



Hybrid nano-resin esthetic crowns in primary teeth. Case report

Coronas estéticas de nano-resina híbrida en dientes temporales. Reporte de caso

Amalia Rojas Reynoso,* Gabriela Gasca Argueta[§]

ABSTRACT

Within the field of dentistry, loss of primary teeth due to caries, pulp conditions and crown fractures has been recognized as one of the most severe etiological factors of dental problems in the pediatric dentistry field. One of the greatest headways in dentistry in the last years encompasses the adhesion to enamel of primary teeth, this has led to the development of many techniques to restore the tooth. Obstacles that might be encountered are the presence of an aprismatic layer on the surface of primary teeth. This layer might reach 25 μ as well as the reduced amount of enamel present. Nevertheless, dentists might overcome these factors and manufacture esthetically-pleasing restorations. Crowns manufactured with composite resins and used in indirect techniques in the laboratory optimize physical and chemical characteristics and in general, polymerize with the use of physical means (light, heat, pressure, etc.). Therefore, they present smooth, pore-free surfaces, which allow for suitable esthetics, greater resistance to abrasion and proper adaptation. The aim of the present work was to present a clinical case of rehabilitation with indirect composite resin restoration (Signum-ceramis-Heraeus) and to show a technique for the rehabilitation of primary, upper anterior teeth which did not entail placement of provisional teeth. Rehabilitation of primary temporary teeth with nano-resin-hybrid crowns prefabricated in the lab represents a suitable option in the field of pediatric dentistry.

Key words: Esthetic crowns, primary anterior teeth, nano-resin.

Palabras clave: Coronas estéticas, dientes anteriores temporales, nano-resina.

RESUMEN

La pérdida de dientes temporales anteriores debido a las caries, patología pulpar y fracturas coronarias ha sido reconocida como uno de los factores etiológicos más severos de los problemas dentales en el campo de la odontopediatría. Uno de los mayores avances en la odontología en los últimos años implica la adhesión al esmalte de los dientes primarios, lo que ha llevado a desarrollar muchas técnicas para restaurar estéticamente al diente. Los obstáculos en este tema son la presencia de la capa aprismática en la superficie de los dientes temporales, cuyo espesor llega a ser de 25 μ , y la cantidad reducida del esmalte. Sin embargo, los dentistas pueden superar estos factores y producir restauraciones hermosas. Las coronas fabricadas con composite para técnicas indirectas, utilizadas en el laboratorio, optimizan las características químicas, físicas y por lo general se polimerizan mediante el uso de medios físicos (luz, calor, presión, etc.), por lo que presentan superficies homogéneas y libres de poros, lo que le da una buena estética, mayor resistencia a la abrasión y una adaptación adecuada. El objetivo del siguiente trabajo es presentar un caso clínico de rehabilitación con restauraciones de composites indirectas (Signum-ceramis-Heraeus), mostrando una técnica para la rehabilitación de los dientes anteriores superiores temporales, sin la colocación de provisionales. La rehabilitación de los dientes temporales con coronas de nano-resina híbrida prefabricadas en laboratorio son una buena opción en odontopediatría.

INTRODUCTION

Loss of primary anterior teeth due to caries, pulp disease and crown fractures has been recognized as one of the most severe etiological factors of dental problems in the field of pediatric dentistry. Trying to preserve primary incisors is important not only to achieve proper chewing and phonation; abnormal habits can develop, furthermore, aesthetics would be another factor to consider.¹⁻⁷ Characteristics of the aforementioned lesions as well as crown morphology prompt the clinician to use restorations which will provide resistance durability, and above

all, esthetics. Suitable esthetics is the most difficult goal to achieve.⁵

Pediatric dentists have sought different rehabilitation and prevention alternatives for primary anterior teeth.

* Pediatric Dentistry Specialty student.

§ Pediatric Dentistry Specialty professor. Pedodontics Specialist.

School of Dentistry, Autonomous University of the State of Mexico (UAEM).

