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Factors influencing the acceptance of space maintainers: A comparative study among parents of schoolchildren in Tulcán, Ecuador

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Abstract
This study explores the influence of social beliefs and perceptions regarding oral health on the acceptance of space maintainers among parents of children aged 6 to 10 years old in the city of Tulcán. The objective was to evaluate prevailing beliefs and their relationship with the acceptance of space maintainers, identifying dominant myths, parental knowledge levels, and the role of information technologies in promoting healthy practices across various educational institutions. The research employed a descriptive observational approach, utilizing structured questionnaires and qualitative content analysis applied to a representative sample of parents. One of the most significant findings revealed that 77% of respondents believe that primary teeth do not require care because they will eventually fall out. This reflects a deeply rooted belief system that hampers the implementation of preventive measures such as the use of space maintainers. The analysis of different schools showed that the level of knowledge and acceptance of space maintainers varies depending on the type of educational institution. In public schools, where families typically belong to a lower socioeconomic stratum, the acceptance of space maintainers was the lowest, influenced by prevailing myths and limited access to reliable dental health information. In semi-public) schools, perceptions regarding space maintainers were moderate, indicating a greater openness to preventive treatment, although some misconceptions persisted. Conversely, private schools exhibited higher levels of acceptance and awareness regarding these devices, largely due to more frequent access to dental consultations and more trustworthy information sources. The conclusions underline the necessity for culturally adapted educational strategies, emphasizing that training programs focused on the functional and preventive benefits of space maintainers may play a decisive role in transforming prevailing beliefs.

Keywords: Evaluation, impact, beliefs, oral health, space maintainers

Introduction

Children's oral health is a fundamental component of overall well-being. Various studies agree that factors such as limited access to dental services, socioeconomic conditions, and the developmental changes inherent to childhood have a direct impact on the emergence of cavities, gingivitis, and other oral conditions [1,2]. Scientific evidence supports the notion that prevention is key, not only due to its clinical effectiveness but also because of its long-term impact on quality of life, as it reduces the need for complex and costly treatments [3,4].

Parental involvement plays a crucial role in children's oral health care. The inclusion of mothers in oral health promotion strategies is particularly emphasized, given their central role in the oral hygiene practices of young children [5]. Scholars highlight that many families tend to underestimate the importance of primary teeth, which results in inadequate preventive practices and an increased risk of malocclusions [6,7]. This misconception, common even in urban settings, leads to delayed attention and a low adoption rate of treatments such as space maintainers [8,9]. Space maintainers are essential devices in pediatric dentistry, used to preserve the space following the premature loss of primary teeth and to prevent dental shifts that could compromise the proper eruption of permanent teeth [10,11]. These appliances are classified as either fixed or removable, and their selection depends on the patient's age, the location of the missing tooth, and the estimated time of eruption [12]. Literature evidences that their clinical effectiveness is closely related to timely placement and adequate follow-up [13,14].

However, acceptance of these devices is not always favorable. Studies underscore that parental perceptions of space maintainers can significantly influence their implementation, particularly when there is a lack of clarity regarding their long-term benefits. Insufficient information, distrust, or prioritization of aesthetic concerns are common barriers within family settings [15,16].

Social imaginaries surrounding oral health shaped by personal experiences, oral tradition, and media also influence family behavior regarding prevention [17,18]. The belief that dental treatments are only necessary in the presence of pain, or that primary teeth do not require care, limits the adoption of preventive practices and reinforces reactive care patterns [19,20].

In this context, oral health education plays a decisive role. Initiatives such as school workshops, community campaigns, and scheduled dental visits have proven effective in improving oral health knowledge and practices during childhood [21]. Active participation by health professionals in these spaces allows for the adaptation of content to family needs and encourages the development of healthy habits from an early age [2].

The objective of the present study is to evaluate the impact of parental knowledge and beliefs regarding oral health on the acceptance and use of space maintainers among parents of children aged 6 to 10 years in Tulcán. The aim is to identify strategies to improve children's oral health in this community. Through this analysis, the study seeks to understand how misconceptions and deeply rooted beliefs influence decision-making concerning children's dental care,

potentially affecting the adoption of preventive measures such as space maintainers.

