THE EUROPEAN SOCIETY OF MEDICINE
Medical Research Archives, Volume 13 Issue 7

RESEARCH ARTICLE

Orthognathic Surgery in Facial Feminization and Masculinization: Surgical Planning, Techniques, and Gender-Affirming Outcomes

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OPEN ACCESS

PUBLISHED
31 July 2025

CITATION
Birbe Foraster, J., 2025. Orthognathic Surgery in Facial Feminization and Masculinization: Surgical Planning, Techniques, and Gender-Affirming Outcomes. Medical Research Archives, [online] 13(7). https://doi.org/10.18103/mra.v13i7.6659

DOI
https://doi.org/10.18103/mra.v13i7.6659

ISSN
2375-1924

ABSTRACT

Orthognathic surgery has emerged as a cornerstone in gender-affirming facial procedures, offering structural modifications that contribute significantly to gender congruence and patient satisfaction. Facial Feminization Surgery and Facial Masculinization Surgery often incorporate maxillomandibular adjustments to align skeletal contours with gender-specific aesthetic norms. While these procedures are critical in the treatment of gender dysphoria in transgender and gender-diverse individuals, they are also increasingly sought by cisgender patients aiming to enhance or refine sexually dimorphic facial characteristics. This article provides an integrative review of current practices in orthognathic surgery for both transgender and cisgender individuals, encompassing preoperative assessment, surgical planning using virtual simulation tools, intraoperative techniques, and postoperative outcomes. Emphasis is placed on the ability of orthognathic procedures to address both occlusal function and the distinct morphological differences that contribute to facial gender perception. Drawing from recent literature and institutional experience, we explore how orthognathic surgery contributes to improved psychosocial wellbeing, functional rehabilitation, and perceived femininity or masculinity. The evidence supports its essential role in the multidisciplinary framework of gender-affirming and aesthetic facial surgery.

Keywords: orthognathic surgery, facial feminization, facial masculinization, gender-affirming surgery, craniofacial dimorphism, patient-reported outcomes

Introduction

Gender dysphoria refers to the psychological distress experienced when an individual's gender identity does not align with their sex assigned at birth. This incongruence can affect various aspects of a person's life, particularly in social, occupational, and psychological domains[1]. Among transgender and gender-diverse individuals, facial appearance is often cited as one of the most significant determinants of gender perception by others. Facial gender incongruence can reinforce misgendering and contribute to social dysphoria, making facial surgery a key aspect of the transition process for many patients[2,3].

In this context, the face—particularly the mid and lower third—becomes a critical target for surgical modification[4,5]. Orthognathic surgery, which involves repositioning the jaws to correct skeletal discrepancies, has traditionally been performed to improve occlusion, facial balance, and airway function. However, in recent years it has taken on a broader role in modifying sexually dimorphic craniofacial features[6]. The prominence of the gonial angles, projection of the chin, maxillary height, mandibular width, and incisor display are among the features that differ systematically between masculine and feminine facial phenotypes[7].

By adjusting these skeletal parameters, orthognathic surgery can feminize or masculinize the face in ways that are both stable and profound. Feminizing modifications often include setback genioplasty, reduction of mandibular width, and vertical maxillary advancement to increase incisor show and anterior nasal spine projection. Masculinizing changes typically emphasize mandibular projection, chin augmentation, and increased facial height. These transformations affect not only static morphology but also dynamic expressions and social interactions[8].

While orthognathic surgery is an essential component of care for many transgender patients seeking gender congruence, it also plays a valuable role in aesthetic enhancement for cisgender individuals who desire to accentuate feminine or masculine traits. In both populations, the aim is to harmonize skeletal architecture with individual identity or aesthetic goals, ultimately improving facial confidence and psychosocial wellbeing.

This article aims to synthesize current approaches to orthognathic surgery in the context of facial gender-affirming and aesthetic surgery. We describe surgical planning strategies, procedural techniques, and outcomes associated with feminizing and masculinizing orthognathic procedures[9]. The discussion draws on both clinical evidence and institutional case experience, with an emphasis on functional rehabilitation and the attainment of gender congruence or enhanced sexual dimorphism as primary goals of care.

CRANIOFACIAL DIMORPHISM

Sexual dimorphism in craniofacial anatomy is critical to gender perception and underpins many surgical decisions in FFS and FMS. Masculine faces are generally characterized by a prominent mandibular angle, forward-projecting pogonion, vertically elongated maxilla, and a broad, squared chin. In contrast, feminine faces typically exhibit a more obtuse mandibular angle, recessed pogonion, reduced maxillary height with increased incisor show, and a narrow, ovoid chin shape. Recognizing these features allows for a systematic approach in surgical planning and the customization of skeletal movements to align with gendered aesthetic norms[10].

PATIENT SELECTION AND PREOPERATIVE EVALUATION

Successful outcomes in gender-affirming orthognathic surgery rely on meticulous patient selection and comprehensive preoperative evaluation. A multidisciplinary approach involving maxillofacial surgeons, endocrinologists, psychologists, and speech therapists is standard. Preoperative imaging, including lateral cephalometry and 3D CT scans, facilitates accurate diagnosis and virtual surgical planning. Equally important is the articulation of patient-specific gender goals—what aspects of their facial morphology they associate with gender identity and how they wish to change them. This alignment of surgical objectives with psychological

intent is crucial to achieving satisfactory outcomes and minimizing postoperative regret[11].

