Certificate in Dental Radiography

- **Day 1**
  - Intraoral Techniques
  - Extraoral Techniques
  - Care of the patient

Intraoral Techniques

STEPHEN BRIGGS
BDS/BSC (HONS) RADIOGRAPHY

Aim

To enable dental nurses to competently perform intraoral radiographic techniques tailored to individual patient needs, ensuring diagnostic quality and patient safety

Objectives

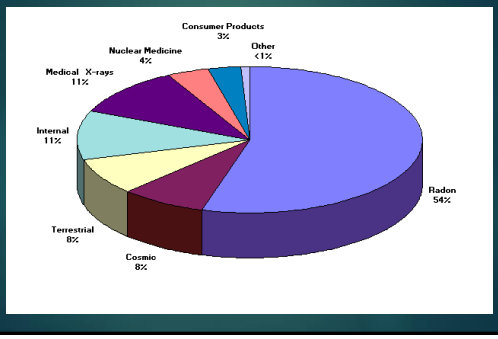
(1) Identify and apply appropriate intraoral techniques including bitewing, periapical (paralleling and bisecting angle), occlusal and endodontic views

(2) Demonstrate correct use of image receptor holders and collimation

- (3) Understand how to achieve "A" rated radiographs using recommended techniques
- (4) Understand the clinical indications for each intraoral view
- (5)Minimise patient exposure through technique optimisation and equipment use

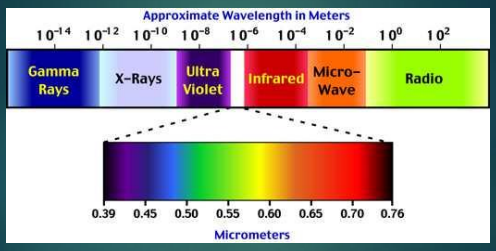
From what sources do we receive radiation exposure?

Radiation all around us



What are the risks of exposure to radiation?

EM Spectrum

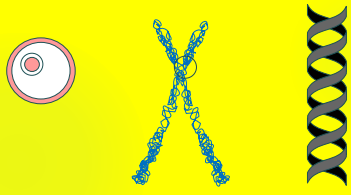


X-rays are "packets" of energy known as photons, which are short wavelength, high frequency radiation

What effects can radiation exposure have?

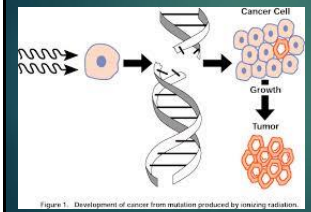
- Deterministic effects
- **Stochastic effects**

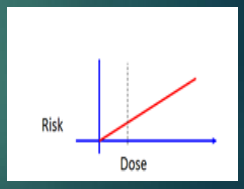
Biological Effects of Ionising Radiation



Stochastic effects

- Effects can appear in both the exposed person (somatic) or future generations (genetic)





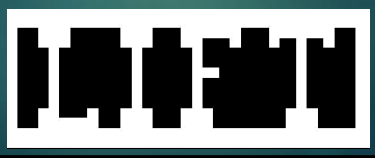
BED (Banana Equivalent Dose)

One dental x-ray?	50
Flight from London to NY?	400
Fatal dose without treatment?	80 million

Introduction to Radiography

- Integral part of clinical dentistry
- Clinicians "Main Diagnostic Aid"
- Knowledge divided into 4 main sections
  - ***Basic Physics and Equipment***
  - ***Radiation Protection***
  - ***Radiography***
  - ***Radiology***

VIEWING AND INTERPRETATION



Roles of Radiography

- Diagnostic Aid
  - (eg) Apical pathology?
- Treatment Planning
  - (eg) Orthodontic Treatment
- Post-treatment Appraisal
  - (eg) RCT / Apicectomy check
- Medico-legal cases

Radiograph assessment

- Identification – not on dental x-rays
- Marker – pip raised when x-ray laid flat
- Area – correct area included?
- Projection – distortion? elongated? shortened?
- Contrast – black/white/grey
- Collimation – info collimated off image?
- Artefacts – dentures/necklaces/glasses etc
- Variation – anatomy normal?

Scenario

- A patient comes to the clinic and has an abscess that has swollen the side of their face?
- You are looking for the source of the infection, so need to see the apex of the tooth. What are your options for imaging?
- What images will not provide the roots?

Intraoral Radiographic Views in Dentistry

- Intraoral Periapicals (IOPA)
  - Paralleling
  - Bisecting Angle
- Bitewings
- Occlusals

Phosphor Plate Size

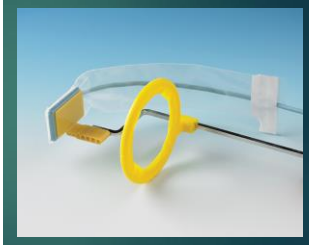
IOPA Anterior teeth (3-3) - Size 0 vertically

IOPA Posterior teeth (4-8) - Size 2 horizontally

Bitewings - Size 2 horizontally

Occlusal - Size 4 (vertical or horizontal depending on the patient's mouth)

(1) Intraoral Periapicals (IOPA)

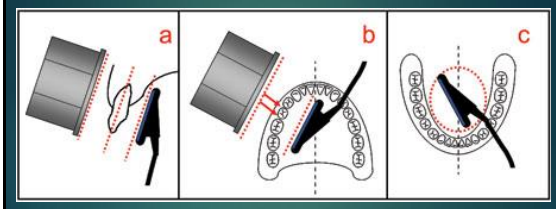


Ideal Positioning

(1) Object and image receptor ***in contact*** or as close as possible

(2) Object and image receptor ***parallel*** to eachother

(3) Tubehead positioned so primary beam meets both object and image receptor at ***right angles***



Intraoral Periapicals (IOPA)

- Ideal Positioning Requirements
  - Tooth and image receptor as close together as possible
  - Tooth and image receptor PARALLEL
  - Anterior teeth (3-3) = Long axis VERTICAL
  - Posterior teeth (4-8) = Long axis HORIZONTAL
  - Tubehead positioned so beam meets tooth / receptor at right angles (both vertical and horizontal plane)
  - Positioning should be **REPRODUCIBLE**

Paralleling Technique (using holders)

- Put the holder together (3 parts)
- Ensure you can see the phosphor plate in the centre of the ring (when you look through it)
- The patient should always be biting on the ridges of the bite-block (not on the corner of it, as this changes the vertical angle)
- Slide the ring down the bar until it is in contact with the patient's face
- Align collimator with rectangular indentations on the ring

Holder Assembly

ANTERIOR HOLDER 3 - 3 (BLUE)

