BASIS OF **CRANIOMETRY & CEPHALOMETRY**

Craniometry

*the branch of physical **anthropology** dealing with the study and measurement of **dry skull** after removal of its soft part*

Cephalometry

- Is a measurement of the head and facial structures

*- Is used in **dentistry**, and especially in orthodontics, to gauge the **size and special relationships of the teeth, jaws, and cranium**.*

- This analysis informs about treatment planning, quantifies changes during treatment, and provides data for clinical research

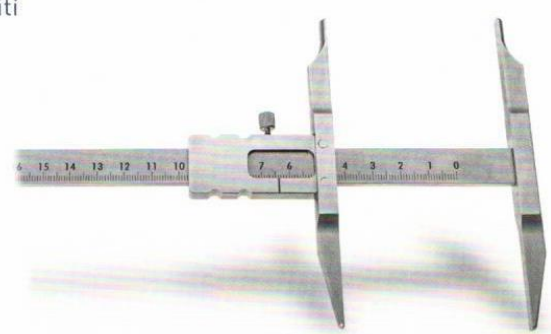
The way of measurement

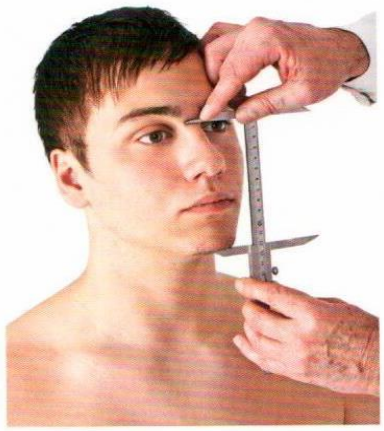
using antropometric instruments

(sliding gauge, cephalometr)

Obrázek 22.

Posuvné měřítko M-222
praktické použití





Použití kefalometru při měření délky a šířky hlavy a šířky obličeje

délka hlavy

šířka hlavy

šířka obličeje

Craniometric / cephalometric Points

The most important craniometric points

Points marked with Greek or Latin names

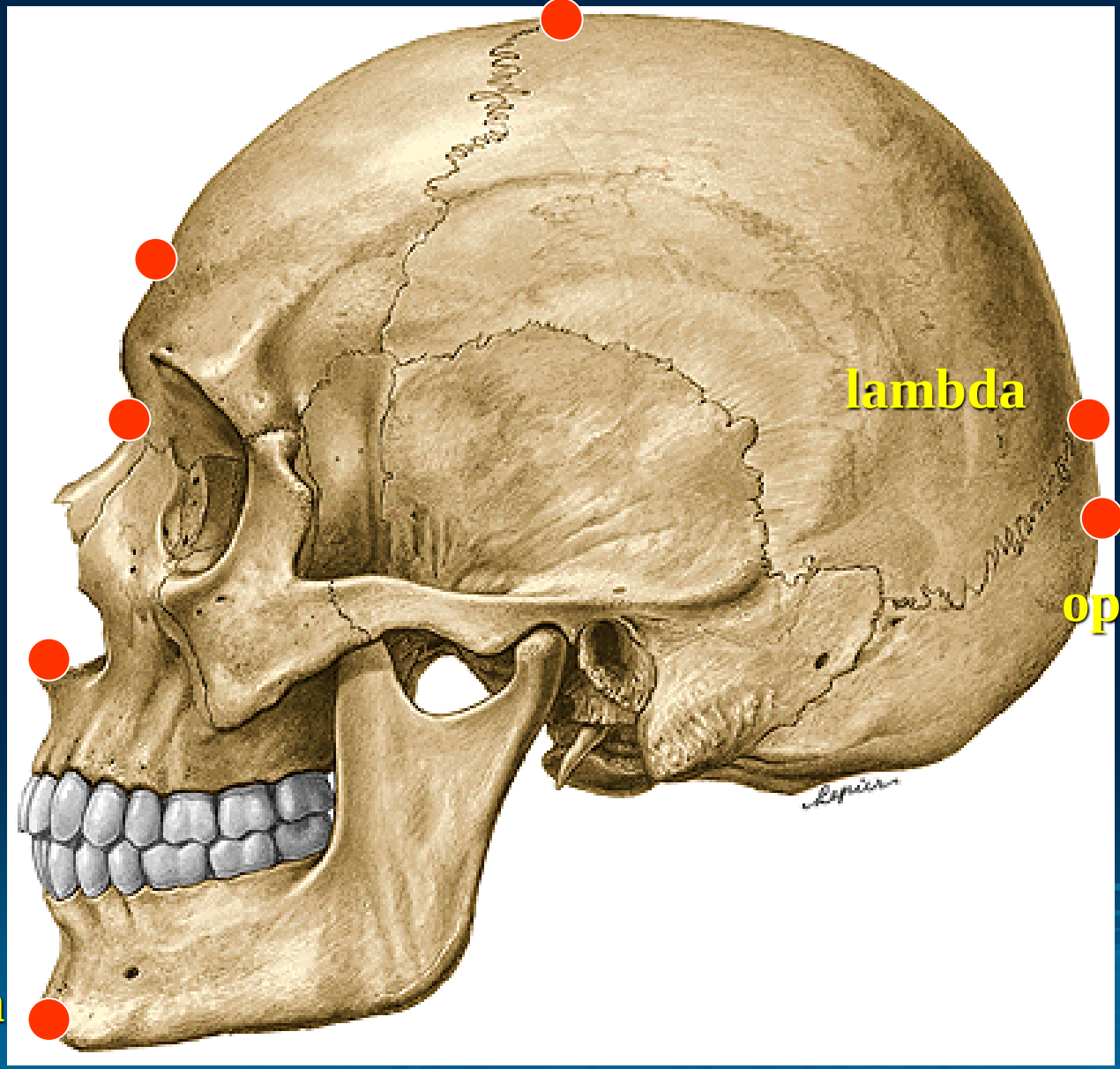
Unpaired ***– in the middle line***

- ***nasion***
- ***glabella***
- ***bregma***
- ***lambda***
- ***opisthocranion***
- ***basion***
- ***akanthion***
- ***gnathion***
- ***orale***
- ***staphylion***

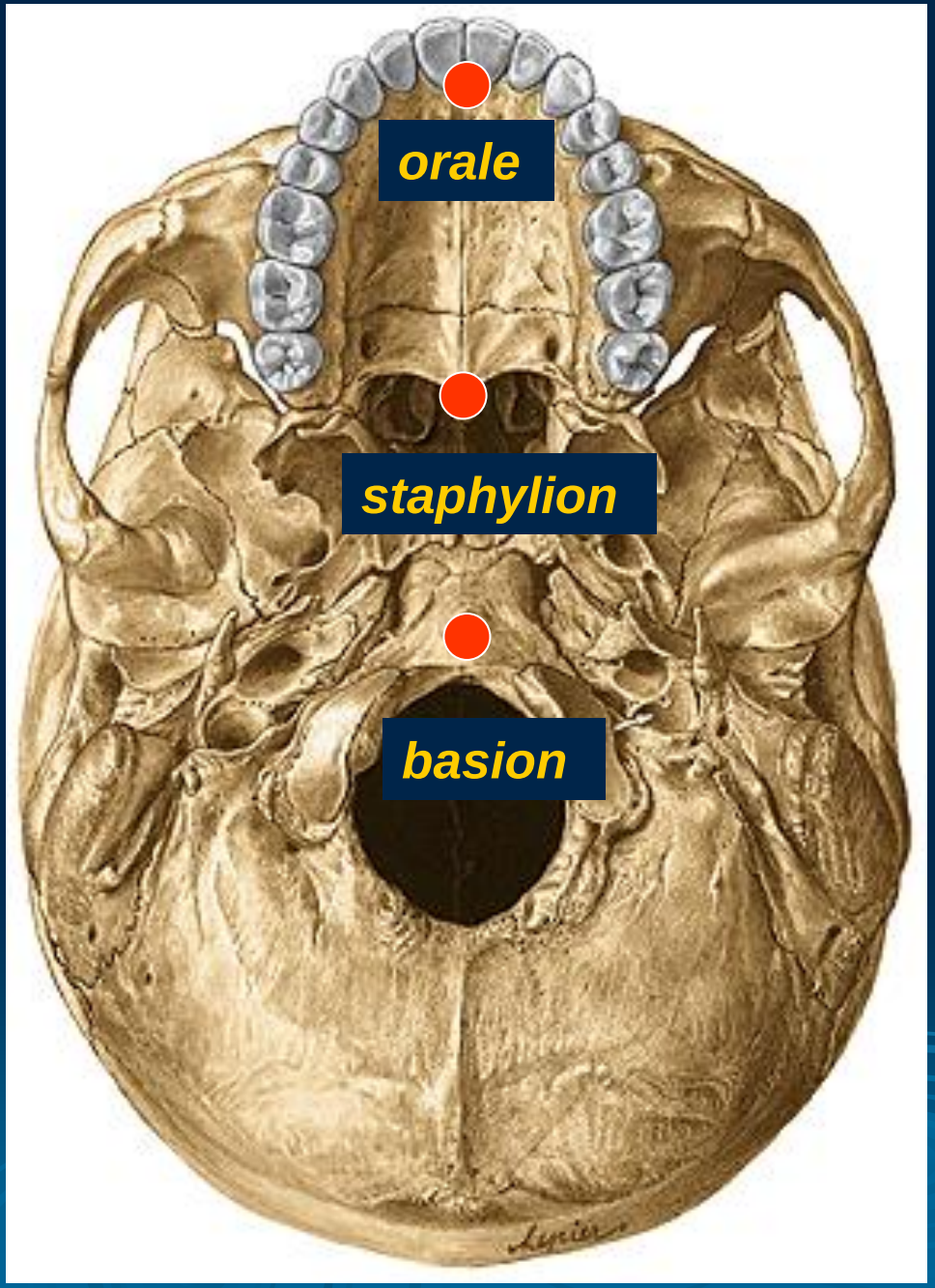
Paired

- ***pteryon***
- ***porion***
- ***euryon***
- ***zygion***
- ***gonion***
- ***endomolare***

