

## Quality of Life Following Symptomatic Macromastia Surgery: Short- and Long-term Evaluation

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■ **Abstract:** Mammary hypertrophy or macromastia can cause a wide range of symptoms (physical, psychosomatic or behavioral), which affect patients' quality of life. Breast reduction can, in most of the cases, solve the problem. However, certain factors could have a negative effect on the outcome of surgery. The aims of this study were to discover the degree of patient satisfaction (short- and long-term) and to evaluate results of reduction mammoplasty, and also to ascertain which factors may have a negative role on the effectiveness of breast reduction surgery. We carried out a prospective and longitudinal study of 121 patients who underwent breast reduction surgery. Quality of life, outcome of surgery (complications and sequelae) and degree of patient satisfaction were evaluated at 1 month and at 1 year after reduction mammoplasty. Mean patient age was 40.71 (SD = 12.02). Among them, 35.5% were overweight, 44.6% were obese and 34.7% were smokers. The most common symptom was pain. The mean amount of resected breast tissue was 1785 g (SD = 876). A total of 27.3% of the patients suffered complications and 30.60% suffered sequelae. Our results show an improvement in symptoms ( $p < 0.001$ ) and quality of life ( $p < 0.001$  to  $p = 0.002$ ) 1 month after and 1 year after breast reduction compared with the preoperative situation. Neither age, body mass index, smoking habit nor the amount of tissue removed had a negative effect on the results of surgery. One year after surgery, the majority of patients were satisfied with the outcome (96.6%), they would recommend it to others (96.6%), and they would undergo surgery a second time (95.8%). Conclusions: Breast reduction is highly efficient in resolving symptoms and in improving quality of life. It leads to a high level of short- and long-term satisfaction irrespective of each patient's individual characteristics. ■

**Key Words:** breast reduction, macromastia, quality of life, reduction mammoplasty, satisfaction

Mammary hypertrophy is defined as an excessive, diffuse and in some cases, incapacitating development of one, or both breasts with no pathologic process nor underlying illness. There is no known etiology of macromastia and it is thought to be a multifactorial process. While on many occasions macromastia does not produce physical or psychological alterations, it can, however, lead to many clinical pictures. Symptomatic macromastia is defined as a symptomatic complex which is different in each individual woman. It is characterized by physical, psychosomatic, and behavioral symptoms induced, in most cases, by mammary hypertrophy and resolved, in most cases, by breast reduction surgery (1).

Sometimes, it is difficult to distinguish between a normal breast and a hypertrophic breast since

diagnosis of macromastia is often lacking in objective evidence. It must therefore be based first, on the evaluation of the signs and symptoms presented by the patient and, second, on the exploration carried out by the doctor her/himself so as to ascertain the degree of severity and intensity.

Symptoms related to macromastia are chronic pain (neck, shoulders, dorsal column, breasts and superior extremities, etc.), fatigue, difficulty in carrying out daily activities, tingling in the hands, intertrigo in the upper layers of the skin, skin grooves caused by the constant pressure of the bra straps, and on occasions, headaches. The differences in symptoms perceived between populations, patient age or social groups are significant (2).

Macromastia can even have a negative mechanical effect on the fastening and balancing systems of the backbone since the excess of weight in the front part of the chest can cause a redistribution of the forces which hold the torso upright and in the correct position (3).

Macromastia is associated with a more sedentary lifestyle and with difficulty to exercise. Moreover, it

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leads to socialization problems and to problems in finding adequate clothes.

Symptomatic macromastia can also have a negative effect on patients' quality of life. Quality of life is difficult to measure and express in objective terms since many of the alterations in quality of life are not due to mammary hypertrophy, but to a varied and complex number of causes which do, however, improve greatly after surgery (4–13).

The most effective treatment for mammary hypertrophy is surgery. Breast reduction surgery is highly efficient (4,12–17).

Long-term studies have even shown that breast reduction can be effective in reducing the risk of breast cancer. Patients who have undergone breast reduction surgery are less likely to suffer breast carcinoma (18), particularly, patients over 40 (19). The inverse correlation between the amount of breast tissue removed and the risk of breast cancer has also been described (20).