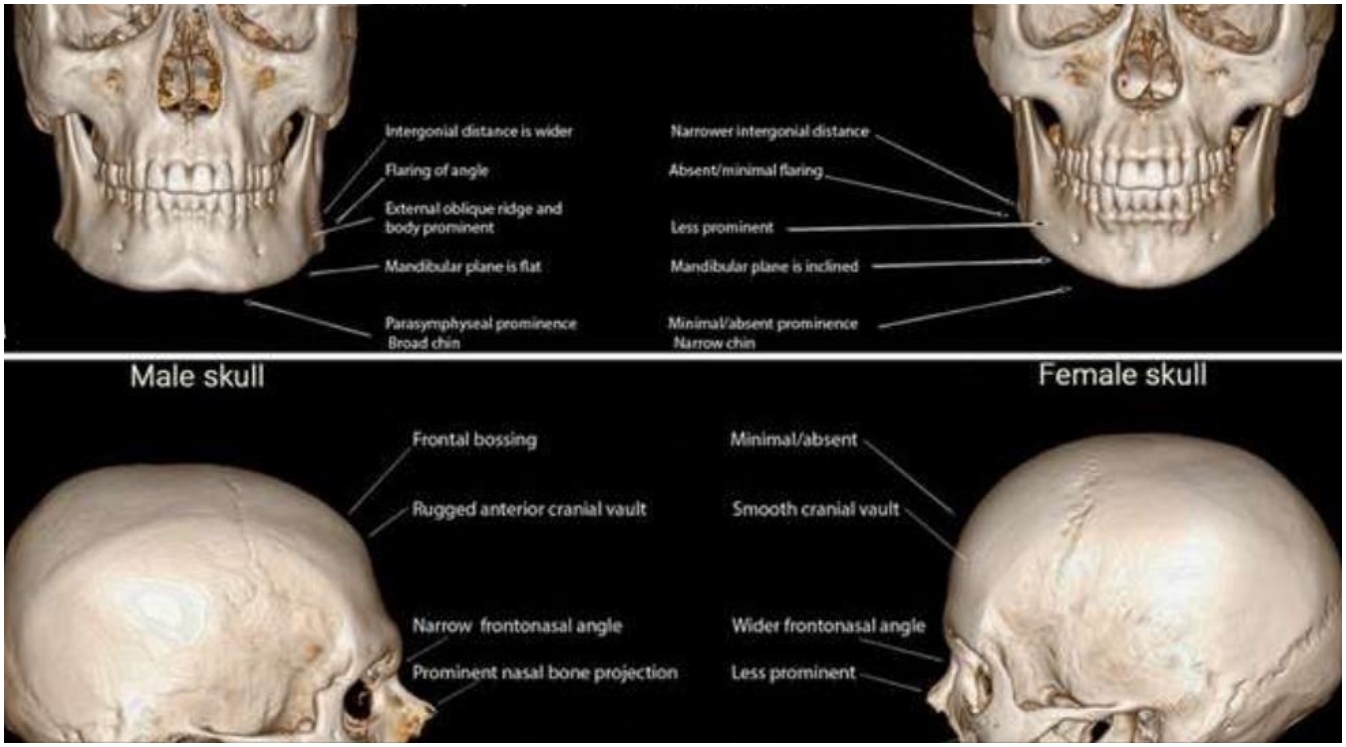


Figure 1. Differences between the male and female skull.

Material and Methods

This study is structured as a narrative review, guided by the Scale for the Quality of Observational Studies in Narrative Reviews (SORBE). The decision to employ SORBE, as opposed to PRISMA, reflects the current heterogeneity in study design, the predominance of descriptive and observational reports, and the emerging clinical nature of facial gender-affirming orthognathic surgery.

Search Strategy and Eligibility Criteria

A comprehensive literature search was conducted using PubMed, Scopus, and Web of Science databases, covering publications from 2005 to 2025. Search terms included combinations of "orthognathic surgery," "facial feminization," "facial masculinization," "gender-affirming surgery," "transgender facial surgery," and "aesthetic jaw surgery." Inclusion criteria encompassed clinical trials, cohort and case-control studies, retrospective reviews, and expert opinion pieces that provided data on surgical technique, outcomes, and psychosocial metrics. Excluded were articles lacking empirical data or focused exclusively on non-skeletal facial surgeries.

Data Extraction and Synthesis

Data were extracted and categorized based on surgical planning approaches (e.g., virtual surgical planning, cephalometric analysis), operative techniques (e.g., Le Fort I osteotomy, bilateral sagittal split osteotomy [BSSO], sliding genioplasty), and reported outcomes. Outcomes included esthetic measures, complication rates, need for revisions, and patient-reported outcome measures (PROMs), particularly those assessing psychosocial well-being and satisfaction. Studies evaluating facial gender congruence and psychological impact, such as changes in anxiety, depression, and gender dysphoria, were also integrated into the review.

Ethical and Developmental Considerations

Literature assessing ethical dimensions of care and appropriate timing of surgery was critically reviewed. The World Professional Association for Transgender

Health (WPATH) recommends deferring skeletal surgery until the completion of craniofacial growth, typically by ages[17–18], ensuring skeletal stability and minimizing relapse risk. Psychological assessments supporting surgical readiness and confirming gender dysphoria were considered standard preoperative protocols in most included studies.

Integration with Institutional Experience

In addition to published literature, the review includes insights from institutional case series involving transgender and cisgender patients undergoing facial gender-affirming orthognathic surgery. Institutional protocols emphasize multidisciplinary collaboration with psychiatry, endocrinology, and speech therapy, aligned with guidelines for comprehensive gender-affirming care.