UNPAIRED


bregma
glabella
nasion
lambda
opistocranion
akanthion
gnathion

UNPAIRED



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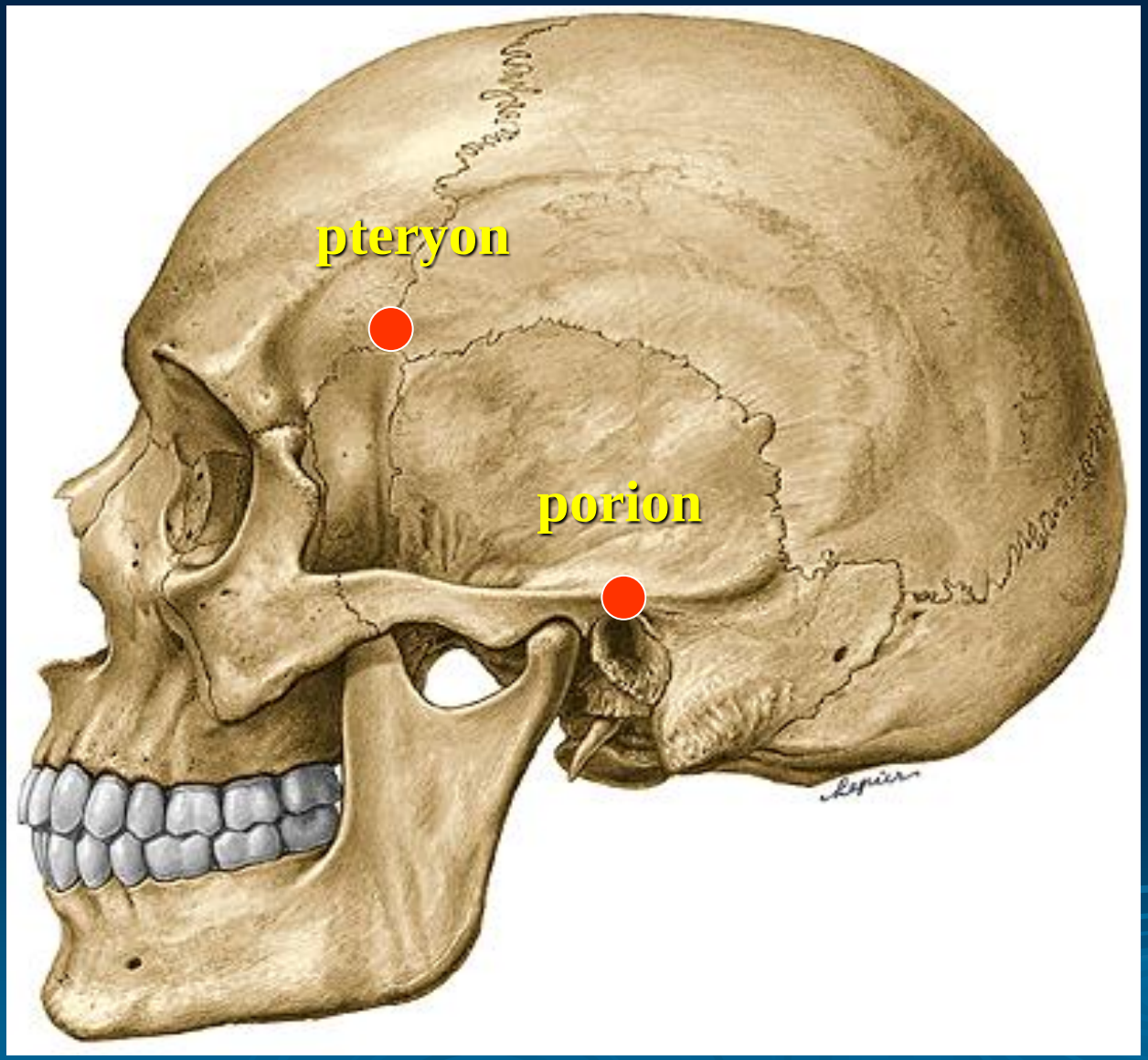
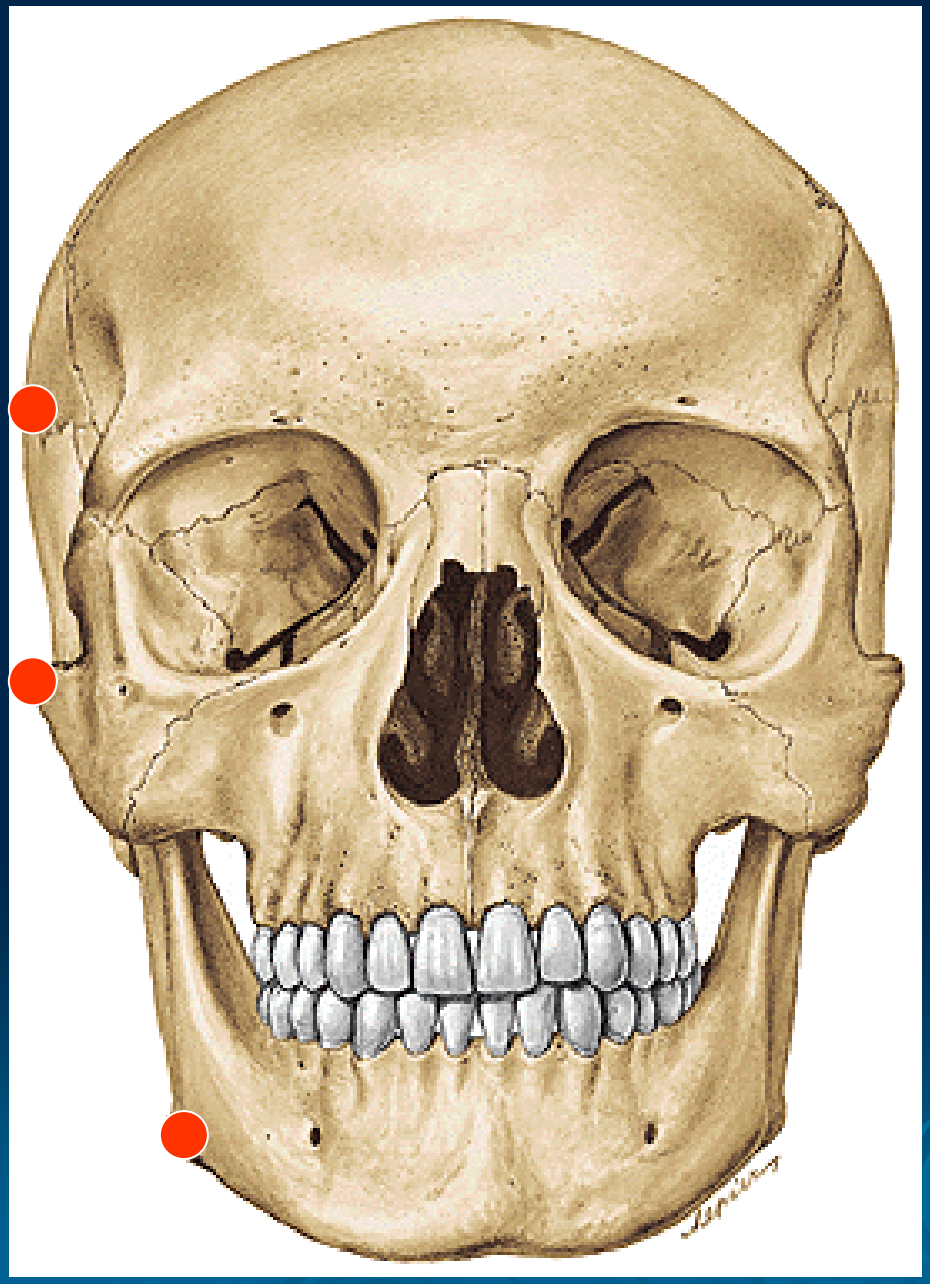


