

# Radiography

# Radiography

- Imaging method completing clinical examination of patients

# Radiography

Principle:

X- ray radiation going through various materials (tissues) is absorbed.

The absorption causes

– image on the film

(a special suspension AgBr – silver bromide)

Or

- image on the computer screen (sensor – semiconductor)

# Radiography

- Roentgen tube – x- ray tube:

Cathode – Anode – Tension



Cathode (heated) – emission of electrons – going against anode – strike – heat and x ray radiation originates .

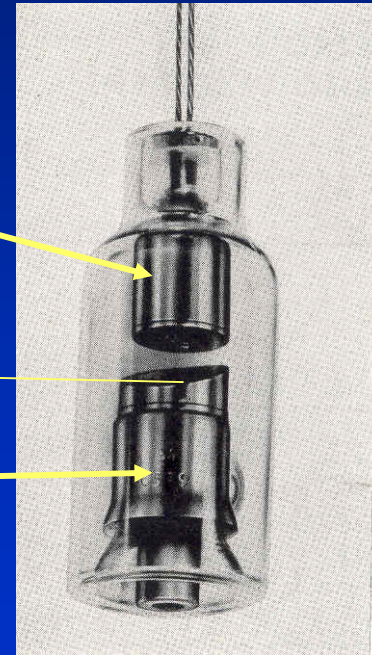
Wavelength –  $0,3 - 0,5 \times 10^{-10} \text{ m}$

# Roentgen tube X ray tube

Cathode  
wolfram  
(tungsten) filament inside  
*(heated – brought to white heat)*

*Focus – made of wolfram*

Anode





Orthopantomograph

The x-ray picture is monochrome – black and white  
Light areas – radioopaque (radioopacity)  
Dark areas – radiolucent (radiolucency)

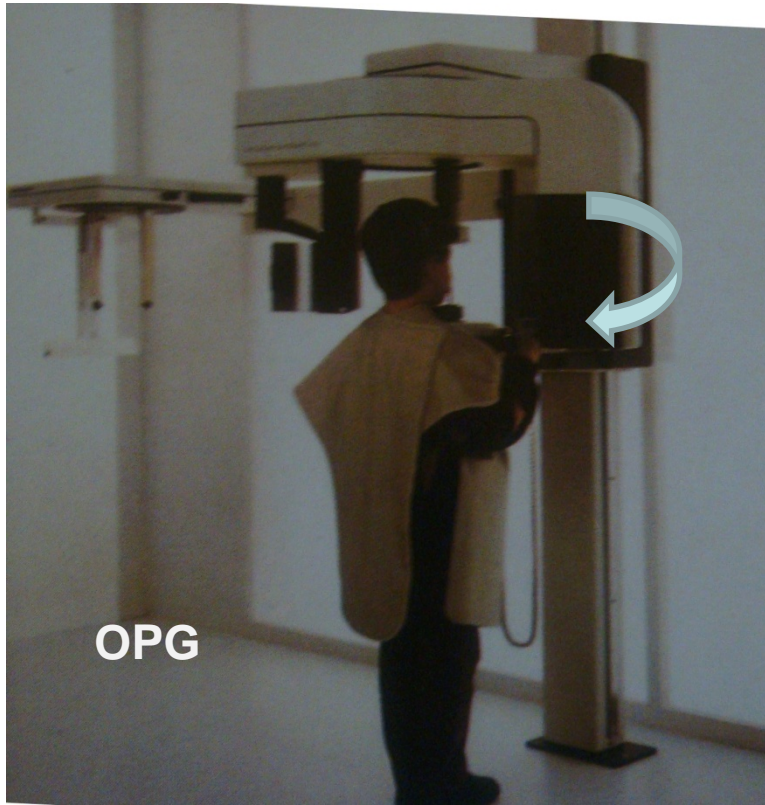
# Extraoral and intraoral radiography

- Extraoral:

The film is placed outside of oral cavity

- OPG (orthopantomography)
- Teleradiography
- Skull x-ray posteroanterior
- Skull x-ray half axial
- Skull x-ray side projection (TMJ, mandible)
- CT (computer tomography)





