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# Differences between patients and medical professionals in the evaluation of aesthetic outcome following breast reconstruction with implants

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## KEYWORDS

Aesthetic outcome evaluation;  
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**Summary** *Background and aim:* Most studies on breast reconstruction evaluate different surgical techniques, types of implant or time of reconstruction. Moreover, evaluations are usually performed either by surgeons or by patients, but are rarely compared. We conducted a study on aesthetic outcome following breast reconstruction with implants comparing the evaluation by patients versus medical professionals.

*Methods:* Forty-seven patients, who had a breast reconstruction with implants between 2001 and 2010 (median follow-up 71 months), underwent a clinical examination, standardized photo documentation and filled out a questionnaire to evaluate their aesthetic result (rate 1 very good to 5 very poor). Photo documentation was independently evaluated by 18 medical professionals using the same evaluation instrument and the results were compared. Gender and patient aspects were taken into account.

*Results:* We found statistically significant differences between patients and medical professional ratings. The patient evaluation was better through all categories as compared to the evaluation by medical personnel. The degree of medical education or gender aspects did

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not significantly affect the professional ratings. Age at reconstruction, length of follow-up or primary versus secondary reconstruction did not seem to make a difference in the evaluations of the patients versus the medical professionals..

*Conclusion:* The differences between patient and expert opinion in rating of aesthetic results indicate that patient satisfaction is influenced by multiple factors and not only by good aesthetic outcome. Patient evaluation should therefore be carefully considered in treatment and outcome studies of breast reconstruction..

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## Introduction

Breast cancer is one of the leading cancers among women worldwide.<sup>1</sup> Although the last decade has seen a paradigm shift towards less invasive surgical approaches, up to one-third of breast cancer patients still require a mastectomy and consequently some type of breast reconstruction.<sup>2</sup> As surgical techniques are steadily refined and reconstruction rates increase, the demand for an aesthetic outcome becomes more and more important.<sup>3–5</sup> In addition to surgical and oncological aspects, patient satisfaction and quality of life are key goals of treatment.

Breast cancer diagnosis and reconstruction itself present a woman with not only strong physical but also psychological challenges.<sup>6,7</sup> While the diagnosis is commonly associated with elevated levels of anxiety and depression, the consequences of mastectomy range from pain and major scarring to psychological distress and sexual dysfunction.<sup>8</sup> There is considerable evidence that breast cancer survivors may experience protracted psychological alterations related to a negative perception of body image, although the women may be cured.<sup>9</sup>

For many patients, a reconstructive operation of the breast offers the opportunity for restoring physical integrity and therefore reducing psychological distress.<sup>10–12</sup> Independent of the type of reconstructive procedure, improvements concerning psychosocial variables occur for all patients following breast reconstruction.<sup>13</sup>

Most studies evaluating breast reconstruction focus on the comparison of different surgical techniques, types of implant or time of reconstruction.<sup>14–16</sup> Interestingly, the literature lacks definitive aesthetic criteria for the reconstructed breast as well as reliable evaluation methods. The aesthetic evaluation in many studies is performed by either surgeons or patients and rarely a comparison between the evaluators is made. Sneeuw et al. showed low levels of concordance between patients' and observers' ratings after breast-conserving treatment for early-stage breast cancer.<sup>17</sup> Beesley et al. investigated the factors that influence patient evaluation of breast reconstruction and the sources of disagreement between patients and their treating physicians.<sup>18</sup> From our general clinical experience, we can confirm that patients often evaluate their reconstructive result differently from the medical personnel. For this reason, we conducted a study comparing the evaluation of breast reconstruction by patients versus that of medical professionals based on the same evaluation instrument.

