In the name of “**GOD**”

DIAGNOSIS AND TREATMENT PLANNING

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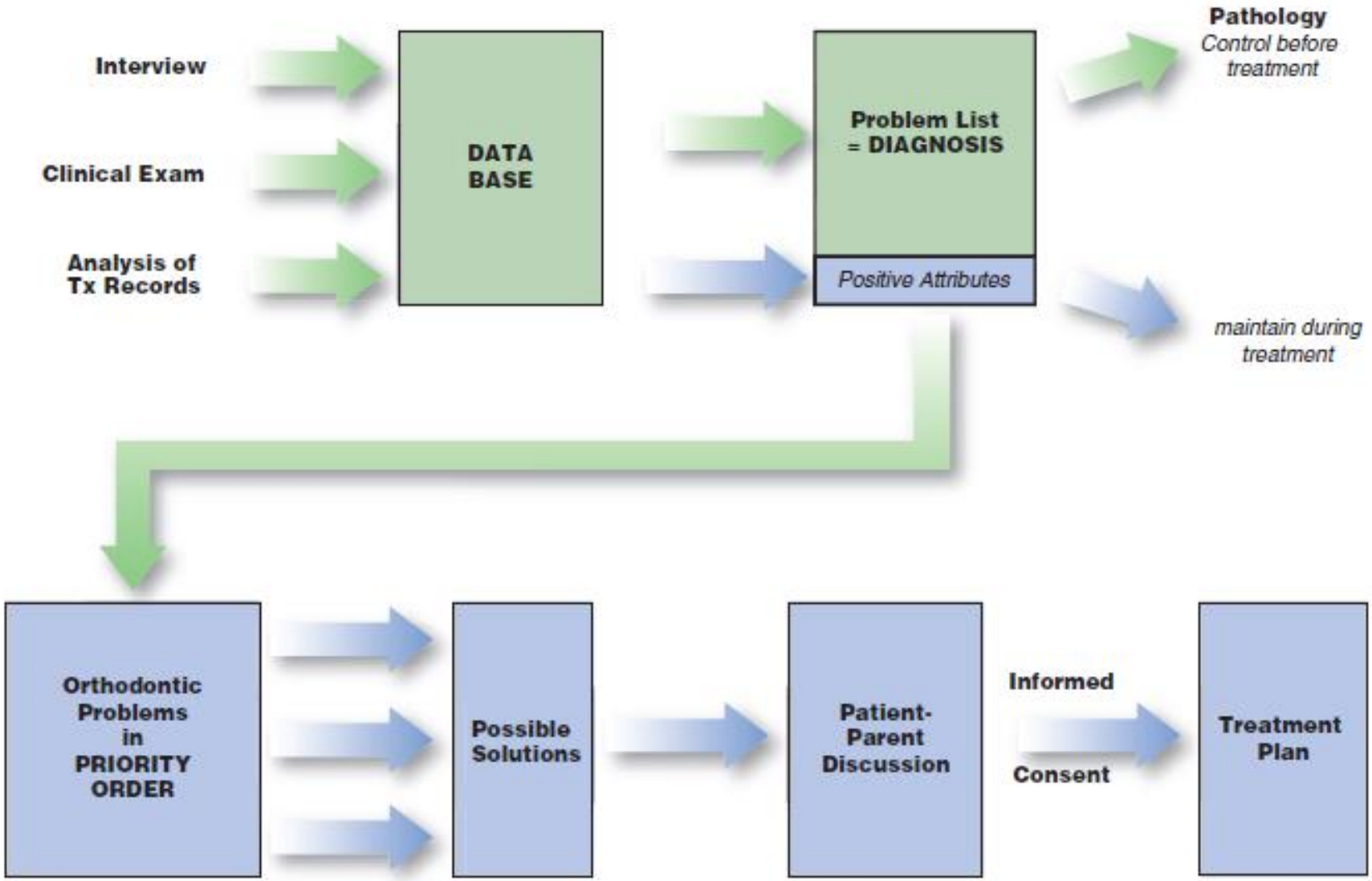
Problem list

It is important to recognize that both the **patient's perceptions** and the **doctor's observations** are needed in formulating the problem list.

Treatment planning

The task of treatment planning is to synthesized **possible solutions** of these **specific** problems .


Interview
Clinical Exam
Analysis of Tx Records
DATA BASE
Problem List = DIAGNOSIS
Positive Attributes
Pathology
Control before treatment
maintain during treatment
Orthodontic Problems in PRIORITY ORDER
Possible Solutions
Patient-Parent Discussion
Informed
Consent
Treatment Plan

(I)The timing of treatment

- **Any time during a patient's life**
- **First visit for children: 6 years old**
- **Panoramic (6,8 and 10 years old)**

- **Gold standard** treatment during **adolescent**
  - Sufficient **growth remaining**
  - All **permanent teeth** (**second** molars)
  - **Psychosocial condition**
  - **Self-motivation** (appliance and oral hygiene care)

(II) the complexity of the treatment

Less complex cases would be selected for treatment in **general** or **family** practice

More complex cases would be referred to a **specialist.**

(III) The predictability of success

Data gradually are accumulating to allow choices to be based on **evidence** of outcomes rather than anecdotal reports and the claims of advocates of particular approaches.

(IV)Pateint AND Parents desire

~~Paternalistic~~

Both **ethically** and **practically**, patients must be involved in the decision making process

Informed consent requires the involvement of the patient in the treatment planning process

Orthodontic diagnosis requires a broad overview of the patient's situation.

Data base

(I) Questions of the patient (written and oral)

(II) Clinical examination of the patient

(III) Evaluation of diagnostic records, including dental casts ,radiographs and photograph

Questionnaire and Interview

The first step in **the interview process should be to Chief Complaint**

- **Esthetics**
- **Function**
- **Quality of life**

Physical Growth Evaluation

Transverse/Sagittal/Vertical

Rapid growth during the adolescent growth spurt facilitates **tooth movement**.

Growth modification may **not** be possible in a child who is beyond the peak of the growth spurt.

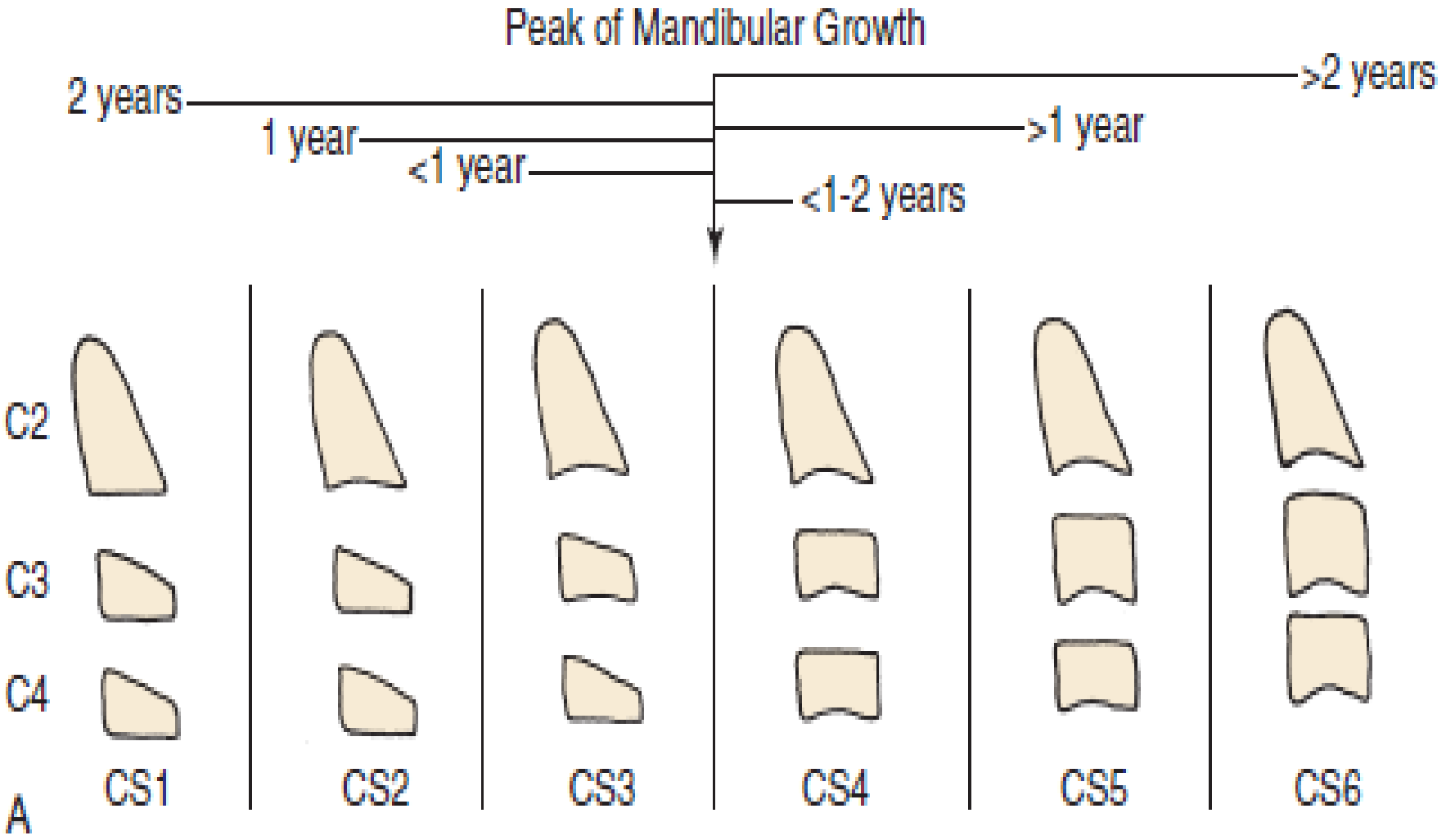
Adolescent growth spurt?