- Once assembled, blue holder can be used for all quadrants

POSTERIOR HOLDER 4 - 8 (YELLOW)

- Assembly of holder will depend on quadrant being imaged
- Metal bar should always be extending out of the mouth
- Always check you can see the phosphor plate when looking through the ring

Intraoral Periapicals (IOPA)

Indications

- Apical infection / inflammation
- Periodontal status
- Trauma to teeth and alveolar bone
- Presence and position of unerupted teeth
- Root morphology before extraction
- During endodontics (RCT)
- Preoperative assessment and postoperative appraisal of apical surgery
- Detailed evaluation of apical cysts/other lesions within bone
- Evaluation of implants postoperatively

Endodontic holders

Endodontic holders

- These are set up in the **same way as a yellow posterior holder**
- The main difference is that there is a **space in the bite-block** for endodontic files to fit into
- The bite-block is a bit taller too, so it can be harder to get between the back teeth

Collimation

- A rectangular collimator should **always** be used when using the paralleling technique (holders)
- Reduces the patient radiation dose by approx. 50%
- Holders are designed to have a rectangular collimator positioned against the indentations of the positioning ring

Where should the ring be positioned?

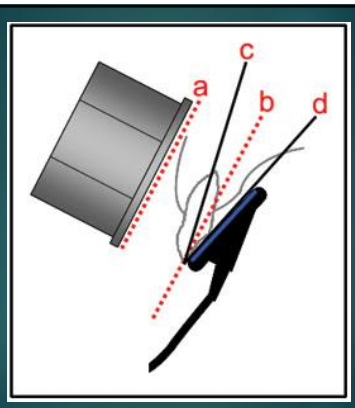
What direction should the metal bar be going?

What do you do if the patient cannot tolerate a film holder in their mouth?

BISECTING ANGLE TECHNIQUE

What is Bisecting angle?

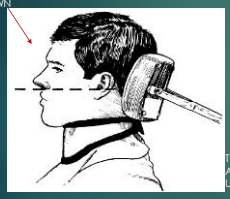
- No film holder required
- Patient holds film with index finger into floor of mouth or palate
- Occlusal plane of required jaw positioned parallel to the floor
- Round collimator used instead of rectangular
- Specific angles used to get good profile view of each individual tooth
- Primary beam centred through long axis of tooth required (perpendicular)



HEAD POSITION FOR UPPER TEETH BISECTING ANGLE

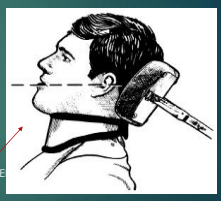
TRAGUS OF EAR □ ALA OF NOSE

TUBE ANGLE DOWN



HEAD POSITION FOR LOWER TEETH BISECTING ANGLE

TRAGUS OF EAR □ ANGLE OF MOUTH



TUBE ANGLE UP

BISECTING ANGLE TECHNIQUE FOR UPPER TEETH (IN THIS CASE UPPER INCISORS)

X-RAY TUBE ANGLED DOWN FOR UPPER TEETH

	Maxilla	Mandible
Incisors	60	30
Canine	50	20
Premolars	40	10
1st and 2nd Molars	30	5
3rd Molars	25	0

Advantages (Bisecting)

- Simple and Quick
- Good if patient gags with holder
- Patient feels more in control
- Comfortable film position for patient
- Good for ectopic canines
- Parallax views
  - Ectopics
  - Root fractures
  - Canal Morphology

Disadvantages

- Not reproducible
- No holder to ensure accurate profile of tooth
  - Elongation/Foreshortening
- Higher patient dose
  - Rectangular collimator not used
- More user dependent
  - Angles need to be accurate
  - Patient head position important
  - Horizontal beam wrong = overlap/distortion

- Bone levels poorly shown
- Zygomatic buttress
  - Overlies molar apices
- Considerable skill required
- More likely to collimate
  - Beam not aligned to tooth/film by ring
- Patient dependent
  - Film can slip if patient holding

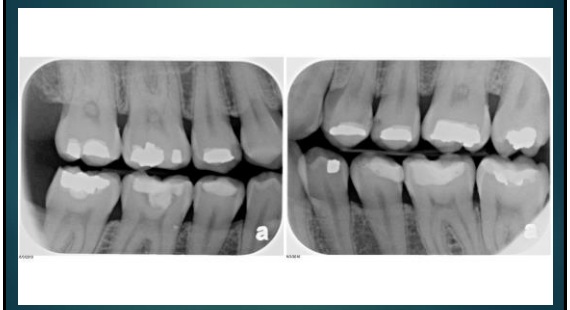
Snap-a-ray

- Blue side – anterior (3 – 3)
- Yellow side – posterior (4 – 8)
- Always use Size 2 phosphor plate
- Round collimator

Positioning

- Anterior
  - Patient bites blue surface using tooth in question
  - Primary beam aimed directly at tooth in question and angled parallel to blue surface
- Posterior
  - PSP gripped between yellow jaws (as shown)
  - PSP positioned beside tooth (mostly lower wisdom teeth)
  - Patient bites along holder
  - Head positioned to get appropriate jaw parallel to floor (same as bisecting angle)
  - Tube angled at correct angle (same as bisecting angle)
  - Beam aimed directly at tooth in question (beam perpendicular)

(2) Bitewings



Bitewings

- Ideal Positioning Requirements
  - Appropriate holder with beam aiming device
  - Image receptor positioned centrally within the holder
  - Receptor positioned horizontally/landscape
  - Posterior teeth and image receptor as close as possible
  - Posterior teeth and image receptor PARALLEL
  - Beam at right angles to teeth and image receptor
  - **Reproducible**

Bitewing Technique

- Put the holder together (3 parts)
- Ensure you can see the phosphor plate in the centre of the ring (when you look through it)
- Position the anterior edge of the PSP in line with the contact point between lower 3-4
- Position the bite on the lower occlusal surfaces
- Hold the holder firmly in place until the patient has bitten gently together (do not let it move when the patient is biting)
- Slide the ring down the bar until it is in contact with the patient's face
- Align collimator horizontally with rectangular indentations on the ring

Bitewings

Indications

- Carious lesions
- Progression of dental caries
- Existing restorations
- Periodontal status

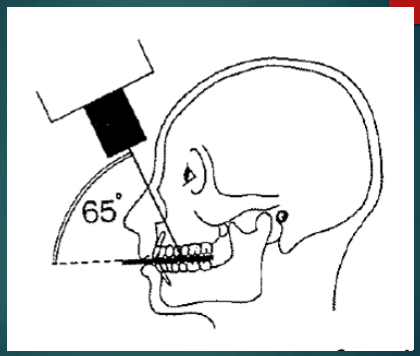
(3) Occlusals

- Maxilla
  - Upper Anterior Occlusal
- Mandible
  - Lower 90 degree Occlusal (true occlusal)
  - Lower 45 degree Occlusal

