



## Case Report

# Removable Mandibular Retractor- An Effective Treatment for Early Class III Malocclusion: A Case Report and Review

Singh V<sup>1</sup>, Kumar N<sup>2</sup>, Gauba K<sup>3</sup>

### ABSTRACT

Developing class III malocclusion presents a challenge to clinicians due to its varied etiology. Several treatment modalities have been developed over the years to tackle this anomaly. However, most of the appliances are either difficult to fabricate and use or not tolerated well by the patient. Removable mandibular retractor is a simple and convenient yet often overlooked appliance for management of early class III malocclusion. Only a few case reports of the appliance in use are present in the literature. This case report presents the case of a 10 year old patient treated successfully with this appliance.

**Key words:** Developing class III, removable mandibular retractor, simple appliance.

### Introduction

Angle's class III malocclusion although, a well recognized entity, remains one of the most difficult to treat. Globally, its prevalence ranges from 0%- 26.7% amongst different populations and ethnic groups.<sup>1</sup> In India, class III malocclusion affects 1.4%- 3.4% of the population with the average being lower than the global average.<sup>2</sup>

Time and again, various modalities have been put forth to manage class III malocclusion but none has demonstrated significantly greater benefit as compared to others.<sup>9</sup> Removable mandibular retractor, first described by Tollaro in 1995<sup>8</sup>, is a simple, low cost appliance with favourable results.<sup>5,9</sup>

This case report, presents the case of a female patient successfully treated with removable mandibular retractor highlighting the relative efficacy of this simple appliance over other more complex treatment modalities in management of developing class III malocclusion.

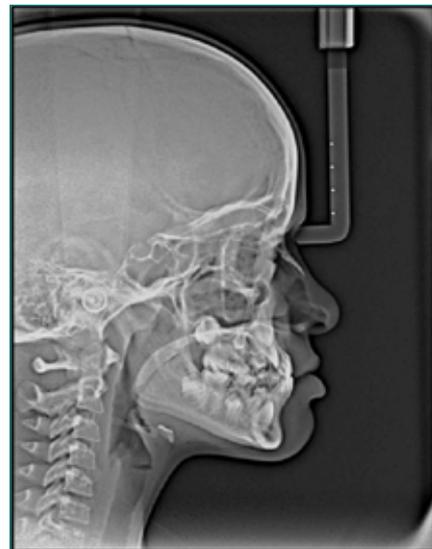
### Case

A 10 year old female reported to the Unit of Pedodontics and Preventive Dentistry, Oral Health Centre, PGIMER, Chandigarh with the chief complaint of irregularly erupting teeth. The history vis-à-vis trauma or deleterious oral habits was non-contributory. On examination, the patient was in the mixed dentition stage with erupting 11,21 in crossbite with teeth 31,41,42 (figure 1). The molar relationship was mesial step bilaterally with a developing end-on relation. The DMFT+deft was 7 with teeth 74,75,85,52,54 being carious and 64 and 84 being root

**Figure 1:** Pre-treatment frontal view showing anterior crossbite



**Figure 2:** Pre-treatment frontal view showing anterior crossbite and a protruding chin button



**Figure 3:** Post appliance delivery



**Figure 4:** Corrected incisor relation post appliance therapy



**Figure 5:** Post treatment cephalogram showing corrected incisor relation

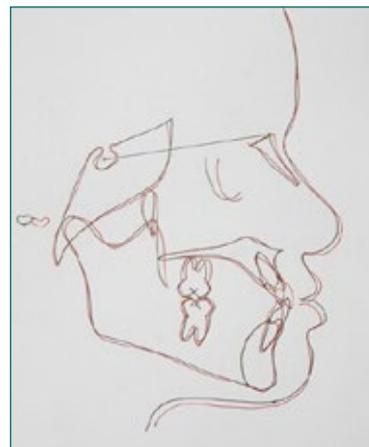


stumps. Also mild crowding was present in the mandibular anterior region. Cephalometric analysis (Figure 2, Table 2) did not reveal any skeletal discrepancies. Hence, it was decided to use a Removable Mandibular Retractor (RMR) for correction of developing anterior crossbite along with carrying out restorative work (Figure 3). The patient was monitored at regular 3 weekly intervals and at 4 months post initiation of appliance therapy the anterior crossbite was corrected (Figure 4) and was retained by the natural incisor alignment. The patient displayed no signs of relapse or other occlusal problems at 11 months follow up (Figure 6).

**Figure 6:** 11 months follow up frontal view showing retained corrected incisor relationship



**Figure 7:** Cephalograph superimposition depicting pre- and post-treatment changes



**Discussion**

Class III malocclusion needs to be tackled at an optimum time to achieve favorable results.<sup>6</sup> The general consensus, however, for treating a cross-bite is as soon as its discovered especially during eruptive stages of the maxillary incisors.<sup>10</sup>

Various appliances have been described in literature for intercepting class III malocclusion vis-à-vis maxillary expansion, removable plates with springs, fixed or removable inclined planes, functional appliances, chin-cups, simple fixed appliances etc. However, most of them are difficult to fabricate and not tolerated well by the patients. Removable mandibular retractor is a simple, low cost, appliance which has been shown to produce favorable growth changes in the mandible.<sup>3-6,8,9</sup>

The results achieved in the present case correspond to that of other authors.<sup>3-6,8,9</sup> There was an improvement in SNA angle and Witts' appraisal and no change in SNB angle (Table 2) demonstrating a favorable growth pattern.

