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Quality of Life Stages of Breast Cancer throughout Treatment & Recovery

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Abstract:

The purpose of this long-term, follow-up study of breast cancer patients is to define universal psychological stages specific to the cancer. A validated and modified breast cancer Quality of Life model from the National Medical Center and Beckman Research Institute is the study tool. A pilot of eight breast cancer patients from a reconstructive plastic surgeon's office were recruited and prospectively completed one pre-operative survey; seven of eight subjects also completed a post-operative survey using the same QOL scale. Subjects were consented and analysis was blinded. Pearson's correlation test was used for comparison of questions in each survey. Significant correlations were found between different questions and responses on each survey, suggesting stages in recovery after 1 month of treatment. These included increased awareness of breast asymmetries, decrease in overall happiness and increase in difficulty to cope with cancer after the first survey. The study and follow-up surveys will continue through the ongoing recruitment of fifty patients and their recovery up to a year post-operatively. The final results will provide an educational tool for both patients and healthcare professionals by defining common stages of recovery for breast cancer patients and providing a means for surgeons and post-operative counselors to better tailor their care. This model will be similar to the stages of grief. We hypothesize that breast cancer recovery is predictable and can be defined in four stages—survival, restitution, symmetry and enhancement.

Introduction with Literature Review:

One in eight women have breast cancer¹ and, despite increased awareness of breast cancer over the past twenty years, there is a dearth in research defining common psychological stages that patients encounter throughout treatment. Cancer centers provide information on what

are referred to as “Stages of Cancer Survivorship,” but these are general in nature and sometimes simply called “acute,” “extended,” and “permanent” stages.² A bibliographic review of literature on quality of life and breast cancer between 1974 and 2007 by Montazeri show that QOL research is growing and contributing to breast cancer care, but issues related to the disease, its treatment side effects and symptoms and sexual functioning need more focus.³ While these programs are supportive to all patients, specific research into common stages of breast cancer would be more useful to patients and their support network, especially during their surgery decision-making process.

Clinical studies by Ward et al, Costanzo et al and Liao et al show that levels of depression, distress and anxiety are all notably higher at the beginning of breast cancer treatment than at the end.⁴⁻⁶ Generally, there is a greater sense of control over cancer and more guidance and support as treatment is completed. Patients exhibiting high assertiveness in conjunction with a yielding mode (ie willingness to accept situation) showed evidence of greater adjustment to breast cancer on the Functional Living Index in comparison to overly controlling or passive patients.⁷ This suggests that a greater patient understanding of both treatment and psychological stages can positively influence emotional well-being, as well as ultimate recovery.

Unlike certain other cancers, patient care typically does not end after treatment and radiation/tumor excision. Reconstruction is often the next step; it plays an important role in the overall psychological well being of the patient and represents a physical return to normalcy. This is more significant by the psychosocial body-imaging role of the breast in modern American society. Reconstruction is often a yearlong stage during which the patient is in and out of their workplace for surgical revisions and recovery.

Hypothesis

Experimental: the stages of breast cancer recovery are reputable and predictable and outlined by: survival, restitution, symmetry and enhancement. **Null hypothesis:** there are no stages of recovery in breast cancer and it is a random process.

Methods: This research was submitted and approved by the Institutional Review Board at American University prior to experimental analysis. Eight consecutive subject participants were recruited from DAVinci Plastic Surgery at their first scheduled appointments with a goal of fifty total for the final study with 90% compliance. The PI, Gabrielle LaBove recruited patients in order to limit any perception of pressure from Dr. Davison. Patients were assigned an ID number that is randomly generated by NexTech Medical Practice Software and remained anonymous during data analysis. Dr. Davison (MD, FACS, DAVinci Plastic Surgery), Dr. Monica Jackson (PhD, statistics, American University), and Gabriell LaBove were the only researchers working with the data. Dr. Davison was present in the clinic during surveys and interviews at DAVinci Plastic Surgery (for support/advising/answering questions), while Dr. Jackson helped with analysis of the data on her encrypted computer specifically for data analysis.

