

The History of Body Contouring Surgery

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ABSTRACT

Body contouring surgery is a rapidly evolving field of plastic surgery. Fueled by the exponential growth of successful bariatric surgery cases, the subspecialty of body contouring has expanded to include new procedures for treating redundant skin in all areas of the body. This review highlights the major technical developments that have served as the building blocks for current techniques.

KEYWORDS: Body contouring, abdominoplasty, weight loss

“The sooner you make your first five thousand mistakes the sooner you will be able to correct them.”

Kimon Nicolaides¹

Nicolaides alluded to an artist attempting to convey thought, feeling, and emotion through the creation of form, gesture, and structure. Precisely the same creative intellectual endeavor has been evolving over the last century as the minds of pioneering surgeons have devised clever, reproducible techniques to mold the bodily morphology of their patients. Leonardo da Vinci is known to have said, “The supreme misfortune is when theory outstrips performance”; this is never more poignant than in the attempt to recreate the human form surgically.

The development of adequate procedures to recontour the misshapen has been an evolving craft accelerated by a global increase in obesity. In the United States alone, the Centers for Disease Control and Prevention estimates that 64% of American adults are either overweight or obese. Greater than 30% of the population is considered obese, with an additional 5% being morbidly obese (body mass index greater than 40).² Obesity in American youths younger than 19 years has more than tripled in the past 15 years, with more than 15% considered overweight and the prevalence rising.³ Developing countries are likewise seeing increases in population obesity, although at a slower rate. The International Obesity Task Force estimates that

1 billion people are overweight globally and 300 million are obese.⁴

The medical consequences of obesity are numerous and the health care expenditure staggering. These facts alone have engendered efforts for decades to control excess weight and its concomitant problems. Unfortunately, dietary, lifestyle, workplace, and medicinal interventions have proved to be largely ineffective at controlling obesity. An alternative, gastrointestinal tract “remodeling,” has emerged in various forms as the only proven modality at this juncture. One of the earliest attempts to induce weight loss surgically was the jejunoileal bypass. This procedure had a complication rate approaching 58%, a reoperative rate of 23%, and potentially fatal hepatic fibrosis and subsequent liver failure.⁵ As a result, this procedure has been relegated to the position of historical curiosity. Mason is largely credited with recognizing the weight loss effects of definitive ulcer surgery and upon his observations devised the gastric bypass.⁶ This proved to be largely effective; however, early versions of the procedure were fraught with nutritional deficiencies secondary to malabsorption. This led him to devise the vertical banded gastroplasty (VBG), a restrictive procedure.⁶ Ultimately, through education,

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experience, and technical refinements designed to better regulate malabsorption, the gastric bypass has largely supplanted the VBG as the weight loss surgery of choice. The development of better laparoscopic instruments and surgeon training in laparoscopic gastric bypass has fueled a rapid increase in the number of procedures done. The American Society of Bariatric Surgeons (ASBS) estimated that in the year 2005, 150,000 bypasses would be done in the United States alone.⁷

Developing in parallel with weight loss surgery, the field of body contouring surgery has attempted to sculpt a pleasing form surgically. Operative intervention to remove large pendulous festoons of skin and fat, although increasing rapidly at this juncture, is not a novel idea. Over a century ago, the renowned Dr. Kelly performed what must have seemed to colleagues like an act of lunacy when, in 1899, he performed a panniculectomy with a resection specimen of 7450 g. He reported his exploits to the medical community that same year.⁸ Babcock also performed dermolipectomies in the early part of the 20th century using primarily a vertical incision.⁹ Most authors would agree that the earliest work by these pioneers and others generally represented truly functional panniculectomies. There was tremendous variation in scar location and morphology; however, the basic approach remained the same, simple dermolipectomy.¹⁰

The first major aesthetic accomplishment in contour surgery is credited to Thorek, who performed the first umbilicus-preserving abdominoplasty in 1924.¹¹ Passot's contribution would prove to be vital when he utilized undermining as a modification of Kelly's original technique.¹² Vernon, in the 1950s, ushered in a new era when he combined extensive undermining with the novel concept of umbilical transposition and relocation, a concept still applied today. In 1967, Callia first described aponeurotic suturing as a component of his procedure, which involved an infrainguinal incision.¹³ Pitanguy in the same year published a series of 300 abdominal lipectomies that piqued surgeon's interest across the globe.¹⁴ The early 1970s saw Regnault modify the incision championed by Pitanguy into the "W" incision.¹⁵ In 1973 Grazer championed the "bikini line" incision seen with such frequency today. An observation in 1977 by Grazer and Goldwyn that abdominoplasty decreased anterior projection of the abdomen but did little to change waist diameter¹³ led to Psillakis' assertion in 1978 that muscular aponeurotic suturing was an underutilized tool to decrease waistline dimensions.¹⁶ An important addition to the field came when Somalo and Gonzalez-Ulloa extended the transverse abdominal incision circumferentially and introduced the belt lipectomy. This concept would provide the intellectual impetus for many subsequent "radical" lifting procedures.^{17,18}