However, this is a type of surgery that can lead to complications (21,22) and sequelae and, on occasions, it can fail to fulfill patient expectation, although there may have been an apparently satisfactory outcome for the surgeon. Consequently, the preoperative consultation is crucial in explaining all the psychological, functional and cosmetic factors involved, namely all the aspects related to the need for surgery as well as the patients' expectations. The surgeon is obliged to provide a clear explanation of what the patient's real expectations should be, the potential complications and sequelae, and also the effects (23).

Certain patient characteristics, such as age, body mass index (BMI), smoking habit, as well as the amount of tissue removed are considered to be capable of affecting the outcome of breast reduction surgery (24,25). However, some data published diverge from this view (5,6) and the personal and clinical factors with a negative effect on the outcome of surgery and patient satisfaction have not yet been clearly identified.

Macromastia is therefore a problem with a potentially enormous effect on health and quality of life. Taking into account the number of cases, social and cultural influence on the valuation of quality of life, and the scarcity of studies on Spanish populations, we focused on analyzing the impact of breast reduction surgery in patients from our social and geographic proximity.

## Aim

The aims of our study were: to analyze the changes in quality of life and physical status; to analyze the degree of satisfaction produced by breast reduction in patients diagnosed with symptomatic macromastia and to evaluate the factors involved in the outcome of surgery.

## METHODS

### Study Design

We carried out a descriptive, observational, longitudinal, and prospective study of patients undergoing surgery using the same surgical technique: inferior pedicle based breast reduction technique. We valued quality of life, outcome of surgery, and the degree of satisfaction with surgery by means of standardized questionnaires carried out by the same researcher prior to surgery, 1 month after and 1 year after.

### Patients

All patients were aged over 18, diagnosed with symptomatic mammary hypertrophy at consultation in the Breast Care Unit of the Hospital Clínico Universitario "Lozano Blesa" in Zaragoza (Spain). They all underwent breast reduction surgery from November 2009 through April 2012.

Patients with symptomatic macromastia who fulfilled at least two of the following criteria were included in the study:

- Submit a report provided by the Traumatology and/or Rheumatology Units stating that the symptoms described may be caused or aggravated by mammary hypertrophy.
- Submit a psychosomatic report stating that the macromastia had caused significant behavioral involvement which could be resolved by breast reduction.
- Present several of the following symptoms: chronic dorsal pain, chronic cervical pain, pain in the superior extremities, tingling in the fingers, intertrigo in the upper skin, mastodinia or headaches, as observed by the breast surgeon.
- Alterations in behavior observed by the breast surgeon

The exclusion criteria were:

- Patients with breast tumors or prior breast radiotherapy

- Patients unable to comprehend the scope of the surgery involved or with unreal expectations concerning results.
- Patients with a psychiatric history
- Patients without mammary hypertrophy observable in consultation

### Measurement Instruments

Personal interviews with patients, physical exploration, revision of clinical history, mammary hypertrophy symptom-specific questionnaire, and SF-36 quality of life questionnaire were used.

**Socio-demographic and Clinical Data** In the personal interview, the following socio-demographic data were gathered: age, education level, type of work and abode. Physical exploration and revision of clinical history were carried out to ascertain personal history, smoking habit, weight, height, BMI (kg/m<sup>2</sup>), and the reason for surgery. From surgery, the following data were gathered: amount of tissue removed per breast, anatomopathological study, hospital stay, complications, sequelae, and reinterventions. For this study, immediate postoperative complications were those which appeared up to the end of postoperative month 1, and sequelae were those which appeared from the end of month 1 onward.

**Health-related Quality of Life: Questionnaire SF-36** In the personal interview the patients completed questionnaire SF-36. SF-36 fundamentally evaluates health-related quality of life (26). The scale has been validated for the Spanish population (27). It contains 36 questions, or items, and assesses positive and negative states of health. It is comprised of eight dimensions of general health: Physical function (PF), Physical role (PR), Body pain (BP), General health (GH), Vitality (VT), Social function (SF), Emotional role (ER), and Mental health (MH). It is measured on a scale of 0 (worst state of health in a given dimension) to 100 (best state of health).

