

# Facial Feminization Surgery Changes Perception of Patient Gender

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### Abstract

**Background:** The goal of facial feminization surgery (FFS) is to feminize the sexually dimorphic characteristics of the face and enable transwomen to be correctly gendered as female. Studies have demonstrated high patient satisfaction with FFS. However, the correct gendering of patients after FFS has not been objectively studied.

**Objectives:** The aim of this study was to determine if FFS changed the perceived gender of patients in the public eye.

**Methods:** An online survey platform with control images of cis-gender males and cis-gender females as well as pre-operative and postoperative FFS patients was created. Respondents were asked to identify patients as “male” or “female” and to assign a confidence score ranging from –10 (masculine) to +10 (feminine) (n = 802).

**Results:** Cis-gender male and female controls were gendered correctly 99% and 99.38% of the time and with a confidence metric (CM) of –8.96 and 8.93, respectively. Preoperative FFS patients were gendered as female 57% of the time with a CM of 1.4 despite hormone therapy, makeup, and hairstyle. Postoperative FFS patients were gendered as female 94% of the time with a CM of 7.8. Ninety-five percent of patients showed a significant improvement in CM after FFS.

**Conclusions:** This study illustrates that FFS changes the social perception of a patient’s gender. Patients after FFS are more likely to be identified as female and with greater confidence than before surgery. This is despite preoperative female hormone therapy, and nonsurgical methods that patients use to feminize their appearance.

### Level of Evidence: 4

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Sexual dimorphism, or the difference between males and females, may be significant in some species but in humans there are relatively few body and facial differences.<sup>1,2</sup> To make themselves more attractive to the opposite sex, both men and women try to accentuate their gender-specific facial features through makeup, hairstyles, jewelry, and even with cosmetic procedures. Patients dealing with gender dysphoria often find it necessary to accentuate gender-specific facial features in order to be gendered correctly. At times, these same patients seek consultation from plastic surgeons to surgically modify facial features.

Pioneered by Dr Douglas Ousterhout in the 1980s, facial feminization surgery (FFS) is the term used to describe surgery to modify the sexual characteristics of the face to

make them more feminine.<sup>3</sup> These procedures focus on the areas of the face that exhibit the greatest sexual dimorphism—forehead, orbits, nose, jaw, chin, and thyroid

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**Table 1.** Demographics of Study Patients Showed Similar Age and Race Among the 4 Groups

Group	Average age, years (range)	Race, %						
		White	African American	Hispanic	Asian	American Indian	Pacific Islander	Other
Male controls	35 (24–53)	50	20	20	10	0	0	0
Preoperative FFS	37 (22–56)	60	20	10	5	5	0	0
Postoperative FFS	37 (26–48)	60	20	10	5	5	0	0
Female controls	37 (25–55)	60	20	10	10	0	0	0

cartilage.

When comparing males with females, males have larger, more angular facial features, whereas females have smaller, tapered, softer features. The male forehead is higher with greater brow bossing. Procedures in this region include forehead contouring (frontal sinus wall set-back), brow lift, and scalp advancement.<sup>3-6</sup> Female orbits are larger and rounder than their male counterparts. As such, orbital contouring to reduce the outer third of the supraorbital ridge and decrease the dimensions of the anterior orbital rim are performed.<sup>7</sup> The female nose is smaller, has a more obtuse glabellar angle, and a more projected tip. These nasal feminization changes may be accomplished with standard septorhinoplasty techniques.<sup>4</sup> Males have a wider, lower face with a squarer chin; females have a more tapered, triangular lower face and chin. To change these features, mandibular angle reduction<sup>4,6</sup> inferior mandibular border resection, and osseous genioplasty with narrowing, vertical shortening, and/or advancement may be performed.<sup>6,8,9</sup> Lastly, males have more prominent thyroid cartilage which may be modified with a laryngochoondroplasty.<sup>4</sup> Each of these facial regions has features that can be classified as mild, moderate, or severe; thus, modification procedures may vary.<sup>10</sup>

When objectively studying clinical outcomes, it is important to look at patient satisfaction via standardized surveys. Several studies have demonstrated high patient satisfaction with FFS.<sup>3,4,6-9,11-15</sup> However, the success of FFS procedures is not only judged by patient satisfaction but also by public perception of the result.

