

MANAGEMENT OF ANTERIOR DEEP BITE- A CASE REPORT

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Abstract:

Deep overbite is perhaps one of the most common malocclusion and the most difficult to treat successfully. Aetiology must be considered in detail to formulate a comprehensive diagnosis and treatment plan for each patient so that optimal skeletal, dental, and aesthetic results can be attained. The choice of treatment is based in part on the etiology of deep bite, the amount of growth anticipated, the vertical dimension, relationship of the teeth with the adjoining soft tissue structures, and the desired position of the occlusal plane. An adult who has more than 6 mm overbite or 8 mm of overjet could be considered a candidate for surgery solely on the basis of dental relationships, without even considering facial esthetics but in following case report we could deal very efficiently a similar kind of discrepancy solely by orthodontic treatment.

Introduction:

Deep overbite is perhaps one of the most common malocclusion and the most difficult to treat successfully. The amount of incisor overlap varies greatly and is primarily a manifestation of dental malocclusion. Understanding the concept of overbite is imperative to any discussion of deep-bite malocclusion. In 1950, Strang defined overbite as “the overlapping of the upper anterior teeth over the lowers in the vertical plane.” However, the crown length of the upper and lower incisors varies significantly in individuals, therefore redefined overbite as “the amount *and percentage* of overlap of the lower incisors by the upper incisors.”

The ideal overbite in a normal occlusion may range from 2 to 4 mm, or more appropriately, 5% to 25% (overlap of mandibular incisors by maxillary incisors) (Fig. 1). According to Nanda, a range of 25% to 40% without associated functional problems during various movements of the Temporomandibular joint (TMJ) may be considered “normal.”

However, overlap greater than 40% should be considered “excessive” (deep bite) because of the potential for deleterious effects on the overall health of the surrounding periodontal structures and the TMJ.¹⁻⁴

A case report of management of severe deep bite, and decreased overjet for a Class I malocclusion patient using reverse curve of spee arch wire is discussed in this article

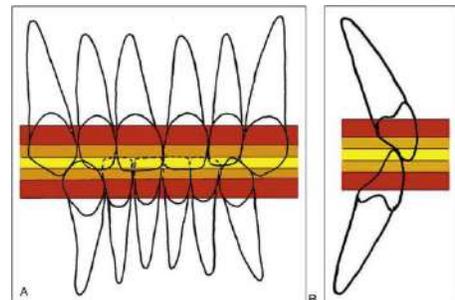


Figure 1. Zones of overbite. From 5% to 25% is normal (yellow), 25% to 40% is increased overbite (orange), and greater than 40% is excessive (deep) overbite (red). A- Frontal view, B- Lateral view.

Etiology:

A skeletal or dental overbite is caused by genetic or environmental factors, or a combination of both. *Skeletal* deep bites usually have a horizontal growth pattern and are characterized by;

- (1) Growth discrepancy of the maxillary and mandibular jawbones,
- (2) Convergent rotation of the jaw bases,
- (3) Deficient mandibular ramus height,
- (4) Intrinsic and extrinsic growth rotation of the mandible.

In these patients the anterior facial height is often short, particularly the lower facial third. On the other hand, *dental* deep bites show supraocclusion (over eruption) of the incisors, infraocclusion (under eruption) of the molars, or a combination. Other factors that can affect deep bite are alterations in tooth morphology, premature loss of permanent teeth resulting in lingual collapse of the maxillary or mandibular anterior teeth, mesio-distal width of anterior teeth, and natural, age-related deepening of the bite.^{3,5}

Deep bites that are primarily caused by environmental factors can also be classified as *acquired* deep bites. It is well known that a dynamic equilibrium exists between the structures around the teeth (tongue; buccinators, mentalis, and orbicularis oris muscles) and the occlusal forces, which assist in the balanced development and maintenance of the occlusion.⁶ Any environmental condition that disrupts this dynamic harmony can lead to a malocclusion, such as the following:

- A lateral tongue thrust or abnormal tongue posture causing infra occlusion of the posterior teeth

- Wearing away of the occlusal surface or tooth abrasion
- Anterior tipping of the posterior teeth into extraction sites

Deep-bite aetiology must be considered in detail to formulate a comprehensive diagnosis and treatment plan for each patient so that optimal skeletal, dental, and aesthetic results can be attained.

