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ORIGINAL RESEARCH

Malocclusions and social determinants of health in patients at the Eloy Alfaro Lay University of Manabí

Maloclusiones y determinantes sociales de la salud en pacientes de la Universidad Laica Eloy Alfaro de Manabí

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ABSTRACT

Malocclusions are among the most common disorders in dentistry and are commonly classified according to Angle's criteria into Classes I, II, and III. Although their origin is multifactorial, social determinants of health (SDH) can influence their onset and the timeliness of care. Objective: To analyze the relationship between malocclusions and social determinants of health in the Orthodontic Clinic of the Dentistry Degree at ULEAM during the academic period 2025-1. Materials and methods: A descriptive, correlational, observational, cross-sectional study with a quantitative approach was conducted. The sample consisted of 90 patients selected using non-probability convenience sampling. Sociodemographic, clinical, and social determinants data were collected from medical records and administered surveys. Statistical analysis included frequencies, percentages, and the chi-square test to establish associations between variables. Results: Class I malocclusion was the most prevalent (71.1%), followed by Class II (25.6%) and Class III (3.3%). No statistically significant associations were found between Angle classification and gender (p = 0.567) or age (p = 0.090). Regarding SSD, conditions of vulnerability were identified, including food insecurity (45.6%), economic hardship (72.2%), and limited access to health services (45.6%). Conclusions: Although no significant associations were found between SSD and Angle class, the results show the presence of social factors that may indirectly influence oral health.
Keywords: Malocclusions. Social determinants of health. Angle classification. Orthodontics.

RESUMEN

Las maloclusiones son de las alteraciones más frecuentes en odontología y se clasifican comúnmente mediante los criterios de Angle en Clases I, II y III. Aunque su origen es multifactorial, los determinantes sociales de la salud (DSS) pueden influir en su aparición y en la oportunidad de atención. Objetivo: Analizar la relación entre las maloclusiones y determinantes sociales de la salud en la Clínica de Ortodoncia de la Carrera de Odontología en la ULEAM durante el período académico 2025-1. Materiales y métodos: Se realizó un estudio descriptivo correlacional, observacional, transversal con enfoque cuantitativo. La muestra fue de 90 pacientes seleccionados mediante muestreo no probabilístico por conveniencia. Se recopilaron datos sociodemográficos, clínicos y de determinantes sociales a partir de las historias clínicas y encuestas aplicadas. El análisis estadístico incluyó frecuencias, porcentajes y la prueba de Chi cuadrado para establecer asociaciones entre variables. Resultados: La maloclusión Clase I fue la más prevalente (71,1%), seguida de la Clase II (25,6%) y la Clase III (3,3%). No se encontraron asociaciones estadísticamente significativas entre la clasificación de Angle y el género (p = 0,567) ni con la edad (p = 0,090). Respecto a los DSS, se identificaron condiciones de vulnerabilidad, destacando inseguridad alimentaria (45,6%), dificultades económicas (72,2%) y limitaciones para el acceso a servicios de salud (45,6%). Conclusiones: Aunque no se hallaron asociaciones significativas entre los DSS y la clase de Angle, los resultados evidencian la presencia de factores sociales que pueden influir indirectamente en la salud bucal.
Palabras clave: Maloclusión. Determinantes sociales de la salud. Clasificación de Angle. Ortodoncia.

INTRODUCTION

People's living conditions, as well as how they learn, work, engage in leisure activities, and practice their religion, can affect health and generate disparities. Therefore, despite improvements in health care and disease prevention, health inequalities are real and difficult to counteract[1,2]. Likewise, the social determinants of health are reflected in the way people live, that is, whether they have access to medical care, economic stability, food security, and a safe climate. The social environment, as well as the educational and work environments, also have an impact. All these daily circumstances play a crucial role in patients' overall health. Consequently, health professionals must be trained to understand that they play a role in the detection, assessment, and management of these determinants in their clinical practice[2].

In this regard, there are social determinants that negatively impact health and well-being, such as poverty; lack of access to quality education or employment; substandard housing; unfavorable working and neighborhood conditions; and the concentration of disadvantages among specific population groups and in specific locations[3].

