Section Objectives Cervical Spine Series
At the conclusion of this course, the student doctor should;
1. be able to efficiently conduct all parts of a 3, 5, or 7 view cervical spine series and ancillary views including determining the cassette size and orientation, setting of technical factors, patient positioning, placement of the filters/shields, and giving patient instructions.
2. be able to identify the significant anatomy demonstrated on each view of each series.

Standard Cervical Spine Series

### 3 View cervical series
- A-P lower cervical
- A-P open mouth
- Neutral lateral

### 5 View cervical series
- A-P lower cervical
- A-P open mouth
- Neutral lateral
- R & L obliques (both posterior)

### 7 View cervical (Davis) series
- A-P lower cervical
- A-P open mouth
- Neutral lateral
- R & L obliques (both posterior)
- Flexion/extension laterals

Optional Cervical Spine views
- Swimmer’s lateral
- R & L pillar views

Organizing the Series
Make the series flow with least motion and most time efficiency
I perform 40” views first and 72” views last
- 40”: A PLC, A POM
- 72”(Nb): neutral lateral, R & L obliques, flex/ ext

Special considerations
- Trauma series
  - Perform neutral lateral first and check it
  - A PLC 2nd, A POM 3rd and check each
  - Then obliques and finally flex/ ext
  - If any fractures, refer
A-P Lower Cervical

PREPARE THE ROOM
Cassette: black; 8” X 10”; lengthwise (tall) (flash up and away from lung apices)
  - If patient measures < 12 cm, don’t use grid (nonbucky)
Tube: 40” FFD, 15 ° tube tilt (varies according to pt)
Technique: 70 kVp, small focal spot
Measure: through central ray at appropriate angle
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
  - patient is fully gowned with no jewelry, hairpins, glasses, etc.
  - can be seated or standing (less motion if seated)
  - have the pt extend the neck so that the mandible and the EOP are parallel to the floor
filters/shields: gonad shield (1/2 apron)
CR: aim at C6 (bottom of thyroid cartilage) and center film to the CR (note the angle!)
Coll: open to full cassette vertically, side-to-side to soft tissue (include lung apices)
Marker: either side

EXPOSE
Patient directions: “Hold still, don’t move”
A-P Lower Cervical: EVALUATION CRITERIA
  - C3 to T1 should be clearly seen
  - no rotation, spinous processes should be equidistant from spinal borders
  - intervertebral disc angles should be open indicating correct central ray angle
  - optimum exposure should demonstrate both bone and soft tissue density
AP Open Mouth

PREPARE THE ROOM
Cassette: black; 8” X 10”; crosswise (wide) (flash up)
- If patient measures < 12 cm, don’t use grid (nonbucky)
Tube: 40” FFD, no tube tilt
Technique: 70 kVp, small focal spot
Measure: use APLC measurement + 3 cm
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with no jewelry, hairpins, etc.
- can be seated or standing (less motion if seated)
- patient’s head is slightly extended so that the bottom of the top teeth are level with the EOP
- hold the patient’s head so that they don’t flex/extend and ask them to open their mouth wide by dropping their lower jaw
- center the cassette to the central ray
CR: should pass just below the top teeth in midline
Coll: to the acanthion and mental symphysis vertically, laterally to the mastoid processes
Marker: R or L

EXPOSE
Patient directions: “Hold still, don’t move.”

AP Open Mouth: EVALUATION CRITERIA
- the atlas and axis must be clearly seen through the open mouth
- C1/2 zygapophyseal joints should be clearly demonstrated
- optimal position is achieved if the base of the occiput and bottom of the incisors are superimposed
- optimum exposure should demonstrate both bone and soft tissue density
Neutral Lateral Cervical

PREPARE THE ROOM
Cassette: black; 8” X 10”; lengthwise (tall) (flash down)
  • If patient measures < 12 cm, don’t use grid (nonbucky)
Tube: 72” FFD, no tube tilt
Technique: 70 kVp, small focal spot
Measure: across the trapezius muscle at the base of the neck
F/ S: gonad shield (1/ 2 apron)

PREPARE THE PATIENT
Position:
  • patient is fully gowned with no jewelry, hairpins, etc.
  • can be seated or standing (less motion if seated)
  • assure a true lateral position with no rotation of pelvis, shoulders, or head
  • pt is seated or standing “with good posture”, left shoulder touching bucky (if used), and eyes directly forward
  • have patient relax shoulders and drop them as far as possible (do just before exposure b/c difficult to maintain)
CR: through C4 with film centered to this
Coll: laterally to soft tissues and to film size vertically
Marker: L

