

How to Preserve the Nipple Erogenous Sensation in Breast Lifting and Reduction Mammoplasties

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ABSTRACT

Preservation of nipple sensitivity after breast reduction is an important goal to achieve. However, most breast reduction techniques focus more on breast aesthetics and nipple areolar complex vascularity, ignoring nipple sensitivity particularly nipple erogenous sensation. In fact, the nipple nervous system includes a tactile sensation system and an erogenous sensation system, the latter being less described and commonly overlooked by plastic surgeons performing breast reductions. The erogenous sensation is supplied by the IVth, Vth and VIth intercostal nerves who run laterally on the surface along the muscular aponeurosis. The total posterior pedicle breast reduction technique described by Richard Moufarrege in 1982 consists of dissecting the skin away from the breast tissue offering free access to all breast quadrants. This technique is known for its robust blood supply to the nipple areolar complex, for its preservation of the breastfeeding function and for its low rate of long term complications such as pseudoptosis. In this article, we also demonstrate that the Moufarrege Total Posterior Pedicle preserves the nipple erogenous sensation among women undergoing breast reduction using this technique.

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1- INTRODUCTION

The nipple nervous system of the breast is divided into 2 (1–3):

The tactile sensation system

This sensation reaches the nipple area through peripheral subcutaneous nerves stemming from the neighbouring nervous system, which branch into a subcutaneous nervous plexus spanning the entire surface area of the breast. These cutaneous nerves take their origin from the superficial

cervical plexus which is composed of the Great Auricular, Occipital, Transverse Cervical and Supra Clavicular nerves. This nervous plexus will eventually provide tactile sensation to the nipple through regenerative sprouting and axonal outgrowth in the event intra-operative transection of the intercostal nerves has occurred, either accidentally or due to the nature of the surgery (fig. 1). In summary, these tactile sensation nerves will regenerate after having been injured, contrary to the erogenic nerves who do not regenerate.

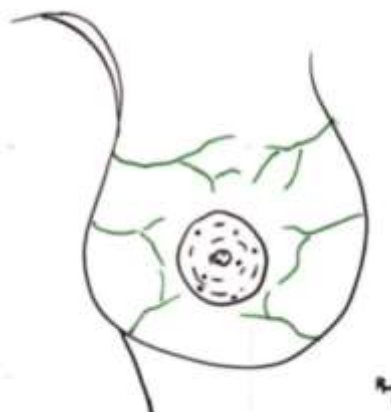


Figure 1. Tactile sensation of the breast.

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The erogenous system

The nipple's erogenous sensation and muscular function are supplied by the IVth, Vth and VIth intercostal nerves (4,5). These nerves penetrate the breast area laterally along the muscular aponeurosis and course medially towards the central part of the breast where they plunge anteriorly towards the nipple and the peri-areolar region (figs. 2 and 3). Interruption of the nerve along its course will result in the loss

of the erogenous sensation and disappearance of the motor phenomenon at the level of the small intrinsic muscles of the nipple and areola. Contrary to the tactile sensation nerves, the intercostal nerves, when interrupted, will never regenerate and will cause a permanent loss of the nipple erogenous sensation. The claim of some surgeons to the effect that nipple sensation recovers concerns only the tactile sensation, not the erogenous one



Figure 2. Breast intrinsic intercostal nerve trajectory.

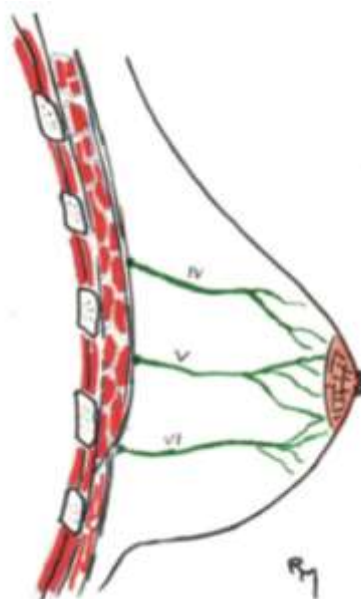


Figure 3. Sagittal section of the intrinsic intercostal nerves trajectories.

2- PHYSIOPATHOLOGY

The knowledge of the nerves anatomy responsible for the erogenous sensation of the nipple makes it possible to understand the reasons why this sensation can be altered or preserved according to the surgery.

