

The use of a resin-bonded denture to replace primary incisors: case report

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The most frequent causes of anterior primary tooth loss among preschool children are caries (nursing caries), traumatic injuries, and diseases presenting absence of teeth as a clinical characteristic. Premature loss of primary incisors usually does not require the placement appliances for space maintenance because no mesial movement of the adjacent teeth is normally expected when the canines have already erupted.¹ However, replacement of anterior teeth may be indicated for esthetic purposes or possibly to facilitate normal pronunciation.²⁻⁴ The treatment options in these cases are removable maintainers of space or fixed partial dentures, the former being most often used.⁵ When there is no cooperation on the part of the patient for their use or when the devices provoke discomfort or atypical deglutition, fixed partial dentures may be used, taking into consideration premaxillary growth.

Based on the idea of resin-bonded dentures prepared for adult patients,⁶⁻¹¹ this system has been used for children with edentulous areas of small extension with unrestored non-carious abutment teeth or teeth having small restorations. A resin-bonded denture with a nonrigid connector in the median palatine suture has the advantage of not requiring periodic changes, since this system permits normal premaxillary development.

The objective of the present report was to describe the preparation of resin-bonded denture with a nonrigid connector for a children with loss of central primary incisors.

Case report

Clinical phase

A 3.5-year-old girl presented loss of the central upper primary incisors due to traumatic injury (Fig 1). A removable space maintainer had been first fabricated

for aesthetic reasons three weeks after the loss of the primary central upper incisors. Since the patient had not adapted to the use of removable space maintainer by two months after their installation due to the discomfort caused by the acrylic part of the palate, a fixed denture was then planned. The patient was first submitted to clinical examination, periapical radiographs of abutment teeth and a full impression of the upper and lower arch with a stock tray and alginate (Jeltrate, Dentsply International, Inc., Petropolis, Brazil). For denture preparation, the right upper lateral incisor, the right upper canine, the left upper lateral incisor, and the left upper canine were prepared at the enamel level and the margins were placed supragingivally, according to the same principles as used for resin-bonded dentures for adults.

Using a 3113 diamond burr (MKS, Ind. Com. Ltda., Brazil), the mesial surfaces of the right upper lateral incisor and left upper lateral incisor were prepared by only removing the convexity and the palatine convexity of the right upper lateral incisor, right upper canine, left upper lateral incisor, and left upper canine. In the palatine concavity a 3118 diamond burr (MKS) was used only to remove the shine of the enamel, with care taken not to invade proximal contact areas and the incisal border. A cingulum rest was then prepared with a 1064 diamond burr (MKS).

After these preparative procedures, a full



Fig 1. Anteroposterior view. Loss of the upper central primary incisors.



Fig 2. Prepared cast. Lingual view of the primary upper lateral incisors and canines with the preparations and cingulum rests for the fabrication of the resin-bonded denture.



Fig 3. Labial view of the framework adapted to the stone cast with the joined hypodermic needle.



Fig 4. Labial view of the fixed denture immediately after fixation. The proximal space between the pontics (upper central incisors) is minimal.

impression was taken with a stock tray and addition silicone (Provil, Heraeus-Kulzer, Germany) in order to obtain a working cast (Fig 2).

Laboratory phase

The framework was constructed with autopolymerizing resin (Duralay, Reliance Dental MFG. Co. Worth, IL) and the marginal fit with wax (Kerr Manufacturing Company) and cast into a single piece using a nickel-chromium alloy (Verabond, Aalba Dent. Inc., Cordelia, CA). After divesting, cleaning, and fitting the piece in the working cast, part of a nJ 40/12 hypodermic needle (IBRAS, Brazil) was joined to each pontic with a silver alloy (Fig 3) and the framework was then sectioned in the region of the central incisors. An orthodontic wire measuring 0.7 mm in diameter (Dentaram, Germany) was placed inside the needle.

