Introduction to Orthodontics

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Orthodontics

- Orthodontics is a branch of Dentistry concerned with the prevention, interception and correction of malocclusions and other dento-facial abnormalities.
- The treatment, therefore, can be categorised as :
  - Preventive
  - Interceptive
  - Corrective/Definitive/comprehensive

Malocclusion

- Malocclusion (= a basic orthodontic defect) may be defined as a constant occlusal dysfunction, which may exist before, during and after development of occlusion.

- The individual characteristics of malocclusion do vary with age.

- These individual characteristics may involve defects in:
  - skeletal, such as the mandible disproportion in size to the maxilla
  - dental, such as a discrepancy in the size of the teeth and jaws, or
  - Neuromuscul

Health risks related to Malocclusion

- Health risks include:
  - Damage to teeth and surrounding structures
  - Functional disorders
  - Psychological stress
  - Late sequelae
- Malocclusion may lead to:
  - Discrimination because of facial appearance
  - Problems of oral function (i.e. mastication speech, Swallowing), including TMD
  - Greater susceptibility to trauma, periodontal Dx, or dental caries.

Prevalence of Malocclusion

- The prevalence of malocclusion can be determined for various population groups such as:
  - Stages of dental development
  - Age groups
  - Ethnic groups
  - Racial groups
  - Geographical areas

Attitude to facial appearance

- **Have been influenced by:**
  - Increased disposable income
  - Expansion of the press and media
  - The impression that looking youthful and attractive aids success in the workplace and in social settings
  - Increased and more targeted advertising to consumers
  - Possibility of correcting a condition allows people to consider the condition to be unacceptable

Goals of Orthod Tx

- To intercept the deviations from the normal development of the dento-facial region or restore normal/ favourable environment in which normal development can be resumed

- Improve dento-facial aesthetics
  - Malocclusion results in social handicap and even affects individual's self-esteem, affects students progress in class, in employability and in competition for a mate

  these problems are not just cosmetic!!!

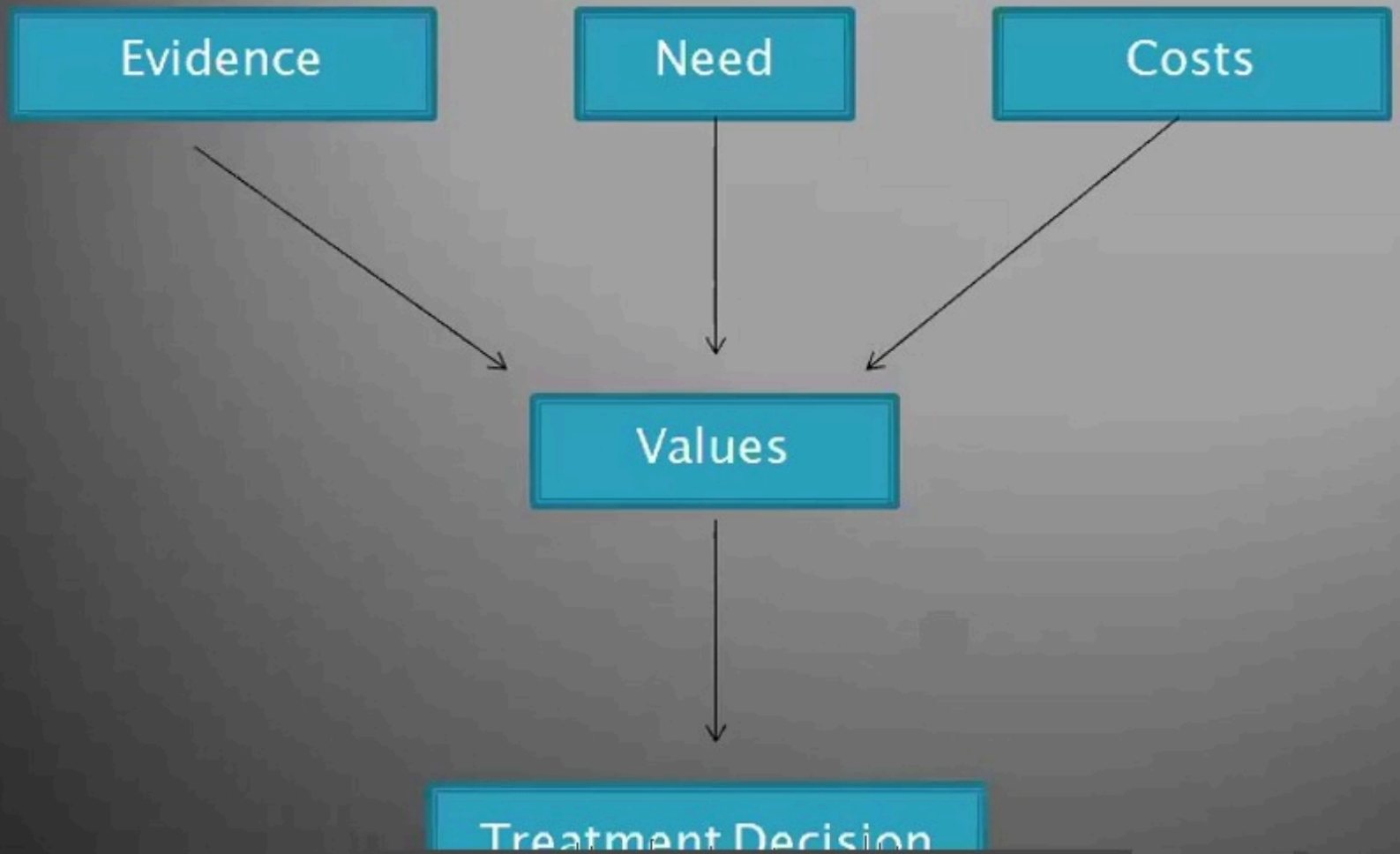
- Improve oral functions

- Prevent dental diseases such perio Dx, dental caries, TMD

Need of Ortho Tx

- Is the clinician's assessment of the necessity of performing treatment, Nanda & Kapila, 2010
- Usually assessed by clinicians using specific indices.
- Assessment of individual treatment needs is process that varies in different countries, depending on the structure of healthcare and orthodontic care

Value based healthcare



Methods of Malocclusion Assessment

- No universally accepted method exists
- Qualitative – e.g. Angle, Bjork et al, Proffit and Ackerman, WHO 2013
  - NOTI – Need for orthodontic treatment
  - ICON–index of complexity, outcome and need
- Quantitative – Tx Priority Index (Grainger, 1967)

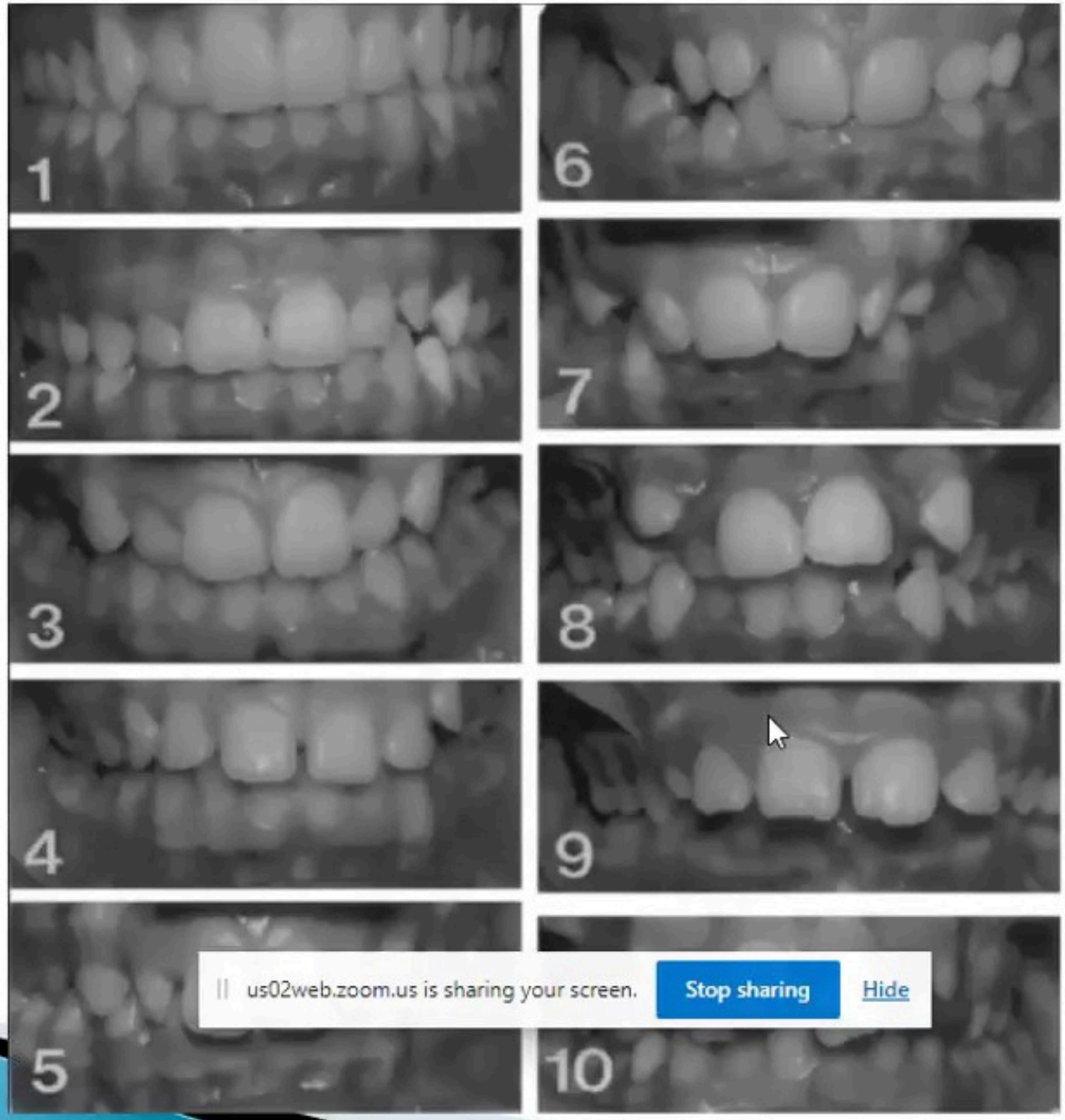
  – Occlusal index (Summer)