All data was gathered electronically and stored in the patient's medical file through NexTech, which is encrypted for all patients. A private security group of the consented patients was created and can only be accessed by Dr. Davison and Gabrielle LaBove. A validated study tool based on a Quality of Life survey created by the National Medical Center and Beckman Research Institute will be used to determine stages of recovery at the time it is completed. The first two surveys for seven of the eight patients were collected at initial appointment and post-operatively at 1 month. The eighth patient has only completed the initial survey, as surgery was

not undergone in time for analysis. Further follow-up surveys will be completed at 2 months, 4 months, 6 months and 12 months (completion of recovery). Grading is on a Likert Scale from 0-10, the latter value corresponding to complete recovery. As the study progresses, 15 minute interviews will be conducted with each patient for follow-up questions. These interviews are already informally done and scribed at each patient's visit, but will be collected and analyzed from consented individuals. Demographic responses requested in the patient paperwork will also be used as independent variables as sample increases—occupation, age, race, ethnicity, gender and stage of cancer.

Pearson correlation values were calculated with corresponding significance values in order to compare relatedness in responses between questions in both the first and second surveys. A repeated measure analysis will be used in the future to compare responses of the surveys at different times throughout treatment and recovery. Future analysis and results will be submitted for publication and presented to the Plastic Surgery Research Council.

Results:

The first set of tables is a comprehensive summary of responses by patients from surveys one and two. Seven patients completed their initial survey as well as their first post-operative survey and one patient has completed an initial survey, as the patient has not yet undergone surgery. The tables show the ranked numerical values circled by each subject, along with each question and its specific qualitative scale.

