

# Esthetic considerations in surgical excision of benign breast lesions

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## Abstract

**Introduction:** Benign lesions are a common finding in the female breast. Surgical excision is, usually, the preferred definitive mode of treatment. This, however, often results in formation of unsightly scars and/or distortion of breast shape. Application of certain plastic surgical principles may contribute to the minimization of the aforementioned sequelae.

**Patients and methods:** The charts of 43 consecutive female patients with benign breast pathology, surgically excised, were retrospectively analyzed. A periareolar incision was used to access the lesion. A small group of 3 patients, in which a curvilinear incision following Lange's skin tension lines was used, served as control. The resultant defect was immediately reconstructed in all patients using a breast advancement flap, a breast rotation flap or a 'controlled' hematoma. Follow - up ranged from 6 months to 3.5 years. Postoperative complications and recurrences were recorded. The esthetic result using a

4 - point scale, as well as the patients' satisfaction using a 3 - point scale, was assessed.

**Results:** There were neither recurrences nor postoperative complications. There were neither hypertrophic or unsightly scars nor distortion of the breast shape. The result was judged as excellent or good in 95% of cases. All patients were either very satisfied or satisfied with the outcome.

**Conclusion:** The high rate of excellent and good results and the high rate of patient satisfaction observed in this retrospective study allow us to recommend the periareolar incision and the immediate defect reconstruction as useful adjuncts to surgical excision of benign breast lesions.

**Key words:** Benign breast lesions; surgical excision; periareolar incision; breast advancement flap; reconstruction

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## Introduction

Benign breast disease is a common finding among women. Benign pathology accounted for over 80% of 1.6 million breast biopsies (1.34 million) performed in 2010 in the United States<sup>1</sup>. Surgical excision is the definitive procedure performed for symptomatic or suspicious benign tumors to alleviate symptoms,

when present, as well as anxiety regarding potential for growth or malignancy<sup>2,3</sup>. However, surgical excision often results in formation of unsightly scars, potential for hyperplastic scars, loss of breast volume eventually leading to breast asymmetry, and distortion of breast shape as well as distortion or displacement of the nipple - areola complex<sup>4,5</sup>.

The nonmalignant nature of fibroadenomas and other benign breast lesions allows, or even requires, cosmetic considerations during their surgical excision. An important goal of the treatment should be an esthetically pleasing result, especially because the majority of patients are young individuals.

Application of a number of plastic surgical principles (periareolar incision, immediate reconstruction of the resulting defect) may reduce the aforementioned sequelae in most cases and finally lead to a satisfactory outcome as well as a pleasing cosmetic result.

Aim of the present study was the retrospective review of a case series of 43 consecutive patients who underwent surgery for excision of a benign lesion using the principles mentioned before. A small group of 3 patients served as control.

### Patients and Methods

The charts of all female patients with benign breast pathology (benign tumors, cysts, radiologically suspicious areas e.g. calcifications) operated on during a 5 - year period were reviewed. All procedures were performed by the same surgeon and all content and procedures described within conform to the principles outlined in the Declaration of Helsinki. Forty - three cases were found. Data were collected regarding patient age, breast side affected, size of the lesion, histopathological diagnosis, post-operative complications and recurrences. Scar appearance (pigmentation, vascularity, pliability, and size), nipple - areola deformities, breast contour and shape, and breast symmetry were evaluated clinically. Pre- and postoperative breast contour and shape, and breast symmetry were compared on frontal and lateral patient photographs. The esthetic outcome was assessed using a simple 4 - point scale (1= excellent, 2= good, 3= fair, 4= poor). Patient satisfaction was assessed using a simple 3 - point scale (1= very satisfied, 2= satisfied, 3= not satisfied).

Access to the breast lesions was gained through a periareolar incision in all cases (Figure 1). In three other cases a curvilinear incision following Lange's skin tension lines was used. The reason was the in-

ability of the radiologist to place the guiding wire through a periareolar entry point. In one patient a partial nipple - areola complex excision was necessary because of sanguineous nipple discharge due to an intraductal papilloma situated 1cm from the nipple.

