Brachial-dorsal mammoplasty: body contour surgery of the upper region of the trunk after major weight loss

_Braquio-dorso-mamoplastia: cirurgia do contorno corporal da região superior do tronco após grandes perdas ponderais_

**Introduction:** In Brazil, 88000 bariatric surgeries were performed in 2014. After weight loss, deflation occurs around the trunk, with sagging and folding of excess skin of the breasts in the posterior dorsal region. We, therefore, propose a surgical procedure to treat upper region of the entire trunk, including breasts, side and rear back, and arms. **Objective:** To present a personal experience in brachial-dorsal mammoplasty surgeries. **Method:** We operated 13 patients from 2007 to 2014, 11 women and two men. **Results:** The average age was 41.9 years. The brachial-dorsal mammoplasty was performed in all patients. In three cases, L-brachial-dorsal mammoplasty was performed, due to lower latero-posterior deformity. The average surgery duration was 4 hours and 30 minutes. The average Body Mass Index (BMI), before bariatric surgery, was 53.5 kg/m². Weight loss ranged from 47 to 114 kg. The pre-surgery BMI ranged from 23 to 39 kg/m². There were no cases of infection, large dehiscence or seroma. Two patients developed hematoma, requiring a new intervention for drainage. **Conclusion:** Deformities of the thoracic region in patients with large weight loss are variable, requiring several surgical treatments that should address the entire chest as a single anatomical area. It is important to understand the deformity that each patient presents and adapt the surgical approach accordingly. The main indication for a brachial-dorsal mammoplasty is lateral drop of the inframammary fold.

**Keywords:** Torso; Bariatric surgery; Weight loss; Mammaplasty.

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**ABSTRACT**

**Introduction:** In Brazil, 88000 bariatric surgeries were performed in 2014. After weight loss, deflation occurs around the trunk, with sagging and folding of excess skin of the breasts in the posterior dorsal region. We, therefore, propose a surgical procedure to treat upper region of the entire trunk, including breasts, side and rear back, and arms. **Objective:** To present a personal experience in brachial-dorsal mammoplasty surgeries. **Method:** We operated 13 patients from 2007 to 2014, 11 women and two men. **Results:** The average age was 41.9 years. The brachial-dorsal mammoplasty was performed in all patients. In three cases, L-brachial-dorsal mammoplasty was performed, due to lower latero-posterior deformity. The average surgery duration was 4 hours and 30 minutes. The average Body Mass Index (BMI), before bariatric surgery, was 53.5 kg/m². Weight loss ranged from 47 to 114 kg. The pre-surgery BMI ranged from 23 to 39 kg/m². There were no cases of infection, large dehiscence or seroma. Two patients developed hematoma, requiring a new intervention for drainage. **Conclusion:** Deformities of the thoracic region in patients with large weight loss are variable, requiring several surgical treatments that should address the entire chest as a single anatomical area. It is important to understand the deformity that each patient presents and adapt the surgical approach accordingly. The main indication for a brachial-dorsal mammoplasty is lateral drop of the inframammary fold.
INTRODUCTION

Obesity is, without doubt, a worldwide epidemic. According to the Brazilian Society of Endocrinology and Metabolism, Brazil has around 70 million overweight individuals, which has doubled in the last three decades ago. Of these, 18 million are considered obese. In 2014, approximately 88000 bariatric surgeries were performed in Brazil, according to the Brazilian Society of Metabolic and Bariatric Surgery.

Obesity surgery (bariatric surgery) is a type of surgical technique designed to promote weight reduction and treatment of diseases that are associated and/or aggravated by obesity.

Usually, the subcutaneous tissue and skin of the chest cling firmly to the muscle-aponeurotic plane in the anterior medial regions (pre-sternal) and back (thoracic spine). Weight increase causes vertical and horizontal circumferential expansion of the chest, remaining adhered to these medial regions described above, called adhesion zones.

After weight loss, the chest deflates, resulting in excessive skin in these two dimensions, causing the appearance of flaccid skin and creating a larger thoracic skin fold in the lateral region. This causes a lateral descent of the inframammary fold, which continues with the dorsal fold, characterizing the main anatomical aspect of these patients with great weight loss.

To perform an appropriate treatment of these patients, the plastic surgeon should examine the chest as a whole. Therefore, we believe in the treatment of the upper region of the trunk as a single anatomical area.

Upper body lift surgery or brachial-dorsal mammoplasty is a combination of brachioplasty, resection of excess skin of upper region of the posterior and lateral trunk and treatment of the breast, or anterior thorax in men. This is necessary in cases where thoracic deformities are related to large weight loss. L-brachial-dorsal mammoplasty can be considered in patients with excess skin in the lateral region of the chest, without major excesses in the posterior region.