Results

The cumulative evidence and institutional experience demonstrate that orthognathic surgery, whether applied to facial feminization (FFS) or facial masculinization (FMS), significantly reshapes facial skeletal architecture and enhances both aesthetic[12,13] and psychosocial outcomes[14]. These effects are further amplified when orthognathic surgery is integrated with adjunctive skeletal and soft tissue procedures within a sequenced treatment algorithm.

Orthognathic Surgical Goals: Maxillary and Mandibular Planning

In FFS, surgical movements are designed to soften and refine skeletal contours:

Maxillary Modifications aim to:

Increase upper incisor display, producing a youthful and feminine smile arc.

Advance the maxilla superiorly and anteriorly to provide enhanced midfacial support and forward projection, improving nasolabial angle and cheek contour.

Project the anterior nasal spine, reinforcing nasal tip support in preparation for rhinoplasty and enhancing midface convexity.

Figure 2. Front view of a female patient with facial asymmetry that also requested skeletal movement to improve her feminine traits.

Mandibular Modifications focus on:

Steepening the occlusal and mandibular plane angles through **clockwise maxillomandibular rotation**, which elevates the posterior mandible and repositions the chin to soften the lower facial third.

Contouring the mandibular angles to reduce lateral flare, creating a narrower, less angular jawline. **Chin reshaping with genioplasty**, typically involving narrowing and vertical repositioning to achieve an ovoid chin shape that aligns with facial proportion norms.

Figure 3. Post operative facial view of that same patient with symmetry corrected, more ovoid shape chin and proportionate facial thirds

In **FMS**, these movements are reversed[15,16]:

The **maxilla** is often repositioned superiorly and moderately advanced to reduce incisor show and flatten midfacial projection.

The **mandible** is advanced and widened, increasing gonial angle prominence and broadening the chin, which is often squared or vertically elongated to masculinize the lower third of the face.

Figure 4. Profile preoperative view of same patient, showing lip incompetence, mentalis muscle strain and lower lip distortion due to chin malposition, midface lack of support with a concave profile.

Figure 5. Postoperative view of same patients, with midface improved support, good lip projection and and relationship, adequate chin contour with an improved vertical facial proportions relationship.

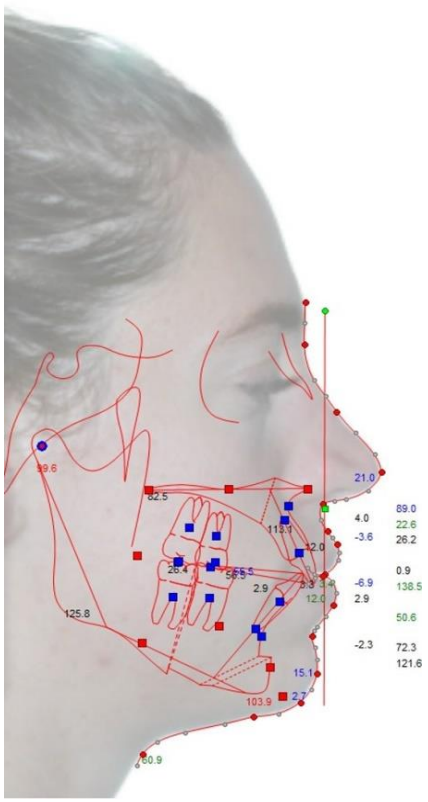


Figure 6: Soft tissue cephalometric analysis of the planned surgical correction, with an improved mandibular plane angle and occlusal plane angle, adequate facial thirds proportions and adequate sagittal facial projection.

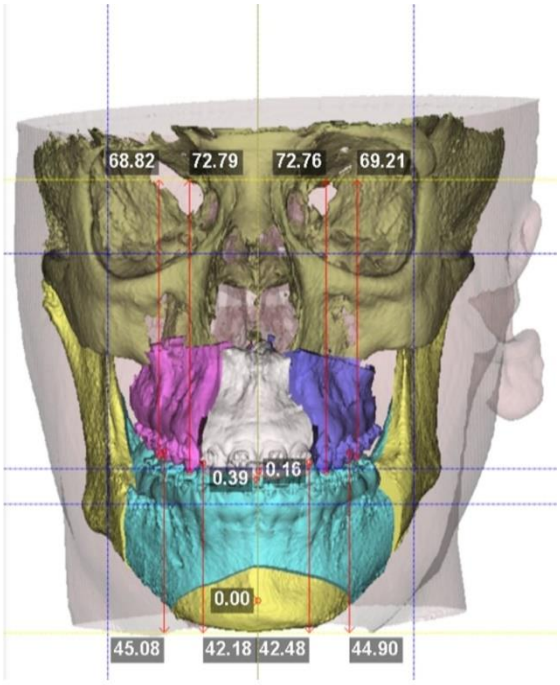


Figure 7. Virtual Surgical Planning of the skeletal corrections planned with a mandible first sequence, midline correction of 6mm to the right, bilateral sagittal split osteotomies with 3mm right set back and 6mm left advancement, 4mm Lefort I segmented osteotomy with 4mm advancement, 3mm right differential impaction and 4mm expansion. Genioplasty consisted of 5mm advancement and 3 mm impaction.

Integration of Adjunctive Skeletal and Soft Tissue Procedures

Orthognathic surgery is frequently complemented by additional skeletal modifications that enhance the upper and midfacial regions. Forehead recontouring and orbital rim reduction help to soften frontal bossing and improve upper facial convexity[17]. Zygomatic contouring is employed to either increase or decrease cheekbone prominence, thereby modifying midface width in alignment with gender goals[18]. Additionally, chondrolaryngoplasty is performed to reduce the projection of the thyroid cartilage in feminizing procedures, promoting a smoother cervical-facial transition[19].