EXPOSE
Patient directions: “Take a breath in, now blow it out and hold still, don’t move!”
  • suspended expiration helps keep shoulders depressed
Neutral Lateral Cervical: EVALUATION CRITERIA
  • C1 through C7 should be entirely visualized (if C7 is not seen, must add swimmer’s view to series)
  • mandibular rami should be superimposed over each other but not over upper cervicals
  • optimum exposure should demonstrate soft tissue including margins of the air column, as well as proper bone density of the entire cervical vertebrae
Radiographic Positioning of the Cervical Spine

R or L Posterior Oblique

PREPARE THE ROOM
Cassette: black; 8” X 10”; lengthwise (tall) (flash down)
  • If patient measures <12 cm, don’t use grid (nonbucky)
Tube: 72” FFD, 15° cephalad tube tilt
Technique: 70 kVp, small focal spot
Measure: obliquely across the trapezius muscle at the base of the neck
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
  • patient is fully gowned with no jewelry, hairpins, etc.
  • erect position (preferred) or recumbent if required
  • center spine to midline of table or bucky
  • patient is angled at 45° with appropriate shoulder touching bucky
  • head is turned to be parallel with the film
CR: at C4 and center cassette to CR (remember tube tilt!)
Coll: laterally to soft tissues and to film size vertically
Marker:
  • RPO or LPO are ideal markers
  • R or L placed on appropriate side (will appear on film to be ahead of spine)

EXPOSE
Patient directions: “Take a breath in, now blow it out and hold still, don’t move!”

EVALUATION CRITERIA
  • C1 through C7 should be clearly visualized with open intervertebral spaces
    and open intervertebral disc spaces
  • rami of mandible should not superimpose upper cervical vertebrae
  • base of skull should not superimpose C1
  • cervical pedicles should be seen
  • RPO shows left pedicles and IVF, LPO shows right pedicles and IVF
  • optimum exposure should demonstrate soft tissue including margins of the
    air column, as well as proper bone density of the entire cervical vertebrae
Cervical Flexion Lateral

PREPARE THE ROOM
Cassette: black; 8” X 10”; crosswise (wide) (flash up)
  • If patient measures < 12 cm, don’t use grid (nonbucky)
Tube: 72” FFD, no tube tilt
Technique: 70 kVp, small focal spot
Measure: same as for neutral lateral cervical
F/S: gonad (1/ 2 apron)

PREPARE THE PATIENT
Position:
  • patient is fully gowned with no jewelry, hairpins, etc.
  • begin with patient in same position as for neutral lateral
  • give directions to “tuck in chin and then look to floor”
  • NEVER push them further
  • put them in position just before making exposure, this position is uncomfortable!
CR: at C4
Coll: laterally to behind eyes and including all of spine, to edge of film vertically
Marker: L

EXPOSE
Patient directions: “Take a breath in, now blow it out and hold still, don’t move!”

EVALUATION CRITERIA
  • C1 through C7 should be clearly visualized
  • mandibular rami should be superimposed over each other but not over upper cervical
  • optimum exposure should demonstrate soft tissue including margins of the air column, as well as proper bone density of the entire cervical vertebrae
Cervical Extension Lateral

PREPARE THE ROOM
Cassette: black; 8’’ X 10’’; lengthwise (tall)(flash down)
  • If patient measures < 12 cm, don’t use grid (nonbucky)
Tube: 72” FFD, no tube tilt
Technique: 70 kVp, small focal spot
Measure: same as for neutral lateral cervical
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
  • patient is fully gowned with no jewelry, hairpins, etc.
  • begin with patient in same position as for neutral lateral
  • give directions to “look to ceiling as far as comfortable”
  • NEVER push them further
  • put them in position just before making exposure, this position could cause vascular compromise!
CR: to C4
Coll: to soft tissues laterally and film vertically
Marker: L

EXPOSE
Patient directions: “Take a breath in, now blow it out and hold still, don’t move!”