PAIRED

euryon

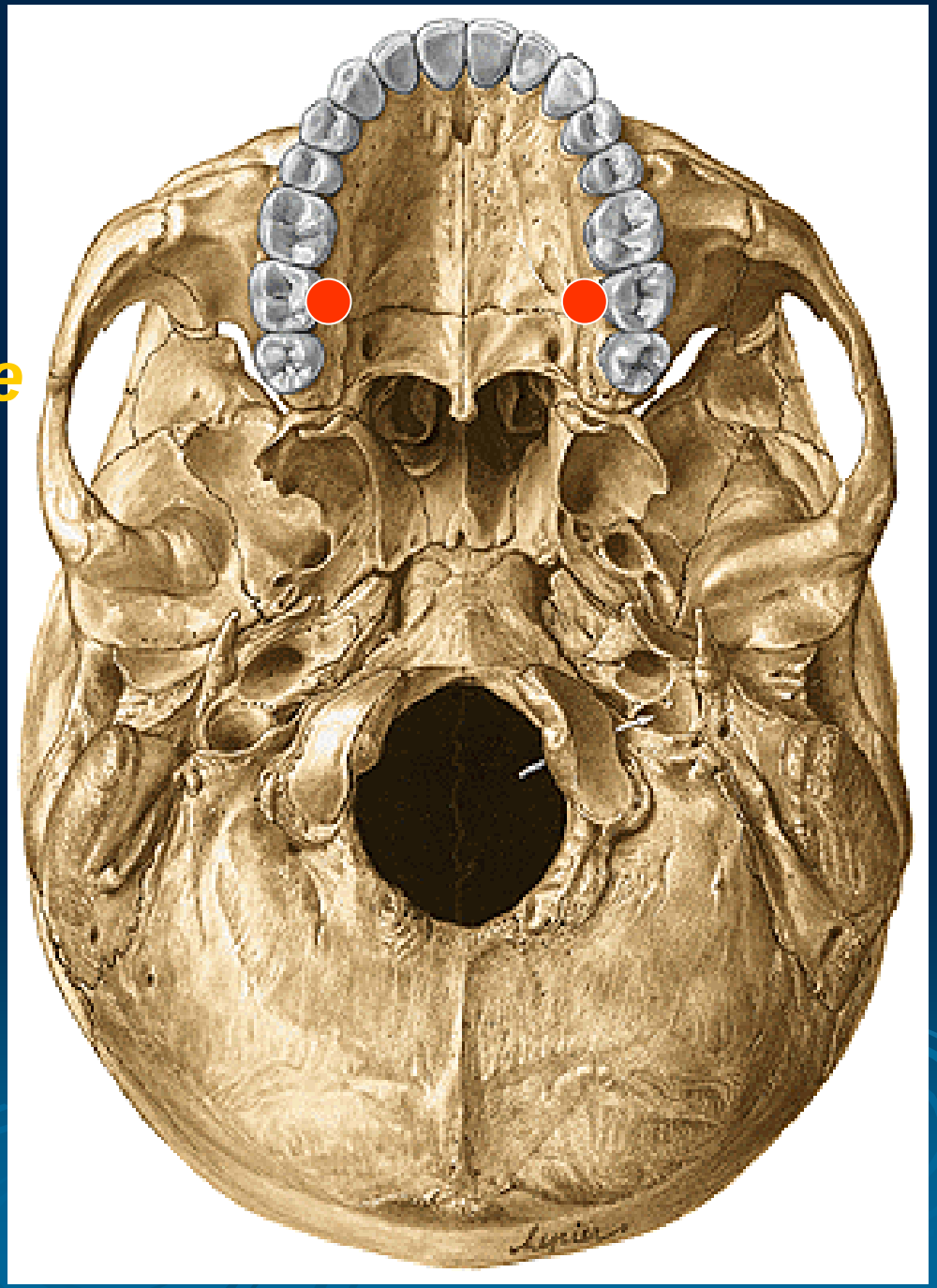
zygion

gonion

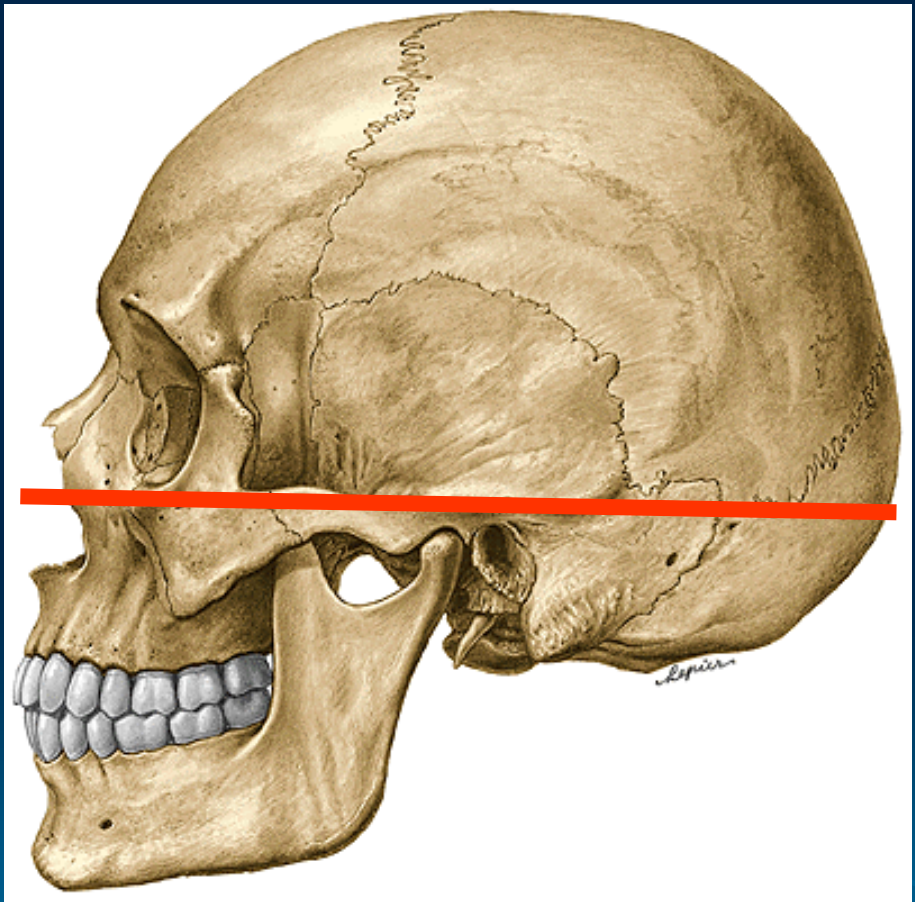


PAIRED

endomolare



Frankfurt horizontal plane

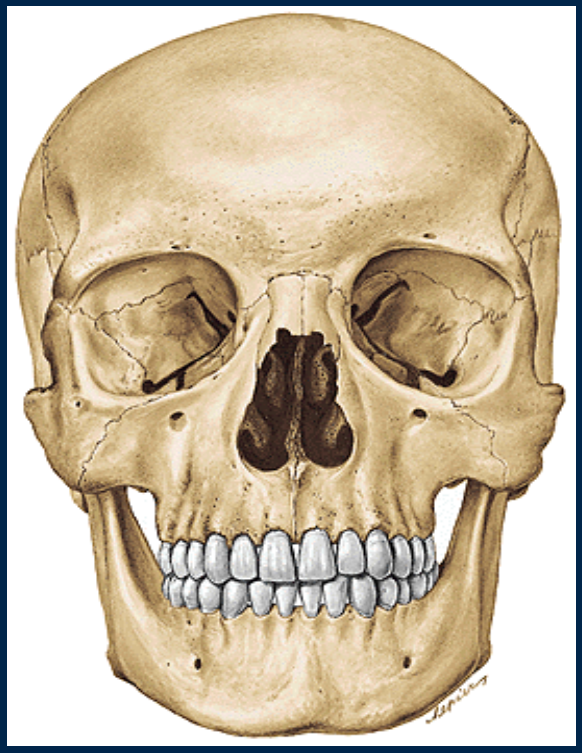


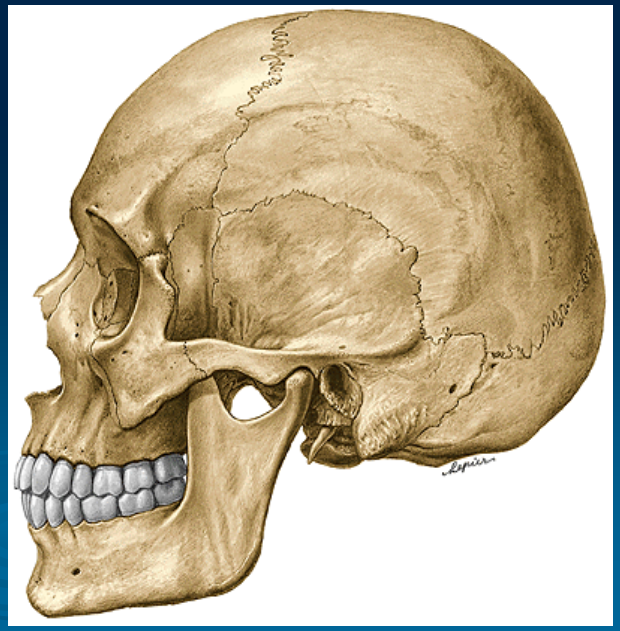
a horizontal plane represented in profile by a line between the lowest point on the margin of the orbit (orbitale) to the highest point on the margin of the auditory Meatus (porion)

