

## Deep overbite—A review

### (Deep bite, Deep overbite, Excessive overbite)

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**Abstract** :- Deep overbite or Deep bite is one of the common malocclusion which has a varied of etiologies. The etiology may be present at different levels of structures, Viz. dental skeletal, combination of skeletal and dental etc., The treatment plan depends upon the severity and the age of the patient. A review of deep bite in general with due reference to some treated cases is done in this article

**Key words**:- Deep bite, skeletal, Dental, Treatment.

#### Introduction

Deep bite is one of the frequently seen malocclusions next to crowding. It can occur along with other associated malocclusions. It is said to be one of the most perpetuating and damaging malocclusions. It may jeopardize the periodontal support, occlusion itself or TMJ. The excessive overbite is a complex orthodontic problem that may involve a group of teeth or whole dentition, alveolar bone, of maxillary and mandibular basal bones, and/or soft tissue of the face. The management of this problem demands a careful diagnostic analysis, treatment plan, and selection of appropriate treatment therapy

The term "**overbite**" applies to the distance which the maxillary incisal margin closes vertically past the mandibular incisal margin. In the concept of normal occlusion, the maxillary central incisors slightly overlap the mandibular incisors. Normally the lower incisal edges contact the lingual surface of the upper incisors at or slightly above the cingulum (i.e., normally there is 1 to 2 mm overbite). This vertical overlap is either described in millimeters or as the percentage of mandibular incisor crown length overlapped by maxillary central incisors. Since the crown length of the lower incisors significantly varies in individual, a notation of the overbite in percentage is more descriptive and desirable. When the teeth are brought into habitual or centric occlusion. Usually normal overbite is 2-

3mm or 30% percent or 1/3 rd the clinical crown height of the mandibular incisors ( Fig 1)

#### Definition

The **deep over bite** or **deep bite** can be defined by the excess amount or percentage of overlap of the lower incisors by the upper incisors. **Graber** has defined 'Deep bite' as a condition of excessive overbite, where the vertical measurement between the maxillary and mandibular incisal margins is excessive when the mandible is brought into habitual or centric occlusion'. It is customary to diagnose deep bite when the incisors' overlap exceeds one third of the crown height of the lower incisors. Deep bite (or deep overbite) is present when the mandibular incisors' occlusal edges occlude apical to the cingulum of the maxillary incisors. This may be due to overeruption of either the maxillary or mandibular anteriors.

The term "**closed bite**" describes condition of excessive overbite, where the vertical measurement between the maxillary and mandibular incisal margins is excessive when the mandible brought into habitual or centric occlusion. Closed bite is excessive overbite resulting from loss of posterior teeth. It is rarely seen in young children, must not be confused with deep bite.

Excessive overbite is most prevalent in the mixed dentition and is a self correcting transient malocclusion. Open bite is comparatively more

prevalent in the deciduous dentition and tend to disappear in the later mixed dentition.

**Classification**

**1. According to its origin;**

- a) Dental deep bites (Simple).
- b) Skeletal deep bite (Complex).

**2. According to functional classification;**

- a) True deep bite.
- b) Pseudo deep bite.

**3. Depending on the extent of deep bite**

- incomplete over bite
- complete over bite

**4. According to dentition;**

- a) Primary dentition deep bite.
- b) Mixed dentition deep bite.
- c) Permanent dentition deep bite.

**1. Dental and skeletal deep bite**

**a. Simple (dental) deep bite(Fig 1, 2 and 3)**

A simple deep bite is localized to the teeth and alveolar processes. In this type of deep overbite, the problem lies mainly within the dentition. Dental deep bites occur due to over-eruption of anteriors or infra-occlusion of molars. The result may be labial version of the upper incisors and impingement of the lowers into the palatal mucosa

A majority of the problems in this category are created by the loss of permanent teeth causing a lingual collapse of maxillary or mandibular anterior teeth. The denial of a skeletal contribution to the condition is critical to the diagnosis. This kind of deep bite is characterized by the absence of any skeletal complicating features which are seen in skeletal deep bites .In the mandibular dentition, it may manifest as a deep curve of Spee or a reverse curve of Spee in the maxillary dentition. These patients frequently show temporomandibular dysfunction and a limited range of functional occlusal movements.

**b. Complex (skeletal) deep bite ( Fig 2, 3 and 4.)**

Complex deep bite is a deep bite associated with basic skeletal features with which the alveolar process cannot cope.

A skeletal type of overbite may be due either to malrelationship of alveolar bones and/or underlying mandibular or maxillary bones or to an overgrowth or undergrowth of one or more alveolar segments

The diminished anterior vertical height of the face is also an important criterion for diagnosis of skeletal deep overbites.

Complex deep bite is frequently associated with class II div 2 and occasionally with Class III.

**2. True and pseudo-deep overbite**

<b>True deep overbite</b>	<b>Pseudo-deep overbite</b>
This is caused by infraocclusion of the posterior segments ie..molars	is caused by overeruption of the anterior teeth that already has normal eruption of the posterior segment teeth
Seen in class II div II	Seen in class II div I malocclusions
It is often the result of a lateral tongue posture of tongue thrust . The interposition of tongue prevents the eruption of the posterior teeth. It can also occur due to premature loss of posterior teeth	It is the result of overeruption of the incisors. Due to the presence of the increased overjet, the lower incisors to over-erupt until they meet the palatal mucosa.
These patients have near flat curve of spee.	These patients hence exhibit an excessive curve of Spee
There is a large interocclusal clearance	The inter-occlusal clearance is usually normal or small as the molars are fully erupted.

