

Reading Hospital School of Health Sciences

Medical Imaging Program

Clinical Case Study-Forearm/Elbow

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Each student will be assigned clinical a seminar case study for each procedure taught within the semester. Case study review will allow demonstration of knowledge, practice of image critique skills, anatomical structure identification and pathology identification. Submit answers to the below questions for each projection within the case study in a Word.doc (Each projection assigned must have the below answers completed: Forearm procedure & Elbow procedure). Within the attached PPT, identify the required anatomy by sliding the corresponding arrow/letter to the anatomy requested. Completed answers to the questions below and anatomical structure labeling within the PowerPoint must be uploaded into the Edvance 360 dropbox under that designated body section. Please be sure to fully answer each line item identified within the assignment below.

Answer #1-#10 for each assigned projection

AP elbow

1. Is orientation of the image correct? Yes
 - a. If orientation is incorrect, explain why. N/A
 - b. State how to modify the orientation. (flip, rotate, etc) N/A
2. Is all necessary anatomy included?- yes
 - a. Explain the anatomy required by evaluation criteria. And if it is all included in the image- radial head neck and tuberosity slightly superimposed by the distal ulna, open humeroradial joint, olecranon fossa in the center of the humerus with the epicondyles on equal ends. (no superimposition of the radial head neck or tuberosity, ulna not in line with the humerus, closed humeroradial joint)
 - b. Drag the arrows with letters on the Case Study slides to identify anatomical structures within each slide.
3. Is the body part centered appropriately? Yes
 - a. Where should the central ray enter for this projection? At the elbow joint
 - b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. (inferiorly, laterally, etc.)
4. Is the body part positioned accurately? No
 - a. If the body part is not positioned accurately:
 - i. Explain what anatomy demonstrates inaccurate positioning (over or under-rotation etc).over rotation the arm is rotated laterally because the radial head neck or tuberosity is not superimposed
 - ii. State the modification of positioning necessary to meet evaluation criteria. Elbow needs to be rotated a bit medially so that the epicondyles are parallel to the IR with no flexion of the elbow
5. Is the collimation and IR orientation as required?- yes
 - a. State the proper collimation size to be used.- to anatomy of interest the body of humerus to the proximal end of the radius and ulna
 - b. State how the IR should be oriented to the patient.- the hand should be supinated with elbow joint parallel to the IR, image is portrait
6. Is the proper marker(s)/annotation(s) utilized on the image? Yes
 - a. State if the marker was placed in the proper location.- yes
 - b. State if any additional marker(s)/annotation(s) are required. N/A

7. Is the exposure within the appropriate EI range? Yes 450
 - a. Identify the correct technique. 70kVp 1.4mAs
 - b. If not within the appropriate EI range, explain specifically how to adjust the technical factors to bring the EI into range. N/A
8. Are there any artifacts present on the image? N/A
 - a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient necessary. N/A
9. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? Not acceptable
 - a. State the reasons this image will require the patient to have a second exposure. The radial head neck and tuberosity is not superimposing slightly over the ulna the humeroradial joint is not open, the ulnar is not in line with the humerus and olecranon fossa

