Cerrahpaşa Med J 2024; 48(1): 50-54 ORIGINAL ARTICLE

Equilateral Triangle Concept for Relocation of the Nipple in Breast Reduction

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Cite this article as: Ercan A, Ercan LD, Yalçın CE, Morkuzu S. Equilateral triangle concept for relocation of the nipple in breast reduction. *Cerrahpaşa Med J.* 2024;48(1):50-54.

Abstract

Objective: Planning and marking are vital stages of breast reduction, and a significant step in this process is deciding the new location of the nipple. Many intricate measurements have been described to guide this decision, but there has not been a consensus on the best method. Most of these methods involve vertical repositioning of the nipple, and horizontal repositioning is neglected to some extent. Common marking techniques are not suitable for all breast types, especially breasts with laterally placed nipples. We propose a simple method for preventing mispositioning of the nipple–areola complex (NAC) on the horizontal axis.

Methods: The suprasternal notch to nipple (SNN) axis was used to relocate the NAC in selected patients with laterally located nipples. During marking, both SNN axis and midclavicular point to nipple (breast meridian) axis were drawn. New potential nipple locations were reflected on both axes, and the distance in between was measured. Patients were asked to evaluate their post-op results regarding both shape and NAC positioning.

Results: Seventeen patients with laterally placed nipples were operated on by the primary surgeon. The SNN axis was used to relocate NAC. The mean distance between two projected nipple locations was 2.1 cm. No major complications were encountered, and all the patients were satisfied with their appearance.

Conclusion: The horizontal repositioning of the nipple during breast reduction is not given enough significance. While performing breast reduction, using the traditional breast meridian for patients with laterally placed nipples can lead to lateralized nipples after surgery. Our simple plan modification can prevent this minor complication.

Keywords: Breast reduction, nipple position, equilateral triangle, breast meridian, suprasternal notch–nipple line

Introduction

Breast reduction is one of the most frequently requested plastic surgery operations, according to recent polls.[1] As the obesity rates continue to rise all over the world, demand for reduction increases as well.[2] With the accumulating overall experience, we can come up with new techniques to enhance this procedure, and plastic surgeons are expected to perform consistent and reliable results for all kinds of patients with highly varied breasts and body types.

The nipple holds upmost importance as the primary anatomical landmark of the breast, with both aesthetic and sexual significance for women.[3,4] The position of the nipple is altered in every reduction/mastopexy procedure, so deciding its new location is a major step in the operational plan. The main aims of the reduction procedure are to get rid of the sagging breast image and place the nipple on the most projecting segment of the breast mound.[5] Because of these reasons, the vertical repositioning of the nipple–areola complex (NAC) has drawn much attention. Many techniques and landmarks have been described for deciding the new location of the NAC throughout the years, but it is still an ongoing debate.[6,7,8] We believe horizontal repositioning has received less attention than vertical repositioning. But a nipple's postoperative location on the horizontal plane should be as important as its vertical position because lateralized nipples can be bothersome, and medialized nipples can be disastrous.

Nearly all marking methods utilize the breast meridian line, an imaginary line starting from the midclavicular point and transecting the NAC (Figure 1).[9] This axis is used to relocate the NAC to its end position and can be used reliably for the majority of the patient population. But, when this line is used on breasts with medially or laterally placed nipples, it may result in unfavorable results. Our focus in this study was on patients with laterally placed nipples, patients with medially placed nipples are going to be the subject of a further study. In our mere observation, standard preoperative marking techniques using the breast meridian line can cause overtly lateralized nipples in patients with already laterally placed nipples. We think this problem can be overcome by using another line for guidance when relocating the NAC, the suprasternal notch–nipple (SNN) line (Figure 1). In this study, we aim to present our logic behind this modification, our indications to use this axis, and our results.

