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Correction of combined anterior and posterior crossbites in the primary dentition with fixed appliances: case report

Cynthia J. Frey, BS, DDS Clemens A. Full, BS, DDS, MS

Abstract

The use of a W appliance and labial arch wire to correct combined anterior and posterior crossbites in the primary dentition is described. This combination of fixed appliances is presented as a successful treatment alternative.

A crossbite in the primary dentition should be corrected as early as a child's cooperation can be obtained. Early treatment will eliminate or decrease aberrant growth of alveolar processes and jaws. In the case of the pseudo-Class III malocclusion, early treatment is of primary importance (Clifford 1971). This report presents a method of treatment for combined anterior and posterior primary crossbites.

Literature Review

Most of the literature supports early correction of primary crossbites. Breitner (1940) reported experimental work in young rhesus monkeys in which primary teeth were moved with orthodontic appliances. His findings suggest unerupted succedaneous teeth tend to move along with their predecessors. Mathews (1969) applied the experimental findings of Breitner (1940) to humans. He published a case report providing additional evidence for the orthodontic movement of unerupted permanent teeth along with their overlying primary teeth. Mathews (1969) demonstrated that translational orthodontic movement of mandibular first primary molars into second primary molar positions was accompanied by distal movement of the unerupted first premolars. The first premolars subsequently erupted in this more distal position.

In contrast to Breitner (1940), Hahn (1955) suggested that movement of primary teeth in children does not affect the succedaneous teeth. Rather, he proposed treatment of malocclusion in the primary dentition to permit more normal development of the face. More recently, Clifford (1971) stated that if a crossbite remains untreated, malocclusion tends to worsen to involve not just the teeth and alveolar processes, but skeletal structures of the mandible and maxilla.

A longitudinal study by Kutin and Hawes (1969) further supports early treatment of posterior crossbites in the primary dentition. Forty-four of 48 first permanent molars erupted in the same crossbite relationship as the untreated primary molars. The premolars in uncorrected crossbite cases erupted in the same crossbite relationship as their primary counterparts. In contrast, the premolars and permanent molars in the corrected cases erupted into a normal relationship. Kutin and Hawes (1969) concluded that early correction of posterior crossbites is indicated as crossbites do not improve with eruption of permanent teeth.

Leighton (1966), in opposition to previously quoted authors, does not recommend routine treatment of posterior crossbites in the primary dentition. He refers to the spontaneous correction of crossbites as primary teeth are exfoliated. In his longitudinal study, he reports spontaneous correction in 7 of 19 cases of posterior crossbite. No other source in the literature reports the phenomenon of spontaneous crossbite correction.

In summary, the literature supports early correction of crossbites regardless of etiology. By restoring normal function, early treatment of the primary dentition leads to normal development (Clifford 1971). At most, early treatment may prevent the need for further orthodontic treatment. At the least, early correction will decrease the severity of a resultant malocclusion.

Case Report

A cooperative 3 1/2-year-old girl was referred to the graduate pediatric dentistry clinic for treatment of combined anterior and posterior crossbites. The health history and examination of the head and neck were unremarkable. Intraoral examination revealed a primary dentition with combined anterior and bilateral posterior crossbites. The terminal plane relationship of the primary molars was a mesial step; primary canines demonstrated a Class I relationship.

Interceptive treatment of the combined crossbite was accomplished in two phases. Because of the young age of the patient, fixed appliance therapy was considered

to be most desirable. A *W* appliance constructed with general-purpose primary molar bands[a] and .036-inch stainless steel wire was first used to treat the posterior crossbite. The patient returned for removal, activation, and recementation of the appliance every 3-4 weeks. Within 2 months, posterior expansion and resultant crossbite correction were completed (Fig 1). The amount of transverse expansion achieved with the *W* appliance at the maxillary canines was 5.0 mm. The patient was scheduled 1 week later for preparation for the second phase of treatment.

FIG 1. Intraoral view after posterior crossbite correction only. Note that the patient can bring incisors edge-to-edge during centric relation.

Standard edgewise buccal tubes[a] were spot welded to the molar bands of the *W* appliance. Standard edgewise .022-inch slot, orthodontic brackets[a] were bonded to the primary maxillary incisors. Placement of the brackets in the gingival third of the labial tooth surface was necessary to prevent mechanical interference during occlusion. An open loop was placed in the .016-inch Permachrome Standard®[a] round arch wire mesial to each molar tube (Fig 2). Upon insertion of the arch wire with Alastiks®,[a] labial force was delivered to the anterior teeth in crossbite.

[a] Unitek; Monrovia, CA.

