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Body Contouring of the Arms and Brachioplasty

Body-Contouring des Arm-Thorax-Bereichs und Oberarmstraffung

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Schlüsselwörter
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- thigh reduction
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Zusammenfassung

Patienten mit Zustand nach massivem Gewichtsverlust leiden unter Cutis laxa im Bereich der Oberarme, die über die Axilla hinaus in den Thoraxbereich reicht. Die bisherigen Korrekturmaßnahmen waren aus unserer Sicht unbefriedigend und führten oft zu auffälligen Narben. Um das Gesamtbild der Deformität zu korrigieren, wurde die L-förmige Oberarmstraffung entwickelt. Sie beinhaltet die Resektion zweier ungleicher ellipsoider Hautareale, wodurch sich natürliche Konturen mit einer unauffälligen L-förmigen Narbe wiederherstellen lassen. Die Deformität der Cutis laxa im Bereich der oberen Extremität und des Thorax beinhaltet einen Hautüberschuss an den Oberarmen, eine zu große hintere Axillarfalte, eine Abflachung und Verlängerung der vorderen Axillarfalte sowie die Wulstbildung an der lateralen Thoraxwand. Durch das Fassen des Hautüberschusses wird eine Hautellipse markiert, die vom distalen Oberarm bogenförmig bis in die Fossa deltoideopectoralis reicht. Eine zweite kürzere elliptoide Hautexzision wird aus der Axilla bis auf die laterale Thoraxwand markiert. Beide Ellispen werden durch eine Markierung in Form eines umgekehrten V in der Axilla zusammengeführt. Nach der Hautresektion werden die Wundränder durch eine dreieckförmige Dehnungslappenplastik aus der hinteren Axillarfalte verschlossen. Hierdurch lassen sich gut konturierte Oberarme, Axilla und laterale Thoraxwand mit einer inevertierten L-förmigen Narbe, die vom medialen Unterarm über den Dom der Axilla reicht und von dort senkrecht an der lateralen Thoraxwand nach kaudal reicht, formen. In den vergangenen vier Jahren wurden mehr als fünzig Patienten nach starkem Gewichtsverlust durch diese ästhetisch-plastische Neuformung mit unauffälligen Narben und geringen Komplikationen behandelt. In acht Fällen wurde eine Narbenkorrektur durchgeführt, wovon zweimal eine Z-Plas-

Abstract

Massive weight loss patients suffer severe arm deformity, extending through the axilla and onto the chest. We found current operations inadequate, often with conspicuous scars. The L brachioplasty was evolved to treat the entire deformity through the excision of two right angle unequal ellipses, leaving natural contours and an unobtrusive L-shaped scar. The upper body deformity consists of loose upper arm skin, oversized axilla, descent of the posterior axillary fold, flattening and elongation of the anterior axillary fold, and lateral chest rolls of skin. By tissue gathering and pinching, a hemi-ellipse is drawn over the lower half of the inner arm, sweeping up to the deltopectoral groove. Then a shorter ellipse is extended through the axilla onto the chest. These ellipses are connected by an inverted V-resection through the axilla. After skin resection the wound margins are closed with a triangular flap advancement of the posterior axillary fold. The result is a properly contoured reduced arm, axilla, and lateral chest with a sweeping inverted L-scar coursing upward along the lower medial arm to cross the dome of the axilla and then drop vertically along the mid lateral chest. Over the past four years more than fifty weight loss patients have been treated with aesthetic reshaping of the upper arm leaving inconspicuous scars and only minor complications. There have been 8 scar revisions, including two Z-plasties for contracture. The rationale and results compare favorably with contemporary techniques. L-brachioplasty is our procedure of choice for the massive weight loss patient and can be selectively applied to the aging arm.

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tik nötig war. Das Konzept und die Ergebnisse sind im Vergleich zu anderen Verfahren äußerst günstig. Die L-förmige Oberarmstraffung ist unsere Technik der Wahl bei Patienten nach massivem Gewichtsverlust. Die Technik kann auch zur Straffung im Rahmen des natürlichen Alterungsprozesses eingesetzt werden.