We will leave aside the study of the path of the intercostal nerves IV, V and VI from their exit from the spine to the posterior axillary line; this section of the nerve path cannot be affected by breast surgery. Starting at the axillary line level, these three nerves each give rise to a subcutaneous branch that

passes through the muscular plane and runs along the thoracic muscles up to the central region of the breast. It is starting at this region of the axillary line that breast surgery may have some effect on these nerves.

The intercostal nerves IV, V and VI, responsible for the sensation have a quarter-circle path that makes them evolve on the surface of the serratus anterior muscle and slightly on the uncovered surface of the pectoralis minor, then over the pectoralis major up to the breast central vertical axis (fig. 4).

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At that level, the three nerves will plunge forward into the mammary gland towards the nipple-areola complex (6).

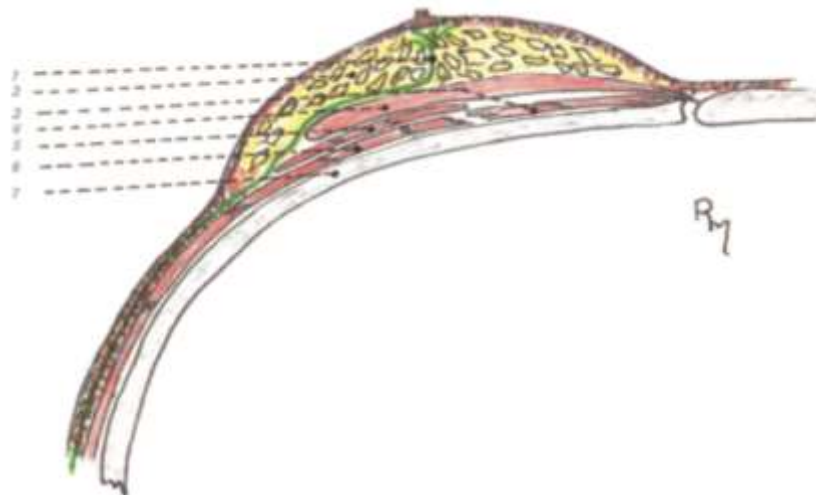


Figure 4. Cross-section of the left hemi-thorax wall showing the intercostal nerve running on the surface of the anterior wall muscles. 1. Intercostal nerve, intrinsic portion 2. Breast gland 3. External Oblique m. 4. Pectoralis Major m. 5. Pectoralis Minor m. 6. Serratus Anterior m. 7. Rib

3- THE FATE OF THE EROGENOUS NIPPLE SENSATION IN CLASSICAL BREAST REDUCTIONS

The main element governing the technique principle of a breast reduction is the pedicle of the nipple-areola complex. It is ultimately this pedicle that will allow or not the three intercostal nerves IV, V, and VI to innervate the nipple-areola complex. There are pedicles that have some potential in fulfilling this condition; others simply cannot lend themselves to this preservation of the erogenous sensation of the nipple.

The Superior Pedicles

All superior pedicles, whatever their names or their inventors, cannot ensure, by their geography, a space for the passage of the intercostal nerves IV, V, and VI to the nipple areola complex without their interruption. This is due to the fact that these pedicles mainly consist of dermis, hypodermis and sometimes a small parcel of gland (7,8). In addition, these pedicles are located in a region and a position that simply cannot contain the abovementioned nerves. We can therefore say that the superior pedicles cannot retain the erogenous sensation of the nipple (fig. 5).

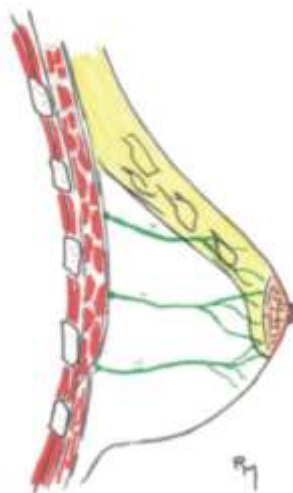


Figure 5: Superior pedicles by no way can include any of the three intercostal nerves, condemning the nipple to permanently lose its erogenous sensation.

The Inferior Pedicles

The Inferior Pedicles of McKissock (9) or Robbin (10) type have a certain chance of serving as a bridge for one of these three nerves mentioned above, essentially the sixth intercostal

nerve which passes relatively low in the tissues of the lower breast quadrant. There is however no guarantee of keeping this sixth nerve intact because, from one surgeon to another

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and from one surgery to another, the inaccuracy in the designation and development of these pedicles can make the sixth intercostal nerve inclusive or not. In any case, conserving this nerve intact is not a concern in these techniques. We recall here that the sixth intercostal nerve innervates the lower region of the areola and surrounding

tissues and therefore, cannot alone ensure the nipple a true erogenous sensation. The inferior pedicle, Robbin type, which is a little larger than McKissock's one, might be a little more likely to contain the sixth intercostal nerve that could allow a partial erogenous sensation of the nipple (figs. 6 and 7). But again, the chances of this conservation are low.