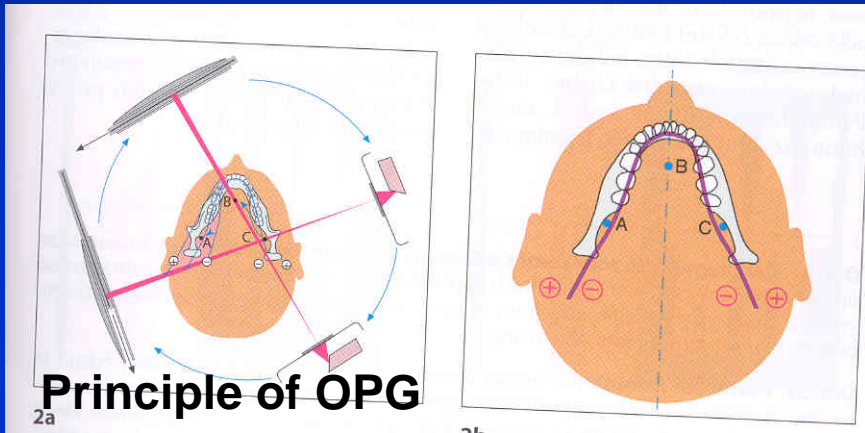
**OPG**



**Skull posteroanterior**

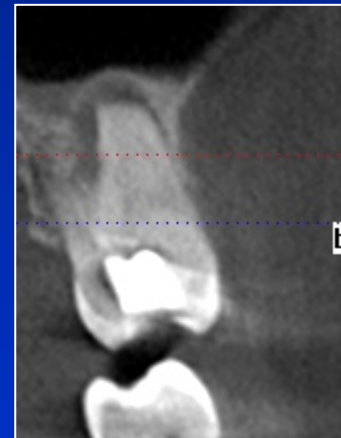
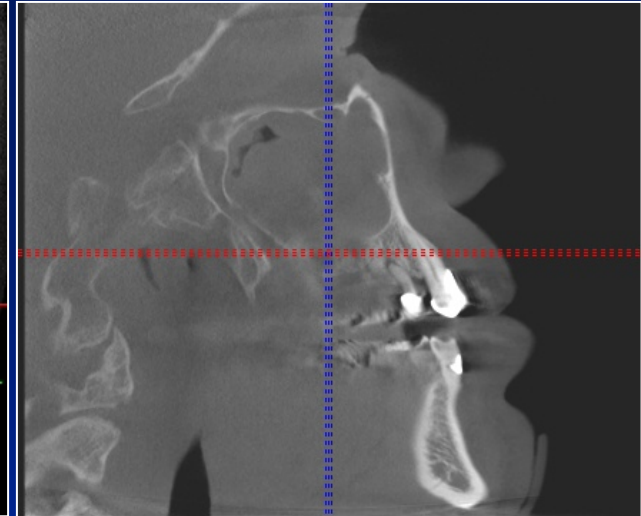
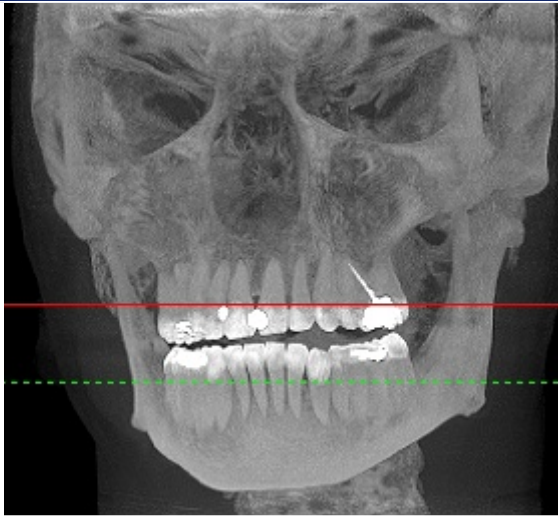


**Skull side projection**



**Skull halfaxial projection**



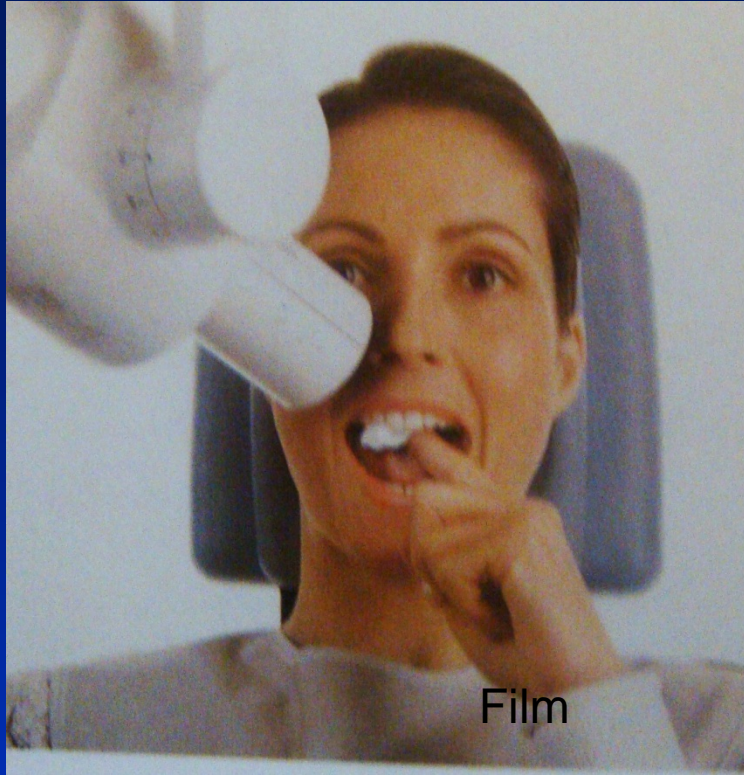


**CT – computer tomography**

# Extraoral and intraoral radiography

Intraoral – the film is placed into the oral  
Cavity – a special x-ray apparatus.