Excision of the breast lesion was followed by careful hemostasis. Local breast tissue advancement flaps (BAF) were mobilized, and sutured against each other, for immediate reconstruction of the defects in all cases. The breast tissue was advanced beneath the breast skin flap and, when necessary, along the chest wall to fill the defect. Careful but sufficient mobilization of the skin flap through undermining between the skin and the breast tissue was performed in order to avoid skin retraction and so achieve a better esthetic outcome. When both superficial and deep undermining of the breast tissue was necessary, the flaps were carefully designed, in order not to compromise blood supply and thus avoid necrosis, especially late fat necrosis in obese patients. Occasionally, full thickness fibroglandular breast tissue flaps were transposed or rotated in order to fill a defect. Suction drains were used when considered necessary (when the flap approximation was not perfect).

The sole quadrantectomy defect was localized in the lower outer quadrant of the left breast. A Penrose drain was inserted after completion of the resection and left in situ for three days facilitating removal of the blood excess. The drain was pulled out on the 4<sup>th</sup> postoperative day. The 'controlled' hematoma nicely filled up the defect (Figure 2). No regional flaps were used for the reconstruction of any defect. The periareolar sutures were removed on the 6<sup>th</sup> postoperative day.

### Results

Patient age ranged from 20 to 53 years (mean 35.5 years). The right breast was affected in 24 patients and the left in 19 patients. The size of the benign tumors ranged from 1.9 to 6.5cm (Figure 3). The smaller ones included within radiologically 'suspicious' areas ranged from 0.4 to 0.6cm. The size of the



**Figure 1**

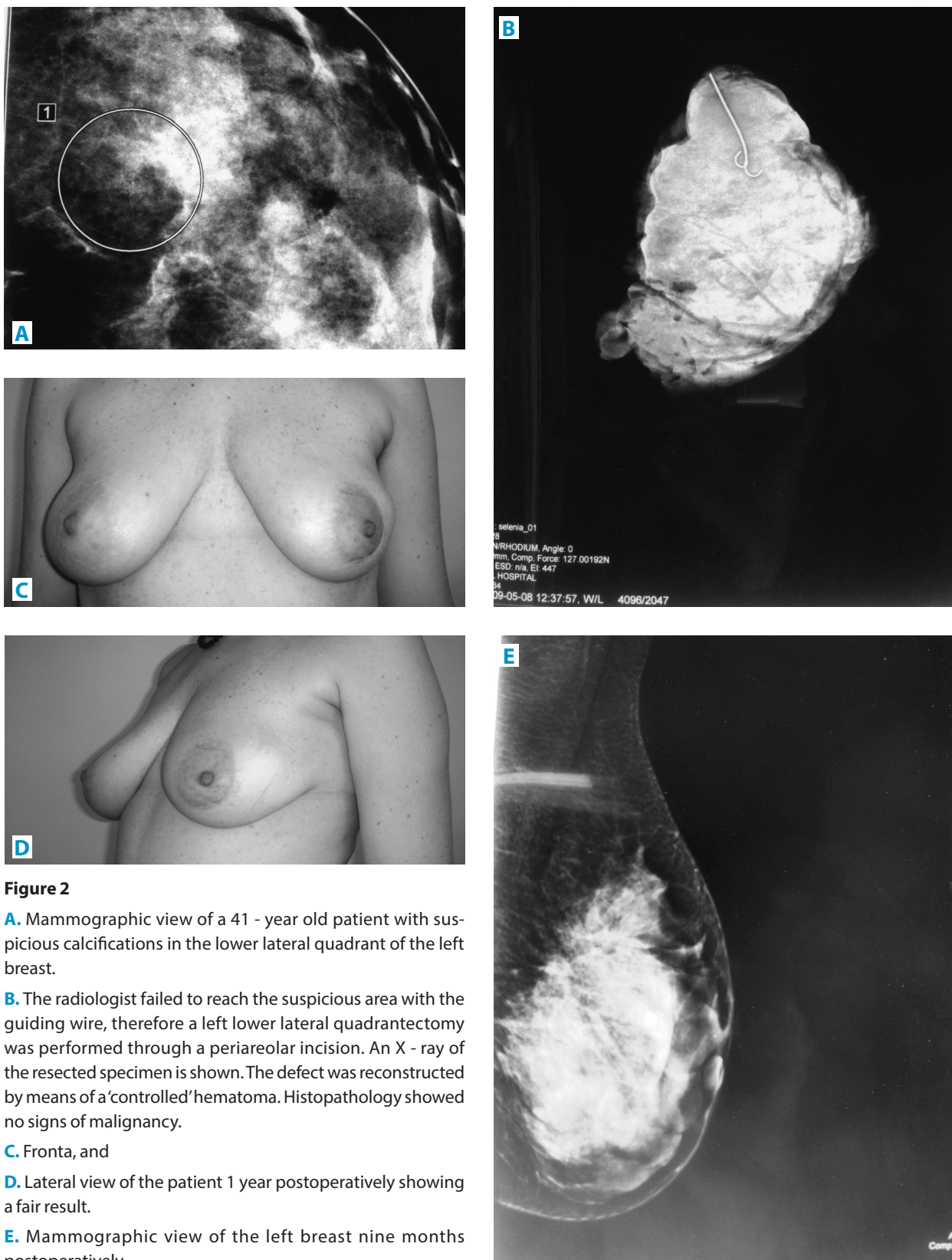
**A.** Preoperative clinical picture of a 27 - year old patient with a lump in the upper lateral quadrant of the right breast (the cross shows its exact location at 10 o' clock 6cm craniolateral to the nipple).