EVALUATION CRITERIA
• mandibular rami should be superimposed over each other but not over upper cervical
• optimum exposure should demonstrate soft tissue including margins of the air column, as well as proper bone density of the entire cervical vertebrae
Swimmer’s Lateral

PREPARE THE ROOM
Cassette: black; 8” X 10”; lengthwise (tall) (flash down)
Tube: 40” FFD, 5° caudad tube tilt
Technique: 90 kVp, large focal spot (like for L/S)
Measure: from R SCM to L axilla
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with no jewelry, hairpins, watches, etc.
keeping head parallel to the film, slightly twist shoulders so that L arm reaches forward
and right arm grasps posterior thigh and pulls shoulder inferior
- set the cassette
CR: aim at C7 (vertebra prominens). The film is centered to the CR
Coll: to film size
Marker: L

EXPOSE
Patient directions: “Take a breath in, now blow it out and hold still, don’t
move!”

EVALUATION CRITERIA
- vertebral rotation should appear to be minimal
- C4 to T3 should be seen in outline
- humeral heads should be separated vertically
- the magnified humeral head (which was furthest from film) should appear
distal to T4/ T5
R or L Pillar Views

PREPARE THE ROOM
Cassette: black; 8” X 10”; lengthwise (tall) (flash down)
Tube: 40” FFD, 45 ° caudad tube tilt
Technique: 70 kVp, small focal spot
Measure: through central ray
F/ S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with no jewelry, hairpins, etc.
- pt supine; slightly extend and rotate head 45 ° to both sides
- put them in position just before making exposure, this position could cause vascular compromise!
CR: through C3/4. The film is centered to the CR
Coll: laterally to soft tissues and full vertical
Marker: appropriate R or L marking the contralateral side of rotation

EXPOSE
Patient directions: “Hold still, don’t move.”

EVALUATION CRITERIA
- all facet joints from C1 through T1 should be visualized
- optimum exposure should demonstrate both bone and soft tissue density
Section Objectives
At the conclusion of this course, the student doctor should:
1. be able to efficiently conduct all parts of a thoracic spine series, chest series, rib series and ancillary views including determining the cassette size and orientation, setting of technical factors, patient positioning, placement of the filters/shields and giving patient instructions.
2. be able to identify the significant anatomy demonstrated on each view of each series.

Standard Thoracic Spine, Chest, and Rib Series

<table>
<thead>
<tr>
<th>Thoracic Spine series (3 views)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A-P thoracic</td>
</tr>
<tr>
<td>• lateral thoracic</td>
</tr>
<tr>
<td>• P-A chest</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chest series (2 views)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• P-A chest</td>
</tr>
<tr>
<td>• lateral chest</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rib series (5 views)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A-P</td>
</tr>
<tr>
<td>• 30°, 60° oblique</td>
</tr>
<tr>
<td>• below diaphragm view</td>
</tr>
<tr>
<td>• P-A expiratory chest</td>
</tr>
</tbody>
</table>

Optional Thoracic Spine, Chest, and Rib Series
• apical lordotic chest view
• Swimmer’s Lateral if C7/ T1 junction is not seen
A-P Thoracic

PREPARE THE ROOM  
Cassette: black; 14" X 17"; lengthwise (tall) (flash up)  
Tube: 72" FFD, no tube tilt  
Technique: 80 kVp, large focal spot  
Measure: slide calipers over shoulder to rest on sternum at about level of T6  
F/S:  
  • A-P thoracic on upper 1/3  
  • breast shields if nonscoliotic  
  • gonad (1/2 apron)  

PREPARE THE PATIENT  
Position:  
  • patient is fully gowned with no jewelry, hairpins, bra, etc.  
  • patient is standing facing the x-ray tube with the midsagittal plane centered to the central ray  
CR: the film should be placed about 1" above vertebra prominens and the central ray is centered to this  
Coll: open to full cassette vertically, side-to-side to midclavicular line  
Marker: R or L  
F/S: place AP thoracic on upper 1/3 of film, breast shields to midclavicular line and ½ apron as gonad shield  

EXPOSE  
Patient directions: “Take a breath in, hold it, now don’t move!”  
zzzzzzaaaaapppppp!EVALUATION CRITERIA  
  • the spinal column from C7 to T12 should be seen centered in the midline of the film  
  • good collimation will include side collimation borders medial to female breast shadows  
  • sternoclavicular joints should be seen equidistant from the spine indicating no rotation  
  • optimum exposure including the use of a wedge filter in addition to the correct use of the anode-heel effect should clearly visualize the lower thoracic vertebral body margins and intervertebral joint spaces without overexposing the upper thoracic vertebrae.
Lateral Thoracic