- Teeth
- Alveolar bone
- Periodontal space
- Fillings
- Caries
- Impacted teeth
- Level of endodontic treatment



Film



Sensor

# Hold up of the tubus

- In vertical plane
- In horizontal plane

Vertical hold up

## The size of the picture should conform to the size of the tooth:

*The vertical hold up of the tubus must be correct*

*If yes:*

*the picture is isometric*

*If not:*

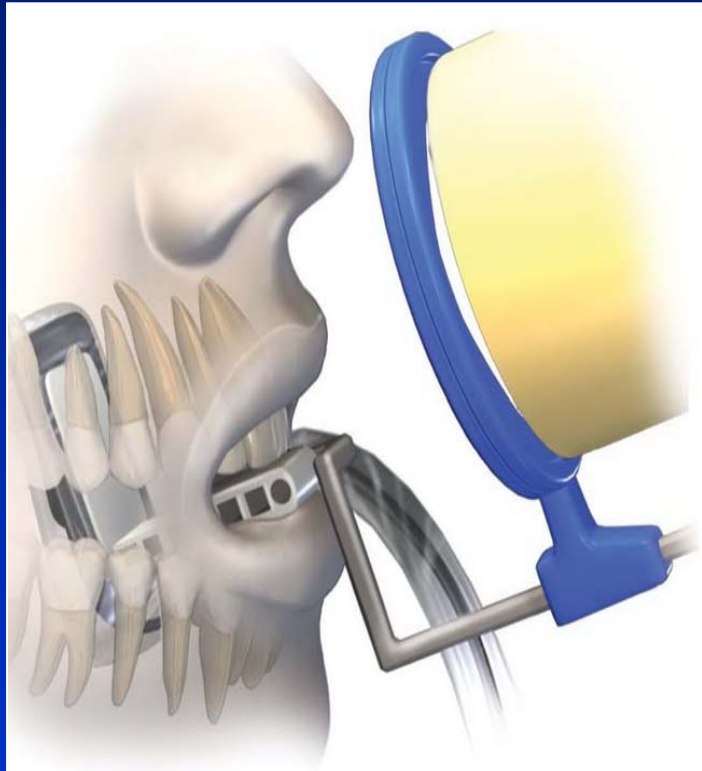
*the picture of the tooth is smaller— hypometric*

*or*

*the picture of the tooth is bigger than the tooth - hypermetric*



## Parallel technique

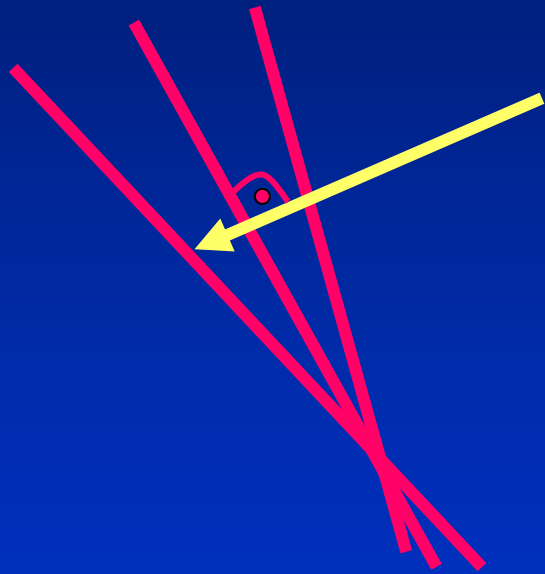


### Parallel technique

*The film or sensor is parallel to the long axis of the tooth. The picture is unbiased. The x-ray beam goes in right angle to the plane of the film as well as long axis of the tooth*

## Technique of halving angle:

*Sometimes is impossible to put the film into the holder therefore the technique of halving angle must be used*

