

Direct-to-implant Breast Reconstruction with Autoderm

Eoin M. McFadden, MD*
 Beatriz Lopez-Obregon, MD†
 Jill P. Stone, MD, FRCSC‡
 Carmen E. Webb, MA†
 Claire F. Temple-Oberle, MD,
 MSc, FRCSC†

Background: Traditional transverse mastectomies yield suboptimal results in women with higher body mass index, wide breast footprint, and ptotic breasts. An option for this patient population is a reduction-pattern style mastectomy, and recruiting an inferiorly based dermal flap using the lower mastectomy flap. This is analogous to a vascularized dermal matrix supporting the lower pole of the implant, termed “Autoderm” breast reconstruction. This allows for aesthetically appealing skin reduction mastectomies with the added safety of a vascularized dermal flap to facilitate an immediate direct-to-implant breast reconstruction. This study assesses patient satisfaction using the validated BRECON-31 questionnaire to enhance shared-decision making with women contemplating breast reconstruction.

Methods: A 2-year retrospective review of women who underwent Autoderm direct-to-implant breast reconstruction comparing patients who underwent unilateral and bilateral reconstruction in terms of characteristics, complications, and BRECON-31 scoring.

Results: Overall patient scores were high (81.6 of 100). In particular, women scored very high on self-image (85.0), arm concerns (86.4), intimacy (87.4), satisfaction (88.3), and expectations subscales (85.5). Women choosing bilateral reconstruction outperformed unilateral reconstruction in every subgroup, but only attained statistical significance in the “self-consciousness” subgroup. Compared with a historical cohort of a mix of implant reconstruction types, Autoderm patients showed improved satisfaction (88.3 versus 82.5; $P = 0.07$) and breast appearance (73.9 versus 66.8; $P = 0.06$), approaching significance. Safety was demonstrated by low major complications (4.7%) and low implant loss rates (2.3%).

Conclusions: Autoderm breast reconstruction is a safe option in women with large, ptotic breasts, with patients reporting high satisfaction using a validated instrument. (*Plast Reconstr Surg Glob Open* 2018;6:e2027; doi: 10.1097/GOX.0000000000002027; Published online 17 December 2018.)

INTRODUCTION

Obtaining a satisfactory immediate implant-based breast reconstruction in a woman with large, ptotic breasts is challenging due to lengthy skin envelopes and the predisposition to large lateral and medial chest wall standing cones. Traditional transverse mastectomy incisions and

2-stage expander implant reconstructions are less than ideal in terms of both aesthetics and comfort.

A modified direct-to-implant procedure¹⁻⁴ wherein the loose skin envelope is aesthetically shaped through an anchor style breast reduction pattern, results in a more desirable mastopexy. This also medializes the redundant tissue that forms at the lateral chest wall, avoiding the standing cone deformity seen in transverse mastectomy incisions. Given the risk of T-junction necrosis with anchor incisions, a buried, inferiorly based, de-epithelialized, vascular dermal flap is used to protect the underlying implant, and is secured to the released inferior edge of the pectoralis muscle, analogous to a direct-to-implant with acellular dermal matrix reconstruction. For this reason, the use of the patients' own tissue as an acellular dermal matrix has been termed “Autoderm”, not to be confused with “autologous” as this is an implant-based procedure.

From the *Department of Surgery, University of Saskatchewan, Saskatoon, Saskatchewan; †Departments of Surgery and Oncology, University of Calgary, Calgary Alberta; and ‡Department of Plastic and Reconstructive Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Received for publication September 5, 2018; accepted September 21, 2018.

Copyright © 2018 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.
 DOI: 10.1097/GOX.0000000000002027

Disclosure: The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the University of Calgary Libraries and Cultural Resources.