## Material and methods

### Study design

A retrospective study design was used and all data were analysed anonymously. The local ethics committee approved the study and all patients gave their written consent. Women after implant breast reconstruction underwent a clinical examination, standardized photo documentation, and filled out a questionnaire to evaluate the aesthetic result (1 very good to 5 very poor). The questions addressed patient satisfaction concerning aesthetic aspects of the breast, characteristics of the nipple–areola complex (NAC), the inframammary fold (IMF) and the scar (Figure 1). Patients evaluated only their own reconstructive outcome based on their subjective perception. Photographic images of all patients were evaluated by a panel of 18 persons at different levels of medical training, applying the same questionnaire. The images were presented on a screen and the questionnaire was filled out simultaneously by all medical investigators in a single session.

### Patients and patient images

Forty-seven patients with breast cancer followed by reconstruction with a breast implant were included in the study. Exclusion criteria were bilateral reconstruction, radiotherapy and pregnancy. Twenty-five women underwent immediate breast reconstruction (53%), and 22 women underwent secondary reconstruction (47%). Median patient age was 56 years (range 49–68 years) at the time point of evaluation. The average follow-up time (time from the last reconstructive surgery until evaluation) was 71 months (range 42–111 months) (Table 1). Follow-up included a clinical examination and photo documentation. Photographic images of the patients were taken in frontal, oblique and sagittal views.

### Questionnaire

An instrument to evaluate the appearance of implant breast reconstruction was created by the authors on the basis of a literature review of previous work performed on appearance outcomes of autologous breast reconstruction.<sup>4,17–20</sup> The instrument (Figure 1) included 10 criteria: size, form and volume of the reconstructed breast;

**BREAST**

1. How would you evaluate the size of the breast?

1    2    3    4    5

2. How would you evaluate the form of the breast?

1    2    3    4    5

3. How would you evaluate the symmetry of the breast?

1    2    3    4    5

**NIPPLE-AREOLA-COMPLEX**

4. How would you evaluate the appearance of the nipple-areola-complex?

1    2    3    4    5

5. How would you evaluate the position of the nipple-areola-complex?

1    2    3    4    5

6. How would you evaluate the symmetry of the nipple-areola-complex?

1    2    3    4    5

**INFRAMAMMARY FOLD**

7. How would you evaluate the position of the inframammary fold?

1    2    3    4    5

8. How would you evaluate the symmetry of the inframammary fold?

1    2    3    4    5

**SCAR**

9. How would you evaluate the appearance of the scar?

1    2    3    4    5

10. How would you evaluate the position of the scar?

1    2    3    4    5

**Figure 1** Questionnaire addressing the aesthetic outcome following implant breast reconstruction. Outcome evaluation: 1 (very good): very pleasing aesthetic result. 2 (good): good aesthetic outcome. 3 (moderate): satisfying aesthetic outcome. 4 (bad): tolerable outcome. 5 (very bad): unsatisfying result.

appearance, position and symmetry of the nipple–areola complex; position and symmetry of the inframammary fold; and the appearance and position of the scar. Questions were graded in a single-choice form on a scale from 1 to 5, with 1 being an excellent (very good) outcome to 5 being non-satisfying (very bad). The questionnaire was completed by the patients based on their personal perception and by the evaluating professionals based on the patient photographs (Figure 2).

**Statistical analysis**

Evaluation of the result of the breast reconstruction was rated with a score from 1 (very good) to 5 (very bad). In the overall comparison between the patients and the professionals, the evaluation was categorized into high (1 or 2) versus low (3, 4, or 5) ratings. To investigate aspects of the professionals and the patients, means and standard deviations were calculated, based on a complete case analysis. Differences were tested with the *t*-test. Because of multiple comparisons, statistical significance was evaluated conservatively by using the low level of two-sided *p*-value <0.01. The statistical analysis was performed with SPSS version 19.