Similarly, social determinants act as risk factors for collective oral health. This translates into populations facing socioeconomic difficulties, belonging to less advantaged social strata, with low income and limited formal education, presenting a higher prevalence of oral diseases[4,5].

On the other hand, dental occlusion involves the dynamic relationship among the teeth (upper and lower), the maxilla, the mandible, the temporomandibular joint (TMJ), and the muscles. Ideally, a dynamic balance should exist to ensure the functional state of the stomatognathic system[6]. Malocclusions, by contrast, refer to misalignment or imbalance between the upper and lower teeth, as well as between the jaws, leading to unfavorable consequences for the patient from an anatomical, physiological, and aesthetic standpoint[7].

According to a scoping review conducted by Cenzato et al.[8], among the three Angle classes, Class I was the most frequent, followed by Class II, with Class III being the least frequent. Specifically, the prevalence of Class I ranged from 34.9% to 93.6%, while the average prevalence of Class II was 20.2%. In turn, Alhammadi et al.[9] reported that the global distribution of malocclusion according to Angle's classification was 74.7% for Class I, 19.56% for Class II, and 5.93% for Class III.

Orthodontics is commonly understood exclusively from its clinical dimension[10]. However, incorporating the analysis of the role of social determinants of health may allow for a more comprehensive approach that includes preventive strategies, considering patients within their social context, which is consistent with public health principles. Furthermore, since social determinants influence oral health from an early age[11], studying this relationship may reveal inequalities in the occurrence and treatment of malocclusions, which is crucial for improving health equity.

At the Orthodontics Clinic of the Dentistry Program at ULEAM, patients with different types of malocclusions are treated. This research aims to identify the types of malocclusions according to Angle's classification present in this population, while also exploring possible connections between malocclusions and the social determinants of health. Therefore, the objective of this study is to analyze the relationship between malocclusions and social determinants of health at the Orthodontics Clinic of the Dentistry Program at ULEAM during the academic period 2025-1.

MATERIALS AND METHODS

This was a descriptive study with a retrospective, observational, and cross-sectional design. The population consisted of the clinical records of patients who attended the Orthodontics Clinic of the Dentistry Program at ULEAM during the 2025-1 period, as well as oral health–related quality of life questionnaires completed by the patients with the support of their parents or legal guardians, and social determinants questionnaires completed by the guardians. A non-probabilistic convenience sampling method was used, resulting in a sample of 90 clinical records with their corresponding surveys.

Data were obtained through a database developed from the transcription of dental clinical records (Form 033) of the Ministry of Public Health[12] and from the application of the survey on social determinants of health and risk factors for oral health[13].

Ethical considerations

Prior to the execution of the research, the protocol was submitted to the Ethics Committee for Research Involving Human Beings of the Universidad Laica "Eloy Alfaro" de Manabí (CEISH–ULEAM) and was approved under code CEISH-ULEAM_0346. Before data collection, the parents and/or legal guardians of the participants signed an informed consent form. The right to anonymity and confidentiality was guaranteed, and ethical and responsible data management was ensured. The information contained in the clinical records was transcribed into a database, to which only the researchers had access.

Data analysis

Once the database was obtained in Excel (Microsoft Office 365), it was imported into the statistical software SPSS, version 2 7 (IBM), for data processing. Descriptive and inferential statistical measures were obtained. Data were presented in frequency distribution tables and cross-tabulation tables.

RESULTS

Demographic data showed a predominance of male patients, with 51 individuals (56.7%), and of the age group of nine years or older (51.1%). Regarding malocclusions, 71.1% were Class I and 25.6% were Class II (Table 1).

Table 1. Demographic characteristics and malocclusions in patients who attended the Orthodontics Clinic of the Dentistry Program at ULEAM during the 2025-1 period.

