

Treatment and retention of a mandibular arch telescoped within the maxillary arch: case report

Milton E. Gellin, DDS

Abstract

A patient in the early mixed dentition was experiencing "difficulty in eating." The right mandibular posterior teeth were telescoped within the maxillary arch. The mandibular midline deviated to the left of the maxillary midline. With the midlines aligned, posterior occlusion was minimal. By activating a lingual arch, the mandibular arch width was increased to establish a posterior occlusion. Also, the lingual arch was used as a retainer. The posterior occlusion remained stable throughout the mixed dentition. An unexpected second phase of treatment was indicated in the permanent dentition because the maxillary right first and second premolars and the maxillary right second molar were completely buccal to the mandibular teeth. Successful treatment was accomplished in spite of broken appliances and noncompliance.

Literature Review

There are different definitions for this type of malocclusion. Brodie (1943) described a mandibular arch telescoped within the maxillary arch. Sim (1977) used the term "bilateral buccal cross bite" 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 (1982) also used the term "scissors bite." Moyers (1988) characterized a bilateral skeletal type crossbite as "an osseous disharmony between mandible and maxilla."

Treatments to expand the mandibular arch are fairly similar: fixed or removable appliances. Most authors reported the use of modified fixed appliances such as a

split lingual arch (Mills 1982) or an innovative mandibular labial appliance (Williams 1970). Tulley and Campbell (1970) used a removable mandibular appliance with an expansion screw. However, Kisling (1981) illustrated a unilateral posterior scissors bite of the primary dentition. When the midlines coincided, cuspal interferences were noted. Bite exercises and selective grinding resulted in an immediate slight decrease in the maxillary arch width and a slight increase in the mandibular arch width. These procedures resulted in further correction of the scissors bite during the primary dentition. Kisling acknowledged that functional grinding seldom is the only treatment, and noted that a mandibular removable expansion plate should be used.

Case Report

At 6 years, 4 months old, a male Caucasian was examined with the chief complaint of "difficulty in eating." The patient was unable to establish centric occlusion because the right mandibular posterior teeth were telescoped within the maxillary arch. Skeletal midlines were correct, but the mandibular dental midline deviated to the left of the maxillary midline (Fig 1). With the midlines approximately aligned, posterior occlusion was minimal (Fig 2). The intramaxillary arch width at the first permanent molar central pits was 44.8 mm, and the same measurement in the mandibular arch was 33.7 mm. The maxillary arch width was greater than one standard deviation from the mean of 41.85 mm, whereas the mandibular arch was significantly

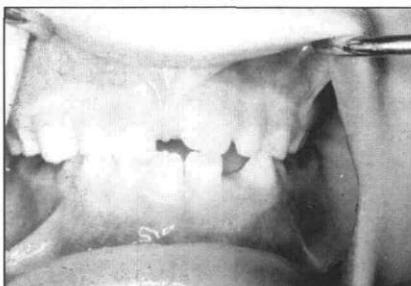


Fig 1. Initial examination at 6 years, 4 months. Note the midline deviation and the right mandibular posterior teeth telescoped within the maxillary arch.

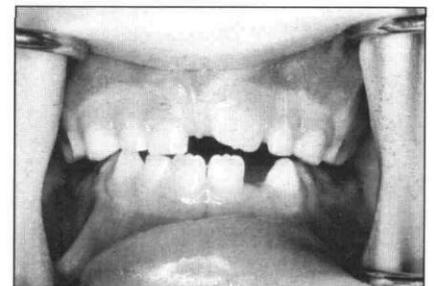


Fig 2. Initial examination at 6 years, 4 months. With the midlines approximately aligned, the posterior occlusion is minimal.

deficient by more than two standard deviations from the mean of 40.2 mm (Moyers et al. 1976). The mandibular posterior teeth had severe lingual inclination.

The mandibular permanent lateral incisors were unerupted. The maxillary left permanent central incisor was erupted, but the right central incisor was not. An anterior/posterior cephalometric evaluation showed an acceptable range for skeletal measurements for the patient's age and gender.

