Secondary Breast Augmentation

Pietro Berrino

1 Reoperation Rates After Breast Augmentation

The "Inamed silicone breast implants core study" [1] reported a 28.8 % reoperation rate within 6 years after primary breast augmentation and showed that one-quarter of reoperated women required more than one reoperation through 6 years.

The "Mentor core study on Memorygel breast implants" reports a 15.4 reoperation rate at 3 years [2] and 19.4 at 6 years [3].

Breast augmentation is therefore the procedure associated with the highest reoperation rate in aesthetic surgery.

As a consequence, breast augmentation is a frequent cause of litigation, and although it is a routinely performed operation with little technical difficulty in standard cases, it is to be considered a high-risk operation for the surgeon.

Nevertheless, a 95 % satisfaction rate is reported [1] and this theoretically badly matches the reported high incidence of complications and reoperation rates. Patients' satisfaction and compliance are mainly related to psychological characteristics: patients' selection should include not only physical features, but (primarily) psychological aspects. Patients with unrealistic expectations, fragile, aggressive or irrational women should be refused. Marital status, education, and, last but not least, financial capabilities must be taken into account before selecting a patient.

Preoperative information must include published images showing complications and untowards results, and these should be formally mentioned in the informed consent.

P. Berrino, MD
Private Practice, Chirurgia Plastica Genova S.r.l., Genoa, Italy
e-mail: berrino@hotmail.com

2 Reasons for Reoperation After Breast Augmentation

Capsular contracture (27.5 %), request for size/style change (20.6 %), implant malposition (14.4 %) and ptosis (12 %) are the reasons more frequently leading to reoperation [1]. However, other complications such as rippling, need for biopsy, seroma, infection, extrusion and rupture have a significant impact on the need for reoperation.

With the exception of requests for different implant style or volume, which account for one reoperation out of five [1], reasons for reoperation can be schematically grouped as follows:

- Group 1: Complications due to implant modifications and surrounding tissues' reactions.
- Group 2: Complications due to body modifications.

The first group includes changes or modifications of the implant structure and/or alterations in the surrounding tissues provoked by the implant. Alloplastic material should ideally be *stable* and *inert*. Decades of experience have shown that, in spite of the continuous search for better implants, even last-generation prostheses are far from being *stable* and *inert*.

2.1 Implant Stability

Gel modifications, shell rippling and rupture are examples of the lack of implant stability.

The inner gel can show colour changes even few months after implantation (Fig. 1a), probably as a consequence of shell permeability. The gel can have a yellowish serum-like colour. This alteration is often encountered in conditions leading to implant removal. Implants presenting brownish material inside the shell have also been observed (Fig. 1b). These observations confirm that there is an interaction between surrounding fluids and the inner part of the implant,