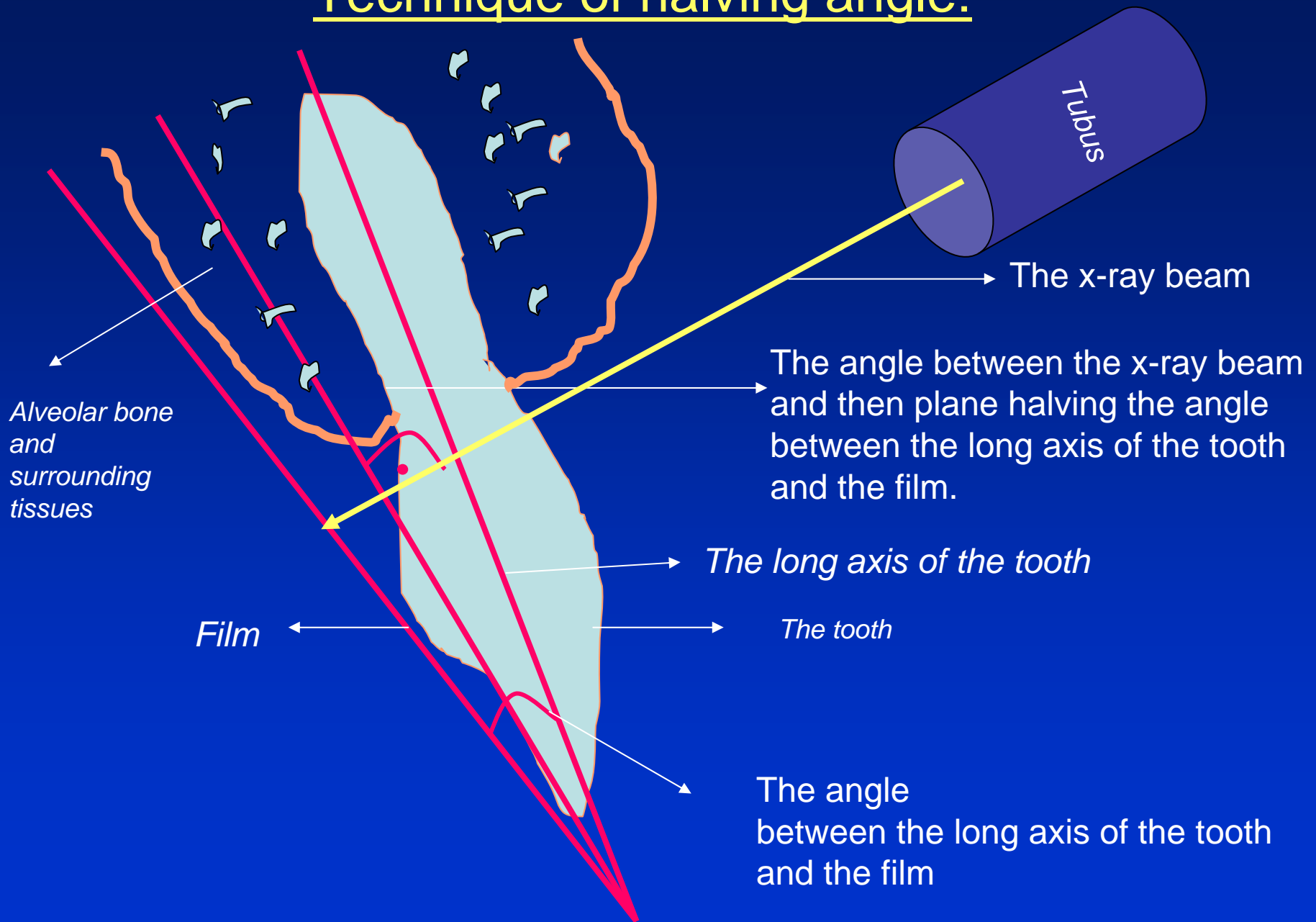


Film is not parallel with the axis of the tooth.

There is an angle between this axis and the film.

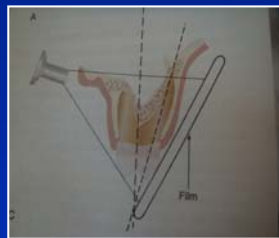
Central beam goes in right angle to the plane halving this angle

# Technique of halving angle:



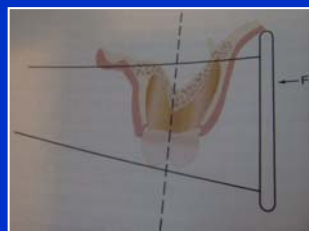
## Hypometric and hypermetric picture

*Hypometric picture: the picture of the tooth is smaller in comparison to real size*  
the x-ray beam goes in right angle to the tooth



