

Assessing the Influence of Asymmetry Affecting the Mandible and Chin Point on Perceived Attractiveness in the Orthognathic Patient, Clinician, and Layperson

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Purpose: The purpose of this investigation was to undertake an objective and quantitative evaluation of how severity of asymmetries affecting the mandible and chin point influence perceived attractiveness.

Materials and Methods: The mandible and chin point of idealized male and female frontal facial images were altered in 5-mm increments from 0 to 25 mm and to the left and right, to represent horizontal, vertical, and combined asymmetry affecting these regions. These images were rated on a 7-point Likert scale by a preselected group of orthognathic patients before treatment, clinicians, and laypeople.

Results: In relation to a 5-mm asymmetry, observers progressively decreased attractiveness ratings and increased the desire for surgery for greater asymmetries. Clinicians and patients were found to be more critical than laypeople. The desire for surgery decreased by 3% for each year increase in age, was 53% less for men, and 45% greater for white observers.

Conclusions: Asymmetry of 10 mm is perceived as being significant; at 5 mm and below, it is largely unnoticed. The greater the degree of asymmetry greater than 10 mm, the more noticeable and the greater the desire was for correction. Clinician and patient ratings were similar and more critical than ratings of laypeople. A desire for surgery was negligible for 5 mm of asymmetry but increased considerably at 10 mm and continued to increase with greater degrees of asymmetry. The highest-rated images showed perfect bilateral symmetry, whereas the lowest-rated images showed significant degrees of mandibular and chin asymmetry.

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J Oral Maxillofac Surg 70:192-206, 2012

Symmetry is defined as a correspondence in the size, shape, and relative position of parts on opposite sides of a dividing line or median plane. Asymmetry is described as a lack or absence of symmetry. The

application of this definition to the human face illustrates an imbalance or disproportionate aspect between the right and left sides. Although a mild degree of asymmetry is normal and acceptable in the average

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0278-2391/12/7001-0\$36.00/0

doi:10.1016/j.joms.2010.12.055

face, greater degrees of asymmetry have been correlated with clinical depression, low self-esteem, and other health problems associated with poor quality of life, such as neurosis and inferiority complex.¹ Some studies have demonstrated that facial asymmetry can have a significant influence on perceived attractiveness.^{2,3}

Facial asymmetry can be caused by a range of factors that affect the underlying facial skeleton and/or overlying soft tissues. Asymmetry of the lower third of the face often results from asymmetric growth of the mandible, which may be predominantly horizontal (hemimandibular elongation) or predominantly vertical (hemimandibular hyperplasia) in direction, or a combination of the 2.⁴

Each facial parameter, such as lower facial symmetry, will have an “average” value or “norm” for a given population, which is specific for age, gender, and ethnicity. Each of these norms will also have a range of variability, with the existence of a facial deformity often resulting from a significant deviation of 1 or more facial parameters from the accepted norm for a population. At what point does the deviation of a facial parameter move from the limits of the acceptable range of variability into being perceived as a facial deformity?

The magnitude of the deviation, whether it is from an underlying dentoskeletal discrepancy, the overlying facial soft tissues, or a combination of the 2, is an important factor in decision-making when jaw surgery may be required. If the magnitude of the discrepancy of a facial parameter is great (eg, significant mandibular asymmetry), then the treatment planning decision may be relatively straightforward. However, there are significant numbers of patients who are regarded as “borderline” in need for surgical treatment. In such patients, the decision-making process may be transferred from subjective clinical judgment to objective, evidence-based guidance based on data from studies investigating perceptions of facial attractiveness. For example, if the relative position or size of a facial parameter, such as chin asymmetry, is being assessed, it may be found that a large percentage of observers find that greater than x millimeters of chin asymmetry from the facial midline is regarded as unattractive and requires surgical correction. This would provide objective evidence to guide clinicians when planning treatment.

Mandibular and chin point asymmetry are potentially important factors in the perception of facial attractiveness. To date there have been no investigations on the perceptions of attractiveness in relation to mandibular and chin point asymmetry. Therefore, no objective evidence currently exists to help clinicians in planning the treatment of patients

with these types of facial deformity in relation to the influence of severity on perceived attractiveness.

The principle aim of this investigation was to quantitatively evaluate the influence of mandibular and chin point asymmetry on perceived attractiveness. In addition, the relation between degree of asymmetry and attractiveness was recorded to ascertain the range of normal variability in observer acceptance and determine the clinically significant threshold value or cutoff point beyond which a mandibular and chin point asymmetry is perceived as unattractive and treatment is desired. The perceptions of orthognathic patients, clinicians, and laypeople were compared for these different variables.

Materials and Methods

Ethical approval was sought and granted for the study.

IMAGES

Two-dimensional facial profile silhouettes have been routinely used to assess the perceptions of facial profile attractiveness. However, it is not possible to assess frontal facial views using silhouettes. Therefore, idealized 2-dimensional frontal facial views were created using computer software.

Front-Face Images

A male and a female frontal facial image were created with computer software (Adobe Photoshop CS2; Adobe Systems Inc, San Jose, CA). The 2 images were then manipulated using the same computer software to construct an “ideal” male and an “ideal” female symmetrical frontal facial image with proportions⁵ and soft tissue measurements⁵⁻¹¹ based on currently accepted criteria (ie, vertical facial trisection, vertical facial bisection, upper lip to lower lip/chin height proportion, transverse rule-of-fifths, bitemporal width–bizygomatic width–bigonial width ratio, mouth width—equal to the distance between the medial iris margins, total face height, lower anterior face height, upper lip height, upper vermilion height, lower lip height, lower vermilion height, lower lip/chin height, vertical position of mentolabial fold, nasal height, nasal width, nasal alar base width, eye width, eye shape, eyebrow position and shape, and ear position and height).

Front-Face Image Manipulation (Incremental)

For mandibular and chin point asymmetry, the male and female images were manipulated, to the left and the right, in 5-mm increments from 0 to 25 mm, in horizontal (corresponding to the mandibular and chin point asymmetry viewed in hemimandibular elongation), ver-

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