

Endoscopically Assisted Aesthetic Augmentation of Tuberous Breasts and Fat Grafting to Correct the Double Bubble

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Abstract

Background Treatment of tuberous breasts types 1 and 2 must deal with the problem of the pseudo-double bubble in the primitive inframammary fold and also must release the constrictive ring. Two techniques currently are used to overcome these problems, but neither is entirely satisfactory. The first technique, in which the approach is via the primitive inframammary fold, leaves significant scarring when the lower poles expand. The second technique, in which the approach is periareolar, considerably reduces the area's sensitivity. This report presents a new endoscopically assisted technique with an axillary approach designed to solve these problems.

Methods Between 2005 and 2010, 68 patients (ages 18–42 years) underwent surgery. The intervention was bilateral in 57 and unilateral in 11 of these patients. All cases involved tuberous breasts types 1 and 2 (Grolleau's classification). The augmentation involves a transaxillary subfascial endoscopic approach, opening of the fascia at the primitive inframammary fold, and releasing of the constricting ring to enable the breast to expand, followed by implantation of an anatomic prosthesis to add volume to the lower quadrants. If the pseudo-double bubble appears, fat grafting is applied during the same surgical procedure. **Results** The results were reported to be highly satisfactory both by the patients and by the independent medical team. For six patients (8.82 %), fat grafting had to be repeated in the double bubble. No major complications were reported.

Conclusion The endoscopically assisted subfascial breast augmentation technique obtains highly satisfactory results in tuberous breasts types 1 and 2 (Grolleau's classification). The single scar is concealed in the axillary fold.

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Keywords Tuberous breast · Endoscopic breast surgery · Fat grafting

Introduction

Tuberous breasts grades 1 and 2 (Grolleau's classification) [4] are characterized by undeveloped lower quadrants of the breast. With type 1, the lower internal quadrant is limited, whereas with type 2, the development of the two lower quadrants is deficient, and the areola points downward.

Many surgical techniques have been proposed to treat this malformation, but all of them leave notable residual scarring, and in many cases, the remaining double bubble cannot be removed [7–10, 17]. Certain authors perform mammoplasty [18] or tissue expansion [19], but in our view, these are highly aggressive techniques for patients with tuberous breasts grades 1 or 2 who usually are unaware of their malformation and who consult for breast augmentation.

This study aimed to present the correction of tuberous breasts types 1 and 2 using a transaxillary endoscopic approach and fat grafting, to evaluate the results of the technique, and to review the complications.

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Materials and Methods

Patient Selection

All the patients in this study were white Caucasians with a body mass index (BMI) of 19–29 kg/m². Those with a BMI higher than 30 kg/m² were excluded from the study, as were smokers who had not given up smoking a month before surgery and patients with significant metabolic illness such as severe diabetes, cardiac disorders, and other general contraindications to surgery. For the patients with very enlarged areolas, we used periareolar techniques to reduce the nipple–areola complex (NAC), to correct the shape of the breast, and to introduce the prosthesis.

The study was accepted by the hospital's ethics committee, and all the patients gave written informed consent. The surgical procedures all were performed at the Quirón University Hospital in Barcelona. All the patients were followed up for at least 1 year.

Surgical Procedure

Before surgery, care is taken to inform the patient clearly about the possibilities and limitations of tuberous breast augmentation.

First we mark the midline, the midclavicular line passing through the NAC, the current inframammary fold, and the site 7–8 cm from the nipple at which we intend to place the new inframammary fold after correcting the deformity, bearing in mind the proportion of the breast in order to form the two lower quadrants. The site of the incision is the highest horizontal fold of the axilla. The procedure is performed with the patient under general anesthesia using propofol and a laryngeal mask.

A 5-cm axillary incision is made, but without crossing beyond the lateral edge of the pectoralis major muscle. After the skin incision, the superficial fascia of the pectoralis major muscle is identified, and an incision is made parallel to the fibers along the edge of the muscle.

Subfascial dissection is performed under the fascia of the pectoralis major muscle and above the muscular fibers with the aid of endoscopy and using our patented retractor [11] as far as the border of the pectoralis major muscle. The subfascial pocket is dissected as far as the site of the new inframammary fold. At this level, with the aid of an endoscopes, we perform parallel vertical incisions in the fascia 5–6 cm long at 1-cm intervals to allow lateral expansion. At the height of the old inframammary fold, we perform two horizontal incisions perpendicular to the vertical incisions, which allow the correct longitudinal expansion of the mammary tissue (Fig. 1). We then restore hemostasis with the aid of endoscopy.

