

PREMATURE LOSS OF PRIMARY TEETH DUE TO DENTOALVEOLAR TRAUMA AND THE IMPORTANCE OF SPACE MAINTAINERS AS PREVENTIVE TREATMENT

PERDA PRECOCE DE DENTES DECÍDUOS DEVIDA A TRAUMA DENTOALVEOLAR E A IMPORTÂNCIA DOS MANTENEDORES DE ESPAÇO COMO TRATAMENTO PREVENTIVO

PERDIDA PREMATURA DE DIENTES TEMPORALES POR TRAUMATISMOS DENTOALVEOLAR Y LA IMPORTANCIA DEL MANTENEDOR DE ESPACIO COMO TRATAMIENTO PREVENTIVO

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ABSTRACT

Introduction: Dentoalveolar trauma refers to injuries affecting both hard and soft tissues, caused by various social, cultural, and even socioeconomic factors. The characteristics of these traumas in children are relatively uncommon due to pediatric physiology and anatomy. Dental treatment for pediatric patients must be carefully planned based on the child's age and the complexity of the specific case.

Methods: This research employed a mixed-methods approach, as it incorporated both quantitative and qualitative data. It followed a descriptive research design with a non-probability convenience sampling method. The sample consisted of 57 eighth-level dental students from San Gregorio de Portoviejo University. A literature review was conducted using scientific articles published in databases such as PubMed, Web of Science, Latindex, and SciELO.

Results: Of the 57 students surveyed, 32 were male and 25 were female. The study aimed to identify the most frequently observed type of malocclusion in their clinical practice. The results, ranked from most to least frequent based on the number of responses, were as follows: "Class I malocclusion" with 20 votes, "Class II Division 2 malocclusion" with 19 votes, "Class II Division 1 malocclusion" with [insert number] votes, and "Class III malocclusion" with 19 votes.

Conclusions: Primary dentition plays a crucial role in functions such as mastication, space maintenance for permanent teeth, and stimulation of maxillary growth.

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Keywords: Trauma. Occlusion. Space Maintainer.

RESUMO

Introdução: O trauma dentoalveolar refere-se a lesões que afetam tanto os tecidos duros quanto os tecidos moles, sendo causado por diversos fatores sociais, culturais e até socioeconômicos. As características desses traumas em crianças são relativamente incomuns devido à fisiologia e à anatomia pediátricas. O tratamento odontológico em pacientes pediátricos deve ser cuidadosamente planejado com base na idade da criança e na complexidade do caso específico.

Métodos: Esta pesquisa utilizou uma abordagem de métodos mistos, incorporando dados quantitativos e qualitativos. Adotou-se um delineamento de pesquisa descritiva, com amostragem não probabilística por conveniência. A amostra foi composta por 57 estudantes do oitavo nível do curso de Odontologia da Universidade San Gregorio de Portoviejo. Foi realizada uma revisão de literatura utilizando artigos científicos publicados em bases de dados como PubMed, Web of Science, Latindex e SciELO.

Resultados: Dos 57 estudantes entrevistados, 32 eram do sexo masculino e 25 do sexo feminino. O estudo teve como objetivo identificar o tipo de má oclusão mais frequentemente observado na prática clínica dos participantes. Os resultados, classificados do mais ao menos frequente com base no número de respostas, foram os seguintes: “Má oclusão Classe I”, com 20 votos; “Má oclusão Classe II Divisão 2”, com 19 votos; “Má oclusão Classe II Divisão 1”, com [inserir número] votos; e “Má oclusão Classe III”, com 19 votos.

Conclusões: A dentição decídua desempenha um papel fundamental em funções como a mastigação, a manutenção do espaço para os dentes permanentes e a estimulação do crescimento maxilar.

Palavras-chave: Trauma. Oclusão. Mantenedor de Espaço.

RESUMEN

Introducción: Los traumatismos dentoalveolares son lesiones de los tejidos duros y blandos provocados por diversos factores sociales, culturales, e incluso socioeconómicos. Las características de estos traumatismos en niños son poco comunes debido a la fisiología y anatomía pediátrica. El tratamiento odontológico que se debe aplicar a un paciente pediátrico debe establecerse bajo una planificación en base a la edad y a la complejidad del caso que presente.

