BULK FILL COMPOSITE ASSOCIATED WITH THE BEHAVIORAL MANAGEMENT TECHNIQUES IN PEDIATRIC NON-COLLABORATING PATIENTS: CASE REPORTS.

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Abstract

Background The control techniques of behavior in dental care have the intention to reduce negative feelings and develop a bond with the child. In addition, dental caries is frequently present in the dentition, becomes its repair and conservation null coming to harm its physiodinamic and development. Therefore, the objective of this study is to report three clinical cases about the composite Bulk Fill in conjunction with the techniques of conditioning in pediatric non-colaborating patientes.

Case Report The patients were selected according to their stage of mixed dentition and presenting carious cavitated lesions up to 5mm in posterior teeth deciduous and/or permanent. After selection, the professional choose the technique for the management of conditioning and restorative treatment using the composite Bulk Fill.

Follow-up and conclusions Two years after the procedure, two patients presented with satisfactory restoration and the other with exfoliation dental during its normal physiological period. The application of the techniques talk-show-do, positive reinforcement and control of voice along with the treatment by Bulk Fill composites proved to be an option of excellence, allowing speedy restorationist, contributing with the execution and efficiency of clinical technique.

Keywords: Pediatric dentistry, Resins, Dental restoration, Child behavior, Composite resins.
Background

Fear, dismay and anxiety are feelings that especially children patients come to feel during a dental care. It is the legal guardians will instruct the child psychologically to receive treatment in conjunction with the professional who has the competence to express a simple form, clear and balanced everything that will be executed during the appointment (Marsillac 2013).

In pediatric dentistry, the techniques of conditioning the behavior consist in behavioral psychology, which seeks to establish positive actions in a gradual way and agile through communication. According to the American Academy of Pediatric Dentistry (AAPD), established some tools which help to a conditioning suited in order to establish positive actions. Among them are the non-pharmacological techniques, which are indicated for all children patients, such as: control of voice, communication multi-sensory or non-verbal, talk-show-do, positive reinforcement and distraction. Soon, these methods provide emotional control, confidence and tranquility to the child, enabling quality and effectiveness to the dental care (Marsillac 2013; AAPD 2016).

Dental caries still a reality notably present in the deciduous dentition and permanent due to negligence of oral hygiene (Traebert et al. 2002; Davidoff et al. 2005), sometimes, the possibility of repair and conservation of dental elements affected, becomes almost null, compromising its psysiodynamic, development and stabilization of occlusion with patterns of normality.

Currently, it is visible to the search for techniques and restorative materials that imitate optical characteristics and dental anatomic, allow agility and longevity for the care in pediatric dentistry. In this way, direct restorative materials, such as composite resin, come suffering changes in its composition, considering the size of the particles, aiming at improvements to its mechanical resistance, compression, flexure, finishing and polishing, aiming at a possibility of reduction the step by step operative restorer (Ferracane 2011).

The recent modifications related to composite resin, concerns the minimization of the tension of contraction of polymerization, resulting in the composite Bulk Fill or resins single increment who generally is a material of low degree of contraction, allowing its application in larger increments of 4 to 5mm and light-activation once, unlike conventional composite resins, which have increment limitation of 2mm. In addition, the composites of Bulk Fill evidenced higher potential of mechanical resistance in great depths, because it has the capacity to adapt to internal angles of the cavity with greater ease in comparison to the conventional adhesive restorative materials (Caneppele e Bresciani 2016).

The purpose of this study is to report three clinical cases about the relevance of the composite Bulk Fill in conjunction with the application of the techniques of behavioral management in pediatric dentistry patients non-colaborative.
**Case reports**

For the present study, the patients were selected of the community located next to the school of pediatric clinic of the University Center of Tiradentes (UNIT/AL), Maceió, Alagoas, Brazil.

For the present study, inclusion and exclusion criteria were defined, the patients were in the stage of mixed dentition that submit cavitated carious lesions up to 5mm in posterior teeth deciduous or permanent and with reports of previous experiences unpleasant feelings in the dental office.

The study was performed after the presentation, to legal guardian, of Free and Informed Consent Form (ICF) present in the records the patient, expressing possible discomforts, risks and benefits that the treatment would provide for the child. After signing, the survey information from the gestational period of the individual was conducted to their habits, diet and oral hygiene, as well as presence of any physiological abnormality were investigated through anamnesis along with the physical examinations intra and extra oral.

The first contact with child was adopted a consultation of conditioning through the observation of expressive behavior, the choice of techniques for the assessment of the oral condition and intervention. Realization of prophylaxis, clinical examination and radiographic, this latter being performed only when necessary due to the non-cooperation of the child, proceeded to orientation of oral hygiene.