  – IOTN (Shaw et al, 1989); places pts in 5 grades from "no need for Tx" to "Tx need" . With 2 components: dental health and aesthetic

IOTN-DH Component

- The need for orthodontic treatment can be assessed by means of the DHC of the IOTN (Brook and Shaw, 1989).
- The DHC of the IOTN has five grades:
  - grades 4 and 5 represent high priority for treatment,
  - grade 3 borderline need, and
  - grades 1 and 2 no or little need for treatment

The Aesthetic Component of the IOTN



Oral health related quality of Life (OHrQL)

- Few tools for measurement for OHrQL have been developed especially for children eg COHIP (Child Oral Health Impact Profile)

- Proper measurement of OHrQL can be used to assess both the need for and outcome of clinical interventions from the perspective of the individual in question or the popula

Demand of Ortho TX

- Demand is the patient's expressed desire for treatment (Nanda & Kapila, 2010)
- Demand is indicated by the no. of patients who actually make appointments and seek orthodontic care
- Adults (upto 20% in developed world) are increasingly demanding Orthod Tx as do younger people

Financial Implications

- Ideally, patients, orthodontic professional , and third parties should agree on the method for the distribution of the financial resources

- The amount of money for orthodontic care should be balanced with the extent of orthodontic care required by the populations

- To guarar[illegible]dontic care is accessible for those who need it and want it, a balance must be struck

Orthodontic assessment

- Involves identifying the causes of dental, skeletal or soft tissue abnormalities, with reference to their effects on oral functions
- This is considered together with growth stage, development and facial aesthetics
- Examination of the dentition includes the condition of the individual teeth, their position in the dental arch, and their relationship to teeth in the opposing jaw
- Assessment of Orthodontic records/ interpretation of diagnostic

Clinical examination

- **Clinical and diagnostic records are used to establish:**
  - Prominence in the lips, nose and chin
  - Whether the profile is straight, concave or convex
  - The relative retrusion or prominence of Mx or Mn and their relation to the cranium
  - The anterior and posterior facial heights and proportions
  - Divergence of the mx and Mn

Parafunctional activity

- Four main groups should be checked:
  - Tooth to tooth contacts
  - Tooth to soft tissue
  - Soft tissue to soft tissue
  - Tooth to foreign objects

Ideal/Optimal occlusion

- **Static occlusion (Andrew's six keys)**
  - Andrew's Class I molar relationship
  - No rotations
  - Tooth inclination
  - Tooth angulation
  - No spaces
  - A relatively level curve of Spee (0–1.5mm)
- **Functional occlusion (Roth, 1981)**
  - Centric Relations = Centric Occlusion
  - Lateral excursions
    - Contacts and interferences
    - Canine guidance/group function
  - Incisor guida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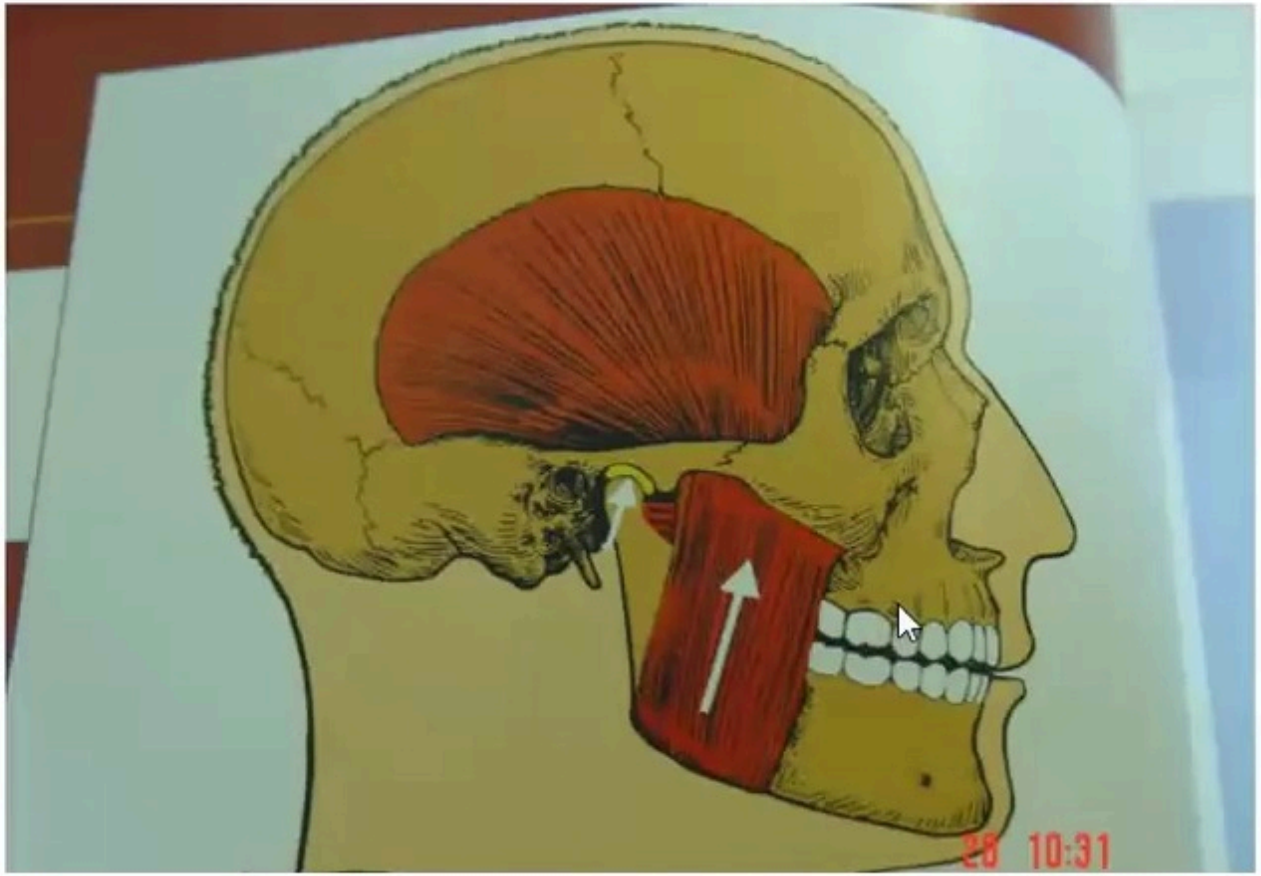
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the fingers be located on the

Aesthetics in orthodontics

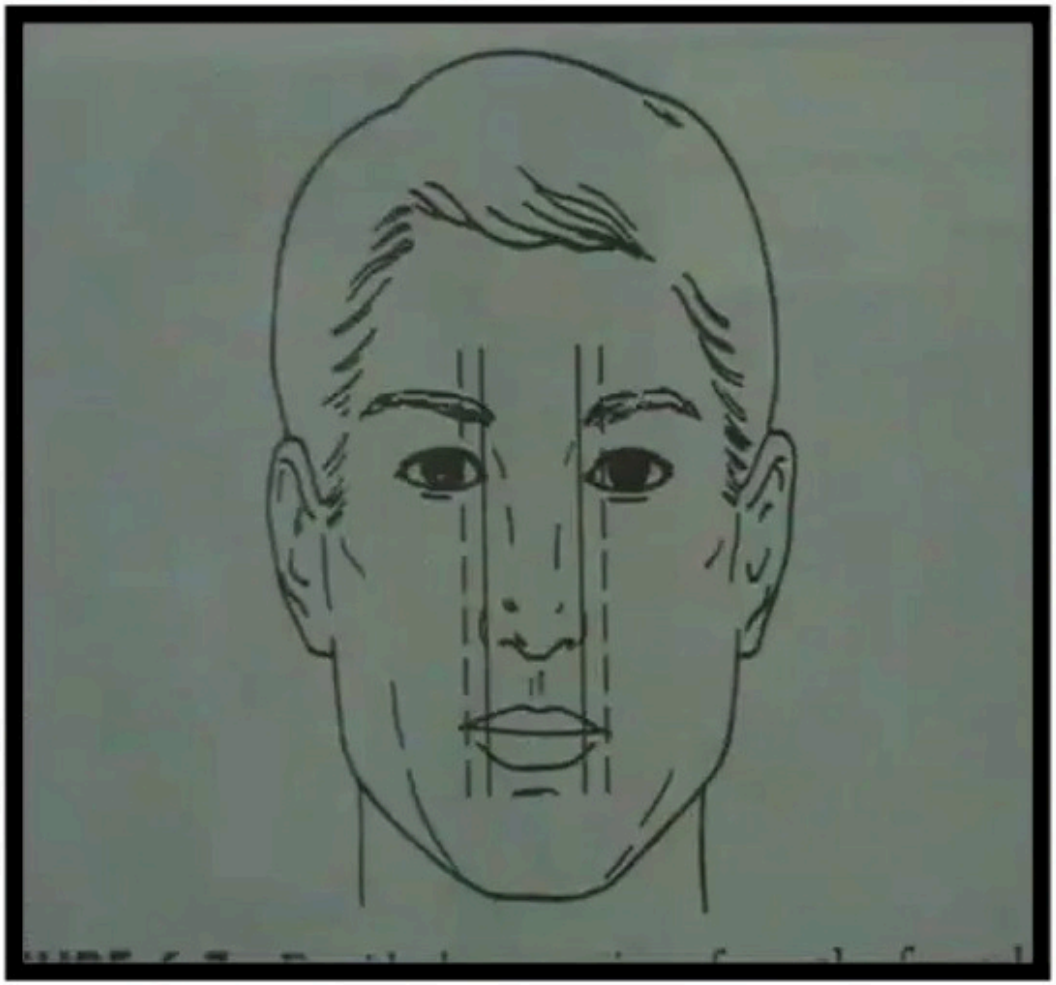
- **Facial aesthetics**
  - Facial symmetry
  - Harmonious frontal and profile proportions, optimal lip and smile aesthetics

