Lactational Performance after Breast Reduction with Different Pedicles

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Background: Uncertainty still exists as to whether one type of pedicle is superior to another in preserving the breastfeeding potential of young women who need breast reduction surgery.

Methods: The lactational performance of women who had breast reduction surgery with different pedicle types was compared with that of women of childbearing age with macromastia but no prior breast surgery. Of those who had reduction mammaplasty, 48 had superior, 59 had medial, and 57 had inferior full-thickness dermoglandular pedicles. A total of 151 women with macromastia but without prior breast surgery comprised the control group. All women completed a questionnaire on breastfeeding success. Successful breastfeeding was defined as breastfeeding for 2 weeks or more. The women were also classified as having breastfed exclusively or with supplementation.

Results: Of the women in the control group who attempted to breastfeed, 62 percent were successful. Breastfeeding success rates for patients who had breast reduction surgery were 62 percent for superior pedicle, 65 percent for medial pedicle, and 64 percent for inferior pedicle. No significant difference ($p > 0.05$) was found between groups. Thirty-four percent of the control group supplemented breastfeeding and no significant difference was found between the control group and the patients who had breast reduction surgery with superior (38 percent), medial (38 percent), and inferior (35 percent) pedicles. Loss of nipple sensation was 2 percent for all pedicle types.

Conclusion: The lactational performance of women who had breast reduction surgery using superior, medial, or inferior full-thickness pedicles was not significantly different from that of women with macromastia but no breast surgery. (*Plast. Reconstr. Surg.* 120: 35, 2007.)

The surgeon is often concerned with the preservation of breastfeeding potential of young women who have requested breast reduction surgery, and uncertainty still exists as to whether one type of pedicle is superior to another. Early reports of inferior pedicle techniques[1–4] being superior in younger women because of better lactation have not been corroborated in the more recent literature.[5] Successful breastfeeding requires that part of the gland remains connected to the ducts and nipple after surgery; however, the amount of gland that has to be preserved has not yet been determined.

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Many patients presenting with macromastia are also overweight. In the Breast Reduction Assessment of Value and Outcomes study,[6] the mean body mass index of women who presented for breast reduction surgery was 30.4, whereas normal control subjects with A, B, or C cup size had a mean body mass index of 24.9. The body mass index is currently considered to be normal if it is between 18.5 and 24.9, overweight if between 25.0 and 29.9, and obese if equal to or greater than 30.[7] It is known that the lowest rates of initiation and shortest duration of breastfeeding are often associated with overweight and obesity.[8–16] The negative effect of a high body mass index on lactational performance is attributable to a number of factors of which the simple mechanical difficulty of latching on and obtaining proper positioning of the infant is included. Overweight is also negatively associated with the prolactin response to suckling in the first week postpartum[7] and thus may contribute to early lactation failure.

As the levels of progesterone, prolactin, and placental lactogen rise during pregnancy, the lobular units of the breast undergo a remarkable expansion. Physiologically, three stages of lactogenesis have been described. During stage I, which occurs at midpregnancy, secretory differentiation of the lobular alveolar epithelium occurs but the gland remains quiescent. This period of quiescence depends on the presence of high levels of circulating progesterone. Stage II, the onset of copious milk secretion, is initiated 2 to 3 days postpartum by a fall in plasma progesterone, whereas the prolactin level remains high.[17] This process does not depend on suckling by the infant until the third or fourth day, and the secretion declines if milk is not removed from the breast. Milk transfer to the suckling infant starts at a volume of less than 100 ml/day and at approximately 36 hours postpartum increases to an average of 500 ml/day. As long as prolactin secretion continues and milk is removed from the gland, the mature function of the breast is maintained. It is stage II lactogenesis that is believed to be affected by obesity because of diminished prolactin response to suckling. Finally, stage III is characterized by the maintenance of established lactation.

All the components that affect lactational performance must be considered when comparing the breastfeeding success rate of women who have had breast reduction surgery, and comparisons should not be made to a random group of women with normal body mass index. A properly performed study should compare women with macromastia and similar body mass index, one group with and another without breast reduction surgery, to assess the effect of surgery on lactational performance.

PATIENTS AND METHODS

In an effort to evaluate the lactational performance of women who had breast reduction surgery with different pedicle types, a retrospective clinical study was designed. In this study, the breastfeeding success of women of childbearing age (15 to 40 years) with macromastia but no prior breast surgery was compared with that of women of similar age who had undergone reduction mammaplasty with superior, medial, or inferior full-thickness dermoglandular pedicles (Fig. 1).