**Case 01**

Patient female, 7 years of age, demonstrated since the first contact expressive characteristics of hyperactivity and disapproval with the ambiance, being reported by the responsible that the child had trauma of previous dental treatments. In was observed the mother’s patient behavior, and she was very agitated, this situation shows that probably she also had negative feelings about the treatment. In this way, there was the need for management of behavior, with the aim of establishing a bond of trust between the dentist and child and alleviate the negative feelings. The techniques talk-show-do and positive reinforcement of playful way were used with the aim of inducing the desirable behavior and guidance to mothers with respect to behavior in front of the child. The clinical examination showed the tooth 75 presented with extensive injury carious, deep and with the presence of painful symptoms caused during their feeding, hygiene and fluid intake. The radiographic examination showed proximity that the lesion carious the pulp chamber and absence of thickening of the pericemental space and periapical lesions. The tooth in question even if presented with 2/3 roots, and his successor (tooth 35) was below the stage 6 of Nolla. In this way, reached the diagnostic hypothesis of reversible pulp, adopting the treatment of pulpotomy.

Finalizing the endodontic conservative therapy, the need for further definitive restoration was observed, since the tooth in question still possess active function in the mouth for about three years (Fig 1). This mode was carried out step by step of procedure for restoring class II Black occlusal-mesial resin in Bulk Fill (3M ESPE, USA).
In the case was the absolute isolation of the operative field to assist in the control of humidity. Ran the lowering of the provisional restoration of glass ionomer cement (MIC), which went on to serve as the basis for the restoration using the conical diamond tip 1046 dual-FG (KG Sorensen, Brazil), at high speed. After preparation, it was found that the depth of 5mm of the cavity using a periodontal probe millimeter, measured this enough for the use of selected composite (Fig 2). Soon after, was been the conditioning of the cavity with the phosphoric acid 37% (Condac - FGM, Brazil), acting by 15 seconds in enamel and 10 seconds in dentin followed by rinsing twice the time and drying with light air jets (Fig 3). Soon after, it was applied two layers of conventional adhesive (Ambar, FGM, Brazil) of active form using the micro-applicator (Cavibrush, FGM, Brazil). Lightweight air jets for evaporation of the solvent and light-activation for 20 seconds (photopolymerizer Emitter B- Schuster, Brazil) (Fig 4). Adaptation of the system matrix with the implementation of the door of Tofflemire matrix (Golgran, Brazil) together the tape metal band matrix 0.7mm (Microdont, Brazil). Following the preparation of the proximal wall with a Bulk Fill (3M ESPE, EUA), application of Bulk Fill flow (3M ESPE, EUA) for regularization of the cavity and better adaptation to the internal angles (Fig 5). Using a spatula titanium for resin and condenser Ward nº. 03 (Millennium Golgran, Brazil) it was insert a considerate amount of 5mm in a single increment composite Bulk fill (3M ESPE, USA) to cavity and prepared the sculpture anatomy of the tooth (Fig 6). Then it was utilized the light activation with the use of LED (photopolymerizer Emitter B- Schuster, Brazil) under high light intensity (>1200 mW/cm²) during 20 seconds, as recommended by the manufacturer of the resin. Finally, with a diamond tip 3118FF (KG Sorensen, Brazil) was performed the occlusal adjustment of the restoration, with the aim of removing excess restorative material and refinement of dental anatomy (Fig 7).

Case 2

Patient female, 7 years of age, over the course of anamnesis, her mother reported that the patient had attention deficit disorder with episodes of hyperactivity disorder (ADHD). During the clinic evaluation, it was observed restlessness, impulsivity and anxiety on the part of the child. Being necessary to involve and attract the child’s attention, helping the child been more comfortable by the oral explanations and demonstrations of how would be the care of the technique talk-show-do. Also using self instruction as form of dynamics to encouragement of therapeutic intervention.

The intraoral examination, it can be observed darkening in the mesio-occlusal region (OM) of tooth 65 (Fig 8), which with the passage of the floss in the proximal the tooth affected, noted a fraying of the same. In the radiographic examination, we observed interproximal region radiolucency (Fig 9), compatible with dental caries.

