

## Rapid correction of a simple one-tooth anterior cross bite due to an over-retained primary incisor: clinical report

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### Abstract

*Where a permanent anterior tooth cross bite results from over-retention of a primary incisor, a rapid correction method may prove successful. When the over-retained primary incisor is extracted, the permanent successor in cross bite is tipped into the extraction site, correcting the cross bite.*

**M**oyers defines a simple anterior tooth cross bite as a dental malocclusion resulting from the abnormal axial inclination of one or more maxillary teeth.<sup>1</sup> Simple anterior tooth cross bites are termed dental malocclusions chiefly to separate them from the skeletal-type cross bite malocclusions which they can resemble closely.

An accurate differential diagnosis to separate the skeletal- from the dental-type cross bite is key to successful treatment for, as Moyers notes, only the simple or dental-type cross bite can be corrected by tipping the teeth labially to bring them into normal alignment. Lee discusses the diagnostic criteria for separating the dental from the skeletal anterior cross bites.<sup>2</sup> Dental-type anterior cross bites usually exist in those patients where:

1. The molars and cuspids are in a Class I relationship
2. The cross bite involves only one or two teeth
3. The profile of the patient is generally normal and the same when the mandible is at rest
4. The teeth are occluded and the tooth or teeth involved in the cross bite exhibit only an abnormal lingual axial inclination usually in the presence of a causative factor.

A variety of factors have been reported to cause the abnormal axial inclination of the teeth in dental-type anterior cross bites. McDonald discusses three of these in his text.<sup>3</sup> They include a labially positioned supernumerary tooth, inadequate arch length, or a traumatic injury that displaces the permanent tooth bud. An injury also can affect the permanent tooth's position when it causes delayed exfoliation of the primary tooth. A traumatic injury can cause the pulp of the primary tooth

to become nonvital or to undergo calcific degeneration. In these cases the primary tooth does not resorb normally and acts as a foreign body causing, as in the other instances, displacement of the permanent incisor and eruption into cross bite.

There are many approaches to the treatment of a simple single tooth anterior cross bite. Treatment choice depends on several factors; Lee outlines five factors to consider before selecting a treatment approach:

1. Adequate space to reposition the tooth in the arch
2. Sufficient overbite to hold the tooth in position following correction
3. An apical position of the tooth in cross bite that is the same as it would be if the tooth was in normal occlusion
4. A Class I occlusion.

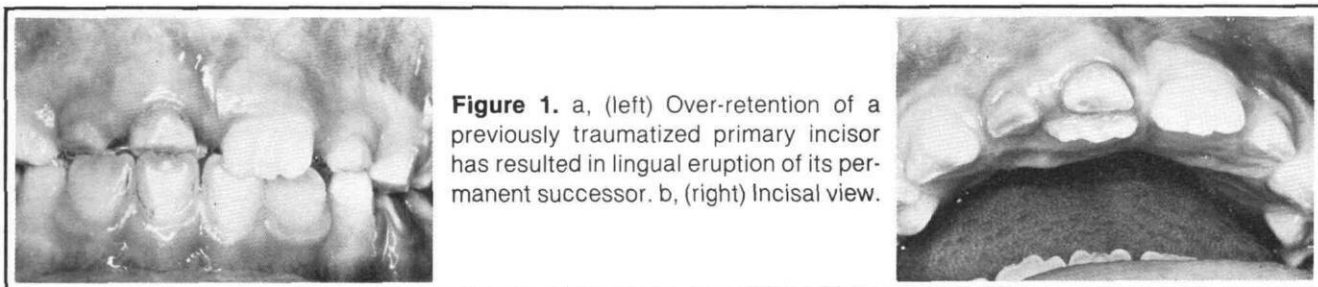
The following treatments for an anterior cross bite have been reported. They include: tongue blade therapy, inclined planes, a reverse stainless steel crown, and removable and fixed appliances.<sup>3-5</sup> Some treatments depend heavily on cooperation of parent and child.

In selected cases, when a cross bite results from over-retention of a primary incisor, rapid correction may be possible. When the over-retained primary tooth is extracted, the permanent tooth in cross bite is tipped into the extraction site, correcting the cross bite.

### Clinical Report

An eight-year-old boy was referred to a pediatric dental clinic with the complaint of "two rows of upper front teeth" (Figure 1). The health history was unremarkable except for lacerations to the head and face suffered in an auto accident at four years of age. At the time of the accident injuries to the teeth could not be substantiated.

Clinical examination revealed an early mixed dentition. All first permanent molars were erupted and in a Class I relationship. Although the remaining primary dentition was abraded from normal wear, the primary cuspids also were judged to be in a Class I relationship. The patient's



**Figure 1.** a, (left) Over-retention of a previously traumatized primary incisor has resulted in lingual eruption of its permanent successor. b, (right) Incisal view.

profile was normal; the same whether the mandible was at rest or when the teeth were occluded. The maxillary permanent central incisors were erupted, but the right central incisor had been deflected lingually due to the presence of an over-retained primary incisor that was positioned firmly in the arch. The maxillary primary lateral incisors were mobile and ready to exfoliate.

Both the maxillary primary right central and lateral incisors were yellow compared to the primary left lateral incisor. All maxillary primary incisors were caries-free.

Periapical radiographs showed the root canal of the primary right central incisor was obliterated (Figure 2).



**Figure 2.** Preoperative periapical radiographs of maxillary anterior teeth showing obliterated pulp chamber and delayed resorption of right primary central incisor and deflection of its permanent successor.

Additionally, root resorption of the right primary central incisor was delayed markedly when compared to the remaining incisors which were ready to exfoliate. Root development of the permanent central incisors was about two-thirds complete, as expected at the patient's chronologic age. The diagnosis in this case was a single tooth dental-type anterior cross bite due to the presence of an over-retained primary incisor.