**B.** Magnetic resonance imaging (MRI), depicting the benign character of the lump.

**C.** Intraoperative picture of the 4cm large lump which was removed through a periareolar incision. The defect was immediately reconstructed with a BAF. Histopathology diagnosed a benign fibroadenoma.

**D.** Frontal, and

**E.** Lateral view of the patient, 1 month postoperatively. The result was deemed good.



**Figure 2**

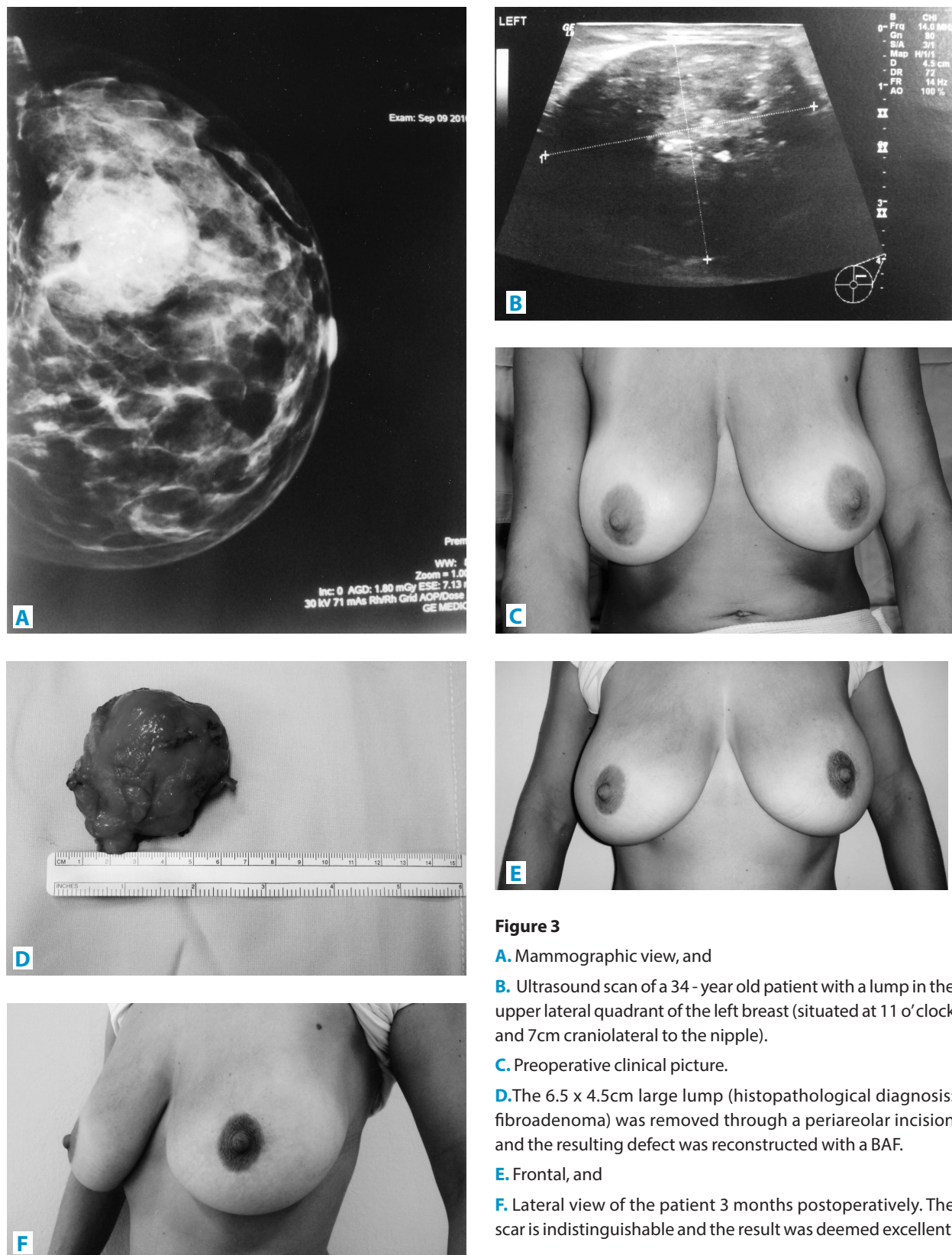
**A.** Mammographic view of a 41 - year old patient with suspicious calcifications in the lower lateral quadrant of the left breast.

