Egypt, J. Plast. Reconstr. Surg., Vol. 31, No. 1, January: 57-61, 2007

Restoring Upper Pole Fullness in Reduction Mammaplasty and Mastopexy

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ABSTRACT

Advances in techniques of reduction mammaplasty and mastopexy lead to the adoption of the concept of vertical techniques. This concept is based on parenchymal resection and reshaping rather than skin excision and re-draping. Vertical techniques controlled the bottoming out sequence of other techniques but left the upper pole deficient. The aim of this work was an attempt to increase the success of the vertical principle by restoring the upper pole fullness in reduction mammaplasty and mastopexy. Two steps were needed to achieve this goal. First, the ptotic upper breast was freed from the deep (pectoral) fascia. Then, it was re-fixed to the same fascia at a higher position using a superiorly based infraareolar dermofascial flap. Forty patients were operated upon using this technique in the period between January 2004 and January 2006. Seating Owl-shaped markings of Oscar Ramirez were used. Upper pole fullness was achieved on the operating table. Follow up for at least six months showed maintenance of the results. We concluded that both undermining of the ptotic breast from deep fascia and re-suspension at a higher level were essential to restore the upper pole fullness. This procedure had no adverse effect on the blood supply or sensation of the breast.

INTRODUCTION

The dominant supply to the integument of the anterior chest is from the following sources: The internal thoracic artery medially, especially from the 2nd and 3rd interspaces; the lateral thoracic artery laterally; the anterior intercostals arteries inferiorly, especially from the 4th and 5th intercostals spaces and from the acromiothoracic perforator superiorly. These vessels anastomose in the vicinity of the nipple-areola complex **[1]**.

Corduff and Taylor **[1]** imagine the developing breast as a tissue expander which is fixed to the skin at the nipple. Expansion results in elongation of the supplying vessels and their compression towards the periphery of the gland forming a vascular hood. Ricbourg **[2]** termed this vascular hood "cutaneo-glandular plexus".

Within the boundary of this vascular perimeter is a relatively avascular plane between the undersurface of the breast and the deep (pectoral) facia. The breast is supplied by vessels that penetrate the gland from the vascular hood following the connective tissue framework between the breast lobules **[1]**. Therefore the glandular tissue is supplied by retrograde flow from the cutaneo-glandular plexus.

The breast being a skin appendage (a modified sweat gland) is enclosed within superficial fascia **[3]**. Part of this fascia is anterior to the breast and the other part is posterior. The anterior layer of the superficial fascia is an indistinct fibrous fatty layer that is connected to but is separate from dermis and from breast tissue **[4,5]**. The posterior layer of the superficial fascia has fascial extensions to the underlying deep (pectoral) fascia. These extensions fix the breast to the pectoral fascia. As breast size increases, these connections become looser as a result of gravitational forces and the so called retromammary (retro-glandular) space is formed **[5]**.

Therefore enlarged breasts are usually ptotic and have deficient upper pole. Correction of this ptosis and restoration of upper pole fullness during breast reduction or mastopexy necessitates undermining of the breast from the deep (pectoral) fascia and restoring the anchor points between the breast and the deep (pectoral) fascia to their original superior position.

To achieve this goal Marchac and deOlarte **[6]** introduced the concept of upper glandular plication and suspension to the pectoralis fascia. Lejour **[7,8]** adopted the same concept. Dermofascial suspension using the anterior layer of superficial fascia and the overlying dermis to fix the breast high up to the deep (pectoral) fascia was described by Grotting et al. **[9]** for mastopexy and Awad et al. **[10]** for reduction mammaplasty.

Other techniques introduced a chest wall based flap into the upper pole to hold the upper gland up and provide upper pole fullness **[11-17]**.

On the other hand, techniques that do not undermine the gland from the underlying deep (pectoral) fascia to elevate it superiorly **[18-21]** will end up with deficient upper pole and squeezed breast tissue at the lower pole. Suturing the medial and lateral pillars in vertical mammaplasty techniques will prevent bottoming out but do not necessarily provide upper pole fullness **[15]**.

The aim of this work was an attempt to restore upper pole fullness in reduction mammaplasty and mastopexy through undermining the upper breast from deep (pectoral) fascia and re-fixing it at a higher position.

PATIENTS AND METHODS

We operated on 40 patients. They complained of different degrees of breast hypertrophy and/or breast ptosis. These operations were performed between January 2004 and January 2006. Preoperative examination and investigations revealed no suspicion of any malignancy in the breast. All patients were fit for surgery. Smoking stopped for two weeks preoperatively in patients who smoke. Figs. (1,2,3) show the preoperative photos of the breasts of one of the patients.