These skeletal changes are often followed by soft tissue refinements essential to achieving a complete and harmonious facial transformation[20]. Rhinoplasty is used to adjust nasal projection, refine the dorsum, and reshape the nasal tip[21]. A lip lift can reduce philtral length and enhance upper lip show, contributing to a more feminine perioral aesthetic[22]. Brow lifts elevate the eyebrows above the orbital rim, enhancing upper facial expression, and are readily perform with the same forehead surgery[23]. Finally, face and neck lifts are tailored to redrape the skin following skeletal modifications, ensuring optimal soft tissue tension and a rejuvenated appearance. Mastoid crevasse technique performed during the neck lift is useful to better gain mandibular angle definition[24].

Figure 8. Preoperative front view of patient that requested aesthetic orthognathic surgery to masculinize his face. Rounded face with poor chin definition, poor midface support, tear trough deformity, and short lower third height.

Figure 9: Postoperative view of same patient, after bimaxillary orthognathic surgery with improved chin definition, proportioned facial thirds height, good lip relationship, better midface soft tissue support after additional lipofilling to tear through and malar prominence and brow lift for better brow distribution. Overall appearance is more masculine.

Figure 11. Profile view of the same patient after bimaxillary orthognathic surgery with genioplasty, lipofilling of infraorbital and tear trough, brow lifting. Note improved mandibular angle and inferior border contour definition, acute mento-cervical angle, good midface soft tissues support and brow position lifted. Overall appearance is more masculine.

Figure 10. Preoperative profile view of the same patient with poor mandible angle and mandibular contour definition, obtuse and short cervico-mental angle, tear trough deformity, mid face soft tissues sagging, and low lateral brow position.

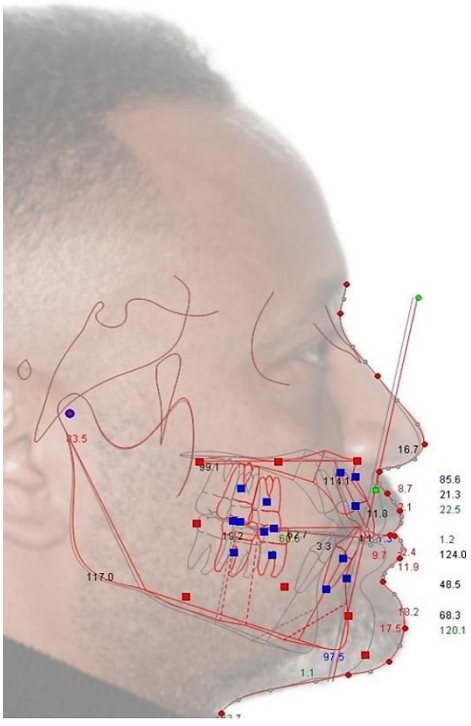


Figure 12. Soft tissue cephalometric analysis and superimposition of preoperative (black tracing) and planned movements (red tracing) showing a counter clockwise rotation advancement of the maxilo-mandibular complex with posterior maxilla down grafting and mandibular advancement and rotation.

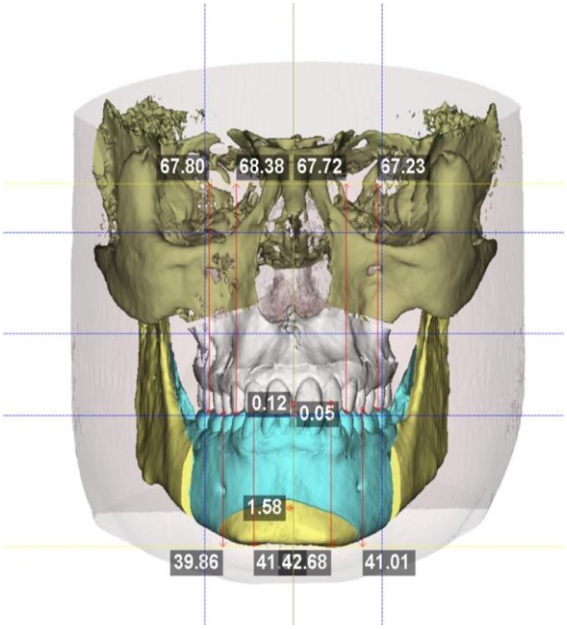
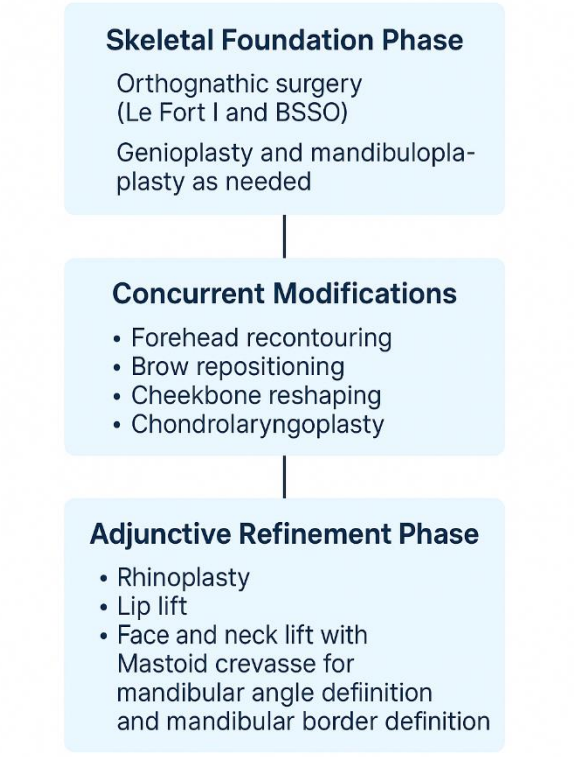


Figure 13. Virtual Surgical Planning of the surgery with maxilla first sequence, 7mm maxilla advancement with 2mm posterior downgrafting, maintain incisor vertical position. Mandibular bilateral sagittal split osteotomies with 8mm advancement and 4mm genioplasty advancement.

