IMAGING PROTOCOL BOOK
TRA/MULTICARE

Prepared and Submitted for final review by:

Radiologist - Lawrence Tang MD and Zubeir Jaffer MD
Imaging Quality Manager - Jeffery Perez DHA RT(R)
Imaging Supervisor – Tracy Armstrong RT(R)(CT)
Imaging Lead Tech - Sandi McInerney BS RT(R)(VI)

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TRA/MultiCare Imaging Protocol

- **Procedure Guidelines for General Radiology**
  - This manual is intended as a guideline and standard for the **General Radiology** Technologist and support staff working in any of the Multicare or TRA Radiology Departments; for or under the direction of the **TRA RADIOLOGISTS.**
- **This Manual was Instructed, Reviewed and Approved by:**
  - Douglas Seiler MD - Senior Radiologist
  - Lawrence Tang MD - MSK Radiologist
  - Zubeir Jaffer MD - Pediatric Radiologist
  - Jill Taylor - AVP Acute Imaging Services
  - Jeffrey Perez – Imaging Quality
  - Tracy Armstrong RT(R)(CT)
  - Sandi McInerney BS RT(R)(VI)

ARRT Standard of Ethics

Remember to strive to provide quality in your imaging and to always advocate for your patients. Please review the ARRT standard of ethics copied below and highlighted for emphasis.

1. The Registered Technologist acts in a professional manner, responds to patient needs and supports colleagues and associates, in providing quality care.
2. The Registered Technologist acts to advance the principal objective of the profession to provide services to humanity with full respect for the dignity of mankind.
3. The Registered Technologist delivers patient care unrestricted by concerns for personal attributes or the nature of disease or illness, and without discrimination based on race, color, creed, religion, national origin, sex, marital status, disability, sexual orientation, gender identity, veteran status or any other legally protected status.
4. The Registered Technologist practices technology founded on theoretical knowledge and concepts, uses equipment and accessories consistent with the purposes for which they were designed and employs procedures and techniques appropriately.
5. **The Registered Technologist assesses situations; exercises care, discretion, and judgement; assumes responsibility for professional decisions; and acts in the best interest of the patient.**
6. The Registered Technologist acts as an agent through observation, and communication to obtain pertinent information for the physician to aid in the diagnosis and treatment of the patient and recognizes that interpretation and diagnosis are outside the scope of practice for the profession.
7. The Registered Technologist uses equipment and accessories, employs techniques and procedures, performs services in accordance with an accepted standard of practice, and demonstrates expertise in minimizing radiation exposure to the patient, self and other members of the healthcare team.
8. The Registered Technologist practices ethical conduct appropriate to the profession and protects the patients right to quality radiologic technology care.
9. The Registered Technologist respects confidences entrusted during professional practice, respects the patient's right to privacy, and reveals confidential information only as required by law or to protect the welfare of the individual or the community.
10. The Registered Technologist continually strives to improve knowledge and skills by participating in continuing education and professional activities, sharing knowledge with colleagues, and investigating new aspects of professional practice.
11. The registered Technologist refrains from the use of illegal drugs and/or any legally controlled substances which result in impairment of professional judgement and/or ability to practice radiologic technology with reasonable skill and safety to patients.

Quality Assurance / Workflow Intelligence

The following tools are in place in the Workflow Intelligence Pacs system. To implement the standards highlighted within this approved protocol, our Radiologists, Managers and Lead Techs use these guidelines to assess and direct performance standards.

• **Positioning**	• Required anatomy all present and centered in each image • Requested views all present • Removal of all external artifacts • Motion addressed in notes or repeated • Pacs presentation as requested
• **Exposure**	• Review the Exposure Index range for over/under exposure
• **Documentation**	• Appropriate history is present including mechanism of injury with trauma
• **Labeling**	• Images are correctly marked right, left, upright or supine etc. Digitally marked images include tech initials.
• **Protocol**	• Requested protocols are followed unless documentations supports the submitted imaging
• **Collimation**	• Images are collimated to body part
• **Delayed Presentation**	• Images submitted to Radiologist in a timely manner

Table of Contents

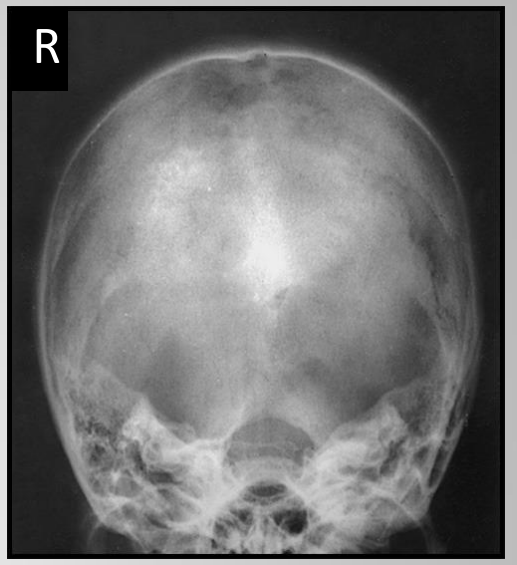
Headwork

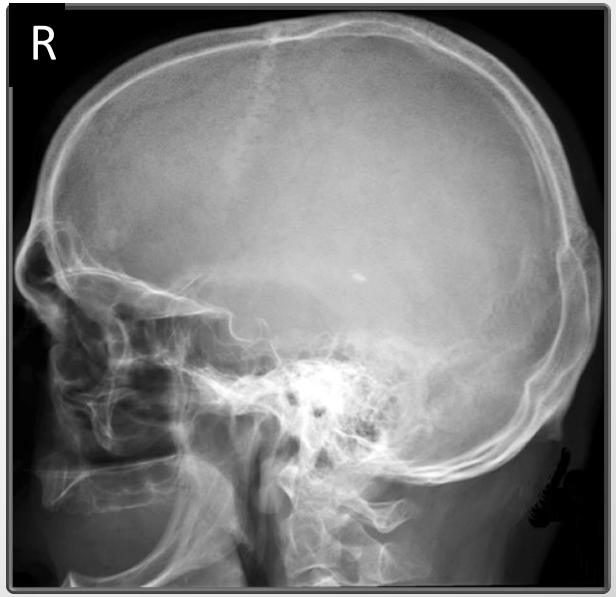
Projections: Bolded items are protocol	
Skull	
	3 View
Facial Bones	
	3 View Limited
	3+ View complete
Mandible	
	4 View
Sinuses	
	3 View
Orbits	
	2 View – foreign body MRI
	4+ View Complete
Nasal Bones	**2 View**

