

Reconstruction After Mastectomy: A Patient-Centered Review

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I have no relevant affiliations or agreements to disclose.

Objectives:

At the conclusion of this session, participants should be able to:

- Discuss prevalence of breast cancer amongst the general population of the U.S., as well as in disproportionately affected communities
- Define mastectomy, immediate reconstruction, delayed reconstruction, tissue expander, and autologous tissue reconstruction
- Identify the most common risks and benefits related to breast implant placement vs. autologous tissue reconstruction
- List additional procedures that may be required for patients undergoing unilateral mastectomy vs. bilateral mastectomy
- Summarize the common pathways for breast reconstruction after unilateral and bilateral mastectomy

Acknowledgements

Patient Case:

A 45 year old female presents to your office to discuss options for breast reconstruction. She has a lump on her right breast that was found to be Ductal Carcinoma in Situ (DCIS). Her breast surgeon has offered her the options of lumpectomy, unilateral mastectomy, or bilateral mastectomy. She is understandably overwhelmed and anxious. She asks for an explanation of how she would be “put back together and look normal again” with each of these options.

How would you proceed?

Breast cancer prevalence

- U.S. women have a 13% risk of developing breast cancer in their lifetime (approx. 1 in 8)
- There were an estimated 287,850 new cases of invasive breast cancer diagnosed in women in the U.S. in 2022, with 51,400 new cases of non-invasive (in situ) breast cancer.
- U.S. men have a lifetime risk of breast cancer of approx. 1 in 833.
- As of January 2022, there were more than 3.8 million women with a history of breast cancer in the U.S. This includes women currently being treated and women who have finished treatment.
- Breast cancer is the most commonly diagnosed cancer among U.S. women. In 2022, it's estimated that about 30% of newly diagnosed cancers in women are going to be breast cancers.
- Breast cancer is the second-leading cause of cancer-related death in women in the U.S., second only to lung cancers.

Disproportionally affected populations

- Breast cancer is the second-leading cause of cancer-related death in the United States, following lung cancer, for Asian and Pacific Islander women, American Indian and Alaska Native women, and white women.
- Breast cancer is the leading cause of cancer-related death in the United States for Black and Hispanic women.
- Black women are most likely to die from breast cancer than women of any other racial or ethnic group.
- Ashkenazi Jewish women have a higher risk of breast cancer because of a higher rate of BRCA mutations.

Resources for further information on health disparities and organizations that support advances in healthcare for women of color:

- **The African American Breast Cancer Alliance, Inc**
 - www.aabcainc.org
- **Sisters Network® Inc**
 - www.sistersnetworkinc.org
- **The Black Women's Health Imperative**
 - www.bwhi.org
- **Sisters By Choice**
 - www.sistersbychoice.org
- **Sisters on a Mission**
 - www.sistersonamission.org
- **The Latino Cancer Institute**
 - www.latinocancerinstitute.org
- **The Denise Roberts Breast Cancer Foundation**
 - www.tdrbcf.org

Review of terms and surgical options

Note: surgical options are dependent upon the degree of invasion of the cancer, patient preference, surgeon preference and comfortability, and degree of risk of recurrence.

Lumpectomy

Removal of a portion of the breast tissue while leaving the remaining breast intact, with the goal of removal of all present cancer but sparing as much healthy tissue as possible.

