

## Aesthetic and Functional Rehabilitation in Pediatric Dentistry Patient: Case Report

### Reabilitação Estética Funcional de Paciente Odontopediátrico: Relato de Caso

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#### Abstract

Currently, caries is still a major problem in public health, despite the great technological development and new prevention methods. The caries is a multifactorial, infectious, transmissible and diet dependent disease. It is more prevalent in kids because of their higher intake of carbohydrates and sucrose, and the lack of motor control during the toothbrushing. The treatment is divided into four stages: systemic, preparatory, rehabilitative and maintenance. Thus, this article aims to report a case about a six-year-old child affected by early childhood caries, describing the treatment phases, comprising rehabilitation with composite created in units and space maintainer to replace the missing units. At the end of the treatment, the patient showed satisfaction with the outcome, restoring the quality of her life.

**Keywords:** Dental Caries. Space Maintenance, Orthodontic. Oral Health. Pediatric Dentistry. Glass Ionomer Cements.

#### Resumo

A cárie dentária na atualidade continua sendo um problema de saúde pública, apesar do grande avanço tecnológico e de novas técnicas para preveni-la. Esta, se caracteriza como uma doença multifatorial, infecciosa e dieta dependente. Além disso, se apresenta mais prevalente em crianças devido a maior ingestão de carboidratos e sacarose, além de falta de controle motor durante higienização. O tratamento é dividido em quatro fases: sistêmica, preparatória, reabilitadora e manutenção. Assim, este artigo tem como objetivo relatar o caso clínico de criança de 6 anos de idade acometida por cárie precoce, descrevendo o tratamento em fases, compreendendo a reabilitação com resina composta nas unidades acometidas pela cárie e mantenedor de espaço com intuito de substituir as unidades na qual foram perdidas. Ao final do tratamento proposto, a paciente demonstrou satisfeita com o resultado, o que foi possível devolver a qualidade de vida da mesma.

**Palavras-chave:** Cárie Dentária. Mantenedor de Espaço em Ortodontia. Saúde Bucal. Cimentos de Ionômero de Vidro.

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#### 1 Introduction

Dental caries is still considered a serious public health problem, despite the great advances associated with oral health. It is a multifactorial, infectious, transmissible and dependent diet disease, which produces demineralization of dental structures.<sup>1,2</sup> Caries disease can evolve in two ways: acute, of rapidly progressing, yellow coloration and painful symptomatology; and chronic, of slow progression, dark coloration and no painful symptomatology.<sup>3,4</sup>

In childhood, dental caries often causes severe destruction of the mineralized tissues of teeth, leading to early loss of deciduous units, which will later affect the organization and harmonization of permanent teeth in the arches.<sup>5</sup> In addition, because of its rapid progression, most of its causes are: poor oral hygiene, excessive carbohydrate intake and sucrose, associated with poor motor skills.<sup>6</sup> In this condition, parents should monitor the oral hygiene of their children. Therefore, the success of treatment depends on family motivation. The approach with the patient and responsible for it depends on the severity of the caries disease, the age and the child's cooperation. These are some elements necessary to assist the

professional in the integral planning of dental treatment.<sup>2</sup>

To carry out the integral plan in Pediatric Dentistry, it is important to follow the different phases of the treatment, which are: systemic, preparatory, rehabilitative and maintenance.<sup>7</sup>

Systemic phase, it is the initial contact between the dental surgeon, the child and her caregivers, in which the complete anamnesis, intra- and extra-oral exams and request for complementary tests are verified in order to verify the health status of the same, when necessary. At this stage the diagnosis and treatment plans are also defined.<sup>7</sup> The preparatory phase consists of preventive measures in children who have untreated caries cavities and the adjustment of the buccal environment should be made. In addition, emergency procedures such as exodontia or pulpotomy are done for pain relief. It may include endodontic therapy, curettage of caries lesions, and temporary restorations using glass ionomer or zinc oxide and eugenol.<sup>7</sup>

The rehabilitation phase aims to restore shape and function to the teeth affected by the disease with the use of materials of higher strength and durability, such as composite resins and amalgam or even with the use of prostheses.<sup>7</sup> And finally, the

maintenance phase consists of the patient's follow-up with periodic visits, previously scheduled taking into account their risk of developing caries.<sup>7</sup>