The specific treatment objective was to expand the mandibular arch bilaterally, so that the posterior teeth would have an acceptable interdigitation. After expansion, the mandibular arch would be retained with a lingual arch until the late mixed dentition; then the patient would be placed on periodic recalls to evaluate the stability of expansion in the permanent dentition.

Several selective equilibrations were attempted before the mandibular permanent incisors had erupted. No change occurred, and the midlines remained deviated. When the patient was 7 years, 9 months old, the mandibular permanent incisors were erupted fully. A lingual arch was selected to accomplish the expansion, along with a maxillary bite plane to disengage the posterior occlusion.

The lingual arch was expanded to one half of the buccolingual width of the first permanent molars. Three additional activations followed at approximately one-month intervals. When the lingual cusps of the mandibular posterior teeth began to occlude with the maxillary posterior teeth, the maxillary bite plane was discontinued. After six months of treatment, the lingual arch was lost, and a new one was inserted and activated two more times. It took eight months with a total of six activations to establish an acceptable occlusion in the transverse dimension. The lingual arch served as a retainer for 15 months, during which time it broke and was replaced and lost again. Retention was discontinued because no measurable change occurred in the one month without retention after the arch was lost.

When the patient was 11 years, 8 months old, the maxillary right first and second premolars and the maxillary right second molar were noted to be completely buccal to the mandibular teeth, with mild crowding of the maxillary and mandibular incisors.

The mandibular dental midline was deviated to the left. The first permanent molars and right permanent canine were in a Class I relationship, but the left permanent canine was in a Class II relationship (Fig 3).

Cephalometric analysis revealed a skeletal Class I with a mild Class II tendency, but vertical skeletal measures were within normal limits. The maxillary incisors were upright but were in an acceptable anterior position. The mandibular incisors were inclined labially and also positioned anteriorly.

Treatment to correct the malposed maxillary first and second premolars, second molar, and the mildly crowded incisors consisted of full banding with standard edgewise mechanics. The malaligned maxillary right posterior teeth were aligned by correlation of the maxillary arch wire to the mandibular arch, and the incisors were aligned after the slenderizing of the interproximal surfaces. In a stable joint position (superior anterior position of the condyle in the fossa) the teeth occluded with maximum intercuspation. On the right and left working sides, canine rise was established. In addition, there were no nonworking interferences. The patient had a normal range of mandibular movement with no joint sounds. Treatment time was 18 months.

Retention consisted of a maxillary wraparound Hawley removable retainer and a fixed mandibular appliance consisting of a 0.028 wire bonded to the lingual tooth surfaces from canine to canine. The last observation was made when the patient was 18 years old, with the maxillary arch out of retention for four years, and the mandibular anterior incisors out of retention for two years three months (Fig 4). Cephalometric appraisal at 18 years of age revealed a Class I dentition superimposed on a Class II relationship due to a posteriorly positioned mandible.

Fig 5 (next page) illustrates cephalometric superimpositions at the initial examination (6 years, 4 months), at the beginning of treatment in the permanent dentition, (11 years, 8 months), and at 18 years of age.

Discussion

The early expansion of the mandibular arch was indicated. The severe bilateral lingual inclination of the mandibular posterior teeth prevented adequate masti-



Fig 3. Re-evaluation of the occlusion at 11 years, 8 months. The maxillary right first and second premolars and second molar are completely buccal to the mandibular teeth. Note the deviation of the midlines.



Fig 4. Occlusion at 18 years of age. Maxillary arch was out of retention for 4 years, whereas the mandibular anteriors were out of retention for 2 years, 3 months.

