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Aesthetic-functional rehabilitation of deciduous anterior teeth without removal of carious tissue: series of clinical cases

Reabilitação estético-funcional em dentes anteriores decíduos sem remoção de tecido cariado: série de casos clínicos

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ABSTRACT

The treatment of cavity carious lesions in anterior deciduous teeth is a frequent demand in the pediatric dentistry clinic, since the control of the disease in early childhood still presents itself as an inter-factor challenge in child health care. While the scientific evidence on the minimally invasive principles of approach in Dentistry is presented at an increasing level, the alternatives for restorative treatment in anterior deciduous teeth still face the low availability of reports that associate minimal intervention with the aesthetic needs inherent to the treatment. Thus, this article presents a series of cases in which direct restorations in composite resin, without removing carious tissue using polyvinyl matrices, were treatment alternatives for moderate and severe caries lesions in anterior deciduous teeth. It was observed, therefore, that the use of this artifact helped the rehabilitation of compromised dental elements with speed and satisfactory 50 result, suggesting that this is an appropriate approach for application in Pediatric Dentistry, 51 since it offers resistance, durability, besides providing aesthetics and functionality, it presents lower cost and agility as it eliminates the laboratory phase.

Indexing terms: Dental caries. Dental atraumatic restorative treatment. Pediatric Dentistry. Tooth deciduous.

RESUMO

O tratamento de lesões cavitadas de cárie em dentes decíduos anteriores é uma demanda frequente na clínica de odontopediatria, visto que o controle da doença na primeira infância ainda se apresenta como um desafio interfatorial nos cuidados em saúde infantil.

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Enquanto a evidência científica nos princípios minimamente invasivos de abordagem em Odontologia apresenta-se em nível crescente, as alternativas para tratamento restaurador em dentes decíduos anteriores ainda esbarram na baixa disponibilidade de relatos que associem a mínima intervenção às necessidades estéticas inerentes ao tratamento. Assim, este artigo apresenta uma série de casos em que as restaurações diretas em resina composta, sem a remoção de tecido cariado utilizando matrizes de polivinila foram alternativas de tratamento para lesões de cárie moderadas e severas em dentes decíduos anteriores. Observou-se que o uso desse artefato auxiliou a reabilitação dos elementos dentários comprometidos com rapidez e resultado satisfatório, sugerindo que essa é uma abordagem adequada para aplicação em Odontopediatria, já que oferece resistência, durabilidade, além de proporcionar estética e funcionalidade, apresenta menor custo e agilidade na medida que dispensa a fase laboratorial.

Termos de indexação: *Cárie dentária. Dente decíduo. Odontopediatria. Tratamento dentário restaurador sem trauma.*

INTRODUCTION

Despite all the preventive measures available in pediatric dentistry, caries in early childhood is still a common problem, often responsible for aesthetic and functional damage to the anterior deciduous dentition [1,2]. In addition to clinical consequences widely known by dentists, emotional damage, social isolation and school bullying can be associated with the presence of visible cavitated lesions in children [3].

Carrying out the appropriate rehabilitation treatment, solving the functional and aesthetic problems of children who lost their deciduous anterior teeth prematurely, is still a challenge for many pediatric dentists [2,4,5]. Dental surgeons recognize that aesthetic impairment often adversely affects the child's social and psychological development [3,6].

The frustration associated with solving these problems has been significantly avoided, with advances in the quality of restorative materials and bonding techniques to tooth enamel.

The minimally invasive restorative technique (MI) is the treatment of tooth decay with a conservative approach to preserve the tooth structure as much as possible and which aims to treat and minimize the structural damage resulting from the process. In addition to considering the type of injury, the selection of this technique is based on a personalized analysis for each patient [4,5,7,8]. When properly trained in MI dentistry techniques, dentists and patients have a favorable opinion and, in many cases, prefer more conservative therapies for the treatment of caries [9].

The International System for the Detection and Assessment of Caries (ICDAS) was developed to include early caries lesions in the enamel according to the stage of their progression, in addition to categorizing the "obvious" dental caries lesions according to their progression. The ICDAS system is composed of six diagnostic criteria, it is very useful for the purposes of clinical practice, research and development of public health programs [10,11]. The MI restorative approaches have strong scientific evidence and good clinical acceptance, as they are applied with less anesthesia demand, less clinical time and fewer patient handling steps than in conventional restorative treatments [12].