- **Dental aesthetics**
  - Ideal tooth shape, size and colour
    - Crown width
    - Gingival levels and form

EVALUATION OF FACIAL PROPORTIONS

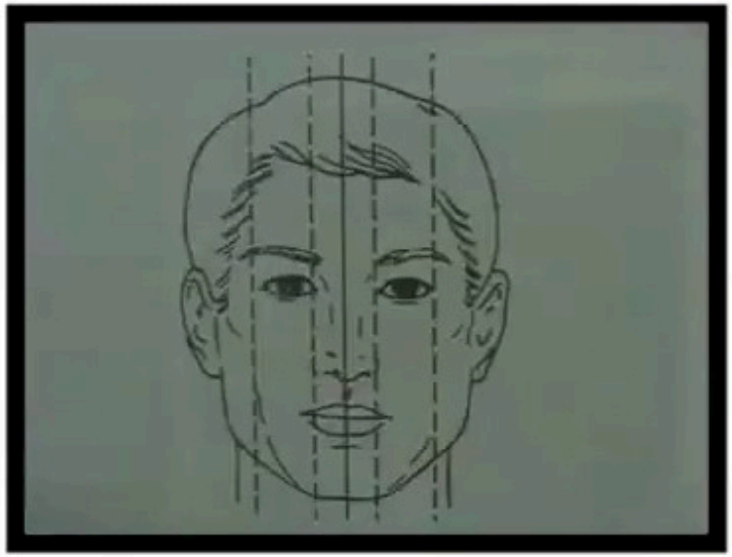
- Frontal examination for proportional widths of the eyes/nose/mouth and bilateral symmetry

- For ideal proportions the width of the base of the nose should be approximately the same as the inter-innercanthal distance (solid line) while the width of the mouth should approximate the distance between the irises



Facial symmetry in the frontal plane

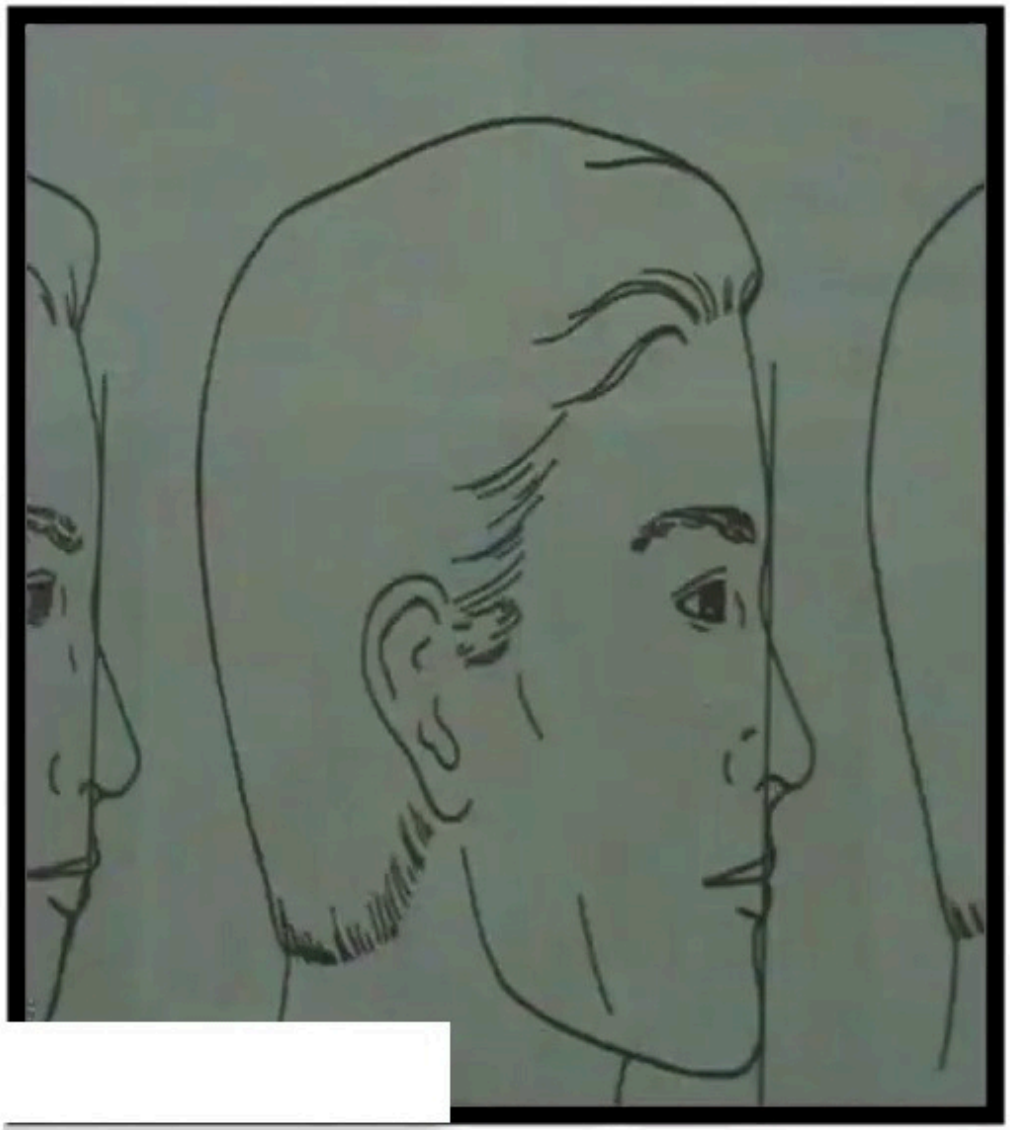
- A small degree of bilateral facial asymmetry exists in essentially all normal individuals



- Should be distinguished from deviations of the nose or chin

STRAIGHT PROFILE

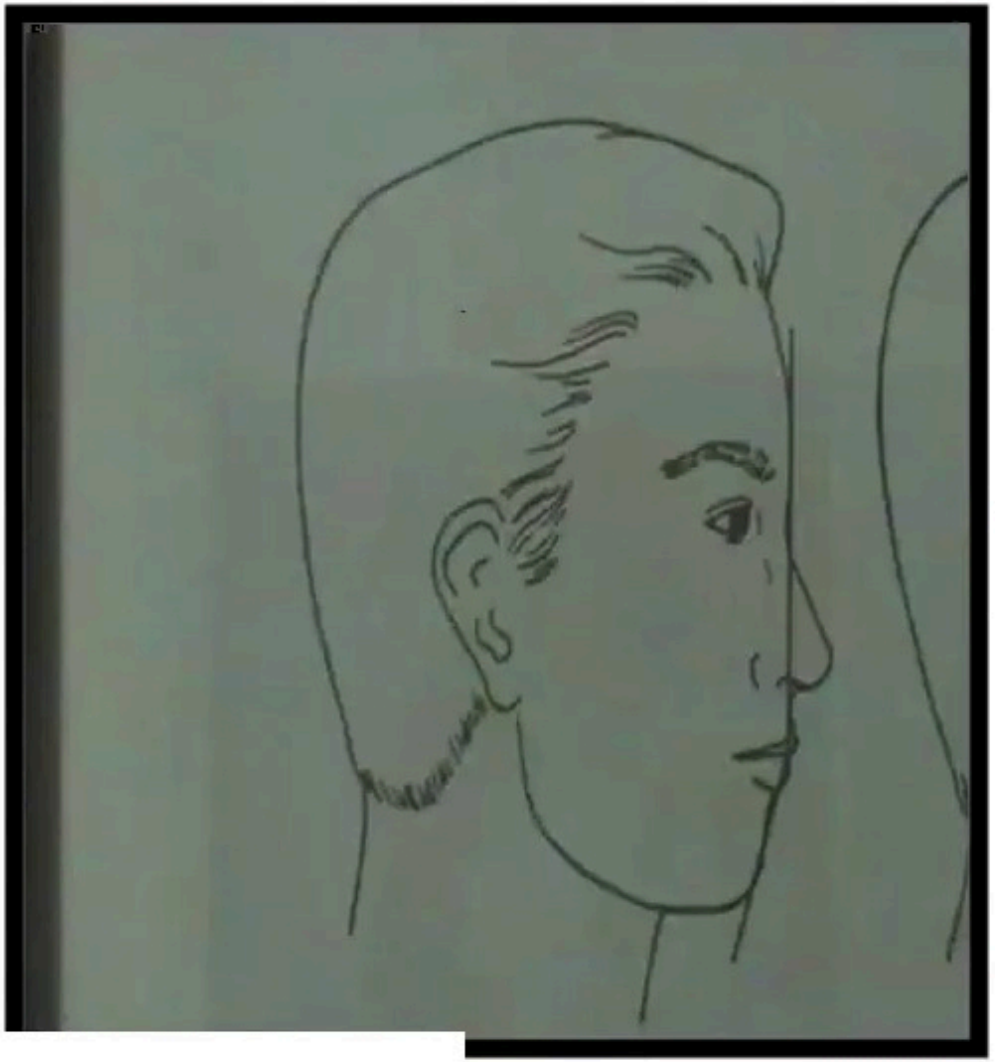
- Normal no underlying jaw discrepancy in the anteroposterior dimension.



