Case Report

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Dentistry Section

Orthodontic Marvel: Correction of Class II Malocclusion with the Churro Jumper Appliance

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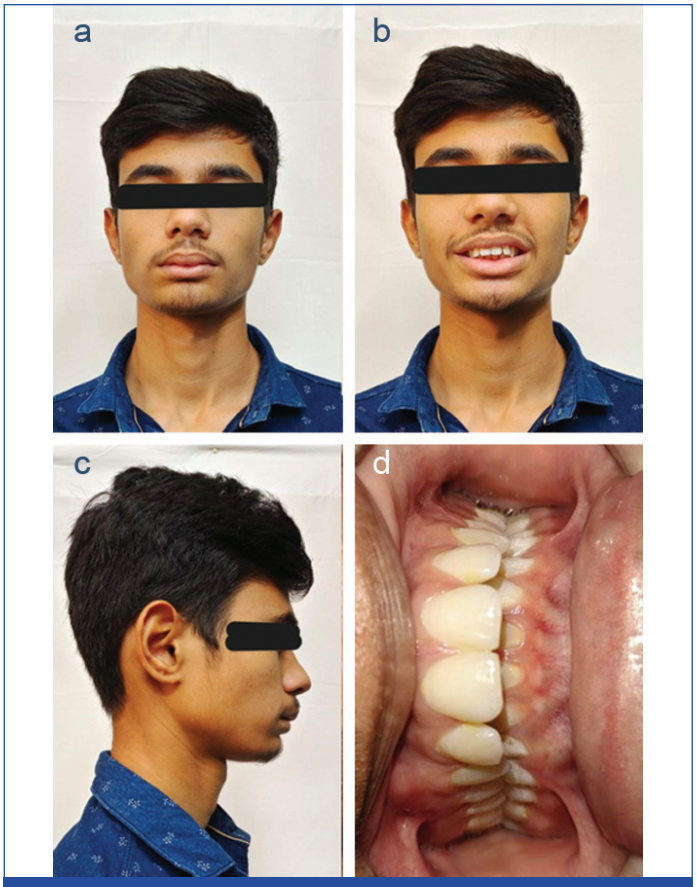
ABSTRACT

Class II malocclusion is a common orthodontic issue characterised by an excessive overjet, where the upper front teeth are significantly ahead of the lower ones. It often leads to aesthetic concerns and functional problems. Orthodontic treatment is the preferred solution to correct Class II malocclusion, and among the diverse range of appliances available, the Churro Jumper Appliance has emerged as a groundbreaking innovation. The present case report is about a 15-year-old male patient with Class II division 1 malocclusion and a retrognathic mandible. The MBT 0.022" prescription was used for bonding. After levelling and aligning both the upper and lower arches, and closing the anterior spacing, the Churro Jumper was used as a fixed functional appliance for mandibular repositioning. The required results were achieved using the appliance, and the patient's occlusion was brought to a Class I molar and canine relationship, while also improving the profile. The treatment was completed in 17 months. Although several fixed functional appliances are available in the market for Class II correction, the Churro Jumper appliance was used in the present case.

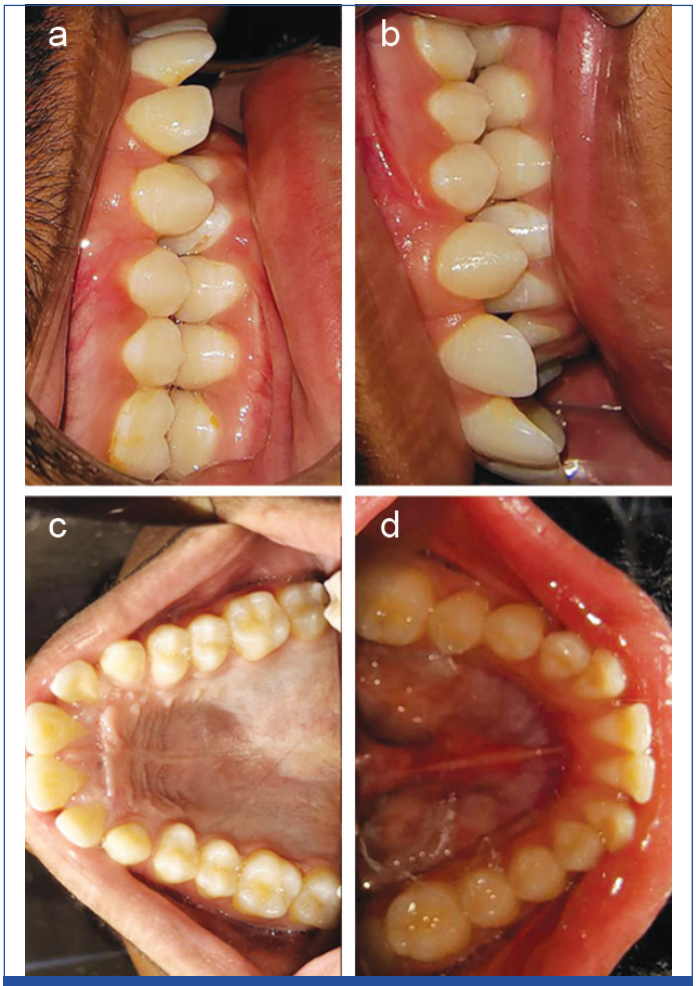
Keywords: Dentofacial orthopaedics, Fixed functional appliance, Mandibular advancement techniques