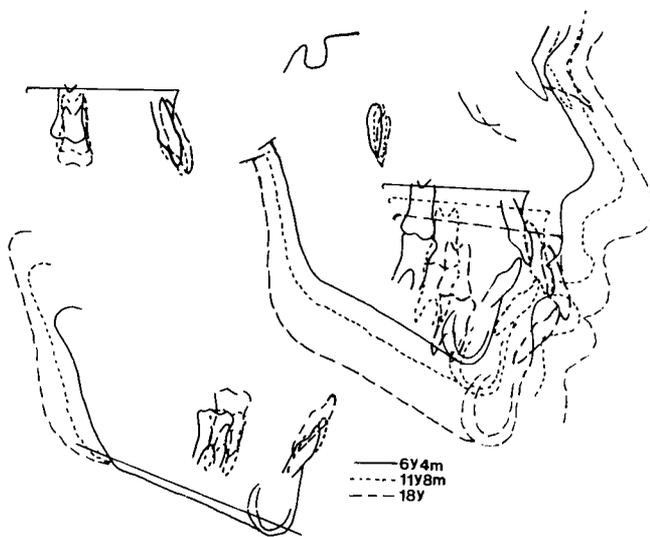


Fig 5. Superimpositions at the initial examination (6 years, 4 months), at the beginning of treatment in the permanent dentition (11 years, 8 months), and at 18 years of age.

cation. This was the patient's chief complaint. Bilateral expansion of the mandibular arch during the mixed dentition established proper interdigitation. This expansion could allow for the permanent teeth to erupt into an acceptable interdigitation.

With many treatment options available for the mandibular expansion, a fixed removable lingual arch with adjustment loops was chosen. This decision was based upon the severe lingual inclination of the mandibular posterior teeth. A removable appliance was not considered, because encroachment of the tongue space made the appliance difficult for the patient to tolerate.

The need for a second phase of treatment in the permanent dentition was surprising. However, in retrospect, the maxillary intermolar width of 44.8 mm at the initial examination (6 years, 4 months) may have provided a clue, since it was greater than one standard deviation from the mean of 41.85 mm. Contraction of the maxillary arch in the mixed dentition may have

allowed the maxillary right premolars to erupt into an acceptable alignment. However, this may not have affected the buccal position of the maxillary right second molar.

Conclusion

Efficient mastication is impossible when the mandibular arch is telescoped within the maxillary arch. If this malocclusion remains, the mandibular permanent teeth can erupt into similar positions. This case report demonstrated that lingual arch expansion during the mixed dentition increased posterior intraarch width to establish maximum interdigitation. Unexpectedly, further treatment was indicated because of the unilateral abnormal eruption positions of the maxillary premolars and second molar. This report further illustrated that in spite of broken appliances and noncompliance, the overall treatment was successful.

Dr. Gellin is professor emeritus, Department of Oral Health Practice, Section of Pediatric Dentistry, University of Kentucky, Lexington, KY.

- Brodie AG: Bureau of public relations. *Orthodontics*. J Am Dent Assoc 30:433-38, 1943.
- Kisling E: Occlusal interferences in the primary dentition. *ASDC J Dent Child* 48:181-91, 1981.
- Moyers RE, van der Linden FPGM, Riolo ML, McNamara JA: *Standards of Human Occlusal Development*. Ann Arbor, MI: University of Michigan, Center for Human Growth and Development, 1976, p 82, 88.
- Moyers RE: *Handbook of Orthodontics*. 4th ed. Chicago: Year Book Medical, 1988 pp 392-96.
- Mills JRE: *Principles and Practice of Orthodontics*. Edinburgh: Churchill Livingstone, 1982, pp 208-9.
- Sim JM: *Minor Tooth Movement in Children*. 2nd ed. St Louis, MO: CV Mosby Co, 1977, p 278, 300.
- Tulley WJ, Campbell AC: *A Manual of Practical Orthodontics*. 3rd ed. Bristol: John Wright and Sons, 1970, pp 179-80.
- van der Linden FPGM, Boersma H: *Diagnosis and Treatment Planning in Dentofacial Orthopedics*. Chicago: Quintessence, 1987, p 65, 266.
- Williams DW: A method of treating total lingual occlusion. *Trans Brit Soc Study Orthod* 56:97-98, 1970.