The proposal of MI Dentistry is based on its biological foundation of interrupting the caries disease evolution process, associated with morphological rehabilitation and aesthetic demand, making it plausible to carry out restorative treatments of deciduous anterior teeth with an acetate matrix and composite resin, respecting the protocols of adhesion and adaptation of the material to the remaining dental structure [13-15].

This case series focuses on presenting aesthetic and functional approaches and rehabilitations using direct composite resin restorations through polyvinyl matrices without removing decayed tissue in anterior deciduous teeth.

Technique description

There was no preparation or removal of any tissue from the teeth being treated. The tooth measurement was performed using a dry point compass (Trident, Itapuí-SP, Brazil) and a flexible ruler (Jon, São Paulo-SP, Brazil), in which the mesiodistal width was obtained to choose the chloride matrix of polyvinyl (PVC) (TDV, Pomerode, SC, Brazil) for deciduous anterior teeth, while cervicoincisal measurements were taken with reference to adjacent and antagonist teeth. The choice of using polyvinyl chloride matrices due to their possibility of formatting the size and shape of the restored

crown, enabling greater anatomical reliability and shorter restoration execution time, as it eliminates the manual sculpting step of the dental element. The selected matrices were cut and fitted in a test in the cervical of the remaining dental structures, removed and reserved for use. Under relative isolation, etching with 37% Condac37® phosphoric acid (FGM, Joinville-SC, Brazil) was performed according to the manufacturer's recommendations. Adper Single Bond® adhesive (3M ESPE, Barueri-SP, Brazil) was applied with a microbrush brush, followed by light curing for 20 seconds. Each polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil) was filled with composite resin according to what each operator had in their office, (not being of relevant importance for the success of the technique) in color previously selected, and adapted to involve the entire structure of the teeth being treated. Excess resin that leaked into the cervical region of all faces was removed and the buccal and palatal surfaces of each tooth were light-activated for 20 seconds per face of each tooth. The matrix was removed with the aid of an explorer probe, and finished with sandpaper discs (TDV, Pomerode-SC, Brazil), felt discs (TDV, Pomerode-SC, Brazil), Sof-lex Pop On® discs (3M) ESPE, Barueri-SP, Brazil) and Prisma Gloss® polishing paste (Dentsply, São Paulo-SP, Brazil) (figure 1).

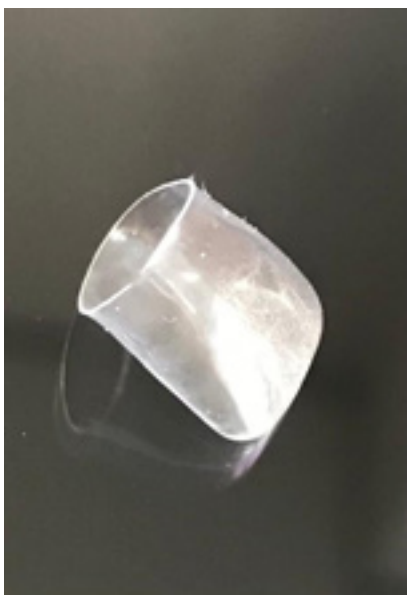

Figure 1. Polyvinyl chloride matrix (PVC) (TDV, Pomerode, SC, Brazil).

Case 1

The patient, aged two years and seven months, normorreactive, came to the office accompanied by her parents, whose main complaint was the appearance of the child's front teeth. The consultation and treatment were authorized through the Terms of Free and Informed Consent (TCLE) and Authorization for the Use of Images, duly signed by those responsible.

The anamnesis was performed, in which the mother reported the daily consumption of foods with a high amount of sucrose and fermentable carbohydrates. No report of spontaneous or induced pain in the teeth. Also, according to the parents' report, they had started brushing with fluoride toothpaste two months ago, twice a day. On clinical examination, after prophylaxis, active caries lesions were found ICDAS score "5" in upper lateral incisors and score "6" in upper central incisors (figure 2A).

The child had completed deciduous dentition, with no visible lesions on clinical examination in the posterior teeth. Modified upper occlusal radiography was performed (figure 2B), in which the presence of periapical lesions was

not observed. The treatment began with guidance to the child's parents about brushing and the family's referral to the maternal and child nutritionist for the adequacy of eating habits. Duraphat ® fluoride varnish was applied.

