

The Male Abdominoplasty



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KEYWORDS

• Male plastic surgery • Male aesthetics • Male abdominoplasty • Male body contouring

KEY POINTS

- Surgeons must consider the unique anatomical differences between men and women presenting for abdominoplasty.
- Male gender is an independent risk factor for complications following abdominal contouring.
- Liposuction, fat grafting, multiple row plications, and strategic scar placement can be used to optimize aesthetic outcomes following male abdominoplasty.

INTRODUCTION

The demand for male body contouring has increased exponentially over the last 2 decades. Although this patient population was historically comprised of overweight men primarily concerned about abdominal girth, it has since become dominated by 2 new patient populations; (1) massive weight loss with mild to moderate adiposity but significant skin excess, (2) young, athletic males seeking to enhance their muscular definition more than can be achieved by exercise alone.

Health, fitness, and sexuality are commonly judged by the appearance of the abdomen, and it is a common source of concern for male patients as they age. As such, abdominal contouring remains one of the most common procedures in plastic surgery, and its popularity continues to increase. In 2016 alone, 181,540 abdominoplasties were performed in the United States, of which 96% were women and 4.4% were men. The number of abdominoplasties increased by 28% from 2012 to 2017.¹ The proportion of men seeking abdominoplasties is projected to increase with an increasing population of patient with massive weight loss^{2,3} and emerging minimally invasive technologies, which allow younger patients to enhance their abdominal contour with less downtime.

Since the senior authors review nearly 2 decades ago,⁴ few studies have been published about the male abdominoplasty. Surgeons meeting the growing demand must equip themselves with the knowledge of the unique anatomical and technical considerations that make male abdominal contouring different than female. Herein, the authors review the relevant anatomy, technical approach, and postoperative outcomes for the modern male abdominoplasty.

ANATOMICAL DIFFERENCES IN MALE ABDOMINAL ANATOMY

Key anatomic variations in skin, fat, and fascia exist between the male and female abdomen. With respect to skin, although thickness depends on age and genetics, multiple studies have demonstrated increased thickness in men compared to women.⁵⁻⁷ This may contribute to an increased tendency toward laxity, overstretching, and striations in females versus male patients. Consequently, in non-massive-weight-loss male patients, excessive skin redundancy may require more weight loss to manifest itself.

Significant gender-specific differences exist with respect to abdominal adiposity. Fat distribution is modulated by sex steroids. As such, differences in adipose distribution arise during puberty

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and persist over the lifetime in men and women. At puberty, there is an increase in body weight, which in men is due to increases in lean mass, whereas in women is due to an increase in fat mass.^{8,9} At this time, a classic android and gynoid body habitus begins to develop. Unlike women, men commonly gain their weight centrally, in the abdominal region, and this “apple,” android pattern of fat distribution has been associated with an increased risk of coronary heart disease.¹⁰ In contrast, the “pear,” gynoid pattern of adiposity seen in women has a more gluteofemoral distribution and is thought to confer a lower cardiometabolic risk. Women have a higher percentage of body fat than men, but unlike men, the fat distribution, independent of total body fat, confers protection against metabolic diseases, such as coronary artery disease and diabetes.¹¹ For men and women with the same body mass index (BMI), women preferentially accumulate more white subcutaneous tissue in the superficial, suprascapular fat layer.¹² Sex differences in fat distribution relate to cell size. In women, the gluteofemoral adipocytes are larger, and in men, the visceral adipocytes are larger.^{13,14} For younger age groups, women also have less intraabdominal fat than men.¹⁵ With increasing age in men, testosterone declines and visceral adiposity increases, contributing to rectus diastasis. In menopausal women, adipose tissue is redistributed to a more android phenotype.^{16,17}

Differences in myofascial anatomy also exist. Studies have demonstrated significantly larger rectus abdominus muscles in men compared with women.^{18–20} With respect to rectus diastasis, women more commonly present with a lower diastasis leading to a suprapubic bulge, whereas men present with an upper rectus diastasis, leading to a more diffuse and upper abdominal bulge. The cause of rectus diastasis is also unique. One in 3 women experience rectus diastasis 1 year postpartum²¹ owing to both physiologic and mechanical weakness at the linea alba. Levels of progesterone, estrogen, relaxin, and corticosterone directly stimulate metalloproteinases, which degrade extracellular matrix, weakening the fascia.^{22,23} Abdominal wall compliance also increases 1.5 times by the mechanical stretch of intraabdominal volume during pregnancy, changing the extracellular matrix composition.²⁴ In men, on the other hand, absolute intraabdominal pressure by visceral obesity and repeated pressure increases during exercise contribute to the rectus diastasis.²⁵ Some have suggested that certain exercises alone can exacerbate the rectus muscle diastasis.