Tables of Patient Responses for Survey 1 vs Survey 2, by Question

Survival

1. Rate your overall physical health

extremely 0-10 excellent
poor

Q1	Q1
8	8
9	9
9	9
10	6
10	9
6	6
8	7
7	

2. How difficult is it for you to cope today as a result of your disease?

not at all 0-10 very difficult
difficult

Q2	Q2
1	2
7	2
2	0
2	5
0	0
2	2
2	4
5	

3. How difficult is it for you to cope today as a result of your treatment?

not at all 0-10 very difficult
difficult

Q3	Q3
5	4
0	0
3	1
2	5
0	5
2	2
2	4
5	

4. How good is your quality of life?

extremely poor 0-10 excellent

Q4	Q4
10	8
9	8
9	9
9	8
10	10
6	6
8	7
10	

5. How much happiness do you feel?

none at all 0-10 a great deal

Q5	Q5
10	7
7	8
9	9
9	8
9	7
6	6
8	6
10	

6. Do you feel like you are in control of situations in your life?

not at all 0-10 completely

Q6	Q6
5	4
0	1
9	9
9	6
9	7
4	4
7	5
4	

7. To what extent are you fearful of:

Future diagnostic tests

no fear 0-10 extreme

fear

Q7	Q7
1	3
9	7
7	2
9	10
8	10
5	5
3	8
7	

8. Recurrence of cancer

no fear 0-10 extreme

fear

Q8	Q8
3	3
5	6
8	2
9	10
0	0
7	7
3	8
7	

9. How much anxiety do you have as a result of your illness and treatment?

none at all 0-10 a great deal

Q9	Q9
5	3
5	1
7	0
4	8
4	7
5	5
3	8
7	

10. How satisfying is your life?

not at all 0-10 completely

Q10	Q10
10	9
9	8
9	9
10	8
10	9
8	8
9	6
9	

Restitution

11. Has your illness or treatment caused changes in your appearance?

not at all 0-10 extremely

Q11	Q11
0	6
0	0
0	8
0	7
0	9
0	0
2	9
0	

12. Has your illness or treatment caused changes in you self-concept (the way you see yourself)?

not at all 0-10 completely

Q12	Q12
0	1
5	4
4	0
7	8
3	7
7	7
0	3
2	

13. How distressing is/was cancer surgery?

not at all distressing 0-10 very distressing

Q13	Q13
5	2
6	10
7	2
2	8
0	0
9	9
0	8
9	

14. To what degree do you feel your life is back to normal?

none at all 0-10 a great deal

Q14	Q14
3	3
6	5
2	8
8	4
8	5
0	0
7	2
5	

15. Is your sexuality impacted by your illness?

none at all 0-10 a great deal

Q15	Q15
7	9
8	7
5	3
0	
2	3
5	5
0	5
6	

16. To what degree has your illness and treatment interfered with your employment?

no problem 0-10 severe problem

Q16	Q16
7	0
3	0
5	0
1	7
0	0
4	4
0	0
0	

17. To what degree has your illness and treatment interfered with your activities at home?

no problem 0-10 severe problem

Q17	Q17
3	7
7	1
0	3
1	6
2	9
4	4
0	7
2	

18. How much uncertainty do you feel about your future?

not at all uncertain 0-10 very uncertain

Q18	Q18
1	0
8	8
5	1
5	10
2	5
6	6
3	7
5	

19. How did the idea of immediate reconstruction help?

not at all 0-10 a lot

Q19	Q19
10	9
10	10
10	10
10	7
10	9
3	3
9	9
10	

20. Are you affected by changes to your breast?

not at all 0-10 a lot

Q20	Q20
8	7
1	1
2	3
1	6
3	3
5	5
3	9
9	

Symmetry

21. How often do you notice breast asymmetry?

never 0-10 all the time

Q21	Q21
9	6
0	1
1	5
0	2
4	9
1	1
2	10
6	

22. How often do you notice nipple asymmetry?

never 0-10 all the time

Q22	Q22
1	6
0	0
1	5
0	2
4	9
1	1
2	8
1	

23. How bothersome is breast asymmetry?

not at all 0-10 very

Q23	Q23
6	2
0	1
1	1
0	2
4	9
1	1
2	7
5	

24. How bothersome is nipple asymmetry?

not at all 0-10 very

Q24	Q24
1	2
0	0
1	1
0	2
4	9
1	1
2	7
5	

25. To what degree do you feel your breasts are back to normal?
 not at all 0-10 very much

Q25	Q25
3	3
5	1
9	0
8	0
7	0
0	0
8	0
7	

26. How important are normal appearing breasts?
 not at all 0-10 very important

Q26	Q26
10	7
0	1
10	10
7	8
7	7
3	3
6	6
10	

27. How happy are you with your result?
 not at all 0-10 very happy

Q27	Q27
7	5
8	10
8	9
7	3
8	7
5	5
7	0
10	

28. To what extent are you fearful of a poor result in reconstruction?

no fear 0-10 extreme fear

Q28	Q28
5	4
0	0
7	1
6	4
2	3
2	2
6	8
5	

29. Do you feel a need to correct asymmetries?

not at all 0-10 very much

Q29	Q29
9	8
0	0
1	8
2	7
2	3
0	0
2	2
8	

30. How important are symmetry revisions for your psychological well-being?

not at all 0-10 very much

Q30	Q30
9	8
0	0
10	8
3	5
2	3
0	0
2	2
9	

Enhancement

31. To what extent has your illness made positive changes in your life?

none at all 0-10 a great deal

Q31	Q31
5	7
9	10
6	6
8	9
9	10
2	2
8	7
0	

32. To what extent has your illness made positive changes in your family's life?

none at all 0-10 a great deal

Q32	Q32
5	6
2	7
5	
5	6
10	10
2	2
8	7
0	

33. To what extent has your illness made positive changes in your relationships?

none at all 0-10 a great deal

Q33	Q33
7	7
10	10
6	5
5	6
10	10
2	2
8	7
5	

34. Do you sense a purpose/mission for your life or a reason for being alive?
 none at all 0-10 a great deal

Q34	Q34
9	7
10	10
10	5
9	6
10	10
10	2
3	7
5	

