Intraoral Technique Errors

By

Mahmood Al-Fahdawi B.S., M.Sc., Ph.D.

Oral Radiology Teacher, Anbar University

Radiographic Errors and Artifacts:

Quality Evaluation Criteria:

1. All radiographs must have acceptable image (details, definition, density & contrast).

2. All crowns and roots including apices are fully depicted together with interproximal alveolar crests, tooth contact areas, and surrounding apical bone regions.

3. Image of all teeth and other structures are shown in proper relative size and contour with minimal distortion and without overlapping images, where anatomically possible.

4. The radiograph is free from film handling and processing errors.

Film Placement Errors:

Bitewing Radiography Evaluating Criteria:

1. The interproximal contacts should not be overlapped from the distal surface of the canine to the mesial surface of the third molar, to the extent that interpretation is impossible.

2. The crown of the maxillary and mandibular teeth should be centered in the image from top to the button.

3. The crest of alveolar bone should be visible with no superimposition of the crowns of adjacent teeth.

4. The occlusal plane should be as horizontal as possible.

5. The buccal and lingual cusps should not be excessively separated.

Films with errors should be avoided due to the following reasons:

Retake will lead to:

- 1. Expose the patient to unnecessary radiation.
- 2. Waste film & time (money).

3. Interfere with accurate interpretation and diagnosis.

Film Placement Errors:

- 1. Anterior-posterior placement.
- 2. Vertical placement (too far above or below occlusal plane):

a. Apices cut off and crown cut off.

- 3. Dropped film corner.
- 4. Black dot at the apex.

Angulation errors:

Correct Horizontal Angulation: X-ray beam directed perpendicular to a line connecting the buccal surfaces of the teeth. When using the paralleling instrument, the film should be parallel to this line.

Incorrect horizontal angulation: If the x-ray beam is not perpendicular to the line connecting the buccal surfaces of the teeth, overlap between the buccal surface of one tooth and the lingual surface of the adjacent tooth occurs.

Incorrect vertical angulation: Results in an image of the tooth that is longer or shorter than the actual tooth. Primarily seen when using the bisecting angle technique.

- Decrease vertical angulation Image foreshortening.
- Increase vertical angulation: Image elongation.

Miscellaneous Technique errors:

- 1. Film bending.
- 2. Film creasing.
- 3. Phalangioma.
- 4. Double exposure.
- 5. Movement.
- 6. Reversed film.
- 7. Failure to remove dentures, glasses.

Reversed film:

The all-white side of the film should face the teeth. When placing the film in the biteblock of the paralleling instrument (periapical or bitewing), the all-white side of the film should face the ring. When using stick-on tabs for bitewings, the tabs should be placed on the all-white side of the film.

The lead foil, which is embossed with a pattern and is normally behind the film when positioned properly, is now in front of the film, producing the tire-track pattern seen on the left side of the film. The film is also lighter than it should be.

Double exposure:

Caused by inadvertently using the same film to expose two different areas of the mouth.

Patient Movement:

Results in a blurring or apparent double image of the teeth and surrounding structures.

Slight movement of the tube head, in the absence of patient movement, will not affect the images on the film.

Film bending:

Most frequently caused by placing the finger in an unsupported area while using the bisecting angle technique. Most obvious in canine region on this film, where root curves off of film.

Film creasing:

Excessive film softening (black lines).

Phalangioma:

Finger in path of x-ray beam (arrow), between PID and film.

Failure to remove dentures, glasses:

Exposure factors errors:

Film Placement Errors

- 1. Incorrect Anterior-posterior placement
- 2. Apices cut off
- 3. Crown cut off
- 4. Dropped film corner
- 5. Double exposure
- 6. Reversed film
- 7. Dot artifact
- 8. Phalangioma

- 9. PID alignment errors
- 10. Cone cutting
- 11. Horizontal overlap
- 12. Foreshortened image
- 13. Elongated image
- 14. Negative angulation Bitewing

Patient Preparation errors:

- 1. Movement
- 2. Failure to remove dentures, glasses

Exposure factors errors:

- 1. Overexposure
- 2. Underexposure
- 3. Unexposed film
- 4. Film exposed to light
- 5. Film Handling errors
- 6. Film bending
- 7. Film creasing

Patient Preparation Errors

Error	Appearance	Problem	Solution
Failure to	Image of the	Metallic objects in the	Metallic objects in the head and neck area
remove	metallic object	head and neck area	were not removed.
metallic	superimposed over	were not removed.	
objects	the film.		
Movement	Blurred image	Patient moved during	Stabilize the patient's head before exposure
		the exposure	and instruct the patient to remain still.
			Never expose a film when a patient is
			moving
Apex cut off	No apices on the	Film was not	Make sure no more than 1/8 inch of the film
	film	positioned in the	edge extends beyond the inciso-occlusal
	Excessive black	patient's mouth to	surfaces of teeth.
	margin	cover the apical	
		regions of teeth.	