It is currently unknown how often preoperative FFS patients postoperative FFS patients are misgendered by the public. To study this, we used an online survey platform, otherwise known as crowdsourcing, to collect large, diverse public opinion on gender identity of FFS patients. Crowdsourcing

is a unique tool that has emerged due to the power of the internet and increasing connectivity. It has been used to study other plastic surgery outcomes, and enables gathering of opinions from a large and diverse sample.<sup>16</sup> In this study, facial images were used to test whether public perception of gender was accurate with cis-gender (control male and females) and transwomen both before and after FFS.

## METHODS

An online survey was created with frontal and lateral photographs of cis-males and cis-females, preoperative FFS patients, and postoperative FFS patients (n = 50). All FFS procedures were performed between January 2015 and December 2018 following approval of a multidisciplinary team and successful completion of psychosocial evaluations. All patients and controls had a similar distribution of age and race (Table 1). FFS patients had completed staged facial feature modification with both hard and soft tissue procedures performed by the senior authors (myself and Dr. D.M.). They were chosen as consecutive completed patients who had completed all stages of their surgical plan. In Table 2 we document, Typical hard tissue procedures included frontal sinus set-back, lateral supraorbital rim reduction, mandibular angle reduction, osseous genioplasty with narrowing and/or vertical height reduction, and laryngochoondroplasty/tracheal shave. Typical soft tissue procedures included browlift/shortening, septorhinoplasty, upper lip shortening, and fat grafting (Table 2).

Anonymous crowdsourcing respondents were recruited via the Amazon Mechanical Turk (Seattle, WA) platform. Survey respondents were naive to the study purpose (ie. gender identification), to do this distractors were used

**Table 2.** Facial Feminization Surgery Procedures Performed on Study Patients

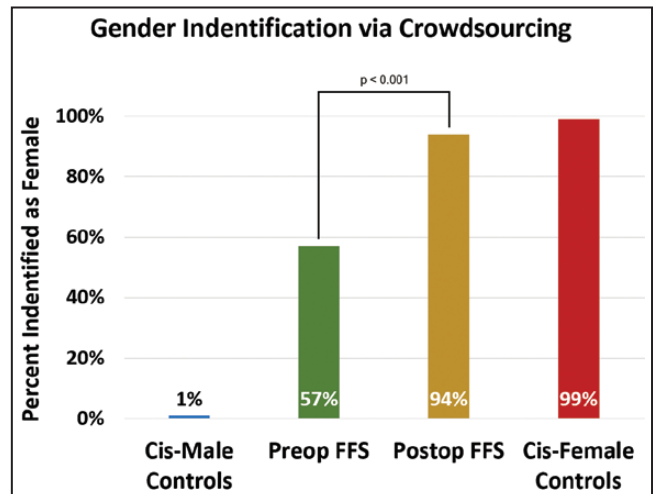
	Procedure	Percentage of patients
Hard tissue	Frontal sinus setback	85
	Lateral supraorbital rim reduction	95
	Mandibular angle reduction	85
	Osseous genioplasty with narrowing	80
	Osseous genioplasty with vertical height reduction	65
	Orthognathic surgery (double jaw)	10
	Soft tissue	Brow lift/shortening
	Septorhinoplasty	75
	Upper lip shortening	55
	Fat grafting	80
	Malar augmentation	10
	Facelifting	10
	Blepharoplasty	5

(eg, smoking, age inquiry). Surveys were randomly generated for each respondent with the Qualtrics survey design platform to include cis-male male controls, 5 cis-female controls, and either the preoperative or the postoperative photo of 20 FFS patients, all in randomized order. Respondents were asked to identify the patient’s gender as “male” or “female” and then assign a confidence score from 0 to 10 for their choice, with 0 = not confident at all and 10 = very confi-dent (Appendix).