Introduction

The female upper arm, axilla, and adjacent chest are appreciated for femininity, beauty, and sensuality. Understandably, excess sagging skin and fat in this area following massive weight loss or aging is not accepted. While the most dramatic manifestation is the upper arm canopy-like draping, disturbing deformity invariably includes the axilla, lateral chest, and breast. These afflicted women cover up with long sleeves and skin rolls annoyingly overhang the top edge of their bra. Excessively deep armpits are bizarre and difficult to shave.

Brachioplasty treats this common condition [2,11,15,19]. In essence, brachioplasty removes excess medial upper arm skin and fat for aesthetic reshaping. Severe deformity teaches that brachioplasty should include the axilla and upper chest. The new contour should be normal, the scars inconspicuous, and complications minor and uncommon.

Finding established techniques inadequate, the senior author designed a continuous skin excision from the arm through the axilla and onto the chest in the form of the letter L [8]. We experienced consistent success with only minor occasional complications in over 50 patients. The "L" represents the shape of the excision with the long limb along the medial axis of the upper arm and the short limb meeting at right angles across the axilla along the mid-lateral chest. The sweeping scar across the axilla resembles a reclining letter L. The L-brachioplasty has been adapted to the aging arm.

There is considerable variability. Nevertheless, there are five consistent distortions (**Fig. 1** and **2**). The results of the L-brachioplasty on the patient seen in **Fig. 1** and **2** are shown in **Fig. 3 a** to **c**.

Number one deformity is tapered sagging of the upper arm along the posterior margin from the axilla and the elbow towards the hanging center. Number two abnormality is inferior dislocation of the posterior axillary fold (PAF). The ptotic PAF broadens the attachment of the arm to the chest, like a wing. The loosely suspended PAF contrasts to the tightly adherent deep axillary dome and elongated anterior axillary fold. Number three is the enlarged or hyper-axilla. Number four is the flattened and elongated anterior axillary fold (AAF). The descended breast accentuates the deformity. Number 5 is the lateral chest skin laxity leading into mid-torsal transverse rolls.

The ideal candidate has ptotic skin that more than doubles the expected width of the upper arm. Oversized arms may need preliminary liposuction. Patient selection is also based on the usual decision-making in cosmetic surgery with special attention to the visibility and unpredictability of the scars and risks of delayed healing, under- and over-resection, wound dehiscence, infection, and seromas and lymphoceles.

Fig. 1 These are preoperative frontal and posterior views of the upper arms and chest showing moderately deformity in a thirty-five-year-old woman. Prior to her body contouring, she was 5 feet 7 inches tall and weighed 157 pounds (BMI 26), having lost 150 pounds two years after her Roux-en-Y bypass surgery. She has sagging upper arm skin, descent of the posterior axillary folds, oversized axillas, elongated and flattened anterior axillary folds, and upper lateral chest rolls.

Patients and Methods

Operative technique

The preoperative markings permit expeditious excision of nearly all the excess skin and fat to obtain symmetrical effective closures. There should be minimal intraoperative adjustments. With the patient sitting, an arm and forearm are abducted 90 degrees with the palm forward. Dot the mid-point of the arm slightly posterior to the medial bicipital groove. Then the anterior line is drawn from the medial elbow through this dot to the deltopectoral groove across the dome of the axilla. There should be a gentle rise to the line, and if not, the original mid-point dot is dropped a centimeter or so posterior. By gathering and pinching excess skin and fat posterior to the initial mark, the width of mid arm excision is determined and a second dot is made near the posterior border. A straight line is drawn from that point to meet the medial elbow termination of the first line. Then a critical point is picked and marked along the inferior border of the medial arm that can be advanced to the deltopectoral point at the proximal termination of the anterior line. Approximation of these points should raise the posterior axillary fold, and equalize the lengths of the anterior and posterior lines. The line then acutely angles to descend inferiorly through the axilla, skirting the posterior axillary fold. A parallel line descends from the deltopectoral groove through the axilla. The distance between these last two lines removes the excess skin of the axilla and lateral chest.

