

## Deep Bite, Etiology and Mangement - A Review

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### ABSTRACT:

Deep bite is one of the most frequently seen malocclusions which is very difficult to treat successfully. The unfavourable sequelae of deep bite can predispose patient to trauma, stress, bruxism, clenching, periodontal problems, functional problems and TMJ disturbances. This article will discuss about types of deep bite, etiology and its management.

**Keywords:** deep bite, etiology, appliances.

### INTRODUCTION:

Graber [1] has defined deep bite as a condition of excessive vertical overbite, where the vertical measurement between the maxillary and mandibular incisor margin is excessive when mandible is brought into habitual or centric occlusion. In deep bite cases, the mandibular incisor crowns are excessively overlapped vertically by overlap of the incisor teeth when the posterior teeth are in contact. (Fig. 1)

### CLASSIFICATION:

Various classifications have been proposed for deep bite: [2,3,4]

- a) According to origin
  - Dental deep bite (Simple) and
  - Skeletal deep bite (complex)
- b) Functional classification
  - True deep bite and
  - Pseudo deep bite
- c) Depending on extent of deep bite
  - Incomplete overbite and
  - Complete overbite
- d) According to dentition
  - Primary Dentition deep bite,

- Mixed dentition deep bite and
- Permanent dentition deep bite.

### **Etiology**

Deep bite can be caused by -

- a) Inherent factors like tooth morphology [7] skeletal pattern malocclusion [8] condylar growth
- b) Acquired factors [9] like muscle habit, changes in tooth position, loss of posterior supporting teeth, lateral tongue thrust habit etc

Deep bite can be diagnosed through the routine diagnostic aids such as clinical examination, study models, lateral cephalographs. Lateral cephalometric analysis helps in diagnosis of skeletal deep bite.<sup>10</sup>

### **TREATMENT MODALITIES OF DEEP BITE:**

**The deep bite can be corrected by** extrusion of posterior teeth, intrusion of anterior teeth, combination of both, proclination of incisors, and surgical treatment. (FIG. 2)

#### **a) EXTRUSION OF POSTERIOR TEETH**

This modality of treatment is mostly indicated in horizontal growing patients. Removable appliances such as bite planes, sved bite planes [3, 6] myofunctional appliances such as activator [7] bionator, twin block [8] and functional regulator [9] allow extrusion of posterior tooth thus opening the bite. Cervical headgears exert a vertically downward component of force of about 200-300gm per side for duration of 14-16 hours. This causes extrusion of molars thus opening the bite. Fixed appliances such as Nance appliance [11], fixed bite plate with glass ionomer cement [12] banded bite planes with composites [13]; can be used for extrusion of molars.

#### **b) INTRUSION OF ANTERIOR TEETH**

Biomechanics of intrusion- for intrusion of tooth force should pass through centre of resistance so that translation motion takes places without any tipping. The force ranges from 15-20gm for each upper incisor and 10-15gm for each lower incisor. In adults, forces have to be applied carefully [14]

### **CORRECTION OF DEEPBITE WITH BEGG'S TECHNIQUE**

In Begg's technique bite opening bends are given to activate the arch wires so that they depress the upper and lower incisor into socket to open up anterior bite [15 ,16]. In conventional Begg's technique the bite opening bends are given mesial to molars but this

may cause distal tipping of the molars. To overcome this, various authors have proposed different sites for bite opening in the arch wire [17-19]

### **CORRECTION OF DEEPBITE WITH EDGEWISE**

Auxiliary arches such as Burrstone's 3-piece intrusion arch [22], Utility arch [23], Mulligan's intrusive arches [24], K-SIR Arch [25], and CIA [26] are different arches that are used along with pre-adjusted edgewise technique to bring about intrusion of the anterior teeth. CIA (Connecticut Intrusion Arch) was given by Ravindra Nanda. They are available as pre-formed with appropriate bends in two sizes 0.016"- 0.022" and 0.017"-0.025". The maxillary version has anterior dimensions of 34 mm and mandibular version have dimension of 25mm [26]. It is made of nickel titanium alloy to provide advantages of shape memory, springiness and light continuous force distribution.