CASE REPORT

A 15-year-old male patient visited the orthodontic office with the chief complaint of protruding teeth. In addition to having competent lips, the patient appeared to have a symmetrical mesoprosopic face form. The lower lip was everted, while the upper lip was hypotonic. Upon examination from the side, the patient had a convex facial profile. The patient had a symmetrical smile that displayed more than half of his incisors [Table/Fig-1a-d]. An intraoral examination revealed that all teeth were present in both arches. A sufficient zone of attached gingiva was present, and the gingival health was satisfactory. Except for the third molars, all of the teeth were present in both arches. The canines and molars had a Class II relationship. Increased overjet and overbite were observed [Table/Fig-2a-d]. Upon functional examination,



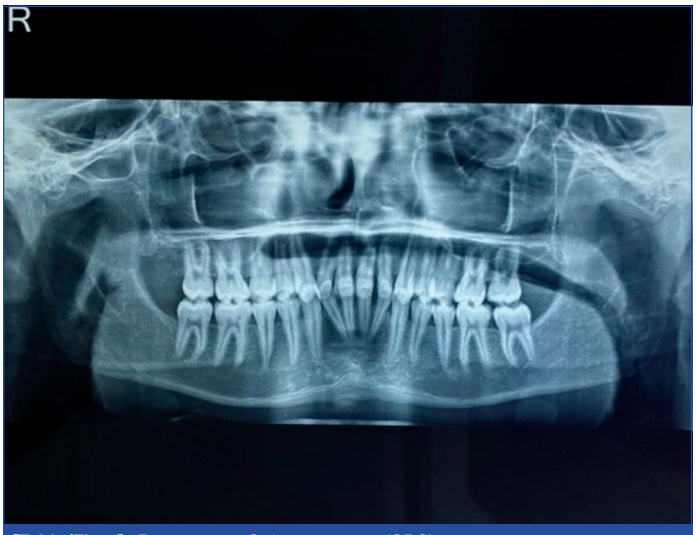
[Table/Fig-1]: Extraoral pretreatment photographs.



[Table/Fig-2]: Intraoral pretreatment photographs.

the patient exhibited a normal swallowing pattern, oronasal breathing, and a normal speech pattern. There were no abnormalities in the mandibular closure path, and there were no additional symptoms or signs related to Temporomandibular Disorders (TMD). Hyperactive mentalis muscle activity was observed. Examination of the study models revealed symmetrical arches with Class II molar and canine relationships on both sides. A 5 mm overbite and a 7 mm overjet were present. According to cephalometric analysis, the patient had a horizontal growth pattern with Class II skeletal bases and was in Cervical Vertebrae Maturation Index (CVMI) Stage IV (deceleration). The upper incisors exhibited proclination. Soft tissue analysis showed a decreased nasolabial angle (96°) and a deep mentolabial sulcus [Table/Fig-3,4].

[Table/Fig-3]: Pretreatment lateral cephalogram.



[Table/Fig-4]: Pretreatment Orthopantogram (OPG).

Diagnosis

The patient presented with a skeletal Class II and Angle's Class II Division 1 malocclusion, along with a horizontal growth pattern.

Problem List

- Proclination of upper and lower incisors
- Spacing in upper and lower anterior
- Class II molar and canine relationship
- Increased overjet and overbite
- Convex profile

Treatment Objectives

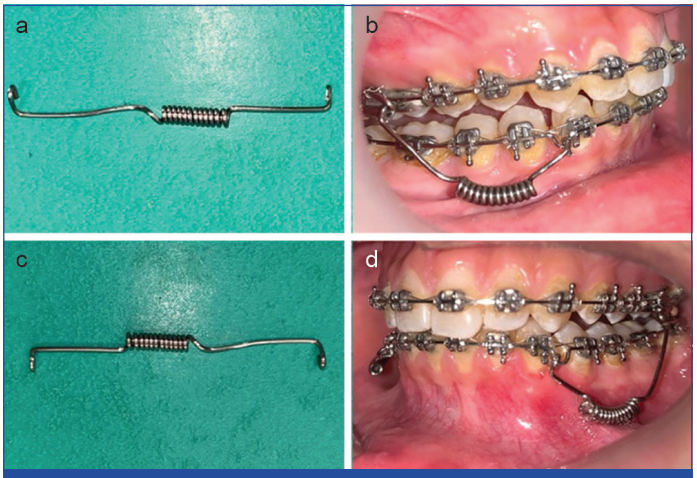
- To achieve a normal and straight profile
- Correction of proclination of incisors in the upper and lower arch
- Correction of spacing in the upper and lower arch
- To achieve a normal overjet and overbite
- To achieve a Class I molar and canine relationship

