REMOVABLE PROSTHESES FOR PRE-SCHOOL CHILDREN: REPORT OF TWO CASES.

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Summary: To avoid psychological, speech or swallowing problems in pre-school children with considerable tooth loss, dental prostheses are frequently used. Two cases of pre-school children are presented, involving multiple loss of primary teeth. **Purpose:** The purpose of this study was to promote the correct development of the maxilla and mandible by using removable dental prostheses and to guide the eruption of the permanent molars. **Method:** Removable acrylic prostheses were provided for two children, with a special metallic s-shaped handle (ansa) which guided the eruption of the first permanent molars. These prostheses were modified as the childs growth progressed. **Results :** By replacing missing teeth several oral functions were re-established, development of the maxilla and mandible was promoted and each child could develope socially from a psychological point of view. **Conclusion:** The use of removable dental prostheses in pre-school aged children presenting with considerable tooth loss can be a viable and successful treatment option.

Key words: Removable dental prostheses. Paediatric Dentistry. Loss of primary teeth. Children. Speech problems. Oral functions.

INTRODUCTION

Removable dental prostheses for children with missing teeth can be a viable treatment option by preserving the space between teeth, and by providing a psychological benefit and for the phonetic alterations that premature tooth loss can cause in children (1,2). Some authors (3-5) have suggested that removable dental prostheses should be the prosthetic treatment of choice for young children with congenitally missing teeth.

When a child presents with premature loss of teeth, it is important to determine the level of co-operation expected from both the child and the parents. The use of a removable prostheses must also be justified with clinical and radiographic evaluations. A removable prostheses has certain advantages: 1) the ease with which it is cleaned, adjusted and maintained. 2) the low damage that is caused to adjacent teeth. 3) high tolerance level among children and, 4) its low cost (6). The disadvantages include their tendency to accumulate plaque and the need for constant attention and periodic revisions, which require excellent child and parental co-operation.

The objectives of prosthetic rehabilitation in young children with missing teeth are to provide aesthetic, phonetic, and masticatory improvements, to prevent psychological trauma and to avoid development of incorrect oral habits.

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CASE A : AMB

The subject was a girl of 3.5 years with caries which had almost completely destroyed the teeth in both arches (fig.1). She attended the Unit for Children's Integrated Dentistry after having been referred by the Maxilofacial Surgical Unit. Her parents wanted to avoid extraction of all her teeth under general anesthesia.

On taking her clinical history the girl was found to have suffered from fetal alcoholism syndrome and had been born one month premature. She had previously been hospitalized for under-nourishment, she refused to ingest solid food and had developed several abscesses. Family records revealed that her mother was an alcoholic and drug abuser with a history of serious calcium deficiency.

A clinical examination was completed together with the taking of a panoramic radiograph. This examination was performed in order to assess the possible future eruption process and the degree of root formation in the permanent teeth. Prosthesis rehabilitation should allow for three dimensional growth according to the axes and location of the natural dentition. Initial examination also detected multiple cavities, great masticatory difficulty and problems with pronunciation of most words. After diagnosis, a plan of treatment was established that included: 1) six extractions (the centre maxillary incisors, the centre mandibular incisors**,** the lateral maxillary incisors) 2) five pulpectomies, (the maxillary second right deciduous molar,

the mandibular second left deciduous molar, the mandibular right deciduous canine, the maxillary left deciduous canine, the maxillary right deciduous canine), 3) two crowns**,** (the maxillary right second deciduous molar and the mandibular left second deciduous molar) 4) four dental restorations**,** (the mandibular right lateral deciduous incisor, the mandibular right deciduous canine, the maxillary left lateral deciduous incisor and the mandibular left deciduous canine), and 5) the construction of a removable dental prosthesis. Impressions were taken with hard setting vinyl polysiloxane material instead of alginate to avoid risk of inhalation, and to improve the quality of the models. Conventional maxillo-mandibular registrations were obtained for assembly on an articulator. This patient had a tendency towards a class III jaw relationship favoring an edge to edge prosthetic set up. This tendency to class III in premature tooth loss is not infrequent according to Lory, Graveriau and David, because in these cases there is always a marked decrease in the lower third section of the face. The loss of the anterior guidance can cause a diastema, problems in swallowing, a lowered tongue posture, sagittal underdevelopment of the pre-maxilla and functional dislocation of the mandible (7).

Once the prostheses was tested with a wax try-on, it was observed that on the right side dental replacement of the prostheses was not possible due to loss of most of the vertical

dimension. Taking into consideration the time the patient had to wear the prosthesis and the natural changes in her dental arch, we chose a Type V Brauer design for the maxillary arch and a type VI Brauer design for the mandibular arch both in acrylic, in order to replace the missing teeth (8) .