**Symptoms Questionnaire** The specific breast-symptoms questionnaire has 9 questions. Aspects related to macromastia are analyzed: neck or back pain, shoulder pain, skin lesions, sensitivity of the nipple-areola complex, numbness in hands, daily activities, physical appearance, frequency and type of exercise, and respiratory problems. Each of the multiple-choice

questions, with five options, indicates a progressively higher degree and the higher the result, the higher the symptomatology. Each question is evaluated separately.

For the postoperative phase, the questionnaire contains three additional questions concerning the degree of satisfaction with the results 1 month and 1 year after surgery: Are you satisfied with the results? Would you be willing to undergo surgery again? Would you recommend surgery to others? Each question answer has five possible responses, indicating a progressively lower degree. Moreover, to make analysis easier, categorization was based on dichotomic qualitative variables: (yes/no).

**Questions Related to Perception, Shape, and Size of the Breast** Patients were also asked about the shape and size of the breasts: Do you like the shape of your breasts? Do you think your breasts are over-sized? Once again, the yes/no format was used.

### Procedure

From November 2009 through April 2012, all the patients diagnosed with macromastia and who fulfilled the inclusion criteria were invited to participate in our study. On admission, they were informed and requested to provide written consent. Questionnaires and interviews were conducted by the same researcher at admission time. Follow-up interviews were carried out 1 month and 1 year after surgery in the course of scheduled visits to the Breast Unit.

### Statistical Analysis

For the descriptive analysis of the data, relative and absolute frequencies were calculated for qualitative variables, and mean and standard deviation (SD) for quantitative variables.

Chi-squared test was used to show the association between independent qualitative variables. Fisher's exact test was used when the application criteria for chi-squared test were absent. McNemar's test was used to evaluate association in the occurrence of two qualitative variables.

To estimate if there had been changes in the patients' state, we compared the results of the scales of the three moments chosen in relation to surgery (before, 1 month on and 1 year on) by means of Wilcoxon's or Friedman's nonparametric related-average

comparison tests, for two or three moments in time, respectively. To compare averages between independent groups, *U* Mann–Whitney test was used for two groups and Kruskal–Wallis test was used for three or more groups. Normality of variables was evaluated by means of the Kolmogorov–Smirnov normality test.

SPSS (v 15.0) program was used for the statistical analysis of the data. Statistical significance was established for a *p*-value <0.05.

### Ethical Considerations

Authorization was obtained from the Comité Ético de Investigación Clínica de Aragón and the Hospital Research Commission of the University Hospital “Lozano Blesa” to interview the patients. We also obtained permission from the owners of the Copyright to use the Spanish version of the SF-36 questionnaires.

## RESULTS

From November 2009 through April 2012, 121 women received breast reduction surgery. It was possible to perform follow-up procedures on all patients after 1 month (100%). However, in the remainder of the follow-up period two patients opted to discontinue. The first one refused to complete the last questionnaire due to a serious complication and the second one moved abroad and could not be located. Hence, the study was completed with 119 patients (98.34%).

### Clinical and Socio-demographic Characteristics

Patients’ mean age was 40.71 years old (SD = 12.02), range 18–78. Average weight was 76.51 kg. (SD = 12.84), range 49–111 kg. A total of 80.2% of the patients were overweight or obese. Average height was 160 cm (SD = 6.27). Patients’ characteristics are shown in Table 1.

Although the patients presented a varied symptomatology, pain was the main reason for surgery in 118 of 121 cases (97.5%). Only two patients requested surgery due to “extreme grade IV ptosis” and one other requested it due to “psychological problems” (this patient was referred to the Psychosomatic Unit).

### Surgery Data

Mean amount of tissue removed was 1785 g. (SD = 876), range 401–5790 g. Mean hospital stay in

**Table 1. General Characteristics of Patients Undergoing Surgery**

Characteristics	<i>n</i> (%)
Age (years)	
<36 years	39 (32.2%)
36–46 years	45 (37.2%)
>46 years	37 (30.6%)
BMI (kg/m <sup>2</sup> )*	
Underweight	1 (0.8%)
Normal	23 (19.0%)
Overweight	43 (35.5%)
Obese	54 (44.6%)
Education	
Primary	47 (38.8%)
Trade skills	11 (9.1%)
High School	42 (34.7%)
University	21 (17.4%)
Smoking habit	
Yes	42 (34.7%)
No	79 (65.3%)
Place of abode	
Rural	68 (56.2%)
Urban	53 (43.8%)
Work activity	
Worker	75 (62%)
Nonworker†	46 (38%)

\*BMI: body mass index. <18.5: underweight; 18.5–25: normal range; >25–30: overweight; >30: obese.