The access to the carious lesion ran with the use of spherical diamond tip (1014 KG Sorensen, Brazil) with high speed by the occlusal surface and with the carbide drill nº. 3 (Microdont, Brazil), at low speed proceeded with the removal of all carious tissue. Thee preparation was finished as class II of Black (OM). Followed by the isolation of the operative field and probing the cavity with a millimetric periodontal probe (Probe Williams - Golgran, Brazil) showed the depth of 3.5mm (Fig 10). For the restorative procedure was used the system modified matrix (Matrix Unimatrix mini kit, TDV, Brazil) and executing the conditioning selective of the enamel with
phosphoric acid to 37% (Condac - FGM, Brazil) during 15 seconds, after washing and drying expressive (Fig 11). In this case, it was applied a single step self-etching adhesive (Single Universal Bond - 3M ESPE, USA) with the micro-applicator (Cavibrush, FGM, Brazil), followed by light curing for 20 seconds (Emitter B - Schuster, Brazil) after evaporation of the solvent (Fig 12). Then, it was inserted in a single increment the Bulk-Fill resin (3M ESPE, USA) with a spatula the titanium for resin with condenser Ward nº. 03 (Millennium Golgran, Brazil), to facilitate the condensation and sculpture of the restoration (Fig 13). After curing photopolymerizing each face, buccal, occlusal and lingual for 20 seconds (LED - Emitter B - Schuster, Brazil), was the occlusal adjustment with carbon paper (contact paper, Angelus, Brazil) then finish with diamond tip 3118FF (KG Sorensen, Brazil), without polishing (Fig 14).

Case 3

Male patient, 8 years of age, was referred to the clinic with complaint of painful symptoms caused after the ingestion of liquids and foods in reference to the tooth 36. During the anamnesis, the responsible reported that the children presented history of convulsions, possessing a medical diagnosis of delayed neuropsychomotor development (DNPD), moderate mental retardation and was doing use medicines for behavioral control. Along the clinical evaluation, we noted lack interest and indifference, there having is no visual contact by the child. We opted for consultations in the morning and always at the same time, adopting a clear term, simple and short through the techniques of voice control and talk-show-do for conditioning, having as purpose to acquire the attention and cooperation.

The clinical examination of the oral cavity showed a darkening in the region of central sulcus, with white edges curtains and integrity of the enamel the tooth 36 (Fig 15). Radiographically was observed radiolucent area in dentin with medium extension. Reaching the diagnostic hypothesis of active caries lesion, opting for the restorative procedure class I occlusal Black, with the resin Bulk Fill (3M ESPE, USA).

After the isolation of the operative field, ran-if the access to the lesion caries with spherical diamond tip (1014 KG Sorensen, Brazil) at high speed and removal of carious tissue with the use of carbide drill nº. 03 ball joint (Microdont, Brazil) at low speed. By means of a millimeter periodontal probe (the instrument Upstream Williams - Golgran, Brazil) demarcated in 5mm, we observed a depth of 4mm (Fig 16). Proceeded to cleaning the cavity with selective application only in enamel of phosphoric acid to 37% (37% Condac - FGM, Brazil) during 15 seconds. Washing and drying (Fig 17). Employment of double layer of self-etching adhesive (Single Universal Bond - 3M ESPE, USA), with the use of micro-applicator (Cavibrush, FGM, Brazil) in all preparation, leaving the solvent to evaporate followed by 20 seconds light-activation (photopolymerizer Emitter B - Schuster, Brazil) (Fig 18). Subsequent to the Bulk Fill flow (3M ESPE, USA) was performed filling the cavity of up to 2mm (Fig 19) providing an better contact with the cavity's angles and thus avoiding maladaptation of the material. Soon after, being performed to cure for 20 seconds with photopolymerizer of LED (Light Emitter B - Schuster, Brazil). Followed by the application of a portion of the 2mm of conventional composite resin (Filtek Z350 XT - 3M ESPE, USA), for confection the anatomy of the dental element and curing end during 20 seconds (Fig 20). Lastly with
the use of diamond tip 3118FF (KG Sorensen, Brazil) was performed the finishing and checking the occlusion with contact paper (Angelus, Brazil) (Fig 21).

Follow-up

All restorations were reassessed semiannually on basis the following clinical criteria: marginal adaptation, presence or absence of fractures, pigmentation, marginal leakage, secondary caries, painful symptoms and mobility.

After two years of follow up, in the case 01 (Fig 22) it was detected partial fracture of the cuspid mesial-buccal and restoration in the mesio-lingual face, absence of marginal leakage, painful symptoms and color change. The clinical conduct chosen was the repair of the restoration. In the case 02 (Fig 23), it was observed exfoliation of the dental element, emphasizing that the correct indication and implementation of restorative procedures in the deciduous dentition reinstating the integrity of tissues affected by caries, favoring the maintenance of the teeth during your normal physiological period. In the case 03 (Fig 24), there was marginal integrity of the restoration, absence of fracture and any symptoms, in addition to absence of secondary caries. However, due to the extrinsic pigmentation of the restoration, a remodeling was carried out by means of a new finishing and polishing.

