Visualized Surgery

Visualized pre- and subpectoral implant placement for immediate breast reconstruction

Diana L. Dyrberg[1], Camilla Bille[2], Gudjon L. Gunnarsson[3], Jens A. Sørensen[2], Jørn B. Thomsen[1]

[1]Department of Plastic Surgery, Odense University Hospital, Odense/Lillebaelt Hospital, Vejle, Denmark; [2]Department of Plastic Surgery, Odense University Hospital, Odense, Denmark; [3]Department of Plastic Surgery, Telemark Hospital, Skien, Norway

Correspondence to: Jørn Bo Thomsen, MD, PhD. Associate professor, Department of Plastic Surgery, Odense University Hospital, Odense/Lillebaelt Hospital, Vejle, Sdr Boulevard 29, 5000 Odense C, Denmark. Email: Joern.Bo.Thomsen@rsyd.dk.

Abstract: The use of mesh for immediate breast reconstruction was introduced almost two decades ago. Lately, the number of prepectoral direct to implant breast reconstructions has increased as this technique seems to leave an unimpaired muscle function and may lead to less or no breast animation deformity (BAD) and quicker recovery. However, challenges still remain as there is a risk of thin tissue coverage, visible implant edges and secondary ptosis. In this visualized surgery paper, we visualize the technical disparities between the sub- and prepectoral direct to implant breast reconstruction.

Keywords: Breast reconstruction; breast implants; surgery; animation

Submitted Feb 14, 2019. Accepted for publication May 27, 2019.
doi: 10.21037/gs.2019.05.09
View this article at: http://dx.doi.org/10.21037/gs.2019.05.09

Introduction

A paradigm shift in modern breast reconstruction occurred in 2001 with the introduction of acellular dermal matrix (ADM) allowing a direct to implant breast reconstruction that has become a standard procedure and evolved further using various types of biological and synthetic meshes (1-4). The increased practice of one stage direct to implant reconstruction has resulted in an increased focus on the unsightly breast animation deformity (BAD) that has been suggested to be proportional to the degree of muscle involvement (5).

Prepectoral placement of the implant has resurrected as an alternative to avoid the BAD results. This change however, gives a resurgence of potential problems such as thin tissue coverage allowing visible implant edges, secondary ptosis and possibly increased rates of capsular contracture. These are potential risks, which needs to be examined in future studies (5,6). The aim of this visualized surgery paper was to visualize and highlight the technical disparities between a sub- and prepectoral direct to implant breast reconstructive techniques applied at our institutions.

Operative techniques

Video 1 (Figure 3)

This video demonstrates a subpectoral direct-to-implant breast reconstruction directly applied after mastectomy of the patients right breast (*Figures 1-3*).

The breast base and the inframammary crease were marked, and the width, height and projection of the breasts were measured. Prior to surgery the breast parenchyma, tumor and flap thickness as well as junction between the subcutaneous fat and the breast parenchyma were assessed by a T2-weighted MR scan. The MRI is not necessary for this procedure, however we find that the procedure is more secure in our hands when using MRI as skin flap thickness can be estimated and the tumor localization is more precise.

Following nipple sparing mastectomy, the mastectomy flap viability and thickness was evaluated by vision and palpation prior to reconstruction. The subcutaneous pocket was thoroughly washed with saline. Monopolar cautery was used to dissect a pocket under the pectoralis major muscle, which insertion was released inferomedially. The choice of implant was based on measurements and

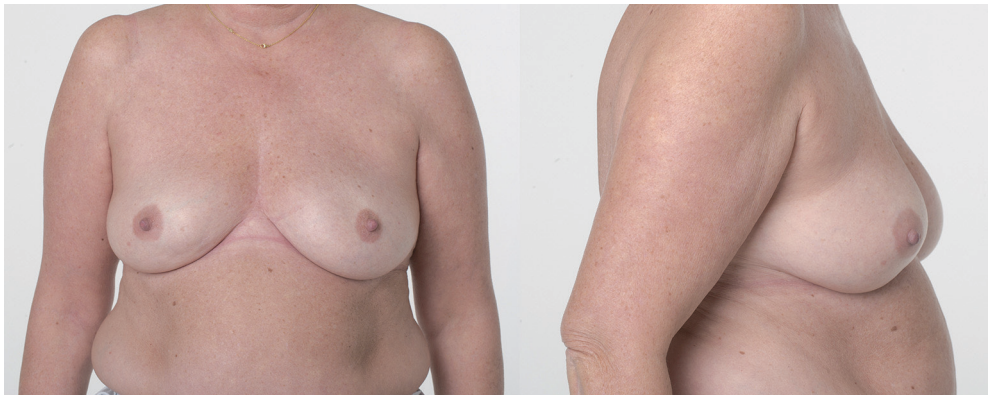

Figure 1 Patient with a tumor in the right breast below the nipple. Before surgery.