†Nonworker included: retired, students, and unemployed. Data are expressed as number of patients (percentage).

hospital was 2.94 days (SD = 1.32), range 1–11 days. A total of 75.2% of the patients spent 3 or under 3 days in hospital.

### Postoperative

Two patients were reoperated within the first 24 hours due to hematomas requiring urgent surgical evacuation in one of the breasts.

A total of 27.3% of the patients presented complications up to 1 month after surgery. The most common complication was partial cutaneous dehiscence (11.6%), followed by hematoma (3.3%) (Table 2).

According to bivariate analysis, the presence or absence of complications had no significant statistical relation to the patient’s age, BMI or smoking habit. Moreover, the more the amount of mammary removed, the higher the number of complications, although the difference was not statistically significant (*p* = 0.097).

A total of 30.6% of patients presented sequelae 1 year after surgery. Within this group, 51.4% had hypertrophic scars. The remaining sequelae occurred in much lower percentages (Table 2).

The appearance of sequelae 1 year after surgery had no relation to BMI, smoking habit, age, or the amount of mammary tissue removed.

**Table 2. Complications and Sequelae of Breast Reduction**

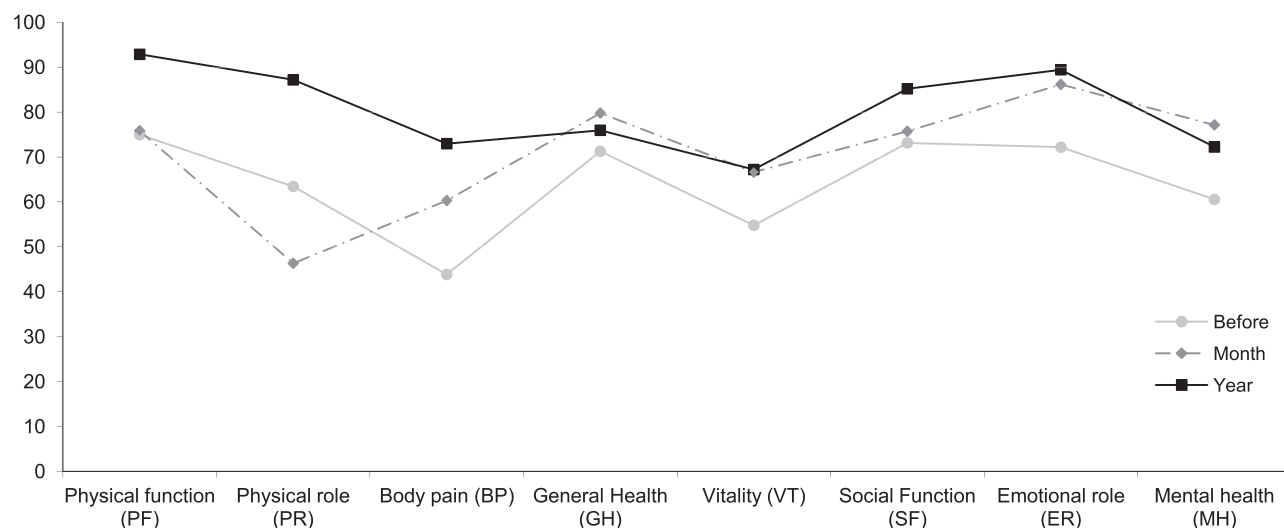
Complications	n (%)	Sequelae	n (%)
Cutaneous dehiscence	14 (11.6%)	Hypertrophic scars	19 (15.7%)
Hematoma	4 (3.3%)	Hyperpigmented scars	1 (0.8)
Allergy to stitches	3 (2.5%)	Keloid scars	1 (0.8%)
Fat necrosis	2 (1.7%)	Mammary nodules	1 (0.8%)
CAP Necrosis	2 (1.7%)	Fat necrosis	1 (0.8%)
Cellulitis/mastitis	2 (1.7%)	Snoopy*	2 (1.7%)
Infection	2 (1.7%)	Dog ears	9 (7.4%)
Cutaneous necrosis	1 (0.8%)	Asymmetry	1 (0.8%)
Fistula	1 (0.8%)	Periareolar fistula	2 (1.7%)
Others	2 (1.7%)		

\*Snoopy (increase in areola distance submammary groove).  
Data are expressed as number of patients (percentage).

