Use of the Subfascial Plane for Gender-affirming Breast Augmentation: A Case Series

Geetika Mehra, BA*
Tal Kaufman-Goldberg, MD†
Sagit Meshulam-Derazon, MD‡
Elizabeth R. Boskey, PhD, MPH,
LICSW, MSW§
Oren Ganor, MD§

Background: Transgender women seeking gender-affirming breast augmentation often present with differences in preoperative chest measurements and contours in comparison with cisgender women. These include a more robust pectoralis muscle and limited glandular tissue, raising important considerations in determining the optimal anatomical plane for implantation. Abundant literature has described advantages and drawbacks of the available planes for breast augmentation in cisgender women. Certain drawbacks may be more pronounced for transgender women, given their distinct anatomy. The subfascial plane offers lower complication rates than the subglandular plane when using smooth implants, and avoids implant animation and displacement associated with the subpectoral plane. To our knowledge, existing studies have not yet addressed this discussion in the transfeminine population. The goal of this article is to highlight potential benefits of the subfascial plane for gender-affirming breast augmentation, utilizing a case series of 3 transfeminine patients, and to review the literature on surgical techniques and outcomes in this population.

Methods: A retrospective chart review of patients presenting to a single surgeon for gender-affirming breast augmentation in 2019 was performed. A narrative literature review on surgical techniques and outcomes for gender-affirming breast augmentation was conducted.

Results: Three cases of gender-affirming breast augmentation using subfascial implant placement are described. From the literature search, 12 articles inclusive of 802 transfeminine patients were identified.

Conclusions: The subfascial plane represents an option for implant placement in gender-affirming breast augmentation that merits further investigation. There is a need for more research comparing surgical techniques and outcomes in the transfeminine population. *(Plast Reconstr Surg Glob Open 2021;9:e3362; doi: 10.1097/GOX.0000000000003362; Published online 21 January 2021.)*

INTRODUCTION

Gender dysphoria refers to distress experienced by individuals whose gender identity does not correspond with their natal sex.[1] For transfeminine patients, those who were assigned male gender at birth but identify themselves as female, the absence of sufficient breast growth or the presence of a masculine chest contour can be one source of substantial distress. As such, feminizing chest surgery is increasingly being performed as a component of gender-affirming medical care for these patients.[2] Efforts to achieve a feminine breast contour typically begin with a minimum of 12 months of gender-affirming hormone therapy, but many transfeminine patients express interest in surgical intervention to achieve sufficient breast volume and a satisfactorily feminine appearance.[3,4]

In comparison with cisgender women (those assigned female gender at birth with a female gender identity), transgender women presenting for gender-affirming breast augmentation represent a unique population in terms of their demographic, anatomic, and medical characteristics. Typically, these patients present older, with higher BMI, and with higher rates of certain comorbidities, including a history of smoking, depression, and

anxiety.[2,5] Preoperative chest measurements and contours also differ significantly between transgender and cisgender women. Transgender women often present with a more robust pectoralis muscle, shorter nipple-to-inframammary fold distance, and longer sternal notch-to-nipple, breast width, and nipple-to-midline distances.[5–7] The chest anatomy of transfeminine patients is further characterized by the effects of varying durations of exposure to estrogen therapy, different levels of testosterone suppression, and heterogenous responses to these exposures.[4,8] These factors raise important considerations in determining which anatomical plane is optimal for implant placement in breast augmentation for transfeminine patients.

Throughout the past decade, breast augmentation for cisgender women has been the most common cosmetic surgical procedure in plastic surgery.[9] There are several options for the anatomical plane of implant placement in this population, each with its advantages and drawbacks.[10–15] A growing body of evidence suggests that use of the subfascial plane for breast augmentation, a technique first described by Ruth Graf 3 decades after use of the subglandular and subpectoral planes, offers several advantages over these techniques.[10–14,16] Specifically, the subfascial plane has been associated with lower rates of capsular contracture, hematoma, and seroma in comparison with the subglandular plane.[12,17] Use of the subpectoral plane has also been associated with lower complication rates in comparison with the subglandular plane; however, there remains concern regarding implant displacement and animation with pectoral muscle contraction using this technique.[12,18–20] This has the potential to be of even greater concern for transfeminine patients due to their tendency toward a more robust pectoral muscle.[6]

Use of the subfascial plane has been suggested as an approach that offers lower complication rates than the subglandular plane, while avoiding implant animation and displacement associated with the subpectoral plane. To our knowledge, existing studies have not yet addressed the question of breast implantation plane in the distinct context of the transfeminine population. The goal of this article is to emphasize the potential benefits of use of the subfascial plane for gender-affirming breast augmentation utilizing a case series of 3 transfeminine patients, and to review the literature on surgical techniques and outcomes in this population.

METHODS

A retrospective chart review of patients presenting for gender-affirming breast augmentation was performed. All patients were seen by a single surgeon for the purpose of gender-affirming breast augmentation in 2019. Information regarding patient demographics, past medical history, surgical materials and technique, and postoperative outcomes was abstracted from provider notes.