The objective of this study was to assess patient satisfaction using the validated BRECON-31 questionnaire⁵⁻⁷ to enhance shared-decision making with women who are contemplating breast reconstruction.⁸

METHODS

Patient Selection

Suitable patients for this procedure have ptotic breasts (grade 2 or 3) breasts. A distance of 10 cm or more from nipple to the inframammary fold (IMF) provides sufficient Autoderm. Patients must also desire a smaller, reduced breast postmastectomy reconstruction, and accept nipple-areolar complex excision. Smoking, elevated body mass index (BMI), and tumor location have not been a contraindication for this procedure. Of particular note, we do not have a strict BMI cut off and, in fact, this technique is quite effective in our higher BMI patients. We do counsel these women about increased wound complications related to elevated BMI to fully inform the patient of potential risks.

Marking

Each patient is marked preoperatively in the standing position. In this study, the only planned skin resection to go along with the mastectomy specimen is the nipple and areola. Once the IMF is marked, and the areola encircled, a line is drawn from the lateral most and medial most point of the IMF line toward the areola, transversely. It can be moved up or down depending on the relative needs for upper breast skin for skin closure, versus the size of Autoderm required for the dermal sling (Fig. 1A). In our sample, bringing the transverse incision to the inferior aspect of the areola works well in the majority of patients. In addition, using a skin closure pinch test is helpful.

Surgical Technique

The de-epithelialization of the inferior mastectomy flap can be done before or after the mastectomy (Fig 1B, C). If a dermatome is used, a setting of 16 or 18/1000 of an inch is generally deep enough to remove epidermis and upper dermis. This is most easily done before the mastectomy so that the breast can be everted to facilitate contact with the dermatome. In this series, we have not used tumescence, but it could be considered. Alternative methods of de-epithelialization are also acceptable, such as knife or scissors, but care needs to be taken to avoid perforating the dermis. This is especially important at the T-junction, to avoid implant exposure in case of necrosis of the overlying mastectomy flap.

Skin-sparing mastectomy flaps are developed by the surgical oncologist in the anatomic mastectomy plane. Assessment of skin flap viability is done with clinical examination, trimming back redundant skin, and inspecting for dermal bleeding. Following the mastectomy, the de-epithelialized skin is reinspected and, if any areas appear to only be superficially de-epithelialized, they are deepened with scissors. The intention of the deepening here is to avoid epidermal inclusion cyst formation. Often the

IMF is violated in the mastectomy, and it is then sutured to the chest wall with 3 interrupted 3-0 Vicryl sutures. These sutures are placed right to the deep dermis of the IMF on the underside of the Autoderm flap and tied tightly down to the chest wall, creating small dents along the IMF. These dents will disappear within a few weeks. This IMF definition is critical to prevent the implant from drifting downward with subsequent elevation of the transverse IMF incision onto the breast mound itself.

Next, the pectoralis major is released from its inferior attachment, progressing medially to the lowermost insertion on the sternum. The flap is raised to create a pocket of suitable size, exposing and protecting the thoracoacromial vessels and the pectoral nerves. A sizer is then placed under the pectoralis major and the Autoderm flap is brought up and tacked temporarily together. The skin flaps are checked that they can accommodate the reconstruction. Optimally, there is a hand-in-glove fit of the implant with the muscle-Autoderm construct, and the skin is draped without tension. The permanent implant, predominantly a shaped textured high profile implant, is then placed (Fig. 1D), and the dermal flap is sutured to the inferior border of the pectoralis major muscle with interrupted 3-0 Vicryl. The lateral mammary fold is defined by another row of sutures between the Autoderm flap and the serratus anterior muscle.

The final anchor scar pattern is developed by draping and trimming the redundant mastectomy skin (Fig. 1F). This maneuver removes the distal-most, least-perfused portions of the skin-sparing mastectomy, which lowers the rates of both mastectomy flap necrosis and wound-healing complications after immediate breast reconstruction.

