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Immediate Post-Mastectomy Reconstruction with Prosthesis Using the Total Posterior Pedicle Mammaplasty Design

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ABSTRACT

The author, who has already described the "Total Posterior Pedicle Mammaplasty", presents a simple and rational way for immediate breast reconstruction using the same cutaneous resection principles as in the "Total Posterior Pedicle Mammaplasty".

The surgeon will first draw and execute the incisions by following the rule of cutaneous resection taking care of the ptosis degree as in the "Moufarrege Total Posterior Pedicle Mammaplasty". So, the importance of resection will be directly proportionate to the angle of the arms surrounding the skin to be respected, spreading from 90 degrees in the non-ptotic breasts to 180 degrees in very ptotic breasts.

The large exposition of the gland allowed by the cutaneous undermining and the total mastectomy will ensure an easy access to the axilla to perform the node surgery stage, as well as to create the retro-pectoral pocket for the installation of the prosthesis.

The skin closure performed with an inverted T is similar to that of the cosmetic mammaplasty lifting. The difference with the Wise incision is that our horizontal section of the incision will be much shorter, that is to stay three to seven centimeters. Furthermore, this reconstruction, when well indicated, leads to very nice results at very low costs in terms of pain, morbidity and financial charges.

Keywords

Breast reconstruction without artificial dermis matrix, Immediate reconstruction post-mastectomy, Moufarrege mammaplasty, Total Posterior Pedicle mammaplasty, Total retro-muscular prosthesis reconstruction.

Introduction

The idea of proceeding to breast reconstruction with a pre-established drawing realized by the plastic surgeon originates from our concern to avoid a breast reconstruction after a Halsted incision mastectomy [1-4] The latter would already condemn the result either shape wise or because of the scar quality.

It is on this basis that we agree with the Toth and Loppert concept (1991) which recommends that immediate breast reconstruction should start by drawings executed by the plastic surgeon for a better aesthetic result [5-8].

Regarding the shape, Halsted incision creates a handicap because of the strangulation over the reconstructed breast on its center which is exactly the area where the projection should be the biggest.

It is well known that this strangulation could be corrected by the execution of one or more Z plasties, but this will lead to greater handicap with the scar, making it more present on the most visible area of the breast. Furthermore, this horizontal scar is known to leave a less aesthetically pleasing mark compared to the vertical incision under the nipple which has the big advantage of fading as if by magic.

History

The first time we've described the Total Pedicle Mammaplasty was in 1979 [9-12]. This technique has the advantage of creating a complete separation between the skin and the underlying gland, thus allowing a shaping of the skin independently from the glandular tissue.

From then on, it was logical for us to use this style of incision in order to cover a reconstructed breast using the advantage given by the conization of the skin; this is how we performed our first breast immediate reconstruction in 1995.

Technique

An exemplary collaboration between the oncologist surgeon and the plastic surgeon is a must. As soon as the oncologist has established the indication for a mastectomy followed by an immediate reconstruction, the plastic surgeon will start the procedure by drawing the incision lines, which are the same as the Moufarrege Total Posterior Pedicle incisions, but without the circle of the key hole (Figure 1,2).

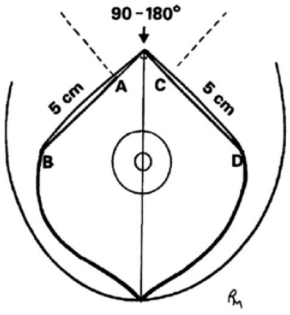

Fig. 1. The incisions of mammaplasty by the Total Posterior Pedicle applied to the immediate post-mastectomy breast reconstruction.

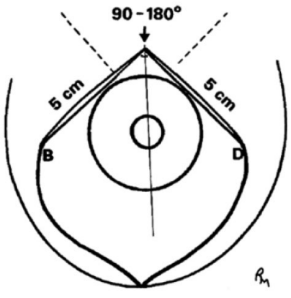

Fig. 2. The incisions of the mastectomy in breast cases without ptosis; The two arms of the incision furrow the limits of the areola; The location of the new nipple will be situated lower than the upper extremity of the incision.