linea horizontalis auriculoorbitalis

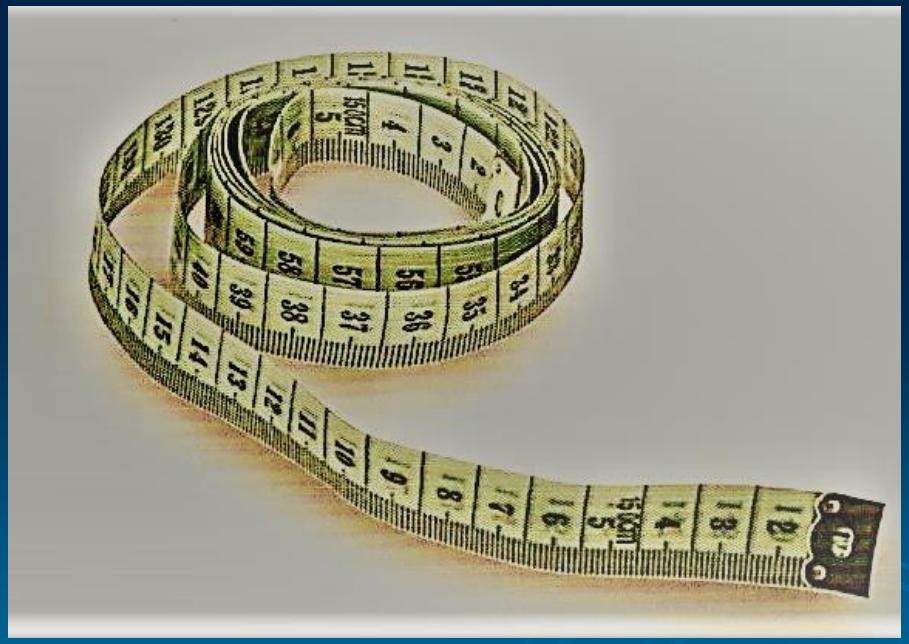
The Size Of The Human Skull

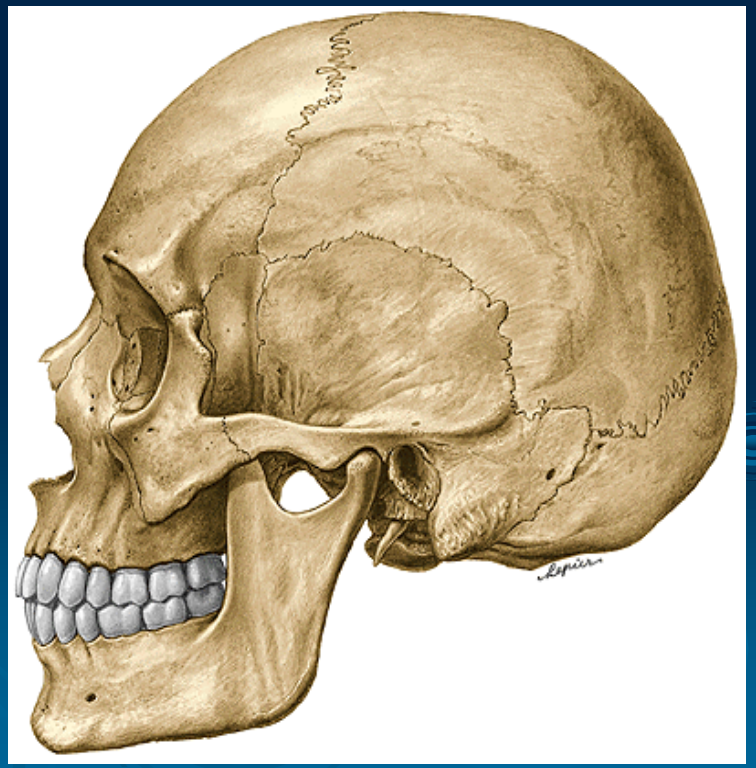
	FROM	TO
Length	glabella	opisthocranion
Width	euryon	euryon
Height	bregma	basion
Facial length	nasion	gnathion
Facial width	zygion	zygion
Palatal width	endomolare	endomolare
Palatal length	orale	staphylion





Peripheral measurement - ***circumferentia horizontalis frontooccipitalis***



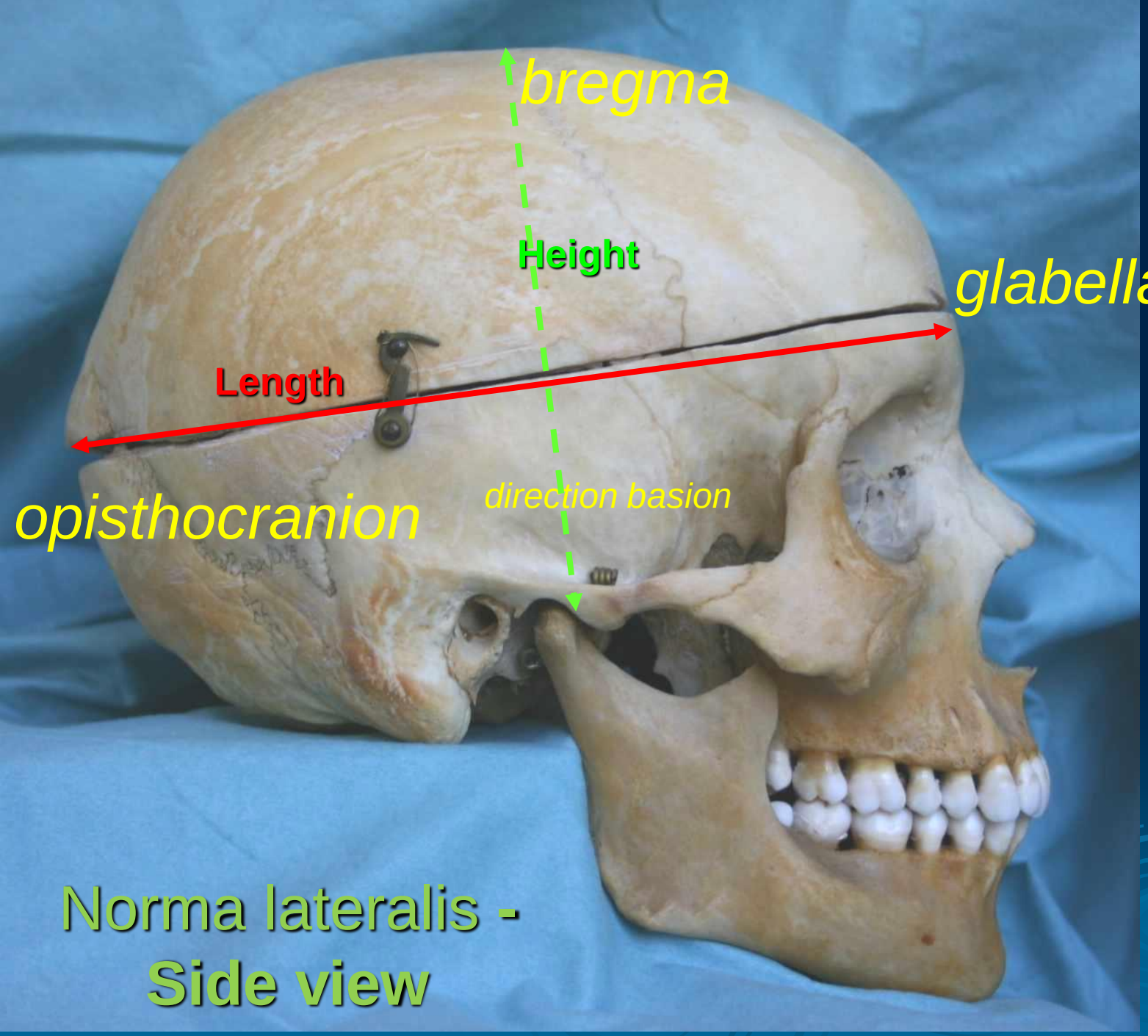


Variability in the skull size

We distinguish several **specific views** on the measured skull –

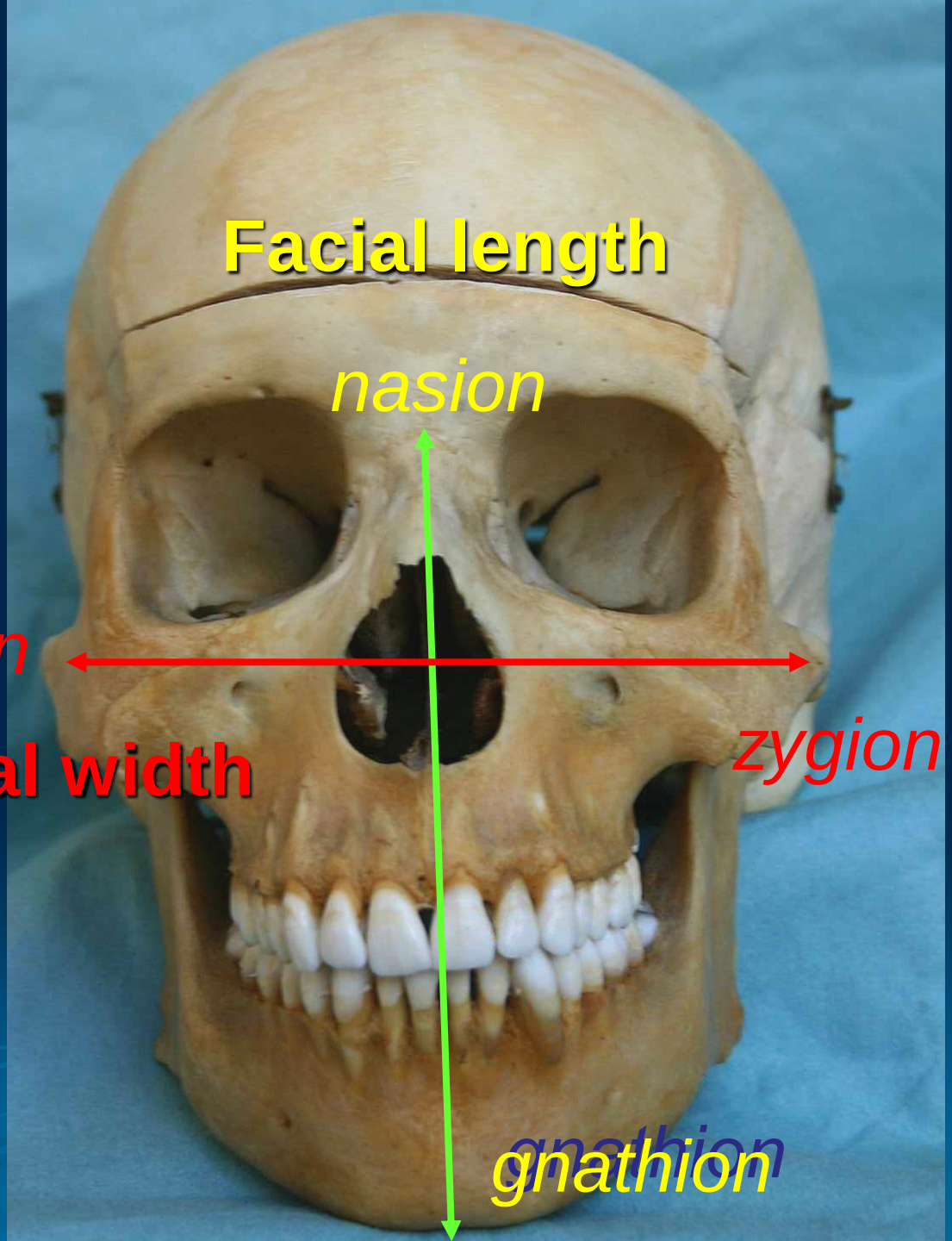
side view (norma lateralis)
front view (norma frontalis)
view from above (norma verticalis)