Materials and Methods

This study follows a descriptive observational approach with a mixed-method design, combining both quantitative and qualitative analysis to evaluate the factors influencing the acceptance of space maintainers among parents of children aged 6 to 10 years in Tulcán.

The target population consisted of parents or legal guardians of children attending public, faith-based, and private schools in the city of Tulcán, drawn from a universal sample of 1,187 students. A representative sample of 510 participants was selected, with a 95% confidence level and a 5% margin of error. The sample was distributed as follows: 220 participants from public schools, 230 from schools (45%), and 60 from private schools.

For data collection, structured questionnaires were administered to parents, including both closed and open-ended questions to evaluate their level of knowledge about oral health, beliefs, and willingness to use space maintainers. Informed consent was obtained from all participants, ensuring confidentiality of the data and its use exclusively for academic purposes. The surveys were administered in educational institutions in Tulcán with the collaboration of teachers, who were previously trained. Once completed, the surveys were submitted to the school principals for its administration.

The data obtained were tabulated in Excel and processed using SPSS software, applying both descriptive and correlational analyses. Statistical tests such as Shapiro-Wilk, Fisher's exact test, and Chi-square were used to examine the relationship between variables such as parents' level of knowledge, access to oral health information, and acceptance of space maintainer use.

Results

As a first step, a p Shapiro-Wilk normality test was conducted, in which all variables yielded a p-value of 0.00; that is, they do not follow a normal distribution and are there for non-parametric. Thus, non-parametric tests were used for all comparisons. Qualitative analysis was carried out using the content analysis method, which enabled the identification of patterns and recurring themes in participants' responses. This provided a deeper understanding of the sociocultural factors that influence perceptions of space maintainers. Finally, differences in the acceptance of space maintainers were examined based on the type of educational institution.

Relationship Between Receipt of Information and Access to Space Maintainer Treatment

Table 1: Independent Chi-square test for receipt of information and receipt of treatment

Chi-Square Tests					
Tests	**Value**	**df**	**Asymptomatic Significance (two-sided)**	**Exact significance (two- sided)**	**Exact significance (one- sided)**
Pearson Chi-square	7,743[a]	1	,005		
Continuity Correction	6,677	1	,010		
Likelihood Ratio	8,005	1	,005		
Fisher's Exact Test				,009	,004
Linear-by-Linear Association	7,703	1	,006		
Number of Valid Cases	192				
a. 0 cells (0.0%) have an expected count less than 5. The minimum expected count is 15.00.					
b. Calculated only for a 2x2 table.					

Table 1 indicates that there is a statistically significant association between these variables. Furthermore, after applying the continuity correction for 2x2 tables, the significance was confirmed ($\chi^2 = 6.677$, $p = 0.010$).

Relationship Between Gender and Media Exposure

A significant association was identified between gender and media exposure ($p = 0.042$), suggesting a slight tendency among women to rely more on digital media for obtaining information about oral health.

Relationship Between Type of Institution/School and Media Usage

Table 2: Relationship Between Type of Institution/School and Media Usage

Chi-Square Tests			
Tests	**Value**	**Df**	**Asymptomatic Significance (two- sided)**
Pearson Chi-square	27, 348a	16	,038
Likelihood Ratio	28,415	16	,028
Linear-by-Linear Association	4,801	1	,028
Number of Valid Cases	510		
a. 11 cells (40,7%) have an expected count less than 5. The minimum expected count is,12.			

The Table 2, reveals a significant relationship between the type of institution and sources of information about oral health, with a p-value of 0.38.

Relationship Between Type of Institution/School and Oral Health Myths

The analysis of the 14 myths evaluated showed that seven of them presented a statistically significant difference ($p < 0.05$). In contrast, the remaining seven myths did not show a significant relationship ($p > 0.05$), suggesting that the belief in these myths is similar across all types of institutions, without a clear influence from the educational context. In the analysis of the myth of hereditary tooth loss and the use of space maintainers, a significant relationship was identified, indicating that the myth does have an influence. Another myth is that placing analgesic tablets directly on the affected tooth or area reduces pain. When this belief is

analyzed in relation to the use of space maintainers, the p-value obtained indicates a statistically significant relationship between these variables. This finding is further supported by Fisher's exact test.

