Indirect Composite Onlay Restorations in Primary Molars: a clinical report

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The authors describe a clinical case of oral rehabilitation, in a 4-year-old patient, using indirect composite onlay restorations. Eight severely decayed primary molars were restored. The clinical findings after 4 years demonstrated the efficiency of the technique as well as its indication in extensive restorations in Pediatric Dentistry, reestablishing function and aesthetics of these primary teeth. The indirect composite onlay restorations seem to wear at rate compatible with primary tooth wear and maintain a smooth, continuous anatomic form.
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INTRODUCTION

Many changes have occurred in the development and availability of restorative materials for children. In the past, the only option would have been to extract the severely decayed teeth and replace them with prosthetic substitutes until the permanent teeth erupted. This treatment was justified on the basis that permanent teeth would eventually replace the extracted ones.

Today, the importance of preserving the integrity of the primary dentition until the appropriate exfoliation time is well recognized. Increased expectations of patients and parents towards esthetics as well as function, together with improved diagnostic and materials advances, have expanded the boundaries of esthetic dentistry.[1] Among the restorative treatment options, the use of prefabricated crowns and resin composite restorations, either by means of direct or indirect techniques is mentioned in the literature.[2-6] However, few citations can be found reporting the use of the indirect technique in primary molars.

The purpose of this article is to present the prosthetic oral rehabilitation, in a 4-year-old patient, using indirect composite onlay restorations for anatomical and functional reconstruction of primary teeth.

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CLINICAL CASE

A 4-year-old patient presented to the Pediatric Dentistry Department at the University of São Paulo with with all maxillary primary teeth and mandibular molars severely destroyed by poor hygiene habits and early childhood caries (ECC) (Figures 1 A and B). The patient was submitted to clinical and radiographic evaluations. A treatment plan was presented to the parents. Advantages and

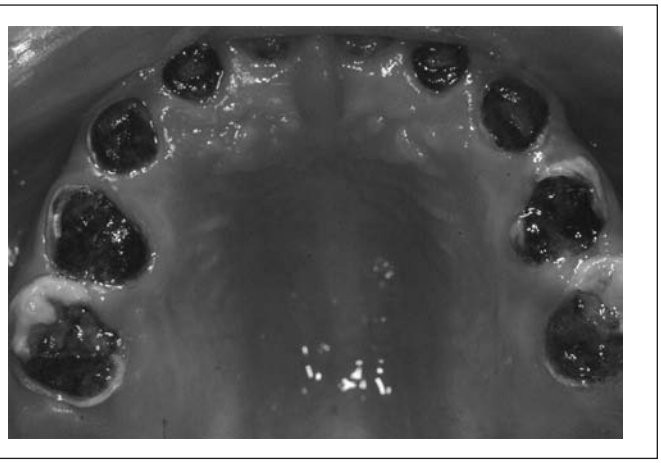

Figure 1A: Preoperative view of maxilar arch.

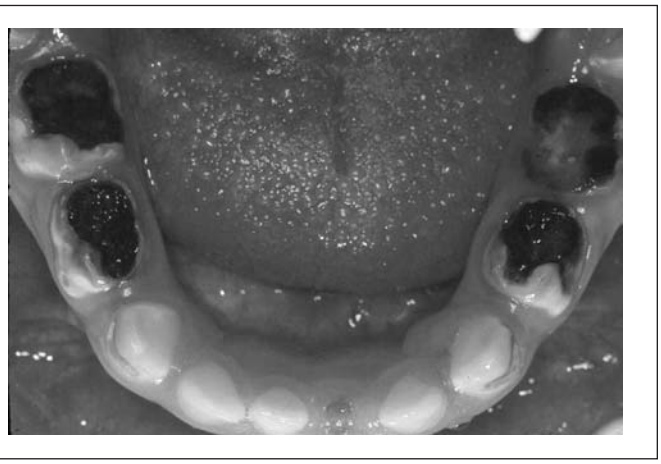

Figure 1B: Preoperative view of the mandibular arch.

disadvantages of various treatment alternatives were explained. Composite onlay restorations were suggested and accepted.

OPERATIVE SEQUENCE

All maxillary primary incisors were extracted. Endodontic treatment was accomplished in both canines in 1 appointment and in another session root canals were cleansed and prepared to receive intracanal metal post. Endodontic treatment was also performed in all mandibular primary molars, in all maxillary first molars and in maxillary left second primary molar and a thin layer of gutta-percha and resin modified glass ionomer (Vitremer, 3M) were inserted. Non retentive preparations were made, ending in a chamfer shoulder-type margin with rounded corners.