EXTREMITY PACS PRESENTATION	
Images should be properly marked and oriented as listed below Before sending to PACS for Radiologist interpretation: • Review QA expectations for each projection • Each should look as close as possible to example image • Send brief history in Epic Tech Notes including mechanism of injury • If altering protocol for patient condition or cooperation list reasons in history	
Headwork orientation:	• AP/PA images hang with left side on right side of screen
	• Lateral images – Top up left-side facing left screen(flipped-rad preference) and right-side facing left screen • Correctly marked
	• Digitally marked images need tech initials

Skull

Projections:	
Skull – 3 view	• **PA/AP skull** • **AP axial Towne** • **Lateral affected side only**
	• Annotate • Watch for minimal rotation and tilt • Marker and appropriate collimation
Skull – 4 view complete	• Add Waters view- pictured here





Facial Bones

Projections:	
Facial bones – 3 view limited	• **PA Caldwell** • **Modified Waters** *(less neck tilt – petrous ridges in maxillary sinus for better orbit visualization)* • **Left Lateral**
Facial bones – 4+ complete	• Add SMV for zygoma injury
Nasal Bones – 2 View	• **Waters** • **Lateral affected side**
	• Marker and appropriate collimation • Watch for tilt and or rotation

Mandible

Projections:	
Mandible - 4+ view	• **PA** • **Towne** • **Bilateral obliques**
	• PA – forehead and nose on IR and OML perp to IR • Obliques: Keep the affected region of mandible (body, rami, or symphysis) parallel to IR and use 25 deg cephalic angle or tilt head and use straight CR.
TMJ – Recommend CT to ordering physician (adults only not pediatrics) **– per Radiologist protocol, plain film TMJ imaging is no longer best practice. If insist:** • **AP open mouth** • **Lat open mouth** • **Lat closed mouth**	