Concordant with improvements in abdominal contour surgery, procedures to ameliorate redundant skin elsewhere on the body were being devised. The arms of weight loss patients often manifest sagging deflated skin, downward descent of the posterior axillary fold, and redundant axillary skin. Initial attempts to correct the anomalies were seen in the 1920s by Thorek and his contemporaries and consisted primarily of elliptical excisions of skin.¹⁹ The procedure changed little and remained relatively uncommon until 1973, when Lewis carried the resection into the axilla and performed a Z-plasty to mitigate the deleterious effects of scar contracture. Pitanguy developed a variant for patients with excessive lateral axillary skin in which he continued the arm scar into the inframammary fold. He further developed the technique of a "bat-wing" torsoplasty in the 1970s, which combined brachioplasty with vertical axilloplasty in a single contiguous scar bilaterally.²⁰ Regnault produced a fishtail variant of the arm reduction that has been modified slightly by many surgeons to represent the multitude of techniques utilized today.²¹

The lower extremities likewise would suffer the ill effects of massive weight loss and gravitational forces. In the beginning of the 20th century, Drs. Kelly and Noel realized the aesthetic impact of thigh morphologic abnormalities and performed local excisions of thigh tissue in combination with abdominal lipectomy.^{22,23} Elliptical excisions of skin and fat were performed. It was not until Lewis devised the notion of a thigh lift in 1957 by a circular resection with vertical components added to reduce overall circumference that thigh contour was greatly altered.²⁴ Pitanguy's description of trochanteric lipodystrophy in the 1960s²⁵ led to Farina's "riding trousers" type of resection.²⁶ This unfortunately left scars in an undesirable position. The technique was improved upon by Pitanguy's semicircular excision technique, which at once remedied trochanteric adiposity and medial and lateral thigh laxity. Baroudi, Regnault, and Grazer produced variants of this technique. Ultimately, the semicircular thigh reduction was taken 360 degrees by Regnault and the circular thigh reduction was born.²⁷ One of the untoward results of these techniques was an entity known as gluteal depression, a contour deformity between the iliac crest and femoral trochanter. Agris, Aston, and others remedied this by filling this area with discarded deepithelialized skin.^{28,29}

Dr. Ted Lockwood would later revolutionize the rejuvenation of the lower extremity as well as the entire thigh-abdomen-trunk aesthetic unit by describing the anatomic features and making use of the superficial fascial system (SFS) to anchor tissues after excisional lifting procedures.^{30,31} His description of the medial thigh anchoring technique in 1988 allowed a more durable lift of the inner thigh with less scar migration.³² The introduction of the high lateral

tension abdominoplasty and the lower body lift expanded upon the earlier belt lipectomy concept of Somalo and Gonzalez-Ulloa to remedy the entire thigh-trunk-abdomen aesthetic unit.^{17,18}

Male and female breast tissue would also experience unpleasant conformational changes as a result of massive weight loss. The typical abnormalities consist of asymmetric volume loss, loose inelastic and redundant skin, medialized nipple areolar complex position in women, and lateral outward migration of tissue resulting in axillary skin excess. Chest rejuvenation remains one of the most fluid and most challenging areas of body contouring surgery. However, Schwarzmans demonstration of nipple viability on a dermal pedicle,³³ Beisenberger's dermoglandular separation,³⁴ Wise's pattern,³⁵ Strombeck's bipedicle technique,³⁶ Skoog's nipple transposition on a unilateral vascular pedicle in 1963,³⁷ Regnault's B type reduction,³⁸ Lassus's vertical mammoplasty,³⁹ Benelli's periareolar reduction,⁴⁰ and various authors' description of glandular reshaping and dermal suspension have facilitated the creation of new techniques to recreate reliably male and female breast shape.

Apart from surgical resection techniques, no single intervention has changed the landscape of body contouring more profoundly than suction lipectomy. Dujarrier, of France, first attempted the subcutaneous removal of fat from the leg of a dancer in 1921 utilizing a uterine curette. Unfortunately, damage to the femoral artery cost her her leg.⁴¹ In 1976, Aprad and Giorgio Fischer in Rome devised suction lipectomy using a hollow cannula attached to suction and used the technique of crisscross tunnel formation.⁴² Pierre Fournier, from Paris, saw benefit in liposculpture and initially practiced the "dry technique."⁴³ Illouz, also from Paris, described the "wet technique" in which he infiltrated a solution of hypotonic saline and hyaluronidase prior to suction lipectomy. He felt that "dissecting hydrolysis" would facilitate fat removal and minimize local trauma.⁴⁴ Illouz is largely credited with creating the wet technique and creating worldwide publicity for the procedure.⁴⁵ In 1987, Klein's description of the tumescent technique and subsequent demonstration of its safety and efficacy revolutionized the art and practice of suction lipectomy.^{46,47} Liposculpture has become a proven modality that can avoid obtrusive scars in patients with good skin tone and provide an important adjunct to excisional lifting procedures. Ultrasonic liposuction techniques have the potential to improve aesthetic results.

All of the advances made in body contouring, from the original work of Dr. Kelly and his contemporaries to the modifications seen every decade since, have contributed to a dynamic and evolving specialty. Currently there is no field within the realm of plastic surgery growing with the same rapidity, and with worldwide obesity continually on the rise, the growth of this field is

unlikely to abate in the near future. The contributions of Thorek, Passot, Pitanguy, Baroudi, Grazer, Wise, Regnault, Lassus, Illouz, Klein, Lockwood, and others have provided the necessary armamentarium to approach the post-weight loss patient knowledgeably, thoughtfully, and adequately equipped to restore pleasing contour to the patients we as surgeons care for. The combination of regional dermolipectomies, lifts, and suction lipoplasty has the potential to restore the elegant human form, to recreate gesture, and to restore appropriate structure.

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