Two irreversible hydrocolloid impressions were taken from both maxillary and mandibular arches. Casts were poured and mounted on a semi-adjustable articulator in the central occlusal position. The composite onlays restorations were built up and light cured in increments using a hybrid resin composite (TPH, Dentsply), according to the indirect technique, in increments of approximately 2mm of thickness. Each increment was photo-polymerized for 40 seconds (Figures 2 A and B).

Under rubber isolation, the enamel and dentin surfaces of all mandibular primary molars were etched for 15 seconds with 35% phosphoric acid (3M/ESPE Dental Products), followed by bonding (Single Bond, 3M) and curing with halogen light, according to the manufacturer's instructions. The internal surface of the onlays were also etched then cemented with a dual-cure resin-based cement (Enforce, Dentsply) (Figure 3). After removal of the rubber dam, the cement residues were removed and cervical regions of the restorations were polished using diamond tips of fine granulation (resin composite finish, KG Sorensen). Finally, the occlusion was examined in centric and eccentric movements using ultrathin articulating paper to ensure that no functional interferences existed. In a next appointment the maxillary onlays were cemented in the same sequence described for the mandibular teeth. Figures 4 A and B illustrate the indirect composite onlay restorations after cementation. The child and parents were instructed on the importance of oral hygiene and diet, to preserve the primary teeth. They were also motivated to attend periodic appointments for prevention of caries.

During the 4-year evaluation the indirect composite onlay restora-

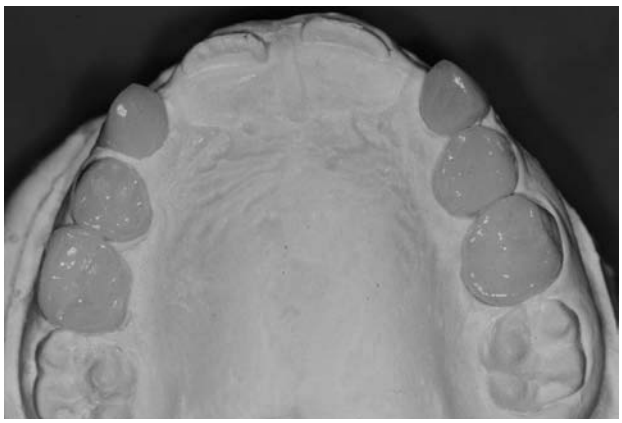

Figure 2A: Composite onlay restorations seated on the stone casts.

Figure 2B: Composite onlay restorations seated on the stone casts.

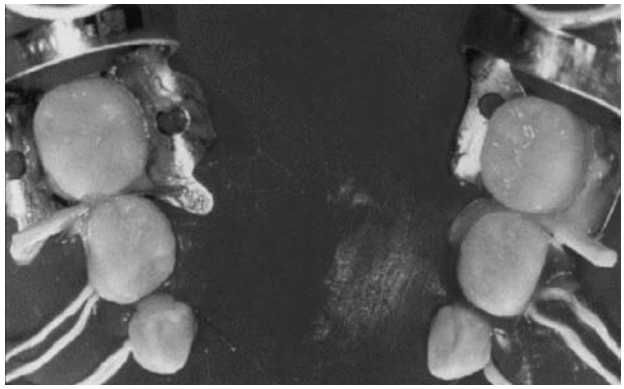

Figure 3: Occlusal view after cementation of the composite onlay restorations with dual-cure resin-based cement.

Figure 4A: Immediate postoperative view of maxillary arch.

Figure 4B: Immediate postoperative view of mandibular arch.

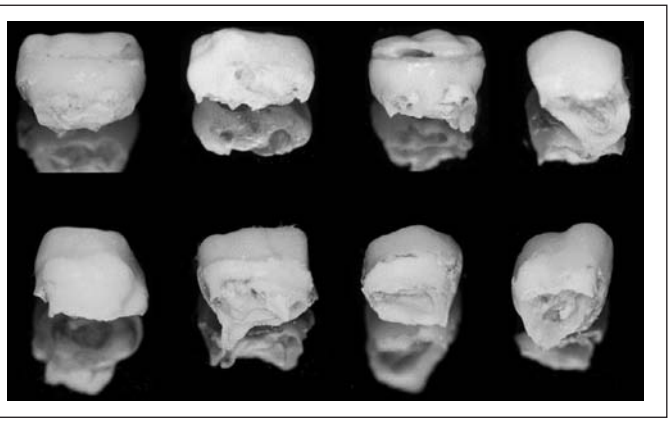

Figure 5: Teeth after exfoliation.

