

CASE REPORT

Drifting the teeth via Carriere Way!

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ABSTRACT

A very important goal of orthodontic treatment is not only to provide patient with functional results but also an efficient and esthetic treatment. The purpose of this article is to present two patients exhibiting Class II division 1 malocclusion that were treated by a non-extraction therapy divided into two phases. First, the use of carriere motion appliance, followed by fixed orthodontic therapy.

Keywords: Carriere motion appliance; Distalisation; Orthodontics; Class II malocclusion.

INTRODUCTION

Orthodontists encounter a myriad of patients having Class II malocclusion in day-to-day practice. One has a vast array of treatment modalities to correct it, including orthognathic surgeries, non-surgical camouflage treatments with functional appliances to accelerate mandibular growth, headgear to restrict maxillary growth, different extraction patterns, distalisation of maxillary dentition and the use of class II elastics. But an efficient treatment plan can only be obtained, when the proper diagnosis is determined in order to assess the dental or skeletal discrepancy, patients' age, availability of growth and the most important of all, patients' acceptance and cooperation.

Conventional approaches like headgear for molar distalisation possesses esthetic and social concerns.¹ Therefore, the intraoral distalisers have motivated many clinicians to consider molar distalisation as an effective modality to be very useful in non-extraction borderline case management. The Carriere Motion Appliance(CMA), invented by Dr Louis Carriere in 2004,² is one of the popular versatile intermaxillary class II corrector. It works on the principle of establishing class II molar and canine relationship to class I relationship before the start of the comprehensive orthodontic treatment. The appliance is made of nickel-free stainless steel rods containing mesh-pads on its either ends, extending from canine to molar. In addition, Class II elastics are used for its

activation with the an appropriate mandibular anchorage unit. Both growing and adult patients can be treated with CMA. However, the bracycephalic facial patterns give better results when compared to the dolicocephalic facial patterns.³

The purpose of this case series is to illustrate the successful orthodontic management of Class II malocclusion patients treated with CMA followed by fixed orthodontic therapy with minimal discomfort and good patient compliance.

CASE REPORTS:

Case 1

A 15-year-old female presented with the chief complaint of forwardly placed upper front teeth. On extraoral examination, she had convex facial profile with posterior divergence, potentially competent lips and acute nasolabial angle. No other physical abnormality was elicited. The intraoral examination revealed class II molar and Class II canine relationship bilaterally, mild mandibular anterior crowding, narrow maxillary arch with an overjet of 7mm and overbite of 1mm. Cephalometric analysis revealed skeletal class ii relationship on the basis of prognathic maxilla with average growth pattern and proclined maxillary incisors. The treatment was initiated by bonding of the CMA in the maxillary arch – between the first molar and the cuspid on both sides. Mandibular arch was bonded simultaneously with .022” passive self-ligating brackets. The patient was instructed to wear the elastics full time from the distalizer on both the canines to mandibular molar tube. After

six months, spaces had opened up distal to the maxillary lateral incisors, and a full Class I relationship had been achieved on both sides. The distalisers were then removed, and .022” passive self-ligating brackets were bonded to the maxillary arch to obtain a full Class I relationship on both sides, align the upper and lower incisors, and achieve a functional overjet and overbite. After 10 months of fixed orthodontics, the treatment goals were achieved. The post treatment cephalometric findings were improved. The case was retained using a bonded lingual retainer extended canine-to-canine in the mandibular arch and lateral-to-lateral in the maxillary arch. The final panoramic x-ray showed no pathology. Total treatment duration was of 16 months. (Figures 1,2,3,4) (Table 1)

IMPA	90	99
Interincisal Angle	132	133
Nasolabial Angle	102	105
Overjet	7	2.5
Overbite	1	2



Figure 1: Pre and Post treatment extra-oral photographs



Figure 2: Pre, Mid and Post treatment intra-oral photographs

Table 1: Cephalometric readings

Measurement	Pre-treatment	Post-treatment
SNA	86	84
SNB	79	79
ANB	7	5
Wits	11	4
SN-GoGn	24	25
Y Axis	57	56
U1-NA	23/2	16/1
L1-NB	15/3	24/4