Some Class II, division II, malocclusion with adequate lip line relationships are good examples	Some Class II division I, malocclusions with a "gummy" smile and a poor lip line relation can fall into this category
Treatment in the mixed dentition period requires the elimination of environmental factors that are inhibiting eruption of the posterior teeth. Ideal for functional appliance therapy	Incisors cannot be intruded effectively using functional methods during mixed dentition .
Extrusive mechanics of molars possible	All possible intrusive mechanics on the incisor teeth with fixed appliances is usually indicated . extrusion of molars is possible only to a limited extent

### 3. Incomplete and complete deep bite ( Fig 5)

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

Complete over bite on the other hand is a relationship in which the lower incisors contact the palatal surface of the upper incisors or the palatal tissue when the teeth are in centric occlusion . This kind of deep bite often results in trauma of the mucous palatal to the maxillary incisors

#### IV. Etiology of deep bite

The etiology of deep overbite is a complex problem and may include one or more of the following;

1. **Hereditary** and may follow a genetic pattern or familial condition

### 2. Skeletal ( Fig 6)

- a. An overgrowth or undergrowth of one or more alveolar segments.
- b. An excess of growth of the ramus and posterior cranial base permits the mandible to rotate upward. Thus Long ramus and short body with decreased gonial angle is characteristic feature
- c. Convergent upper and lower jaw bases ( fig 3)
- d. Horizontal growth pattern or forward rotation or anticlock wise rotation of the of the lower jaw ( Fig 4)
- e. The four planes of the face (intraorbital ( FH Plane), palatal, occlusal, and mandibular) as seen from lateral roentgenograms are horizontal and nearly parallel to each other.

### 3. Dental

- a. Loss and/or mesial tipping of posterior teeth. In other words diminished posterior dental height
- b. Early loss of teeth and lingual collapse of the anterior teeth
- c. Overeruption of the incisor teeth, infraocclusion of the buccal segment or a combination of both.
- d. Overbite may be caused or accentuated by an aberration in the tooth morphology.
- e. Periodontal disease. Bite may deepen if the posterior tooth drift mesially during the pathological migration and worsen the existing condition
- f. When the teeth are reduced in size and number, the dental arches oppose less resistance against mandibular closure.

### 4. Muscular

The posterior vertical chain of muscles (masseter, internal pterygoid, temporal) is strong and attached anteriorly on the mandible and stretches in nearly a straight line vertically. The molars are directly under the impact of the masticatory forces of this chain. When the posterior vertical chain of muscles is strong and anteriorly positioned, a greater depressive action is transmitted to the dentition

### 5. Habits

- a. lateral Tongue thrust swallow
- b. Finger sucking,
- c. Lip sucking

**V. Features and Effect of deep over bite**

**Extraoral features ( Fig 7 and 8)**

1. Brachycephalic and europsocopic face. Facial esthetics is impaired (muscular face). Strong contractions of the masseter muscle can be seen in the face by clenching the teeth
2. Straight to Mild convex profile
3. Short anterior face height as measured from nasion to gnathion (fig 6)
4. Diminished anterior lower face height. Short nose-chin distance.
5. Normal distance from the chin to the incisal edge.
6. The lips are thin and with an excess of lip height relative to face height. This gives a curled appearance of the lips .
7. Mento labial sulcus :There is usually deep furrow, or sulcus, between the prominent chin and the lower lip
8. Mandibular deficiency characterized by long mandibular ramus and short body, Square gonial angle, flat mandibular plane, prominent zygoma and prominent chin. Many of these features are common to class II div II

**Intra oral features( Fig 8)**

1. The maxillary dental arch is broad, with often a maxillary buccal cross-bite
2. May involve a group of teeth or whole dentition.
3. In skeletal deepbites the patient may exhibit gummy smile if there is clockwise rotation of maxilla . When the problem is in the anterior maxillary region, the patients often show excessive gingival tissue during smiling or event while speaking even when the upper lip is of adequate length ( fig 8)
4. The palatal vault is flat. The presence of deep bite may cause palatal grooving by the indentations caused by lower anteriors.
5. The dentition exhibits a tendency to small teeth prone to abrasion and a high increased percentage of congenitally missing teeth.

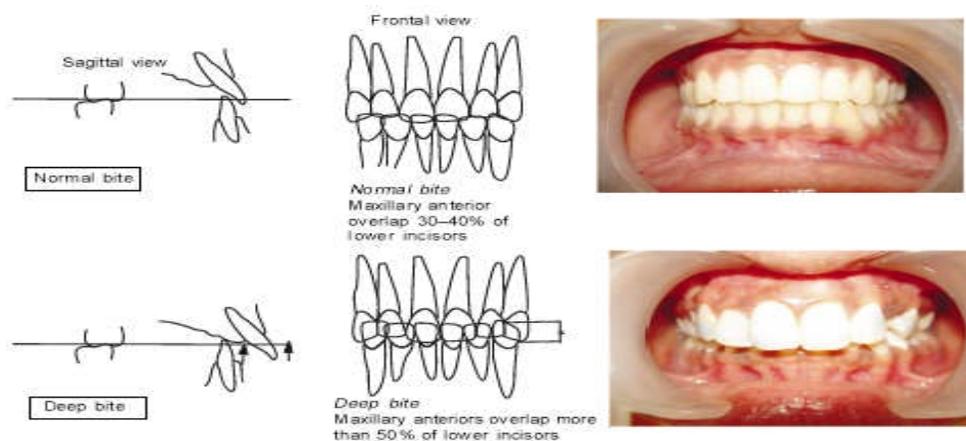
6. Although teeth tend to spaced, a crowding of lower incisors may be present as a result of the deep bite.
7. A deep curve of Spee in lower arch or a reverse curve of Spee in the maxillary dentition( Fig 2)
8. Occlusal functions become impaired.
9. Often the maxillary incisors are tipped lingually in Angle's Class II, division 2 pattern ( Fig 7)

**Other features**

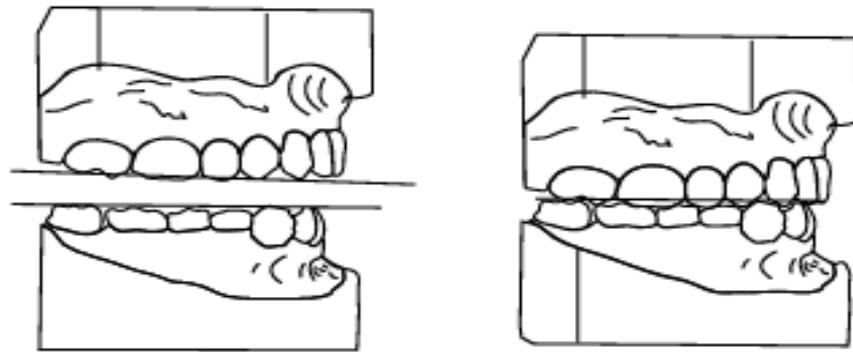
1. The mandible cannot be opened to an appreciable degree in skeletal cases.
2. Temporomandibular joint dysfunction due to overclosure of the mandible characterized by clicking sensation of the joint.
3. Periodontal conditions may be found as a result of such occlusion.