CONVEX PROFILE

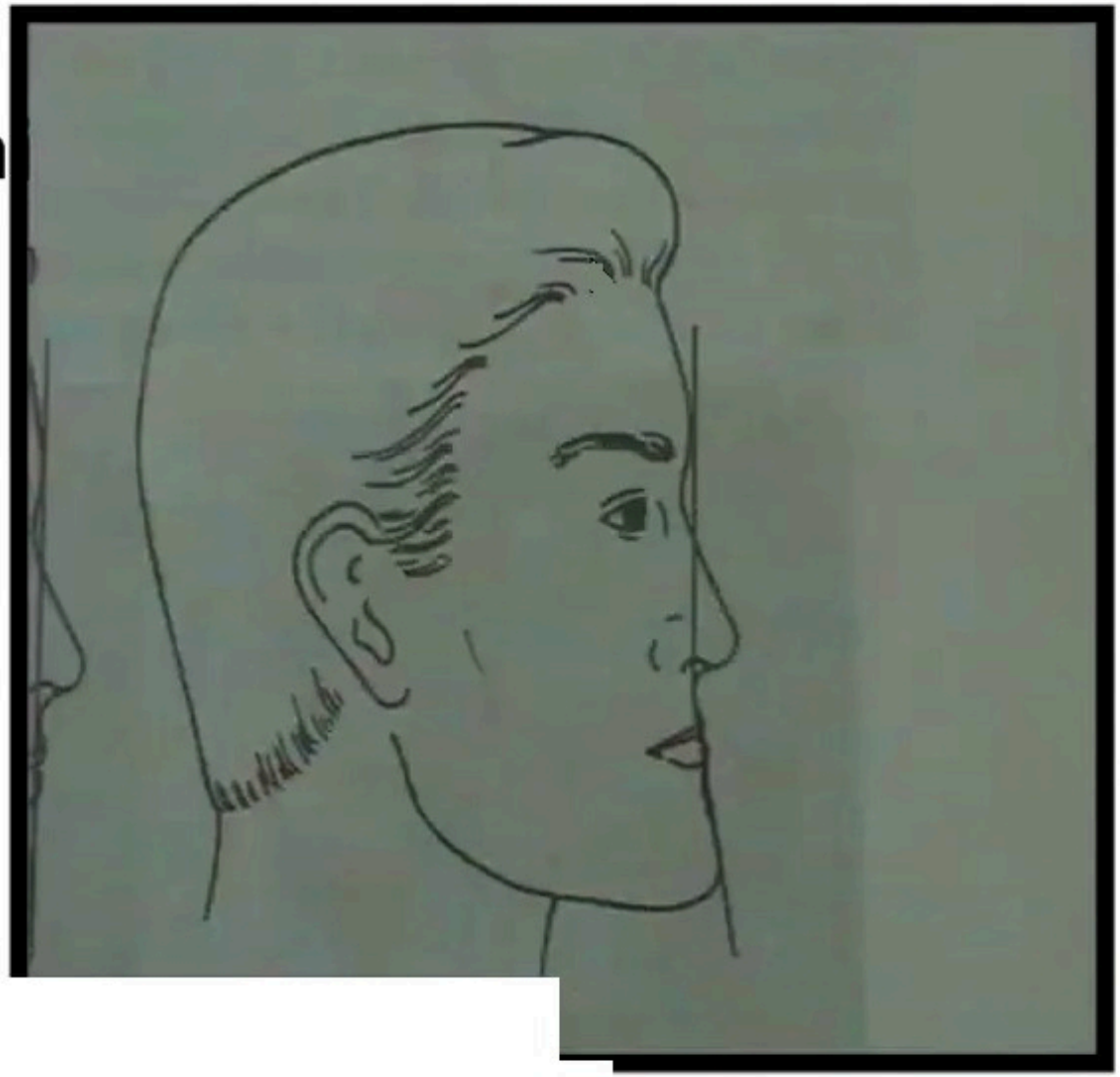
May suggest a class II jaw relationship

We tend to have maxillo-mandibular (bimaxillary protrusion)



CONCAVE PROFILE

May suggest
a class III relationsh

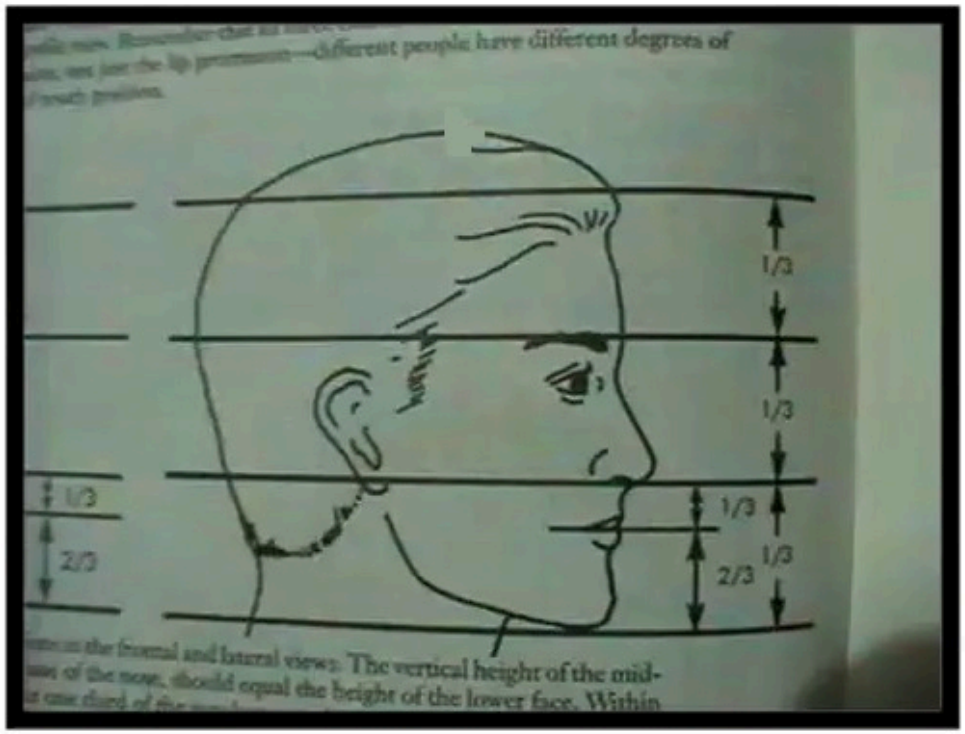


EVALUATION OF LIP POSTURE AND INCISOR PROMINENCE

- Done with the patient at rest
- Excessive protrusion of the incisors is revealed by prominent lips that are separated when they are relaxed hence patient strains to close the lips at rest
- Inter labial gap of more than 3-4 mm considered as lip incompetence
- Lip prominence is strongly influenced by racial and ethnic chara

EVALUATION OF VERTICAL FACIAL PROPORTIONS AND MANDIBULAR PLANE ANGLE

- Evaluated both in the frontal and lateral views
- The vertical height of the mid-face from the supra orbital ridges to the base of the nose should equal the height of the lower face.
- Within the lower face the mouth should be about one third of the way between of the nose and the chin



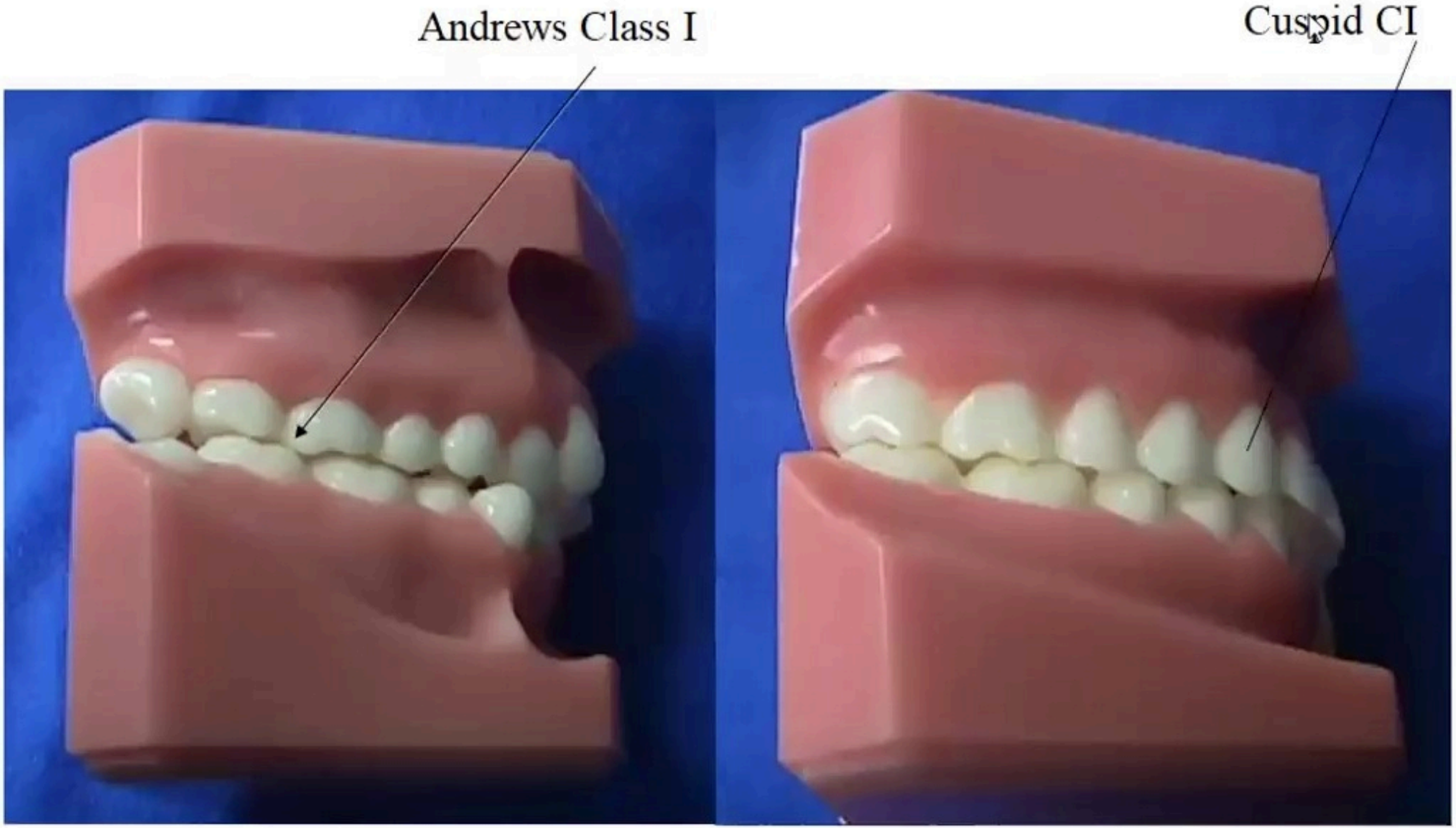
- The mandibular plane angle can be visualised clinically by placing a mirror handle or other instrument along the border of the mandible..
- A steep MPA corresponds with a long anterior facial height and anterior open bite.
- A flat MPA corresponds with a short anterior facial height bite malocclusion.