35. How hopeful do you feel?
 not at all 0-10 very hopeful

Q35	Q35
10	8
5	8
10	10
10	8
9	7
7	7
8	7
10	

36. Are you interested in physical enhancement?
 not at all 0-10 a lot

Q36	Q36
8	7
2	0
10	9
10	10
2	7
2	2
2	4
6	

37. How important is your aesthetic outcome?
 not at all 0-10 very important

Q37	Q37
9	7
2	4
10	10
9	6
4	7
5	5
3	4
10	

38. How important is an improved functional outcome?
 not at all 0-10 very important

Q38	Q38
9	6
2	2
10	10
10	7
7	9
10	10
9	9
5	

39. How important is an improved cosmetic outcome?
 not at all 0-10 very important

Q39	Q39
9	6
2	2
10	10
10	8
7	9
5	5
2	4
10	

40. To what extent has your self-esteem changed?
 negatively 0-10 positively

Q40	Q40
5	5
5	5
9	5
9	5
6	1
5	5
6	5
5	

41. To what extent will physical enhancement improve your recovery?
 not at all 0-10 a lot

Q41	Q41
6	5
10	5
10	8
9	5
2	3
2	2
4	8
7	

Table 1: Pearson correlations: Survey 1, Initial Consultation Appointment

<u>Explanatory</u>	<u>Response</u>	<u>Correlation coefficient</u>	<u>p-value</u>
Q5: How much happiness do you feel?	Q4: How good is your quality of life?	0.857	0.007**
Q10: How satisfying is your life?	Q1: Rate your overall physical health	0.753	0.031
Q13: How distressing is/was cancer?	Q9: How much anxiety do you have as a result of your illness and treatment?	0.820	0.013
Q15: Is your sexuality impacted by your illness?	Q13: How distressing is/was cancer?	0.754	0.031
Q18: How much uncertainty do you feel about your future?	Q2: How difficult is it for you to cope today as a result of your disease?	0.784	0.021
Q19: How did the idea of immediate reconstruction help?	Q4: How good is your quality of life?	0.903	0.002**
Q23: How bothersome is breast asymmetry?	Q20: Are you affected by changes to your breast?***	0.840	0.009**
	Q21: How often do you notice breast asymmetry?***	0.978	0**
Q28: To what extent are you fearful of a poor result?	Q17: To what degree has your illness and treatment interfered with your activities at home?	-0.878	0.004
Q29: Do you feel a need to correct asymmetries?	Q21: How often do you notice breast asymmetry?	0.922	0.001
Q31: To what extent has your illness made positive changes in your family's life?	Q22: How often do you notice nipple asymmetry?	0.842	0.009**
Q33: To what extent has your illness made positive changes in your relationships?	Q8: To what extent are you fearful of recurrence of cancer?	-0.708	0.050
Q36: Are you interested in physical enhancement?	Q35: How hopeful do you feel?	0.749	0.033
Q37: How important is your aesthetic outcome?	Q35: How hopeful do you feel?	0.846	0.008
	Q36: Are you interested in physical enhancement?	0.892	0.003
Q38: How important is an	Q2: How difficult is	-0.795	0.018

improved functional outcome?	it for you to cop today as a result of your disease?		
Q39: How important is an improved cosmetic outcome?	Q5: How much happiness do you feel?	0.740	0.036
	Q26: How important are normal appearing breasts?	0.811	0.015
	Q37: How important is your aesthetic outcome?	0.940	0.001**
Q40: To what extent has your self-esteem changed?	Q6: Do you feel like you are in control of situations in your life?	0.739	0.036
Q41: To what extent will physical enhancement improve your recovery?	Q22: How often do you notice nipple asymmetry?	-0.720	0.044

**=p-values especially significant Dr. Monica Jackson from the Department of Mathematics & Statistics at

American University aided in the correlation and regression analysis of preliminary data, which was only be identifiable through the assigned ID patient numbers.

The above table shows the significant correlation coefficients calculated from the responses to survey 1 at the time of initial consultation. Out of forty-one total questions, these comparisons—how well the “explanatory” question is a predictor of answers for the “response” (other question in the survey)—showed the most significant and interesting results. Happiness felt and positive quality of life pre-operatively show a strong positive correlation coefficient of 0.857 with a significance value of 0.007. Correlation between the feelings that the idea of immediate reconstruction was helpful (six ranking it 10/10, one 9/10, and one 3/10) was also strong with positive ratings of quality of life ($r = 0.903$, $p\text{-value} = 0.002$). Relative feeling that breast asymmetry was not bothersome showed a strong correlation value of 0.840 ($p\text{-value} = 0.009$) with relative feeling of being unaffected by changes to the breasts and also a strong correlation value of 0.978 ($p\text{-value} = 0$) with infrequent notice of breast asymmetry.

