

The Restoration of Nipple-Areola Complex Sensation and Nipple Erection after More Than a Year From Reduction Mammoplasty: A Comparative Study between Superior and Posterior Pedicle Techniques

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ABSTRACT

Reduction mammoplasty is one of the most frequent procedures in plastic surgery practice. We evaluated the restoration of nipple areola complex sensibility and nipple erection after more than a year from the surgical intervention for 60 patients who underwent reductive mammoplasty either by superior pedicle technique = 33, or posterior pedicle technique = 27. The patients were divided into two groups according to the weight of resected tissue (A: less than 500g, B: 500g or more). The subjective assessment shows that the restoration of nipple areola complex sensibility and nipple erection is directly related with the weight of resected tissue regardless the technique. The results show that the superior pedicle technique has better restoration of sensation of nipple areola complex in both groups. No notable difference between the two techniques in restoration of nipple erection.

INTRODUCTION

Breast reduction is one of the most frequent procedures in plastic surgery [1]. Women requesting the procedure are generally more concentrated on improvement of size and shape of their breasts than with the preservation of mammary sensation. Even after surgery if not specifically asked, many patients do not mention changes in the sensitivity of the nipple and areola. The improved appearance of the breasts causes a positive change in body image and makes the patient feel more sensual [2] and for several decades ago, the sensibility of the female breast was considered to be largely of psychological significance [3].

The sensation is often diminished in women with large and ptotic breasts. Two hypotheses have been put forward to explain this: Firstly, that it could result from neuropraxia of sensory nerve fibers secondary to traction caused by the heavy breast parenchyma. Secondly, that the tissue expansion of the nipple and areola, by the voluminous

breast parenchyma, causes a decrease in the density of nerve fibers and hence decrease nerve perception [2-4]. Several authors have reported improved sensibility after breast reduction [2,5], so the second hypothesis does not explain the improvement of sensibility following reduction mammoplasty as resection of skin can not increase its innervation density [2].

Anatomical studies of the sensory nerves to the breast have shown the complexity of innervation of the breast. The main nerve supply of the nipple-areola complex (NAC) is through the third, fourth or fifth intercostal nerves (mostly the fourth). There is always a dual nerve supply: Medially through the anterior cutaneous branches of intercostal nerves and laterally through the lateral cutaneous branches of the intercostal nerves. The lateral nerve is dominant as the diameter of the lateral cutaneous branches near the NAC is always bigger than anterior branches [1-3,5], whereas the innervation of the skin of the breast arises from both the lateral and medial branches of the second to sixth intercostal nerves and from supraclavicular cutaneous branches [2,5-6]. The dominant lateral nerve branches take a deep course within the pectoral fascia, passing through the central mammary gland and reaching the nipple-areola complex from its posterior surface in 93% of women while they take a superficial course in 7% of women [2].

The nipple and the areola appear to have different thresholds for various sensory modalities; the nipple is:

- More sensitive to light touch [2,4].
- More sensitive to temperature [2,7].
- More sensitive to vibration [2,7,8].

- More sensitive to 1-point moving touch (Approximately twice the sensitivity of the areola) [2,9].
- Less sensitive to painful stimuli [2,7].

Surgical procedures performed in the thoracic region can easily harm the cutaneous nerves of the female breast, which result in loss of sensibility [3]. In this study we want to evaluate the restoration of areola and nipple sensation as well as nipple erection after more than a year from reductive mammoplasty using either superior or posterior pedicle technique.

The superior pedicle technique has been primarily described by Arie in 1957. This description was followed with refinements by Pitanguy in 1967. The advantages of the superiorly based pedicle technique include less skin undermining and simplified en-bloc resection of excess breast tissue which result in significant reduction in operative time. Importantly, this technique fosters preservation of dermoparenchymal relationship with maintained microvascular connectivity which, in turn, minimizes the risk of skin and fat necrosis [10].

The total posterior pedicle technique has been used by Moufarrège [11], in this procedure he preserves the dermoglandular tissue as a pedicle with excision mainly from lateral quadrant, but with saving the areolar tissue to preserve intercostal nerves and to less extent from medial quadrant, with no excision from upper and lower quadrants [12].

PATIENTS AND METHODS

60 patients who underwent reductive mammoplasty by one of the two techniques (superior pedicle technique=33, posterior pedicle technique=27) between January 2005 and July 2006 at the Bordeaux CHU, were sent a questionnaire letter after at least 13 months following the intervention regarding preoperative and more than a year post-operative areola and nipple sensation as well as nipple erection. The age range was between 15 and 62 years (mean=32.8 years). Using information found in the medical records, the resected tissue weight ranged from 0-1215g (mean=509g). Accordingly, the patients were divided into two groups on the base of the weight of resected tissue (A: less than 500g, B: 500g or more).

The restoration of areola and nipple sensation and nipple erection was divided into two categories: 1) No restoration or to less than preoperative and 2) Restoration to preoperative level or greater than preoperative level.

