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Aesthetic-Functional Fixed Appliance as Treatment of Premature Loss of primary Anterior Teeth

Mantenedor de Espaço Fixo Estético-Funcional como Tratamento para Perda Precoce de Dentes Decíduos Anteriores

Priscila Vieira da Silva[a]; Juliana Severino Lupinetti Noberto[b]; Ariane Barbosa Rodrigues Del Papa[c]; Cíntia Aparecida Damo Simões[b]; Sandrine Bittencourt Berger[d]; Andreza Maria Fábio Aranha*[a]

[a]University of Cuiabá, Graduate Program in Integrated Dental Sciences. MT, Brazil.
[b]University of Cuiabá, Course of Dentistry. MT, Brasil.
[c]Institute of Health Sciences FUNORTE/EAPE. MT, Brasil.
[d]Unopar, Stricto Sensu Graduate Program in Dentistry. PR, Brazil.
*E-mail: andreza.aranha@gmail.com
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Abstract

The early loss of anterior primary teeth is frequent in the pediatric dentistry clinic and it is associated with extensive caries or dental trauma. The purpose of this study was to report two cases of aesthetic-functional rehabilitation due to early loss of anterior primary teeth, with the aid of fixed space maintainers of the tube-bar type. In the first case, a 4-year-old female child referred for dental treatment is reported. During clinical examination, several restorations in the posterior teeth and absent upper anterior teeth were observed. The treatment plan consisted of installing a tube-bar type upper fixed space maintainer, considering the ease of installation and adaptation for young children. The second case reports a 5-year-old male patient with the main complaint of dental caries. Clinical examination revealed extensive coronary destruction in the upper central incisors, as well as in the posterior teeth that presented carious lesions in several teeth. For the case planning, it was determined the need for the posterior teeth restorations and the exodontia of the anterior dental remnants. After oral rehabilitation, an aesthetic-functional space maintainer of the tube-bar type was made and installed. In both cases, prosthetic rehabilitation was fundamental to maintain the space until the eruption of the permanent successors, avoiding future damages, as well as to restore the children's self-esteem and introversion behavior.

Keywords: Deciduous. Space maintenance. Mouth rehabilitation.

Resumo

A perda precoce dos dentes decíduos anteriores é frequente na clínica odontopediátrica e está associada a processos de cáries extensas ou traumas dentários. O objetivo do presente estudo foi relatar dois casos clínicos de reabilitação estético-funcional após perda precoce de dentes decíduos anteriores, com auxílio de mantenedores de espaço fixo do tipo tubo-barra. O primeiro caso refere-se a uma criança do sexo feminino, quatro anos de idade, encaminhada para atendimento odontológico. Durante exame clínico, observou-se restaurações nos dentes posteriores e ausência dos dentes anteriores superiores. O plano de tratamento consistiu na instalação de um mantenedor de espaço fixo superior do tipo tubo-barra, levando em consideração a facilidade de instalação e adaptação para crianças com pouca idade. O segundo caso reporta um paciente de sexo masculino, cinco anos de idade, tendo como queixa principal a presença de cáries dentárias. Ao exame clínico, foi notado extensas destruições coronárias nos incisivos centrais superiores, assim como nos dentes posteriores. Para o planejamento do caso, determinou-se a necessidade de restaurações dos dentes posteriores e as exodontia dos remanescentes dentários anteriores. Após adequação do meio bucal foi confeccionado e instalado um mantenedor de espaço estético-funcional do tipo tubo-barra. Em ambos os casos, a reabilitação protética foi fundamental para a manutenção do espaço até a irrupção dos sucessores permanentes, evitando prejuízos futuros, devolvendo a autoestima e a mudança do comportamento de introversão das crianças.

Palavras-chave: D*ente decíduo. Reabilitação bucal. Mantenedor de espaço em ortodontia.*

1 Introduction

The loss of anterior deciduous teeth is considered a frequent problem in clinical practice in Pediatric Dentistry[1], which is considered to be premature when it occurs before the time of its physiological exfoliation and/or when the deciduous teeth are lost before the germs of the permanent successors are in stage 6 of dental formaᵗion of Nolla[2]. The tooth loss before stage 6 of Nolla may slow down the eruption process of the permanent successor, while the loss after stage 7 of Nolla may accelerate the eruptive process[2,3].