CONSULTATION WITH THE MALE ABDOMINOPLASTY PATIENT

Patient Presentation

Patient presentation for male abdominoplasties differs significantly from that in females. In the senior authors' last *Clinics of Plastic Surgery* article on the male abdominoplasty in 2004,⁴ the common characteristics of the male abdominoplasty were outlined, including older age at presentation, higher presenting weight, and interest in an isolated region. Over the last two decades the demographic of males presenting for abdominal contouring has changed quite significantly. Today, we find men fall into 1 of 3 categories (**Table 1**). The first group of men are often younger, aged 20 to 40 years, and either seek to enhance an existing muscular physique with high-definition liposuction and/or fat grafting, or increase the visibility of their underlying musculature by removing mild infraumbilical skin excess. These patients tend to present with multiple cosmetic concerns and come well read on the multiple procedures that they hope will address it. They have specific goals in mind, and it is not uncommon for them to propose treatments to the plastic surgeons before the surgeon does. It is particularly important to address realistic expectations in this patient population and together come up with a surgical plan that can meet these expectations.

The second group of patients present with a more classic android habitus. They have moderate adiposity and skin excess, rectus diastasis, and a significant contribution of visceral fat. This cohort of patients is at highest risk for dissatisfaction with their final result because of residual protuberance from unaddressed visceral fat. These patients are best pretreated with dieting and exercises to reduce their BMI as much as possible before surgery. Most patients are treated with lip-abdominoplasty, yet higher BMI patients are sometimes better served with a staged procedure, with high volume liposuction performed at the first stage followed by abdominoplasty 3–6 months later.

The final group of patients have undergone massive weight loss following bariatric surgery or by natural means. These patients have a primary concern of excess abdominal skin and suprapubic skin ptosis. These patients are psychologically debilitated by their pannus. They seek to rid themselves of their previous perception of self and live comfortably in their new body. These patients are highly satisfied after surgery, yet their poor skin quality increases risk for wound healing complications and a prolonged postoperative course.

Table 1
Most common male presentation and treatment

Categories	Patient Vignette	Skin	Fat	Fascia	Treatment
I	Young athletic patient seeking to extenuate muscles and get rid of stubborn fat that does not respond to exercise	Minimal laxity	Mild/Moderate	Minimal	Liposuction abdomen/flanks + Superficial liposculpting ("high-definition liposuction") of linea alba, linea semilunaris, and tendinous inscriptions ± Mini-abdominoplasty (if there is focal infraumbilical skin laxity)
II	Middle-aged man with excess skin and fat that does not respond to exercise	Moderate laxity	Moderate/Severe	Lower and upper diastasis	Liposuction abdomen/flanks + Full abdominoplasty + Vertical ± transverse rectus plication (* Consider staging)
III	Massive weight loss patient after bariatric surgery or natural weight loss	Severe laxity	Minimal	Variable	Full/extended abdominoplasty (± body lift or fleur de lis if needed) ± Vertical ± transverse rectus plication (only if required)

Physical Examination

Examination of the male abdomen should be performed in standing, sitting, and supine positions. Skin examination should note the presence of scars, bulges, or signs of skin irritation under the pannus. The degree and location of skin excess should be noted, including the presence of supra-pubic skin ptosis. Fat examination should note the degree of adiposity (lipodystrophy class 1–3), the location of the adiposity (primarily infraumbilical versus diffuse), and the relative contribution of visceral (intraabdominal) fat. Fascial examination, which should be done in both standing and supine positions, should note the presence of hernias, and the location and approximate distance of the rectus diastasis. When there is clinical suspicion of a hernia, advanced imaging is recommended for further characterization.