Table 3: Relationship Between Type of Institution and Knowledge of When to Use Space Maintainers

Chi-Square Tests			
Tests	**Value**	**Df**	**Asymptomatic Significance (two- sided)**
Pearson Chi-square	15, 170a	4	,004
Likelihood Ratio	15,383	4	,004
Linear-by-Linear Association	12,274	1	,000
Number of Valid Cases	184		
a. 1 cells (11,1%) have an expected count less than 5. The minimum expected count is 3,42.			

Table 3 details a statistically significant relationship between the type of educational institution and knowledge about when space maintainers are used.

Table 4: Relationship Between Type of Institution and Knowledge of the Type of Space Maintainers

Chi-Square Tests			
Tests	**Value**	**Df**	**Asymptomatic Significance (two- sided)**
Pearson Chi-square	12, 829a	6	,046
Likelihood Ratio	12,729	6	,048
Linear-by-Linear Association	3,269	1	,071
Number of Valid Cases	184		
a. 5 cells (41,7%) have an expected count less than 5. The minimum expected count is ,49.			

Table 4 reveals a significant difference between the variables, with a p-value =0.046p. This indicates that the type of educational institution influences the level of parental knowledge about the different types of space maintainers (removable, fixed, or both).

Table 5: Relationship Between Type of Institution and Use of Space Maintainer Treatment

Chi-Square Tests			
Tests	**Value**	**Df**	**Asymptomatic Significance (two- sided)**
Pearson Chi-square	8, 162a	2	,017
Likelihood Ratio	7,799	2	,020
Linear-by-Linear Association	8,115	1	,004
Number of Valid Cases	192		
a. 1 cells (16,7%) have an expected count less than 5. The minimum expected count is 2,97.			

Table 5 details a statistically significant association (p = 0.017), indicating that the type of institution influences the likelihood that children will receive this treatment. Institutions are also related to other variables studied, such as conversations with experts. A statistically significant association was found between the type of institution and discussions with medical or dental professionals regarding the loss of primary teeth and the use of space maintainers. Furthermore, the type of institution is significantly associated with the location where these conversations occur (p-value = 0.032), indicating that the institution influences where such discussions take place.

Discussion

The results obtained in this study reflect various factors that influence the acceptance and use of space maintainers in Tulcán, with particular emphasis on the relationship between the level of information available to parents and the adoption of preventive oral health practices.

Receiving information about space maintainers increases the likelihood that caregivers will choose this treatment for their children. This is consistent with the findings of Gacitúa et al. who highlight the importance of educating parents and caregivers on the benefits and necessity of using these devices for children's dental health [22]. A relationship was identified between gender and media usage, particularly in contexts where women tend to use digital media to access information about oral health. Overall, mothers demonstrate greater awareness and knowledge regarding space maintainers compared to fathers, suggesting that gender plays a role in decision-making processes [23]. This same phenomenon was observed by Humeres-Flores et al., who concluded that mothers are generally better informed about their children's oral health [6].

Regarding education level, respondents with completed university studies (36.67%) showed greater receptivity towards the use of space maintainers, reinforcing the hypothesis that a higher academic level is associated with a greater willingness to adopt preventive measures in dentistry. However, the presence of a significant percentage of individuals with basic or incomplete education highlights the need for inclusive strategies that address health literacy gaps, as suggested by previous studies on the unequal access to dental information [9].

The predominance of respondents residing in urban areas (89.41%) reflects greater access to dental resources compared to rural areas. This is consistent with the report by Thakur et al., who found that the availability of services and modern technologies, such as 3D-printed space maintainers, tends to be concentrated in urban areas [24]. In this regard, the implementation of informational campaigns and oral health programs in rural sectors could help mitigate the disparities observed in access to and knowledge.