Treatment Plan

Written and informed consent were obtained from the patient, and the case was started with MBT 0.022" slot prescription. Banding of the upper and lower first and second molars and bonding of the upper and lower arches were done. Initial levelling and alignment of both arches were performed. Correction of the Class II molar relation using a fixed functional appliance was planned. Finishing and detailing in both arches and retention were planned.

Treatment Progress

The upper and lower arches were bonded with MBT 0.022" prescription. Anchorage preparation was done by bonding the maxillary and mandibular second molars. Levelling and alignment were initiated with a 0.014" Nickel Titanium (NiTi) wire in both arches, up to a 0.019"×0.025" stainless steel wire. Levelling and alignment of both arches took about 10 months of treatment time. After levelling and alignment of both arches, followed by space closure, a fixed functional appliance, namely the Churro jumper [Table/Fig-5a-d], was used to correct the Class II relationship for four months. After correction of Class II with the Churro jumper appliance [Table/Fig-6a-d,7a-d], the setting phase took about three months of treatment time. The total treatment took near about 17 months to complete and achieve stable results.

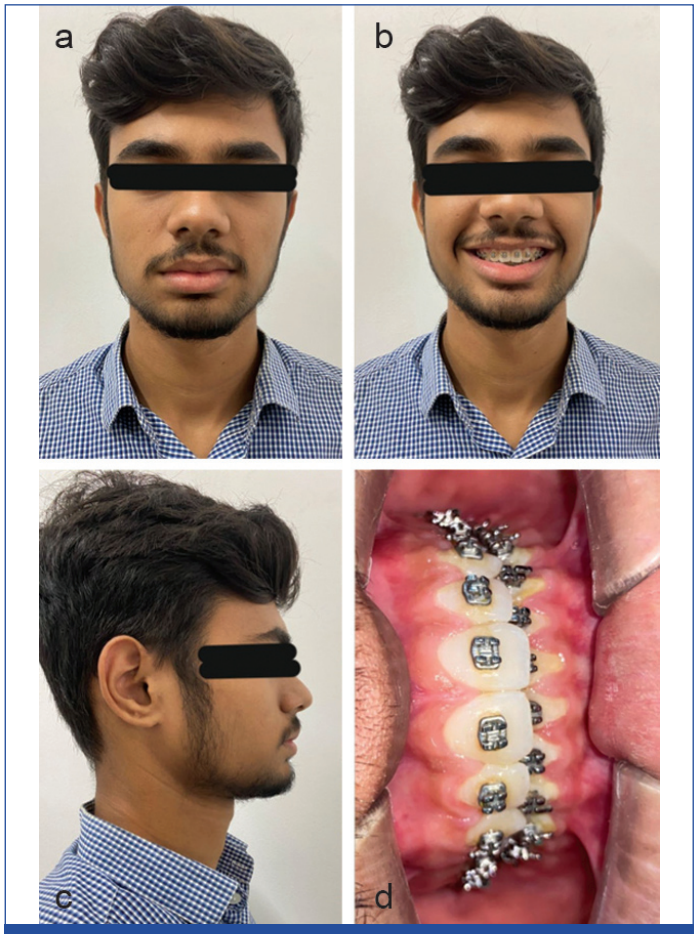


[Table/Fig-5]: Mechanotherapy.

Treatment Result

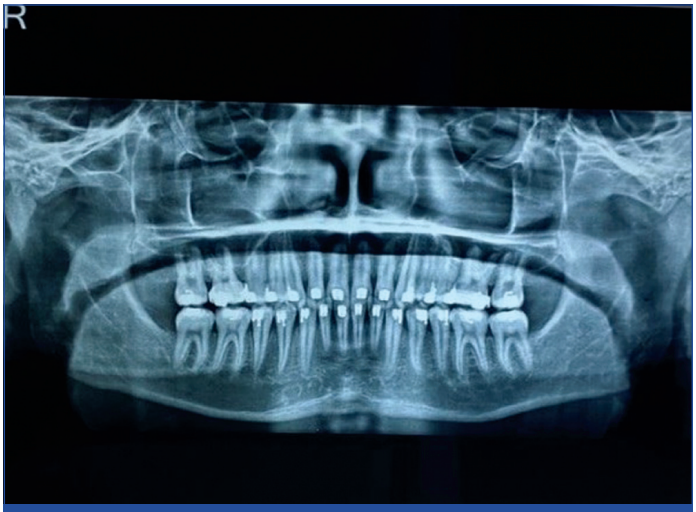
After 17 months of treatment time, correction of the proclination of incisors was achieved, along with a normal overjet and overbite. The cephalometric values of the patient also improved post-treatment [Table/Fig-1,8,9]. Space closure was achieved with a Class I molar and canine relationship [Table/Fig-10a-c]. The convexity of the facial profile was reduced, and a straight profile was achieved [Table/Fig-11a-d]. The case was recently debonded, and a follow-up will be scheduled later.