BRECON-31

The BRECON-31 is a patient-reported outcome measure used to assess a woman's quality of life and satisfaction postmastectomy breast reconstruction. It has been validated and found reliable to examine satisfaction with breast reconstruction.⁵⁻⁷ It allows physicians to provide patients with objective data about the various breast reconstruction techniques. This inherently gives the patient the ability to make an informed decision and to be aware of the challenges they may face postoperatively. As standard practice, we ask patients to complete the questionnaire at their final clinic visit, once they have completed any revisions or nipple and areola reconstruction if desired. In this study group, the BRECON was completed at a median of 628 days post-immediate breast reconstruction and included 20 women who had had some form of nipple and/or areola reconstruction and 15 who did not. Subscales were scored as per published scoring system.⁶

Study Population

Charts of women who had consecutively undergone Autoderm direct-to-implant breast reconstruction over a 2-year period were reviewed. Recorded details included unilateral or bilateral reconstruction, patient characteristics (BMI, age, ptosis, nipple to IMF, sternal notch to nipple, mastectomy, and implant weight), and treatment (unilateral or bilateral mastectomy, direct-to-implant, or postoperatively adjustable implant).

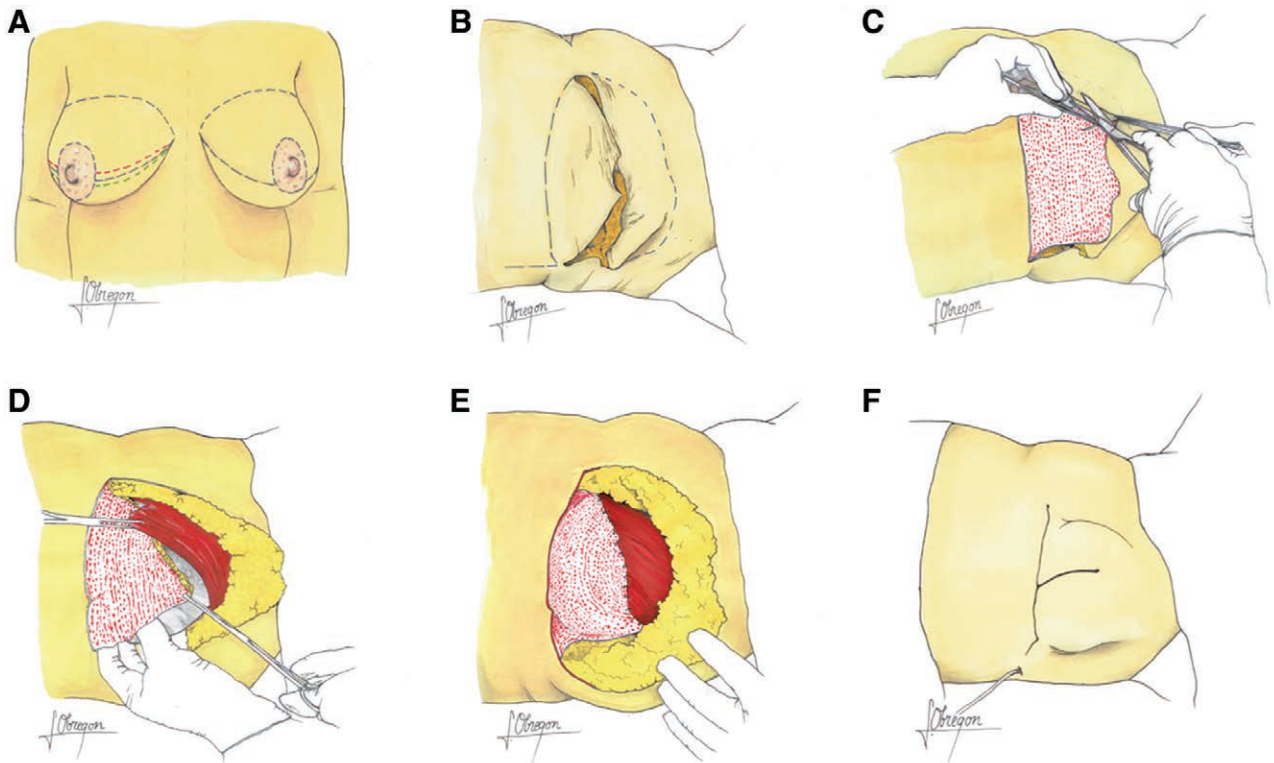


Fig. 1. DTI and Autoderm surgical technique. A, Preoperative markings. The transverse incision can be moved cranially or caudally depending on the Autoderm flap length required. B, Skin flaps after mastectomy. C, De-epithelialization of the lower mastectomy flap. D, Implant placement under the pectoralis major muscle and Autoderm flap. E, After inset of the Autoderm flap. F, Final surgical outcome after trimming the superior mastectomy flap with an inverted anchor scar pattern.