Método: Está investigación tuvo un enfoque mixto, debido a que se basa en datos de naturaleza cuantitativa y cualitativa, con un tipo de investigación descriptiva, de estudio no probabilístico por conveniencia. La muestra estuvo conformada por 57 estudiantes de octavo nivel de la Universidad San Gregorio de Portoviejo. Se realizó una revisión bibliográfica de artículos científicos publicados en bases de datos como PubMed, Web of Science, Latindex, y SciELO.

Resultados: De la encuesta realizada a 57 estudiantes 32 de ellos pertenecen al género masculino y los 25 restantes al género femenino. se busca identificar cual es el tipo de maloclusión que se presenta con mayor frecuencia en sus clínicas odontológicas, obteniendo como resultados de mayor a menor con base en los votos adquiridos: con 20 votos



"maloclusión clase I", con 19 votos "maloclusión clase II división 2", con votos "maloclusión clase II división 1" y, con votos "maloclusión clase III".

Conclusiones: La dentición temporal desempeña funciones importantes, como la masticación, el mantenimiento del espacio para los dientes permanentes y el estímulo del crecimiento de los maxilares.

Palabras clave: Trauma. Oclusión. Mantenedor.



1 INTRODUCTION

Dentoalveolar trauma is injury to the hard and soft tissues caused by various social, cultural, and even socioeconomic factors. The characteristics of trauma in children are uncommon due to pediatric physiology and anatomy. The loss of the tooth as a result of Dentoalveolar trauma brings with it the inclination of the adjacent teeth, causing the loss of the necessary physiological space ^(1,2).

The dental treatment that should be applied to a pediatric patient must be established under a plan based on the age and complexity of the case presented, for this reason the international association of pediatric dentistry defines a series of possible conditions to develop in the deciduous dentition, however, the premature loss of teeth is established as the main consequence of the origin and progression of dental caries, because it acquires the ability to establish an imbalance process in relation to the remineralization and demineralization of the hard tissues of the tooth ⁽³⁾.

Orthodontic appliances such as space maintainers are used preventively to prevent the tilting of adjacent teeth, causing little physiological space needed in the child's oral cavity. This type of appliance is available in two fixed and removable presentations, each of which has its indications that will depend on the time that the pediatric extraction has elapsed and the healing of the soft tissue lesions ⁽⁴⁾.

Internationally, a study carried out in Europe found that 15% of pediatric patients aged 3 to 5 years and school-age children (6 to 12 years) have suffered dental trauma ⁽⁵⁾, while a study from Saudi Arabia found that 57.9% of patients presented for tooth loss were due to dental avulsions. ⁽⁶⁾

In Latin America, dentoalveolar trauma in children has become a problem in oral health, and in a study carried out in Cuba, 24% of school-age children have had some dental trauma to the anterior teeth ⁽⁷⁾. Therefore, in the clinical case carried out by Coureaux also in Cuba, the placement of a removable aesthetic space maintainer in a 7-year-old pediatric patient who lost his tooth 21 ⁽⁸⁾ is detailed.

Ecuador In a study of the prevalence of dental trauma, it was found that, in a sample of 26 pediatric patients, 8.1% have lost their teeth due to blows caused by accidents or falls ⁽⁹⁾.

The objective of this study was to determine the efficacy of space maintainers as a treatment for premature loss of primary teeth.

2 MATERIALS AND METHODS

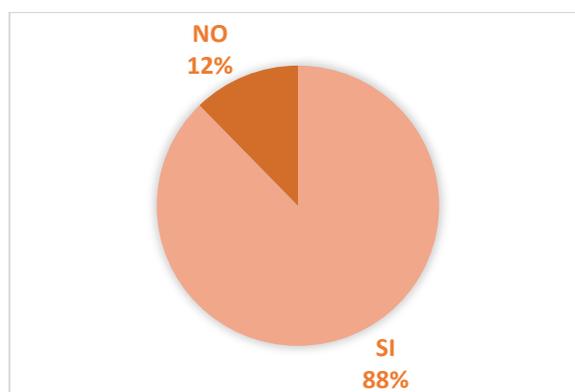
This research had a mixed approach, because it is based on quantitative and qualitative data, with a type of descriptive research, of non-probabilistic study for convenience. The sample was made up of 57 eighth-level students of the Dentistry career of the San Gregorio University of Portoviejo. The instrument used was a survey. A bibliographic review of scientific articles published in databases such as PubMed, Web of Science, Latindex, and SciELO was carried out.

