

# TREATMENT OF DEEP OVERBITE IN HIGH ANGLE PATIENT WITH SEGMENTED ARCH TECHNIQUE

## A Case Report

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### ABSTRACT

This case report describes the orthodontic and orthopedic treatment of a 18-year-old female patient who presented with the prognathic maxilla, deep overbite, high mandibular plane angle, and increased incisal display at rest and smile. Burstone three piece intrusion arch was used for the true intrusion of maxillary incisor. The final treatment outcomes were satisfactory and true intrusion was achieved with proper selection of biomechanics.

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### INTRODUCTION:

Strang defined overbite as the overlapping of the upper anterior teeth over the lowers in the vertical plane. The ideal overbite in a normal occlusion may range from 2 to 4 mm or 5% to 25%. The overbite >40% should be considered as deep overbite and affects the periodontal structures and temporomandibular joints<sup>1</sup>. A deep overbite can be corrected by extrusion of upper/lower posterior teeth, intrusion of upper/lower incisors and combination. Extrusion of posterior teeth is indicated in patients with a short lower facial height, excessive curve of spee in growing patient and moderate to minimal incisor display, whereas intrusion of incisor is indicated in patients with long lower facial heights, excessive incisor display, increased interlabial gap, and gingival smile<sup>1,2</sup>. The orthodontic appliances used to carry out intrusion are J hooks pull headgear, tip back bends, burstone three piece intrusion arch, Ricketts utility arch, Nanda Connecticut intrusion arch, and mini-implants assisted intrusion<sup>1,3,4</sup>

Intrusive tooth movements are most effectively done with low force magnitudes<sup>5</sup>. The advantage of lower force magnitudes are reduced molar tip back moment and root resorption<sup>1,6</sup>. Burstone three piece intrusion arch is based on statically determinant force system, which implies magnitude of all the forces produced by activation is measurable. 1-6 This paper report a treatment of deep overbite in high angle patient who needs true intrusion of upper anterior teeth which is done by segmented arch technique.

### CASE REPORT

A 18 year old female Patient came to our department

Complaints of proclined upper front teeth and unable to approximate lips. Her medical history was unremarkable, and no history of deleterious habits in childhood was reported by her parents. Extra oral examination showed mesocephalic head, mesoprosopic facial form, convex facial profile, incompetent lips, everted lower lip, acute nasolabial angle, increased incisal display at rest and smile, increased interlabial gap, (Figure 1). Intraoral examination showed Class I molar and canine on both sides, increased overjet of 4 mm, increased overbite of 4 mm. (Figure 2). Treatment objectives

1. Decrease lower facial height
2. Establish ideal overjet and overbite
3. Level curve of spee
4. Decrease incisal display at rest and smile
5. Improve soft tissue lip relation.



FIGURE-1

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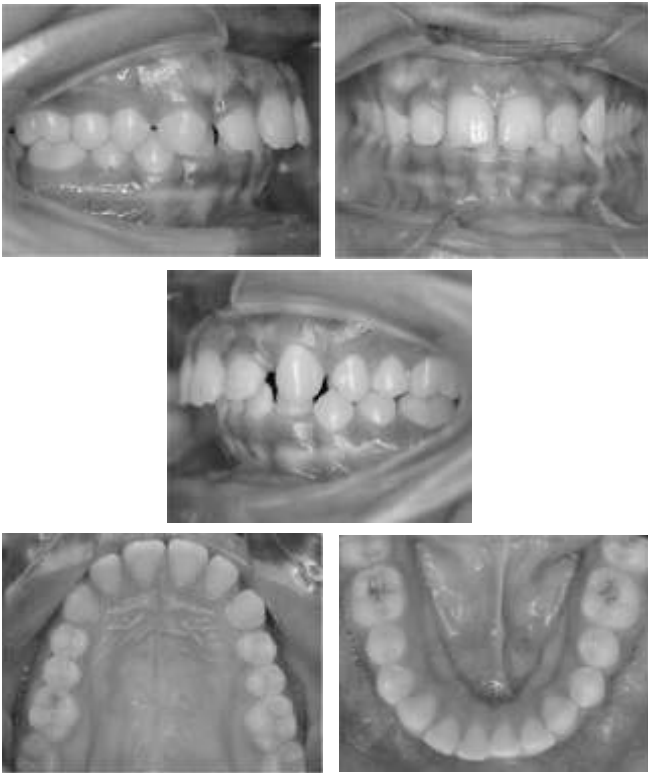


FIGURE-2

**TREATMENT OBJECTIVES AND PLAN**

The objectives of orthodontic treatment for the patient were non- extraction and in two phase. In phase one three piece intrusion utility arch given for true intrusion and in phase two leveling and aligning all other remainig teeth.