**VI. Diagnosis**

Excessive overbite is not to be viewed as an isolated entity: it must be seen as a part of the total malocclusion. The routine diagnostic aids such as clinical examination, study models and lateral cephalogram are used of the diagnostic exercise . The factors contributing to excessive overbite vary with the type of occlusion and skeletal pattern. Their determination is the most important step in diagnosis and Treatment planning. Excessive overbite is not being viewed as an isolated entity. It must seen as a part of the total malocclusion. The primary diagnostic problem in both deep bite and open bite is to ascertain the site of the dysplasias whether dental or skeletal. The skeletal bite can be differentiated from dental deep bite by cephalometric analysis.

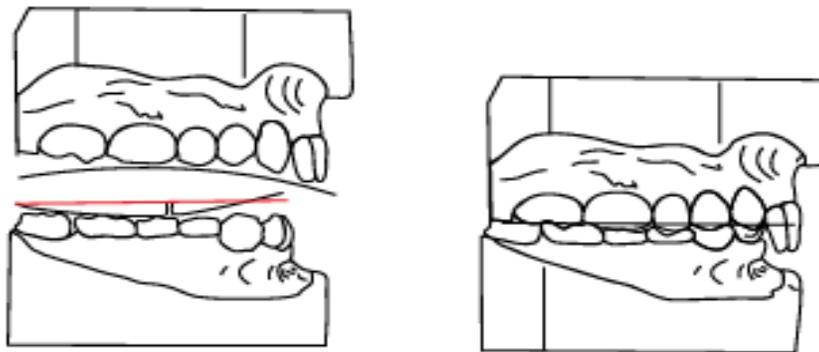


**Fig. .1 Normal bite and deep bite**



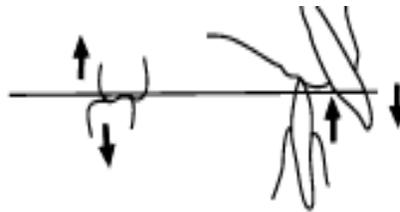
Normal curve of Spee and normal overbite

Dental deep bites

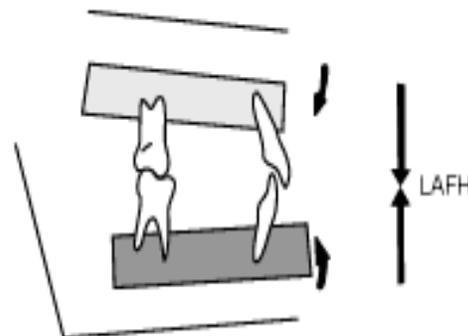


Exaggerated curve of Spee in lower arch and exaggerated curve of Spee in maxillary arch. This is due to overeruption of anteriors or undereruption of posteriors

**Fig. 2** Normal bite and deep bite



Dental deep bite results from overeruption of anterior teeth or undereruption of molars. True deep bite results from infraocclusion of posteriors. Whereas pseudo-deep bite results from supraeruption of posteriors



Skeletal deep bite results with jaw bases moving towards each other (convergent jaw bases). The lower anterior facial height (LAFH) is diminished

**Fig. 3** Dental and skeletal deep bites

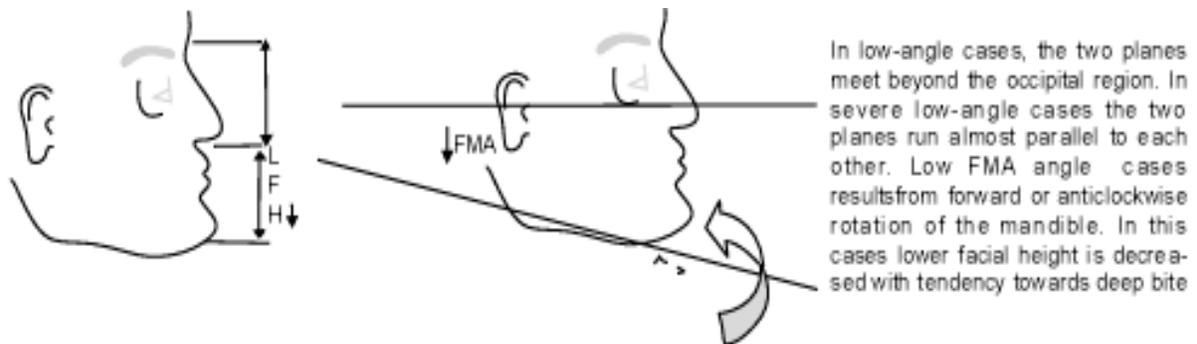
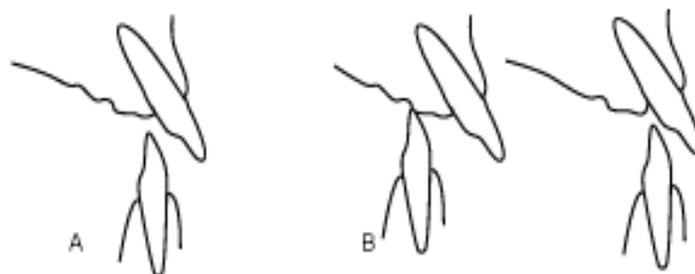
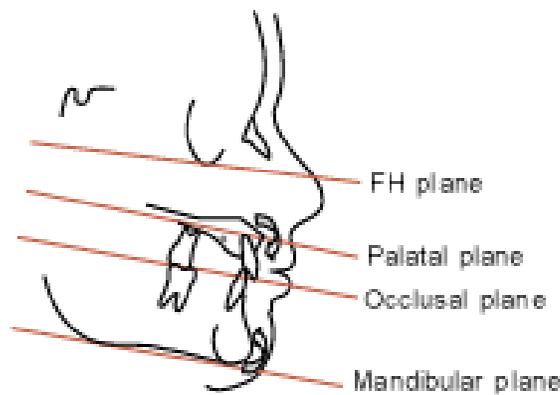