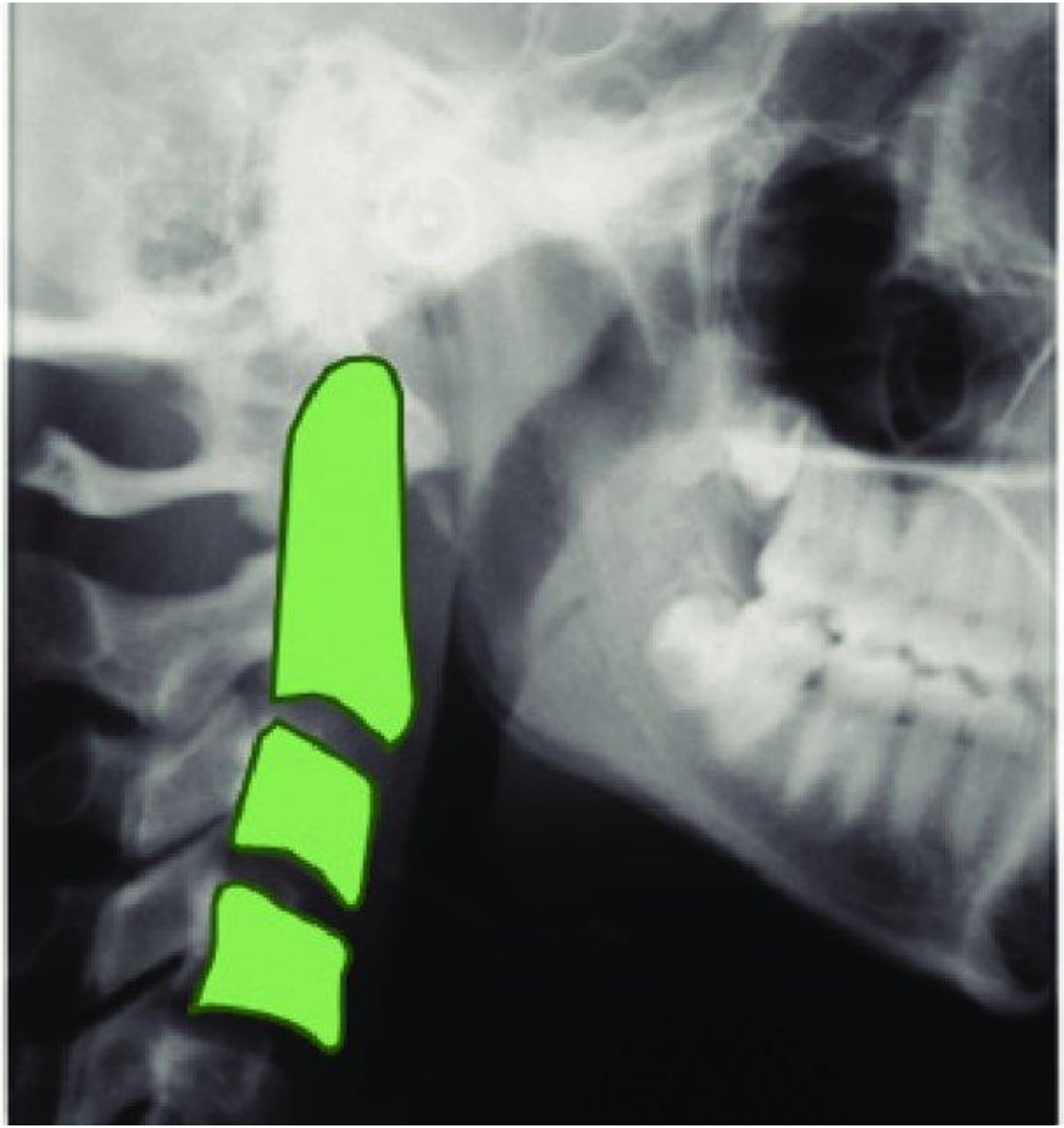
1. analysis of vertebral maturation

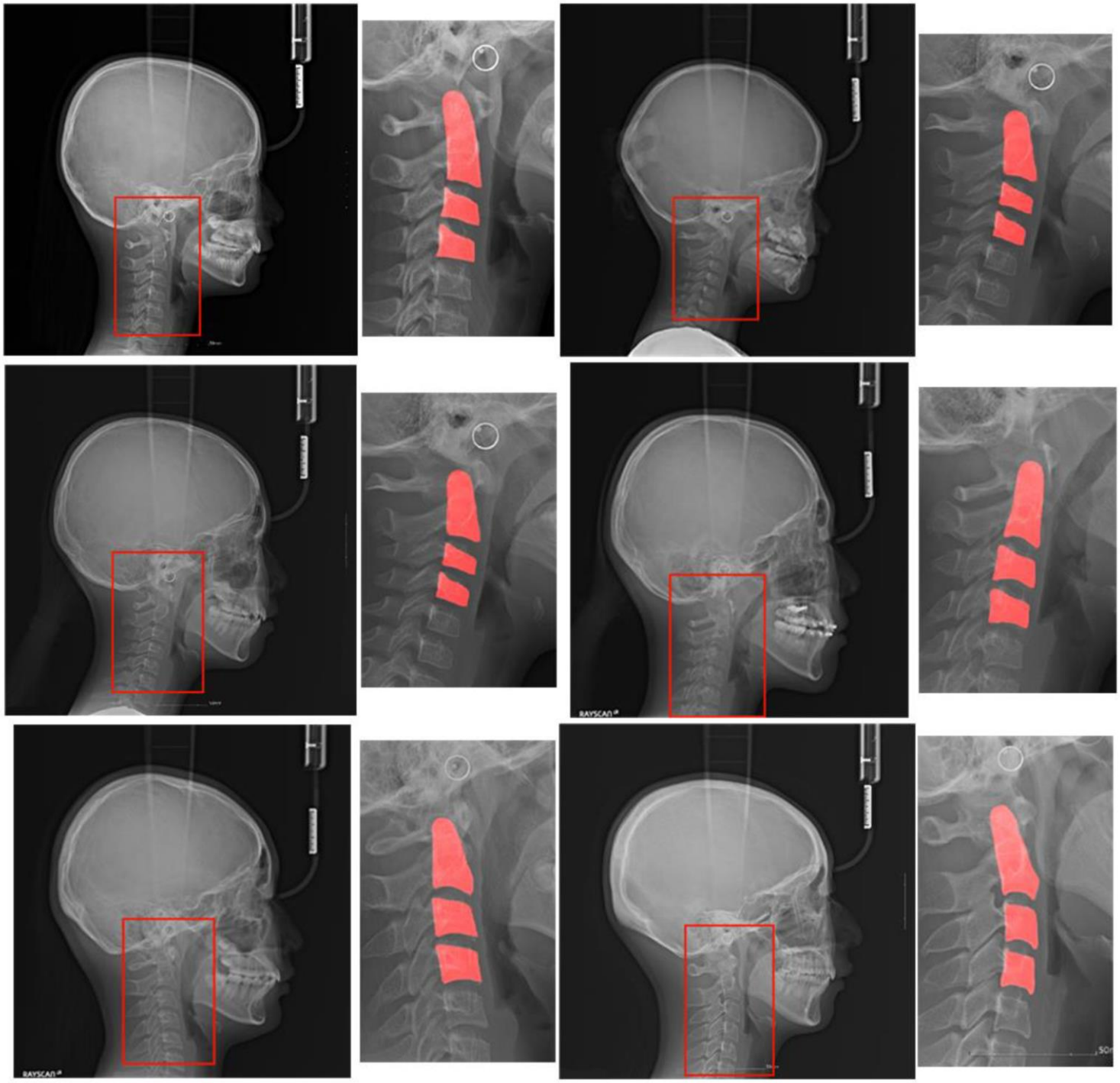
2. Hand-wrist radiograph

3. Serial cephalometric radiographs

   The most accurate to determine if growth has **stopped** or not.


Peak of Mandibular Growth
2 years
1 year
<1 year
>2 years
>1 year
<1-2 years
C2
C3
C4
A
CS1
CS2
CS3
CS4
CS5
CS6





Clinical Evaluation

- Two goals of orthodontic clinical evaluation:

1) To evaluate and document oral health, jaw function, facial proportions and smile characteristics.

2) To decide which diagnostic records are required.

Evaluation of oral health

General guideline is that **any problems** of disease or pathology must be under control before orthodontic treatment of developmental problems begins.

This includes **medical problems**, **dental caries or pulpal pathology**, and **periodontal** disease. (missing or supernumerary)

Periodontal evaluation

- Active periodontal disease
- Potential or actual mucogingival problem

Gentle probing?

Pocket depth

BOP

Inadequate attached gingiva

Dehiscence

Non-extraction

prevention of stripping of tissue away from the teeth with a graft or other periodontal therapy is easier than correction it later

Jaw & occlusal function

1. **Mastication**
2. **Speech**
3. **TMJ problems**

In an individual with **cerebral palsy** or other types of severe neuromuscular disease, normal adaptation to the changes in tooth position produced by orthodontics may not occur.

Mastication

Patients with severe malocclusion:

- Chew their food with extra effort
- Not socially acceptable manner
- Avoid certain food
- Cheek and lip biting
- Not reasonable diagnostic test

Swallowing

- Never affect by malocclusion
- Lip strength & how hard push the things with tongue

Speech

- Normal speech in present of severe malocclusion
- Speech difficulties in a child are unlikely to be solved by orthodontic treatment

Speech therapy & orthodontics

Sleep disorders

- Severe mandibular deficiency
- Interdisciplinary team

Jaw function

- A general guideline is if the mandible moves **normally** its function is **not** severely impaired.

The most single indicator of joint function is the amount of maximum opening.

Jaw function

- Lateral and anterior shift on closure
- Centric relation in children?

  (not developed articular eminence)
- True unilateral x-bite or unilateral with shift
- Sunday bite ?
- Pseudo class III ?

Facial and dental appearance evaluation

- **Facial proportion & Macro-Esthetics**

  asymmetry, excessive or deficient face height, mandibular deficiency or excess

- **Smile framework & Mini-Esthetics**

  assessments as excessive gingival display on smile, inadequate anterior tooth display, inappropriate gingival heights, and excessive buccal corridors

- **Teeth & Micro-Esthetics**

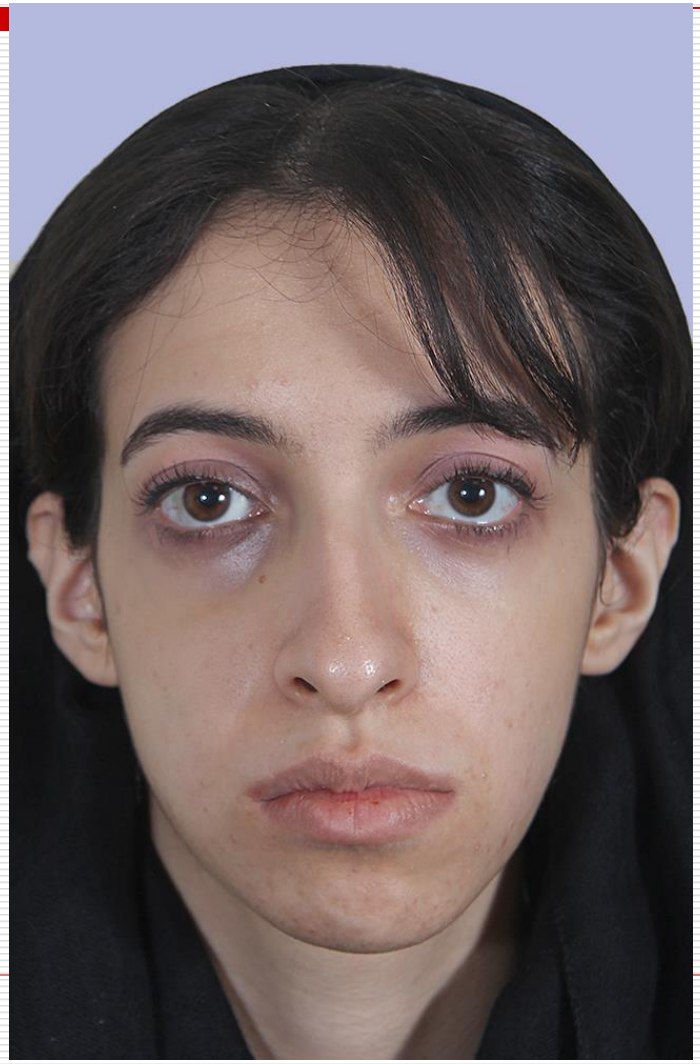
  tooth proportions in height and width, gingival shape and contour, connectors and embrasures, black triangular holes, and tooth shade.

Frontal examination

- **First step in facial proportion analysis**
  - Low ear or eye
  - Dental-digital syndrome
- **Normal asymmetry**
  - Composite photographs
  - Mild asymmetry is a rule rather than exception
  - Right side usually larger than left

Composite photographs

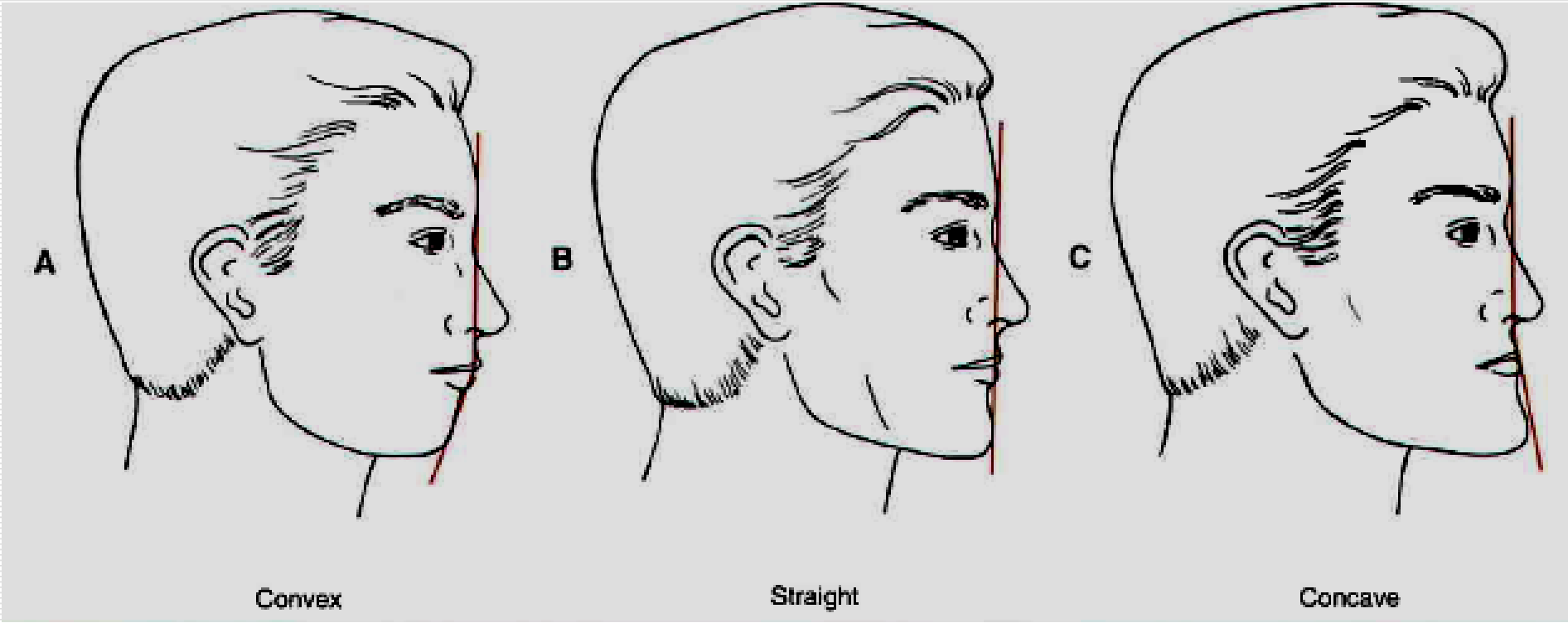
Facial proportion in Frontal plane



Facial proportion in vertical plane

“Poor man's cephalometric analysis"