When the arm is fully raised, the equal lengths of the anterior and posterior incision lines of the upper arm are confirmed be-

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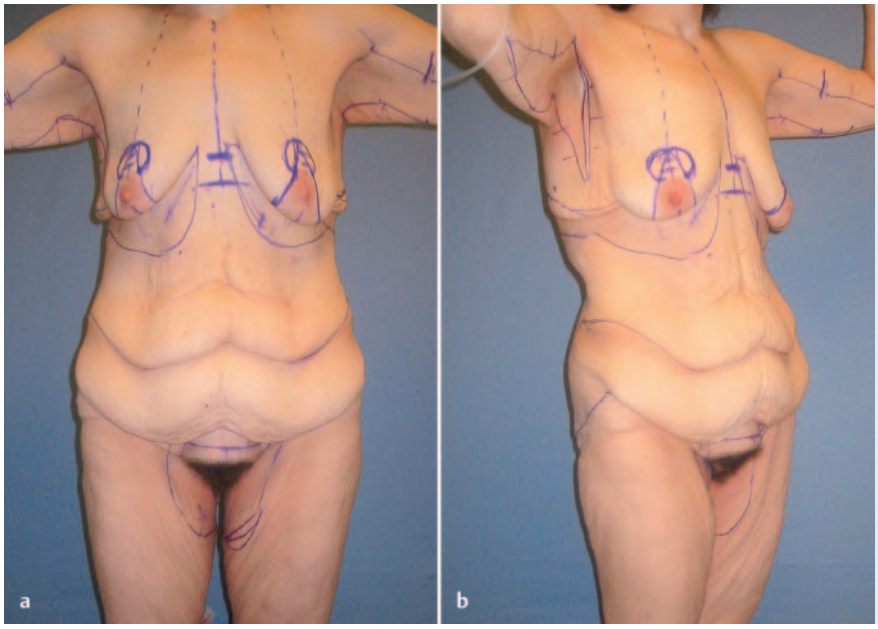

Fig. 2 a and **b** These are the full body anterior (**a**) and right anterior oblique (**b**) views of the patient in **Fig. 1** with immediate preoperative surgical markings for a total body lift and the L-brachioplasty.