Periodontal health and Stability

- Hard and soft tissue integrity – bone levels
- Root parallelism
- Optimal soft tissue colour and consistency
- Oral hygiene care

Class I

Ideal Occlusion


Andrews Class I
Cuspid CI

Ideal/Optimal occlusion

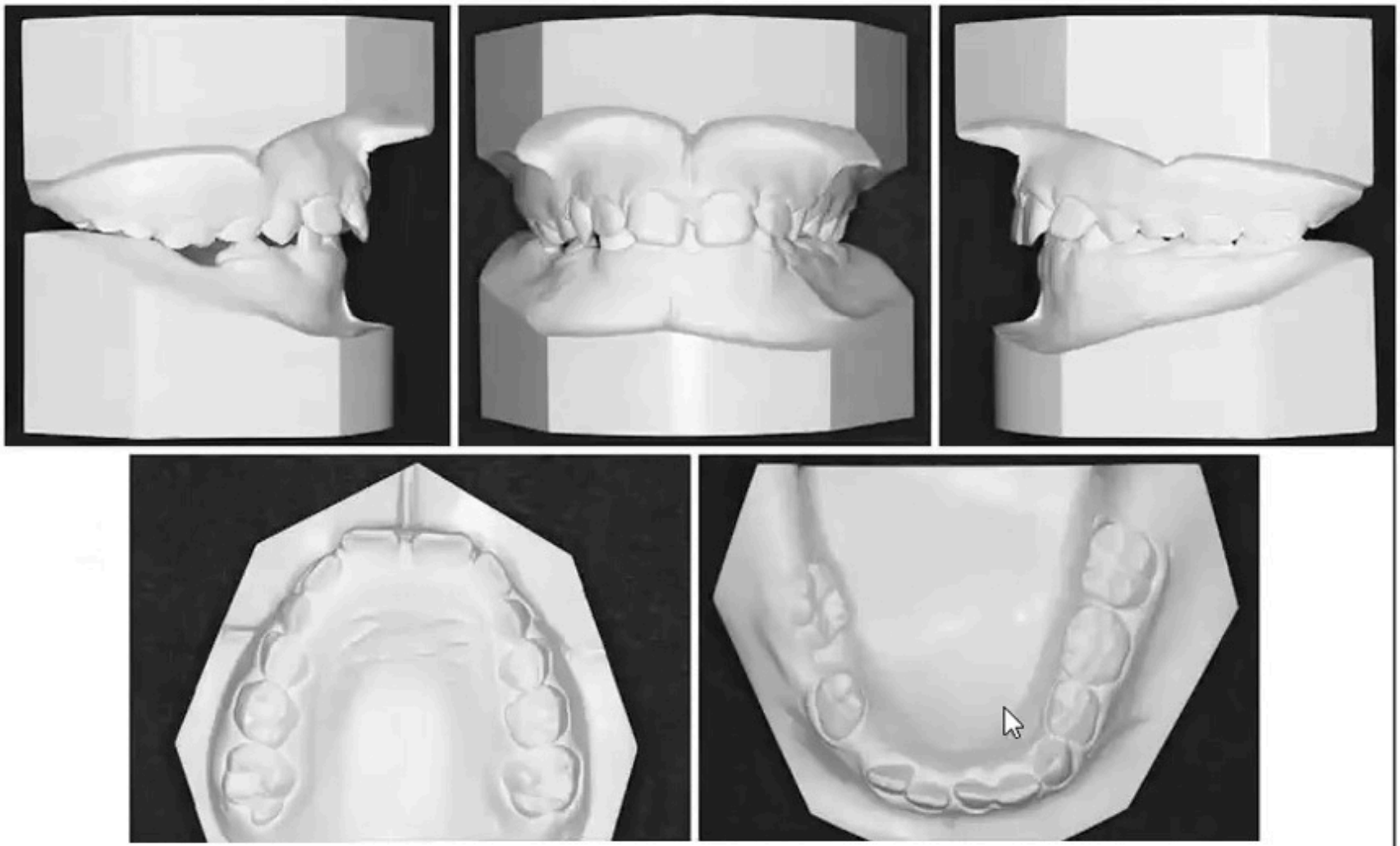
- **Static occlusion (Andrews six keys):**
  - Andrew's Class I molar relationship
  - No rotations
  - Tooth inclination
  - Tooth angulation
  - No spaces
  - A relatively level curve of Spee (0-1.5mm)

- **Functional occlusion (Roth,1981)**
  - CR=CO
  - Lateral excursions
    - Contacts and interferences
    - Canine guidance/group function
  - Incisor guida

Diagnostic tools

- Study Models
- Radiographs – e.g. OPG, Lateral Cephalograph
- Clinical Photos
- Any relevant biochemical tests

