



# Simple and composite circumferential abdominoplasty: technical evolution, 10-year experience and analysis of complications

*Abdominoplastia circunferencial simples e composta: evolução técnica, experiência de 10 anos e análise das complicações*

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## ■ ABSTRACT

**Introduction:** Morbidly obese patients undergoing bariatric surgery after massive weight loss evolve with large skin folds in various body regions, including the abdomen. In patients with dermofat excesses throughout the abdominal circumference and ptosis of the gluteal region, circumferential abdominoplasty (simple or composite) has been an effective surgical solution conventional or “anchor” abdominoplasty brings unsatisfactory results in those patients with severe dysmorphia. The objective is to analyze the technical evolution of simple and composite circumferential abdominoplasty and its complications.

**Methods:** Twenty-nine patients were evaluated, 28 females, with a mean age of 41.17 years, submitted to circumferential abdominoplasty between 2002 and 2012. This retrospective study, conducted through data collected from medical records, evaluated: surgery time, the weight of the resected surgical specimen, length of hospital stays, antibiotic therapy used, associated complications, and changes in the surgical technique in this period. **Results:** Composite circumferential abdominoplasty was performed in 23 patients (79.3%) and the simple one in six (20.7%). The mean surgical time was 346 minutes, and the surgical specimen’s mean weight was 4323 grams. Three patients (10.3%) had significant complications (symptomatic anemia and major suture dehiscence) and five (17.2%) minor complications (minor dehiscence, slight spontaneous bleeding, seroma, and hypertrophic scarring). Between 2002 and 2004, 75% of the complications occurred. The reoperation rate was 6.9%. **Conclusion:** There was a significant technical evolution in circumferential abdominoplasty performance, and the incidence of complications and the rate of reoperation were similar to those found in the literature.

**Keywords:** Abdominoplasty; Adverse effects; Skin folds; Obesity; Morbid obesity; Body contour; Postoperative complications; Quality of life.

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## ■ RESUMO

**Introdução:** Pacientes portadores de obesidade mórbida submetidos à cirurgia bariátrica, após perda ponderal maciça, evoluem com grandes dobras de pele em várias regiões do corpo, incluindo abdome. Nos pacientes com excessos dermogordurosos em toda circunferência abdominal e ptose da região glútea, a abdominoplastia circunferencial (simples ou composta) tem demonstrado ser uma solução cirúrgica eficaz, pois a abdominoplastia convencional ou “em âncora” traz resultados insatisfatórios naqueles pacientes com dismorfia severa. O objetivo é analisar a evolução técnica da abdominoplastia circunferencial simples e composta e suas complicações. **Métodos:** Foram avaliados 29 pacientes, sendo 28 do sexo feminino, com média etária de 41,17 anos, submetidos à abdominoplastia circunferencial, entre 2002 e 2012. Este estudo retrospectivo, realizado através de dados colhidos dos prontuários médicos, avaliou: tempo de cirurgia, peso da peça cirúrgica ressecada, tempo de internação hospitalar, antibioticoterapia utilizada, complicações associadas e alterações ocorridas na técnica operatória neste período.

**Resultados:** A abdominoplastia circunferencial composta foi realizada em 23 pacientes (79,3%) e a simples em seis (20,7%). O tempo cirúrgico médio foi de 346 minutos e o peso médio da peça operatória foi 4323 gramas. Três pacientes (10,3%) tiveram complicações maiores (anemia sintomática e deiscência de sutura maior) e cinco (17,2%) complicações menores (pequenas deiscências, pequeno sangramento espontâneo, seroma e cicatriz hipertrófica). Entre 2002 e 2004 ocorreram 75% das complicações. O índice de reoperação foi de 6,9%. **Conclusão:** Houve importante evolução técnica na realização da abdominoplastia circunferencial, sendo que a incidência de complicações e a taxa de reoperação foram similares às aquelas encontradas na literatura.

**Descritores:** Abdominoplastia; Efeitos adversos; Pregas cutâneas; Obesidade; Obesidade mórbida; Contorno corporal; Complicações pós-operatórias; Qualidade de vida.

## INTRODUCTION

After treatment of morbid obesity, the patient evolves with great weight loss, consequently decreased thickness of adipose tissue (hypodermis), skin sagging, and extensive skin folds distributed in various areas of the body<sup>1</sup>. The *superficialis fascia*, distended while the patient was obese, now presents loose<sup>2</sup>. The post-bariatric patient's skin has lower retraction capacity and decreased elasticity, mainly provided by the lower density of collagen fibers in dermal matrix<sup>3</sup> or higher proportion of fine fibers than thick fibers<sup>4</sup>. This complex condition is defined as body dysmorphia, and, in these circumstances, we identified patients with a small amount of subcutaneous adipose tissue and significant excess skin (Figure 1).