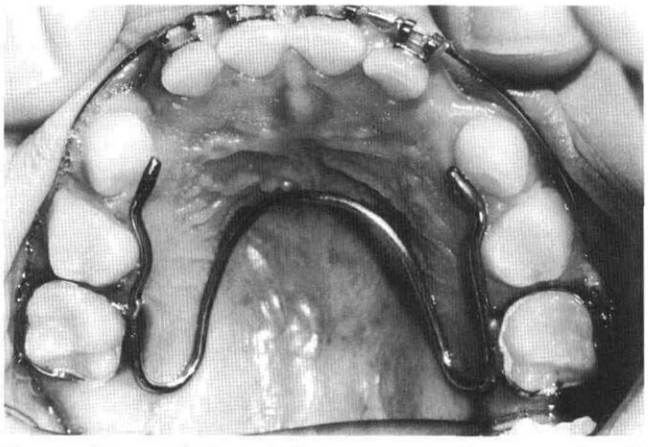

FIG 2. Intraoral view during treatment demonstrating *W* appliance with .016-inch labial arch wire.

The patient was recalled in 2 weeks. At that time, a .020-inch Permachrome Standard round arch wire was placed. To deliver additional force to the still uncorrected anterior teeth, an open helical coil loop was placed in the arch wire mesial to each molar tube. The patient was recalled in 1 month to check for progress. At that time, the anterior crossbite was corrected, and acceptable overjet and overbite had been achieved. The amount of anterior expansion that occurred during treatment was 2.0 mm. The patient was scheduled for appliance removal in 6 weeks.

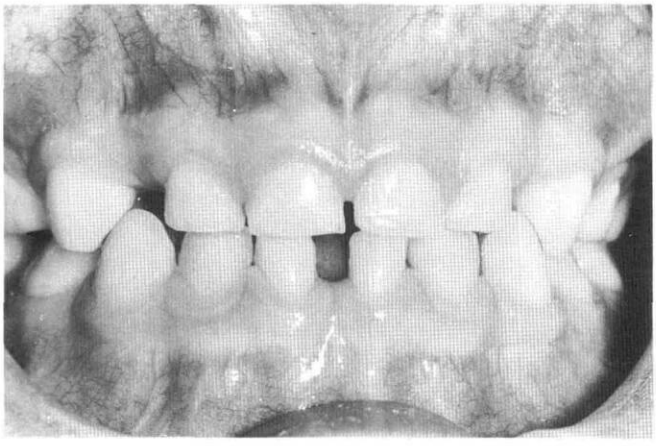

FIG 3. Post-treatment intraoral view. Compare with Figure 1 for pretreatment incisor position.

At appliance removal (Fig 3), the retention period for the posterior crossbite had been 3 months. The anterior crossbite correction had been retained only 6 weeks due to the presence of adequate overbite. Total treatment time for correction of the combined anterior and posterior crossbites was 6 months (Figs 4a, 4b — next page). Post-treatment, the primary molars exhibited a flush terminal plane relationship. The Class I relationship of the primary canines was maintained during treatment. Two years post-treatment, the patient has a functional occlusion without crossbite.

Discussion

The dental literature supports early interception of malocclusion to eliminate or diminish aberrant orofacial growth and development. The success of early treatment, however, is limited by the ability of a young child to cooperate with the pediatric dentist. This case demonstrates successful correction of combined anterior and posterior crossbites in the primary dentition using a *W* appliance and labial arch wire.

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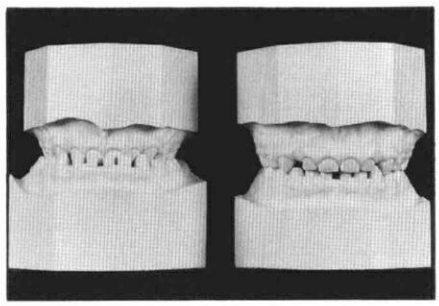
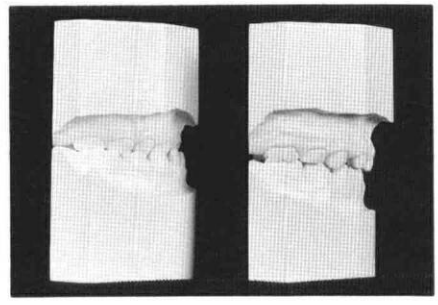
Dr. Frey is a graduate student and Dr. Full is a professor, pediatric





FIGS **4a and b.** Pretreatment *(left)* and post-treatment *(right)* models for comparison.

dentistry, University of Iowa. Reprint requests should be sent to: Dr. Clemens A. Full, Dept. of Pediatric Dentistry, College of Dentistry, University of Iowa, Iowa City, IA 52242.

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Arthroscopic surgery on jaws

Using miniature equipment manipulated by a tiny, lighted tube, surgical specialists are treating severe jaw disorders without major surgery.

Jaw arthroscopy has been used successfully for years in Japan, but has been introduced to the United States only recently, according to a Johns Hopkins researcher. The oral surgeon first examines and then treats the jaw joint by inserting the arthroscope through a tiny incision.

The technique is being used to treat patients who suffer from temporomandibular joint (TMJ) dysfunction, which covers severe jaw joint problems caused by misalignment, as well as muscle pain in the neck and jaws that often results from grinding or habitual clenching of the teeth by those under stress.

Besides treating patients with TMJ disorders, doctors also can use the technique on patients who have arthritic jaws or who have experienced trauma to that area.