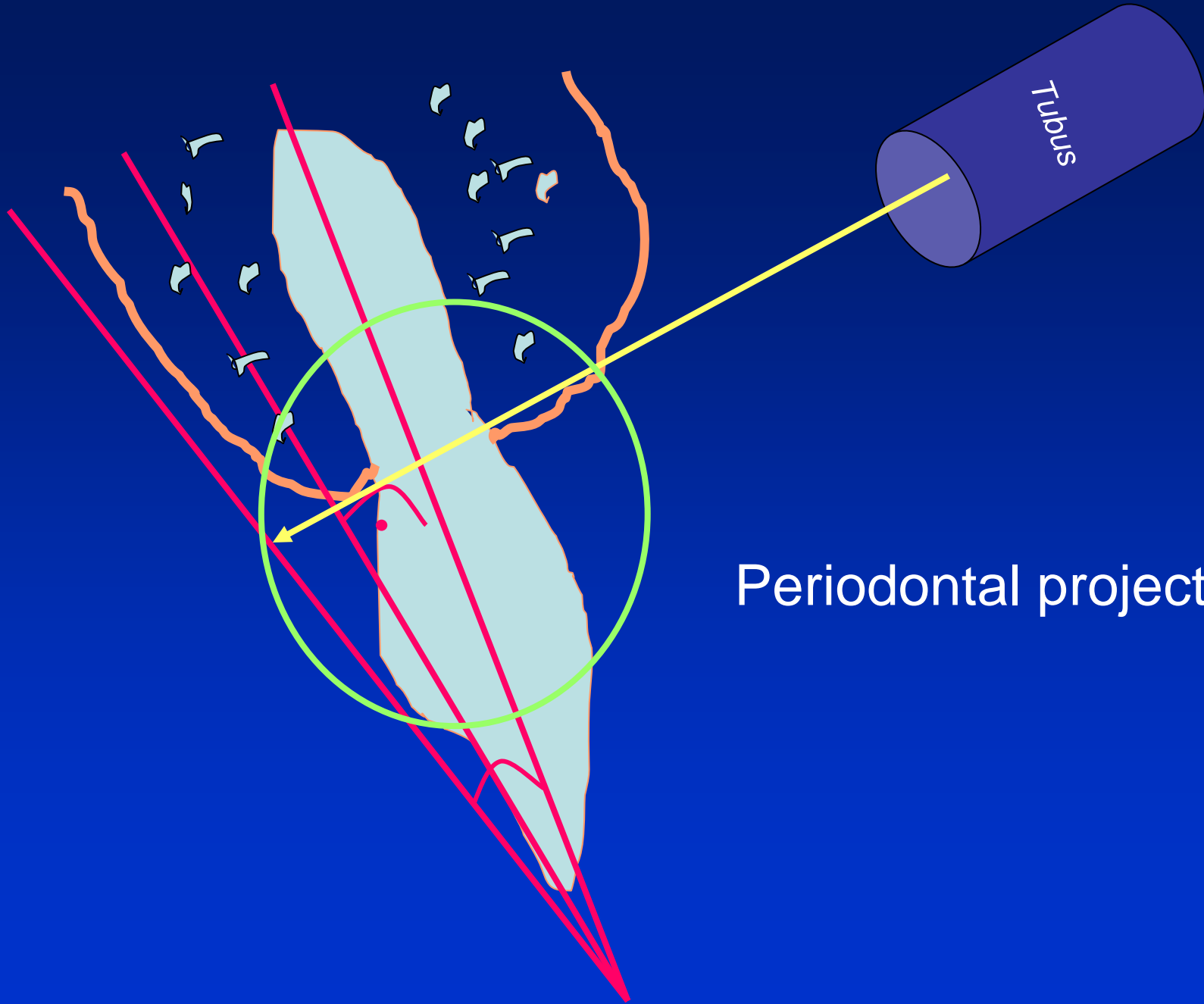
*Hypermetric picture : the picture of the tooth is bigger than the tooth*

