

Deep Bite-Treatment Modalities

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Abstract

The correction of deep bite is one of the primary objectives of orthodontic treatment and optimal treatment of deep bite requires a proper diagnosis, a careful treatment plan and an efficient appliance design. An unfavorable sequelae of this malocclusion predisposes a patient to periodontal involvement, abnormal function, improper mastication, excessive stresses, trauma, functional problems, bruxism, clenching and temporomandibular joint disturbance that make geriatric dental service a losing battle unless overbite can be controlled.

Introduction

Malocclusion can occur in three planes of space i.e. sagittal, transverse and vertical plane. Dental vertical relationships can be divided into four major categories: anterior open bite, anterior deep bite, posterior open bite and posterior collapsed bite with overclosure. Since the same occlusal relations can result either from skeletal jaw proportions or from infraeruption or supraeruption of teeth, the descriptive terminology should be as precise as possible in indicating whether jaw or tooth positions are basically at fault in producing a vertical problem. The maxillary dental arch being larger than the mandibular dental arch allows the maxillary anteriors to overlap the mandibular anteriors. This overlapping of the mandibular teeth occurs in both the horizontal as well as vertical direction. The horizontal overlap is called as overjet while the vertical overlap is termed overbite. Therefore, some degree of vertical overlapping or overbite is a normal feature of human dentition. However, some patients present with excessive overbite, condition which is characterized by excessive vertical overlapping of the mandibular anteriors by maxillary anteriors termed as deep bite.¹

Characteristics of the Deep Bite Malocclusion:

The deep overbite in the permanent dentition may be caused by factors inherent in an individual's malocclusion or by other factors acquired during the life of that dentition.

So, etiology of deep overbite is classified into.

A. Inherent factors

- 1) Tooth morphology
- 2) Skeletal pattern and malocclusion
- 3) Condylar growth pattern

B. Acquired factors

- 1) Muscular habits
- 2) Changes in tooth position
- 3) The loss of posterior supporting teeth or
- 4) Lateral tongue thrust habit.

Classification of Deep Bite:

A. Dentoalveolar Deep Bite:

The dentoalveolar deep bite is characterized by infraocclusion of molars and / or supraocclusion of incisors. The growth pattern usually is average or toward the vertical.³

The deep overbite that is due to the

infraocclusion of molars has the following features:

- 1) The molars are partially erupted.
- 2) The interocclusal space is large
- 3) A lateral tongue thrust or posture is present.
- 4) The distances between the maxillary and mandibular basal planes and occlusal plane are short

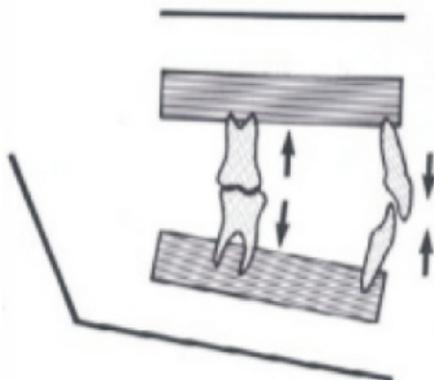


Fig 1. Dent Alveolar Deep Bite

The Deep overbite caused by supraeruption of incisors has the following characteristics:

- 1) The incisal margins of the incisors extend beyond the functional occlusal plane.
- 2) The molars are fully erupted.
- 3) The curve of spee (compensatory curve) is excessive.
- 4) The interocclusal space is small.

2) Skeletal Deep Bite :

Different terms used for skeletal deep bite³ –

- a) Vertical maxillary deficiency
- b) Idiopathic short face
- c) Hypodivergent face
- d) Low angle face
- e) Short face syndrome

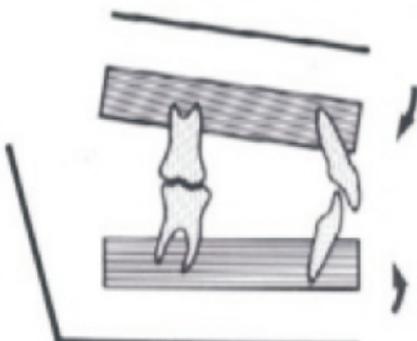


Fig 2. Skeletal Deep Bite

Cephalometric Characteristics⁴

- Anteriorly tip down palatal plane and decreased percentage lower facial height.
- Less eruption of the maxillary posteriorly teeth.
- Upward and forward rotation of the mandible.
- Decrease eruption of maxillary and mandibular incisors.

Prevalence

Prevalence of severe deep bite is about 8% in the US, the average overbite ranging from 36.5 to 39.2% in children between the age of 5 and 6 years, and from 37.9 to 40.7% in adults.³

Diagnosis

A detailed clinical examination of the dentition, occlusion, jaw movements and soft tissue pattern of face is very important. For an adolescent patient, a lateral cephalograms must be taken to study the skeletal, dental and soft tissue relationship and the growth pattern and its status.⁵

The different diagnostic aids are:-

1. Clinical examination
2. Study models
3. Cephalograms
4. Photographs

Treatment Consideration

1) Soft Tissue Consideration

Careful clinical examination of the patient's soft tissue drape is the first step in determining which the ideal option to treat the deep bite is. The following components of the soft tissue are important as interlabial gap, Upper Incisor Display, smile line, lip length.⁶

2) Skeletal Consideration

The most important component to consider for selecting an option to correct deep overbite is the vertical dimension of a patient. In patients with large lower facial height, an extrusion of molars to correct deep overbite is not the treatment of choice because it further lengthens the face with concomitant undesirable changes of the soft tissues.