Fig. 4 Skeletal deep bites with diminished lower facial height and forward rotation of the mandible



- A. Incomplete deep bite—lower incisors do not touch either the palate or the palatal surface of upper incisors
- B. Complete deep bite is characterised by lower incisors touching the palate or palatal surface of the upper incisors

Fig.5 Complete and incomplete bite



Skeletal deep bites are characterised by convergent jaw bases. The maxillary basal bone rotates downwards, i.e., clockwise rotation. The mandible rotates forwards and upwards i.e., anticlockwise rotation. All the four planes of face are horizontal and near parallel to each other. The lower facial height is decreased

Fig. .6 Cephalometric findings in deep bite

Postural position is also used in the differential diagnosis of deep bite cases: the freeway space will be larger than normal in cases with inadequate vertical development of the buccal segments and normal in cases of over-eruption of the incisor teeth

**VII Management of deep overbite**

The extent of the intermaxillary distance "freeway space" is an important factor in treatment planning. When the freeway space is minimal or even absent the problem is more severe

**1. Treatment modalities in growing and non growing patients.**

Growing patients

- o Intrude anteriors
- o Erupt posteriors
- o Combination of posterior eruption and anterior intrusion

Non growing patients (little or no growth expected)

- o Orthognathic surgery
- o Intrusion of anteriors (posterior extrusion invariably relapses)

whatever the treatment modality the management of deep bite is by intrusion of anteriors, extrusion of posteriors or combination of the both

**2. Factors to be considered before intrusion or extrusion**

- Interlabial gap
- Growth pattern whether vertical or Horizontal
- Presence of adequate free way space or interocclusal clearance

**Intrusion of anteriors**

Intrusive mechanics is considered in the following situations

Deep bite with large interlabial gap(In a relaxed mandibular position, an individual has normal of 2 to 4 mm) , intrusion is the ideal choice. Extrusion of posteriors may deteriorate the esthetics and further increase the interlabial gap.

In a clinical situation, if incisor-stomion distance is large, ( the distance between the incisal edge of the maxillary central incisor to the lower most border of the upper lip is an average of 2 to 4 mm) which is often associated with a high smile line or "gummy smile", the best method of treating a deep overbite may be by intrusion of the upper incisors.

In a Class II, division 1 type of malocclusion with large vertical facial height, extrusion of posterior teeth may cause serious functional, esthetic, and stability problems. Extrusion of molar furthers causes the downward and backward rotation of the mandible worsening the condition. In those cases the intrusion of anteriors is the treatment option.

Intrusion mechanics are considered if there is inadequate or normal freeway space. Encroachment of this space by extrusion of posterior teeth is determinant and bound to relapse. It results in fatigue of the muscles of mastication which get stretched and predispose to relapse. It also strains the TMJ.

**Extrusion of molars**

In deep bite with redundant upper and /or lower lips, or no interlabial gap, posterior extrusive mechanics may be desirable (if other considerations permit).

If a patient with deep overbite exhibits normal incision-stomion distance, the choice of correction of deep bite by an intrusion of maxillary incisors is often contraindicated since it will give the patient an edentulous appearance. Extrusion of posteriors is the treatment option

In patients having excessive overbite with Class II, division 2 type of skeletal malocclusion, an extrusion of the posterior teeth met be the treatment of choice ( if other considerations permit). Extrusion mechanics are considered if there is adequate interocclusal space.

<b>Intrusion of incisors</b>	<b>Extrusion of molars</b>
Deep bite with large interlabial gap	Deep bite with no interlabial gap
If gummy smile is present	Normal incisor-stomion distance

In class II div I patients with large vertical facial height	In class II div II patients with short vertical facial height
Considered if Inadequate free way space is there	Considered if adequate free way space is there

**3. Planning Treatment in different age groups**

1) **Treatment planning in primary dentition** Both deep bite and open bite malocclusion occur in the primary dentition. Open bite is more common. Anterior deep bites in the primary dentition are fairly common but are rarely treated. When an excessive overbite is seen in the primary dentition, it is likely to have a skeletal basis with the presence of developing Class II malocclusions. Activator type appliance may be used to direct differential alveolar growth, reduce the interocclusal distance, and improve skeletal morphology. As with Class II malocclusions, treatment decisions are typically postponed until the mixed dentition when the child attains maturity to wear the appliance. Indications for treatment in the primary dentition include impingement on the palatal mucosa, excessive grinding, clenching, and headaches if they are believed to be secondary to the deep bite

2) **Treatment planning for mixed dentition (Fig 12)**

The overbite is greater just after eruption of the prominent incisors and decreases with eruption of the posterior teeth. If the skeletal bases are class I with normal incisor angulation, it is better to wait and watch till the eruption of the posterior teeth which results in resolution of deep bite.

In non skeletal deep bites a utility arch that incorporates molar and incisor teeth can be used during the mixed dentition to intrude, tip, or reposition both molars and incisors. Realistically, although bite depth changes can be made in the mixed dentition by intrusion of anterior teeth, intrusion is difficult to retain-even in later phases of full appliance therapy. For this reason, intrusion as a part of early treatment is seldom required. It is often better to defer this treatment until the early permanent dentition, using an intrusion arch during

the first stage of comprehensive fixed appliance therapy

Early childhood is the best time to treat complex deep bite. Functional jaw orthopedic appliances can then guide the eruption of the permanent dentition upper molars, while eruption can be manipulated with and help control vertical skeletal growth. Cervical headgear produces more eruption of the upper molars and with functional appliance either the upper or lower molars erupt more.

Deepbites with anterior vertical maxillary excess showing gummy smiles can be intercepted by high pull headgears.

Class I skeletal deepbites with horizontal growth pattern can also be intercepted with the myofunctional appliances.

3) **Treatment planning for early permanent dentition** comprehensive orthodontic treatment is usually required to treat the cases of deep bite. Leveling of the teeth tends to elevate the posterior teeth and depress the anterior teeth while improving incisal stops and reducing the depth of bite

Several factors such as the growth pattern, the pattern of the rotation of the mandible type of dental malocclusion, deleterious habits, relationship of intraoral and extra oral musculature should be considered. The treatment becomes more complicated if there is, in addition, an excessive overjet, reverse overjet, crowding in either anterior region or excessive alveolar bone loss.

