# IN THE NAME OF GOD

# CL III DIAGNOSIS

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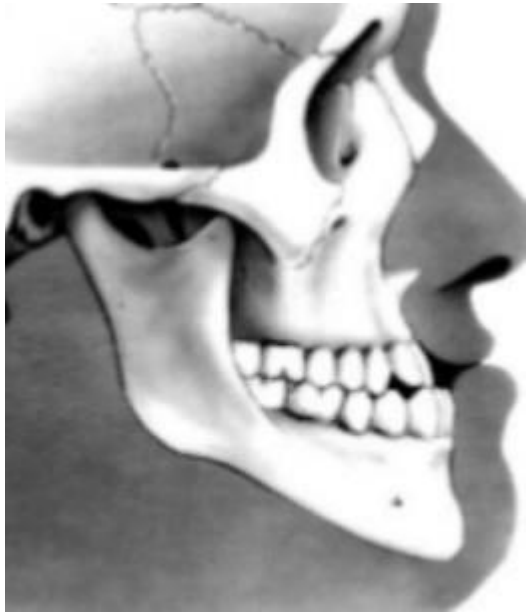
# DEFINITION



# DEFINITION

- Incisor relationship as ‘’the lower incisal edge lies anterior to the cingulum plateau of the the upper incisors
- According to AngleAccording to Angle (1899): defined as class III molar relation with the mesio – buccal cusp of the maxillary first permanent molar occluding in the inter dental space between the mandibular first and second molars. Or lower permanent molar is ahead of the upper first molar by a distance of the width of a premolar or half the width of a molar

- Skeletofacial Class III malocclusion can be defined as skeletofacial deformity characterized by a forward mandibular position with respect to the cranial base and maxilla.

# PREVALENCE

- Caucasians 1 to 4 % 7 to 13 Years - 4.2% 14 to 18 Years - 9.4%
- African – Americans 5 to 8%
- Asian Maxillary deficiency

-Japanese: 4 % younger / 14 % older

- Chinese: 3 % younger / 13 % older
- Indians: 1.3% (J Ind. Ped & Prev Dent: 1998 – Uteraja et al)
- Iranian: 2.1% (East Mediters Health J: 2006: Danaie et al)

# ETIOLOGY

- multifactorial etiology. It can be broadly classified as:
- **Genetic:** – 33 out of 40 decendants of the HABSBURG family had a class III jaw : prognathic lower jaw
- **Ethnic:**
  - 3% in Caucasians
  - 5% african american
  - 14% chinese and Japanese
  - (3.4% indians)

# ETIOLOGY

- **Environmental (epigenetic)**:

– Large tongue

– Forward tongue position ( eg in cases of adenoids)

– Mouth breathing

- **Syndroms:**

- Apert

- Cruzons

# ETIOLOGY

- **Systemic**:

– Acromegaly and hemi mandibular hypertrophy: Acromegaly is caused by anterior pituitary tumour that secretes excessive amount of growth hormone. Here excessive mandibular growth occurs creating a skeletal class III malocclusion.

– Teratogenic: Teratogens causing cleft lip and palate are aspirin, cigarette smoke (hypoxia), dilantin, 6-mercaptopurine, valium vitamin D excess causes premature closure of sutures and might lead to class III malocclusion.

- **Habits**:

protruding the mandible

# CAUSES OF REVERSE OJ

| cause | Aetiology |
|---|---|
| **Skeletal pattern (Class III)** | - Long mandible<br>- Forward placement of glenoid fossa positioning the mandible more anteriorly<br>- Short and/or retrognathic maxilla<br>- Short anterior cranial base |
| **Anterior mandibular displacement on closure** | - Premature contact |
| **Retained primary upper incisors** | These may deflect the eruption path of their successors palatally into crossbite |
| **Restrained of maxillary growth** | - Found in repaired cleft lip & palate & attributed to the effect of postsurgical scar tissue |

| | |
|---|---|
| Retained primary upper incisors | These may deflect the eruption path of their successors palatally into crossbite |

# PSEUDO CL III

| cause | Aetiology |
| --- | --- |
| Anterior mandibular displacement on closure | - Premature contact |

Causes of an reversed overjet

| cause | Aetiology |
| --- | --- |
|  |  |
| Restrained of maxillary growth | - Found in repaired cleft lip & palate & attributed to the effect of postsurgical scar tissue |

# SPEECH

- Difficulty in pronunciation of labiodental **F & V**

# CLASSIFICATION

- Dentoalveolar
- Skeletal
- Pseudo cl III

# PSEUDO CL III

- The pseudo class 3 malocclusion is often due to collapse of the arch perimeter resulted from:
- Caries in some Eastern societies (caries collapse)
- TSD or small, missing or impacted or palatal positioning of the upper teeth (perimeter-collapse)