Statistical analysis was then performed. with Stata Statistical Software,

**Table 3.** Crowdsourcing Respondent Demographics

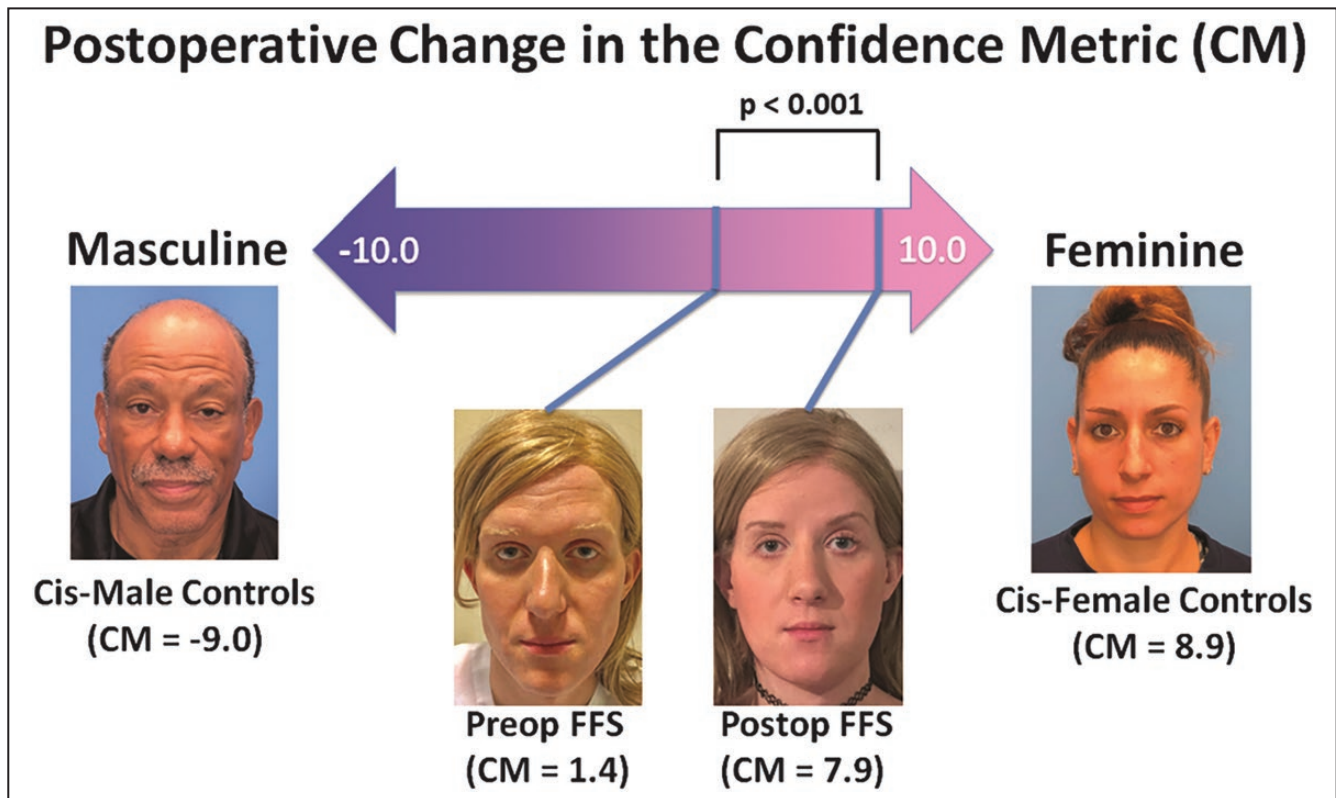
		Number	Percentage
Gender	Male	388	48.38
	Female	414	51.62
Age (mean, 34.03 years)	<30 years	412	51.37
	>30 years	390	48.63
Ethnicity	Asian	279	34.79
	Black	52	6.48
	Caucasian	376	46.88
	Hispanic	42	5.24
	Mixed	27	3.37
	Other	26	3.24



**Figure 1.** Bar graph illustrating an increase in correct gendering from preoperative to postoperative facial feminization surgery patient photographs.

**RESULTS**

A total of 802 survey responses were obtained from a diverse range of respondents (Table 3). Survey respondents were 48% male and 52% female and had an average age of 34 years (range, 18–71 years). Cis-gender control patients were correctly gendered 99% of the time (99.0% male, 99.38% female), and with very high average confidence of 9.0 (9.11 male, 9.02 female).



**Figure 2.** Visual representation of the CM scale, ranging from  $-10$  (confidently masculine) to  $10$  (confidently feminine). Cis-male controls confidently rated to be masculine (CM =  $-8.9$ ), cis-female controls rated confidently feminine (CM =  $8.9$ ), preoperative FFS rated CM =  $1.4$  but improved to postoperative FFS with CM =  $7.8$ ;  $P < 0.0001$ . Sample photographs: cis-male = 56 years, FFS preoperative = 36 years, FFS postoperative = 37 years, cis-female = 28 years. CM, confidence metric; FFS, facial feminization surgery.

Preoperative FFS patients were identified as female 57.3% of the time with an average confidence of 8.3 for those gendered female, and 7.8 for those gendered male. Postoperative FFS patients were gendered female 94.3% of the time with an average confidence of 8.7 for those gendered fe-male, and 6.8 for those gendered male.