(a) Upper Anterior Occlusal

Positioning

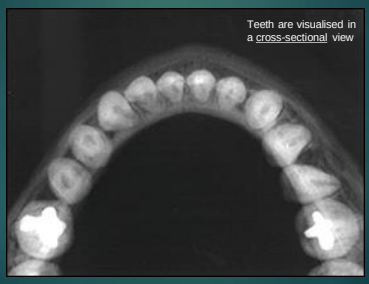
- Large Size 4 PSP
- Sideways - Adult with larger mouth
- Longways - Adult with smaller mouth and kids
- Use cardboard protector to protect the PSP
- Let patient position it as far back as they can
- Position tube to aim down the patient's midline (view patient from the front)
- Centre the primary beam through the bridge of the nose (view patient from the side)
- Angle of the tube is **65 degrees downwards**
- Ensure that the beam is covering the anterior portion of the maxilla
- **Can also do an upper oblique occlusal by positioning beam over area of interest instead of down midline (eg. aim at UL4)**

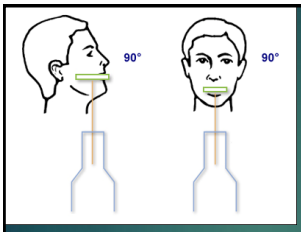


Upper Anterior Occlusal

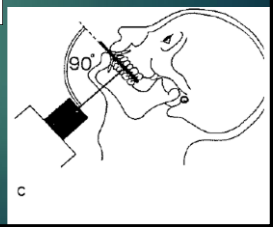
- Indications
  - Periapical assessment of upper anterior teeth
  - Presence of unerupted canines, supernumeraries and odontomes
  - 1 of parallax views (midline view) to determine position of unerupted canines
  - Size and extent of lesions such as cysts or tumours
  - Assessment of fractures of anterior teeth / alveolar bone

(b) Lower 90 degree Occlusal





Lower 90 degree occlusal also known as a "TRUE OCCLUSAL"



Lower 90 degree Occlusal

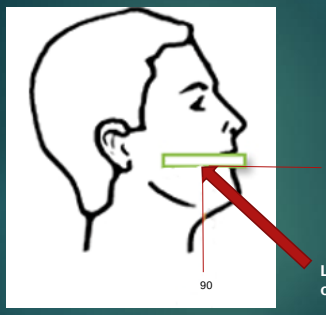
- Indications
  - Radiopaque calculi (stones) in the submandibular salivary ducts
  - Bucco-lingual (BL) position of unerupted mandibular teeth
  - Bucco-lingual expansion of the body of mandible (caused by cysts / tumours / other lesions)
  - Displaced fractures

Positioning

- Large Size 4 PSP
- Sideways - Adult with larger mouth
- Longways - Adult with smaller mouth and kids
- Use cardboard protector to protect the PSP
- Let patient position the PSP as far back in their mouth as they can
- Position the black side of the PSP packet facing downwards
- Patient should extend their neck backwards as much as possible
- Aim primary beam down the patient's midline (view patient from front)
- Primary beam should be aimed at **90 degrees** (perpendicular) to the PSP (view patient from side)

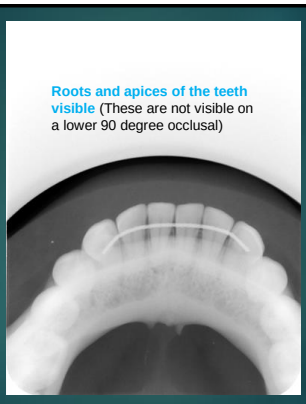
(c) Lower 45 degree Occlusal

- Indications
  - Periapical assessment of the lower incisor teeth (shows better length of roots than 90 degree one)
  - Size and extent of lesions such as cysts or tumours affecting the anterior part of the mandible
  - Displaced fractures



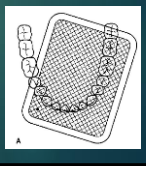
Positioning

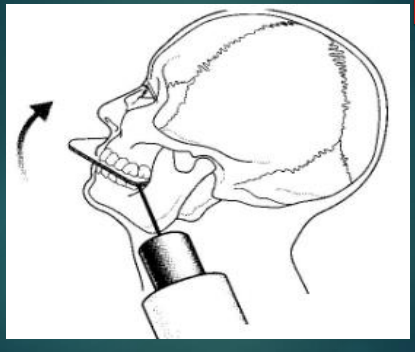
- Large Size 4 PSP
- Sideways - Adult with larger mouth
- Longways - Adult with smaller mouth and kids
- Use cardboard protector to protect the PSP
- Let patient position the PSP as far back in their mouth as they can
- Position the black side of the PSP packet facing downwards
- Patient does not need to extend neck like 90 degree occlusal
- Aim primary beam along the patient's midline (view patient from front)
- Primary beam should be aimed at **45 degrees** to the PSP (view patient from side)



Oblique Occlusal

- An oblique occlusal can also be done
- This is done the same way, but the primary beam is positioned **over the area of interest** instead of down the midline
- The sensor should be moved over towards the side in question





How do you minimise radiation exposure of your patient?

Minimising Radiation exposure to patients

- Good training
- Correct choice of technique
- Adequate reason for exposure (justification)
- Rectangular Collimator
- Accurate positioning
- Correct Exposure settings
- Hold button until exposure completed
- Report any faults

Extraoral Techniques

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Routine EXTRAORAL Views

- Orthopantomogram (OPT)
- Oblique Lateral Views of the Mandible
- Cephalometric Views
- CBCT

Aim

To equip dental nurses with the skills and knowledge to perform extraoral radiographic techniques effectively and safely

Objectives

(1) Understand the principles and indications for extraoral techniques including oblique lateral, panoramic and cephalometric views

(2) Understand how to achieve "A" rated extraoral radiographs tailored to patient needs

- (3) Apply best practice in positioning, exposure settings and equipment handling
- (4) Recognise and manage common faults in extraoral imaging
- (5) Ensure patient comfort and safety during procedures

(1) **Orthopantomogram** (OPT)

Orthopantomogram (OPT)

- Panoramic radiography has become very popular in dentistry for these main reasons:
  - All the teeth and their supporting structures on one image
  - Technique is relatively simple
  - Radiation dose is relatively low, especially using with modern DC units, intensifying screens or digital image receptors
  - BUT less detailed / inferior quality than IOPA's, and some areas out of focus due to movement

How do you position a patient for an OPT?