For the purpose of this study, a narrative literature review on surgical techniques and outcomes for gender-affirming breast augmentation was also conducted. The search was performed using keywords "transgender persons," "transsexualism," "mammaplasty," "breast implantation," "breast augmentation," and variations of these terms in PubMed, Embase, LGBT Life, GenderWatch, and Google Scholar. Manual searches were also performed by reviewing the references of identified articles and relevant review articles. Included articles were those that contained primary data on breast augmentation in transfeminine individuals.[3,5,21–30] Three articles appeared to have overlapping patient cohorts, but reported different information (surgical technique versus provider- and patient-reported outcomes); therefore, all were included.[3,21,23] Articles were excluded if they did not pertain to gender affirmation in transfeminine patients, did not study primary breast augmentation in this population, or did not include information on surgical techniques or outcomes. Extracted information from these studies included general study information, characteristics of the study sample, surgical technique, patient- and/or physician-reported outcomes, complication types and rates, and satisfaction rates. The Institutional Review Board of the authors' affiliated hospital determined that this protocol was exempt from review.

A total of 3 cases of gender-affirming breast augmentation are described (Table 1). All 3 patients underwent breast augmentation using subfascial implant placement with Mentor smooth round silicone implants (manufactured by Mentor Worldwide LLC, Irvine, Calif.). Patients were aged 18, 21, and 24 years at the time of surgery. Patients had body mass indices (BMIs) of 35.1, 21.4, and 23.6 and underwent estrogen therapy for a duration of 54, 16, and 30 months, respectively. Preoperative chest measurements, past medical history, and smoking history are further detailed in Table 1.

Before surgery, our team ensured that the criteria outlined in the World Professional Association for Transgender Health's (WPATH) *Standards of Care* were met, including documentation of persistent gender dysphoria and collection of referral letters.[31] As per the *Standards of Care*, patients were required to have undergone at least 12 months of hormone therapy before surgery, and patients were additionally required to avoid all first- and second-hand smoke exposure for 4 weeks before surgery.

Surgical Technique

Several implants were considered based on measurements carried out during the preoperative visit and on the patient's desired breast size. As a general guiding rule, the patient's breast width minus 10 mm should reflect the base of the selected implant. In the preoperative area, measurements were verified, and markings were made before the procedure, with the patient in the upright position. The procedure was conducted with the patient in supine position under general anesthesia. Prepping and draping included nipple–areolar complex coverage with a Tegaderm tape. After subcutaneous injection of 0.25% lidocaine with epinephrine and 0.5% Marcaine with epinephrine (ratio 1:1) to the incision site, a horizontal cut was made 1–1.5 cm below the current inframammary fold (IMF). Dissection was carried straight down where the lower insertions of the pectoralis major muscle were identified. The pectoral fascia was incised and the breast

Table 1. Patients Undergoing Gender-affirming Breast Augmentation Utilizing the Subfascial Plane

Patient ID	Age at Surgery	Height, Weight, BMI	Comorbidities	Smoking History	Gender-affirming Hormone Therapy Duration (mo)	Preoperative Chest Measurements* (cm)	Follow-up Time (mo)	Complications	Implant plane	Implant size (cc)
1	21	172 cm 63.4 kg 21.4	None	None	Estrogen, 16 Spironolactone, 16	SN-N 19.5 N-IMF 5 BBW 12	13	None	Subfascial	215
2	24	184 cm 8 0 kg 23.6	ADHD† Anxiety Depression h/o IVDU‡	Marijuana Juul	Estrogen, 30 Progesterone, NA	SN-N 23 N-IMF 6 BBW 13.5	16	None	Subfascial	275
3	18	171.5 cm 103.2 kg 35.1	ADHD Anxiety h/o self-harm	Nicotine	Estrogen, 54 Leuprolide, 57	SN-N 23 N-IMF 7R, 5.5L BBW 16.5	15	None	Subfascial	510

*SN-N, sternal notch to nipple; N-IMF, nipple to IMF; BBW, breast base width.
†Attention-deficit/hyperactivity disorder.
‡Intravenous drug use.

parenchyma was elevated with the pectoral fascia, directly above the pectoral muscle. A pocket was created in accordance with preoperative markings. Different silicone sizers were then inserted and the patient was elevated to a seated position to evaluate symmetry and proposed result. After final hemostasis and Bacitracin irrigation, the same local anesthetic solution was used to infiltrate the fascia to reduce postoperative pain. Permanent smooth round silicone implants were inserted using a Keller funnel. The incision was closed in layers and dressed, and a surgical bra was placed. Patients were discharged from the hospital the following day, with instructions to place ice packs on the breasts, and to use the surgical bra for 6 weeks.