Majanni et al<sup>7</sup> conducted a randomized controlled trial comparing bone anchored inter-maxillary traction

**Table-1:** Review of literature present on Removable Mandibular Retractor

Author/ Year/ Country	Nature of Study	Sample size and age	Appliance used	Conclusions
Almeida/ 2011/ Brazil	Case Report with 10 year follow up	N=1 Age: 9 years, Female	Removable Mandibular Retractor with chin cup and comprehensive orthodontic treatment	Corrected functional class III malocclusion remained stable with only minor corrections done by fixed orthodontic treatment. Treatment using mandibular retractor allowed proper facial growth and development and prevented worsening of malocclusion.
Baccetti T, Tollaro I/ 1998/ Italy	Retrospective	2 groups  <b>Group I (deciduous dentition):</b>  N=20  Mean age: 5 years $\pm$ 7 months  <b>Group II (mixed dentition):</b>  N=18  Mean age: 8 years $\pm$ 9 months	Removable mandibular retractor used in both groups and compared with control group in which no treatment was used.	More favourable changes in mandibular rotation and mandibular length were achieved by the appliance in the deciduous dentition group. Thus the optimum time for intervention using functional appliance appeared to be in the deciduous dentition period.
Loli D/ 2017/ Rome	Systematic review conducted using studies on PubMed and Scopus	-	Removable mandibular retractore	Removable mandibular retractor is a simple, low cost device capable of producing favourable changes in mandibular positioning and growth
Machado/2016/ Brazil	Case report	N=1 Age: 6 years, Male  4.5 years follow up	Removable mandibular retractor	Removable mandibular retractor is a simple modality to treat early class III malocclusion with favourable retention
Majanni MR/2016/ Syria	Randomized controlled trial	N=38 Mean Age: 11.46 $\pm$ 1.28 years	Removable mandibular retractor and Bone Anchored Intermaxillary Traction	Bone anchored intermaxillary traction appeared to be better than removable mandibular retractor in correcting mild to moderate class III malocclusion in growing patients

Author/ Year/ Country	Nature of Study	Sample size and age	Appliance used	Conclusions
Tollaro I/ 1995/ Italy	Longitudinal	N=38 (18 test, 18 control) Mean Age: 5.47±1.14 years	Removable mandibular retractor	Statistically significant upward-forward rotation of mandible was observed in the treated group which compensated for the excessive mandibular growth. Thus the appliance showed favourable results.
Woon SC/2017/ United Kingdom	Systematic review and meta analysis	Studies collected from Cochrane Database of Systematic Reviews, Embase, MEDLINE	Chin cup, face-mask, modified tandem traction bow, appliance, tongue plate, removable mandibular retractor, bite block appliance, bionator III, maxillary protractor	There is moderate evidence to suggest that early facemask treatment results in positive skeletal and dental changes. However, there is a lack of evidence about its long term effectiveness. There is some evidence for chin cup, tandem bow, removable mandibular retractor but the studies have a high risk of bias.

**Table 2:** Pre- and Post- treatment Cephalograph readings

Parameter	Pre-treatment Value	Post-treatment Value
Saddle Angle (N-S-Ar) (123±5)	124°	125°
SNA (81±1.0)	82°	80°
SNB (79±1.8)	81°	81°
ANB (3.12±1.8)	+1°	2°
Articular angle (S-Ar-Go)	137°	140°
Gonial Angle(Ar-Go-Me) (123±7)	128°	128°
Y axis (S-Gn/PH) (59±3)	59°	62°
Inter-Incisor Angle (121)	134°	128°

Parameter	Pre-treatment Value	Post-treatment Value
SN length (65mm)	59 mm	60 mm
Maxillary length (44 mm)	42 mm	44 mm
Mandibular Length (69 mm)	61 mm	62 mm
SN-MP (32-35)	30°	32°
FMA (23.8±2)	22°	28°
IMPA (99)	98°	93°
Witts Appraisal	-2mm	+3 mm

(BAIMT), which is a fixed modality, with the removable mandibular retractor. They concluded that BAIMT was superior to the retractor. However, we feel that it is not pragmatic to compare a fixed bone anchored modality with a removable one as the former has the added steps of fixing the units surgically thus increasing morbidity and also the mechanism of action and indication of both the appliances is different.

A few clinical trials have been conducted using the removable mandibular retractor (RMR), however,

literature mostly contains case reports on this appliance (Table 1). By the time of the penning of this case report, a clinical trial on evaluating the efficacy of the removable mandibular retractor was recruiting patients.<sup>11</sup> This will probably shed better light on the efficacy of this humble appliance.

The present case demonstrated favorable changes in the growth pattern post appliance therapy. The corrected cross-bite was also retained naturally by the positive overjet and remained stable at 11 months follow up.

## Conclusion

This case report shows that developing class III malocclusion, with minor skeletal involvement, can be easily treated with RMR. The appliance induces a favorable anterior morphogenetic rotation of the mandible leading to positive inclination of the maxillary incisors. The stability of the results achieved depends on the correct diagnosis and early treatment.

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**Conflict of interest:** None

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