Received: May 11, 2023 **Revision Requested:** August 16, 2023
Last Revision Received: August 24, 2023 **Accepted:** September 19, 2023
Publication Date: April 26, 2024
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DOI: 10.5152/cjm.2023.22015

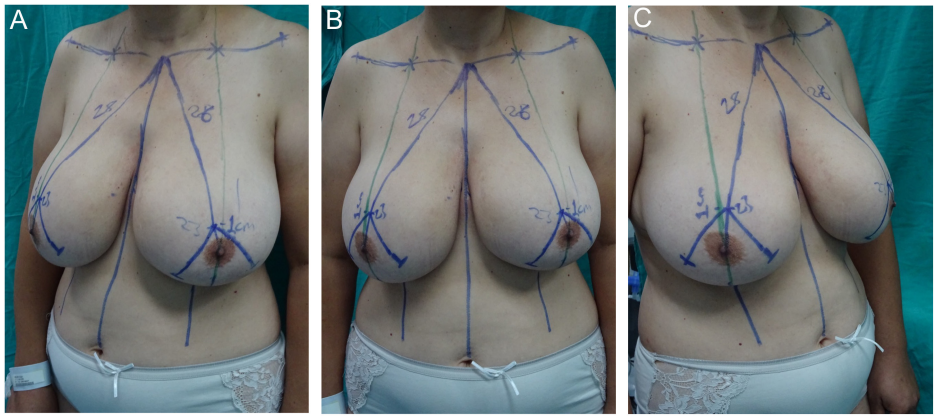

Figure 1. Forty-two years old female patient. Left SNN distance was 26 cm (A), right SNN distance was 28 cm (B,C). When nipple was projected on two different axes, the distance was measured 1 cm.

Methods

For this retrospective cohort study, ethical approval was obtained from the Institutional Review Board of İstanbul University-Cerrahpaşa (Approval No: 2023/57, Date: October 10, 2023). Seventeen female patients who were operated on by the senior author between 2015 and 2019 were included. The inclusion criteria comprised no previous operation done on any of the breasts, and an inter-nipple distance should be equal to or longer than the SNN distance while the patient was standing upright.

All patients were operated on with the short, inverted T scar pattern and superomedial pedicle technique. Preoperatively, routine distances were measured and recorded while the patient standing upright. New nipple locations were projected on both the breast meridian line and the SNN line. The distance between the two projections was measured and recorded. All procedures were performed in accordance with the Helsinki Declaration of 1975, and written informed consent was obtained prior to any surgical procedure and inclusion in the study.

Patients were followed up for a period between 2 and 7 months (mean, 4.3). During the late-term control, patients were asked to evaluate their overall end results and the position of their nipples.

The measurements and markings were done while patient was standing upright.

1. Midclavicular point was marked, then the breast meridian line transecting the nipple was drawn. The lines joining the nipples and the suprasternal notch were drawn as well.
2. Both suprasternal notch to nipple (SNN) distances (a and b) and the distance between left and right nipples (c) were measured, making up a triangle.
3. If the length of the lower side (c) of the triangle is equal to or longer than the remaining sides (a and b), the nipple was moved upwards on the SNN line rather than the breast meridian line.
4. The distance between the two projected locations of the nipples were measured and recorded (Figure 2)

Results

The mean age of the patients was 36.4 years. The average duration of hospitalization was 2.3 days, and the mean body mass index of the included patients was 25.4 kg/m^2. Demographic and surgical data for our sample are presented in Table 1. The mean preoperative distance from the midclavicular point to the nipple was 26.43 cm for the right breast and 27.26 cm for the left breast. The mean preoperative distance between the left and right nipple was 27.2 cm. In the postoperative period, the new nipple location was 21.27 cm from the midclavicular point, showing no significant change between the immediate postoperative period and a couple of months later (Figure 2). The distance between the left and right nipple was 21.1 cm postoperatively.

The distance between the two projected nipples on two distinct lines varied between 1 and 3.2 cm (mean, 2.1). All the patients were satisfied with their overall appearance and nipple position. There were no complications requiring hospitalization or overtly medialized nipples during the follow-up.