Profile convexity or concavity

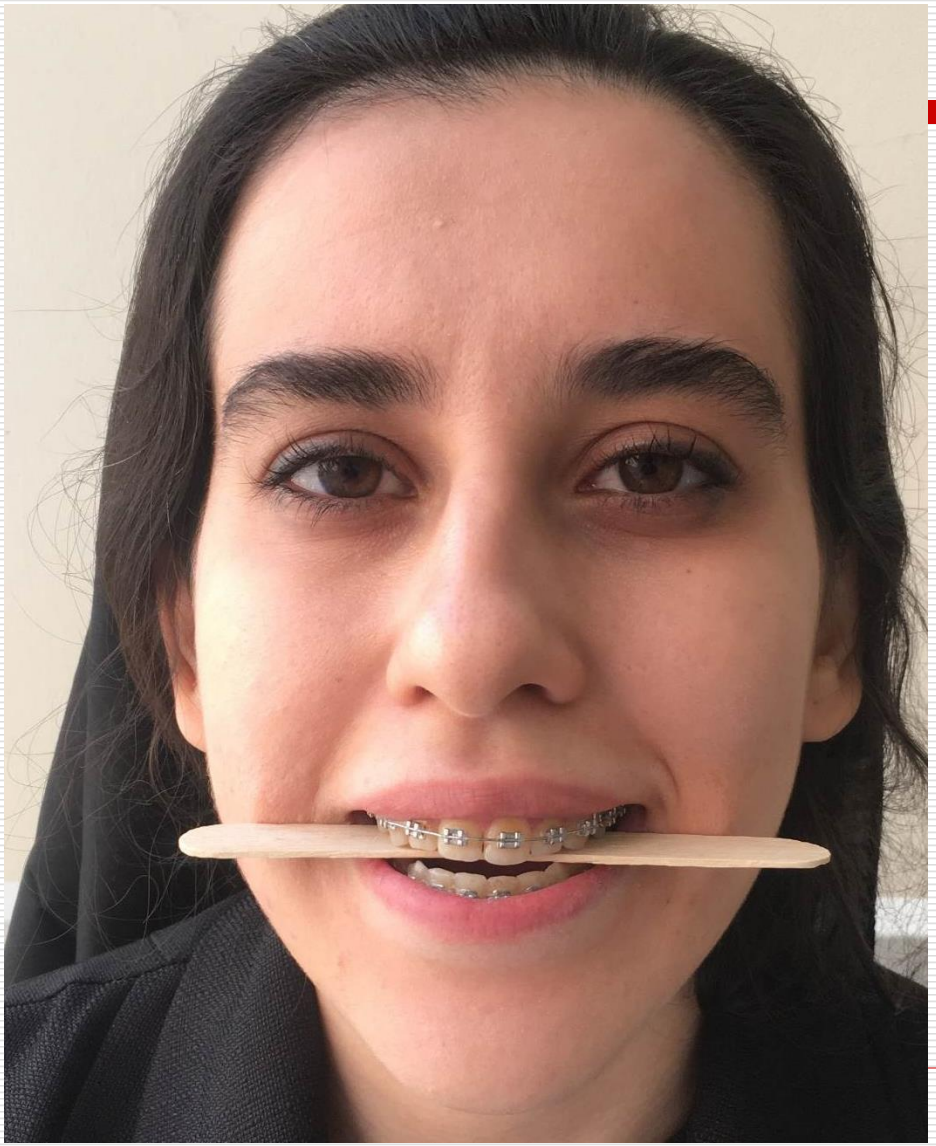


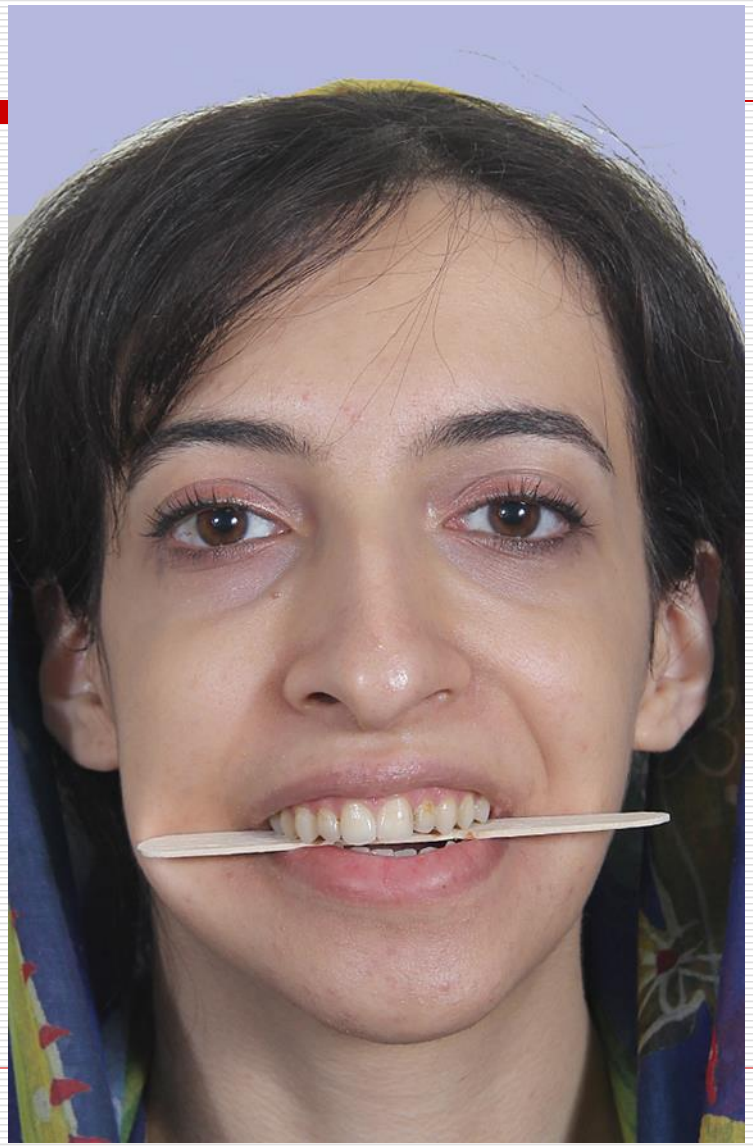
Bimaxillary dentoalveolar protrusion

Mandibular plane angle

Smile framework
&
Mini-Esthetics

Cant to the occlusal plane





Smile Analysis.

Posed or social smile

The social smile is reproducible, and is the one that is presented to the world routinely

The social smile is the focus of orthodontic diagnosis.

Emotional smile

The emotional smile varies with the emotion being displayed.

Smile Analysis.

In smile analysis, the oblique (3/4) view as well as the frontal and profile views are important.

1. **Amount of Incisor and Gingival Display**
2. **Transverse dimensions of the Smile relative to the upper Arch.**
3. **The Smile Arc.**

The data indicate that this is much more important as a factor in smile esthetics than buccal corridor width.

Amount of Incisor and Gingival Display

Transverse dimensions of the Smile relative to the upper Arch.

The Smile Arc

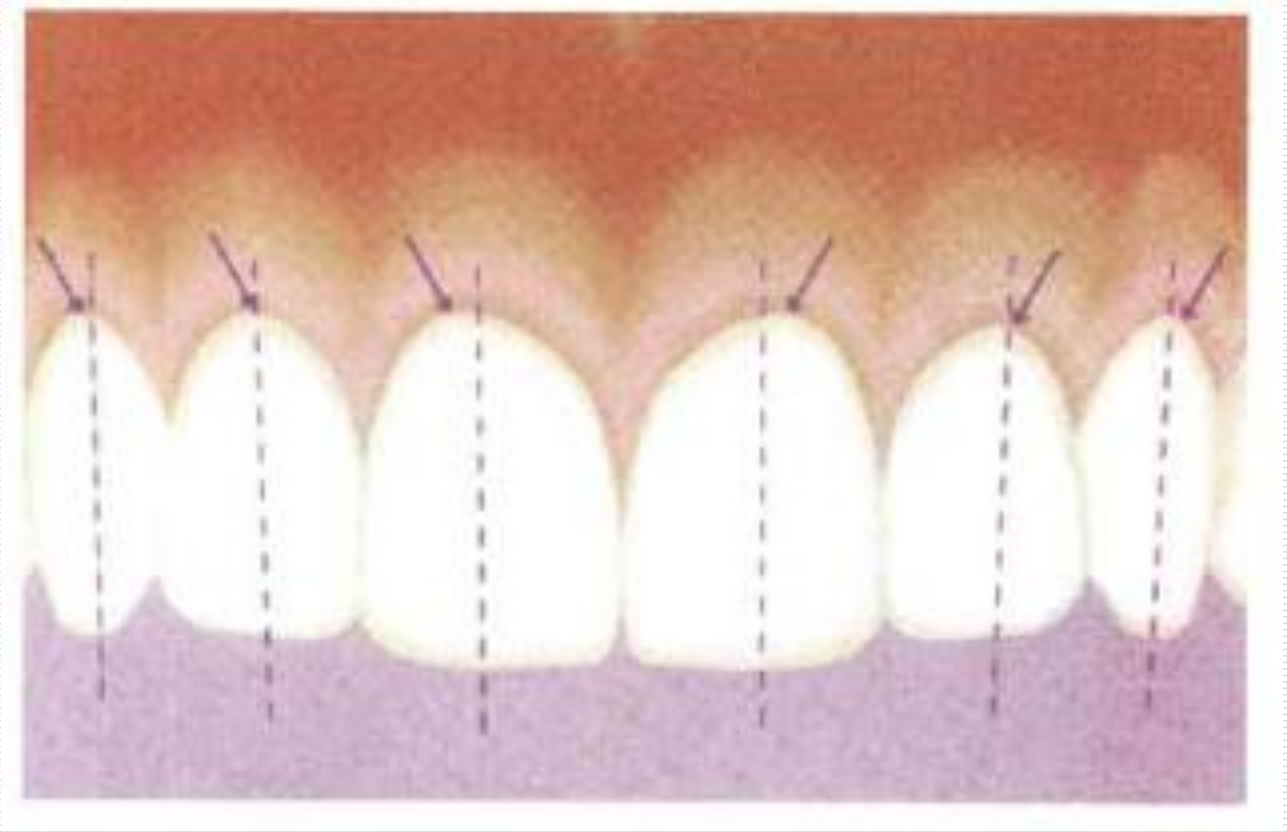
Teeth & Micro-Esthetics

1. Tooth Proportions.
2. Width Relationships and the "Golden Proportion."
3. Height-Width Relationships
4. Gingival Heights, Shape and Contour.
5. Connectors and Embrasures.
6. Embrasures: Black Triangles?
7. Tooth Shade and Color.