Gender	**n (90)**	**%**
Male	51	56.7
Female	39	43.3
Age group	**n (90)**	**%**
≤ 8	44	48.9
≤ 9	46	51.1
Malocclusions	**n (90)**	**%**
Class I	64	71.1
Class II	23	25.6
Class II	3	3.3

Source: Clinical records – Orthodontics Clinic of the Dentistry Program at ULEAM, 2025-1.

In the analysis of distribution by gender, it was concluded that in Class I, 53.1% were male and 46.9% were female. In Class II, 65.2% were male and 34.8% were female; meanwhile, in Class III, males accounted for 66.7% and females for 33.3%. The Chi-square test result (p = 0.567) showed no statistically significant differences between gender and Angle classification (Table 2). Class I was more frequent in the group aged 8 years or younger (56.3%) than in the group aged 9 years or older (43.7%).

On the other hand, Class II was more frequent among patients aged 9 years or older (69.6%), while Angle Class III was similarly distributed between the two age cohorts. The relationship between age and Angle classification was not statistically significant according to the Chi-square analysis (p = 0.090) (Table 2).

Table 2. Prevalence of malocclusions according to Angle classification among patients of the Orthodontics Clinic of the Dentistry Program at ULEAM during the 2025-1 period, by gender and age group.

Angle Classification	**Gender**				Totals	
	Male		Female			
	n	%	n	%	n	%
Class I	34	53.1	30	46.9	64	100
Class II	15	65.2	8	34.8	23	100
Class III	2	66.7	1	33.3	3	100

p = 0.567 (NS)
Chi-square test of independence.
S = Significant (p < 0.05); NS = Not significant (p ≥ 0.05)

Angle Classification	**Age group**				Gender	Totals
	≤ 8		≥ 9		Male	Female
	n	%	n	%	n	%
Class I	36	56.3	28	43.7	64	100
Class II	7	30.4	16	69.6	23	100
Class III	1	33.3	2	66.7	3	100
Totales	44	48.9	46	51.1	90	100

p = 0.090 (NS)
Chi-square test of independence.
S = Significant (p < 0.05); NS = Not significant (p ≥ 0.05)

Source: Clinical records – Orthodontics Clinic of the Dentistry Program at ULEAM, 2025-1.

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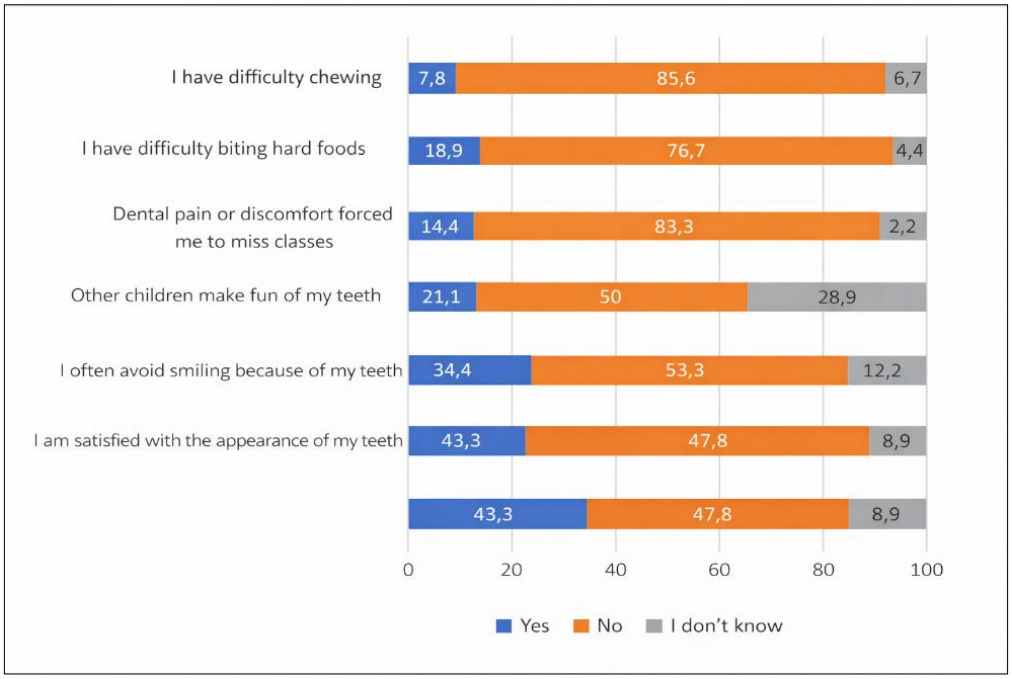
Patients reported various situations experienced due to dental or gingival problems. A total of 47.8% of participants stated that they were not satisfied with the appearance of their teeth, and 34.4% reported avoiding smiling because of their teeth (Figure 1).

