DEEP BITE - ETIOLOGY, DIAGNOSIS AND MANAGEMENT: A REVIEW

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ABSTRACT

AIM
This article aims at giving a better understanding about deep bite, its etiology, its diagnosis and management

BACKGROUND
Dentition is an important component of appearance. Ideal occlusion and spacing are the cornerstones of good dentition. Malocclusion not only affects hygiene and health of oral tissues but it can also lead to poor self esteem. Deep bite is a malocclusion that is seen commonly in everyday practice while treating patients. Hence it would be helpful to increase our knowledge about this particular type of malocclusion.

REASON
This article gives an insight into the etiology of deep bite and the various modalities available for treatment and management of the malocclusion.

Keywords: Deep-bite, malocclusion, over-bite, overjet

INTRODUCTION
Deep bite is one of the most common malocclusions seen in children as well as adults. It is also one of the malocclusions that are most difficult to treat and correct [(1)].

WHAT IS DEEP BITE?
Deep bite is a malocclusion in which the upper front teeth excessively overlap the bottom front teeth when back teeth are closed or in centric occlusion [(2)]. This is also frequently referred to as closed bite or overbite.

CLASSIFICATION
Deep bite can be classified as [(3) (4) (5)]

A. According to its origin
- Dental deep bite (simple)
- skeletal deep bite (complex)

B. ACCORDING TO FUNCTIONAL CLASSIFICATION
- True deep bite
- Pseudo deep bite

C. DEPENDING ON THE EXTENT OF DEEP BITE
- Incomplete over bite

- Complete over bite

D. ACCORDING TO DENTITION

- Primary dentition deep bite
- Mixed dentition deep bite
- Permanent dentition deep bite

SIMPLE DEEP BITE

A simple deep bite is localized to the teeth and alveolar processes. It occurs due to over eruption of anteriors or infra occlusion of molars.

COMPLEX DEEP BITE

Complex deep bite is associated with basic skeletal features with which the alveolar processes cannot cope. It occurs due to mal relationship of alveolar bones and underlying maxillary or mandibular bones or because of an overgrowth or undergrowth of one or more alveolar segments.

TRUE DEEP BITE

This type of deep bite is caused by an infraocclusion of posterior segments. It is usually seen in class II division II malocclusions.

PSEUDO DEEP BITE

Pseudo deep bite is caused by over eruption of the anterior teeth in relation to the normally erupted posterior segment of teeth. It is usually seen in class II division I malocclusions.

INCOMPLETE DEEP BITE

Incomplete over bite is an incisor relationship in which the lower incisors fail to occlude with either the upper incisor or the palate when the teeth are in occlusion.

COMPLETE DEEP BITE

Complete deep bite is a relationship in which the lower incisors contact the palatal surface of the upper incisors or the palatal surface when the teeth are in centric occlusion.

ETIOLOGY OF DEEP BITE

There are various factors that contribute to the etiology of deep bite

a) Hereditary factors
b) Skeletal factors
c) Dental factors
d) Muscular factors
e) Habits

HEREDITARY FACTORS

This is usually due to some genetic factors or a familial condition.

SKELETAL FACTORS

- Overgrowth or undergrowth of one or more alveolar segments
- An excess growth of the ramus of the mandible
- Convergent upper and lower jaw bases
- Horizontal growth pattern of lower jaw
- Forward rotation or anti-clockwise rotation of the lower jaw
- The four facial planes are horizontal and nearly parallel to each other

DENTAL FACTORS

- Loss of posterior teeth
- Mesial tipping of posterior teeth
- Early loss of teeth
- Lingual collapse of anterior teeth
- Diminished posterior dental height
- Over-eruption of incisors
- Periodontal disease

MUSCULAR FACTORS

The posterior vertical chain of muscles - the masseter, internal pterygoid and temporal are strong and attached anteriorly on the mandible. This causes a depressive action on the dentition which may result in a deep bite.