# PSEUDO CL III

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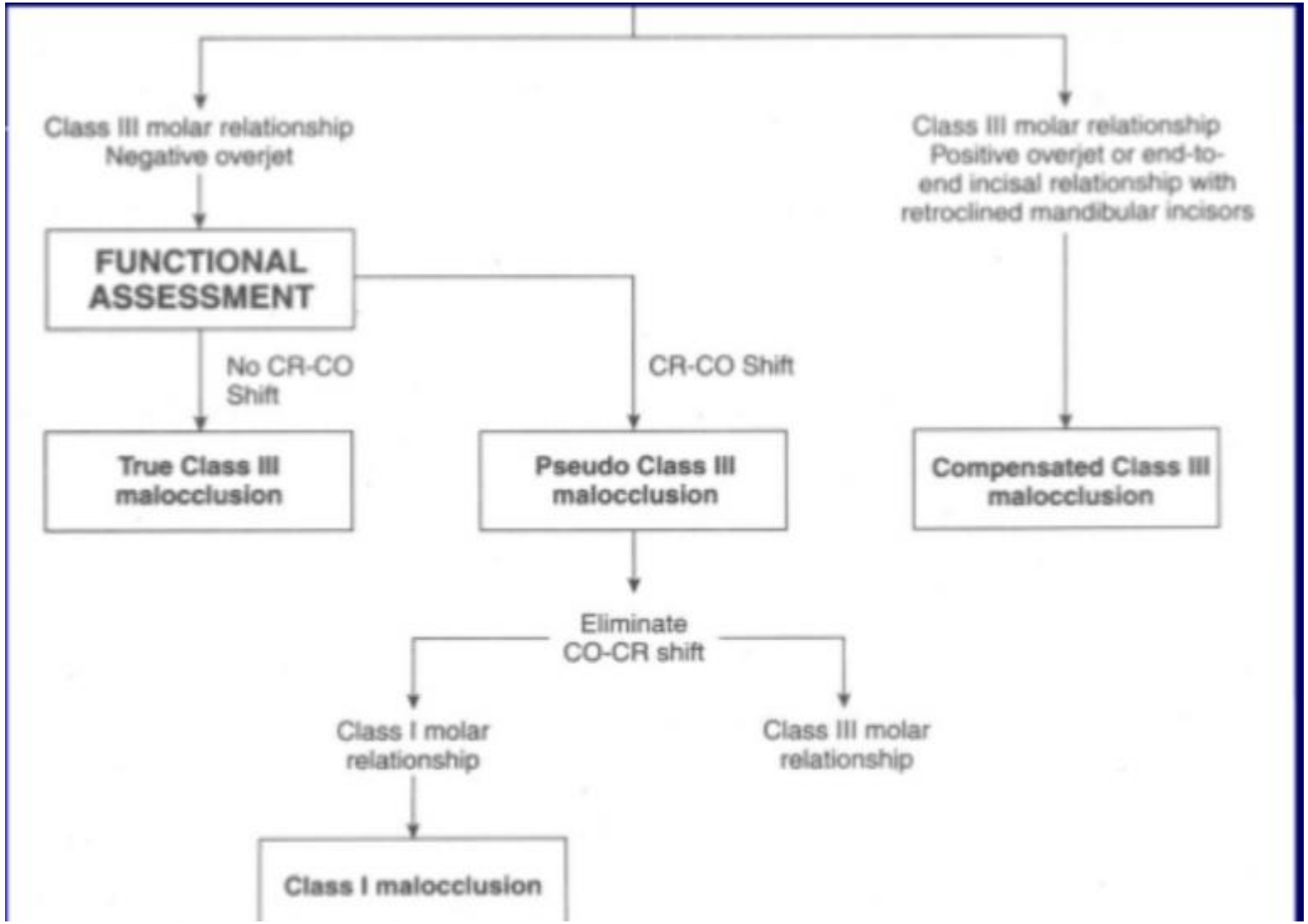
# PSEUDO CL III

| cause | Aetiology |
| --- | --- |
| Anterior mandibular displacement on closure | - Premature contact |

Causes of an reversed overjet


Class III molar relationship
Negative overjet
Class III molar relationship
Positive overjet or end-to-end incisal relationship with retroclined mandibular incisors
FUNCTIONAL ASSESSMENT
No CR-CO Shift
CR-CO Shift
True Class III malocclusion
Pseudo Class III malocclusion
Compensated Class III malocclusion
Eliminate CO-CR shift
Class I molar relationship
Class III molar relationship
Class I malocclusion

# DENTAL CL III

- Hypodintia / impacted tooth in maxilla
- Over retained of maxillary deciduous tooth
- Retroclined upper teeth/ Proclined lower teeth

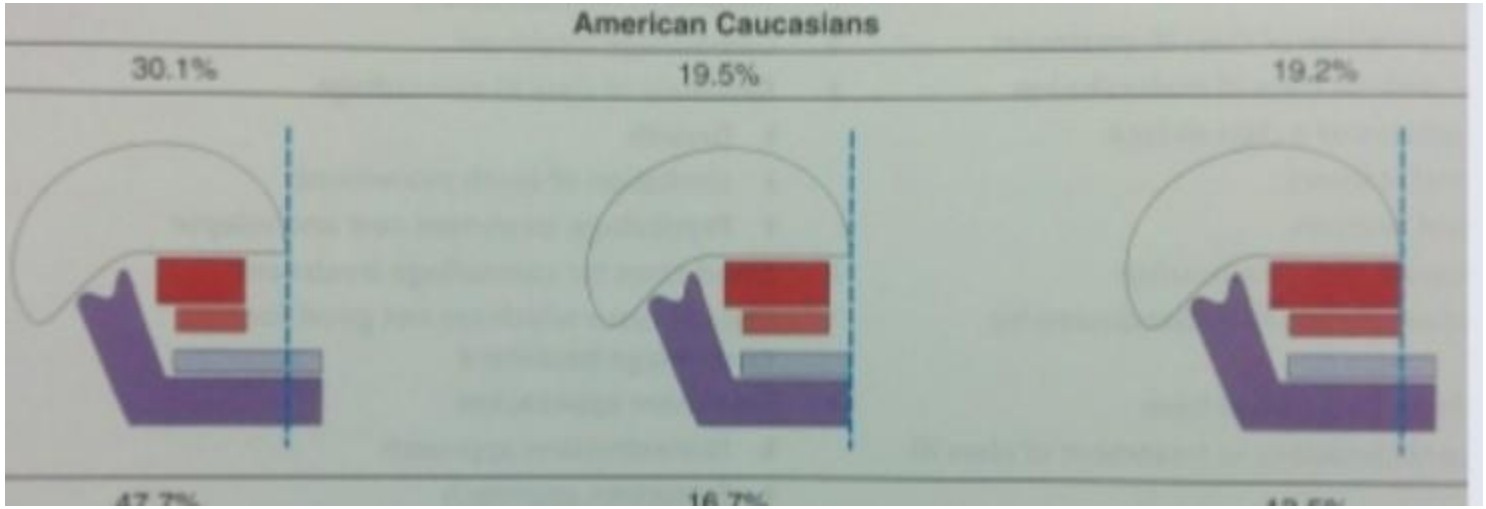
# CLASSIFICATION OF SKELETAL CL III

- Acc to Delaire, Class III malocclusion can be classified as:
- 1. Maxillary retrusion with mandibular retrusion
- 2. Orthognathic maxilla with prognathic mandible
- 3. Maxillary and mandibular protrusion
- 4. Maxillary retrusion with orthognathic mandible
- 5. Maxillary and mandibular retrusion
- 6. Maxillary retrusion with mandibular protrusion
- 7. Orthognathic maxilla with mandibular retrusion
- 8. Maxillary protrusion with mandibular orthognathia
- 9. Maxillary protrusion with mandibular retrusion