In seven patients, pathologic histologic lesions were found: one ductal carcinoma in situ, two atypical ductal hyperplasia, three in situ lobular neoplasia (NL-2), and one phyllodes tumor.

### Quality of Life

Figure 1 shows the mean values for the results of quality of life before breast reduction, 1 month after, and 1 year after. An improvement in quality of life can be observed in all the dimensions 1 year after surgery (PF, PR, BP, VT, SF, ER, and MH  $p < 0.001$ ; GH  $p = 0.002$ ). One month after the surgery, all the changes were significant (PR, BP, GH, VT, and MH  $p < 0.001$ ; ER  $p = 0.001$ ) except for PF and SF, which did improve, but not significantly. PR was the only dimension which deteriorated 1 month after surgery



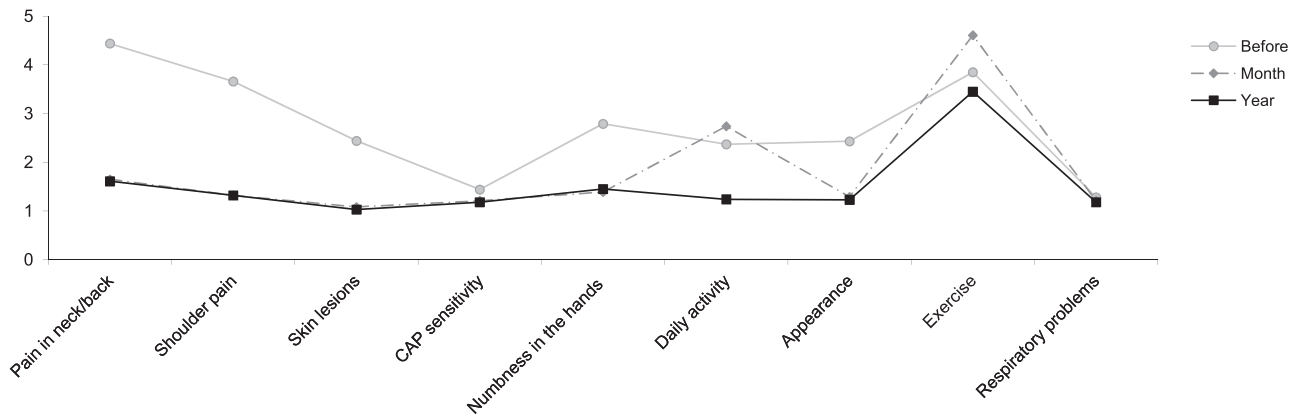
**Figure 1.** Comparison between mean score of SF-36 before surgery, 1 month after and 1 year after. Data expressed in mean values.

( $p < 0.001$ ), although at 1 year it had improved and surpassed the figures obtained before surgery ( $p < 0.001$ ). Quality of life improved significantly between the 1-month and 1-year postsurgery marks in all dimensions (PF, PR, BP and SF  $p < 0.001$ ; MH  $p = 0.016$ ) except GH, VT and ER. VT and ER remained the same as at the 1-month mark.

Stratified analyses were performed to control confounders and no differences in SF 36 scores according to age (grouped  $<36$ ,  $36-46$  and  $>46$  years old), BMI status (underweight:  $<18.5$ ; normal:  $18.5-25$ ; overweight:  $>25-30$  or obesity  $>30$ ) or amount of tissue removed ( $<1.300$  g,  $1.300-2.000$  g and  $>2.000$  g).