Exposure Selection

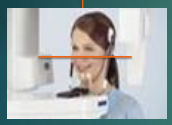
- Select **program**
  - Whole jaws / one side only (incl. TMJ)
  - Dentition only
- Select **patient size**
- Manual adjustment of exposure factors
- Exposure charts

Positioning

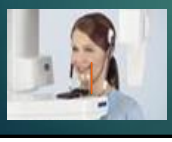
- Adjust unit to correct height
- Keep body/spine straight
- Patient holds onto handles
- Feet together and forward
- Patient bites peg **edge-to-edge**
- Chin on chin-rest
- Align planes of head
- Head supports positioned
- Instructions for during exposure
- **Chin rest can be used instead of bite-peg if patient is edentulous**

OPG IDEAL POSITIONING

MEDIAN SAGITTAL PLANE
CHECK IF ROTATED LEFT/RIGHT



FRANKFORT PLANE
SUPERIOR BORDER EAM TO LOWER ORBITAL MARGIN- CHECK CHIN UP/ DOWN POSITION



ANTERIOR TEETH GUIDE LIGHT CHECK IF TO FAR IN OR OUT OF MACHINE

During Exposure

- **Stay still**
- **Put tongue to roof of mouth**
- **Close lips**

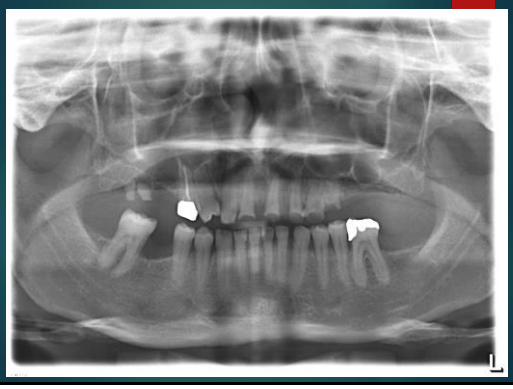
NOTE

(a) OPT not suitable for <6 years old (due to length of exposure and need to stay still)

(b) Lead apron not required – No justification for using and can interfere with final image

Orthopantomogram (OPT)

- Indications
  - Pathology of jaws
  - Maxillofacial injuries
  - TMJ disease
  - Antral disease
  - Third molar assessment – near canal, position, root morphology etc
  - Periodontal assessment
  - Bone assessment for implants
  - Orthodontic assessment
  - Prosthetic assessment



(2) Cephalometric Radiographs (Ceph)

How do you position a patient for a Ceph?

Positioning

- Standing upright
- Arms by sides
- Ear rods positioned in EAMs (External Auditory Meati)
- Nasion support
- Frankfort plane parallel to floor
- Mid-sagittal plane straight

During Exposure

- **Stay still**
- **Back teeth together**
- **Lips at rest**

Cephalometric Radiographs

- Indications – Can be divided under 2 headings
- (1) Orthodontics
- (2) Orthognathic surgery

(1) Orthodontics
- Initial Diagnosis
- Treatment Planning
- Monitoring Treatment Progress
- Appraisal of Treatment Results

(2) Orthognathic Surgery

- Preoperative evaluation of skeletal and soft tissue patterns
- To assist in treatment planning
- Postoperative appraisal of the results of surgery and long-term follow-up studies

(3) CBCT

- 3D reconstruction
- 3 planes (sagittal, coronal and axial)
- **Much higher radiation dose to patient**
- **Much better detail** for specific information
- 3D imaging must have good justification for the additional radiation dose the patient will receive

Fields of View (FOV)

- Measured in cm

- 4 x 4
- 5 x 5
- 5 x 8
- 6 x 6
- 8 x 8
- 10 x10
- 12 x 10

Dose Comparison

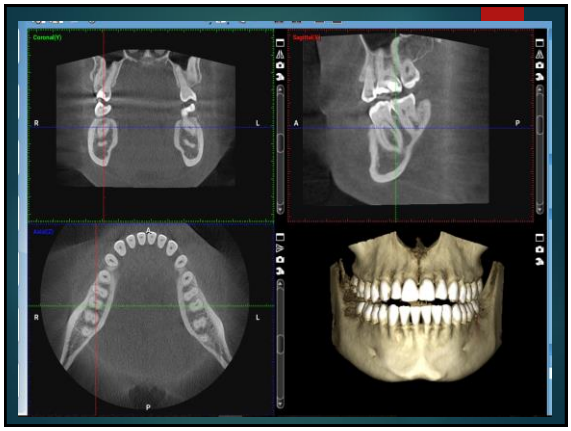
OPT – Dentition only approx. 38mGycm2

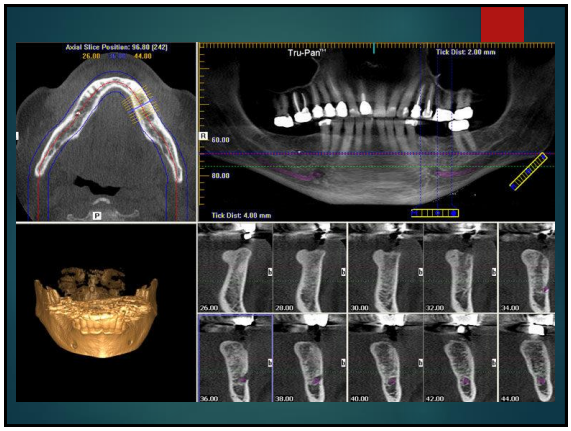
CBCT – 4 x 4cm - 3 or 4 teeth approx. 154mGycm2

- Most common is likely 4 x 4cm due small area for reporting and reduced radiation dose to patient

CBCT Main Uses

- Implant planning
- Proximity of roots to IAN
- Assessment of pathology (eg. Large cysts)
- Assessment of unerupted teeth or supernumeraries





What is an Oblique Lateral?