# COMPONENTS OF SKELETAL CL III

- Guyer et al found that approximately 57% of the patients with either a normal or prognathic mandible showed a deficiency in the maxilla.
- In a sample of Chinese patients, Wu, Peng, and Lin found the percentage of skeletal Class III malocclusion with maxillary retrusion to be as high as 75%.
- Contemporary studies have found Class III to be composed of pure mandibular protrusion (19.1% to 45.2%), pure maxillary retrusion (19.5% to 37.5%), or a combination of mandibular protrusion and maxillary retrusion (1.5% to 30%).
- According to Ellis and McNamara 1984 and Sue et al 1987, maxillary retrognathism is present in 62% to 67% of all class III patients
- According to Bell et al AJO 1981 maxillary retrognathism was found in 30–40% and Jacobson et al AJO 1974 reported that the one-quarter of Class III malocclusions demonstrated retruded maxilla

# COMPONENTS OF SKELETAL CL III



# Mandibular prognathism

## Maxillary deficiency

## Differentiation between mandibular prognathsim & maxillary deficiency

| | Maxillary deficiency | Mandibular prognathism |
|---|---|---|
| Frontal | Tendency to show sclera | Normal show of sclera |
| | Sallow paranasal form | Normal paranasal form |
| | Narrow alar base width | Normal alar base |

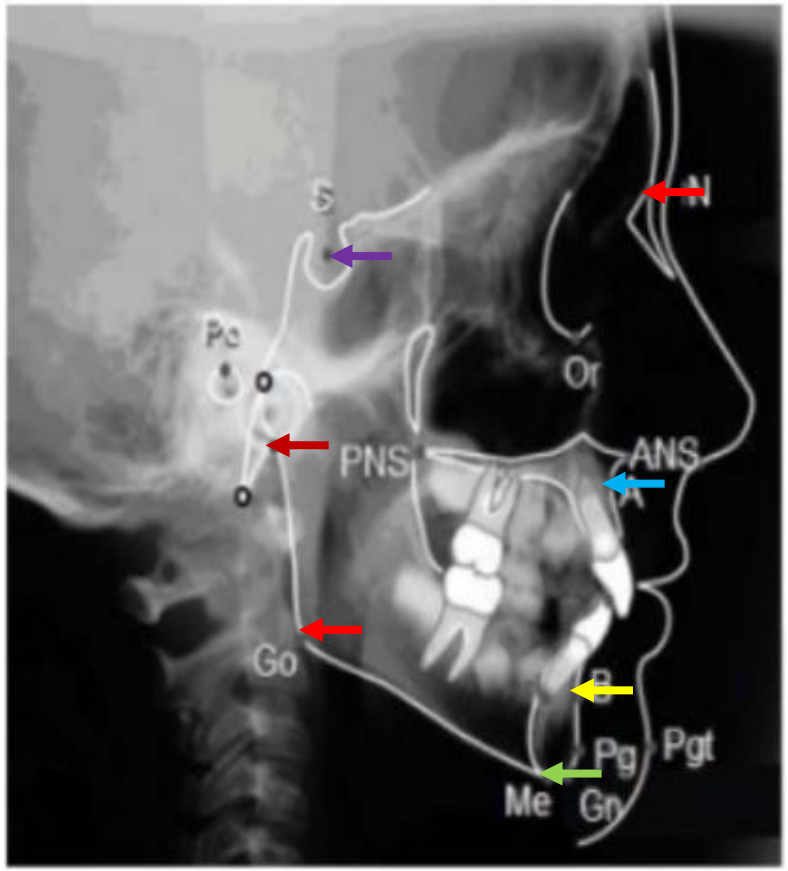
| | | |
|---|---|---|
| | Tendency of upper lip to be thin | Normal upper lip |
| | Normal chin projection | Prominent chin |
| | Normal to decreased lower facial height (LFH) | Normal, increased or decreased lower facial height (LFH) |
| Profile | Nasolabial line-Subnasale: subnasale-tip of nose ,usually not 1:1 ratio | Normal |
| | Nasal tip down | Normal |
| | Obtuse nasolabial angle | Normal nasolabial angle |
| Smiling assessment | Less incisor visible | Good |
| Cephalometric assessment | Normal to decreased total facial height | Increased total facial height |
| | Short Pty-ANS | normal |
| | Facial concave | Anterior divergent |
| | Normal ramus width | Narrow |

| | Maxillary deficiency | Mandibular prognathism |
|---|---|---|
| Occlusal Assessment | Tendency toward crowding and missing teeth in the upper | Spacing in lower arch |
| | Transverse deficiencies noticeable in maxillary arch | Normal |

# SKELETAL CL III

- **Vertical:** Deficient / Normal / excess
- **Anterio-Posterior components** : • Maxillary Deficient • Mandibular excess • Combined Maxillary deficient and mandibular excess

