Modalities of Pre-Operative Marking Techniques for Breast Reduction & Mastopexy

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INTRODUCTION

It has long been recognized that overly large breasts can be a significant burden for women. Treatment was delayed until the advent of anesthesia. Initially, amputation techniques were used because they were relatively simple and straightforward. Surgeons began to understand that resection of parenchyma and skin should be designed to preserve nipple and areolar circulation. Numerous techniques were described over the years to reduce bulk, preserve the nipple and achieve an aesthetically desirable effect. Preservation of sensation and breast feeding potential were secondary. No perfect design was achieved, but plastic surgeons persisted in trying to improve the cosmetic results while maintaining some of the successes achieved in the past with combining resection with preservation of nipple viability. Surgeons attempted to reduce scars while achieving a good shape and today the controversy persists as to which procedure or technique is superior. As with many other decisions in plastic surgery, the answer comes down to surgeon experience and comfort along with individual patient indications and desires [1].

A thorough understanding of breast development and anatomy is a requirement for modern plastic surgeons. Advanced techniques of reduction mammoplasty, mastopexy, augmentation, and reconstruction demand comprehensive knowledge of the new detailed descriptions of breast architecture [2].

Conventional Marking Technique

On the day of surgery, the following materials are needed to perform the markings: ruler, tape measure, keyhole pattern, and surgical skin marker. The areolar diameter is 42 mm and the vertical limbs are 5 cm. There are additional templated hash marks for the 3 and 9 o'clock positions along the keyhole.

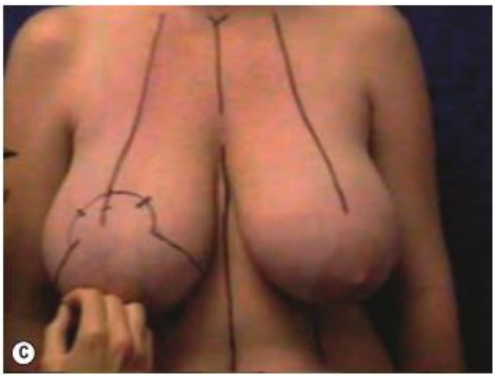

Fig (1): The breast meridian has been marked along the mid portion of the gland (Key Step 1) The IMF has been marked on the right breast and the vertical limbs determined (Key Step 3). C The areolar outline has been marked (Key Step 4) [1]

There are seven key steps to focus on in the markings:

- ***Key step #1: The breast meridian***, the vertical representation of the central axis of the breast, is drawn from clavicle across the superior breast, inferior pole and across the ribcage **(Fig. 1)**.
- ***Key step #2: Avoid using a standard SN-N*** length to set the new nipple position. The NAC should be placed at the level of the IMF. To delineate the anatomic transition between the breast and axillary roll, the woman is asked to raise her arms above her head and the lateral breast boundary is marked **(Fig. 1)**.

Fig (2): In women who exhibit significant axillary rolls [1]

- ***Key step #3: To delineate the vertical limbs of the keyhole pattern*** and thus the length of the medial and lateral flaps, the breast is rotated lateral and superior and the vertical axis of the meridian is transposed to the displaced medial breast tissue. **(Fig. 1)**.
- ***Key step #4: The keyhole template is centered over the mark indicating the new nipple height***. The limbs of the template are then spread apart so they overlap the medial and lateral vertical limbs.
- ***Key step #5: Two additional regions are mapped out on the breast which we denote the medial and lateral ghosts***. These are marked with dashed lines from the 5 cm point on the vertical limbs extending horizontally toward the medial and lateral aspects of the breast. These ghost areas indicate where breast tissue will be removed leaving the skin intact.
- ***Key step #6: Finally, the pedicle is designed***.
- ***Key Step #7: Check all markings for symmetry.*** We typically check the following discrete measures [3].

Intra-operative markings:

The final two markings are performed with the patient supine on the operating room table. The bottom part of the keyhole is completed in a curvilinear fashion. A 42 mm areolar marker is used to delineate the boundaries of the 'new' NAC. This is done with the breast manually stretched out. It is critical that similar stretch be applied to both breasts [1].

The Sitting, Oblique, Supine (SOS) Marking Technique

Fahmy 2006 has developed the sitting, oblique, supine (SOS) marking technique. This method is dependent on the natural breast fall and is aimed to guide the required angle between the two vertical limbs, each breast on its individual merits.

