

Bonded Polyacid Modified Composite Slopes for Correcting Anterior Tooth Cross-bite: A Case Report

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Abstract

Many techniques have been used to correct anterior crossbites in mixed dentition. All of these techniques were without drawbacks. The current case report described the treatment of such cases. The patient was a 8-year-old girl with a crossbite of tooth #11 and the crossbite was of dental origin. A fixed inclined plane made by the help of celleloid crown that was fixed in a reversed position to build up fixed inclined plane by the use of polyacid modified composite material (compomer). The treatment period was four weeks, a very short time, and considered an advantage. All dentists may find this technique useful in treating crossbite cases of the mixed dentition. This is because it is easy, saves time and money and more conservative for the enamel. The last advantage was due to the opaqueness of compomer used in building up the inclined plane facilitated its distinguishing from the enamel, a condition that guards against enamel abrasion. Furthermore the tooth can make use of the fluoride released from compomer for caries fighting.

Keywords: Anterior crossbite; Bonded Polyacid Modified Composite slope

Introduction

Anterior crossbite is defined as a malocclusion resulting from the lingual positioning of the maxillary anterior teeth in relationship to the mandibular anterior teeth [1]. Anterior crossbite may be found in upper frontal primary teeth or permanent ones [2]. Anterior tooth crossbite have been commonly treated with acrylic resin inclined bite ramps cemented to the mandibular incisors and canine teeth [3,4] or by cementing a ready-made stainless steel (st.st.) crown form in a reversed position on the tooth requiring correction. In fact, the cemented crown with its labial surface, which is palatally directed, will create an inclined plane. This later, will deflect the maxillary tooth in buccal position [3-5]. Drawbacks of using a st. st. crown form present many disadvantages. In fact, they are difficult to adapt. In addition, they present unaesthetic metallic appearance. Moreover, the cement may fail with subsequent swallowing by the patient.

The Catlan's appliance (Lower Inclined Bite Plane) works on the principle of Newton's third law of motion, the resin slope functions to tip an upper anterior tooth labially while the mandibular tooth is tipped slightly in the lingual direction [6]. This method is a safe, cost effective, rapid and easy alternative for the treatment of cross-bite. It is cost effective because it does not involve the use of fixed orthodontic tooth movement procedures [7,8]. However, like any other fixed appliance, oral hygiene is a problem and should be strictly monitored. Since only soft diet is possible when it is in place, motivation of the patient plays a crucial role in treatment success [9].

Another method utilizing bonded custom made composite resin inclined plane to the maxillary incisor teeth is introduced to the profession and claimed that it eliminated the drawbacks of the previous techniques [10,11]. Even this technique was without drawbacks. Its main disadvantage was the need for enamel etching during composite slope builds up with subsequent abrasion of the enamel during removal after crossbite correction. The current technique in this case report utilized polyacid modified composite resin to build up the inclined plane to avoid drawbacks of composite resin.

Polyacid-modified composite resin (compomer), that combines certain features of the traditional dental composite resin and glass ionomer cement [12]. It is introduced as a new class of dental materials to overcome the problems associated with conventional glass ionomers and composite resins [13]. The word compomer is derived from the terms “composite” and “ionomer”, indicative that the materials combine the features of both types of these dental materials. Compomer restorative material is made up of two main constituents: dimethacrylate monomer(s), with two carboxylic groups present in its structure, and filler that is similar to the ion-leachable glass present in glass ionomer cements [14]. Compomers set via light-activated addition polymerization followed by an acid-base reaction that arises from the adsorption of water in the oral cavity [14,15]. They release fluoride by a mechanism similar to that of conventional glass ionomers [16-18].