### **UTILITY ARCH [23]**

Utility arch is constructed from 0.016 x 0.016 inch, square- edged, non-heat treated blue elgiloy wire for better control for axial inclination of incisors while intrusion. (Fig. 4)

### **THREE-PIECE BASE INTRUSION ARCH [22]**

It is a modification of Burrstone intrusive arch that is designed to produce pure intrusion and maximum control on molar extrusion by controlling the intrusive force, there is specific attachment of the intrusive arch to the anterior segmented arch instead of engaging to anterior brackets. For intrusion along with incisal positioning of brackets a bend is given in archwire such that it lies gingivally to bracket groove. (Fig. 5)

### **CORRECTION BY LINGUAL ARCH FOR INTRUDING AND UPRIGHTING LOWER INCISORS [27]**

A lingual arch with elastomeric chain attached to lingual buttons on the incisors overcomes the problem of both sectional and full arches by creating equal downward force vectors that passes behind the centre of resistance of all four incisors. Four elastic chains are attached to anterior bridge of the lingual arch with mosquito forceps. (Fig. 6)

### **CORRECTION OF DEEPBITE WITH MINI SCREW ANCHORAGE SYSTEM**

Upper incisor can be intruded by placement of mini screw between upper lateral incisors and canine [28]. (Fig. 7) The placement of mini screw should be done after levelling and alignment to enable adequate inter radicular bone at their site of placement. Two mini screws 1.2mm in diameter and 6mm in length is placed distal to maxillary lateral incisors, the screws are loaded with medium super elastic NiTi coil spring and intrusion force of 80 g [28]

## **CORRECTION OF DEEP BITE WITH MAGNETS**

Samarium cobalt magnets are used in orthodontics. They are used on buccal as well as lingual or palatal side, but most common is buccal side in attractive mode. On average 120gm force is generated which can be controlled by the operator by adjusting the air gaps [29].

## **CORRECTION OF DEEPBITE WITH ORTHODONTICS AND SURGERY**

An adult who has more than 6mm overbite or 8 mm overjet is an ideal candidate for surgery. [30] The surgical treatment includes:-

- 1) Orthodontics and inferior onlay mandibuloplasty
- 2) Orthodontics and interpositional genioplasty
- 3) Orthodontics and mandibular advancement
- 4) Orthodontics and inferior repositioning of maxilla and mandibular advancement
- 5) Orthodontics and combined maxillary and mandibular surgery

## **INTRUSION AND APICAL ROOT RESORPTION**

Apical root resorption after intrusion depends on the anatomical environment of root. In young patients the root apex is surrounded by spongy bone hence a light continuous force obtained with light wire technique is favourable in young patients. If the bone near root apex is compact as in adult a light interrupted force is preferable. [4, 31, 32]

## **USE OF CLEAR ALIGNERS THE MOST ADVANCED TECHNIQUE [33]**

INVISALIGN SYSTEM makes use of series of aligners made from thin, transparent, thermoplastic material formed with CAD-CAM Technique. Each aligner is designed to move the teeth to maximum of about 0.25 to 0.3 mm over a period of one week. Patient is required to wear it for 20 to 22 hrs a day to be affective [22]. Align technology recently developed new treatment options including special designing of attachments and virtual bite ramps. Attachments are composite buttons which are attached to the buccal surface of teeth; they are available in different shapes to assist tooth movement. These attachments increase retention and support auxiliary functions like placement of elastics [23]. Bite ramps work similar to bite planes and bite turbos by disoccluding the posterior teeth.