Major complications were defined as a perioperative complication requiring a return to the operating room irrespective of requirement for implant removal, such as hematoma and periprosthetic infection. Minor complications, such as seroma, cellulitis, epidermal cyst formation, and minor mastectomy flap necrosis, were defined by the ability to be treated conservatively with watchful waiting, antibiotics, or minor surgery.

The patients were dichotomized into unilateral and bilateral reconstructions, to determine whether satisfaction is affected by contralateral prophylactic mastectomy. Differences between the groups were elucidated using a *t* test for continuous variables and chi-squared for categorical variables. BRECON-31 questionnaire data were extracted from the chart review and subscales from the BRECON-31 were compared for unilateral versus bilateral reconstructions. Finally, the patient-reported outcome measure data from the Autoderm patients within this study were compared with raw data from a previously published implant reconstruction series also assessed by BRECON-31.⁹ Online software (available at <http://socscistatistics.com> and <http://www.quantitativeskills.com>) was used for statistical analysis, with statistical significance set at a *P* value of 0.05.

RESULTS

Fifty-one women undergoing 86 breast reconstructions with Autoderm were identified in a single surgeon's practice, over a 2-year time frame. The patient demo-

graphics reveal an obese patient population with notable ptosis and large breast volumes. Average BMI was 28.2 kg/m², average distance from sternal notch to nipple was 27.3 cm, and nipple to IMF distance was 10.5 cm. The average mastectomy specimen weight was 756 g and implant weight was 532 cc. Two of 16 the unilateral patients and none of the bilateral patients had previous radiation therapy.

Sixteen women underwent unilateral reconstruction and 35 bilateral. Demographics and measurements were similar between the 2 groups (Table 1). Forty-seven of the breast reconstructions were designed as a postoperative adjustable implant, all occurring in the first part of the series. The remaining 39 breasts underwent single stage direct-to-implant, predominantly using shaped textured high-profile implants, to mitigate the port-related complications. (See Figures 2 and 3 for typical results.)

Questionnaires were completed by 13 women who underwent unilateral reconstruction and 22 who underwent bilateral reconstruction. The bilateral patients consistently scored higher than the unilateral subgroup, but this did not reach statistical significance. To help assure representativeness of the patient population, we compared characteristics of the patients who completed the questionnaires "responders" with those who did not, "nonresponders" (Table 2). Age, BMI, mastectomy weight, implant weight, distance from nipple to IMF, distance from sternal notch to nipple and the grade of ptosis, minor and major com-

Table 1. Autoderm Patient Demographics: Comparing Patients Who Underwent Unilateral and Bilateral Reconstruction

Patient Characteristics	Unilateral (n = 16)	Bilateral (n = 35)	P
Age (y)	53.6	50.0	0.22
BMI (kg/m ²)	28.3	28.2	0.99
Mastectomy weight (g)	710.8	765.1	0.63
Implant weight (cc)	546.6	528.0	0.60
Nipple to IMF (cm)	10.2	10.6	0.63
Sternal notch to nipple (cm)	26.7	27.4	0.47
Ptois (median)	2	2	
Direct to full-size implant (%)	44	46	0.89
Smoker (%)	14	6	0.36
Diabetes (%)	6	3	0.58
Preoperative radiation (%)	13	0	
Postoperative radiation (%)	6	3	0.56

Table 2. Patient and Treatment Characteristics in Patients Who Had Completed BRECON Versus Not Yet Complete

Patient Characteristics	Questionnaire Responders (n = 35)	Questionnaire Nonresponders (n = 16)	P
Age	52.7	46.7	0.09
BMI	28.8	27.0	0.26
Mastectomy weight (g)	808.2	665.5	0.07
Implant weight (cc)	541.0	513.6	0.36
Nipple to IMF (cm)	10.9	9.9	0.06
Sternal notch to nipple (cm)	27.8	26.4	0.06
Ptois (median)	2	2	
Complications			
Major	1 (1/57)	3 (3/29)	0.07
Minor	22 (22/57)	13 (13/29)	0.31

plications were similar among the responders and nonresponders.