N. Scuderi, B.A. Toth (eds.), *International Textbook of Aesthetic Surgery*, DOI 10.1007/978-3-662-46599-8_15

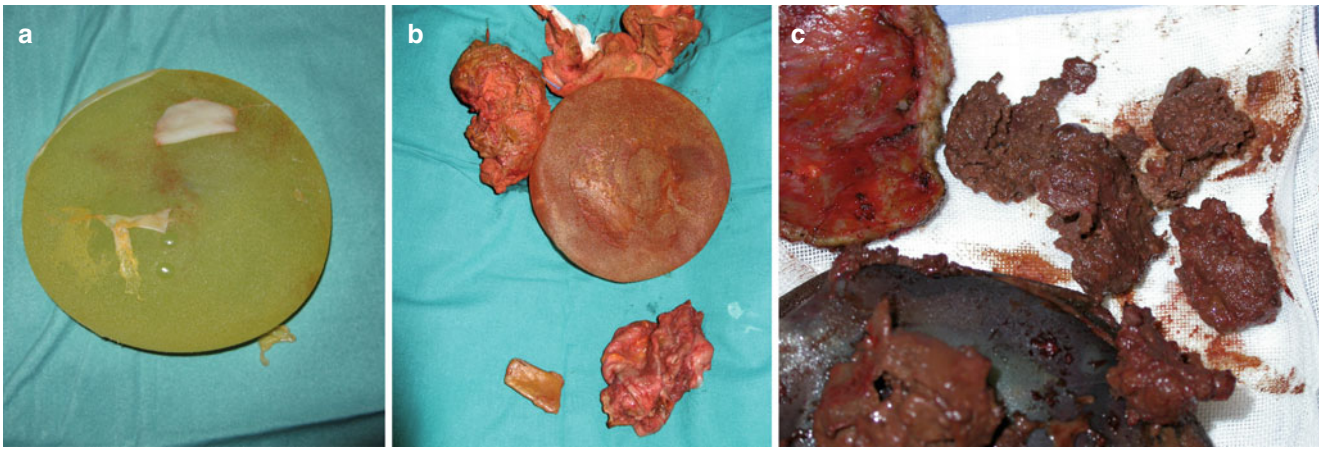

Fig. 1 (**a**) A last-generation anatomic implant showing deteriorated yellowish gel; (**b**) an implant showing deteriorated brownish gel; (**c**) mud-like peri-prosthetic collection

with evident changes in the implant content. This interaction represents a violation of the ideal stability. Hydrogel implants represent another example of lack of stability, since they showed long-term loss of the gel "structure" or osmotic passage of fluids from outside to inside the shell.

Creases in the shell are encountered in high-cohesivity implants and are probably due to excessive pressure during positioning. This alteration is often associated with visible rippling or shape distortion even in women with a good subcutaneous layer.

The 6-year by-implant rupture rate has been reported to be 3.5 % and it increases to 15/17 % at 10 years [1–3]. Problems related to implant rupture, although less frequently seen with last-generation implants, will therefore be encountered more often in the future.

2.2 Implant Inertness

Fluid collections, double capsules, capsular contractures and erythematous reactions are examples of the lack of inertia of breast implants.

Serum collections around the prosthesis are often seen at sonography even years after implantation. This does not represent a clinical complication unless associated with volume asymmetry or inflammation. Volume increase is often seen during summer, because of the high external temperature and sun exposure, and can be accompanied by discomfort, pain and tenderness. Antibiotic and anti-inflammatory treatment is advised. Patients are often very disturbed by this condition which often arises when it is more difficult to hide the asymmetry and represents a serious cause of anxiety and complaint. Serum collection and subsequent volume increase can subside on one side and start on the other one, adding good reasons for complaining. The aetiology of serum collection is unclear and generally referred to an aspecific body reaction. However, contamination with *Staphylococcus epidermidis* or Mycobacteria has been demonstrated. It is uncertain whether contamination occurs primarily or secondarily. Infected serum can lead to implant exposure. This generally happen in the lower breast quadrants, and most often in the submammary scar. Submammary scars represent a weak area subject to diastasis and implant exposure.

Other types of collection around the implant have been described: brownish mud-like materials are probably the result of a periprosthetic hematoma and/or silicone leakage (Fig. 1c). The blood collection leading to this condition can be due to an immediate blood loss or can happen several days or months after the operation, since some patient described a sudden volume increase occurring well after the operation. Patients with this type of collection around the implant report discomfort or pain, changes in the "feeling" of the implant and contracture. The treatment is implant removal, debridement and implant repositioning or mastopexy.

Capsular contractures using last-generation implants are reported to have a by-patient rate of 14.8 % at 6 years [1] and represent the most frequent reason for reoperation (27.5 % of all reoperation). Calcified or nodular capsules are commonly seen in case of silicone bleeding or implant rupture (Fig. 2a). More rarely a double capsule is encountered, with an inner layer adherent to the implant, surrounded by serum collection inside a smooth outer fibrous capsule (Fig. 2b). The inner capsular layer can be soft or constricted. When soft, the implant can easily be moved inside the outer layer and the patient can dislocate the prosthesis. This can have an important medico-legal aspect since the patient can manually create a temporary deformity by dislocating the implant (Fig. 3). When compressed