Procedures

An 8 year old female patient presented to the department of prosthodontics referred by the orthodontist at the dental centre of King Fahad Hospital, Al-Madenah Al-Munawara. She was complaining about anterior cross-bite, unaesthetic appearance, inability to pronounce specific letters correctly and difficulty in incising. A comprehensive examination revealed that the cross bite concerns tooth #11 (Figure 1). Analyses revealed that the problem was related to teeth and not skeletal. The decision was to construct fixed inclined plane from Dyract compomer material (Detrey, Dentsply) as follows:

An oversized acetate crown form is placed in reversed position and has been used to build up new clinical crown of compomer material which should be longer than the tooth and inclined labially (Figure 2).

Suitable mechanical advantage is confirmed by presence of occlusal separation posteriorly and contact between the malposed tooth and its opposing one only when the patient occludes (Figure 3). The patient was instructed to eat soft diet.

Four weeks later, posterior occlusion is re-established and tooth # 11 has been moved anteriorly (Figure 4). After removal of the fixed inclined plate by its cutting away with burs and disks. Extreme care should be taken to avoid damaging the enamel surface. Later, the normal overbite relationship is established of tooth #11 with its opposing and this will prevent relapse (Figure 5). Palatal view of the case after correction of the cross-bite of tooth #11 (Figure 6) showing normal position of the corrected tooth in the arch form.



Figure1: Tooth #11 is in crossbite & associated with palatal tipping of the tooth.



Figure 2: Building up of bonded compomer slope which should be longer than the tooth and inclined labially.



Figure 3: Suitable mechanical advantage is confirmed.



Figure 4: Three weeks later, posterior occlusion is reestablished and tooth #11 has been moved anteriorly.



Figure 5: Three months later, tooth #11 in normal overbite with the lower that prevents relapse.



Figure 6: Palatal view of the tooth # 11 after crossbite correction.

Discussion

An anterior crossbite is present when one or more of the upper incisors is in lingual-occlusion relative to the lower arch [19]. Anterior crossbites in the mixed dentition should be corrected as soon as they are discovered because it may adversely affect forward maxillary alveolar growth and further complicate the crowding of the maxillary anterior teeth in patients with arch deficiency problems [20]. The occlusion of an 8-year-girl with her tooth #11 was in lingual crossbite. Her remaining upper incisors and lower incisors overlapped with about 50% overbite, which was a favourable condition. Her maxillary anterior arch had adequate length to accommodate the incisor in crossbite in their new position. Her maxillary central incisor was lingually inclined, a finding favourable for simple forward tipping of the tooth.

Such line of treatment is indicated when an anterior crossbite is associated with little overbite where a posterior bite block is not needed for the correction of the crossbite. After correction of the crossbite, retention stability depends on the presence of adequate overbite. Patients with incisor crossbite associated with little or no overbite are the most difficult to treat and retain. Treatment of anterior crossbite with little overbite is best managed with fixed appliances that can extrude incisors to develop sufficient overbite to retain the teeth in their corrected positions [20]. The author makes use of these conditions which were available in his case report.

Fixed appliances are unlike the removable one in that they are worn the full time. During the treatment the patient was instructed to cut up food and adopt a soft diet until the incisor relationship is correct and the appliance can be removed. Treatment should only take a matter of weeks and if improvement does not appear to be taken place soon, a thorough check should be made on the diagnosis of the case. In the current work, the treatment took four weeks.

The present technique eliminated the drawbacks of using resin composite to build up bonded slopes by avoiding etching of the enamel. Also it is known that compomer materials are more opaque than composite a condition which facilitated distinguishing it from

the enamel. This facilitated compomer removal from the tooth without enamel abrasion. Another merit for using compomer as bonded slopes is its fluoride release, which helps to fight decay. Some drawbacks of the present technique such as anaesthetic appearance because the tooth appears to be elongated, inability to incise, occlude on molars as well as to chew harder food. These draw back were transient because the duration of the treatment is very short and the patient was instructed to chew softer diet.

Conclusion

A simple fixed inclined plane constructed from polyacid modified composite can be used for the correction of anterior tooth cross-bite. All dentists (general, paediatrics, as well as orthodontists) can utilize this cost effective, time saving, and easier technique to manage cases with similar conditions.

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