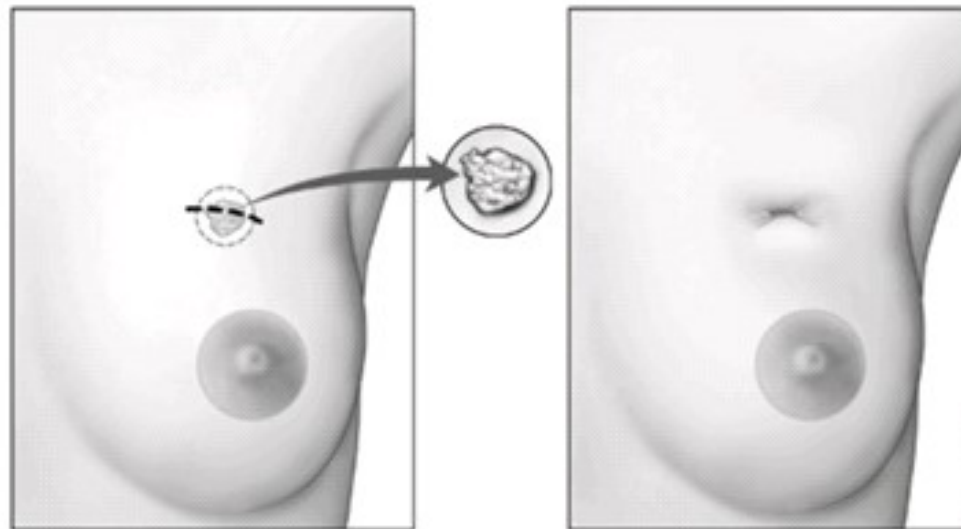


Image: Northwestern Plastic Surgery

Mastectomy

Removal of breast and glandular tissue.

Radical Mastectomy: Removal of breast tissue, overlying skin, pectoralis major and minor and pectoral fascia, as well as the regional lymph nodes

Modified Radical Mastectomy: Removal of breast tissue, overlying skin, pectoral muscle fascia , and some of the regional lymph nodes

Simple Mastectomy: Modified mastectomy but without removal of lymph nodes

Skin- and Nipple-sparing Mastectomy: Removal of affected breast tissue while preserving skin and/or the nipple-areolar complex as able

Unilateral Mastectomy

Removal of the breast and soft tissue from one side of the chest while leaving the breast and soft tissue of the other side unaffected.

Bilateral Mastectomy

Removal of breasts and soft tissue from bilateral chest. This may be done due to metastatic disease, inherent risk for cancer re-occurrence, fear of cancer recurrence, or patient preference for immediate symmetry.

Autologous Flap

Use of the patient's own tissue (skin, subcutaneous fat, and at times muscle) to recreate breast tissue or to supply overlying skin.

Common misconceptions: Single procedure

After you explain the differences between lumpectomy, unilateral and bilateral mastectomies, Julia states that she is glad she'll only have to have one surgery and then "be back to normal."

You pause, is this correct?

Breast reconstruction generally occurs in multiple stages, depending first upon the method required or chosen for removal of cancerous tissue and the patient's desired aesthetic outcome.

If a patient has a unilateral mastectomy, the unaffected breast may later be altered for symmetry (breast lift, breast reduction, breast augmentation, etc.)

Reconstruction Pathways*

- Tissue expander to implant exchange
- Immediate reconstruction with autologous flap
- Tissue expander to autologous flap

*this list is not comprehensive but covers the most common reconstructive pathways

Common misconceptions: I have to get implants

Patients may choose to get breast implants, to have autologous tissue transfer, or to have no reconstruction at all.

Tissue Expander to Implant Exchange

- A tissue expander is an implanted device that is slowly filled over time to allow sufficient skin growth to allow for reconstruction

Breast
Tissue

Expanders

Filled!



Youtube channel: Being Barton

<https://www.youtube.com/watch?v=NR3DnTf9ozs>

Dr. Puya Davoodi, Northeast Georgia Plastic Surgery

Breast Implants: Saline vs Silicone



Breast Implant Risks

- Additional surgeries
- Infection
- Breast implant associated-anaplastic large cell lymphoma (BIA-ALCL) - most associated with textured breast implants
- Breast Implant Illness – not clearly understood, vast array of systemic symptoms
- Capsular contracture/ breast deformity
- Breast pain
- Implant rupture

Breast Implant Monitoring

- MRI at 5 years and then every 2-3 years
- Implants exchanged approximately every 10 years, though some may be retained much longer

Figure 2. Types of alloplastic implant-based reconstruction: A) Two-stage reconstruction; B) direct-to-implant reconstruction.