Informed Decision Marking and Patient Counseling

Once equipped with the knowledge of the patient's concerns and specific anatomy, the

surgeon can now tailor their surgical plan accordingly. The authors' practice is to go through the proposed technique and explain why the chosen technique will specifically address each concern. Local and systemic complications of the procedure are then reviewed, which vary according to the type of procedure being performed. Local complications include infection, hematoma, seroma, wound dehiscence, scar irregularities, umbilical stenosis/necrosis/malposition, skin paresthesia/numbness, contour irregularities, and persistent protuberance from residual intraabdominal fat. Systemic complications include respiratory compromise from elevated intraabdominal pressure, deep vein thrombosis/pulmonary embolism, systemic infection, major wound dehiscence, lidocaine toxicity, visceral injury and death. Surgeons must be reminded that abdominoplasty has a higher systemic complication rate (specifically risk for venous thromboembolism) than any other cosmetic surgery. As such, a detailed plan for perioperative prophylaxis must be considered. A discussion of modifiable risk factors for complications is also prudent, with a thorough

preoperative workup advised to identify such factors. The authors recommend at least an electrocardiogram, complete blood count, hemoglobin A_{1c}, nicotine test and nutritional workup (particularly important in massive-weight-loss population for which vitamin and electrolyte deficiencies are common).

The authors then provide the patient with a perioperative instruction packet, which provides information on dressings, showering, drain care, body positioning, pain control, and a timeline for returning to normal activities, such as sexual activity and exercise. They also review an ERAS (enhanced recovery after surgery) protocol, which describes the type of drugs the patient will be prescribed to manage symptoms such as pain, anxiety, nausea/vomiting, and constipation.

ABDOMINOPLASTY TECHNIQUE

Technique Selection

The patient's anatomy dictates the surgical technique (**Table 1**). Group 1 patients have an athletic build and seek to remove modest amounts of fat and/or skin to enhance muscular definition. Many of these patients can be treated with power-assisted liposuction alone. A combination of deep and superficial liposuction (also known as high-definition liposuction) is performed in order to enhance transition zones and natural body concavities and convexities. A pinch test is used as guidance. Superficial liposculpting is performed using a 4-mm basket cannula in the suprascarpal layer along the linea alba, linea semilunaris, and in select cases, over the tendinous inscriptions of the rectus muscle. Fat grafting to the rectus and pectoralis major muscle is also an effective way to further enhance trunk aesthetics. Radiofrequency skin tightening devices are particularly useful in older athletic males who have reduced skin elasticity, and can be used concomitantly with liposuction and/or abdominoplasty. Some group 1 patients have infraumbilical skin laxity that can be addressed surgically. These patients usually need not undergo a full abdominoplasty and are effectively treated with a skin-only mini-abdominoplasty, with skin elevation limited to the infraumbilical region. This procedure is particularly useful in improving the aesthetics of the male umbilicus, as skin resection creates superior hooding.

Group 2 patients present with the classic android, apple-shaped abdomen with moderate amounts of fat and skin excess, varying degrees of intraabdominal fat, and a rectus diastasis. These patients are best treated with a full abdominoplasty or lipoabdominoplasty with or without rectus plication. A frank discussion about the final

contour is critical with these patients, as the amount of intraabdominal fat can significantly limit the final aesthetic. Occasionally, surgeons may also evaluate the need to stage these patients, depending on the amount of liposuction required. In the first stage, aggressive abdominal, flank and/or back liposuction is performed, followed by full abdominoplasty 3-6 months later. The authors have found this technique particularly useful in improving the final aesthetic in higher BMI patients, while improving the safety profile of the operation.

Group 3 patients have classic stigmata of massive weight loss. These include a hanging abdominal pannus with possible underlying skin changes, multiple deflated skin rolls, skin excess laterally (possible circumferentially), and mons ptosis with or without a genital deformity. The patients may or may not have a rectus diastasis and tend not to have a significant degree of intraabdominal fat. These patients are best treated with an abdominoplasty or extended abdominoplasty (270° lift) with conversion to circumferential body lift or fleur-de-lis abdominoplasty if the patient's anatomy would benefit from it. If rectus diastasis is minimal, it is unnecessary to plicate, as it contributes significantly to the pain profile of the procedure, may increase risk of deep venous thrombosis, and does not improve the final aesthetic.