Among the existing treatments used to rehabilitate the sequelae caused by dental caries, there is the endodontics one. This treatment occurs when caries affects the enamel and dentin, with pulp involvement, but the dental unit has conditions to remain in the arch.<sup>8</sup> In some cases, when the tooth has an extensive carious lesion with total destruction of the crown, or if it does not have any bone support due to the absence of the root, extraction should be indicated.<sup>8</sup> In these situations the installation of apparatus is indicated, such as space maintainers, that can guarantee the maintenance of the space for eruption of the permanent teeth in their correct position. Therefore, the dental surgeon must choose the treatment that can restore the oral health, function and aesthetics to the patient taking into consideration, the limit of cooperation and acceptance of the same.<sup>5</sup>

This paper aims to report the clinical case of a 6 year - old child affected by early caries, describing the treatment in phases, comprising the rehabilitation with composite resin in the caries units and space maintainer for replacement of the lost units.

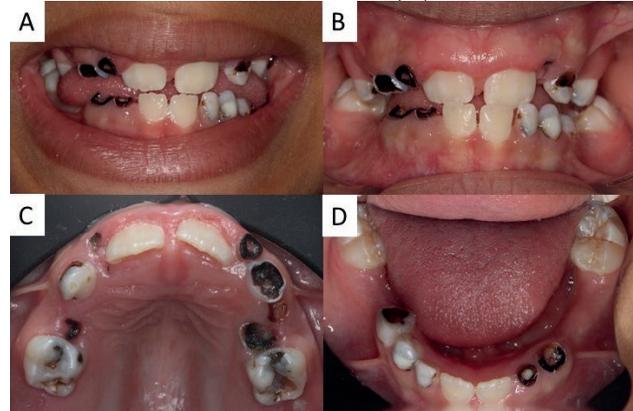
## 2 Case Report

C.R.S., female, 6 years old, attended the clinic of the dentistry course of the School of Medicine and Public Health (BAHIANA) accompanied by her mother. She was reportedly reported that her daughter's teeth were damaged due to excessive consumption of candies and lack of hygienization. She signed the Informed Consent Form and the patient signed the Term of Assent agreeing with the beginning of the treatment and the use of the data.

The systemic phase: proceeded to anamnesis and the mother reported that her daughter was constantly ingesting candies hidden and did not carry out hygiene. In addition, she mentioned that the appearance of the teeth has negative repercussions on socialization in school, and that it did not present systemic alteration. At the clinical examination (Figure 1A and B) it was verified that in the upper arch there were the presence of units 55, 54, 53, 52, 11, 21, 62, 63, 64 and 65 (Figure 1C). After clinical and radiographic (Figure 2) exams, exodontia of the units 52, 55, 54, 62 and 64 was

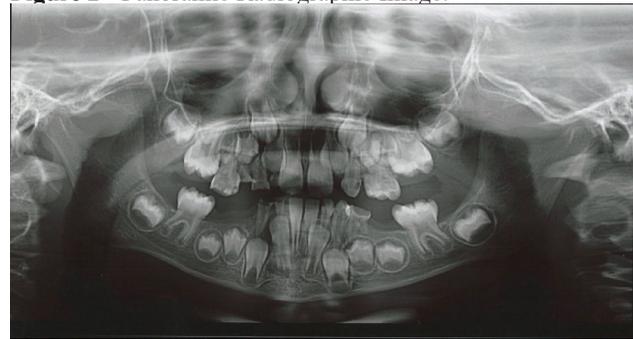
planned because of the great coronary destruction, leaving only root residues, and restorations of units 55, 53, 63 and 65 with carious lesion and posterior installation of functional aesthetic space maintainer.

**Figure 1** - Initial appearance. Extra-oral frontal view (A), frontal intraoral view (B), occlusal view of the upper arch (C) and occlusal view of the inferior arch (D)



Source: Authors.

**Figure 2** - Panoramic Radiographic Image.

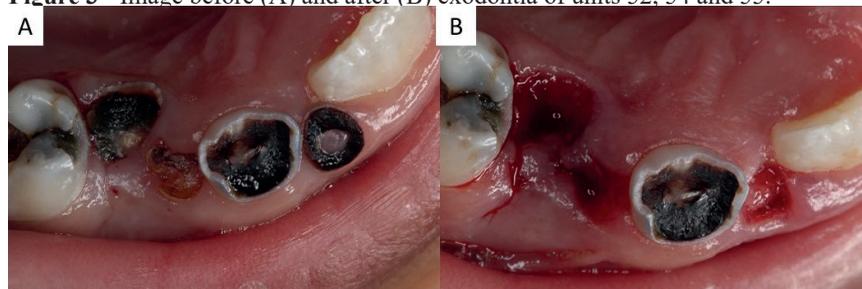


Source: Authors.