### Symptoms

Figure 2 shows the results of symptomatology presented by patients before, 1 month after and 1 year after surgery. A significant improvement was observed in all symptoms 1 month and 1 year after surgery ( $p < 0.001$ ), with the exceptions of CAP sensitivity and exercise activities. This improvement was observed in all the groups studied irrespective of age, BMI, smoking habit, and amount of tissue removed. As regards exercise, a greater limitation was observed 1 month after surgery although it did show a significant improvement 1 year after in relation to the other preoperative values ( $p < 0.001$ ). On comparing the evolution in postoperative symptoms at 1 month and at 1 year, we also observed a significant increase in daily activities ( $p < 0.001$ ).



**Figure 2.** Symptomatology presented by patients before, 1 month after and 1 year after surgery. Data expressed mean values.

### Satisfaction with Results

Table 3 shows the degree of patients' satisfaction with breast reduction.

When asked "Are you satisfied with the results obtained? (final size of breasts, position, scars ...)," 1 month after surgery, 99.2% of patients were satisfied, and 1 year after, 96.6% of patients were satisfied.

In the bivariate analysis of satisfaction, we observed no significant differences at 1 month and at 1 year according to age, BMI, smoking habit and amount of tissue removed. The patients who were

less satisfied with the results of surgery after 1 year were those presented sequelae ( $p = 0.012$ ) and those who did not like the breast shape after surgery ( $p < 0.001$ ).

When asked "Would you recommend surgery to others?," 1 month after surgery 97.5% said they would recommend it. One year after surgery 96.6% said they would recommend it.

The patients who were not satisfied with the shape of their breasts after surgery were the ones less willing to recommend surgery ( $p = 0.002$ ).

**Table 3. Satisfaction of Patients with Global Result of Surgery and with Breast Shape and Size, Degree of Surgery Recommendation, and Willingness to Re-undergo Surgery at 1 month and 1 year**

	Month (N = 121), n (%)	Year (N = 119), n (%)	
Are you satisfied with the result obtained?			
Yes			
- Very satisfied	60 (49.6%)	48 (40.3%)	
- Satisfied with the final results	34 (28.1%)	40 (33.6%)	
- Satisfied with the final results but there are some aspects which concern me	26 (21.5%)	27 (22.7%)	
No			
- Not satisfied with the final results	1 (0.8%)	3 (2.5%)	
- Profoundly unsatisfied with the final results	0 (0.0%)	1 (0.8%)	
Would you recommend surgery to others?			
Yes			
- Yes I would undergo surgery again and recommend it to other women	110 (90.9%)	112 (94.1%)	
- I don't know if I would undergo surgery again but I would recommend it to other women	8 (6.6%)	3 (2.5%)	
No			
- Yes, I would undergo surgery again but I would not recommend it to other women	2 (1.7%)	2 (1.7%)	
- I would not undergo surgery again and I don't know if I would recommend it to other women	1 (0.8%)	2 (1.7%)	
- I would not undergo surgery again and I would not recommend it to others	0 (0.0%)	0 (0.0%)	
Would you undergo surgery again?			
Yes			
- Yes, I would undergo surgery again and would recommend it to others	110 (90.9%)	112 (94.1%)	
- Yes, I would undergo surgery again but I would not recommend it to other women	2 (1.7%)	2 (1.7%)	
No			
- I don't know if I would undergo surgery again but I would recommend it to other women	8 (6.6%)	3 (2.5%)	
- I would not undergo surgery again but perhaps I would recommend it to others	1 (0.8%)	2 (1.7%)	
- I would not undergo surgery again and I would not recommend it to others	0 (0.0%)	0 (0.0%)	
	Before (n = 121)	Month (N = 121), n (%)	Year (N = 119), n (%)
Do you like the shape of your breasts?			
Yes	15 (12.4%)	114 (94.2%)	110 (92.4%)
No	106 (87.6%)	7 (5.8%)	9 (7.6%)
Do you think your breasts are too large?			
Yes	120 (99.2%)	1 (0.8%)	3 (2.5%)
No	1 (0.8%)	120 (99.2%)	116 (97.5%)

The results for the question “Would you undergo surgery again?” are also shown in Table 3. For the bivariate analysis, it was observed that the older the patients, the greater the willingness, in percentage terms, to undergo surgery again, whereas the greater the amount of tissue removed, the lower was the willingness. The differences, however, were not significant.