Diagnosis:

A 26 years old male patient sought treatment for deep bite. He had no significant medical history. He had undergone root canal treatment in relation to 46 four years back. He had a slight convex profile and competent lip with 1 mm overjet and 6 mm overbite. Maxillary incisors were severely retroclined and rotation in relation to 11 and 12. He had two peg laterals in relation to upper arch. Mandibular left central incisor was periodontally compromised. Occlusal features revealed U shaped maxillary and mandibular arch. The lower midline was coinciding with respect to the upper midline. He had pit and fissure caries in relation to 36, 37 and 47 along with mandibular anterior crowding. (Fig.2). Temporomandibular joint (TMJ) assessment revealed no history of pain or clicking on maximum opening and closure. The right and left excursive movements were normal, oral hygiene status average with maximum mouth opening of 39 mm.

OPG and cephalometric analysis

The panoramic radiograph showed that all teeth were present and 46 was root canal treated along with prosthesis (crown). It also revealed optimum bone support for orthodontic mechanotherapy (Fig2). TMJ space revealed normal size, shape and position of the condylar heads.

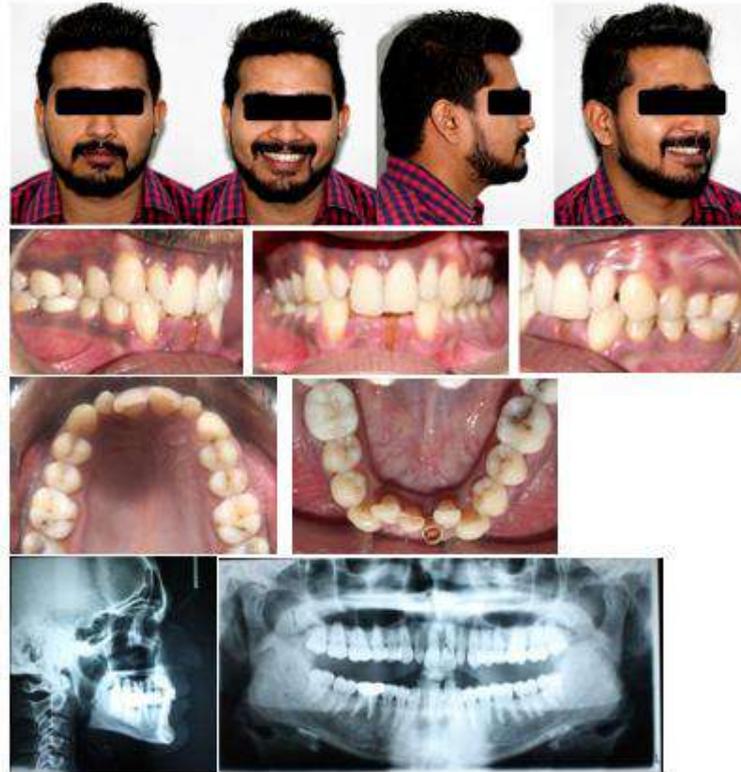


Figure 2. Pretreatment Records

Cephalometric analysis showed a Class I skeletal pattern with low mandibular plane angle. The maxillary incisors and NA were 1 mm and 16° and mandibular incisors and NB were 2 mm and 14° (Table 1). Based on these findings, the patient was diagnosed with Angle's Class I malocclusion with Deep bite.

Treatment objectives and treatment plan:

The treatment objectives were to create a satisfactory occlusion with correction of deep bite, and alignment of maxillary and mandibular teeth. Correction of axial inclination of maxillary and mandibular anteriors with intrusion of the maxillary and mandibular anterior teeth to reduce deep bite. In this case reverse curve of spee arch-wire was used in mandibular arch and excessive spee in maxillary arch for correction of deep bite. Using arch wires to level the curve of Spee (excessive in the maxillary arch and reverse in the mandibular arch), regardless of the type of alloy, will promote extrusion of

posterior teeth, especially of premolars, followed by pseudo-intrusion of incisors (more buccal tipping than pure intrusion) (Fig. 3).⁷

Mandibular left central incisor was extracted for aligning the mandibular anteriors. Extraction of mandibular central incisor decided because it was periodontally compromised.