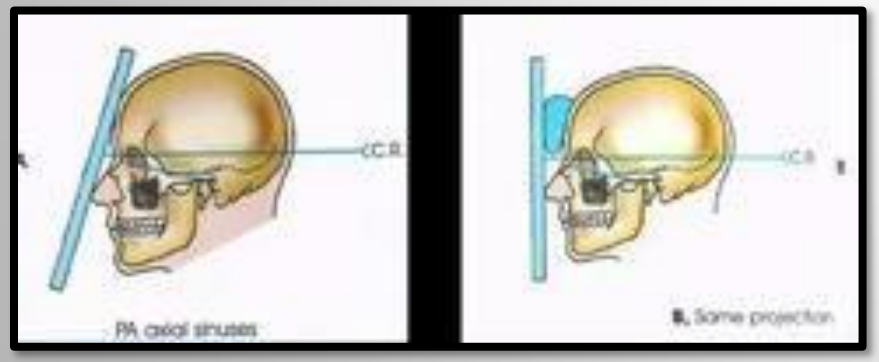
Mandible Body / bilateral

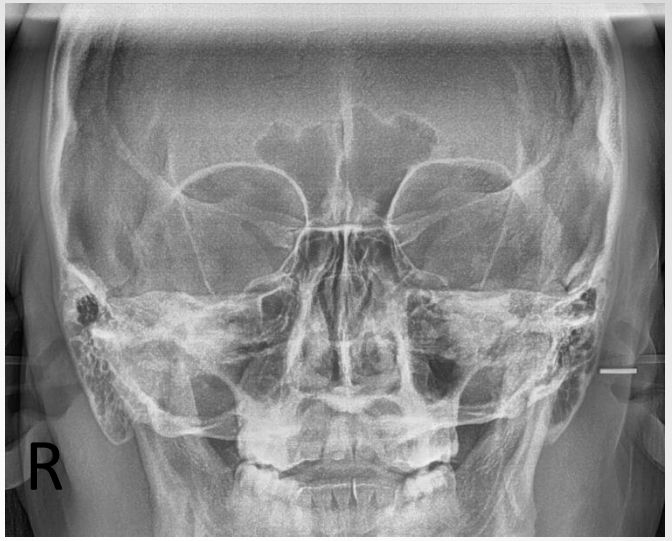
OR

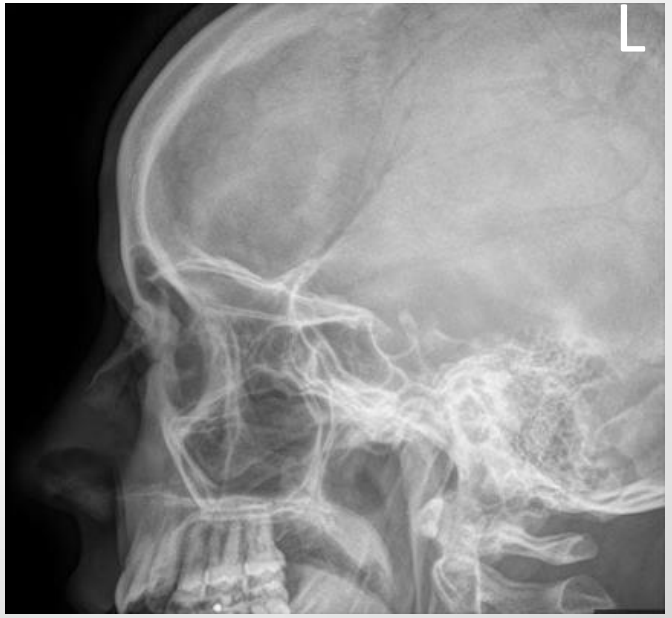
Mandible Rami / bilateral

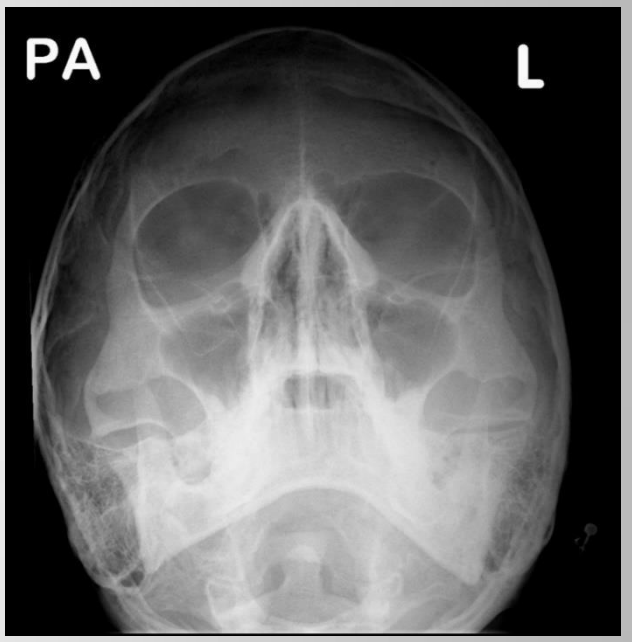
Sinuses

Projections:	
Sinuses – 3 View Complete	• **Caldwell (head angle - not tube)** • **Waters** • **Lateral**
Sinuses – Limited < 3 views	• Waters • Lateral
• **For Caldwell - Be sure to place OML at 15 deg angle to keep horizontal beam**	



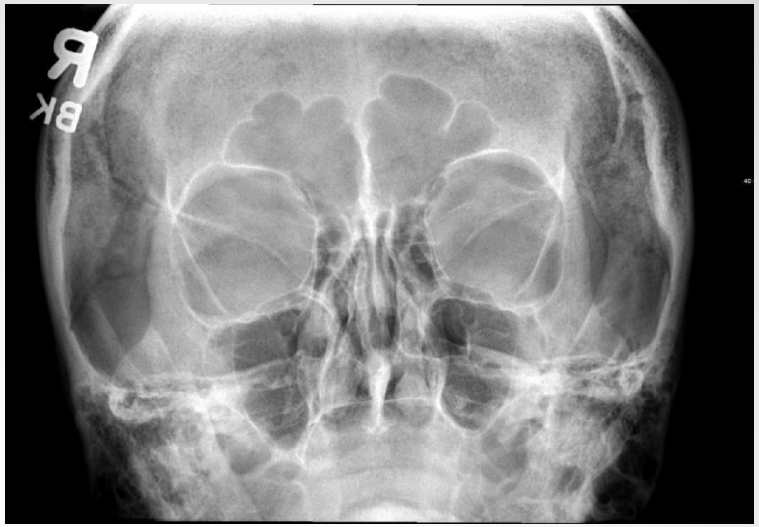


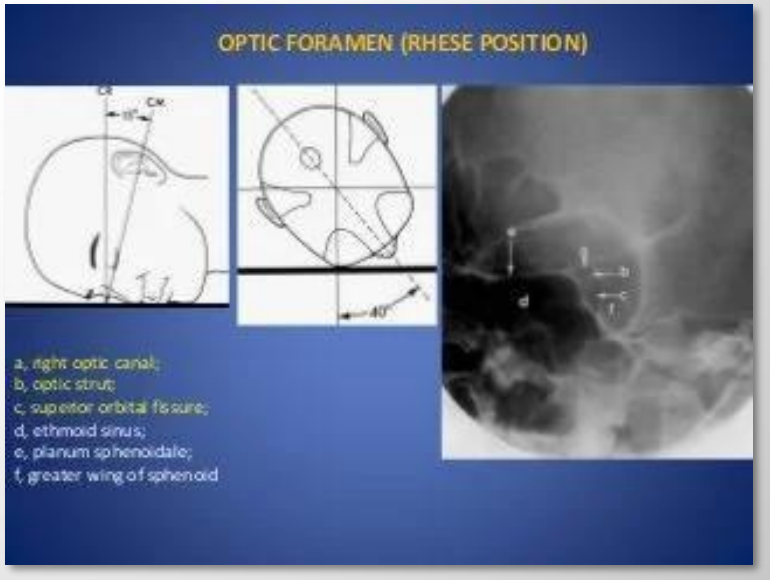




Orbits

Projections:	
Orbits – 4+ view complete	• **Modified Waters** • **Lateral** • **Rhese Bilateral**
Orbits – 2 view for foreign body	• Modified Waters • Lateral
Recommend CT to ordering physician – per Radiologist protocol, plain film orbit imaging for fracture is no longer best practice. • **See positioning tips at right for Rhese**	





Chest and Abdomen

Projections: • **Bolded items are protocol**	
Chest	1 View
	2 View
	3 & 4 View – additional images as requested by MD on order
Sternum	
	2 View
Ribs	
	Unilateral with Chest
	Bilateral with Chest or without
Abdomen	
	1 View KUB
	Abdomen Series with Chest
	Abdomen W/Decub or Erect
	KUB for feeding tube
	G or J tube check with contrast injection
	Gastrografin challenge