**B.** The radiologist failed to reach the suspicious area with the guiding wire, therefore a left lower lateral quadrantectomy was performed through a periareolar incision. An X - ray of the resected specimen is shown. The defect was reconstructed by means of a 'controlled' hematoma. Histopathology showed no signs of malignancy.

**C.** Fronta, and

**D.** Lateral view of the patient 1 year postoperatively showing a fair result.

**E.** Mammographic view of the left breast nine months postoperatively.



**Figure 3**

- A.** Mammographic view, and
- B.** Ultrasound scan of a 34-year-old patient with a lump in the upper lateral quadrant of the left breast (situated at 11 o'clock and 7cm craniolateral to the nipple).
- C.** Preoperative clinical picture.
- D.** The 6.5 x 4.5cm large lump (histopathological diagnosis: fibroadenoma) was removed through a periareolar incision and the resulting defect was reconstructed with a BAF.
- E.** Frontal, and
- F.** Lateral view of the patient 3 months postoperatively. The scar is indistinguishable and the result was deemed excellent.

resected breast specimens ranged from 1.6 x 1.5 x 0.7cm to 9.5 x 9 x 2.5cm, the largest one having been a quadrantectomy (Figure 2). The histopathological diagnosis was: fibroadenoma (n= 27), papilloma (n= 4), cysts (n= 3), fibrosis/adenosis/sclerosing changes/epithelial hyperplasia/hyalinization/calcifications (n= 12). In some patients there were more than one histological diagnosis (e.g. small fibroadenoma and calcifications). Follow - up ranged from 6 months to 3.5 years. There were no postoperative hematomas or infections. There were no recurrences. Neither stretched nor hypertrophic scars were noticed. There were no skin retractions. No indentations were observed. There were no nipple - areola or breast deformities. All breasts retained their preoperative form and shape. In the periareolar incision group there was one case of a noticeable breast asymmetry in a patient with small breasts, where a 5.5cm large fibroadenoma had been removed. However, the patient was satisfied with the final result and wished no further interventions. A slight indentation was observed in another patient after partial resection of the nipple areola complex and reconstruction of the defect with a local Z - and a V - Y plasty. The patient wished no corrective surgery. In the small, curvilinear incision group there was one hyper pigmented scar.