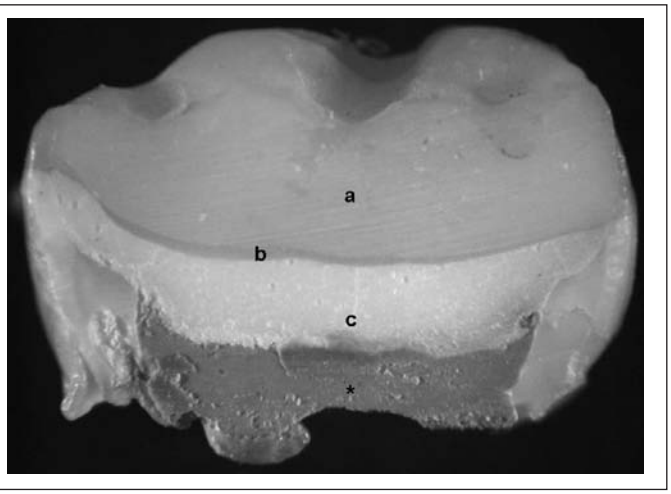

Figure 6: Mesio-distal section of 1 tooth restored with indirect composite onlay (a represents composite resin; b represents resin cement; c represents glass-ionomer; asterisk represents a thin layer of gutta - percha) (optical microscopy).

tions functioned well in primary molars. Teeth restored with resin composite onlay after exfoliation are illustrated in Figure 5. The indirect resin composite crowns seem to wear at rate compatible with primary tooth wear, and maintain a smooth, continuous anatomic form. (Figures 5-7)

DISCUSSION

Destruction of primary teeth in children may result in reduced masticatory efficiency, loss of vertical dimension, psychological problems and growth and development alterations.[7,8] Restoration of severely decayed primary teeth is a clinical challenge in Pediatric Dentistry.[1]

Restorative modalities used to treat primary molars include stainless steel crowns, amalgam, resin-bonded ceramic onlays and composite resin used direct or indirectly. Stainless steel crowns, when badly adapted are stressing factors to periodontal tissues.[9] Amalgam placement in children is sometimes difficult, because it requires a brief time to obtain even minimal strength properties, during which the dentist or the patient can destroy it. This material also provides an unaesthetic result, disagreeable to most parents.[2] Composite resins, used direct or indirectly, have been an excellent choice for severely carious teeth due to their adhesive bonding and esthetic appearance.[3,4] However, the intrinsic characteristics of the resin composites (low wear abrasion, shrinkage, and micro leakage) limited the use in posterior teeth. When direct composite resin is placed, polymerization may be inherently incomplete beyond a material thickness of two to three millimeters.[4,5]