Drawing

With the patient in a seated position, the plastic surgeon will draw the vertical axis of the breast passing through the nipple. One should know this axis does not necessarily pass by the middle of the clavicles, but rather, will adopt different inclinations depending on the orientation of the breasts (Figure 3,4).

A spot is drawn on the axis over the present nipple; this spot will be the superior extremity of the incision (Figure 3,4).

Ideally this spot should be at the level or lower than the nipple which is to be reconstructed. This will not constitute any problem when the breast is ptotic. (Figure 4) If it is impossible, mainly in the case of a non-ptotic breast, this spot will be chosen at the lowest possible point, but with the condition that the two arms surrounding the skin to be excised with the mastectomy pass the closest possible to the existing areola without cutting a part of it (Figure 3).

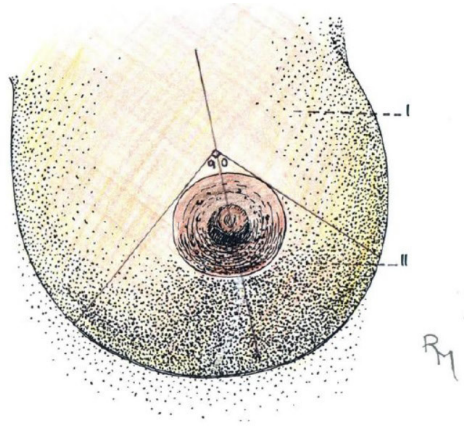

Fig. 3. Drawings for mastectomy and reconstruction in non-ptotic breast
I- Skin to be spared
II- Skin to be resected

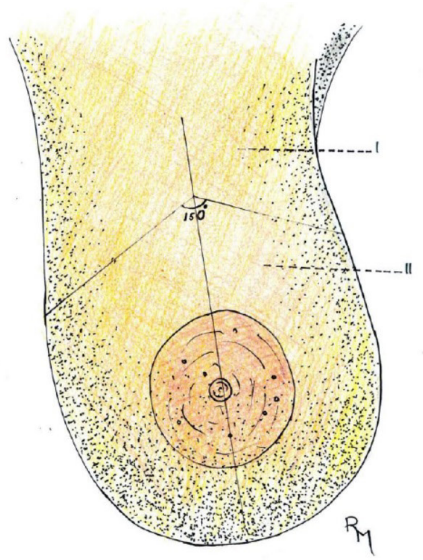

Fig. 4. Drawings for mastectomy and reconstruction in ptotic breasts.
I- Skin to be spared
II- Skin to be resected

Starting at this spot, the two arms of the skin excision will form an angle which will depend on the breast ptosis, exactly as described in the Total Posterior Pedicle Mammaplasty technique (Figure 5,6) [11,12].

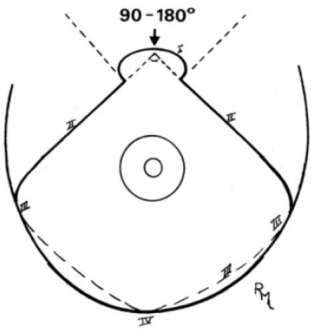

Fig. 5. Drawing in classical Total Posterior Pedicle mammaplasty procedure, which shows:

I. the keyhole elliptical part.
II. the starting of the keyhole arms.
III. the way keyhole arms follow the meridian to join each other on the sub-mammary fold (IV).

