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Gender-Affirming Surgery

Chest Wall Contouring in Transgender Men: A 20-Year Experience from a National Center

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Background: Several western countries have experienced a drastic increase of referrals to specialist gender services of transgender and gender-diverse people. Chest wall contouring is an important element in treatment of gender dysphoria. National data concerning this group have yet to be investigated. The aim of this study was to examine and evaluate the techniques and surgical outcome of chest wall contouring from the last 20 years from a single center in Norway.

Methods: This study is a retrospective review of all female-to-male patients who underwent chest wall contouring surgery at Oslo University Hospital between 2000 and 2020. Statistical analysis with comparison of techniques and evaluation of development over time was examined.

Results: In total, 333 patients underwent bilateral chest wall contouring, 209 (62.8%) with inframammary incision with free nipple graft (IM), and 124 (37.2%) with periareolar technique (PA). In 20 years, the average age decreased from 31 (19–68) to 24.9 years (17–61). Average body mass index was significantly lower in the PA-group than in the IM-group. Complication rate was 20.7%, with postoperative bleeding being the most frequent (9.6%). Revision surgery was required in 24.9% of the cases; periareolar technique required significantly more procedures.

Conclusions: The number of patients referred and operated on has increased drastically over a 20-year period. When comparing the techniques, the outcome concerning complications and revisions is at an acceptable level. Postoperative bleeding and revision surgery occur more often with the periareolar technique. There remains a knowledge gap concerning quality of life and satisfaction after surgery within this patient group. *(Plast Reconstr Surg Glob Open 2023; 11:e4952; doi: 10.1097/GOX.0000000000004952; Published online 28 April 2023.)*

INTRODUCTION

Norway is one of many western countries that is now experiencing a drastic increase in referrals of transgender persons to specialist gender services.[1,2] Gender incongruence (GI) is a condition characterized by marked and persistent discrepancy between an individual's perceived gender and biological gender. This often leads to a desire to live and express oneself as their perceived gender.[3] The term gender dysphoria is often used to describe the discomfort associated with the person's biological attributes. Interestingly, the majority of the increase in individuals seeking health care for GI is made up of young girls who identify as boys.[2,4] Chest wall contouring surgery is for many an important element in treatment of gender dysphoria for transmen.[5]

In Norway, individuals with GI are initially observed and examined by the gender identity clinic either by the adolescent or the adult team. Each team has highly specialized professionals. Transgender individuals may choose to undergo a variety of treatments. These options include both medical and surgical interventions, which aid in the physical and social gender transition. For individuals transitioning from female to male (transgender men), medical treatment includes hormonal therapy with testosterone at the age of majority in a given country. The age for this in Norway is 16 years. Our clinic recommends around 1 year of hormone treatment and real-life experience before a referral to perform the chest wall

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contouring surgery.[6] Testosterone does not cease breast tissue development, and many transmen use chest binders. Binding of the chest may cause discomfort and may lead to undesired consequences such as musculoskeletal pain, soreness of the ski,n or difficulty breathing.[7]

Chest wall contouring surgery is usually the first surgical procedure in female-to-male affirming surgery, and the main aim of this procedure was to create an aesthetic chest contour with the breasts removed. There are several factors taken into consideration before choosing the appropriate technique, and several algorithms have been developed for choosing the most beneficial technique.[8–12] Breast qualities that are evaluated amongst most algorithms include breast size, degree of ptosis, skin quality, and elasticity.[8,10,13,14] Based upon these qualities, multiple techniques are described.[11,15] The two most common surgical approaches are variants of the periareolar technique (PA) and double incision of the inframammary fold with a free nipple graft, further referred to as the inframammary technique (IM).[5,8,14]

Studies show different outcomes regarding complications and the need for revision surgery with regard to the techniques applied.[5,16] National data concerning this particular patient group have yet to be investigated. Gender-affirming treatment began in Norway in 1979. Within the national health care system, all surgical procedures concerning gender-affirming treatment are performed at Oslo University hospital (OUH). The aim of this study was to examine and evaluate the techniques and surgical outcome of chest wall contouring surgery over a 20-year period from this national center.

MATERIALS AND METHODS

Subjects

All patients who underwent chest wall contouring surgery at OUH from 2000 to 2020 were identified from the national register of GI. The GI diagnosis was initially given by the specialists at the national GI center. All patients used testosterone before surgery apart from three who had a medical contraindication to receive this treatment. One patient was excluded because of the technique being limited to only liposuction. Contraindications for surgery were smoking, ongoing severe psychiatric disease, and body mass index (BMI) more than 30. The age limit is 18 years old. However, each patient has been assessed individually, and there has been exceptions to these contradictions over the course of 20 years.

Clinical Data

Patient Demographics

Patient demographics include age at referral, age at cross-sex hormone substitution, weight, risk factors (smoking status), and medical history.

Surgical Data

Surgical data include age at surgery, operative technique, surgical time, hospitalization days, and subsequent surgical procedures.

