Image Critique Answers

Module 3

1. Use the 5 evaluation criteria categories when critiquing the following images to determine if they are diagnostic:

PA Hand @ 55 kVp



1. Is all the required anatomy included in the radiograph?
   Yes No
   **If no, explain what is required*
2. Does the anatomical appearance in the radiograph correlate to what is expected from a PA projection?
   Yes **No**
   **If no, explain how the appearance of this radiograph is different compared to the ideal radiograph*
   - **IP joints are closed**
   - **1st-3rd MCP joints are narrowed**
   - **Soft-tissue overlap between the 1st and 2nd phalanges**
   - **2nd-5th Distal phalanges are foreshortened (appear "shorter/smaller" than ideal)**
3. Identify if the appropriate amount of radiation was used to form the image.
   Acceptable, Overexposed, Underexposed
   - Is motion present in the image?
     Yes **No**
4. Identify if the collimated light field was:
   Acceptable, Too Small, **Too Large Included more than 1-inch of distal forearm**
   - Was the CR close to the middle of the required anatomy?
     Yes No
5. Does the marker placement follow Edenbrook's Marker Rules?
   Yes **No – move to "thumb" side**
   - Are there artifacts in the image?
     Yes No
     **If yes, could they have been removed?*
     ****Yes the marker should not be under anatomy of interest***

Is this image diagnostic? Yes No
based on this semesters Image Critique Rubric

2. Use the 5 evaluation criteria categories when critiquing the following images to determine if they are diagnostic:

1. Is all the required anatomy included in the radiograph?
   Yes **No**
   **If no, explain what is required*
   Must include 1-inch of distal radius and ulna
2. Does the anatomical appearance in the radiograph correlate to what is expected from a PA projection?
   Yes **No**
   **If no, explain how the appearance of this radiograph is different compared to the ideal radiograph*
   - **Some IP joints are closed**
   - **Uneven appearance of phalangeal & metacarpal shafts**
   - **Unequal soft-tissue margins of phalanges**
   - **Interosseous space between metacarpal heads is uneven**
3. Identify if the appropriate amount of radiation was used to form the image.
   Acceptable, Overexposed, Underexposed
   - Is motion present in the image?
     Yes **No**
4. Identify if the collimated light field was:
   Acceptable, **Too Small**, Too Large
   ***not all required anatomy could not be included**
   - Was the CR close to the middle of the required anatomy?
     Yes No

PA Hand @ 65 kVp



Is this image diagnostic? Yes **No**
****The pt. is not positioned for a true PA projection (appearance is more similar to an oblique projection) & required anatomy is clipped***

5. Does the marker placement follow Edenbrook's Marker Rules?
   Yes No
   - Are there artifacts in the image?
     Yes **No**

3. Use the image below to answer the next five questions:

a. Which routine projection of the hand is displayed?
PA oblique projection

b. What positioning error(s) occurred?
- **Over-rotation**
- **Phalanges not parallel to IR *(likely resting on the surface of the cassette)***
- **Phalanges not separated sufficiently**

c. If the image was repeated, how would you correct the positioning error(s)?
- **Reduce the pt.'s obliquity (rotate their palmar surface closer to the IR)**
- **Straighten all the digits**
- **Spread the phalanges apart**

d. How did you identify the positioning error(s)?
- **Excessive overlap of the 3-5th metacarpal shafts and heads = over-rotation**
- **IP joints are closed = phalanges not parallel to IR**
- **Excessive soft-tissue overlap around the 3-5th phalanges = superimposition, from digits being too close together**

54 kVp



e. If the image had to be repeated, would you make any other adjustment(s)? Explain your rationale.

- **Increase the technique; kv range should be 60+/-5kVp; technique used caused an underexposure (i.e. difficult to visualize trabecular markings and the edges between the carpal bones, radius and ulna; i.e. image appears "too light")**
- **The collimation size is not excessive side-to-side, however the CR is not centered over the middle of the required anatomy (from the lateral to medial side); move the CR closer to the medial side (closer to the 3rd MCP) to ensure even amounts of "light" will surround the required anatomy; if digits are straightened and parallel to IR, the the collimation must be decreased (aka. field size made larger) proximally/distally to prevent clipping anatomy (the distal phalanges)**