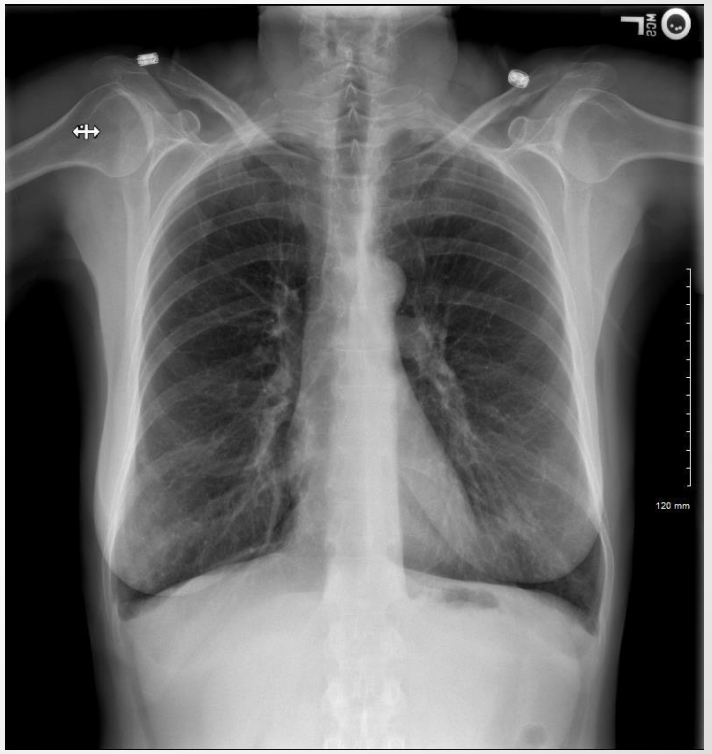
CHEST / ABDOMEN : PACS PRESENTATION	
Images should be properly marked with tech initials and oriented as listed below Before sending to PACS for Radiologist interpretation:	
Chest/Ribs	
	PA/AP Chests orient anatomic left chest right monitor
	Lateral chests orient with the anterior chest facing left side of monitor
	Annotate upright or supine
Abdomen	
	All abdominal images orient anatomic as patient is upright, annotate position

- **Repeats for clipped anatomy need lower or upper Half of chest with missing region**
  - **NOT a small strip of missing apices, angles**
  - **Additional views should be labeled: 1 of 2 / 2 of 2**

CHEST 2 View PA/AP Lateral

Projections:	
Chest	• PA/AP • Left Lateral – ***this projection will now be oriented to hang with the spine to the right of the screen – patient facing left screen***
	• Entire lung fields, apices to costophrenic angles
	• No rotation: sternal ends symmetric
	• Deep 9 Rib inspiration if possible
	• Technical factors support superior thoracic vertebrae **visible through** heart shadow on PA/AP

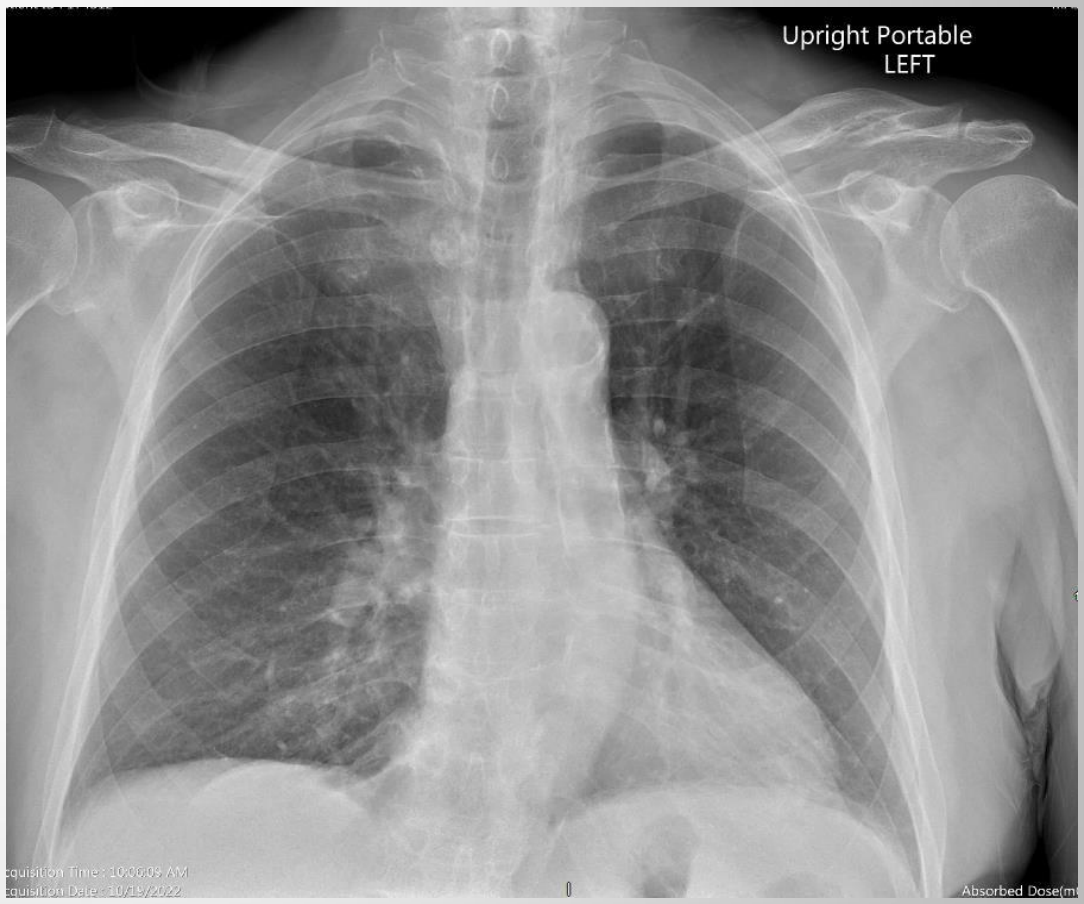
- **Repeats for clipped anatomy need lower or upper HALF of chest with missing region**
  - **NOT a small strip of missing apices, angles**
  - **Additional views should be labeled: 1 of 2 / 2 of 2**



Chest AP Portable

Projections:	
Chest	AP Portable
	Entire lung fields, apices to costophrenic angles
	No rotation: sternal ends symmetric
	Deep 9 rib inspiration if possible
	• **Grid required for any patient over 200 lbs., increase technique for grid use -** Technical factors support visualization of superior thoracic vertebrae visible through heart shadow – when possible, move wires out of direct lung visualization

- **Repeats for clipped anatomy need lower or upper HALF of chest with missing region**
  - **NOT a small strip of missing apices, angles**
  - **Additional views should be labeled: 1 of 2 / 2 of 2**

