Reading Hospital School of Health Sciences

Medical Imaging Program

Clinical Case Study- Sacrum, Coccyx & SI Joints

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Due Date: 10/12/2020

Each student will be assigned clinical a seminar case study for each procedure taught within the semester. The case study will allow the student to practice their knowledge of image critique, anatomical structure identification and pathology identification. Students will submit answers to the below questions for each projection within the case study. Completed answers to the questions below and the pathology and anatomical structure labeling within the PowerPoint must be uploaded into the Edvance 360 dropbox.

Answer #1-#9 for each assigned projection

AP AXIAL SACRUM

1. Is orientation of the image correct? Yes, we orient these images as if the patient is looking at us, so their right side will be on our left when we look at the image.
    a. If orientation is incorrect, explain why. N/A
    b. State how to modify the orientation. N/A
2. Is all necessary anatomy included? Yes
    a. Explain the anatomy required by evaluation criteria. Sacrum in its entirety.
    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. Identify the correct location for centering. This image is centered with a 15 degree cephalic angle 2 inches superior to pubic symphysis and down the MSP.
    b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. This image is off centered on the MSP to the patients left side, and a little more superior than 2 inches from pubic symphysis, but all anatomy is on the image, so I would not repeat for this centering.
4. Is the body part positioned accurately? Yes
    a. If the body part is not positioned accurately: N/A
        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
5. Is the collimation and IR orientation as required? Yes
    a. State the proper collimation size to be used. 10x12
    b. State how the IR should be oriented to the patient. 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, the right marker is marking the patients right side.
    b. State if any additional marker(s)/annotation(s) are required. N/A
7. Is the exposure within the appropriate EI range? Yes, close to overexposure, but acceptable
    a. Identify the correct technique. 90 kvp @ center cell for AEC, or 14 mAs for non AEC
    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? No
    a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient. N/A
9. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? ACCEPTABLE
    a. State the reasons this image will require the patient to have a second exposure. Could be better centered, but all anatomy is on and is positioned appropriately.

AP AXIAL COCCYX

1. Is orientation of the image correct? Yes, we orient these images as if the patient is looking at us, so their right side will be on our left when we look at the image.
    a. If orientation is incorrect, explain why. N/A
    b. State how to modify the orientation. N/A
2. Is all necessary anatomy included? Yes
    a. Explain the anatomy required by evaluation criteria. Coccygeal segments seen in entirety without superimposition of the pubic bone.
    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. Identify the correct location for centering. This image should be centered using a 10 degree caudal angle 2 inches superior to the pubic symphysis.
    b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. This images centering is appropriate, but it could have been centered slightly more inferiorly and medially (To the right) to be better centered over the coccyx.
4. 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
5. Is the collimation and IR orientation as required? No, this collimation looks too open, they should have increased collimation.
    a. State the proper collimation size to be used. 6x8
    b. State how the IR should be oriented to the patient. 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, the right marker was placed on the patients right side.
    b. State if any additional marker(s)/annotation(s) are required. No
7. Is the exposure within the appropriate EI range? No
    a. Identify the correct technique. 85 kVp @ center cell for AEC or 14 mAs if non AEC
    b. If not within the appropriate EI range, explain specifically how to adjust the technical factors to bring the EI into range. To bring this image into range you would half your mAs if it was a fixed technique or decrease your density by 2 if AEC to bring this image into an appropriate range.
8. 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. N/A
9. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? ACCEPTABLE
    a. State the reasons this image will require the patient to have a second exposure. I would not repeat this image, but if there was a reason to repeat I would adjust my mAs or density to bring EI into range, but due to it being overexposed I would not repeat for that. The centering and collimation could also be adjusted, but overall this image is acceptable.