RESULTS

Outcomes

Follow-up time ranged from 4 to 6 months following breast augmentation. No complications such as hematoma, seroma, infection, or other complaints were noted. Table 1 provides a more detailed overview of these cases. Preoperative and postoperative photographs for patient cases 2 and 3 are shown in Figures 1 and 2, respectively. Patient-reported outcomes were not formally assessed, but based on clinical notes, all patients expressed that they were very pleased with the outcome of the procedure.

Literature Review

From the literature search, a total of 12 articles with primary data related to breast augmentation in transfeminine patients were identified.[3,5,21–30] There were 5 retrospective cohort studies, 2 cross-sectional surveys utilizing retrospective cohorts, 1 prospective cohort study, and 4 case studies. Of the retrospective studies, 3 appear to pertain to the same cohort of patients. No studies documented the use of the subfascial plane. A total of 990 patients participated in these studies, of whom 802 were transgender women. Five cohort studies, inclusive of 716 transfeminine patients, reported complications, with rates ranging from 0% to 33%. All four case studies documented the complication of breast-implant-associated anaplastic large cell lymphoma (BIA-ALCL). Five studies, inclusive of 622 transfeminine patients, reported patient satisfaction, with rates ranging from 67% to 82%. A list of these studies is provided in Table 2.

DISCUSSION

In this study, we offer a review of our preliminary but potentially promising experience using the subfascial plane for implant placement in transfeminine patients undergoing gender-affirming breast augmentation. Prior studies of gender-affirming breast augmentation have not explicitly documented the use of the subfascial plane, and there remains a need for an expanded description of how the distinctive anatomical features of the transfeminine chest affect the use of various planes for implant insertion.

The anatomy of the chest differs in a variety of ways between transgender and cisgender women. The chest of a cisgender woman typically features a narrower sternum, shorter distance between the nipple–areolar complexes, wider areolas, more glandular tissue, longer nipple-to-inframammary fold distance, and less robust pectoral muscle and fascia.[6,7] More specifically, one study comparing cisgender and transgender women presenting for breast augmentation found longer sternal notch-to-nipple, breast width, and nipple-to-midline distances in the transgender cohort.[5] These differences are vital to consider when seeking to achieve aesthetically natural breast augmentation for transfeminine patients.

Historically, smooth implants have been available for a longer period of time and are more commonly used than textured implants in the United States.[32,33] More recently, textured implants have also been associated with the rare, but documented complication of BIA-ALCL.[34,35] Smooth implants were the implant of choice for the senior author.