Takeaways

Question: How has the development of chest wall contouring surgery been in Norway the last 20 years? Which technique is the most favorable, the periareolar or the inframammary technique?

Findings: The number of patients has increased drastically. Age at the time of surgery has decreased. Both techniques show acceptable complication and revision rates. Postoperative revision procedures and bleeding occurs more often with the periareolar technique.

Meaning: Chest wall contouring is a procedure that has become increasingly popular during the last years. Both techniques are safe; a good preoperative selection of patients is needed to avoid unnecessary complications.

Complications and Revisions

These data include any deviation from a normal postoperative course that required medical assessment, and management was defined as a complication. This includes bleeding, wound rupture, infection, seroma or nipple-areola complex (NAC) necrosis. Revision procedures are defined as subsequent procedures to correct the initial result. The decision to perform a revision was based on the professional assessment of the surgeon.

Surgical Management

Before surgery, the patient meets with a plastic surgeon for a preoperative evaluation to select the most suitable surgical technique. As previously mentioned, the decision is based on breast size, skin quality, degree of ptosis and body shape. The patient's personal preference is also taken into consideration.

In the PA approach, the incision is close to the areola in a semicircular, circular, or in a circular concentric fashion, often including some skin excision (Figs. 1A-B and Fig. 2). This technique is applied for smaller breasts with good skin elasticity and minimal ptosis. It leaves discrete scars, but limits the removal of excess breast skin tissue. However, the exposure to the surgical site is smaller, which may limit intraoperative hemostasis.[5,11] Previous studies have shown a trend toward an increased risk of postoperative complications and the need for revision surgery using this technique compared with the IM technique.[14,17] The IM technique with free grafting of the NAC is mainly applied for more sizeable breasts with larger degree of ptosis and poorer skin-quality (Figs. 1C and 3). The incision is made aligned with the inframammary fold, in a linear fashion to create a less feminine scar. The breast tissue is excised, and the NAC is transplanted as a free graft more laterally on the chest, which appears more masculine.[18] This technique leaves a bigger scar, but serves a more accessible operating field for the surgeon.[19]

Postoperatively, the patients had drains, which were subsequently removed when the production was less than 20 mL during 24 hours. The breast specimens were routinely examined by histopathology.