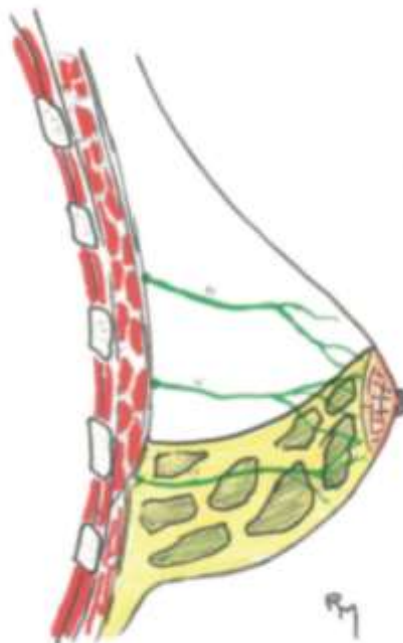


Figure 6. Robbin's inferior pedicle has a larger origin than that of McKissock. It might include one of the three intercostal nerves, i.e. the VI; this will provide a certain sensation in the inferior area of the areola.

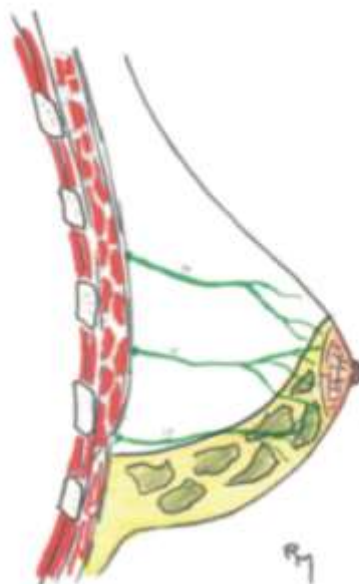


Figure 7. McKissock's inferior pedicle section cannot include any intercostal nerves; if it does however, it will most likely be due to an incidental superior extension of the pedicle's origin.

The Central (septal) Posterior Pedicles

The Posterior Pedicles, which bear different names, all derive from the Moufarrege Total Posterior Pedicle, Richard Moufarrege being the first to describe the Posterior Pedicles (11,12).

These posterior pedicles, once reduced to a limited central pedicle according to the cases, have some potential of providing support to the intercostal nerves concerned in the function of the erogenous sensation of the nipple; but here, we are still in the realm of potential and not of certainty because the designation and dissection could encompass the

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complete path of one of these three nerves but could also move the pedicle next to these three nerves in question (fig. 8).

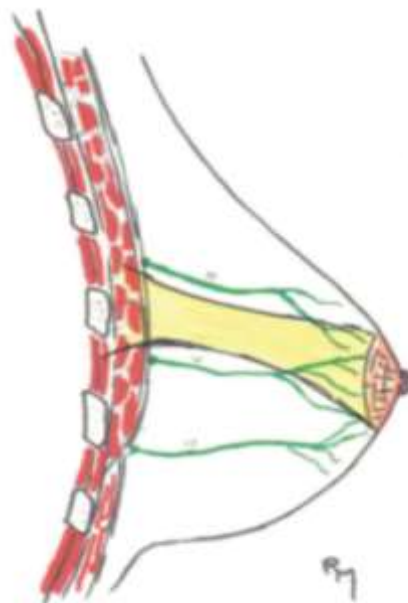


Figure 8. Central Posterior Pedicles have a limited potential of including one of the three nerves (V or VI). Expecting a real erogenous sensation in these pedicles remains within the realm of hope.

The Moufarrege Total Posterior Pedicle

The Moufarrege Total Posterior Pedicle is guaranteed, if the technique is properly executed, to give the nipple areola complex the chance to totally preserve its erogenous sensation of the nipple in an almost constant way (12). We insist on the “almost constant” expression because it can happen that the surgery drifts away from the precise technique as described by Moufarrege. This drift emanates

from the non-respect of the areolar tissue which essentially covers the large Serratus Anterior muscle and which the technique of Moufarrege insists on preserving. In fact, the intercostal nerves IV, V, and VI run in this areolar tissue to join the vertical central axis of the breast before plunging anteriorly into it through the wide and safe posterior pedicle (figs. 9 and 10).