[Table/Fig-6]: Intraoral photographs post-Churro Jumper.

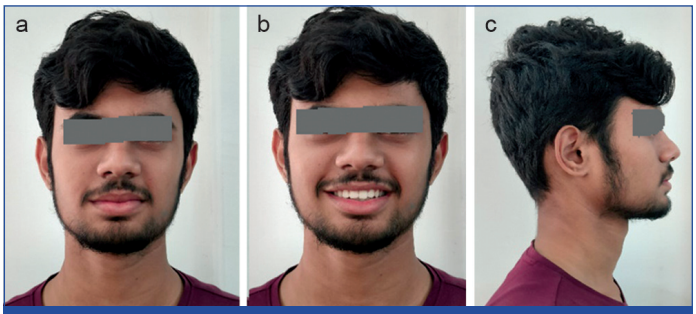


[Table/Fig-7]: Extraoral photographs post-Churro Jumper.

[Table/Fig-8]: Post-treatment lateral cephalogram.



[Table/Fig-9]: Post-treatment OPG.



[Table/Fig-10]: Extraoral post-treatment photographs.

[Table/Fig-11]: Intraoral post-treatment photographs.

DISCUSSION

The Churro Jumper appliance falls under the category of flexible fixed functional appliances [1], which restricts unfavourable maxillary growth while promoting mandibular growth in the correct direction. This therapeutic approach utilises the principle of pushing mechanics to apply positive force vectors that stimulate mandibular growth [2]. The effectiveness of the functional appliance is evident in the improved volume of the oral cavity, which encompasses the dentition and oral structures like tongue position, as well as the enhanced length of the mandible. These factors contribute to improved lip seal and breathing patterns resulting from the forward positioning of the mandible [3]. However, there is limited literature discussing practical issues associated with devices like the Churro Jumper, such as increased breakage and poor oral hygiene [4].

Pancherz's research findings revealed that approximately 30% of patients experienced moderate pain in their masticatory muscles following the placement of the Churro Jumper. The forward movement of the mandible caused disharmony in the condyle's position, leading to hyperactivity in the jaw muscles and an increased occurrence of muscle tenderness, as observed in the present case [5].

According to Bjork's research, any increase in vertical facial height negatively affects the health of a Class II malocclusion patient, as it results in posterior rotation of the mandible, exacerbating the Class II pattern. Therefore, any orthodontic device that rotates the mandible counterclockwise can help correct the Class II malocclusion and prevent its progression. This forms the basis for correction of Class II malocclusion using functional appliances (fixed or removable) correction [6].

One advantage of the Churro Jumper is its ability to be fabricated with minimal time, effort, expertise, and expense [7]. Elasticity and flexibility are two key features of these appliances, allowing for satisfactory mandibular movements and facilitating ease of lateral guidance. The appliance can be entirely controlled by the clinician, allowing for adjustment of the amount of force applied. However, the flexibility of the appliance also leads to fatigue in the springs. Since system fracture is a major drawback, it is important to advise and instruct patients to avoid opening their mouths too widely [8].

The patient presented to the Outpatient Department (OPD) of the department with a Class II malocclusion and increased overjet, and multiple treatment options were considered. Given the patient's advanced age and a favourable Visual Treatment Objective (VTO), a non extraction treatment plan using a fixed functional appliance was recommended. The Forsus appliance was one of the appliances considered [9], along with the Eureka spring [10]. Ultimately, a decision was made to use the Churro jumper appliance, taking into account its advantages, including cost-effectiveness, which the patient agreed upon. This appliance requires minimal patient cooperation and has been shown to successfully treat Class II malocclusions, ultimately reducing overall treatment time.

CONCLUSION(S)

While fixed functional appliance therapy is effective and addresses the limitations of traditional myofunctional therapy in terms of patient compliance, it does come with certain limitations. Orthodontic practitioners encounter challenges such as frequent breakages and difficulties in patient acceptance. However, the Churro jumper serves as a cost-effective and reliable alternative to the more expensive fixed functional appliances available in the market.

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