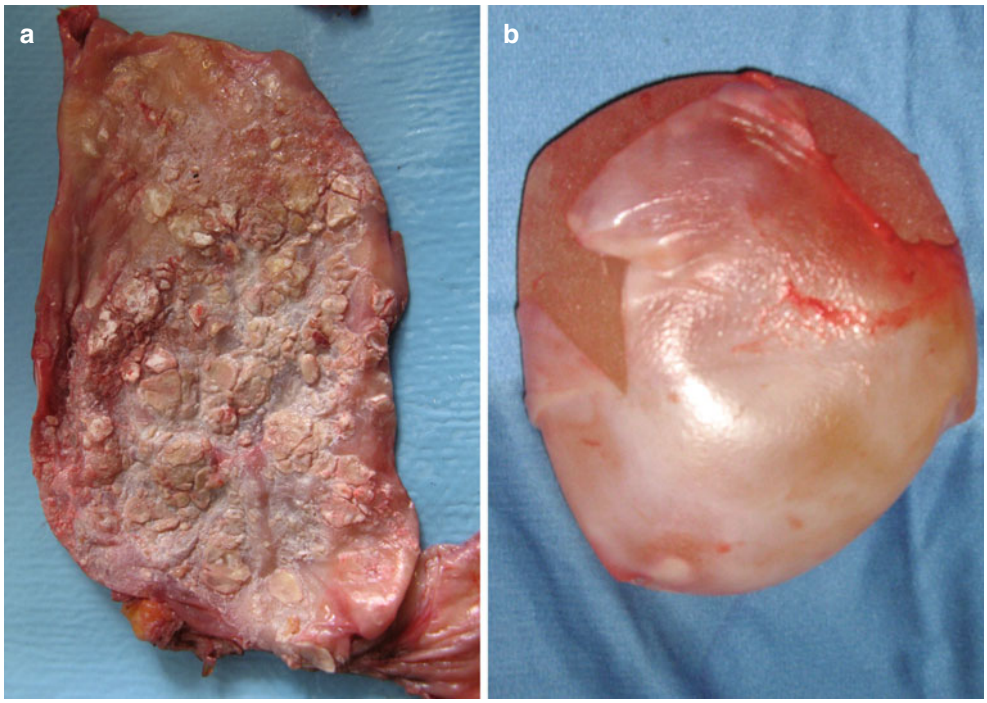

Fig. 2 (**a**) A calcified capsule. (**b**) A double capsule, hardly compressing the implant. This inner capsule was surrounded by a normal non-contracted external capsule, and was adherent to the implant surface

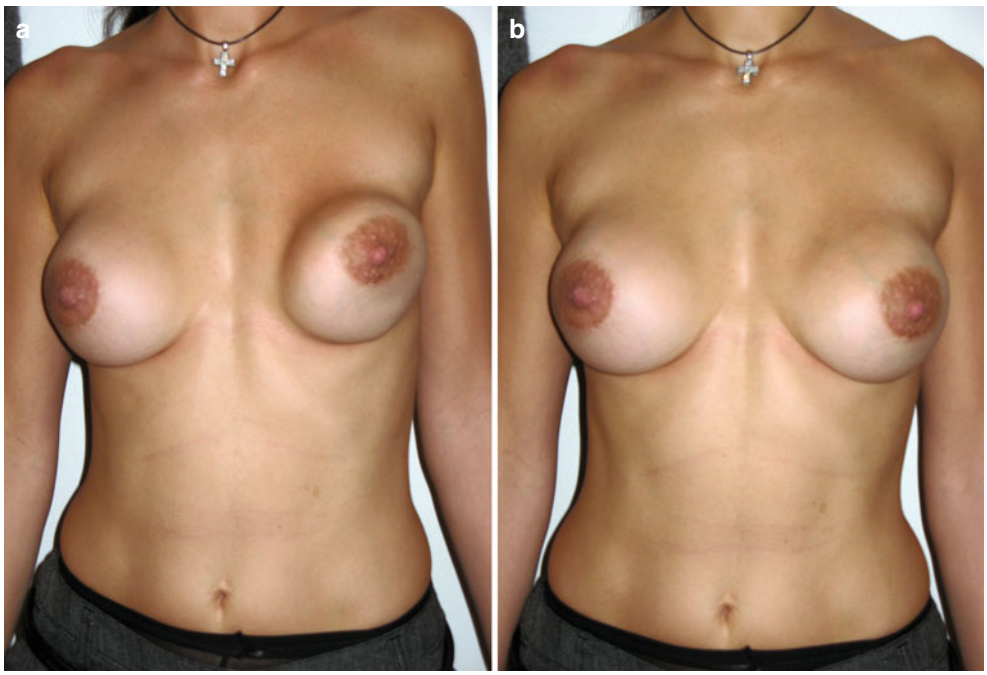

Fig. 3 (**a**) A patient showing an acceptable result 9 months after augmentation. (**b**) Due to the presence of a soft double capsule, this woman could displace the implant towards the axilla

by the inner capsule, the implant shows a stone-like hardness and cannot be explanted through a short incision unless the inner capsular layer is incised (Fig. 2b).