# Landmarks




**(A)**
Deepest concavity on anterior profile of maxilla

**(B)**
Deepest concavity on anterior surface of mandibular symphysis

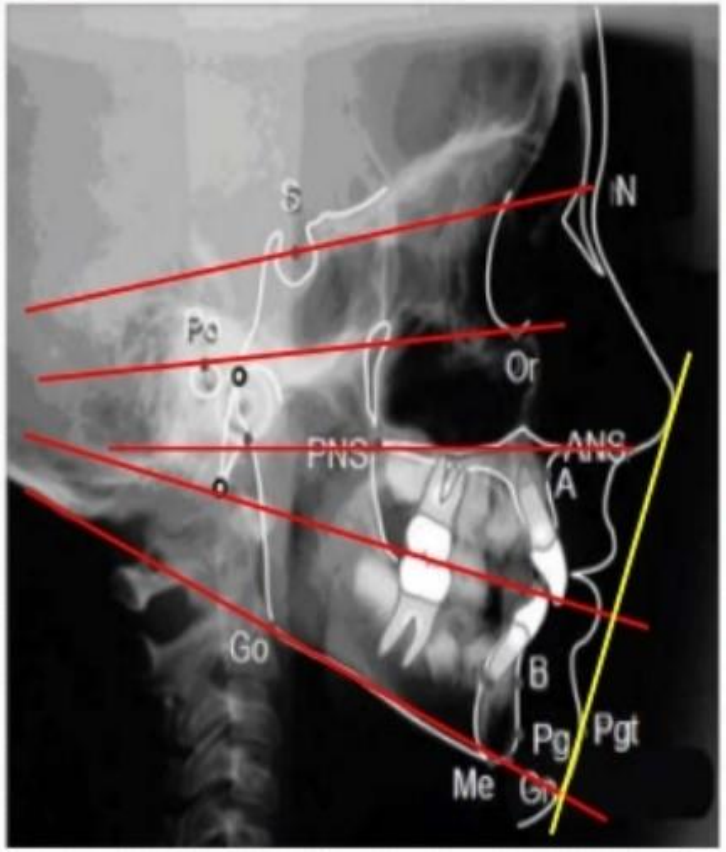
**Anterior nasal spine (ANS)**
Tip of anterior process of maxilla

**Posterior nasal spine (PNS)**
Tip of posterior nasal spine of maxilla

**Pogonion (Pg)**
Most anterior point on bony chin

**Nasion (N)**
Deepest point on frontonasal suture

# Planes




**SN line**
A line joining sella(S) and nasion(N) representing the anterior cranial base

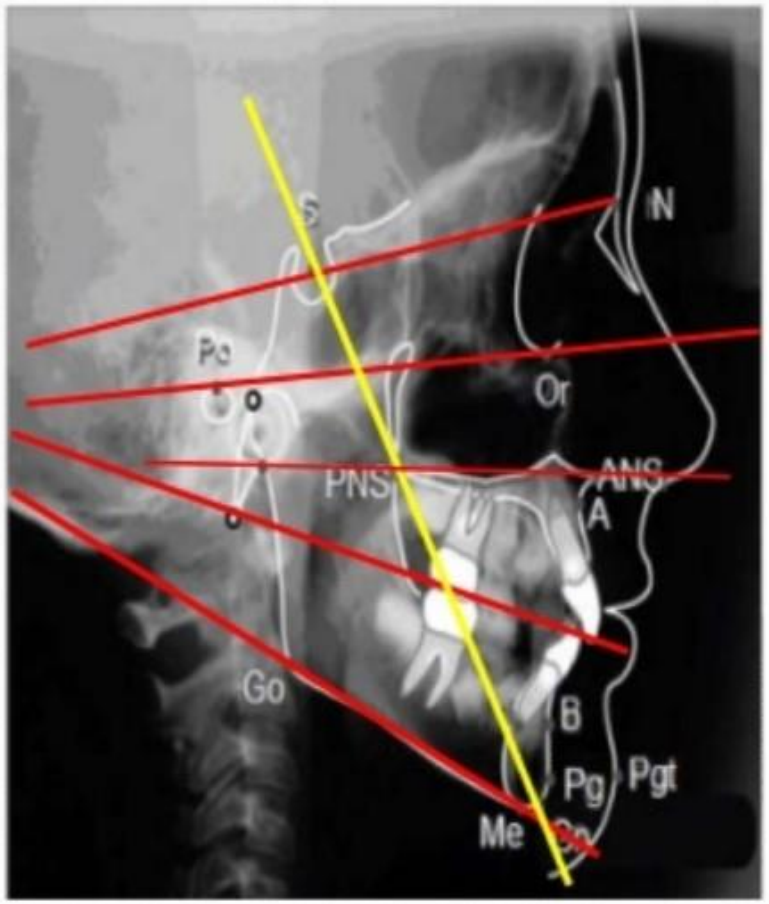
**FH Frankfort horizontal plane**
A line joining porion(Po) and orbitale(Or)

**OP Functional occlusal plane**
A line drawn between the cusp tips of the permanent molars and the premolars or deciduous molars

