

Intraoperative Assessment of Breast Prosthesis Volume Using a Set of Graduated Expanders

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24.1 Introduction

One of the most puzzling decisions in augmentation mammoplasty for aesthetic purposes or following mammary gland removal is related to adequacy of the volume of the prosthesis to be inserted [1–10]. Several theoretic methods exist to calculate the final prosthesis volume on the basis of anthropometric measurements of the chest and/or contralateral breast. Nevertheless, in clinical practice such assessments often prove to be inadequate and do not correlate with the patient's actual needs or expectations. Most surgeons use a graduated gauge to measure the surface between the inframammary groove, the supramammary margin, the costoclavicular line, and the anterior axillary line.

A very practical method to assess the patient's expectations has been suggested by Brody [11]. The patient is invited to buy a brassiere of desired size and volume and fill it with cotton wool or other filling material to compensate for mammary gland lack. After the patient has worn the bra for several days or weeks and has found it aesthetically pleasant, the nurse in the plastic surgeon's office measures the lacking volume, replacing the bulk material with small plastic bags filled with a defined amount water. In measuring the likely prosthesis volume by such a gross method, the author observed an average underrating by 50–100 ml on the basis of breast inspection alone.

Another preoperative measure created by Schultz and refined by Tezel [12] includes applying the principle of Archimedes. The breast is inserted into a graduated cylinder filled with water, the spillover of which will correspond to the gland volume in terms of cubic centimeters. This method, initially carried out with direct contact of the water with the breast skin, was then improved using polyethylene bags that were prefilled within the measuring cylinder. The patient was then invited to wear a bra having a size adequate to the new postprosthesis status to anticipate the final result.

Pechter [13] suggests a preoperative assessment based

on breast girth, which is measured from the lateral to the median breast fold. An A cup would correspond to 17.78 cm (7 in), a B cup to 20.32 cm (8 in), a C cup to 22.86 cm (9 in), and so on, with a cup increase or decrease by 2.54 cm (1 in). According to the author, such a method may be very accurate on a preoperative basis. Obviously, the physician–patient relationship, while being highly introspective and able to perfectly identify the current needs, cannot result in a thorough interpretation because of the low quality of the measurements that have been carried out. During surgery it is possible to measure the subglandular or retropectoral pocket with traditional cutaneous expanders, which, however, are neither graduated nor shaped according to the exact size of the permanent prostheses, giving rather approximate clues since they never represent the final actual breast projection once the operation is completed.

The authors deemed it necessary to plan the production of a set of expanders, or “phantoms,” that are completely identical to permanent prostheses in shape and volume. They are connected to a valved tube that can be filled with sterile physiologic solution, permitting expansion of the breast to reproduce the exact desired shape and size. The expanders are provided within a kit containing low-, high-, and medium-profile round and anatomic shapes. When the volume and type of prosthesis is chosen, the inflatable expander is rapidly deflated and extracted from the mammary cavity to be replaced with the definitive prosthesis.

24.2 Technique

The patients are told that during the operation the surgeon will carry out a technical trial of volume expansion, finally choosing on his or her own responsibility the prosthesis that most suits the patient's desire and the anatomic conformation of the mammary region.

The operation is performed under general anesthesia, with midazolam premedication and propofol induction.



Fig. 24.1 Intraoperative steps. **a** Inframammary incision. **b** Phantom introduction. **c** Phantom inflated through a valved tube. **d** Water filling of phantom in place to foresee the final cosmetic outcome. **e** Introduction of the definite breast prosthesis. **f** Final results at the end of the operation

The periareolar or inframammary cutaneous incision with a perfectly symmetrical 3-cm-wide base is followed by a retroglandular blunt dissection under the control of a light-carrying retractor (Fig. 24.1). Thorough hemostasis is done in each quadrant.

After determining the ideal space for the creation of a suitable pocket in which the prosthesis will be placed, the inflatable prosthesis models are bilaterally inserted. These have various volumes (from 100 ml to 800 ml, with high and low profiles and anatomic and round shapes). The expander is equipped with a tube having an antireflux valve, which can be connected to a 50 ml syringe provided with a 3-way stopcock, thereby permitting the surgeon to rapidly inflate and deflate the

simulators without any liquid loss (Fig. 24.1c). After the phantom is inflated with saline to the desired volume, the expected results are reviewed, observing the breast remodeling in the various profiles (Fig. 24.1d).

