

Management of Deep Bite: A Detrimental Condition for the Health of Dental Units

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ABSTRACT

Background: Deep bite is one of the most detrimental malocclusions considering the health and longevity of teeth and supporting structures. The basic considerations and basic principles for correction of deep bite along with different mechanotherapies to correct deep bite are discussed in this article.

Keywords: Deep bite, detrimental condition, management.

INTRODUCTION

Deep bite is a malocclusion in which excessive overbite exists. In this condition, the vertical measurement between maxillary and mandibular incisal margins is excessive and the mandible is in centric occlusion. The correction of deep bite is most important to achieve good health of teeth and their supporting structures. Management of deep bite aims at approximation to normal overbite with the elimination of causative factors. So, one should determine the etiological factors affecting deep bite. Deep bite may be classified into Developmental deep bite and Aquired deep bite.

1. Developmental deep bite

This is skeletal in nature with the following features-

- Horizontal growth pattern with reduced gonial angle.
- Anterior lower facial height is reduced with increased posterior facial height.
- Inter-occlusion clearance is reduced.

2. Aquired deep bite

This is usually of dental origin which may arise due to the following etiology-

- Lateral tongue thrust which results in infra-occlusion of posterior teeth leading to deep bite.
- Premature loss of deciduous molars and early loss of permanent teeth may result in aquired deep bite.
- Attrition of occlusal surfaces of posterior teeth may result in aquired deep bite.

Aquired deep bite has the following features-

- Growth pattern is average.
- The malocclusion lies in the dentition with either infra-occlusion of molars or supra eruption of incisors or a combination of both.

It is utmost important to decide whether the correction of deep bite requires intrusion of maxillary and mandibular incisors or extrusion of posterior teeth or a combination of both. There are five basic considerations for the correction of deep bite which are as follows-

Lip Relation

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The normal inter-labial gap is of 2-4mm when the mandibular position is relaxed. So, when the deep bite is accompanied with excessive inter-labial gap, mechanics for posterior extrusion will deteriorate the esthetics but when there is no inter-labial gap or the lips are redundant, mechanics for posterior extrusion may be helpful. The normal incisor to stomion distance is 2-4 mm. When deep bite is accompanied with normal incisor stomion distance, the correction of deep bite should not be done by maxillary incisor intrusion as it will give an edentulous look. When the incisor stomion distance is increased with the appearance of gummy smiles, the treatment of choice should be upper incisor intrusion.

Vertical facial relationship

The mechanotherapy of extrusion and intrusion affect the vertical facial height. The extrusion of posterior teeth leads to downward and backward rotation of mandible which increases the anterior vertical facial height and reduces the deep bite. Extrusion of posterior teeth leads to increase in vertical facial height. So extrusion of posterior teeth should be used in patients with average growth pattern.

Occlusal plane

At the end of orthodontic treatment, the occlusal plane should be flat and not step type. Sometimes the deep bite correction results in a step type occlusal plane between the anterior and posterior region which is unwanted.

Free way space

The normal free way space is 2-4 mm. The posterior teeth should not be supraerupted into this space as the full occlusal contact of posterior teeth during speech and mastication will lead to pathological changes in the temporomandibular joint. When free way space increases, greater opportunities exist for deep bite correction by guiding the vertical alveolar development.

Age of the patient and duration of treatment

Adult patients having skeletal deep bite with vertical facial and alveolar problems should be treated with orthodontic treatment along with orthognathic surgery as only orthodontic treatment

would be long and insufficient for complete facial correction.

Management of deep bite

There are five basic principles to treat deep bite which are as follows-

1. Levelling the arch brought about by eruption of premolars along with clockwise rotation of mandible and increase in lower facial height.
2. Extrusion of molars.
3. Intrusion of upper and lower incisors.
4. Labial inclination of incisors.
5. Extrusion of molars and inhibiting further eruption of incisors.

Deep bite can be corrected by the following mechanotherapies-

- Removable appliance therapy
- Myofunctional appliance therapy
- Fixed myofunctional appliance like Herbst appliance
- Fixed appliance therapy
- Fixed appliance along with vertical pull head gear
- Orthognathic surgery

Removable appliance therapy

In cases of deep bite associated with reduced lower facial height and low FMA for growing children, removable appliances are the treatment of choice.

Anterior bite plane

This is a removable appliance which is made up of an acrylic bite platform behind the upper incisors on which the lower incisors bite. The bite plane is parallel to the occlusal plane. A labial bow of heavy wire is a component of the appliance to prevent the anterior inclination of upper incisors due to the anterior component of force. The anterior bite plane intrudes the lower anterior teeth and allows the relieved posterior teeth to erupt further. This is termed as opening the bite.

SVED bite plane

Sved introduced a bite plane which covered the incisal edges of upper anterior teeth (incisal

capping to prevent their labial flaring) thus transmitting the pressure axially to the teeth and diminishing the anterior component of force.

Expansion and labial segment alignment appliance with bite plane (ELSAA)

In some cases of CI-II div 2 in growing patients, this appliance can be used before starting the myofunctional therapy. This appliance achieves anterior arch alignment by-

- Expanding the upper labial segment by 4-5 mm with the activation of an expansion screw and utilizing this expansion to roust out the upper labial segment.
- The anterior bite plane wear tips the upper incisors labially thus increasing the arch perimeter.
- Opening the bite along with slight intrusion and protrusion of upper and lower labial segments.