A variety of factors motivated the senior author to consider the subfascial plane of implant placement for gender-affirming breast augmentation. For a number of reasons, the subglandular plane was not considered ideal for gender-affirming breast augmentation. Subglandular placement of smooth implants is potentially associated with a higher rate of capsular contracture in comparison with textured implants.[36–38] Smooth, round implants in the subglandular plane may also produce a less natural breast shape in comparison with textured anatomic implants, particularly for transfeminine patients who have limited
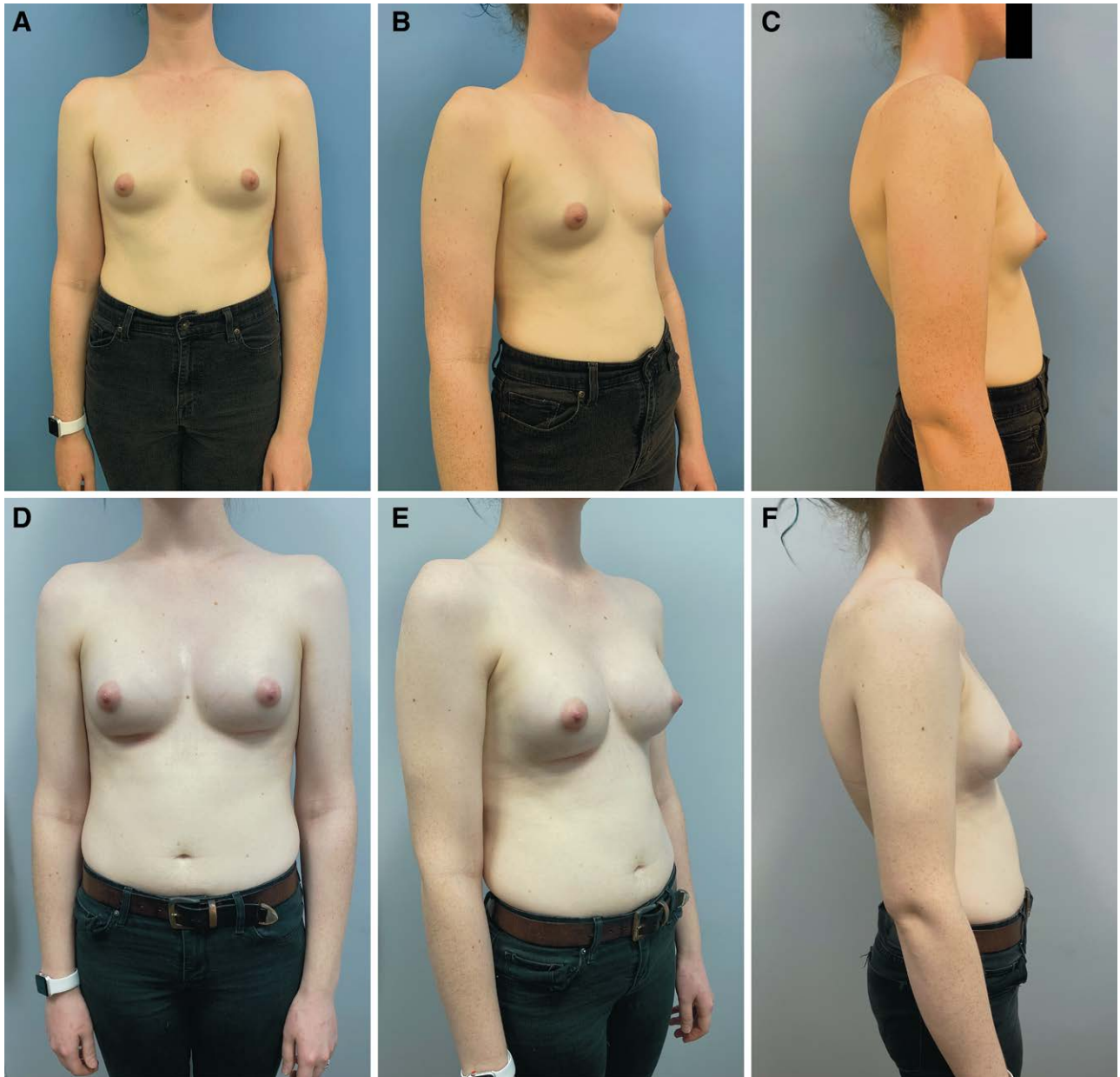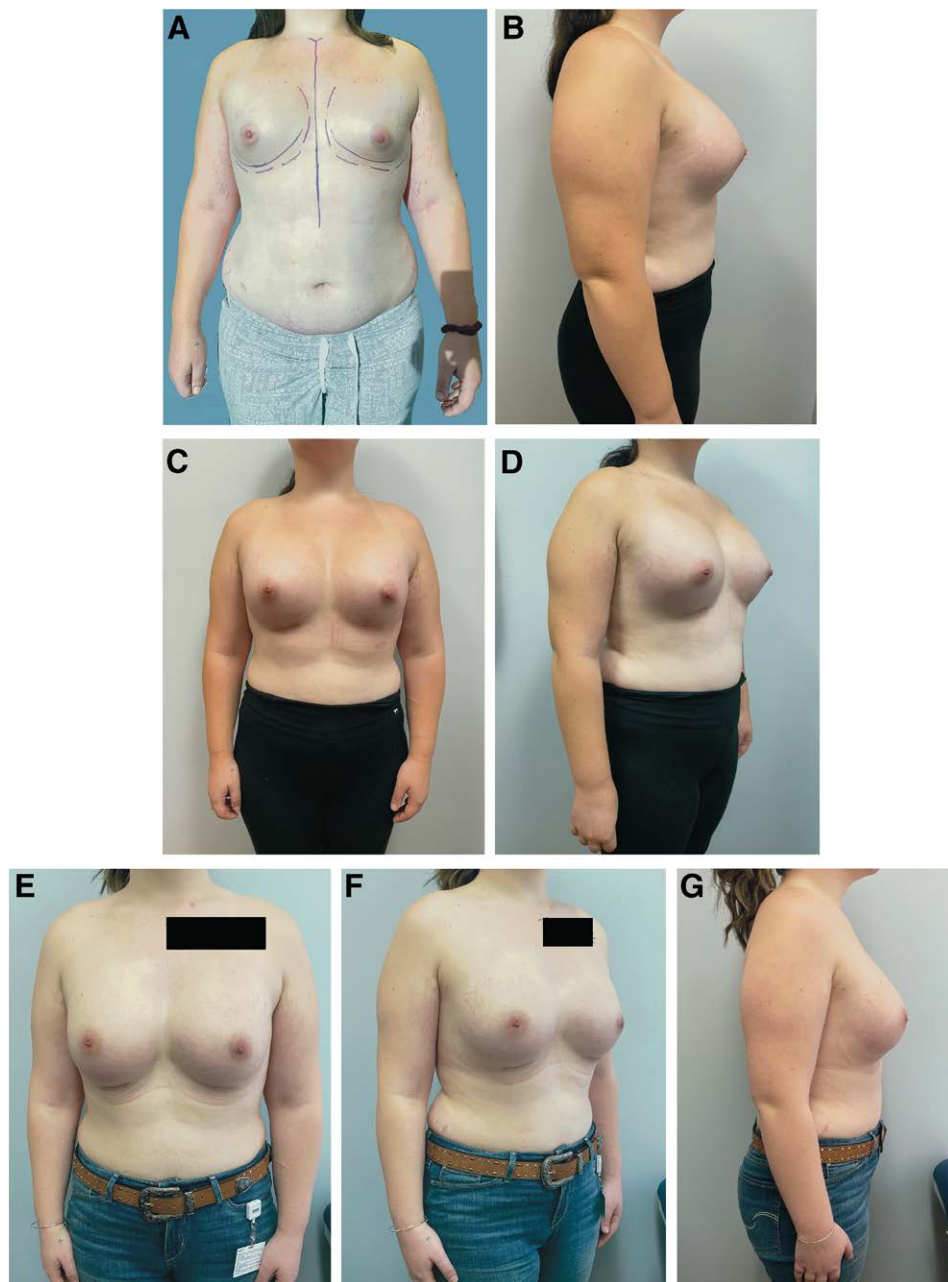
Fig. 1. Patient photographs of a 24-year-old transgender woman, 30 months on Estrogen. BMI 23.6. Preoperative (A–C) and 1-month postoperative (D–F) photographs of a 24-year-old patient (Case 2) who underwent subfascial breast augmentation.