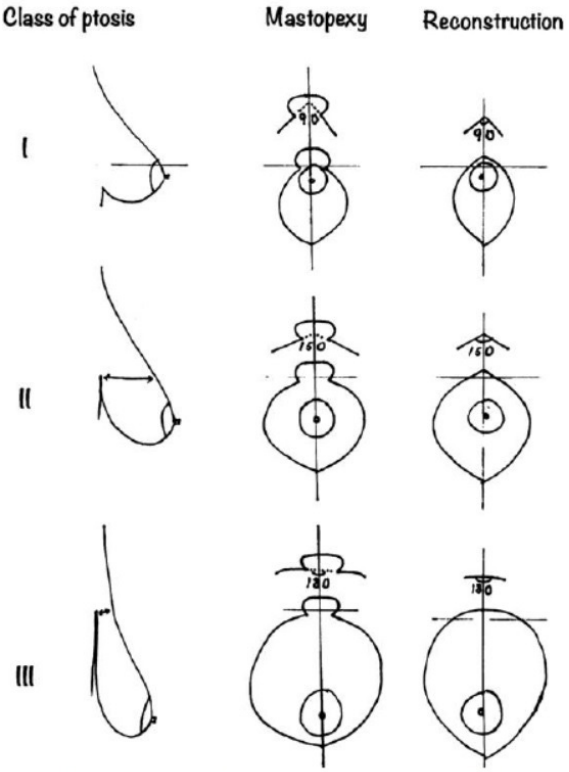

Fig. 6. Adaptation of the Total Posterior Pedicle incisions to reconstruction planification following the degree of ptosis.

The principle of this angle choice is based on the following: we divide breasts into three categories of ptosis (The Moufarrege three ptosis classification) [11] (Figure 7).

- In category I, the nipple is at the level or over the level of infra-mammary fold: the angle is 90°.
- In category II, the nipple is below the infra-mammary fold, but the breast is thick at the level of that fold: the angle is 150°.
- In category III, the nipple is extremely low under the infra-mammary fold and the breast is empty at the level of the fold: the angle is 180°.

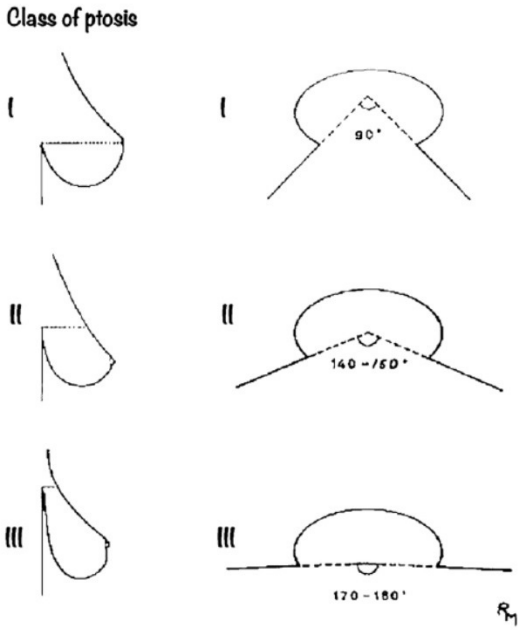

Fig. 7. Principle of the three angles of the incisions corresponding to the three categories of ptosis in the Moufarrege Total Posterior Pedicle mammaplasty.

The advantages of these various incisions, which depend on the degree of ptosis, will b have discussed in the Total Posterior Pedicle philosophy.

Once the resection arms - with an angle of 90°,150°,180°- are designed, they will follow the breast sphere in the manner of the earth globe meridian until their encounter on the infra 127 mammary fold (the equivalent of the south pole) (Figure 8).

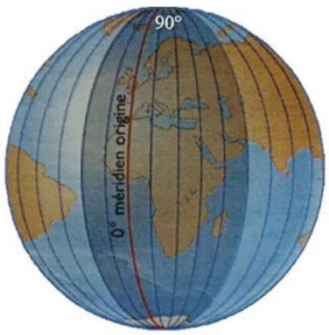

Fig. 8. The Meridians. The way the keyhole arms go around the breast. *From Le Petit Larousse illustré*

The difference between drawings in mastopexies and reductions on the one hand, and in reconstruction on the other hand is the presence of the keyhole circle in mastopexies and its absence in reconstruction. Both drawings will respect the same principle for the angle leading to skin resection (Figure 6).