**Results****Patient versus expert evaluation**

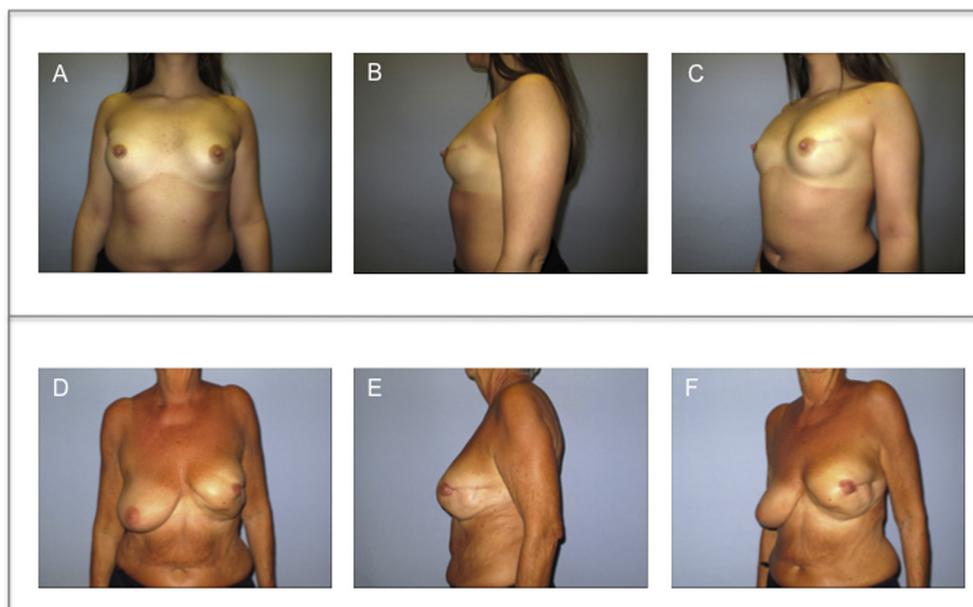
Patients evaluated their breast size in 72% as very good or good, the form in 62%, the scar appearance in 64% and scar position in 72%, whereas breast symmetry was rated very good and good in only 32%. As not all patients had wanted to have the NAC reconstructed, the data on NAC position and symmetry do not represent the whole patient group and could therefore not be analysed. In contrast to the patients, the professionals were more critical in their evaluation of breast and scar criteria. Breast size was scored as 1 or 2 in only 47%, breast form in 31% and symmetry in 18% by the professionals. In addition, the ratings for the position and symmetry of the inframammary fold were worse compared to patient ratings. The percentages in which patients and professionals evaluated the aesthetic outcome as very good or good (score 1 or 2) are presented in Table 2. Figure 3 depicts the scores concerning each item of the questionnaire rated by the patients versus the medical professionals.

**Professional evaluation: different groups and gender aspects**

The aesthetic outcome was on average slightly more positive among female as compared to male professionals, namely only in aspects of scar criteria. Also, the degree of medical training does not seem to influence the evaluation. The differences between the three professional groups (medical students, residents and senior surgeons) were not significant and are shown in Table 3.

**Table 1** Patients characteristics.

<i>n</i> = 47 patients	
Age	Median (IQR): 56 years (49–68 years)
Duration of follow-up	Median (IQR): 71 months (42–111 months)
Primary reconstruction	<i>n</i> = 25 (53%)
Secondary reconstruction	<i>n</i> = 22 (47%)
Abbreviation: IQR interquartile range.	

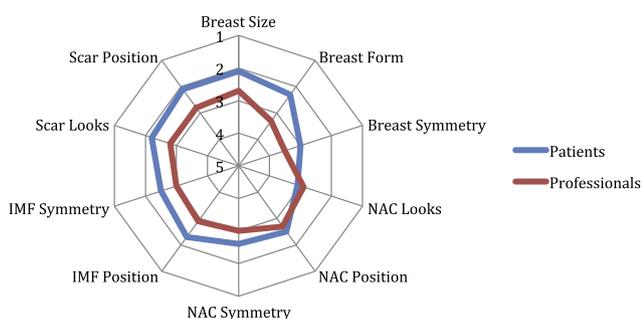


**Figure 2** (A–C): The mean scores for overall impression (total of 10 questions) were calculated based on the evaluation of standardized photographs. Patient evaluation in this case was similar to that of all other groups. This woman evaluated her result with a score of 14, students with a mean score of 15.2, residents 19.3 and senior surgeons with a score of 16.9. (D–F): In this case, patient evaluation differed completely from that of all other groups. This woman evaluated her result with a score of 15, while students gave a mean score of 42.7, residents 33.2 and senior surgeons 37.6.