All women with macromastia who came to be evaluated for possible breast reduction surgery and who had children before their consultation, but no prior breast surgery, were considered eligible to enter the control group. A total of 151 women participated in the control group.

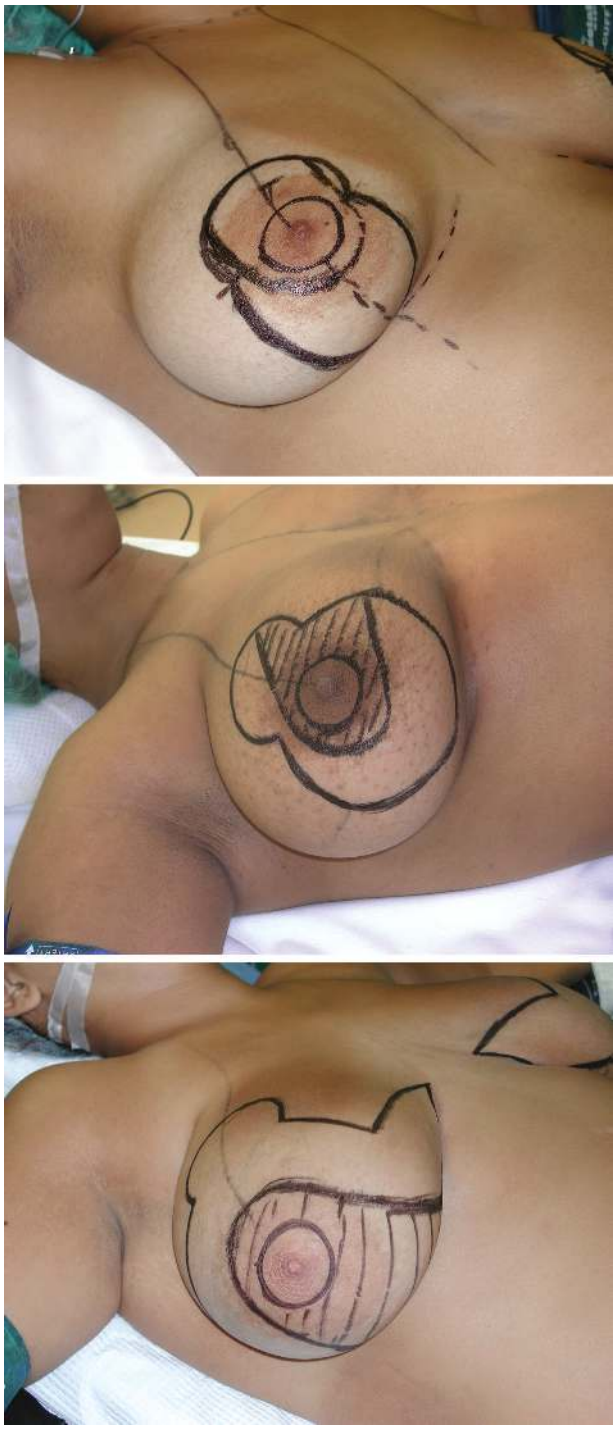

Fig. 1. The markings for the usual superior (*above*), medial (*center*), and inferior (*below*) full-thickness dermoglandular pedicles used for nipple-areola complex transposition during breast reduction are shown.

All women presenting after breast reduction surgery for routine follow-up visits who had a live

birth subsequent to their surgery were considered eligible to enter the study groups. The study groups consisted of women who had their breast reduction with superior ($n = 48$), medial ($n = 59$), and inferior ($n = 57$) full-thickness dermoglandular pedicles. The study was performed during a 12-month period, and no control cohort was included as a study cohort.

All women completed a self-administered questionnaire at the time of their initial consultation (control group) or regular follow-up visit (study groups) that provided information on their breastfeeding success. The questionnaire was composed of 11 items similar to those used in previous studies[5] that evaluated breastfeeding (Table 1). Patient information requested included age, weight, height, whether breastfeeding was attempted, whether it was successful, and the need to supplement with formula. The weight requested was that present at the time of the consultation; the body mass index was calculated from the patient's reported weight and height. For our study, a period of 2 weeks or more was chosen as the defining duration of a successful breastfeeding attempt. Those individuals judged able to breastfeed were further classified on the basis of having breastfed exclusively or with supplementation. Information was also obtained regarding the presence or absence of nipple sensation, as assessed by the patient. The study design was approved by the Institutional Review Board of the University of Puerto Rico.