As a result of early loss of deciduous teeth, possible disturbances in the occlusion development may occur, such as migration of adjacent teeth toward the region of the loss, loss of space appropriate to the irruption of the permanent successor tooth, shortening the arch and extrusion of permanent successor teeth, thus creating problems with lack of space[2,4]. The greater the number of lost teeth at an early age, the greater the crowding observed in permanent dentition, and the earlier the loss, the more severe resulting malocclusion will be[5-7].

Defects in the development of phonetics and poor articulation of language are also associated with early loss of deciduous anterior teeth[8], being the sounds of pronouncement of the letters "V", "S", "F" and "Z", the most affected ones[9,10].

Aesthetics can also be impaired and rebound on the child's interpersonal interactions[7].

The deciduous dentition is fundamental in maintaining the space in the mesio-distal and cervico-occlusal direction for the eruption of permanent successor teeth, preserving the physiological, functional, occlusal relations and allowing the correct positioning of the permanent teeth in the dental arch[4.11]. However, the early loss of deciduous anterior teeth, may interfere with the appropriate dentitions transition [3].

Among the possible causes of early loss of deciduous teeth, dental traumas stand out, especially in the anterior-superior region, in the pre-school and school age, as a consequence of falls, fights or struggles, sports accidents, car accidents, injuries with objects[12.13]. The presence of early childhood caries (CPI), which is a dependent sugar-dependent disease, is also associated with early loss of deciduous teeth, once it is characterized by rapid progression and results in partial or total destruction of the deciduous teeth of the affected population[8,14,15].

Due to early tooth loss, in order to prevent the establishment of a dental malocclusion, it is recommended that oral rehabilitation through the use of orthodontic devices, known as space maintainers, which replaces one or more deciduous teeth and are used to preserve the space intended for the permanent successor tooth, restore form and function[16.17].

The selection of the appropriate appliances becomes an important aspect of the treatment plan, which the following characteristics should be considered: simplicity of use and installation, resistance, ease of sanitization, interference in the growth of bone bases, in the occlusion, in speech and/or chewing[18]. The space maintainers appliances can be removable, fixed, functional or non-functional. For the selection of the appliance it is of fundamental importance to consider the stage of the child's dental development, the involved dental arch, the missing tooth [19], as well as patient age, degree of cooperation, oral hygiene and the child's and her guardian's wishes[18].

The removable space maintainers are among the most commonly used appliances, due to their easy preparation and handling, but they require the patient's cooperation regarding the use and periodic adjustments of the staples, have a higher risk of fracture and loss, and there is a possibility of occlusal discomfort [20]. The maintainer of anterior space of fixed type is a low cost option, easy to manufacture and installation, and favorable aesthetic, which obtains satisfaction of the family and the own child[19,21]. However, the fixed device may interfere with the growth and development of bone bases, especially in the increase of the dental arches in the transverse direction, being contra-indicated in many cases [22].

The maintainer of aesthetic space fixed functional modified, with the tube-bar system[23], has been considered as a viable and low cost alternative, although fixed, does not prevent the normal development of the maxilla[18,23,24]. The purpose of this study was to report two cases of aesthetic-functional rehabilitation due to early loss of anterior primary teeth, with the aid of fixed space maintainers of the tube-bar type.

2 Report and Cases

2.1 Clinical Case 1

A four-year-old female patient was referred to the Clinic of specialization in Pediatric Dentistry of EAPE-FUNORTE, Cuiabá-MT, for the oral rehabilitation, due to early loss of deciduous upper incisor teeth (52, 51, 61, 62) due to caries. During the anamnesis, it was observed that the patient was very shy and did not smile. During the intraoral examination, restorations of glass ionomer cement were observed in upper deciduous molar teeth, deciduous molars, lower and upper right deciduous canine (55, 54, 53, 64, 65, 75, 74, 84, 85) performed in the Family Health Program (FHP) of Cuiabá-MT, as well as the absence of deciduous upper incisor teeth (52, 51, 61, 62). Periapical radiograph (Figure 1 A-B) in the region of upper deciduous central incisors were conducted to assess the stage of formation of permanent successors teeth (11, 21), which were in stage 6 of Nolla, with complete formation of dental crowns.