Algorithmic Approach to Facial Gender Surgery

The following integrated algorithm is employed to guide treatment sequencing:



This sequenced approach ensures skeletal stability supports soft tissue refinement, improving both function and aesthetics.

Figure 14. Front facial view of a transgender patient requesting facial feminization surgery. Note squared shape mandible with tall chin, midface support deficiency and low brows.

Figure 15. Front facial postoperative view after mandibulaplasty, inverted "V" shape narrowing and impaction genioplasty, brow lift and malar area lipofilling.

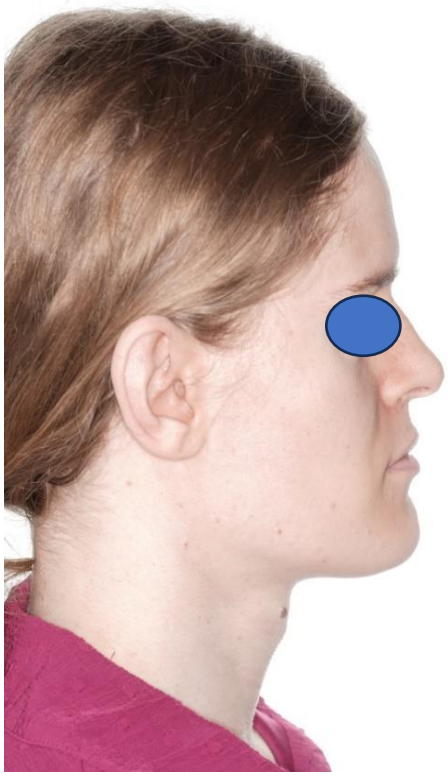


Figure 16. Profile preoperative view of same patient displaying strong mandibular angles, overprojected and tall chin, midface deficient soft tissue support and low brow position.

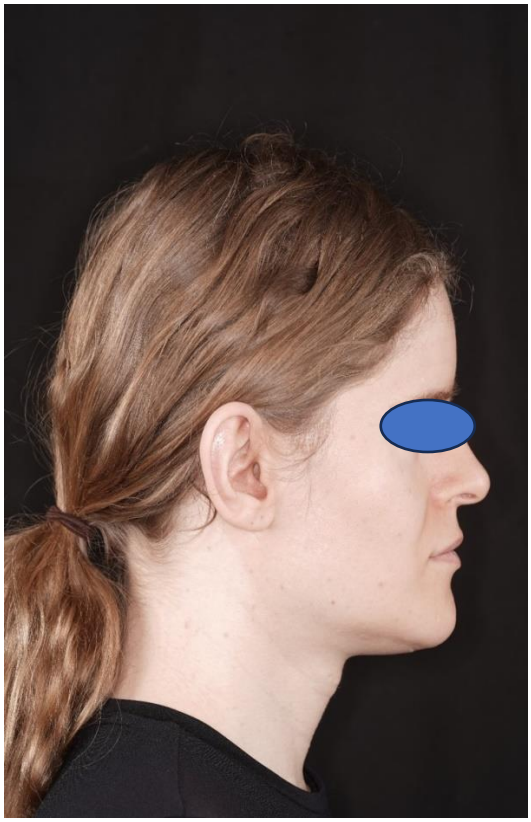


Figure 17. Profile postoperative view showing softer mandibular angles, being less squared, more rounded, and a softer and shorter chin. Improve midface soft tissues support and brow position .

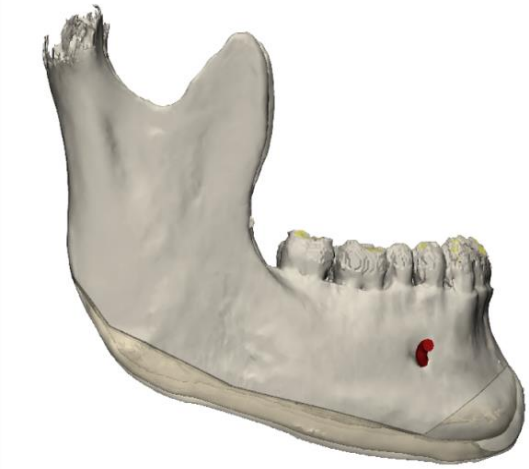


Figure 18. Virtual Surgical Planning of reduction mandibuloplasty and genioplasty