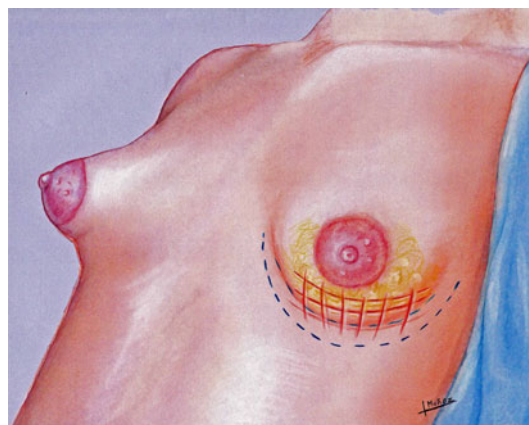


Fig. 1 Horizontal and vertical sections to expand the mammary tissue

Table 1 Implants

Implant size (ml)	Type of prosthesis	No. of patients
280	MM	26
295	MF	14
320	MM	12
335	MF	7
360	MM	5
375	MF	4

MM medium height and medium projection, *MF* medium height and full projection

We use sizers to determine the required volume and shape of the definitive prosthesis and to assess bilateral symmetry, taking into consideration the pinching test and the width from 2 cm from the midline to the axillary line. This helps us to decide which procedure will solve the double-bubble problem, meet the patient's expectations, and ensure the correct expansion of the glandular tissue. Finally we insert the anatomic implants, Natrelle™ (Allergan, Santa Barbara, CA) medium height and medium or full projection, according to the requirements of the case (Table 1). The reference points of the prosthesis are assessed via endoscopy to ensure adequate placement.

However small, an old inframammary fold will always remain, creating a pseudo-double bubble. We use fat grafting to correct it, as we do in the case of tuberous breasts type 3 [15]. We obtain the fat from the periumbilical region using a 10-ml low-pressure syringe. First, we inject 200 ml of lidocaine 1 % with 1:200,000 of adrenalin in the periumbilical region. Next, the fat is centrifuged at 1,500 rpm for 2 min. We have shown that this modification of the Coleman technique obtains a better graft response [3]. With a 1.6 × 9-cm Coleman cannula and a 1-cm syringe, we inject the fat in crossed tunnels. The incisions are made at each end of the old inframammary fold

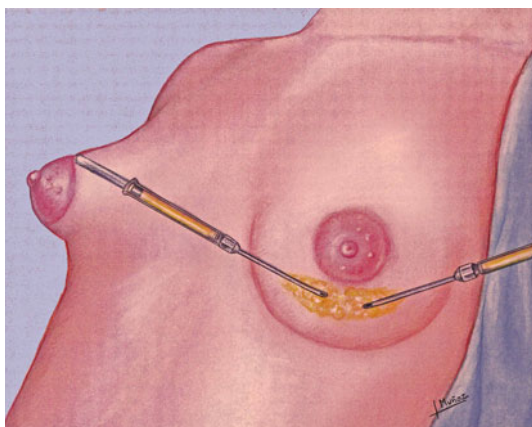


Fig. 2 Injection of fat from the two ends of the old inframammary fold if it persists

(Fig. 2). If the breasts are separated at the midline, we inject 20–32 ml of fat into the medial part of each breast. At the level of the old inframammary fold, we inject 10–20 ml of fat depending on the size of pseudo-double bubble.

Aspirative drainage is put in place, and the axillary incision is closed. A dressing is placed carefully to maintain the implant in the appropriate position during the first week to avoid rotation due to any involuntary movement of the patient. Thereafter, the patient should sleep in a supine decubitus position with a brassiere to maintain the position of the implant. The entire procedure takes about 120 min.

Results

Between 2005 and 2010, 68 patients (ages 18–42 years; mean age, 26.9 years) underwent surgery. The pathology was bilateral for 57 patients and unilateral for the remaining 11 patients. All the patients had tuberous breasts types 1 and 2.

The patients were followed up at 1 week, 1 month, 3 months, and 12 months after surgery. In the first week of the postoperative period, the patients were administered analgesics to alleviate pain. No cases of infection, hematoma, or dehiscence of the suture occurred. Due to its location in the axilla, the scar in some cases was slightly affected by the production of sweat, and for this reason, the stitches were removed somewhat later than usual.

To assess the results, we used two scales [6]: the one for the medical team and the other for the patient (Table 2). Although subjective, these ratings were useful for comparing the expectations of patients before surgery and their postoperative satisfaction. According to the patient reports at 12 months, 41 patients were very satisfied, 21 were satisfied, and 6 were not satisfied. The medical team

Table 2 Assessment criteria

Medical team		
Scale	Correction of deformity	Symmetry
1	Inadequate	High asymmetry
2	Good	Slight asymmetry
3	Excellent	Good symmetry
Patients		
Scale	Patient satisfaction	
1	Not satisfied	
2	Satisfied	
3	Very satisfied	

appraised the results as excellent in 44 cases, good in 18 cases, and inadequate in 6 cases.