breast tissue.[39,40] There is additionally an increased risk for visible rippling with subglandular implant placement in individuals who have had insufficient breast growth while on feminizing hormone therapy.[41]

The subpectoral plane also presented several drawbacks for transfeminine patients, although it had been previously used in this patient population by the senior author. The more developed pectoralis major muscle seen in transfeminine patients raises concern for implant distortion or displacement using subpectoral implant placement.[12,18–20] Aesthetically, the bulk of the pectoralis major may also blunt breast borders or result in wider-appearing breasts.[7] Additionally, the broader breast width of the transfeminine chest typically necessitates the use of wide implants. Such

wider implants would be accompanied by lower projection in the less pliable subpectoral pocket, contributing to difficulty achieving a favorable aesthetic outcome.

A previously described alternative to subglandular and subpectoral implant placement is dual plane placement. Dual plane implant placement is defined as a combination of subglandular and partial subpectoral pocket locations to optimize the benefits of each pocket location, while limiting the tradeoffs and risks of a single pocket location.[15] One study quantified dynamic breast deformity following dual plane breast augmentation and reported that no patients in the sample complained of or required reoperation for animation deformity.[42] In our experience, dual plane implant placement in transfeminine patients presents

Fig. 2. Patient photographs of an 18-year-old transgender woman, 54 months of Estrogen, BMI 35.1. Preoperative (A), 1-month postoperative (B–D), and 4-month postoperative (E–G) photographs of an 18-year-old patient (Case 3) who underwent subfascial breast augmentation.

disadvantages similar to subpectoral implant placement, due to the robustness of the pectoralis major muscle and the limited breast tissue present. In previous cases using the dual plane technique, we found that the implant was at risk of being flattened by the muscle, and may even give rise to two eminences, similar to the "double bubble" deformity.

In our analysis, subfascial placement seemed to be the best option for transfeminine patients, given the potential disadvantages associated with subglandular, subpectoral, and dual plane implant placement. This approach took advantage of the added coverage of the fascial layer, without the additional bulk of the pectoralis muscle. The subfascial pocket is pliable, allowing for the choice of implants with greater projection for any given width. The pliability of the pocket also enables proper implant placement with low risk of implant edge visibility, particularly in the upper pole. As previously mentioned, in comparison with the subglandular plane, the subfascial plane presents lower risk of capsular contracture, hematoma, and seroma. In comparison with the subpectoral plane, the subfascial plane presents lower risk of implant dislocation, animation, and bulkiness.[12,17–20] Notably, the technique of hybrid breast augmentation combines the use of implants and fat grafting, which helps generate more substantial

Table 2. Narrative Review of Literature on Surgical Techniques and Outcomes for Gender-affirming Breast Augmentation