The criteria used for the selection of patients who are candidates for reconstructive surgery of thoracic deformity are similar to those of other regions of the body. The patient must have a stabilized weight loss.
for at least 6 months to 1 year\(^6\). One must perform a thorough preoperative evaluation, which includes determination of serum iron and plasma proteins to minimize complications. Note that after bariatric surgeries patients present some degree of malnutrition.

**OBJECTIVE**

The objective of this study is to present our experience in brachial-dorsal mammoplasty surgeries and report the systematization of the procedure.

**METHODS**

This review of our experience describes statistical data of all brachial-dorsal mammoplasty surgeries performed by a single surgeon, from 2007 to 2014, in private hospitals and the Clinical Hospital of the Federal University of Paraná, in Curitiba, PR.

The characteristics of patients such as age, gender, body mass index (BMI) pre-weight loss and BMI after weight stabilization, duration of surgery and postoperative complications were assessed.

**Operative technique**

**Demarcation**

Marking of brachial-dorsal mammoplasty was initiated with the patient standing. A posterior midline of the chest was demarcated. Then, we marked a superior incision line of the dorsoplasty. With a digital clamping maneuver of the excess skin, we demarcated the inferior line up to the middle axillary line, seeking to maintain the resulting scar within the bra region (Figure 1).

Next, we began the demarcation for brachioplasty, marking the brachial sulcus. Then, 1 cm below this line, the anterior incision from the axilla to the distal segment of the excess skin was demarcated. A digital clamping maneuver was performed to mark the posterior incision, finishing the distal marking with a slight angle toward the antecubital fossa, to hide the scar. In the axillary region, two triangles, with anterior apex, were demarcated, one in each line of the brachioplasty marking, with the aim of breaking the scar and preventing skin retractions in this region (Figure 1).

Then, we performed the markings of the lateral vertical dorsoplasty, connecting the posterior line of the brachioplasty to the superior line of the dorsoplasty, at a right angle. With digital clamping, we marked the anterior dorsolateral line, taking care to avoid lateralization of the breast.

Marking of the mammoplasty in an inverted T was carried out. Usually, we used Peixoto technique in “S”, and then joined the dorsolateral markings (Figure 2). In male patients, the demarcation of the anterior region of the chest accompanied the bottom edge of the pectoral muscle, with design of the lower pedicle flap to the areola-papillary complex (Figure 3).

**L-Brachial-dorsal mammoplasty**

In these cases, the demarcation of brachioplasty and lateral dorsoplasty was carried out, joining the lines of the two laterally to the marking of the lateral extremity of the inframammary fold, in the posterior axillary line. The line was drawn in a curve, calculating the tissue to be resected by digital clamping.

**Surgical procedure**

**Brachial-dorsal mammoplasty**

During surgery, we initiated the surgery at the dorsal region, with the patient in ventral decubitus. We infiltrated the markings and incised up to the muscle...
fascia. Tissue resection was followed by thorough hemostasis. Closure was performed by planes with PDS® 3.0 with fixing of tissues to deep fascia to decrease dead space and, consequently, seroma (Figure 4).

The patient was placed in dorsal decubitus, and we performed the brachioplasty incising up to the superficial fascia. Skin and subcutaneous tissue were resected in the block above the superficial fascia, which should be superficial in the axillary region, performing only skin resection to protect the lymphatic drainage. The closure was done by planes with Monocryl® 3.0 and 4.0 (Figure 5).

We performed mammoplasty with de-epidermization of the previously marked area and constructing a lower chest flap with lateral extension to obtain a larger breast volume, securing it with nylon 2-0 sutures to the pectoral muscle at the height of the second rib.

In patients with lower tissue volume, we performed breast implants, via the subfascial upper third of the surgical pocket, and constructed a small flap of the chest wall, elevating together with the anterior fascia of the chest to protect the implant. We sutured the superficial fascia at the lower edge of the incision lateral to the periosteum of the rib, in continuity with the dorsoplasty, to fix the inframammary fold to the new position (Figure 6).

In male patients, the incision was performed in the inframammary fold according to the demarcation, with the construction of the inferior pedicled flap to the areola. Resection of excess skin and fixation of flaps was done as shown in Figures 7 to 9.

Finally, there was the resection of the lateral vertical dorsoplasty, with closure in the fascial and cutaneous planes.

An aspiration drain was maintained until the first postoperative day. Deep venous thrombosis prophylaxis was held in all patients with physical methods and drug therapy. The majority of the patients were discharged on the first postoperative day.