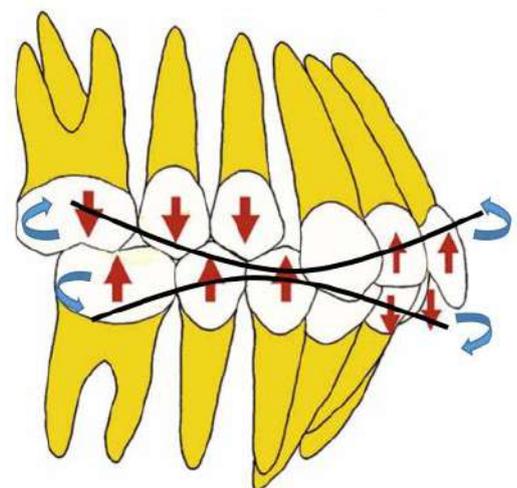


Figure 3. Mechanical effects of arches used to manipulate the curve of Spee.

	NORM	PRE TREATMENT	POST TREATMENT
SNA	82°	82°	82°
SNB	80°	81°	80°
ANB	2°	1°	2°
MPA	32°	25°	26°
1/NA	22°	16°	21°
1-NA	4.0mm	1 mm	4.0mm
1/NB	25°	14°	15°
1-NB	4.0mm	2 mm	2.0mm
IMPA	90°	80°	95°
1/1	131°	144°	128°

Table 1: Cephalometric Readings of Patient's Lateral Cephalograms tracing.

Treatment progress: (Fig. 4)

Orthodontic treatment began in March 2017 and lasted for 13 months. Preadjusted 0.022" MBT brackets (3M Unitek) were bonded to all teeth. As the treatment progressed, the left mandibular central incisor was removed as its prognosis was poor. With sequential nickel-titanium arch-wires, alignment and levelling in upper arch were achieved in 2 months. Excessive spee incorporated in 0.016 X 0.022" rectangular stainless steel wire to correct the overbite. Lower arch was bonded subsequently after five months when bite was opened. Initially 0.012" and 0.014" Ni-Ti wire placed followed by 0.016" reverse curve of spee wire used for correction of spee in lower arch with an intention to cause intrusion of anterior and extrusion of premolars. Class I molar relation was maintained on both sides and class I canine relation achieved bilaterally.

Upper dental midline coincided with the long axis of right mandibular central incisor.

After 13 months of active treatment, class I molar relationship, ideal overjet and overbite with pleasing soft tissue profile was achieved (Figure 5). Following this, debonding was done and post treatment records were taken. Fixed bonded lingual retainer given in upper and lower arch for retention.

Result:

The post treatment extraoral photographs showed marked improvement of the facial profile, and the patient's smile improved. Maxillary anterior teeth retrusion were corrected, and a Class I molar relationship was maintained. The overjet and overbite were corrected. Mandibular plane angle had increased from 25° to 26°. The upper incisors to NA had increased from 16° to 21°. IMPA had increased from 80° to 95° (Table 1). The movement of the



Figure 4. Mid Treatment Records

Maxillary incisors contributed to correction of the soft tissue profile. He was not willing for composite build-up of peg laterals (Fig. 5). The gap present between the canine and premolar area was due to deficient interdental col.

Discussion:

Deep overbite can be corrected by many ways like intrusion of anteriors, extrusion of

posteriors and/or combination. However, it should be decided which method will be more beneficial or which will improve the patients facial appearance and functional efficacy.⁶

The choice of treatment is based in part on the etiology of deep bite, the amount of growth anticipated, the vertical dimension, relationship of the teeth with the adjoining soft tissue structures, and the desired position of the occlusal plane.

