Restoration of a fractured primary incisor

Martin Romero* / Manuel Saez** / Carmen Cabrerizo***

Esthetic restoration on primary teeth has been a special challenge to pediatric dentists. Composite restorations are the most often used treatment for decay and fractures of primary teeth, however, there are other possible alternatives. We present a case in which we have used an acrylic crown to treat a fractured primary incisor in a 1.8 years old child.
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INTRODUCTION

To maintain maxillary primary incisors is important not only for mastication and enunciation, but also to avoid abnormal swallowing habits and for esthetic reasons.

Though most parents do not perceive special difficulties in children after the extraction of the four maxillary primary incisors, some of them refer to problems in eating, establishing social contacts,[1] and speaking,[2] which oblige pediatric dentists to try not to extract these primary incisors.

Nursing caries starts shortly after the eruption and though early recognition is very important, many parents contact the dentists only when the child complains about pain and teeth are seriously destroyed.[3] The four mandibular incisors usually remain unaffected,[4] and the process may cause extensive destruction of the teeth.

On the other hand primary teeth are more prone to displacement injuries such as luxation.[5] Oral trauma may cause fractures in primary teeth that should be repaired. Discoloration, a common occurrence following primary tooth trauma[6] may lead many parents to ask for an esthetic treatment for their children.

* Martin Romero, MD, PhD, DMD, Head of the Department of Children's Dentistry Clinics, Dental School, Murcia University.
** Manuel Saez, MD, DMD, Assistant Professor in the Department of Children's Dentistry Clinics, Dental School, Murcia University.
*** Carmen Cabrerizo, MD, PhD, DMD, Assistant Professor Department of Children's Dentistry Clinics, Dental School, Murcia University.

Send all correspondence to Dr. Martin Romero, Corazon de Maria 84 1ºE, 28002 Madrid, Spain.

Phone and FAX: 003491-4154086

Esthetic restorations on primary teeth have been a special challenge to pediatric dentists.

Polycarbonate crowns were one of the first solutions dentists found to solve the esthetics problems,[7-9] before these crowns appeared, the treatment of choice was silver alloy[10] or anterior stainless steel crowns.[11] Polycarbonate crowns however are associated with the common clinical problems of fracture, debonding and dislodgement. They are contraindicated when there is inadequate spacing between teeth, crowding, deep overbite, bruxism or abrasion.

Composite restorations are now the most often used treatment to restore primary incisors.

Though some studies have showed that bond strength of composite resins to the dentin surface is lower in primary teeth than in permanent teeth,[12,13] others support the idea that resin adhesive systems may achieve bond strength to primary enamel and dentin as high as bond strengths to permanent enamel and dentin.[14,15] Bond strength may be improved by reducing the time for conditioning the dentin of primary teeth to 50% less than the time recommended for permanent teeth.[16] Other studies have showed that there is no statistically significant difference of mean shear bond strength of compomer between the primary and the permanent dentition.[17]

Another way of using composites is combined with strip crowns. This method provides good esthetic results and allows normal incisal wear of the primary teeth. With composites, dentin adhesives may be used in cases in which little enamel is left. If necessary a composite post may be used.[18,19]

Glass ionomer restorative materials have also been used to restore primary incisors.

These materials have lower bond strength to both enamel and dentin than composites. The wear resistance is less than the one of composite resins, but they are esthetically pleasing, adaptable to a variety of clinical situations and retain well.[20]

Finally the pre-veneered primary stainless steel crowns are the following step to the open face stainless

Figure 1. Frontal view.

Figure 2. Periapical radiograph.

steel crowns.[21,22] Dental manufacturers have developed and marketed veneered stainless steel crowns for primary teeth using various laboratory bonding processes that allow composite resins and thermoplastics to be attached or bonded to stainless steel. These crowns provide an esthetic restoration that can be placed in a single short appointment. Some disadvantages exist such as the adaptability of the crown to the prepared tooth that is limited, or that crimping or contouring these crowns can cause some veneers to break,[23,24] but they offer a superior esthetic alternative, do not require lengthy or multiple appointments and their esthetics is not affected by blood, saliva[25] or sterilization.[26] A chair side veneering technique have also been devised.[27]

In this paper we describe a very young patient in which we have restored a primary incisor by the use of an acrylic crown.

CLINICAL CASE

A 1.8 year-old boy was referred to our office because he had fractured and upper incisor in a fall the day before.

His parents state that he has great discomfort when they try to feed him.

Intra-oral examination revealed that part of the tooth was missing (Figure 1). The parents state that they did not recover the fragment. There were no lesions in soft tissues.