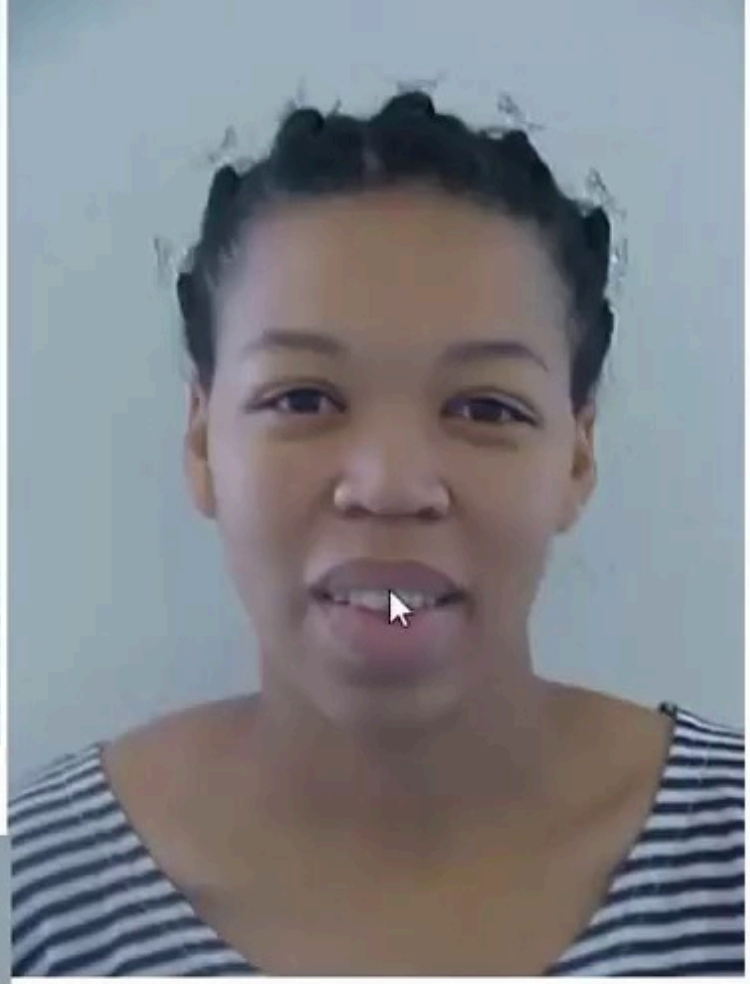
Study Models

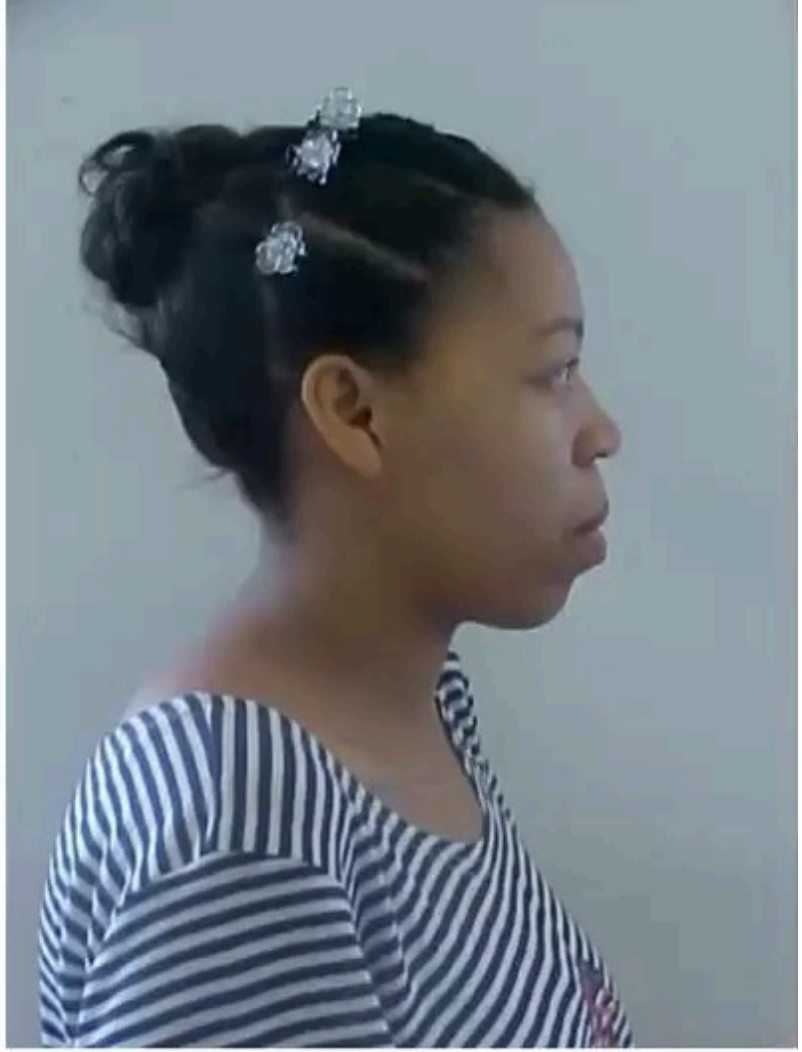


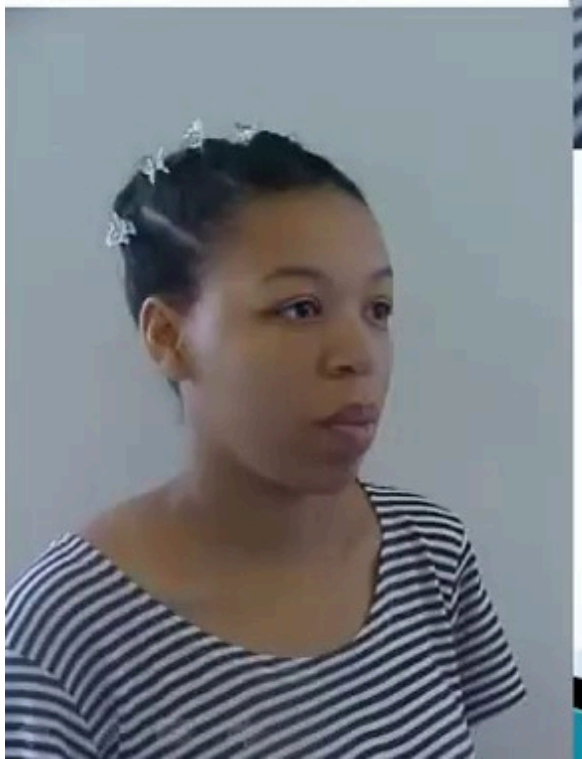
Photography

Extraoral Photos

- Frontal : lips together
- Frontal : smiling
- Lateral view
- ¾ view



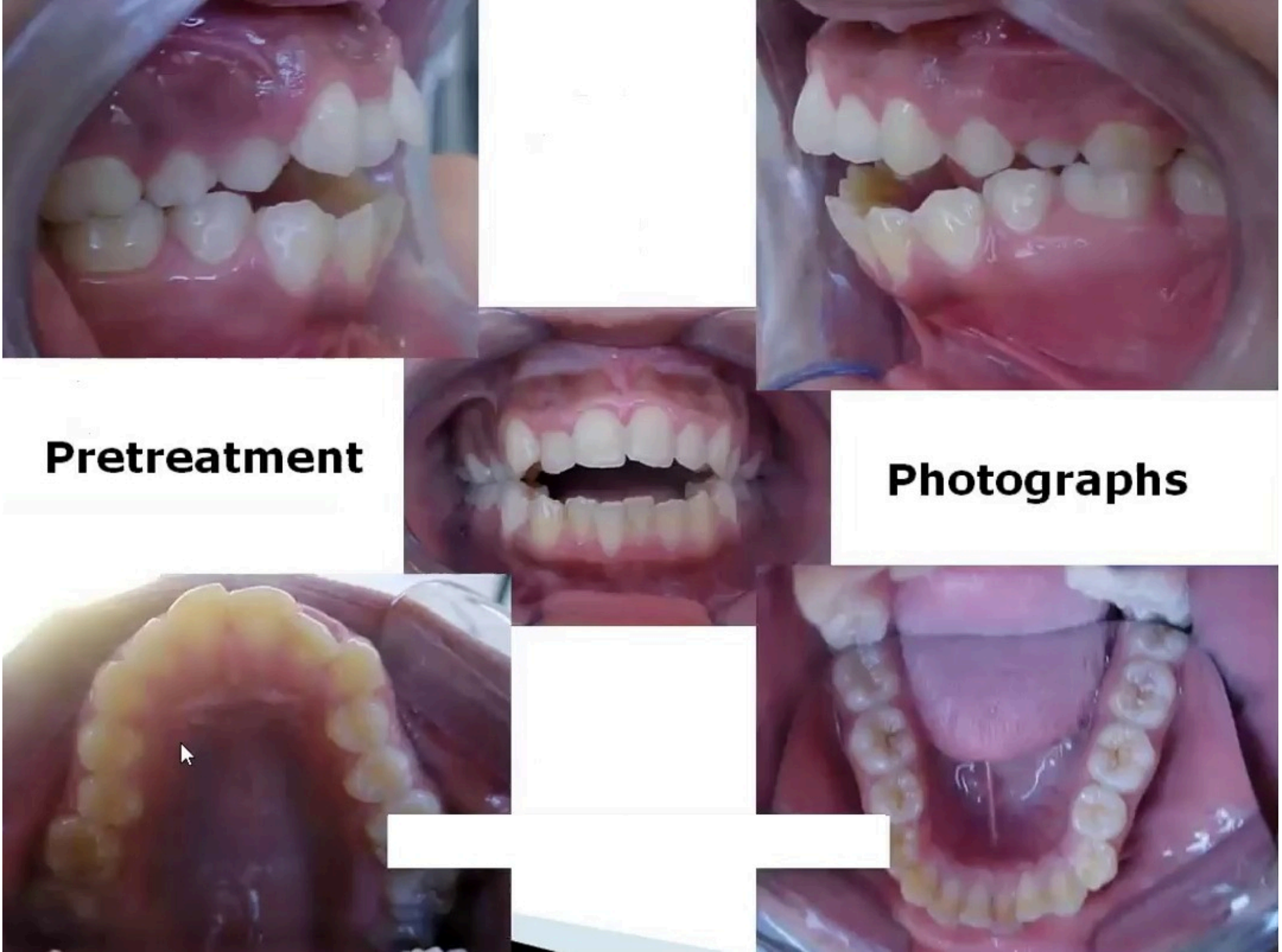




Pre-treatment photos

Intraoral photos

- Occlusals: upper and lowers
- Lateral views: Lt and Rt
- Frontal view
- ¾ view


Pretreatment
Photographs

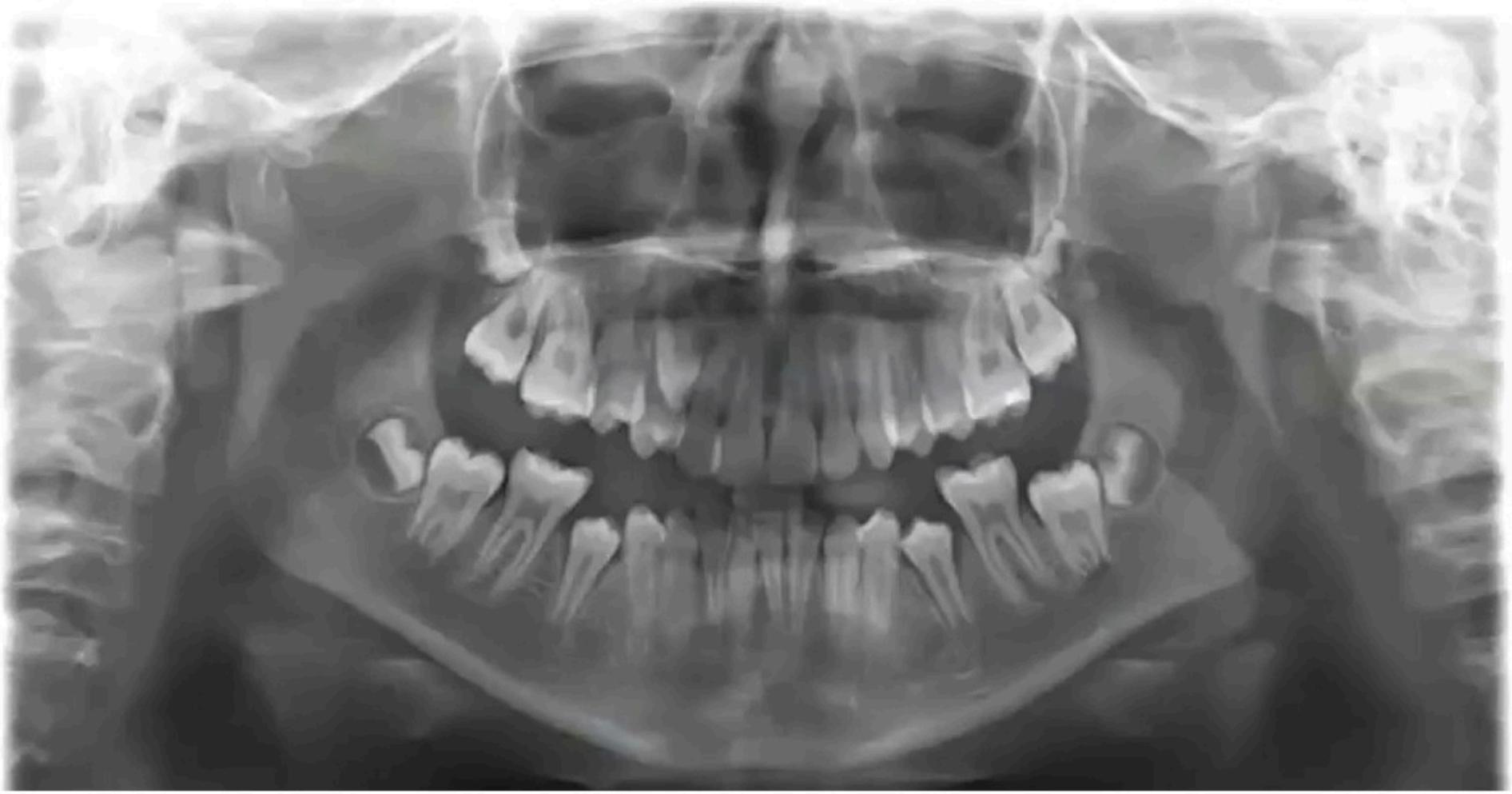