Figure 2. Sample case 1, the distance between two projections was 2 cm on the right breast (A) and 3.5 cm on the left (B) breast. Postoperative fourth week (C) and fourth month results (D).

Table 1. Demographic, Pre- and Postoperative Information of the Patients Included in the Study.

			Preoperative Measurements					Perioperative Measurements	Postoperative Measurements		
Case Number	Age	Duration of Stay	BMI	MCPR	MCPL	Internipple Distance	Distance Between Two Projected Nipple Locations	Amount of Resected Breast Tissue (g)	MCPR	MCPL	Internipple Distance
1	53	2	31.00	26.00	28.00	29.50	3.20	1300.00	21.50	21.9	21.35
2	21	2	27.00	26.00	27.00	26.00	2.30	1200.00	21.20	22	20.1
3	17	1	17.90	29.00	27.00	29.00	2.10	1450.00	20.20	21.5	21.1
4	39	3	23.60	26.50	27.20	25.00	3.20	920.00	21.00	20.4	20.1
5	26	3	23.63	27.80	28.40	28.50	1.20	1040.00	21.20	21.35	21.15
6	23	2	26.90	26.50	28.00	29.00	2.30	800.00	22.10	22.7	21.6
7	47	2	26.50	26.80	27.50	26.50	1.10	1200.00	21.00	21.1	21.2
8	42	1	31.00	28.00	26.00	27.50	1.00	1300.00	22.00	21.8	21.3
9	53	2	25.96	26.50	28.50	27.50	1.90	1000.00	20.40	21.65	20.9
10	49	4	25.70	25.00	26.50	29.00	2.60	1350.00	20.35	21.05	21
11	46	4	25.10	26.50	27.30	25.50	1.50	1250.00	21.25	20.9	21.05
12	50	2	32.00	25.00	26.80	28.00	1.80	1150.00	22.00	21.7	21.05
13	46	2	26.80	26.40	27.00	26.00	2.40	750.00	22.20	22.3	20.95
14	24	2	20.40	25.00	26.80	25.00	2.20	950.00	19.10	19.2	21.1
15	32	4	23.30	26.00	27.50	28.00	1.50	850.00	21.80	21.7	21.25
16	40	1	22.66	26.50	27.20	26.50	2.90	600.00	20.80	21.2	21.4
17	28	2	29.00	25.40	27.40	28.00	1.80	700.00	21.30	21.2	21.4
Mean	**36.44**	**2.3125**	**25.47**	**26.43**	**27.26**	**27.19**	**1.99**	**1031.88**	**21.12**	**21.36**	**21.04**

Case Samples

Case 1

A 53-year-old female underwent breast reduction, with a distance between two projections of 2 cm on the right breast and 3.5 cm on the left breast (Figure 2). Postoperative results at the fourth week and fourth month revealed sustained nipple symmetry and an expected migration of the breast tissue towards the lower pole throughout the follow-up period.

Case 2

A 21-year-old woman with significantly laterally placed nipples was operated. A total of 1200 g tissue was resected from both breasts (Figure 3). Follow-up pictures demonstrated an overall symmetrical appearance of the breasts. Symmetrical appearance of the nipples can be appreciated despite the patient's history of chronic use of steroids due to preexisting rheumatoid arthritis and resulting wound healing issues.

Case 3

A 17-year-old woman with juvenile hypertrophy was operated. A total of 1450 g tissue was resected from both breasts (Figure 4). Postoperative outcomes were favorable, considering the jeopardized elasticity caused by the long-term skin changes caused by hypertrophy of the breast tissue. (Figure 5)

Discussion

Aesthetic procedures are performed to provide two core benefits: better function and better form. Relief from back/shoulder pain, getting rid of intertrigo of the folds, and recovering from social anxiety caused by breast hypertrophy are functional benefits of the reduction mastopexy.[10] As plastic surgeons, we should not disregard better form and try to tailor our technique for different variations encountered.[11]

The process of determining the new location of the nipple has not been perfected. Lately, there are many intricate measurement methods to help with this decision. Many of these techniques use either subjective visual assessment or cumbersome ruler measurements for each anatomical landmark. For instance, Khan et al used basic trigonometry principles with high efficiency and obtained good results.[7] Using geometry is a sound approach; as our core idea stems from geometrical principles too. The issue is how to implement those concepts into practical ideas that would not need complex calculations. These methods may overcomplicate the planning part and cause confusion.