It was decided to use three piece intrusion utility arch for intrusion of upper anterior teeth. After achive intrusion bond other all lower teeth and continuous Niti wire were given including all teeth.

**TREATMENT PROGRESS**

0.022 slot MBT brackets were bonded in maxillary arch. transpalatal arch was cemented to maxillary first molar. Burstone three piece intrusion arch consist of two cantilever coil spring made of 0.017 × 0.025 β-titanium alloy wire, 0.019 × 0.025 stainless wire extends from lateral to lateral incisor with vertical steps and elastomeric chains. The vertical step anterior wire was ligated with stainless steel wire from lateral incisor into lateral after that cantilever spring was inserted into the auxiliary maxillary first molar buccal tube. The spring was pulled downward and engaged into the anterior segment before that force was calculated with Corex gauge. The elastomeric chain was engaged

from maxillary hook to anterior segment for retraction purpose. [FIGURE-3]

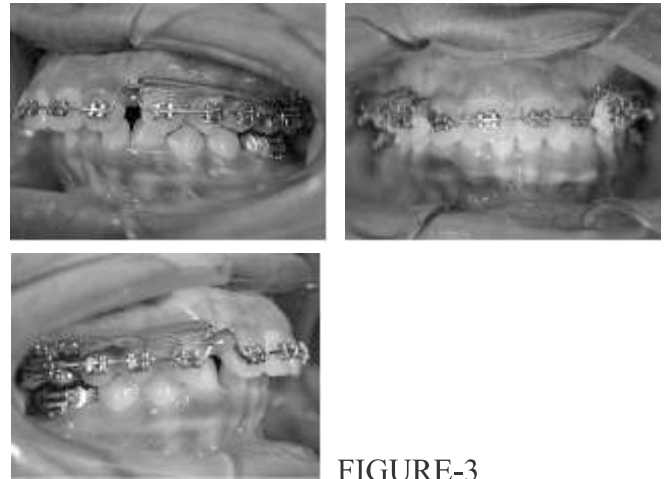


FIGURE-3

**TREATMENT RESULTS**

Within 6 months of active orthodontic treatment using three piece intrusion utility arch True intrusion of upper incisors was very well achieved [figure -4].