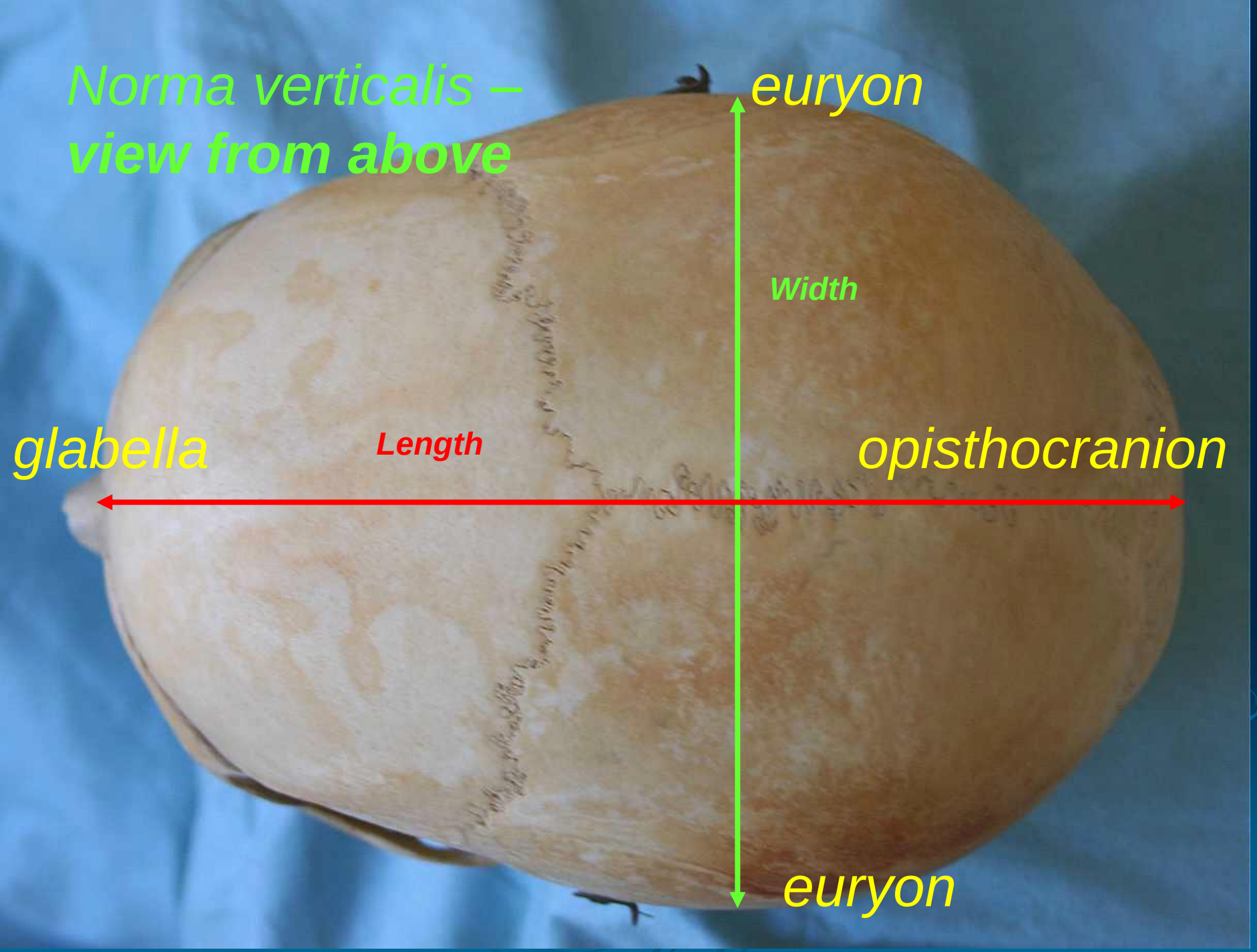
to be able to compare objectively



Norma lateralis - **Side view**

Norma frontalis – ***front view***




Norma verticalis –
view from above
euryon
Width
glabella
Length
opisthocranion
euryon

On the basis of measured parameters we can calculate ***indexes:***

Cephalic index (CI)

the ratio of the maximum width of the head multiplied by 100 and divided by its maximum length

Facial index (FI)

the ratio of the length of the face multiplied by 100 divided by width

Palatomaxillary index (PMI)

the ratio of the length of the hard palate to its breadth (width) multiplied by 100

CI	**Dolichocephalic** x - 74,9 *(long-headed)*
	Mesocephalic 75,0 - 79,9 *(medium-headed)*
	Brachycephalic 80,0 - x *(short-headed)*
FI	**Leptoprosopic** 90,9 - x (long narrow face)
	Mesoprosopic 85,0 - 89,9 *(average width face)*
	Euryprosopic x - 84,9 *(short broad face)*
PMI	**Leptostaphylic** x - 79,9 *(narrow palatum)*
	Mesostaphylic 80,0 - 84,9 *(average width)*
	Eurystaphylic 85,0 - x *(broad palatum)*

Clinical Diagnosis of Orofacial Anomalies

Use of craniometry in dentistry

- Anamnesis (patient´s medical history)
- Examination of orofacial region:

  - Intraoral, extraoral

  - Functional

  - Others: photographs (en face, profile), analysis of models, X-rays: 1.orthopantomogram (OPG) **2.teleradiography** – basis for cephalometric analysis

2. Cephalometry

- *A standardized and reproducible form of skull radiography used extensively **in orthodontics** to assess **the relationships of the teeth to the jaws and the jaws to the rest of the facial skeleton***

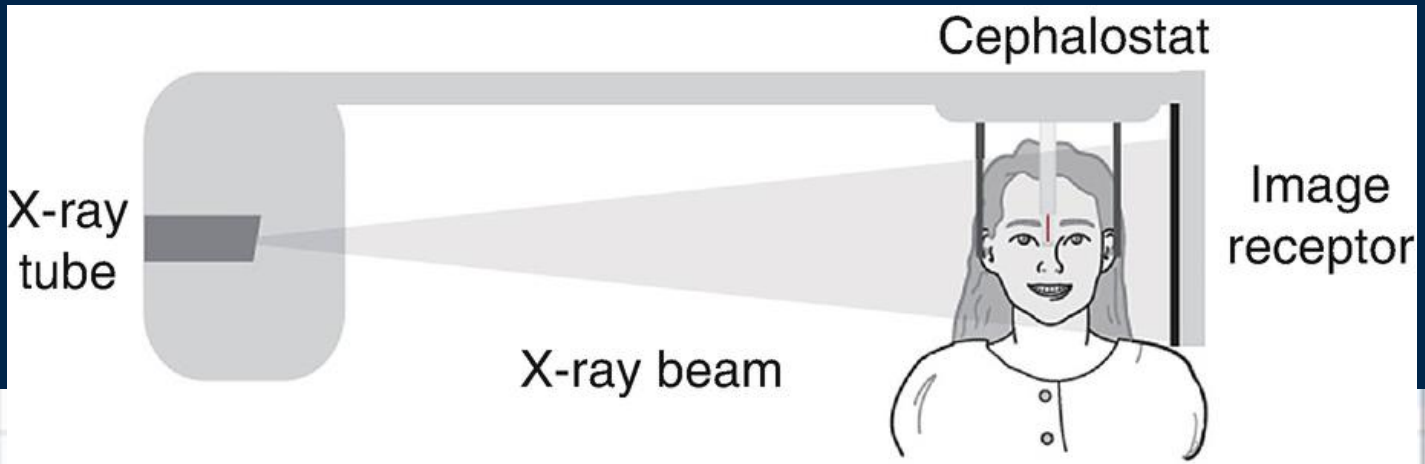
- *Main indications - monitoring treatment progress, preoperative evaluation of skeletal and soft tissue patterns, postoperative appraisal of the results of surgery and long-term follow-up studies*

- *The pacient is positioned within the cephalostat in the Frankfort plane horizontal, teeth should be in maximum intercuspation*