The concept of the ideal breast is cited commonly in breast augmentation, but we think it is underutilized in breast reduction.[12]

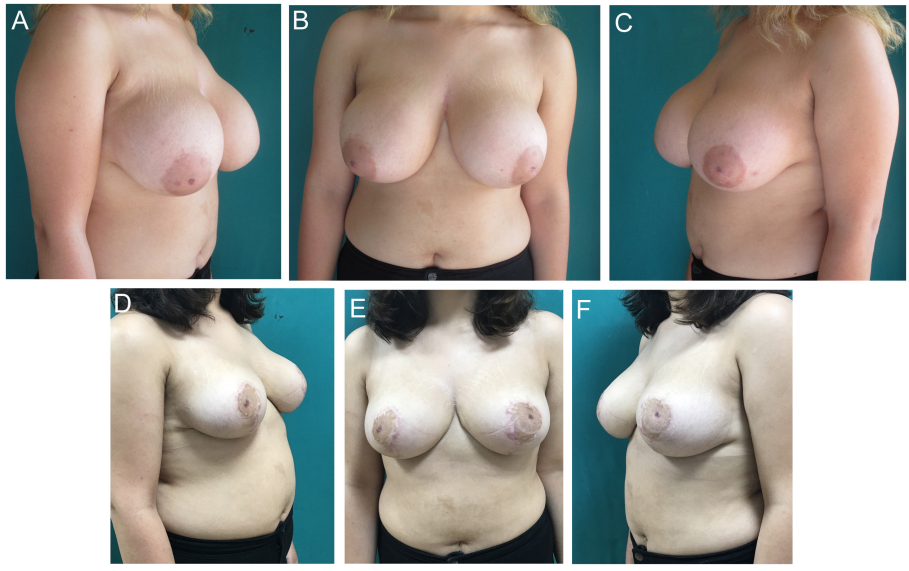

Figure 3. Sample case 2, preoperative photographs: right-sided (A), anterior (B), and left-sided (C) views. Postoperative fourth month results from right-sided (D), anterior (E), and left-sided (F) views.

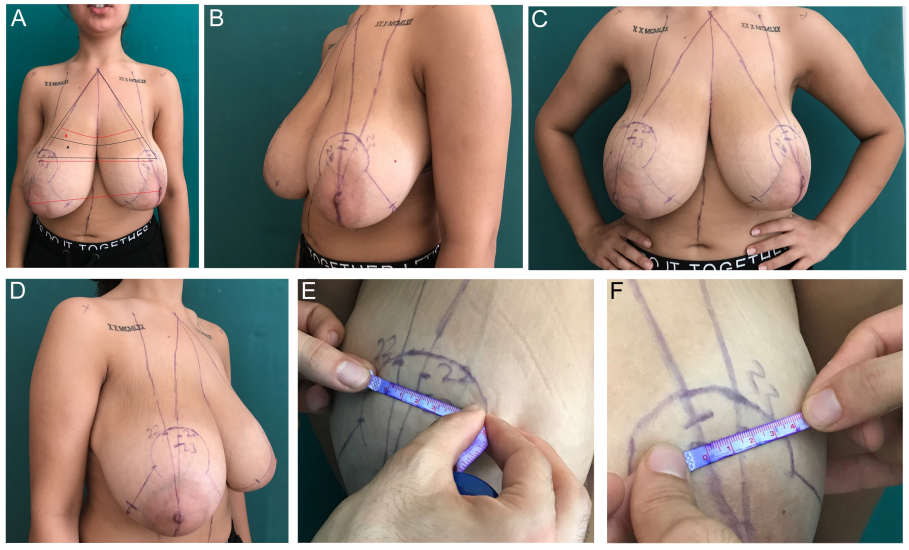

Figure 4. Sample case 3. (A) preoperative markings. Preoperative photographs: Left-sided (B), anterior (C), and right-sided (D) views. The distance between two projections was 1.7 cm on the right breast (E) and 2 cm on the left breast (F).