Figure 1(A-B) (A) Initial photograph; (B) - Initial periapical radiographs.

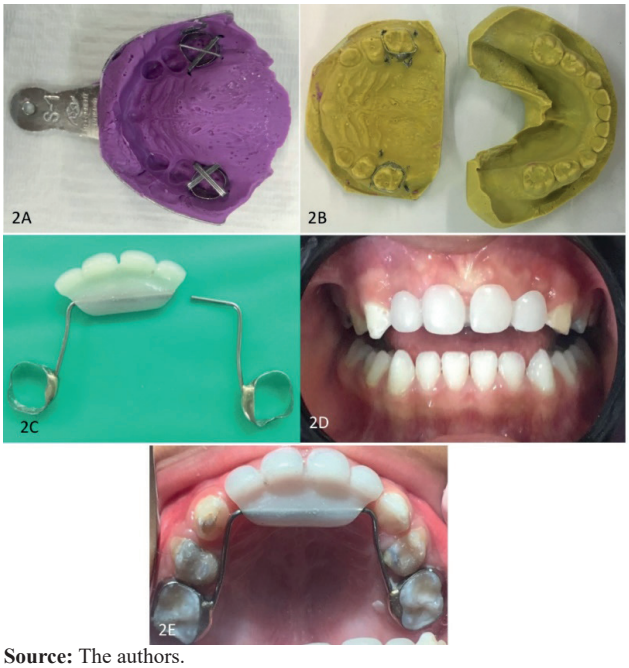
The proposed treatment for the case was the installation of a fixed-space maintainer of tube-type bar. Thus, Morelli bands (Dental Morelli Ltda, Sorocaba, SP, Brazil) were selected for the second upper deciduous molar teeth (55, 65). Then, the transfer molding with Orthotrace alginate (Cavex Alginate, Dental Cremer, Blumenau, SC, Brazil) and registration of wax bite number 7 (Asfer, Dental Cremer, Blumenau, SC, Brazil). The models were made with special plaster type IV (Durone, DentSply Catanduva, São Paulo, Brazil).

For the maintainer confection a palatinal arc with steel orthodontic wire 0.20 mm was made (Morelli, Dental Morelli Ltda, Sorocaba, SP, Brazil), welded in orthodontic bands. The manufacture was performed with a male-female type tube that allows the movement of the wire between the artificial incisor, not interfering in the maxilla growth. The mounting of the teeth of artificial stock, color 60 (Biolux, OMC, VIPI, Dental Cremer, Blumenau, SC, Brazil), was performed according to

the dentition characteristics, such as the type of dental arch, presence of primate spaces and flat occlusal surface.

After 30 days (Figure 2 A-E), the maintainer was installed with glass ionomer cement for cementation (Meron C; Voco, Dental Cremer, Blumenau, SC, Brazil), following the manufacturer's recommendations. Those responsible for the patient were oriented on the importance of oral hygiene and orthodontic device, as well as the need of periodic returns.

Figure 2(A-E) (A) - Transfer molding; (B) Models of work; (c) Fixed-space maintainer aesthetic-functional tube-bar type; (D) Buccal view; (E) Occlusal view of the installation of the space maintainer.



Source: The authors.

2.2 Clinical Case 2

A male patient, five years and eight months of age appeared following the mother, to the Clinic of Specialization in Pediatric Dentistry EAPE-FUNORTE, Cuiabá-MT, having as a complaint the presence of caries lesions and the unsatisfactory appearance of the teeth, which hindered the child's socialization. During the anamnesis, the patient presented good general state of health, with absence of systemic diseases. At the extraoral examination, no abnormalities were found.

During the intraoral examination (Figure 3 A-B),it was noted that great destruction of coronaries in the upper deciduous incisor teeth (51, 52, 61, 62). The deciduous canine and molar teeth (53, 54, 55, 63, 64, 65, 83, 84, 85) also presented impairment as a result of caries. The deciduous lower incisor teeth and lower left canine deciduous teeth (82, 81, 71, 72 and 73) were healthy.

Figure 3 (A-B) - (A) Initial photograph of the upper jaw; (b) Initial photograph of the lower arch.

Source: The authors.