Abdominal Marking

A vertical line is drawn from the base of the penis to the xiphoid as a reference for the true midline, irrespective of the umbilicus position. Two parallel lines are then marked over the linea semilunaris bilaterally. Incorporating the umbilicus into the midline marking is a common error, increasing the risk for umbilicus malposition, as it is a midline structure in less than 2% of cases.²⁶ In athletic men undergoing concomitant high-definition liposuction, the authors ask the patient to flex, so the linea semilunaris and tendinous inscriptions of the rectus muscle can be marked statically and dynamically. These reflect the transition zones over which more superficial liposuction is performed to enhance muscular definition. Of note, if performed in the context of an abdominoplasty, the surgeon must medialize their markings in anticipation for the rectus diastasis repair and medialization of the abdominoplasty flap upon closure. Ignoring this will lead to inappropriately placed transition zones upon closure.

The patient then sits, and the extent of the skin creases are marked out laterally with a dot to mark the apex of the skin resection bilaterally. In patient with massive weight loss, these typically

extent up to and past the anterior axillary line. If there is significant adiposity laterally and posteriorly, the surgeon should not hesitate to extend circumferentially to prevent dogear formation and poor abdominoplasty flap redraping.

Skin incision placement in men is more flexible than in women and is best designed using the patient's preferred undergarments as reference. Creating a more acute arc is beneficial in women, as it recruits tissue medially and accentuates the waist. This is unnecessary in male patients, so a gentler arc is more appropriate. The lower skin incision is marked while the patient gently grasps and pulls up the skin flap. Superior traction is important, as it accounts for the superior scar migration that occurs following abdominoplasty. It is important to keep the incision parallel and superior to the inguinal ligament to recruit thick tissue for closure and mitigate the risk of injury to the lateral femoral cutaneous nerve of the thigh. The patient is then asked to bend at the waist to mimic bed flexion. A pinch test is then performed to evaluate closure tension and the location of the upper incision.

Abdominal markings in patient with massive weight loss are more challenging. Asymmetric pannus weight makes marking in the standing position difficult. It is easier to mark these patients lying down, where the inferior margin is marked and then one hand retracts the pannus away from the inferolateral markings in the vector that mimics closure tension.

Lipoabdominoplasty Procedure

Liposuction has become a frequently used adjunct to the modern male abdominoplasty. One to two L of tumescent solution is injected to the flanks, upper abdomen, and suprapubic area, keeping in mind the maximal dose of tumescent and epinephrine of 35 to 55 mg/kg and 0.7 mg/kg, respectively. Simultaneous separation and tumescence (SST) uses the Microaire power-assisted liposuction cannula (MicroAire Surgical Instruments LLC, Charlottesville, VA) and a rollerpump to improve the efficiency and safety of infiltration. Liposuction then proceeds in a graded fashion using a 4-mm Mercedes cannula with the knowledge of abdominal flap vascularity.²⁷ Liposuction is performed deep to prevent contour irregularities, which is the most common complication of abdominal liposuction. Superficial liposuction is then added in select patients with a 4-mm basket cannula to the superficial fat layer, accounting for flap medialization during redraping and closure.

Liposuction instruments are then passed off the field and attention is directed at pannus excision. Markings are verified with a crisscross suture

technique at the xiphoid and mons pubis.²⁸ The umbilicus is incised, and scissors are used to free the umbilical stock from the abdominoplasty flap. The superior incision is then made, and dissection is carried down to the fascia with a 20-blade scalpel. Monopolar cautery is then used to create a narrow tunnel up the xiphoid, preserving perforators from the epigastric arteries medially and intercostal arteries laterally. The anesthesiologist then flexes the table, and the abdominoplasty flap is pulled inferiorly to confirm the previously marked inferior incision. The inferior marking is then made, and pannus is excised from side to side with a 20-blade scalpel while an assistant achieves hemostasis with an insulated forceps and monopolar cautery. Surgeons must make the inferior incision cautiously in the patient with massive weight loss, as the ptotic tissues can distort anatomy and bring critical structures into the plane of excision.