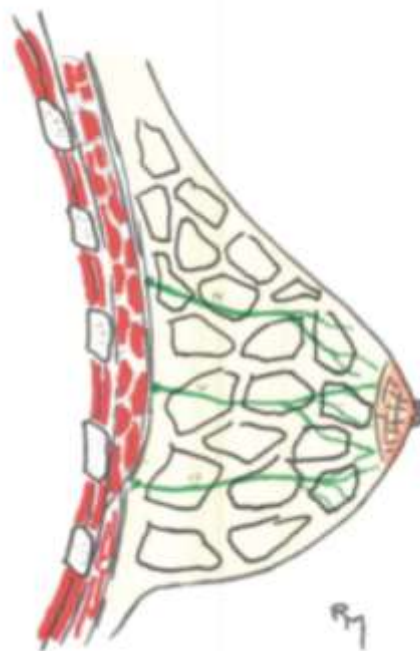


Figure 9. The Moufarrege Total Posterior Pedicle: sagittal section showing the three intercostal nerves included in the pedicle.



Figure 10. The Moufarrege Total Posterior Pedicle: cross-section showing the three intercostal nerves included in the pedicle.

4- PATIENTS AND METHODS

We conducted a retrospective study on a cohort of 924 patients operated with the Moufarrege Total Posterior Pedicle between 1981 and 1997. A total of 573 patients agreed to participate in the study by completing the questionnaire. The primary objective was to evaluate the degree of preservation of the erogenous sensation after the surgery. In order to do so, 5 values of preservation of the erogenous sensation were proposed to the patients, a degree of conservation of 100%, 75%, 50%, 25% or 0%. Results were classified into three categories: full sensation (75-100 %), partial sensation (25-50 %), and no sensation (0 %).

5- RESULTS

Of the 573 patients who responded to the questionnaire, three did not address the erogenous sensation. As a result, after the reduction mammoplasty, 70.4% (n = 401) of the patients reported having retained close to all of their preoperative erogenous sensation. In 23.9% (n= 136) of the patients, the erogenous sensation was maintained at a half or a quarter of its initial level. Patients who had an absence of erogenous sensation at the end of their surgery accounted for 5.8% (n = 33) of the totality (n = 570) (Tables 1 and 2).

Table 1: Degree of preservation of the erogenous sensation of the nipple in a cohort of 573 patients who underwent a Moufarrege Total Posterior pedicle breast reduction.

Percentage of preservation of erogenous nipple sensation	Number of patients	Percentage
0%	33	5.8
25%	42	7.4
50%	94	16.5
75%	132	23.2
100%	269	47.2
Total	570	100

Table 2: Rationalization of the results of the preservation of the erogenous sensation of the nipple in the Moufarrege Total Posterior pedicle reduction.

Preservation of erogenous nipple sensation	Number of patients	Percentage
No sensation	33	5.8
Partial sensation	136	23.9
Full sensation	401	70.4
Total	570	100

6- DISCUSSION

In our study, patients who report a complete or almost complete erogenous sensation constitute 70.4% and those who maintain a partial sensation constitute 23.9%. Even if we

cannot, scientifically speaking, add these two values to claim a total of 94.3%, one will however realize that these numbers are far superior to those found in the rare literature on the other traditional mammoplasties. On the other hand, we

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should not forget that women who report having erogenous sensation in the nipple in the general population without any surgery constitute only 73 %. Our retrospective study was performed, as mentioned previously in 2008 on a series of patients operated between 1981 and 1997. At that time, and mainly in the first 3-4 years, we used to take less care on the integrity of the areolar tissue along the muscle wall on the lateral aspect of the thorax. The three intercostal nerves IV, V and VI run within that areolar tissue before reaching the pedicle of the Nipple-Areola complex. It could have happened that one of the three nerves was injured by accident. This explains the 23.9 % of partial erogenous sensation of the nipple. For the 30 past years, we pay a particular attention to the respect of that areolar tissue. This has necessarily a positive impact on the sensation conservation.

There is a fairly striking fact: the appearance of a postoperative erogenous sensation in the Moufarrege series while it was absent preoperatively. This can be explained by a phenomenon of neuropraxia that may have affected the three intercostal nerves IV, V and VI by imposing an undue stretching secondary to breast hypertrophy and the ptosis that ensues. Once this stretching is resolved, the nerves assume better their role of nerve conduction therefore improving the sensation.

7- CONCLUSION

The Moufarrege Total Posterior Pedicle mammoplasty is certainly the only known technique associated with a high level of conservation of nipple erogenous sensation.

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