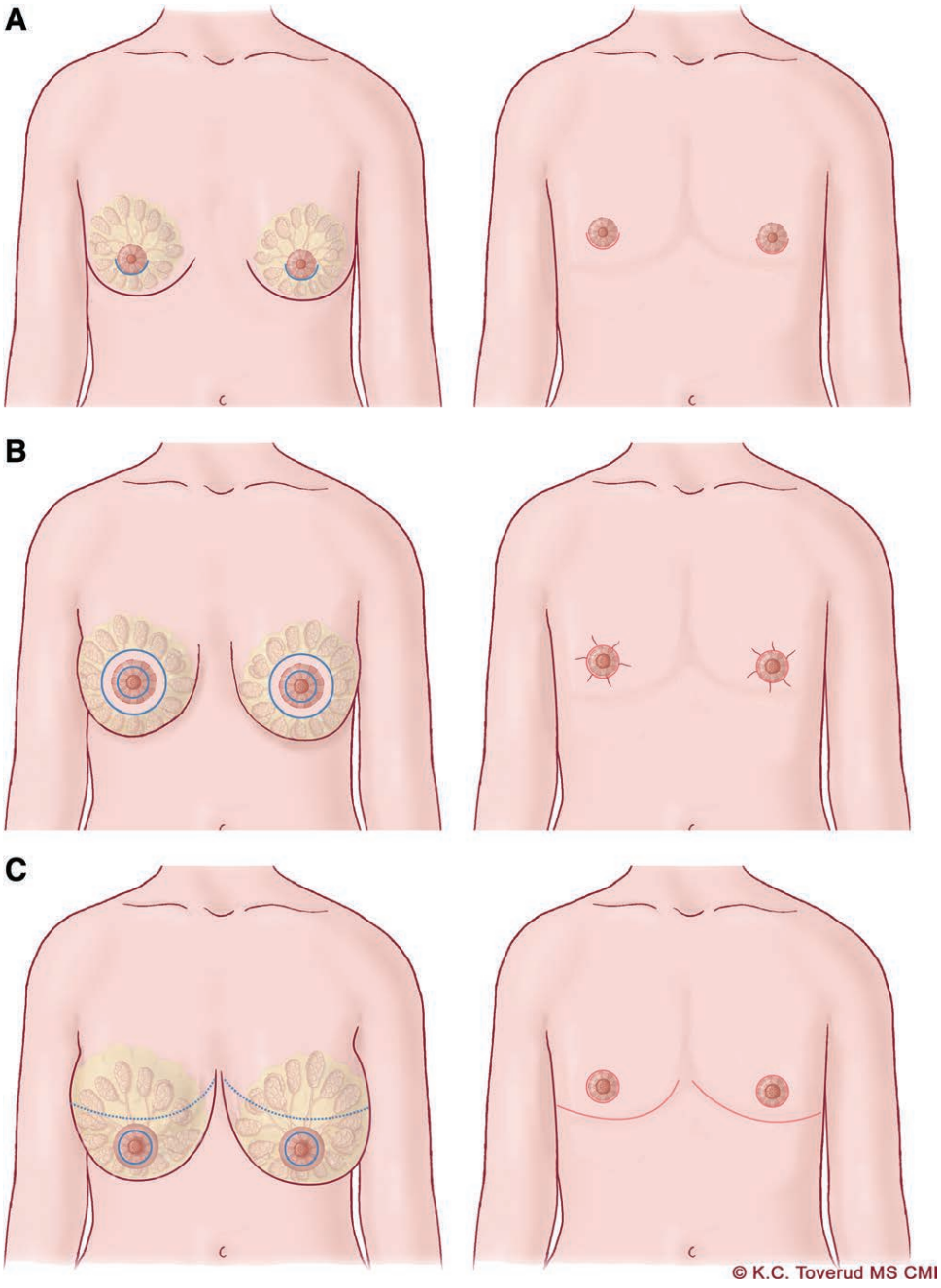

Fig. 1. Illustration of the two techniques. A, B, Variants of the periareolar technique. C, The inframammary technique.

The patients were instructed to use compression garments for at least 6 weeks. In those cases where a free nipple graft was used, the bolster bandage was removed after 5–7 days in the outpatient clinic. All patients were routinely offered a postoperative appointment where the need for revision surgery was assessed. Over the course of 20 years, 14 different surgeons have performed these procedures at our institution, and there have been some variations within the techniques. For the purpose of this study, the techniques are divided into periareolar (PA) and double incision of the inframammary fold with free nipple graft (IM).

Statistical Analyses

The data were collected from the national register of GI and transferred to the Statistical Package for the Social Sciences, version 26 (IBM, Armonk, N.Y.) for statistical analysis. Missing data were not included in the analysis. The data were analyzed in 2021 and are summarized as frequencies with means and standard deviations. When comparing the two techniques, independent *t* test was applied. To show the development over time, patients were divided into 7-year groups. ANOVA test for independent sample sizes was used when the comparing groups. For pair-wise comparison between the 7-year groups, a Bonferroni post