Intrusion of incisors is difficult. Deep overbite correction by intrusion of anterior teeth offers a number of advantages including simplifying control of the vertical dimension, and prevents downwards rotation of mandible to aid in Class II correction.¹⁰

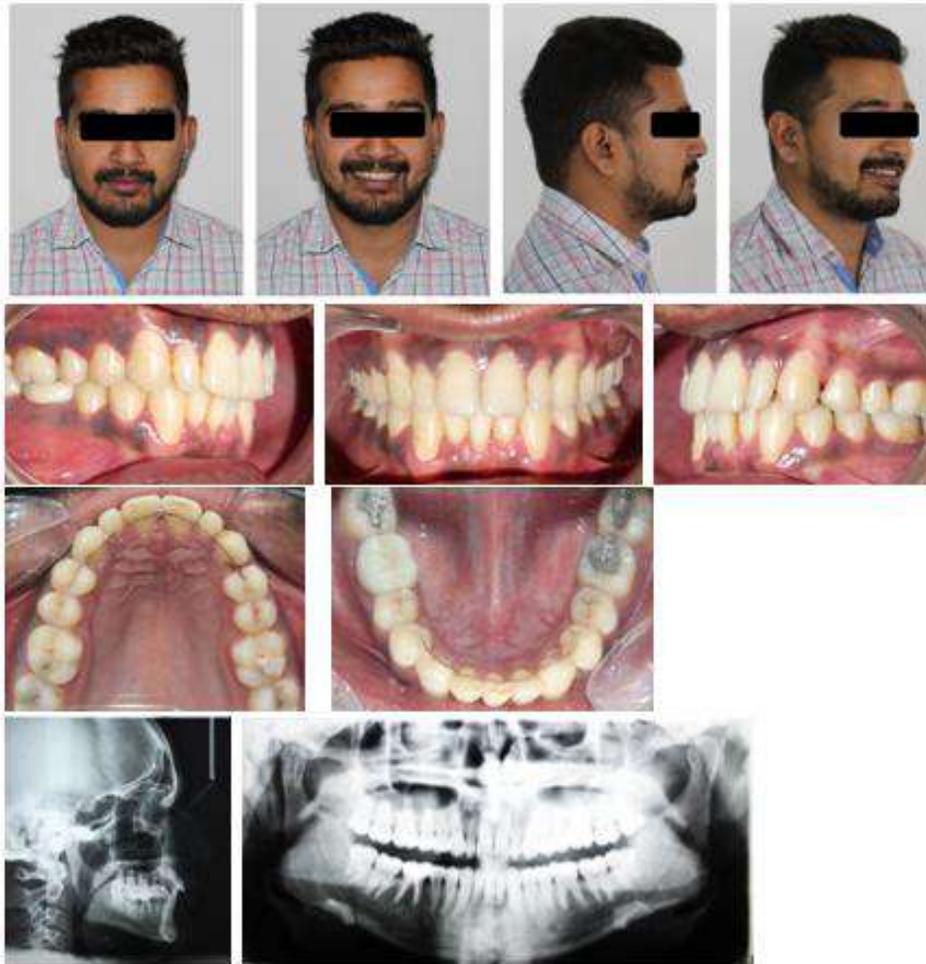


Figure 5. Post Treatment Records

In this case intrusion of upper and lower anteriors were more in comparison to extrusion of premolars which helped in correction of deep bite. Lower left central incisor (periodontally compromised) was extracted to align the lower arch and upper peglaterals compensate the tooth material discrepancy in Bolton analysis.

An adult who has more than 6 mm overbite or 8 mm of overjet could be considered a candidate for surgery solely on the basis of dental relationships, without even considering facial esthetics^{8, 9} but in our case we could deal very efficiently a similar kind of discrepancy solely by orthodontic treatment .

Kovich and Shapiro (1984), the deliberate extraction of a lower incisor in certain cases allows the orthodontist to improve occlusion and dental aesthetics with a minimum of orthodontic action.¹¹

Declaration of patient consent

The author certifies that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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How to cite this article: Goyal M, Kumar M, kumar S, Kushwah A, jain D A. management of anterior deep bite- a case report. TMU J Dent 2020;7(4) 37-43.