4. Use the image below to answer the next five questions:



a. Which routine projection of the hand is displayed?
Closest in appearance to a fan Lateral

b. Which non-routine projection does this radiograph resemble?
Extension Lateral

c. What positioning error(s) occurred?
- **Long axis of the hand not parallel to IR**
- **Digits not separated**
- **Thumb in a PA position**
- **Wrist not in a true lateral position**

d. If the image was repeated, how would you correct the positioning error(s)?
- **Align the elbow, wrist, and metacarpal heads until they run parallel to the long edge of the cassette**
- **"Fan" out the digits, separating them evenly – ensuring they remain parallel to the IR *(this will also help the thumb move into a slight oblique position)***
- **Rotate the pt.'s wrist more laterally (i.e. roll the wrist posteriorly) ensuring the metacarpal heads remain superimposed**

e. How did you identify the positioning error(s)?
- **Hand is at an angle that does not match the angle of the IR = part not parallel to IR**
- **Superimposition of 2-5th phalanges = digits not separated**
- **Equal concavity on the body of 1st metacarpal and proximal phalanx = PA position**
- **Distal radius and ulna are not superimposed = not in true lateral = rotation (*note the ulna is posterior to the radius, meaning the wrist needs to be rotated more posteriorly)**

e. If the image had to be repeated, would you make any other adjustment(s)? Explain your rationale.
- **Marker does not follow Edenbrook's Marker Rules; move the marker to the anterior side of the image**
- **Remove the patient artifact *(most likely a ring, which is classified as a removable artifact)***
- **Decrease the kVp to an acceptable range (55-65)**

5. Use the 5 evaluation criteria categories when critiquing the following images to determine if they are diagnostic:

1. Is all the required anatomy included in the radiograph?
   Yes **No**
   **If no, explain what is required*
   Entire trapezium (including joint spaces) must be included in Thumb imaging

2. Does the anatomical appearance in the radiograph correlate to what is expected from a Lateral projection?
   Yes **No**
   **If no, explain how the appearance of this radiograph is different compared to the ideal radiograph*
   - **IP joint is closed**
   - **MCP joint is closed**
   - **Anatomy is not parallel to length of IR**

3. Identify if the appropriate amount of radiation was used to form the image.
   Acceptable, Overexposed, Underexposed
   - Is motion present in the image?
     Yes **No**

4. Identify if the collimated light field was:
   Acceptable, Too Small, **Too Large**
   - **The light field extends more than 1-inch beyond the distal phalanx**
   - **Side-side collimation is appropriate; If the anatomy was aligned with the IR the trapezium would not be clipped**
   - Was the CR close to the middle of the required anatomy?
     Yes **No – not centered over 1st MCP joint**

   ***note: incorrect CR centering can cause beam divergence to make joints appear closed**

5. Does the marker placement follow Edenbrook's Marker Rules?
   Yes No
   - Are there artifacts in the image?
     Yes **No**
     **If yes, could they have been removed?*

Lateral Thumb @ 55 kVp



Is this image diagnostic? Yes **No**
****required anatomy was clipped***

6. Use the 5 evaluation criteria categories when critiquing the following images to determine if they are diagnostic:

PA Oblique Thumb @ 65 kVp



1. Is all the required anatomy included in the radiograph?

   Yes **No**

   **If no, explain what is required*

   Soft-tissue is required – clipping the very edge of the lateral soft-tissue at the base of the 1st metacarpal

2. Does the anatomical appearance in the radiograph correlate to what is expected from a PA projection?

   Yes **No**

   **If no, explain how the appearance of this radiograph is different compared to the ideal radiograph*

   - **Thumb not fully extended (phalange appear to be at a slightly different angle than the metacarpal)**
   - **Anatomy not parallel to length of IR (1st metacarpal not aligned to distal radius)**

3. Identify if the appropriate amount of radiation was used to form the image.

   Acceptable, Overexposed, Underexposed

- Is motion present in the image?

  Yes **No**

Is this image diagnostic? Yes No

4. Identify if the collimated light field was:

   Acceptable, Too Small, **Too Large**

   Distally/proximally collimation was insufficient as the distal radius and entire scaphoid not required; medial/laterally collimation was acceptable

   ****Note: unacceptable to tilt the collimator on campus; if the part was aligned properly, collimator tilt would not have been necessary***

- Was the CR close to the middle of the required anatomy?

  ***Yes** No

Should be centered on 1st MCP joint (i.e. centering could be moved a bit more distally)

5. Does the marker placement follow Edenbrook's Marker Rules?

Yes **No – none present**

For thumb, marker can be on either side

- Are there artifacts in the image?

  Yes **No**

  **If yes, could they have been removed?*

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7. Use the image below to answer the next five questions:

52 kVp



a. Which routine projection of the thumb is displayed?

AP projection

b. What positioning error(s) occurred?

- **Superimposition**

c. If the image was repeated, how would you correct the positioning error(s)?

- **Using the patients opposite hand, draw the medial side of the affected hand and palmar surface away from the thumb**
  - ***Ensuring the patient does not rotate from an AP thumb position with this movement***

d. How did you identify the positioning error(s)?

- **Soft-tissues of the palm are obscuring clear visualization of the 1st metacarpal, proximal phalanx, and trapezium**

e. If the image had to be repeated, would you make any other adjustment(s)? Explain your rationale.

- **Radiograph is underexposed, increase the technique; kv should be between 60+/-5kv**
- **Radiograph includes excessive amounts of anatomy, increase collimation side-side (aka. medially/laterally) to remove the 2nd-5th phalanges from the radiation field**