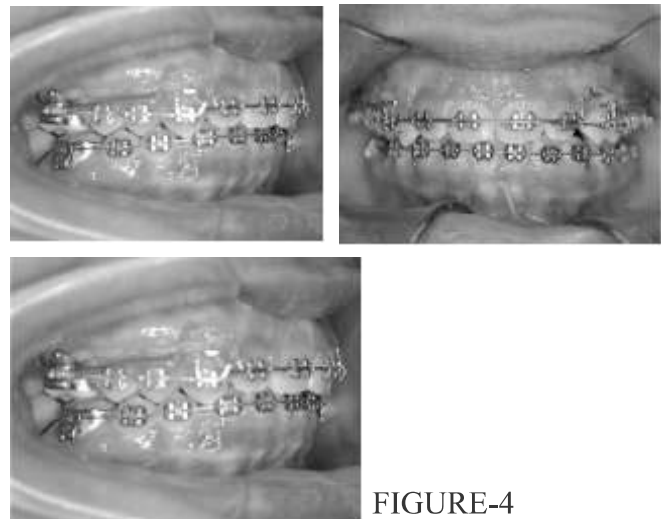


FIGURE-4

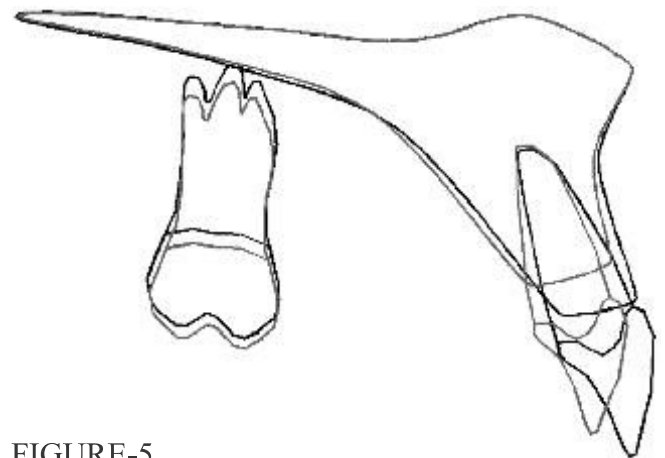


FIGURE-5

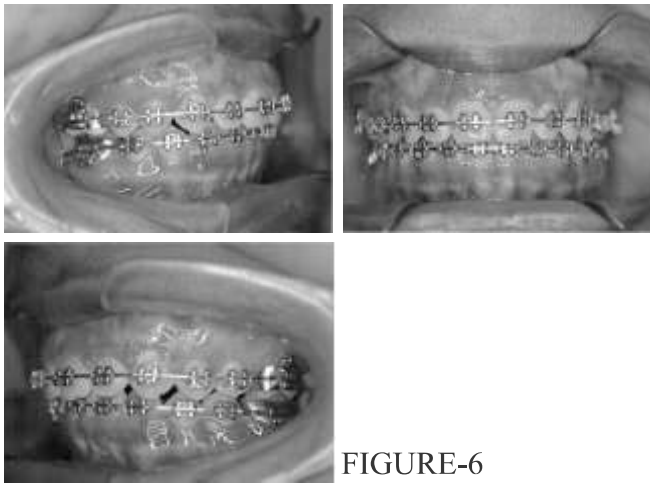


FIGURE-6

Parameters	Mean value	pretreatment	posttreatment
Upper 1 to NF(linear)	30 ± 2.1mm	32 mm	28mm
Upper 1 to NF(angle)	111 ± 4.7°	120°	111
Lower 1 to MP(linear)	45 ± 2.1 mm	41 mm	41mm
Lower 1 to MP(angle)	95.9 ± 5.2°	100°	104
Upper 6 to NF	26.2 ± 2 mm	24mm	24mm
Lower 6 to MP	35.8 2.6mm+	30mm	30mm

## DISCUSSION

Absolute intrusion, relative intrusion, and extrusion of posterior teeth are the three methods used for deep overbite correction. Relative intrusion is achieved by preventing the eruption of the lower incisor while ramal growth provides vertical space into which the posterior teeth erupt, whereas in extrusion of the posterior of teeth mandible rotates down and back in the absence of growth. As a general rule, extrusion is undesirable, while relative intrusion is acceptable during growing stage and absolute intrusion in non-growing stage<sup>5</sup>.

In low angle cases with deep bite, bite opening with molar eruption is usually desired, whereas in high angle cases with a deep overbite, bite opening should be carried out with upper and lower anterior teeth intrusion. Clinically intrusion is a difficult movement to achieve, and it requires three

dimensional controls. Intrusion mechanics basically depend on the initial inclination of the incisor. Clinically pure bodily intrusion is difficult owing to the complexity of the movement. A slight change in the relationship of the line of action of the force with the center of resistance can change the type of movement. If the forces pass anterior to the center of resistance the incisor protrudes, which can be prevented with a light chain elastic<sup>2</sup>. Leveling by intrusion can be accomplished with continuous archwires that bypass the premolar and segmented archwires with auxiliary depressing arch<sup>5</sup>. Anchor bends in Begg's technique and Rickett's utility arch are examples for the continuous method<sup>7,8</sup>. Burrstone three piece intrusion and mini-implant assisted intrusion are examples for the segmented method.

Difficulty in controlling posterior anchorage and application of intrusive force through center of resistance are the two limiting factors in continuous archwire method<sup>5</sup>. This limitation can be easily controlled in segmented method and skeletal anchor. In the segmented arch technique, amount of forces and moments are predictable or statically determinate. Meta-analysis in non-growing patients showed that the segmented arch technique can produce 1.5 mm of true incisor intrusion in the maxillary arch and 1.9 mm in the mandibular arch<sup>9</sup>. Micro-implant provides good anchorage support and for absolute incisor intrusion in both the maxilla and mandible<sup>1,5</sup>.

## CONCLUSION

Optimal correction of deep overbite requires proper diagnosis, treatment planning, and efficient execution of treatment mechanics. A careful combination of treatment planning and biomechanics to correct deep overbite can help to achieve a desirable esthetic result and to minimize relapse during the post-retention phase.

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