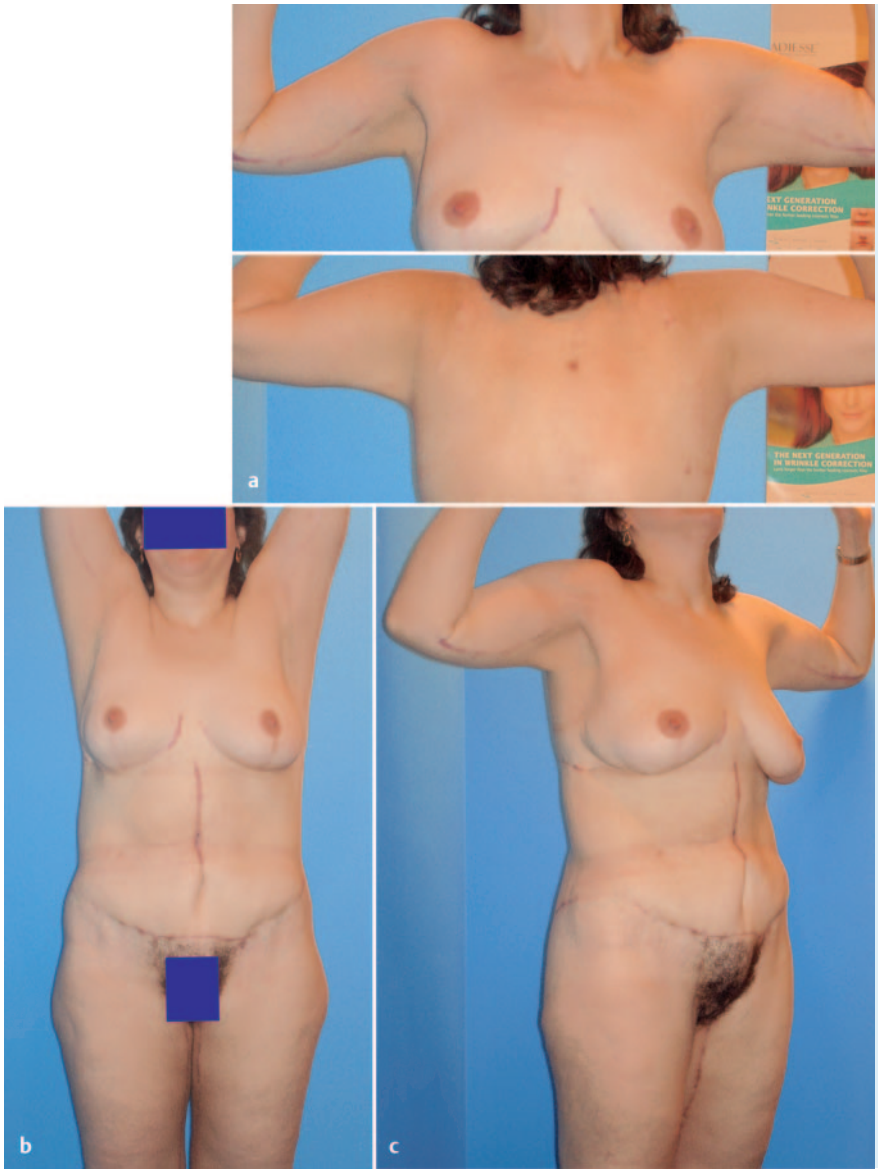

Fig. 3 a to **c** These are the one-year postoperative total body lift and L-brachioplasty frontal and posterior views of the upper arms and chest (**a**) and right anterior oblique (**b**) and raised arm full body frontal (**c**) views of the patient shown in **Fig. 1** and **2**. The upper arm sagging is symmetrically corrected leaving a normal drape to the posterior contour. The arm pit is smaller and shallower. The posterior axillary fold is raised to the proper position. With the help of the spiral flap reshaping of the breast, the lateral convexity of her breast transitions to a softly reverse curving and shortened anterior axillary fold. The short limb scar of the L is hidden behind the anterior axillary fold leading to a zigzag unrestrictive crossing of the axilla and curving towards the posterior border of the arm.

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fore continuing as zigzags across the axilla. An inferiorly based triangular flap of the proximal posterior upper arm has been formed as the inferior arm incision meets the lateral incision of the vertically oriented axillary ellipse. Cross hatching alignment lines are drawn.

The operation

With the patient supine, the arms are abducted about 80 degrees on arm boards. Arm intravenous infusion is avoided. The width of resection is rechecked. About 100 mL of saline with 1 mg of epinephrine and 20 mL of 1% xylocaine per liter are infused. Ultrasonically assisted lipoplasty completely removes most fat from under the arm ellipse, leaving a depression. Limited lipoplasty may be performed elsewhere.

The arching posterior arm incision is made through skin to the superficial fascia, and then undermined one centimeter. The raising anterior straight line arm incision is similarly made. Next, the outline of the shorter axillary-chest ellipse is incised. In the chest the incisions extend through fat to serratus fascia. If a spiral flap breast reshaping is to be performed, the posterior limb of the ellipse is not incised until the mastopexy/augmentation is completed.

The arm skin is resected like a full-thickness skin graft. Bleeding is minimal. The excision courses sub-dermal through the axilla and then is completed deeply over muscular fascia of the lateral chest. The clavipectoral fascia of the axilla is seen, but not entered. Veins and sensory nerves are seen, through a latticework of connective tissue nearly empty of adipose tissue. A deep suture advances the PAF triangular flap to the deltopectoral groove. The incisions are then aligned with towel hooks according to the hatch marks. A continuous horizontal running 2-0-gauge long-lasting absorbable suture approximates the subcutaneous fascia. A second smaller caliber continuous monofilament intradermal closure follows. Dermal glue completes the operation. No drains are used. The operative time for both arms is approximately 90 minutes. The arms are wrapped in gauze and an ace wrap (**Fig. 3 a** to **c**).