Major complications included hematoma formation (2) and periprosthetic infection requiring explantation (2), representing an overall implant loss rate in 2 of 86 breasts (2.3%), similar to rates in the existing literature.¹⁰ Minor complications occurred in 35 of 86 (40%) breasts, which included flap necrosis (14 breasts, 16.3%), fat necrosis (3 breasts, 3.5%), cellulitis (7 breasts, 8.1%), seroma (5 breasts, 5.8%), port infection (2 breasts, 2.3%), and hematoma (1 breast, 1.2%). A complication unique to Autoderm breast reconstruction is the formation of epidermal cysts within the buried de-epithelialized dermal flap, which was observed in 3 of 86 breasts (3.5%). These cysts were treated by re-raising the mastectomy flaps and excising the skin cysts from the autoderm flap. Mastectomy skin flap necrosis occurred most frequently (14 breasts, 16%); however, all cases responded to localized wound care and antibiotics without necessitating returning to the operating room or ending with implant loss. Minor complications were evenly distributed across the subgroups who had and had not completed the BRECON. Unpredicted need for adjuvant radiation therapy occurred in 1 of 16 unilateral and 1 of 35 bilateral patients in this series.

Table 3 compares BRECON-31 scores between unilateral and bilateral mastectomy and reconstruction patients. The bilateral population scored higher in every category;

Table 3. BRECON-31 Subgroup Mean Score for the Unilateral and Bilateral Patient Groups Compared Using t Test Probability

Subscales	Total	Unilateral	Bilateral	P
Self image	85.0 (14.4)	83.2 (13.6)	86.1 (15.1)	0.56
Arm concerns	86.4 (17.0)	83.3 (20.2)	88.1 (15.3)	0.49
Intimacy	87.4 (11.7)	87.1 (10.3)	87.6 (12.7)	0.9
Satisfaction	88.3 (13.3)	87.5 (11.3)	88.7 (14.6)	0.8
Recovery	66.9 (16.4)	64.3 (17.3)	68.5 (16.1)	0.49
Self-consciousness	75.4 (18.8)	64.2 (19.8)	81.8 (15.3)	0.02*
Expectations	85.5 (12.9)	83.2 (11.8)	86.9 (13.7)	0.41
Breast appearance	73.9 (15.6)	68.6 (14.9)	77.1 (15.5)	0.12
Nipple	70.4 (17.6)	68.8 (18.1)	71.3 (17.6)	0.79
Summary score	81.6 (9.4)	79.5 (6.6)	82.6 (10.6)	0.37

*Statistical significance was set at a P value of 0.05.

Table 4. Comparison of Historic Cohort of Patients' BRECON-31 Scores Versus Current Study Cohort

Subscales	Alloplastic	Current	P
Self-image	81.5 (15.2)	85.0 (14.4)	0.27
Arm concerns	88.4 (16.9)	86.4 (17.0)	0.59
Intimacy	86.5 (12.6)	87.4 (11.7)	0.75
Satisfaction	82.3 (17.9)	88.3 (13.3)	0.07
Recovery	67.9 (17.5)	66.9 (16.4)	0.78
Self-consciousness	71.3 (20.5)	75.4 (18.8)	0.34
Expectations	83.1 (15.3)	85.5 (12.9)	0.43
Breast appearance	66.8 (20.1)	73.9 (15.6)	0.06
Nipple	71 (13.7)	70.4 (17.6)	0.91

however, this only reached statistical significance in the “self-consciousness” category.

The BRECON-31 scores of the current study's women was compared with a previously published group of women who had undergone implant-based reconstruction for which we had original data;⁹ the majority of this previously published group had undergone traditional 2-stage expander implant reconstruction with transverse mastectomy patterns. Autoderm patients in this study reported higher satisfaction and breast appearance, approaching significance.

