

Interdisciplinary management of facial alterations in Latin American: What do we know?

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The interdisciplinary management of facial alterations is of great interest for oral and maxillofacial surgeons as well as for contemporary orthodontists in search of a functional and aesthetic result for the patient. However, due to the environmental or genetic etiological factors, these alterations require a management that goes beyond the dental field. The analysis of facial asymmetries in Latin American mestizo individuals has to be approached employing several disciplines, considering the specific characteristics of this group. Yet, the management is still debatable due to the different clinical protocols as well as to limited scientific and evidence-based clinical literature. The face is one of the dimensions of the human body that reflects our identity. Lack or absence of symmetry is defined as asymmetry,^{1,2} and it influences facial attractiveness, affecting interpersonal relationships and the daily life of the individual.³

Many body parts develop with bilateral symmetry. However, due to biological factors inherent to the development processes as well as to environmental disturbances, perfect bilateral symmetry is rarely found in living organisms.^{4,5} Inheritance is the genetic transmission that determines a phenotype. The etiology of facial alterations is diverse and complex, with different origins of facial asymmetry, such as: i) congenital, of prenatal origin; ii) evolutionary, originating during growth with discrete etiologies; and iii) acquired, as a result of functional mandibular displacements, traumatic injury or any pathology.³ From a genetic point of view, slight asymmetries are imperceptible and are considered normal. The lower and middle parts of the face as well as the upper and lower jaws develop from the medial and late lateral nasal processes.^{5,6} Several researchers have explored certain environmental factors that would influence facial morphology, relating it to poverty and/or socioeconomic status among others.^{2,7}

In a biological sense, the current mixing process in the population of Latin America generates complex nonlinear genetic and phenotypic patterns,² considered a natural reference for anthropological and epidemiological studies, which can be used to infer the genetic basis of traits of interest.⁸ Since non-pathological asymmetry is "indiscernible", it is differentiated into three categories: directional asymmetry (DA), anti-asymmetry (AA), and fluctuating asymmetry (FA), from which the multiple morphometric characteristics arise.^{1,3} The differences and

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magnitudes in patterns of DA and FA of the samples studied in Latin American mixed individuals exhibit a higher number of Amerindian genetic ancestors and show asymmetric changes. That is, the higher the degree of mixing, the lower the levels of asymmetry displayed, which supports the notion that the expression of facial asymmetry is not directed by a dominant or epistatic effect, and that the genetic and environmental conditions of mixed individuals cannot be seen as a case of development instability. Therefore, individuals with greater proportions of a parental genetic background are more asymmetrical.² The Amerindian and African ancestry in Latin America together with the influence of European descent have contributed to the Latin American ethnic mixture (mestizo) with a wide range of origins, which is seen as a natural experiment for anthropological and epidemiological studies. In the same manner, it provides an adequate scenario to explore the central tendency and FA variation across a wide geographic range.⁸ Both the asymmetry between paired structures and between the right and left halves of the human face are common findings.⁶

According to the study by Kornreich *et al.*,⁶ asymmetries are greater in men than in women. In addition, it was observed that the average asymmetries

in both sexes increase gradually from 43.8% in the upper third of the face to 53.4% in the lower third. The management of facial asymmetry is a necessary and arduous and challenging task essential for a precise qualitative and quantitative diagnosis and to formulate a rational plan of integrated treatment. A combination of orthodontics and orthognathic surgery is needed in accordance to the objectives of the aesthetic treatment, which varies according to the severity of the case, age, gender, region, stage of growth, complexity, and the realistic expectations of the patient since, today, facial appeal is the main reason for consultation.^{1,9}

The facial phenotypic complex has been insufficiently analyzed and it constitutes a field not yet explored and with few results but from which unprecedented findings can be extracted. The future unfolds a broad spectrum of research on genetic alterations that will contribute to early detection of alterations in the oral-facial structures and mutations involving organs of the oral cavity so as to determine some of these alterations.^{7,10} At present, systems for the quantification of asymmetry that could quickly and accurately detect facial asymmetries in adults are not yet mastered. Clinical studies might lead to research in order to increase our knowledge about the pathogenesis of asymmetry.

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