All the patients received fat grafting in the old inframammary fold during the operation. The double bubble disappeared in all the patients after the application of fat grafting, but after 1 year, six patients (8.82 %) presented with a slight recurrence of the old inframammary fold and required reoperation under local anesthesia for additional fat grafting (5–7 ml). No capsular contracture, wrinkling, or rippling was found at the follow-up appointment. No cases showed rotation of the implant.

Axillary scars evolved satisfactorily, with no case of hypertrophy or intercostobrachial nerve injury (Figs. 3, 4). After 1 year, when asked whether they noticed an alteration in the sensitivity of the NAC, all the patients answered in the negative. Six patients gave birth during the study period and were able to breastfeed normally.

Discussion

The most frequently used techniques for the treatment of tuberous breasts aim to reduce the size of the NAC and for this reason use a double periareolar incision [1]. Some authors use a lower flap to correct the herniation of the breast tissue inside the NAC [2, 7], but patients with tuberous breasts grade 1 or 2 normally are unaware of their pathology and ask only for augmentation with as few scars as possible.

Other techniques for adding tissue in the lower quadrants use breast tissue flaps to cover the prosthesis and the quadrants [10, 16, 17]. We use these techniques in cases of very pronounced grade 3 tuberous breasts, but we have found that they alter sensitivity, leave visible scars, and affect the ability to breastfeed [15].

Some authors perform sections in the base of the mammary parenchyma to achieve expansion of the breast. To do so, they make a skin incision at the presumed site of the new inframammary fold [9, 10], but the scar is highly visible and not always in the correct place. Other authors

Fig. 3 A 26-year-old patient who presented with type 2 tuberous breasts showing asymmetric volume and the right breast slightly smaller than the left breast. **a–c** Endoscopically assisted transaxillary subfascial breast augmentation was performed. Radiation of the gland using the described technique (**d**) and insertion of cohesive silicone gel anatomic prostheses of different volumes were used to correct the asymmetry (320 ml in the left breast and 360 ml in the right breast). Fat grafting also was performed to correct the double bubble and to improve the cleavage (**e**). The patient reported a high level of satisfaction in postoperative controls. Control images at 12 months: Frontal view of the patient (**f**). Lateral view of the patient (**g**). Oblique view of the patient (**h**)



use endoscopy, but because they do not perform sections at the base of the breast to achieve its expansion, the pseudo-double bubble persists [5].

The difficulties treating tuberous breasts types 1 and 2 are due to the presence of a constricting ring that impedes the development of the lower quadrants. In more advanced cases, this produces a prolapse of the mammary gland tissue as far as the NAC and causes the inframammary fold to be unusually high. When the prosthesis is inserted without correction of this deformity, an unsightly double bubble appears and does not disappear with time.

Patients with grade 1 tuberous breasts tend to consult for breast augmentation. Because their breasts are not aesthetically unattractive, the fact that they are tuberous passes unnoticed [1]. These patients ask for augmentation without visible scars and experience good aesthetic and functional results.

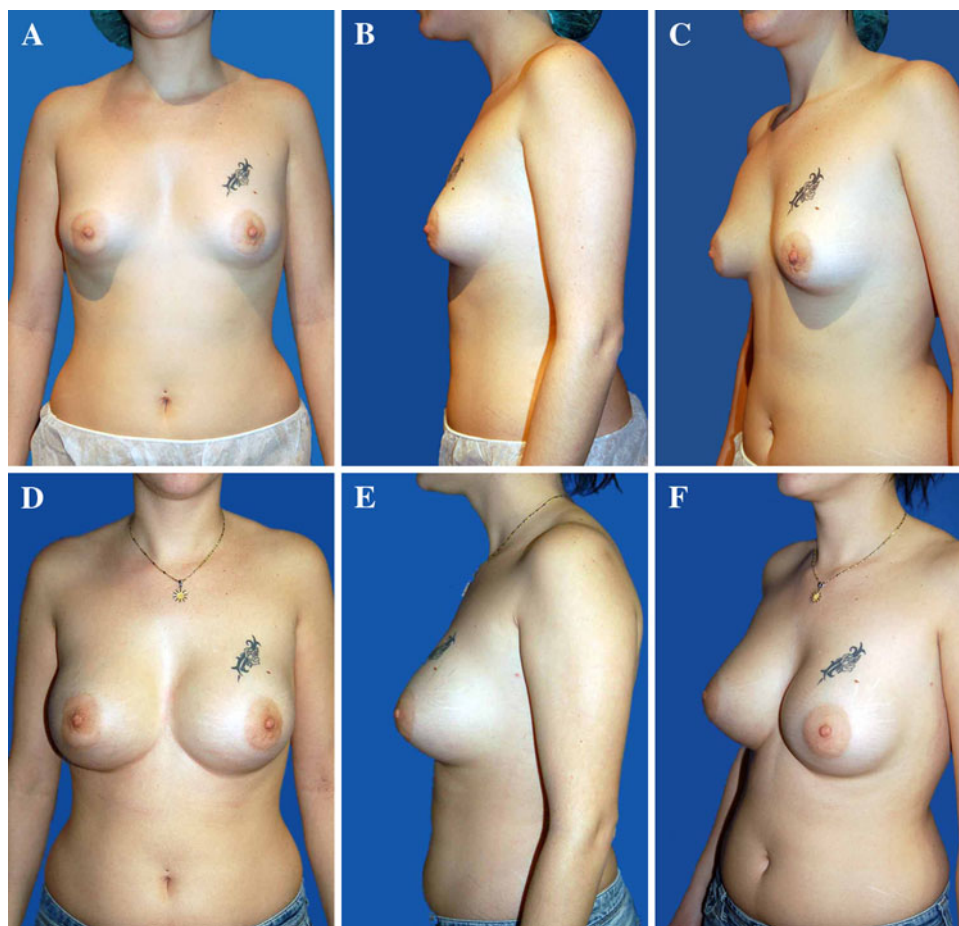
In our view, open techniques with flaps and visible scars to remodel the breast are excessive for augmentation of