All analyses were conducted with the statistical software program SPSS, Version 12.0 (SPSS, Inc., Chicago, Ill.). Comparisons among the groups for categorical variables (expressed as frequencies and percentages) were assessed by Fisher's exact test followed by pair-wise comparisons between groups, again based on Fisher's exact test contingent on significance of comparisons among all four groups. Similarly, comparison among the groups involving quantitative variables (expressed as means ± SD) were assessed using one-way analysis of variance followed by pair-wise comparisons between groups based on two-sample t test, depending on the statistical significance from the analysis of variance. Differences between groups were declared to be statistically significant at $p \leq 0.05$.

RESULTS

The groups were not significantly different in age. The mean age of groups was as follows: control group, 26 ± 13 years; superior pedicle group, 25 ± 10 years; medial pedicle group, 26 ± 9 years; and inferior pedicle group, 27 ± 12 years. The control group and the study groups were not significantly different regarding body mass index (Table 2), which reflected that, on the average, macromastia patients tend to be overweight.

Table 1. Questionnaire

Patients with no prior breast surgery			
1. How old are you?		_____	
2. What is your weight?		_____lbs	
3. What is your height?		_____	
4. Have you had children?	Yes	No	
5. Did you attempt to breastfeed any of your children?	Yes	No	N/A
6. Was your breastfeeding attempt successful?	Yes	No	N/A
7. If unsuccessful, was it due to insufficient milk production?	Yes	No	N/A
8. Were you able to breastfeed for at least 2 weeks?	Yes	No	N/A
9. Did you have to supplement with formula during the 2 weeks?	Yes	No	N/A
10. Did you supplement because of insufficient milk production?	Yes	No	N/A
11. Do you have decreased nipple sensitivity?	Yes	No	
Patients with breast reduction surgery			
These questions pertain to breastfeeding after your breast reduction surgery:			
1. How old are you?		_____	
2. What is your weight?		_____lbs	
3. What is your height?		_____	
4. Have you had children after your breast reduction surgery?	Yes	No	
5. Did you attempt to breastfeed any child after the breast reduction?	Yes	No	N/A
6. Was your breastfeeding attempt successful?	Yes	No	N/A
7. If unsuccessful, was it due to insufficient milk production?	Yes	No	N/A
8. Were you able to breastfeed for at least 2 weeks?	Yes	No	N/A
9. Did you have to supplement with formula during the 2 weeks?	Yes	No	N/A
10. Did you supplement because of insufficient milk production?	Yes	No	N/A
11. Do you have decreased nipple sensitivity after surgery?	Yes	No	

N/A, not applicable.

Table 2. Body Mass Index for Control and Study Groups*

Group	No.	Body Mass Index
Control	151	29 ± 2
Superior pedicle	48	27 ± 4
Medial pedicle	59	28 ± 2
Inferior pedicle	57	29 ± 3

*The values for body mass index are presented as means ± SD. No significant difference was found between the control and study groups regarding body mass index ($p > 0.05$).

Evaluation of the information obtained from the self-administered questionnaires disclosed that 62 percent of the women in the control group who attempted to breastfeed were successful. No significant difference ($p > 0.05$) between the control group and the superior, medial, and inferior pedicle groups was found (Table 3). For the purpose of this study, the ability to breastfeed for at least the initial 2 weeks was considered as evidence of preservation of a sufficient number of glandular lobules connected to lactiferous ducts and the nipple to allow for successful breastfeeding. Analysis of the successful group disclosed that 34 percent of the control group supplemented breastfeeding with formula. No significant difference ($p > 0.05$) was found between the control group and the different surgical groups (Table 3).

Loss of nipple sensation, as reported in the self-administered questionnaires, was 2 percent for all surgical groups. Our data indicated that lactational performance in women who had breast reduction surgery was not significantly different when nipple transposition was performed with superior, medial, or inferior full-thickness pedicles when compared with a control group of women of similar body mass index and macromastia who did not have breast surgery.