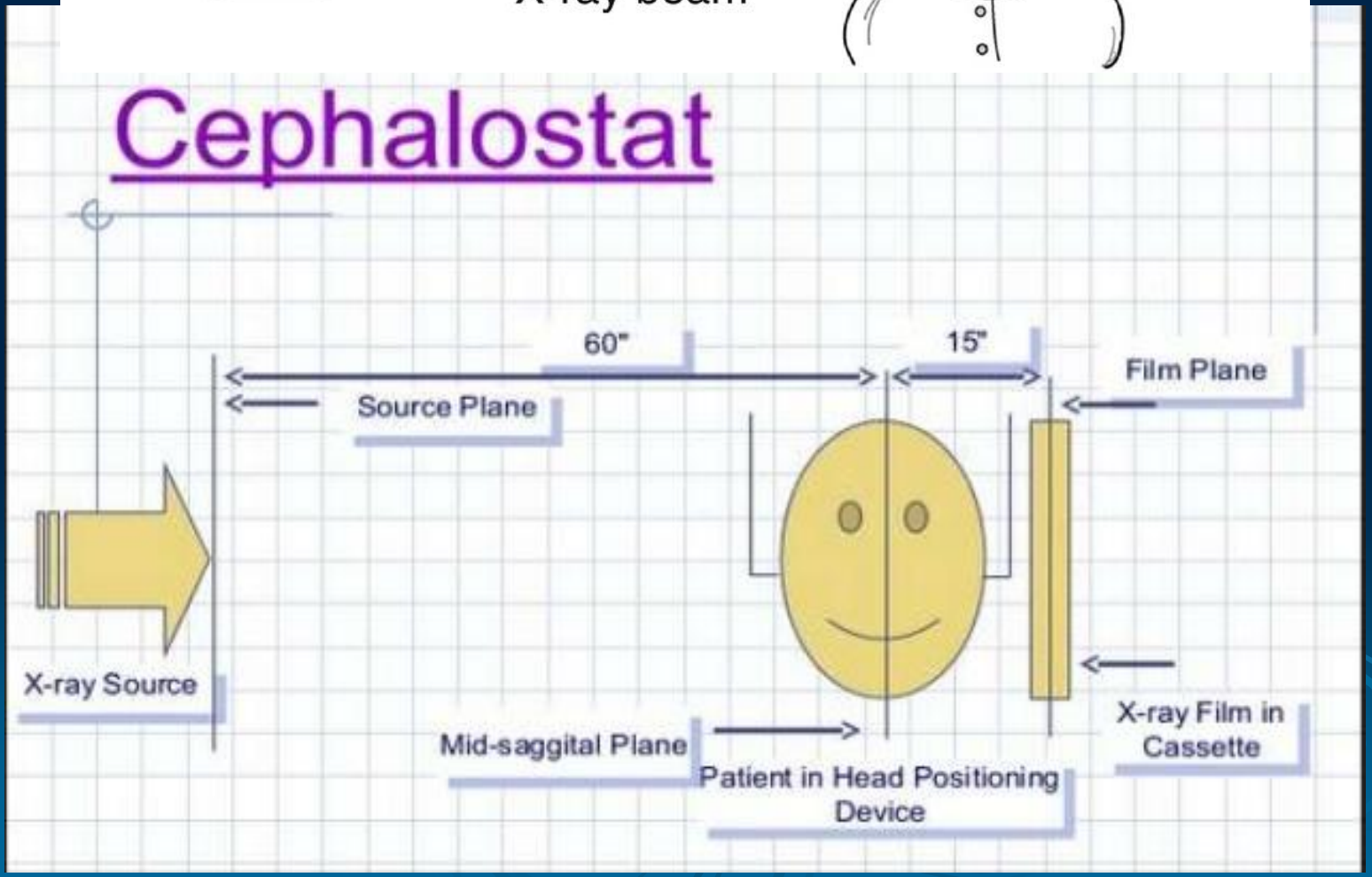
- *The head is immobilized within the apparatus with the plastic ear rods being inserted into the external auditory meati*

- *The X-ray beam is horizontal and centred on the ear rods*

- *Soft x-rays*



Cephalostat



Cephalometric Analysis

S Sella mid point of sella turcica

N Nasion most anterior point on fronto-nasal suture

Or Orbitale most inferior anterior point on margin of orbit

Po Porion upper most point on bony external auditory meatus

ANS anterior Nasal Spine

PNS posterior Nasal Spine

Go Gonion most posterior inferior point on angle of mandible

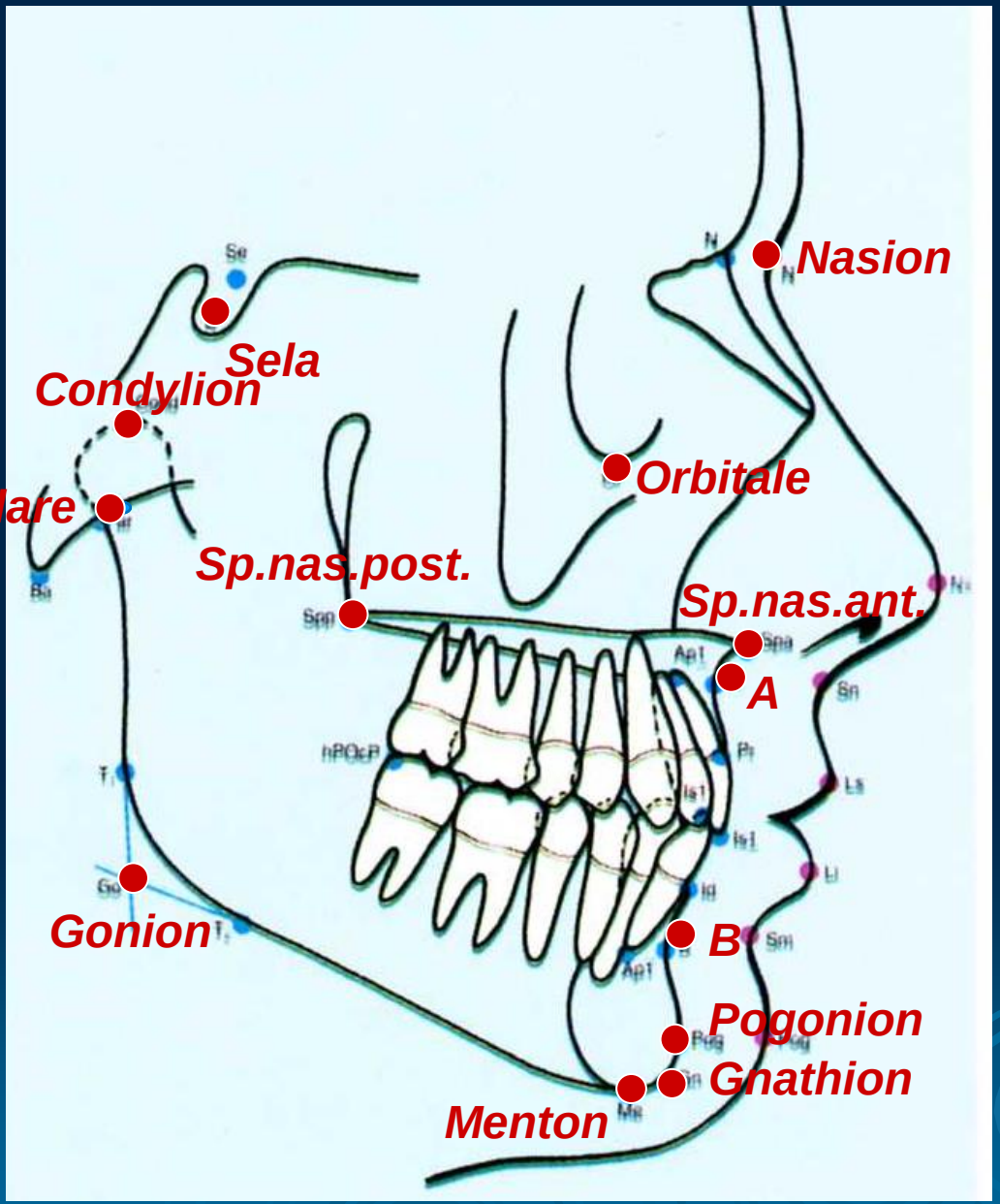
Me Menton lowest point on the mandibular symphysis

A point deepest concavity on anterior profile of maxilla

B point deepest concavity on anterior profile of mandibular symphysis

Pog Pogonion the most ventr point of the bony chin in the med plane

Ar Articulare intersection of the shadow of ramus mandib. and the lower edge of the base of the skull

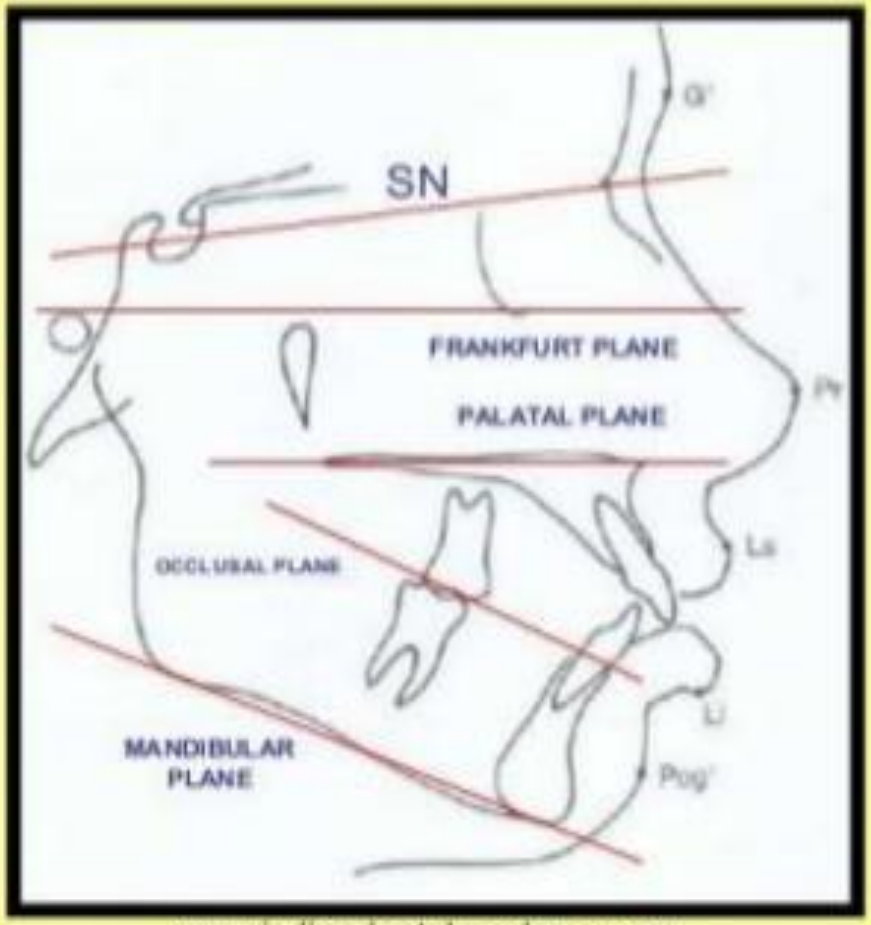

Nasion
Sela
Condylion
Articulare
Orbitale
Sp.nas.post.
Sp.nas.ant.
A
Gonion
B
Pogonion
Gnathion
Menton