Malocclusion

Cleft Alveolus

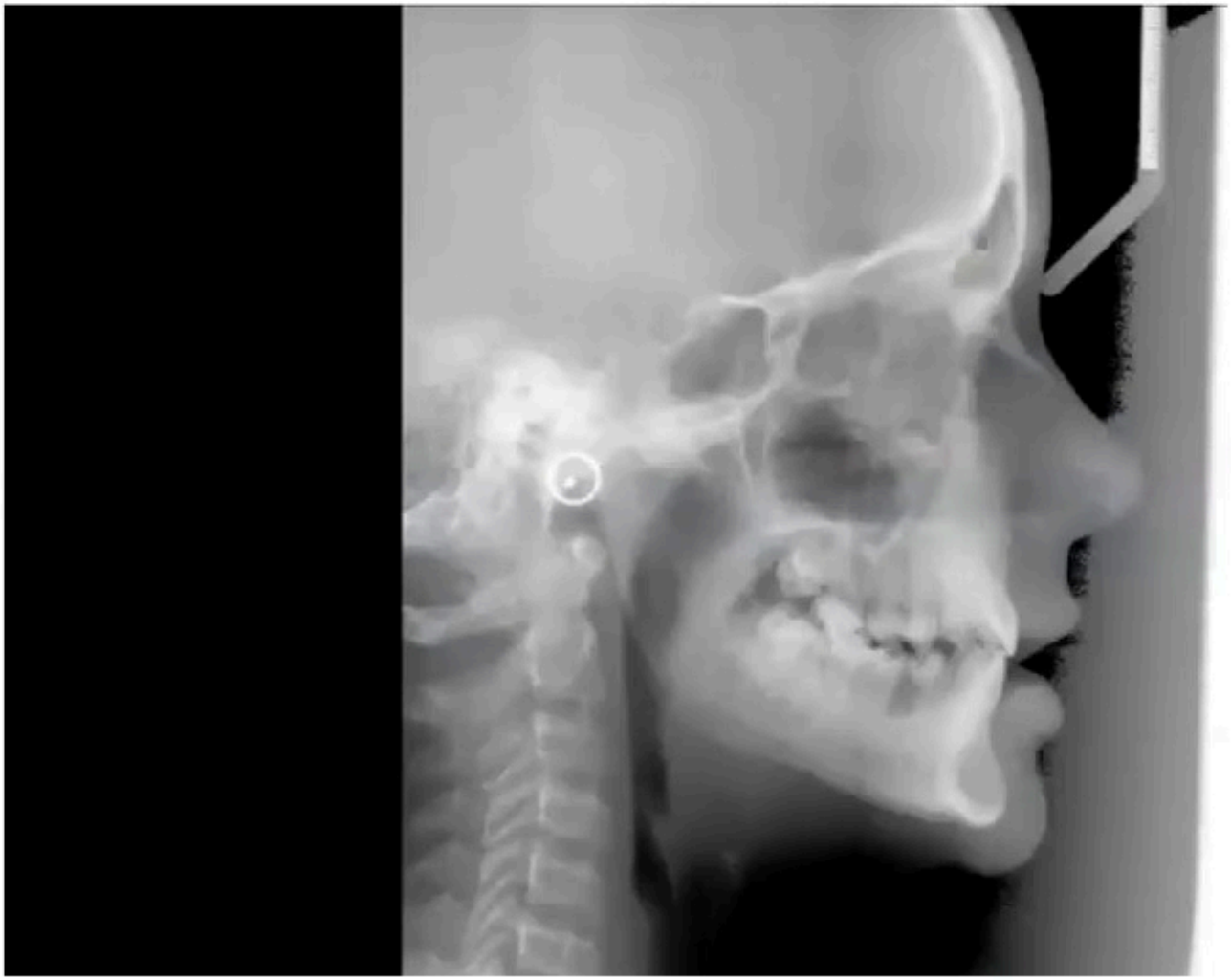
OPG

L

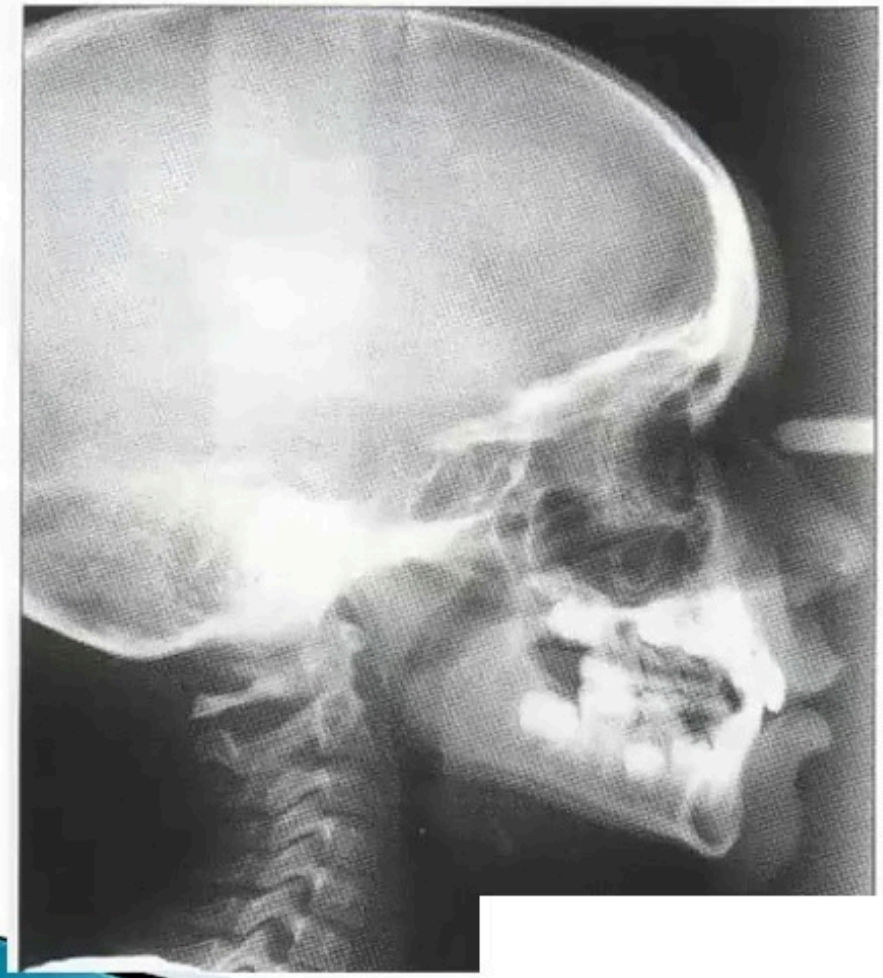

JESSE

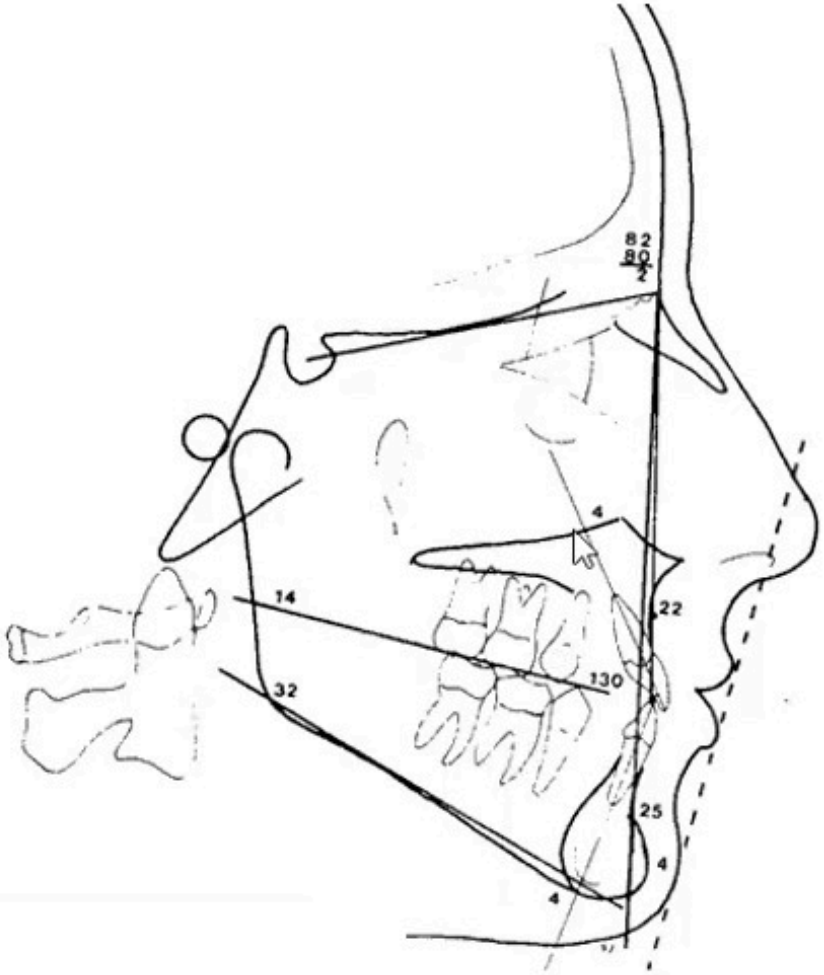


Lateral Cephalograph



Cephalometric Analysis





Diagnosis

- Accurately done in 3D:
  - Soft tissue
  - Dento-alveolar
  - Skeletal
- Ages
  - chronological
  - Dental
  - Skeletal

Removable appliance

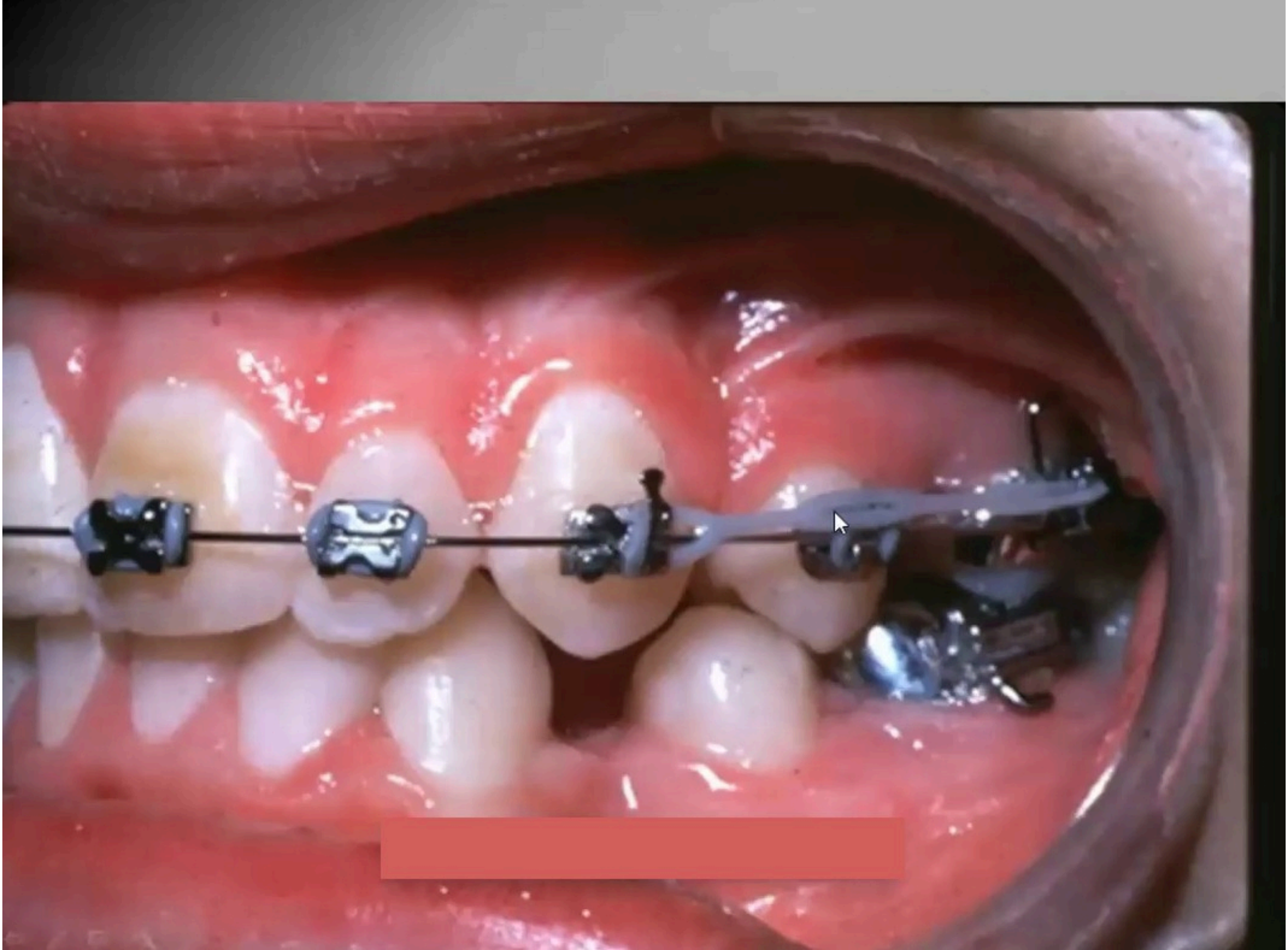
Treatment Objectives