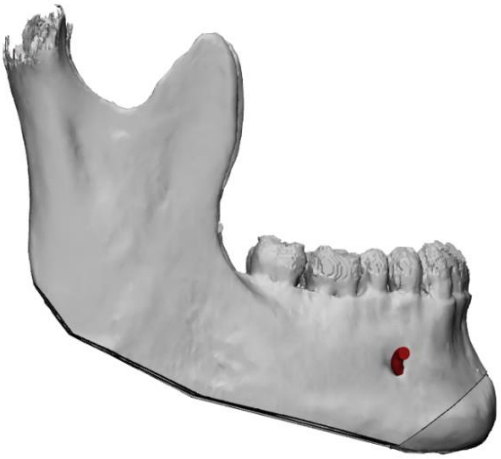


Figure 19. Planned Virtual Surgical result after mandibuloplasty and genioplasty

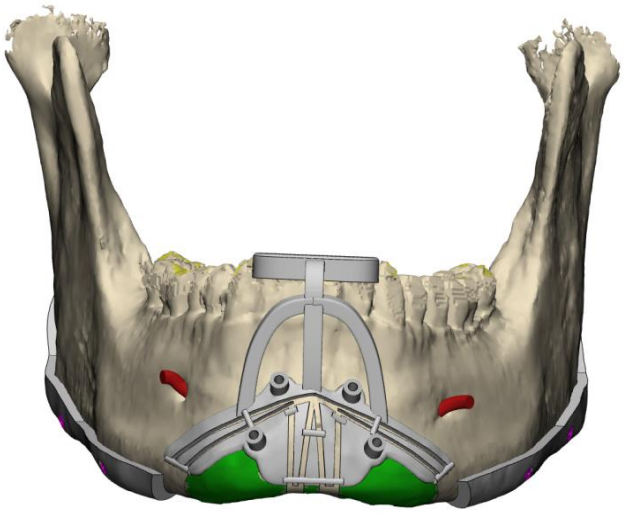


Figure 20. Surgical cutting guides for mandibuloplasty and inverted "V" shape genioplasty. Green areas show areas to be shaved. Note for holes for custom made miniplate fixation of the genioplasty.

Clinical Outcomes and PROMs

Quantitative data show consistent achievement of gender-congruent cephalometric outcomes. Feminizing movements result in narrower mandibular width (mean reduction: 8.2 mm), increased incisor show (mean: +3.5 mm), and decreased gonial flare. Masculinizing changes produce increased chin projection (+6.1 mm) and enhanced jawline definition[25]

PROMs demonstrate high satisfaction, with FACE-Q scores averaging 89/100 in FFS and 86/100 in FMS cases. Psychological assessments reveal substantial reductions in dysphoria, anxiety, and social discomfort[26,27].

Complications and Revisions

Complication rates remain comparable to traditional orthognathic surgery. Transient paresthesia affected 22% of patients, resolving within six months in most[28]. Minor infection occurred in 1.7% of cases. Revision was more common in feminization (12.4%) than masculinization (8.9%), typically for minor asymmetries or additional contouring[29].

Discussion

The findings of this review underscore the central role of orthognathic surgery in achieving gender-congruent facial morphology, both as a standalone intervention and as a scaffold for further facial feminization or masculinization procedures. The ability to reshape fundamental craniofacial dimensions—including jaw projection, facial height, and incisor display—positions orthognathic surgery as a cornerstone in comprehensive facial gender-affirming care.

Orthognathic movements tailored to feminization, such as maxillary advancement and clockwise rotation of the occlusal plane, offer predictable enhancement of midface convexity and incisor exposure, which are critical markers of femininity. Similarly, mandibular setbacks and chin narrowing effectively reduce the angularity and breadth of the lower face. These interventions, while skeletal in focus, have profound effects on soft tissue dynamics and social perception, aligning the patient's facial appearance more closely with their gender identity. Conversely, masculinization procedures reinforce angularity, projection, and skeletal prominence—traits culturally associated with male facial features[30].

Importantly, these surgical principles are not exclusive to transgender individuals. An increasing number of **cisgender patients** are also seeking orthognathic procedures to enhance **sexual dimorphism**, aiming to accentuate feminine or masculine facial features. For these individuals, surgery is not about transitioning between gender identities but about optimizing or intensifying existing gender-related facial traits. This underscores the **broader applicability** of orthognathic and adjunctive procedures in aesthetic and identity-aligned care.

From an epidemiologic standpoint, facial feminization and masculinization surgeries—including orthognathic components—are now performed more frequently than many classic craniofacial operations, such as cleft lip and palate repairs[31]. Recent data from specialized centers indicate that gender-related facial surgeries outnumber cleft-related procedures in urban surgical units with dedicated gender-affirming programs, reflecting rising societal recognition and acceptance, as well as growing demand for facial harmony in both transgender and cisgender populations.

The integration of orthognathic procedures with adjunctive skeletal and soft tissue surgeries optimizes the outcome. Forehead recontouring and orbital reshaping in the upper third, zygomatic adjustments in the midface, and chin and jaw modifications in the lower third establish facial harmony. Soft tissue refinements—such as lip lifts, rhinoplasty, mastoid contouring, brow repositioning, and facial lifting—further adapt the skin envelope and facial expression to reflect gender identity.

It is essential to distinguish **facial gender-affirming surgery** (FFS/MFS) from purely **aesthetic surgery**.

While both may share overlapping techniques and tools, their goals differ. Gender-affirming surgery is primarily intended to reduce gender dysphoria and align facial appearance with internal identity, a medically necessary intervention for many[32]. Aesthetic surgery, in contrast, is often pursued to enhance beauty, symmetry, or facial youthfulness without an underlying discordance between gender identity and physical features. In many cases, patients seek a **dual outcome**—enhancing both identity congruence and aesthetic appeal—but the distinction remains critical in terms of psychological intent, clinical justification, and surgical planning.

While highly effective, these interventions are not without limitations. Patient expectations must be realistically managed, particularly when soft tissue responses to skeletal repositioning vary. Complications such as nerve paresthesia, although typically transient, and the need for revision surgery should be clearly communicated during preoperative counseling. Differences in satisfaction rates between FFS and FMS patients suggest that social and psychological pressures may differentially impact perceived surgical success.

Potential sources of bias in the literature include heterogeneity in study designs, variability in outcome metrics, and reliance on subjective patient-reported outcomes. Furthermore, many studies lack long-term follow-up, limiting insights into stability and psychosocial adaptation over time. Standardization in cephalometric evaluation and PROM tools would enhance comparative research and clinical benchmarking.