Myofunctional appliance therapy

Myofunctional appliances use the muscular forces that are generated by altering the mandibular position sagittally and vertically to bring about the required changes.

Activators in the management of deep bite

Principle: The activator treats deep bite by the principle of differential eruption. The activator simulates active intrusion of incisors by inhibiting their normal eruptions and teeth in the buccal segments are allowed to follow their normal eruption paths.

Case selection: Activator treatment increases the lower facial height so patients with increased lower facial height should not be given activator treatment. Growing patients who have excess free way space and decreased lower facial height resulting from mandibular over closure are good cases that can be selected for activator therapy.

Function regulator of Frankel in the management of deep bite

Principle: The functional regulator treats the deep bite by stimulating normal function while eliminating the lip trap, hyperactive mentalis,

aberrant buccinator and orbicularis oris action. The basic difference between FR and activator is that the FR is confined only to the vestibule of the oral cavity. It holds the buccal and labial segments away from the dentition in those areas where this pressure restricts the development of these areas during the critical phase of development. Deep bite is treated by the differential eruption of the posterior teeth into the space created by the bite and the buccal soft tissue inter positioning in this space is prevented by the buccal shields.

Case selection: For deep bite treatment Fr-I and FR-II can be used. Best results can be achieved in patients in the late mixed dentition and transitional dentition period when both soft and hard tissues are undergoing greatest transitional changes.

Twin block in the management of deep bite

Principle: The mechanism of the appliance is designed to harness the forces of occlusion to treat the distal occlusion and deep bite. The twin block is made of two blocks, upper and lower unlike other functional appliances to fit the teeth in both jaws.

Case selection: Growing patients with increased overjet and deep bite are ideal cases to be treated with twin block therapy. Angle's CI-II div 1 malocclusion with a full unit distal occlusion in the buccal segments with uncrowded arch form can be selected for twin block therapy.

Fixed myofunctional appliance therapy

Functional appliances that eliminate the need of patient co-operation in wearing the appliance and apply forces using auxiliaries and springs between the arches. Commonly used fixed functional appliance for treating deep bite is the herbst appliance.

Herbst appliance

Principle: Herbst appliance displaces the condyle anteriorly at all times and the pressure against the teeth produces significant tooth movement in addition to any skeletal effects.

Case selection: Deep bite in patients in the terminal phase of pubertal growth spurt and in patients who do not cooperate to wear the removable myofunctional appliance. Also CI-II malocclusions

with retroclined mandibular incisors are the right choice for herbst mechanotherapy. Patients with increases lower facial height and cases prone to root resorption should not be selected for treatment with this appliance.

Fixed appliance therapy

The Begg's appliance provides an excellent deep bite correction. The anchor bends in the initial arch wires along with the use of CI-II elastics together achieve the deep bite correction. 0.016 Australian arch wire with anchor bends placed mesial to the first molar is pinned in all tooth brackets but is ligated loosely as it passes the second premolar bracket. The long span of the arch wire anterior to the anchor bend produces a gentle intrusive force on the incisors while the opposite force on the molar tends to upright it and tip it distally. CI-II elastics are worn around the buccal tube of the lower molar to the upper inter-maxillary circle mesial to the upper canines. CI-II elastics produce stabilization of the lower molar against the distal tipping at the cost of some extrusion of the molar.

The preadjusted edgewise appliance achieves deep bite correction in two ways.

Levelling by extrusion

Extrusion of the posterior teeth is achieved by fixed appliance therapy.

Leveling by intrusion

The key to intrusion is light continuous forces which are directed towards the apex of the tooth. Intrusion of one tooth should not be pitted against the extrusion of other because extrusion can dominate. This can be achieved in two ways:

1. Bypass arches

Continuous wires that bypass premolars and sometimes canines

Mulligan's levelling arch-

Stainless steel wire with anchor bend mesial to the first molar is inserted in the molar tubes and made to bypass premolars and canines is engaged in incisor brackets.

Ricket's utility arch-

Rectangular SS wire with step down bends between the first molar and the lateral incisor is engaged.

2. Segment approach

Segmented arch wires for levelling developed by Burstone in which posterior segment is stabilized and anterior segment is controlled for force application.

Fixed appliances along with vertical pull head gear

With the use of bypass arches, only the molars are available as the posterior anchorage so extrusion of the tooth may occur. This is acceptable in growing patients with average facial pattern but in non growing patients with a poor skeletal pattern, excessive molar eruption should be avoided. High pull head gear to the upper molar can be added along with any bypass arch systems to improve upper posterior anchorage and intrude the anterior teeth.

Orthognathic surgery

Resection and osteotomy is done to correct skeletal deep bite in adult patients.

Maxillary surgery:

The correction of deep bite resulting from vertical maxillary excess can be done by surgically repositioning the maxilla in superior direction with Le-Forte I surgery.

Mandibular surgery:

Non growing patients with skeletal deep bite and short face exhibiting a long ramus, square gonial angle are treated with mandibular ramus surgery that allows mandible to move downward only at the chin increasing the mandibular plane angle. Sagittal split mandibular ramus surgery to rotate the mandible slightly forward and downward. The deep bite in mandibular anterior alveolar region can be corrected by subapical osteotomy.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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