A)



Preoperative



Tissue expander



Silicone gel implants

B)



Preoperative



Silicone gel implants

Autologous Flap Reconstruction

- Use of the patient's own tissue to reconstruct a new breast
- Deep Inferior Epigastric Perforator (DIEP) flap
- Latissimus dorsi muscle flap
- TRAM flap

- Flaps may be "pedicled" wherein the blood supply remains attached, or "free", wherein the blood supply is disconnected and then reconnected micro-surgically to the blood supply of the chest.
- All DIEP flaps are "free" flaps

Immediate Reconstruction with Autologous Flap

- Occurs within same surgical stay as mastectomy
- No use of tissue expanders prior to placement of flap

Latissimus Flap Reconstruction

A



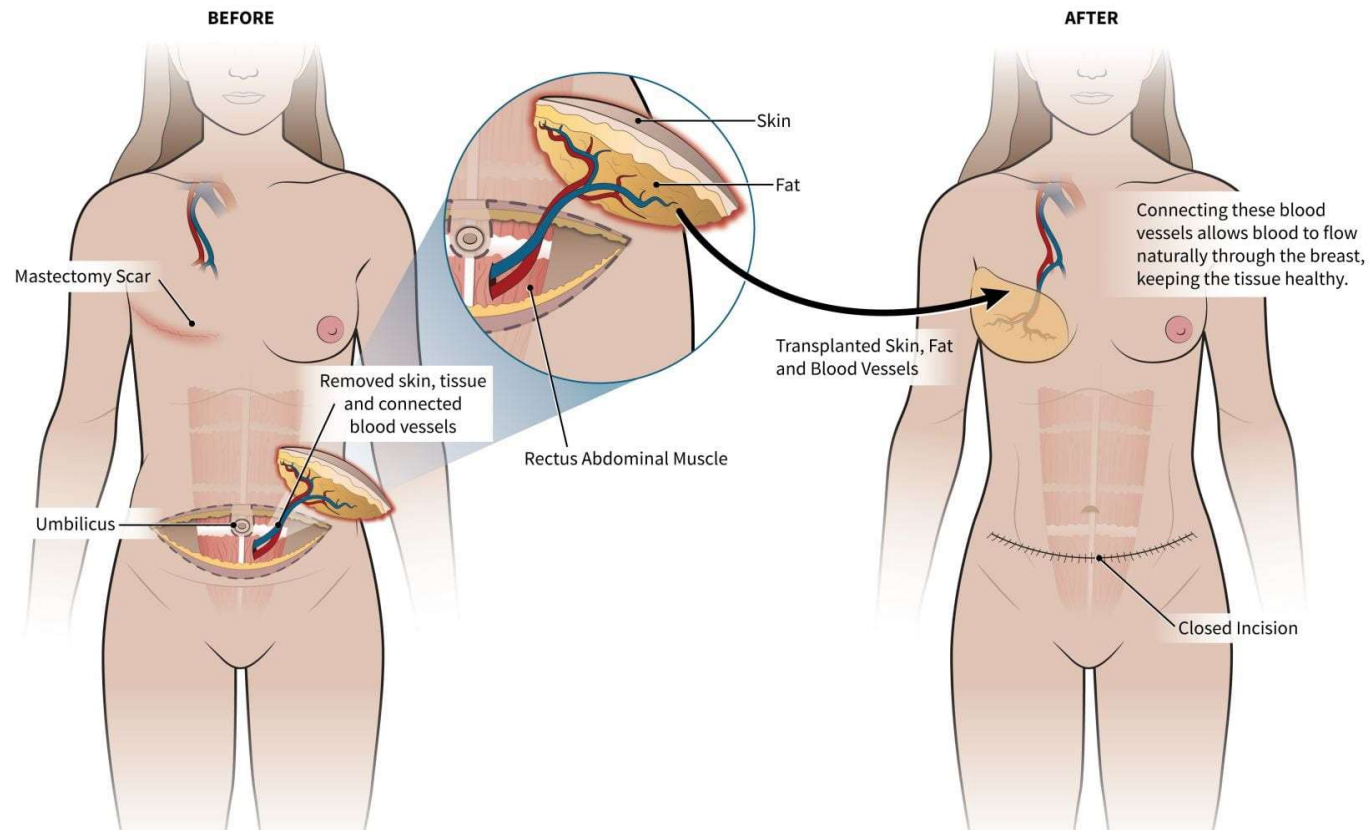
B



(Sood et al., 2018)