Skin excision and mastectomy

We have just defined the limit of the cutaneous resection and mastectomy. Here, the oncologist will proceed to the mastectomy, resecting in the same piece: the skin between the incisions, the nipple areola complex, and the totality of the breast gland. Axillary dissection or research of the sentinel adenopathy, depending on the case, will take place without contra-incision in the axilla, the opening of the wound meant to proceed to the mastectomy being wide enough to provide easy access to the axilla.

Reconstitution

Here begins the second step of the reconstruction, with the muscular undermining of the implied hemi-thorax and the desired prosthesis insertion depending on the shape and the shape and the requested dimensions [13,14].

We have to insist on the approach to the retro pectoral pocket. Unlike all other traditional or classical techniques, our retro pectoral pocket will not start at the lower lateral free side of the Pectoralis major muscle; the prosthesis will not be placed only behind the Pectoralis major as traditionally (Figure 9). A big change we brought to reconstruction consists into creating the prosthesis pocket totally retro-muscular, so the prosthesis will be entirely covered on its frontal aspect by muscles. Four muscles will participate in the muscular wall protecting the prosthesis: The External oblique, the Serratus anterior, the Pectoralis minor and the Pectoralis major. While the traditional retro-pectoral insertion gives a muscular cover for only the upper two- thirds of the prosthesis (Figure 9), our pocket will allow the prosthesis to be entirely covered by the muscles (Figure 10).

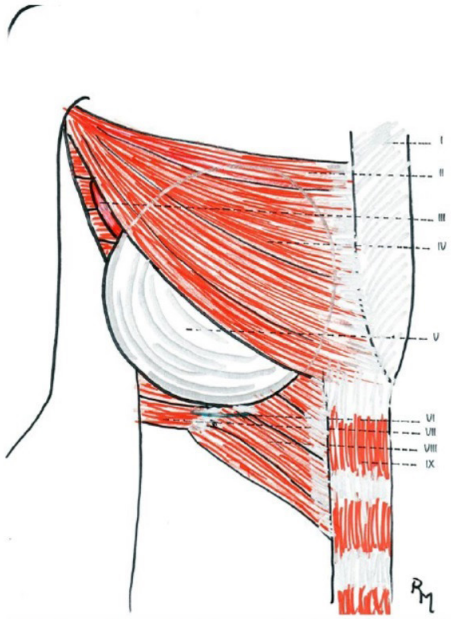

Fig. 9. Traditional positioning of the prosthesis behind the pectoralis major.

I) Sternum
II) Pectoralis major
III) Pectoralis minor
IV) Pectoralis major
V) Prosthesis
VI) Incision
VII) Serratus anterior
VIII) External oblique
IX) Rectus abdominis

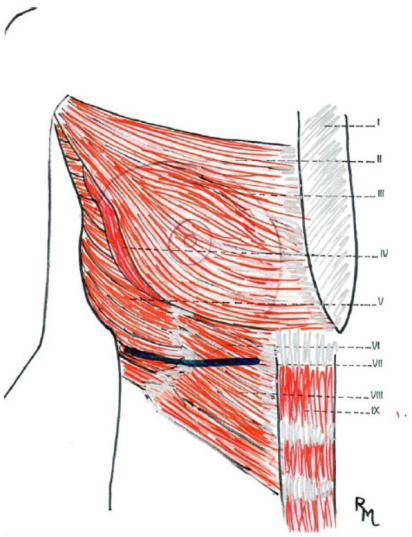

Fig. 10. Prosthesis is placed behind the four muscles of the right anterior hemi-thorax. One can see the outer convexity on the lateral side of the thorax because of the presence of the prosthesis.

I) Sternum
II) Pectoralis major
III) Pectoralis major
IV) Pectoralis minor
V) Serratus anterior
VI) External oblique
VII) Incision
VIII) External oblique
IX) Rectus abdominis

Incidentally, we use the same technique in breast augmentation, which will help us avoid a possible double bubble deformity in some cases.