During this phase, the framework was tried in the mouth, all the necessary adjustments were made, and the color of the resin for the preparation of the facial veneer was selected. After polishing, the facial veneer was constructed with acrylic resin and the metal framework was submitted to internal sandblasting with 50 μ m aluminum oxide and placed in ultrasonic cleaner filled with isopropyl alcohol for 5 min. for further surface cleaning. The denture was then ready to be fixed.

Under a rubber dam, the abutment teeth were cleaned with a rubber cup and with a slurry of oil-free pumice and water, submitted to acid etching, and fixed with Panavia-Ex resin (Kuraray Co., Japan) manipulated according to manufacturer instructions. The rubber dam was cut and removed (Figs 4, 5) and the parents were instructed about the hygiene and care of the denture.

The patient initially returned to the clinic for monthly follow-up visits for 3 mon., with visits scheduled at 2 mon. intervals thereafter, when clinical and radiographic examinations were performed. When these examinations showed that the eruption of the upper central incisors was in stage 6 of Nolla¹² the patient returned monthly to the office and when eruption was imminent the denture was

removed (Figs 6–8) and the patient continued to return monthly for eruption monitoring (Fig 9).

Discussion

The indication of removable or fixed space maintainer should be made after careful analysis, with each case being treated individually on the basis of the multiple factors present: early loss of primary teeth before 4 years of age, psychological reasons, with the child strongly valuing esthetic appearance, difficulty in phonation, collaboration of child and parents, possibility to maintain patient control¹³, and absence of occlusal interference (deep overbite).¹⁴ In addition to providing esthetic and psychological benefits, these appliances may restore phonetic function (the pronunciation of the s, v, f, and z sounds) in certain children, masticatory function and deglutition, and prevent deep overbite by avoiding supra-eruption of the antagonist teeth and the development of undesirable habits such as tongue interposition.^{13–15}

When there is a loss of one or more primary teeth, a removable space maintainer is the first choice option—causing no interference with the process to tooth and arch development. In the case of anterior dentures, when the acrylic base has a wide vestibular extension, the development of the alveolar process may be prevented, with the consequent impairment of correct incisor eruption. When used during growth and when the adjacent teeth are erupting, removable space maintainers require periodic adjustments and their success depends largely on the cooperation of the child. In cases in which there is no cooperation or the device causes discomfort such as nausea, or is not



Fig 5. Lingual view of the fixed denture immediately after fixation. The metal framework of the denture is thin, causing no overcontour.



Fig 6. Labial view 25 mos after fixation. The proximal space between the pontics is increased due to the physiological growth of the premaxilla.

tolerated by the mouth, an alternative treatment is the use of fixed dentures.

If the teeth adjacent to the edentulous area are healthy or only have small restorations and if radiographic examination shows that the teeth are not in the active phase of eruption, a modified resin-bonded denture can be used. This denture is viable for children since the preparations are carried out at the enamel level, no anesthesia is required, the process is reversible, and short clinical sessions are needed.

By not forming a rigid connection between the pontics, this type of denture permits normal physiological premaxillary growth. In the present case, care was taken to use four abutment teeth to prevent the masticatory effort from causing more rapid root reabsorption.

The persons responsible for the child must be instructed about supervision of the child's diet, avoiding excessively sticky foods, and should make sure that the child does not bite directly on the denture (when eating bread or biting into an apple, for example), as is also done for children with removable space maintainers and adult patients with conventional resin-bonded fixed dentures. Since children do not have the motor coordination needed for proper hygiene, the parents are instructed to perform this task for them.

Patients with these dentures should be seen periodically by the dentist who will assess whether the denture is permitting normal premaxillary growth and determine the stage of eruption of the permanent incisors.

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Fig 7. Radiographic examination 25 mos after fixation. The permanent teeth (permanent upper central incisors) are in stage 6 of Nolla.¹²



Fig 8. Buccal view after denture removal, beginning of eruption of the permanent left upper central incisor (29 mos after)



Fig 9. View after eruption of the permanent central upper incisors, 8 mos after denture removal.

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