The clinical reassessment consultation took place after seven days, with observation of the appearance of cavitated lesions, which had a darker appearance and less thick biofilm adhesion. Then, all teeth were prophylaxis with pumice stone and water, with a Robinson brush at low speed. Restorative and esthetic treatment started with elements 52 and 62 due to the lesser severity and smooth and shiny appearance of the lesions present. The technique described above was performed. In this case reported, the mesiodistal measurements of the crowns were 6.5 mm for element 52 and size 6.0 mm for element 62, while the resin Z350 ® (3M ESPE, Barueri-SP, Brazil) in color A1B was selected for the restorations (figure 2C).

The next consultation was carried out, in which element 61 was restored, under the MI Dentistry protocols, with selective removal of infected dentin in the vicinity of the element's axial walls, with the aid of a dentin spoon, without instrument contact with the pulp wall. Local anesthesia was not performed for the procedure in which the same protocol used in the previous consultation was used. The mesiodistal width for choosing the polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil) was 7.5 mm in size for element 61 (figure 2D). Due to the darkening of the remaining affected tissue, an increment of Opallis ® resin (FGM, Joinville-SC, Brazil) in color B 0.5 was applied on the buccal surface of the tooth, followed by photoactivation for 20 seconds, with the aim of aesthetic masking from the surface. Then, the adaptation of the polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil) filled with Z350® resin A1B color was carried out in order to involve the entire structure of tooth 61. Element 51 was not subjected to treatment MI due to the report of spontaneous pain during the treatment, adopting, then, the endodontic treatment and its rehabilitation with a fiberglass post and direct resin crown made with a polyvinyl chloride (PVC) matrix (TDV), Pomerode, SC, Brazil).

The patient returned to the office three months after the end of treatment, when a new modified upper occlusal radiograph was performed (figure 2E), with no presence of periapical lesions. There was no report of pain after treatment, and there was an increase in the child's cooperation at each visit. The restorations were well adapted, with the aesthetic and functional maintenance obtained right after the end of the treatment.

Case 2

A four-year-old female child, normorreactive, came for dental care without any specific complaint, but the mother wanted to improve her daughter's esthetics. Consultation and treatment were authorized with prior signature of the TCLE and the Authorization Term for the Use of Images, by those responsible.

Figure 2. Case 1: Initial clinical examination – active carious lesions ICDAS score "6" on teeth 52 and 62 and score "5" on teeth 51 and 61; B) Initial anterior occlusal radiograph; C) Teeth 52 and 62 restored in direct composite resin, without removal of carious tissue; D) Teeth 51, 61 and 62 restored in composite resin using acetate matrices. Tooth 51 restored in direct resin after endodontic treatment; E) Anterior occlusal radiograph three months after starting treatment.

After the anamnesis, the clinical examination revealed the presence of active caries lesions ICDAS score "6" on teeth 61 and 62 and score "5" on tooth 51 (figure 3A), all without clinical signs of pulp pathology, other teeth presented no caries activity. Initial radiography was not performed due to the technical difficulty of the patient's cooperation. Before performing the procedure, mother and child received hygiene and diet instructions and committed to intensify the oral hygiene methods presented.

The selection technique and restoration steps described in this article were performed. In tooth 61, a 6.5 mm polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil) filled with Empress® resin (Ivoclair Vivadent, Barueri-SP, Brazil) color A1D was used and in tooth 62, 5.5 mm matrix filled with Empress® resin (Ivoclair Vivadent, Barueri-SP, Brazil) color A1D was selected. For tooth 51, a 6.5 mm matrix was used and the aforementioned procedures were repeated. After photoactivation, the matrices were removed with the aid of an explorer probe. Excess resin in the cervical region was removed, occlusal adjustments and polishing performed with Sof-lex Pop On® discs (3M ESPE, Barueri-SP, Brazil) and polishing paste (figure 3B).

The final radiograph was taken days after the restorations (figure 3C and 3D) and external root resorption was observed in tooth 61, but as the patient was clinically without mobility and had no fistula, the follow-up continued until the teeth were exfoliated.

Figure 3. Case 2: A) Teeth 51 and 52 restored in direct composite resin. Teeth 61 and 62 with active carious lesions; B) Teeth 51, 52, 61 and 62 restored in direct composite resin; C) Periapical radiograph of elements 51 and 61 after direct restorations in composite resin using acetate matrices; D) Periapical radiograph of elements 61 and 62.