The result was rated excellent (1) in seventeen patients (17/43, 39.5%), good (2) in twenty - three (23/43, 53.4%) and fair (3) in three (3/43, 6.9 %). There was no case rated poor (4).

All patients in the periareolar incision group were either very satisfied (1) or satisfied (2) with the appearance of the scar and all patients were very satisfied with the shape of the breast. There was no patient who was not satisfied with her result. The patient in the curvilinear incision group with the hyper pigmented scar expressed some concern regarding the outcome; however, as the follow - up period was not long enough (6 months), we decided to wait.

## Discussion

Benign breast tumors are common among women.

Fibroadenomas account for most masses occurring in female patients younger than 40 years<sup>2</sup>. Autopsy series have identified the former in approximately 10% of women studied in a post mortem examination<sup>3</sup>. Cysts are most common in patients in their 5<sup>th</sup> decade and those who are perimenopausal<sup>2</sup>.

The option of surgical excision of a clinically benign mass versus observation should be discussed in detail with the patient. Patients who opt for observation should undergo further workup (ultrasound and needle biopsy - the so called 'triple test')<sup>2</sup>.

Surgical excision performed for benign breast lesions alleviates physical discomfort and anxiety regarding potential for growth or malignancy. There are two main goals in the pathologic evaluation of a benign breast biopsy: First, to distinguish benign lesions from in situ or invasive breast cancer (a carcinoma arising within a fibroadenoma is rare, the rate varying from 0.002% to 0.125% in fibroadenoma specimens<sup>4</sup>), and second to assess the risk of subsequent breast cancer associated with the benign lesion(s) identified<sup>5</sup>. Surgical treatment of giant fibroadenomas in adolescents is indicated because of distortion of the breast, potential to cause psychological harm, and potential for enlargement that may cause venous congestion, glandular distortion, pressure necrosis and ulceration<sup>6</sup>.

Primary goal of a benign tumor excision is the avoidance of a recurrence. However, equally important, given the nonmalignant nature of these lesions, is cosmesis. It should be noted that the majority of claimants for poor cosmesis after breast surgery had benign disease as shown by Richards and Vihj who analyzed National Health Service Litigation Authority (NHSLA) data pertaining to breast care over a 4 - year period (2005 - 2008) focusing on claims for a poor cosmetic outcome. Comparison of the data with previously obtained NHSLA data (1995 - 2005) demonstrated an upward trend in such claims<sup>7</sup>.

The accepted definitive treatment of surgical excision results in scar formation and potential for unsightly or hypertrophic scars, as well as breast vol-

ume loss and potential for nipple - areola distortion or displacement. Traditionally, benign breast lesions are excised through an overlying incision. However, unsightly scars have frequently resulted, causing a great nuisance to patients as well as doctors.

The periareolar incision has been used in breast surgery on various indications. It provides good cosmesis when used for the excision of benign disease<sup>8</sup>. Liu et al.<sup>9</sup> compared the results after use of an overlying or a periareolar incision for the removal of a breast fibroadenoma in 76 patients. Cosmetic assessment at 6 months demonstrated statistically more excellent/good results in group A (periareolar incision) than in group B (overlying incision). However, the periareolar incision was associated with more early postoperative complications and more nipple sensation losses than the overlying incision. The results of the present study showed no altered nipple sensation or other complications when the periareolar incision was used. Our observations are in accordance with the findings of Mofid et al.<sup>10</sup>, who observed no difference in sensory outcomes of the nipple - areola complex in patients who underwent an augmentation mammoplasty by either the periareolar or the inframammary approach. It should be noted that some of our good results could become excellent with time, as the follow up of a number of patients was short (6 months) for definitive scar assessment.

