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Original Research Article

# Clinical epidemiological analysis of malocclusions and facial biotype at the Mexican center of stomatology, Morelia campus

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## Abstract

**Introduction:** The Mexican population, characterized by extensive genetic mixing, presents anthropometric variations influenced by genetic, environmental and geographical factors. These differences affect skeletal, dental and facial biotypes, essential for accurate orthodontic diagnosis and treatment.
**Objectives:** Determine the prevalence of skeletal classes and facial biotypes in patients treated at the orthodontic clinic of the Mexican Center for Stomatology Campus Morelia.
**Materials and Methods:** Retrospective, descriptive and analytical study in 94 complete clinical records from the orthodontic clinic. Age, sex, place of origin, treatment philosophy, skeletal class, facial biotype and use of orthopedic devices were analyzed.
**Results:** Of the records reviewed, the predominant age range was 12 years. More female patients were observed, with a higher prevalence in the dolichofacial biotype. The most frequent dental class was Class II. In terms of work philosophies, 45 Roth, 20 MBT and Alexander 3 were applied. In addition, 19 orthopedic devices were activated.
**Conclusion:** The patients treated at the orthodontic clinic of the Mexican Center for Stomatology, Morelia Campus, showed a greater tendency toward Class II dental malocclusion and dolichofacial biotype compared to what was reported by the authors evaluated.

**Keywords:** Orthodontics, Health profile, Mexico, Technique

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## 1. Introduction

The Mexican population is primarily distinguished by a significant genetic admixture resulting from the integration of various genotypes distributed throughout the national territory. This admixture, commonly referred to as mestizaje, includes Amerindian, European, African, and Asian components, whose historical interaction has profoundly influenced a wide range of both biological and cultural aspects. Over time, this process of genetic and cultural integration has shaped the national identity and led to observable changes in physical characteristics, particularly anthropometric traits, including notable variations in skeletal and dental classifications.[1-4]

According to Hernández-Moreno TY, research conducted in distinct geographic regions of the country demonstrates the predominance of specific skeletal and dental types, depending on the local genetic and environmental factors. This regional morphological variability is closely associated with elements such as climate, altitude, nutrition, and ancestral lineage. Therefore, the establishment of clear, objective, and standardized criteria for the classification of skeletal morphology, dental characteristics, and malocclusions is of paramount importance. Such classification facilitates not only a better understanding of biological diversity among populations but also more accurate diagnostic and therapeutic planning in dental specialties such as orthodontics.[5-8]

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In this context, Rivas GR and Rojas-García AR have noted that the Latin American population, when compared to other North American groups, tends to present a more protrusive skeletal and dental profile. This observation highlights the necessity of recognizing that different racial and ethnic groups exhibit distinct patterns of craniofacial growth and development, influenced not only by genetic inheritance but also by environmental, social, and geographical factors.[9]

Malocclusion can be broadly defined as a deviation in the normal growth of the maxillary or mandibular bones or in the positioning of the teeth, resulting in impaired function of the masticatory system. From a technical standpoint, any irregular occlusal contact between the maxillary and mandibular teeth qualifies as a malocclusion. Common types include overbite, open bite, crossbite, and underbite. Beyond functional impairment, malocclusions can produce significant aesthetic concerns, affecting physical appearance, facial symmetry, and, frequently, the patient's emotional and social well-being. Despite its clinical relevance, there is currently no universally accepted system for determining the severity of malocclusion that warrants orthodontic intervention.

The term facial biotype refers to the set of morphological and functional characteristics that define the growth direction and structural behavior of the face. This concept encompasses both hereditary and environmental influences that shape craniofacial development. Facial biotypes are generally classified into three main categories: brachyfacial, mesofacial and dolichofacial. Proper identification of a patient’s facial biotype is essential for comprehensive diagnosis and for selecting the most appropriate orthodontic treatment strategy, as each type exhibits a distinct response to applied biomechanical forces.[8-15]

### *1.1. Malocclusions*

*Class I:* Normal relationship between the upper and lower molars; the mesiobuccal cusp of the upper first molar fits into the buccal groove of the lower first molar. *Class II:* The lower first molar is positioned distally relative to the upper first molar. *Division 1:* Protrusion of the upper incisors, with increased overjet and a convex profile. *Division 2:* Retrusion of the upper incisors, with a deep overbite and a straighter profile. *Class III:* The lower first molar is positioned mesially relative to the upper first molar.

## 2. Materials and Methods

### *2.1. Study type*

Retrospective, descriptive, analytical, and quantitative, study Universe: 94 orthodontic clinic records.