- Refers to specific and achievable treatment goal derived from patient's diagnosis and considered in a prioritizes manner

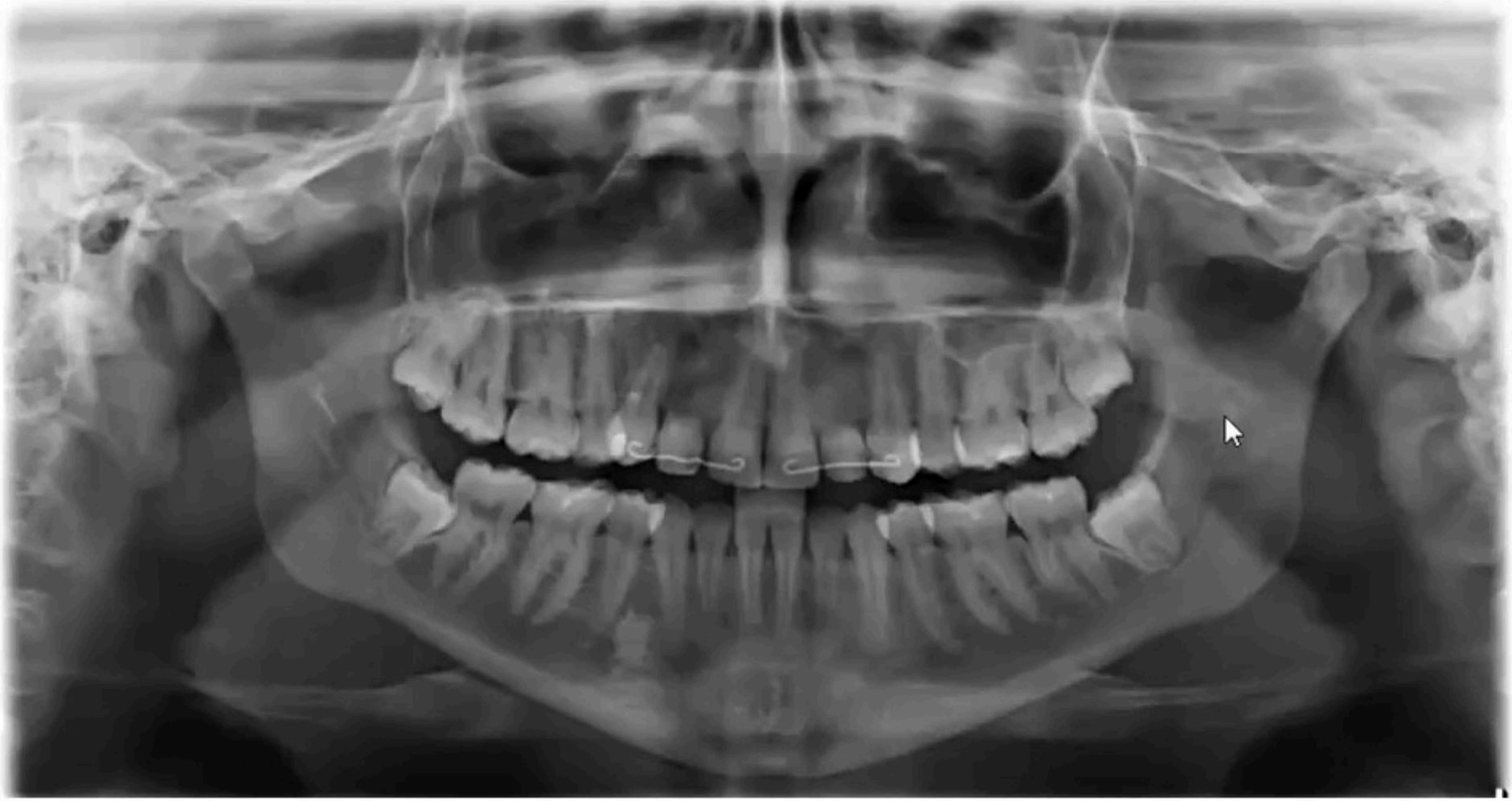
Treatment plan: is selection of appropriate treatment strategies while considering the patient's cost (psychological, time and financial).

Functional Appliance

Fixed Orthodontic Appliance



Side effects



Clinical decision

- Consultation with a colleague
- Referral (But stating the reason for referring)
- Execution of a specific treatment

Any Questions