DISCUSSION

Skin-sparing mastectomies traditionally use a transverse elliptical skin pattern, which leave large standing cones in women with elevated BMI and large breasts. To pexy the redundant skin, anchor style breast reduction skin incisions are used, but may struggle with ischemia and tension at the T-junction. A nonvascularized dermal sling and implant will not fare well with wound breakdown at the T-junction. Thus, plastic surgeons have been hindered in their ability to deliver an aesthetic breast reconstruction using implants in patients with large, ptotic breasts.

Autoderm breast reconstruction is a technique that has been described as a safe and effective alternative to traditional transverse mastectomy scars in women with an increased BMI and nipple to IMF distance.¹⁻³ Autologous de-epithelialized dermis is used to provide secondary inferior pole protection by creating a fully vascularized pocket of pectoral muscle and sling underneath Wise pattern reduction mastectomy flaps.²

Our experience supports that the Autoderm reconstruction is safe, with only 4.7% of women requiring re-

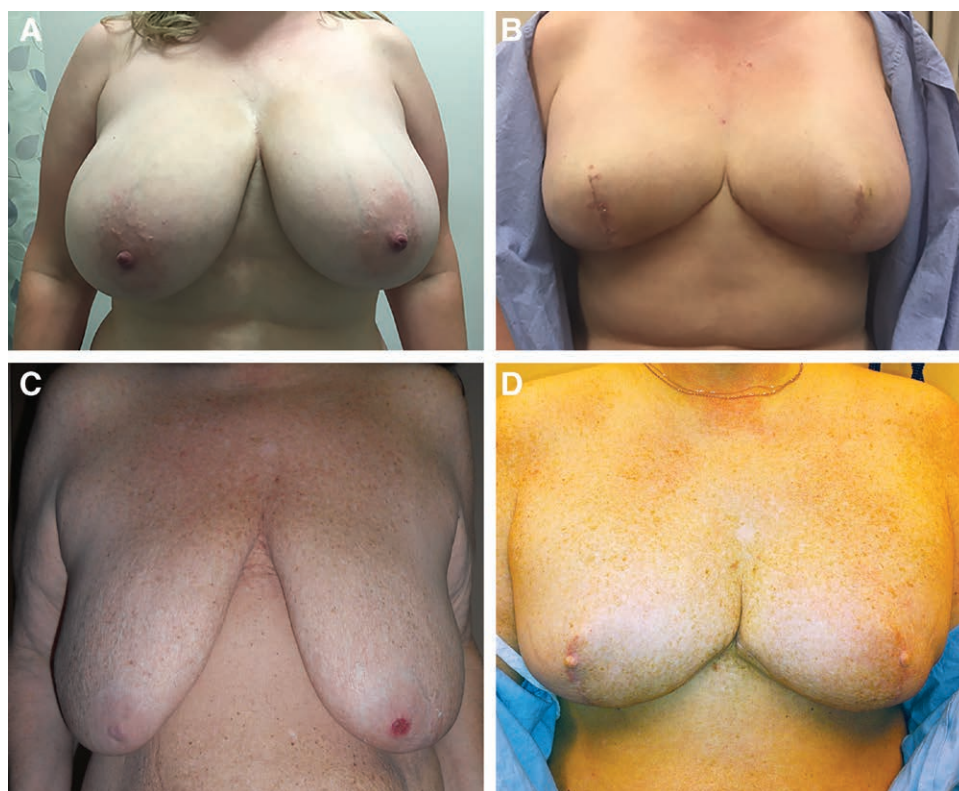


Fig. 2. Bilateral direct-to-implant and Autoderm pre (A and C) and post (B and D) is displayed.