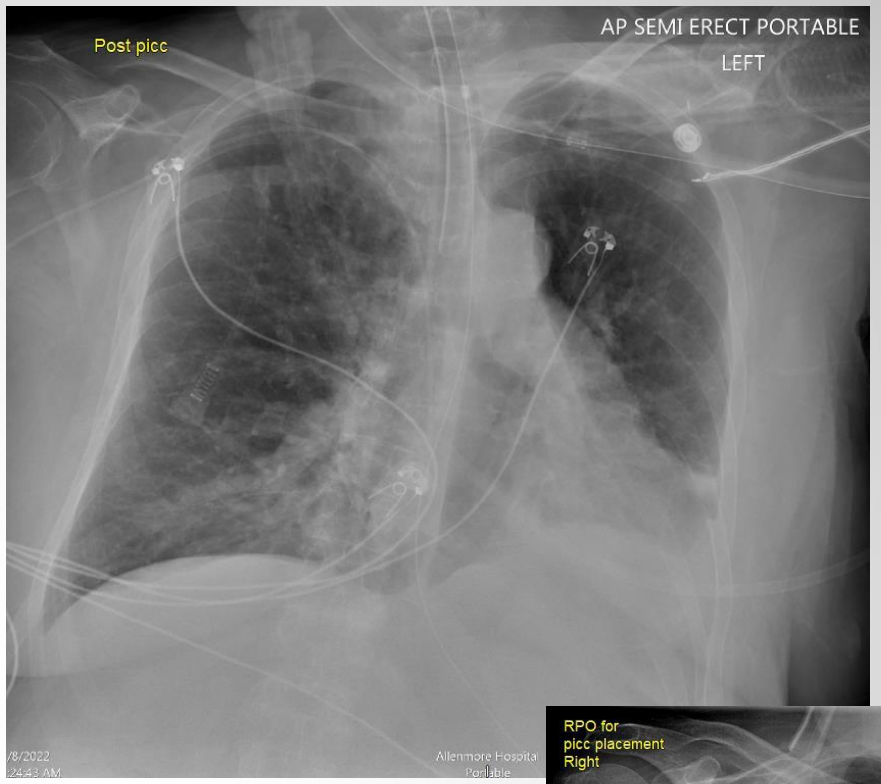


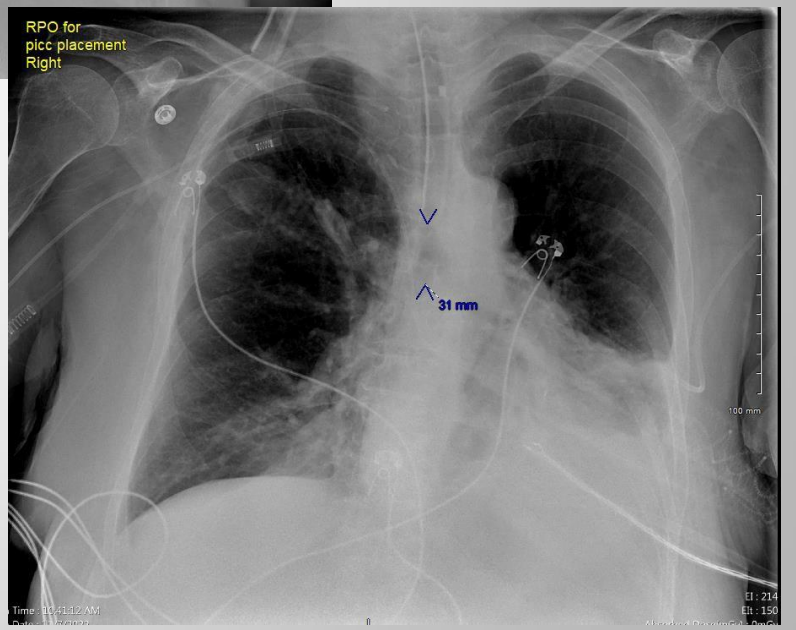
Chest Post Procedure

Projections:	

Chest	• AP Portable or PA upright
	  • For Post Picc if line is not observed include Oblique RPO for AP port or LAO for PA upright (remove grid for portable)
	  • Darken ROI over distal line on second image

	• Entire lung fields, apices to costophrenic angles
	• **Grid required for any patient over 200 lbs., increase technique for grid use -** Technical factors support visualization of superior thoracic vertebrae visible through heart shadow – when possible, move wires out of direct lung visualization