Skin markings:

We used the seating Owl shaped markings that have been mentioned by Ramirez **[21]**. Markings were performed while the patient was standing. We determined the mid-sternal line, the meridian of each breast and then the equator of each breast. Next we marked four points: Point A was marked on the meridian 2cms below the level of the projection of the inframammary fold. Points B and C were located on the equator. Point B was 10cms from mid-sternal line. Point C was 10cms from the point where the arm of the patient touches the equator. Point D was marked on the meridian 3-6cms above the old inframammary fold. Connection between the four points formed a rhomboid. The seating Owl Shaped markings were drawn guided by the rhomboid. The periareolar component (the head of the Owl) started 2-3cms above point A on the meridian and then curved inside the rhomboid at about 3cms above the equator. The length of the periareolar component was about 1.5 times the circumference of the new areola (the circumference of 5cms diameter areola is 16cms). The periareolar component ended at or just above the equator. From the ends of the periareolar component another gentle curvilinear lines were made that followed the lower medial and lateral sides of the rhomboid. This lower part formed the vertical component (the body) of the Owl. The horizontal component (the feet) of the Owl was either premarked at point D 3-6cms above and parallel to the inframammary fold or left unmarked so that the point D was the end of the vertical component with no horizontal component.

Surgical technique:

The periareolar component was deepithelized around the new areola. Deepithelization extended at least 2cms below the limits of the new areolar border. Further deepithelization at the vertical component allowed inclusion of superiorly based infraareolar dermofascial flap for suspension of the breast. The dermofascial flap was raised from the breast parenchyma at the vertical component in cases of reduction mammaplasty. In cases of mastopexy the dermofascial flap was elevated as one unit with the underlying breast parenchyma.

Excision of breast parenchyma as planned for reduction was done from the vertical component [leaving two (medial and lateral) parenchymal pillars], superiorly on the medial and lateral quadrants underneath the deepithelized peripheral portions of the periareolar component and inferiorly in the area between the old and new inframammary folds. For cases that need larger reduction, parenchymal resection was extended underneath the pillars (leaving the superficial half of each pillar), inferolateral to excise the axillary tail and inferomedial. Care was taken during excision to preserve the major musculoglandular perforators medially and laterally and the accompanying medial and lateral intercostal nerves. The excised tissues look like the shape of a flying owl. The body is the excised vertical component. The wings are the excised parenchyma from underneath the medial and lateral pillars and from the inferomedial and inferolateral parenchyma. The tail is the excised tissues between the old and new inframammary fold.

Then the breast parenchyma deep to the nipple areola complex was undermined at the retromammary space through blunt dissection from deep (pectoral) fascia. Insetting of the new areola was done first. Then the dermofascial flap was sutured as high as possible to the pectoral fascia without adding tension to the areolar closure. This was followed by suturing the medial and lateral pillars and closure of skin. Horizontal component of incision was added in our early cases and abandoned in the late cases. Fig. (4) shows a diagram demonstrating the seating Owl-shaped incision and the flying Owl-shaped excision of the breast parenchyma and the folded superiorly based infraareolar dermofascial flap.

Fig. (1): Preoperative anterior view of the breasts of one of the patients.

Fig. (2): Preoperative right oblique lateral view of the breasts of one of the patients.

Fig. (3): Preoperative left oblique lateral view of the breasts of one of the patients.

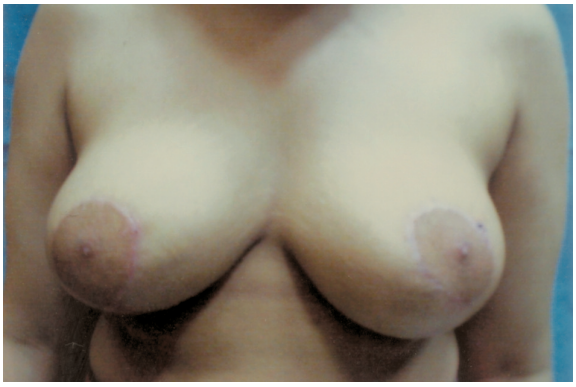

Fig. (5): Postoperative anterior view of the breasts of one of the patients.

Fig. (6): Postoperative right oblique lateral view of the breasts of one of the patients.

Fig. (7): Postoperative left oblique lateral view of the breasts of one of the patients.

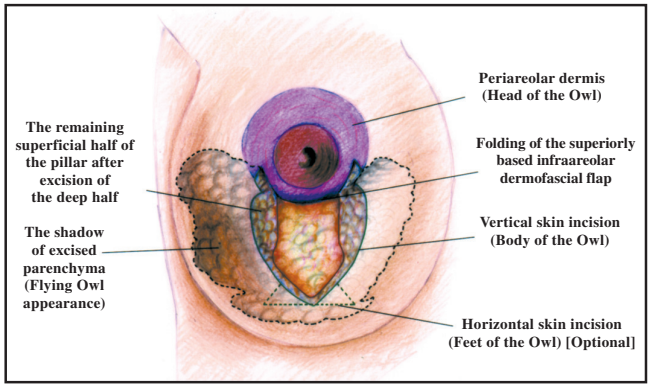

Fig. (4): A diagram for a right side breast demonstrating the seating Owl-shaped incision and the flying Owl-shaped excision of the breast parenchyma and the folded superiorly based infra-areolar dermofascial flap. This diagram is modified from a diagram used by Ramirez **[21]**.