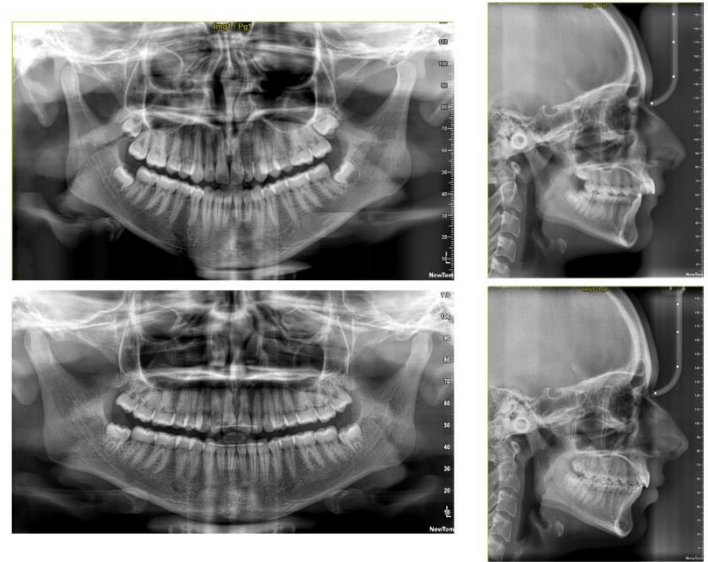


Figure 3: Pre and Post treatment pantomogram and lateral cephalogram

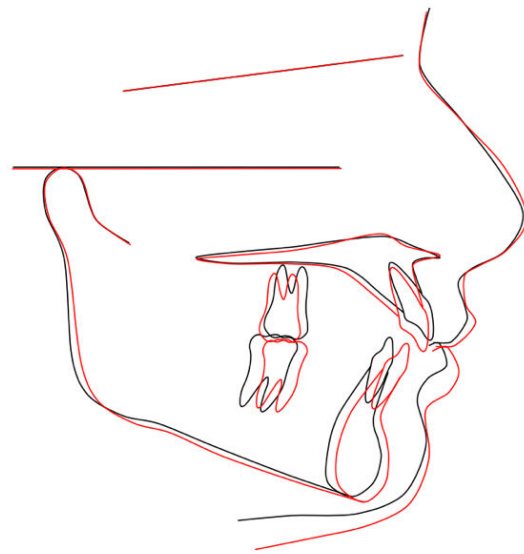


Figure 4: Superimposition

Case 2

A 14-year-old female presented with the chief complain of forwardly and irregularly placed upper front teeth. Extraorally, the patient exhibited convex facial profile with posterior divergence, average nasolabial angle and non-consonant smile. No other physical abnormality was found. On intraoral examination, there were few retained deciduous teeth along with their erupting successors, Class II molar and class II canine relationship on both the sides and the midlines were not coinciding. Cephalometric analysis revealed skeletal class ii relationship on the basis of prognathic maxilla and retrognathic

mandible with an underlying average growth pattern and upright maxillary and mandibular incisors. Since the maxillary canines were erupting, so the stage I treatment with CMA was initiated by bonding it between maxillary first premolars and molars on both sides. Mandibular arch was bonded simultaneously with .022" passive self-ligating brackets. In this case, patient used Class II elastics to activate the distalizer. The maxillary canines drifted distally as the space was gained by the distalisation of first premolar and molar. Thus class I canine and class I molar relationship were achieved in five months. Thereafter, the distalizer was debonded and .022" passive self-ligating brackets were bonded to the maxillary arch to align the upper and lower incisors, and achieve a functional overjet and overbite. After only 9 months of treatment, the arches were well coordinated and a full Class I relationship was obtained. The post-treatment cephalometric findings were improved and the final panoramic xray showed no pathology. Patient's profile was harmonious and she had a consonant smile. The case was retained using a bonded lingual retainer extended canine-to-canine in the mandibular arch and lateral-to-lateral in the maxillary arch. Total treatment duration was of 14 months. (Figures 5,6,7,8)(Table 2)