Figure 1. Examples of patients after major weight loss.

Plastic surgery aims to dry out skin excesses, provide more harmonic body contouring, and minimize the side disorders that accompany dysmorphia, and often the first surgery requested is abdominoplasty<sup>5</sup>.

The most frequent abdominoplasty techniques are those performed with cross-sectional (classical), vertical, or anchor incision (“*fleur-de-lis*”). Classical abdominoplasty<sup>6,7</sup>, when applied to a patient with considerable dermofat remains, leaves lateral cutaneous remnants, which are treated with the extension of the incisions to the flanks, defining what is known as flanktoplasty<sup>8</sup>.

As a natural sequence of flanktoplasty, to improve the contour of the entire circumference of the abdomen and suspend the gluteal region, the incisions are extended until the projection of the spine, constituting circumferential abdominoplasty (CA)<sup>9-11</sup>, *belt lipectomy*<sup>12,13</sup> or simple circumferential abdominoplasty (SCA)<sup>14</sup>. When these patients also present with dermo fat accumulations in the epigastrium and supra or periumbilical region, fusiform vertical excision associated with the transverse incision is indicated, constituting the composite circumferential abdominoplasty (CCA), resembling an anchor<sup>14</sup>.

## OBJECTIVES

This study aims to analyze the technical evolution of simple and composite circumferential abdominoplasty and its complications.

## METHODS

For the present retrospective study, 29 patients were selected, through medical records, enrolled and followed up at the Plastic Surgery Outpatient Clinic of the Division of Plastic Surgery and Burns of the Hospital das Clínicas of the Faculty of Medicine of the University of São Paulo, who had undergone circumferential abdominoplasty, between 2002 and 2012.

Inclusion criteria of the patients: age between 18 and 65 years, at the time of the CA; surgery performed between June 1, 2002, and December 31, 2012; and body weight stability for a minimum period of 12 months.

Exclusion criteria: weight loss through clinical treatment; weight loss through another bariatric surgery technique different from that described by Capella-Fobi; and association of another surgery with CA.

The research project was presented to CAPPesq - Ethics Committee for The Analysis of Research Projects of the Hospital das Clínicas of the Faculty of Medicine of the University of São Paulo, under registration number 11,819, and approved without restrictions. The project was also registered and approved at the Brazil Platform of the National Research Ethics Commission (CONEP) of the Ministry of Health, under Certificate of Presentation for Ethical Appreciation (CAAE) number 26869314.7.0000.0068.

Data were collected from patients such as name, age, date of surgery, height, body weight, body mass index (BMI) pre-gastroplasty, and plastic pre-surgery. The following items were also analyzed: surgery time, the weight of the resected surgical specimen, hospital stay time, antibiotic therapy used, and associated complications.

Patients were divided into two groups: A (patients operated between 2002 and 2004) and B (operated between 2005 and 2012). Changes in surgical demarcation and technical evolution (learning curve) occurred between the groups.

The complications were divided into major and minor, considering that, for the treatment of the larger ones, surgical intervention, increase in the hospitalization period, or rehospitalization<sup>15,16</sup> (Chart 1) was required.

**Chart 1.** Major and minor complications.

Larger	Smaller
Great dehiscence	Seroma
Bruise	Small dehiscence
Symptomatic anemia	Minor bleeding
Flap necrosis	Hypertrophic scar
Infection/abscess	Asymptomatic anemia
Deep vein thrombosis	Infection/cellulite
Pulmonary embolism	Pulmonary atelectasis
Greasy embolism	
Death	

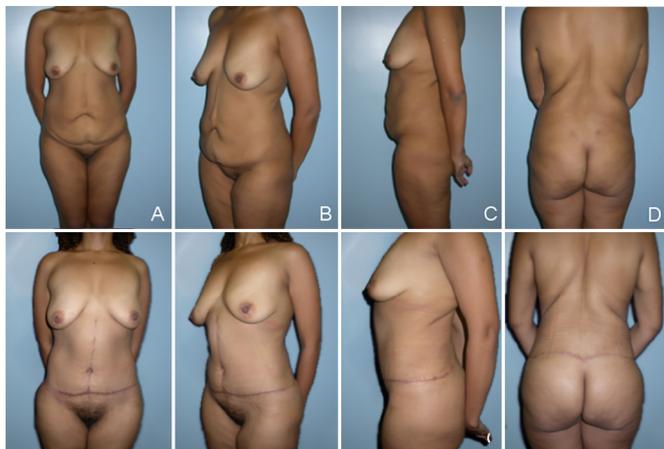
## RESULTS

The sample consisted of 29 patients, 28 women (96.5%) and one man (3.5%). The mean age of the sample was 41.17 years (26-71 years).

SCA was performed in six patients (20.7%), while CCA was performed in 23 patients (79.3%) (Figures 2 and 3).