This article can be read in its full version in the following page:
<http://www.medigraphic.com/facultadodontologiaunam>

Due to the extensive caries frequently presented by children, treatments have mostly consisted on extractions and pulpectomies, and use of amalgam or chrome-steel crowns.⁶

Among others, materials used to restore primary anterior teeth are: light-cured resins, metallic crowns, pre-formed metallic crowns with esthetic front, poly-carbonate crowns and acrylic resin crowns. Chrome-steel crowns provide better resistance and durability but are inconveniently unesthetic.^{1,5,6}

Resin restorations comply with esthetic requirements, nevertheless they exhibit secondary effects such as polymerization contraction which can cause an inter-phase at the adhesive union, post-operative pain, marginal discoloration, recurrent caries, and, finally, loss of the restoration.

Crowns made of light-heat-cured composite resins offer suitable adaptation: surface is homogeneous and free of pores, this confers appropriate esthetics and higher resistance to abrasion.¹

The prismless layer can become a problem to achieve suitable adhesion; for this reason many authors suggest it should be eliminated.^{8,9,10}

Composite resins used in the laboratory for indirect techniques optimize physical and chemical characteristics and generally polymerize through

the use of physical methods (light, heat, pressure, etc.).^{1-7,11-14}

The aim of the present study was to present a clinical case where rehabilitation of indirect composite resins was performed (Signum-ceramis-Heraeus).

CLINICAL CASE

An apparently healthy 3 year ten month old female patient attended the Pediatric Dentistry Clinic. The patient's mother informed that «caries in the front teeth» was the reason for their visit. Clinical examination revealed caries in teeth 51 and 61, previously restored with resin and with frequent dislodgement history. Frankel IV conduct with normal occlusion (*Figure 1*).

METHOD

During the first visit, impressions were taken with irreversible hydrocolloid; and over the model teeth were carved with a 169 L bur, 1 mm were eroded at all sides, rounded borders without retention and shaping a cervical chamfer. The model was then sent to the laboratory in order to manufacture crowns, with shape and color specifications (*Figures 2 and 3*).

At the second visit, infiltration anesthesia was conducted (2% lidocaine and 1:100,000 epinephrine), in teeth 51 and 61, rubber dam isolation was performed. Preparation of the aforementioned teeth was achieved with a «pencil shape» tip bur, wearing down 1 mm at all sides, and rounded borders. Restorations were adjusted, the tooth surface was etched for 15 seconds, and an adhesive layer was applied, polymerization was promoted during 10 seconds, and finally teeth were cemented with dual resin (*Figure 4*). Restorations had previously been treated with hydrofluoric acid and silane application (*Figure 5*). Upper anterior restorations were completed preserving function and exhibiting high aesthetic value (*Figure 6*).



Figure 1. Affected teeth.



Figure 2. Hybrid nano-resin crowns. Anterior view.

DISCUSSION

There are different treatment methods to restore the anterior sector of primary dentition, but not all of them meet the expectations of the pediatric dentist. One of the most used treatments is the use of chrome-steel crowns. They meet functionality requirements but are unaesthetic.⁵

Pre-formed metallic crowns with esthetic front are another option to restore the anterior sector;



Figure 3. Hybrid nano-resin crowns. Posterior view.



Figure 4. Crown placement.

nevertheless, they have shown to wear down, or experience fractures in the aesthetic front, this is due to the fact that masticatory forces are higher than what these crowns can endure.¹¹

Polycarbonate crowns are esthetically acceptable, but involve the disadvantage of eliciting poor gingival adaptation, this might lead to gingivitis caused by accumulation of dental plaque, teeth are worn down and pigmented.

Another treatment option would be direct resin crowns as well as celluloid crowns. This technique meets with aesthetic requirements but does not meet functionality requirements since these crowns frequently are dislodged or fractured.⁵

Heat and light cured composite resins crowns exhibit suitable adaptation, homogenous surface and absence of pores, these characteristics confer proper aesthetics and higher resistance to abrasion.⁵ Composite resins for indirect techniques used in the laboratory optimize



Figure 5. Crown treatment.



Figure 6. Adjusted and polished crowns.

physical and chemical characteristics, and generally polymerize with the use of physical means (light, heat, pressure, etc.).^{1,5,12-20} The fact of dividing treatment into two periods shortens time require to complete each separate phase.⁵

In the present case, crowns were decided upon since the patient had a history of resin restorations dislodgement, taking thus advantage of the adhesion to all the dental structure.