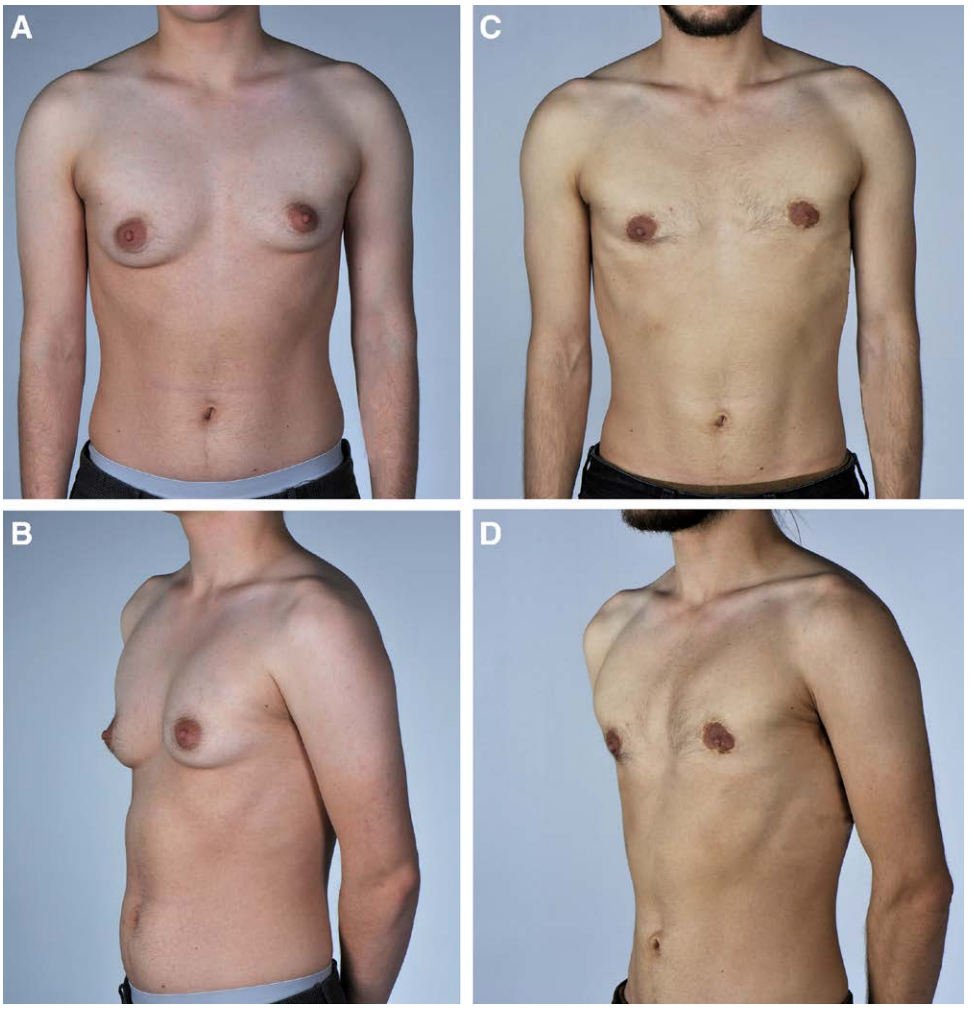

Fig. 2. This figure represents a patient with a minimal amount of ptosis, for whom the periareolar technique is a more appropriate option. A-B, The chest before surgery. C-D, Postoperative results approximately 18 months after surgery.

hoc test was performed. Mann-Whitney test was used when comparing nonnormal distributed data. The logistic regression model with odds ratio was used when examining the effects of thought risk factors. A 5% level of significance was considered statistically significant.

Ethics

The data were extracted from the national register of GI, which is approved by the Norwegian Data Protection Agency. This study was approved by the local data protection officer at OUH. Oral and written consent was obtained for the two patients who were photographed for the pre- and postoperative photos. According to Norwegian legislation, neither approval from the ethics committee nor informed consent from the study populations is required for registry studies where the project aims to compare two established methods.[20]

RESULTS

Patient Characteristics and Development over Time

Between 2000 and 2020, 343 patients underwent bilateral mastectomy at OUH; nine patients were excluded due to short follow-up time, and one was excluded due to the technique being limited liposuction only. In total, the inframammary group (IM) was the largest with 209 patients (62.8%), and the periareolar group (PA) had 124 patients (37.2%). For a summary of the demographic data, see Table 1.

The average age of referral was 21.7 years (range 7–66). For commencing hormonal treatment, the average age was 23.5 years (range 16–67), and for chest wall contouring surgery, 25.8 years (range 17–68). BMI was lower in the PA group than in the IM group, 22.3 versus 26.3 kg/m^2 ($P < 0.001$). Hospitalization length and surgery duration was similar in the two groups, with an average of 1.6 days. After surgery, 37 patients (11.1%) went home the same day. Of those admitted [n = 296 (88.9%)], the average length of stay was 1.8 days (range 1–6).

Development over time is found in Table 2 and Figure 4. The average age at the time of surgery has been reduced from 31 years in the period 2000–2006 to 24.9 years in the period 2014–2020 ($P < 0.001$). Similarly, a parallel decrease for the age of referral and start of hormone treatment was observed from 28.6 to 20.4 and 29.5 to 22.6