**Figure 2.** Simple circumferential abdominoplasty (SCA); A-D. Preoperative; E-H. Postoperative (12 months).



**Figure 3.** Composite circumferential abdominoplasty (CCA); A-D. Preoperative; E-H: Postoperative (12 months).

The mean height of the patients was 1.62m, with extremes between 1.49m and 1.78m. Before gastroplasty, the average body weight was 145.6kg (105-234kg); and BMI before gastroplasty was 55.41kg/m<sup>2</sup> (39.0-82.9kg/m<sup>2</sup>). The average weight before plastic surgery was 77.62kg (51-98kg; and the mean BMI before plastic surgery was 29.56kg/m<sup>2</sup> (19.2-37.5kg/m<sup>2</sup>).

The mean surgical time to perform THE and CCA was 346 minutes, i.e., 5h46min, ranging from 250 to 480 minutes. The mean length of hospital stay was 4.34 days (2-15 days). The mean weight of the resected surgical specimen was 4323 g (3100-6356 g).

Antibiotic therapy with a first-generation cephalosporin, cephalothin, or cefazolin was used for all patients. They received the first dose 30 minutes before surgery, and the therapeutic regimen was maintained for seven days.

Three patients (10.3%) had major complications. Two patients (6.9%) presented symptomatic anemia and required a blood transfusion because they presented postural hypotension; one patient received six units of red blood can concentrates and the other one unit. One patient (3.4%) presented suture dehiscence, which required hospital readmission, debridement, and resuture in the operating room.

Five patients (17.2%) presented minor complications. Two patients (6.9%) had small dehiscences, which were treated with serial dressings. One patient (3.4%) had minor spontaneous bleeding, without the need for surgical intervention; one patient (3.4%) required serial punctures of seroma on an outpatient basis, and one patient (3.4%) evolved with hypertrophic scarring in the infraumbilical region (Table 1).

Between 2002 and 2004 (group A), there were six complications, two major and four minor complications, corresponding to 75% of the total complications.

**Table 1.** Occurrence of major and minor complications.

Complications	Patients (n=29)
Larger	
Great dehiscence	1 (3.4%)
Bruise	-
Symptomatic anemia	2 (6.9%)
Flap necrosis	-
Infection/abscess	-
Deep vein thrombosis	-
Pulmonary embolism	-
Greasy embolism	-
Death	-
Smaller	
Seroma	1 (3.4%)
Small dehiscence	2 (6.9%)
Minor bleeding	1 (3.4%)
Hypertrophic scar	1 (3.4%)
Asymptomatic anemia	-
Infection / cellulite	-
Pulmonary atelectasis	-

Between 2005 and 2012 (group B), there were two complications (25%), with a major complication and a minor complication.

The statistical analysis, performed through the Fisher's test, showed no significant difference between the two time periods regarding the occurrence of complications ( $p=0.215$ ), according to Table 2.

**Table 2.** Patients with and without complications in both periods.

	The	B	Total
With complication	6 40.0%	2 14.3%	8 27.6%
No complication	9 60.0%	12 85.7%	21 72.4%
Total	15 100.0%	14 100.0%	29 100.0%

$p=0.215$

The extent of Fisher's test also showed no statistically significant difference between the complications that occurred between the two time periods, when divided into larger and smaller ones ( $p=0.444$ ), according to Table 3.

**Table 3.** Major and minor complications in both periods.

	The	B	Total
With major complication	2 13.3%	1 7.1%	3 10.3%
With minor complication	4 26.7%	1 7.1%	5 17.2%
No complication	9 60.0%	12 85.7%	21 72.4%
Total	15 100.0%	14 100.0%	29 100.0%

*p*=0.444

Of the 29 patients, two (6.9%) have been reoperated. One patient (3.4%) was submitted to readmission for debridement and new wound suture, and the other (3.4%) was subsequently submitted to hypertrophic scar resection to refine the result.

## DISCUSSION

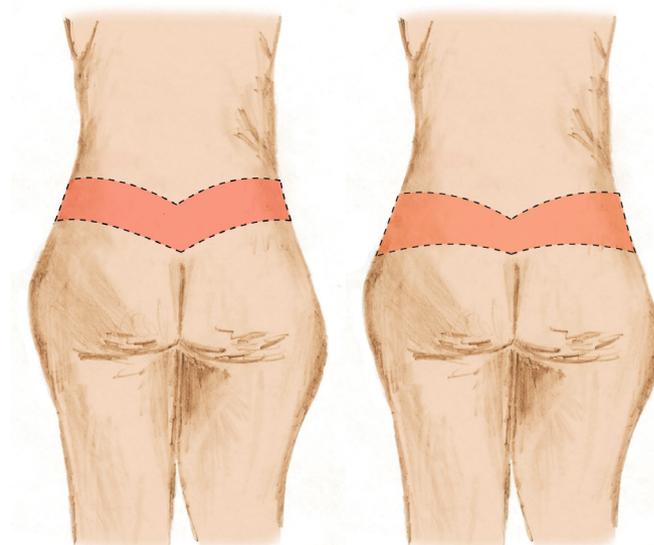
Circumferential abdominoplasty is a technique widely used for patients with high weight loss and who have excessive dermofat in the anterior, lateral and posterior abdomen. Besides, the gluteal region ptosis, requiring or not to increase the buttocks' volume, is also a primary factor in the technique's indication. It should also be quantified the excess of skin and adipose tissue in the epigastric region and the presence or not of the scar from gastroplasty by conventional means, as these will be determining factors for the indication of simple or composite circumferential abdominoplasty<sup>17</sup>.