Film placement Errors

Error	Appearance	Problem	Solution
Apex cut off.	No apices on the	Film was not	Make sure no more than 1/8 inch of the
	film	positioned in the	film edge extends beyond the inciso-
	Excessive black	patient's mouth to	occlusal surfaces of teeth.
	margin.	cover the apical	
		regions of teeth.	
Dropped film	Occlusal plane	The edge of the film	Make sure the edge of the film is parallel to

corner.	tipped or tilted.	was not placed parallel to the inciso-occlusal surfaces of teeth. The patient was not instructed to hold the film firmly against the tooth (this error occurs with the finger holding method of bisecting technique).	the inciso-occlusal surfaces of teeth. Instruct the patient to hold the film firmly in place.
Phalangioma	Patient's finger appears on film	Patient's finger was placed in front of the film instead of behind. Occurs with finger holding method of bisecting technique.	Make sure patient's finger used to stabilize the film is placed behind the film and not in front of it.
Double Exposure	Double image	Film was exposed in the patient's mouth twice. It results in two retakes, one for each area previously exposed.	Always separate exposed and unexposed films.
Incorrect antero- posterior film placement.	Distal surface of the canine not visible on premolars films Third molar region is not visible on molars films.	The film was positioned too far posterior The film was positioned too far anterior.	Make sure the anterior edge of premolars films is positioned at the midline of the canine. Make sure the anterior edge of molars films is positioned at the midline of the second premolar, even when no erupted third molars are present.
Reversed film.	A light image with a herringbone pattern.	Film was placed in the patient's mouth backwards and then exposed.	Always note the front and the back sides of the film before placing it in the patient's mouth. Always place the white side of the film adjacent to the teeth.
Dot artifact.	Circular radiolucent artifact interfers with radiographic interpretation.	Improper placement of the dot coronally.	Bisecting technique: place the dot towards the occlusal surface. Parallel technique: place the dot in the slot.

Film Handling Errors

Error	Appearance	Problem	Solution
Film	Images are stretched and distorted.	Film was bent excessively due to	Cotton rolls can be
bending		the curvature of the hard palate or	placed between the
		heavy finger pressure on the film.	film and the palate
			Instruct the patient
			to stabilize the film
			gently
			Film holding
			devices are helpful.

Film	Thin radiolucent line.	Film was creased and emulsion	Do not bend or
creasing		was cracked.	crease the film
			excessively.
			Gently soften the
			corners of the film
			before placing in
			the patient's mouth.

PID Alignment Errors:

Error	Appearance	Problem	Solution
Cone cut with film holder.	A clear unexposed area appears on film.	X-ray beam did not expose the entire film because the PID was not properly aligned with the periapical film holder.	Make sure the PID is properly aligned with the film holder and the x-ray beam is centered over the film If aiming ring is used, make sure the PID and aiming ring are properly aligned.
Cone cut without film holder.	A clear unexposed area appears on film.	PID was not directed at the center of the film.	Make sure the x-ray beam is centered over the film.
Incorrect horizontal angulation.	Overlapped contacts	Central ray was not directed through the interproximal spaces	Direct the x-ray beam through the interproximal regions.
Foreshortened image.	Short teeth with blunted roots	Steep vertical angulation. Occurs with bisecting technique.	Do not use excessive vertical angulation with the bisecting technique Using Rinn instruments minimizes this error.
Elongated image.	Long distorted teeth	Vertical angulation was too flat Occurs with bisecting technique.	Use adequate vertical angulation with the bisecting technique. Using Rinn instruments minimizes this error.
Negative angulation in Bitewings.	Radiograph shows the roots of the lower teeth and the occlusal surface of the upper teeth.	Negative vertical angulation.	Always use a +10 vertical angulation to compensate for the slight tilt of the upper teeth and the slight lingual bend of the upper half of the film caused by the hard palate

Exposure Errors:

Error	Appearance	Problem	Solution
Unexposed film	Clear film	Failure to turn on the x- ray machine. Electrical failure. Malfunction of the x- ray machine.	Make sure the x-ray machine is turned on and listen to the audible exposure signal.
Film exposed to light	Black	Film was accidently exposed to white light	Do not unwrap the film in a room with white light. Check the darkroom for possible light leaks. Turn off all lights in the darkroom (except for the safelight) before unwrapping the film.
Overexposed film	Dark image	Excessive exposure time, kilovoltage, milliamperage, or a combination of these factors.	Check the exposure time, kilovoltage and milliamperage settings on the x-ray machine before exposing the film.
Underexposed film	Light image	Inadequate exposure time, kilovoltage, milliamperage, or a combination of these factors.	Check the exposure time, kilovoltage and milliamperage settings on the x-ray machine before exposing the film.

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