HABITS

- Lateral tongue thrust
- Finger sucking
- Lip sucking

SEQUELAE OF DEEP BITE

A patient with deep bite is predisposed to a number of unfavorable sequelae such as

- Periodontal problems
- Abnormal function
- Improper mastication
- Excessive stress
- Trauma
- Bruxism
- Clenching
- Temperomandibular joint disorders
- Functional problems

FEATURES OF DEEP BITE

I. **EXTRA ORAL FEATURES**

- Bracycephalic face
- Straight to mild convex profile
- Short anterior face height
- Diminished nose chin distance
- Deep mento-labial sulcus
- Lips are usually thin with a curled appearance

II. **INTRA ORAL FEATURES**

- Maxillary dental arch is broad
- Gummy smile
- Palatal vault is flat
- Small teeth prone to abrasion
- Crowding of lower incisors

DIAGNOSIS OF DEEP BITE

A deep bite, as previously mentioned, may be caused due to supra-eruption of upper and/or lower incisors or infra-eruption of posterior teeth [(6)]. Cephalometric analysis can be used to assess whether a patient has deep bite.

MANAGEMENT OF DEEP BITE

To attain a proper inter-incisal relationship between overbite and overjet, it is important that the deep bite incisor relationship be corrected. This also ensures retention and stability during function [(7)].

TREATMENT MODALITIES OF DEEP BITE

1. **TREATMENT MODALITIES IN GROWING PATIENTS**
   - Intrude anteriors
   - Erupt posteriors
   - Combination of posterior eruption and anterior intrusion

2. **TREATMENT MODALITIES IN NON GROWING PATIENTS**
   - Orthognathic surgery
   - Intrusion of anteriors (there is an invariable relapse when the posterior teeth are extruded)

In non growing patients, we should remember that little or no growth may occur.

The basic principle of management lies in the intrusion of the anterior teeth, extrusion of posterior teeth or a combination of both whichever treatment modality is chosen for correction of deep bite.

FACTORS TO BE CONSIDERED BEFORE CORRECTION

- Interlabial gap
- Growth pattern – vertical or horizontal
- Freeway space or interocclusal clearance

INTRUSION OF ANTERIOR TEETH

- Intrusion mechanics are considered when there is inadequate freeway space or normal freeway space.

- Intrusion of upper incisors is also the best method of treatment when a patient has a gummy smile.
- In a Class II, division I malocclusion, intrusion of anteriors is the advised course of management of deep bite.
- Intrusion is also the ideal choice of treatment when a patient has a deep bite with a large interlabial gap.

The optimal force used for intrusion on an average is around 15 to 20g for the upper incisors and 10 to 15g for each lower incisor [(8) (9)]. In adults a lower range of force is usually applied.

EXTRUSION OF POSTERIOR TEETH

- Extrusion of molars is advisable in case of short upper or lower lips.
- Extrusion is also considered the best course of treatment when there is no interlabial gap.
- In a Class II, Division II malocclusion, extrusion of the molars is the treatment option.
- Extrusion of molars is also the best management option when there is adequate freeway space.

Different methods are available for extrusion of posterior teeth [(10)].

- Removable appliances such bite-planes and modified biteplanes
- Myofuntional appliances such as Activator [(11)], Bionator [(3)], Functional regulator [(9)] and Twin Blocks [(12)].
- Headgears that exert a force of about 200 to 300g per side for a duration of fourteen to sixteen hours a day [(13)]
- Fixed appliances like modified Nance appliance [(14)], fixed bite planes [(15)] and bonded bite planes [(16)].

ORTHOGNATHIC SURGERY

MAXILLARY SURGERY

- The maxilla is moved upwards in a Lefort I procedure to correct the deep bite.
- Surgically repositioning of maxilla in a superior direction can also be done by a complete maxillary osteotomy.

MANDIBULAR SURGERY

- Patients with a short face are usually treated by a mandibular ramus surgery.
- A sagittal split mandibular surgery can also be done in order to correct the deep bite of a patient with a short face
- A deep bite in the anterior mandibular alveolar region can be corrected by a sub-apical osteotomy.

Some of the other surgical options include [(17)]

- Interpositional genioplasty
- Inferior onlay mandibuloplasty
- Combined maxillary and mandibular surgery

CONCLUSION

A successful management of deep bite requires careful analysis of all the factors contributing to the condition. Treatment planning must take into account all the various factors and also aim to satisfy the patient's need. Deep bite can be corrected and managed by various methods. The important criteria we should keep in mind while selecting the mode of management is patient's facial aesthetics as well as functional efficacy. This will be beneficial to the patient in the long run.

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