The satisfaction of these patients is directly related to the body extension treated; that is, the larger the area with body contour restored, the greater its satisfaction. For this reason, circumferential abdominoplasty, which treats the entire circumference of the abdomen and suspends the lateral face of the thighs and the gluteal region, generally promotes great satisfaction to patients<sup>18,19</sup>.

Several authors have described their techniques, associating them with liposuction and making surgical demarcation changes, always to position the posterior scar<sup>7,8,10-14</sup> properly. It is essential to highlight that the body contour surgery group of the plastic surgery division and burns of HCFMUSP followed and contributed substantially in this historical context.

In the first operated cases – group A – the posterior scar was positioned more superiorly in the

dorsal region. This promoted the trunk's waistlines, but it became difficult to cover the scar with the bathing suits. At this time, there was partial dehiscence of the posterior scar on the coccyx in some patients, caused by excessive tension on the scar because the posterior incisions were parallel. Since then, the distance between the posterior demarcation lines in the area over the coccyx has been decreased. Thus, this intercurrence became infrequent (Figure 4).



**Figure 4.** Demarcation of the posterior resection area of the circumferential abdominoplasty; A. Preview, with parallel lines; B. Current, lower and with convergent lines towards the vertex over the intergluteal groove.

The moment of change of decubitus of the anesthetized patient is critical and should be carefully planned concerning monitoring, venous access, airway, and the patient's own physical state. These decubitus changes should be avoided in hypotensive or hypohydrated patients, at risk of triggering deleterious autonomic reflexes by altering body fluids' position with severity<sup>20</sup>. For this reason, it opts for the beginning of surgery with the patient in horizontal ventral decubitus and, after synthesis of the posterior region, it is changed to prone dorsal decubitus. With this, there is only one change of decubitus in the transoperative period.

Another crucial technical evolution between the groups was the proscription of drains' use and the beginning of the points of apathy or progressive tension. The use of drains is an exception. With the fixation of flaps to aponeurosis in both anterior and posterior regions, there is a considerable reduction or elimination of dead spaces<sup>21-24</sup>.

Three patients (10.3%) presented major complications - symptomatic anemia (n=2) and suture dehiscence that required debridement and resuture (n=1), an incidence compatible with the literature.

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There was no deep vein thrombosis in this series, pulmonary or fatty embolism, systemic infection, or hematoma requiring surgical intervention. Five patients (17.2%) presented minor complications (small dehiscence or bleeding, seroma, and hypertrophic scar), incidence also compatible with that found in the literature<sup>15,25-27</sup>.

The incidence of complications was higher in group A (75%) when compared to group B (25%). This suggests the positive influence of the learning curve and the surgical team's interaction regarding pre, trans and postoperative care, although there is no statistically significant difference (Tables 2 and 3).

The reoperation rate was 6.9% (n=2), also compatible with the literature, and one patient was operated on for debridement and resuture of the surgical wound, and the other patient was operated on later to improve the hypertrophic scar<sup>25,26</sup>.

It is known that Latino patients are concerned with the extent and positioning of scars. Perhaps, for this reason, CA is not as widespread in Latin America as in North America. There were changes in surgical demarcation, and the surgical team's training decreased the operative time and minimized risks. Even so, it continues to be considered a major surgery<sup>28,29</sup>.

## CONCLUSION

An essential technical evolution has occurred in the performance of circumferential abdominoplasties, such as better positioning of incisions, sutures, and restriction in the indication of the use of drains. In the sample presented, the incidence of complications and reoperation rates were similar to those found in the literature.

## COLLABORATIONS

<b>WC</b>	Analysis and/or data interpretation, Conception and design study, Conceptualization, Data Curation, Final manuscript approval, Formal Analysis, Methodology, Project Administration, Realization of operations and/or trials, Supervision, Validation, Writing - Original Draft Preparation, Writing - Review & Editing
<b>MM</b>	Realization of operations and/or trials, Writing - Review & Editing
<b>RIR</b>	Realization of operations and/or trials, Writing - Review & Editing
<b>RG</b>	Supervision

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