Author, Year, Country	Study Design (N)	Average Estrogen Exposure (range) (mo)	Incision Sites*	Average Implant Size (range) (cc), Type, and Plane†	Complication Rate	Subsequent Surgery Rate	Patient-reported Satisfaction Rate
de Blok C, 2020, the Netherlands	Retrospective cohort with cross-sectional survey (308)	12	—	—	102 (33%)	—	247 of 308 (80%)
Nauta AC, 2019, USA	Retrospective cohort (188 cis‡, 82 trans§)	54 (12–360)	—	—	—	—	—
Fakin RM, 2019, Switzerland and Spain	Retrospective Cohort (138)	>12	IMF (82.4%) PA (11.0%) AX (6.6%)	324 Silicone textured Round (67%) Anatomic (33%) SP (51%) SG (49%)	2 of 138 (1.4%)	25 of 138 (18.1%), including 13 for larger implants	93 of 138 (67%) Very satisfied 20 of 138 (14%) satisfied
Miller TJ, 2019, USA	Retrospective Cohort (34)	37 (0–216)	IMF	520 (350–700) Smooth round (24%) Textured anatomic (76%) SP	6 of 34 (17.6%)	2 of 34 (5.9%)	83% (of 35% response rate)
Weigert R, 2013, France	Prospective cohort (35)	59 (15–200)	IMF	327 (190–425) Silicone-based Micro-textured Anatomic SP (77%) SG (23%)	0 of 35	—	67%
Kanhai RC, 2000, the Netherlands	Retrospective cohort with cross-sectional survey (107)	100 (36–312)	—	258 (130–450)	—	—	80 of 107 (75%)
Kanhai RC, 2001, the Netherlands	Retrospective Cohort (201)	35 (2–330)	IMF (92.5%) AX (7.5%)	255 (120–450) SP (23%) SG (77%)	—	11 of 201 (5.5%)	—
Kanhai RC, 1999, the Netherlands	Retrospective cohort (201)	—	—	(165–450) Silicone gel-filled (83%) SG preferred	22 of 201 (11%), including 11 capsular contractures	21 of 201 (10%)	—
Ali N, 2019, USA	Case study (1)	—	—	—	BIA-ALCL‖	1 of 1	—
Patzelt M, 2017, Czech Republic	Case study (1)	—	PA	360 Silicone gel-filled Textured Anatomic SP	BIA-ALCL	1 of 1	—
De Boer M, 2017, the Netherlands	Case study (1)	—	—	460 Silicone gel-filled Textured	BIA-ALCL	1 of 1	—
Orofino N, 2016, Italy	Case study (1)	—	—	Textured implants placed 1 year following primary breast augmentation	BIA-ALCL	1 of 1	—

*IMF, inframammary; PA, periareolar; AX, axillary.
†SP, subpectoral; SG, subglandular.
‡Cisgender.
§Transgender.
‖Breast-implant-associated anaplastic large cell lymphoma.

glandular tissue coverage.[43] For transgender women with less glandular tissue, this technique may offer an important area for further study.

Our study population was younger than those described by previous studies of breast augmentation in transfeminine patients. The prevalence of mental health diagnoses in our study population was consistent, with evidence demonstrating the increased risk for depression, anxiety, and other mental health comorbidities that transgender individuals face in comparison with cisgender peers.[5,44,45] Complications associated with breast augmentation, such as hematoma, seroma, capsular contracture,

and infection, were not observed in our patients, who were followed for a minimum of 4 months. Based on our review of the literature on breast augmentation in transfeminine patients, complication rates and frequency of reoperation span a wide range. However, a larger, population-based study suggests that 30-day complication rates for transfeminine patients following breast augmentation are comparable to those for cisgender patients.[2]

Our review of the literature discussing surgical technique and outcomes for gender-affirming breast augmentation reveals a need for further study in this field. One-third of identified studies were single-patient cases studies. Apart from these, several studies were published in the last 2 years following an almost 20-year gap in the literature examining breast augmentation technique in the transfeminine population. Prior studies involved implant placement only in the subglandular and subpectoral planes. None of the studies discussed use of the subfascial plane for implant placement. The inframammary incision site was most commonly used across studies. Variation in the type of implant was also observed, as both anatomic and round implants were used. Notably, textured implants were more commonly used than smooth implants across these study populations. For example, Miller et al. use textured anatomic implants in the subpectoral pocket for three-quarters of their patients, explaining preference for this technique "due to the lack of overlying glandular tissue and to provide naturally shaped feminine breasts without the appearance of overly full superior pole."[22] In this sense, the option of using textured anatomic implants is important to consider, for achieving natural-appearing breast augmentation for transfeminine patients. Given the potential for an improved aesthetic outcome and the low overall incidence of BIA-ALCL, providing patients with the option of textured implants, along with information regarding risks and benefits, may be appropriate. Reported complication rates ranged from 0% to 33%. This range may be explained in part by the absence of a standardized definition for this outcome. All 4 case studies discussed the long-term, rare complication of BIA-ALCL.

There are several limitations of this case series. First, the sample size is small, and the same lead surgeon was responsible for all cases. Second, the duration of follow-up is very short, although there is evidence to suggest that a majority of complications would arise within the first 6 months following breast augmentation.[46] However, a longer duration of follow-up would be preferable to capture and account for longer-term outcomes, including capsular contracture. Finally, our review of the literature focused purposefully and specifically on prior studies that included information regarding surgical planning, technique, or outcomes. As a result, studies documenting relevant pre-surgical considerations such as hormone therapy are not included here.

CONCLUSIONS

The subfascial plane represents an option for implant placement in gender-affirming breast augmentation for transfeminine patients that merits further investigation.

In considering the unique anatomical characteristics of this population, the subfascial plane offers the potential to minimize complications, while optimizing aesthetic outcome. As gender-affirming breast augmentation becomes more common, there is an increasingly pressing need for further research regarding surgical technique and its effects on both patient- and provider-reported outcomes.

