The Modified Bluegrass Appliance

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Studies have shown that a sucking habit can have an adverse effect on the normal pattern and direction of growth. Because the tongue must be positioned low in the mouth, under the thumb, nipple, or pacifier,[1] maxillary and mandibular growth tends to occur in an abnormally anterior, protrusive direction.[2] The maxillary teeth can become acutely angled and protrusive (Fig. 1), while the mandibular teeth are often found to be lingually inclined.[3-5]

Sucking habits also tend to produce some constriction of the maxillary arch, particularly in the deciduous canine region; occlusal interferences may then lead to an anterior and lateral shift of the mandible. A crossbite can develop when the pressures of the cheek musculature are not balanced by those of the tongue musculature.[6] If the situation is not resolved early, permanent skeletal asymmetry can develop.[7]

Any abnormal craniofacial growth, since it affects the balance of the child's face, will have a negative impact on the child's self-image. Sucking habits can also make speech abnormal and difficult to understand. In addition, the abnormally low tongue position may be a lifelong development that contributes to mouth-breathing, snoring, sleep apnea, speech deficits, and widely spaced, protrusive incisors, even after orthodontic treatment.

According to Proffit, "As long as the sucking stops before the eruption of the permanent incisors, most of the dental changes will resolve spontaneously."[4] As long as the habit remains, however, successful orthodontic treatment will be impossible. Proffit adds, "If a child does not want to quit sucking, habit therapy, especially appliance therapy (braces), is not indicated."[4]

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Fig. 1 Anterior open bite resulting from thumb-sucking habit.

This article presents a comfortable, hygienic, and virtually invisible appliance that not only stops the sucking habit, but retrains the tongue.

Appliance Design

In 1991, Haskell and Mink described an easy-to-wear appliance that did not have the problems associated with traditional palatal cribs.[10] This device, called the Bluegrass appliance, uses a hexagonal Teflon roller on a cross-palatal wire. It almost always ends a sucking habit within several days, if not immediately, and begins training the tongue toward a normal posture, normalizing facial growth and allowing proper speech. In 1998, Korrodi Ritto and Leitão introduced a similar appliance, the Lingual Pearl, and listed multiple clinical applications.[2]

We have modified the Bluegrass appliance design to utilize 4mm acrylic beads, which are made in our laboratory from dental monomer and

polymer, on the cross-palatal wire (Fig. 2). The first advantage of the new design is that it encourages maximum neuromuscular stimulation by using two or more beads, according to the principles of Castillo-Morales.[11] The second major advantage is its reduced bulk, which results in less obstruction and more stimulation of tongue function.

An additional benefit from the child's standpoint is the availability of various colors. The wire and bands cemented to the second deciduous molars cannot be seen from outside the mouth. A child quickly becomes comfortable with the Bluegrass and enjoys the sensation of the tongue playing with the beads.

Fig. 2 Modified Bluegrass appliance.

Clinical Management

Haskell and Mink did not recommend the Bluegrass appliance for preschool-age children.[10] The majority of my patients, however, have been in that age group. The modified Bluegrass appliance is easily tolerated by young children, and we prefer to correct the direction of growth as early as possible. Therefore, as soon as a patient's oral habit is diagnosed and the second deciduous molars have erupted, we schedule band fitting, an impression, and subsequent appliance cementation.

Children like to choose the colors of their beads. One to four beads are placed on the cross-palatal wire, depending on the amount of space available, and protected from the heat of soldering with Heat Shield* or a stone.

After prescribing the Bluegrass appliance for 209 children from 20 months to 12 years of age, we have found it effective in stopping the habits of all but two patients. In addition, 32 children with pacifier habits and one with a nail-biting habit have been successfully treated.

We find a direct relationship between the age of the child at the time of appliance placement and the speed of habit correction. With a 24-to-30-month-old child, the parents usually report the cessation of the habit in the first day. It has also been our observation that the younger the patient, the more quickly and completely the tongue position becomes normalized. In older children, it may take as long as a few weeks before the habit disappears. We have had two 12-year-old patients who, although they experienced a considerable reduction in the frequency of their habits, continued to suck even after long-term appliance wear.

Parents of some patients with pacifier habits have reported that their children continued to carry the pacifiers around, but didn't put them in their mouths. Others have said that their children even asked them to throw the pacifiers away.

The parents of a toddler should be prepared to spend the first two to five minutes after placement of the Bluegrass drawing the child's attention away from it. On the other hand, a child 4 to 5 years of age can be told to play with the beads with the tongue immediately after placement. This gives the child the opportunity to accept and adjust to the appliance and to learn the very activity that normalizes tongue position and function. Rather than instructing the child about cessation of the habit, the parents should encourage the use of the tongue beads. If a child expresses concern about the habit, the parent should merely assure the child that the Bluegrass appliance will help stop that when he or she plays

*Great Lakes Orthodontics, Ltd., 199 Fire Tower Drive, Tonawanda, NY 14150.

with the beads.

If a sucking habit is identified in a child who already exhibits any form of posterior crossbite, the modified Bluegrass design can be incorporated in a Quad Helix** appliance. There is no need for two-stage treatment, because the response to the Bluegrass appliance is immediate and coincident with treatment of the crossbite.

We have found it advisable, as Haskell and Mink recommended, to leave the Bluegrass in the mouth for six months after the habit has stopped.[10] Earlier removal has resulted in reappearance of the habit. If the low tongue position persists after six months, we leave the comfortable Bluegrass appliance in place to continue tongue retraining. Referring speech therapists have asked us not to remove appliances, having observed a positive effect on the progress of speech therapy.

Conclusion

The modified Bluegrass appliance is completely comfortable and esthetic. Both parents and children like it. It requires no reminding, cajoling, or bribing. Because the child and the parents are freed from anxiety and frustration about the habit, what could have turned into a battle instead becomes a positive, happy experience for everyone. Furthermore, the child's growth is allowed to proceed in a normal direction, assuring an improved facial appearance for a lifetime.

**RMO, Inc., P.O. Box 17085, Denver, CO 80217.

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