DISCUSSION

The trend to breastfeed has increased. In 2001, the prevalence of initiation of breastfeeding (69.5 percent) and breastfeeding to 6 months of age (32.5 percent) in the United States reached the highest levels recorded to date.[18] The Surgeon General's health goals for 2010 are that 75 percent of women initiate breastfeeding and that 50 percent continue it through 6 months postpartum.[19] Realistically, we can anticipate that more women will breastfeed and possibly in time reach the goals noted above. Fostering this change is better information on the benefits of breastfeeding, rooming-in practice (allowing mother and infant to remain together at maternity services), and baby-friendly hospitals that promote and support breastfeeding.[20] Currently, women's expectations for successful breastfeeding are higher, and the need to provide accurate information to our patients regarding the outcome of breast reduction surgery has increased in importance. The literature on the subject of lactational performance after breast reduction surgery has been rather uneven and without adequate control groups. Aboudib et al.[21] reported normal breastfeeding in 91 percent of 11 patients who had Pitanguy reduction mammaplasties. Sandsmark et al.[22] reported 65 percent successful breastfeeding in 292 women who underwent breast reduction by six different techniques. Marshall et al.[23] indicated that 73 percent of 28 women who had different types of breast reduction surgery before their pregnancies were breastfeeding at the time of hospital discharge after delivering their babies. Harris et al.[1] found a 45 percent successful breastfeeding rate among a group of 20 patients who became pregnant after an inferior pedicle type of breast reduction. Brzozowski et al.,[2] evaluating breastfeeding after inferior pedicle breast reduction, found a 62 percent success rate in a group of 37 patients. In reports by Zambacos and Mandrekas[3] and Mandrekas et al.[4] using the inferior pedicle technique, of 18 women who gave birth after their breast reduction surgery, 72 percent breastfed successfully. Hefter et al., in a group of 13 women, reported a 54 percent breastfeeding success rate following lateral pedicle mammaplasty.[24]

A review of the literature noted above makes it appear that there is a wide range, 45 to 91 percent, in the breastfeeding success rate after breast reduction surgery with pedicle transposition of the nipple-areola complex. This is probably attributable to the rather small number of patients in most of these reports. The most reliable data are presented in the largest study, which included 292 women and reported a 65 percent breastfeeding success rate following reduction mammaplasty.[22] Our study, with success rates of 62 percent for superior pedicle, 65 percent for medial pedicle, and 64 percent for inferior pedicle, compares favorably with that report.

Table 3. Breastfeeding Data for Control and Study Groups*

Group	No.	Breastfeeding Attempted	Successful Breastfeeding (%)	Supplemented Breastfeeding (%)
Control	151	93	58 (62)	20/58 (34)
Superior pedicle	48	29	18 (62)	7/18 (39)
Medial pedicle	59	37	24 (65)	9/24 (38)
Inferior pedicle	57	36	23 (64)	8/23 (35)

*No significant difference was found between the control and the study groups regarding breastfeeding success ($p > 0.05$) or the need to supplement breastfeeding with formula ($p > 0.05$).

Breast reduction techniques that use dermoglandular pedicles for nipple transposition and preserve nipple sensation should permit successful breastfeeding. The normal breast contains 15 to 20 lobules, each of which is drained by a lactiferous duct that usually opens independently in the nipple. The absolute minimum number of lobules that must remain after breast reduction to permit successful breastfeeding is not known, but it probably is rather small. Some spontaneous recanalization of divided lactiferous ducts probably also occurs after surgery.[25,26]

To determine whether the breast reduction surgery and the selection of pedicle for nipple transposition affect lactational performance, a control group must be included in the investigation design. It is only in that manner that the outcome of the study can meaningfully be compared. The control group should not be a random sample of women with normal body mass index, because it is known that overweight and obesity have a negative effect on lactational performance. The proper control group should be composed of women with similar body mass index who have macromastia but who have not had breast surgery.

Possible biases of our work include the eligibility criteria for inclusion in the study. The control cohorts were women with macromastia who had a prior pregnancy and had come for a consultation for possible breast reduction surgery. This is not a sample of all women with large breasts. They could represent those that are more symptomatic or have other problems. The study cohorts were women who had a live birth subsequent to their breast reduction surgery and were identified when they came for routine follow-up visits. Ours is not a sample of all women who had breast reduction. The study cohorts might represent women who take better care of themselves and attend their regular follow-up visits.

Another possible bias is that women who had a history of pregnancy and are presenting now for breast reduction were attempting to breastfeed in the past, when the support for such was not in place to the extent that it is now, and had they tried at the present time, perhaps the cohort would have had a higher breastfeeding rate.

Despite such possible shortcomings, our study indicates that women with breast reduction surgery that had nipple-areola transposition with a full-thickness pedicle have a greater than 60 percent breastfeeding success rate, which is not significantly different from the control group.

CONCLUSION

Our study found no significant difference in the breastfeeding success of women who had breast reduction surgery using superior, medial, or inferior full-thickness pedicles for nipple-areola transposition, and women with macromastia who had not been operated on.

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DISCLOSURE

Neither of the authors has a financial interest in any of the products, devices, or drugs mentioned in the article.

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