Frankfort Plane Po - Or Equivalent to the true horizontal when patient is standing upright

Maxillary Plane PNS - ANS Gives inclination of maxilla relative to other lines/planes

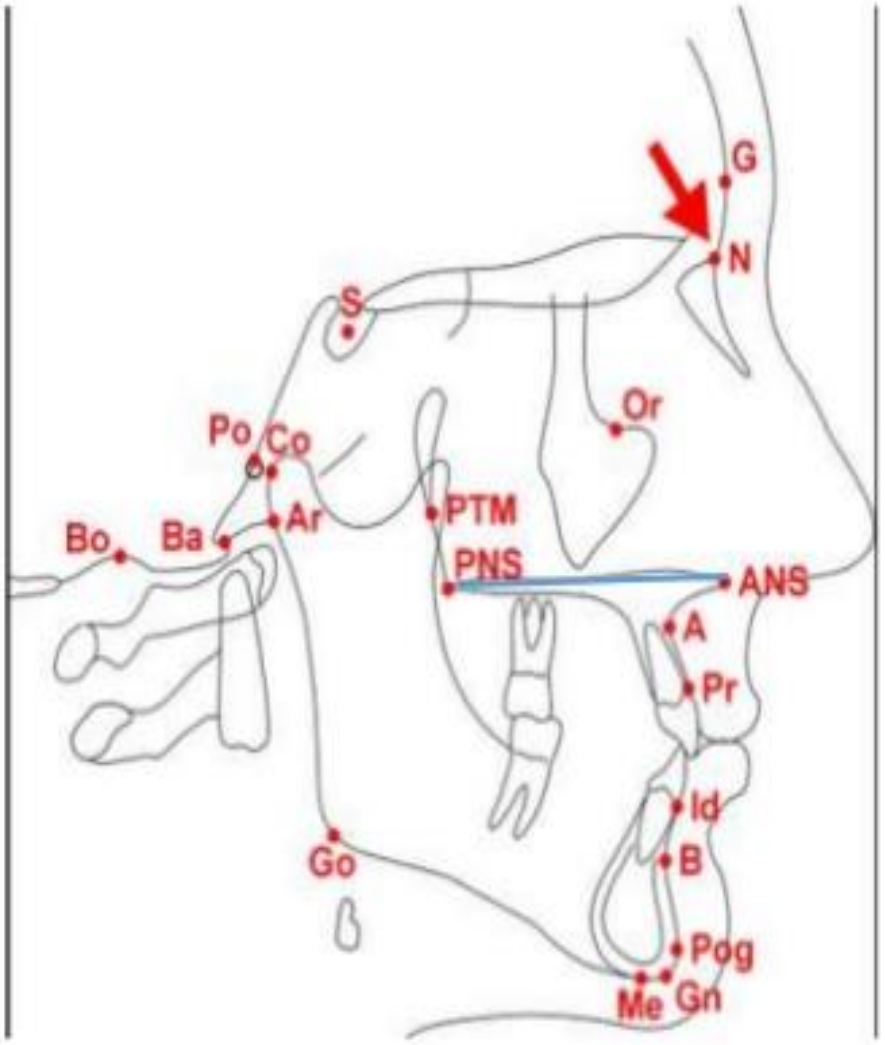
Mandibular Plane Go - Me Gives inclination of mandible relative to other lines/planes

CEPHALOMETRIC PLANES



PALATAL PLANE

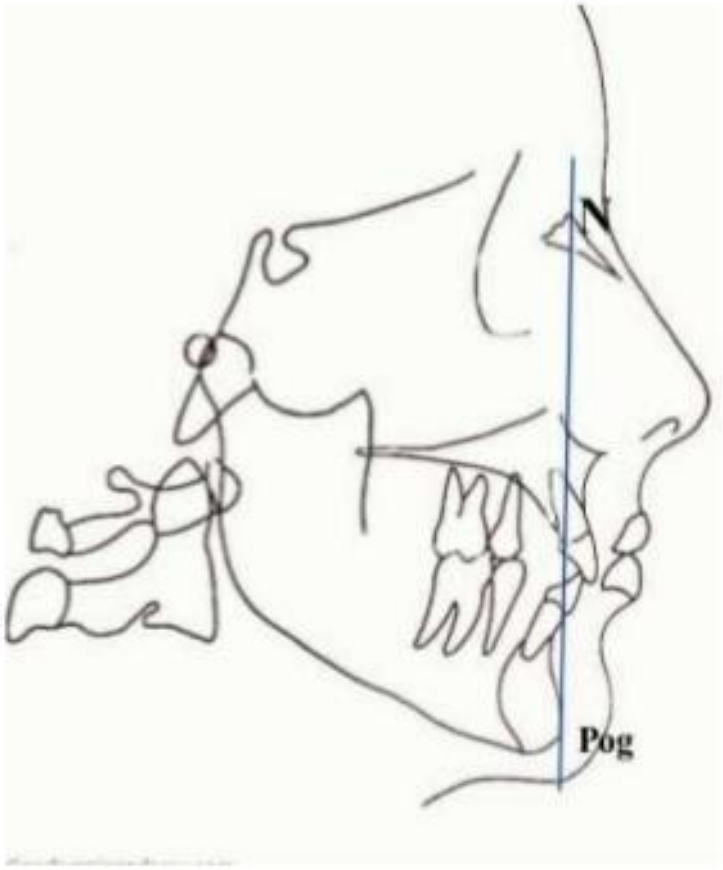
- This plane extends through the ANS to PNS.
- The relationship of this plane to FH plane is useful in evaluating treatment changes occurring in the maxilla.
- Assessment of remaining alveolar bone for implant placement.



FACIAL Plane :

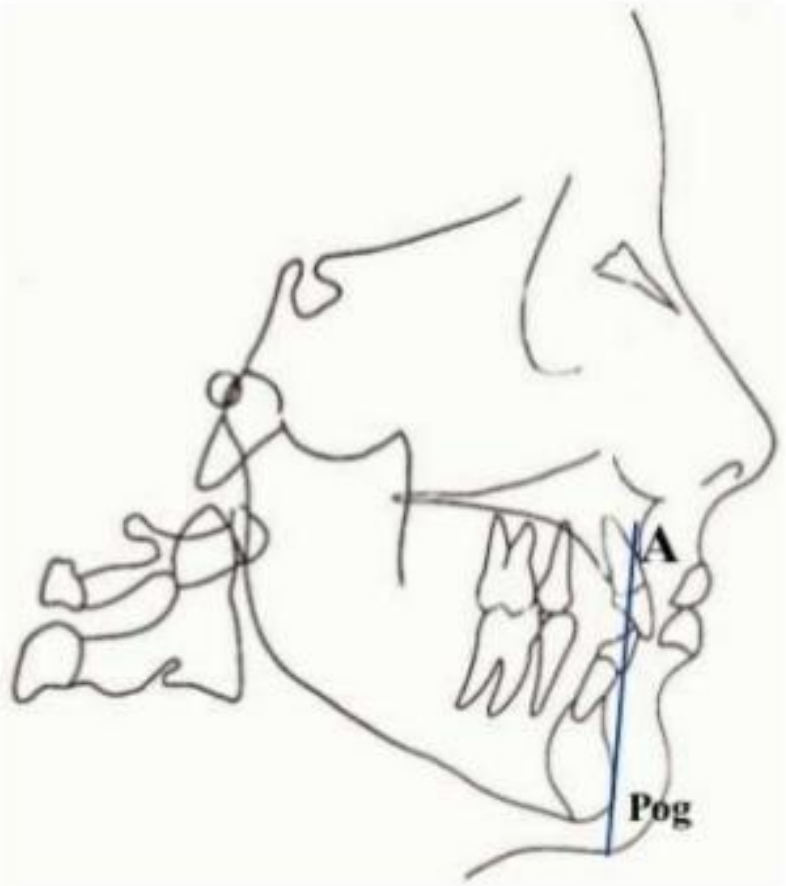
It is a line from the anterior point of the frontonasal suture (N) to the most anterior point of the mandible (Pog).

Used to record position of chin. And to relate position of maxilla to facial plane.