Discussion

During the clinical care the pediatric dentist is able to analyze and recognize the different types of behavior from the degree of fear, anxiety and cooperation of the patient, which results in a better performance clinical. In concordance with the studies of Zanetti (2001), Moraes et al. (2004) and Silva et al. (2016), from the analysis of all minds, all selected techniques in ours cases were determined from the observation of the behavior of the child from your presence in the waiting room until the procedure to be performed. Even so, the professional should be aware that before deciding which of the techniques will be applied, each child has its limitations (Silva et al. 2016).

In this context, feelings may be strongly linked to the fear and concern of those responsible for child dental treatment (Themessi-Hubner et al. 2010). In the researches of Cardoso and Loureiro (2008), and Moreira et al. (2015), usually the companion of the child to the odontological office is the mother, where, in most cases they spend most of his time with the children. This leads us to observe during the description of the case 01, where the mother reported that the minor lived experienced unpleasant previous, while mother presented restlessness during the care, evidencing, thus, fear to the dental treatments, which consequently resulted in the behaviors non-collaborative of the child. With this, in agreement with the study by Moreira et al. (2015), it is remarkable the influence of parents on the feeling of anxiety of the son, but it is up to the dentist provide guidance with the aim that they prepare them in transmitting security and positive phrases so that they do not transfer their fear or anxiety.
However, it is necessary to be aware not only of the reasons which cause anxiety to the patient, but also to the responsible.

Another important factor to be observed in this study is about the employment of technical talk-show-do, which was present in all three cases. In reason of that it is a method where the operator is able to transmit information to child care, in which the same comprises more easily, without being surprised. Topic well emphasized by Brandenburg and Haydu (2009), which reported that the demonstration of certain instruments and equipment, plus the reproduction of that will run, has the purpose to reduce the anxiety of the child before a new circumstance. In addition, among the methods of conditioning discussed in this case, the tools for the management of the infant patient complied with the objectives of the AAPD (2016), where, the technique of positive reinforcement, led to the desired behavior in order to proceed with the consultations, the techniques talk-show-do and control of voice were effective, once they reached the purpose of attracting the attention and familiarization of the child in care decreasing their negative emotions. Becoming its essential application contributing satisfactorily in the progress of restorative procedures enabling a shorter time clinical.

The composites Bulk Fill suffered modifications in their composition, which minimize and control the contraction, avoiding stress and damage to the hybrid layer, also innovating systems the photoinitiators and amplification the translucency of the composite. All this mechanism allows the passage of light with greater ease, reaching greater depths and sensitizing the initiators of curing with greater efficiency, as well as the complement of the inorganic phase with glass fibers, giving greater mechanical resistance to restoration (El-Saftyt et al. 2012; Charamba et al. 2017). By exhibit good characteristics, such finding is relevant, since its implementation in the attendance provided to non-collaborative patients, is also able to reduce the time of clinical service.

The restorative technique was based in accordance with the recommendation of the manufacturers, where these materials can be inserted into the cavity and photoactivated in increments of 4 to 5mm, thus providing the decrease in the duration of clinical work. Agreeing with what describe Ilie, Bucuta And Draenert (2013), where the composite studied remained stable with the characteristics before the polymerization in an increment of 4mm. Furthermore, have evidenced the greatest potential of mechanical resistance at great depths, because it has the capacity of accommodation to the internal angles of the cavity with greater ease in comparison to conventional composite (Ilie et al. 2014; Leprince 2014).

The Bulk fill has superior advantages than the conventional, expressing satisfactory properties, for example, lower stress of contraction and increased resistance to fracture (Rosatto et al. 2015), the Bulk Fill is a composite capable of restoring large cavities with only one increment thus providing the reduction of clinical time presenting a greater adhesive strength (Sagsoz et al. 2016), color stability, low frequency of secondary caries and fractures (Van Dijken and Pallesen 2015).

As pointed out Lally (2014) and Leprince (2014), the properties with restorative material Bulk Fill stand out in virtue of shorter working time without spoil the quality and the outcome of the restoration. Van Dijken and Pallesen (2015) proved at an interval of 3 years that the technique of single increment was efficient and resistant when compared with the incremental technique of conventional composite resin of 2mm. In the face of what has been said, it should be emphasized that the preference for a restorative material with favorable properties
and with fewer steps restorer for non-collaborative patients was one of the main goals for which the material was used.