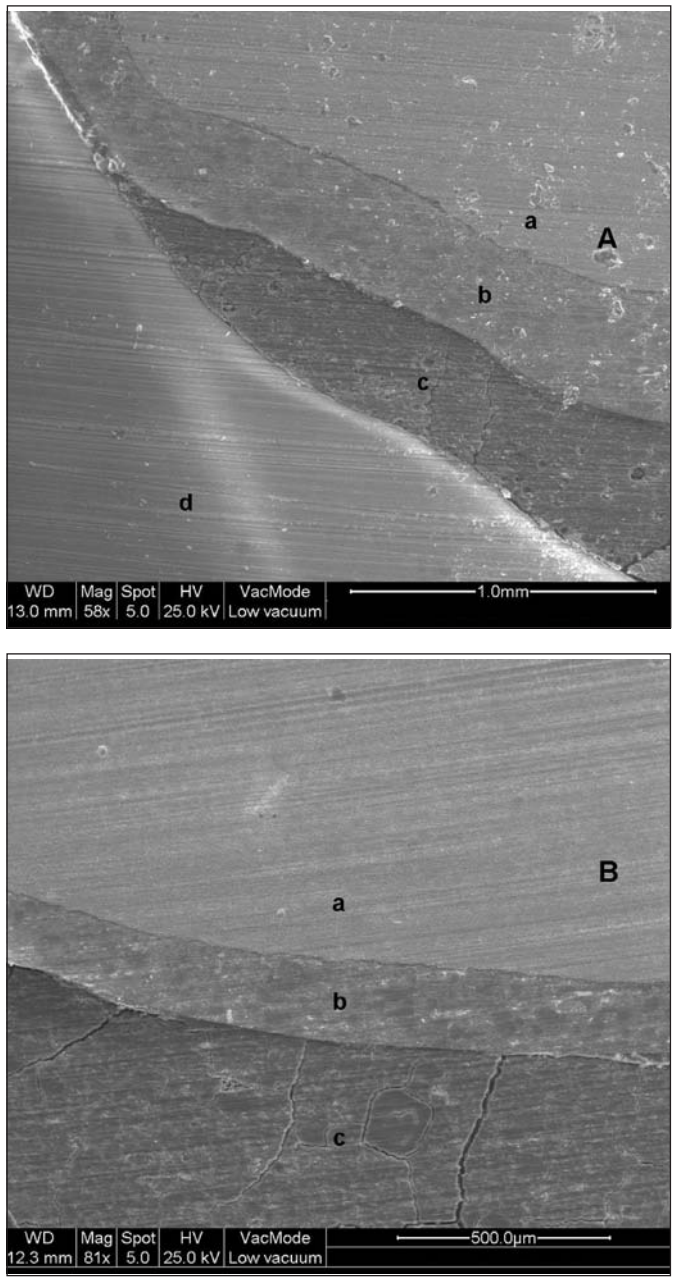

Figure 7: Representative SEM images of a tooth restored with indirect composite onlay: In A (a represents composite resin; b represents resin cement; c represents glass-ionomer; d represents dentin); In B (a represents composite resin; b represents resin cement; c represents glass-ionomer) (original magnifications: A, X 58; B, X 81).

The purpose of using the indirect restorative technique was to reduce the current problems of the direct restorative technique. This technique, especially for large restorations, provides a faster rehabilitation, thus the patient has shorter sessions of treatment and it makes possible to re-establish properly the anatomy of proximal outlines and cervico-occlusal height, restoring the function to teeth widely affected by the process of decay or others pathologies.[6]

In this case, the rehabilitation process was performed through

indirect composite onlays because of the number of severely decayed teeth that required restoration. The child`s chair time at each appointment was reduced, and cervical adaptation, general esthetics, and function were improved. The indirect composite onlay restorations can be used to restore infra-occluding primary molars.[10,11]

Few longitudinal follow-up has been reported for the composite onlays, therefore parents must be warned about the possible microleakage at the gingival margins and failure of the restoration and the need for periodic follow-up appointments. Further clinical and experimental studies are necessary for additional information.

REFERENCES

1. Ram D, Peretz B. Composite crowns for severely decayed primary molars: a technique for restoring function and esthetics. J Clin Pediatr Dent 2000;24:257-60.
2. Christensen GJ. Restoration of pediatric posterior teeth. J Am Dent Assoc 1996;127:106-8.
3. Croll TP. Bonded composite crowns for primary incisors: technique uptade. Quintessence Int 1990;21:153-7.
4. Updyke J, Dan Sneed W. Placement of preformed indirect resin composite sheel crown: a case report. Pediatr Dent 2001;23:143-4.
5. Ellis RK, Donly KJ, Wild TW. Indirect composite resin crowns as an esthetic approach to treating ectodermal dysplasia: a case report. Quintessence Int 1992;23:727-9.
6. Rabêlo RTS, Caldo-Teixeira AS, Puppin-Rontani RM. An alternative aesthetic restoration for extensive coronal destruction in primary molars: indirect restorative technique with composite resin. J Clin Pediatr Dent 2005;29:277-82.
7. Acs G, Shulman R, Ng MW, Chussid S. The effect of dental rehabilitation on the body weight of children with early childhood caries. Pediatr Dent 1999;21:109-13.
8. Ayhan H, Suskan E, Yildirim S. The effect of nursing or rampant caries on height, body weight and head circumference. J Clin Pediatr Dent 1996;20:209-12.
9. Checchio LM, Gaskill WF, Carrel R. The relationship between periodontal disease and stainless steel crowns. J Dent Child 1983;50:205-9.
10. Evans RD, Briggs PFA. Restoration of an infra-occluded primary molar with an indirect composite onlay: a case report and literature review. Dent Uptade 1996;23:52-4.
11. Giachetti L, Bertini F, Landi D. Morphological and functional rehabilitation of severely infra-occluded primary molars in the presence of aplasia of the permanent premolar: a clinical report. J Prosthet Dent 2005;93:121-4.