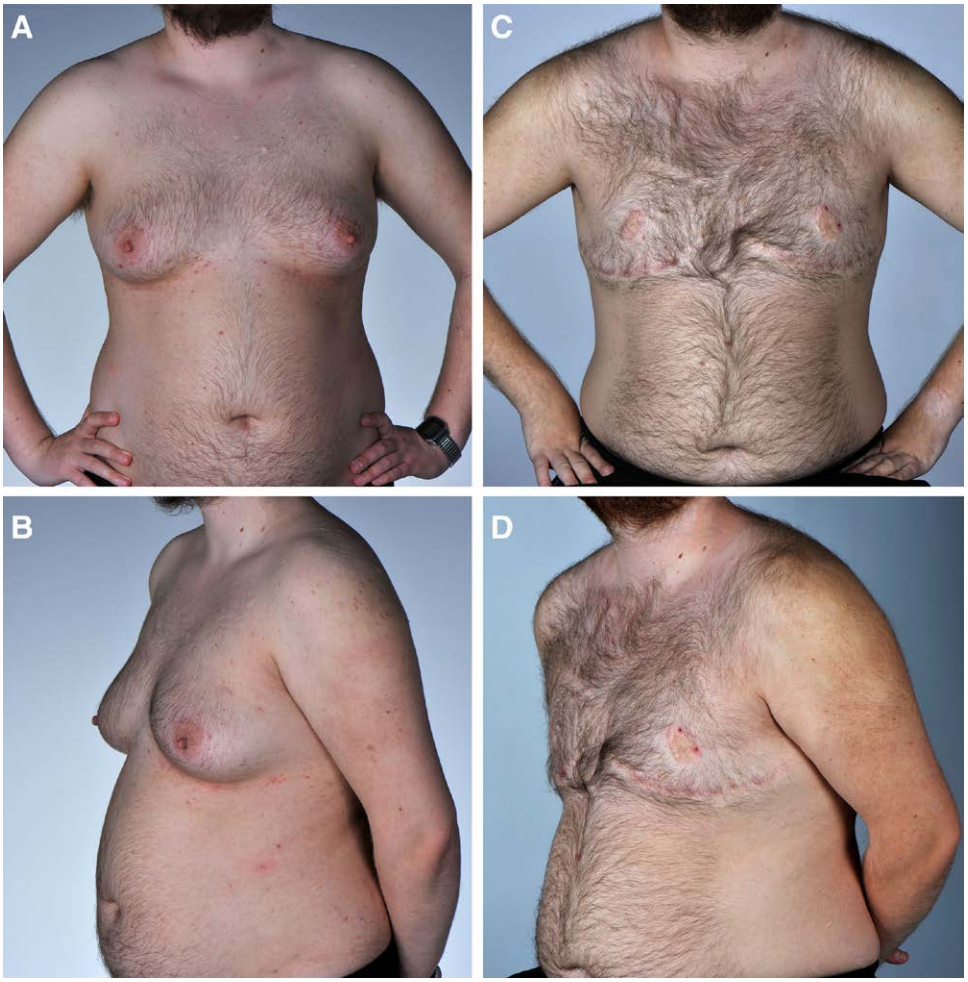

Fig. 3. A typical result from a patient with more ptosis. A-B, The patient's chest before surgery. C-D, Postoperative results.

years. Patients are treated longer with hormones before surgery, with an average of 21.9 months increasing to 27.1 months in the last period. The hospitalization length has decreased significantly for both groups ($P = 0.005$).

Of the 333 patients, 261 had undergone hysterectomy. In total, 124 patients were referred to genital surgery. Of these, 86 have subsequently undergone genital reconstructive surgery; 61 with metoidioplasty, 18 with a groin flap, and seven with an ALT-flap.

Complications and Revision Surgery

One or more complications occurred in 69 (20.7%) of the 333 patients (Table 3). The most common complication was postoperative bleeding, which required acute evacuation (9.6%). Other complications were NAC necrosis (4.2%) and wound infection (3.9%). There was a statistically significant difference between the two techniques when comparing the whole time period ($P = 0.041$). A tendency toward more bleeding with periareolar technique can be interpreted ($P = 0.051$).

When comparing the revision surgery, the periareolar technique required significantly more revision procedures. This included liposuction, correction of the NAC, and removal of excess breast tissue (Table 4). Scar revision was the most frequent postoperative procedure done, required in 19.4% with the PA technique and 14.4% with the IM technique.

Over time, the complication and revision rates have dropped. Postoperative bleeding fell from 11.1% to 4.1% within the IM technique when subdividing into 7-year groups. The PA technique does not show a similar significant decrease (Table 2).

Neither BMI, smoking, age, or the use of tranexamic acid were seen to have an effect on the influence of postoperative bleeding when examined with logistic regression. Age at the time of surgery showed a significant association with both a postoperative complication and the need for a revision surgery. Using the IM technique shows reduced risk of complication and revision rates. Use of tranexamic acid had a significant association with reduced risk of revision surgery, and a positive smoking history had a significant association to increased revision rates (Table 5).

DISCUSSION

This study represents a detailed analysis of 20 years of experience with chest wall contouring surgery from the national GI center in Norway. Our results show an immense

Table 1. Patient Characteristics

Variables	Total (N = 333)	Periareolar Technique (PA) (n = 124)	Inframammary Technique (IM) (n = 209)	*P* (PA versus IM)
Age, year.months				
Referral (N = 333)	21.7 (8.0)	20.2 (5.9)	21.7 (8.5)	0.185
Range	7–66	11–47	7–57	
Testosterone treatment (n = 333)	23.5 (7.5)	22.1 (5.7)	23.8 (8.1)	0.133
Range	16–67	16–49	16–59	
Breast surgery (N = 333)	25.8 (7.6)	24.1 (5.8)	26.0 (8.0)	0.051
Range	17–68	17–51	17–61	
BMI, no. (%)				
n = 328 (PA = 121, IM = 207)	24.8 (4.2)	22.4(0.4)	26.2 (0.3)	**<0.001**
BMI <18.4 (underweight)	17 (5.2)	13 (10.7)	4 (1.9)	
BMI 18.5–24.9 (normal)	174 (53.1)	85 (70.3)	85 (41.1)	
BMI 25–29.9 (overweight)	101 (30.8)	20 (16.5)	77 (37.2)	
BMI 30–34.9 (obese degree 1)	43 (12.8)	3 (2.5)	39 (18.8)	
BMI 35–39.9 (obese degree 2)	2 (0.6)	0 (0)	2 (1.0)	
Smoking history, no. (%)				
History of smoking	34 (9.9)	16 (12.8)	18 (8.3)	0.122
Duration of hormonal treatment (mo)	25.9 (9.5)	25.1 (9.2)	26.4 (9.6)	0.239
Range	0- 71.5	6–60.9	0–71.5	
Duration of surgery (min)	136 (56)	133 (34)	132 (36)	0.907
Range	54–312	54–204	60–312	
Hospitalization length (d)	1.6 (1.3)	1.4 (1.3)	1.6 (1.2)	0.123
Range	(0–6)	(0–5)	(0–6)	
Hysterectomy, no. (%)	261 (78.4)	102 (82.3)	159 (76.1)	0.119
Genital surgery*, no. (%)	132 (38.6)	63 (49.5)	69 (31.8)	**<0.001**

Unless otherwise stated, values are given as mean (SD). A *P* value in bold means significant differences between the groups ($P < 0.05$).
*Genital surgery either referred to or performed.