Despite these limitations, the evidence supports orthognathic surgery as a critical modality in the gender-affirming surgical arsenal. Its skeletal permanence, potential for dramatic contour changes, and compatibility with other procedures make it indispensable in multidisciplinary care. Future directions should include longitudinal cohort studies, patient-centered outcome research, and innovations in virtual planning and AI-assisted diagnostics to further refine surgical precision and patient satisfaction.

In summary, orthognathic surgery not only restores occlusal and functional harmony but also acts as a transformative tool in the affirmation of gender identity and the enhancement of facial sexual dimorphism. Its integration with aesthetic procedures in a sequenced, algorithmic approach offers one of the most powerful strategies for achieving facial gender congruence and improving the quality of life in both transgender and cisgender patients seeking gender-aligned facial features.

Conclusions

Orthognathic surgery plays a foundational role in the evolving landscape of facial gender-affirming and aesthetic surgery. Its ability to alter skeletal dimensions with precision and permanence makes it an essential modality not only for transgender individuals seeking facial alignment with their gender identity, but also for cisgender patients pursuing enhanced sexual dimorphism.

This procedure, when performed within a multidisciplinary, algorithmic framework, allows for predictable, stable, and meaningful changes in facial morphology. By addressing the structural bases of facial shape—particularly the maxilla, mandible, and chin—orthognathic surgery facilitates both functional rehabilitation and profound aesthetic transformations.

Importantly, facial feminization and masculinization surgeries must be clearly distinguished from conventional aesthetic procedures. Although they may use similar techniques, the goals, indications, and psychosocial impact differ substantially. Gender-affirming surgery addresses medical and psychological needs related to identity, while aesthetic interventions typically aim to enhance appearance within one's affirmed gender.

As the demand for facial gender-related surgery continues to rise—now surpassing more traditional craniofacial surgeries in specialized centers—

orthognathic interventions are becoming increasingly relevant. The future of this field lies in expanding access, refining outcomes through standardized protocols and digital planning, and continuing to explore the psychosocial benefits that these transformative procedures offer.

In conclusion, orthognathic surgery should be recognized not only as a corrective or functional tool, but as a powerful mechanism for identity affirmation, gender congruence, and aesthetic enhancement across diverse patient populations.

Funding:

This research received no external funding.

Informed Consent Statement:

Written informed consent has been obtained from the patient) to publish this paper and the accompanying images.

Conflicts of Interest:

The authors declare no conflicts of interest.

References:

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association; 2000.

2. Caprini, Rachel M. BS*; Oberoi, Michelle K. MD*; Dejam, Dillon BS*; Chan, Candace H. BS*; Potemra, Hi'ilani M.K. MS*; Morgan, Katarina B.J. D.D.S†; Weimer, Amy MD‡,§; Litwin, Mark S. MD, MPH§,‖,¶,#; Mendelsohn, Abie H. MD§,**; Lee, Justine C. MD, PhD*,§. Effect of Gender-affirming Facial Feminization Surgery on Psychosocial Outcomes. Annals of Surgery 277(5):p e1184-e1190, May 2023. | DOI: 10.1097/SLA.0000000000005472

3. Almazan AN, Keuroghlian AS. Association Between Gender-Affirming Surgeries and Mental Health Outcomes. *JAMA Surg*. 2021;156(7):611–618. doi:10.1001/jamasurg.2021.0952

4. Raffaini, M., Sesenna, E., & Raffaini, G. (2016). Surgical treatment of facial gender dysphoria. International Journal of Oral and Maxillofacial Surgery, 45(1), 85-91.

5. Raffaini M, Magri AS, Agostini T. Full Facial Feminization Surgery: Patient Satisfaction Assessment Based on 180 Procedures Involving 33 Consecutive Patients. Plast Reconstr Surg. 2016 Feb;137(2):438-448. doi: 10.1097/01.prs.0000475754.71333.f6. PMID: 26818277.

6. O'Ryan F, Lassetter J. Optimizing facial esthetics in the orthognathic surgery patient. *J Oral Maxillofac Surg*. 2011;69:702–715.

7. Fisher EL, Morrison S, Susarla SM, Ettinger R. Planning the Cut: Gender-Affirming Considerations in Orthognathic Surgery. J Oral Maxillofac Surg. 2024 Nov;82(11):1343-1346. doi: 10.1016/j.joms.2024.07.017. PMID: 39488343.

8. Fisher, A., Kim, J., & Patel, R. (2024). Multidisciplinary Approaches in Facial Gender Surgery. Journal of Craniofacial Surgery, 35(2), 189-195.

9. Gray R, Nguyen K, Lee JC, Deschamps-Braly J, Bastidas N, Tanna N, Bradley JP. Osseous Transformation with Facial Feminization Surgery: Improved Anatomical Accuracy with Virtual Planning. Plast Reconstr Surg. 2019 Nov;144(5):1159-1168. doi: 10.1097/PRS.0000000000006166. PMID: 31397786.

10. Farkas LG, Ed. *Anthropometry of the Head and Face*. New York: Raven Press; 1994.

11. Coleman, E., Radix, A. E., Bouman, W. P., Brown, G. R., de Vries, A. L. C., Deutsch, M. B., … Arcelus, J. (2022). Standards of Care for the Health of Transgender and Gender Diverse People, Version 8. *International Journal of Transgender Health*, *23*(sup1), S1–S259. https://doi.org/10.1080/26895269.2022.2100644

12. Becking AG, Tuinzing DB, Hage JJ, Gooren LJ. Transgend er feminization of the facial skeleton. *Clin Plast Surg*. 2007;34:557–564.