In the inferior arch units 36, 31, 41, 46, 72, 73, 74, 82 and 83 were present (Figure 1D); unsatisfactory restorations of units 72 and 73; Occlusal-distal destruction of 74, and units 82 and 83 had only root residues, which are indicated for the exodontia.

In the preparatory phase exodontias of the units 62, 52, 54, 55, 64, 82 and 83 were performed in three sessions with topical anesthesia (Benzotop, DFL, Jacarepaguá - RJ, Brazil) and local anesthesia with 2% Lidocaine (Alphacaine 1: 100,000, DFL, Rio de Janeiro - RJ, Brazil) followed by removal of the root remains with the aid of straight levers (Figure 3).

**Figure 3** - Image before (A) and after (B) exodontia of units 52, 54 and 55.

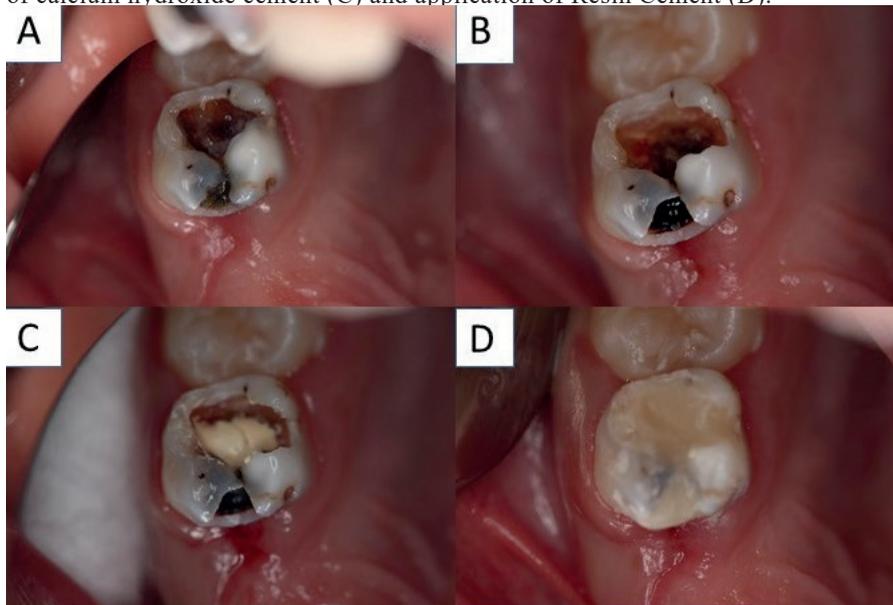


Source: Authors.

In units 65 and 55 (Figure 4A), expectant treatment was performed, where in the first session the carious tissue was partially removed from the axial wall and totally from the surrounding walls with low-rotation spherical drill (CA 3, KG Sorensen, Cotia – SP, Brazil) and curettes, followed by cleaning and drying with absorbent paper (Figure 4B).

Application of calcium hydroxide cement (Hydro C, Dentsply, Petrópolis – RJ, Brazil) in the axial wall (Figure 4C), in order to promote the formation of restorative dentin; restoration with resin-modified ionomer cement (Riva Light Cure – SDI São Paulo – SP, Brazil) (Figure 4D), and then conferring the occlusion, when the opposing tooth was present.

**Figure 4** - Unit 55, initial aspect (A), partial removal of carious tissue (B), application of calcium hydroxide cement (C) and application of Resin Cement (D).



Source: Authors.

In units 72, 73 and 74 (vestibular) restorations that were unsatisfactory were removed, and the carious tissue of units 63 and 74 (occlusal) were also removed with the aid of low-rotation spherical drill (CA 3, KG Sorensen, Cotia – SP, Brazil) and curette, cleaning the cavities with water and drying with absorbent paper, and then the application of glass ionomer cement (Maxxion, FGM, Joinville – SP, Brazil) as a temporary restoration.