**Table 2** Evaluation by patients versus medical professionals. Evaluation (*n* (%) score 1 or 2) based on 47 patients.

	Patients	Professionals	<i>n</i> Missing
Breast size	34 (72%)	394/842 (47%)	0
Breast form	29 (62%)	260/846 (31%)	0
Breast symmetry	15 (32%)	150/845 (18%)	0
NAC looks	14 (41%)	241/571 (42%)	13
NAC position	21 (60%)	290/590 (49%)	12
NAC symmetry	21 (58%)	223/601 (37%)	11
IMF position	30 (70%)	298/747 (40%)	4
IMF symmetry	28 (62%)	280/810 (35%)	2
Scar appearance	30 (64%)	406/846 (48%)	0
Scar position	34 (72%)	368/845 (44%)	0

Abbreviations: IMF inframammary fold; NAC nipple–areola complex.



**Figure 3** Evaluation outcome (mean scores) by patients versus medical professionals, displayed in a spider diagram.

### Patient aspects in detail

For a more detailed evaluation, we created subgroups and evaluated, if factors like patient age, length of follow-up or primary versus secondary reconstruction had an influence on the difference between patient and expert evaluations. Generally, the variations between subgroups were much smaller than the differences between the patients' and the professional evaluations. The average rating of the patients was more positive in all categories compared to the professionals' ratings (Table 4). Additionally, we analysed three-dimensional subgroups, split up according to age, follow-up length and primary/secondary reconstruction, to assess possible combined effects. In total, there were thus eight subgroups, for instance, one of them being the subgroup <60 years of age, follow-up  $\geq 60$  months and with a primary reconstruction. Although the general pattern still seemed to be the same, the results are ambiguous because of the small number of cases in the subgroups.

### Discussion

The beneficial effects of breast reconstruction on both the physical and mental well-being of women with breast cancer are well established.<sup>21–23</sup> However, most studies in the literature evaluating results after breast reconstruction are based on expert opinions or patient self-evaluation, but rarely compare both.<sup>19,20,24</sup> Interestingly, the few studies comparing patient and expert evaluation have shown differences similar to our study.<sup>17,18</sup> Dian et al. evaluated aesthetic results after autologous breast reconstruction versus breast-conserving therapy.<sup>25</sup> Results were analysed

**Table 3** Outcome evaluation by gender and medical training of the professionals.

Evaluation (1–5)	Professionals		<i>p</i>	Students (mean, SD)	Residents (mean, SD)	Senior surgeons (mean, SD)
	Females (mean, SD)	Males (mean, SD)				
Breast size	2.7 (0.6)	2.8 (0.7)	0.576	2.7 (0.7)	2.8 (0.6)	2.7 (0.7)
Breast form	3.2 (0.7)	3.3 (0.9)	0.299	3.3 (0.9)	3.3 (0.7)	3.1 (0.9)
Breast symmetry	3.5 (0.6)	3.6 (0.7)	0.351	3.7 (0.8)	3.5 (0.6)	3.5 (0.7)
NAC looks	2.9 (0.8)	3.1 (1.0)	0.106	3.2 (1.0)	3.0 (0.8)	2.8 (0.9)
NAC position	2.6 (0.6)	2.7 (0.7)	0.499	2.9 (0.8)	2.6 (0.7)	2.6 (0.8)
NAC symmetry	3.0 (0.6)	3.0 (0.8)	0.856	3.3 (0.8)	2.8 (0.7)	3.0 (0.8)
IMF position	3.0 (0.6)	2.9 (0.7)	0.557	3.1 (0.7)	2.8 (0.6)	2.9 (0.8)
IMF symmetry	3.1 (0.6)	3.1 (0.7)	0.932	3.4 (0.7)	2.8 (0.6)	3.0 (0.8)
Scar appearance	2.7 (0.6)	2.9 (0.8)	0.007	3.1 (0.9)	2.7 (0.6)	2.5 (0.8)
Scar position	2.6 (0.6)	3.0 (0.7)	0.000	3.2 (0.7)	2.7 (0.6)	2.6 (0.7)