DIEP Flap Reconstruction

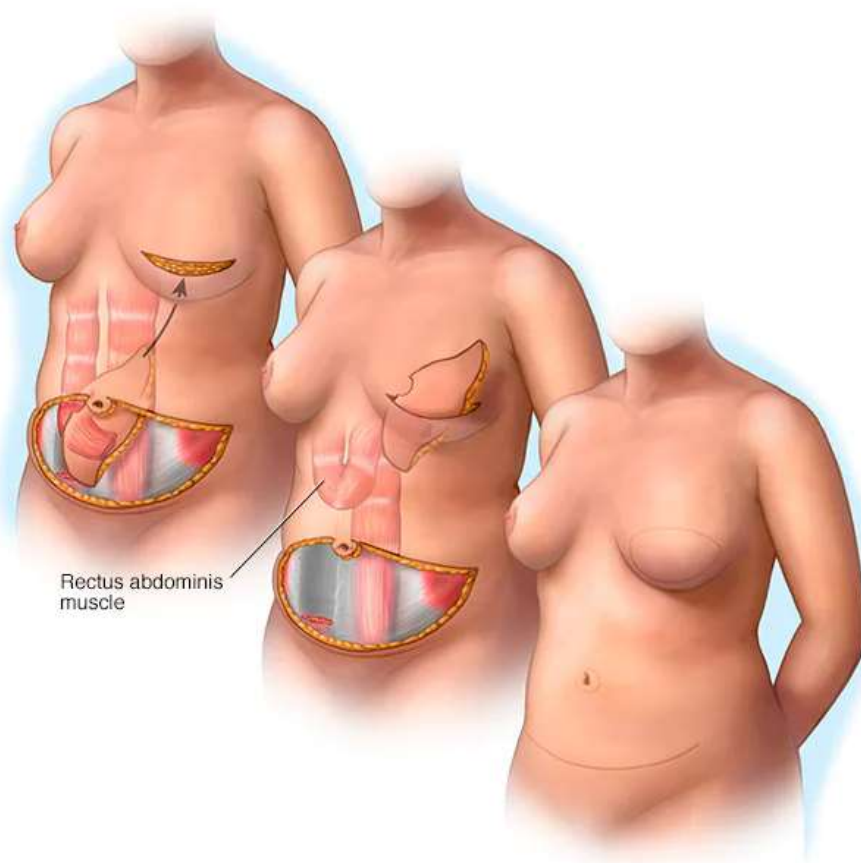
Deep Inferior Epigastric Perforator (DIEP) Flap Surgery



Washington University School of Medicine Dept. of Surgery
<https://surgery.wustl.edu/what-is-diep-flap-surgery/>

TRAM Flap Reconstruction

- Transverse Rectus Abdominus Muscle Flap
 - Pedicled TRAM FLAP



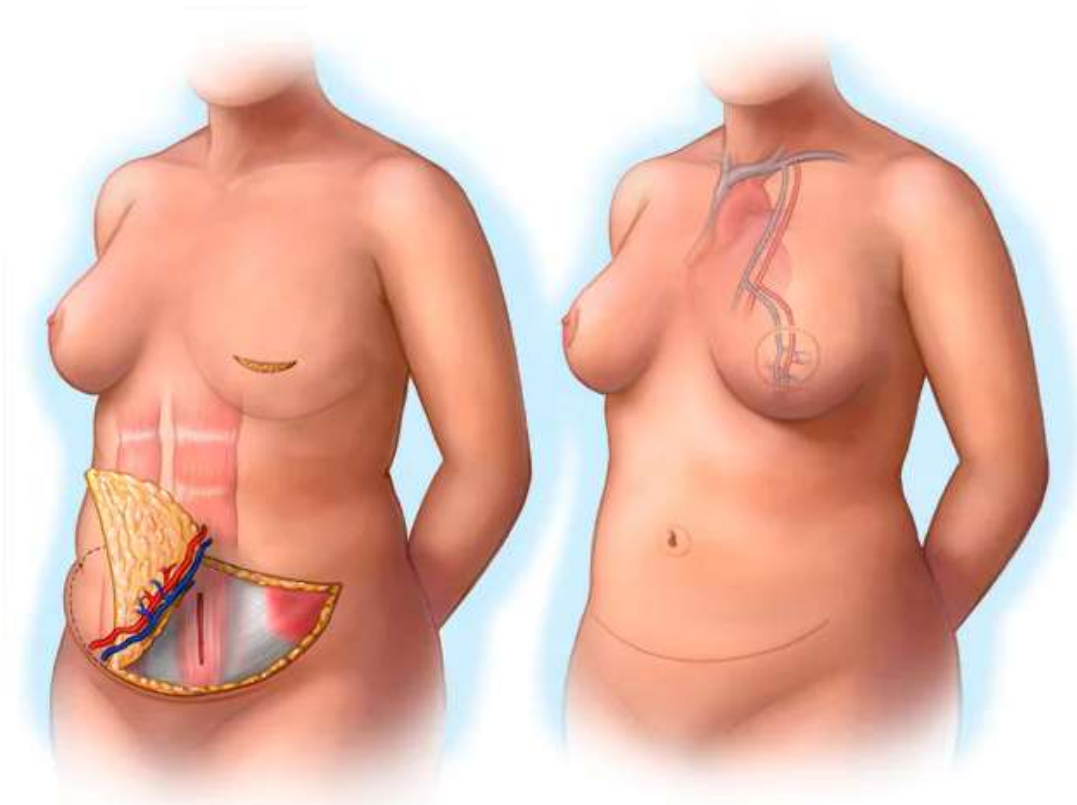
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Mayo Clinic

