdominoplasty is excised first. Attention is then directed to the vertical component. In order to prevent distraction of the transverse incision line while marking the final vertical resection, the transverse resection margins are closed with towel clips. Starting from a level just caudal to the xiphoid process, the estimation of the vertical resection is checked with a pinch test (Fig. 2). At the inferior margin of the vertical pattern, the marking is biased back toward the midline to preserve tissue at the T-junction. The pattern can be viewed as a true "fleur-de-lis" in its orientation. The intended incision lines are then injected with the epinephrine solution and incised with the plane of resection



Fig. 2. The transverse resection is performed first and closed temporarily with sharp towel clips. The location of the T-junction is set and secured with a towel clip. With the horizontal suture line secured, a pinch test will estimate the vertical extension resection margins.

directed cautiously so as to not undermine the abdominal flaps outside of the area of resection. Unnecessary undermining of the abdominal flaps disrupts the direct cutaneous perforators and increases the risk of wound complications (**Fig. 3**).



Fig. 3. Final resection pattern in the fleur-de-lis abdominoplasty. Limited undermining outside of the area of resection preserves the perforating vessels adjacent to the vertical excision and improves the viability of the triple-point skin flaps.

Subcutaneous tissue can be debulked at the most cephalad extent of the incision to prevent contour irregularities and dog-ear formation. The T-junction is then tailor tacked in both the vertical and horizontal directions and can be adjusted to ensure the optimal amount of soft tissue is removed to obtain an ideal contour. Closure of the resection pattern is accomplished with reapproximation of the superficial fascial system at the level of the mons beginning with the transverse incision. If there is tissue thickness discrepancy, or the mons is in an inferiorly displaced position, the mons area can be debulked with direct fat excision and suspended to the abdominal wall fascia. Drainage tubes are placed in the abdominal dead space and the vertical limb is then closed with a deep layer approximating the superficial fascial system. To prevent excess widening of the



Fig. 4. Case 1: 33-year-old woman with Roux-En-Y bypass. BMI reduction from 70.7 to 37.4 was associated with resolution of sleep apnea, hypertension, diabetes, and gastroesophageal reflux disease. (*A*) Preoperative anteroposterior (AP) view. (*B*) Preoperative lateral view. (*C*) Nine-month postoperative AP view. (*D*) Nine-month postoperative lateral view.

umbilicus, the umbilicus is inset directly into the vertical closure without additional skin excision. Final skin closure is obtained with a running intradermal barbed suture.

POSTOPERATIVE MANAGEMENT

On completion of the procedure, the patient is maintained in a flexed position and transferred from the operative table to the stretcher. The stretcher is adjusted to maintain flexion at the hips. An abdominal binder is placed. Drain output is monitored and the drains are removed when the output is less than 30 mL over a 24-hour period. When the drains are removed, the patient can transition into a compression garment for a total period of 4 to 6 weeks. Aggressive physical activity is also minimized during the recovery period of 4 to 6 weeks.

OUTCOMES AND COMPLICATIONS

Previous reports have suggested the superiority of a vertical abdominoplasty in obtaining an ideal cosmetic result in the population with massive weight loss and epigastric skin excess.^{3,9,14,16} As stated, the main concern with this operative procedure is a theoretic increase in wound-related complications, particularly at the T-junction. The overall complication rate for this procedure is not



Fig. 5. Case 2: 42-year-old woman with gastric bypass who underwent Fleur-De-Lis abdominoplasty with circumferential lower body lift. (*A*) Preoperative AP view. (*B*) Preoperative lateral view. (*C*) 5 year postoperative AP view. (*D*) 5 year postoperative lateral view.

well described in the literature because of small patient populations relative to studies focused on the standard abdominoplasty. However, with the rise in bariatric surgery, and the subsequent rise in individuals with massive weight loss who are seeking contour correction, the patient demographic is expanding. In the limited literature, the most common complications encountered with this procedure are wound dehiscence, infection, hematoma, seroma, and skin necrosis.2,3,9,14,17,18 It is difficult to compare the complication rates between the vertical abdominoplasty and the traditional abdominoplasty, as the patient demographics between the 2 populations vary widely. Most of the data regarding vertical abdominoplasties is from the population with massive weight loss, with complication rates ranging from 3.0% to 35.5%, 3,4,6,9,16,17 and is heavily influenced by preoperative BMI, absolute change in BMI, smoking status, and coexisting medical conditions. A comparative analysis in 2010³ showed that within

a population with massive weight loss, the transverse and vertical abdominoplasty had similar rates of complications (30.5% for vertical abdominoplasty vs 24.6% for traditional abdominoplasty) with no statistical difference regarding major complications (5% overall). In multivariate analysis, the vertical abdominoplasty procedure was associated with a statistically significant increase in wound infection. However, wound dehiscence, hematoma, seroma, and skin necrosis rates were similar between the 2 groups.

SUMMARY

Vertical abdominoplasty is a safe and effective procedure to correct abdominal contour abnormalities in individuals with excessive soft tissue in both the vertical and transverse orientation (**Figs. 4–6**). The literature, although limited, supports the effectiveness of this procedure in addressing this clinical scenario. Further, the



Fig. 6. Case 3: 26-year-old male with weight loss through diet and exercise. Fleur-De-Lis abdominoplasty was performed as part of staged plan along with gynecomastia correction, brachioplasty, and lower body lift. (*A*) Preoperative AP view. (*B*) Preoperative lateral view.



Fig. 6. (*continued*). 26-year-old male with weight loss through diet and exercise. Fleur-De-Lis abdominoplasty was performed as part of staged plan along with gynecomastia correction, brachioplasty, and lower body lift. (*C*) Ten-month postoperative AP view. (*D*) Ten-month postoperative lateral view.

complication rates are comparable to a standard transverse abdominoplasty.

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