The patient is marked preoperatively in three positions.

1. ***Sitting:*** This position is adopted to mark the midline, midclavicular point and the breast meridian ***(Fig. 03)***.

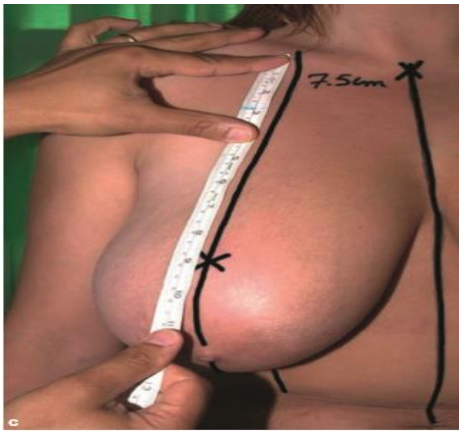

Fig (3): Patient in sitting position. (a) The breast meridian marked from the midclavicular point, usually 7.5 cm lateral to the sternal notch. (b) The superior limit of the vertical limb marked with reference to the inframammary fold. (c) The contralateral NAC is marked at the same distance from the midclavicular point[4]

2. ***Supine:*** The supine position is used to mark the inframammary fold incision and the medial limb of the vertical markings ***(Figure 04)***.[4].

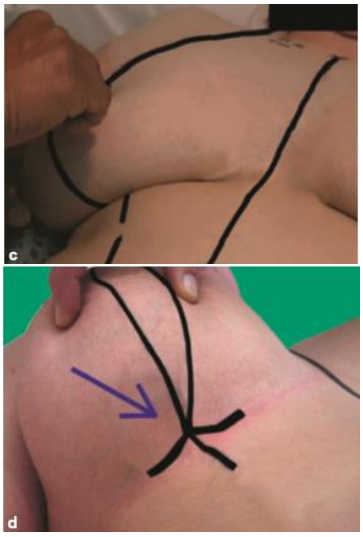

Fig (4): Patient in the supine position. (a) Gentle pressure on the breast mound clearly defi nes the inframammary fold. (b) Marking of the inframammary fold, arrow pointing to the dart. (c) Marking of the medial limb. (d) Marking of the medial limb completed [4]

3. ***Oblique (Left and Right):*** The oblique position is mainly to mark the lateral limb of the vertical markings ***(Fig. 5).*** A straight line is marked joining the superior limit of the vertical limb to the dart.

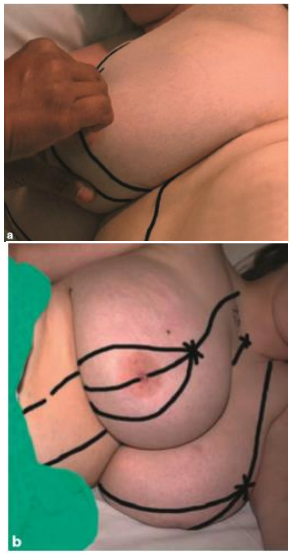

Fig (5): Patient in the oblique position [4]

4. ***Finally, the patient is returned to the sitting position.***

The medial and lateral vertical limbs are measured at a length of 7 cm from the superior limit of the vertical limbs.

The SOS marking is a versatile technique dependent on the natural breast fall. The breast is viewed as a dynamic organ requiring the individual analysis of each breast. The natural fall of the breast spontaneously generates the desired angle between the vertical limbs, accounting for any existing asymmetries.

Template-Goniometer for Marking the Wise Keyhole Pattern:

The template-goniometer [5] measures about 10 cm in height, and is easily portable in the pocket. It is simple to use and curtails the time required for preoperative marking. It consists of two P-shaped pieces of firm plastic or similar transparent material joined together by a rivet in the centre of the upper, round part of the P.

The rivet allows the two arms of the device to open and close, thus allowing the angle of the keyhole to be set and consistently carried across to the other breast ***(Fig. 06)***. This upper part is marked in degrees as a goniometer for measuring the angle between the vertical limbs of the keyhole. The combined upper parts of the P form a circle of 4.5 cm in diameter. This part is used to mark the upper part of the keyhole, which will receive the areola. The vertical limbs of the P are marked in millimeters or centimeters for measurement of the length of the vertical limbs of the keyhole – the new nipple–inframammary crease distance.