PREPARE THE ROOM
Cassette: black; 14" X 17"; lengthwise (tall) (flash up)
Tube: 72" FFD, no tube tilt
Technique: 80 kVp, small focal spot
  • small mA is required to make time greater than 1.0 second, this blurs the ribs
Measure: from latissimus dorsi bilaterally through central ray
F/S:
  • lateral thoracic filter for bottom ½ of film
  • breast shield in front and back of patient
  • gonad (½ apron)

PREPARE THE PATIENT
Position:
  • patient is fully gowned with no jewelry, hairpins, etc.
  • patient is in lateral position with mid-coronal plane centered to the bucky
  • if patient has thoracic curve, place convexity to film, otherwise use L lateral
  • have patient place arms on top of the head
CR: the film should be placed about 1" above vertebra prominens and the central ray is centered to this
Coll: open to full cassette vertically and laterally to 2" on either side of the spine.
Marker: L (usually)

EXPOSE
Patient directions: “Take a deep breath in, now slowly blow it out!”
  • precise timing is required as we take the exposure while the patient is exhaling

EVALUATION CRITERIA
  • the spinal column from C7 to T1 should be seen centered in the midline of the film
  • for most patients, the upper vertebra will be underexposed due to superimposition of the shoulders
  • intervertebral disc spaces should be open
  • vertebral bodies should be in lateral profile without rotation as indicated by superimposed posterior ribs
  • optimum exposure should demonstrate the lower two-thirds of the thoracic spine with blurring of the ribs and lung markings
PREPARE THE ROOM
Cassette: InSight; 14” X 17’;
   • lengthwise (tall) (flash up) for females, crosswise (wide) (flash up) for males
Tube: 72” FFD, no tube tilt
Technique: 110 kVp, small focal spot
Measure: slide calipers over shoulder to rest on sternum at about level of T6
F/S: gonad (1/2 apron)

THE IN SIGHT CASSETTE
the front and back screens are different; the front screen is designed to see the
lungs, the rear screen is designed to see the mediastinum, retrocardiac and
subdiaphragmatic areas
the film is specialty film identified by a double notch in one corner
   • front screen identifies where the notches fit into the cassette
   • if reversed, it makes a lousy radiograph
   • 350 cumulative ASA

PREPARE THE PATIENT
Position:
   • patient is fully gowned with no jewelry, etc.
   • patient is standing, facing the film with hands on waist, head extended
     (preferred) or head turned to right
   • if female, have her pull breasts laterally and then get as close as possible to
     bucky, then put hands on waist
   • patient should roll the shoulders forward to move the scapula laterally and
     out of the way
CR: at T7 and center the cassette to this
Coll: to full chest size vertically and laterally
Marker: R or L

EXPOSE
Patient directions: “Take a deep breath in, now blow it all the way out. Another
deep breath and hold still!”
   • Timing is crucial! You want to expose at the peak of the second inspiration.

EVAL UATION CRITERIA
   • the larynx and trachea should be filled with air and well visualized
   • there should be no rotation as evidenced by the symmetrical appearance of
     the sternoclavicular joints
   • collimation borders should appear on all sides with minimal borders on top
     and bottom
   • optimum exposure should be dark enough to visualize the air-filled trachea
     through the cervical and thoracic vertebrae
   • patient ID and R or L marker should be visible without superimposing essential anatomy
**P-A Expiratory Chest**

expiratory chest views accentuate a pneumothorax (if present) by decreasing the intrathoracic pressure
technique is identical to usual P-A chest except expose on expiration instead of 2nd deep inspiration
Lateral Chest

PREPARE THE ROOM
Cassette: black; 14” X 17” InSight; lengthwise (tall) (flash up)
Tube: 72” FFD, no tube tilt
Technique: 115 kVp, small focal spot
Measure: through central ray at appropriate angle
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with no jewelry, hairpins, glasses, etc.
- standing with left side against film (heart closest to film) and weight evenly distributed on both feet
- raise arms and place on top of head and keep chin up
CR: the top of the film should be 1” above shoulders with CR perpendicular to, and at level of, T7
Coll: open to full cassette vertically, side-to-side to soft tissue
Marker: L

EXPOSE
Patient directions: “Take a deep breath in, now blow it all the way out. Another deep breath and hold still!”
- Timing is crucial! You want to expose at the peak of the second inspiration.