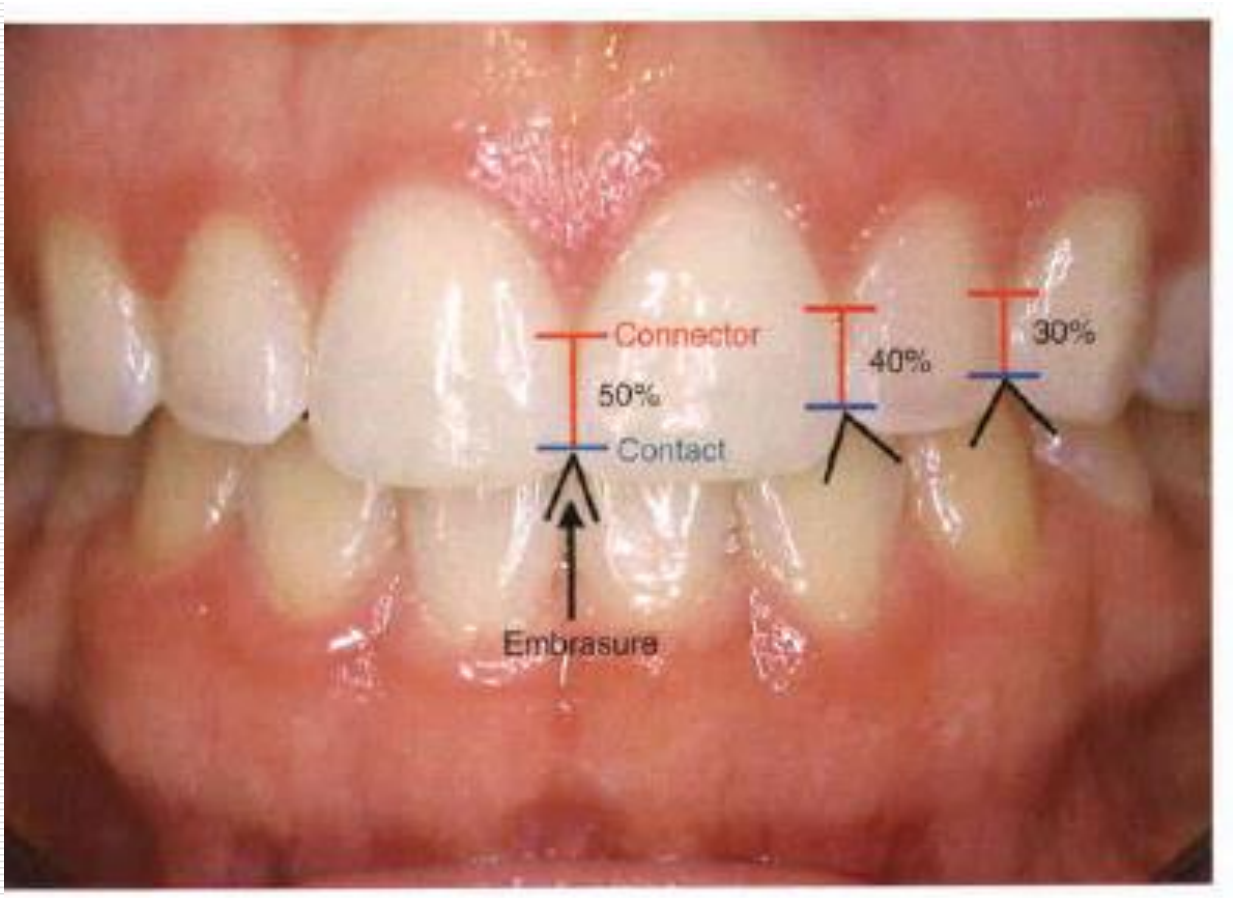
Width Relationships and the "Golden Proportion."

Height-Width Relationships

Gingival Heights, Shape and Contour



Connectors and Embrasures



Embrasures: Black Triangles?

I Health of Teeth and Oral Structures

1. Intraoral photographs
2. Panoramic radiograph
3. periapical and bitewing radiographs
   - horizontalshift method
   - vertical shift rule
4. Cone-beam computed tomography
5. Radiographs of the
   - CT or MRI scans are likely to be more useful than transcranial or laminagraphic TMJ radiographs.

Conditions

Condition	Recommended Radiographs
Regular dental care	
No previous caries	Panoramic radiograph only
No obvious pathologic condition	
History of fluoridation	
Previous caries	Add bitewings
Obvious caries	
Deep caries	Add periapicals, affected area only
Periodontal disease	Add bitewings or periapicals, affected areas only

From the American Dental Association/U.S. Food and Drug Administration. *Guidelines for Prescribing Dental Radiographs*, revised 2009.

Dental Records

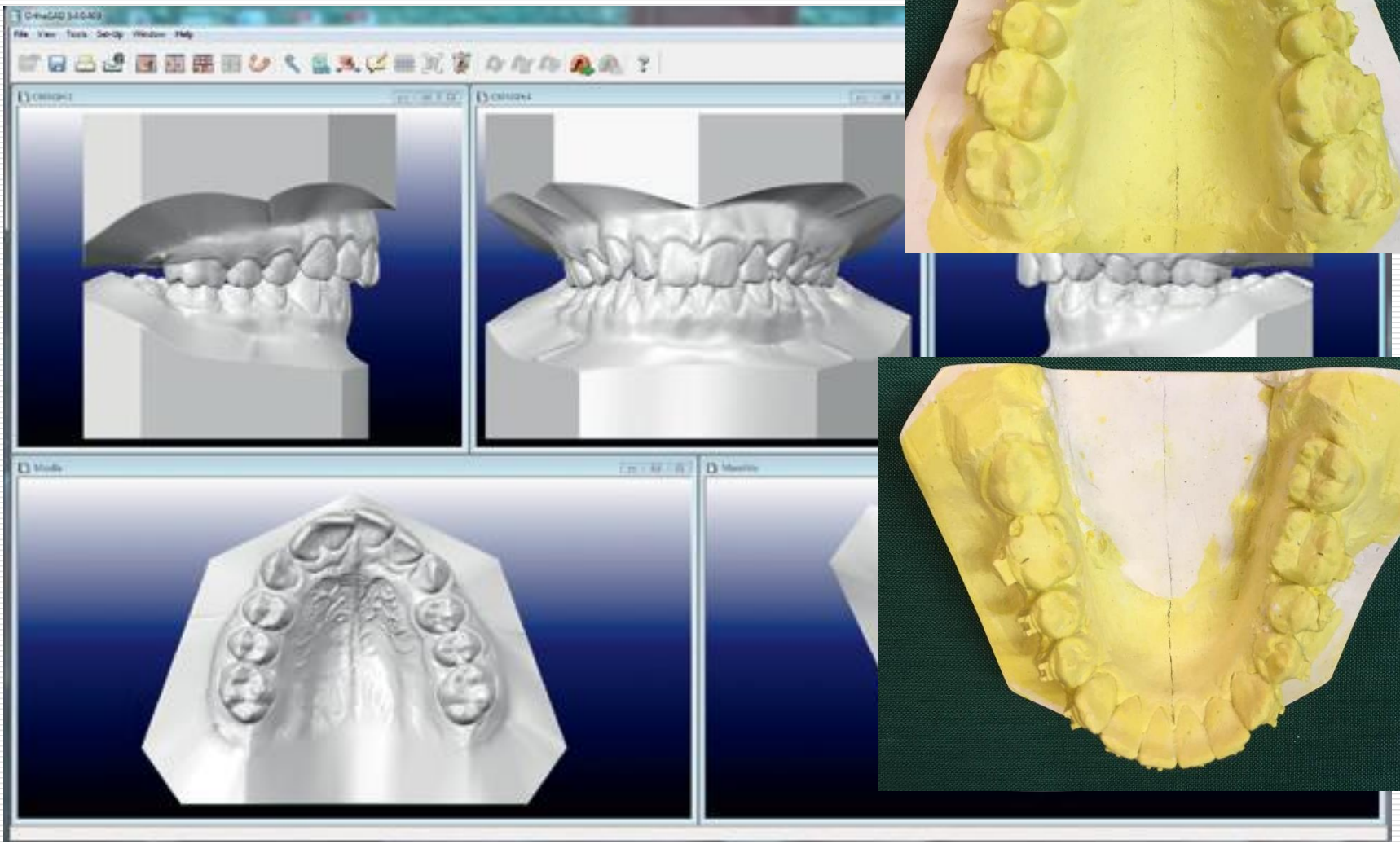
Evaluation of the occlusion requires two things:

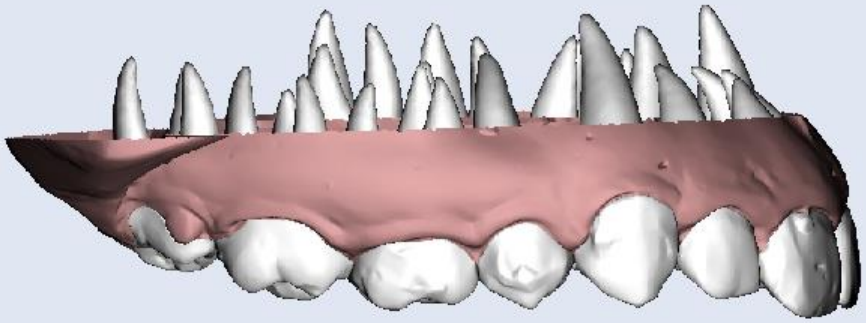
1. Impressions for dental casts or digital scanning into computer memory
2. Record of the occlusion either a wax bite or a buccal scan.

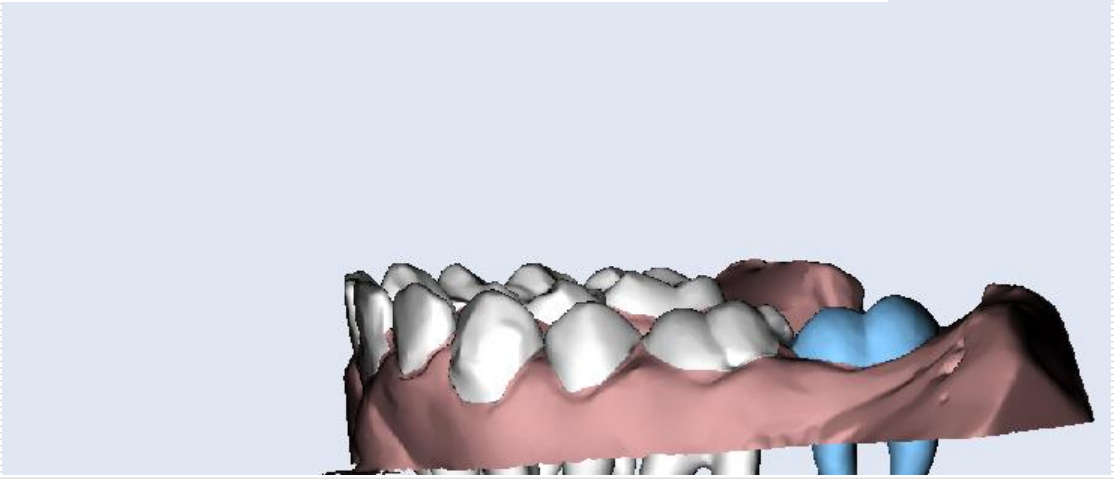
Physical Versus Virtual Casts

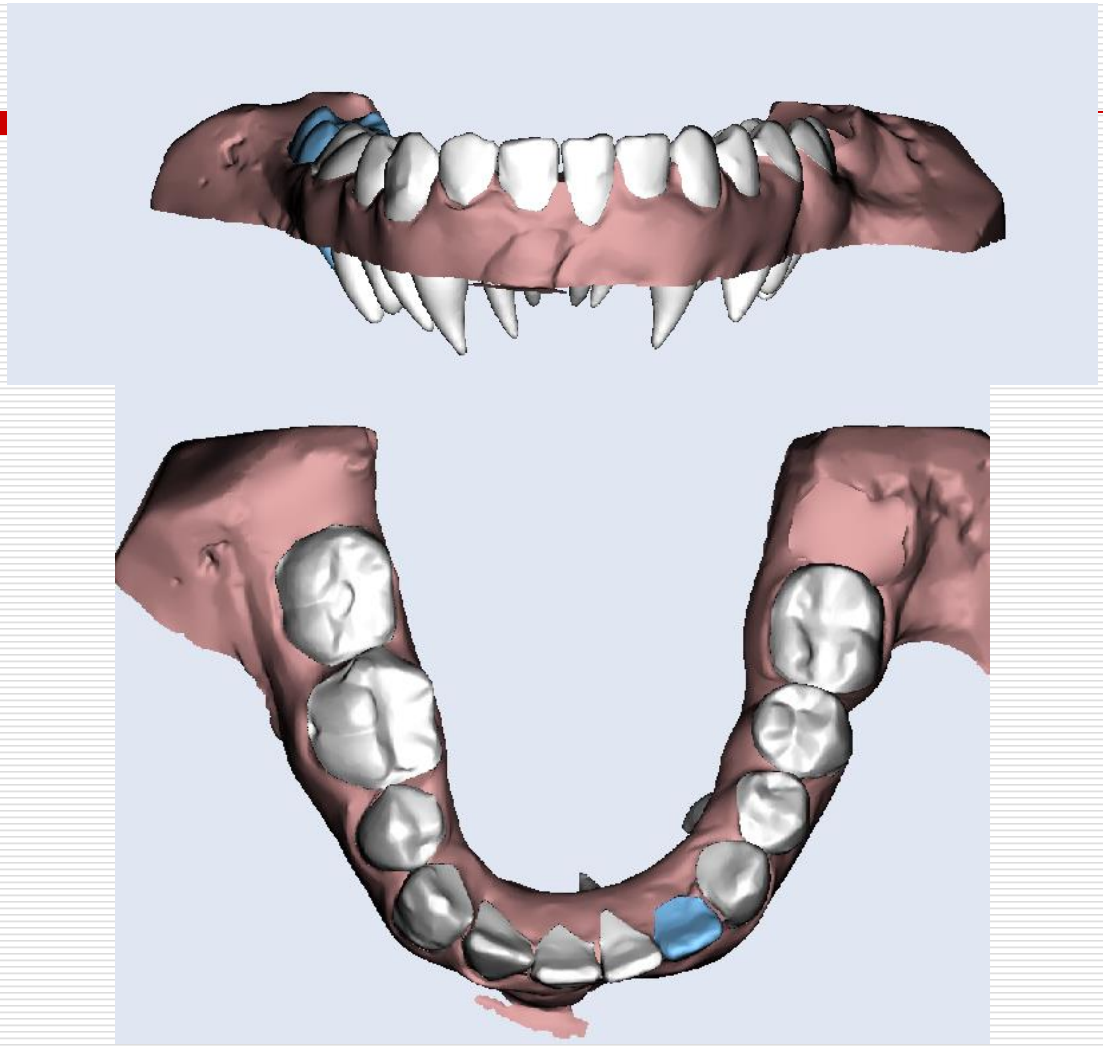
- An impression of the teeth that also gives **maximum displacement of the lips and cheeks** is desired.
- Being able to visualize the **inclination of the teeth**, not just the location of the crown, is important.
- If the impression is not well extended, important diagnostic information may be missing.