The rehabilitation phase, was started after oral health assessment, successfully, the provisional restorations of units 72, 73, 74 and 63, were replaced by composite resin with the aid of high-speed spherical drill (AR 2, KG Sorensen, Cotia – SP, Brazil), taking care not to remove healthy tissue. After removal of the provisional material, washing, drying and application of 37% phosphoric acid were performed (Biodinâmica Quím. e Farm. LTDA, Ibiporã – PR, Brazil) for 15 seconds in dentin and 30 seconds in enamel, then washing with water and drying with absorbent paper, active application of two layers of adhesive, according to the manufacturer's recommendations (Adper Scotchbond da ESPE 3M, São Paulo – SP, Brazil), and photopolymerization for 20 seconds. The restoration with composite resin was carried out (Filtek Z350 da ESPE 3M, São Paulo – SP, Brazil) in small increments with photoactivation of each increment for 10 seconds, and final photoactivation for 40 seconds with the photopolymerizer Optilight (LD MAX da Gnatus). After the restoration was finished, the occlusion test was performed with a carbon strip and, finally, the finishing and

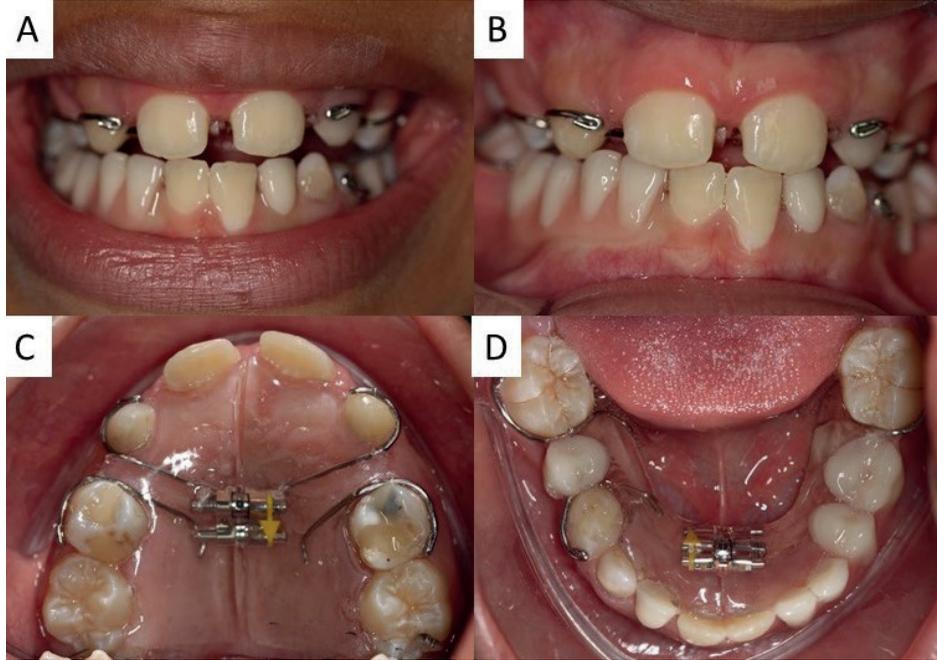
polishing with tips Enhance (Dentsply, Petrópolis – RJ, Brazil), polishing and felt disks with polishing paste (Diamond AC I & II - FGM Produtos Odontológicos - Joinville – SC, Brazil).

At the end of the rehabilitation phase it was necessary to make upper and inferior space maintainers to replace the missing teeth and to guarantee the spaces maintenance. For this, molding with alginate (Jeltrate Dustless, Dentsply, Petrópolis – RJ, Brazil) was carried out in both arches thus obtaining the molds. From this, they were cast with orthodontic gypsum in order to obtain the models. Afterwards, staples, definition of insertion of artificial teeth and expansion screws were planned, and the models were sent for the preparation of the maintainer in the laboratory.

At the time of installation of space maintainers of the upper and inferior recommendations of use and instruction of hygiene to the patient and the person in charge were given. The guardian was also instructed on how to perform the activation of the expander screw every 3 weeks with two quarters back in the upper. Due to occlusion being at the top, it was recommended not to perform the inferior maintainer activation. However, after overcorrection, the need to activate the inferior maintainer bolt was evaluated by a quarter turn every 3 weeks.

The space maintainers reestablished the phonetics and aesthetics, chewing and self-esteem of the patient. The mother and the child's satisfaction was evidenced shortly after the maintainers installation (Figure 5).

**Figure 5** - Final view with the space maintainer installed. Extraoral oral view (A), frontal intraoral view (B), occlusal view of the upper arch (C) and occlusal view of the inferior arch (D).



Source: Authors.

In all sessions, the patient and his guardian were motivated to maintain good oral hygiene and were informed about the need for healthy eating habits.

