Treatment of Unilateral Buccal Crossbites in the Primary, Early Mixed, and Permanent Dentitions: Case Reports

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It is important to recognize the development of an arch-width problem in pediatric patients and to determine the best time to treat it. One of these conditions is the posterior (buccal) crossbite where one may also find an exaggerated overjet, caused by maxillary excess, and/or mandibular width deficiency. One may also find a mandibular midline deviation on the side of the crossbite, creating a long-term orthopedic problem with a mild facial asymmetry.
When correction of this condition is attempted in adulthood, poor results can be expected, making this the most important reason for early treatment. Six clinical cases are presented, along with the mechanics performed in both arches
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REVIEW OF LITERATURE

The first to describe this type of malocclusion was Brodie (1943), as a mandibular arch telescoped within the maxillary arch. Since then it has been known as the Brodie syndrome. Sim (1977) used the term "bilateral buccal crossbite" when the maxillary arch enclosed the mandibular arch. Van der Linden and Boersma (1987) defined a scissors bite as total "endo occlusion" of the mandibular posterior teeth. Mills (1988) characterized a bilateral skeletal crossbite as "an osseous disharmony between mandible and maxilla."[6-8] It is generally accepted that alveolar bone architecture and shape are maintained by stimuli through the musculature and teeth and that remodeling of bone is caused by changes in the stimuli acting on the bone. Left untreated, it could lead to skeletal deformation; therefore, changing tooth positions, as well as the musculature, as soon as possible is essential to prevent complications.[9]

The various treatment modalities found in the literature are fairly similar, treated either with fixed or removable appliances. Most authors reported the use of modified fixed appliances, such as a split lingual arch (Mills, 1982) or a modified mandibular labial appliance (Williams, 1970). Tulley and Campbell (1970) used a removable mandibular appliance with an expansion screw. Some researchers mention that even exercise and selective grinding result in an immediate slight increase in mandibular arch width. However, Kisling (1981) states that functional grinding is seldom the only treatment performed during the primary dentition in the correction of scissors bite. He noted that grinding can be accompanied by a mandibular removable expansion plate to facilitate treatment.

Adkins, Nanda, and Currier have shown that expansion of the maxillary arch results in a slight compensatory buccal uprighting of the mandibular posterior teeth from the occlusal forces.[1,4,5,6] In our experience, the treatment of only one arch is not sufficient to assure a good interdigitation of the mandibular and the maxillary arches, specially in severe cases. It is necessary to use a maxillary appliance to achieve a palatal dentoalveolar inclination, as well as a compensatiing buccal dentoalveolar inclination of the lower arch.

Six clinical cases are presented, along with the mechanics performed in both arches.

CASE 1

A 5-year-6-month-old male patient presented with the chief complaint of "asymmetry." The patient was unable to achieve centric occlusion because the left mandibular posterior teeth were contained within the maxillary arch. Mandibular skeletal and dental midlines deviated to the right side of the face (Fig 1).

FIGURE 1: Pre-activated condition of 5–year-6-month-old patient with left buccal crossbite and midline deviated to the right from a mandibular shift. Maxillary appliance with bands on second primary molars and 0.36-inch extension wires toward the primary cuspids and palatal multiloop arch.Active lingual arch.

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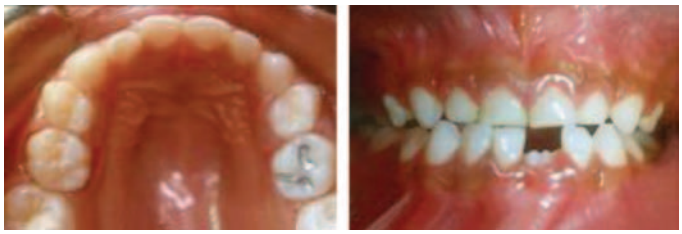

Figure 2: Clinical condition after overcorrection showing maxillary constriction and midline correction.

The maxillary arch width was greater, whereas the mandibular arch was significantly deficient. The mandibular posterior teeth had slight lingual inclinations.

The specific treatment objective was to expand the mandibular arch and to contract the dentoalveolar maxillary arch bilaterally, so that the posterior teeth would have an acceptable interdigitation. After expansion and contraction of the appropriate arches, overcorrection was performed before placing the patient on 2 months' retention, which was established according the neuromuscular activity and occlusal interdigitation.

The mandibular lingual arch was expanded to one-half the buccolingual width of the second mandibular primary molars. The maxillary arch was contracted with internal loops to one-half the buccolingual width of the second maxillary primary molars. Only one activation with a three prong plier was completed during treatment to correct the bite, with an extra activation approximately one and one-half month later for the overcorrection.

CASE 2

A 4-year-2–month-old male patient presented for a routine dental checkup. At that time we found a left buccal crossbite involving the first and second primary molars. A mild midline discrepancy toward the right with a slight mandibular shift was also seen.

Appliances similar to Case 1 were used for two months(figs 3-4).

FIGURE 3: Initial condition of 4-year-2-month-old patient with left buccal crossbite and minor midline deviation.

FIGURE 4: Same patient after 6 months of treatment showing good right and left molar occlusion. Observe coincident midlines.

CASE 3

A 6-year-old male presented with a bite irregularity. Clinical evaluation revealed a primary dental occlusion with a severe buccal crossbite of the right side involving the first and second primary molars. A mild midline discrepancy toward the left, with a mandibular shift, was also seen. In addition, dentoalveolar extrusion in the area of the crossbite was noted, causing an irregular sagittal position.