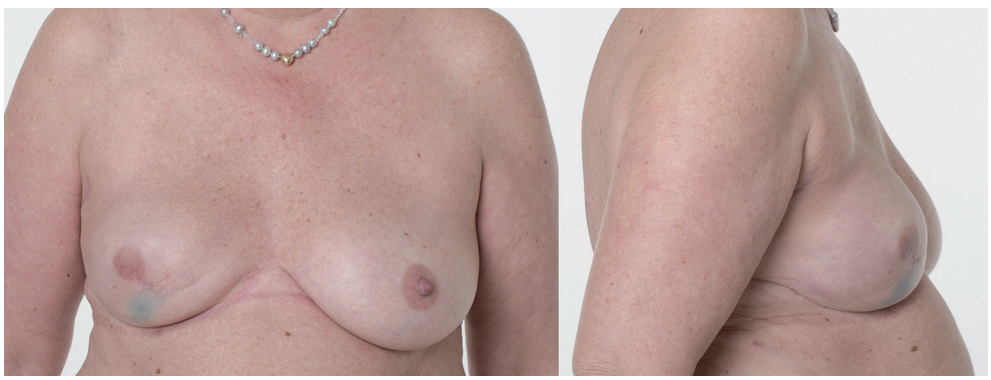

Figure 2 The same patients after surgery. The nipple had to be removed in a secondary procedure due to close margins.

Figure 3 Subpectoral implant placement for immediate breast reconstruction, video 1 (7).
Available online: http://www.asvide.com/watch/32973

the use of an inflatable sizer. We used a porcine derived mesodermal matrix, Meso Biomatrix®, for inferior support of the implant. The matrix was sutured by running Vicryl 2.0 sutures to the edge of the pectoralis major muscle and the thoracic wall along the location of the inframammary crease.

The implant was placed in the pocket and the matrix was then sutured laterally to complete the muscle/matrix pocket. We do not rinse the implant pocket in antibiotics as a standard.

Two drains were placed and the skin edges at the IMF were deepithelialized prior to suturing by 3.0 running vicryl and 3.0 running monocryl sutures. We use a transparent drape for 14 days to support the reconstruction and allow for skinflap and wound observation without dressing removal.

Video 2 (Figure 4)

This video demonstrates a prepectoral direct-to-implant breast reconstruction on the left breast in a risk reducing case (*Figure 4*).

Following nipple sparing mastectomy, the mastectomy

Figure 4 Prepectoral implant placement for immediate breast reconstruction, video 2 (8).
Available online: http://www.asvide.com/watch/32974

flap viability and thickness was assessed by vision and palpation prior to reconstruction. The subcutaneous pocket was thoroughly washed out with 0.9% saline. Two pieces of porcine derived mesodermal matrix, Meso Biomatrix®, were sutured to the pectoralis major muscle and the thoracic wall using a running Vicryl 2-0 sutures circumferentially along the breast footprint, where the implant was to be placed. The chosen implant was inserted between the two pieces of mesh creating a prepectoral implant pocket. The mesh edges were then sutured together above the implant by running vicryl 2.0 sutures thereby closing the pocket. Two drains were placed, and the skin sutured as described above.

Comments

In this paper we visualize our two preferred techniques for direct to implant breast reconstruction, subpectoral and prepectoral, using a mesodermal matrix as a hammock. Currently, we are conducting a randomized study to examine if one of these techniques should be preferred to the other. We started using subpectoral ADM assisted direct to implant breast reconstruction in 2011 (3,9-12). However, when tested at follow-up nearly all of our patients had BAD to some extent. Since 2015 we have changed the implant pocket from subpectoral to prepectoral in the patient with a severe degree of BAD. However, this is not possible in all cases due to thin tissue coverage.

The prepectoral pocket change clearly seems to reduce the incidence of BAD. Currently, we apply both techniques, as visualized in the two videos. The prepectoral placement is somewhat faster to perform and on the short-term seems to be associated with a less pain and reduced drain output compared to the subpectoral technique (13).

However, our experience is still relatively short and user dependent so knowledge about the patients perception of the cosmetic and functional outcomes of the two techniques needs to be assessed and compared. Furthermore, we need long-term data about rippling, visible implant edges, ptosis and capsular contracture and other morbidities that implants are known to cause in cosmetic and reconstructive breast surgery.

We are currently comparing the two techniques with regard to BAD, cosmetic and functional outcome as well as patient related outcome to gain more knowledge about the advantages and disadvantages of the two techniques. Patient selection is important, and we based the selection on clinical evaluation and supplemented by a preoperative T2 weighed MRI scan, which in our experience give valuable information about the thickness of the subcutaneous tissue layer, the Coopers ligaments as well as the location and size of tumours in cancer patients.