Importance of improved cosmetic outcome strongly correlated with similar responses to feeling a great deal of happiness ($r=0.740$, $p=0.036$), and feeling that normal appearing breasts are important ($r=0.811$, $p=0.015$). Additionally, an importance in aesthetic outcome when asked later in the survey elicited a strong positive correlation with $r=0.940$ and $p\text{-value}=0.001$). Pre-operatively all eight subjects ranked their self-esteem as the neutral or positive, which, when compared to their responses for feeling in control of situations was strong with $r=0.739$, $p=0.036$. An interesting relatively strong, but negative relationship was observed between the responses ranking the extent to which physical enhancement will improve recovery as high with infrequent notice of nipple symmetry ($r=-0.720$ and $p=0.044$).

Table 2: Pearson Correlation, Survey 2, ~Initial Post-Op Visit

<u>Explanatory</u>	<u>Response</u>	<u>Correlation coefficient</u>	<u>p-value</u>
Q2: How difficult is it for you to cope today as a result of your disease?	Q1: Rate your overall physical health.	-0.759	0.048
Q8: To what extent are you fearful of future diagnostic tests?	Q2: How difficult is it for you to cope today as a result of your treatment?	0.921	0.003
Q9: How much anxiety do you feel as a result of your illness and treatment?	Q3: How difficult is it for you to cope today as a result of your treatment?	0.832	0.021
Q13: How distressing is/was cancer surgery?	Q4: How good is your quality of life?	-0.760	0.047
Q14: To what degree do you feel your life is back to normal?	Q5: How much happiness do you feel?	0.9	0.006**
Q17: To what degree has your illness and treatment interfered with your activities at home?	Q3: How difficult is it for you to cope today as a result of your treatment?	0.939	0.002
Q18: How much uncertainty do you feel about your future?	Q7: To what extent are you fearful of	0.802	0.030

	recurrence of cancer?		
Q19: How did the idea of immediate reconstruction help?	Q1: Rate your overall physical health.	0.794	0.033
Q21: How often do you notice breast asymmetry?	Q11: Has your illness or treatment caused changes in your appearance?	0.794	0.033
Q22: How often do you notice nipple asymmetry?	Q21: How often do you notice breast asymmetry?	0.913	0.004**
Q23: How bothersome is breast asymmetry?	Q21: How often do you notice breast asymmetry?	0.894	0.007**
Q24: How bothersome is nipple asymmetry?	Q21: How often do you notice breast asymmetry?	0.903	0.005**
	Q23: How bothersome is breast asymmetry?	0.994	0**
Q26: How important are normal appearing breasts?	Q6: Do you feel like you are in control of situations in your life?	0.900	0.006**
Q27: How happy are you with your result?	Q20: Are you affected by changes to your breast?	0.914	0.004**
Q29: Do you feel a need to correct asymmetries?	Q26: How important are normal appearing breasts?	0.862	0.012
Q30: How important are symmetry revisions for your psychological well-being?	Q29: Do you feel a need to correct asymmetries?	0.978	0**
Q33: To what extent has your illness made positive changes in your relationships?	Q31: To what extent has your illness made positive changes in your life?	0.919	0.003
Q34: Do you sense a purpose/mission for your life or a reason for being alive?	Q2: How difficult is it for you to cope today as a result of your disease?	-0.811	0.027
Q35: How hopeful do you	Q2: How much	0.881	0.009

feel?	happiness do you feel?		
Q36: Are you interested in physical enhancement?	Q26: How important are normal appearing breasts?	0.946	0.001**
Q39: How important is an improved cosmetic outcome?	Q36: Are you interested in physical enhancement?	0.879	0.009
Q40: To what degree has your self-esteem changed?	Q23: How bothersome is breast asymmetry?	-0.763	0.046

**=p-values especially significant

Table 2 summarizes significant correlations between responses for the second survey, which was administered at the first post-operative appointment. The same questions were asked, yet all of the significant results comparing responses were different than those found significant from the first survey in Table 1.