### *2.2. Inclusion criteria*

Records from the last five years that are complete.

### *2.3. Exclusion criteria*

Records older than five years.

### *2.4. Elimination criteria*

Incomplete records.

## 3. Results

A total of 94 clinical records corresponding to patients treated at the orthodontic clinic of the Mexican Center for Stomatology, Morelia Campus, were evaluated. The objective of the analysis was to collect and describe relevant data to identify the most frequent demographic, clinical, and therapeutic characteristics within this population. The variables considered included patient age, sex, place of origin, the orthodontic treatment philosophy applied, dental classification, facial biotype, and whether dental extractions were indicated as part of the orthodontic treatment plan.

The sample consisted of 94 patients, of whom 32 (34%) were male and 62 (66%) were female. The patients' ages ranged from 6 to 55 years, with the most common age group being 12 years old, which corresponds to a developmental stage during which various dentofacial anomalies are typically identified and treated. Regarding place of origin, 65 patients (69.1%) were residents of Morelia, Michoacán, while the remaining patients came from other nearby municipalities or localities. With respect to the orthodontic treatment philosophies employed in the clinic, three main approaches were identified: the Roth philosophy was the most frequently used, applied in 45 cases (47.9%), followed by the MBT philosophy with 20 cases (21.3%), and the Alexander philosophy in only 3 cases (3.2%). In addition to fixed appliance therapy, a total of 19 orthopedic appliances were activated, primarily in patients undergoing growth. These included 3 Roth self-ligating systems, 2 MBT self-ligating systems, and 2 deprogramming splints, which were used as part of a complementary therapeutic approach.

The analysis of these clinical records allowed for the characterization of the patient profile commonly seen in the institution, as well as the identification of trends in the selection of orthodontic techniques used by practitioners. This information is relevant for academic purposes, institutional planning, and future research concerning malocclusion patterns, therapeutic decision-making, and clinical outcomes in the Mexican population treated in academic settings. **Figure 1**

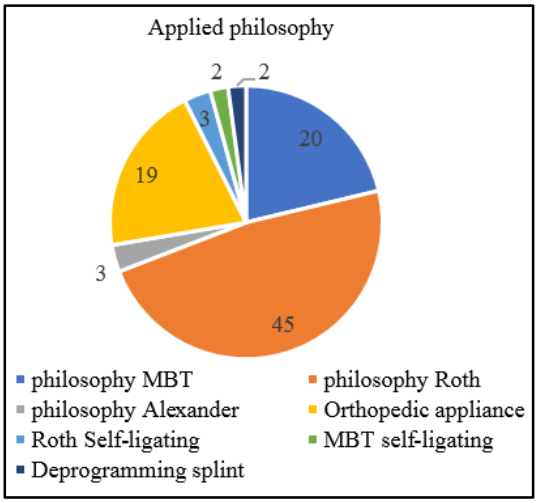


**Figure 1:** Applied philosophy according to records at the Mexican center for stomatology, Morelia campus.

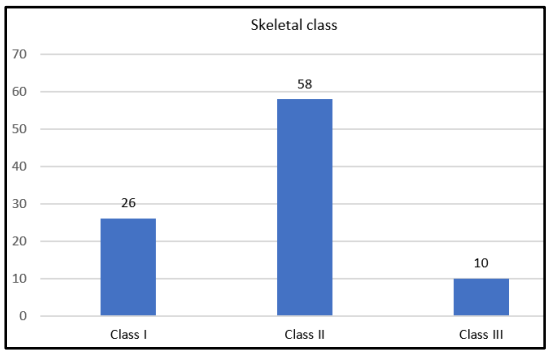


**Figure 2:** Reported skeletal class frequency, with Class II being the most commonly observed.

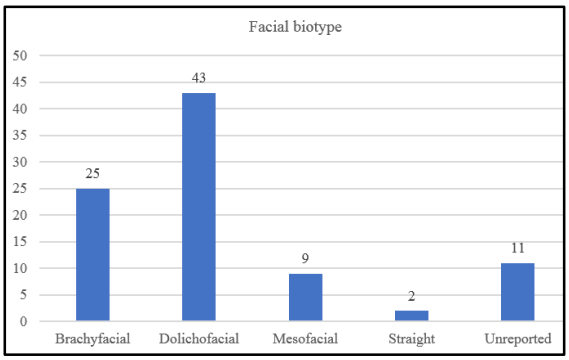


**Figure 3:** Reported facial biotype frequency, with dolichofacial being the most commonly observed.

The dental class with the highest frequency observed in the sample was Class II, present in a total of 58 patients, representing the largest proportion among the evaluated categories. Class I was the second most common, identified in 26 patients, while Class III was the least frequent, detected in only 10 patients. Regarding facial biotype, the most prevalent was dolichofacial, recorded in 43 patients, followed by brachyfacial with 25 cases and mesofacial with 9 cases. However, during a thorough review of the clinical records, it was noted that in 11 cases the patient's facial biotype was not documented, representing a limitation for a more comprehensive analysis. This lack of information highlights the importance of detailed clinical record-keeping to enable precise evaluations and to plan personalized orthodontic treatments based on the individual characteristics of each patient. **Figure 2**, **Figure 3**