RESULTS

The surgical procedure was easily performed with no danger on the vascularity of the nipple areola complex or of the skin flaps. The excised parenchyma ranged from 400ml to 1400ml. Only few minutes were needed to deepithelize and elevate the dermofascial flaps. The undermining of the upper breast from the deep (pectoral) fascia was easily performed through blunt dissection with no blood loss and no affection of the vascularity of the nipple areola complex.

Excellent results (upper pole fullness) were obtained immediately on the operating table. Vertical scars were not too long to extend to the upper abdomen so that there was no need to add horizontal component in late cases. Disruption at the periareolar suture line occurred in two of early cases due to high tension applied to this suture line and they were re-sutured. Sensation of the nipple areola complex and lactation was not compromised. Follow up of cases showed maintenance of upper pole fullness and no bottoming out. Figs. (5,6,7) show the post operative photos for the breasts of one of the patients.

DISCUSSION

The progressive improvement in reduction mammaplasty and mastopexy contributed to by Lejour **[7,8]**, Lassus **[18,19]**, Hall-Findlay **[20]**, Ramirez **[21]** and others gave results with dramatic improvement in the size and length of the resulting scar, but left the upper pole still deficient **[15]**.

In Lassus **[18-19]**, Hall-Findlay **[20]** and Ramirez **[21]** techniques, absence of undermining of the upper breast from the deep (pectoral) fascia to allow higher suspension to correct ptosis, resulted in deficiency of the upper pole. Excision of central part of breast parenchyma in Lejour **[7,8]** technique for reduction mammaplasty, also resulted in deficient upper pole.

As regard the incision, we adopted the Owl incision described by Ramirez **[21]**. It combines the features of the large periareolar reduction of Benelli **[22]** and the vertical reduction of Lassus **[18,19]** and Lejour **[7]**. Point A was drawn 2cms below the level of the projection of the inframammary fold to leave enough skin above the new areola to accommodate the breast tissues pushed to the upper pole to restore fullness. Point D was drawn 3-6cms above the old inframammary fold according to the size of the breast (the larger the size the more the distance). A horizontal inframammary scar was either made very short or completely eliminated. The seating Owl incision combines different incisions to maximize the advantages and positive aspects of each incision and to diminish their negative features **[21]**.

Enlargement of the periareolar skin resection diminished the length and pleating of the vertical scar. Conversely, inclusion of the vertical component to the periareolar technique eliminated the pleating effect of the periareolar incision **[21]**.

The superiorly based infraareolar dermofascial flap is similar to that used by Frey **[23]** and Exner & Scheufler **[24]** but the way of fixation differ. Fixing the dermofascial flap to the deep (pectoral) fascia behind the undermined upper breast could suspend the breast very efficiently because the superficial fascia can tolerate high tension as mentioned by Lockwood **[5,25]**. Grotting et al. **[9]** used deepithelized superiorly based inferior flap for mastopexy. Awad et al. **[10]** used medially based dermofascial flap for suspension in cases of gigantomastia with success.

Keeping the breast parenchyma of the vertical component underneath this dermofascial flap without excision and folding them together underneath the upper breast parenchyma resulted in autoaugmentation in mastopexy patients with no need to use breast implant. Similar flap was used by Grotting et al. **[9]**.

Based on the pattern of vascularity of the breast described by Corduff & Taylor **[1]** and by Ricbourg **[2]**, we undermined the superior pole without compromising the vascularity of the nipple areola complex. The dissection in the retromammary space (between the superficial and deep fascia) was bloodless.

Insetting the areola before fixing the dermofascial flap to the deep (pectoral) fascia allowed the adjustment of the tension. This prevented wound disruption at the periareolar suture line. This modification was done after experiencing disruption at the periareolar suture line in two of our early cases. Suturing of the medial and lateral pillars was adjusted too so that it did not add any more tension.

Thinning of the pillars did not affect their efficacy to prevent bottoming out. Ramirez **[21]** in his Owl technique used to put suture at the dermofascial part of the pillars. He thought that this was enough to prevent bottoming out. He found that the breast tissue in the majority of patients has a significant fatty component and it usually does not hold the sutures.

The use of dermofascial flap to support the undermined and elevated superior pole is better than the use of the chest wall based flaps designed by Graf & Biggs **[15]** and Ritze et al. **[17]**. Graf & Biggs **[15]** elevated a bipedicled pectoralis major muscle flap to hold an inferiorly pedicled flap up while Ritz et al. **[17]** used a bipedicled pectoral fascia flap to hold a similar inferiorly pedicled flap up. Both techniques violate the tissue compartments and raised oncologic concerns. Should a breast cancer develop, the standard oncologic principle is to remove one normal tissue layer beyond the one involved with cancer **[26]**. The next anatomical layer is the chest wall itself in Graf & Biggs **[15]** technique and the pectoralis muscle in the Ritze et al. **[17]** technique.

To summarize, management of ptotic breast whether enlarged or not necessitate release the lower attachment to the deep (pectoral) fascia and elevation to a higher position to restore the upper pole fullness. Maintenance of this higher position is better achieved by the use of a dermofascial flap for suspension. These two steps of undermining and suspension will not adversely affect the vascularity of the nipple areola complex.

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