A significant relationship was found between the institution and the acceptance of treatment with space maintainers. Gacitúa et al. identified that institutions with more resources are able to offer a wider range of orthodontic options compared to those with limited funding [22]. Similarly, Palacios et al. suggest that institutions providing comprehensive education on dental health may positively influence parents' acceptance of these treatments [7]. Furthermore, the relationship between the institution and the sources of information on oral health was found to be significant. Gacitúa et al. noted that many institutions collaborate with media outlets, particularly social media, to promote awareness and education about dental treatments and oral hygiene practices [22]. In this context, effective communication strategies can improve public understanding and facilitate access to orthodontic care, positively impacting overall oral health. Palacios et al. emphasize that the use of various channels, such as brochures, workshops, or digital platforms, influences the effectiveness of

information dissemination [7]. These findings align with those of Montano-Silva et al. who demonstrated that limited knowledge about the importance of primary teeth can affect decision-making in dental care [25].

A statistically significant relationship was observed between the belief that dental loss is hereditary and the decision to use space maintainers. Additionally, an association was identified between the myth of placing pain-relieving tablets on the tooth to reduce pain and the choice of this treatment. Moreover, the results reflect a significant prevalence of misconceptions, such as the idea that it is unnecessary to care for primary teeth (77.84%) or that using hard bristles on a toothbrush whitens teeth (77.06%). These misconceptions limit the adoption of appropriate practices, in agreement with Thakur et al., who identified myths and misinformation as significant barriers to children's oral health [24].

Gacitúa et al., also addressed some of these myths in their research, such as the belief that dental treatments only serve an aesthetic purpose or that orthodontic evaluations are not necessary until adolescence [22]. Verona and Cavero noted that ignorance about the importance of caring for primary teeth can lead to the omission of essential preventive treatments, affecting proper dental alignment [26]. Similarly, Palacios et al., highlight that misinformation can generate doubts about seeking appropriate treatments, making it essential to demystify these beliefs to promote better dental care practices [7].

Regarding the type of educational institution (public, semi-private, or private), the results indicate that it does not significantly influence the level of parents' knowledge about the function of space maintainers. However, Gacitúa et al. argue that institutions with specialized dental programs tend to offer more comprehensive training on the topic [22]. In contrast, institutions with general programs may not address this subject in depth, leading to knowledge gaps between students and professionals.

A significant relationship was found between the type of educational institution and parents' knowledge of the different types of space maintainers (removable, fixed, or both). Although there are no previous studies specifically analyzing this relationship, research by Reem et al. and Ali et al. confirm that parents' awareness significantly influences the decision to opt for these devices [23,8]. The lack of proper information may lead to their underuse, highlighting the importance of strengthening education in this area.

Likewise, the type of educational institution influences the likelihood of children receiving this treatment. Garcia et al. establish that financial considerations play a key role in the decision to opt for dental treatments, suggesting that access to space maintainers is linked to each family's economic resources [27]. Palacios et al. add that, in addition to economic factors, the specific dental situation of each patient and the risk of developing malocclusion also influence the decision to use these devices [7].

Finally, a statistically significant relationship was found between the type of institution and the frequency of conversations with medical or dental experts about the loss of primary teeth and space maintenance. Although 54.35% of parents receive information directly from dentists, a significant proportion still relies on informal sources such as the internet (14.13%) or friends (4.89%). This finding highlights the need to strengthen the role of oral health professionals as the primary educators in this field, as suggested by [24]. Verona and Cavero emphasize that dental professionals play a fundamental role in assessing these factors and recommending appropriate interventions [26]. Additionally, Thakur et al. underscore those technological advances, such as 3D printing in space maintainers, have improved the accuracy and customization of these devices, which could influence their acceptance by caregivers [24]. In this regard, the existence of a statistically significant relationship between the type of institution and access to specialized information is confirmed, which aligns with the findings of Gacitúa et al. (2020)[22], who suggest that the availability of information within each institution influences the choice of specialized centers for treatment [22].

To improve the acceptance and use of space maintainers in the pediatric population of Tulcán, it is recommended to develop educational strategies directed at parents, focusing on demystifying misconceptions about oral health. These strategies should include informational workshops in schools, accessible educational materials, and digital campaigns that reinforce the importance of dental care from an early age.

Furthermore, it is essential to strengthen the role of dentists in community education, promoting preventive consultations and ensuring that information about pediatric dental treatments is clear and understandable for caregivers. The incorporation of digital technologies, such as mobile apps and interactive platforms, is also suggested to facilitate access to reliable information on the use and benefits of space maintainers. Finally, it is recommended to establish partnerships between health and educational institutions to implement prevention programs that ensure a sustainable impact on children's oral health.