tuberous breasts grades 1 and 2. For patients with a higher grade, however, they are very useful. These patients tend to be particularly distressed by the shape of their breasts and are more likely to accept open techniques [15]. Patients must be informed that these open techniques require the creation of flaps with breast tissue and a reduction in the diameter and herniation of the breast tissue in the NAC.

In our experience, when we have had to reduce the size of the areola and treat the tuberous breast with breast tissue flaps, sensitivity was altered in all cases [15]. The aforementioned techniques reduce the possibility of breast-feeding and alter the sensitivity of the NAC. For these reasons, we believe that open surgery is a valid option for severe cases of type 3 tuberous breasts but not for mild or moderate cases that can be managed with less traumatic endoscopically assisted techniques.

In recent years, some authors have used endoscopy for this type of surgery [5] to avoid these scars. However, the rates of reconversion to open surgery are high, and the

Fig. 4 A 23-year-old patient presenting with type 1 tuberous breasts. **a–c** Transaxillary subfascial breast augmentation was performed using the endoscope and radiation of the gland as described. Cohesive silicone gel anatomic prostheses of different volumes were inserted to correct the asymmetry (335 ml in the left breast and 335 ml in the right breast). Fat grafting also was performed to correct the double bubble. The patient reported a high level of satisfaction in postoperative controls. Control images at 12 months: Frontal view of the patient (**d**). Lateral view of the patient (**e**). Oblique view of the patient (**f**)



aesthetic results are not entirely satisfactory because of the inability to expand the lower quadrants of the breast and to resolve the problem of the remaining double bubble.

Our technique using an endoscopically assisted transaxillary subfascial approach creates a very tight-fitting pocket that prevents the prosthesis from rotating and allows placement of the inframammary fold at the desired site [12]. With the radial sections in the fascia 3 cm above and below the old inframammary fold, we achieve satisfactory lateral expansion of the breast tissue, and with horizontal sections, we achieve longitudinal expansion and weaken the constricting ring. Using sizes of different volumes, we are able to insert a prosthesis that both meets the expectations of the patient and adapts to the expanded glandular tissue. The use of anatomic prostheses allows us to increase the volume in the lower poles of the breast because a main feature of tuberous breasts is the lack of volume in this area. With the axillary approach, we can conceal the scar in the highest horizontal fold of the axilla.

Fat grafting corrects the possible problem of the double bubble and also remodels the entire breast at the sites

where additional tissue is needed, for example, in the cleavage, axillary line, or lower quadrants [13, 14].

The combination of all these techniques produces highly satisfactory results using a less traumatic approach, with very good functional results. These aspects are particularly important given the relatively young age of most patients.

Conclusions

Endoscopically assisted augmentation of grades 1 and 2 tuberous breasts using a transaxillary approach avoids visible scarring and obtains good functional results. Using the vertical sections of the fascia and breast parenchyma with a depth of 1 cm, we achieve lateral expansion of the mammary tissue, and with the horizontal sections, we achieve longitudinal expansion. The use of anatomic prostheses achieves highly satisfactory filling of the lower quadrants. Fat grafting is able to correct the pseudo-double bubble if it persists at the end of the process.

Conflict of interest None.

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