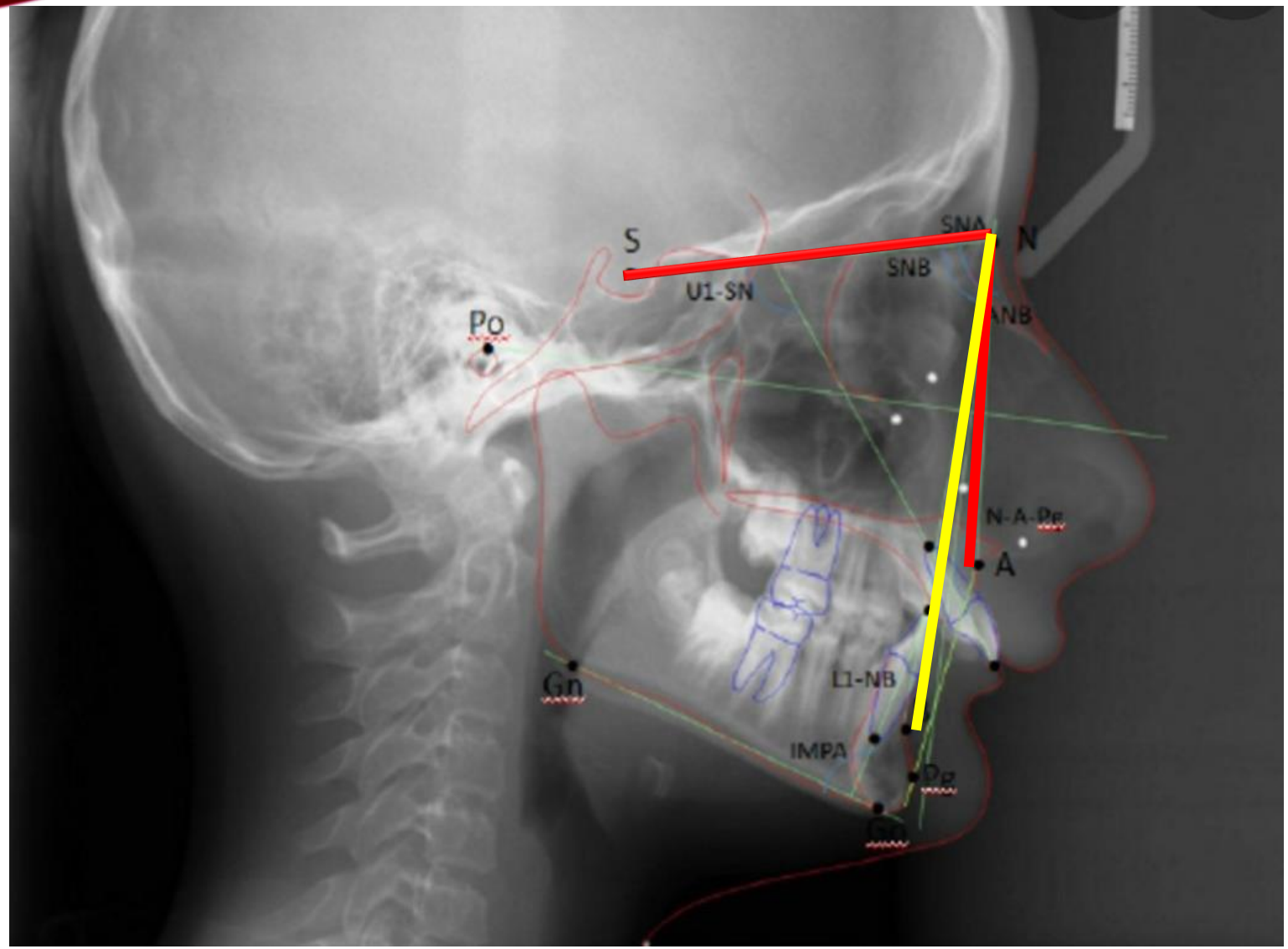
**Md Mandibular plane**
A line joining gonion(Go) and menton(Me)

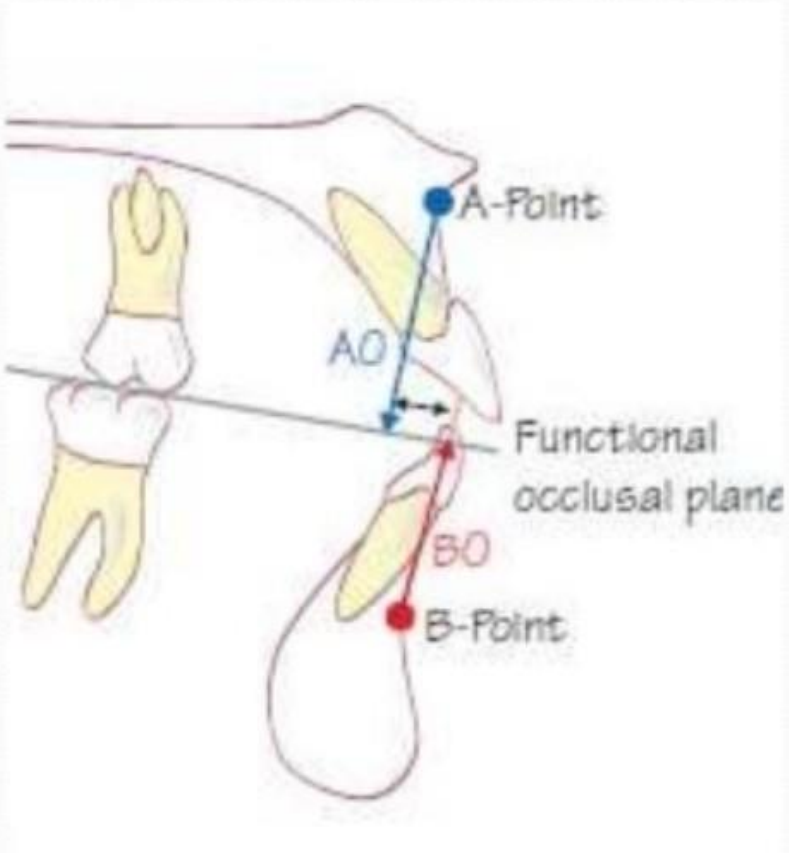
**Mx maxillary plane**
A line joining ANS &PNS

**E Ricketts ' E - line**
A soft tissue line tangential to chin(Pg soft tissue ) and nasal tip




SNA
SNB
ANB
MMPA
Y-axis (growth) Angle between Frankfort H. plane and line from sella turcica and Gnathion
Mandibular plane angle (MPA) SN-Go.Me
U1-L1 angle (interincisal angle)
L1-MP