Practically, we make a horizontal incision as large as needed for the insertion of the prosthesis two centimeters lower than the desired infra mammary fold and begin muscle undermining upperly at that point (Figures 10,11). This incision will be practically situated in the upper part of the External oblique muscle and undermining will include the upper fibers of External oblique as well as the Serratus anterior, the Pectoralis minor and finally the Pectoralis major muscles.

We will not elaborate any further in this chapter on the reasons of prosthesis choice [15], but we will give some quick ideas concerning those choice principles: one should avoid cohesive prosthesis in previously irradiated patients, or those who are supposed to undergo postoperative radiotherapy, because, in our experience, there is a higher risk of prosthesis exteriorization.

In that case, we use the saline prosthesis [16,17].

We do not think the saline anatomical prosthesis keeps as much projection as promotional documents try to let us believe, the fibrous capsule being a factor which sooner or later will provoke a progressive rounding movement even if there is a possibility that the prosthesis conserves a certain trend toward the drop shape.

Once the prosthesis is inserted in the Total retro-muscular pocket (Figures 12,13) and the muscle incision closed, we then proceed to the skin closing by approximating the two lateral and medial skin flaps on the vertical line. The latter will be transformed into an

inverted T with a very short horizontal incision as described in the Moufarrege Total Posterior Pedicle (Figure 14) [9,10].

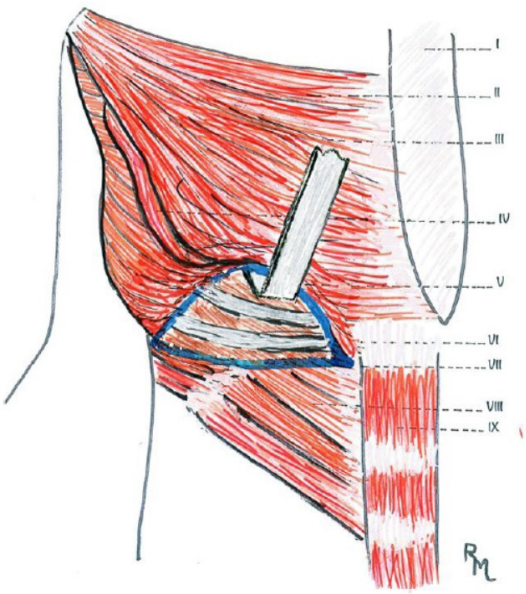

Fig. 11. Creating the retro-muscular pocket by elevating the four anterior hemi-thorax muscles.

Retractor

I) Sternum
II) Pectoralis major
III) Pectoralis major
IV) Pectoralis minor
V) Retractor
VI) External oblique
VII) Incision
VIII) External oblique
IX) Rectus abdominis

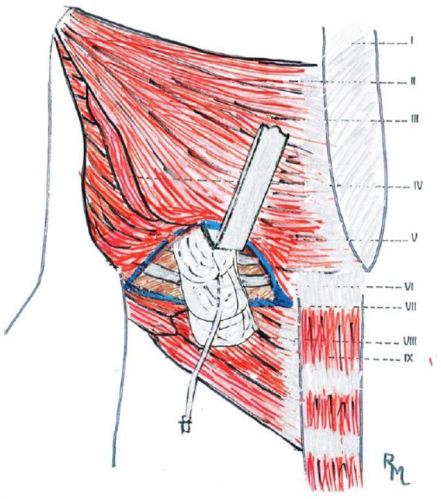

Fig. 12. Inserting inflatable prosthesis behind the four muscles.