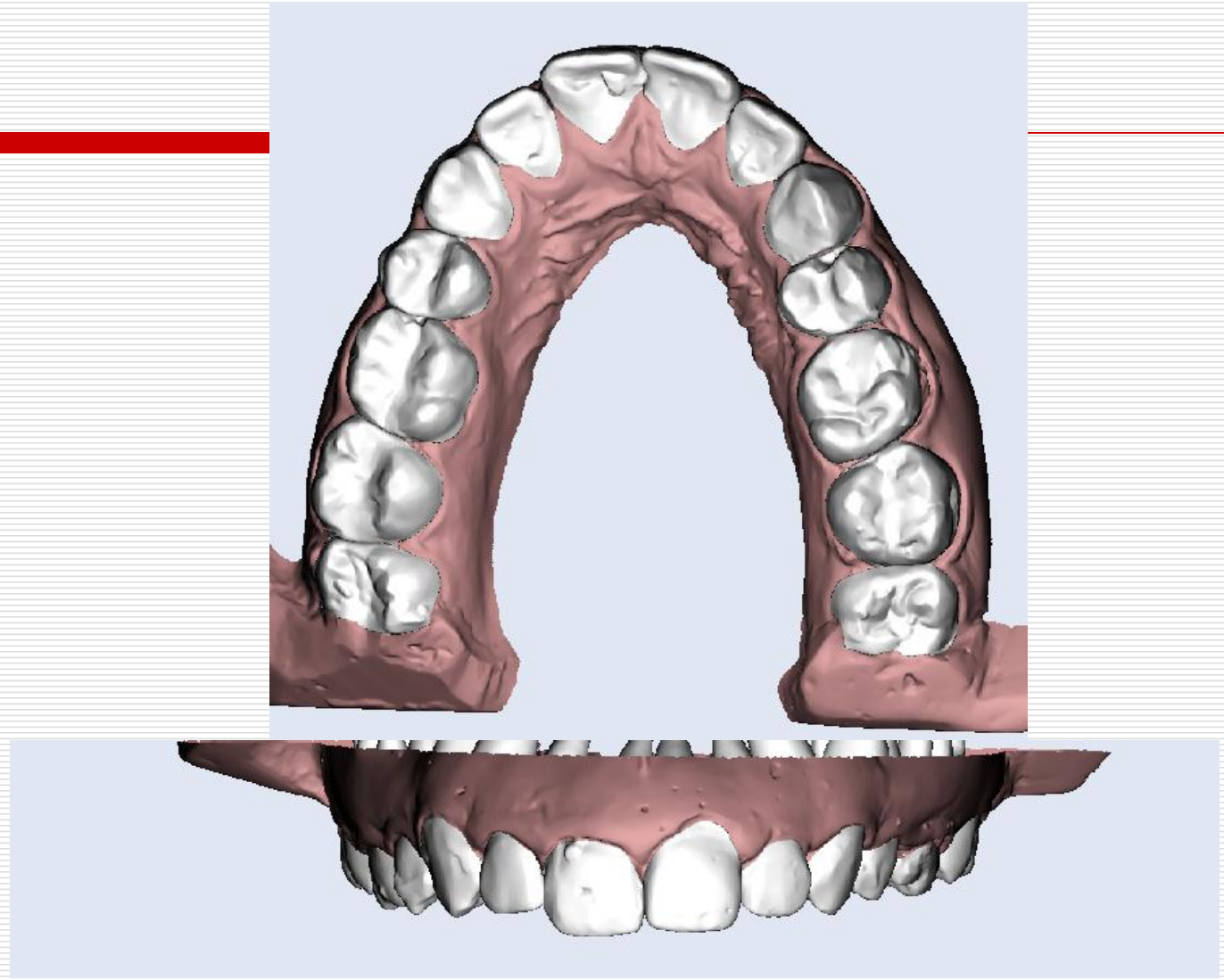
Trimmed cast







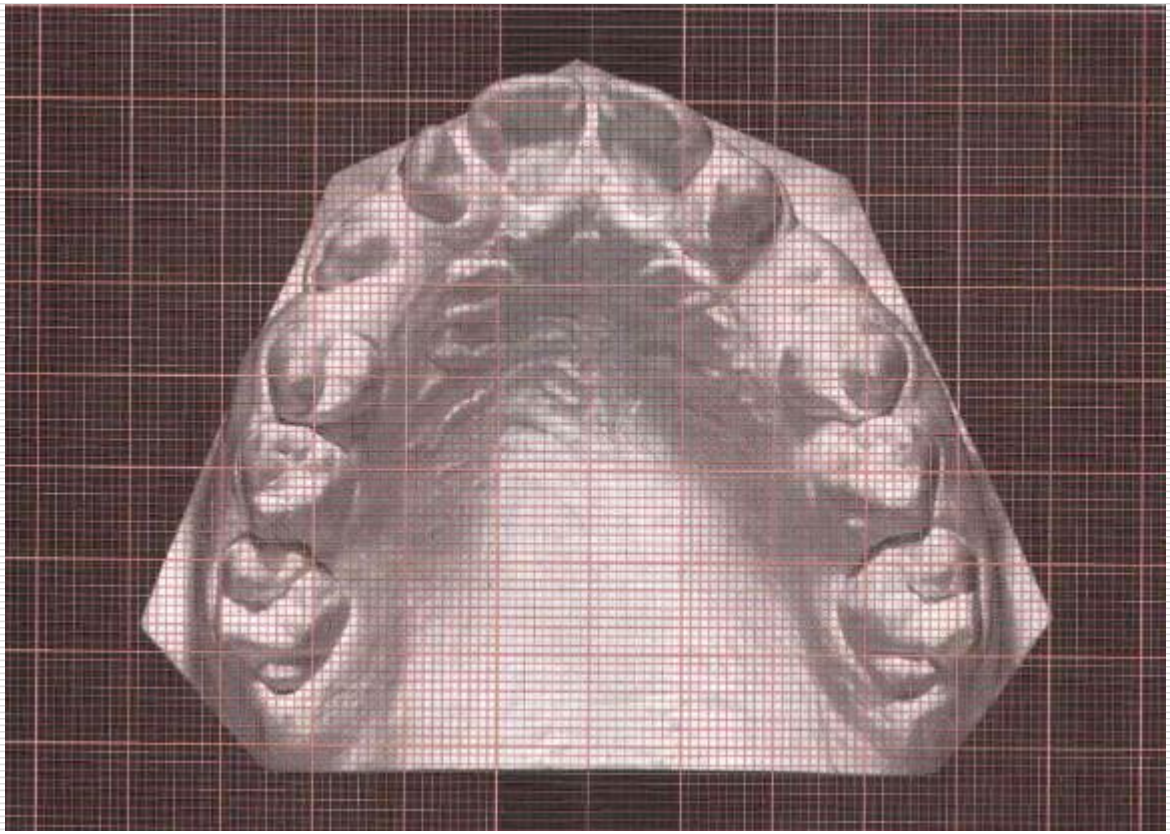




Cast Analysis:

1. ***Symmetry***
2. ***Space***
3. ***Tooth Size***

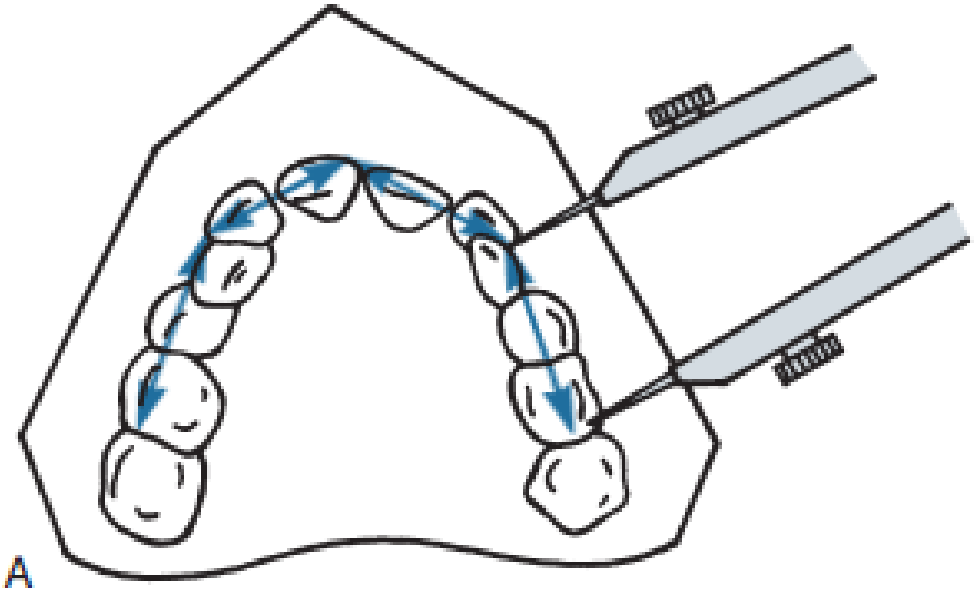
Cast Analysis: Symmetry



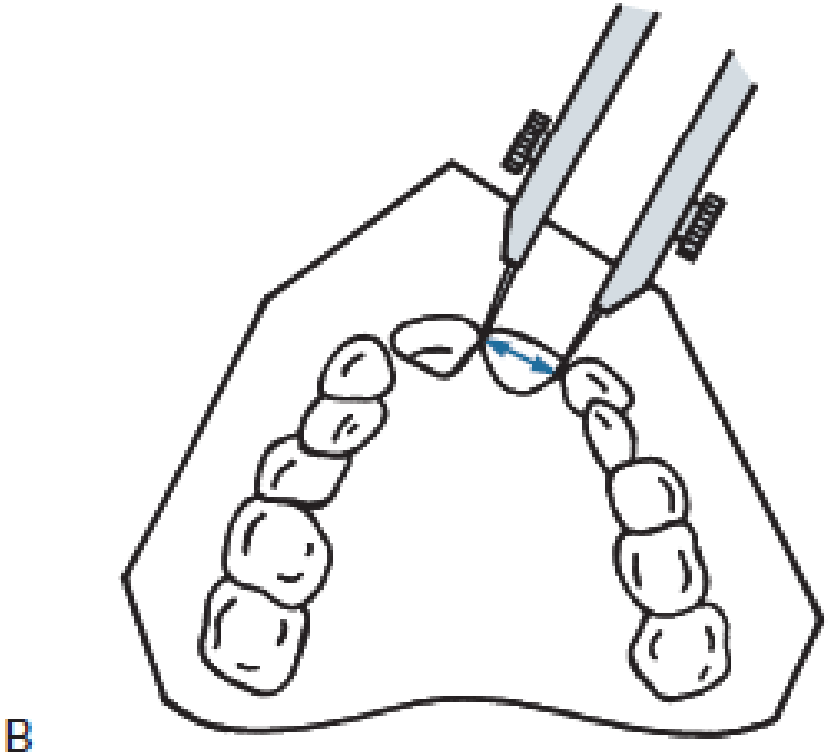
Alignment, Crowding, and Spacing: Space Analysis.