(4) Oblique Laterals of the Mandible

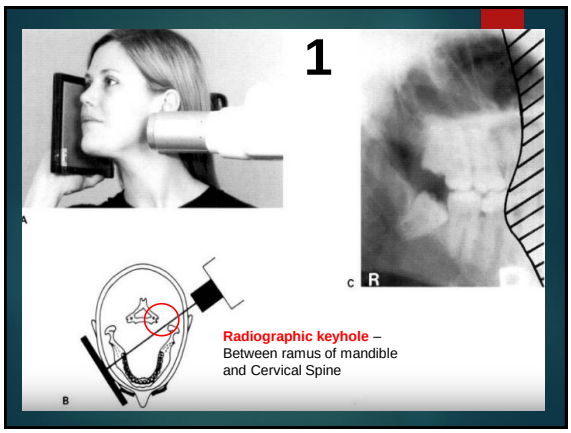
- Used mostly for Special Care Dentistry
- Alternative for taking an OPT
- Works on same premise of OPT (aim under one side of mandible to image the other)
- Cassettes used with a larger sensor
- Processed through an intraoral scanner

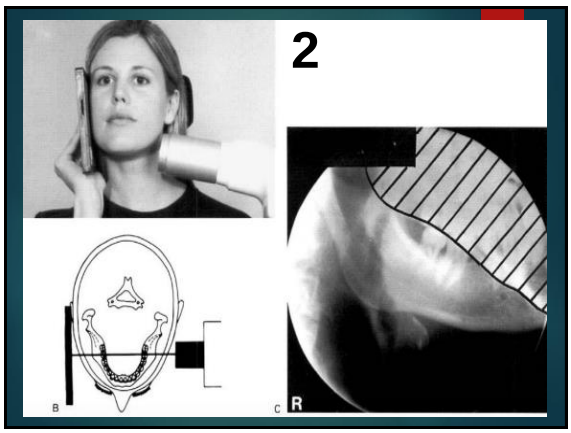
Indications

- Assessment of wisdom teeth / other unerupted teeth
- Fractures / pathology of the mandible (tumour, cyst etc)
- Patient unable to tolerate intraoral imaging due to severe gag reflex or unable to open mouth
- Patient unable to sit/stand upright for an OPT
- Patient unable to stay still for approx. 20 seconds

2 Techniques

- **(1) Behind the ramus of the contralateral mandible** (aiming through the radiographic keyhole). For this technique, the primary beam will be directed in a PA direction between the ramus and the cervical spine.
- **(2) Beneath the lower border of the contralateral mandible**. For this technique, the primary beam will be directed upwards under the contralateral side of the mandible. This is the easier of the 2 techniques.





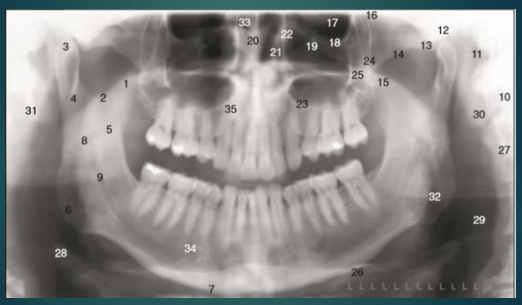
Patient Comfort and Safety

- **OPT / CBCT** – hold handles, chin rest, head supports
- **Ceph** – ear rods, nasion support
- **Oblique Laterals** – may need carer / comforter with them to support cassette

Normal Radiographic Appearances

- Anatomical shadows (OPT)
  - **REAL SHADOWS** (aka Actual Shadows)
    - Of structures in, or close to the focal trough
  - **GHOST SHADOWS** (aka Artefactual Shadows)
    - Created by the tomographic movement
    - Cast by structures on the OPPOSITE SIDE or a long way from the focal trough
    - The 8 degree upward angle of the beam means they appear at a higher level than the structures that have caused them

OPT anatomy?



Answers

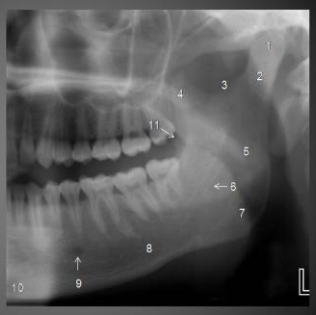
1. Coronoid Process
2. Sigmoid Notch
3. Mandibular Condyle
4. Condylar Neck
5. Mandibular Ramus
6. Angle of Mandible
7. Inferior Border of Mandible
8. Lingula
9. Mandibular Canal
10. Mastoid Process
11. External Auditory Meatus
12. Glenoid Fossa
13. Articular Eminence
14. Zygomatic Arch
15. Pterygoid Plates
16. Pterygomaxillary Fissure
17. Orbit
18. Inferior Orbital Rim
19. Infraorbital Canal
20. Nasal Septum
21. Inferior Turbinate
22. Medial Wall of Max. Sinus
23. Inferior Border of Max. Sinus
24. Posterolateral Wall of Max. Sinus
25. Malar Process
26. Hyoid Bone
27. Cervical Vertebrae 1- 4
28. Epiglottis
29. Soft Tissues of Neck (look Vertically For Corotid Artery Calcifications Here)
30. Auricle
31. Styloid Process
32. Oropharyngeal Air Space
33. Nasal Air Space
34. Mental Foramen
35. Hard Palate

Maxillary, Temporal and Zygomatic structures

1. pterygopalatine fossa
2. pterygoid plate
3. ext auditory canal
4. zygomatic arch
5. lateral wall maxilla
6. zygomatic buttress (dashed line)
7. inferior wall maxilla
8. hard palate
9. inferior concha (arrowheads)

Mandibular Structures

1. condyle
2. neck
3. sigmoid notch
4. coronoid process
5. ramus
6. inferior dental canal
7. angle
8. body
9. mental foramen
10. symphysis mentis
11. external oblique ridge

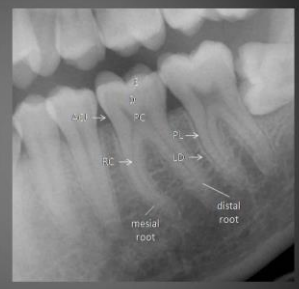


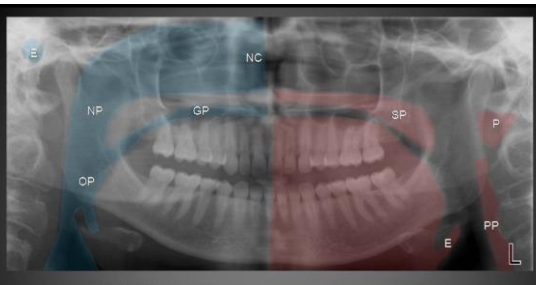
Surrounding Structures

1	articular eminence
2	glenoid fossa
3	anterior arch of C1
4	styloid process
5	body of C2
6	hyoid bone

Dental Anatomy

E	enamel
D	dentine
PC	pulp cavity
RC	root canal
ACJ	amelo-cemental junction
PL	periodontal ligament
LD	lamina dura





Air Shadows

N	nasal cavity
NP	nasopharynx
OP	oropharynx
GP	glossopharynx
E	external auditory canal

Soft tissue Shadows

SP	soft palate
T	dorsum of tongue
P	pinna
E	epiglottis
PP	posterior pharyngeal wall