Abbreviations: IMF inframammary fold; NAC nipple–areola complex; SD standard deviation.

by the patient herself, a medical jury (the surgeon himself and two post-graduate trainees) and two non-medical lay persons. In accordance with our results, patient evaluation was best, while the medical professionals were more critical. Comparing primary or secondary autologous reconstruction, patient ratings were equal, while lay persons and experts showed a tendency to assess the immediate reconstructions more positively. By contrast, our study showed no differences between primary and secondary implant reconstructions in patient and professional ratings. In our study, the group of medical student evaluators were surveyed as lay persons representing the patients' personal environment. However, we found no differences in the evaluation due to medical educational status.

In another study, Gerber et al. compared patients' and surgeons' evaluations of aesthetic results in a subgroup of patients undergoing skin-sparing mastectomy and immediate autologous reconstruction.<sup>26</sup> They found very good ratings in 80% of patients and 77% of surgeons, 10% good ratings by patients versus 7% by surgeons and 10% satisfactory ratings by patients versus 15% by surgeons, confirming that surgeons' evaluations are overall less positive, although only marginally.

This raises the question, which factors contribute to patient satisfaction and which factors influence medical investigators. Beesley et al. interviewed 27 patients with breast reconstruction after mastectomy and showed that mainly four factors influenced patient evaluation: their subjective cosmetic result of feeling and looking normal, a respectful and trusting relationship with their physicians, reconstruction completing their cancer journey and post-operative complications. They showed that patients linked their subjective evaluation to factors that went beyond cosmetics, and some patients even disregarded cosmetics. The quality of the relationship with the medical team was the major element in a positive patient evaluation.<sup>18</sup>

In contrast to Beesley et al., our study used a standardized questionnaire, had a larger group of medical investigators (18 versus one practitioner and one nurse) and analysed multiple factors influencing medical and patient evaluations.

Therefore, we think that our study is important in demonstrating further aspects of why and how evaluations

**Table 4** Outcome evaluation by age, duration and primary versus secondary reconstruction.

Evaluation (1–5)	Patient (mean, SD)	18 professionals (mean, SD)	<i>p</i>
Breast size, all	2.1 (1.0)	2.7 (0.6)	0.001
Age <60 years	2.2 (1.1)	2.8 (0.6)	0.024
Age ≥60 years	2.0 (1.0)	2.7 (0.7)	0.020
FU <60 months	1.9 (0.9)	2.8 (0.6)	0.005
FU ≥60 months	2.2 (1.1)	2.7 (0.6)	0.050
Primary	2.2 (1.2)	2.7 (0.6)	0.108
Secondary	2.1 (0.9)	2.9 (0.6)	0.000
Breast form, all	2.3 (0.9)	3.3 (0.8)	0.000
Age <60	2.4 (1.0)	3.2 (0.7)	0.002
Age ≥60	2.1 (0.9)	3.4 (0.8)	0.000
FU <60 months	2.3 (1.0)	3.3 (0.7)	0.005
FU ≥60 months	2.2 (0.9)	3.2 (0.8)	0.000
Primary	2.3 (1.1)	3.1 (0.9)	0.010
Secondary	2.2 (0.8)	3.4 (0.7)	0.000
Breast symmetry, all	3.0 (1.2)	3.5 (0.7)	0.012
Age <60	3.2 (1.1)	3.5 (0.6)	0.263
Age ≥60	2.7 (1.2)	3.6 (0.7)	0.012
FU <60 months	3.1 (1.3)	3.6 (0.6)	0.160
FU ≥60 months	3.0 (1.1)	3.5 (0.7)	0.040
Primary	3.2 (1.3)	3.4 (0.7)	0.469
Secondary	2.9 (1.0)	3.7 (0.6)	0.001
IMF position, all	2.3 (1.1)	2.9 (0.6)	0.001
Age <60	2.4 (1.2)	2.9 (0.6)	0.113
Age ≥60	2.0 (1.0)	2.9 (0.5)	0.002
FU <60 months	2.3 (1.2)	2.8 (0.5)	0.115
FU ≥60 months	2.2 (1.1)	2.9 (0.6)	0.007
Primary	2.0 (1.1)	2.7 (0.6)	0.008
Secondary	2.5 (1.1)	3.0 (0.6)	0.075
IMF symmetry, all	2.5 (1.2)	3.0 (0.7)	0.006
Age <60	2.8 (1.4)	3.1 (0.7)	0.204
Age ≥60	2.1 (0.8)	3.0 (0.6)	0.002
FU <60 months	2.4 (1.1)	3.0 (0.7)	0.055
FU ≥60 months	2.6 (1.3)	3.1 (0.7)	0.050
Primary	2.2 (1.1)	2.9 (0.7)	0.030