## 4. Discussion

A thorough review of the literature available on various specialized scientific platforms reveals that studies focusing on the analysis of malocclusions and facial biotype in Mexico remain limited. Most evaluations have been conducted by international authors, highlighting a gap in local research that may be influenced by factors such as resource availability, infrastructure for clinical studies, and the concentration of research in specific regions. However, within this limited scientific output, the work of Villasana-Villa PG et al. stands out as a pioneering study analyzing the prevalence of malocclusions in a Mexican pediatric population, providing valuable data to understand the regional situation.

In their study, Villasana-Villa PG and colleagues evaluated a sample of 76 students aged between nine and 12 years. The results were striking: only 13.2% of subjects presented normocclusion, whereas a high 86.8% exhibited some degree of malocclusion, demonstrating a high incidence of these dentofacial alterations in the analyzed population. This finding is particularly relevant, as malocclusions can significantly impact masticatory function, facial aesthetics, and overall quality of life, besides often requiring complex and prolonged orthodontic treatments. Regarding the facial profile, analysis revealed a notable predominance of the straight profile in 64.5% of cases, followed by the convex profile in 26.3% and the concave profile in 9.2%. These results underscore the importance of including facial profile evaluation as an integral part of orthodontic diagnosis and treatment planning, given its close relationship with craniofacial growth and its influence on clinical decisions.

Concerning facial biotype, most patients were classified as mesofacial (68.4%), indicating harmonious and balanced facial growth in the studied population. The dolichofacial biotype, characterized by a longer and narrower face, was identified in 27.6%, while the brachyfacial biotype, corresponding to a shorter and wider face, was the least frequent at 3.9%. This pattern suggests a predominantly balanced distribution of facial growth within this sample, with less representation at the vertical and horizontal growth extremes. Additionally, regarding dental alterations associated with malocclusions, dental crowding was the most common condition, present in 61.8% of patients, followed by diastemas in 9.2%. These findings highlight the necessity for early monitoring of dental spacing in pediatric patients to prevent future orthodontic complications, potentially leading to less invasive treatments with better prognoses.[9]

Complementarily, Martínez-Barrera LK and Lehmann-Mendoza JM conducted a study with a sample of 120 patients to analyze the relationship between dental arch shape, facial profile, facial biotype, and skeletal class. Standardized methods were applied, such as Vert's analysis on lateral cephalometric radiographs, measurement of the facial convexity angle on profile photographs, and determination of skeletal class through Steiner's ANB angle. The results indicated that the oval shape was the most prevalent dental arch form in both the maxilla and mandible. However, no statistically significant association was found between dental arch shape and the other variables studied. This indicates that a specific dental arch form is not linked to a particular facial profile, facial biotype, or skeletal class, evidencing the complexity and heterogeneity of craniofacial and dental morphology, as well as the difficulty in defining universal patterns applicable to all populations.

These findings emphasize the lack of universal consensus regarding the correlation between dental arch form, facial profiles, and skeletal classes, highlighting the need for continued research to better understand morphological variations and their clinical implications. Although no direct correlations were identified, these variables remain fundamental for individualized orthodontic treatment planning, ensuring aesthetic, functional, and stable long-term outcomes tailored to each patient's specific characteristics.[10]

Finally, Rivas GR and Rojas-García AR suggest that, compared to other North American population groups, the Latin American population tends to exhibit a more protrusive skeletal and dental pattern. This phenomenon reflects how racial and ethnic groups may have differentiated growth and development norms, determined by both genetic inheritance and environmental and geographic factors specific to each region. These differences reinforce the need to consider biological and environmental context in the evaluation and planning of orthodontic treatment in diverse populations.[9]

## 5. Conclusion

Patients treated at the orthodontic clinic of the Mexican Center for Stomatology, Morelia Campus, exhibited a marked tendency toward Class II dental malocclusion and dolichofacial facial biotype compared to those reported by various authors in previous studies. This prevalence suggests a characteristic pattern within this population that differs from observations in other regions or ethnic groups. Conversely, no significant tendency toward Class III malocclusion was observed in the analyzed sample, contrasting with some reports from Latin American populations indicating a higher presence of this class. However, it is important to consider that this particularity may be influenced by genotypic and phenotypic factors specific to the region, as 99% of the reviewed records corresponded to patients originating from the state of Michoacán. This information is relevant because the genetic composition and environmental conditions of Michoacán could be determining these specific dentofacial characteristics. Therefore, the results underscore the importance of conducting regional studies to adapt diagnostic and therapeutic protocols to the peculiarities of each population, thus optimizing orthodontic care.