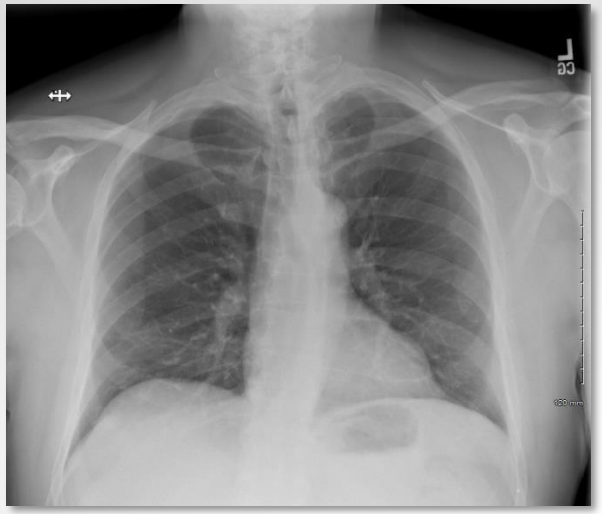




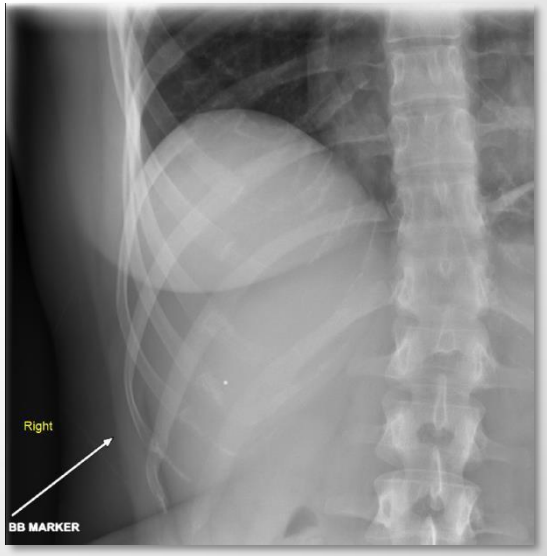
Sternum

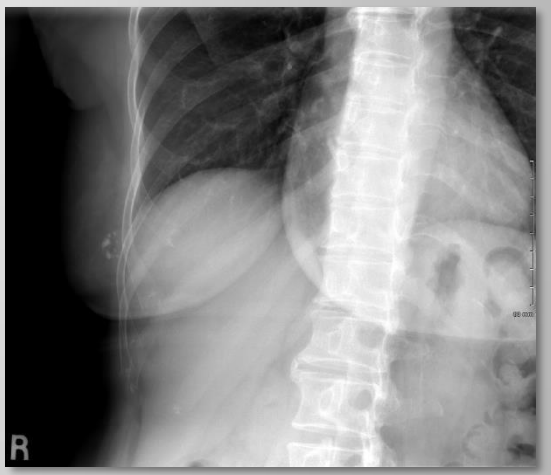
Projections:	
Sternum – 2 views	• RAO • Lateral
RAO	• Entire sternum projected over heart • Blurred pulmonary markings/shallow breathing
Lateral	• Manubrium free of shoulder/rib superimposition

Ribs - Unilateral / Right or Left

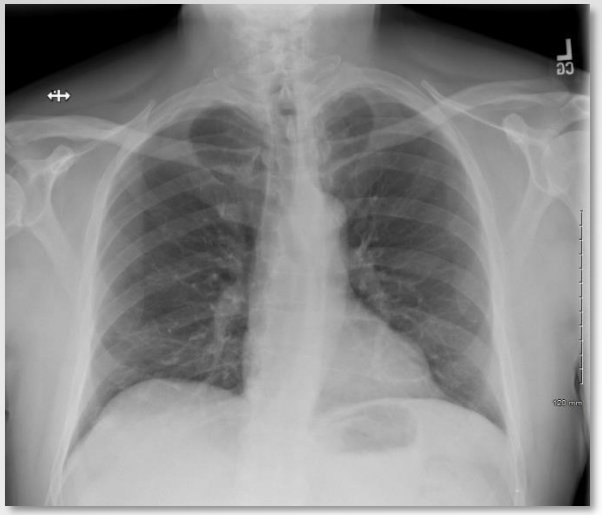


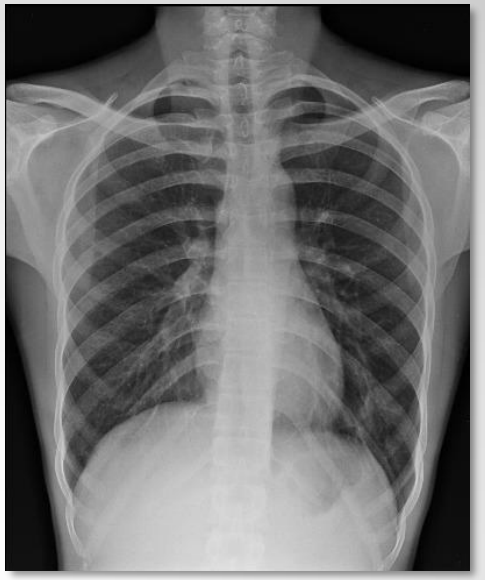
Projections:	
• **Ribs - Unilateral 3+ views**	• **<u>PA Chest</u>,** • AP/PA upper and lower *(affected side only)* • Oblique upper and lower *(affected side only)*
	• Use 72” SID and 70-75 kVp for bony contrast upper ribs • Use 40” SID for lower ribs • Place BB at Site of pain
*Any Rib orders without chest should be changed (protocol) unless patient had a same day 2 view chest exam	





Ribs Bilateral





Projections:	
Ribs - Bilateral	Protocol: • **<u>PA Chest</u>,** • AP/PA upper and lower – bilateral single image • Oblique upper and lower ribs single image bilaterally
	• Use 72” SID and 70-75 kVp for bony contrast upper ribs • Use 40” SID for lower ribs increase kVp • Place BB at Site of pain
*Any Rib orders without chest should be changed (protocol) unless patient had a same day 2 view chest exam	

Abdomen / KUB

Projections:	
Abd/ KUB – 1 view	• **AP supine**
	• Include entire abdomen symphysis to just below diaphragm – portrait or landscape as pictured here with spine centered.
	• **When quadrant images required: Additional images as needed to include all bowel.

OR:

Abdomen Series / Abdomen 2 view

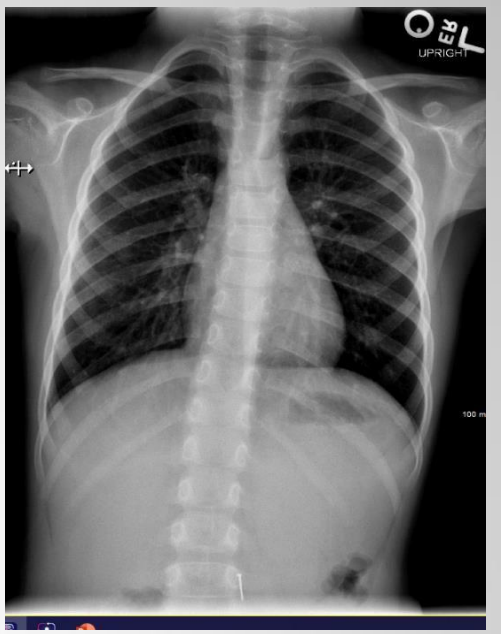
Projections:	
Abd Series	• PA/AP chest • Erect OR decubitus – left side down • Supine
Abdomen - 2 view	• Erect OR decubitus – left side down • Supine abdomen
	• Erect or Decub - include diaphragm down(do not need symphysis) • Supine: Include entire abdomen symphysis up to just below diaphragm(do not need entire diaphragm)