(continued on next page)

Table 4 (continued)

Evaluation (1–5)	Patient (mean, SD)	18 professionals (mean, SD)	<i>p</i>
Secondary	2.8 (1.3)	3.3 (0.6)	0.104
Scar appearance, all	2.2 (1.1)	2.8 (0.7)	0.000
Age <60	2.2 (1.1)	2.7 (0.7)	0.006
Age ≥60	2.2 (1.2)	2.8 (0.6)	0.022
FU <60 months	2.4 (1.0)	2.8 (0.6)	0.076
FU ≥60 months	2.1 (1.1)	2.7 (0.7)	0.002
Primary	2.4 (1.2)	2.8 (0.7)	0.063
Secondary	2.0 (0.9)	2.7 (0.6)	0.001
Scar position, all	2.1 (1.2)	2.8 (0.6)	0.000
Age <60	2.3 (1.2)	2.8 (0.6)	0.030
≥60	1.9 (1.0)	2.9 (0.6)	0.001
FU <60 months	2.2 (1.1)	2.8 (0.5)	0.072
FU ≥60 months	2.1 (1.2)	2.8 (0.6)	0.001
Primary	2.2 (1.3)	2.7 (0.7)	0.051
Secondary	2.1 (0.9)	3.0 (0.4)	0.000

Abbreviations: FU follow-up; IMF inframammary fold; SD standard deviation.

of reconstructive results differ between patients and medical professionals.

To achieve patient satisfaction we must consider more treatment aspects than the aesthetic outcome after reconstruction alone. Satisfaction in general can be achieved by approximating the actual to the ideal, or expected, state. From the psychological literature we know that fulfilling or exceeding conscious or unconscious levels of expectation leads to positive emotions and contentment.<sup>27</sup> Snell et al. showed that inaccurate patient expectations before implant reconstruction corresponded to later patient dissatisfaction.<sup>28</sup> In this context, patient guidance and conversation about possibilities and expectations regarding their breast reconstruction might lead to a better outcome concerning patient satisfaction. Reconstruction is the part of the cancer treatment that patients volunteer to undergo and it is not a life-saving procedure. Communicating in detail what can be achieved and what complications may occur is essential to create realistic expectations.<sup>18</sup>

The fact that we saw no significant differences between primary and secondary reconstructions, between older or younger patients, or between length of follow-up might further emphasize that other factors are more important for positive evaluations.

In summary and in agreement with prior studies reported in the literature, our study shows major differences in the evaluation of reconstructive results by patients and by medical professionals. Studies evaluating only expert opinions should be interpreted carefully as they may not represent what is most beneficial for patients.

## Conflict of interest

None declared.

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