Medial oblique

10. Is orientation of the image correct? Yes
 - a. If orientation is incorrect, explain why. N/A
 - b. State how to modify the orientation. (flip, rotate, etc) N/A
11. Is all necessary anatomy included? Yes
 - a. Explain the anatomy required by evaluation criteria. And if it is all included in the image- coronoid process in profile, radial head in line with the olecranon process, olecranon process in profile of the olecranon fossa, ulna superimposing the radial head neck and tuberosity, open elbow joint,
 - b. Drag the arrows with letters on the Case Study slides to identify anatomical structures within each slide.
12. Is the body part centered appropriately? Yes
 - a. Where should the central ray enter for this projection? The elbow joint
 - b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. (inferiorly, laterally, etc.) N/A
13. Is the body part positioned accurately? Yes
 - a. If the body part is not positioned accurately:
 - i. Explain what anatomy demonstrates inaccurate positioning (over or under-rotation etc). there is slight over rotation because the radial head is slightly superimposing the coronoid process
 - ii. State the modification of positioning necessary to meet evaluation criteria. The elbow needs to move a tiny bit laterally
14. Is the collimation and IR orientation as required? Collimation insufficient more anatomy shown than needed
 - a. State the proper collimation size to be used. To anatomy of interest, the distal end of the humerus to the distal bodies of the radius and ulna
 - b. State how the IR should be oriented to the patient. The elbow start parallel to the IR then moved to have a 45 degree angle, hand pronated, epicondyles should be at a 45 degree angle , image is portrait
15. Is the proper marker(s)/annotation(s) utilized on the image? Yes
 - a. State if the marker was placed in the proper location. Yes
 - b. State if any additional marker(s)/annotation(s) are required. N/A
16. Is the exposure within the appropriate EI range? 750 acceptable
 - a. Identify the correct technique. 70kVp 1.4mAs
 - b. If not within the appropriate EI range, explain specifically how to adjust the technical factors to bring the EI into range. N/A
17. Are there any artifacts present on the image? no
 - a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient necessary. N/A
18. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? Acceptable because there is slight over rotation but it is so minimum and everything is present in the image

- a. State the reasons this image will require the patient to have a second exposure. N/A

Lateral oblique

- 19. Is orientation of the image correct? Yes
 - a. If orientation is incorrect, explain why. N/A
 - b. State how to modify the orientation. (flip, rotate, etc) N/A
- 20. Is all necessary anatomy included? Yes
 - a. Explain the anatomy required by evaluation criteria. And if it is all included in the image- radial head neck and tuberosity free from superimposition of the ulna, the capitulum in view, elongated lateral epicondyle
 - b. Drag the arrows with letters on the Case Study slides to identify anatomical structures within each slide.
- 21. Is the body part centered appropriately? Yes but it's a little off
 - a. Where should the central ray enter for this projection?- elbow joint
 - b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. (inferiorly, laterally, etc.) Cr could move a tiny bit proximally/ superiorly
- 22. Is the body part positioned accurately?- yes there is slight superimposition of the radial head but that not enough for repeat according to RH
 - a. If the body part is not positioned accurately:
 - i. Explain what anatomy demonstrates inaccurate positioning (over or under-rotation etc). N/A
 - ii. State the modification of positioning necessary to meet evaluation criteria.- N/A
- 23. Is the collimation and IR orientation as required?- no insufficient collimation
 - a. State the proper collimation size to be used. To anatomy of interest, proximal ends of the radius and ulna to the distal end of the humerus
 - b. State how the IR should be oriented to the patient.- elbow in AP position, elbow rolled laterally so the posterior side is at a 45 degrees, thumb can be touching the IR. image is portrait
- 24. Is the proper marker(s)/annotation(s) utilized on the image? Yes
 - a. State if the marker was placed in the proper location. Yes
 - b. State if any additional marker(s)/annotation(s) are required. N/A
- 25. Is the exposure within the appropriate EI range?- 650 acceptable
 - a. Identify the correct technique. 70kVp 1.4mAs
 - b. If not within the appropriate EI range, explain specifically how to adjust the technical factors to bring the EI into range. N/A
- 26. Are there any artifacts present on the image? no
 - a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient necessary. N/A
- 27. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE?- Acceptable even though there is more anatomy shown than there needs to be the rotation was good
 - a. State the reasons this image will require the patient to have a second exposure. N/A

Lateral elbow

- 28. Is orientation of the image correct? Yes
 - a. If orientation is incorrect, explain why. N/A
 - b. State how to modify the orientation. (flip, rotate, etc) N/A
- 29. Is all necessary anatomy included? Yes
 - a. Explain the anatomy required by evaluation criteria. And if it is all included in the image- shaft of the humerus to the shafts of the radius and ulna, superimposition of the epicondyles, radial head