OR:

Abdomen Pediatric

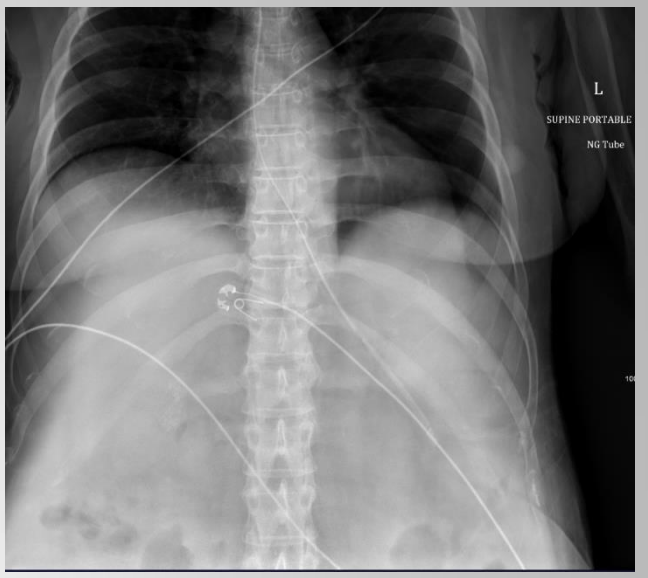
Foreign Body Localization

Projections:	
Abd for FB:	• **AP supine** • **Lateral Soft tissue Neck**
	• Include entire chest/abdomen nose to rectum on AP • Multiple images ok if patient does not fit.



KUB for Feeding Tube Placement

Projections:	
KUB Feeding Tube	• Supine (Ch)abdomen
	• Center over left mid abdomen and chest do not need symphysis • Include carina to be sure tube is not in airway • Technical factors optimal for both chest and abdomen visualization of the feeding tube • Move wires out of view if possible

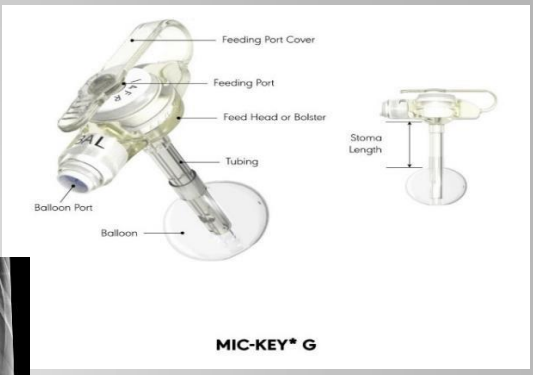


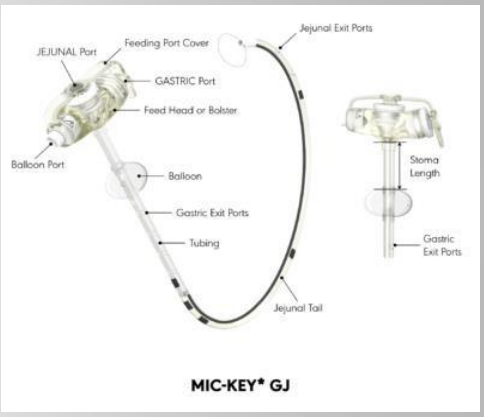
Tube Verification Check with Injection

• **Projections:**	
• Tube Verification- 3 views	• Supine Kub pre and post injection • Lateral post injection

	• Scout Kub - Center over mid abdomen - do not need symphysis, then:
	  • Inject **15 ml** Gastrografin in single port OR **J side if dual port**
	  • *Tubes pictured here*
	  • **<u>DO NOT</u>** access Balloon side of Tube
	• Second AP without changing position after injection
	• Lateral can be x-table or true lateral. Increase technical factors

• Note any difficulty injecting in tech notes for radiologist/IR	



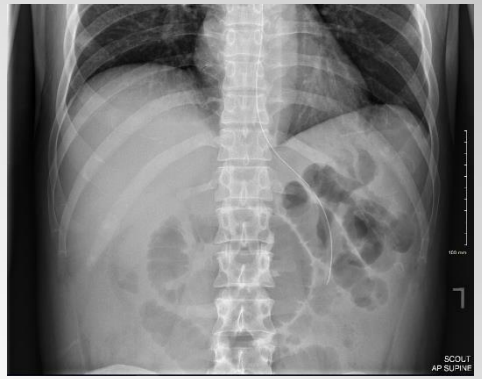


Gastrografin Challenge

Protocol:	
Oral Contrast	• Scout – no need to call rad with scout images • Administer **90 ml Gastrografin full strength** as quick as patient can drink safely

Via NG tube	• Scout - obtain scout images - **contact rad to Verify NG tube placement is still in position prior to injection**
	  • If no rad on duty call TRA
	• Inject and administer **90 ml Gastrografin full strength** and flush with 30 ml water to clear tube
	  • Inject at a rate tolerable and comfortable to patient
	  • Attach STOP suction sticker to NG tube if applicable

Both Oral and NG	• Immediate image – note time on image and in Epic
	  • Ancillary Note in chart for patient to remain NPO for 6-8 hrs (no dilution of contrast)
	• Timing of images flexible per site and reason for exam; can be done at 6 and 12 hours, 12 and 24 hours or timing requested by Ordering MD - Note the timing on the images
	  • If or When contrast is in colon finalize the exam and close for review in Pacs – do not assign to specific radiologist if unsure or contrast doesn't pass, please consult any radiologist
	• Technologists responsible for written communication between shifts for timing requirements on images and status of exam



Upper Extremity:

Projections: • **Bolded items are protocol**	
Clavicle	**2 View**
AC / SC Joints	**2 View**
Shoulder	**2+ View**
	2 View
Scapula	**2 view**
Humerus	**2 View**
Elbow	**3 View**
	2 View
Forearm	**2 View**
Wrist	**3+ View**
Hand	**3 View**
	• Arthritis Series • Bone Age
Fingers	**3 view**