Results

All but a few of our more than fifty patients are pleased. All arms were closed primarily without dehiscence. Tip necrosis of the V advancement flap occurred in about 20% of the cases, leaving a small wound in the axilla to heal secondarily. This problem decreased by withholding early use of constricting elastic sleeves. Debridement in the axilla and secondary closure was needed in three patients. Another patient required skin grafting of delayed healing axillary and hip wounds. Further limited skin reduction after a year was performed in two patients. One obese patient suffered chronic mild total arm swelling temporarily responsive to pressure therapy. Recurrent lymphoceles of 3 to 5 cm in the mid to distal medial arm occurred in about twenty per cent of the patients. All lymphoceles responded to repeated aspiration and localized pressure. A few patients accept walnut-sized lumps.

Complete maturation of the scars often takes longer than two years. So patients could be encouraged to wait extended periods for scar fade. No patient expressed regret over the trade-off for their inner arm scar. The axillary scars were faint and a nonissue in all but a few patients. There was persistent banding from the axilla to the chest in two patients, leading to Z-plasties.

Discussion

We found prevalent full length brachioplasties inadequate to fully treat the weight loss patient [2,11,15,19]. Furthermore, the straight scars along the bicipital groove or along the posterior border were too conspicuous. Ending the linear scar into Ts or Zs upon entry into the axilla did not improve aesthetics. As these patients have both hanging skin and poor elasticity short scar techniques are inadequate [10,16,18]. In most every case, excess skin needs to be removed along the entire length of the arm. The challenge is how to do this simply, symmetrically, and reliably, leaving aesthetic contours and scars. Furthermore, the hyperaxilla, descended posterior axillary fold, flattened anterior axillary fold, and lateral chest roll need attention.

The width of the excisions through the arm, axilla, and chest is based on preoperative assessment through anatomical point locations followed by pinch and gathering maneuvers. With obsessive marking, resection adequacy, scar location, and symmetry is expected. As advocated by others [4], preformed skin excision patterns play no role.

Some techniques include a Z- or T-plasty or fish tails through the axilla to retard scar contracture [3,5,14,15,17]. That is a conceptual error, as the axillary deformity is addressed secondarily. Therefore aesthetic improvement of the arm pit is haphazard. The Z-plasty triangular flaps may interpose different quality skin (hair-bearing, non-hair-bearing, thin and thick), which leaves an unnatural and cobblestone-like appearance. In the unusual instance of scar contracture across the axilla following an L-brachioplasty, it can be treated secondarily with a better positioned Z-plasty inferior to the axilla. The T-plasty excision provides limited elevation of the descended posterior axillary fold [9,11]. This technique leaves two right-angle arm flaps leading into the axilla. Tip necrosis with widened scars and contracture does occur. The T-scar may drift into the arm.

After designing the L-brachioplasty, the senior author learned of Pitanguy's rather similar extended brachioplasty through the axilla onto the chest and under the breast [13]. Unlike Pitanguy's technique, the L-brachioplasty anterior incision line is made just behind the anterior axillary fold. This position maximizes elevation of the descended posterior axillary fold. We have used a de-epithelialized thoracic extension of the Pitanguy operation to contribute to an upper body lift and spiral flap reshaping of the breast. Along with the spiral flap reshaping of the breast, the L-brachioplasty restores complex aesthetic curves of the upper torso [6,7]. Finally, Pitanguy paid little attention to changes in the axilla. In fact, plastic surgeons have virtually ignored its aesthetics.

Troublesome postoperative lymphedema and lymphoceles complicate brachioplasty [10]. Pascal's logic of lymphatic sparing, pre-excision extensive liposuction, and his excellent results have encouraged us to do the same in recent cases [12]. There is no need to dissect out and anchor arm skin into the axillary fascia and that stitch may injure neurovascular structures [11,17]. The advanced posterior axillary fold skin smoothly conforms to the hemi dome fascia of the axilla. Finally, arm reduction that amputates the inferior excess from both the medial and lateral side destroys the natural mid-arm drape and accentuates the still ptotic posterior axillary fold. The mid-posterior arm becomes flat and tight just where it should be curved and soft. Posterior scars tend to noticeably contract [19].

The L-brachioplasty restores anatomical subtleties in both the weight loss and the aging patient with the least obtrusive scar.

The success is due to the rather large resection of skin and the direct triangular flap advancement of the axillary fold. There are no geometric scars or dog ears from rotation flaps.

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