Overall physical health was ranked the same or poorer, while difficulty in coping with cancer became more difficult after surgery ($r=-0.759$, $p=0.048$). Life was ranked less normal post-operatively than at consult, strongly correlating with an overall decrease in happiness ($r=0.9$, $p=0.006$). A strong relationship between an increase in interference of illness and treatment with activities at home with an increased difficulty in coping as a result of treatment was found with $r=0.939$ and $p=0.002$. An increased awareness of nipple symmetry also occurred post-operatively with a strong, positive relationship with increased awareness of breast asymmetry. After the first surgery, patients ranked breast and nipple asymmetry as more bothersome, both of which were strongly correlated with a relative increase in noticing breast asymmetry (r values of 0.894 and 0.903 and p -values 0.007 and 0.005, respectively). The importance of normal appearing breasts was also ranked higher after first surgery and showed a

Pearson correlation value of 0.9 (p value 0.006) with a decreased feeling of control of situations. Another relationship absent in the first survey was between the importance of symmetry revisions for psychological well-being and a need to correct asymmetries—r value 0.978, p value 0.

Though at initial consult patients overall were happy with their current breasts (Q27), this feeling decreased after the first surgery and was strongly correlated with an increase in feeling affected by changes to the breasts (Q20). The r-value for this comparison was 0.914 with significance of 0.004.

Q27	Q27	Q20	Q20
7	5	8	7
8	10	1	1
8	9	2	3
7	3	1	6
8	7	3	3
5	5	5	5
7	0	3	9
10	-	9	-

An interesting negative relationship found between two responses during the second survey was between questions 34 and 2:

Q34	Q34	Q2	Q2
9	7	1	2
10	10	7	2
10	5	2	0
9	6	2	5
10	10	0	0
10	2	2	2
3	7	2	4
5	-	5	-

This relationship had an r-value of -0.811 ($p=0.027$)—decrease in feeling a purpose/mission for life or reason for being alive with an increase of difficulty in coping as a result of cancer.

Discussion:

Breast reconstruction increased in occurrence by 8 percent in 2010, ranking as one of the top five reconstructive surgeries in the United States⁸. This is due to greater awareness and continuous advancements in procedures. The reconstructive process consists of two main options: silicone/saline implants or autologous tissue. The latter usually involves either a TRAM flap or DIEP flap, both of which involve the transplantation of abdominal tissue and blood vessels from the abdomen to form new breasts. Of the approximately 93,000 breast reconstructive surgeries in 2010, about 64,000 involved expander to implant exchanges, followed by about 7000 TRAM flaps and 5,000 DIEP flaps, respectively.⁸ The difference in occurrence is due to the complexity of the transplant flap procedures. More skilled surgeons are able to tailor the procedure to the individual based on age, weight, medical history and tissue availability.

Recovery times vary depending on the procedure and required revisions. A qualitative study looking at breast reconstruction recovery revealed three common areas of concern—return to normalcy, breast/body image and emotional adjustment. Common responses were increased recovery for autologous options, but also increased confidence, feeling of wholeness and control after reconstruction.⁹

Individual research shows the presence of psychological needs and desires by breast cancer patients throughout treatment and reconstruction, yet little research has gone into specifically defining the stages. The Kubler-Ross model for stages of grief has been a useful guide for grievers and health professionals. The model defines a five-stage response to grief—

denial-dissociation-isolation, anger, bargaining, depression and acceptance. A study by Downe-Wamboldt and Tamlyn examined death education by looking at responses from 80 faculties of nursing and 36 faculties of medicine and concluded that the Kubler-Ross model was used most frequently.¹⁰ Similarly, formally identifying common stages of breast cancer recovery will provide an educational resource, inform healthcare workers and patients about the cancer, as well as create doctor-patient dialogue in tailoring individual patient care. This study explores patient-subjective QOL surveys to establish the observed psychological stages of survival, restitution, symmetry and enhancement in breast cancer.

Descriptions of Observed Stages of Breast Cancer

I. SURVIVAL

This is the phase in which the patient is focused predominantly on survival. It occurs before the mastectomy until after the surgery.

II. RESTITUTION

If the patient chooses immediate reconstruction this occurs simultaneously with the mastectomy. If the patient defers reconstruction, it is referred to as delayed.

III. SYMMETRY

The patient desires breasts to look the same one another. This resolves with subsequent phases of reconstruction such as implant exchange and fat grafting.

IV. ENHANCEMENT

Final procedures that the patient chooses to add on to “fine tune” her new look, i.e. increasing/decreasing breast size, liposuction, or breast lift. This is a very common and *healthy* phase.

