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Understanding modern breast reduction techniques with a simplified approach

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Summary *Objective:* The purpose of this study was to analyse the geometrical principles of breast reduction, to propose a classification of reduction mammaplasty techniques and to show a simplified approach based on the authors experience.
Methods: A thorough analysis of the geometrical differences between the normal and enlarged breast was performed. As a result of this analysis, the concept of separate management of the skin and gland for breast reduction was used as a method to classify the different techniques. Some aspects of technique selection and the authors' preferences are also discussed.
Results: The four geometric differences between the normal and enlarged breast are: vertical excess, broadened base, horizontal excess and a descended nipple-areola complex. All breast reduction techniques use a specific pedicle and a separate skin incision pattern, so they should be named after the scar and pedicle used. Technique selection must consider the degree of hypertrophy and ptosis, the skin and gland quality, the patient's requirements, and the surgeon's experience and preferences. Some clinical examples are provided.
Conclusion: The comprehension of basic breast geometry, a universal language for communication and a simple algorithm to approach the breast reduction patient are valuable tools, particularly for the surgeon who is becoming acquainted with reduction mammaplasty procedures.

The basic principles of modern breast reduction are to decrease breast volume while maintaining a normal anatomy (shape, contour and symmetry) and preserving the normal physiologic function (sensibility and lactation) of the breast.[1] Many of the described techniques have attempted to achieve these basic principles successfully, but there is still debate concerning the best single procedure. This could be due to the fact that we have not found the ideal treatment yet or, more certainly, because the problem has different solutions depending on its severity. Unfortunately, debate has been focused on minor technical aspects instead of considering the real concept behind modern breast reduction. Furthermore, the insufficient comprehension of elementary breast geometry, the lack

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of a universal classification for surgical technique, and the ambiguous approach in the decision making process, have been essential contributors to the increase in controversy. This situation has generated confusion and passionate discussions,[2,3] all of which makes the necessity of a consensus in the modern conception of breast reduction imperative.

In this article we will try to address some of these important issues, emphasising our current philosophy of breast reduction, reviewing basic ideas and proposing a simple and valid universal language that could serve as the foundation for future discussions and publications.

The breast cone: geometrical concepts for reduction mammaplasty

Geometrically, the breast can be considered as a cone projecting horizontally from the anterior thoracic wall.[4] The rounded base of this cone is limited by an inferior border which corresponds to the inframammary fold. It has a relatively fixed position in the thoracic wall from where it elevates giving projection to the breast until it reaches a tip at the nipple-areola complex. The base of the cone should always be proportional to its projection in order to have a pleasant appearance, but there are specific clinical situations where a discrepancy may be observed (tuberous breasts). On the other hand, finding a perfect cone-shape breast in real life is almost impossible and this simplistic approach must be adjusted to biological features to serve as a suitable model and to enhance our understanding. Gravity (breast weight) and tissue dynamics (skin and gland quality) are the most important biologic factors that affect the normal profile of the ideal breast cone. These elements distort the ideal breast shape and determine its hanging configuration in the standing position. As a result, the normal breast cone is not ideal and is characterised by a slight upper pole flattening, a moderate rounding of the lower pole, a small descent of the cone tip and a mild loss of projection (Figure 1).

In breast hypertrophy or macromastia, the volume and weight of the breast cone are increased. Keeping the projection-to-base proportion, the enlarged breast cone will be more affected by the biological factors of gravity and elasticity, and will result in further upper pole flattening, lower pole rounding, larger tip descent and severe loss of projection (Figure 1). These geometrical differences between the normal and enlarged breast cone have an accurate clinical translation. Because of gravity, the first difference to be judged is the vertical excess of the enlarged breast when compared to the normal one. In breast hypertrophy the vertical excess determines a significant drop of the breast and a lower position of the nipple-areola complex. A horizontal excess is also present in macromastia due to the increased width of the cone base that determines the characteristic lateral breast displacement and bulging in these patients. The vertical and horizontal excesses should be addressed simultaneously and precisely during breast reduction procedures (Figure 2).

To modify an enlarged breast cone into a desired normal shape, all the above tridimensional elements must be taken into consideration. The first surgical principle supported in the geometrical analysis is to reduce the base of the breast cone because it will establish the basis for the following

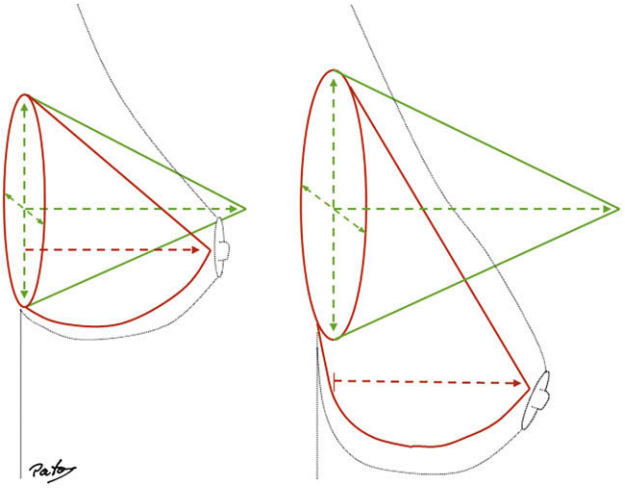

Figure 1 Geometry of the normal and enlarged breast: (Left) In the ideal breast cone (in green), the height, width and projection can be observed. After the action of gravity and tissue dynamics, the normal breast is characterised by a slight upper pole flattening, a moderate rounding of the lower pole, a small drop of the cone tip and a mild loss of projection. (Right) The same effects can be seen in the enlarged breast but are more pronounced. Observe that the base-projection ratio is kept constant to demonstrate the ptosis effect.

manoeuvres. Second, the base and projection should be addressed in balance by maintaining a proportional projection-to-base ratio in order to obtain a more pleasant breast profile. And third, to correct the projection, the tip of the cone (nipple-areola complex of the breast) must be sufficiently repositioned over the new breast mound in order to correct the gravitational and skin dynamics related ptosis. To summarise, breast base reduction, projection-

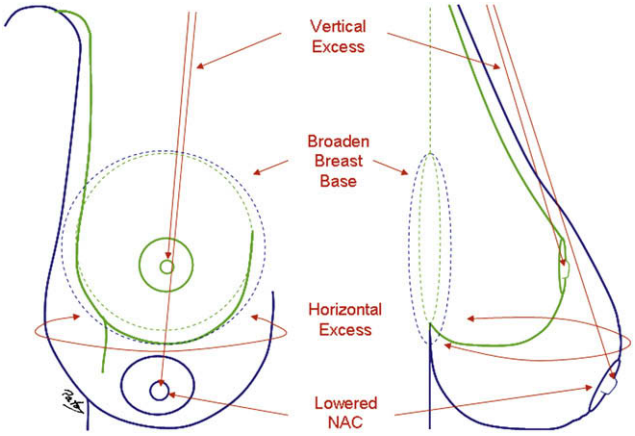

Figure 2 The four clinical differences between the normal and enlarged breast: vertical excess, broaden base, horizontal excess and descended nipple-areola complex. These differences are based and deducted from the geometrical analysis and allow organisation of the surgical objectives of breast reduction techniques: breast base reduction, projection-to-base ratio maintenance, and nipple-areola complex repositioning.