A periapical radiograph was taken to assess the state of the tooth (Figure 2). It showed there was another loose fragment and an affected pulp.

It was decided to extract the loose fragment (Figure 3) and to do a pulpectomy (Figure 4).

After one week the tooth was slightly reconstructed and prepared. An alginate impression of both arches was taken and bite was registered in wax. The stone casts and the wax were sent to the laboratory where they constructed an acrylic crown (Figures 5, 6).

The following day this crown was placed in the mouth (Figures 7, 8).

Figure 3. Loose fragment extracted.

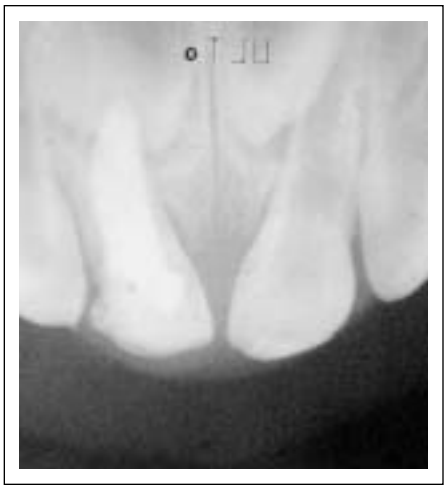

Figure 4. Radiograph.

Figure 5. Acrylic crown.

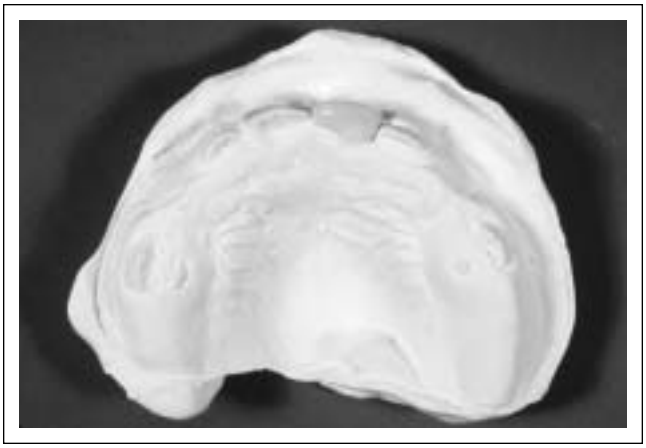

Figure 6. Acrylic crown on the cast.

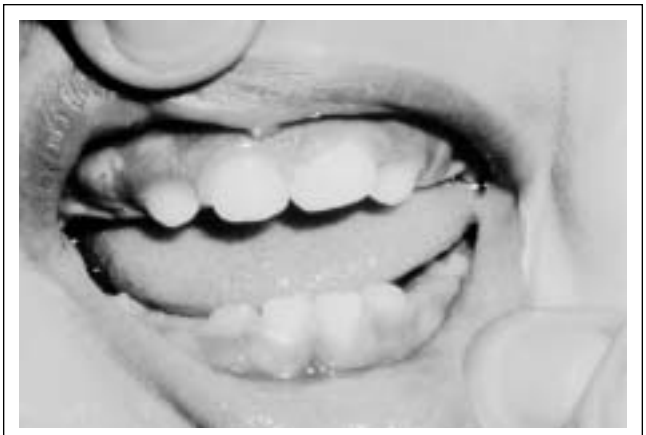

Figure 7. Frontal view.

Figure 8. Upper arch.

DISCUSSION

Sherman[28] used acrylic crowns years ago, but made them as a chair side technique in one appointment procedure.

We think the adjustment that may be achieved in the laboratory, working on the cast will be much better, even though there is the disadvantage of needing another appointment.

In our case after extracting the loose fragment, little enamel and dentin were left, which made it very difficult to use composites or strip crowns. Besides composites decolorize with time.[28] As it would be necessary to polish the composite every certain time, a risk would exist some darkness became visible.

We could have probably used a pre-veneered primary stainless steel crowns, but we thought it was fundamental to obtain the maximum possible retention and that is why we opted for constructing in individualized crown made on the cast, which would avoid the problems of dislodgment so as those of crimping and contouring, some authors describe in pre-veneered stainless steel crowns.[23,24]

The treatment with acrylic crowns accomplishes the requirement of being easily repaired if it fails because a new impression would able us to make a new crown at very low cost.

The age of the patient, who was very young, and the fact that molars had not erupted yet, added special difficulties to this case, but we think that both esthetic and functional results were satisfactory.