The study presents several limitations that should be considered when interpreting the results. First, the sample was restricted to the city of Tulcán, which limits the generalizability of the findings to other regions with different socioeconomic and cultural characteristics. Additionally, the study relied on the self-perception of participants through questionnaires, which could introduce response biases due to prior beliefs or a lack of knowledge on the subject.

Another limitation lies in the cross-sectional design of the study, which does not allow for the establishment of causal relationships between the analyzed variables, but only associations. Furthermore, participation was contingent on the willingness of parents, which may have affected the representativeness of certain sectors of the population. Finally, although a qualitative analysis was included to complement the quantitative data, it would be beneficial to conduct longitudinal studies that allow for the evaluation of changes in the perception and use of space maintainers over time.

Conclusions

The results of the analysis related to the first specific objective conclude that the main myths and misconceptions about oral health prevalent in the analyzed community are deeply rooted in social factors that devalue the importance

of caring for primary teeth. This perception negatively impacts the acceptance of space maintainers, as they are perceived as unnecessary or secondary. The research highlights how these beliefs, supported by oral tradition and reinforced by educational limitations, create significant barriers to the adoption of essential preventive practices, underscoring the need for educational strategies specifically designed to demystify these concepts. The level of oral health knowledge among parents plays a crucial role in their willingness to adopt preventive practices such as the use of space maintainers. The data reflect those higher levels of education and access to reliable information, primarily through healthcare professionals, are correlated with a greater openness to these treatments.

Finally, based on the general objective, it is concluded that the knowledge of oral health beliefs regarding the acceptance of space maintainers is significant, largely influencing parents' decisions regarding these preventive devices. The research reveals that, while there is moderate willingness to adopt these measures in sectors with greater educational access, cultural and knowledge barriers still limit their widespread acceptance. Therefore, the design of effective strategies should incorporate multidimensional approaches that include community education, the use of technology, and greater involvement of healthcare professionals in disseminating evidence-based information. This integrated approach will contribute not only to the acceptance of space maintainers but also to the sustainable improvement of children's oral health in Tulcán.

