



ORAL PRESENTATION GROUP 1 – PRESENTATION 1

Evaluating the Success of Facial Feminization Surgery through Artificial and Human Intelligence

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PURPOSE Male-to-female transgender patients desire to be identified as female, not only with their partners, but also in public settings. Facial feminization surgery (FFS) entails highly visible changes in the facial hard and soft tissues which may affect such social first impressions. No study to date has evaluated the impact of FFS on how patients are gender-typed. To study the effectiveness of FFS we investigated preoperative/postoperative gender typing using both 1) neural networks trained on facial features (artificial intelligence) and 2) a large public online survey (crowd sourcing).

METHODS For both studies, standardized frontal and lateral view preoperative and postoperative images of twenty patients who completed staged FFS (combinations of frontal sinus wall setback, supraorbital recontouring, mandibular angle reduction, genioplasty, upper lip shortening, septorhinoplasty, tracheolaryngeoplasty) were used; in addition, ten male and ten female unoperated control patients were included. 1) For the first study, the images were analyzed by four public neural networks trained to identify gender. Preliminary results led us to 2) a second study, using an online crowd sourcing platform. Respondents identified the gender of the same images, randomized, with a confidence rating (1=not confident, 10=highly confident). Age and smoking status were recorded as distractants. All results were recorded and analyzed for statistical significance.

RESULTS 1) For the neural network study, all four programs provided a gender; two also provided a confidence score. The networks correctly identified male and female controls 98.6% and 91.2% of the time. Preoperative FFS patients were recognized as female only 54.5% of the time, while post operatively this improved to 93.7% (Figure 1). Confidence scores (ranging from -1=confidently masculine to 1=confidently feminine) also significantly improved from 0.27 (preop) to 0.87 (postop) ($p < .0001$), with controls of -0.91 (male) and 0.89 (female).

2) For the crowd sourcing study, 802 people completed the survey. Control male and female images were correctly gender-identified 99.0% and 99.4% of the time with confidence 8.9 and 9.0, respectively. Preoperative FFS patients were identified as female only 57.3% of the time; by contrast, post-operatively 94.3% were identified as female, a statistically significant improvement of 37% ($p < .0001$) (Figure 2). The confidence rating also improved from 1.41 to 7.78 ($p < .0001$).

CONCLUSION: The success of FFS (identification more likely as female) was demonstrated by both artificial and human intelligence methods. This is the first study of its kind evaluating how machine learning and the public gender type FFS patients.

Figure 1

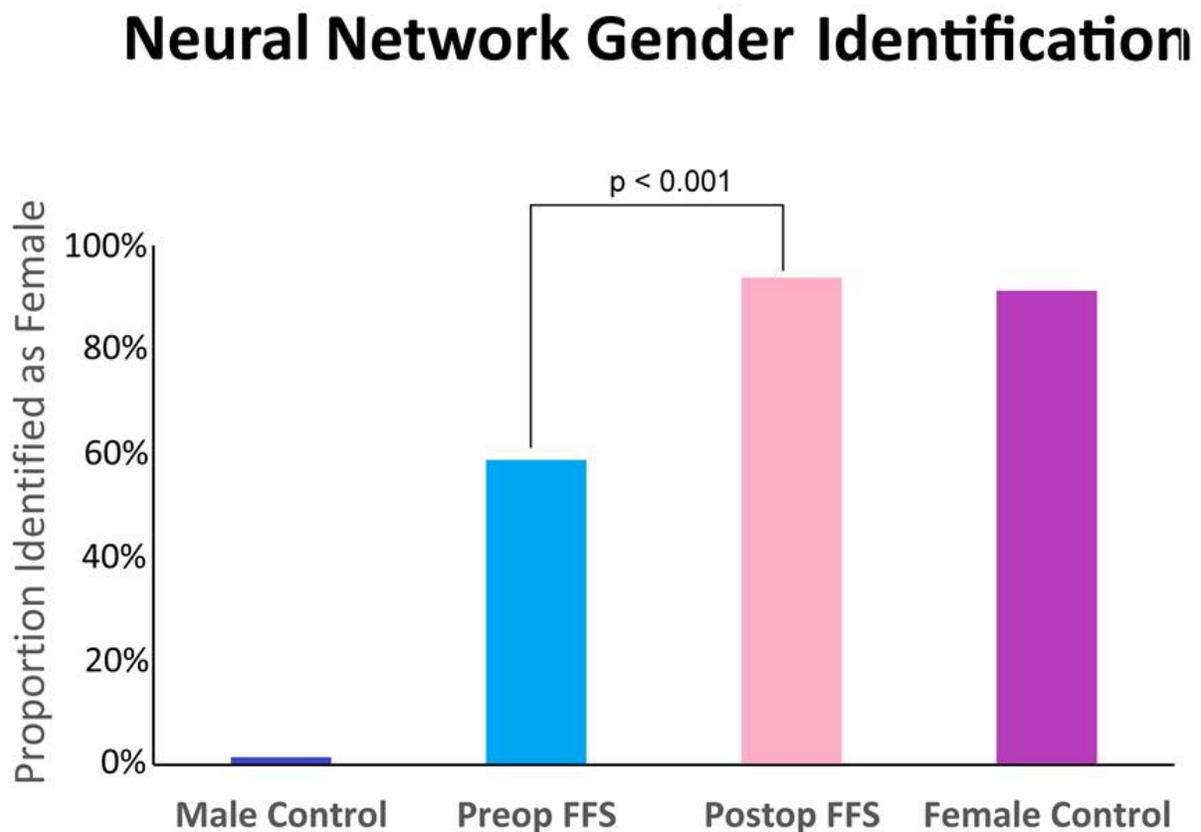


Figure 2

Crowd-Sourced Gender Identification