Table 2. Development over 20 Years

	2000–2006 (N = 33)	2007–2013 (N = 57)	2014–2020 (N = 243)	*P*
Age, year.months				
Referral (N = 333)	28.6 (10.3)^{A}	22.9 (7.0)^{B}	20.4 (7.3)^{B}	**<0.001**
Hormonal treatment (n = 330)	29.5 (10.6)^{A}	23.8 (5.8)^{B}	22.6 (7.1)^{B}	**<0.001**
Breast surgery (N = 333)	31 (10.2)^{A}	26.4 (7.1)^{B}	24.9 (7.0)^{C}	**<0.001**
Duration of hormonal treatment (mo)				
Total (n = 330)	21.9 (11.1)^{A}	23.3 (10.8)^{B}	27.1 (8.7)^{C}	**<0.001**
BMI				
Periareolar technique (n = 124)	23.4 (3.2)	23.3 (3.8)	21.9 (2.9)	0.059
Inframmary technique (n = 209)	27.0 (5.3)	27.7 (4.8)	25.9 (3.9)	0.086
Hospitalization (d)				
Periareolar technique (n = 124)	2.1 (0.9)^{A}	1.7 (1.5)^{AB}	1.2 (1.0)^{B}	**0.005**
Inframmary technique (n = 209)	3.4 (1.9)^{A}	2.4 (1.5)^{B}	1.4 (1.0)^{C}	**<0.001**
Complication (frequency)				
Periareolar technique, no. (%)	6 (35.3)	10 (34.5)	22 (28.2)	0.744
Inframmary technique, no. (%)	6 (37.5)	12 (42.9)	28 (17)	**0.003**
Bleeding (frequency)				
Periareolar technique, no. (%)	2 (11.8)	5 (17.2)	10 (12.8)	0.814
Inframmary technique, no. (%)	1 (6.3)	7 (25.0)	7 (4.2)	**<0.001**
Revision (frequency)				
Periareolar technique, no. (%)	12 (70.6)	13 (44.8)	14 (17.9)	**<0.001**
Inframmary technique, no. (%)	9 (56.3)	12 (42.9)	25 (15.2)	**<0.001**

Unless otherwise stated, values are given as mean (SD). ANOVA with Bonferroni post hoc for means. Pearson chi-square test for frequencies. A,B,C: Different letter means significant post hoc analysis between the groups ($P < 0.05$).
Bold *P* values indicate significant differences between the groups.

increase in both number of referred patients for gender-affirming treatment and chest wall contouring surgery, as seen in other western countries.[1,2,21] Over a 20-year period, the age at referral, start of hormone treatment, and surgery has dropped significantly. Postoperatively the complication and revision rates have decreased, especially for the IM technique. The hospital duration has been reduced in both groups whereas the surgery duration time has stayed stable.

This study comprises data from two decades, with the last decade presenting a variety of new approaches,