Oren Ganor, MD
300 Longwood Avenue
Boston, MA 02115
E-mail: oren.ganor@childrens.harvard.edu

REFERENCES

1. National LGBT Health Education Center. LGBTQIA+ glossary of terms for health care teams. Available at https://www.lgbthealtheducation.org/publication/lgbtqia-glossary-of-terms-for-health-care-teams/. Published 2020. Accessed February 3, 2020.
2. Cuccolo NG, Kang CO, Boskey ER, et al. Epidemiologic Characteristics and postoperative complications following augmentation mammaplasty: comparison of transgender and cisgender females. *Plast Reconstr Surg Glob Open.* 2019;7:e2461.
3. Kanhai RC, Hage JJ, Asscheman H, et al. Augmentation mammaplasty in male-to-female transsexuals. *Plast Reconstr Surg.* 1999;104:542–549.
4. Orentreich N, Durr NP. Mammogenesis in transsexuals. *J Invest Dermatol.* 1974;63:142–146.
5. Nauta AC, Baltrusch KM, Heston AL, et al. Differences in chest measurements between the cis-female and trans-female chest exposed to estrogen and its implications for breast augmentation. *Plast Reconstr Surg Glob Open.* 2019;7:e2167.
6. Claes KEY, D'Arpa S, Monstrey SJ. Chest surgery for transgender and gender nonconforming individuals. *Clin Plast Surg.* 2018;45:369–380.
7. Morrison SD, Wilson SC, Mosser SW. Breast and body contouring for transgender and gender nonconforming individuals. *Clin Plast Surg.* 2018;45:333–342.
8. Seal LJ, Franklin S, Richards C, et al. Predictive markers for mammoplasty and a comparison of side effect profiles in trans-women taking various hormonal regimens. *J Clin Endocrinol Metab.* 2019;97:4422–4428.
9. American Society of Plastic Surgeons. 2018 plastic surgery statistics report. Available at https://www.plasticsurgery.org/documents/News/Statistics/2018/plastic-surgery-statistics-full-report-2018.pdf. Published 2018. Accessed July 1, 2020.
10. Graf RMMD, Bernardes AMD, Rippel RMD, et al. Subfascial breast implant: a new procedure. *Plast Reconstr Surg.* 2003;111:904–908.
11. Hunstad JP, Webb LS. Subfascial breast augmentation: a comprehensive experience. *Aesthetic Plast Surg.* 2010;34:365–373.
12. Shen Z, Chen X, Sun J, et al. A comparative assessment of three planes of implant placement in breast augmentation: a Bayesian analysis. *J Plast Reconstr Aesthet Surg.* 2019;72:1986–1995.
13. Siclovan HR, Jomah JA. Advantages and outcomes in subfascial breast augmentation: a two-year review of experience. *Aesthetic Plast Surg.* 2008;32:426–431.
14. Góes JC, Landecker A. Optimizing outcomes in breast augmentation: seven years of experience with the subfascial plane. *Aesthetic Plast Surg.* 2003;27:178–184.
15. Tebbetts JB. Dual plane breast augmentation: optimizing implant-soft-tissue relationships in a wide range of breast types. *Plast Reconstr Surg.* 2001;107:1255–1272.
16. D'Onofrio C. Subfascial breast augmentation with crossed fascial sling, under tumescent anaesthesia with or without sedation and lower periareolar access. *Aesth Plast Surg.* 2020;44:1508–1513.

17. Namnoum JD, Largent J, Kaplan HM, et al. Primary breast augmentation clinical trial outcomes stratified by surgical incision, anatomical placement and implant device type. *J Plast Reconstr Aesthet Surg*. 2013;66:1165–1172.

18. Pereira LH, Sterodimas A. Transaxillary breast augmentation: a prospective comparison of subglandular, subfascial, and submuscular implant insertion. *Aesthetic Plast Surg*. 2009;33:752–759.

19. Stoff-Khalili MA, Scholze R, Morgan WR, et al. Subfascial periareolar augmentation mammaplasty. *Plast Reconstr Surg*. 2004;114:1280–1288; discussion 1289.

20. Spear SL, Schwartz J, Dayan JH, et al. Outcome assessment of breast distortion following submuscular breast augmentation. *Aesthetic Plast Surg*. 2009;33:44–48.

21. Kanhai RC, Hage JJ, Karim RB. Augmentation mammaplasty in male-to-female trans-sexuals: facts and figures from Amsterdam. *Scand J Plast Reconstr Surg Hand Surg*. 2001;35:203–206.

22. Miller TJ, Wilson SC, Massie JP, et al. Breast augmentation in male-to-female transgender patients: technical considerations and outcomes. *JPRAS Open*. 2019;21:63–74.

23. Kanhai RC, Hage JJ, Mulder JW. Long-term outcome of augmentation mammaplasty in male-to-female transsexuals: a questionnaire survey of 107 patients. *Br J Plast Surg*. 2000;53:209–211.