With the purpose of guiding the eruption of the first permanent molars, in the maxillary prosthesis as well as in the mandibular one, in the areas where the second primary molars were absent, a metallic ansa (handle) was placed in the acrylic in order to cause gingival ischaemia, thus acting as a gingival space maintainer(Fig. 2a,2b). To improve retention of the upper prostheses “tie-shaped” clasps over the second primary molars were utilized (Fig.3). Frequent follow-up of this type of prosthesis is needed so that it can be re-adapted to the teeth and maxillae as changes take place as the child is growing (9).

During the first revision, after examination and radiographs, the mandibular prosthesis was modified in order to facilitate the eruption of the central incisors and new impressions taken for the maxillary prosthesis in order to improve its adjustment. Fourteen months later, the mandibular incisors had completely erupted with no problem; the patient was able to eat and breathe better; her posture was improved and her general physical condition was excellent. This patient has since maintained her overall physical and dental condition for the last four years (now she is eight years old) (Fig.4).

CASE B : JAP

The subject was a 4-year-old girl who attended the University Dental Department suffering from a "bottle syndrome" after having used pacifiers "dipped in sugar". The patient was suffering psychologically, keeping her lips firmly closed to hide the loss of her incisors and canines which created speech aberrations. The standard clinical and radiographic examination revealed radicular remains in the maxillary arch, the open bite had interposition of the tongue and there was a loss of vertical dimension (fig. 5). A treatment plan was designed which included a removable dental prosthesis (fig. 6).

The damaged canines were conserved in the maxillary arch after performing a pulpectomy, and placing metallic crowns on them in order to attach the prostheses. A wax try-on made on mounted casts was performed, using as reference the highest functional position, which is easily located in a child after swallowing (4). As the child also showed a crossed bite and severe functional canine problems, two holes were drilled in the prostheses to facilitate the occlusion of the canine teeth and to retain the prostheses (Fig.6). Since molars had not yet erupted, metallic ansas (handles) were incorporated in the resin to guide the eruption of these first molars by causing ischaemia. These became gingival space maintainers.

Once the prosthesis was made, the functional alignment of the child's mouth when wearing the prosthesis was studied as, according to Bes (10), this type of prosthesis must allow the physiological movement of one arch over the other. This movement is necessary during the period of growth and functional maturity of the buccal and dental facial structures (11). To accomplish this, the obstacles that had prevented the arch from closing were cut away. Thus, the physiological damage that the child's temporary teeth would have had at the time of the study was reproduced . After 10 months the patient returned for a check-up and the eruption of the permanent molars had commenced. The molar zone was freed of resin as the eruption of the molars continued. Once the molars erupted an Adams clasp was added onto the permanent molars to attach the prostheses more firmly (Fig. 7). Supervision was needed in order to trim the acrylic prosthesis to fit as tooth eruptions were taking place (Fig. 8). When the anterior section had been changed three years after starting treatment, an upper prostheses was made to reposition the back teeth. This prostheses also contained a sector screw to guide correction of the cross-bite.

CONCLUSIONS

According to our observations, the most frequent reason why children need dental prostheses is premature tooth loss due to multiple cavities with no possibility of restoration. The psychological effects that tooth loss causes, and the functional alterations in articulation and mastication can be detrimental for the child development. These treatment prostheses must be checked and readjusted frequently to avoid problems with oral hygiene and in order to adapt

them to the developing dentition. Prosthesis placement in children should be accompanied by motivation and education in dental hygiene and other precautionary measures. Some important factors to be taken into account are: 1) that children's prostheses should always maintain proper dental spacing, 2) the prostheses should guide the eruption of new teeth, 3) the prostheses prevent extrusion of antagonists teeth, 4) physiological function should be promoted and 5) the prostheses should not hinder normal development.

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FIGURE FOOTNOTES

Fig. 1.- Patient (A) pre-treatment. Note severe caries to all deciduous teeth.

Fig. 2a.- Patient (A) mandibular prostheses showing ansa space maintainer imbedded in the prostheses.

Fig. 2b.- Patient (A). X-ray of lower prostheses showing metallic ansa that guides eruption of the permanent first molar.

Fig. 3.- Patient (A) with upper prosthesis in mouth. Ischaemia is appreciated.

Fig. 4.- Patient (A) four years post operatively. Note successful eruption of permanent teeth in both arches.

Fig. 5.- Patient (B) pre-treatment.

Fig. 6.- Upper prosthesis for patient (B). Note ansa space maintainers for guidance of eruption of first molars.

Fig. 7. - Modification of prosthesis in patient (B) after permanent molars have erupted.

Fig. 9.- Active prostheses with dental repositioning and sector screw used in order to uncross the bite. Note successful eruption of maxillary permanent teeth.