Dixon postulated that removal of peripheral fibroadenomas through a circumareolar (periareolar) incision achieves a much better cosmetic outcome, particularly when the lesion is in the upper inner quadrant<sup>11</sup>. Benson, on the other hand, commented that removal of these mobile lesions through a periareolar incision can be a trap for the inexperienced operator resulting in failure to remove the lesion<sup>12</sup>. Furthermore, such a dissection may involve loss of more tissue than necessary with an increased risk of hematoma formation and consequently a much poorer result. It is a fact that this is not an operation for the unsupervised trainee. When performed by an experienced individual, there is no reason why it should involve loss of more tissue than an incision

directly over the lesion or that there should be an increased risk for hematoma. Lighted retractors or endoscopes can be used to see down long subcutaneous tunnels, visualize any bleeding vessels and thus prevent hematoma formation<sup>13</sup>.

Treatment of non - palpable lesions often involves ultrasound - guided placement of a guiding wire to facilitate their localization during surgical excision. Placement of the wire by the radiologists through the periareolar margin, which would enable a periareolar incision, is not always feasible. In these cases a curvilinear incision over the wire following Lange's skin tension lines is mandatory giving, occasionally, less satisfactory results<sup>12,14</sup>, as was also shown by the results of the present study (1/3 hyper pigmented scar). Unfortunately the curvilinear incision group was very small and therefore statistical analysis and comparison with the periareolar incision results was meaningless.

Surgical excision of benign breast pathology results in breast volume loss and eventual breast asymmetry. The percentage of breast volume excised was reported to be an important determinant of cosmesis and patient satisfaction after breast conserving surgery. The investigators observed that when the estimated percentage of breast volume excised (EPBVE) was below 10%, 83.5 % of patients were very satisfied with their appearance and only 3.1% were not satisfied, compared with 37.0% and 16.7%, respectively, if the EPBVE was more than 10%<sup>15</sup>. Resection of superior, medial and inferior lateral tumors was associated with substantial asymmetry<sup>16</sup>. Pronounced breast asymmetry was found to be significantly correlated with poor psychological functioning<sup>17</sup>. The esthetic result was associated more profoundly with aspects of satisfaction than either surgical therapy or the occurrence of postoperative complications<sup>18</sup>. Other investigators, however, observed no relationship between subjective and objective breast asymmetry after breast conserving surgery, suggesting that cosmetic results are mainly related to patient subjective perception. The only variable associated with subjective breast asymmetry was high educational lev-

el, possibly because of higher expectations in this group of patients<sup>19</sup>.

Most post - tumorectomy defects can be managed with primary closure; however, the esthetic outcome is unpredictable and frequently an unsatisfactory result is achieved<sup>20</sup>. Many surgeons concentrate on removing the lesion and pay little attention to the long term esthetic outcome. Unsightly, indented scars, breast shape distortion and severe asymmetry are not uncommon. Treatment strategies today focus on surgical procedures that aim at not only adequately removing the lesion, but equally important achieving a satisfactory esthetic result. The latter is considerably improved, when the defect is reconstructed, instead of simply closed.

Reconstructive approaches have changed, as the focus on quality of life has intensified. Before making the reconstructive decision, a thorough analysis of the breast defect as well as the clinical condition of the patient needs to be made. The latter is generally not a problem, because the majority of these patients are young without comorbid conditions. Reconstructive techniques are generally related to volume displacement or replacement procedures. Seldom is the resulting asymmetry in benign lesion surgery of such dimension, as to necessitate contralateral breast surgery.

Local flaps and a variety of regional flaps are the most commonly employed procedures. There is no consensus over the best approach. The surgeon's experience and the size of the defect in relation to the size of the remaining breast mostly determine the procedure to be used. The least traumatic technique achieving the best possible aesthetic result should be opted.

Munhoz et al.<sup>21</sup> identified trends in types of breast defects and developed an algorithm for immediate breast reconstruction after breast conserving surgery for cancer according to the initial breast volume, the extent/location of glandular tissue resection and the remaining available breast tissue. In order to develop this algorithm, defects were classified into one of three types.

Type I defects result from lesion resection in

smaller breasts without ptosis. Type IA defects (small) result after resection of less than 10 - 15% of the total breast volume. Type IB defects (moderate) result after resection of 15 - 40% of the total breast volume. Type IC involves large defects that cause significant volume alteration/distortion in the breast shape and in the symmetry and result after the resection of more than 40% of the total breast volume.