Similarly, patients with short vertical dimension often have a class II division 2 malocclusion along with a deep overbite. In these patients, extrusion of posterior teeth may be the treatment of choice to open the bite.⁷

3) Functional Consideration

Functional considerations are of paramount importance if extrusion of molars or posterior teeth is to be attempted to open the deep bite, especially in adult patients. First, if the

extrusion of the posterior teeth remains stable, the condyle, TMJ and muscles have to remodel or readapt to their new morphologic position of the mandible. Second, the adjustment results in relapse because the muscles of mastication and altered occlusion may pound the extruded posterior teeth back to their original position until a soft tissue and hard tissue equilibrium is attained again.

Bite plates are often used to correct deep overbite problems in adults. A biteplate disoccludes the posterior teeth, thereby allowing them to extrude until the bite is open. This method is quite easy and often tempting to use in every adult patient but it should be used judiciously.⁶

4) Dental Consideration

Intrusion of incisors is an ideal option to correct deep bite because it maintains the vertical dimension of the patient. If a patient needs intrusion of incisors to correct deep overbite, up to 4.0 mm upper incisor intrusion can be accomplished without any significant root resorption. If a patient needs more than 4.0 mm, of upper incisor intrusion, it can be combined with the intrusion of lower incisors. Intrusion should also be the treatment of choice for adult patients who have had significant bone loss around the incisors. Periodontal disease should be under control in adult patients before the start of orthodontic treatment.⁶

5) Stability

Stability of attained results should be prime concern in correction of deep bite. In children, often the growth acts as a major catalyst in taking care of extrusive side effects. In adults, adaptation of the muscles, vertical dimension, and TMJ is difficult. The treatment option in adults should be limited to teeth whenever possible. Intrusion of teeth can be accomplished without any change in skeletal and muscular components of the face.

Intrusion is also a relatively stable procedure. In a clinical study have shown that relapse of intruded teeth is almost insignificant up to 2 years from treatment. This is important, especially because incisors are not often retained in vertical dimension.⁶

6) Occlusal Plane

In conventional orthodontics, one of the objectives of the treatment is to provide the patient with a flat occlusal plane. This objective, if not considered along with lip and vertical facial height considerations may result in unpleasant and unstable conditions.

On other occasions, slight or moderate curve of spee in the mandibular arch may be left intact if the lip and facial height considerations demand treatment only by an intrusion of the maxillary incisors.⁶

7) Interocclusal Space

The average, normal interocclusal space is between 2 to 4 mm. The correction of a deep overbite by extruding posterior teeth to encroach on this space should be avoided as it often results in relapse caused by the muscles of mastication and because of full occlusal contact of posterior teeth during speech and mastication.⁶

8) Treatment Time and Age of Patient

In adult patients showing excessive deep bite with accompanying high smile line, decreased vertical facial height and alveolar problems, the length of treatment may be very long. In these instances, the patient should be given a choice for an orthognathic correction of problem. In these patients, the treatment plan to correct the excessive overbite should be done in conjunction with oral and maxillofacial

surgeons.⁶

Methods of Deep Bite Correction

- Correction of deep bite with removable appliances
 - Bite plane⁸
 - Sved bite plane⁹
 - An Essix intrusion appliance¹⁰
- Correction of deep bite with myofunctional appliances
 - Activator¹¹
 - Bionator¹²
 - Functional regulator¹²
 - The twin block functional appliance¹³
- Correction of deep bite with orthopedic appliances¹⁴
- Correction of deep bite with combined activator headgear orthopedics¹⁵
- Correction of deep bite with fixed appliance therapy^{7,16}
 - Bite opening with fixed bite plane^{17,18,19,20,21}
 - Bite opening with Begg's technique^{22,23,24}
 - Bite opening with Edge-wise technique²⁵
 - Bite opening with segmented arch technique^{26,27,28,29}
 - Bite opening with utility arches^{30,31,32,33}
 - Bite opening with bite opening and space closing arch wire³⁴
 - Bite opening with equiplan quad helix³⁵
 - Bite opening with lingual arch³⁶
 - Bite opening with mini-screw anchorage system³⁷
 - Bite opening with magnets³⁸
- Correction of deep bite with orthognathic surgery³⁹

Orthognathic Surgery (a Combination of Orthodontics and Surgery)

The guidelines for coordination orthodontics and surgery for deep bite malocclusion is the same as for any other surgical – orthodontic treatment. Surgical procedures often involves a bimaxillary approach with lefort I anterior maxillary impaction. Segmental maxillary and/or mandibular osteotomies are likely to be employed. During the presurgical orthodontics, the objective should be to level within but not across the segments, to maintain or create appropriate root separation at the osteotomy sites, and to avoid cross elastics to move the teeth in the direction of the surgical correction. Post- surgically, the orthodontic finishing is no different from that of any other orthognathic surgery patients.³⁹

Orthodontists have been faced with the difficult task of treating patients with anterior deep bite and the subsequent challenge of retention. The orthodontic literature has numerous case reports and studies reporting good results at the end of treatment. These are helpful, but the success of deep bite therapy is ultimately measured by long stability.

Retention stability of Deep Bite

The high relapse rate seen in patients with deep bites makes treating these cases frustrating. Relapse may result in negative esthetic characteristics such as a reverse smile line, and in some instances, inter-proximal anterior spacing.⁴⁰

Mostly relapse of deep bite is the result of intrusion of the posterior teeth, particularly the upper, molars, without any evidence of extrusion of incisors. Controlling intrusion of the upper molars, therefore is the key to retention in deep bite malocclusion. Wearing cervical pull head gear to the upper molars at night time, in conjunction with standard removable retainer with anterior bite plane is one effective and comfortable way for the

patient to control deep bite relapse.⁴¹

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