- superimposing the coronoid process, radial tuberosity pointing anteriorly, olecranon process in view, elbow joint at a true 90 degree flexion (the epicondyles are not superimposed, not at a 90 degree)
- b. Drag the arrows with letters on the Case Study slides to identify anatomical structures within each slide.
30. Is the body part centered appropriately? Yes its off a tiny bit
- a. Where should the central ray enter for this projection? Elbow joint
 - b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. (inferiorly, laterally, etc.) could move a tiny bit proximal to the humerus and distal to the radial and ulna
31. Is the body part positioned accurately? No
- a. If the body part is not positioned accurately:
 - i. Explain what anatomy demonstrates inaccurate positioning (over or under-rotation etc). not in plane with the wrist, the epicondyle is superimposing the humeroradial joint and the humeroulnar joint
 - ii. State the modification of positioning necessary to meet evaluation criteria. Wrist can be elevated it a sponge
32. Is the collimation and IR orientation as required? yes
- a. State the proper collimation size to be used. To anatomy of interest, - shaft of the humerus to the shafts of the radius and ulna
 - b. State how the IR should be oriented to the patient. The elbow should be flexed to a 90 degree, the forearm and wrist should be in a lateral position, the shoulder wrist and elbow should all be in the same plane. Image is landscape
33. Is the proper marker(s)/annotation(s) utilized on the image? Yes
- a. State if the marker was placed in the proper location. yes
 - b. State if any additional marker(s)/annotation(s) are required. N/A
34. Is the exposure within the appropriate EI range? 700 acceptable
- a. Identify the correct technique. 70kVp 1.4mAs
 - b. If not within the appropriate EI range, explain specifically how to adjust the technical factors to bring the EI into range. N/A
35. Are there any artifacts present on the image? no
- a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient necessary. N/A
36. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? Not acceptable
- a. State the reasons this image will require the patient to have a second exposure.- the wrist in not in plane with the elbow causing superimposition

Ap forearm

37. Is orientation of the image correct? Yes
- a. If orientation is incorrect, explain why. N/A
 - b. State how to modify the orientation. (flip, rotate, etc) N/A
38. Is all necessary anatomy included? yes
- a. Explain the anatomy required by evaluation criteria. And if it is all included in the image- carpals to the distal end of the humerus, superimposition of the radial head neck and tuberosity over the ulna, slight superimposition of the distal radius over the ulna (this is okay according to RH)
 - b. Drag the arrows with letters on the Case Study slides to identify anatomical structures within each slide.
39. Is the body part centered appropriately? yes
- a. Where should the central ray enter for this projection? The middle of the forearm

- b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. (inferiorly, laterally, etc.) N/A
40. Is the body part positioned accurately? Yes
- a. If the body part is not positioned accurately:
 - i. Explain what anatomy demonstrates inaccurate positioning (over or under-rotation etc). N/A
 - ii. State the modification of positioning necessary to meet evaluation criteria. N/A
41. Is the collimation and IR orientation as required? no
- a. State the proper collimation size to be used. To anatomy of interest that being the carpals to the distal end of the humerus, this image has insufficient collimation including too much anatomy
 - b. State how the IR should be oriented to the patient.- the arm should be in a supine position, the elbow is in the same plane as the wrist, the epicondyles are parallel to the IR and the styloid processes are parallel to the IR, image is portrait
42. Is the proper marker(s)/annotation(s) utilized on the image? Yes
- a. State if the marker was placed in the proper location. yes
 - b. State if any additional marker(s)/annotation(s) are required. N/A
43. Is the exposure within the appropriate EI range? 600 acceptable
- a. Identify the correct technique. 70kVp 1.25mAs
 - b. If not within the appropriate EI range, explain specifically how to adjust the technical factors to bring the EI into range. N/A
44. Are there any artifacts present on the image? no
- a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient necessary. N/A
45. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? Acceptable
- a. State the reasons this image will require the patient to have a second exposure.