Erythematous spots around the implant are a less common problem which still needs investigation. This alteration most often arises unilaterally at or below the outer lower quadrant, few weeks to few months after implantation in a metameric fashion (Fig. 4). Hystologically vasodilatation with perivascular inflammatory reaction is seen. This phenomenon is resistant to local therapy and it can subside spontaneously, but most often progresses until implant removal. Nerve compression, reaction to metals, subclinical infection and other aetiological factors are still to be proven.

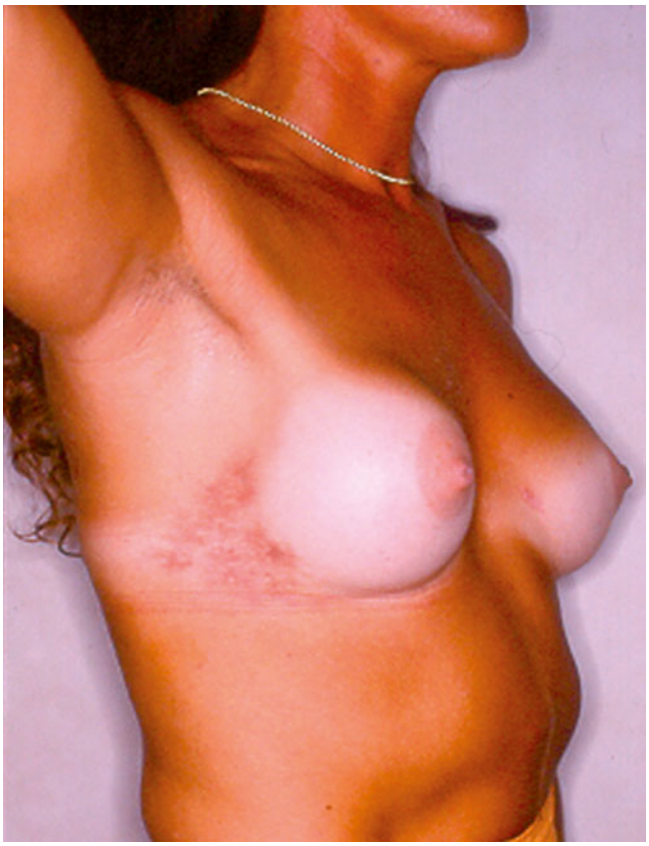

Fig. 4 An erythematous spot with a metameric contour: these reactions are encountered along the intercostals space, laterally and below the implant

3 Body Modifications Around the Implant: Weight Changes, Tissue Thinning, Ptosis

The body undergoes physiological modifications which influence the appearance of the augmented breast in the long run and represent a frequent reason for reoperation. Weight gain can make the augmented breast too big or ptotic. Increase in the breast volume with or without weight gain also represents a problem in several patients in their 50s. In most women, explantation and breast reshaping represent the best surgical choice. Weight loss represents a problem often encountered in problematic patient (i.e. smoker or depressed women), and is often associated with visible or palpable implant contours or rippling. Tissue thinning appears to be frequent around implants as a consequence of the presence of the foreign body, even in the absence of weight loss. The appearance of the augmented breast in such conditions deteriorates since it becomes more round, artificial and poor even in the absence of major contour deformities. The improvement of the defect caused by thinned tissue around the implant represents a major challenge.

Ptosis physiologically occurs in the long term in women who presented some breast volume before the operation or gain breast volume after the operation as a consequence of weight gain or hormonal changes. Submuscular implants tend to create an artificially full upper pole and to increase the ptotic appearance of the breasts. Subglandular implants tend to follow the ptotic breast and to create a low skin envelope with empty upper quadrants.

A further problem due to dynamic changes in the surrounding tissues is represented by dynamic deformities occurring during pectoralis contractions above submuscular prostheses. This represents a scientifically less debated problem which is, on the contrary, very often mentioned in litigations.