EVALUATION CRITERIA
- no rotation, ribs posterior to vertebral column should be directly superimposed; costophrenic angles should be aligned and superimposed
- chin and arms should be elevated sufficiently to prevent excessive soft tissues from superimposing apices
- image should include lung apices at the top and costophrenic angles on the lower margin of the film
- collimation margins should appear on all four sides with T7 in center of film
- NO MOTION, should be evidenced by sharp outlines of the diaphragm and lung markings
- optimum exposure should demonstrate lung markings through the heart shadow and upper lung areas, without overexposing other regions of the lungs
A-P Lordotic Chest

PREPARE THE ROOM
Cassette: InSight; 14" X 17"
Tube: 72" FFD, no tube tilt
Technique: 110 kVp, small focal spot
Measure: use same measurement as for P-A chest
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with no jewelry, hairpins, glasses, etc.
- have patient stand about one foot in front of the bucky and lean back with shoulders, neck and back of head against the bucky
- rest both hands on hips, palms out; roll shoulders forward
CR: perpendicular to film, centered to mid-sternum (3-4" below jugular notch) with the cassette about 3-4" above the shoulders
Coll: collimate to include the area of interest
Marker: R or L

EXPOSE
Patient directions: “Take a deep breath in, now blow it all the way out. Another deep breath and hold still!!”

EVALUATION CRITERIA
- clavicles should appear nearly horizontal and above or superior to apices
- no rotation, sternal ends of the clavicles should be the same distance from vertebral column on each side. The lateral borders of the ribs on both sides should be near equidistant from the vertebral column
- center of collimation field should be mid-sternum with more collimation visible on the bottom
- the ribs should appear distorted with the posterior portion nearly horizontal
- no motion, diaphragm, heart and rib outlines should appear sharp
A-P Rib

PREPARE THE ROOM
Cassette: black; 14” X 17”; lengthwise (tall) (flash down)
Tube: 40” FFD, no tube tilt
Technique: 70 kVp, small focal spot
Measure: through central ray
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
  patient is fully gowned with no jewelry, hairpins, glasses, etc.
  • standing (preferred) or supine with midclavicular line in center of bucky
  • roll shoulders forward to remove scapulae from lung fields
  • raise chin and looking straight ahead
CR: to T7 (3-4” below jugular notch) at approximately midclavicular line. Center cassette to CR
Coll: to outer margins of the thorax. We should see entire vertebral body and outer margins of ribs
Marker: R or L

EXPOSE
Patient directions: “Take a deep breath in, hold still, don’t move!”

EVALUATION CRITERIA
  • the first through eighth or ninth rib should be seen above the diaphragm
  • no motion is seen on the radiograph
  • no rotation of the thorax is evident
  • optimum exposure should visualize ribs through the heart shadow without overexposing mid-posterior ribs through the lung fields
30°, 60° Oblique Rib

PREPARE THE ROOM
Cassette: black; 14” X 17”; lengthwise (tall) (flash down)
Tube: 40” FFD, no tube tilt
Technique: 70 kVp, small focal spot
Measure: through central ray at appropriate angle
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with no jewelry, hairpins, glasses, etc.
- standing (preferred) or supine with patient rotated into oblique position at appropriate angle
  - injury to right anterior ribs perform LAO views
  - injury to right posterior ribs perform RPO views
  - injury to left anterior ribs perform RAO views
  - injury to left posterior ribs perform LPO views
- raise the elevated side’s arm above the head with other arm down & out of beam

CR: with top of cassette about 1.5” above shoulders, CR to T7 and about halfway between spine and lateral margin of affected side
Coll: to outer margins of the thorax. We should see entire vertebral body and outer margins of ribs
Marker: R or L

EXPOSE
Patient directions: “Take a deep breath in, hold still, don’t move!”