Type II: This group includes tissue resection in medium - sized breasts with or without ptosis. Type IIA involves small defects (< 10 - 15%), type IIB moderate defects (15 - 40%) and type IIC large defects (> 40%) that cause significant volume alteration in the breast shape and in the symmetry.

Type III refers to defects in large breasts. Type IIIA involves small, type IIIB moderate and type IIIC large defects.

Defects resulting after resection of benign lesions are mostly of type A, as removal of the former seldom requires resection of more than 10 - 15% of the total breast volume. All, but one, patients in the present series were of type A (either type IA, or IIA or IIIA). One single patient had a type IIB defect (the one submitted to a quadrantectomy).

Reconstructive procedures of breast defects are based on either volume displacement or on volume replacement. The former use a variety of breast reshaping (and occasionally breast reduction) techniques, whereas the latter replace the excised breast volume with local or distant flaps. The advantages of volume displacement procedures are that they are less extensive, the operative time is shorter, and there is no donor - site morbidity. When planning a reconstruction, the surgeon ought to take into account the breast volume, the tumor location and the extent of glandular tissue resected.

Most type A (IA, IIA and IIIA) defects are usually repaired with breast tissue advancement (BAF) or breast rotation (BRF) flaps. BAF or BRF adequately repair the resulting defect when less than 10 - 15%, or according to some authors less than 20%<sup>22</sup>, of breast tissue has been removed. Superficial undermining, between the skin and the breast tissue, and

occasionally deep undermining between the breast tissue and the pectoralis fascia, is necessary when mobilizing the BAF or the BRF. Care ought to be taken not to compromise the blood supply to the skin flap or the BAF/BRF, especially in obese patients with fatty breasts, in order to avoid late fat necrosis. No such complication was noticed in any of the patients of the current series after 3.5 years of follow up.

The esthetic result achieved is usually satisfactory. A slight breast asymmetry, which occasionally ensues in patients with small breasts, does not seem to be a problem provided the breast contour, its shape and nipple symmetry are satisfactory. It was observed in two cases in the present series. The asymmetry was noticeable to the surgeon; the patients, however, were satisfied with the final outcome and wished no further corrections.

Seldom does the surgeon deal with a defect which exceeds 20% of the total breast volume, the reconstruction of which necessitates the use of tissue outside of the breast. In those cases, a number of reported locoregional flaps can be utilized. In general, women with large tumor to breast ratios and women with small to moderate sized breasts who have insufficient residual breast tissue for rearrangement require partial reconstruction using non breast local or distant flaps<sup>23</sup>.

Small lateral defects (<10% of breast volume) can be restored with a transposition flap from the sub axillary area as described by Clough et al.<sup>24</sup>. The latissimus dorsi musculocutaneous flap is a common local option for lateral, central and even medial defects. If one wishes to reduce the donor site morbidity, one can use a pedicled perforator flap from either the thoracodorsal or the intercostal vessels<sup>23</sup>. Defects of the inferomedial quadrant of the breast can be restored with an anterior intercostal artery perforator flap, whose short pedicle, however, limits the range of motion of the flap. The longer pedicle of the superior epigastric perforator flap renders it more versatile for the reconstruction of medial breast defects<sup>25</sup>. It should be noted that Cochrane et al observed an inferior cosmetic outcome in pa-

tients with defects which resulted after excision of medial tumours<sup>26</sup>.

A technique under investigation by the author is the 'controlled hematoma'. It allows for filling of the defect, however, care ought to be taken in order to avoid infection. Meticulous postoperative massaging of the breast accelerates remodeling and finally leads to a satisfactory aesthetic result. The number of patients is still small and the follow up not long enough, so that definitive conclusions as to the value of the method cannot yet be drawn.

In conclusion, the results of the present retrospective study and the high rate of patient satisfaction allow us to strongly recommend the use of the peri-areolar incision for the surgical excision of benign breast lesions and the immediate reconstruction of all resultant defects, in order to achieve an esthetically pleasing outcome, which seems to be as important as the removal of the lesion itself. ■

### Conflict of interest

The author declares no conflict of interest.

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