4 The Correction of Complications Due To Lack of Implant Inertness and Stability

This group of complications includes *capsular contracture* and *implant rupture*. The common features of these conditions are implant dislocation and pocket distortion which require treatment of periprosthetic tissues. Proper treatment of the capsule by total, partial or localized capsulectomies or capsulotomies is the key to aesthetically pleasing final outcome, although improvements can be obtained by pharmacological treatment (leukotrien antagonists, specifically Zafirlukast, given for 3 months) [4].

The objective severity of capsular contracture and the subjective response to this complication suggest the need for secondary surgery: Baker II contractures are usually well tolerated and do not usually require surgical correction, while patients with Baker III contracture surgery usually request implant replacement. Although the Baker classification represents a clinically helpful tool for the evaluation of capsular contractures, a more objective assessment is provided by the measurement of the "mammary compliance" [5]. Total removal of the capsular tissue is not necessary unless it is calcified or contains nodules of silicone. On the contrary, the rigidity of the capsular tissue can be profitably used in order to obtain a natural final shape. Capsular tissues must be released where expansion and projection is needed, while keeping the capsular layer in certain areas (e.g. the upper pole) prevents undesired bulging [6].

Tissue release can be obtained by scoring capsulotomies, keeping in mind that tissue gain is always perpendicular to the direction of the incisions: vertical scoring produce horizontal tissue release, while horizontal incisions produce vertical gain. As a consequence, if the horizontal axis of the breast is to be enlarged (vertically constricted mounds), vertical incisions are mainly carried out (Fig. 5a), while horizontal scoring is mainly performed if a more rounded inferior pole is desired (Fig. 5b). If scoring appears to give insufficient release, periprosthetic tissues need being managed more deeply: local capsulectomies must be performed

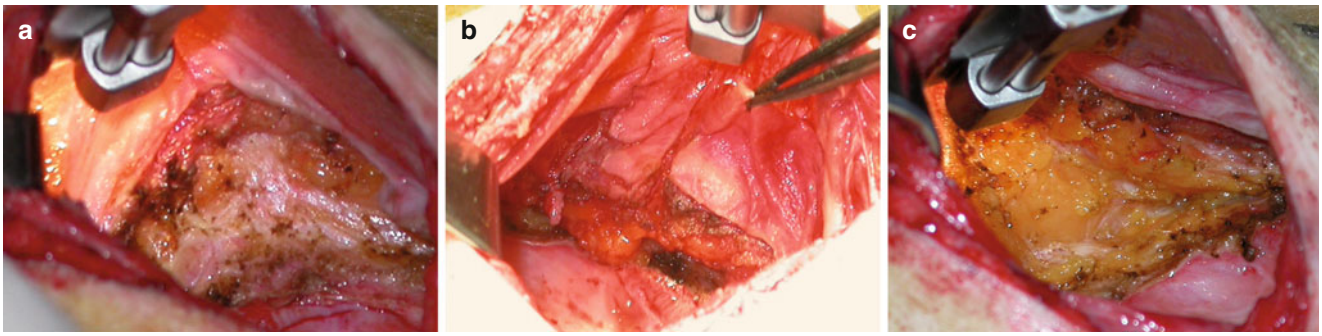

Fig. 5 (**a**) Horizontal capsulectomies and capsulotomies produce vertical tissue release and gain. (**b**) Vertical capsulotomies and capsulectomies produce horizontal tissue release and gain. (**c**) Total circular capsulotomy is necessary to obtain adaptation of the surrounding tissue to the new pocket