When comparing preoperative with postoperative FFS photographs, the percentage of patients gendered as female increased by 37%, from 57% to 94% ( $P < 0.001$ ) (Figure 1). (Figure 2).

**Table 4.** Confidence and Gendering Differences Between Male and Female Respondents

	Patient group	Rater gender		P value
		Male (n = 7760)	Female (n = 8280)	
Confidence metric	Male control	9.1	9.19	0.04
	Preoperative	2.05	0.81	<0.001
	Postoperative	7.91	7.67	0.006
	Female control	8.99	9.06	0.11
Percentage gendered female	Male control	1	1	0.911
	Preoperative	61.2	53.7	<0.001
	Postoperative	95.2	93.4	<0.001
	Female control	99.1	99.6	0.05

**Table 5.** Confidence and Gendering Differences Between Younger and Older Respondents

	Patient group	Rater age		P value
		Age ≤30 years (n = 8240)	Age >30 years (n = 7800)	
Confidence metric	Male control	8.99	9.31	<0.001
	Preoperative	2.06	0.73	<0.001
	Postoperative	7.99	7.56	<0.001
	Female control	8.89	9.16	<0.001
Percentage gendered female	Male control	1.7	0.2	<0.001
	Preoperative	61.3	53.1	<0.001
	Postoperative	96	92.4	<0.001
	Female control	99.1	99.7	0.01

## DISCUSSION

The results of plastic surgery procedures are often judged subjectively. The perception of beauty differs by culture,<sup>17</sup> age,<sup>18,19</sup> sex,<sup>19,20</sup> and race.<sup>19</sup> Much less is known about gender perception except that it is an extremely efficient cognitive process. And, this process is acquired early during childhood.

Until now, the “success” of FFS has been measured by surgeon and patient satisfaction reports. Although patient satisfaction is important, One of the most important goals of FFS is to be socially recognized as a female.

Interestingly, our results demonstrate that preoperative FFS transgender patients who are on hormone therapy for an extended time and use hair and makeup to feminize their faces are only correctly gendered by the public about half of the time. Whereas, after facial feminization, patients are correctly gendered as female 94% of the time.

**Table 6.** The Confidence Metric and the Percentage of Preoperative and Postoperative Patients Identified as Female, Both Broken Down by Respondent Age and Gender

		Rater age, years	% gendered female			Confidence metric		
			Male raters	Female raters	<i>P</i> value (gender)	Male raters	Female raters	<i>P</i> value (gender)
Patient group	Preoperative	≤30	63.3	59.0	0.004	2.35	1.75	0.014
		>30	58.5	49.1	<0.001	1.67	0	<0.001
		<i>P</i> value (age)	0.002	<0.001		0.001	<0.001	
	Postoperative	≤30	96.2	95.9	0.691	7.92	8.07	0.155
		>30	93.9	91.1	<0.001	7.89	7.3	<0.001
		<i>P</i> value (age)	0.001	<0.001		0.82	<0.001	

In addition, viewers were more confident in identifying the postoperative FFS patients as female and less confident in identifying them as male than the preoperative FFS images. This illustrates that after FFS, patients are not only more likely to be recognized with the correct gender but also with more confidence. By contrast, preoperative FFS photographs were less likely to be identified as female and with a lower confidence.

These data demonstrated that preoperative FFS patients who have undergone hormone therapy and use cosmetics/hairstyles to feminize their appearance are still misgendered almost half of the time. More importantly, we demonstrate that FFS was successful in changing the perceived gender of transwoman patients. It should be understood that femininity includes more than just static frontal and lateral images of facial features. Femininity may be judged by one's style of walking, tone of voice, sitting style, posture, and even the use of hands. However, FFS is a necessary step to achieve a female social identity.

Certain FFS procedures may be more responsible for changing social gender identity than others. A future study may serve to determine which procedures are more important. In addition, future studies are necessary to correlate patient satisfaction with patient gender perception.

## CONCLUSIONS

FFS is a powerful technique with high patient satisfaction. This study illustrates that before FFS, patients were correctly gendered by a large public forum about half of the time despite the use of hormonal therapy, hair, and makeup. Most importantly, our study showed that after FFS, patients were significantly more likely to be identified as female and more confidently so. After FFS, patients were gendered correctly almost as often as cisgender female control patients. Future studies are required to determine which FFS techniques are most responsible for correct female gendering.