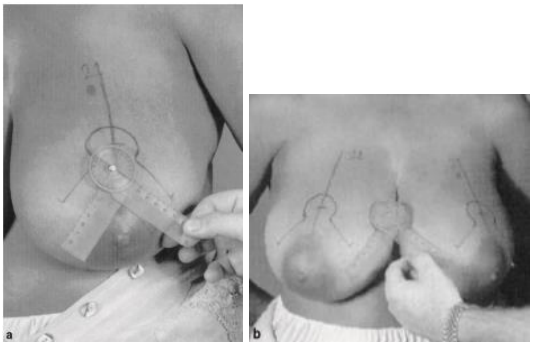

Fig (6): (a,b) Method of using template-goniometer [2]

Similarly, the vertical limbs of the keyhole are easily modified if necessary. The template-goniometer allows the keyhole pattern to be orientated vertically or canted medially or laterally [2].

Individualized Wise Keyhole Pattern:

An Aid in Reduction Mammaplasty of the Asymmetric Breasts

The technique is applicable to a selected group of patients in whom only reduction mammaplasty of the larger breast to fit the other would suffice. The whole surface of the smaller breast is covered with adhesive plasters preferably of thick and inelastic nature **(Fig. 7)**. The inframammary sulcus is strictly obeyed. The nipple– areola complex and midclavicular line are depicted on the plaster coverage.

Afterwards, the plasters are carefully elevated and the circle for the nipple–areola complex is cut off. The hole is connected to the inframammary sulcus (lower border of the plaster coverage) through the previously marked infra-clavicular line in order to create the vertical limb in Wise's keyhole pattern. The mould is stuck to a transparent film or an X-ray and an individualized keyhole pattern is obtained ready to use on the larger breast **(Fig.7)**. The pattern helps to reflect the surface area of the smaller breast to the opposite breast. After the symmetric side for areola nipple complex is determined, the reduction may be performed in regard to the depiction obtained [2].

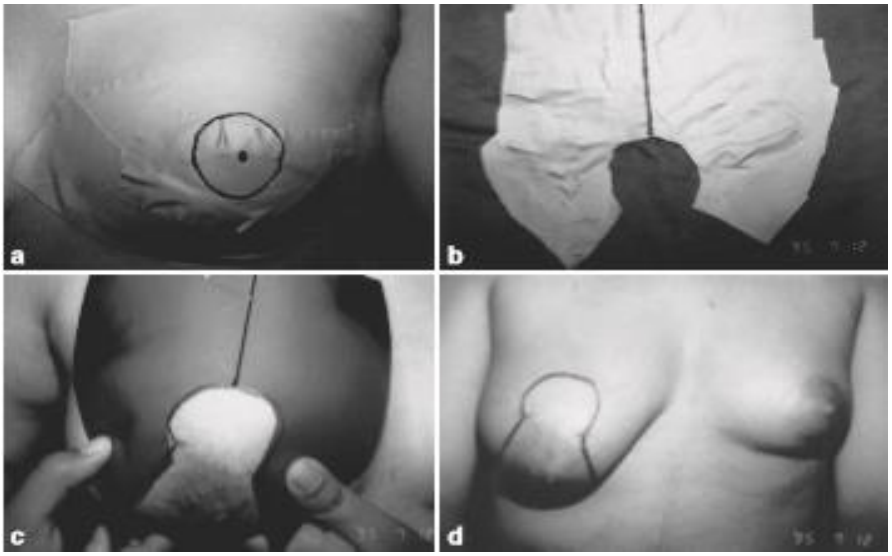

Fig (7): (a) Covering of the left breast with adhesive plaster and marking of the nipple–areola complex. (b) After depicting the landmarks comprising the midclavicular line, areolar circle was excised, the hole was cut to the inframammary sulcus on the midclavicular line. A keyhole pattern was obtained. (c) The plaster mould was transferred on an X-ray fi lm for better use on the breast. (d) After determining the new nipple position, the reduction was designed by using the mould [2]

CONCLUSION

SOS marking technique achieves both symmetrical markings and outcome and adapts easily with pre-existing breast asymmetry. However, the conventional marking technique still has its indications.

Ultimately, the markings for reduction mammaplasty are based on the patient's morphology and the surgeon's artistry and experience. The template-goniometer has been found to facilitate preoperative markings for reduction mammaplasty and to allow not only reproducibility, but also flexibility of design[2].

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