EVALUATION CRITERIA
- the first through eighth or ninth rib should be seen above the diaphragm
- no motion is seen on the radiograph
- optimum exposure should visualize ribs through the heart shadow without overexposing mid-posterior ribs through the lung fields
Below Diaphragm Rib

PREPARE THE ROOM
Cassette: black; 10” X 12”; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 80 kVp, small focal spot
Measure: through central ray
F/S: gonad (1/2 apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with no jewelry, hairpins, glasses, etc.
- supine with midclavicular line centered on table
CR: midway between xiphoid and lower rib cage in midclavicular line. Center the cassette to the CR.
Coll: to cassette size with four sides of collimation
Marker: R or L

EXPOSE
Patient directions: “Take a breath in. Now blow it out and hold still, don’t move”

EVALUATION CRITERIA
- the eighth through twelfth ribs and vertebra should be clearly seen
- no motion is seen on the radiograph
- no rotation of the thorax is evident
- optimum exposure should visualize ribs through the liver/visceral shadow
Radiographic Positioning of the Lumbar Spine and Abdomen

Section Objectives
At the conclusion of this course, the student doctor should;
1. be able to efficiently conduct all parts of a 3 view L/S, 5 view L/S or abdominal series and ancillary views including determining the cassette size and orientation, setting of technical factors, patient positioning, placement of the filters/shields, and giving patient instructions.
2. be able to identify the significant anatomy demonstrated on each view of each series.

Standard Lumbar Spine and Abdomen Series

3 view lumbar series
- A-P lumbar
- lateral lumbar
- A-P L5/S1 spot shot (Ferguson’s view)

5 view lumbar series
- A-P lumbar
- lateral lumbar
- A-P L5/S1 spot shot (Ferguson’s view)
- R and L posterior obliques

7 view (Spondylolisthesis) lumbar series
- A-P lumbar
- lateral lumbar
- A-P L5/S1 spot shot (Ferguson’s view)
- R and L posterior obliques
- Traction/Compression Lateral lumbar

Abdominal Series (1 view)
- Kidney, Ureter, Bladder (KUB)

Acute Abdomen Series (3 views)
- KUB (supine)
- KUB (erect)
- P-A Chest

Optional Lumbar Spine and Abdomen views
- lateral L5/S1 spot shot
- traction/compression views

Ten Day Rule
Only perform nonessential direct radiography of the pelvic bowl in the 10 days following the onset of menses.
Have patient sign permission slip stating that she is within this time AND that she is not pregnant.
If she is outside of the 10 days, you may wish to use a pregnancy test. Be aware, however, these are NOT 100% sensitive.

Radiographic Positioning of the Lumbar Spine and Abdomen

A-P Lumbar

PREPARE THE ROOM
Cassette: black; 14” X 17”; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 80 kVp, large focal spot
Measure: through central ray
F/S: gonad
- female - use Cu heart
- male - use Pb triangle

PREPARE THE PATIENT
An enema will significantly improve visualization in the pelvic bowl. It should be administered immediately before the radiographic exam.

Position:
- patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
- standing (preferred) or recumbent (especially if large) with midsagittal plane centered to bucky
- standing comfortably with weight evenly distributed on both feet
- arms hanging comfortably at sides

CR: 1” superior to iliac crests in midline
Coll: open to full cassette vertically, side-to-side to include TP’s (about to the edge of the cross)
Marker: R or L
F/S: female - place Cu heart directly above pubic symphysis
male - place Pb triangle directly below pubic symphysis

EXPOSE
Patient directions: “Take a deep breath in, blow it all the way out and hold still don’t move!”
- expose on suspended expiration

EVALUATION CRITERIA
- T11 through the sacrum should be clearly seen
- SI joints should be equidistant from spine, spinous processes should be in midline of vertebral body and R and L transverse processes should be about equal in length, all indicating no rotation
- the lateral margin should include the psoas muscle shadow
- optimum exposure should demonstrate both bone and soft tissue density
- patient identification and R/ L marker should be clearly visible without blocking anatomy
Lateral Lumbar

PREPARE THE ROOM
Cassette: black; 14” X 17”; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 90 kVp, large focal spot
Measure: widest part of hips
F/S: gonad: Nolan system: use sacral shield at level of ASIS

PREPARE THE PATIENT
If this exam is planned ahead of time, an enema will significantly improve visualization
Position:
• patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
• standing (preferred) or recumbent (especially if large) with midcoronal plane centered to bucky and left side closest to film (unless scoliotic, then convexity to film side)
• standing comfortably with weight evenly distributed on both feet
• arms folded on chest
CR: 1” superior to iliac crests in coronal plane. Middle of film should be approximately through the greater trochanter of the femur
Coll: open to full cassette vertically, front-to-back to include SP’s
Marker: L (or R)
F/S: gonad
• for both male and female use sacral filter/shield at level of ASIS

EXPOSE
Patient directions: “Take a deep breath in, blow it all the way out and hold still don’t move!”
• expose on suspended expiration