Treatment to reestablish the neuromusculature and dentoalveolar balance was accomplished in less than 5 months, allowing another 3 months for overcorrection. Relapse and occlusal accommodation required additional time (Figs.5 -8).

FIGURE 5: Initial condition of patient with right buccal crossbite and midline deviation.

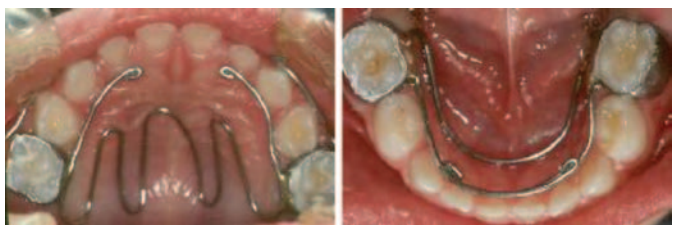

Figure 6: Appliances in place before starting procedure. Note modification of internal wire compared with appliance in Fig.1and the extensions, contacting the buccal surfaces of the primary molars and cuspids for additional support.

FIGURE 7: Clinical condition 8 months later, immediately after appliance removal and maxillary and mandibular arches overcorrection.

FIGURE 8: Clinical condition at age 7 years 8 months. Treatment shows good occlusal balance.

CASE 4

A 6-year-3-months-old male presented for treatment of his bite. His mother reported problems with eating and biting his cheek constantly. Clinical evaluation revealed a primary dental occlusion with a severe buccal crossbite of the right side involving the first and second primary molars. He presented an extremely deep overbite with impingement of the mandibular incisors.

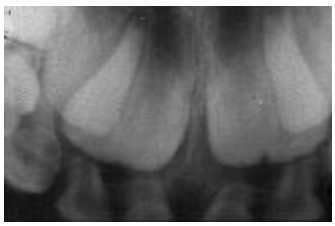

FIGURE 9: Macrodontic central permanent incisors

In addition, periapical radiographs revealed macrodontic permanent central incisors. (Fig. 9).

Appliances used to correct this buccal crossbite is similar to case number 3.

FIGURE 10: Initial condition of patient with right buccal crossbite, midline deviation, and a deep impinging overbite.

Figure 11: Clinical condition approximately a year and 6 months later, after removing appliances and overcorrecting maxillary and mandibular arches. Note the molar crossbite.

FIGURE 12: Clinical condition after overcorrection and adjustment of the maxillary and mandibular arches, showing an intraoral arch for mandibular advancement and bite opening..

CASE 5

A 7–year-old male patient presented for a routine exam and correction of ectopically erupting permanent mandibular incisors. His mother reported that the patient presented problems eating with his mouth closed. Clinical evaluation revealed a primary dental occlusion with overretained primary central mandibular incisors with a right buccal crossbite involving the first permanent molars, first and second primary molars.

FIGURE 13: Condition of patient in Case 5, with right buccal crossbite and overretention of primary centrals.

FIGURE 14: Condition at age 8 shows acceptable balance on right and left side, as well as a good midline.

CASE 6

A 10-year-old female patient presented for orthodontic treatment, for the management of the esthetic and functional problems. Clinical evaluation revealed a permanent dental malocclusion with a right buccal crossbite involving the first and second premolars and first permanent molars, without midline asymmetry.

FIGURE 15: Patient with right buccal crossbite and dentoalveolar discrepancy.

FIGURE 16: Occlusal view of mandibular appliance at time of placement. Note modification of right side of appliance to incline molar and premolars as a group.

FIGURE 17: Condition at age 12, after treatment, shows acceptable balance on right and left sides, as well as a good midline. Decision as to premolar extractions can now be made as patient faces second phase of treatment.

DISCUSSION

The buccal crossbite with mandibular deviation is not a very common type of malocclusion, but it is one of the most difficult to treat if not corrected at early stages.

Since Brodie defined the mandibular "telescoped" arch, there has not been much written about the entity or its treatment (although this paper describes only unilateral cases). Only a few modifications in the handling of this abnormal pattern have been proposed, such as the split lingual arch of Mills, the Williams modified mandibular labial appliance, or the use of a removable mandibular appliance with an expansion screw. Some researchers have even proclaimed that exercise and selective grinding its enough to correct mandibular arch width.

When expansion of the maxillary arch is performed, mandibular posterior tooth correction is achieved with a slight, compensatory buccal uprighting due to occlusal forces. In extreme cases having an abnormal pattern in the maxillary arch as well as the mandibular, it is necessary to compensate both arches.

The correction of buccal crossbites can be complicated if done in the permanent dentition, but simple when performed in the primary or even in the early permanent dentition.

We have shown that the mechanics and retention, even in the most complicated cases, were completed in a few months with excellent results in skeletal balance and occlusal harmony.

CONCLUSIONS

Persistence of a buccal crossbite in the primary dentition may lead to dentoalveolar compensation and maxillary and mandibular bony structural changes in the permanent dentition, creating facial asymmetry and dental malocclusion.

The cases presented in this paper have demonstrated that early intervention using easy mechanics to accomplish mandibular alveolar expansion and maxillary dentoalveolar compensation can be very effective.

Stability in arch width and excellent occlusal interdigitation is obtained, with balanced muscular stimuli creating the expectation of normal growth.

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