Case 3

A four-year-old female child, normorreactive, came for dental care without any specific complaint, but the mother wanted to improve her daughter's esthetics. Consultation and treatment were authorized with prior signature of the TCLE and the Authorization Term for the Use of Images, by those responsible.

After the anamnesis, the clinical examination revealed the presence of active caries lesions ICDAS score "5" on teeth 61 and 62 and score "5" on tooth 51 (figure 4A), all with severe incisal wear and without evidence of pulp pathology. Other elements had initial caries lesions on teeth 75 and 85. Initial radiography was not performed. Before performing the procedure, the mother and child received hygiene and diet instructions, committing to intensify the oral hygiene methods presented, and dental prophylaxis was performed with pumice stone and water with a Robinson brush at low speed.

The steps described in the technical report were performed. For tooth 61, a 6.5 mm polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil) filled with Bulk Fill Admira X-tra ® Universal resin (Voco, Porto Alegre-RS, Brazil) was used, placed in position and light activated for 20 seconds on the buccal and palatal surfaces. On tooth 62, the 5.5 mm polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil) filled with Bulk Fill Admira X-tra ® Universal resin was selected. In tooth 51, a 6.5 mm matrix was used and the aforementioned procedures were repeated (figure 4B). Elements 75 and 85 were restored with direct composite resin.

The final radiograph was taken 13 days later (figure 4C) and the follow-up continued until the teeth were exfoliated.

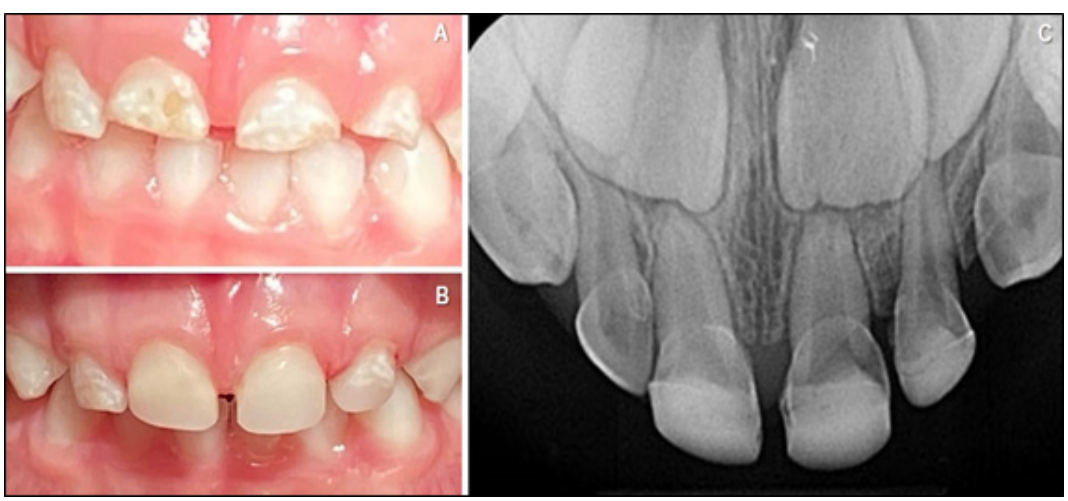

Figure 4. Case 3: Active caries lesions in elements 51, 52, 61 and 62; B) Teeth 51, 52, 61 and 62 restored in composite resin using acetate matrices; C) Occlusal radiography after performing the procedures.

Case 4

A five-year-old girl attended the dental office in Jaru-RO, accompanied by her father, whose main complaint was esthetic impairment in the upper anterior region. Consultation and treatment were authorized with signature of the Informed Consent Form and the Term of Authorization for the Use of Images.

During the clinical examination, the presence of active caries lesions was found, ICDAS score 5 in elements 51 and 61, and score 6 in elements 52 and 62 (figure 5A). The radiographic examination did not show suggestive images of endodontic and periapical involvement (figure 5B). The presence of carious lesions was found in elements 75 and 85, which were restored with glass ionomer cement. At the beginning of the service, the parents received guidance on diet and oral hygiene, professional prophylaxis performed with pumice stone and water, with a Robinson brush at low speed. The child showed to be collaborative with the treatment. Restorative treatment in direct resin with a polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil) in elements 51, 61, 52 and 62 was indicated.