EVALUATION CRITERIA
• T11 through the sacrum should be clearly seen in lateral profile and centered to the film
• the lumbar intervertebral foramina should be visualized
• optimum exposure should demonstrate both cortical and trabecular bone densities of the vertebral bodies and the lumbar spinous processes
• patient identification and L marker should be clearly visible without blocking anatomy
**Ferguson’s A-P L5/S1 Spot Shot**

**PREPARE THE ROOM**

**Cassette:** black; 10" X 12"; crosswise (wide) (flash up)

**Tube:** 40" FFD, 35° tube tilt (approx.)

- to be precise, measure the actual angle on the lateral L/S and use this
- subtract 10° if performed supine
- when the tube tilt is 20° or greater, we must move the tube 1” closer to the film for every 5° of tilt

**Technique:** 80 kVp, large focal spot

**Measure:** through central ray at appropriate angle

- approximately 2X mAs from AP lumbar

**F/S:** gonad for males, lay lead vinyl across the groin, for females, can’t use shielding

**PREPARE THE PATIENT**

**Position:**

- patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
- recumbent (preferred) or standing with midsagittal plane centered to table
- place arms at side or folded upon chest
- can place foam block under knees and pillow under head to make more comfortable

**CR:** passes 1” below the transverse plane connecting the ASIS at appropriate angle. Center the cassette to the CR

**Coll:** open to cross both vertically and laterally (approx. 6” square)

**Marker:** R or L

**EXPOSE**

**Patient directions:** “Hold still, don’t move”

- suspended respiration

**EVALUATION CRITERIA**

- L5/ S1 joint should be clearly seen and in center of exposure field and film
- SI joints should be equidistant from spine, spinous processes should be in midline of vertebral body and R and L transverse processes should be about equal in length, all indicating no rotation
- optimum exposure should demonstrate both bone and soft tissue density
- patient identification and R/ L marker should be clearly visible without blocking anatomy
R or L Posterior Oblique

PREPARE THE ROOM
Cassette: black; 11" X 14"; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 80 kVp, large focal spot
Measure: through central ray
F/S: gonad (Pb vinyl or ½ apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
- supine (preferred) or standing at 45° angle with foam block under both shoulders and pelvis
- LPO has left side closest to film and RPO has right side closest
- place arms across chest out of collimated field
CR: 1” above level of iliac crest passing through vertebral bodies (about 2” medial to ASIS)
Coll: open to full cassette vertically, side-to-side to area of interest
Marker: R or L with 2 rules to follow
- right means right and left means left
- mark the side closest to the film

EXPOSE
Patient directions: “Take a deep breath in, blow it all the way out and hold still don’t move!”

EVALUATION CRITERIA
- the spinal column from T11 to S1 should be clearly seen and in the midline of the film
- “Scotty dogs” (zygapophyseal joints of side closest to film) should be seen on all five L/ S vertebrae
- the pedicles (“eye” of the dog) should be in middle of vertebral body
- optimum exposure should demonstrate both bone and soft tissue density
- patient identification and R/ L marker should be clearly visible without blocking anatomy
L5/S1 Spot Shot Lateral

PREPARE THE ROOM
Cassette: black; 10” X 12”; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 90 kVp, large focal spot
Measure: through central ray
F/S: gonad (Pb vinyl or ½ apron)

PREPARE THE PATIENT
Position:
- patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
- recumbent (preferred) or standing with midcoronal plane centered to bucky and left side closest to film
- arms folded on chest

CR: 1” inferior to iliac crests in coronal plane. Middle of film should be approximately through the greater trochanter of the femur
Coll: open to full cassette including 4 sides of collimation
Marker: L
F/S: gonad
- for both male and female use sacral shield at level of ASIS

EXPOSE
Patient directions: “Hold still, don’t move”
- expose on suspended respiration

EVALUATION CRITERIA
- L4 through the sacrum should be clearly seen in lateral profile and centered to the film
- the lumbar intervertebral foramina should be visualized
- optimum exposure should demonstrate both cortical and trabecular bone densities of the vertebral bodies and the lumbar spinous processes
- patient identification and L marker should be clearly visible without blocking anatomy
Compression Lateral

PREPARE THE ROOM

All this is identical to L5/S1 Spot Shot Lateral Lumbar
Cassette: black; 10” X 12”; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 90 kVp, large focal spot
Measure: through central ray at appropriate angle
F/S: gonad

