



# Single Tooth Anterior Crossbite Correction in Mixed Dentition Using fixed Z'Spring Along with Posterior Bite Plane: A Case Report

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## Abstract

**Introduction:** Crossbite is defined as an abnormal labiolingual or buccolingual relationship between maxillary and mandibular teeth when the teeth of both arches are in occlusion. It can be further defined to specify the location in the mouth i.e. whether anterior or posterior and also whether a single tooth or groups of teeth are involved.

**Case report:** In this case report we discuss 2 cases in which single tooth crossbite is treated with the help of fixed z-spring. Treatment is completed in the time interval of 10-15 days.

**Discussion:** Dental anterior cross-bites involve a single tooth or multiple teeth and can be classified as a simple orthodontic problem. Early management of cross-bite in the deciduous or early mixed dentition is advocated to allow for spontaneous correction of succedaneous teeth. There are many treatment modalities for an anterior crossbite. These range from simple removable appliances incorporating springs or screws to the use of protraction masks in the anterior region. One of the best treatment options for anterior cross-bite patients is Z-spring. It can be given to the patient as a fixed or re- movable appliance.

**Conclusion:** It is desirable to investigate further the extent to which the various aetiological factors that contribute to crossbite for better management of the cases of cross bite. The crossbite should be treated as soon as possible so that future orthodontic problems can be avoided.

**Keywords:** Anterior Crossbite; Fixed Appliance; Z Spring

**Abbreviation:** GIC: Glass Ionomer Cement.

## Introduction

Grabner has defined crossbite as a condition where one or more teeth may be abnormally malposed either lingually or labially with reference to opposing teeth [1-7].

Anterior dental crossbite is known to occur 4-5% of the time

and typically manifests itself in the early mixed-dentition period. Individuals with anterior dental crossbite will display a normal anterior-posterior skeletal relationship, a smooth course of mandibular closure into an Angle Class I relationship, coincident centric occlusion and centric relation [8].

Anterior crossbite clinically manifests with reverse overjet, premature contact of cross- bite teeth leading to

the displacement of the mandible, gingival recession, and mobility of the lower incisors involved in the crossbite.

### Etiology

The anterior crossbite may result from a variety of factors such as the lingual eruption path of the maxillary anterior incisors; a repaired cleft lip; trauma to the primary incisor resulting in the lingual displacement of the permanent tooth germ; supernumerary anterior teeth [9]; an over-retained necrotic or pulp less deciduous tooth or root; odontomas; crowding in the incisor region; inadequate arch length; a habit of biting the upper lip.

If neglected, it may result in abrasion of the labial surface upper incisors, which may harm the lower incisors' periodontal support involved in the cross bite [10].

### Management

Early treatment of the anterior crossbite prevents mandibular displacement, facilitating the development of the centric relationship.

Whether it originates from the skeleton or the dentoalveolar region, treatment of anterior crossbite is advised in the primary and early mixed dentition.

Tongue blades, reversed stainless steel crowns, fixed acrylic planes, bonded resin- composite slopes, and removable acrylic appliances with finger springs are just a few of the treatment options that have been suggested to correct anterior dental crossbite.

Planning orthodontic services requires accurate information on the prevalence of and risk factors for anterior crossbite. As a result, it's crucial to clinically evaluate patients who exhibit cross-bite.

The major objective of treatment is to labially tip the affected maxillary tooth or teeth until a stable overbite relationship is achieved.

### Case Report

All of the cases reported here were in early mixed dentition and had Class I molar and canine relationships. In every case, there was enough mesiodistal space for the maxillary tooth to move labially. Medical histories of the children were non-contributory.

Following clinical and radiographic examinations, the decision was made to create a fixed z-spring appliance. The parents of each of the patients gave their written informed consent for the treatment.

In this case, bands were adapted on the maxillary molars on both sides. The maxillary impression is taken along with adapted bands. Along with adapted bands impression was poured with dental stone. The connecting wire is soldered to the bands and the Z spring. Stainless steel burs are used to finish and polish the appliance. Ultrasonic cleaning of the appliance is done. Using luting GIC cement, bands were affixed to the teeth. The posterior bite block, which is created on the molars using type 1 GIC cement, is used to deocclude the dentition.

The patients were encouraged to practice good oral hygiene, and they were called back a week later to assess the effectiveness of the treatment and the periodontal condition of the anterior teeth. Crossbite correction was completed in 1-2 weeks. After the completion of treatment GIC used to deocclude teeth is removed with a diamond bur at low speed. The enamel surface was polished using finishing discs, and topical fluoride was applied.



**Figure 1:** Pre-Operative.



**Figure 2:** Fixed Z-Spring Luted.



**Figure 3:** After Correction



**Figure 6:** After Correction.



**Figure 4:** Post Operative.



**Figure 7:** Post Operative.

### Case 1

An 8-year-old boy visited the pediatric department for correction of an anterior single tooth crossbite due to aesthetic issues. Intraoral examination revealed a maxillary right central incisor in crossbite. After band adaptation, appliance is fabricated. On the maxillary first permanent molars, adapted bands and a fixed z-spring appliance was luted.



**Figure 5:** Fixed Z-Spring Luted.

### Case 2

A 7-year-old boy was referred to the department of pediatric and preventive dentistry with the chief complaint of irregularly placed teeth. The patient was suffering from unilateral cleft lip and palate and got the first surgery done at the age of 6 years. The patient is in a mixed dentition period with unerupted permanent maxillary anterior and impacted mesiodens. The patient experienced difficulty in occluding teeth due to a single tooth crossbite with respect to the maxillary left central incisor.

Bands were adapted on deciduous molars on both sides and z spring is soldered to the bands via connecting wire. Teeth were deoccluded by giving posterior bite block with GIC (Figure 7). The patient is recalled after one week.

### Discussion

Anterior crossbite is a type of malocclusion that is fast-growing and is one of the causes of a child's undesirable appearance during the period of mixed dentition. The best

chance for occlusal counseling and malocclusion prevention is during the era of mixed dentition. Early intervention is also focused on preventing dysplastic growth of the skeletal and dentoalveolar components. Treatment could be more challenging if it is postponed until a later stage of development.

Early and prompt treatment of anterior dental crossbite is necessary to avoid aberrant enamel abrasion, anterior tooth mobility and breakage, periodontal pathosis, and temporomandibular joint disturbance.

Z' springs or double cantilever springs are routinely recommended for correction of anterior dental crossbite. Since they are fabricated with Hawley's retainer, most of the children either lose them or are not cooperative to wear them. In the present case series, we have presented a few cases of anterior dental crossbite that have been corrected using a fixed Z-Spring appliance. This is a modification to a conventional Z-spring which had Hawley's retainer. Here, the Z spring is soldered to a wire that is in turn soldered to the bands adapted on molars, which provides stability to the appliance. It requires less patient compliance as the appliance is fixed.

In each of the cases reported here, the anterior dental crossbite was corrected within 1-2 weeks without causing any harm to the teeth or the surrounding periodontal tissue and retention is attained as soon as the tooth is in the proper labial position.

## Conclusion

As demonstrated in these cases, a fixed z-spring appliance is a safe, simple and effective method for the treatment of anterior dental crossbite as it needs less patient cooperation and takes less time to complete the treatment.

The diagnosis and assessment of the malocclusion should be given priority.

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