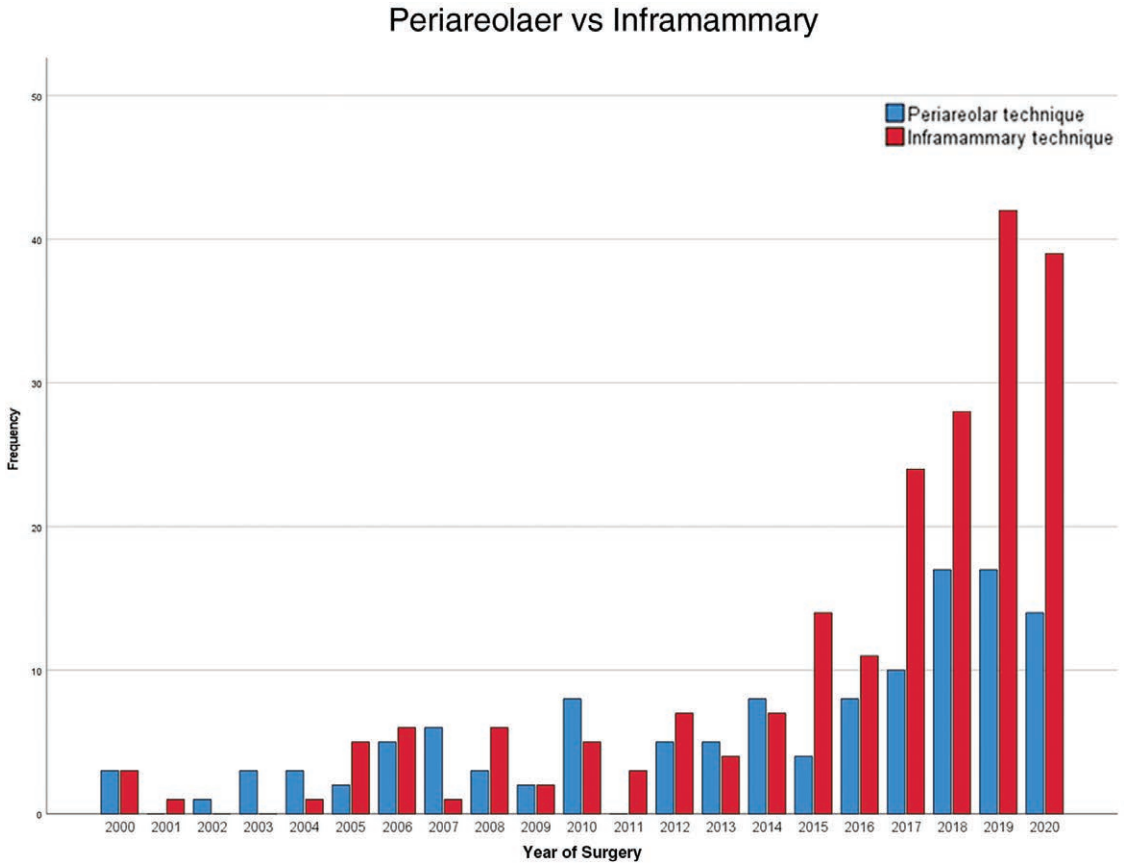

Fig. 4. Frequency of procedures per year, divided by technique.

Table 3. Complications [No. (%)]

	Total (N = 333)	PA Technique (n = 124)	IM Technique (n = 209)	*P*
No. patients with complications	69 (20.7)	33 (26.6)	36 (17.2)	**0.041**
Bleeding that led to surgery	32 (9.6)	17 (13.7)	15 (7.2)	0.051
NAC necrosis	14 (4.2)	7 (5.6)	7 (3.3)	0.313
Infection	13 (3.9)	6 (4.8)	7 (3.3)	0.498
Seroma	7 (2.0)	4 (3.2)	3 (1.4)	0.271
Wound rupture	3 (0.9)	1 (0.8)	2 (1.0)	0.888

A *P* value in bold means significant differences between the groups ($P < 0.05$).

Table 4. Revision Surgery [No. (%)]

Revision Surgery	Total (N = 333)	PA Technique (n = 124)	IM Technique (n = 209)	*P*
Patients with revision surgery	83 (24.9)	39 (31.5)	44 (21.1)	**0.034**
Scar correction (procedure)	54 (16.2)	24 (19.4)	3 (14.4)	0.231
Liposuction	21 (6.3)	13 (10.5)	8 (3.8)	**0.016**
Skin excess removal	21 (6.3)	7 (5.6)	14 (6.7)	0.702
NAC correction	14 (4.2)	9 (7.3)	5 (2.4)	**0.032**
Removal of breast tissue	7 (2.1)	6 (4.8)	1 (0.5)	**0.007**

A *P* value in bold means significant differences between the groups ($P < 0.05$).

techniques, and knowledge. With this comes also improvements as stated by Cregten-Escobar et al.[19] Fewer complications and revisions may be a result of progress in the surgical field. One can also hypothesize that an increase in number of procedures improves the surgeon's technique. In the latter years, the postoperative management with routine use of compression garments and standardized care might also have influenced the decrease in complications.

The age in all the steps of gender-affirming treatment has decreased during this 20-year time period. A similar decrease is also found in a Danish cohort.[22] One could hypothesize that exploring gender identity earlier, standardization of the referral system, and further acknowledgement of treatment has had an impact for this development. Furthermore, the media has also shown more attention toward persons openly expressing their gender identity.

It is well known that chest wall contouring surgery is an important part of the transition from female to male. In Norway, the number of procedures per year has increased almost exponentially. Consequently, both the interval from referral to surgery and the duration of hormonal treatment before surgery have increased. In 2020 there was a slight flattening out, which is thought to be because of the COVID-19 pandemic.[23] Whether the curve continues to rise is not yet known. The reasons for this

Table 5. Risk Factors Related to Surgery, Univariable Logistic Regression Analysis

Risk Factor	Odds Ratio (CI): Bleeding	*P*	Odds Ratio (CI): Complication	*P*	Odds Ratio (CI): Revision Surgery	*P*
BMI	0.949 (0.87–1.04)	0.269	1.006 (0.95–1.07)	0.842	1.032 (0.97–1.10)	0.295
Age at the time of surgery	1.025 (0.98–1.07)	0.250	1.035 (1.00–1.07)	**0.031**	1.035 (1.00–1.07)	**0.027**
Smoking history	1.978 (0.69–5.65)	0.203	1.614 (0.68–3.83)	0.277	3.066 (1.43–6.57)	**0.004**
Use of tranexamic acid	0.524 (0.21–1.32)	0.169	0.890 (0.49–1.61)	0.698	0.161 (0.07–0.36)	**<0.001**
Surgical technique, if IM	0.487 (0.23–1.01)	0.054	0.574 (0.34–0.98)	**0.042**	0.581 (0.35–0.96)	**0.035**
Surgery duration	0.988 (0.98–1.00)	0.052	0.993 (0.98–1.00)	0.075	1.005 (1.00–1.01)	0.204

P < 0.05 (in bold) indicates either a positive (OR>1) or negative (OR<1) association between the risk factor and the outcome.

surge of patients wanting chest wall contouring are multifaceted.[2,24] With this increase in mind, the health care system needs to be prepared for a wave of patients seeking gender-affirming treatment.