24. Fakin RM, Zimmermann S, Kaye K, et al. Long-term outcomes in breast augmentation in trans-women: a 20-year experience. *Aesthet Surg J*. 2019;39:381–390.

25. Weigert R, Frison E, Sessiecq Q, et al. Patient satisfaction with breasts and psychosocial, sexual, and physical well-being after breast augmentation in male-to-female transsexuals. *Plast Reconstr Surg*. 2013;132:1421–1429.

26. de Blok CJM, Staphorsius AS, Wiepjes CM, et al. Frequency, determinants, and satisfaction of breast augmentation in trans women receiving hormone treatment. *J Sex Med*. 2020;17:342–348.

27. Ali N, Sindhu K, Bakst RL. A rare case of a transgender female with breast implant-associated anaplastic large cell lymphoma treated with radiotherapy and a review of the literature. *J Investig Med High Impact Case Rep*. 2019;7:2324709619842192.

28. de Boer M, van der Sluis WB, de Boer JP, et al. Breast Implant-Associated Anaplastic Large-Cell Lymphoma in a Transgender Woman. *Aesthet Surg J*. 2017;37:NP83–NP87.

29. Orofino N, Guidotti F, Cattaneo D, et al. Marked eosinophilia as initial presentation of breast implant-associated anaplastic large cell lymphoma. *Leuk Lymphoma*. 2016;57:2712–2715.

30. Patzelt M, Zarubova L, Klener P, et al. Anaplastic large-cell lymphoma associated with breast implants: a case report of a transgender female. *Aesthetic Plast Surg*. 2018;42:451–455.

31. World Professional Association for Transgender Health. Standards of care for the health of transsexual, transgender, and gender-nonconforming people 7th version. *Int J Transgenderism*. 2012;13:165–232.

32. Center for Devices and Radiological Health U.S. Food and Drug Administration. FDA update on the safety of silicone gel-filled breast implants. Available at https://www.fda.gov/media/80685/download. Published 2011. Accessed March 30, 2020.

33. Tandon VJMD, DeLong MRMD, Ballard TNMD, et al. Evolving trends in textured implant use for cosmetic augmentation in the United States. *Plast Reconstr Surg*. 2018;142:1456–1461.

34. Doren EL, Miranda RN, Selber JC, et al. U.S. epidemiology of breast implant-associated anaplastic large cell lymphoma. *Plast Reconstr Surg*. 2017;139:1042–1050.

35. Hartley RL, Stone JP, Temple-Oberle C. Breast cancer in transgender patients: a systematic review. Part 1: male to female. *Eur J Surg Oncol*. 2018;44:1455–1462.

36. Wong CH, Samuel M, Tan BK, et al. Capsular contracture in subglandular breast augmentation with textured versus smooth breast implants: a systematic review. *Plast Reconstr Surg*. 2006;118:1224–1236.

37. Collis N, Coleman D, Foo IT, et al. Ten-year review of a prospective randomized controlled trial of textured versus smooth subglandular silicone gel breast implants. *Plast Reconstr Surg*. 2000;106:786–791.

38. Malata CM, Feldberg L, Coleman DJ, et al. Textured or smooth implants for breast augmentation? Three year follow-up of a prospective randomised controlled trial. *Br J Plast Surg*. 1997;50:99–105.

39. Bletsis PP, Bouwer LR, Ultee KH, et al. Evaluation of anatomical and round breast implant aesthetics and preferences in Dutch young lay and plastic surgeon cohort. *J Plast Reconstr Aesthet Surg*. 2018;71:1116–1122.

40. Al-Ajam Y, Marsh DJ, Mohan AT, et al. Assessing the augmented breast: a blinded study comparing round and anatomical form-stable implants. *Aesthet Surg J*. 2015;35:273–278.

41. Strasser EJ. Results of subglandular versus subpectoral augmentation over time: one surgeon's observations. *Aesthet Surg J*. 2006;26:45–50.

42. Cheffe MR, Valentini JD, Collares MVM, et al. Quantifying dynamic deformity after dual plane breast augmentation. *Aesthetic Plast Surg*. 2018;42:716–724.

43. Stillaert FBJL, Lannau B, Van Landuyt K, et al. The prepectoral, hybrid breast reconstruction: the synergy of lipofilling and breast implants. *Plast Reconstr Surg Glob Open*. 2020;8:e2966.

44. Becerra-Culqui TA, Liu Y, Nash R, et al. Mental health of transgender and gender nonconforming youth compared with their peers. *Pediatrics*. 2018;141:e20173845.

45. Reisner SL, Vetters R, Leclerc M, et al. Mental health of transgender youth in care at an adolescent urban community health center: a matched retrospective cohort study. *J Adolesc Health*. 2015;56:274–279.

46. Henriksen TF, Hölmich LR, Fryzek JP, et al. Incidence and severity of short-term complications after breast augmentation: results from a nationwide breast implant registry. *Ann Plast Surg*. 2003;51:531–539.