CONCLUSIONS

1. Acrylic crowns to restore primary incisors fulfill the requirements of esthetics, easy repair, and low cost.
2. These crowns may be a satisfactory solution in fractured incisors though it is necessary to carry out a more thorough investigation including more clinical cases.

REFERENCES

1. Koroluk LD. Parental perceptions of the effect of maxillary incisors extractions in children with nursing caries. J Dent Children 58: 233-236, 1991.
2. Riekman GA, ElBadrawy HE. Effect of premature loss of primary maxillary incisors on speech. Pediatric Dent 7: 118-122, 1985.
3. Veerkamp JS, Weerheijm KL. Nursing-bottle caries: The importance of a developmental perspective. J Dent Children 62: 381-386, 1995.

4. Febres C, Echeverri EA, Keene HJ. Parental awareness, habits, and social factors and their relationship to baby bottle tooth decay. Pediatric Dent 19: 22-27, 1997.
5. Meadow D, Needleman H. Oral trauma in children. Pediatric Dent 6: 248-251, 1984.
6. Fried I, Erickson P. Anterior tooth trauma in the primary dentition: incidence, classification, treatment methods, and sequelae: A review of the literature. J Dent Children 62: 256-261, 1995.
7. Mink JR, Hille J. Crowns for anterior primary teeth. Dent Clin N Am 17: 85-92, 1973.
8. Stewart RE, Luke L S, Pike AR. Preformed polycarbonate crowns for the restoration of anterior teeth. JADA 88: 103-107, 1974.
9. Yoho JP. Aesthetics in the primary dentition: a clinical presentation. J Dent Children 48: 21-24, 1981.
10. Daniels LM, Sim JM, Simon JF. Plastics in pedodontics. Dent Clin N Am 17: 85-92, 1996.
11. Humphrey WP. Use for chrome steel in children's dentistry. D Survey 26: 945-949, 1950.
12. Salama FS, Tao L. Comparison of Gluma bond strength to primary vs. permanent teeth. Pediatric Dent 13: 163-166, 1991.
13. Nör JE, Feigal RJ, Dennison JB. Dentin bonding: SEM comparison of the dentin surface in primary and permanent teeth. Pediatric Dent 19: 246-252, 1997.
14. Mazzeo N, Ott NW, Hondrum SO. Resin bonding to primary teeth using three adhesive systems. Pediatric Dent 17: 112-115, 1995.
15. Donly KJ, Kepzta M, Stratmann RG. An in vitro comparison of acid etched vs. non-acid etched dentin bonding agents, composite interfaces over primary dentin. Pediatric Dent 13: 104-207, 1991.
16. Bordin-Ajkroyd S, Sefton J, Davies EH. In vitro bond strengths of three current dentin adhesives to primary and permanent teeth. Dent Mater 8: 74-78, 1992.
17. Jumlongras D, White GE. Bond strengths of composite resin and compomers in primary and permanent teeth. J Clinical Pediatr Dent 21:223-229.1997.
18. Grosso FC. Primary anterior strip crowns: A new technique for severely decayed anterior primary teeth. J Pedodont 11: 375-384, 1987.
19. Grosso FC. Primary anterior strip crowns: A new approach. J Pedodont 11: 182-186, 1987.
20. Foreman FJ, Theobald WD. Direct bonded glass ionomer crowns. J Dent Children 54: 165-169, 1987.
21. Hartmann LR. The open-face stainless steel crown: an esthetic technique. J Dent Children 50: 31-33, 1983.
22. Helpin ML. The open-face crown restoration in children. J Dent Children 50: 34-38.1983.
23. Baker LH, Moon P, Mourino AP. Retention of esthetic veneers on primary stainless steel crowns. J Dent Children 63: 185-189, 1996.
24. Grool TP. Primary incisors restoration using resin-veneered stainless steel crowns. J Dent Children 65: 89-95, 1998.
25. Waggoner WF, Cohen H. Failure strength of four veneered primary stainless steel crowns. Pediatric Dentist 17: 36-40, 1995.
26. Wickersham GT, Seale NS, Frysh H. Color change and fractures resistance of two pre-veneered stainless-steel crowns. Pediatric Dent 20: 336-340, 1998.
27. Wiedenfeld KR, Draughn RA, Welford JB. An esthetic technique for veneering anterior stainless steel crowns with composite resin. J Dent Children 61: 321-326, 1994.
28. Sherman G, Bugg JL, Carruth KR. Restoration of primary incisors with acrylic jacket crowns. One appointment procedure. J Dent Children 33: 182-185, 1966.
29. Hosoya Y, Goto G. Color changes on light-cured composite resins. J Dent Children 16: 247-252, 1992.