**Cephalometry**

The reference is the lecture and the manual of ortho as the dr said

**Cephalo** means head , **metry** means measure , so **cephalometry** :is studying measuring and do assessment of skull radiographs

Most important thing in ortho is, clinical examination , taking standardized record ,studying model , standardized radiograph ( means taking x-ray reliable and repeatable , reproducible with no changes )

History of radiograph began at 19th century but cephalometry began at 1940s

We have two **types** : **a**. conventional radiograph **b**. three dimensional radiograph ( hard and soft tissue )

**Conventional :** most commonly used

Lateral skull view ( standard ) and standardized posterior anterior view " P.A "

**P.A** A radiograph of the head taken with the x-ray beam perpendicular to the patient’s coronal plane with the x-ray source behind the head of the patient and the film cassette in front of the patient’s face,

Frankfort plane parallel to the floor , and we use it for two purpose : to assess the vertical and transverse plane, used mainly to assess the transverse line in patient with asymmetrical face

**Lateral skull view**a radiograph of the head taken with the x-ray beam perpendicular to the patient's sagittal plane. obtained in natural head position , used to study the vertical and sagittal plane , we can look at mandible , maxilla , anterior part of the cranium

Most radiograph follow the *principle ALARA* " as low as reasonably acceptable " : to reduce exposure as possible , if the posterior cranium is not pathologic no need to expose the whole head ( doesn't need assessment ) , sometimes we include part of upper vertebra to be used for skeletal assessment

We can use the conventional for imaging the airways to assess airway potency and any changes but it is not that accurate, and we have another imaging system as endoscopes

**3D** ( cone beam ) **a very powerful imaging** structure and **very convenient** but the doses is too high , so if we have a complex case need OPG , periapical and cephalograph to supplement the diagnose since there is a problem in panoramic graph . . so the best is to have from the start **cone beam CT image for complex cases** ( cone beam is not for all cases ) , it is going to visualize everything instead of OPS , PA and occlusal graph . . cone beam graph need assessment and tracing to get measurement of it , in addition to its advantages cone beam is the best for **good communication** for the patient although it is not the main purpose , it is to take **the proper imaging system for diagnosis** , also good for hard tissue , **soft tissue reconstructed** but it didn't get the accurate measurement for the soft tissue . . other way to capture a 3D soft tissue and combined it with a 3D hard tissue (bone ) , it is just for assessment , look at each part

There is no radiograph without clinical examination to determine what we need , we have to pay attention for the dose problems

The radiologist assess the graphs but in case of periapical the dentist is the best to assess it

Radiograph need to be recorded ( redo it means more exposure to x-ray for the patient ) , keep those record for patient safety

Normally the device for taking panorama, used for cephalometry radiograph and cone beam ( 3 in 1) made by big companies

**Cephalometic equipment :**

**Place to position the pt head**

**ear rod** : to keep the pt head in standardized way using cepalostat ( which is a firm part attached and fitted in pt ears) , making sure that pt is not tilting his head , and this num#1 requirement – making mid sagittal parallel to the film , but that doesn't make us sure that he is not moving his head backward or to the front , so we need to do two position

**Film cassette**

**Cassette holder**

**Aluminum wedge builder** usually sited before the x-ray source , used to reduce the amount of x-ray to the soft tissue , to make it appear in the graph , so if we use a high radiation soft tissue won’t appear ( too dark in the graph )

**x-ray generator apparatus**

**fixed anti scattered grid**

the distance is fixed , in general , one feet between mid sagittal plane and the film and five feet between the source and the beam

**we should know the distance in order to know the magnification** , because in some point the x-ray can't be parallel to the mid sagittal plane ( some will have right angle but the others have acute angle ) , so we try to reduce it and know it , the machine should be calibrated , **usually magnification percent between 8-14%** . . how to know this percent ? by using a ruler which is usually found in the cassette , then calculate the magnification factor , in order to that( knowing the magnification) the distance should be fixed and not changed between the patients

instifying screen reduce the amount of radiation

the most important thing is permination : no necessary to film the whole head

**criteria** to know that the head is positioned correctly :

put ear rods and on x-ray they must be superimposed

two reference line : Frankfort plane and natural head position

Frankfort plane , horizontal plane extend from external auditory miutus and most inferior point in the orbit , it should be parallel to the floor ( 1st reference )

Natural head position , when the patient is at rest and looking in horizon but there is no horizon in x-ray machine so pt look in a mirror to the reflection of his eyes ( 2nd reference ) That position is the most accurate and reliable than Frankfort plane

Teeth must be in occlusion take the maximum intercuspation in all ways even if he had mandibular posturing

Lastly for soft tissue

Don't ask the patient to close his lips they should be at rest and relaxed , you might ask them to make a sound , make no effort on soft tissue , because we might use the cephalograph to assess the tissue ( clinical examination more accurate for examination the soft tissue )

Again , when we need to take a cephalograoh ?

First we do clinical examination and if we have this problems : pt come suffering from facial asymmetry , condylar problem or any problem related to the skeletal growth ( class 2 or class 3 )
but problem in mandible as wisdom teeth we do not use it .

if pt come with problem in soft tissue it is not the first choice

in dilacerations we use it better than perapical .

use it in assessment of changes before surgical and after it to make sure we are Achieve our goal .

we use it in undergoing orthodontics treatment

(to assist dental inclination in order to move the teeth )

you need to know these definition

* Sella : midpoint of the center of sella turcica ( it is radiolucent )
* Nasion : the junction of frontal and nasal bone ( it is suture so it is radiolucent )
* Porion : upper border of the external auditory meatus ( it is radiolucent )
* Orbital : inferior border of the orbital .
* Pogonion : the most anterior part of the chin .
* Gnathion : the most anterior inferior part in the mandible symphysis.
* Menton : the most inferior part in the mandible symphysis.
* Gonon : the most inferior posterior point in the angle of the mouth .
* (don't know what else you should know , it was written in the slides )
* Sheet #6
* Written and corrected by : Bara'h and Duaa