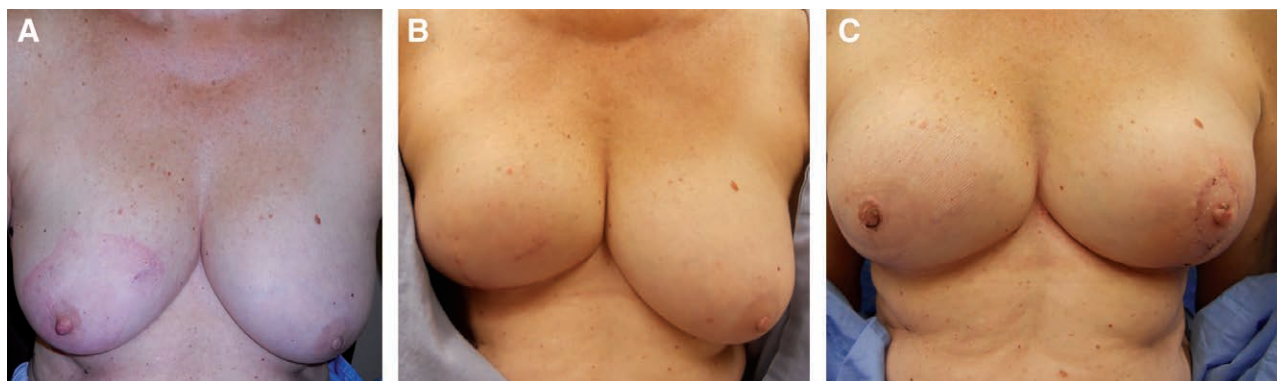


Fig. 3. Unilateral direct-to-implant and Autoderm reconstruction pre (A) and post (B). C, Left balancing procedure.

operation, and 2.3% losing their reconstruction, which compares favorably to the study by Wilkins et al.,¹⁰ which had an implant loss of 5.9% in direct-to-implant and tissue expander cases. In addition, in a population who traditionally may have been denied immediate reconstruction due to concern for complications associated with BMI elevation, and in women who traditionally were counseled away from implant reconstructions for concern of poor cosmesis, we have achieved a highly aesthetic breast appearance with higher rankings across several subscales compared with a cross-section of women with implant-based reconstructions without Autoderm (See Figures 2 and 3 for typical results). A relatively small sample size and single surgeon's practice limits generalizability.

The issue of patient-reported outcomes is particularly germane in the discussion of contralateral prophylactic mastectomy (CPM). CPM is on the rise in women diagnosed with unilateral breast cancer^{11,12} despite not carrying an improved survival for women compared with lumpectomy with radiation or unilateral mastectomy,¹³ in the absence of genetic mutation.¹⁴⁻¹⁶ What is clear, however, is that the majority of these women survive breast cancer, making survivorship and satisfaction with breast reconstruction all the more important. Because of this trend toward CPM, we sought to examine the satisfaction differences between women with unilateral and bilateral reconstructions, to see if greater satisfaction was achieved with the better symmetry and surmised peace of mind af-

forded by bilateral reconstruction.¹⁷ Higher complication rates naturally occur with bilateral surgery, and there are conflicted reports of improved and decreased satisfaction in body image in women choosing more extensive surgery.^{18,19} Our findings suggest that in the subgroup of women with ptosis and high BMI, bilateral procedures carried high satisfaction. The bilateral cohort scored higher on every subgroup, but this only attained statistical significance in the “self-consciousness” subscale, which describes comfort being seen nude changing before family or strangers.

Overall, Autoderm breast reconstruction is a safe option in patients with large, ptotic breasts and elevated BMI. Despite the invasive nature of the procedure, and its frequent demand as a bilateral procedure, for the most part complications are minor and respond to conservative treatment. A unique complication of epidermal inclusion cysts should be addressed by deeper de-epithelization of the inferior mastectomy flap, however with care not to go full thickness through the flap.

CONCLUSIONS

Single-stage Autoderm direct-to-implant breast reconstruction in patients with ptosis and obesity is safe and carries high patient-reported outcomes.