S
N
SNA
SNB
U1-SN
ANB
Po
N-A-Pg
A
Gn
L1-NB
IMPA
Pg
Gn

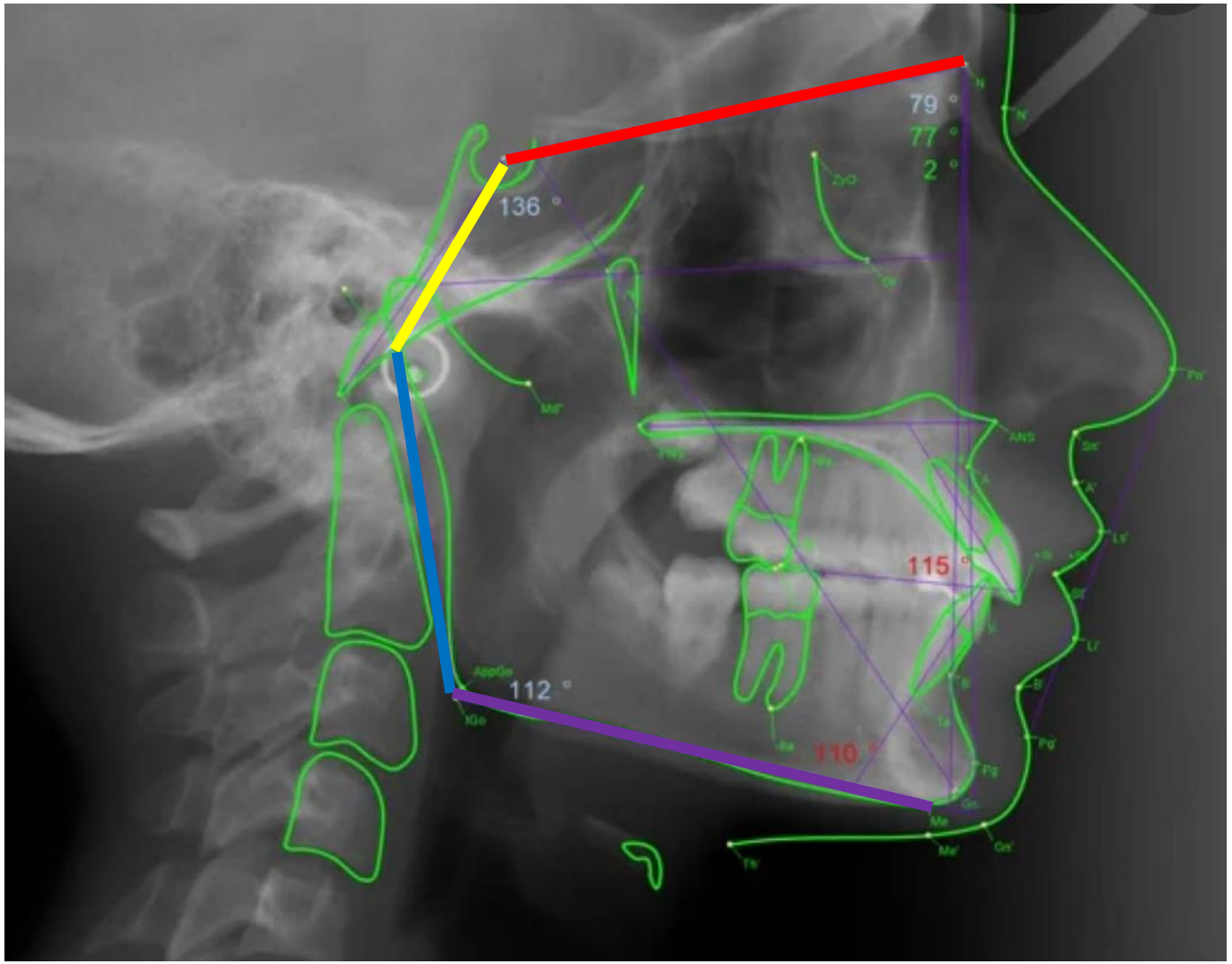



# Wits Aprasial

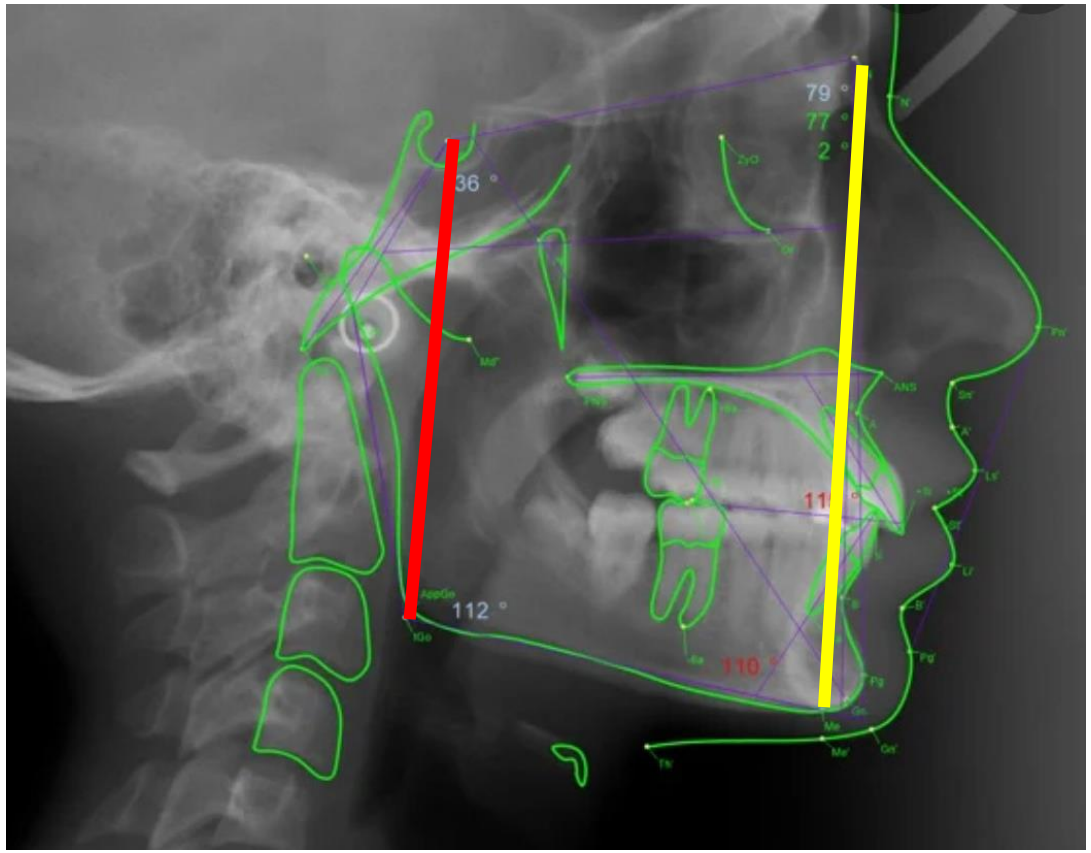
*average jaw relationship is -*1 mm in Males (AO is behind BO by 1mm) & zero mm in Females (AO and BO coincide)*