In cases of simple dental deep bites and when there is a normal interocclusal distance in the mandibular postural position, treatment by arch leveling mechanics alone may be possible.

In class II div I growing patients intrusion or prevention of excessive eruption of the lower incisors is achieved by leveling out an excessive curve of Spee with the continuous arch wire mechanics from molar to incisors.

In the absence of growth, absolute intrusion is required and segmented arch mechanics must be used to achieve this. Eruption of the first molars can be aided by the use of a flat maxillary bite plane or a monobloc and the incisors depressed with utility archwire.

Mild cases of skeletal deepbites in adolescent are treated with full-banded or bracketed appliances. In moderate cases a flat maxillary bite plane is used in conjunction with full-banded therapy. Severe cases of complex deep bite may require orthognathic surgery later. Even in the most severe problems, it is preferable to attempt treatment in adolescence and force the decision toward surgery by the inadequate response to conservative therapy. Adolescent treatment of moderately severe cases usually more successful in boys then girls since boys normally have more remaining growth to utilize the treatment

#### 4) **Treatment planning in adults** (Fig 13)

In adult patient showing excessive deep overbite of 100 per cent or more, with accompanying;

1. High smile line. 2. decreased Vertical facial height. 3. Alveolar problems, the length of treatment may be very long. In this instance, the patient should be given a choice for an Orthognathic correction of the problem. In these patients, the treatment plan to correct the excessive overbite should be done in conjunction with an oromaxillofacial surgeon.

**Maxillary surgery** The maxilla can be moved up quite successfully with Lefort I. Surgically repositioning of maxilla in superior direction can be done by complete maxillary osteotomy. The correction of deep bites resulting from vertical maxillary excess can be effectively corrected by this method.

**Mandibular surgery** Patients with a short face (skeletal deep bite) problem are characterized by a long mandibular ramus, square gonial angle and short nose-chin distance. They are treated most predictably and successfully by mandibular ramus surgery that allows the mandible to move downward only at the chin, increasing the mandibular plane angle. They are treated best by sagital split mandibular ramus surgery to rotate the mandible slightly forward and down and the gonial angle open up.

The deep bites in the anterior mandibular alveolar region can be corrected by subapical osteotomy.

**Appliances and methods used in the treatment of deep bite**

Deep bites can be treated using removable, fixed or myofunctional appliances.

#### **I. Removable appliances**

##### **a. Maxillary acrylic bite plate or anterior bite plane ( Fig 14 A and B)**

The most popular method for correcting a deep overbite is by or anterior bite plane. The anterior bite plane is a modified Hawley's appliance with a with a built-in flat acrylic bite plate or inclined plane or platform lingual to the maxillary incisors . The anterior bite plane consists of Adam's clasps on the molars which help in retaining the appliance. A labial bow is also incorporated to counter any forward component of force on the upper anteriors. The bite plane may be extended labially not to cover more than 1/3rds to produce the same effect ie., to prevent the protusion of upper anteriors.

With this appliance in the mouth during the mandibular closing movement, the mandibular incisors come in contact with the acrylic platform, which causes a disocclusion of the posterior teeth. The disocclusion leaves the molars free to erupt. The disocclusion of the bite accelerates the passive eruption of the posterior teeth, which stops when one or more opposing teeth come in contact . It is advisable not to disocclude the posterior teeth more than 2 mm. If bite opening in the anterior region is not sufficient, the acrylic platform can be augmented in small increments several times during the treatment.

Small increments also apparently do not cause a sudden temporomandibular joint or myofunctional change. If used with a correct treatment plan, the bite plate can also help in minor labiolingual and mesiodistal movements of teeth with the help of a labial bow or auxiliary springs

The patient wears this appliance almost 24 hours a day. The use of bite plates, at the time of attaining the desired overbite, should not be suddenly stopped, the bite plate itself should be used as a retainer and its discontinuance should be gradual.



**Fig..7** Skeletal deep bite associated with Class II div 2 malocclusions. the face is muscular, straight to mild convex. Reduced anterior facial height, particularly the lower facial height. The mentolabial sulcus is deep. Intraorally the maxillary and mandibular incisors are retroclined and there is near 100% vertical overlap



**Fig..8** Deep bite due to vertical maxillary excess and downward and forward (clockwise) rotation of maxilla



A. 50% overbite



B. Complete bite with large-sized incisors



C. Deep bite with proclination of upper incisors



D. Deep complete bite with retroclination of incisors associated with Class II div 2



E. Complete deep bite with lower incisors impinging palatal mucosa



F. Deep bite with reverse overjet usually seen in Class III skeletal cases



G. Deep bite due to extremely large incisors

**Fig..9** Photographs showing the different intraoral features of deep bite cases



Fig.10 Deep bite patients with large interlabial gap and gummy smile should be treated with intrusion of anteriors



Fig.11 Patients with normal interlabial gap, redundant lips and horizontal growth pattern can be treated with extrusion of molars