In **adolescents and adults**

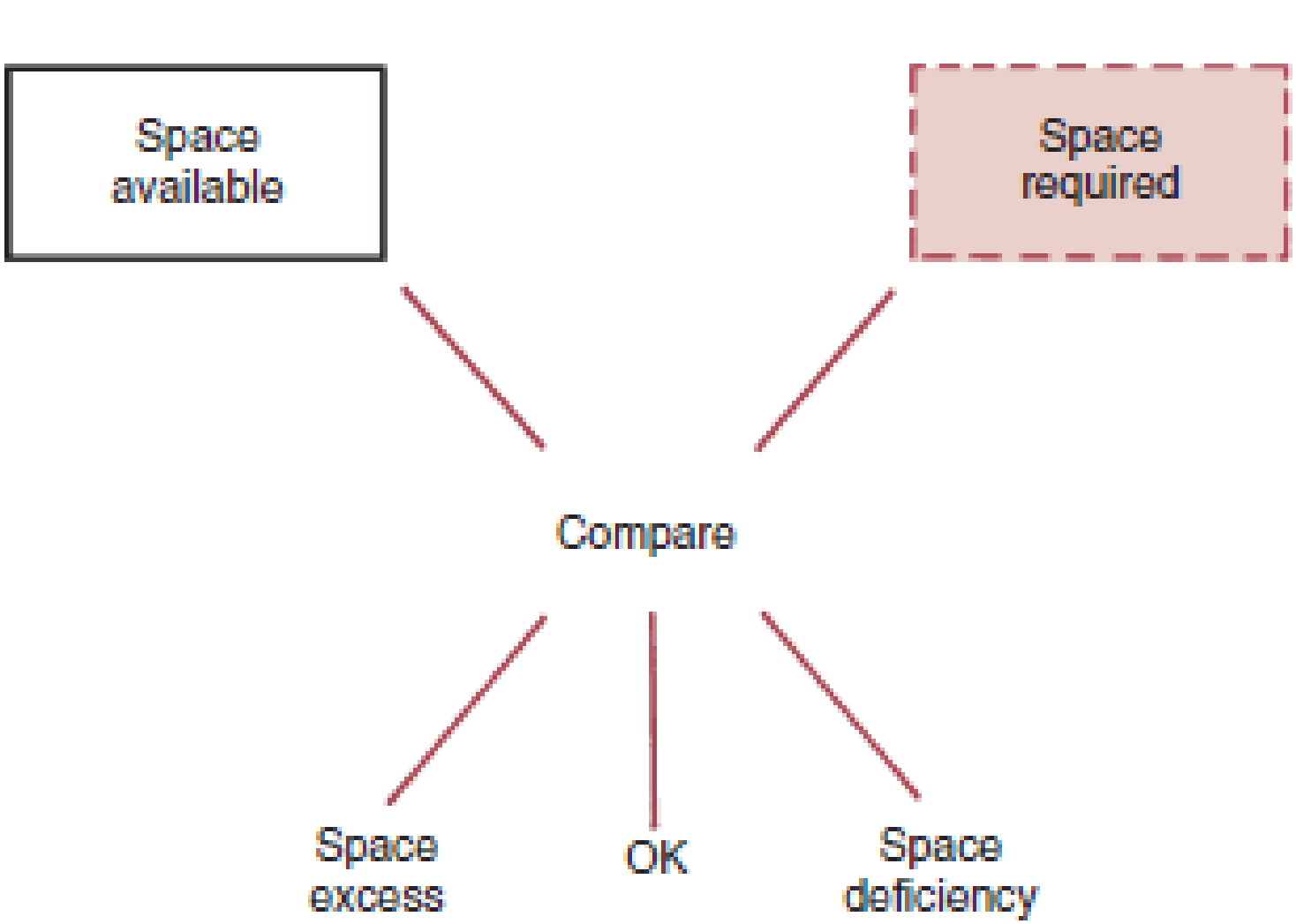
In **the mixed dentition**



A



B


Space available
Space required
Compare
Space excess
OK
Space deficiency

Crowding and protrusion

Crowding and protrusion are really different aspects of the same phenomenon.

Mixed dentition space analysis

• BOX 11.1 Tanaka and Johnston Prediction Values

One half of the mesiodistal width of the four lower incisors

+10.5 mm = estimated width of mandibular canine and premolars in one quadrant

+11.0 mm = estimated width of maxillary canine and premolars in one quadrant

Tooth Size Analysis

- Tooth size analysis, often called ***Bolton analysis*** after is carried out by measuring the mesiodistal width of each permanent tooth.

$$\text{Overall ratio \%} = \frac{\text{Sum mandibular 12}}{\text{Sum maxillary 12}} \times 100$$

$$\text{Anterior ratio \%} = \frac{\text{Sum mandibular 6}}{\text{Sum maxillary 6}} \times 100$$

100

91.3 ± 1.91

(1)

100

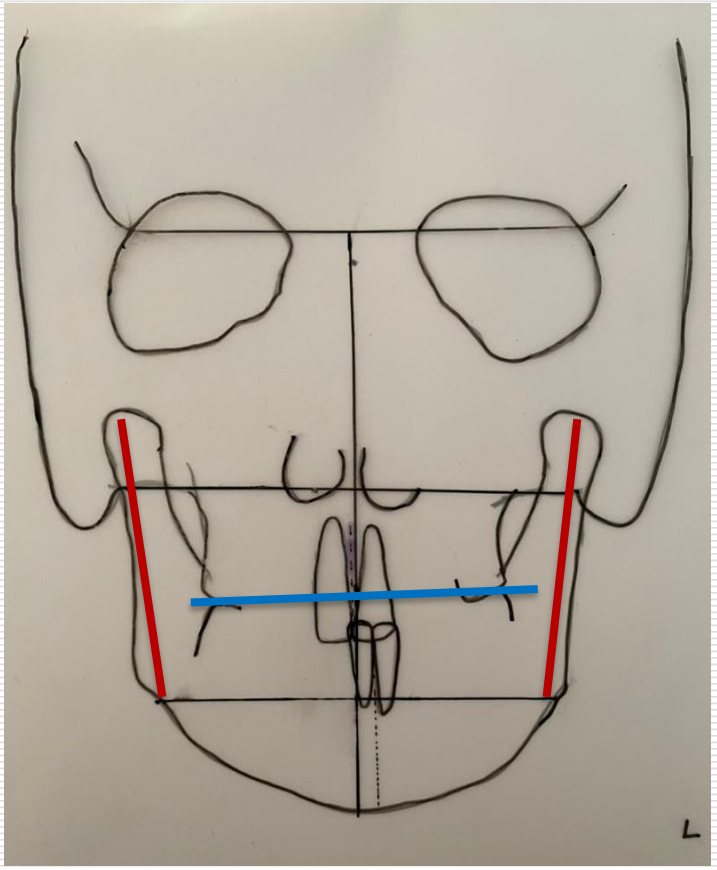
77.2 ± 1.65

(2)