There was, however, a statistically significant difference between patients who were overweight and those who were not. One month after surgery, 95.9% of overweight patients would be willing to undergo surgery again as opposed to 79.2% of patients who were not overweight ( $p = 0.005$ ).

Most of the patients were satisfied with the shape and size of the breasts after surgery (Table 3), results taken 1 month after surgery and 1 year after surgery ( $p < 0.001$ ). As regards shape of the breast, there were significant differences according to the amount of tissue removed ( $p = 0.003$ ) since none of the patients from whom over 2,000 g was removed liked the shape before surgery (0%) as opposed to the 10.3% from whom less than 1,300 g was removed and the 25% from whom between 1,300 and 2,000 g was removed. Moreover, patients with a higher BMI ( $p = 0.004$ ) and with sequelae ( $p = 0.008$ ) were less satisfied with the shape of the breast 1 year after surgery. We observed no significant differences in relation to age and smoking habit.

## DISCUSSION

Our study evaluated the improvements in health obtained from breast reduction in a local population with symptoms of macromastia. There are no previous studies similar to ours in Spain and therefore the data we present are original and correspond to the results of a homogeneous local population.

Hispanic and African patients were more likely to undergo reduction mammoplasty than white American patients. Data on different patients reveal only slight difference in quality of life after breast reduction (2,28). Non-Caucasian women tend to have higher BMI and breast size corresponding to the higher amount of tissue resected. These differences, not ethnic group, could account for the differences in SF-36 scores. However, SF-36 is validated for every country using similar parameters but adding certain differences which make basic evaluation less comparable.

The results of the study showed that breast reduction is a highly satisfactory short- and long-term surgical procedure for most patients. This is proven by the high degree of satisfaction and willingness to recommend surgery to other patients. Practically all our patients would be willing to undergo surgery again.

SF-36 test was chosen for quality of life assessment since it is a generic instrument and the most frequently mentioned tool in the literature. We used the Spanish version validated with only minor differences for the Spanish population.

SF-36 is used in research and clinical practice for over 20 years. In a BMJ meta-analysis (29), SF-36 was described as the most widely evaluated and widely used quality of life and general-health measurement tool. Over 10% of studies published used the tool.

Other questionnaires like the Breast Q-test, the Finnish Breast Associated Symptoms Questionnaire, the World Health Organization Quality of Life or the Breast Reduction Assessed Severity Scale are less frequently used.

The main reason why patients requested medical consultation was pain, and following surgery it was alleviated significantly, as were other macromastia-related symptoms.

As regards pain, our results coincide with most of the studies analyzed in which it is the most frequent symptom and present in practically all the patients with symptomatic macromastia (4,9,10,12,13,15,30). Most of our patients were in employment (62%), meaning that the pain could affect their work. These results concur with other studies in which it is the active population itself which seeks a solution to macromastia by means of surgery (9–11,31,32).

In most of cases the pain referred to eventually disappears after breast reduction surgery (4,9,10,12,13,15,30,33), even in patients with objective structural alterations of the spine, such as severe arthritis, scoliotic, or kyphotic deviations, an aspect which is sometimes inexplicable. The patients are warned before surgery that structural problems in the spine or articulations may not disappear after surgery, although in practice it should be explained that with surgery pain may be alleviated. According to our results, neck pain and pains in the back and shoulders were greatly alleviated 1 month after surgery.

The quality of life analysis is essential in evaluating the results of any surgical procedure. Quality of life was evaluated 1 month after and 1 year after surgery

to see the influence in the results of the surgical complications, which usually occur 1 month later, and, then 1 year later to evaluate the long-term sequelae. We believe that the influence of complications and sequelae of surgery are vital when assessing the advantages and obtaining the full benefit of the questionnaires used. Our results reveal improvement in quality of life in the very short term—namely, the first month after surgery, showing the repercussion of hypertrophy on women's quality of life. Most studies carry out a mid- and long-term analysis of this particular aspect (4,7,34).