Following the indication obtained by the phantom's use, all patients studied had the prosthesis volume changed in eight cases and the shape changed in four cases. The volumes that were introduced varied between 180 ml and 350 ml.

The operation is completed by improving the shape and margins of the retroglandular pocket to obtain a perfect positioning without wrinkling or folding of the prosthetic membrane. In particular, after the extraction of the phantoms, thorough examination and hemosta-

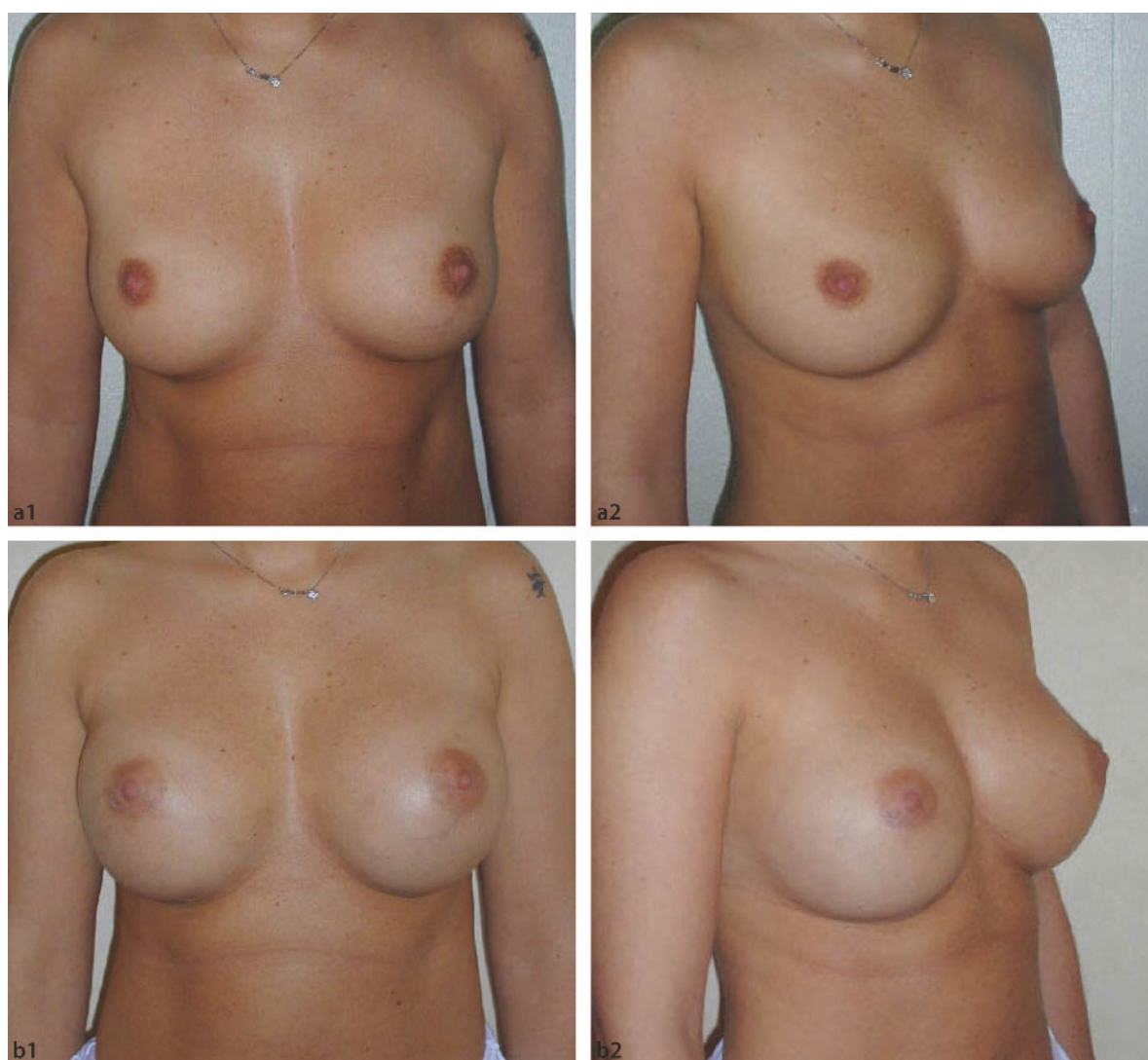


Fig. 24.2 Clinical presentation of a woman implanted using the phantom implant technique. **a** 1,2 Preoperative. **b** 1,2 Postoperative

sis of the dissociated tissues are carried out. Following wide irrigation with saline and diluted Betadine, the definitive prostheses are inserted (Fig. 24.1e), and a two-layer absorbable suture along the cutaneous incision is placed, with a closed-circuit sump drain maintained for 24 h (Fig. 24.1f). The patients are bandaged with elasto-compressive wrap and discharged 24 h later.