Ghost Shadows

HP	hard palate
M	posterior mandible
CS	cervical spine

Image Quality Assessment of Radiographs

- National Radiation Protection Board (NRPB) guidelines for assessing the quality of radiographs
  - Grading System
    - Grade 1 – Very Good
    - Grade 2 – Good Enough for Diagnostic Purposes
    - Grade 3 – Unacceptable
    - **NOW CHANGED TO GRADE "A" AND "N"**

Grade 1 (QS1)

- Excellent Quality
- No errors of patient preparation, positioning, exposure, processing or film handling

Grade 2 (QS2)

- Good Quality
- Some errors of patient preparation, positioning, exposure, processing and film handling
- Image is still of adequate diagnostic quality for the purpose intended and is therefore accepted

Grade 3 (QS3)

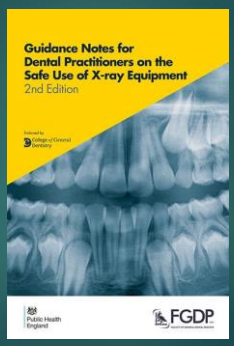
- Poor Quality
- Many errors of patient preparation, positioning, exposure, processing and film handling
- These errors render the image diagnostically unacceptable, and the radiograph must be repeated to ensure adequate information for diagnosis

Minimum Targets for Radiographic Quality

95% Grade A

5% Grade N

PROFESSIONAL GUIDANCE



Quality Assessment

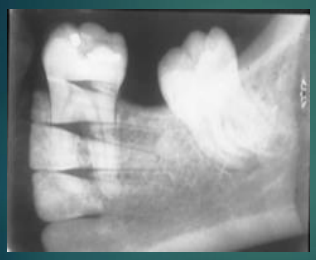
Are these dental radiographs grade 1, 2 or 3?

Radiograph 1

Grade 2

Underexposed

Radiograph 2



Grade 3

Double Exposure

Radiograph 3

Grade 2

Posterior cone mark

Distal surfaces of canine not visible (ideal anatomy not covered)

Radiograph 4

Grade 2

Foreshortened teeth

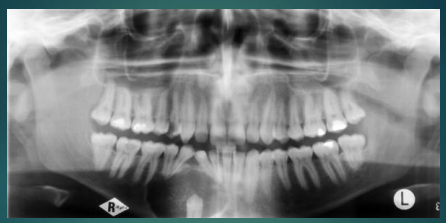
Incorrect angulation of tube

Radiograph 5

Centre tooth – Grade 2

Adjacent teeth – Grade 3 for missed apices

Radiograph 6



Grade 3

Lower border of mandible not included

Radiolucency not entirely visualised

Reasons for Rejected Films

- Patient Factors
- Exposure Faults
- Positioning Errors
- Opacities
- Equipment Faults
- Digital Processing errors

(1) Patient Factors

- Patient Movement
- Thin (dark) / Thick (pale) patient tissues
- Patient biting **too hard** on film packet
- Gag reflex

PATIENT MOVEMENT

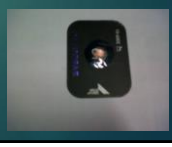
Vertical movement during exposure

(2) Exposure Faults

- Underexposed
  - Wrong exposure time set by operator
  - Exposure switch not depressed for whole exposure
  - Faulty equipment (eg) timer
- Overexposed
  - Wrong exposure time selected by operator
  - Faulty equipment (eg) timer
- Double Exposure

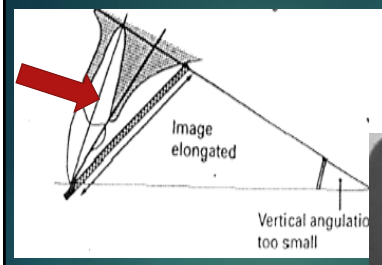
(3) Positioning Errors

- IOPA
  - Improper VERTICAL angulation of tubehead
    - Elongation / Foreshortening of roots
  - Improper HORIZONTAL angulation of tubehead
    - Contact points overlapped
  - Distortion of teeth due to film bending in corner of arch
  - Black lines caused by bent film
  - Areas collimated off image
  - Film around WRONG way

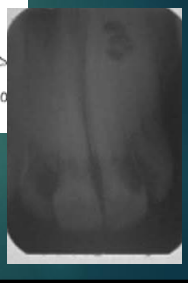


Elongation and Foreshortening

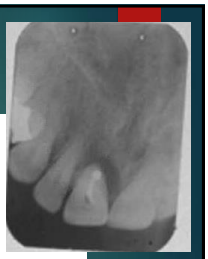
- Elongation
  - X-ray beam perpendicular to object (tooth), but ***not to film (PSP)***
- Foreshortening
  - X-ray beam perpendicular to film (PSP), but ***not to object (tooth)***
- Distortion
  - Object and film parallel
  - X-ray beam ***not perpendicular to either***

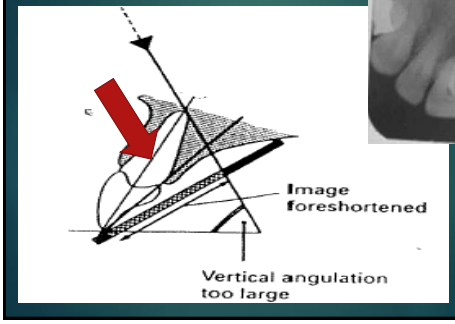


X-ray beam perpendicular to tooth

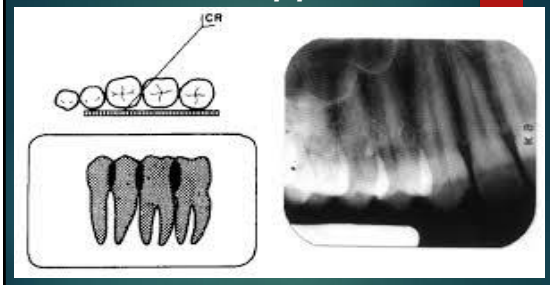


X-ray beam perpendicular to PSP



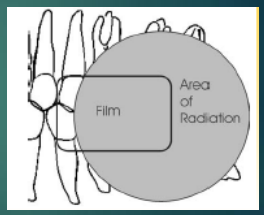


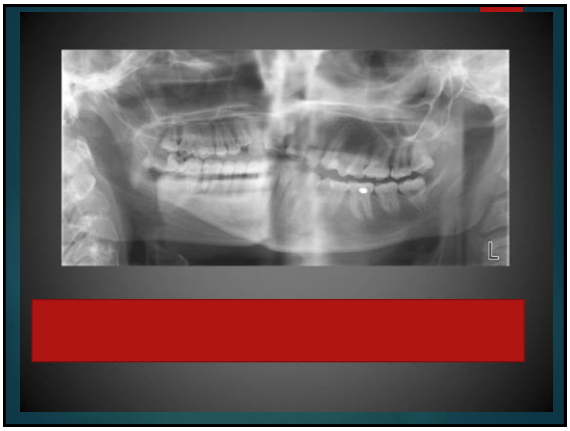
Overlappin



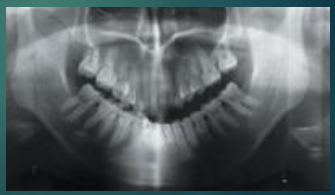
Not good for IOPAs! Cannot accurately diagnose caries☹

