Gender-Related Facial Surgical Goals

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Abstract

In the last several years, there has been an increasing demand for surgical facial feminization or masculinization to treat the gender dysphoric patient. However, while aesthetic ideals for facial rejuvenation are well described and taught, there is a relative paucity of literature on how to achieve a feminine or masculine morphology. It is thus becoming increasingly important for facial plastic surgeons to understand patient goals regarding facial feminization or masculinization, and to have a systematic approach for analyzing the female and male face.

Keywords

► facial analysis
► facial feminization
► facial masculinization
► gender analysis

Gender analysis is essential to understanding what creates feminine and masculine features on a given face. There are accepted differences between a male and female face, with a variety of different distinct features that create an overall masculine or feminine appearance. Overall, a masculine face is angulated and square with a pronounced jaw and chin, while a feminine face is rounded and soft appearing with a heart or inverted triangle shape. The female forehead is vertically higher and more rounded with a smoother gentle arc and smooth hairline. In males, the forehead is flat with prominent supraorbital ridges and a M-shaped hairline with temporal recession. A heavy and straight brow that sits along the superior orbital rim constitutes a masculine appearance. In contrast, a woman’s eyebrows are more arched and sit above the superior orbital rim. The male nose has an acute naso-frontal angle and is wide and straight with a minimal supratip break compared with a thin and concaved female nose. Greater vermillion show on the lip further accentuates feminine features. In the lower third of the face, a long, square chin with mandibular angle prominence is more masculine, while a softer, more tapered appearance constitutes femininity.

Background

The “ideal” form of the human figure was captured initially by Greco-Roman artists. These renderings have come to be known as artistic “canons,” or rules of simple proportions to describe the ideal human form. The canons of facial proportion evolved with the use of Pythagorean mathematics, the best known of which is the so-called golden proportion (1.618). The use of these canons was revived by Renaissance and neoclassical artists, including Albrecht Durer and Leonardo DaVinci. From these artists, several new canons were introduced, including division of the head and face into equal halves, third, or fourths; or vertically into equal fifths.

What we know today of the neoclassical canons is from the remnants of much larger bodies of work in artistic experimentation. That is, the intention of these artists was never to describe the typical or normal morphological appearance of the human face at all. It is important to realize that every face is unique and rather than focusing specifically on textbook proportions, facial features need to be in harmony with each other. Dividing the face into vertical thirds is a common approach used to investigate the various areas of the face, but the ultimate goal should be a harmonious face which portrays the patients desired gender. The following gender-related facial analysis will help provide that guide to enable the surgeon to use proportions as a guideline rather than a universal application.

Facial Analysis

Generally, the male skull is larger with an endocranial capacity of ~200 g greater than that of the female, and is usually less round. This creates some well-defined features that distinguish it from its female counterpart. The female skull differs from the male in that it has more pronounced zygomatic prominences, leading to a pointed chin, creating a “heart shape,” compared with the more square male skeleton.
It is useful when analyzing the face to divide it into thirds and proceed in a top to bottom method. Thus, for the purpose of this article, the face is divided into the upper third (forehead region, brow), middle third (orbit, nose, cheeks), and lower third (lips, mandibular width, chin) (Fig. 1). Skeletal and soft tissue differences are also described for the anatomic subunit when appropriate.

A summary of relative differences between the male and female face and facial skeleton is found in Tables 1–3.

### Upper Third

Analysis of the upper third of the face should include evaluation of the hairline shape, forehead length (nasion–trichion distance), forehead convexity, supraorbital bossing, glabella, nasofrontal angle, and brow position (Fig. 2).

#### Hairline

The feminine hairline is generally full with smooth contours, making its highest point in the center of the forehead. In contrast, the male hairline may be receding and possess a “widow’s peak” or M-shaped hairline. There is generally a shorter distance from nasion to trichion in the female face, starting ~5 cm above the glabella, whereas males typically begin 6 to 8 cm above this.\(^1,9\)

### Frontonasal–Orbital Complex

The frontonasal–orbital complex is arguably the greatest determinant of facial gender. This region includes the supraorbital ridge, brow, orbits, frontonasal, and temporal regions. The frontonasal–orbital complex determines the position of the brows and the positioning of the periorbital soft tissues. This entire complex is typically more pronounced and has