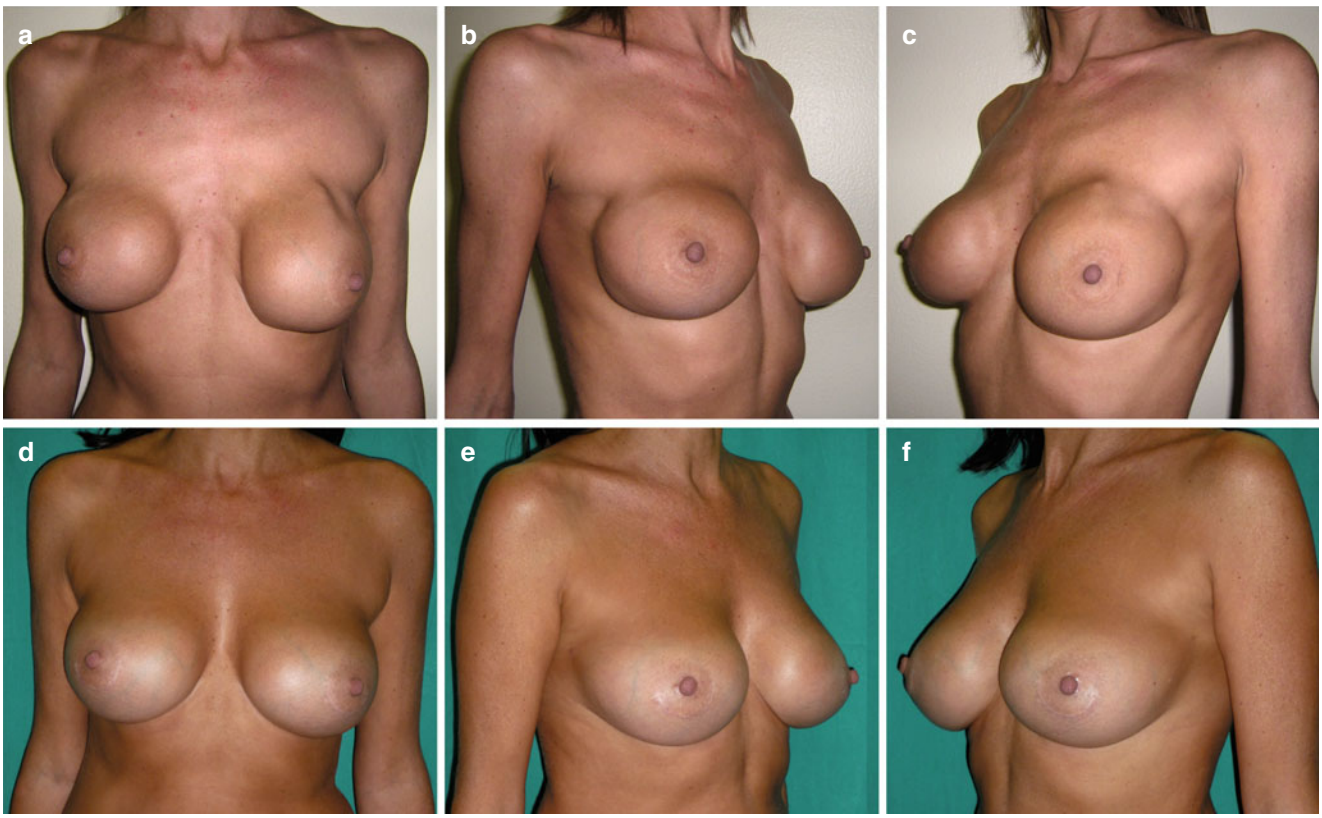

Fig. 6 (*Above* **a–c**) A patient showing severe distortion 3 years after submuscular breast augmentation: the left implant shifted downwards and shows rippling at the upper outer quadrant. On the right side severe contracture developed; (*below* **d–f**) the result after bilateral implant replacement: multiple capsulectomies and circular capsulotomy were performed on the right side, while on the left side capsulectomies and lower capsulorraphy were carried out

perpendicularly to the desired tissue release. No scoring or capsular removal is generally carried out in the upper portion of the pocket, so that the upper pole will remain flat.

However, complete circular capsulotomy is always performed, dividing the parietal capsule from the vault, in order to allow the new implant to set more freely and surrounding tissues to better adapt to the new tension lines (Fig. 5c). Through this capsulotomy incision the pocket is enlarged where needed, most often downwards below the existing submammary fold. This type of management of capsular tissues provides solutions to different difficult conditions, giving the surgeon the opportunity to:

- Modify the shape and size of the pocket
- Create areas where the rigidity of the capsule prevents expansion and bulging
- Obtain tissue release exactly in the desired direction. It is therefore a more creative and effective procedure for the treatment of implant dislocations [6] than traditional total capsulectomy (Fig. 6)