Reports of prepectoral implant based reconstructions have increased at a rapid pace over the last years (14,15). The publications are mostly studies reporting that the prepectoral technique is feasible and safe to perform, but tells us little to none about patient related outcomes on short- or long-term (16). Currently there is a clear trend and shift toward prepectoral implant placement to reduce the degree of BAD, although little is known about the other outcome measures, such as capsular contracture, bottoming out, implant visibility, rippling and most importantly patient related outcome measures as reported by for instance Breast-Q (5,17).

Prepectoral and subpectoral implant based immediate breast reconstruction needs to be compared in prospective trials recording the morbidity and patient related outcomes associated to these procedures. In this visualized surgery paper, we visualize the technical disparities between the sub- and prepectoral direct to implant breast reconstructive techniques, which we are currently comparing in a prospective randomized trial.

Acknowledgments

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

References

1. Albornoz CR, Bach PB, Mehrara BJ, et al. A paradigm shift in U.S. Breast reconstruction: increasing implant rates. Plast Reconstr Surg 2013;131:15-23.
2. Salzberg CA. Nonexpansive immediate breast reconstruction using human acellular tissue matrix graft (AlloDerm). Ann Plast Surg 2006;57:1-5.
3. Heidemann LN, Gunnarsson GL, Bille C, et al. Reconstructive breast surgery using implant and mesh. Ugeskr Laeger 2017;179.
4. Jacobs JM, Salzberg CA. Implant-based breast reconstruction with meshes and matrices: biological vs synthetic. Br J Hosp Med (Lond) 2015;76:211-6.
5. Egeberg A, Sørensen JA. The Impact of Breast Implant Location on the Risk of Capsular Contraction. Ann Plast Surg 2016;77:255-9.
6. Kümmel S, Kümmel A, Hagemann F, et al. Jumping Breast Phenomenon Following Subcutaneous Mastectomy: First Description and Grading of a Well-Known Breast Deformity. Breast Care (Basel) 2018;13:354-8.
7. Dyrberg DL, Bille C, Gunnarsson GL, et al. Subpectoral implant placement for immediate breast reconstruction, video 1. Asvide 2019;6:288. Available online: http://www.asvide.com/watch/32973
8. Dyrberg DL, Bille C, Gunnarsson GL, et al. Prepectoral implant placement for immediate breast reconstruction, video 2. Asvide 2019;6:289. Available online: http://www.asvide.com/watch/32974
9. Gunnarsson GL, Heidemann LN, Bille C, et al. Nipple sparing mastectomy and the evolving direct to implant breast reconstruction. Gland Surg 2018;7:267-72.
10. Gunnarsson GL, Bille C, Reitsma LC, et al. Prophylactic Nipple-Sparing Mastectomy and Direct-to-Implant Reconstruction of the Large and Ptotic Breast: Is Preshaping of the Challenging Breast a Key to Success? Plast Reconstr Surg 2017;140:449-54.
11. Gunnarsson GL, Børsen-Koch M, Wamberg P, et al. How to perform a NAC sparing mastectomy using an ADM and an implant. Gland Surg 2014;3:252-7.
12. Gunnarsson GL, Børsen-Koch M, Arffmann S, et al. Successful breast reconstruction using acellular dermal matrix can be recommended in healthy non-smoking patients. Dan Med J 2013;60:A4751.
13. Gunnarsson GL, Thomsen JB. Prepectoral Hammock and Direct-to-implant Breast Reconstruction in 10 Minutes: A Focus on Technique. Plast Reconstr Surg Glob Open 2018;6:e1931.
14. Hammond DC, Schmitt WP, O'Connor EA. Treatment of breast animation deformity in implant-based reconstruction with pocket change to the subcutaneous position. Plast Reconstr Surg 2015;135:1540-4.
15. Kobraei EM, Cauley R, Gadd M, et al. Avoiding Breast Animation Deformity with Pectoralis-Sparing Subcutaneous Direct-to-Implant Breast Reconstruction. Plast Reconstr Surg Glob Open 2016;4:e708.
16. Dyrberg DL, Bille C, Gunnarsson GL, et al. Breast animation deformity. Arch Plast Surg 2019;46:7-15.
17. Cohen WA, Mundy LR, Ballard TN, et al. The BREAST-Q in surgical research: A review of the literature 2009-2015. J Plast Reconstr Aesthet Surg 2016;69:149-62.

Cite this article as: Dyrberg DL, Bille C, Gunnarsson GL, Sørensen JA, Thomsen JB. Visualized pre- and subpectoral implant placement for immediate breast reconstruction. Gland Surg 2019;8(Suppl 4):S251-S254. doi: 10.21037/gs.2019.05.09