We found a complication rate at 20.7% when looking at the whole period combined. Looking at the period from 2014 to 2020, we found a complication rate of 17% for the IM group and 28.2% for the PA group. Rates from similar studies differ from 11.8% to 30% and the most frequent complication is postoperative bleeding. The acute bleeding frequency, although not significant, showed a tendency toward a higher occurrence with the PA technique ($P = 0.051$) as concurrent with the previously published literature.[5,11,17,25–27] Over the course of 20 years, we found a reduction in bleeding frequency, especially for the IM technique. In the last 3 years, a topical administration of one ampoule of 500 mg of tranexamic acid per breast on the wound surface before closure has also been performed, seeing as this has shown reduction in the amount of bleeding in the first 24 hours after surgery in a Norwegian study from Ausen et al.[28] We did not find this to be a significant factor to avoid bleeding in our analysis, but it showed a significant association to reduced revision and complication rates. The retrospective design has a width of possible confounders, and a different research design could investigate the isolated effect of tranexamic acid on the bleeding occurrence in a more robust way.

A revision procedure occurred in 24.9% of the patients, with a significantly higher frequency with the PA technique. Through a logistic regression analysis we found that the age at the time of surgery and a history of smoking can have a significant association with the need for revision. An explanation for this can be that aging and smoking may affect the skin quality and the wound healing process. One cannot exclude other potential confounders concerning the frequency for revisions.

The chest is prone to develop hypertrophic and keloid scarring after surgery; therefore, hypertrophic scarring was considered a physiologic reaction and not a postoperative complication. Some patients were offered outpatient management of these scars with steroid injections. This illustrates the heterogeneity in reporting complications as stated by Tolstrup et al[29] and can make it difficult to compare the surgical outcome from other studies.

Several authors have proposed algorithms for choosing the most suitable surgical technique.[11,12,30] Still there is no universal algorithm. Most commonly, if the breasts are small without ptosis and have good skin quality, the PA technique is the preferred alternative. In this cohort, we found that the IM technique was chosen in more than 70% of the cases during the last 7-year period versus a 50/50 distribution in the two previous 7-year periods. A recently published systematic review by Oles et al found a 60.8% distribution of patients who underwent surgery with the IM technique with free nipple graft.[16] The IM technique gives the opportunity to lateralize the nipple to give a more masculine appearance of the chest. We found that the PA technique has a higher frequency of a secondary removal of breast tissue and liposuction, illustrating the challenges when operating with a limited visual access. The patient's age at the time of surgery, although not significant at 0.051, shows a tendency that this technique is chosen amongst younger patients. This is to be expected seeing as the skin quality can worsen and breast ptosis becomes more prominent with age.

The strengths of this retrospective design is the large cohort and the few cases lost to follow-up. Another strength from having all patients from one center is that techniques and postoperative patient care are standardized. In the Scandinavian countries, the public hospitals offer this surgical treatment. We are aware that the number is inconclusive in terms of a national representative number, seeing as a select group choose to have surgery done privately. These patients were not included in this study. The design has limitations regarding lack of inclusion of the patient's perspective, self-evaluation, or potential regrets about the procedure. In addition, the choice of revising a surgical result was based on the individual surgeon's experience and opinion. Potential complications and revisions dealt with at other institutions could not be evaluated because of the retrospective design. Previous studies report that around 40% of patients with GI had a history of psychiatric diagnosis before surgical treatment.[31,32] Neither pre- nor postoperative evaluation of psychiatric metrics was examined in this study.

There remains a knowledge gap in our Norwegian cohort concerning satisfaction related to the results and quality of life after chest wall contouring surgery.

Conclusions

The number of patients referred and operated on has increased drastically over a 20-year period. When comparing techniques, the outcome concerning complications and revisions is at an acceptable level with reference to the

current literature. Postoperative revision procedures and bleeding occurs more often with the periareolar technique.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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This study used data from a national register of gender incongruence, which is approved by the Norwegian Data Protection Agency. This study is approved by the local data protection officer at Oslo University Hospital. According to Norwegian legislation, neither approval from ethics committee nor informed consent is required for registry studies where the project aims to examine established methods. The study conforms to the Helsinki Declaration. We thank Mr. Are Hugo Pripp for his support with the statistical analyses, and Kari Samuelsen for the photography of the patients.

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