## 6. Source of Funding

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## 7. Conflict of Interest

No conflicts of interest.

## Reference

1. Rosique GJ. Introduction to Biological Anthropology: Origin, Variability, and Adaptation of Human Populations. 1st ed. Editorial Universidad de Antioquia. Colombia. 2021.
2. Adriana Z, Antinea MG, Fernando RV, Gabriela SM, Lourdes MM, Jorge AGV. Estimation of sex from the diameter of the humeral and femoral heads in Mexican populations from pre-Hispanic and contemporary times. *Rev Arg Antrop Biol*. 2022;24(1):1-12.
3. Pérez BK, Vallejo-Izquierdo LA, Armas-Vargas ADC. Orthognathic treatment for Class III correction with pre- and post-surgical orthodontics. Clinical case. Aula Virtual J. 2024;5(12):1718–26.
4. Mora-Pérez CDC, Álvarez MI, Blanco HA, Gómez-Ortiz ME. Development of orthodontics in Cienfuegos Province. *Medisur*. 2018;16(2):309–21.
5. Rivas PG, Álvarez MI, Mora-Pérez CDC, Morera PA, Pausa-González OJ. Scientific and technical advances in orthodontics and their social impact. Conrado J. 2020;16(72):39-48.
6. Hernández-Moreno TY. Analysis of the position of the lower incisor and the size of the mandibular symphysis in different malocclusions and vertical patterns. (Thesis in Orthodontics). Universidad de Panamá. Panamá, Republic of Panamá. 2018.
7. Gumiela MA, Muiño EJ, Morón C, Toriggia M, Castro L. Orthodontics and orthognathic surgery as allies in treatment. *J Argentine Ateneo of Dent*. 2019;61(2):27-36.
8. (Morales-Olivas MC. Prevalencia de malooclusiones en pacientes que acuden a la Facultad de Odontología de la UACH. (tesis maestria) Universidad Autonoma de Chihuachua. 2022
9. Rivas GR, Rojas-García AR. Cephalometric study a Mexican population´s and their comparison with populations of other regions. *Oral*. 2009;10(30):488–93.
10. Ugalde-Morales FJ. Clasificación de la maloclusión en los planos anteroposterior, vertical y transversal. *Revista ADM*. 2007;64(3):97-109.
11. Cubas C, Deysi S. Severity of malocclusion and need for treatment of malocclusions according to the Dental Aesthetic Index (DAI) in students aged 12 to 16 at the Fe y Alegría School No. 53, Lima, 2018 . (Bachelor's Thesis). Universidad Privada Norbert Wiener. Lima, Perú. 2019. https://repositorio.uwiener.edu.pe/entities/publication/e864b578-7832-4aa9-8507-87210a2ace88
12. Cerda PB, Sculz RS, López GJ, Romo OF. Clinical journal of periodontics, implantology and oral rehabilitation. *Rev Clin Periodoncia Implantol Rehabil*. 2019;12(1):08–11.
13. Calizana AR, Iglesias-Valdivia FA, Ibañe-Sevilla CT. Prevalence of facial biotype according to Ricketts' cephalometric analysis in radiographs obtained at a radiology center in Arequipa 2020. (Bachelor's Thesis). Facultad de Ciencias de la Salud Escuela profesional de Estomatología. Piura, Perú. 2021. https://repositorio.ucv.edu.pe/bitstream/handle/20.500.12692/63775/Calizana_AR-Iglesias_VFA-SD.pdf?sequence=1&isAllowed=y

14. Villasana-Villa PG, Clarke TE, Hernández GT. Prevalence of malocclusions in children at the “6 de Abril” elementary school in Hermosillo, Sonora, Mexico. *Rev AMOP*. 2013;25(1):102-207.
15. Martínez-Barrera LK, Lehmann-Mendoza JM. Asociación entre arcos dentarios con el perfil, biotipo facial y la clase esquelética en pacientes de la Clínica Juchimán II, UJAT. 2017. https://ri.ujat.mx/handle/20.500.12107/3243?locale=en

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