The execution of the technique followed the protocols described above, and polyvinyl chloride (PVC) matrices (TDV, Pomerode, SC, Brazil) filled with Z250® resin (3M ESPE, Barueri-SP, Brazil) in color A3 were used, as matrices were placed in the remaining tooth and light-activated for 40 seconds on each face of each tooth. The matrices were removed with the aid of an explorer probe and excess resin from the cervical region was removed, followed by occlusal adjustments, finishing and polishing (figure 5C).

The patient returned for periodic follow-up, the father reported personal satisfaction with the child's smile. Clinically, no relevant change was observed. The clinical and radiographic follow-up (figure 5D) of the patient continued until the exfoliation of the dental elements.

Figure 5. Case 4: A) Initial clinical examination. Active carious lesions ICDAS score "5" on teeth 51 and 61 and score "6" on teeth 52 and 62; B) Initial occlusal radiography; C) Teeth 51, 52, 61 and 62 restored in composite resin using acetate matrices; D) Occlusal radiography after performing the procedures.

Case 5

The three-year-old patient, normorreactive, arrived at the dental office in the city of Ponta Grossa-PR, accompanied by her mother, who previously signed the consent form and the Authorization Term for the Use of Images. The person in charge complained about the esthetic appearance of the anterior teeth.

Anamnesis and clinical examination were performed. It was not possible to perform a satisfactory radiography due to technical difficulty and the patient was uncooperative for this procedure. Active carious lesions were found ICDAS score 5 in elements 51 and 61 and score 6 in 52 and 62 (figure 6A). Hygiene and diet guidelines were given to the mother and child.

For teeth 62, 61, 51 and 52, which did not show clinical signs of pulp involvement, it was then decided to use direct composite resin restorations with a polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil). For teeth 51 and 61, the matrices of size 7 mm were selected, and for teeth 52 and 62, the matrices of lateral incisor crowns in size 6 mm were selected, taking as reference the size of adjacent and antagonist teeth, and the execution followed. technique previously described. The matrices were filled with Aura® Pediatria DB resin (SDI, São Paulo-SP, Brazil).

After six months of follow-up, the crowns showed satisfactory color, structure and functionality (figure 6B), without pulp damage. Again, due to technical difficulty, radiographic examination was not performed.

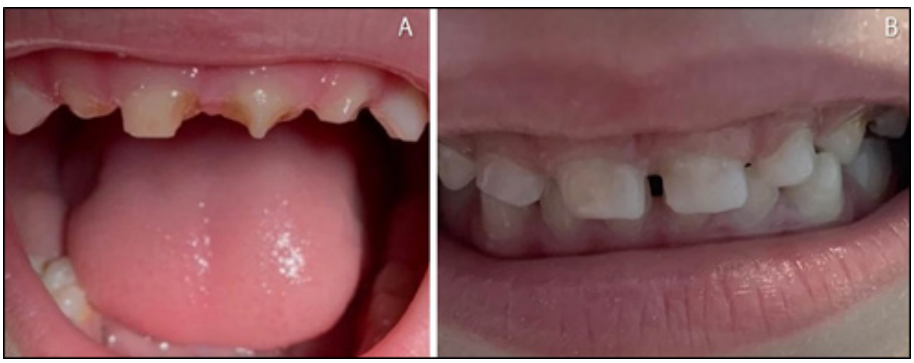

Figure 6. Case 5: Initial clinical examination. Active caries lesions ICDAS score "5" in teeth 51 and 61 and score "6" in 52 and 62; B) Teeth 51, 52, 61 and 62 restored in composite resin using acetate matrices.

Case 6

Female patient, four years old, normorreactive, arrived at the dental office in the city of Ponta Grossa-PR, accompanied by her mother, whose main complaint was the frequent fall of the proximal restorations performed more than three times in another clinic. Teeth 62, 61, 52 and 51 had inactive caries ICDAS score 5 lesions (figure 7A). The consultation and treatment were authorized through the consent form and the Authorization Term for the Use of Images, duly signed by those responsible.

Figure 7. Case 6: A) Initial clinical examination. Active caries lesions ICDAS score "5" on teeth 51, 52, 61, and 62; B) Teeth 51, 52, 61 and 62 restored in composite resin using acetate matrices.