3 RESULTS

From the survey of 57 students, the first question applied aimed to know if the student believed that the use of a space maintainer is useful to preserve the mediailal diameter of a piece lost prematurely, in which 88% answered "yes" and 12% "no". (Figure 1).

Figure 1

Do you think that the use of a space maintainer is useful to preserve the mesiodistal diameter of a piece lost prematurely?

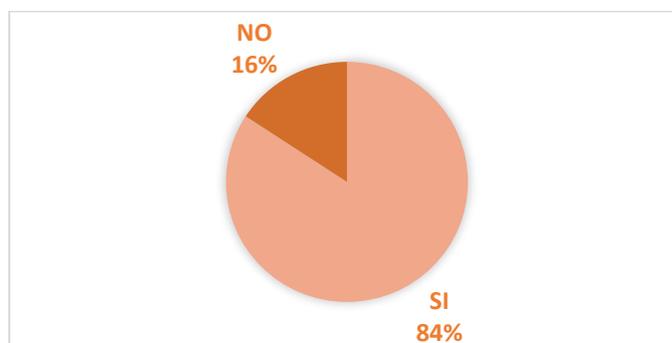


Source: Own elaboration

To determine the use or not of a space maintainer, it was necessary to know if the students believed that the absence of a temporary tooth had the ability to influence the development of a malocclusion, obtaining as results that 84% answered "yes" and 16% "no". (Figure 2).

Figure 2

Do you think that the absence of a temporary tooth influences the development of malocclusion?

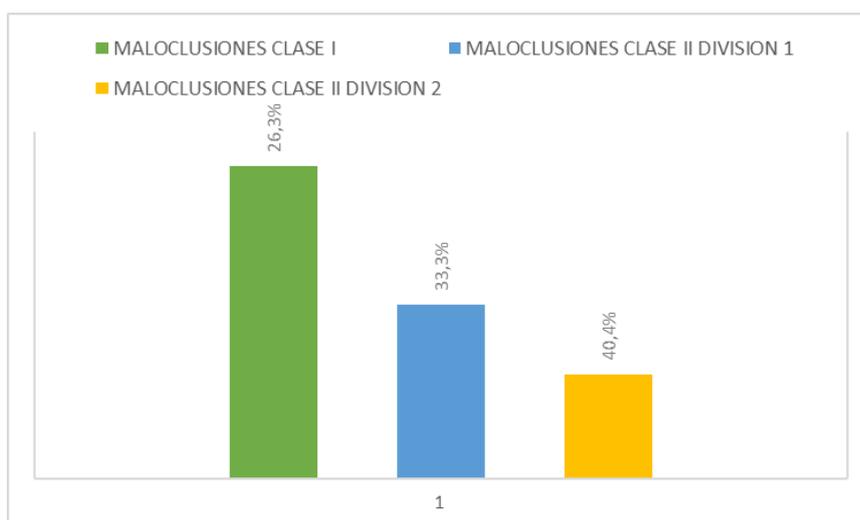


Source: The authors.

From question 2, we seek to identify which is the type of malocclusion that occurs most frequently in their dental clinics, obtaining results from highest to lowest based on the votes acquired: with 20 votes "class I malocclusion", with 19 votes "class II division 2 malocclusion", with votes "class II division 1" and, with "class III malocclusion" votes (Figure 3).

Figure 3

What is the type of malocclusion most frequently presented by pediatric patients?



