AETIOLOGY

SKELETAL PATTERN

DENTAL FACTORS

AETIOLOGY

HABITS

SOFT TISSUES
Cl II Div1 vs Cl II Div 2
CLASS II DIVISION 1

• According to British Standards classification:

“The lower incisor edges lie posterior to the cingulum plateau of the upper incisors, there is an increase in overjet and the upper central incisors are usually proclined.”
SKELETAL PATTERN

• Usually associated with skeletal Class II pattern, due to retrognathic mandible.

• Proclination of the upper incisors &/or retroclination of the lower incisors by a habit or the soft tissues can result in an increase in overjet on skeletal Class I or even a Class III pattern.
SOFT TISSUES

- Influence of soft tissue is mainly mediated by skeletal pattern, antero-posteriorly & vertically.

- Patient’s lips are incompetent, try to achieve anterior oral seal in one of the following ways:
  - Circumoral muscular activity.
  - Forward postured mandible.
  - Lower lip is drawn up behind the upper incisors.
  - Tongue is placed forward between incisors to contact lower lip.
  - Combination of these.
DIGIT SUCKING:
- Proclination of the upper incisors.
- Retroclination of the lower labial segment.
- Incomplete overbite or localized anterior open bite.
- Narrowing of maxillary arch, due to alteration in the balance between cheek & tongue pressure.
DENTAL FACTORS

• Crowding in upper incisors out of the arch labially result in exacerbation of the overjet.
OCCLUSAL FEATURES

- Increased overjet.
- Often increased overbite.
- Incompetent lips.
- Class II molar, canine & incisor relationship.

ANTERIOR OPEN BITE
Clinical Features of Class II - Division 1

- Class II molar relation, that may vary from end on molar to fully fledged class II
- Proclined maxillary anteriors with resultant increased overjet
- Flaring and spaced dentition
V-shaped palatal arch

Deep palate

Excessive curve of Spee

Increased over bite
- Patient may have a short hypotonic upperlip
- Lip trap may be present (placing lower lip against the palatal surface of upper incisor)
- Abnormal buccinator activity leading to a constricted, narrow upper arch. Which predispose to posterior cross bite
- Hyper active mentalis muscle (retrognathic mandible)
CLASS II DIVISION 2

- According to British Standards classification:

“The lower incisor edges lie posterior to the cingulum plateau of the upper incisors. The upper central incisors are retroclined, because of high lower lip line. Overjet is usually minimal or may be increased.”
SKELETAL PATTERN

• Mild skeletal class II pattern.

• Can also be present in association with a class I or even a class III relationship.

• Vertical dimension in class II division 2 malocclusion is typically reduced, results in absence of occlusal stop to lower incisors, leading to increased overbite.
DENTAL FACTORS

- Pre-existing crowding is exacerbated because retroclination of upper central incisors.
A high lower lip line will tend to retrocline the upper incisors.

It may also occur from upper & lower retroclination caused by active muscular lips, irrespective of skeletal pattern.
OCCLUSAL FEATURES

• Retroclined upper central incisors.
• Upper lateral incisors are at an average angulations or are proclined.
• Overbite.
• Lingual crossbite of the 1st and occasionally 2nd premolar.
• Class II molar, canine & incisor relationship.
Class II Division 2 Malocclusion

- Excessive lingual inclination of the maxillary central incisors overlapped on the labial by the maxillary lateral incisors.

- In some cases, both the central and the lateral incisors are lingually inclined and the canines overlap the lateral incisors on the labial.
The Class II Division 2 malocclusion is often accompanied by:

- A U-shaped palatal arch
- A deep overbite and minimal overjet
- With extreme overbite, the incisal edges of the lower incisors may contact the soft tissues of the palate
- In the absence of overjet, mandibular labial gingiva get traumatised by lingually inclined maxillary incisors
**Extra oral features**

**Class II division 1**
- Profile: convex
- Shape of head: dolicocephalic
- Mento labial sulcus: shallow/deep
- Hyper active mentalis: present
- Hypo active upper lip: present

**Class II division 2**
- Profile: straight / convex
- Shape of head: mesocephalic/dolichocephalic
- Hyper active mentalis: absent
- Mento labial sulcus: normal
- Hypo active upper lip: present/absent
DIAGNOSIS

- History
- Intra & extra-oral examination.
- Study models.
- Orthodontic photographs.
- Radiographs.
  - Cephalometrics.
  - Orthopantomogram.
  - Hand wrist radiographs.
FACTORS INFLUENCING DEFINITIVE TREATMENT PLAN

- Likely stability of overjet reduction
- Patient's facial appearance
- Patient's age
- Either skeletal or dental
TREATMENT OF CLASS II MALOCCLUSION
EARLY TREATMENT