The employment of these composites in infant patients has as main objective the reduction of the time of implementing restorative technique. Alencar et al. (2015), confirmed that the composite Bulk Fill has resulted in a shorter period of work when compared with the technique of conventional resins. Furthermore, according to the AAPD (2016), the choice of this material, especially when used in pediatric dentistry, displays efficient features, so that the shorter working time results satisfactorily in the child’s behavior. Thus, because each patient presenting a difficult behavior and delicate, this technique makes clinical care quicker and simpler.

It must be take into account the need for an efficient cure for accurate conversion of the monomers, as well as a suitable finishing and polishing, aiming to durability and immutability in the longevity of the restorations, reintegrating the restored dental elements into their functional physiodynamics until their physiological exfoliation. Li et al. (2015), in their study analyzed the profile of polymerization of composite Bulk Fill evidencing that its photoactivation is satisfactory and effective in a single increment of thickness of 4mm. In another study, Orlowski, Tarczydlo and Chalas (2015), comparing in vitro conditions of marginal seal and curing of the class II restorations of composite Bulk Fill of different trademarks in layers with thickness greater than 2mm. The results were satisfactory as the high translucency of the material which consequently led to the passage of light in the whole extent of the restoration, while two of the four evaluated resins, being they Filtek Bulk fill (3M ESPE, USA) and SonicFill (Kerr, Germany), exhibited a higher marginal sealing in comparison to others. From this analysis, it can be demonstrated that the use of the material Bulk Fill (3M ESPE, USA) studied by the author and chosen for completion of cases, have considerable properties and relevant as the marginal seal between restoration and substrate.

It is important to consider that, even if the resins Bulk Fill featuring numerous qualities in relation to the decrease of the clinical protocol and restorer, resistance and durability, it is necessary that there is a correct conditioning behavioral of the patient, because in cases of non-cooperation, the contamination of the operative field with saliva, or any fluid, will result in failure in the restorative intervention. This situation reflects the same found by Amaral et al. (2011), in which emphasized that the professional should not think only in ease and in the shortest time of restorative clinical work, but that the same it will be plausible when coupled to a correct conditioning of the patient.

Conclusions

The use of composite Bulk Fill in pediatric dentistry non-collaborative patients showed to be an excellent option because taking into consideration their mechanical properties. In conjunction with the techniques of conditioning childlike, greater speed of the restoration was allowed, contributing with the execution and efficiency of clinical technique. However, the professional should understand that each technique should be applied according to the needs of each patient, respecting their level of cognitive development.
Reference


Appendix

**Fig. 1** Intraoperative clinical aspect after conservative therapy dental pulp

**Fig. 2** Analysis of the depth of the cavity after cavity preparation

**Fig. 3** Conditioning with phosphoric acid 37%, 15 seconds in enamel, dentin in 10 seconds

**Fig. 4** Application of adhesive layer using the micro-applicator

**Fig. 5** Adaptation of the System Matrix. Application of resin Bulk Fill flow

**Fig. 6** Insertion of resin Bulk fill with the aid of a spatula of titanium with condenser Ward n°. 03

**Fig. 7** Final aspect of the restoration, after finishing with tip diamond 3118FF and occlusal adjustment, without polishing
Fig. 08 Intraoral clinical aspect, denoting grayish appearance/darkened in glaze, characteristic of hidden caries lesion, with integrity of the enamel.

Fig. 09 Interproximal radiography for analysis and confirmation of interproximal lesion carious of the tooth 65.

Fig. 10 Cavity probing with the use of the millimeter periodontal probe under depth of 3.5mm.

Fig. 11 Adaptation of the system modified matrix, conditioning selective of the enamel with phosphoric acid to 37% during 15 seconds, posterior washing and drying with light air jets.

Fig. 12 The application of double layer of self-etching adhesive using the micro-applicator and light-activation for 20 seconds.

Fig. 13 Insertion of single increment of composite Bulk Fill; inserted in cavity with a spatula for a titanium resin.

Fig. 14 Final aspect of the restoration after polymerisation, occlusal adjustment with carbon paper and adjustment with diamond tip 3118FF, without polishing.
**Fig. 15** Initial clinical aspect, of the tooth 36 evidencing furrow darkened with integrity of the enamel

**Fig. 16** Cavity probing with the periodontal probe it is observed a depth of 4mm

**Fig. 17** Cleaning the cavity with selective application only in enamel of phosphoric acid to 37%

**Fig. 18** Application of self-etching adhesive with the use with micro-applicator

**Fig. 19** Filling up to 2mm of the cavity with composite Bulk Fill flow

**Fig. 20** Application of a layer of 2mm of conventional resin for completion of dental anatomy

**Fig. 21** Final aspect of the restoration after finishing with diamond tip 3118FF, and checking the occlusion

**Fig. 22-24** Clinical reassessment after two years of the respective cases