L-Brachial-dorsal mammoplasty

The patient was positioned in dorsal decubitus. Brachioplasty and mammoplasty were performed
according to the previous description. Finally, lateral dorsoplasty was performed, according to demarcation, with closure of the fascial plane and skin. Care must be taken in the compensation of the suture in both planes.

RESULTS

A total of 13 patients were analyzed, 11 females (84%) and two males (16%) (Figures 10 to 15). The average age at the time of surgery was 41.9 years (ranging from 21 to 62 years). In three patients, breast implants were used. Brachial-dorsal mammoplasty was performed in all patients. In three cases, L-brachial-dorsal mammoplasty was performed, due to lower lateral-posterior deformity.

The average duration of surgeries was 272 minutes (4 hours and 30 minutes), ranging from 180 to 360 minutes.

The BMI before bariatric surgery ranged from 41 to 66 kg/m², with an average of 53.5 kg/m². Weight loss presented by patients ranged from 47 to 114 kg, with
The restoration of body contour after excessive weight loss is of great importance for these patients, restoring self-esteem and rehabilitating the patient for physical activities\textsuperscript{4,5}. The upper region of the trunk includes the breasts, arms and back; however the breasts are a cause of greater impact and complaints in female patients\textsuperscript{4}. For women, the breasts are the key factor for restoring body contour.

Excessive loss of body weight causes several undesirable situations, such as mammary ptosis, skin folds on the back, ptosis of the posterior axillary line and excess tissue in the arms\textsuperscript{4,6}. The breasts vary from atrophy to significant hypertrophy\textsuperscript{4}. Due to the catabolism of fat and connective tissue, there is a reduction in mammary projection, flattening, and flaccidity. Furthermore, descent of the nipple and the inframammary fold occurs. The excess skin in these patients ends up worsening the appearance of the breasts, and the skin of the thoracic region droops on itself in cascades, like a curtain\textsuperscript{6}.

Normally, the skin-fat envelope adheres firmly to the musculoskeletal region of the chest, and the inframammary fold has a semi-circular form. Obesity causes a circumferential and vertical growth of the chest. A pronounced weight loss produces flaccidity of the skin and excess skin in these two directions. There are adhesion spots in the chest in the anterior and posterior median, pre-sternal and thoracic spine regions and, in these places, fat is not deposited. After weight loss, the regions lateral to these adhesions tend to dip. The deformity of each patient depends on the quality of the skin, age, BMI and actual weight lost after bariatric surgery.

Most of our patients have an average weight loss of 58.2 kg after bariatric surgery, which results in large body deformity, including the entire torso, breasts, and arms. This leads to great discomfort, such as difficulty in movement, intertrigo, and psychological sequelae\textsuperscript{4,5}. We emphasize that, even after weight loss, these skin excesses retain the aspect of obesity in the patient, noticeable even with clothes.

DISCUSSION

Excessive loss of weight after gastroplasty results in large body deformity, including the entire torso, breasts, and arms. This leads to great discomfort, such as difficulty in movement, intertrigo, and psychological sequelae\textsuperscript{4,5}. We emphasize that, even after weight loss, these skin excesses retain the aspect of obesity in the patient, noticeable even with clothes.
risk of postoperative complications, especially with the
wound, as this is more extensive. However, the biggest
advantage is that to achieve the objective of the proposed
surgery, fewer operative times are required. The most
important factor in performing resection of tissues in the
same surgical time is obtaining a better body contour.

The average surgical time was 4 hours and 30
min, deemed appropriate, according to the resolutions
of safe surgery suggested by the Brazilian Society of
Plastic Surgery. To attain this, one must have a well-
defined routine, systematic procedure and surgical steps,
integration, and training of teamwork.

Several techniques have been introduced
for the treatment of upper body contour, including
brachioplasty to rejuvenate the region of the arms and
armpits, procedures for the dorsal region and several
techniques to correct the breasts. The objective of
brachial-dorsal mammoplasty is to improve contour of
the arms, and entire circumference of the chest, raise
the inframammary fold, eliminate excess breast laterally
and improve breast contour.

Some reports classify breast deformities to
establish the surgical plan, justified in asserting that
the type of breast deformity determines the best result.
Type 1 is characterized by hypertrophy and excess
breast volume. In Type 2, there is ptosis with adequate
breast volume. Type 3 patients are those with ptosis
with inappropriate breast volume. Surgical options
depend on the anatomic characteristics and desire of
the patient. Among them are breast implants, dermofat
flaps of the lower portion of the breast, and lateral region
of the chest.

Breast deformities have the greatest number of
options for treatment, as cited, and can be treated with
traditional reduction, autologous breast augmentation
or with implants, associated or not with mastopexy. Some
innovative techniques are also suggested such as
spindle flap, total remodeling of the breast, and use of
flap pedicled in perforating vessels.