<https://www.mayoclinic.org/tests-procedures/breast-reconstruction-flap/about/pac-20384937>

TRAM Flap Reconstruction

- Transverse Rectus Abdominus Muscle Flap
 - Free TRAM FLAP



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Mayo Clinic

<https://www.mayoclinic.org/tests-procedures/breast-reconstruction-flap/about/pac-20384937>

Tissue Expander to Autologous Flap

Additional potential procedures

- Fat grafting
- Nipple reconstruction
- Scar revision

Fat grafting

- Use of patient's own fat cells to improve contour deformities
- Fat is harvested via liposuction, "washed" and strained and then reinjected into the desired areas
- Downtime is most dependent on how well the patient tolerates liposuction, which can be very painful

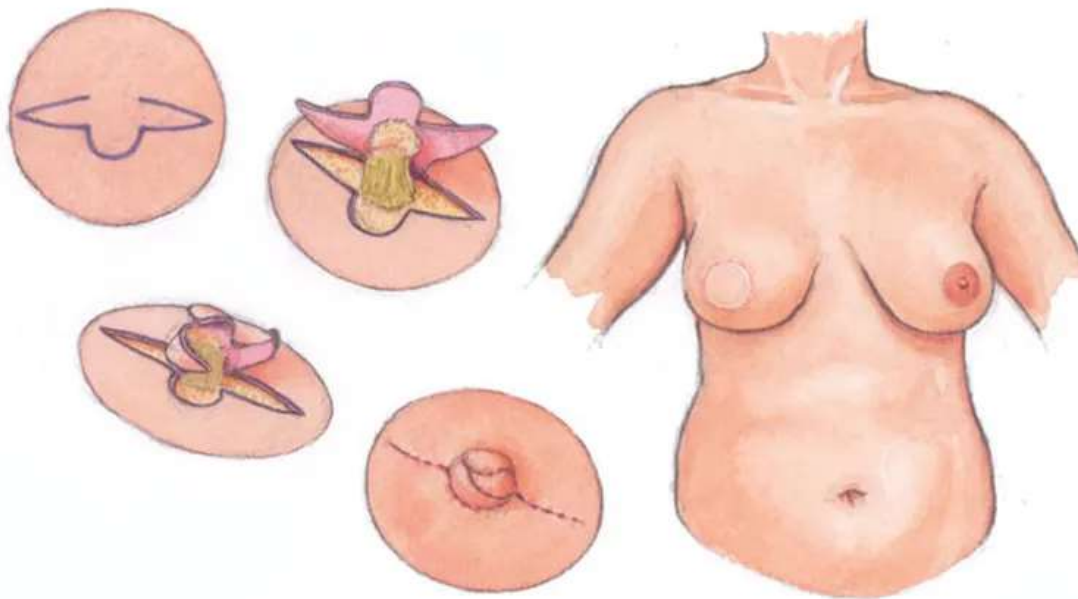
Fat grafting

Figure 4. Fat grafting for lumpectomy defect reconstruction



Nipple reconstruction

- May occur via reconstructive surgery, or the patient may opt for nipple tattooing