Verified inspections used in augmentation can be applied to reduction and mastopexy as well. According to Penn, the aesthetic nipple location on an attractive breast is at one of the two basal angles of an imaginary equilateral triangle, with its apex at the sternal notch and each side measuring 21 cm.[13,14] Each angle of the triangle should be around 60°. This concept of the ideal breast does not stem just from the medical community but also from painters and sculptors, people with high aesthetic perceptions.[14,15] Even though sculpting and surgery are quite different in material, certain concepts of sculpting can be modified into simple tips for surgery.

The group defined as patients with laterally placed nipples is a small population. In all of our breast reduction patients, they consist of a margin of 9.2% (17 out of 184). A nipple was classified as laterally placed if the distance between the right and left nipples was equal to or longer than the SNN distance. If an imaginary triangle was to be drawn connecting suprasternal notch and two

Figure 5. Postoperative third month result of case example 3.

nipples in these patients, we could see that the apex angle would be 60° or higher. Therefore, the apex angle would increase if the breast meridian line were used instead of the SNN line. This would not be compatible with the concept of an ideal breast. F Lista et al found out that during the recovery period, the distance between the clavicula and the nipple decreases, and the nipple gets elevated by 1-3 cm on the chest wall.[16] This inevitable elevation may also result in an increase of the apex angle, thus resulting in more lateralization of the NAC over time. In our practice, we routinely place the nipples about 2 cm lower than the standard suggested location during marking to be compliant with this elevation. Proven measurements like 21 cm or 8-8.5 in should always be taken into account, but increments have to be made according to the body type of the patient and shape of the breast to increase accuracy.

There are not many objective studies looking into the ideal nipple localization after breast reduction surgery, and it is not clear how close we are to consistently providing the ideal breast. According to an extensive population study done in Sweden, the results of 336 breast reductions were collected and nipple localizations after the surgeries were assessed.[17] Patients were chosen from a mixed population, and a good variation could be obtained. The main parameters of the study were the positioning of the nipples on both vertical and horizontal planes after reduction surgery. Postoperative nipple localizations were translated onto an *x-y* axis implemented over the breast, and patients were asked to give their insights about the postoperative results. One of the main deductions from the study, which was also emphasized in the conclusion part, was that the nipple was usually misplaced on the horizontal axis, and most of the time it was placed over-laterally. This point also supported our concerns about nipple relocation in breast reduction.

Our main limitation in this study is its retrospective nature. Moreover, due to the relatively small number of the patients and the absence of a control group, this study produces limited results.

Conclusion

As plastic surgeons, we should be open to new ways to perfect our work if this can be done in a safe and consistent way. Our modification does not rely on cumbersome measurements or complicated tools. It relies on simple aesthetic principles used by artists. Even though the benefit may be minimal, and it can be used by a minority of patients, it is a step toward a better end-result. We believe this modification is rather simple and can easily be implemented into the standard markings.

Level of Evidence: Level IV.

Ethics Committee Approval: The ethical approval was obtained from the Institutional Review Board of İstanbul University-Cerrahpaşa (Approval No: 2023/57, Date: October 10, 2023).

Informed Consent: Informed consent for usage of patient photo documentation and information was obtained from each patient.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – A.E.; Design – A.E.; Supervision – A.E., L.D.E.; Resources – A.E., C.E.Y.; Materials – A.E.; Data Collection and/or Processing – A.E., L.D.E., S.M.; Analysis and/or Interpretation – A.E.; Literature Search – A.E.; Writing Manuscript – A.E., S.M.; Critical Review – L.D.E., C.E.Y.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

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