LATERAL SACRUM

1. Is orientation of the image correct? Yes, we use the left marker and place it anteriorly, and we have the sacrum on the left side of the image.
    a. If orientation is incorrect, explain why. N/A
    b. State how to modify the orientation. N/A
2. Is all necessary anatomy included? Yes
    a. Explain the anatomy required by evaluation criteria. Entire sacrum with no rotation which is indicated by closely superimposed posterior margins of the ilia and ischium.
    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. Identify the correct location for centering. This image should be centered at the level of elevated ASIS and 3 1/2 inches posterior from that elevated ASIS.
    b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. Centering could be moved slightly inferior and posteriorly, but it is appropriate where it is.
4. 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
5. Is the collimation and IR orientation as required? Yes
    a. State the proper collimation size to be used. 10x12
    b. State how the IR should be oriented to the patient. 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, the left marker should be used and should be placed anteriorly.
    b. State if any additional marker(s)/annotation(s) are required. N/A
7. Is the exposure within the appropriate EI range? Yes
    a. Identify the correct technique. 96 kVp @ Center cell AEC or 45 mAs for non AEC
    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? No
    a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient. N/A
9. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? ACCEPTABLE

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

LATERAL COCCYX

1. Is orientation of the image correct? Yes, the marker is on the anterior portion of the patient and it is the left marker, and the coccyx is facing the left side of the image.
    a. If orientation is incorrect, explain why. N/A
    b. State how to modify the orientation. N/A
2. Is all necessary anatomy included? Yes
    a. Explain the anatomy required by evaluation criteria. Entire coccyx with closely superimposed posterior margins of the ischia and ilia.
    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. Identify the correct location for centering. This image should be centered 3 1/2 inches posterior to the elevated ASIS and then 2 inches inferior from the point.
    b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. This image is appropriate, but it could be centered slightly more posteriorly and inferiorly, but it is acceptable.
4. 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
5. Is the collimation and IR orientation as required? No
    a. State the proper collimation size to be used. This image should be a 6x8, they should have increased collimation
    b. State how the IR should be oriented to the patient. 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, the left marker is placed anteriorly. It is very white and hard to see, but it is on this image.
    b. State if any additional marker(s)/annotation(s) are required. N/A.
7. Is the exposure within the appropriate EI range? Yes, just barely. This image is close to being underexposed.
    a. Identify the correct technique. 85 kVp @ center cell AEC or 40 mAs for non AEC
    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? No
    a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient. N/A
9. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? ACCEPTABLE
    a. State the reasons this image will require the patient to have a second exposure. N/A

AP AXIAL SI JOINTS

1. Is orientation of the image correct? Yes, the right marker was used on the patients right side, and their right side should be on our left when looking at the image.
    a. If orientation is incorrect, explain why. N/A
    b. State how to modify the orientation. N/A
2. Is all necessary anatomy included? Yes.
    a. Explain the anatomy required by evaluation criteria. Lumbosacral junction and sacrum and both SI joints
    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. Identify the correct location for centering. This image is centered using a 30 degree cephalic angle for males and a 35 degree cephalic angle for females 1.5 inches superior to pubic symphysis.
    b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. N/A
4. 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
5. Is the collimation and IR orientation as required? No
    a. State the proper collimation size to be used. This should be 12x10, this image needs increased collimation
    b. State how the IR should be oriented to the patient. landscape
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, the right marker was placed on the patients right side.
    b. State if any additional marker(s)/annotation(s) are required. N/A
7. Is the exposure within the appropriate EI range? Yes
    a. Identify the correct technique. 90 kVp @ center cell, or 14 mAs if non AEC
    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? No
    a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient. N/A
9. Overall, is this image ACCEPTABLE or NOT ACCEPTABLE? ACCEPTABLE
    a. State the reasons this image will require the patient to have a second exposure. This image should not be repeated because positioning, angle, and EI are appropriate, but this image could have used increased collimation because this image was opened to a pelvis collimation. Overall, this image is acceptable.