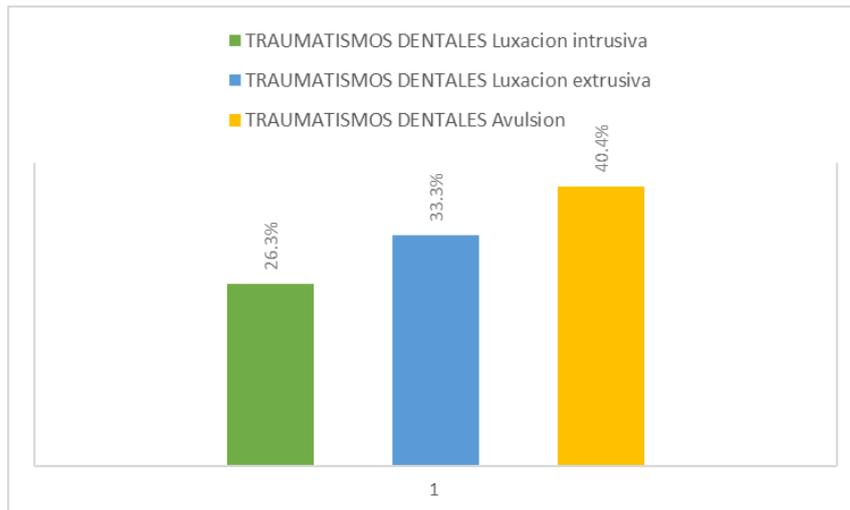
Source: The authors.

Respondents were asked what is the most frequent cause of dental trauma in their patients for which they have lost a temporary tooth, obtaining as results that 26.3% of the respondents presented pediatric extraction due to an intrusive dislocation, while 33.3% was

due to extrusive dislocation, therefore, 40.4% was due to avulsion of the temporary tooth. (Figure 4).

Figure 4

What is the most common cause of Dentoalveolar trauma for which your patients have told you that they have lost their tooth?

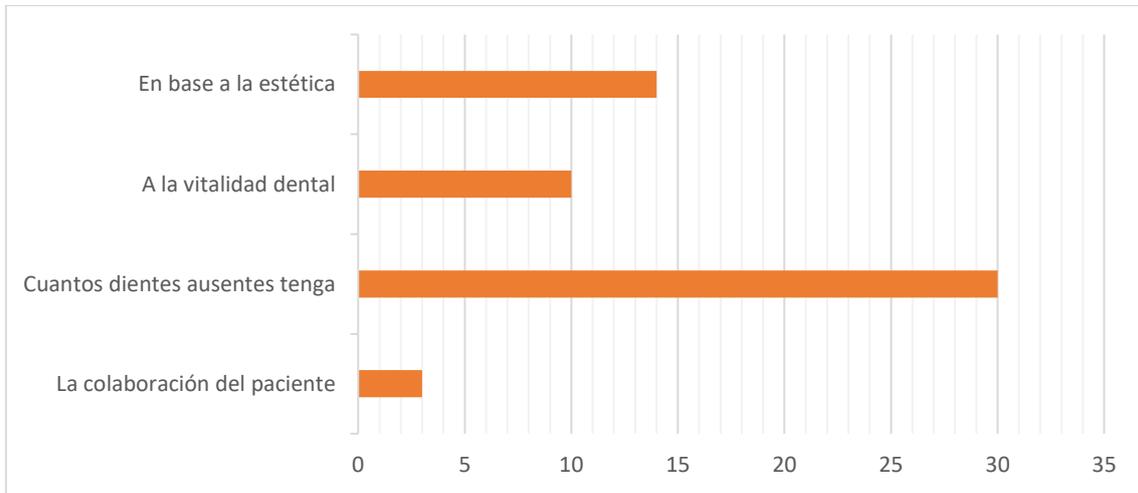


Source: The authors.

To determine the therapeutic use of a space maintainer, it is necessary to take into account various characteristics mentioned by the surveyed students, among these, 3 of them affirm that "the patient's collaboration" is important, another 10 "dental vitality", another 14 "aesthetics" and, the last 30 "how many missing teeth they have" (figure 5). From the characteristics taken into account, the most commonly used maintainer in dental clinics is determined, two mention the "palatine bar", another 2 the "arch of nance", another 8 the "hawley plate with pontics", another 11 the "crown and ansa" and, the last 34 say "bench and ansa" (figure 6). Once the corresponding space maintainer has been chosen for the case presented, the time in which it will be used must be determined, 8 of the interviewees mention that the time is determined by the "corono-root classification", another 11 students mention that the "collaboration of the patient", another 19 "Nola stages" and, the last 19 the "age of the patient" (Figure 7).