#### Table 1 Upper third face

<table>
<thead>
<tr>
<th>Upper third</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hairline shape</td>
<td>Smooth</td>
<td>M-shaped</td>
</tr>
<tr>
<td>Nasion–trichion distance</td>
<td>Shorter than that in males</td>
<td>High</td>
</tr>
<tr>
<td>Forehead convexity</td>
<td>Less convex, sloping</td>
<td>Flat or convex</td>
</tr>
<tr>
<td>Supraorbital bossing</td>
<td>Minimal or absent</td>
<td>Pronounced</td>
</tr>
<tr>
<td>Nasofrontal angle</td>
<td>Obtuse</td>
<td>Acute</td>
</tr>
<tr>
<td>Glabella</td>
<td>Less protruding</td>
<td>Wider, more protruding</td>
</tr>
<tr>
<td>Brow position</td>
<td>Above the supraorbital rim, raised at the lateral third</td>
<td>At the level of the supraorbital rim</td>
</tr>
</tbody>
</table>

#### Table 2 Middle third face

<table>
<thead>
<tr>
<th>Middle third</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orbits</td>
<td>Wider, slight positive tilt</td>
<td>Narrower, neutral tilt</td>
</tr>
<tr>
<td>Zygomatic width</td>
<td>Slightly less wide</td>
<td>Wider</td>
</tr>
<tr>
<td>Zygomatic prominence</td>
<td>More prominent</td>
<td>Less prominent</td>
</tr>
<tr>
<td>Cheek hollowing</td>
<td>Varies by culture</td>
<td>Varies by culture</td>
</tr>
<tr>
<td>Nasal dorsum</td>
<td>Straight or slightly concave</td>
<td>Straight or dorsal hump</td>
</tr>
<tr>
<td>Alar base width</td>
<td>Much narrower</td>
<td>Wide</td>
</tr>
</tbody>
</table>

#### Table 3 Lower third face

<table>
<thead>
<tr>
<th>Lower third</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lips</td>
<td>Greater vermilion show</td>
<td>Less vermilion show, greater cutaneous portion</td>
</tr>
<tr>
<td>Mandibular width</td>
<td>Narrower than zygomatic width</td>
<td>As wide as zygomatic width</td>
</tr>
<tr>
<td>Gonial angle</td>
<td>More obtuse</td>
<td>More acute</td>
</tr>
<tr>
<td>Chin</td>
<td>Trapezoidal, shorter</td>
<td>Square, longer</td>
</tr>
</tbody>
</table>
greater bone volume in the male. The supraorbital ridge is generally more pronounced in the male face, and there is a less steep slant from the supraorbital ridge to the vertex.\(^4\),\(^7\),\(^10\) There tends to be a flat portion immediately above the supraorbital bossing prior to takeoff of the anterior convexity of the male forehead. Frontal sinus development likely contributes to the greater convexity of the medial forehead in males. This leads to a discontinuous curvature compared with the female skull. Contrastingly in females, supraorbital bossing is considerably less, or minimal. The forehead is less flat with a generally continuous mild curvature which continues to the vertex.\(^4\),\(^11\)

In males, the medial supraorbital ridge blends into the glabella. Thus, males generally have a greater glabellar projection than women and this is considered more masculine.\(^9\) However, the range of glabellar variation is much wider than that of the ridges.\(^7\) More importantly, in this region is attention to the nasofrontal angle, which is more acute in males and more obtuse in females.\(^12\) Importantly, the nasoglabellar region represents the transition between the nose and forehead, and should be considered as an entity for affording facial harmony between upper and middle thirds.\(^13\)

The female brow is club shaped medially, starts at or below the rim, then arches laterally to where it peaks at the lateral third. The most lateral portion of the female brow lies 1 to 2 mm above the medial aspect of the brow, and the entire brow lies at or above the superior orbital rim.\(^5\) In contrast, the male brow tends to be thick, straighter and tends to lie at the level of the superior orbital rim.\(^12\),\(^13\)

**Middle Third**

Analysis of the middle third should include examination of the orbital and periorbital tissue, nose (with special notice to the nasal dorsum, tip, and alar base width), zygomatic width, and zygomatic prominence (Fig. 3).

**Periorbital**

The female orbital height is less than that of males, but in relative proportions of facial mass the orbits in women are larger and appear higher.\(^7\) The upper and lateral portions of the orbital rims are less pronounced than in the male.\(^14\) The male upper eyelid crease is generally positioned lower with a minimum of 8 mm above the lid margin, compared with a maximum of 12 mm for women. The male upper lid also
appears fuller, with less pretarsal show.\textsuperscript{8} The canthal tilt generally has a subtle, more positive tilt in females.\textsuperscript{5,8} In contradistinction to the upper lid, there are no significant differences in the lower eyelids of men and women. Spiegel makes note of the increased periorbital soft tissue luminance seen in females, likely due to decreased dermal thickness, and suggests this be addressed as well.\textsuperscript{15}