Coning off anatomy





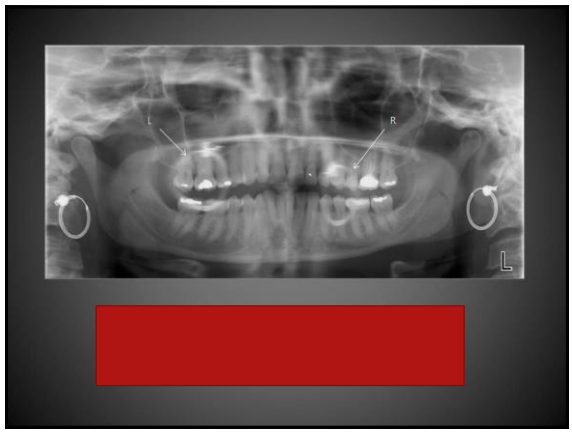
Chin up



Chin down

(4) Opacities

- Earrings
- Necklaces
- Piercings
- Dentures
- Orthodontic Appliances
- Glasses
- Inappropriate use of lead apron



Nightmare! Not one you would be proud of ☺
All that's missing is glasses!

Oh wait! There they are☺

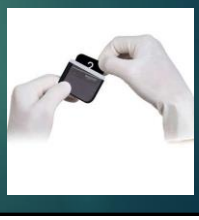
What on earth could this be? *Thyroid shield*

(5) Equipment Faults

- Faulty exposure timer
- Counter-balanced arm faulty

(6) Digital Processing errors

- Peeling of PSP edges
- Fingerprints / Fingernails
- Bending of films
- Scanner errors



Spot the film faults!

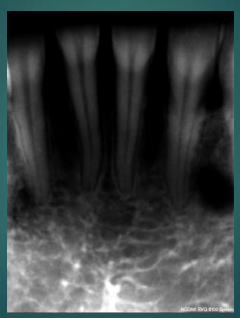
None of us are perfect all of the time!

1.

2.

3.

4.



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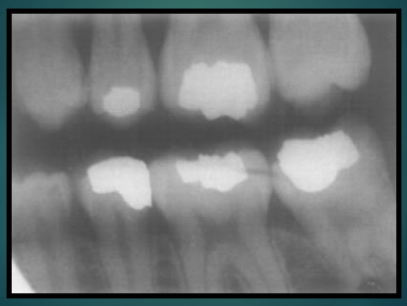

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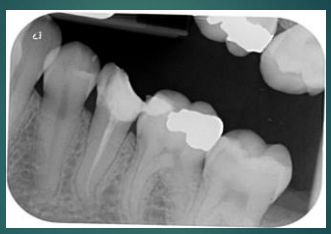

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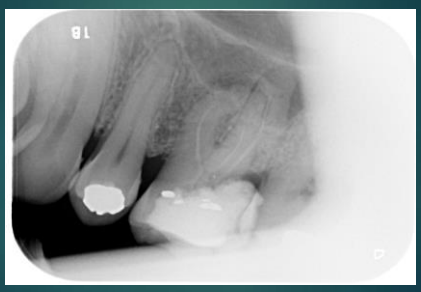

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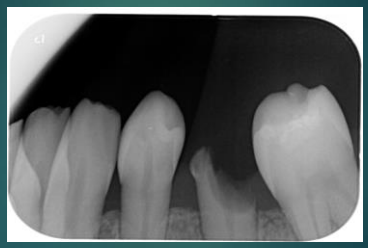

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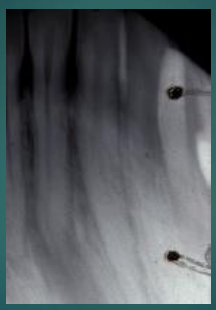

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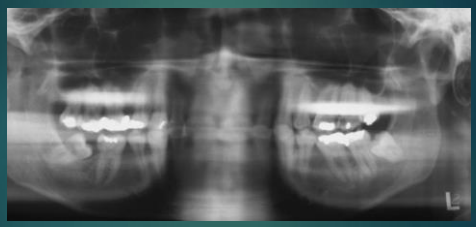

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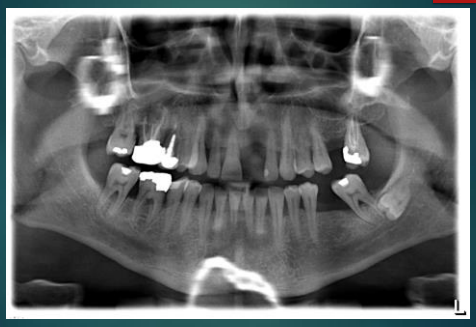


Care of Patients

STEPHEN BRIGGS
BDS/BSC (HONS) RADIOGRAPHY

Aim

To foster a patient-centred approach in dental radiography, ensuring safe, respectful and effective care for diverse patient groups

Objectives

(1) Adapt radiographic techniques for children and patients with special care needs

(2) Apply infection control measures in line with HTM01-05

(3) Communicate radiation risks clearly and appropriately based on patient understanding

- (3) Demonstrate empathy and professionalism in patient interactions
- (4) Ensure informed consent and uphold patient dignity throughout radiographic procedures

Problematic Clinical Scenarios

- Mandibular third molars
- Gagging
- Endodontics
- Edentulous ridge
- Children
- Special needs

Mandibular third molars

- Problems
  - Placement of image receptor far back (gagging)
  - Getting whole tooth on film
  - Paralleling holder may not work
- **Solutions**
  - "Snap-a-ray" (specially designed ho
  - Can use different angulation of beam to image apex

New Angle (aiming

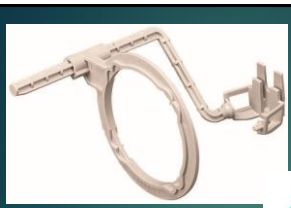
Initial Angle (90

Gagging

- Problems
  - Pronounced gag in some patients
- **Solutions**
  - Anaesthetic lozenge
  - Concentrate on deep breathing
  - Bisecting angle Technique
  - Distraction techniques