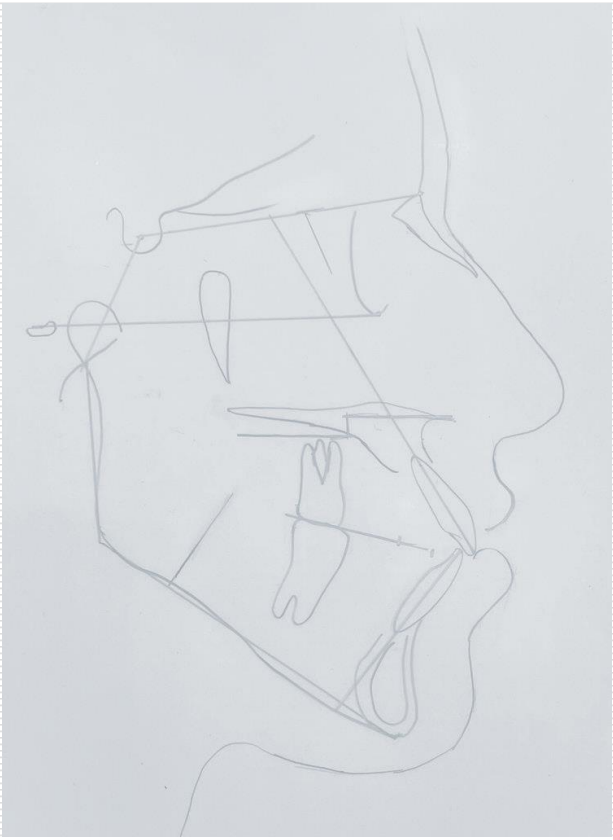
Radiographic records

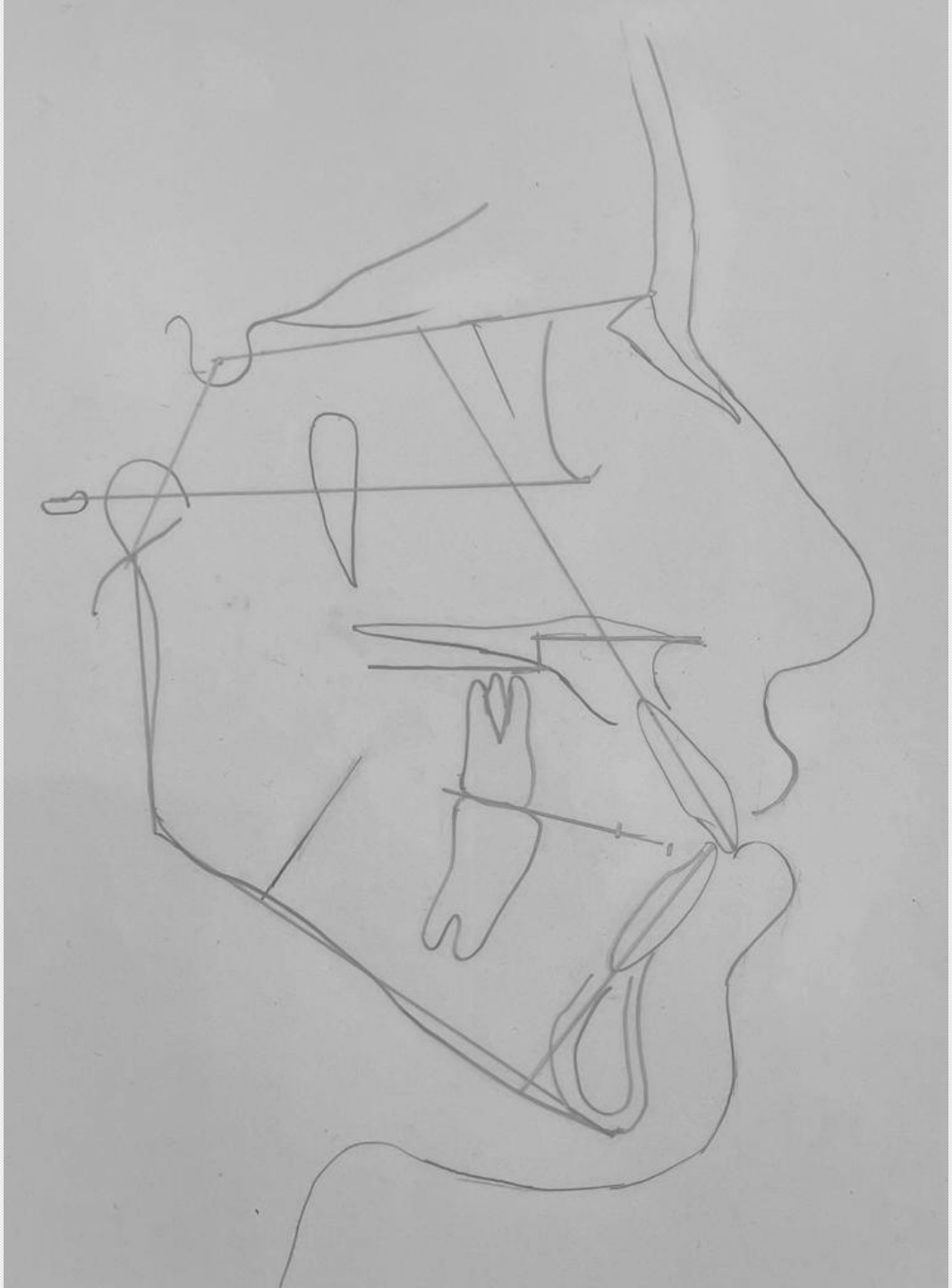
Panoramic analysis

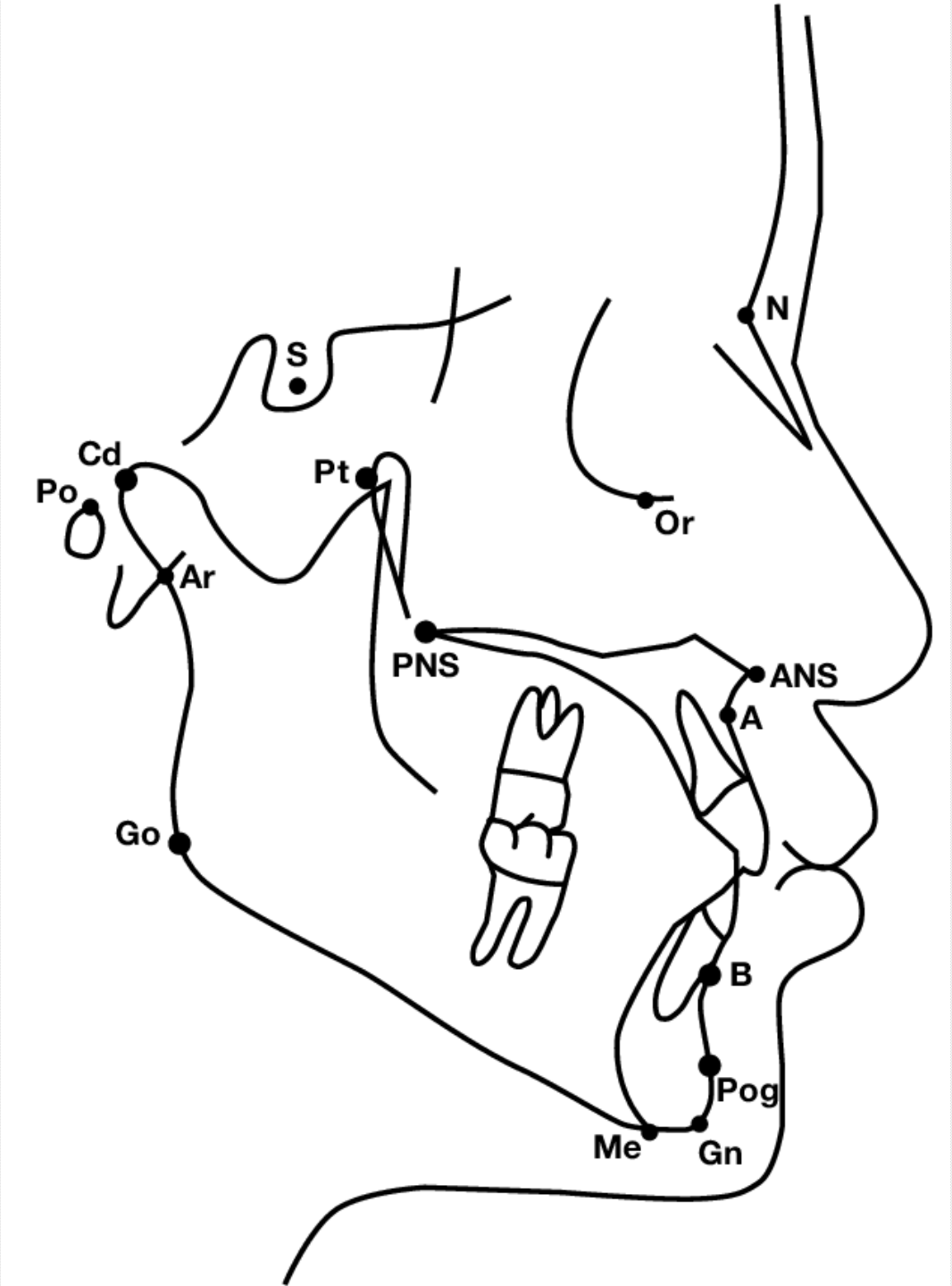
PA cephalometry analysis



Cephalometric analysis



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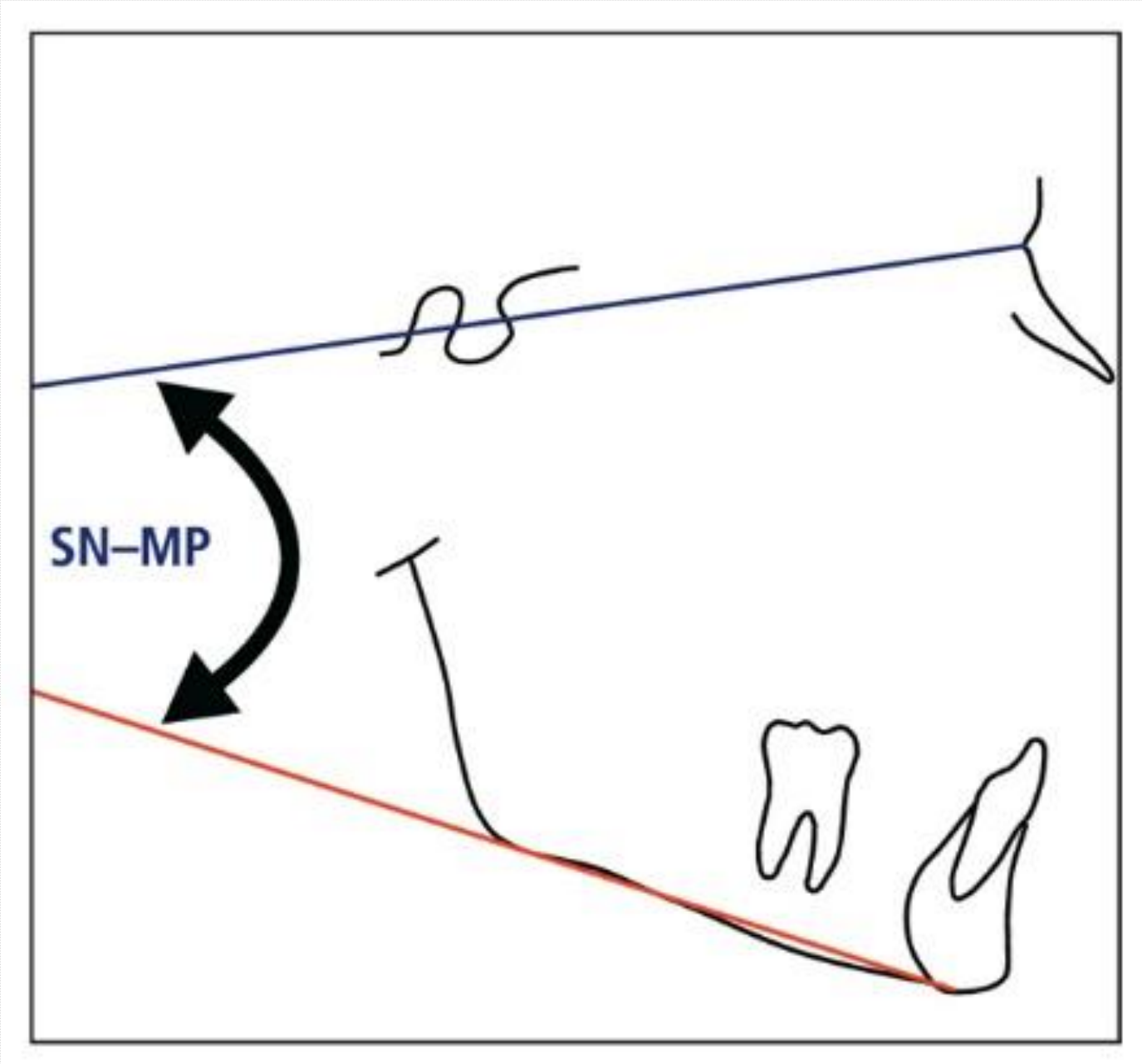
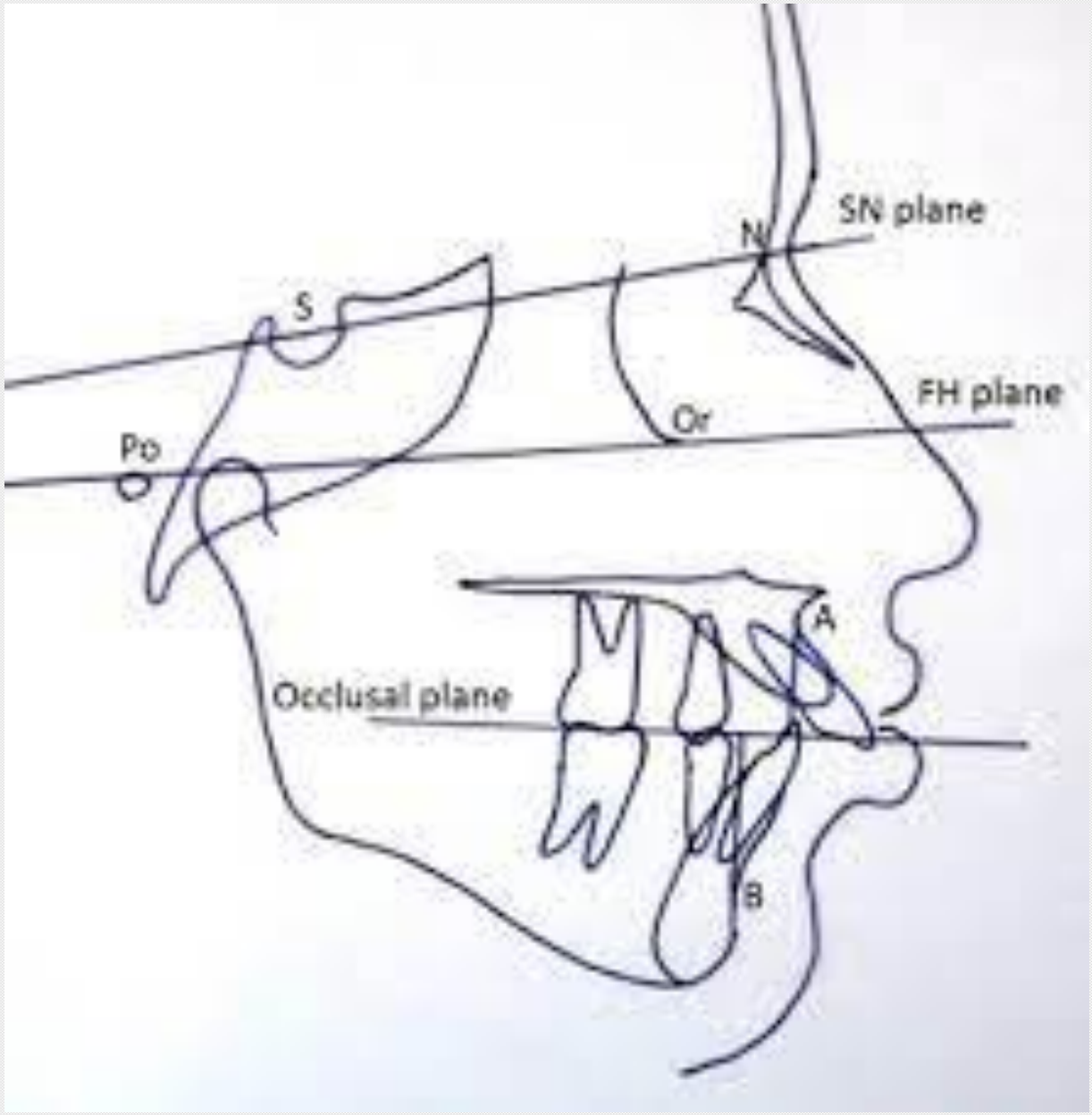
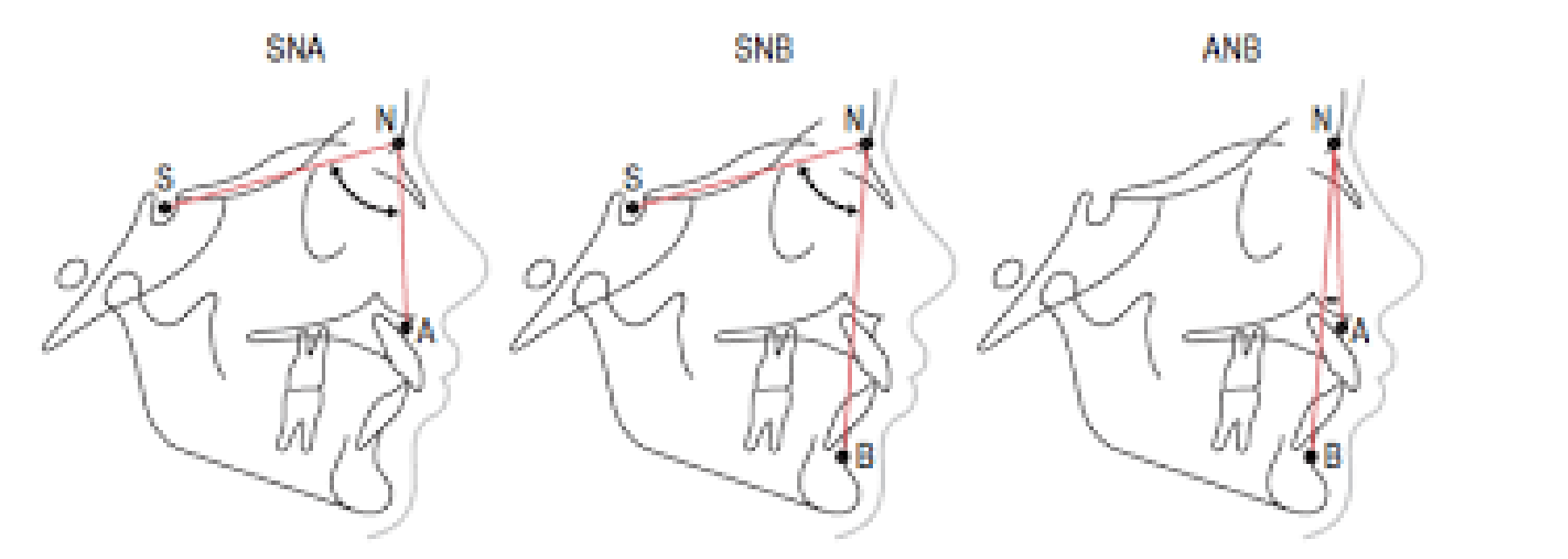