Fig.12 A case of deep bite treated by functional appliance and fixed appliance

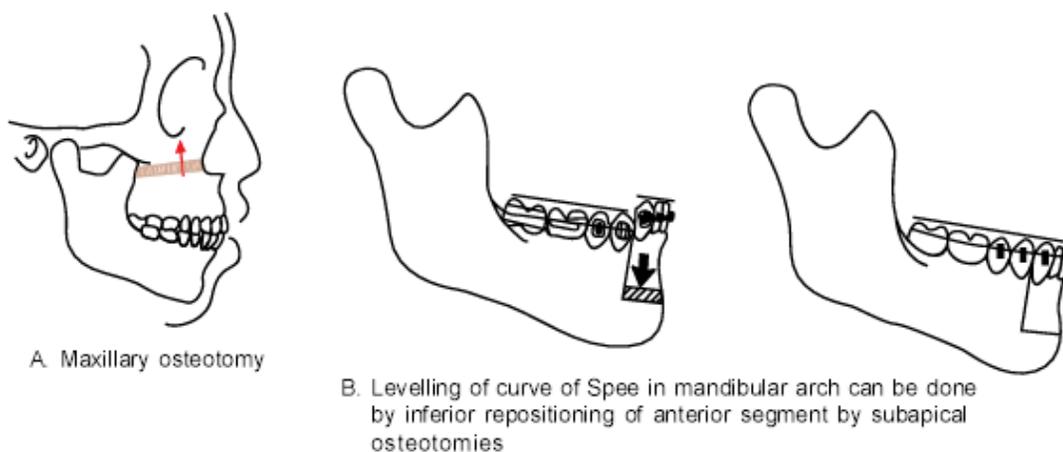


Fig.13 Orthognathic surgeries for deep bite correction

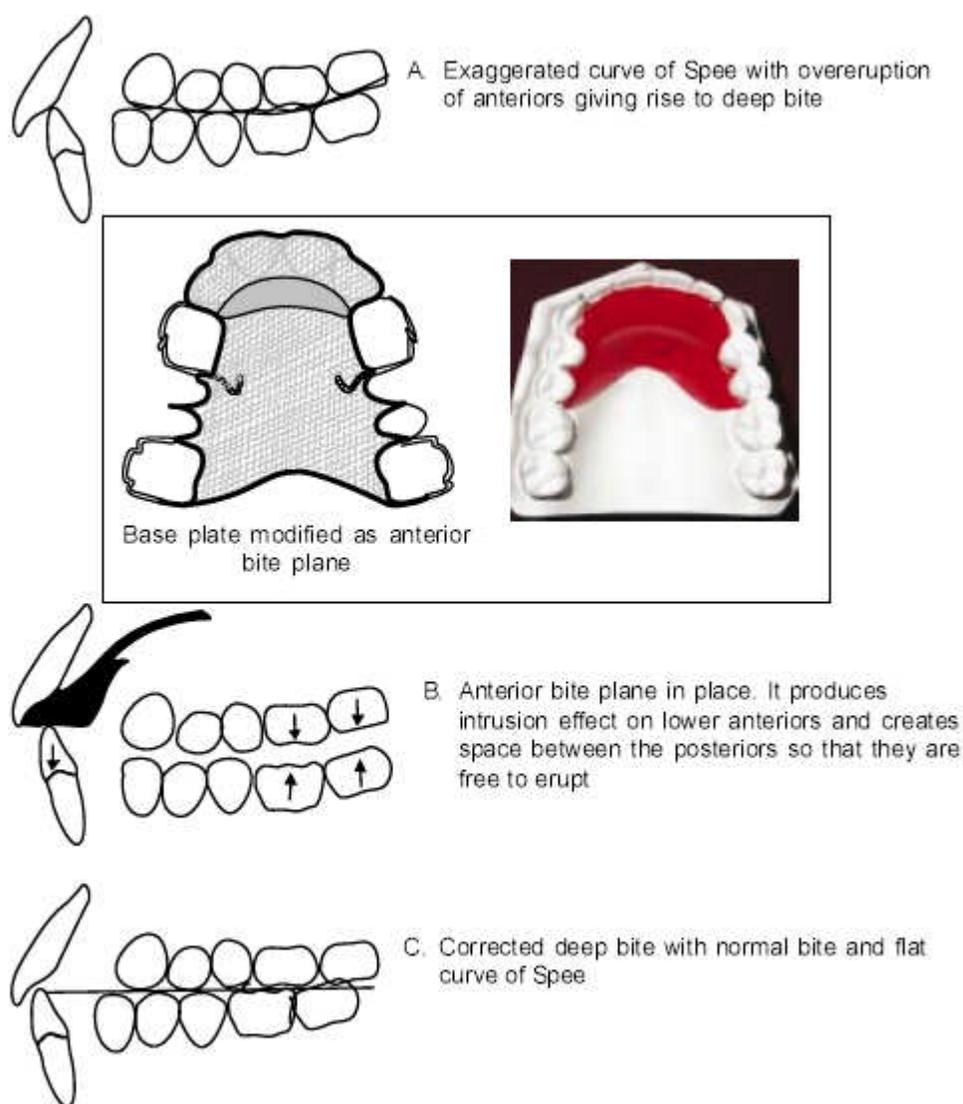
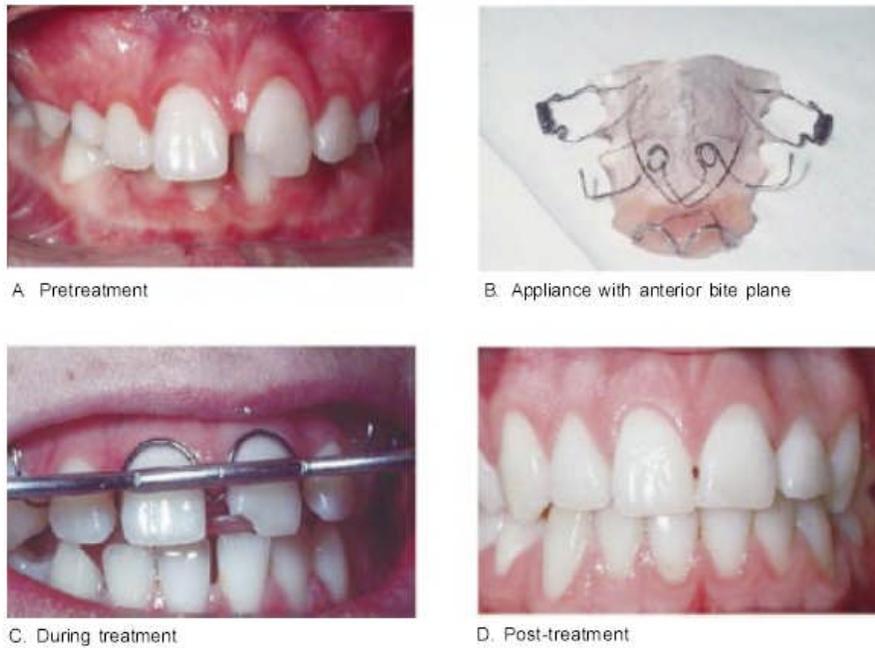
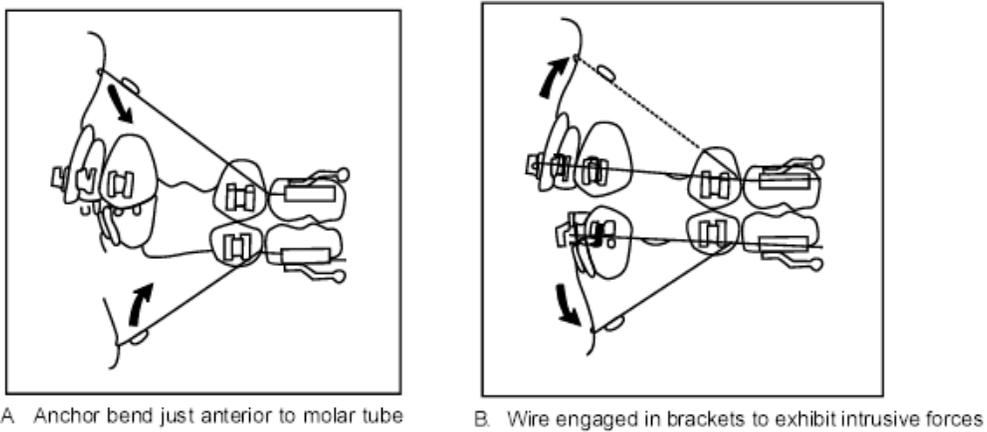


