The Esthetic Space Maintainer

Abstract: This article describes why it is important to replace the maxillary primary incisors when they are prematurely lost in children. The consequences of not replacing these teeth in relation to speech, esthetics, and self-image considerations are provided. A step-by-step description is presented for the fabrication of an esthetic appliance, which can be easily made to replace missing maxillary primary incisors. In addition, information is presented on when and how to remove the esthetic appliance.

When a young child prematurely loses one or more maxillary incisors, the patient's family is usually concerned about the appearance of the child. As a pediatric dentist, the author is also concerned about the self-image of the child.

Once the primary cuspid have erupted, the distance from cuspid to cuspid will not change if a primary incisor is lost prematurely. When a maxillary incisor is lost, the management of the child's dental, speech, and social development is based on three factors:
1. Is the missing tooth or teeth going to be a factor in the child's speech development?
2. Is an esthetic replacement desirable for the family's well-being and guilt feelings?
3. Is an esthetic replacement desirable or necessary for the child's self-esteem?

There is often concern about long-term speech problems, such as lisping, when both primary maxillary incisors are lost early in life. There have been studies that show that over a period of several years, the child's speech will not be affected by early loss of the incisor teeth.1

Gable and colleagues reported that patients who had maxillary anterior teeth extracted before age 5 had no significant difference in speech by the time they reached 8 to 10 years old.1 However, this study did not report on how the patients' speech was affected from the time they had their teeth extracted to 8 to 10 years old. Were lisping and other speech problems apparent? Were these children teased at school because of missing teeth or difficulty in speech during those years? Additional studies have been performed that found the pronunciation of certain sounds can be recovered if the children are provided with an appliance to replace the missing teeth.2,3 The child who loses his or her teeth before 4 to 6 years old will be hindered in being able to correctly pronounce certain sounds, such as s, z, unvoiced th, unvoiced zh, j, and w. A study of Japanese children 4 to 6 years old found that "language and pronunciation functions may be seriously affected" by the early loss of primary teeth.2

The parents and other family members may feel guilty about the child's early loss of these teeth.3 Whether the teeth were avulsed or were extracted as a result of a traumatic injury or as a result of early childhood caries (ECC), the parents may feel that it was their fault that the child is now "toothless." Children do not want to be different. They want to have the same healthy, happy smile as their peers. They will

Learning Objectives:
After reading this article, the reader should be able to:
- identify when and why the replacement of missing maxillary primary incisors is desirable for the patient and family members.
- recognize how to fabricate or prescribe the fabrication of a fixed esthetic appliance to replace the missing maxillary incisors in the primary and early mixed dentition.
- discuss when and how to remove the esthetic fixed appliance.
Fabrication of the Esthetic Maintainer

The esthetic space maintainer appliance was initially developed by the author as a result of several observations. First, the patients’ parents often expressed a feeling of guilt when the child’s maxillary incisors were prematurely lost because of trauma or dental caries and, in many cases, subsequent abscesses. Second, the child’s speech was often noted by both the author and the parents, to be affected by the loss of these teeth, particularly if more than two maxillary incisors were prematurely lost. Third, the child’s self esteem was very important to the author as well as the parents.

This appliance is not necessary as a space maintainer, yet is fabricated in a fashion similar to a fixed space maintainer. Because of that similarity, the author coined the phrase esthetic space maintainer for this appliance. Although one may elect to fabricate a removable appliance, the author has found that (especially in young children) a fixed appliance is more favorable (Figures 1A and 1B).3

First Appointment

Only two appointments are necessary to fabricate the maintainer. At the first appointment, the following procedures should be performed:
1. Select the best-fitting precontoured stainless-steel crowns and place one on each of the maxillary first primary molars (Figures 2A and 2B). Tooth preparation and anesthetic are not usually required because of the thin walls of the crowns. Narrow orthodontic bands without attachments should be used if the patient already has crowns on the teeth (Figures 2C through 2F).

2. Take a maxillary alginate or a compound impression of the maxillary arch.

3. Select a shade for the pontics. Usually the lightest shade of acrylic pontics (7#9) is used.

4. Remove the crowns and place them in the impression (Figure 2G).

5. Pour the model in dental stone.

6. Send the model to the laboratory with a photograph of the patient. If possible, this photograph should show that patient before he or she lost the front teeth.

7. The prescription sent to the laboratory should include: Please fabricate a maxillary esthetic space maintainer from tooth No. X to tooth No. X. Place acrylic pontics replacing teeth Nos. XX. Shade: Biotone X. Place perpendicular wires into the pontic from the main lingual wire. Use 0.036-inch diameter wires (Figure 2H).

Second Appointment

At the second appointment, try-in the esthetic space maintainer to determine the fit of the appliance. Remove any excess acrylic adjacent to the pontics to allow for brushing and/or flossing under the pontics. Remove the appliance and cement the crowns with polycarboxylate cement. If using bands, orthodontic glass ionomer cement can be used (Figure 2I).

When to Remove the Appliance

Approximately 6 to 9 months after the eruption of the permanent mandibular central incisors, the maxillary central incisors begin to erupt. A radiograph will determine when the
permanent maxillary central incisor will be erupting. The parent should be told to look for the eruption of the permanent central incisor and to inform the dentist if this is noticed.

**How to Remove the Appliance**

The appliance is removed by slicing the stainless steel crown on the bucal of each crown using a #557 bur. A large spoon excavator can then be used to pry the stainless steel crown slightly, which loosens the cement bond. The appliance then easily slips off the abutment teeth. If bands were used on the abutment teeth, an orthodontic posterior band remover can be used to remove them. Stainless-steel crowns are preferred because of better strength, retention, and the prevention of caries around a band. The 1-mm to 1.5-mm bite opening will be inconsequential as a result of the wider periodontal ligament space in children. This bite opening will be nonexistent within 24 hours.

**Discussion**

One advantage of the fixed appliance vs a removable appliance is that greater patient cooperation is required for a removable appliance. The author has found that most young children do not wear removable appliances because of a number of factors, including: comfort of the appliance, difficulty in getting accustomed to the appliance, appliance breakage, loss of the appliance, and parental concern about a young child choking on the appliance during naptime and/or bedtime.

The design of the esthetic space maintainer appliance includes a wire into each pontic. The purpose of this perpendicular wire, which is soldered to the main lingual wire, is to provide additional strength and to prevent the pontics from rotating on the lingual wire.

Most children become accustomed to the esthetic maintainer appliance within 2 to 5 days. In addition, it has been the author's experience that an improvement in speech is reported by the parents in approximately the same time period (2 to 5 days). When the appliance is seated, instructions should be given to the parents on the use of flow threaders to clean under the pontics on a daily basis.

An additional concern may be how soon the appliance can be seated after avulsion of the primary incisors. Fabrication of the appliance can begin immediately after avulsion of the incisors; however, the author suggests not seating the appliance for 3 to 4 weeks after avulsion to allow for healing of the tissue surrounding the site of the missing tooth.

**Conclusion**

Step-by-step instructions have been provided for the fabrication of an esthetic maintainer to replace primary maxillary incisors, which were prematurely lost. The reasons for fabricating the appliance include: the prevention of speech problems, anesthetic replacement for the family's psyche, and an esthetic replacement for the child's self-esteem.

**References**