This study could provide useful guidance for both patients and physicians dealing with a cancer that goes far beyond physical changes and surgery. Wanzel and his research team found that 39% of general surgeons and 68% of oncologists admitted they lacked information concerning breast reconstruction.¹¹ Spreading awareness of these stages would improve patient-physician dialogue and help the patient feel actively involved throughout her treatment. In a study which compared patients' and their physicians accounts of treatment options for breast cancer treatments after primary surgery, 71% patients claimed their surgeons explained mastectomy and BCT options, while physicians claimed they discussed the options with 82% of patients.¹² The results and usefulness of this study could improve communication and patient recall of their appointments.

While there has been much research analyzing and defining general stages of cancer survivorship, little has been done concerning breast cancer specifically. Different cancer diagnoses have varying psychological affects on people due to anatomical location and prognosis, making breast cancer unique from others. A longitudinal QOL study at Washington University School of Medicine examined the impact of three surgical treatments (breast-conserving surgery [BCS], mastectomy, and mastectomy with reconstruction) on patients at 4-6 weeks, six, 12, and 24 months post-surgery. It concluded that patients with a combined mastectomy and reconstruction had a poorer body image than breast-conserving patients at all times tested, except at 24 months.¹³ This study shows that, ultimately, patients were happy with their choice, but suggests a process for healing and acceptance. Defining this process will be invaluable to patients and counselors. Another study showed that women with mastectomies with reconstruction felt more uncomfortable with body changes (35.6% compared to 21.5%), more unattractive to their partner (17.7% vs. 14.8%), and felt a greater negative impact on sex life

(45.4% vs. 29.8%) than those with BCS.¹⁴ Reconstruction is a more time-intensive surgery with greater side effects like decreased sensitivity, device rejection and change in physical appearance. More invasive surgeries resulting in body changes have a significant impact on the psychological well being and outlook of the patient. Recognizing these insecurities as part of the process to recovery will also serve as an aid to patients and healthcare professionals.

Our initial frequency ranking comparisons and Pearson correlation values from both survey 1 and survey 2 suggest a similar process. Patients entered consultation and surgery with an overall positive outlook on life, interpreted from their very high ratings of overall physical health, happiness, satisfaction in life, personal self-esteem and feeling of control of situations in life, along with a limited difficulty in coping as a result of cancer.

Pearson correlation values found significance between different question pairs for each survey, suggesting a change in perception and effect of breast cancer on the patients. The positive attitude entering surgery was reflected in the strong correlation values found between high ranking of happiness and quality of life ($r=0.857$), good satisfaction with high rating of physical health ($r=0.753$), and positive self-esteem with feeling of control ($r=0.739$). The high frequency of initial positive perspective suggests that the patients feel well supported and comfortable with the idea of reconstruction. The r -value of -0.795 between high importance of a functional outcome and low difficulty in coping initially because of cancer could be suggestive of an initial pragmatic outlook on the situation. Additionally, the low ranking of need to correct asymmetries and its strong relationship in low ranking of noticing breast asymmetry ($r=0.922$, $p=0.001$) suggests more of an initial focus on survival (“beating the cancer”) and restitution (determining the type of treatment), rather than the aesthetics of later revisions.

Some observed consistencies between the two surveys were limited inference with employment, strong feelings that the idea of immediate reconstruction helped, limited fear of a poor result in reconstruction, and, despite the increased difficulties with treatment and increased awareness of asymmetries, a general feeling that breast cancer has made positive changes for themselves and their family.

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Despite changes in recovery times, revisions for symmetry are still necessary in BCS and reconstruction. Many times, tumor excisions call more attention to inherent asymmetries of the breasts. A study looking at asymmetries in BCS patients using a scale from 1 to 4 showed that reported asymmetry increased with two or more excisions in comparison to one excision (mean value of 18.41 vs. 17.11). Younger patients (<40) also reported more asymmetry than older patients and showed a greater desire for breast reconstruction post-operatively.¹⁵ Women with unilateral mastectomies and reconstruction also desired cosmetic surgery on the unaffected breast to improve symmetry.¹³ Similarly, the importance of completion and symmetry were examined in patients that underwent breast reconstruction with tissue expanders at time of

placement, implant exchange and nipple reconstruction. Bilateral reconstruction at placement received greater cosmetic approval, possibly due to volume adjustments creating an illusion of symmetry. Unilateral reconstruction patients increased their cosmetic scores after implant exchange, as the natural breast was also modified to create more symmetry. Lastly, the highest cosmetic scores were recorded for both cohorts after nipple-areola complex reconstruction, suggesting its importance in the reconstruction/completion process.¹⁶ Desires for more symmetrical breasts post operatively are present in both BCS and reconstruction patients.