The y-ray beam goes in right angle to the film



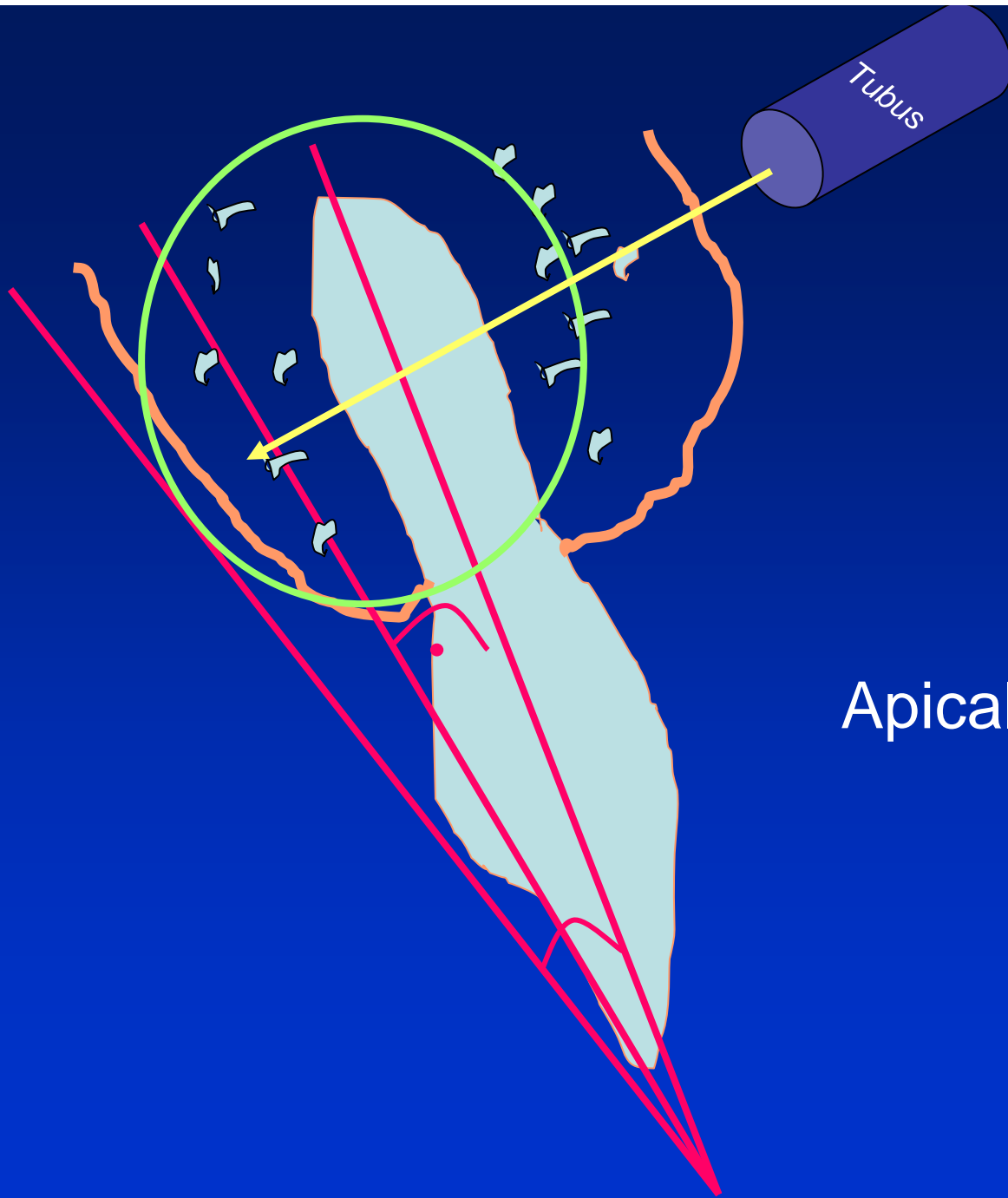
# Intraoral radiography

- Apical projection: the central beam goes through the apex area
- Periodontal projection: the central beam goes through the upper third of the root
- Coronal projection: the central beam goes through the crown.



Periodontal projection

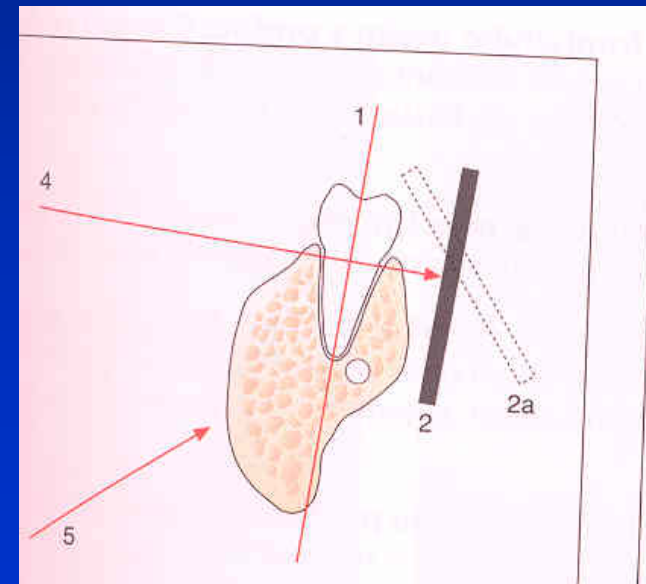
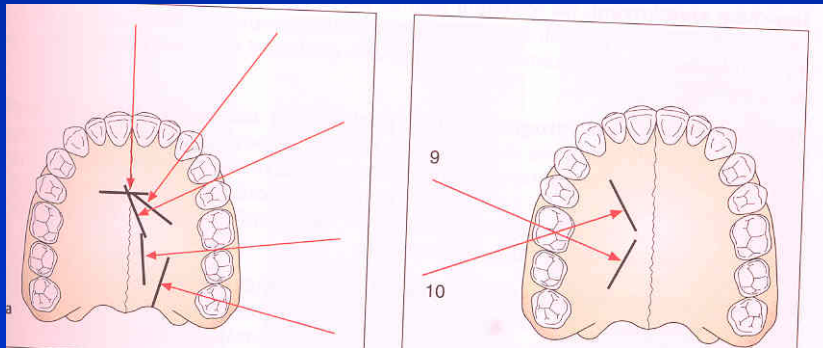




Apical projection

# Orthoradial and excentric projection

- Orthoradial – the central beam goes parallel to interdental septa
- Excentric – goes from distal or mesial side.