Figure 5

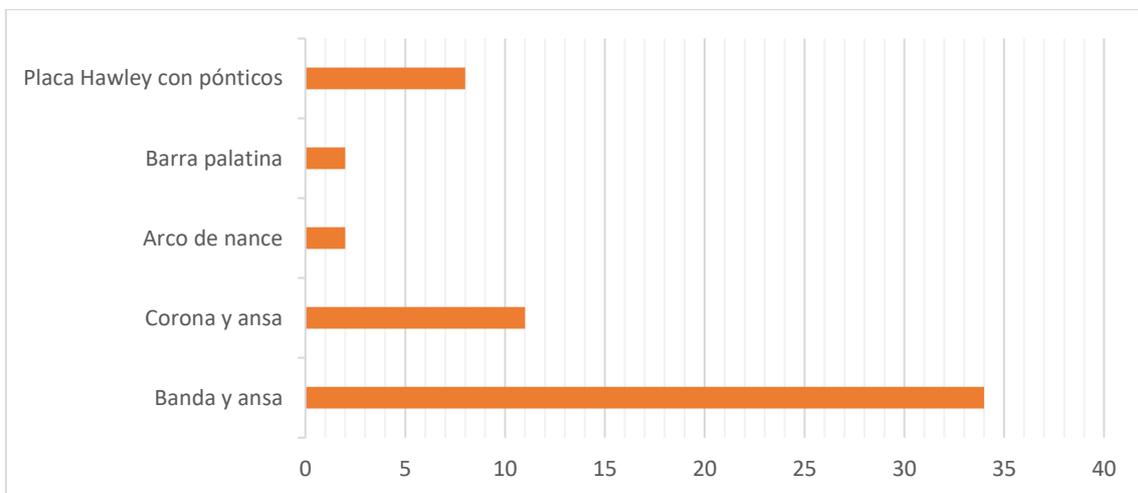
Based on what characteristics do you make your choice of space maintainer types?



Source: The authors.

Figure 6

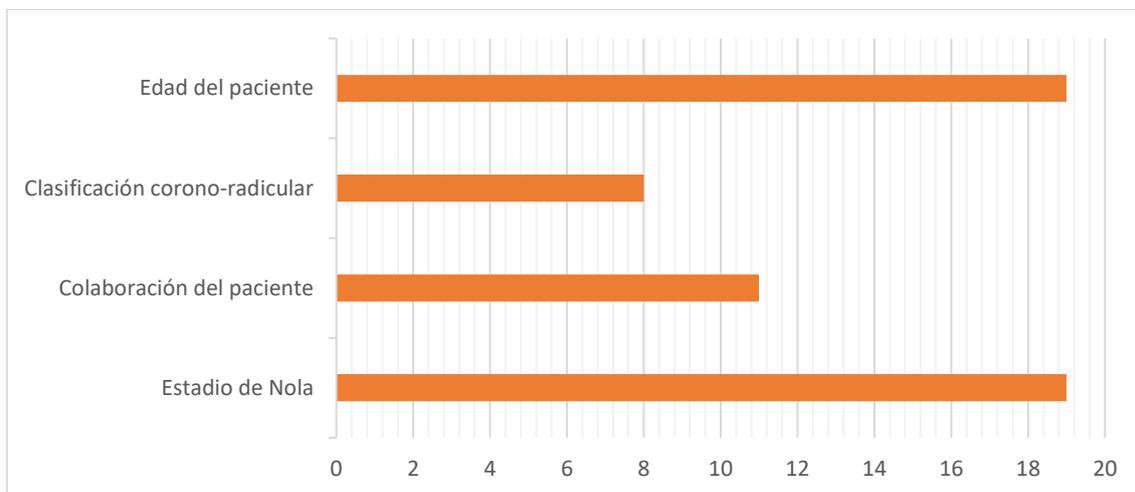
Which of these space maintainers is the most commonly used?



Source: The authors.

Figure 7

What determines the time for space maintainer utilization?