At follow-up visits our patients registered their satisfaction on a form which obtained a consensus on outcome in 100% of the 50 cases, which was also reconfirmed in short-term and long term follow-up checks at 3 months and 6 months (Fig. 24.2).

24.3

Discussion

The cases included in this study definitively outline the opportunity to do realistic intraoperative measurements of prosthetic size and shape. In fact, defining the desired volume and profile according to chest morphology in the preliminary assessment of a patient's breast evaluation is a difficult task. The adjustment of the body image of the woman who undergoes augmentation mammoplasty must be aesthetically improved by confirmation, on an intraoperative basis, of the patient's expectations. The surgeon therefore has the opportunity to temporarily choose the most suitable prosthesis in a very easy and accurate manner during general anesthesia. Without tissue tumescence, intraoperative observation is truly objective. Phantoms are not only useful as confirmation of the potential self-image expectations of the patient, but also of taking care of surgical details such as the final pocket definition, symmetry, and hemostasis control after contact with the phantom silicone environment.

In the authors' experience, the operation planning time when using the phantoms is increased between 10 and 15 min. In fact, the phantoms can be easily deflated and rapidly inflated, allowing the surgeon to do repeated observations of different volumes in rapid sequence.

24.4

Conclusions

Planning with phantom implants is a practical aid to appropriately and consistently select the final breast conformation in augmentation mammoplasty. This is an especially important step to be included in the informed consent, in which the description of the use of the intraoperative phantom, aimed to obtain permission for use, represents a further warranty of accuracy.

Moreover, the satisfaction of all patients with the final outcome of augmentation mammoplasty in this study greatly gratifies the surgeons. Sometimes there is a gap between the expected aesthetic result and the definitive outcome [14–15].

The authors recommend widespread use of the phantom implant, particularly for young plastic and general surgeons in the first stages of the learning curve. A patient's frustration after cosmetic prosthesis surgery can be not only related to a surgeon's lack of experience but also a potential source of medicolegal liability.

References

1. Bouman FG: Volumetric measurement of the human breast and breast tissue before and during mammoplasty. *Br J Plast Surg* 1970;23(3):263–264
2. Kirianoff TG: Volume measurements of unequal breasts. *Plast Reconstr Surg* 1974;54(5):616
3. Snyder GB: Planning on augmentation mammoplasty. *Plast Reconstr Surg* 1974;54(2):312–341
4. Ellenbogen R: A new device to assist in sizing breasts. *Ann Plast Surg* 1978;1(3):333–335
5. Tegtmeier RE: A quick, accurate mammometer. *Ann Plast Surg* 1978;1(6):625–626
6. Tegtmeier RE: A convenient, effective mammary sizer. *Aesthetic Plast Surg* 1979;3:227–229
7. Ramselaar JM: Precision in breast reduction. *Plast Reconstr Surg* 1988;82(4):631–643
8. Godfrey PM, Godfrey NV, Romita MC: Restoring the breast to match the normal side. *Ann Plast Surg* 1993;31(5):392–397
9. Edsander-Nord A, Wickman M, Jurell G: Measurement of breast volume with thermoplastic casts. *Scand J Plast Reconstr Surg Hand Surg* 1996;30(2):129–132
10. Hamas RS: The comparative dimensions of round and anatomic saline-filled implants. *J Aesthetic Surg* 2000;20:281–283
11. Brody G: Breast implant size selection and patient satisfaction. *Plast Reconstr Surg* 1981;68(4):611–613
12. Tezel E, Numanoglu A: Practical do-it-yourself device for accurate volume measurement of the breast. *Plast Reconstr Surg* 2000;105(3):1019–1023
13. Pechter EA: A new method to determinate bra size and predicting postaugmentation breast size. *Plast Reconstr Surg* 1998;102(4):1259–1265
14. Young VL, Nemecek JR, Nemecek DA: The efficacy of breast augmentation: breast size increase, patient satisfaction, and psychological effects. *Plast Reconstr Surg* 1994;94(7):958–969
15. Young VL: The efficacy of breast augmentation: breast size increase, patient satisfaction, and psychological effects. (Response) *Plast Reconstr Surg* 1995;96:1237–1238

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