## **SUMMARY AND CONCLUSION:**

A 5% to 25% overlap of mandibular incisors is considered to be normal. An overbite greater than 40% is considered abnormal and is called deep bite. Deep bite is a malocclusion that occurs in vertical plane of space. Skeletal deep bite is genetic in origin and is caused by upward and forward rotation of mandible. Skeletal deep bite occurs due to over eruption of anteriors and infra-occlusion of posteriors. Deep bite can be corrected by intrusion of incisors

and extrusion of posterior teeth by using various removable and fixed appliances or combination of incisor intrusion and posterior extrusion or even surgery. For successful management of deep bite thorough cephalometric analysis with correct diagnosis and treatment planning with appropriate mechanotherapy followed by correct retention protocol is needed. During treatment planning consideration should be given to age of the patient, treatment time, soft tissue and skeletal pattern, stability and occlusion plane. Correction of deep bite is easier to achieve in growing patients than when it is attempted on those with no appreciable growth left.

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**FIGURES:**

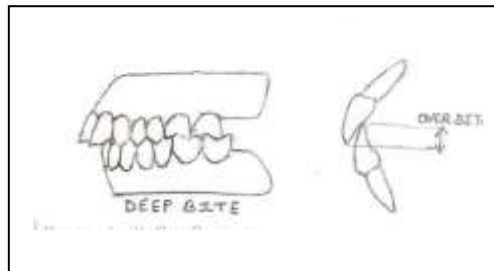


Fig. 1: Deep Bite

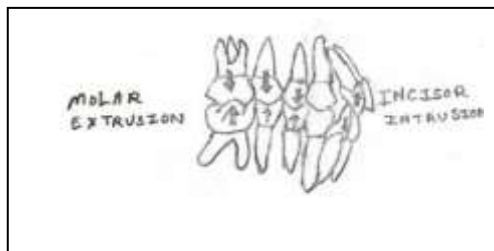


Fig. 2: Deep bite correction by extrusion of posterior teeth, intrusion of anterior teeth, combination of both

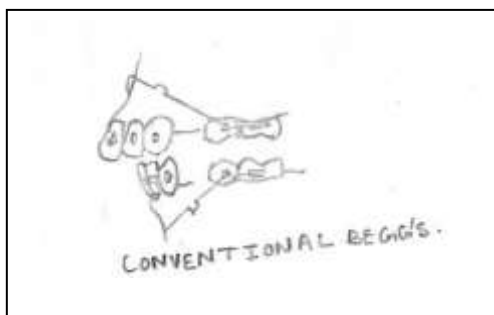


Fig. 3: Deep bite correction through conventional Begg



Fig. 4: Utility arch for deep bite correction

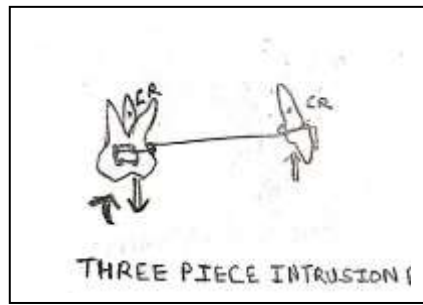


Fig.5: Deep bite correction through 3-piece intrusion arch

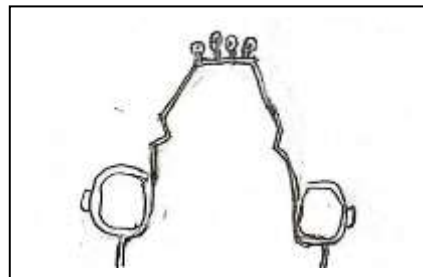
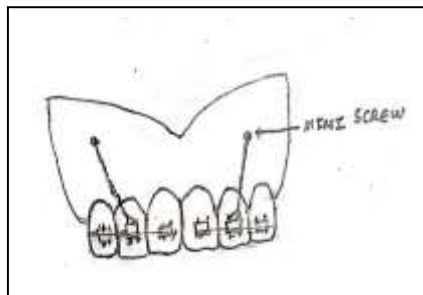


Fig. 6: Deep bite correction through lingual appliance



Fig, 7: Correction of deepbite with mini screw anchorage system