These techniques do not always produce
satisfactory results due to the lack of breast projection
and persistence of the inframammary fold in a lower
position. The lack of treatment of the thoracic region
and axilla results in aesthetic disharmony. In our
study, the majority of patients were submitted to
breast reconstruction with classical techniques, such as
mastopexy with breast implants (two patients),
mastopexy without breast implants and reduction
mammoplasty in “T”.

The surgery to correct excess skin of the arms
should be assessed individually.

There are different ways described to perform
brachioplasty, such as L-brachioplasty, described by
Hurwitz, with demarcation of the medial face of the
arm, resection of skin and liposuction. In the technique
described by Aly, the demarcation is in the posterior
position, resection of skin and fat until the superficial
fascia, and Z-plasty in the axilla is performed. This
technique allows a more aesthetic scar in the axillary
region and with less probability of contracture, being
more simple and faster.

Some reports mention that the scars on the axilla
in “Z” or “T” are not as aesthetic as the “L” form. The
majority of reports that used the “Z” technique suggest
that this scar results in a lower chance of contracture.
In the present study, we performed a combination of
the two techniques, with minor modifications. Therefore
we believe direct resection without liposuction to be more
effective, and drawing of the triangles in the axillary
region provides the breakdown of scar preventing
contractures, without the unpleasant aesthetic outcome
of the visible half of Z-scar in the rear view.

The correction of excess skin in the lateral region
of the chest is a deformity that, in the past, was not
treated properly. For complete resection of excess lateral
and dorsal skin, it must be associated a vertical incision
in the midaxillary line, uniting the brachioplasty with
breast surgery, resulting in a surgery called brachial-
dorsal mammoplasty (upper body lift) in “L”. It must be
performed after an adequate assessment of the patient,
especially if there is excess posterior skin and descent
of the inframammary fold, since in most serious cases a
brachial-dorsal mammoplasty should be the best option.
It can be a good therapeutic option in other cases as well.

Our sample is based on the achievement of
brachioplasty, lateral dorsoplasty or postero-lateral
dorsoplasty. An inferior flap of the back was lifted up
to the superior incision, allowing to eliminate vertical
excess skin, a lateral elevation of the inframammary
fold and eliminate lateral excess skin of the breast and
back, agreeing with the technique described by Aly and
the demarcation of the axilla according to Hurwitz. The
results of correction of excess back and lateral skin in
patients were satisfactory.

After bariatric surgery, patients undergo some
nutritional changes, dependent on the type of surgery
performed. The nutritional deficiencies most commonly
found are of vitamins, protein, minerals (mainly of zinc
and calcium) and iron. These situations, together with
the fact that most have some comorbidity, increase the
risk of postoperative complications.

Most of our patients had some comorbidity such as
hypertension, hypothyroidism, depression and arthrosis.
The main complications found in studies after surgery
in patients with excessive weight loss are bleeding,
infection, inesthetic scar, improper positioning of the
scars and dehiscence, due to extension of the surgical
wound and tension vectors in opposite directions.
Bleeding ends up being up to two-fold more frequent in these patients due to the larger caliber of vessels (up to three-fold). The presence of seroma, lack of definition of the inframammary fold, asymmetry, and inappropriate body contouring has also been reported in the literature. Some patients, when submitted to brachioplasty, might present lymphedema and lymphocele. In breast surgeries, hematoma, dehiscence, necrosis of the areola and flaps and later recurrence of ptosis might occur. Despite the complexity of these patients and higher risk of complications, there were no cases of infection or dehiscence in our study. Only two patients developed hematoma requiring surgical drainage. We also had one patient with mild asymmetry and another with discrete dyschromia of the areola, and one case of seroma, with resolution with aspiration with a syringe and compressive dressings.

CONCLUSION

Deformities of the thoracic region in patients with massive weight loss are variable, requiring several surgical treatments that should address the entire chest as a single anatomical area. It is important to understand the deformity that each patient presents and adapt the surgical approach accordingly. The main indication for a brachial-dorsal mammoplasty is lateral drop of the inframammary fold.

COLLABORATIONS

**AECM** Formulation of the hypotheses and study design; performance of the surgeries and/or experiments; manuscript preparation and critical review of the content.

**PB** Analysis and interpretation of the data; performance of the surgeries and experiments.

**PGC** Analysis and interpretation of the data; performance of the surgeries and experiments.

**ASKA** Analysis and interpretation of the data; performance of the surgeries and experiments.

**RSF** Final approval of the manuscript.

REFERENCES