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Correlation between nipple elevation and breast resection weight: How to preoperatively plan breast reduction[☆]



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Summary Breast hypertrophy is often associated with functional limitations. Beyond the aesthetic concerns, breast reduction can improve symptoms and self-esteem. In different countries, health-care system regulations have fixed the threshold for reimbursement in 500 g of predicted tissue resection for each breast. Different preoperative measurements have been proposed to predict breast-tissue weight to be removed, showing a variable correlation with post-operative evaluation. We describe a reliable, simple measurement to predict the quantity of breast reduction in grams, which can be applicable to any surgical technique.

A total of 128 patients undergoing bilateral breast reduction were evaluated. The correlation between the preoperative nipple–areola complex (NAC) lift distance and the weight of removed breast tissue was tested with linear regression and Pearson's test. Other anthropometric measurements were tested as a control. The ratio between resected grams and lift distance was explored to find a multiplication coefficient to be used at preoperative planning.

The mean resection weight was 686.65 g. The mean NAC-lift distance was 7.6 cm. Positive correlation between the NAC-lift distance and the weight of breast tissue removed was found ($r: 0.87$; $p < 0.001$). The mean weight of the removed breast tissue (g) per centimetre of NAC lift was 81 g/cm in the group between 6 and 12 cm and 70 g/cm in the group with >12 cm of lift distance.

The NAC-lift distance is a single, objective, repeatable measure that can provide a reliable prediction of breast-tissue grams to be removed; it helps in classifying breast-reduction indications. © 2015 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

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Introduction

The cut-off measurement for the classification of breast reductions, distinguishing between those with aesthetic indications and those with functional indications, has been filed and accepted by institutions responsible for the regulation of the health-care system in many different countries. Insurance companies in the USA, UK National Health Service (NHS) Trusts, as well as the Italian Society of Plastic Reconstructive and Aesthetic Surgery guidelines in Italy have stated their criteria to restrict the coverage for breast-reduction surgery. One of these criteria requires that the amount of tissue to be removed must be at least 500 g from each breast.^{1–3} Furthermore, breast reduction can be considered as a functional procedure if there are certified symptoms related to the static weight of the breasts, skin ulceration or severe intertrigo in obese patients, and in cases of symmetrization of the contralateral breast in post-mastectomy reconstruction. As a matter of fact, it may be helpful to codify a pre-surgical planning to guess the amount of tissue to be removed from each breast. Many preoperative measurements have been proposed in the literature as predictors of breast-tissue weight to be removed, but they have often shown a variable and unsatisfactory correlation with post-operative results. Some of the proposed measurements are poorly predictive, not easily repeatable or relative to some specific technique. We realized a retrospective study to establish a practical method to estimate the breast-tissue amount to be removed, and to correctly classify the requested breast reduction as aesthetic or reconstructive (functional), with objective criteria. We evaluated the correlation between the nipple–areola complex (NAC) uplift distance in centimetres and the weight of breast tissue removed in grams. Furthermore, we analyzed the ratio between grams and centimetres in the specimens of resected breast tissue to reliably predict the resection quantity in grams during preoperative planning.

Patients and methods

We analyzed samples from 128 bilateral breast reductions for a total of 256 breast-tissue weight measurements, of patients operated between January 2006 and December 2012. All patients underwent complete physical examination, and clinical history was recorded. Written informed consent was obtained before surgery. The mean patient age was 36 (ranging from 17 to 67 years). Each patient's weight, height and body mass index (BMI) was recorded. BMI was requested to be <30 in order to exclude obese patients. Moreover, patients with a previous history of obesity were also excluded by our series to avoid the potential bias of reduction mastopexy where a high NAC-uplift distance was associated to none or little tissue resection. An inverted T pattern or a vertical scar pattern of skin incisions was used. Different pedicles were used to ensure NAC adequate blood supply (superior, superomedial, superolateral and inferior) choosing the most suitable technique for each patient. All breast reductions were performed by the senior author. Free nipple graft procedures, invariably associated with larger resections and pure mastopexies, with none or

minimal glandular excision were excluded. Breast asymmetry was accurately described, if present, and specific concerns regarding differential resections were addressed.⁴ However, if the reduction weight on one side was planned to be <500 g, then the patient was not included in the study. The pattern of intended incision lines and the NAC complex pedicle were drawn in the upright position. Sternal notch-to-nipple (SNN) distance was measured, recorded and marked on the sub-clavicular skin. The position of the new nipple was marked with a digital manoeuvre at the projection point of the inframammary crease on the anterior breast skin with the patient in an upstanding position. This point was easily visualized and then marked by pushing the surgeon finger from inframammary crease in an upward direction on the vertical mid-breast line.⁵ The NAC-lift distance was calculated as the difference between SNN and sternal notch-to-neo-nipple distance (Figure 1). The weight of the breast tissue removed at surgery was measured intraoperatively using a non-sterile standard digital weighing scale (KD7000 Digital Scale), to avoid sample dehydration. All data were collected after the approval of the local ethical committee, and procedures were conformed to the World Medical Association Declaration of Helsinki. Specimen weight measurements were then correlated to the centimetres of NAC lift, as measured at preoperative planning, with regression analysis. Pearson correlation test and regression analysis were used to investigate whether any correlation between grams of resected tissue and centimetres of NAC uplift was present. The correlation between the weight of removed breast tissue and the patient's SNN, weight, height and BMI was also investigated. The mean values of the removed breast-tissue weight per centimetre of NAC uplift were calculated (g/cm) in order to create a formula to be used to estimate the quantity of tissue to be removed during breast-reduction planning. We divided our patient's data into three subgroups according to the centimetres of NAC uplift: <6 cm, between 6 and 12 cm and >12 cm.

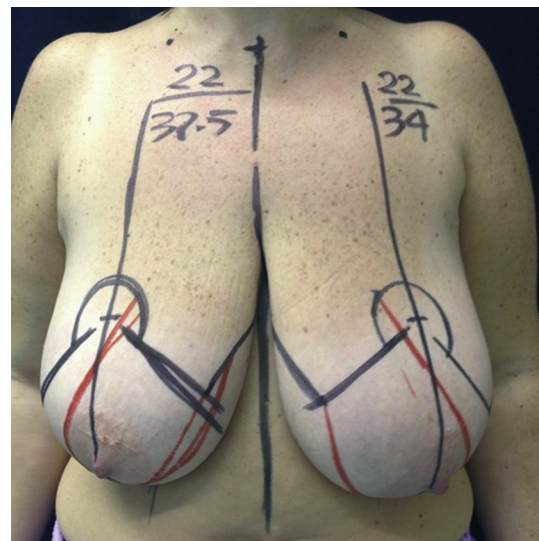


Figure 1 Preoperative markings of breast reduction with the calculation of the NAC uplift distance.

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