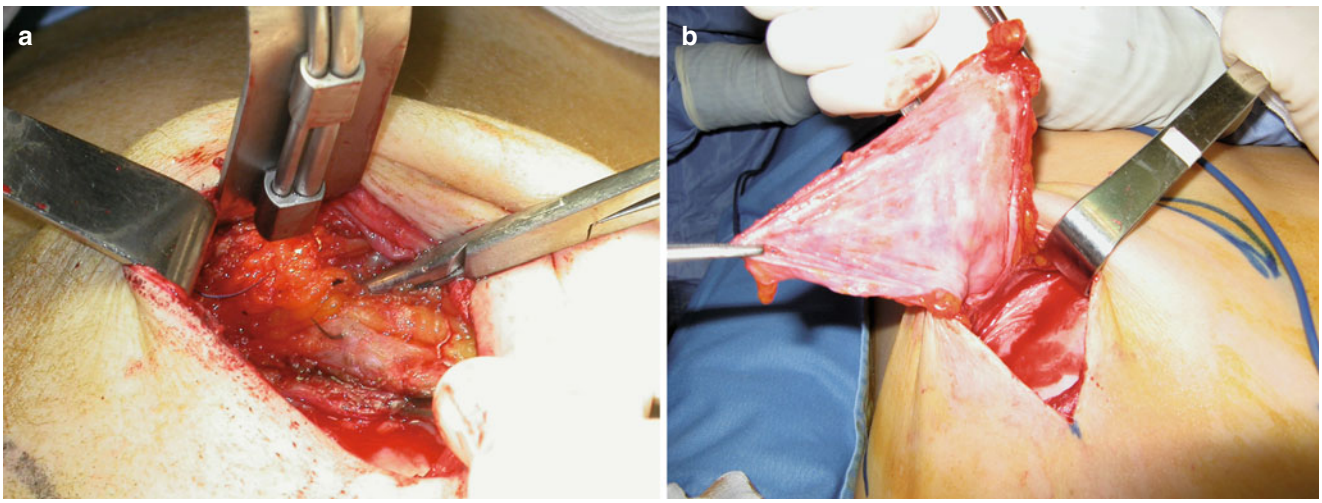

Fig. 7 (**a**) A capsulorraphy is being performed in order to move the inframammary fold upwards: the two edges of the capsules will be sutured along the new crease. (**b**) A capsular flap can be transposed to reinforce implant coverage in the areas of impending exposure

In capsular contracture leading to downward implant dislocation, capsular tissue represents a strong structure to be used to support the lower border of the new pocket and to obtain definition of the new inframammary crease by capsulorraphy (Fig. 7a).

Capsular tissue can be profitably used in case of impending implant exposure. The area of impending exposure can be reinforced by capsular flaps, which provide a reliable tissue layer (Fig. 7b). Infection, if not severe, is not any more considered a contraindication to implant replacement. Cultures should always be carried out in order to provide proper antibiotic treatment. In case of negative culture, Mycobacteria contamination should be postulated and proper long-term antibiotic treatment should be undertaken since Mycobacteria cultures require several weeks and need to be carried out on tissue samples.

5 The Correction of Complications Due To Changes in Tissues Surrounding the Implant

Tissue thinning represents a frequent reason for unsatisfactory long-term results. Rippling and visible implant contours can be improved by lipostructure, but patients showing this problem are often very thin and do not have suitable donor areas. Implant exchange is often advisable and cohesive gel prostheses are usually suggested. Implant with larger base diameter and moderate projection should be used in these conditions in order to compensate for the lack of surrounding tissues. Weight gain should be considered and an appropriate dietary regimen should be suggested.

Dynamic distortions are common deformities which are often disregarded by women. When noticed, these deformities may become a serious reason for complaints. Dynamic distortions can become more obvious several months after the operation, when oedema subsides, tissue thinning develops and pectoralis movements become stronger. Surgical denervation of the pectoralis major muscle is the most effective way of treatment [7].