The treatment began with the instruction and training of the child's oral hygiene. The therapeutic planning was performed in stages: 1st step- extractions of upper deciduous incisor teeth (51, 52, 61, 62) and adequacy of the medium with cement of Ionomer of resin-modified glass (Riva Light Cure®; SDI Dental Product, Bayswater, Victoria, Australia); 2nd step- restorations with composite resin Z100, color A1 (3M®, São Paulo, Brazil) of the elements 53, 54, 55, 63, 64 and 65, 74, 75, 83, 84 and 85 (Figure 4-C); 3rd step-Manufacture of the maintainer of aesthetic-functional space of tube-type bar for the teeth replacement (52, 51, 62, 61). For the confection of the space maintainer, the transfer molding of the upper arch and lower alginate was performed with the type Hydrogum® (Labordental Ltda, São Paulo, Brazil) and the orthodontic bands positioned in upper deciduous second molar teeth (65, 55). Then, the white plaster (Plaster Stone type III, Asfer®, São Caetano do Sul, São Paulo) was leaked to the obtaining of the models, which were sent to the prosthetist for manufacture of functional aesthetic of tube-bar system.

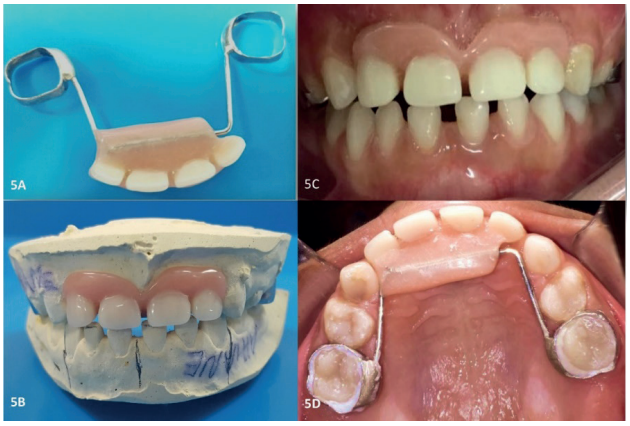
Figure 4 (A-C) - (A) Buccal view after tooth extractions of central and lateral upper incisor teeth; (B) Composite resin restorations on molar and canine teeth; (C) Composite resin Restorations of lower molar and canine teeth.

Source: The authors.

The installation of the space maintainer was performed by

cementation of bands with glass ionomer cement for Maxxion cementation C® (DENTSCARE LTDA, Joinville, Santa Catarina, Brazil) (Figures 5 A-D) and after the necessary adjustments, the child and the mother were instructed regarding the use, cleaning procedures and the importance of monitoring the eruption of permanent teeth during use of the prosthesis.

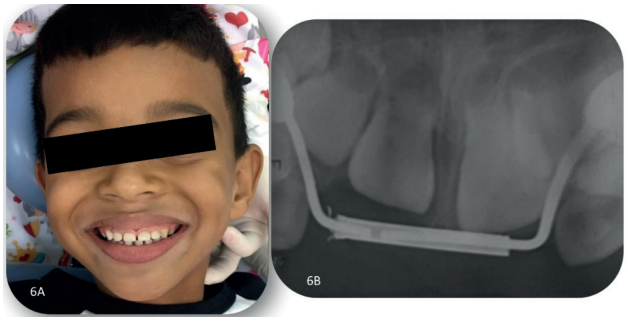
Figure 5 (A-D) - (A) fixed-space aesthetic-functional tube-type bar maintainer; (b) evidence of the space maintainer in a plaster model; (c) the space maintainer installed (occlusal view).



Source: The authors.

It can be observed at the time of installation of the device, improvement in physical and emotional state of the child, with the patient's proper adaptation to the use of the prosthesis. Five months after the installation, periapical radiographic examination was carried out for permanent monitoring of the irruption of the successor teeth (Figure 6 A-B).

Figure 6 (A-B) - (A) Completion of oral rehabilitation with the installation of the space maintainer; (b) Final periapical radiographic examination.



Source: The authors.

3 Conclusion

The installation of the space maintainers showed satisfactory results in relation to the function, aesthetics and restoration of phonetics, in both cases. The improvement of the aesthetics favored the children's esteem, being evident the change of behavior in the social environment, soon after the installation of the same. The diagnosis and early intervention are important for improving the children's quality of life, since it allows the aesthetic and functional restoration.

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