Claire Temple-Oberle, MD, MSc, FRCSC
 Departments of Surgery and Oncology
 University of Calgary
 1331-29 St NW
 Calgary, AB
 T2N4N2
 E-mail: Claire.temple-oberle@ahs.ca

REFERENCES

- Ross GL. One stage breast reconstruction following prophylactic mastectomy for ptotic breasts: the inferior dermal flap and implant. *J Plast Reconstr Aesthet Surg*. 2012;65:1204–1208.
- Ladizinsky DA, Sandholm PH, Jewett ST, et al. Breast reconstruction with the Bostwick autoderm technique. *Plast Reconstr Surg*. 2013;132:261–270.
- Hammond DC, Capraro PA, Ozolins EB, et al. Use of a skin-sparing reduction pattern to create a combination skin-muscle flap pocket in immediate breast reconstruction. *Plast Reconstr Surg*. 2002;110:206–211.
- Plant MA, Scilley CG, Speechley M. Single-stage immediate breast reconstruction using a skin-sparing incision and definitive saline implants compared with a two-stage reconstruction using tissue expansion plus implants. *Can J Plast Surg*. 2009;17:117–123.
- Temple CL, Cook EF, Ross DC, et al. Development of a breast reconstruction satisfaction questionnaire (BRECON): dimen-

- sionality and clinical importance of breast symptoms, donor site issues, patient expectations, and relationships. *J Surg Oncol*. 2010;101:209–216.
- Temple-Oberle CF, Cook EF, Bettger-Hahn M, et al. Development of a breast reconstruction satisfaction questionnaire (BRECON-31): principal components analysis and clinimetric properties. *J Surg Oncol*. 2012;106:799–806.
- Temple-Oberle CF, Ayeni O, Cook EF, et al. The breast reconstruction satisfaction questionnaire (BRECON-31): an affirmative analysis. *J Surg Oncol*. 2013;107:451–455.
- Temple-Oberle C, Ayeni O, Webb C, et al. Shared decision-making: applying a person-centered approach to tailored breast reconstruction information provides high satisfaction across a variety of breast reconstruction options. *J Surg Oncol*. 2014;110:796–800.
- Temple-Oberle C, Ayeni O, Webb C, et al. Shared decision-making: applying a person-centered approach to tailored breast reconstruction information provides high satisfaction across a variety of breast reconstruction options. *J Surg Oncol*. 2014;110:796–800.
- Wilkins EG, Hamill JB, Kim HM, et al. Complications in post-mastectomy breast reconstruction: one-year outcomes of the Mastectomy Reconstruction Outcomes Consortium (MROC) study. *Ann Surg*. 2016;267:164–170.
- Jacob JA. More women with breast cancer opt for bilateral mastectomy despite lack of survival benefit. *JAMA*. 2016;315:2154–2156.
- Steiner CA, Weiss AJ, Barrett ML, et al. “Trends in bilateral and unilateral mastectomies in hospital inpatient and ambulatory settings, 2005–2013.” Agency for Healthcare Research and Quality; 2016. Available at <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb201-Mastectomies-Inpatient-Outpatient.jsp>. Accessed March 23, 2018.
- Kurian AW, Lichtensztajn DY, Keegan TH, et al. Use of and mortality after bilateral mastectomy compared with other surgical treatments for breast cancer in California, 1998–2011. *JAMA*. 2014;312:902–14.
- Jacob JA. More women with breast cancer opt for bilateral mastectomy despite lack of survival benefit. *JAMA*. 2016;315:2154–2156.
- Domchek SM, Friebel TM, Singer CF, et al. Association of risk-reducing surgery in BRCA1 or BRCA2 mutation carriers with cancer risk and mortality. *JAMA*. 2010;304:967–975.
- Fayanju OM, Stoll CR, Fowler S, et al. Contralateral prophylactic mastectomy after unilateral breast cancer: a systematic review and meta-analysis. *Ann Surg*. 2014;260:1,000–1010.
- Temple CL, Tse R, Bettger-Hahn M, et al. Sensibility following innervated free TRAM flap for breast reconstruction. *Plast Reconstr Surg*. 2006;117:2119–2127; discussion 2128.
- Momoh AO, Cohen WA, Kidwell KM, et al. Tradeoffs associated with contralateral prophylactic mastectomy in women choosing breast reconstruction: results of a prospective multicenter cohort. *Ann Surg*. 2017;266:158–164.
- Anderson C, Islam JY, Elizabeth Hodgson M, et al. Long-term satisfaction and body image after contralateral prophylactic mastectomy. *Ann Surg Oncol*. 2017;24:1499–1506.