Nipple reconstruction



Scar Revision

- Hypertrophic scars
- “Dog ears”
- Fat necrosis



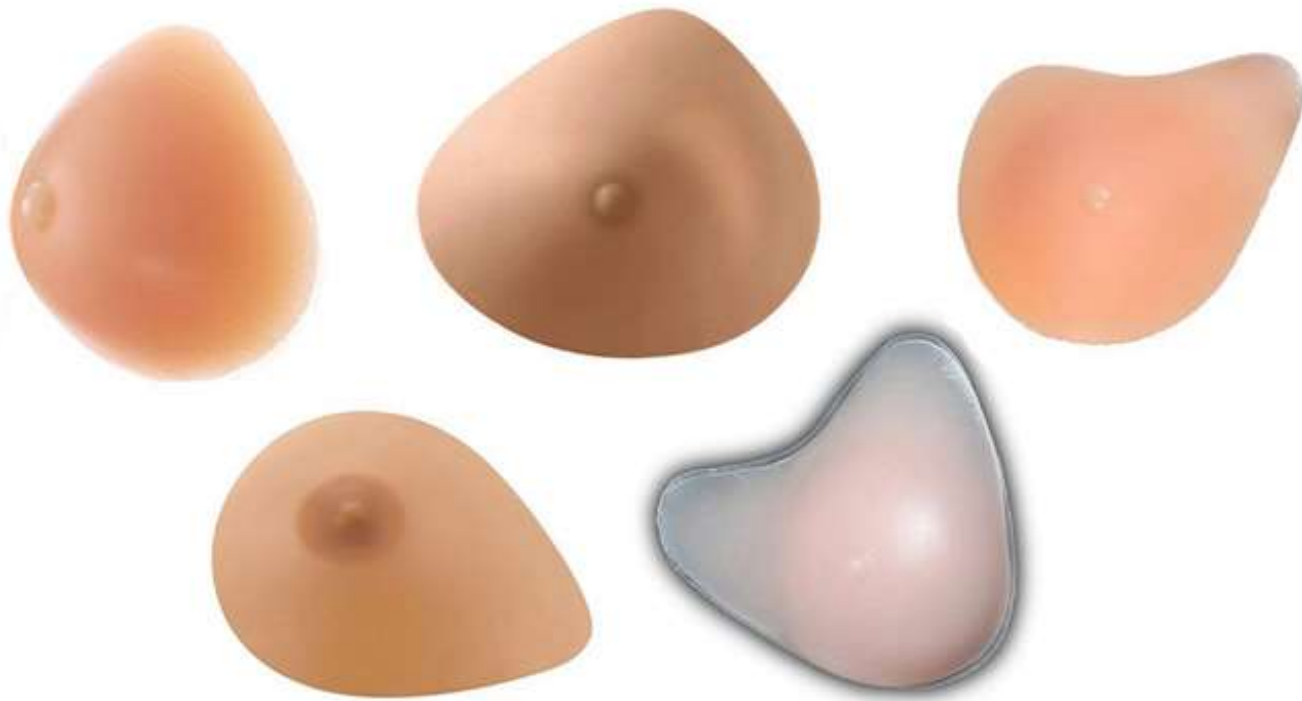
Common misconceptions:

Once I start reconstruction, it's the surgeon's choice when I am finished

Patient's may opt to stop further reconstruction at any time during the process of reconstruction, unless tissue expanders are in place. Tissue expanders are not meant to be placed permanently and must be removed.

Breast Prosthesis/ Contour Garments

- Some women may choose to wear breast prosthesis or contour garments during the construction process, instead of undergoing surgical reconstruction, or if surgical reconstruction is ultimately unable to provide the desired aesthetic result or symmetry
- These come in a variety of styles, and may be made of firm material such as silicone, or soft, cotton-like material
- There are options to match skin tone and specialty bras made for various styles of outfits as well as swim wear



<https://deccanorthopro.com/breast-prosthesis/>

How does chemotherapy affect reconstruction?

- Timing tissue expander fills to minimize intrusion into foreign body (tissue expander) while immune system is weakest
- There is some emerging research that states that reconstruction surgeries may not have more risk during chemotherapy, but standard practice continues to be to deferring surgery until immune system has sufficiently recovered after termination of chemotherapy, at least 1 and up to 6 months.

How does radiation affect reconstruction?

