## Image Critique Questions

## Module 5

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

Lateral Humerus @ 70 kVp




McQuillen Martensen 5th Ed. pg. 251 Fig. 4.210

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 lateral projection?

   Yes **No**

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

   - **Humeral epicondyles are not directly superimposed**
   - **Elbow is not flexed $90^0$**

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

- 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

****Never invade a patient's personal space when placing a marker (even though this is a lateral projection, placing the marker on the anterior side would invade the patients personal space)***

- Are there artifacts in the image?

  Yes **No**

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

**Is this image diagnostic?** Yes **No**

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*

AP Humerus @ 80 kVp




https://radiopaedia.org/cases/giant-humeral-enostosis

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

Yes **No**

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

- **Epicondyles are not in profile (aka. parallel to IR)**
- **Greater tuberosity is not in profile laterally**
- **Excessive humeral head superimposition over the glenoid cavity**

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**

*** Collimator was not tilted to match angle of humeral body, causing excessive amounts of thorax (aka. chest/torso) to be included in the light-field; too much anatomy included inferiorly/distally**

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

Yes **No**

***Superiorly to inferiorly = yes; Laterally to medially = no***

**Is this image diagnostic? Yes** No

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?*

***No, this is patient pathology (dense bony sclerotic lesion)***

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

a. Which projection of the elbow is displayed?

**Lateral projection**

b. What positioning error(s) occurred?

- **Acute-flexion**
- **Shoulder and elbow not on same plane (aka. shoulder is elevated above the elbow)**
- **Wrist and elbow not level (aka. wrist is depressed below the elbow)**

60 kVp




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

- **Decrease the flexion (aka. extend the patients elbow slightly) until the humerus and forearm create a $90^0$ angle**
- **Lower the shoulder until it is at the same height as the elbow**
- **Raise the wrist until it is at the same height as the elbow (*a sponge may be used to help the patient hold this position)**

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

- **Humerus and forearm are flexed greater than $90^0$**
- **Capitulum is projected inferior (aka. below) the trochlea**
- **Capitulum is projected anterior (aka. in front of) the trochlea**

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

- **Increase technique, as the image was underexposed**

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

65 kVp




McQuillen Martensen 5th Ed. pg. 231 Fig. 4.162

a. Which projection of the elbow is displayed?

**AP Oblique projection**
***(with medial/internal rotation)***

b. What positioning error(s) occurred?

- **Over-rotation**
- **Slight flexion**

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

- **Rotate the humeral epicondyles towards the lateral side (aka. externally) until they are $45^0$ to the IR**
- **Fully extend the patients arm**

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

- **Radial head and neck superimposition is too anterior (aka. radial head and neck not centered over the proximal ulna)** ***note: radial head is almost superimposing the coronoid process***
- **Elbow joint space almost closed; Humerus is not aligned to edge of IR, but forearm is aligned** ***(i.e. entire limb should be parallel to long edge of IR for full extension)***

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

- **Increase collimation (up and down/proximally-distally), only 1/3rd of the proximal forearm is required**
- **Move CR centering slightly more distally, placing the crosshairs over the elbow joint**

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*

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

   Yes **No**

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

   - **Almost no superimposition of radial head, neck and tuberosity with the proximal ulna**
   - **Humeral epicondyles not in profile bilaterally**

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

   Acceptable, **Overexposed**, Underexposed

   ****kVp too high***

- Is motion present in the image?

  Yes **No**

AP Elbow @ 77kVp




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McQuillen Martensen 5th Ed. pg. 225 Fig. 4.147

**Is this image diagnostic?** Yes **No**

****appearance is more similar to an AP oblique projection with external/lateral rotation***

4. Identify if the collimated light field was:

   **Acceptable**, Too Small, Too Large

- 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

- Are there artifacts in the image?

  Yes **No**

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

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

AP Elbow @ 63kVp



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

   Yes **No**

   **If no, explain what is required*

   ***Should include @ least ¼ of the distal humerus***

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

   Yes **No**

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

   - ***Excessive superimposition of the proximal radius and ulna***
   - **Elbow joint space not fully open**
   - **Humeral epicondyles not in profile bilaterally**
   - **Olecranon process not "seated" within the olecranon fossa**

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

Acceptable, Overexposed, **Underexposed**

****kVp too low***

- Is motion present in the image?

  Yes **No**

**Is this image diagnostic?** Yes **No**

****Underexposed, & clipped anatomy***

4. Identify if the collimated light field was:

   Acceptable, **Too Small**, Too Large

   ****even if CR was correct, we would not be able to include 1/3rd of distal forearm***

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

  Yes **No **should be over the elbow joint (i.e. must be moved proximally)***

***5.*** Does the marker placement follow Edenbrook's Marker Rules?Yes **No **none present (i.e. should be on lateral side)***

- Are there artifacts in the image?

  Yes **No**

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

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

a. Which projection of the elbow is displayed?

**AP Oblique projection**
***(with lateral/external rotation)***

70 kVp




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McQuillen Martensen 5th Ed. pg. 233 Fig. 4.169

b. What positioning error(s) occurred?

- **Over-rotation**
- **Elbow flexion**
- **Anatomy not aligned parallel to IR**

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

- **Decrease patient obliquity (i.e. slightly rotate the humeral epicondyles medially/internally until they form a $45^0$ angle with the IR)**
- **Fully extend the patients elbow, until entire limb is "flat" on the IR**
- **Ensure the shoulder, elbow and wrist are parallel to long edge of IR and light field**

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

- **Lateral epicondyle and capitulum not in profile (i.e. lateral epicondyle superimposed over the capitulum)**
- **Elbow joint space is closed**
- **Humerus is not aligned to edge of IR, but forearm is aligned *(i.e. entire limb should be parallel to long edge of IR)***

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

- **Incorrect centering of the CR can also contribute to the appearance of closed joint spaces; center CR more proximally (over the elbow joint)**
- **Increase collimation, excessive amounts of anatomy are included in the radiograph (only require 1/3rd of the proximal forearm – radiograph includes half)**