13. Tugnet N, Goddard JC, Vickery RM, Khoosal D, Terry TR. Current management of male-to-female gender identity disorder in the UK. *Postgrad Med J*. 2007;83:638–642.

14. Ainsworth TA, Spiegel JH. Quality of life of individuals with and without facial feminization surgery or gender reassignment surgery. *Qual Life Res*. 2010;19:1019–1024.

15. Ousterhout DK. Dr. Paul Tessier and facial skeletal masculinization. *Ann Plast Surg*. 2011;67: S10–S15.

16. Hage JJ, Becking AG, de Graaf FH, Tuinzing DB. Genderconfirming facial surgery: Considerations on the masculinity and femininity of faces. *Plast Reconstr Surg*. 1997;99:1799–1807.

17. Capitan L, Simon D, Kaye K, Tenorio T. Facial feminization surgery: The forehead. Surgical techniques and analysis of results. *Plast Reconstr Surg*. 2014;134:609–619.

18. Becking AG, Tuinzing DB, Hage JJ, Gooren LJ. Transgender feminization of the facial skeleton. *Clin Plast Surg*. 2007;34:557–564.

19. Sturm A, Chaiet SR. Chondrolaryngoplasty-Thyroid Cartilage Reduction. Facial Plast Surg Clin North Am. 2019 May;27(2):267-272. doi: 10.1016/j.fsc.2019.01.005. PMID: 30940393.

20. Endara MR, Allred LJ, Han KD, Baker SB. Applications of fat grafting in facial aesthetic skeletal surgery. *Aesthet Surg J*. 2014;34:363–373.

21. Noureai SA, Randhawa P, Andrews PJ, Saleh HA. The role of nasal feminization rhinoplasty in male-to-female gender reassignment. *Arch Facial Plast Surg*. 2007;9:318–320.

22. Boucher F, Gleizal A, Mojallal A, Bachelet JT. Chirurgie de féminisation du visage – tiers moyen et inférieur [Facial feminization surgery - middle and inferior thirds]. Ann Chir Plast Esthet. 2017 Apr;62(2):122-130. French. doi: 10.1016/j.anplas.2016.12.003. Epub 2016 Dec 30. PMID: 28043709.

23. Altman K. Facial feminization surgery: Current state of the art. *Int J Oral Maxillofac Surg*. 2012; 41:885–894

24. La Padula S, Coiante E, Beneduce N, Valentini V, D'Andrea L, Giudice GL, Pensato R, Ungerer L, Hersant B, Meningaud JP. Assessment of deep plane facelift in facial feminization surgery: A prospective pilot study. J Plast Reconstr Aesthet Surg. 2023 Oct;85:425-435. doi: 10.1016/j.bjps.2023.07.023. Epub 2023 Jul 20. PMID: 37579653.

25. Morrison SD, Vyas KS, Motakef S, Gast KM, Chung MT, Rashidi V, Satterwhite T, Kuzon W, Cederna PS. Facial Feminization: Systematic Review of the Literature. Plast Reconstr Surg. 2016 Jun;137(6):1759-1770. doi: 10.1097/PRS.0000000000002171. PMID: 27219232.

26. Morrison SD, Capitán-Cañadas F, Sánchez-García A, Ludwig DC, Massie JP, Nolan IT, Swanson M, Rodríguez-Conesa M, Friedrich JB, Cederna PS, Bellinga RJ, Simon D, Capitán L, Satterwhite T. Prospective Quality-of-Life Outcomes after Facial Feminization Surgery: An International Multicenter Study. Plast Reconstr Surg. 2020 Jun;145(6):1499-1509. doi: 10.1097/PRS.0000000000006837. PMID: 32459779.

27. Raner GA, Jaszkul KM, Bonapace-Potvin M, Al-Ghanim K, Bouhadana G, Roy AA, Bensimon É. Quality of life outcomes in patients undergoing facial gender affirming surgery: A systematic review and meta-analysis. Int J Transgend Health. 2023 Nov 20;25(4):653-662. doi: 10.1080/26895269.2023.2278736. PMID: 39465064; PMCID: PMC11500551.

28. Gursky AK, Chinta SR, Wyatt HP, Belisario MN, Shah AR, Kantar RS, Rodriguez ED. A Comprehensive Analysis of Genioplasty in Facial Feminization Surgery: A Systematic Review and Institutional Cohort Study. J Clin Med. 2024 Dec 31;14(1):182. doi: 10.3390/jcm14010182. PMID: 39797264; PMCID: PMC11721636.

29. Knox J, Hoffman WY. Facial Gender-Affirming Surgery: Pitfalls, Complications, and How to Avoid Them. Oral Maxillofac Surg Clin North Am. 2024 May;36(2):237-245. doi: 10.1016/j.coms.2024.01.004. Epub 2024 Feb 23. PMID: 38402140.

30. Deschamps-Braly JC. Facial Gender Confirmation Surgery: Facial Feminization Surgery and Facial Masculinization Surgery. Clin Plast Surg. 2018 Jul;45(3):323-331. doi: 10.1016/j.cps.2018.03.005. PMID: 29908620.

31. Taritsa IC, Ledwon JK, Bajaj A, Gosain AK. 12-Year Trends of Orofacial Clefts in the United States: Highlighting Racial/Ethnic Differences in Prevalence of Cleft Lip and Cleft Palate. Cleft Palate Craniofac J. 2025 May;62(5):820-828. doi: 10.1177/10556656241227033. Epub 2024 Jan 30. PMID: 38291621.

32. https://wpath.org/publications/soc8/