Ptosis is often accompanied by increase in the volume of breast parenchyma, which generally occurs in women in the pre- or post-menopausal age. These middle-aged patients are candidates for explantation and mastopexy, or even simple implant removal. Implant removal represents an acceptable option in patients without relevant aesthetic requests: it often provides acceptable results in harmony with the patient's age without any additional scarring and with little financial costs. Mastopexy is obviously the procedure of choice and, thanks to the increased breast volume, often provides satisfactory results without implant replacement (Fig. 8). It is interesting to notice that most of these women, although they have been satisfied for many years with their breast augmentation, wish to have the implant removed. In patients who had subglandular augmentation, the capsular tissue can be used during mastopexy to strengthen the "new structure" of the breast since this resistant tissue can be grabbed and moved by internal sutures. Lipostructure or filler injection (hyaluronic acid) can be carried out in order to increase breast volume in women undergoing implant removal.

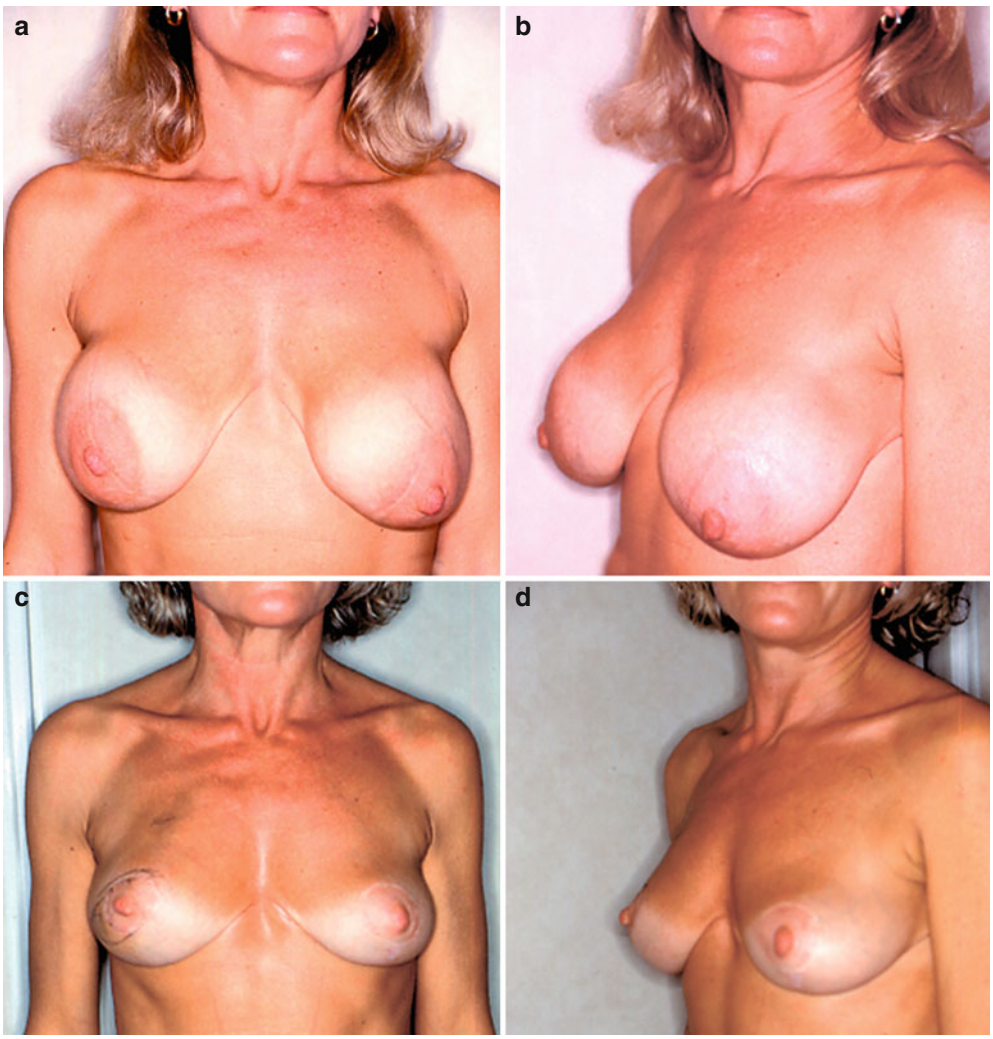

Fig. 8 (*Above* **a**, **b**) patient showing the typical long-term deformity after subglandular breast augmentation; (*Below* **c**, **d**) Implant removal and mastopexy provide natural-looking result and patient satisfaction (Reproduced with permission from: Berrino [6])

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