- Can be done in pre-adolescent children with the use of functional appliances and then followed by fixed appliances in permanent dentition.
  - *Overall longer treatment time.*
  - *Little difference seen comparatively to children who didn’t undergo early treatment.*

- At present, clinicians belief treatment is best deferred until eruption of permanent dentition where space can be gained for relief of crowding & reduction of overjet by extraction (if indicated) & till then soft tissue maturity increases likelihood of lip competence.
  - *In the interim custom made mouth-guard can be worn for sports.*
MANAGEMENT OF CLASS II SKELETAL PATTERN

• *We have 3 options:*
  
  – Growth modifications.
  – Orthodontic camouflage.
  – Surgical correction.
1. GROWTH MODIFICATIONS

- **Can be achieved by:**
  - Stimulation & enhancement of Mandibular growth, through functional appliances:

<table>
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<tr>
<th>REMOVABLE</th>
<th>FIXED</th>
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<td>Activator.</td>
<td>Herbst appliance.</td>
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<td>Bionatar.</td>
<td>Mandibular anterior repositioning appliance (MARA)</td>
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<tr>
<td>Frankel.</td>
<td>Cemented Twin-Block.</td>
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<tr>
<td>Twin-Block.</td>
<td>Forsus appliance.</td>
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Functional appliances

• Tooth Borne

• Tissue Borne

• Tooth and Tissue Borne
  – Dental
  – Skeletal
BIONATAR
FRANKEL APPLIANCE
TWIN BLOCK
FUNCTIONAL APPLIANCE
The Herbst appliance holds the lower jaw in a forward position while pushing the upper jaw backward.
CEMENTED TWIN-BLOCK
1. GROWTH MODIFICATIONS

- Can be achieved by:
  - Redirection of Maxillary growth by extra-oral appliance, *headgear*.
HEADGEAR

**FOR CLASS II SKELETAL PATTERN:**

- High pull/ parietal headgear.
- Cervical headgear.
- Occipital pull (combination).
2. ORTHODONTIC CAMOUFLAGE

- Orthodontic camouflage means that the jaw discrepancy is no longer apparent.

- Following three patterns of tooth movement can be used to correct class II malocclusion:
  - Non-extraction treatment with class II elastics.
  - Retraction of maxillary incisors into a premolar extraction space.
  - Distal movement of upper teeth.
NON-EXTRACTION TREATMENT WITH CLASS II ELASTICS

- It’s a combination of retraction of upper teeth and more forward movement of lower teeth comparatively to upper, without tooth extractions.

- After treatment, lip pressure moves lower incisors lingually leading to:
  - Lower incisor crowding.
  - Return of overjet.
  - Return of overbite.
RETRACTION OF MAXILLARY INCISORS INTO A PREMOLAR EXTRACTION SPACE

- Extraction of maxillary 1st premolar, leading to retraction of incisors in premolar space without lower extraction:
  - Class II molar relationship.
  - Normal overjet.
  - Class I canine relationship.

- Extraction of maxillary 1st premolar and mandibular 2nd premolar, with the use of class II elastics, bring lower molars forward & retract upper incisors:
  - Class I molar relationship.
  - Class I canine relationship.
  - Normal overjet.
DISTAL MOVEMENT OF UPPER TEETH

- Rotation of maxillary first molars mesiobuccally, correcting rotation moves buccal cusps posteriorly & provides at least a small space mesial to the molar.
DISTAL MOVEMENT OF UPPER TEETH

- Extraction of 2\textsuperscript{nd} molar creates a space for distal movement of maxillary 1\textsuperscript{st} molar, then with the help of combination distalization-expansion appliance (PENDEX) distal tipping of the molars is done which opens about 2/3\textsuperscript{rd} of space between premolar & molar, which provides \textit{no more than molar half-cusp correction}. 
DISTAL MOVEMENT OF UPPER TEETH

- Bone anchors are placed bilaterally in the vicinity of base of zygomatic arch (Edward Angle’s “key-ridge”) or in palate, & a nickel-titanium spring generates the force needed for distilization.
3. ORTHOGNATHIC SURGERY

SAGGITAL SPLIT OSTEOTOMY
MANDIBULAR ADVANCEMENT.
SLIDING GENIOPLASTY
MAXILLARY SEGMENTAL SET BACK OSTEOTOMY
POST-CONDYLAR CARTILAGE GRAFT

- It is used for severe mandibular retrognathism in growing children. Insertion of a block of cadaveric or autologous cartilage behind the condylar head can produce results analogous to instantaneous functional appliance treatment in class II division 1 malocclusion, with remodeling of condylar fossa.
REFERENCES

• CONTEMPORARY ORTHODONTICS WILLIAM R. PROFFIT (5TH EDITION)
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Thank you