***Skeletal***

| | Parameter | Mean |
|---|---|---|
| *Sagittal skeletal analysis* | SNA | 82±2° |
| | SNB | 80±2° |
| | ANB | 2° |
| | Facial angle to FH | 88.7° |
| | Witt's App. | 0 to -1 mm |


79 °
77 °
2 °
136 °
115 °
112 °
110 °

| | Parameter | Mean |
|---|---|---|
| *Vertical skeletal analysis* | Saddle angle | 123±5° |
| | Articular angle | 143±6° |
| | Gonial angle | 130±6° |
| | Sum of Bjork | 396° |
| | SN-Go . Gn | 32° |
| | FMA | 25° |
| | Y-axis to FH | 60° |
| | Jaraback index | 62-65° |
| | Pn-Pal (Inc.a) | 85° |
| | Pal-GoMe(Basal a.) | 25° |


79 °
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36 °
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110 °

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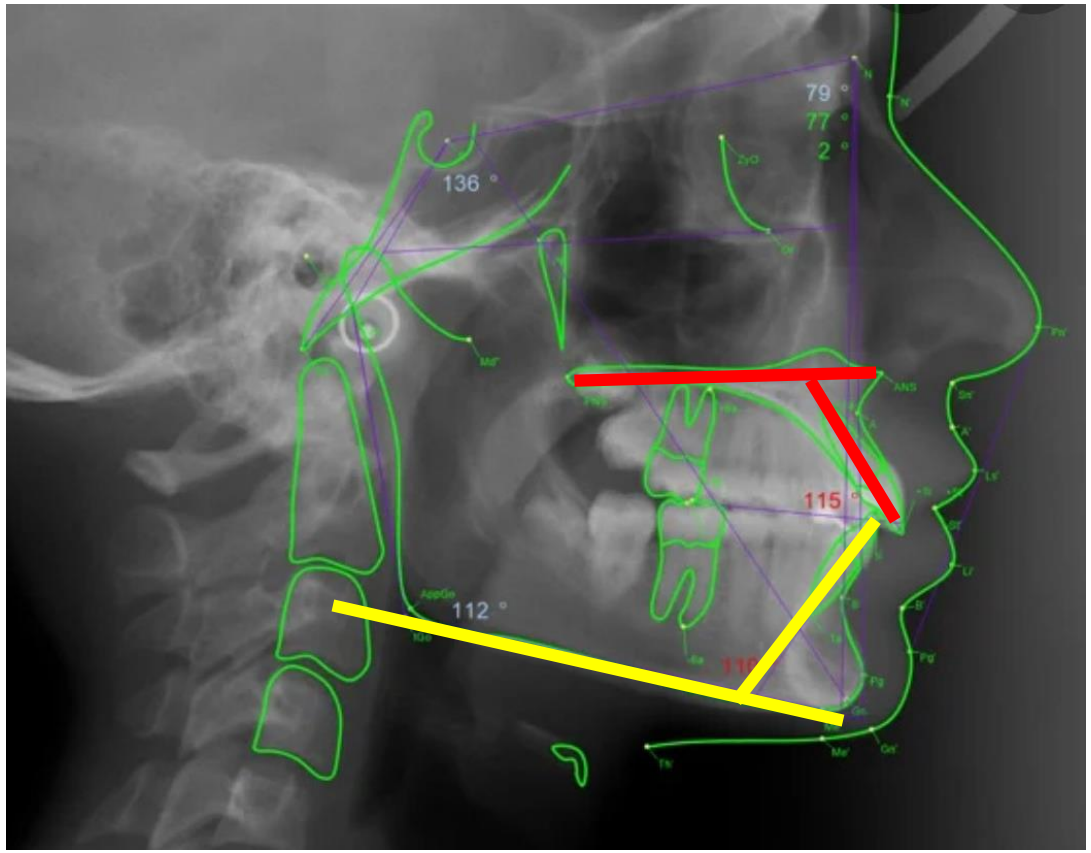
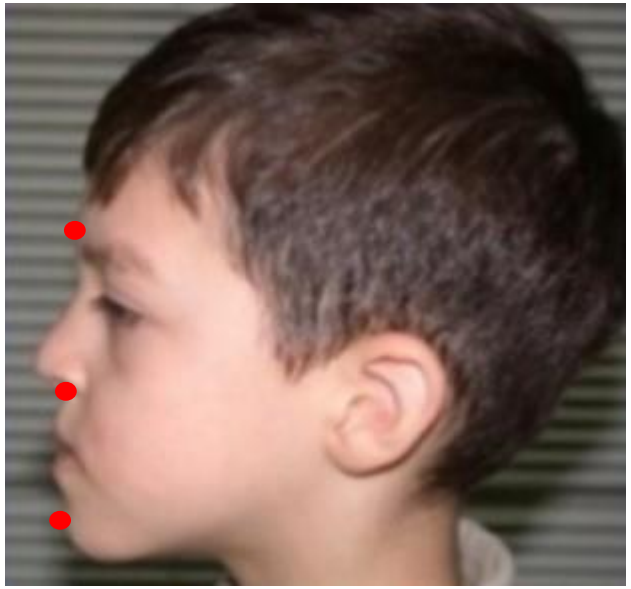

79 °
77 °
2 °
136 °
115 °
112 °

| | | Parameter | Mean |
|---|---|---|---|
| *Dental Analysis* | Upper | 1 to NA | 22° |
| | | 1 to NA | 4 mm |
| | | 1 to FH | 112° |
| | | 1 to SN | 103° |
| | | 1 to Pal | 110° |
| | | N-Pog to 1 | 2-4mm |
| | Lower | $\overline{1}$ to NB | 25° |
| | | $\overline{1}$ to NB | 4 mm |
| | | IMPA | 90° |
| | | FMIA | 65° |
| | | N-Pog to $\overline{1}$ | -2 to +2 |
| | | Interincisal a. | 135° |