## 2.1 Discussion

According to Cardoso et al.<sup>2</sup> oral rehabilitation in Pediatric Dentistry presents numerous difficulties as well as diversity of treatment in which they are interconnected in the return of form, function and aesthetics of the units affected by caries disease. Early childhood caries can cause changes such as late onset eruption, early loss of dental units and problems in phonetics and chewing. These affirmations support the conduct adopted for the patient in the clinical case report that showed early loss and several lesions of caries, impairing chewing.

In the present case, the patient's mother reported that the child's oral condition was affecting the interaction with the colleagues. This fact confirms the observation of Fernandes et al.<sup>1</sup> therefore, they report that psychosocial changes should be treated as soon as possible in order to allow for the child's social and emotional adjustment and to avoid or minimize psychological disturbances that are caused by the aesthetic concern. Thus, the earlier the basic oral health care is established, the easier the establishment of the disease is avoided.<sup>1</sup>

In this case report, exodontias were initially carried out by some units due to the large coronary destruction caused by the caries. Afterwards, restorations with resinous cement were carried out in the other affected units, in order to establish the oral health.

Silva et al.,<sup>9</sup> stated that the glass ionomer cement has as properties the coefficient of thermal expansion similar

to dental structure, biocompatibility with dental tissues and fluoride release. In the presented case the material of choice was the glass ionomer cement because it is a material that has the properties mentioned by the authors and because it makes difficult the caries recurrence.

According to Nicholson and Czarnicka,<sup>10</sup> the cements modified by resin or resin cement, besides presenting the properties mentioned above, also exhibit better aesthetics and greater mechanical resistance to compression and traction. The resinous cement was used in the case reported with the objective of guaranteeing adequate clinical behavior in addition to reestablishing the balance of the oral microbiota associated to the instruction and motivation of oral hygiene performed in all sessions.

According to Silva et al.,<sup>9</sup> the incorporation of the HEMA monomer (2-hydroxyethyl methacrylate) in the composition of the modified ionomer cements, was able to increase the indications of this material. With the monomer, the cement presents greater resistance to wear, durability and color stability, as well as better manipulation and easiness to be molded, as this is activated by light, enabling the manufacture of temporary restorations with more refined anatomy. However et al.<sup>10</sup> stated that resin-modified ionomer cement has disadvantages with the presence of HEMA, reducing the material biocompatibility, as well as being able to cause sensitivity, persistent inflammation and allergic reactions if it diffuses through the dentin and reaches the pulp.

For Barbosa et al.<sup>11</sup> and Ferraz et al.<sup>12</sup> the nanoparticulate composite resins, when compared to other resins found in the market, have superior aesthetics, lower polymerization contraction, surface smoothness, easy handling and fast application besides high mechanical resistance. According to

Bispo<sup>13</sup> the nanoparticulate resins were developed in order to meet the need to be used in both anterior and posterior teeth. Due to the characteristics, durability and better esthetics, in addition to restorative need, in both anterior and posterior teeth, the composite resin was indicated for the treatment of the patient aiming at a better aesthetic and functional result.

In addition, Bispo<sup>13</sup> reported that the ideal resin properties are: translucency, transparency, opacity, opalescence, color stability, dimensional stability, mechanical and abrasion resistance, tooth adhesion, impermeability and insolubility to the oral fluids, being nontoxic, insipid, odorless, linear thermal coefficient of expansion and of contraction close to the dental tissues, being repairable, biocompatible and also, present a low recurrence of secondary caries. However, no dental material currently has all these characteristics, but the most outstanding is the nanoparticulate resin. As the nanoparticulate resin is the one closest to the ideal characteristics, it was considered the best choice for this clinical case. In addition, because it is a resin of universal use, and considering that the patient had a restorative need in anterior and posterior teeth, its used was established for such reasons.

In the reported clinical case, space maintainers were made, as there was early loss of deciduous teeth. Otenio et al.<sup>5</sup> and Cardoso et al.<sup>2</sup> suggested the preparation of space maintainers to keep the edentulous space, avoiding the loss or decrease thereof, with the inclusion of artificial teeth, in order to restore the masticatory, phonetic, aesthetic and vertical dimension of the occlusion.

### 3 Conclusion

Caries disease, so common in children, is easy to prevent, and oral hygiene and diet control techniques must be adopted in addition to motivation. Upon its onset, the disease must be treated first and then the sequelae. It is important that all phases of the treatment plan are performed. The aesthetic and functional restoration must be performed after the preparatory phase, restoring the child's self-confidence and quality of life.

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