RPO SI JOINTS (LEFT)

1. Is orientation of the image correct? Yes, the left side is marked and is on our right side when looking at the image.
    a. If orientation is incorrect, explain why. N/A
    b. State how to modify the orientation. N/A
2. Is all necessary anatomy included? Yes
    a. Explain the anatomy required by evaluation criteria. Open elevated SI 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? No
    a. Identify the correct location for centering. This image should be centered 1 inch medial from the elevated ASIS
    b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. This image should be centered more laterally. This image is centered more on the MSP.
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). This image demonstrates over rotation
        ii. State the modification of positioning necessary to meet evaluation criteria. This patients obliquity should be decreased by bringing their left side closer to the table at the recommended 25-30 degree oblique to ensure the joint space is opened.
5. Is the collimation and IR orientation as required? No
    a. State the proper collimation size to be used. 6x10
    b. State how the IR should be oriented to the patient. 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, the left marker should be used and placed laterally. We mark the side up for these images.
    b. State if any additional marker(s)/annotation(s) are required. N/A
7. Is the exposure within the appropriate EI range? Yes
    a. Identify the correct technique. 90 kVp @ center cell for AEC, or 16 mAs for non AEC
    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? No
    a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient. 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. This image should be repeated by decreasing the patients angle on the table, and by centering one Inch medial from the elevated ASIS, and the collimation should be increased to the recommended 6x10.

LPO SI JOINTS (RIGHT)

1. Is orientation of the image correct? Yes, the right marker is on the patients right side and it shows up on our left when looking at the image.

a. If orientation is incorrect, explain why. N/A
b. State how to modify the orientation. N/A

2. Is all necessary anatomy included? Yes
   a. Explain the anatomy required by evaluation criteria. Opened elevated SI 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? No
   a. Identify the correct location for centering. One inch medial from the elevated ASIS
   b. If centering is incorrect, explain how you would move the central ray to achieve proper centering. This image is centered slightly too far medially. The central ray should be brought laterally (to the right) to be entering 1 inch medial of the elevated ASIS.
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). This SI joint is also over rotated.
      ii. State the modification of positioning necessary to meet evaluation criteria. This patient should have their right hip lowered. Their angle from the table is too steep which is causing the SI joint to be closed.
5. Is the collimation and IR orientation as required? No
   a. State the proper collimation size to be used. 6x10
   b. State how the IR should be oriented to the patient. 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. The right marker is used on the elevated side and is placed laterally.
   b. State if any additional marker(s)/annotation(s) are required. N/A
7. Is the exposure within the appropriate EI range? Yes
   a. Identify the correct technique. 90 kVp @ center cell AEC, or 16 mAs for non AEC
   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? No
   a. If an artifact is present, list which artifact(s) would make the image not acceptable and an additional exposure to the patient. 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. This image should be repeated by moving the centering laterally (to the right) to be that 1 inch medial from elevated ASIS, the collimation should be increased to 6x10, and the patients obliquity should be decreased to be at a good 25-30 degree oblique to ensure the SI joint is open.

ANKYLOSING SPONDYLITIS

10. Select **ONE** of the following pathologies from the section below to research and answer the following questions. Then insert an image which best demonstrates the selected pathology into the Case Study PowerPoint.
    a. Define the pathology. Inflammatory arthritis affecting the spine and large joints.

b. Identify if the pathology is subtractive, additive or neither. Can be additive, but no need to change technique
    i. Explain if the technique would need be modified. Increase in mAs if there is noticeable extra bone growth.
c. Identify symptoms that a patient would have with this pathology. Pain in the ankles, eyes, heels, hips, lower back, middle back, neck or shoulders.
d. Identify the type of imaging that is obtained for best visualization of this pathology. X-ray
    i. State if there are any other additional non-radiographic studies associated with diagnosis of this pathology X-ray is best for detection, diagnosis, and follow ups for patients with this pathology, but CT is also used to evaluate sacroiliitis, and MRI is used to access early cartilage abnormalities and bone marrow edema.