On teeth 51 and 61, polyvinyl chloride (PVC) matrices (TDV, Pomerode, SC, Brazil) were selected for deciduous central incisor of 7.5 mm and on teeth 52 and 62 the polyvinyl chloride (PVC) matrices (TDV, Pomerode, SC, Brazil) of lateral incisor size 6 mm, taking as reference the size of adjacent and antagonist teeth. Polyvinyl chloride (PVC) matrices (TDV, Pomerode, SC, Brazil) were filled with Charisma ® resin (Kulzer, São Paulo-SP, Brazil) in color B1 (figure 7B).

After a year of clinical follow-up, the restorations remain with satisfactory color and functionality, without symptoms.

DISCUSSION

This study proposed the treatment and evaluation of carious lesions in deciduous anterior teeth in children between two and six years of age, using the MI technique.

Dental caries is one of the most prevalent chronic diseases in dentistry. It is formed through a complex interaction between acid-producing bacteria and fermentable carbohydrates on the tooth surface over time. The result of its progression is the carious lesion, which can present from a subclinical stage to the more advanced consequences of the disease, such as extensive cavitation [17,18].

The clinical detection of caries disease signs is performed by visual examination of the tooth surface, complemented by radiography. In addition to the presence or absence of cavitation, as well as its extension in enamel and dentin, it is necessary to evaluate the activity of the carious lesion [17-20]. However, not removing tissue is also practicable, as performed in the reported clinical cases.

The biological approach to caries lesions leads to the appearance of unconventional treatments, performed in a minimally invasive and conservative way, as adopted in the Hall Technique, which is characterized by the placement of a preformed crown without prior tooth preparation, without using anesthesia and without removing the caries lesion [14-16,18].

Scientific evidence demonstrates that preformed crowns are approaches to achieving an effective marginal seal and that bacteria, when isolated from the substrate, does not cause progression of the dental caries lesion [9,13]. These biological principles were the basis for carrying out the clinical cases reported in this work, when it was prioritized the orientation of adequate hygiene habits, the integral preservation of the existing dental structure and the sealing of present lesions as a resource to control caries disease – described in the Hall Technique – while it was associated the adhesive and aesthetic properties for the use of composite resins in such restorations [5].

The reported cases present the possibility of performing treatments without removing the decayed tissue, aiming to associate the biological principles of caries disease control with the restorative and aesthetic properties of the composite resin suitable for the restorative demand of anterior teeth. Matrices are very useful for restoring badly damaged dental crowns, allowing the resin to cover most of the remaining structure. This results in improved strength and protection of the tooth against tooth biofilm and subsequent carious lesions. The restorations offer resistance, durability and a very acceptable aesthetic result. In the literature there is talk of little wear, but in these clinical cases it was decided not to wear or remove decayed tissue.

In the literature, it was possible to see reports of little wear of the dental tissue to receive minimally invasive treatments. The concept of MI Dentistry supports an appreciation of the original tissue, including diagnosis, risk assessment and minimal removal of decayed tissue [8,20]. In the clinical cases treated in this study, there was no wear and the treatment was carried out with a polyvinyl chloride (PVC) matrix (TDV, Pomerode, SC, Brazil), since the direct restoration procedure on the remaining tooth provides little wear of the original tooth surface, as it is performed directly on it, thus obtaining results superior to the various techniques already used, with greater color stability, enabling normal occlusion and with expected integrity up to the physiological exfoliation of the primary tooth, in addition to offering resistance and durability [7,8].

It can be observed that the use of this artifact helped the rehabilitation of compromised dental elements with fast and satisfactory results, suggesting that this is an appropriate option for application in Pediatric Dentistry, as it offers strength, durability, in addition to providing aesthetics and functionality, in addition to present lower cost and agility as it dispenses with the laboratory phase.

CONCLUSION

The non-removal of decayed tissue in deciduous anterior teeth is a conservative minimally invasive approach that demonstrates clinically satisfactory results for aesthetic and functional rehabilitation when using composite resin through polyvinyl matrix crowns in the treatment of moderate and severe cavitated lesions, combined with low complexity of execution of the technique, as well as the low costs involved.

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Collaborators

A Rech, execution of dental procedures and description of clinical cases 2 and 3; writing of the article. M Olberttz, execution of dental procedures and description of clinical cases 5 and 6; writing of the article. DJM Paiva, execution of dental procedures and description of clinical case 4; writing of the article. AN Ribeiro, execution of dental procedures and description of clinical case 1; writing of the article. T Gimenez and JCP Imparato, article review.

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