SN–MP


SN plane
N
S
FH plane
Or
Po
A
Occlusal plane
B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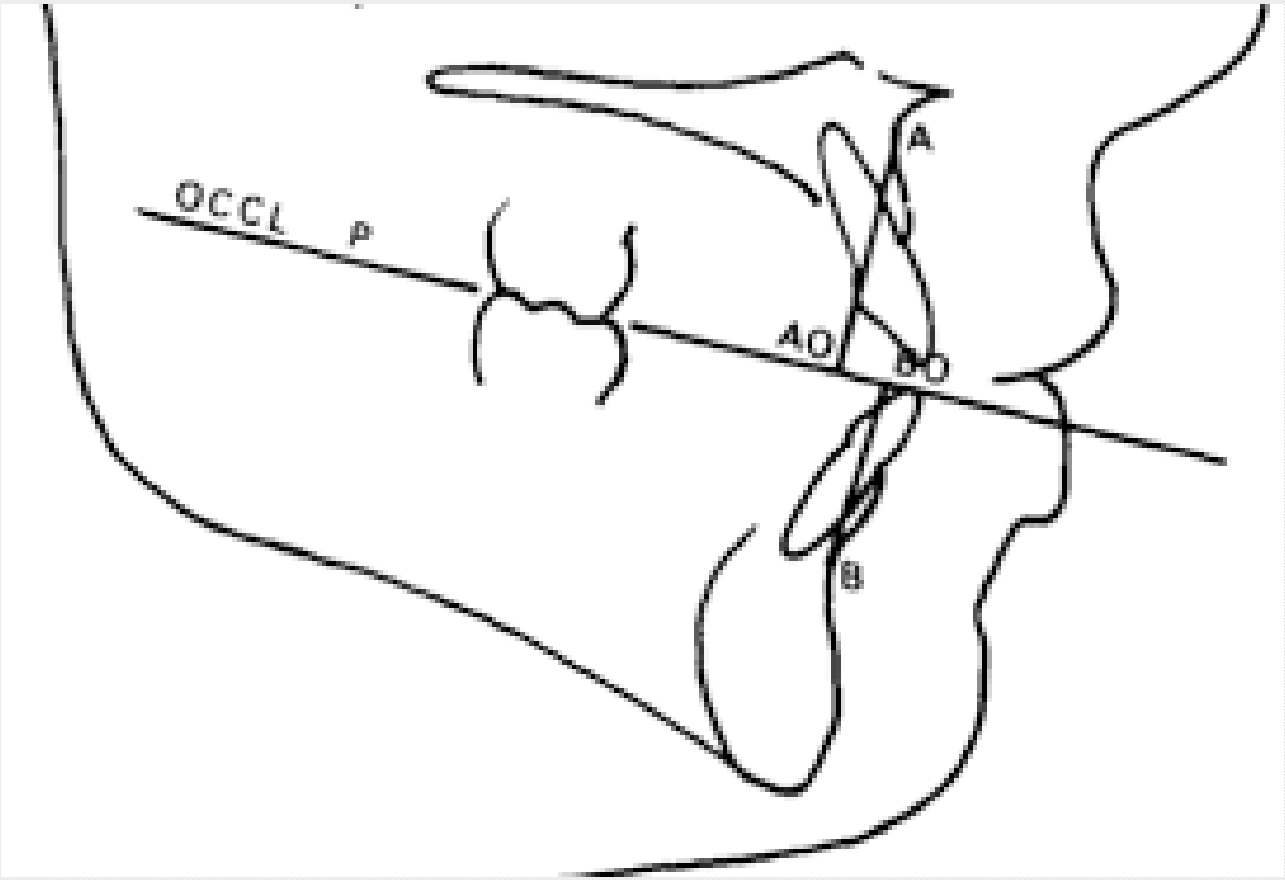
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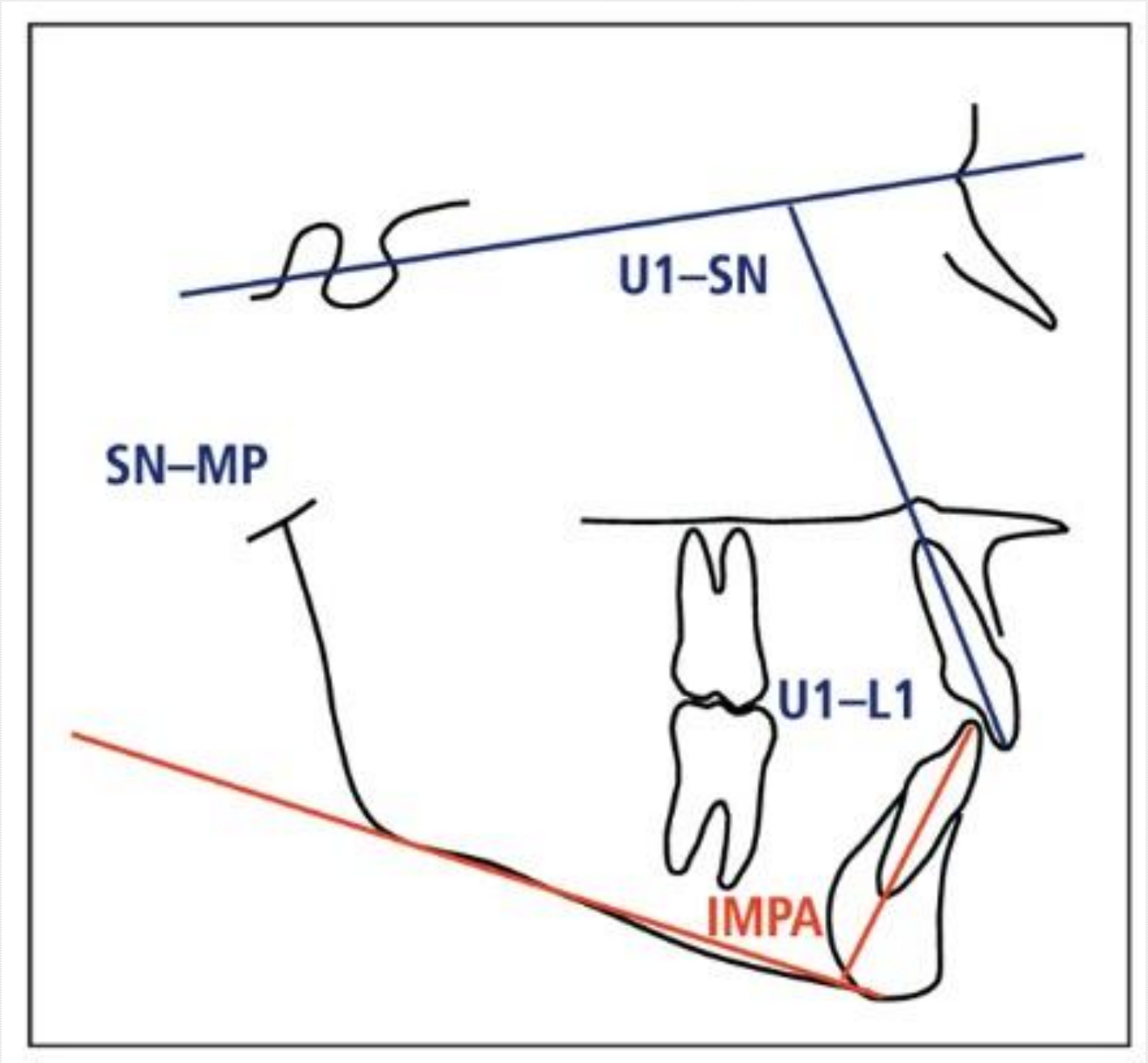
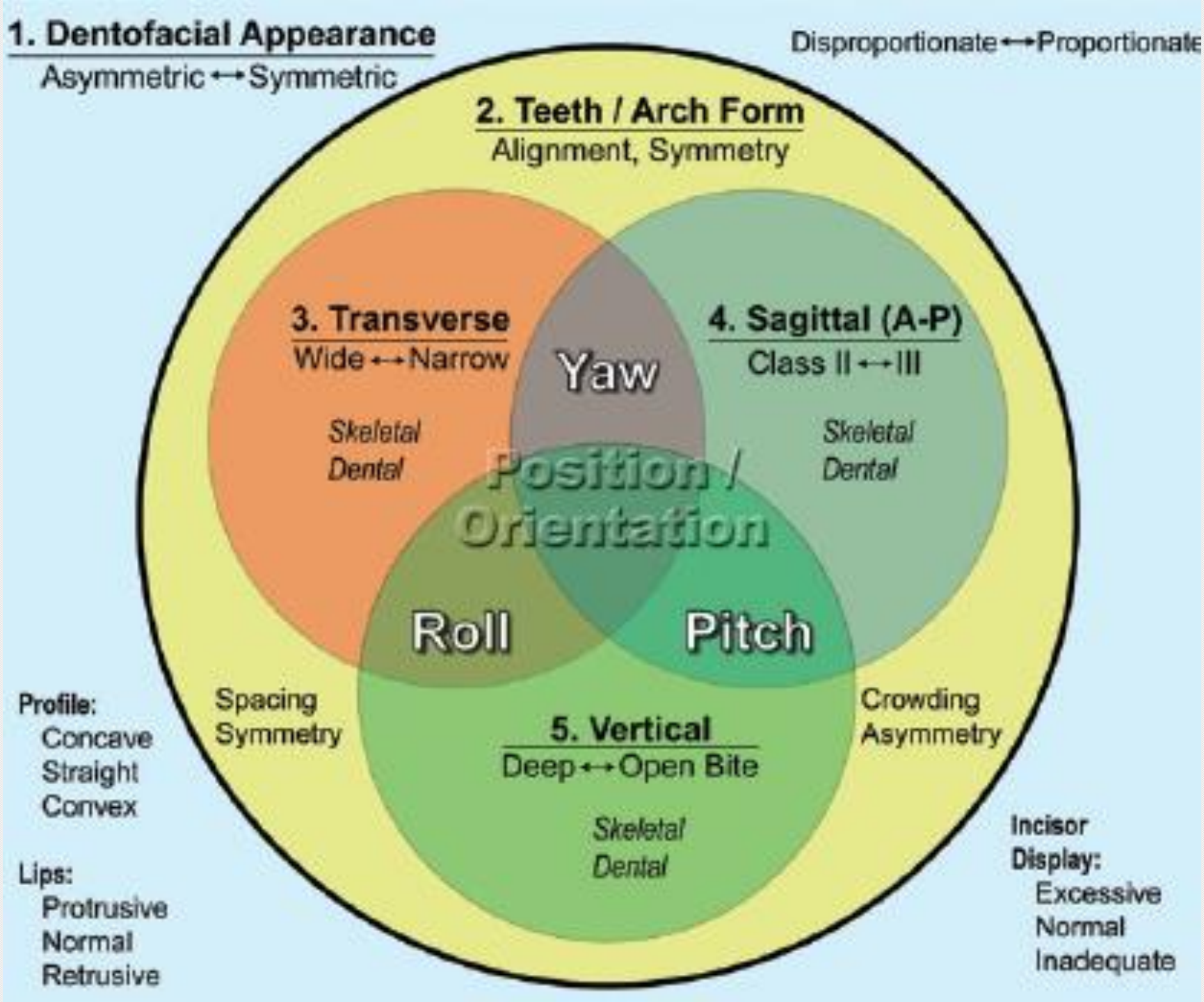

U1–SN
SN–MP
U1–L1
IMPA

Index	Norm	Pt's Value
SNA	81	80.5
SNB	79	78.5
ANB	2	2
SN-Pog	82	79.5
Wits (mm)	-1	-3.5

SN-FH	6-8	6
Saddle	123	120
Articular	143	141
Gonial	130	136
Sum	394	397
Y-axis	66	68
Pn-Pal(Incl.a)	85	82
Jaraback	62-65	70
Pal-GoMe	25	26
SN-MeGo	34	37
OccP-SN	14	19

U1-SN	102	100
L1-MeGo	90	87
U1-NA	+4	+3
L1-NB	+4	+5.4
U1-L1	135	136
U1-Palatal P.	110	111


1. Dentofacial Appearance
Asymmetric ↔ Symmetric
Disproportionate ↔ Proportionate
2. Teeth / Arch Form
Alignment, Symmetry
3. Transverse
Wide ↔ Narrow
Skeletal
Dental
Yaw
4. Sagittal (A-P)
Class II ↔ III
Skeletal
Dental
Position / Orientation
Roll
Pitch
Spacing
Symmetry
Crowding
Asymmetry
5. Vertical
Deep ↔ Open Bite
Skeletal
Dental
Profile:
Concave
Straight
Convex
Lips:
Protrusive
Normal
Retrusive
Incisor
Display:
Excessive
Normal
Inadequate

Diagnosis in one line

- Transverse
- Ant-Post
- vertical