# EARLY EXTRAORAL SIGNS OF A DEVELOPING CLASS III

- Early signs of true progressive mandibular prognathism can be observed from infancy.
- Straight or concave facial profile
- Malar deficiency
- Increased lower anterior facial height
- Anatomically large lower lip length

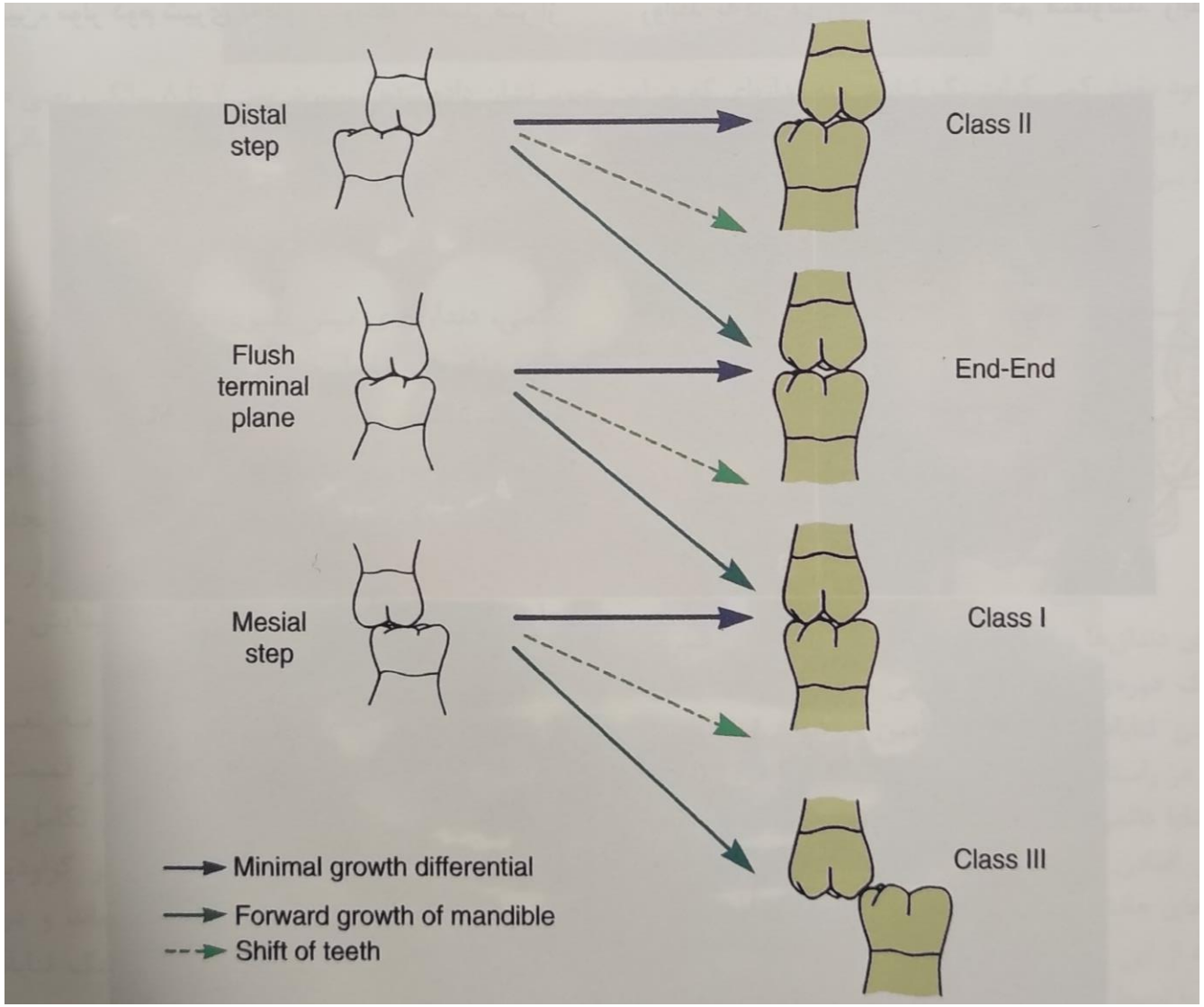


# EARLY INTRAORAL SIGNS OF A DEVELOPING CLASS III

- Eruption of the maxillary central incisors in a lingual relationship and the mandibular incisors in a forward position with no overjet.
- Development of an incisal crossbite during the eruption of the lateral incisors into a normal relationship.
- Flattening of the tongue as it drops away from the palatal contact and postures forward, pressing against the lower incisors

# EARLY SIGNS OF A DEVELOPING CLASS III

- Zero overjet
- Unilateral/ bilateral posterior crossbite
- Proclined maxillary incisors and retroclined mandibular incisors
- Wide lower arch and narrow maxillary arch
- Flat curve of spee


Distal step
Flush terminal plane
Mesial step
Class II
End-End
Class I
Class III
Minimal growth differential
Forward growth of mandible
Shift of teeth

- GTRV analysis is performed in early permanent dentition.
- This helps clinicians to decide whether the malocclusion can be camouflaged by orthodontic or by surgical intervention once the growth is completed.


GTRV =Horizontal growth changes of maxilla

Horizontal growth changes of mandible

- GRTV ratio normal individual 0.77 mm at 8-16 year.

In case of Class III patient have GTRV Ratio 0.33-0.38 mm maxillary deficiency and can be successfully treated by with camouflage

Class III patient with excessive mandibular growth with GTRV<0.38 mm then it indicated Orthognathic surgery.


MEAN ANNUAL GROWTH INCREMENT
EARLY MIXED DENTITION
LATE MIXED DENTITION
MAXILLA
0.8mm / 1.1 mm
1.1 mm / 1.4 mm
MANDIBLE
4.5mm / 2.6 mm
4.4 mm / 2.8 mm
Class III
Normal growers