Regarding SF-36 test, 1 month after surgery the changes were significant, except for PF and SF, which did improve, but not significantly. These two functions are evidently affected by the period of recovery following surgery. PR was the only dimension which deteriorated following surgery and then, 1 year after, surpassed the figures which existed prior to surgery. This is the inevitable result of the fact that in the first month there are limitations due to the need for convalescence after surgery. In our series all the dimensions improved significantly 1 year after surgery.

Our results coincide with a study in which valuations were made at 6 months and at 1 year in relation to preoperative values. Through these values a significant improvement in quality of life was observed (4). Such an improvement was also shown in another study in which the results of a control group awaiting surgery were compared. Two values were taken—one before surgery, and one 4 months after surgery—and improvement was observed in the eight SF-36 dimensions in the group which underwent surgery, whereas improvement was not observed in the group which did not undergo surgery (7).

In a study performed by Hermans et al. (35), in which two groups with macromastia were compared, one group underwent surgery and the other did not. The results indicated significant differences between the two groups in seven of the eight SF-36 dimensions. Only PF failed to yield significant differences before and after surgery. This study, however, is not comparable to ours because the valuation is made 2 years after surgery and no comparison is made with the data obtained before surgery. O'Blenes et al. (11), with a series of 57 patients, had significant improvement at 6 and 21.5 months in seven of the eight dimensions. Only ER showed no significant improvement.

In a systematic review, a high degree of satisfaction was shown (between 78% and 95% of patients were very, or moderately, satisfied) and some improvements in physical appearance and psychological health were also observed after reduction mammoplasty (36).

According to our results, after surgery most of the women were satisfied with the size and the shape of the breasts, thereby proving that the cosmetic results of surgery were satisfactory. The few cases who were not satisfied with surgery were not satisfied with the cosmetic results, as regards shape, either. In these cases they consider the cosmetic factor to be more important than the improvement in symptoms. It was the women with higher BMI and those who presented sequelae who showed less satisfaction with the shape of the breast 1 year after surgery.

The results of surgery measured in terms of average length of hospital stay (13,37) and the percentage of complications and sequelae were similar to other studies (25,38,39) although most of our patients were overweighted or obese. Unlike other studies, patients' personal characteristics (age, BMI, smoking habit) and amount of tissue removed had no influence on the number of complications or sequelae (40–42). In our study, most of the women with sequelae were satisfied with the results of surgery, due to the improvement in symptomatology—the reason why they requested surgery.

We assume a very high complication rate given that most of the complications were related to minor wound dehiscence or delayed skin-healing. However, most of the series we consulted had similar complication rates (from 18.8% to 53.9%) (2,6,43,44). The most frequently occurring complication in the series was cutaneous dehiscence (due to excessive skin tension).

Practically, all the patients would undergo surgery a second time and would recommend it to others. These results coincide with the results published in the literature (31,36,45). Patients' age had no influence on the degree of satisfaction with surgery, as is the case in other published studies. In a retrospective study (33) of patients under 21, who completed a questionnaire several years after surgery, it was revealed that 86% would recommend surgery and, that with the latest knowledge of the procedure, 95.9% would undergo surgery again. In a study with 241 patients (14), also using the inferior pedicle technique, the degree of satisfaction with the results was 96.6%. The data for most of the studies consulted coincided with



the data expressed here, to a greater or lesser extent, concluding that practically none of the patients regretted their decision to undergo breast reduction surgery.

## CONCLUSION

Macromastia is accompanied by a series of symptoms which improve significantly in the first month after surgery. This improvement continues or even increases after 1 year of follow-up. Pain was the main reason why these patients requested surgery and there was alleviation irrespective of the patients' personal and clinical characteristics. Breast reduction also significantly improved quality of life in both the physical and psychosocial dimensions. The number of complications and sequelae was not affected by age, BMI, smoking habit nor the amount of tissue removed.

The degree of satisfaction with the results obtained from breast reduction surgery was high and most of the patients would recommend surgery to others and undergo surgery again. The least satisfied patients were those who failed to obtain the cosmetic result desired for the shape of the breast. Alleviation of preoperative symptoms and improvement in quality of life, along with the high degree of satisfaction among patients, make breast reduction surgery highly recommendable for patients with macromastia, irrespective of age, BMI, smoking habit, or size of the mammary hypertrophy.

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