I) Sternum
II) Pectoralis major
III) Pectoralis major
IV) Pectoralis minor
V) Retractor
VI) External oblique
VII) Incision
VIII) External oblique
IX) Rectus abdominis

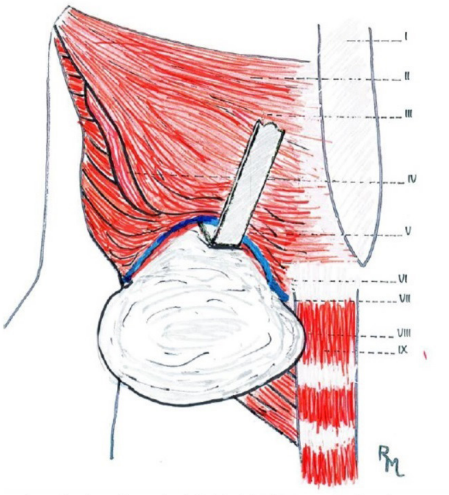

Fig. 13. Inserting cohesive gel prosthesis behind the four muscles (needs a larger incision in the muscle).

I) Sternum
II) Pectoralis major
III) Pectoralis major
IV) Pectoralis minor
V) Retractor
VI) External oblique
VII) Incision
VIII) Cohesive gel prosthesis
IX) Rectus abdominis

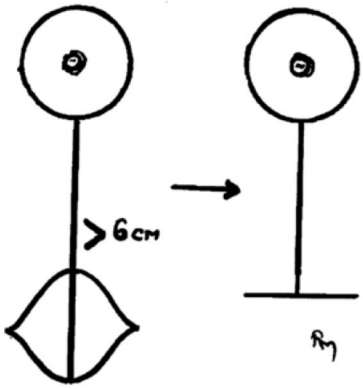

Fig. 14. Transformation of the vertical incision into an inverted T as soon as it exceeds 6 cm in length.

Fig. 15. Result after nipple transplant seen from the front.

Fig. 16. Profile, result after nipple transplant.

Fig. 17. Front view after a tattoo of the areola.

Fig. 18. Left profile after the tattoo of the areola.

Fig. 19. Right profile after the tattoo of the areola.

Fig. 20. Front view 5 months after the tattoo.

Fig. 21. Left profile 5 months after the tattoo.

The protection of the prosthesis by the Total muscular wall (the four muscles) will save us from the use of an artificial dermal matrix. This latter is very well known for the high rate of complications in terms of infection and seromas [18-21]. These complications, combined with the-high cost of these materials will be avoided thanks to the Total retro-muscular approach.

Three to six months later, the nipple will be reconstructed either by graft (opposite nipple, ear lobe) [10,11] (Figures 15,16) or with the propeller flap that I use more and more. I have entirely abandoned the use of a skin graft from the labia minora, internal fold of the thigh, etc, for a well-known reason, i.e. darkening of the graft. At the same time, symmetrization of the opposite breast can be executed (reduction, lifting or augmentation). Later, a tattoo will 186 complete the areola design (Figures 17, 18, 19, 20 and 21).

Clinical cases, evolution and complications

From 1995 to 2010, we proceeded to an immediate breast reconstruction with the Total Pedicle incision in 59 patients among whom 6 underwent a bilateral mastectomy and reconstruction. We experienced one, only partial, necrosis in an obese patient having undergone a bilateral mastectomy and among whom the left breast cancer was voluminous, very superficial and very lateral, almost sub axillary. Furthermore, the patient had undergone previous radiotherapy in her left breast.

Our series also suffered 7 prosthesis expositions, which happened only 6, 10 and 13 weeks after surgery. All these expositions occurred in patients having undergone pre-operative radiotherapy and who had undergone reconstruction using a cohesive prosthesis. This is the reason why we do not recommend a cohesive prosthesis in the context of pre-operative or post–operative radiotherapy.

Nevertheless, all of these last 6 patients reacted favorably to prosthesis removal, followed, after a few months (4 to 6) of tissue maturing and softening, by the insertion of a saline prosthesis. The seventh patient was lost to follow up.

Discussion

We have banished the Halsted type of horizontal trans-mammary incision in our breast reconstruction philosophy. This constitutes an obstacle to a nice reconstructed breast projection and, on the contrary, causes the development of a bridle dividing the reconstructed breast into an upper and a lower lobe, thus leading to a non-harmonious reconstruction.