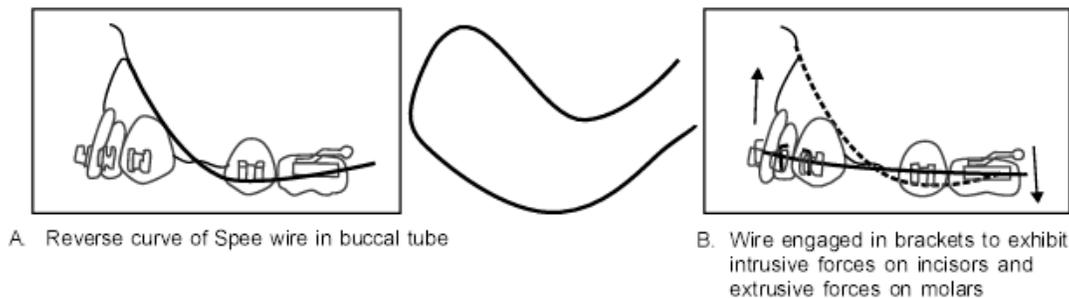
Fig.14a Dental effects of anterior bite plane



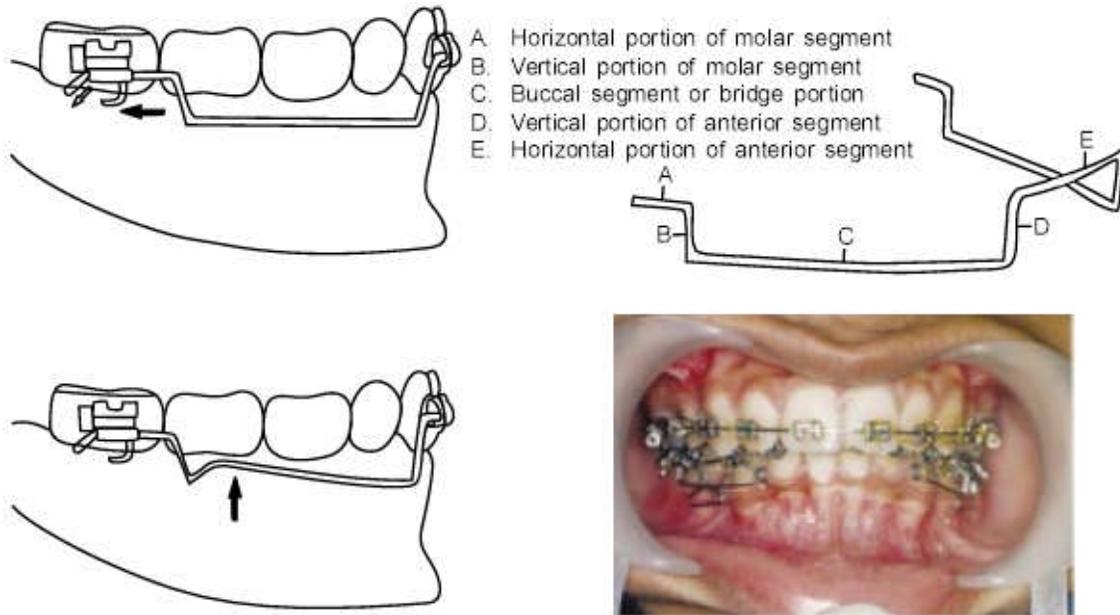
**Fig.14b** Anterior bite plane



**Fig.15** An anchor bend can be used to correct the open bite. A bend is given in the wire just before the molar tube such that the wire lies in sulcus region. Then the wire is forcibly engaged onto the brackets which are at incisal region of anterior teeth. The wire exhibits intrusive forces and the bite opens thus deep bite corrections. This can be aided by anterior bite plane



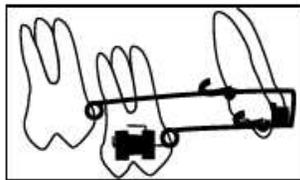
**Fig.16** Deep bite relieved by curve of spee wire



**Fig.17** Utility arch for correction of deep bite. The wire bypasses the premolars or primary molars and is inserted into the incisors. It is activated by placing a V-bend in occlusal direction