**Nose**
The male nose is generally larger than the female nose because of the increased volume of cartilage and bone. As previously noted, the nose has a more acute glabellar angle in the male than in the female.\textsuperscript{4,5,7,11} Male nasal bones tend to meet in the midline at a sharper angle\textsuperscript{7,16} and the nasal aperture is higher and narrower, with sharp rather than rounded margins. In contrast, female noses are smaller and shorter. They have narrower bridges and alar bases, with a more obtuse nasolabial angle.\textsuperscript{12,16} The male nose may have a dorsal hump or straight dorsum with very little supratip break, whereas the female nose is considered attractive if it shows a straight or mildly concave dorsum with an accented tip.\textsuperscript{11,16} The male nose has a slightly wider nasal root than the female nose and a somewhat wider alar width. Additionally, there is a significantly large difference between labial insertions of the alar base in males compared with females.\textsuperscript{5}

**Cheeks**
The cheek bones are heavier in the male with more malar volume. Contrastingly, they are lighter, but also more prominent and rounded in the female.\textsuperscript{7,10,12} This is due to women having a greater concentration of soft tissue and fat and is accentuated with some cheek hollowing in the submalar region.\textsuperscript{12} Additionally, increasing the width of the zygomatic complex creates more roundness of the facial contours and allows the orbits to appear larger in females.\textsuperscript{10} While interzygomatic distance is generally larger in males, it is more prominent in females. In addition, there is a significantly greater fullness in the maxilla relative to the mandible in females which creates a less defined jawline and tends to soften the face.\textsuperscript{6}

**Lower Third**
Analysis of the lower third should include examination of vermillion show and fullness, mandibular width, gonial angle, chin shape, chin height, and chin width (\textsuperscript{Fig. 4}).

**Lips**
The lips are a focal point of the lower face that contain gender-specific features. The overall lip height is greater in males than females. However, females tend to have greater upper incisor show in repose compared with males. The proportion of upper lip cutaneous height to upper vermillion height is also greater in
Jawline and Chin

This region has a series of specific characteristics that can influence the perception of facial gender. During specific evaluation of the lower third of the face, it is important to evaluate the prominence, splay, and angularity of the mandible and associated masseter muscle bulk along with the position, projection, and angularity of the chin. Feminine features include a softer and more tapered chin with a more rounded mandibular angle. Soft tissue draping and laxity with associated rhytids should be noted especially if platysmal banding or marionette lines are present as changes to the bony architecture could accentuate or modify these. The mandible in the male is larger and thicker, with greater mandibular body height, especially at the symphysis. This produces a wider lower facial third in men than in women and gives the jaw a greater vertical height. The ascending ramus is broader and the condyles are larger in males which contribute to the overall increased width and angularity of the mandible. In addition, males have more mandibular flare due to mandibular attachments, resulting in a wider jaw.

The gonial angle should be assessed for its definition and sharpness. Females generally have a softer mandibular angle. The gonial angle is generally less than 125 degrees in both sexes. However, females tend to have a more obtuse angle than males by ~2.7 degrees.

A male chin is wider, taller, and often more projected than a female chin. The chin and lower jaw are usually longer in males by as much as 20%. This produces a chin that tends to be squarer and more pronounced in men. The shape is more square due to bilateral lateral mental eminences in the region of the canines, whereas females generally have a single median mental eminence, giving their chins a more rounded or trapezoidal appearance. It should be noted here that gender does not necessarily determine the projection or position of the chin. Under or overprojection of the chin can be found in both men and women. Nevertheless, the overall aesthetic of a stronger chin and mandibular region is considered a masculinizing feature.
Integument/Soft Tissue Considerations

It is worthwhile to mention the integumentary and soft tissue considerations between the male and female face. The male integument is 30 to 175 microns thicker than that of females, depending on the location being measured, and there is relatively less subcutaneous fat. This is due largely to the presence of follicular units and adnexal structures under the influence of male hormones in the reticular dermis. The influence of estrogen contributes to the greater underlying subcutaneous fat, which leads to more fluid female contour, and less obvious muscular contraction during mimetic movements. In addition, there exists some debate in the literature regarding the degree to which the sexes age and soft tissue descent occurs. Descent of the soft tissue may lead to a masculinized appearance of the female form due to descent of the brow, midface, depressed canthal tilt, and squaring of the jaw. In these instances, a discussion of soft tissue rejuvenation procedures may be warranted, as the results of skeletal correction may not be as visibly appreciated.

Conclusion

There exist several known anthropometric differences between the male and female facial skeleton and soft tissues. In general, the female face is less robust, rounder, or heart shaped, with a shorter forehead, no supraorbital bossing, a smaller nose, more pronounced zygomatic prominences, fuller lips, a smaller mandibular width, and a more tapered chin. A method for analyzing these differences is critical to achieve appropriate facial surgical goals for the patient, both for preoperative planning and for setting postoperative expectations.

Acknowledgments

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References