We believe that a vertical incision contributes to a very favorable conic shape of the breast (Figures, 22, 23, 24, 25 and 26). In the same manner as our skin resection philosophy concerning breast lifting, our breast reconstruction technique will avoid the pitfall of a single drawing, whatever the ptosis degree, before mastectomy. We adjust our skin resection to the degree of ptosis by adopting different angles at the skin resection surface. The level of ptosis is in direct relationship with the amount of excess skin in the breast. It is thus logical to determine the amount of skin resection proportionally to the degree of ptosis, that is to say with variable angles from 90° to 150° to 180° for the three categories of ptosis. The Wise [22] drawing does not take into account the adaptation of skin resection to the excess of skin; it uses the same template in all cases.

The same reasoning applies to the B incision [23]. Contrarily to the Wise, the inverted T will lead to a very short inferior horizontal incision from 3 to 7 cm.

As for Benelli type purse resection and closure, it can only be used with very small breasts and very little ptosis [24,25].

Fig. 22. This patient underwent a breast reduction with the Total Pedicle on one side and an immediate post-mastectomy reconstruction on the other side. It is difficult to recognize the reduced breast of the reconstructed.

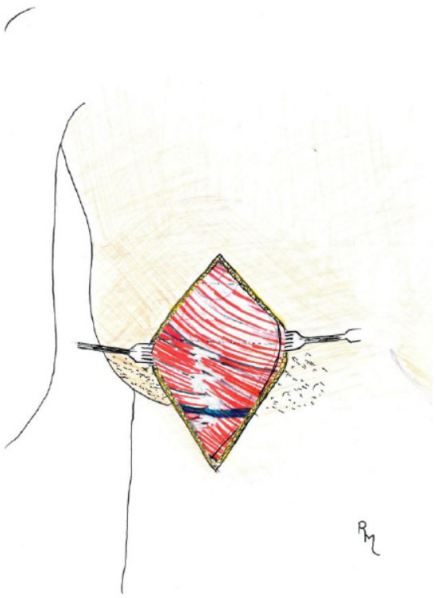

Fig. 23. After muscle closing, before skin flaps approximation.

Fig. 24. After skin closing with a long vertical line.

The use of accessory material

In our series, we have not used any adjuvant material as any type of artificial dermis or even temporary expansion prosthesis. The reason for that is that our technique is safe enough to avoid dehiscence without adding any artificial thickness to cover the prosthesis. The absence of tension in closing is secondary to the wide separation of the skin and the right delimitation of the skin to be resected following the three categories of ptosis rules. The muscular cover on the whole frontal surface of the prosthesis makes it valueless the use of an artificial dermal matrix.

Follow ups report infection cases after use of artificial dermis of any company. This will oblige surgeons to proceed to corrections using some more invasive surgeries.

Some studies have shown an increase rate of postoperative seromas

of 4.24 times and of infection 5.37 times with the use of artificial dermal matrix [18].

All abdominal free flaps could be considered for an immediate reconstruction, but their morbidity should make surgeons reserve them for cases where a simpler reconstruction with a prosthesis is not possible for many reasons.

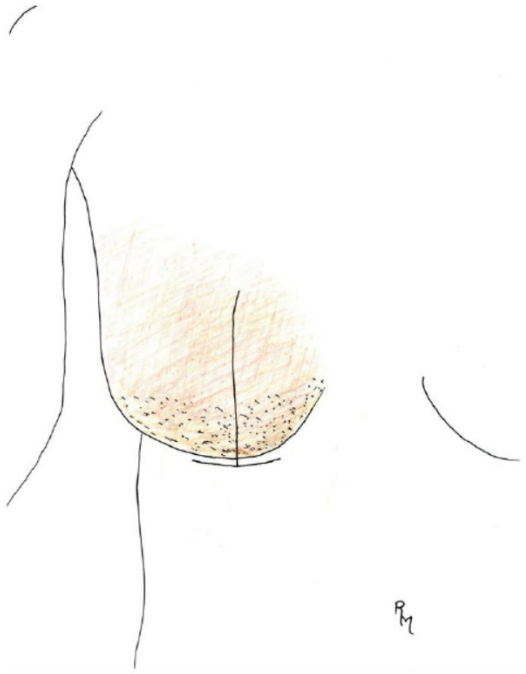

Fig. 25. Transforming long vertical suturing line in an inverted T with a short horizontal scar.