Endodontics

- Problems
  - Placement of receptors when rubber dam, files etc
  - Identification and separation of canals
  - Assessing root canal lengths when elongated or foreshortened images
- **Solutions**
  - Endodontic holders (endoray)
  - Canals can be separated by parallax (2 views)
  - Accurate pre-op paralleling radiograph
    - Reduced distortion than BSA



Edentulous ridge

- Problems
  - Image receptor placement
  - Loss of height in palate or FOM
- **Solutions**
  - Bisecting angle tech
  - Cotton wool rolls

Children

- Problems
  - Difficulty placing image receptor
  - Small mouths
  - Difficulty with co-operation
- **Solutions**
  - Holders for patients with large enough mouths
    - Reproducible for trauma review
  - Bisecting angle technique (modified occlusal?)
  - Careful patient selection
  - OPT may be required if child cannot tolerate intraorals

Special needs

- Problems
  - Difficulty obtaining co-operation
  - Anatomical difficulties
    - Large tongue
    - Small mouth
    - Tight oral musculature
    - Limited neck movement
    - Narrow dental arches
    - Shallow palate
  - Neurological disabilities
    - Communication/Learning difficulties
    - Tremor
    - Palsy

- **Solutions**
  - Careful patient selection
  - Be realistic about patient tolerance/co-operation
  - Choose image receptor of correct size and type
  - Modify technique as required (?BSA)
  - Utilise assistants
    - Relative/Friend if possible
  - X-ray under GA before treatment
  - Avoid OPT if patient cannot stay still for long
  - Paralleling technique where possible
    - Not reliant on head position

- Personal experience
  - Bitewings difficult in those under 5
    - Mouth too small
    - Cannot maintain bite on holder
  - Autism may affect sensory
    - Enhanced gag
    - Cannot tolerate holder in mouth
  - Movement artefact
    - Need to be quick!! ☺

Clinical Tips

- As few people in room as possible
- Don't dive in too quickly
  - Small talk
- Speak to them on their level
- Explain the procedure

- Get parent involved
  - Determined parent may be helpful
- Position carefully
  - Ideally want success after first time
- Be quick once child decides to co-operate

If all else fails?

Infection Control

- PPE (gloves etc)
- Handwashing (soap and water)
- Hand Sanitiser
- BBE
- Clean Uniform
- Hair tied up in clinical areas
- Appropriate footwear
- Follow local IPC policies / protocols
- Bite sheaths

Handwashing

- Required when hands are visibly dirty
- **7 step technique** (including wrists)
- **5 WHO moments** (before and after touching patient etc)

Handwashing technique

- Wet hands
- Dispense soap
- Wash for **15 seconds**
- Rinse well
- Dry hands with paper towel
- Turn off taps with elbow or paper towel
- Dispose of towel in bin
- Apply hand cream regularly

7-step technique

- Palms
- Backs
- Between fingers
- Thumbs and webs
- Knuckle grip
- Fingertips
- Wrists

WHO 5 key moments

- When are they?
  - Before patient contact
  - Before aseptic task
  - After body fluid exposure risk
  - After patient contact
  - After contact with patient surroundings

Hand Sanitiser

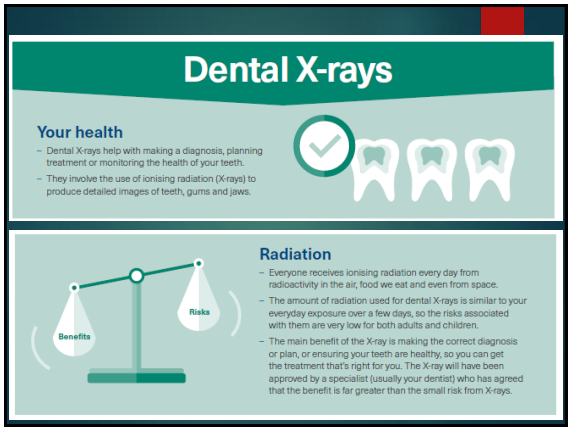
- Good for hand hygiene <u>except</u> when:
- **Hands are visibly soiled**
- **Direct contact with bodily fluids (ie. when no gloves)**

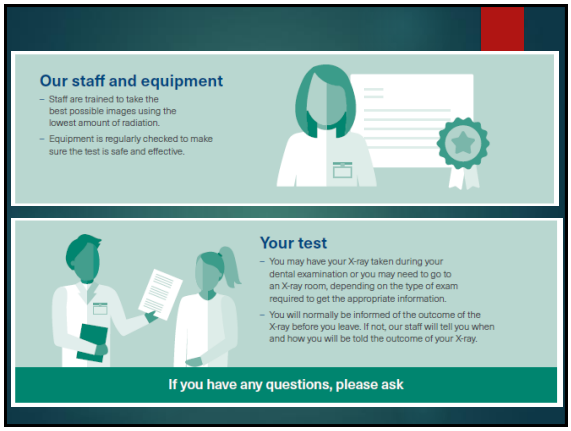
Cleaning, Disinfection and Sterilisation

- Chlorine-based cleaning products
- Cleaning with detergent based wipes
- Disinfectant wipes
- Clinell wipes
- Sterilisation Services

Communicating Radiation Risks

- Negligible risk
- Smallest radiation exposure of all X-Ray examinations
- **Benefits vs Risk** (justification)
- **Benefit = Diagnosis can be determined / confirmed**
- **Risk = Very small radiation dose**
- 1 IOPA = equivalent of a few days background radiation (depending on where you live)





Informed Consent and Patient Dignity

- Explain Procedure to patient
- Ask them if the intended examination is ok
- Be prepared to answer questions about radiation exposure (if they ask them)
- If they do not wish to proceed, abort procedure and speak to referrer

Empathy

- Irrational fear?
- Try to understand from patient's POV
- Put yourself in their shoes and think about how they are feeling and why
- Be patient
- Set aside more time for those who are anxious
- Don't be judgemental
- **Don't rush things**

Professionalism

- Clean, neat/tidy uniform
- Name badges / ID Pass
- Introduce yourself
- Language
- Respectful
- Open and honest

Patient-Centred Care

- Reassurance
- Explain procedure
- Respond to any questions
- Empathy
- Encouragement
- Motivation (to achieve objective – "help the dentist help you")
- Values (open, honest, teamwork)

Any Questions?

THANKS FOR LISTENING!

Briggs30683@gmail.com