lateral forearm

46. Is orientation of the image correct? yes
- a. If orientation is incorrect, explain why. N/A
 - b. State how to modify the orientation. (flip, rotate, etc) N/A
47. Is all necessary anatomy included? yes
- a. Explain the anatomy required by evaluation criteria. And if it is all included in the image- carpals to distal humerus, elbow flex 90 degrees, superimposition of the lateral and medial epicondyles, superimposition of the radius and ulna, radial tuberosity facing anteriorly, radial head superimposing the coronoid process (image does not include superimposing of the epicondyles, the epicondyles are superimposing the olecranon process)
 - b. Drag the arrows with letters on the Case Study slides to identify anatomical structures within each slide.
48. Is the body part centered appropriately? No
- a. Where should the central ray enter for this projection? The middle of the forearm
 - b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. (inferiorly, laterally, etc.) CR should move proximally on the forearm
49. Is the body part positioned accurately? No
- a. If the body part is not positioned accurately:
 - i. Explain what anatomy demonstrates inaccurate positioning (over or under-rotation etc). the shoulder is not in plane with the elbow causing superimposition of the olecranon process
 - ii. State the modification of positioning necessary to meet evaluation criteria. - the elbow needs to be elevated to be in the same plane as the shoulder

50. Is the collimation and IR orientation as required? No, insufficient collimation more anatomy than needed its including the metacarpals and phalanx
- State the proper collimation size to be used.- to anatomy of interest, distal humerus to the carpal bones
 - State how the IR should be oriented to the patient.- arm in a true lateral position, rotated 90 laterally, long axis of arm parallel to the IR radial and ulna styloid processes stacked on top of another, epicondyles stacked, elbow flexed 90 degrees, wrist shoulder and elbow all in in the same plane, image is portrait
51. Is the proper marker(s)/annotation(s) utilized on the image? Yes
- State if the marker was placed in the proper location. Yes
 - State if any additional marker(s)/annotation(s) are required. N/A
52. Is the exposure within the appropriate EI range? 550 ideal range
- Identify the correct technique. 70kVp 1.25mAs
 - If not within the appropriate EI range, explain specifically how to adjust the technical factors to bring the EI into range. N/A
53. Are there any artifacts present on the image? no
- If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient necessary. N/A
54. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? Not acceptable repeat only the elbow joint
- State the reasons this image will require the patient to have a second exposure.- the elbow is not in plane with the shoulder causing the epicondyles to superimpose the olecranon process

55. Select **ONE** of the following pathologies that are identified below to research and answer the following questions. Then insert an image which best demonstrates the selected pathology into the Case Study PowerPoint.

- Barton Fracture
- Collee's Fracture
- Smith (Reverse Collies) Fracture
- Monteggia Fracture
- Hutchinson (Chauffeur) Fracture
- Fat Pad Sign
- Bursitis

- Define the pathology. A monteggia fracture is a transverse fracture at the proximal end of the ulna. Along with the break, the radius head can become dislocated. This is caused by a blow to the medial side of the forearm by self-defense, It can also happen because of a fall.
- Identify if the pathology is subtractive, additive or neither. A monteggia fracture is neither additive of subtractive
 - Explain if the technique would need be modified. N/A
- Identify symptoms that a patient would have with this pathology. A person with a monteggia fracture may experience swelling around the elbow joint, along with the ulna looking deformed. This break is very painful and the person will have extreme pain when flexing or extending the elbow joint. This can cause muscle and tendons to tare then causing pressure. This pressure can then strangle and kill the local tissue that is surrounding the brake
- Identify the type of imaging that is obtained for best visualization of this pathology.- the best image to take is a lateral elbow, the patient may also be able to do the special view of AP partial flexion

- i. State if there are any other additional non-radiographic studies associated with diagnosis of this pathology- diagnostic x-ray is best for this fracture