- Complete all tissue expander fills as able prior to radiation treatments starting, decrease time between fills and increase fill volume amounts as able/ tolerated by patient
- Defer surgery until the patient's skin has had sufficient time to heal (may be up to 1 year)
- If there is significant tissue damage/ skin break down after radiation, the patient may need another reconstructive option (latissimus flap, DIEP flap, etc).
- Radiated skin may also break down in the future depending on the severity of the tissue damage.



<http://aimeebrothersen.blogspot.com/>

Back to our patient

- 45 YOF with right breast DCIS.
- The patient opts for right breast mastectomy with tissue expander top implant exchange.
- Approximately 1 month after her mastectomy, she begins tissue expander fills. She gets tissue expander fills every 2 weeks until her 500cc capacity tissue expander is filled to 400cc, at which point she says “that enough, I don’t want to be any bigger than this.”
- 3 months after her fills are completed, she has the tissue expander removed and implant is placed.
- Approximately 4 months after the implant is placed, the patient is concerned about the appearance of her right breast and that her chest above looks “too flat”

- The patient then opts for fat grafting to her right chest. This occurs approx. 6 months after the implant is placed.
- After one round of fat grafting, the patient still believes that the contour of her chest could be improved. She goes on to have 2 more rounds of fat grafting, one 9 months after her implant was placed, and another 12 months after the implant was placed.
- After she is satisfied with the appearance of her right breast, the patient opts for nipple tattooing rather than surgical reconstruction. The first available appointment was 15 months after the implant was placed.
- The patient is now ready to discuss a left breast lift for symmetry. Due to surgeon availability, this surgery occurs 18 months after the implant was placed and nearly 2 years post mastectomy.

Patient Education Resources

- Many local support groups such as ***
- Breastcancer.org

References

- Kaidar-Person, O., Offersen, B. V., Boersma, L. J., de Ruyscher, D., Tramm, T., Kühn, T., Gentilini, O., Mátrai, Z., & Poortmans, P. (2021). A multidisciplinary view of mastectomy and breast reconstruction: Understanding the challenges. *Breast (Edinburgh, Scotland)*, 56, 42–52. <https://doi.org/10.1016/j.breast.2021.02.004>
<https://pubmed.ncbi.nlm.nih.gov/33610903/>
- Park, J. W., Seong, I. H., & Woo, K. J. (2021). Factors influencing postoperative abdominal pain in DIEP flap breast reconstruction. *Gland surgery*, 10(7), 2211–2219. <https://doi.org/10.21037/gs-21-175> <https://pubmed.ncbi.nlm.nih.gov/34422592/>
- Santosa, K. B., Qi, J., Kim, H. M., Hamill, J. B., Wilkins, E. G., & Pusic, A. L. (2018). Long-term Patient-Reported Outcomes in Postmastectomy Breast Reconstruction. *JAMA surgery*, 153(10), 891–899. <https://doi.org/10.1001/jamasurg.2018.1677>
<https://pubmed.ncbi.nlm.nih.gov/29926096/>

References

- Smolanka, I. I., Bagmut, I. Y., Sheremet, M. I., Lyashenko, A. O., Movchan, O. V., Smolanka, I. I., Jr, Loboda, A. D., Kolisnyk, I. L., Sydoruk, L. P., & Lazaruk, O. V. (2021). Delayed breast reconstruction with tram-flap and various modifications after radical mastectomy. *Journal of medicine and life*, 14(6), 847–852. <https://doi.org/10.25122/jml-2021-0354>
- Somogyi, R. B., Ziolkowski, N., Osman, F., Ginty, A., & Brown, M. (2018). Breast reconstruction: Updated overview for primary care physicians. *Canadian family physician Medecin de famille canadien*, 64(6), 424–432.
• <https://pubmed.ncbi.nlm.nih.gov/29898931/>
- Sood, R., Easow, J. M., Konopka, G., & Panthaki, Z. J. (2018). Latissimus Dorsi Flap in Breast Reconstruction: Recent Innovations in the Workhorse Flap. *Cancer control : journal of the Moffitt Cancer Center*, 25(1), 1073274817744638. <https://doi.org/10.1177/1073274817744638>
- Yun, J. H., Diaz, R., & Orman, A. G. (2018). Breast Reconstruction and Radiation Therapy. *Cancer control : journal of the Moffitt Cancer Center*, 25(1), 1073274818795489. <https://doi.org/10.1177/1073274818795489>