RESULTS

Sensation of the areola:

The results show that there is little difference in the restoration of sensation in areola between the two techniques in group A (superior pedicle 41.18%, posterior pedicle 47.06%), but show a notable difference in group B (superior pedicle 68.75%, posterior pedicle 40.00%) (Table 1). However, if the technique is not taken into consideration there is a difference in sensation restoration between group A & B and it is better in group B than A (Table 2) (Fig. 1).

Sensation of the nipple:

The restoration of sensation is better when the superior pedicle technique is used compared to the posterior pedicle technique in both groups, with a notable difference in group B (superior pedicle 75%, posterior pedicle 50%) (Table 1), but generally, the restoration of sensation is better in group B than A when the technique is not taken into consideration (Table 2) (Fig. 1).

Erection of the nipple:

Generally, there is no great difference between the two techniques in the same group (Table 1) but there is notable improvement of the erection in group B over group A when the technique is not taken into consideration (Table 2) (Fig. 1). We also found that the restoration of nipple erection was more frequent than the restoration of sensation in NAC in both techniques in both groups particularly in group B (Table 1) (Figs. 2,3).

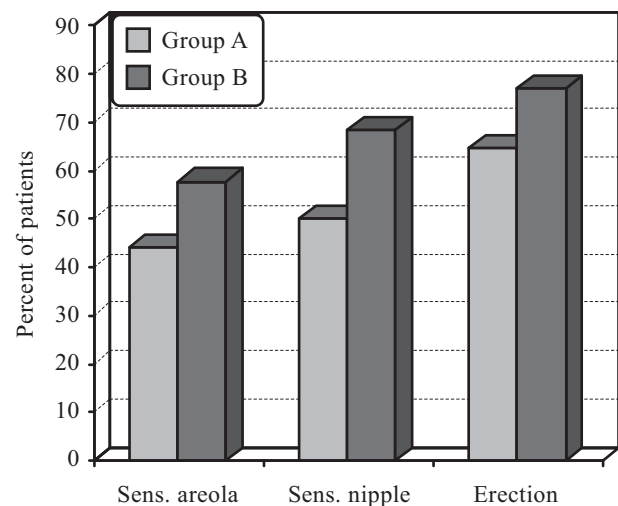


Fig. (1): Restoration of sensation and nipple erection in group A (resected tissue less than 500g) and group B (resected tissue equal or more than 500g) regardless of the technique.

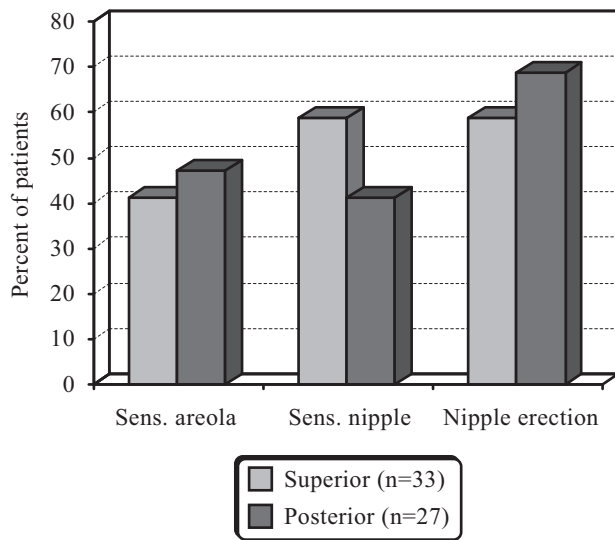


Fig. (2): Restoration of sensation and nipple erection in group A (resected tissue less than 500g), comparing two different techniques (superior and posterior techniques).

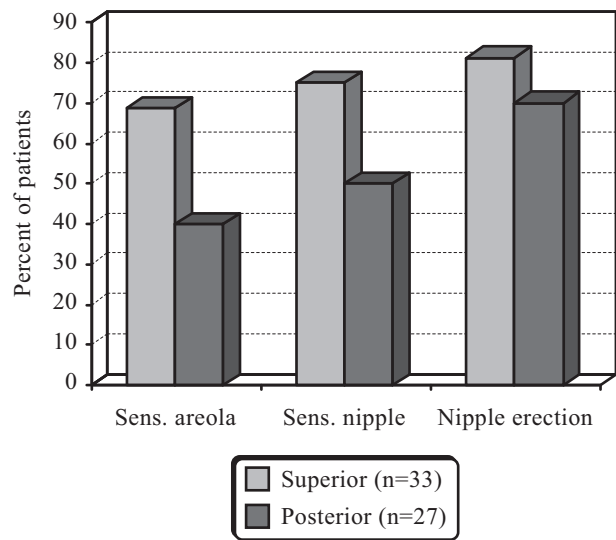


Fig. (3): Restoration of sensation and nipple erection in group B (resected tissue equal or more than 500g), comparing two different techniques (superior and posterior techniques).

Table (1): Restoration of sensation in areola, nipple and nipple erection in group A (resected tissue less than 500g) & B (resected tissue equal or more than 500g) after at least 13 months postoperatively. Showing the absolute values and percent of patients with either restored sensation=RS or diminished sensation=DS in both the superior and posterior pedicle technique.