Body image perception research shows that women who underwent breast reconstruction with a TRAM flap faced common concerns like losing a breast, adjusting to a changing body image and redefining normality. The latter was the realization that having the same body and personal relationships prior to diagnosis was impossible and that accepting change was necessary.¹⁷

This physical appearance of stages is evident from revision surgeries following the initial mastectomy in order to best achieve symmetry and proper enhancement:

Latissimus Flap Physical Stages:



Fig. 1: Before surgery: Right breast nipple-sparing mastectomy and left breast skin sparing



Fig. 2: After surgery: Latissimus flaps and expanders to both breasts



Fig. 3: After surgery: Nipple reconstruction and tattoo to achieve symmetry

Implants: Physical Stages of Recovery



Fig 4: Before surgery: Left breast skin-sparing mastectomy and right breast nipple sparing



Fig 5: After surgery: Implants with fat grafting

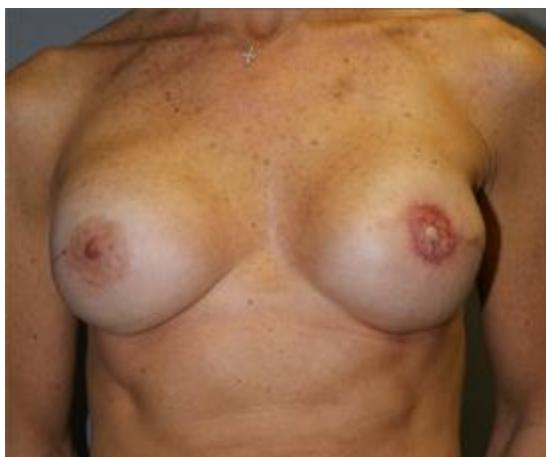


Fig. 6: After surgery: Nipple reconstruction with Alloderm skin placement for symmetry

The Pearson correlation values and pairs, as well as the change in frequency of answers on the QOL scale for the second survey (first survey documenting post-operative feelings) also are suggestive of this observed change of focus to asymmetries after just one month. In addition, the initial positive outlook of most of the subjects was ranked significantly lower in the second survey. A greater difficulty in coping as a result of the disease showed significant correlation ($p=0.048$, $r= -0.759$) with a decrease in ranking overall physical health. Patients ranked their happiness with their reconstructed breasts as lower than their happiness with their own breasts prior to surgery. This change in ranking elicited a strong correlation (0.914 , $p=0.004$) with an increase in patients' feeling affected by changes to the breasts. These changes in attitude suggest that, despite an initial feeling of confidence in expectations, patients were still negatively psychologically affected by the change of an important part of female identity.

Another significant change resulting from the first surgery was the increased awareness to asymmetries and ranking as "bothersome." Ranking both breast and nipple asymmetry as more bothersome post-operatively showed strong correlation with an increase in noticing asymmetries (0.894 and 0.903 with p values of 0.007 and 0.005 respectively). In addition, noticing nipple asymmetry is a good predictor of also noticing overall breast asymmetry ($r=0.913$, $p=0.004$). This change in attitude after the first surgery can be a result of any surgery and the degree to which the person begins focusing on the area—for wound maintenance, examinations, etc.—but could also be a strong indication of the psychosocial value placed on the breasts.

Other responses from the second survey also showed that an improved cosmetic function was ranked as more important and showed a direct correlation with a general increase in physical

enhancement ($r=0.879$, $p=0.009$). This change in evaluation could be an early indicator of the importance of enhancement in recovery.

Although additional follow-up surveys and a complete recruitment of fifty patients will be needed before any of the initial relationships can be used to define stages, the preliminary results are suggestive of distinct stages and changing psychological outlooks after only two surveys and one surgery. Follow up interviews will also help add greater descriptions and explanations of patient feelings at different stages.

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