Before diastasis repair, the authors examine for signs of hernia. This is particularly important for the Group 2 male patient, in which hernias are not uncommon. If a hernia is present, it is repaired before midline plication. It is therefore important to discuss and consent for the use of mesh during the preoperative discussion. Small hernias can be closed primarily, whereas larger ones can be closed with an underlay bioabsorbable mesh.

There is no difference in outcomes related to different techniques of rectus diastasis repair.²⁹ A double-layered closure is performed above and below the umbilicus. The fascial tension is then assessed for the need of additional rows of fascial plications parallel to midline or transversely at the level of the umbilicus. The authors prefer a 0-loop nylon or number 2 PDO quill suture for the running layer. Last, the authors perform transverse abdominus plane blocks with bupivacaine liposome injectable suspension (Exparel), which they find limits (and sometimes eliminates) postoperative narcotic consumption postoperatively.

The authors then tailor tack the flap into place and close with a double layer of barbed sutures (deep layer involves a large bite including Scarpa fascia and dermis with 2-0 PDO Quill, followed by a second subcuticular layer of 3-0 PDO Quill providing closure of the skin.) The umbilicus is then exteriorized through an inverted V incision and inset with 3-0 deep dermal PDS sutures followed by simple interrupted 4-0 nylon suture. Two 14F Jackson Pratt drains are exteriorized and sutured into the incision to decrease scar burden. Alternatively, a newer drain system, such as the Interi internal suction system, can be used. An abdominal binder is sent home with the patient, and they are instructed to start wearing it

continuously postoperative day 3 for a duration of 4 weeks.

SURGICAL OUTCOMES FOR MALE ABDOMINOPLASTY

Abdominoplasties in general have among the highest complication profile of any plastic surgery procedure,³⁰ and male gender has recently been identified as an independent risk factor for complications. Multiple studies support a higher complication rate in men following abdominoplasty. In a study of post bariatric patients, Sirota and colleagues³¹ showed that males had over double the complication rate (40.8% vs 20.3%) and that male gender was an independent risk factor for hematoma and seroma formation. These findings echoed a study by Chong and colleagues³² which illustrated that hematoma and seroma rates were significantly higher in men (14.6% vs 3.5% and 25% vs 13%, respectively). A higher incidence of abdominoplasty complications in males was also noted in retrospective reviews by Momeni³³ and Neaman³⁴. In a study of 25,478 abdominoplasties analyzed from the CosmetAssure database, Winocour³⁰ demonstrated that male gender constituted the largest preoperative risk factor for major complications, with multivariate regressions demonstrating 1.8 times the risk of major complications compared with women undergoing abdominoplasty. A study of 10,473 patients using the American College of Surgeons National Surgical Quality Improvement database by Donato and colleagues³⁵ similarly reported that male gender was an independent risk factor for any complications (odds ratio, 1.3) and major complications (odds ratio, 1.52), and when panniculectomies were performed, an independent risk factor for major complications (OR 1.43). Male abdominoplasties also had significantly greater operative times than in females.

SUMMARY

Unique anatomic considerations and cosmetic concerns make the male abdominoplasty different than in females. The male abdominoplasty also is associated with a higher complication profile than in females. Surgeons meeting the increased demand for male body contouring should equip themselves with the knowledge and skills to safely and effectively manage these patients. To optimize results and patient satisfaction, surgeons must risk-stratify patients appropriately, manage modifiable risk factors before operating, and choose the safest and most reliable procedure that will address the patient's specific anatomy.

CLINICS CARE POINTS

- Age, body mass index and male gender are independent risk factors for complications following abdominoplasty. Preoperative medical optimization, and management of modifiable risk factors is important for reducing complications.
- In patients with moderate to severe lipodystrophy and skin excess, consideration of staging liposuction from abdominoplasty reduces surgical risk and improves the aesthetic result.
- High-definition liposuction and fat grafting are useful adjuncts to the modern male abdominoplasty.

DISCLOSURE

Dr M.J. Stein has no disclosures. Dr A. Matarasso has no disclosures.

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