Figure 1. Situations experienced by patients of the Orthodontics Clinic of the Dentistry Program at ULEAM during the 2025-1 period due to dental or gingival problems.



Source: Surveys conducted – Orthodontics Clinic of the Dentistry Program at ULEAM, 2025-1.

Regarding the frequency of dental visits, 31.1% of patients visited the dentist at least twice in recent months, 16.7% more than four times, while 17.8% had not visited a dentist in the past year and 1.1% had never received dental care (Table 3).

Table 3. Frequency of dental visits among patients of the Orthodontics Clinic of the Dentistry Program at ULEAM during the 2025-1 period.

Frequency of dental visits in recent months	n (90)	%
Once	9	10.0
Twice	28	31.1
Three times	11	12.2
Four times	8	8.9
More than four times	15	16.7
Did not visit in the last 12 months	16	17.8
Never received dental care or visited a dentist	1	1.1
Do not know / do not remember	2	2.2

Source: Surveys conducted – Orthodontics Clinic of the Dentistry Program at ULEAM, 2025-1.

With respect to other social determinants of health, the following findings are highlighted: regarding food access, 45.6% reported having experienced limitations in access to sufficient food during the past 12 months; concerning transportation, 27.8% stated that they had delayed or neglected medical appointments due to transportation difficulties or distance; 47.8% of the population reported having problems covering basic services such as water or electricity; 72.2% reported having insufficient income at some point to pay their bills; and 45.6% indicated that they needed medical care but were unable to attend due to lack of resources for transportation (Table 4).

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Table 4. Social determinants of health among patients of the Orthodontics Clinic of the Dentistry Program at ULEAM during the 2025-1 period.

Category	Item	Response options			
		Yes		No	
		n	%	n	%
Housing and shelter	Are you concerned that in the coming months you may not have stable housing that you own, rent, or belong to as part of your household?	37	41.1	53	58.9
Food	| In the past 12 months, did you ever eat less than you should because you were worried that food would run out before you had money to buy more, or because the food you bought did not last and you had no money to buy more?	41	45.6	49	54.4
Transportation	Do you postpone or neglect going to the doctor due to distance or transportation issues?	25	27.8	65	72.2
Utilities	In the past 12 months, have you had difficulty paying utility bills (electricity or water)?	43	47.8	47	52.2
Family care	Do you have difficulty finding or paying for childcare or care for dependent family members?	14	15.6	76	84.4
	If yes, do these problems make it difficult for you to work or study?	12	13.3	78	86.7
Income	Have you ever not had enough money to pay your bills?	65	72.2	25	27.8
Safety	Have you ever felt unsafe, been threatened, physically harmed, insulted, belittled, or shouted at in your home or neighborhood?	29	32.2	61	67.8
Health care	During the past month, did poor physical or mental health prevent you from carrying out your usual activities such as work, school, or hobbies?	28	31.1	62	68.9
	In the past year, was there a time when you needed to see a doctor but could not because it was too expensive?	41	45.6	49	54.4
Assistance	Would you like to receive help with any of these needs?	68	75.6	22	24.4
	Is any of your needs urgent?	39	43.3	51	56.7
Employment	Do you have a job or another stable source of income?	59	65.6	31	34.4
Education	Do you have a high school diploma?	79	87.8	11	12.2
Clothing and household items	Do you have enough household items, such as clothing, shoes, blankets, mattresses, diapers, toothpaste, and shampoo?	79	87.8	11	12.2

Source: Surveys conducted – Orthodontics Clinic of the Dentistry Program at ULEAM, 2025-1.