Once the over-retained primary incisor was extracted the permanent incisor in cross bite moved into an edge-to-edge relationship with the mandibular incisor. Being in the early stages of eruption, the case seemed ideally suited for the tongue blade correction approach. The child was taught how to use the tongue blade to correct the tooth position, but seemed unable or unwilling to cooperate. Appliance therapy was considered next but because the tooth was only partially erupted, this approach presented problems as well. Rather than have the child return when the tooth was more exposed to check for possible improvement of the situation or for correc-

tion, an attempt was made to correct the cross bite by tipping the permanent tooth into the extraction site.

A surgical curette was used to reposition the permanent tooth. The curette was positioned on the lingual aspect of the tooth and close to the soft tissue where there was sufficient tooth structure bulk. Next, a light but deliberate, steady force was applied to the tooth until movement was noted. Care was taken to make sure no soft tissue within the extraction site prevented tooth repositioning. Force was applied again and again to advance the tooth slowly tipping it into its new position. Occlusion was checked intermittently for progress. Once an overbite relationship was reached with the opposing mandibular incisor, the repositioned tooth was held until a clot formed. This clot, along with the occlusion, steadied it in its new position (Figure 3). The patient was



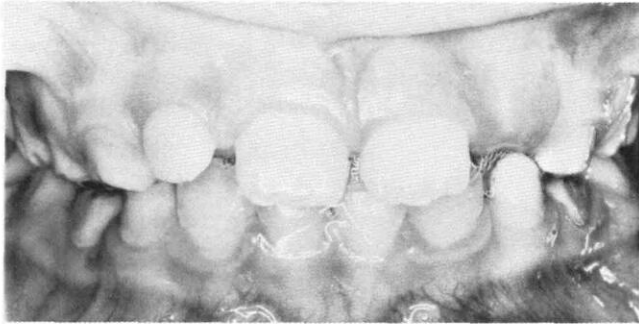
**Figure 3.** Maxillary right central incisor immediately after repositioning. Note primary right lateral also was extracted prior to manipulation of the permanent tooth.

instructed to try to maintain the bite relationship. No further treatment was provided at this visit.

The patient was appointed for a one-week postoperative visit but was not seen for 10 months. The child returned then, complaining of a tooth ache in another area of the mouth. Clinically, the tooth that had been tipped into proper alignment had continued to erupt with no signs of the former malocclusion (Figure 4). Periapical radiographs showed continued root development of the repositioned tooth (Figure 5).

## Discussion

Cases must be selected carefully when rapid correction is possible. The cross bite must be a dental-type maloc-



**Figure 4.** Ten-month postoperative correction. The maxillary right central incisor that was in cross bite has continued to erupt and has been retained in its normal position in the arch.

clusion of a lingually tipped but otherwise normally positioned maxillary tooth with no underlying skeletal component to the malocclusion.

This procedure is accomplished best in young children; the partially erupted permanent tooth roots are formed incompletely, allowing the tooth to be tipped gently into proper position. Also, at this early stage of development, the tooth is deflected only slightly and malalignment is corrected easily.

Finally, the over-retained primary tooth must have sufficient root structure remaining that, upon extraction, a void large enough for repositioning the permanent successor is available.

Case selection closely fits the criteria for tongue blade therapy, but rapid correction is indicated when the child is unable or unwilling to cooperate. If the criteria for this



**Figure 5.** Ten-month postoperative periapical radiograph of maxillary anterior teeth. Root formation of the repositioned central incisor has continued normally.

treatment exist, but relapse of the tooth is a concern, an acid etch splint can be used to stabilize the tooth temporarily until it is firmly in position, completing the correction. Should this rapid correction fail to succeed, other conventional therapy can effect correction later.

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1. Moyers, R.E. Handbook of Orthodontics, 3rd Ed. Year Book Medical Publishers, Inc.; Chicago, 1983, pp 574-77.
2. Lee, B.D. Correction of crossbite, Dent Clin North Am 4:647-67, 1978.
3. McDonald, R.E., Avery, D.R. Dentistry for the Child and Adolescent, 3rd Ed. C.V. Mosby Co.; St. Louis, 1978, pp 424-32.
4. Law, D.B., Lewis, T.M. An Atlas of Pedodontics. W.B. Saunders Co.; Philadelphia, 1969, pp 234-37.
5. Mathewson, R.J., et al. Fundamentals of Dentistry for Children. Quintessence Publishing Co., Inc.; Chicago, 1982, pp 605-15.

### Quotable Quote

Most dental hygienists are not necessarily interested in independent practice; rather they are interested "in a system where collaboration is more important than control . . . and where self-regulation does not mean isolation, separation or fragmentation." In the collaborative model, dental hygienists would be considered knowledgeable about their field, consulted about their opinion of appropriate dental hygiene procedures, and given the opportunity to schedule appointments in a manner that allows them to provide adequate care. Moreover, dental hygienists would be expected to make clinical dental hygiene decisions within the scope of dental hygiene practice. For clarity, a written description of the services and decisions that dental hygienists are expected to undertake on their own initiative could be developed jointly. Any other services or decisions would require a dentist's prior authorization as dictated by state law. Dental hygienists would be responsible for patients' dental hygiene care; dentists would continue to be responsible for patients' overall dental care. When dental hygienists' knowledge and skills are recognized, they experience pride and satisfaction; when they cannot use their knowledge and skills, they experience frustration and seek alternatives. Collaborative practice has been used and valued in medicine, where it provides the foundation for comprehensive patient care in the hospital and in private practice; however, this system has not developed for the delivery of oral health care.

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