A-Pog plane:

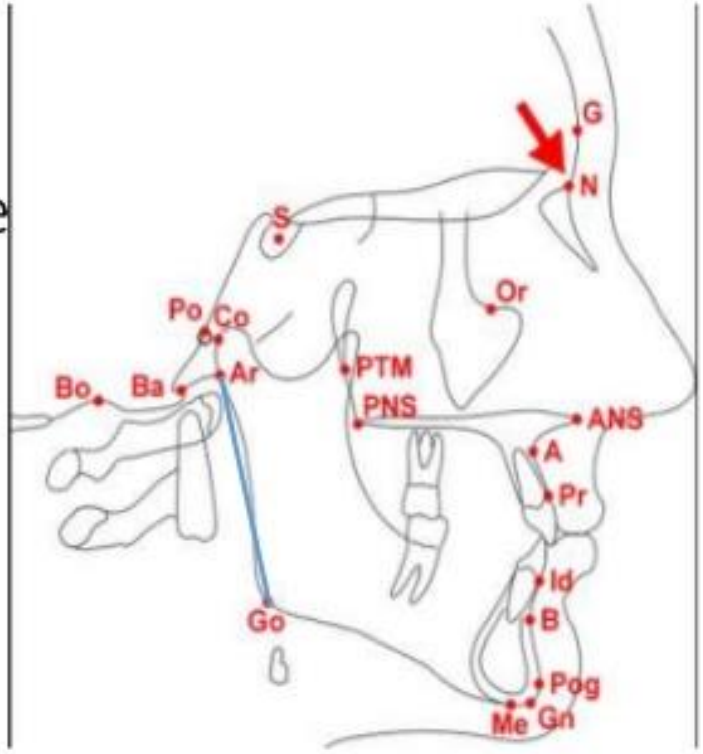
- It is a line from point A on the maxilla to pogonion on the mandible.
- Also known as Dental plane.
- Used in measure position of anterior teeth.



Ar-Go plane:

This plane is formed by the line connecting from Articulare to Gonion.

It is important in the determination of length of ramus.



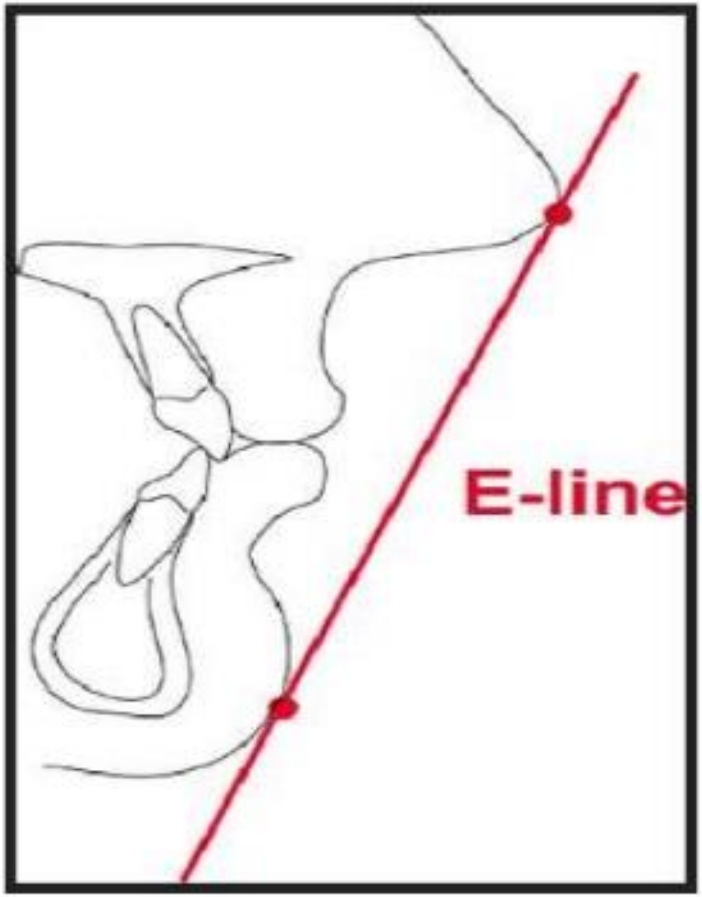
E – PLANE: (soft tissue)

It is also called as Esthetic plane.

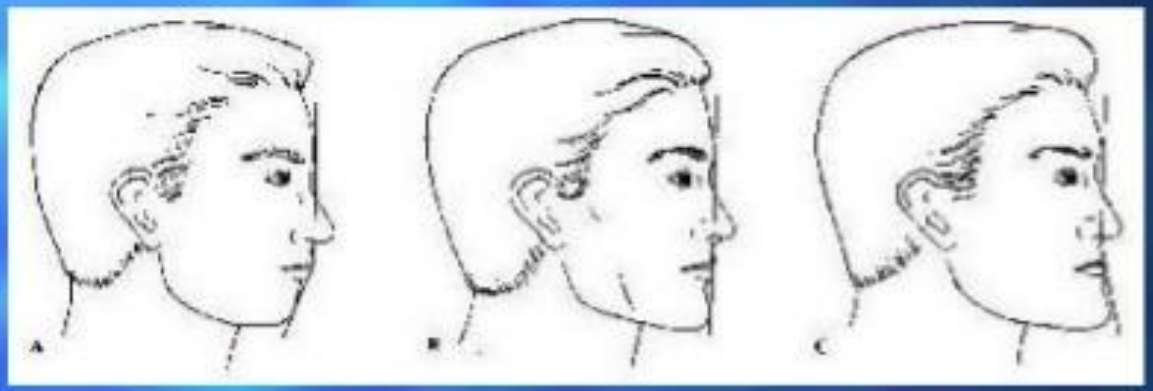
It is also known as RICKETT's esthetic line (By rickett in 1960). Which extends from the tip of the nose to the chin.

The lips should be slightly behind this line for esthetics.

This affects the lips prominency.



Soft Tissue Profile



Convex **straight** **concave**

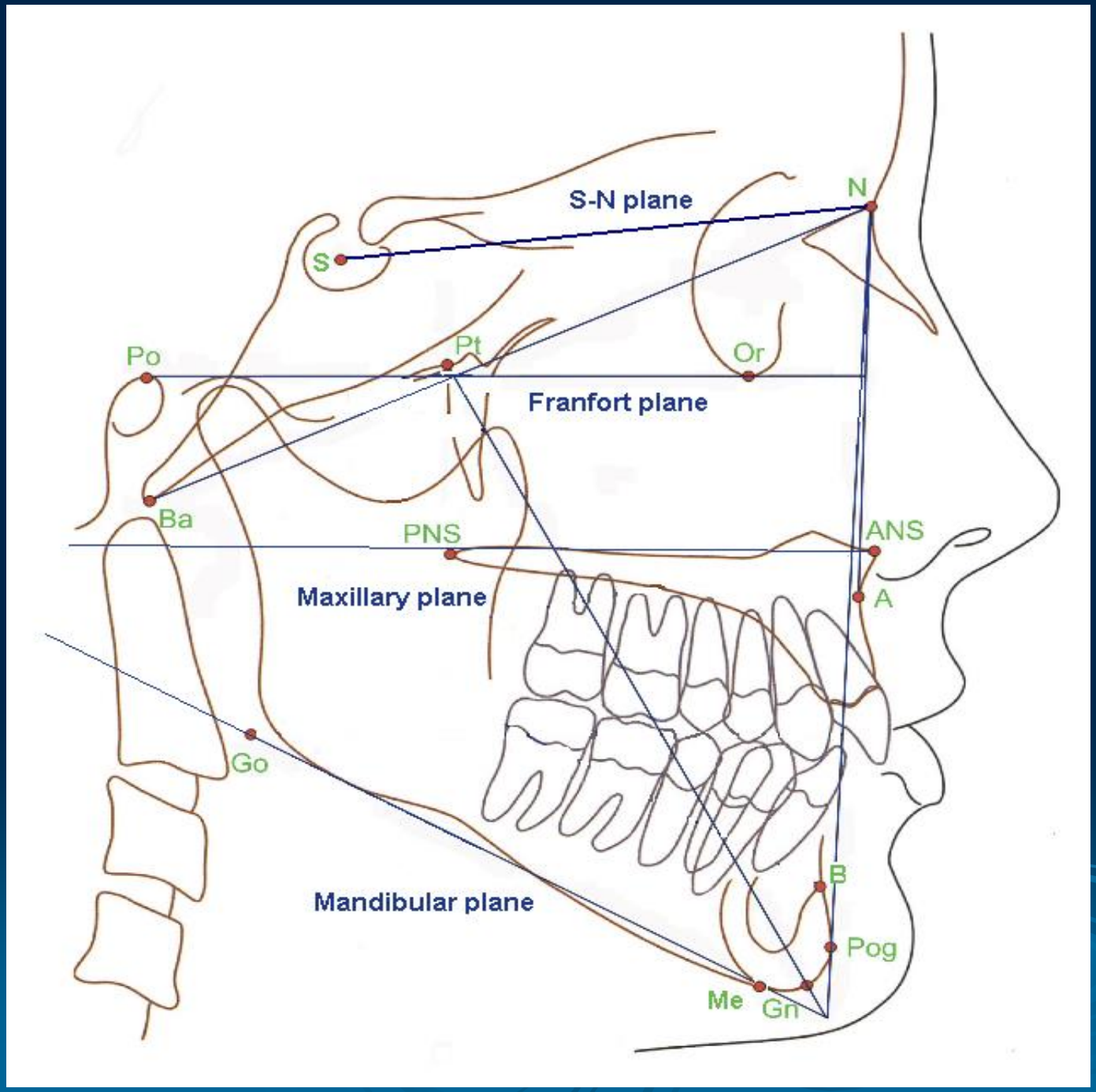
retrognathic **orthognathic** **prognathic**

S - N Line indicates orientation of anterior cranial base

N - A indicates relative position of maxilla to the cranial base

N - B indicates relative position of mandib. to the cranial base

The angles SNA; SNB; ANB indicate relative position of maxilla or mandible to each other and to the cranial base


S-N plane
N
S
Po
Pt
Or
Franfort plane
Ba
PNS
ANS
Maxillary plane
A
Go
B
Mandibular plane
Pog
Me
Gn