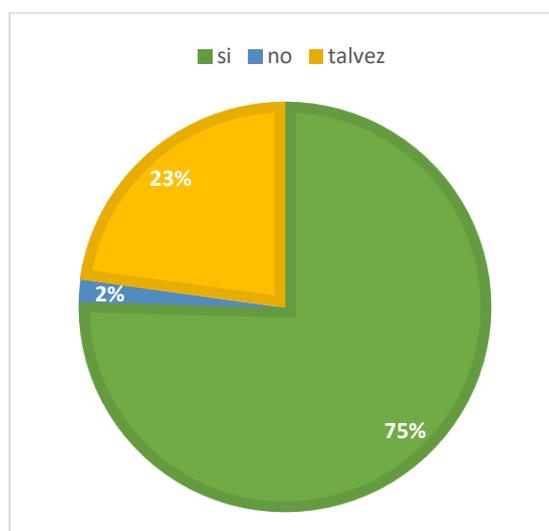


Source: The authors.

Finally, the last question seeks to know the considerations of the space maintainer from the perspective of the students, mentioning if they believe that they serve to preserve the space of one or two permanent pieces, obtaining as results that 75% of the respondents answered yes, 23% that maybe and only 2% that no. (Figure 8).

Figure 8

Do you consider that the space maintainer is used to preserve the space of one or two permanent pieces?



4 DISCUSSION

Occlusion is established as the result of an interaction of environmental and genetic factors, among these variables that have the greatest influence is the primary dentition and the attack of factors that have the ability to destroy it such as dentoalveolar trauma that causes loss of the tooth, being thus, in a study carried out by Rivero N. ⁽¹⁰⁾ mentions that the prevalence of space maintainer placement in patients aged 3 to 9 years with premature loss of primary teeth varies between 70.90%, on the other hand, Lambruschini V. ⁽¹¹⁾ comments in his article that maintaining the temporary teeth in the mouth under physiologically normal conditions is essential to establish a correct occlusion of adult teeth, so in this work we sought to highlight the importance of space maintainer to avoid the inclination of the teeth.

Loo J. et al ⁽¹²⁾ detail in their clinical case that aesthetic rehabilitation through orthodontic appliances or fixed space maintainers, in addition to preventing the messialization of adjacent teeth, restores the confidence in smiling to children who have lost previous teeth, which is why 14 of the 57 students surveyed mentioned that they choose the type of space maintainer according to aesthetics of the patient.

The use of the space maintainer after premature tooth loss is not usually of great importance for parents or guardians, so in a study carried out by Espín M ⁽¹³⁾ he comments that the tooth with the greatest loss in preschool infants is the second lower left molar and in turn indicates that only 30% of cases have space maintainers. In this context, in the article presented by Castellazi R. ⁽¹⁴⁾ mentions that in a randomized study of children between 6 and 9 years of age they presented changes in occlusion due to the lack of space maintainer, affecting the growth of the jaw with 42.6% in the male sex.

One of the main challenges in addressing premature loss of primary teeth due to dentoalveolar trauma is the lack of early diagnosis and adequate follow-up, especially in areas with limited access to pediatric dental care. In addition, many studies on the use of space maintainers feature observational designs with small or non-representative samples, which limits the generalizability of the results. The variability in clinical protocols and the lack of standardization of criteria for the placement of space maintainers also make it difficult to evaluate their long-term effectiveness.

It is essential that the dentist performs a comprehensive evaluation after a dentoalveolar trauma in the primary dentition, identifying any risk of premature loss that may compromise future occlusion. It is recommended to place space maintainers in a timely manner, individualizing each case according to the missing tooth, the estimated time of

eruption of the permanent successor, and the patient's cooperation. It is also essential to educate parents about the importance of monitoring and maintaining the space maintainer to avoid complications such as loss of space or tooth displacement.

5 CONCLUSION

Premature loss of primary teeth as a result of dentoalveolar trauma can adversely affect the proper development of occlusion and maxillofacial growth. The results of this research show that malocclusions are frequently present in dental clinical practice, with class I being the most common, which reinforces the need for a preventive approach from childhood. In this context, the timely and appropriate use of space maintainers is established as a fundamental tool to preserve space in the dental arch, prevent unwanted displacements and avoid future orthodontic complications.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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