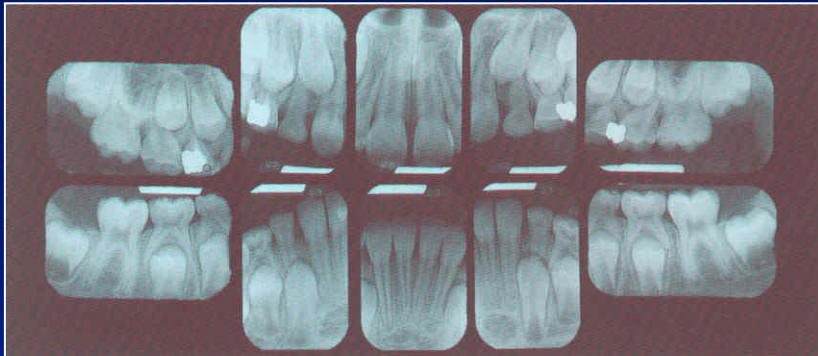


# Bitewing

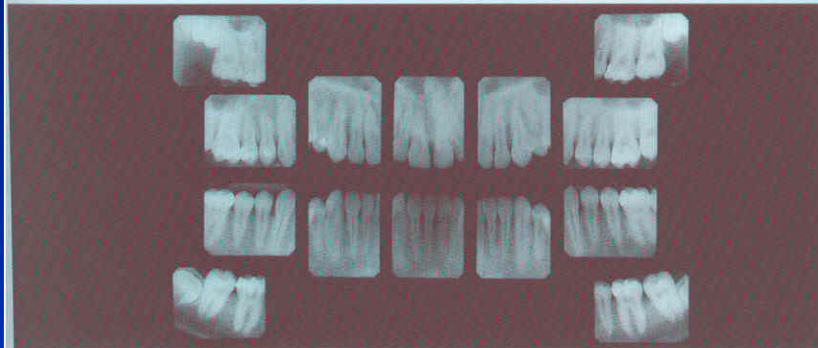


The film or sensor in special holder, with bite plate, the x-ray beam goes parallel to the interdental septa, upper and lower crowns of teeth can be seen – esp. proximal surfaces. Early stages of dental caries can be recognised and also surrounding alveolar bone can be well seen.