Figure 6: Pre, Mid and Post treatment intra-oral photographs

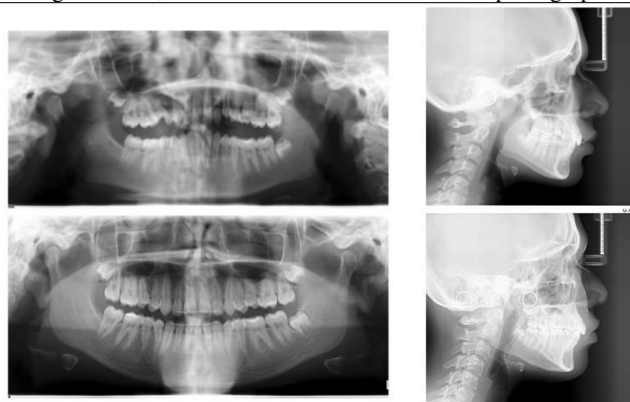


Figure 7: Pre and Post treatment pantomogram and lateral cephalogram

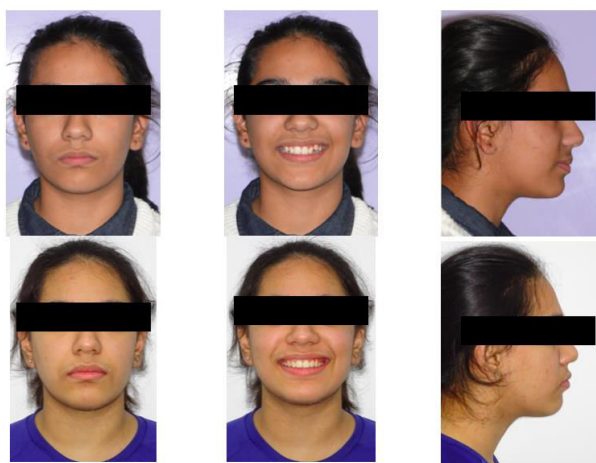


Figure 5: Pre and Post treatment extra-oral photographs

Table 2: Cephalometric readings

Measurement	Pre-treatment	Post-treatment
SNA	83	82
SNB	79	79
ANB	4	3
Wits	1	2
SN-GoGn	30	34
Y Axis	60	62
U1-NA	15/3.5	18/5
L1-NB	24/4	26/6
IMPA	91	92
Interincisal Angle	138	132
Nasolabial Angle	97	96
Overjet	2	2
Overbite	4	2

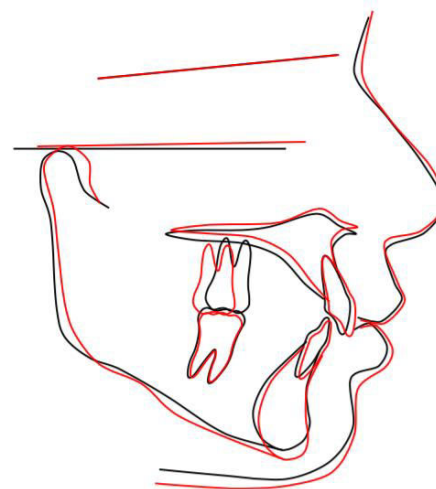


Figure 8: Superimposition

DISCUSSION

The non-compliance intra-oral molar distalization method has been an excellent compromise for patients who are unwilling to wear headgear or to have mini-implants for distalization.¹ There is always a marked individual variation in patient's response to these appliances in terms of anchorage loss and skeletal effects. Carriere motion appliance, as claimed by Carriere, causes distalisation of both maxillary canines and molars as a unit along the alveolar ridge without tipping, and it produces a distal rotational movement of the maxillary first molars along their palatal roots. Since, most of the class II malocclusions involve some mesiopalatal rotation of the upper first-molar crowns, a situation that exacerbates the Class II relationship by locking the

mandible in a retrusive position.⁴ Therefore CMA allows mandible to advance forward by derotating the maxillary first molar roots. This explains how the Class II correction can reduce the overjet by promoting a change in the occlusal plane. In contrary, Various studies have reported that the Class II correction with CMA is only achieved by the dentoalveolar correction with little or no significant effect can be seen in the mandible.^{3,5}

In the two phases of treatment, the clinician may correct sagittal discrepancies in the first phase and dental discrepancies in the second by the use of either clear aligner therapy or fixed orthodontic bracket system. It allows for straightforward Class II correction prior to orthodontics (fixed or clear aligners) at a time when no other mechanics interfere, and compliance is at its best.⁶ Significant cephalometric changes occurred in both the cases presented in this report. These changes included a reduction in Wits, overjet, and overbite measurements, which were mostly due to the effects of Class II elastic mechanotherapy. One common unwanted effect of Class II elastic use is the increase in mandibular incisor inclination.⁷ Possible sources of anchorage are mandibular lingual arch, full mandibular fixed appliance, lower essix appliance (hooks for the elastics placed on the lower molar region), and miniscrews.^{2,8} Sandifer et al examined the treatment effects of the CMA using two mandibular anchorage protocols: a lingual arch and fixed appliances, but found no significant differences between the two.⁹

The treatment time of correcting the dental discrepancy can be considered ideal, with a mean duration of 4.5 months, compared with distalization using other appliances, which may take up to 6-8 months.^{10,11} However, compliance is required for obtaining an ideal result, which may be a disadvantage when treating individuals who do not follow instructions. A series of other patient-related factors may also need to be evaluated before commencing the treatment with Carriere Distalizer, such as vertical skeletal pattern, torque of lower incisors, and inclination of occlusal plane.³

CMA have an advantage over other distalisation appliances in the sense that it is nickel-free. Nickel produces more allergic reactions than any other metal used in orthodontics. Nickel-free treatment alternatives are recommended for the benefit of the patients even when no previous sensitisation reported. Furthermore, the size and esthetics of the appliance makes it patient friendly.

CONCLUSION

The carriere motion appliance is effective in treating borderline non-extraction cases. However, the side effects

such as proclination of the lower dentition and/or increased lower facial height, may occur at a variable rate, depending on the anchorage system.

Abbreviations:

CMA: carrier motion appliance

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Conflict of Interests:

None

Patient's Consent:

Consent has been taken for the information/photographs provided in the manuscript.

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