PREPARE THE PATIENT

Position:

- patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
- 50 pound backpack is placed on patient and patient should then walk for 5 minutes. If pain increases during time, immediately expose film
- then, stand with midcoronal plane centered to bucky and left side closest to film (unless scoliotic, then convexity to film side) still wearing pack
- standing with weight evenly distributed on both feet
- arms folded on chest

CR: 1” inferior to iliac crests in coronal plane. Middle of film should be approximately through the greater trochanter of the femur
Coll: open to full cassette vertically, front-to-back to include SP’s
Marker: L (or R)
F/S: gonad

- for both male and female use sacral shield at level of ASIS

EXPOSE

All this is identical to L5/S1 Spot Shot Lateral Lumbar
Patient directions: “Take a deep breath in, blow it all the way out and hold still don’t move!”
- expose on suspended expiration
Now remove the backpack

EVALUATION CRITERIA

- T11 through the sacrum should be clearly seen in lateral profile and centered to the film. The backpack will be seen
- the lumbar intervertebral foramina should be visualized
- optimum exposure should demonstrate both cortical and trabecular bone densities of the vertebral bodies and the lumbar spinous processes
- patient identification and L marker should be clearly visible without blocking anatomy
Traction Lateral

PREPARE THE ROOM
All this is identical to L5/S1 Spot Shot Lateral Lumbar
Cassette: black; 10” X 12”; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 90 kVp, large focal spot
Measure: through central ray at appropriate angle
F/S: gonad use sacral shield at level of ASIS

PREPARE THE PATIENT
Position:
• patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
• the patient hangs by their arms from a bar that is suspended over the top of the bucky (like trapeze)
• hang with midcoronal plane centered to bucky and left side closest to the film (unless scoliotic, then convexity side to film) Ideally, this will also take place for 5 minutes then exposing while still hanging
CR: 1” inferior to iliac crests in coronal plane. Middle of film should be approximately through the greater trochanter of the femur
Coll: open to full cassette vertically, front-to-back to include SP’s
Marker: L (or R)
F/S: gonad
• for both male and female use sacral shield at level of ASIS

EXPOSE
All this is identical to L5/S1 Spot Shot Lateral Lumbar
Patient directions: “Take a deep breath in, blow it all the way out and hold still don’t move!”
• expose on suspended expiration
Now they can stop hanging and stand up.

EVALUATION CRITERIA
• T11 through the sacrum should be clearly seen in lateral profile and centered to the film.
• the lumbar intervertebral foramina should be visualized
• optimum exposure should demonstrate both cortical and trabecular bone densities of the vertebral bodies and the lumbar spinous processes
• patient identification and L marker should be clearly visible without blocking anatomy

Traction & Compression Lateral
The translation of the spondylolisthetic segment will be compared from the traction to the compression. If it is greater than 4mm, it is unstable.
Kidney, Ureter, Bladder (KUB)

PREPARE THE ROOM
Cassette: black; 14” X 17”; lengthwise (tall) (flash up)
Tube: 40” FFD, no tube tilt
Technique: 70 kVp, large focal spot
Measure: through central ray at appropriate angle
F/S: gonad
  • Pb triangle on male
  • female usually can’t be filtered because of obscuring anatomy

PREPARE THE PATIENT
Position:
  • patient is fully gowned with bra removed, etc. (be aware of metal snaps on underwear)
  • patient is supine with knees bent and midsagittal plane centered to the table
  • if erect KUB is requested to demonstrate air-fluid levels, pt is centered to bucky like in AP lumbar
CR: level with iliac crests (if full vertical collimation will include pubic symphysis)
Coll: open to full cassette vertically, laterally to edge of soft tissues
Marker: R just above R iliac crest
F/S: gonad on male only (Pb triangle)

EXPOSE
Patient directions: “Take a deep breath in, blow it all the way out and hold still don’t move!”
  • expose on suspended expiration

EVALUATION CRITERIA
• the lower margin should include the superior portion of the arch of the symphysis pubis
• the upper abdomen should be included visualizing the upper margins of the kidneys as well as the lower portion of the dense liver and the area of the spleen
• note: a tall, asthenic person may require 2 radiographs to include both areas listed above
• no rotation: the vertebral column should be in midline and the iliac wings should be equal in size and shape
• no motion should be evidenced by sharp gas bubbles
• patient identification and R/ L marker should be clearly visible without blocking anatomy