A. Pretreatment photograph of a case with deep bite



C. Post-treatment



B. Three-piece intrusion arch wire for intrusion of upper anteriors

**Fig 18** Intrusion mechanics

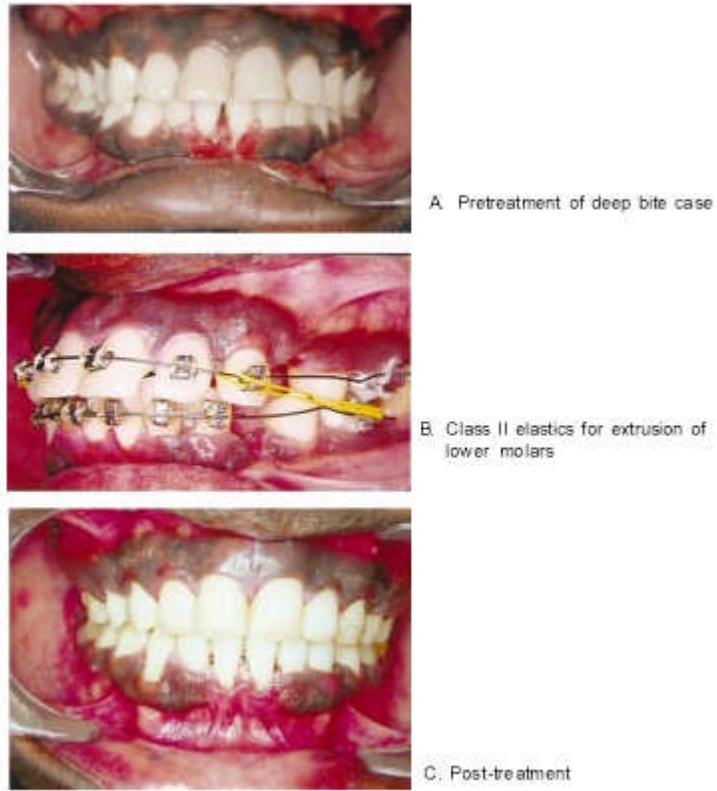


Fig.19 Extrusion mechanics



Fig..20 Intrusion with the help of implants

Courtesy: Dr. Sumanth goel, Belgaum

A bite plate increases lower facial height by permitting posterior dentoalveolar eruption but tends to rotate the mandible in a down-and back direction, this diminishing mandibular projection. This is a advantage in horizontal growth pattern but a disadvantage in vertical growth pattern.

#### **b. Myofunctional appliance**

*Deep bite due to developing class II div I pattern can be intercepted with the myofunctional appliances like activator and bionator.* Deep bite cases diagnosed to be due to infra-occlusion of molars can be treated by an activator designed and trimmed to allow the extrusion of these teeth. The inter-occlusal acrylic is trimmed gradually to encourage the eruption of the posterior teeth. Bionator can also be used for a similar purpose. This is discussed in chapter on myofunctional appliances

#### **c. Headgears**

When an extremely deep overbite is present because of the overeruption of the maxillary anterior teeth, a high pull headgear can be attached to the anterior segment of the arch wire in an attempt to intrude these teeth.

The cervical headgear with its downward vector of force increases lower facial height by extruding the molars. The mechanics are discussed in detail in chapter on myofunctional appliances

#### **II. Fixed orthodontic appliances( Fig 15--18)**

Fixed orthodontic appliances can be used to intrude the incisors or extrude the molars. They can also produce mild skeletal effects. Appliances used for deep bite correction are generically termed intrusion arches and variations include base arches, utility arches, Connecticut arch and reverse curve of Spee wires etc.,.

#### ***Intrusion of anterior teeth can be obtained with the following methods***

***Use of anchorage bends( Fig 15) :*** Anchor bends are given in the arch wire mesial to the molar tubes so that the anterior part of the arch wire lies gingival to the bracket slot. Thus when these arch wires are pulled occlusally and engaged into the brackets, a gingivally directed intrusive force is exerted on the

incisors which reduces the deep bite. When intrusion of anterior teeth is the goal, light forces should be used. Heavier forces are more likely to create a greater tendency for posterior teeth to erupt as a result of the equal and opposite extrusive force at the molar. Recommended forces for intrusion of lower incisors are in the range of 12.5 g per tooth and for maxillary incisors about 15 to 20 g per tooth. The reactionary extrusive force on molars is prevented by natural interdigitating occlusion or in extreme cases by giving a posterior bite plane of minimum thickness

**Use of archwires with reverse curve of Spee( Fig 16):** resilient arch wires that have been curved in a direction opposite to that of the curve of Spee can be used to intrude lower anteriors. When these arch wires are inserted into the molar tubes, the anterior segment curves gingivally. This anterior segment is forced occlusally into the bracket slot resulting in an intrusive force on the incisors. A reverse curve of Spee wire on the lower arch acts mainly by tipping molars distally and incisors labially. As the incisors flare labially, angular changes contribute to overbite correction. If the wire is in place for a long enough period and vertical facial growth occurs, premolars extrude and, to a lesser degree molars and incisors get intruded

**Use of utility arches ( Fig 17):** Utility arches are arch wires that are bent in such a way that they bypass the buccal segment and are engaged on the incisors. These arches can be used to perform a number of tooth movements including intrusion of incisors, protraction or even retraction of incisors. They are activated by giving a V bend in the buccal segment of the wire so as to produce a intrusive force on the anteriors

Three piece segmental wires (Fig 18) - This type of wire is used in cases of absolute deepbite where there is no growth potential. Simultaneous retraction and intrusion can be achieved.

#### ***Extrusion of posterior teeth***

Extrusion of posterior teeth can be obtained with the following methods

**Use of archwires with reverse curve of Spee** The extrusion of posterior teeth can be successfully attained by fixed orthodontic appliances by using 0.16 in. round wire with a reverse curve of Spee. The disadvantage of round wire is that it causes undesirable changes in the axial inclination of the buccal teeth and flaring of the incisors

**Use of intermaxillary elastics** ( Fig. 19) Extrusion of molars might be fortified by means of elastics, which attempt to overerupt the molars in both the upper and lower jaws. Use of anchorage bend in the upper jaw as well as in the lower jaw in combination with Class II elastics may cause overeruption of the lower molars and may help to correct a dental deep bite. One of the draw backs of the class II elastics is that it results in extrusion of the upper incisors, in an attempt to overerupt lower molars

#### **Implants ( Fig 20)**

*Implants can be used as Temporary anchoring devices for intrusion of upper anterior teeth. They are used along with fixed appliances*



Fig. .21 Biteplane type retainer.

#### **Retention (Fig 21 )**

Corrected deep overbites in either Class I or Class II malocclusions usually require retention in a vertical plane (moderate retention). If anterior teeth were depressed to achieve overbite correction, a bite plate on a maxillary retainer is desirable. It is worn continuously for perhaps the first 4 to 6 months. Often the incisal edges of the anterior teeth are unworn and require spot grinding and adjusting in some class II Div I cases.

If cases of skeletal deepbite correction is achieved as a result of bite opening. In these cases the

mandible is forced away from the maxilla and the vertical dimensions should be held until growth (i.e., mandibular ramal height) can catch up. The changes of the mandibular plane angle suggest proper retention.

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