Heat-and light-cured composite resins were the selected restorative materials, since they met with durability and resistance criteria as well as aesthetics, which was of the utmost importance bearing in mind they were front teeth.⁵ They also decrease side effects of polymerization contraction. Even though cementing time was increased, no complications were encountered with the patient, whose behavior was very helpful.

CONCLUSION

Rehabilitation of primary teeth with laboratory pre-fabricated nano-hybrid-resin represents a suitable option in pediatric dentistry.

REFERENCES

1. Bellet JL, Sanclemente C, Casanovas M. Coronas en odontopediatría: revisión bibliográfica. *Dentum*. 2006; 6 (3): 111-117.
2. Martínez JJ. Coronas de Venner de acero con resina fotocurable. *Revista ADM*. 2000; 42 (3): 85-88.
3. Mandroli PS. Biologic restoration of primary anterior teeth: a case report. *J Indian Soc Pedo Dent*. 2003; 21 (3): 95-97.
4. Romero M, Saez M, Cabrerizo C. Restoration of a fractured primary incisor. *Pediatr Dent*. 2001; 25 (4): 255-257.
5. Rivera PR, Ramírez GG. Modificación de la técnica de coronas de celuloide en dientes temporales. *Revista ADM*. 2005; 62 (2): 52-57.
6. Valenzuela E, Parés G. Restauración de dientes anteriores primarios: nueva técnica de aplicación clínica para la fabricación de coronas de acero cromo con frente estético. *Rev Odont Mex*. 2006; 12 (2): 51-57.
7. Cadenero M, Biasotto M, Scuor N, Breschi L, Davidson LC, Di Lenarda R. Assessment of polymerization contraction stress of three composite resins. *Dental Materials*. 2008; 24: 681-685.
8. Margolis SF. A technique for restoring class V caries in primary canines. *General Dentistry*. 2008; 56: 278-280.
9. Whitaker DK. Structural variations in the surface zone of human tooth enamel observed by scanning electron microscopy. *Arch Oral Biol*. 1982; 27: 383-392.
10. Wiedenfeld RK, Draughn AR, Goltra ES. Chair side veneering of composite resin to anterior stainless steel crowns: another look. *J Dent Child*. 1995; 62 (4): 270-273.
11. Roberts C, Lee JY, Wright JT. Clinical evaluation of parental satisfaction with resin-faced stainless steel crowns. *Pediatr Dent*. 2001; 23: 28-31.
12. López VC. Polyethylene fiber tape used as post and core in decayed primary anterior teeth: at treatment option. *Pediatr Dent*. 2001; 26 (1): 1-4.
13. Monroy G. Coronas cerámicas libres de metal con técnica CUT-BACK. *Rev Alta Técnica Dental*. 2010; 64: 9-12.
14. Equipo de Investigación ATD. Las órdenes de trabajo. *Revista Alta Técnica Dental*. 2010; 64: 15-19.
15. Motisuki C, Santos-Pinto L, Giro EM. Restoration of severely decayed primary incisors using indirect composite resin restoration technique. *Pediatr Dent*. 2005; 15: (4): 282-286.
16. Gupta M, Chen J, Ontiveros JC. Veneer retention of preveneered primary stainless steel crowns after crimping. *J Dent Child*. 2008; 75 (1): 44-47.
17. Kırzioğlu Z, Özyay MS. Reconstruction and recovery of hemisectioned teeth using direct fiber-reinforced composite resin: case report. *J Dent Child*. 2008; 75 (1): 95-98.
18. Gerdolle DA, Mortier E, Droz D. Microleakage and polymerization shrinkage of various polymer restorative materials. *J Dent Child*. 2008; 75 (2): 125-133.
19. Francischone LA, Consolaro A. Morphology of the cemento enamel junction of primary teeth. *J Dent Child*. 2008; 75 (3): 252-259.
20. Prabhakar AR, Mahantesh T, Ahuja V. Comparison of retention and demineralization inhibition potential of adhesive banding cements in primary teeth. *J Dent Child*. 2010; 77 (2): 66-71.

Mailing address:
Amalia Rojas Reynoso
 E-mail: amygui18@hotmail.com