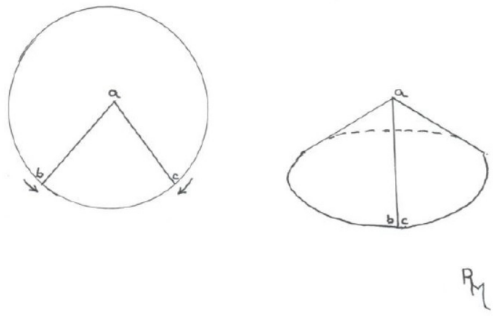

Fig. 26. Illustration simulating the conization of the tissue with a "slice of pie" subtraction.

Total retro-muscular prosthesis

The only reason why reconstructive surgeons need the protection of the artificial dermis is their apprehension from prosthesis exposition by lack of effective skin covering.

This problem originates from the ways most of plastic surgeons would perform their breast reconstruction –and even breast augmentation- by placing the prosthesis behind the Pectoralis major muscle. In such circumstances, only the upper internal two thirds of the prosthesis are covered and protected by the muscle. This will lead to have the prosthesis directly under the skin on one third of its surface, with the threatening risk of exteriorization (Figure 9).

In our technique of reconstruction, the prosthesis will be covered on all its anterior aspect, with a muscular protection represented by the External oblique, the Serratus anterior, the Pectoralis minor, and the Pectoralis major muscles. The meant to accommodate the prosthesis pocket is not only retro pectoral, but rather totally retro muscular, that is to say behind all these said muscles.

The surgeon will make his horizontal incision in the two External oblique and Serratus anterior muscles 2 cm under the projected breast sub-mammary fold and will start his undermining behind the four previously cited muscles to complete the prosthesis pocket preparation. Once installed, the prosthesis will be entirely covered by these muscles which will be covered subsequently by the skin flaps. This will allow surgeons not to use the artificial dermal matrix with all its risks and hazards.

Economic considerations

This immediate reconstruction technique is certainly the less costly one ever. Either in complete private health system where all costs are assumed by the patient or insurance companies, or in a national public health system where breast reconstruction constitutes a heavy cost to be assumed by the society, this technique must be a good alternative when applicable.

Conclusion

Abandon Halsted deforming and non-aesthetic incision or all other related incisions [1-4].

Abandon Wise drawing reconstruction. The latter does not allow adapted skin resection, nor does it give a proper access to axilla; the review of different publications promoting the Wise design confirms the absence of the nice conization we look for; add to all these elements the inconvenience of the ship anchor scar resulting in a less harmonious breast [17,25].

The pre-established drawing, according to the Moufarrege Total Posterior Pedicle Mammaplasty design, with the use of the right prosthesis, leads to an immediately satisfactory shape, as well as an adequate skin coverage for the desired volume and avoids the use of expanders with all their known limitations [26-39].

The immediate breast reconstruction with the Total Posterior Pedicle design leads to an immediate conization of the skin envelope with incisions simulating those of an aesthetic breast 278 lifting with an inverted T scar (Figure 22, 23, 24, 25 and 26).

Avoiding using synthetic dermis in breast reconstruction with a prosthesis will preserve from more and more known complications and inconveniences accompanying the use of these materials in terms of infection, seromas, skin thinning and atrophy [18-21].

The simple short and long-term recovery should be a reason to privilege this type of procedure. This low-cost procedure is another significant advantage one can consider when applicable.

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