References

1. Sandoval S, Carrasco M, Sierra J. Recomendaciones para la atención odontológica segura durante la pandemia por SARS-CoV-2. RECIAMUC,2021:5(4):154–162.
2. Sedky S, El-Sayed A, Medany N. Effect of health educational guidelines on knowledge and practices of mothers having children with Bell's palsy. Egyptian Journal of Health Care,2021:12(3):1437–1450.
3. Huerta D, Campos O, Maridueña M, Flor M. Higiene oral y sus factores de riesgo en el desarrollo de caries en niños entre 6 y 9 años. Conexiones UG,2023:1(1).
4. Romo C, Lobo L, Morales M, San Martín A, Ramírez K. Efecto de la hipomineralización incisivo-molar en la calidad de vida relacionada con la salud bucal de niños y adolescentes: una revisión sistemática. Revista Científica Odontológica,2022:10(4).
5. Benavides Y, Zambrano M, Santorum S. Salud periodontal y embarazo, un acercamiento a la realidad de las mujeres gestantes de San Antonio de Ibarra. Odontología,2024:26(1).
6. Humeres-Flores P, Espinoza-Henríquez I, Diaz-Pérez R. Cuidado de la salud oral en la primera infancia, la perspectiva de sus madres: un estudio cualitativo. Revista Chilena de Pediatría,2020:9(16):786–793.
7. Palacios M, Roh J, Adum M. Percepción de los padres sobre efectos de la pérdida prematura de dientes temporales en niños atendidos en clínicas de la Universidad San Gregorio de Portoviejo. Reincisol,2025:4(7):590–609.
8. Ali A, Hebbal M, Aldakheel N, Ghamdi N, Eldwakhly E. Assessment of parental knowledge towards space maintainer as an essential intervention after premature extraction of primary teeth. Healthcare,2021:10(1057):1–8.
9. Ramakrishnan M, Subramaniam P, Narasimhan M. Evaluation of knowledge and attitude of parents about the importance of maintaining primary dentition. Journal of Family Medicine and Primary Care,2019:8(2):414–418.
10. Moimaz S, Ayach C, Lofego L, Garbin C, Saliba O. Perception on oral health and recommendations for improvement of public service dental. Journal of Health Sciences,2021:21(1).
11. Espasa E, Boj J, Ustrell J. Mantenedores de espacio, una necesidad en patología bucal infantil. Revista Española de Ortodoncia,1994:5(2):88–98.
12. Vargas K, Diaz S. Conocimiento sobre salud bucal y su relación con la higiene oral en gestantes. Ciências da Saúde: bem-estar e qualidade de vida,2024:2.
13. Ram D, Ben M, Efrat J, Moskovitz M. Mantenedores de espacio mandibulares para la prevención de pérdida de espacio posterior a la pérdida prematura de molares primarios. Odontología Pediátrica,2020:9(2):127–140.
14. Lucea A, Echarri P. Mantenedores y recuperadores de espacio. Revista de Ortodoncia Clínica,2021:5(2).
15. Biedma M, Caleza C, Mendoza A, Ribas D. Longevity of aesthetic fixed space maintainers in the anterior area of the pediatric dental patient. Journal of Clinical Pediatric Dentistry,2023:47(1):39–44.
16. Ramakrishnan M, Subramaniam P, Narasimhan M. Survival rate of different fixed posterior space maintainers used in pediatric dentistry. Journal of Clinical Pediatric Dentistry,2019:43(2):150–155.
17. Segovia-Chamorro J, Espinoza-Díaz F, Kuhne-Tapia G, Guerra-Zúñiga M. Creencias en salud bucal en personas que asisten a una facultad de odontología: estudio cualitativo. International Journal of Interdisciplinary Dentistry,2022:15(3).
18. Pérez A, Fierro C, Bravo L, Luengo L, Vivanco E. Creencias y conocimiento de embarazadas frente a la salud oral en Concepción, Chile. Acta Odontológica Venezolana,2020:56(2):7–8.
19. Isidro Olán L, Estrella Castillo D, Vega Lizama E, Rueda Ventura M, Rubio Zapata H. Influencia de los determinantes sociales en la salud oral en poblaciones indígenas de las Américas: revisión de literatura. Odontología Sanmarquina,2022:25(4):1–8.
20. Pineda J, Campoverde R, Salazar C. Percepción, conocimientos, actitudes y prácticas sobre salud bucal: un estudio de revisión. Más Vita,2022:4(3).
21. Agudelo A, Giraldo M, Ocampo A, Ossa Y, Caballero K. Calidad de vida relacionada con la salud bucal del adulto mayor rehabilitado con prótesis total. Cultura del Cuidado,2021:17(2).
22. Gacitúa P, Zárate M, Rojas J, Reveco C. Principales beneficios de un tratamiento de ortodoncia en niños. Reciamuc,2020:4(1):333–345.
23. Reem K, Randah H, Alshaik M, Ghudaf A, Alhazmi O, Abdulazi A, et al. Assessment of parental awareness of

space maintainers in Al-Madinah, Saudi Arabia. Springer Nature,2024:16(10):1–11.
24. Thakur B, Bhardwaj A, Luke A, Wahjuningrum D. Effectiveness of traditional band and loop space maintainer versus 3D-printed space maintainer following the loss of primary teeth: A randomized clinical trial. Scientific Reports,2024:14:14081.
25. Montano-Silva R, Abraham-Millán Y, Reyes-Cortiña G, Silva-Vázquez F, Fernández-Breffe T, Diéguez-Mayet Y. Programa educativo Sonrisa saludable para infantes de educación preescolar: conocimiento sobre salud bucodental. Community and Interculturality in Dialogue,2024:4.
26. Verona L, Cavero J. Utilización de mantenedores de espacio como medida preventiva frente a la pérdida de piezas deciduas: un análisis bibliométrico 2019–2024. Universidad Señor de Sipán,2024.
27. Garcia P, Sánchez K, Ramírez G, Córdova A, Lavado J, Saavedra L, et al. Contribución de la gestión hospitalaria en la salud bucal en un hospital público peruano. Revista de Climatología,2023:23.