DISCUSSION

The results of the present study allow ~~for~~ an analysis of the impact of the ULEAM Mobile Dental Clinic on the oral health of children and adolescents in southern Manabí and enable comparison with similar research conducted in rural settings and vulnerable populations.

The equitable distribution of patients by gender is consistent with findings reported in previous studies, which have identified no significant differences in access to mobile dental services between boys and girls. This reinforces the inclusive nature of this care model in vulnerable populations [6]. This finding supports the effectiveness of mobile clinics as a strategy to promote equity in child oral healthcare.

Regarding age, the highest concentration of care in the 5–7-year age group (47.5%) is consistent with national and international research indicating that this age group presents greater vulnerability to dental caries, particularly in primary dentition [7], Due to inadequate oral hygiene habits and limited adult supervision. This result demonstrates that the mobile clinic is reaching a priority group for the early prevention of oral pathologies.

With respect to geographic distribution, the predominance of the canton of Manta as the main recipient of dental care aligns with studies reporting that mobile clinics tend to concentrate their interventions in areas with higher population density or greater logistical accessibility [8]. However, this concentration also reflects unequal coverage in cantons such as Portoviejo and Montecristi, a situation previously described as one of the main barriers to equitable access to oral health services in rural communities in Ecuador [9,10].

In terms of preventive interventions, the high frequency of dental prophylaxis and fluoride application in Manta and Jipijapa is consistent with other studies highlighting these procedures as priorities in community programs due to their low cost and high impact on plaque reduction and caries prevention. Nevertheless, the low application of dental sealants observed in this study differs from recommendations in the literature, which identify sealants as one of the most effective strategies for preventing caries in permanent molars in the pediatric population [11,12]. This finding suggests the need to strengthen this preventive component.

Finally, the limited provision of restorative treatments in several cantons is consistent with World Health Organization recommendations, which indicate that mobile programs tend to prioritize health promotion and prevention over complex curative treatments. However, the persistence of untreated caries, particularly in primary dentition, highlights the need to reinforce follow-up actions and timely referral mechanisms to achieve a sustained impact on child oral health [13].

Overall, the findings confirm that the ULEAM Mobile Dental Clinic constitutes an effective strategy for improving access to oral health services and strengthening preventive education among children and adolescents, in line with reports in the scientific literature. However, as in other similar contexts, challenges remain related to territorial equity, continuity of care, and the intensification of early preventive actions [14].

CONCLUSION

The evaluation of records from children and adolescents treated by the ULEAM Mobile Dental Clinic during the academic period 2024-1 made it possible to identify an oral health condition that, while showing progress in terms of coverage and oral hygiene education, still faces significant challenges in the prevention and effective treatment of dental caries, particularly in primary dentition.

The concentration of care in certain localities, the high proportion of untreated caries, and the presence of plaque in a substantial segment of the pediatric population reveal the need to strengthen health promotion and prevention strategies, prioritizing intervention at the earliest stages of life. The study reaffirms the value of the mobile clinic as a fundamental resource for delivering dental care to communities with limited access and highlights the importance of maintaining systematic monitoring of oral health indicators to guide future actions.

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AUTHOR CONTRIBUTION STATEMENT

"*Conceptualization and design:* Párraga Ámbar and Macías Iván; *Literature review:* Párraga Ámbar and Macías Iván; *Methodology and validation:* Párraga Ámbar; *Formal analysis:* Macías Iván; *Research and data collection:* Párraga Ámbar and Macías Iván; *Resources:* Not applicable; *Data analysis and interpretation:* Párraga Ámbar and Macías Iván; *Writing – original draft preparation:* Párraga Ámbar and Macías Iván; *Writing – review and editing:* Párraga Ámbar, Macías Iván, and Mendoza Alba; *Supervision:* Mendoza Alba; *Project administration:* Not applicable; *Funding acquisition:* Not applicable."

CONFLICTS OF INTEREST

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