58



59



- X ray status





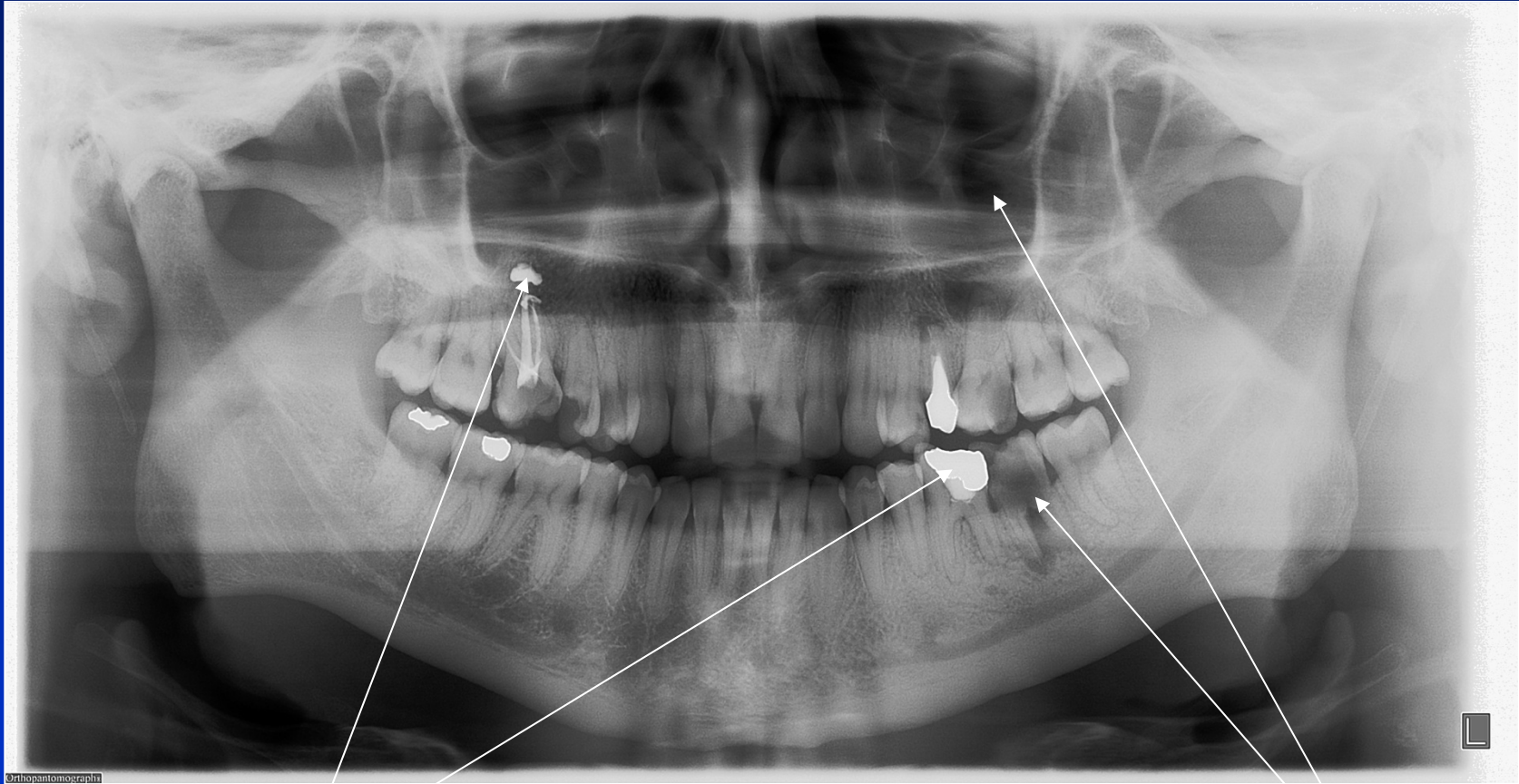
Orthopantomograph

OPG





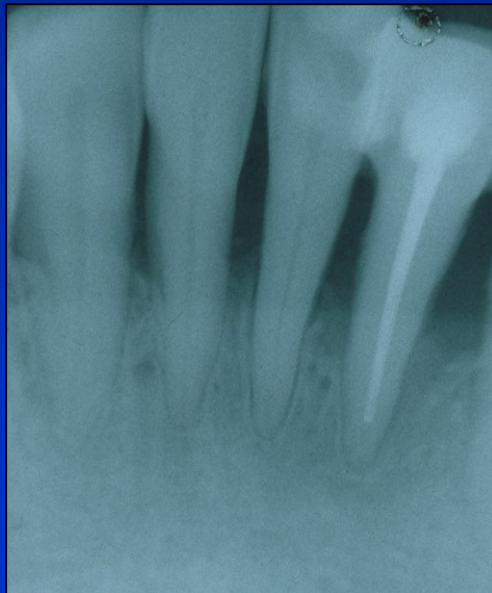
Orthopantomograph



© orthopantomograph

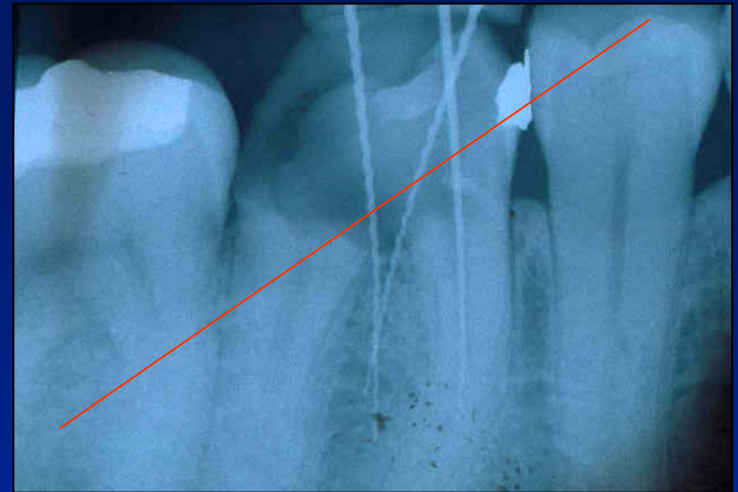
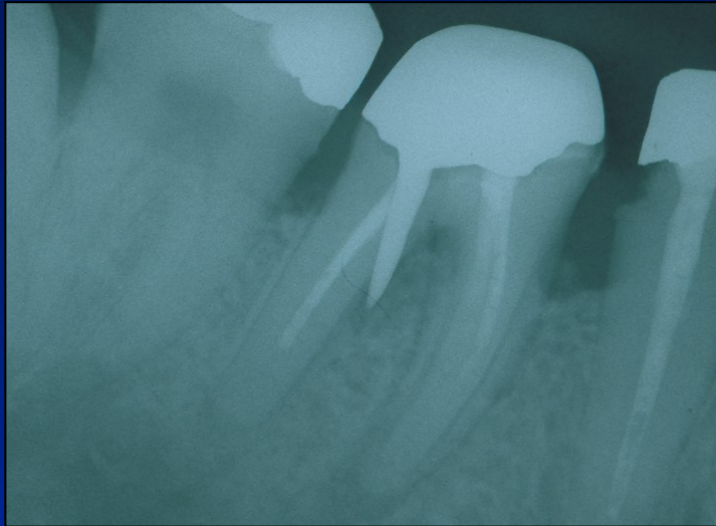
radioopacity

radiolucency









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