## Supplementary Material

This article contains supplementary material located online at [www.aestheticsurgeryjournal.com](http://www.aestheticsurgeryjournal.com).

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## REFERENCES

1. Plavcan JM. Sexual dimorphism in primate evolution. *Am J Phys Anthropol*. 2001;(Suppl 33):25-53.
2. Ruff C. Variation in human body size and shape. *Annu Rev Anthropol*. 2002;31(1):211-232.
3. Ousterhout DK. Feminization of the forehead: contour changing to improve female aesthetics. *Plast Reconstr Surg*. 1987;79(5):701-713.
4. Becking AG, Tuinzing DB, Hage JJ, Gooren LJ. Transgender feminization of the facial skeleton. *Clin Plast Surg*. 2007;34(3):557-564.
5. Shams MG, Motamedi MH. Case report: feminizing the male face. *Eplasty*. 2009;9:e2.
6. Capitán L, Simon D, Kaye K, Tenorio T. Facial feminization surgery: the forehead. Surgical techniques and analysis of results. *Plast Reconstr Surg*. 2014;134(4):609-619.
7. Habal MB. Aesthetics of feminizing the male face by craniofacial contouring of the facial bones. *Aesthetic Plast Surg*. 1990;14(2):143-150.
8. Ousterhout DK. Feminization of the chin: a review of 485 consecutive cases. Vol. 10. Paper presented at: Medimond International Proceedings; 2003, Bologna, Italy.
9. Li J, Hsu Y, Khadka A, Hu J, Wang Q, Wang D. Surgical designs and techniques for mandibular contouring based on categorisation of square face with low gonial angle in orientals. *J Plast Reconstr Aesthet Surg*. 2012;65(1):e1-e8.
10. Gray R, Nguyen K, Lee J, et al. Osseous transformation with facial feminization surgery: improved anatomic accuracy with virtual planning. *Plast Reconstr Surg*. 2019. doi: 10.1097/PRS.0000000000006166. [Epub ahead of print]
11. Hoenig JF. Frontal bone remodeling for gender reassignment of the male forehead: a gender-reassignment surgery. *Aesthetic Plast Surg*. 2011;35(6):1043-1049.
12. Dempf R, Eckert AW. Contouring the forehead and rhinoplasty in the feminization of the face in male-to-female transsexuals. *J Craniomaxillofac Surg*. 2010;38(6):416-422.
13. Hage JJ, Vossen M, Becking AG. Rhinoplasty as part of gender-confirming surgery in male transsexuals: basic considerations and clinical experience. *Ann Plast Surg*. 1997;39(3):266-271.
14. Becking AG, Tuinzing DB, Hage JJ, Gooren LJ. Facial corrections in male to female transsexuals: a preliminary report on 16 patients. *J Oral Maxillofac Surg*. 1996;54(4):413-418; discussion 419.
15. Cho SW, Jin HR. Feminization of the forehead in a transgender: frontal sinus reshaping combined with brow lift and hairline lowering. *Aesthetic Plast Surg*. 2012;36(5):1207-1210.
16. Lu SM, Hsu DT, Perry AD, et al. The public face of rhinoplasty: impact on perceived attractiveness and personality. *Plast Reconstr Surg*. 2018;142(4):881-887.
17. Tomasello M. *The Cultural Origins of Human Cognition*. Cambridge, MA: Harvard University Press; 2009.
18. Foos PW, Clark MC. Adult age and gender differences in perceptions of facial attractiveness: beauty is in the eye of the older beholder. *J Genet Psychol*. 2011;172(2):162-175.
19. Cross JF, Cross J. Age, sex, race, and the perception of facial beauty. *Dev Psychol*. 1971;5(3):433.
20. Cela-Conde CJ, Ayala FJ, Munar E, et al. Sex-related similarities and differences in the neural correlates of beauty. *Proc Natl Acad Sci U S A*. 2009;106(10):3847-3852.
21. Bruce V, Young AW. *In the Eye of the Beholder: The Science of Face Perception*. New York, NY: Oxford University Press; 1998.
22. Wild HA, Barrett SE, Spence MJ, O'Toole AJ, Cheng YD, Brooke J. Recognition and sex categorization of adults' and children's faces: examining performance in the absence of sex-stereotyped cues. *J Exp Child Psychol*. 2000;77(4):269-291.
23. Cellerino A, Borghetti D, Sartucci F. Sex differences in face gender recognition in humans. *Brain Res Bull*. 2004;63(6):443-449.