	60 patients							
	Superior (n=33)				Posterior (n=27)			
	Group A (n= 17)		Group B (n= 16)		Group A (n= 17)		Group B (n= 10)	
	RS	DS	RS	DS	RS	DS	RS	DS
<i>Sens. areola:</i>								
N	7	10	11	5	8	9	4	6
%	41.18	58.82	68.75	31.25	47.06	52.94	40.00	60.00
<i>Sens.nipple:</i>								
N	10	7	12	4	7	10	5	5
%	58.82	41.18	75.00	25.00	41.18	58.82	50.00	50.00
<i>Nipple erection:</i>								
N	10	7	13	3	11	6	7	3
%	58.82	41.18	81.25	18.75	68.75	37.50	70.00	30.00

Table (2): Restoration of sensation and nipple erection in group A (resected tissue less than 500g) & B (resected tissue equal or more than 500g), regardless of the technique used (RS=restored sensation; DS=diminished sensation).

	Group A		Group B	
	RS	DS	RS	DS
Sens. areola	44.12%	55.88%	57.69%	42.31%
Sens. nipple	50%	50%	68.38%	34.62%
Erection	64.71%	35.29%	76.92%	23.8%

DISCUSSION

The nipple is subjectively and objectively the most sensitive part of the breast and important for a woman’s social life. Loss of sensitivity and erectile function can be dramatic for some women, whereas others do not complain about it [13].

Schlenz et al. [2,13] reported that in the first six months after reductive mammoplasty, none of the patients concerned about a decrease or loss of sensitivity of the nipple. Satisfaction with the new size and shape of the breast and relief of preoper-

ative symptoms such as neck and shoulder pain are overwhelming in this period [7,13]. Changes of the sensitivity of the nipple to vibration, temperature and one or two point moving pressure perception may also occur but are of minor importance for a woman, but the most important is light touch [9,13]. There is no evidence that age; smoking or oral contraception has a statistically significant effect on breast sensation [2].

Generally, we found that the restoration of sensation and erectile activity in the nipple is more frequent in group B than group A regardless of the technique used, that does not agree with Gonzalez et al. [14] who reported a higher risk of nerve injury in patients with gigantomastia [13,14]. Greuse et al. [8] assessed their patients in two groups depending on the amount of tissue resected to a less than 500g and more than 500g [8,13]. They found that there is no difference in sensitivity after reduction of less or more than 500g per breast [8] and further substantiated by Schlenz et al. [13] who compared five different techniques and concluded that the loss or diminished in the postoperative sensitivity was not associated with reduced weight of resection per breast [13]. In study presented here the result of more improved in the sensation in group B over the group A may be related to the fact that large breasts have often diminished sensitivity [2-4,13], and that goes more with the first theory (the neuropraxia of sensory nerve fibers).

We found that restoration of sensation in areola after more than a year shows a notable difference in the results of group B in which it was more frequent in superior pedicle than in posterior pedicle. A notable difference was also found between the two techniques in which the superior pedicle shows better restoration of sensation in the nipple than posterior pedicle in both groups particularly in group B. These results are disagreed from other studies. The superior pedicle techniques are associated with a higher risk of injury to the lateral cutaneous branches [2,3,5,13]. The anterior cutaneous branches take a superficial course within the subcutaneous tissue and terminate at the medial areola border some of their terminal branches are injured when the size of areola is reduced [2,13]. Improvement of sensitivity of the nipple and areola after 6 months is caused either by recovery of the medial nerves from neuropraxia or by the regeneration of the lateral cutaneous nerves [13], this may explain our results in which the restoration of sensation in our patients with superior pedicle technique. In the posterior pedicle technique, the surgeon resects from the medial side where the anterior cutaneous branch of the intercostal nerve passes superficially

in the subcutaneous tissue, so that the nerve remains at risk of injury during the procedure. This may explain the limitation of NAC sensibility restoration in posterior pedicle technique.

Restoration of nipple erection generally was similar in both groups but we found that restoration of nipple erection was present in a higher degree in both techniques in both groups particularly in group B than restoration of sensation in NAC. This finding is not going with the finding of Schlenz et al. [13] who found that any decrease or loss of sensation to light touch was accompanied by a decrease or loss of erectile function [13].

Conclusions:

Restoration of sensibility to NAC and the nipple erection was better in higher weight of tissue resection when the technique was not taken into consideration.

In group B, restoration of NAC sensation and nipple erection was more frequent in superior pedicle technique than posterior pedicle technique. In group A, the results were not conclusive because they were more or less near each others.

Concerning nipple erection, there is a notable difference between restoration of nipple erection and NAC sensibility which is more obvious in posterior pedicle technique in which restoration of nipple erection is more frequent.

We suggest continuing this study and increasing the number of patients and make an objective assessment.

Conflict of interest: none. We did not get any conflict of interest or funding from any people, organizations or associations.

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