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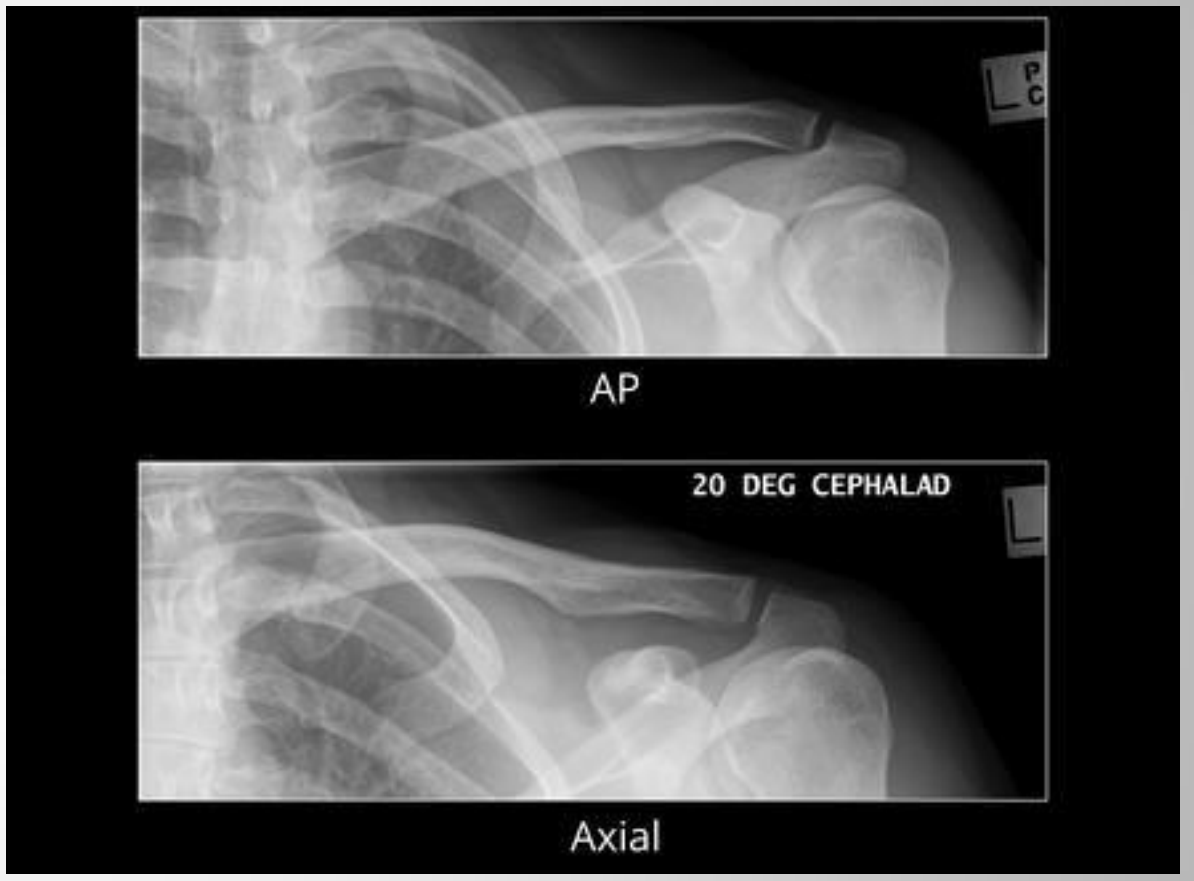
Fingers, Hand Wrist, Forearm	• Orient with digits up to top of monitor - right thumb to left monitor, left thumb to right monitor • **Align body part to plane of IR – keeps images straight in Pacs and angle of body part straight to IR**
Humerus and Shoulder	• Orient anatomic with head of Humerus at top of screen, long bone extending down • Axillary orient humeral head to anatomic side and Humerus will extend out laterally
	• **Radiologists request Minimum two view on post reduction, not 1 view.**

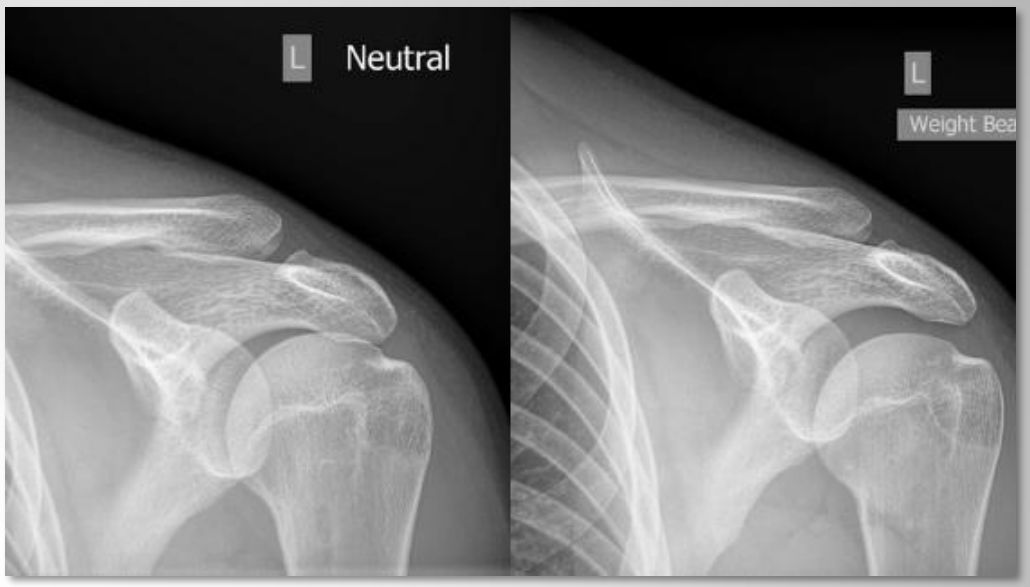
Clavicle

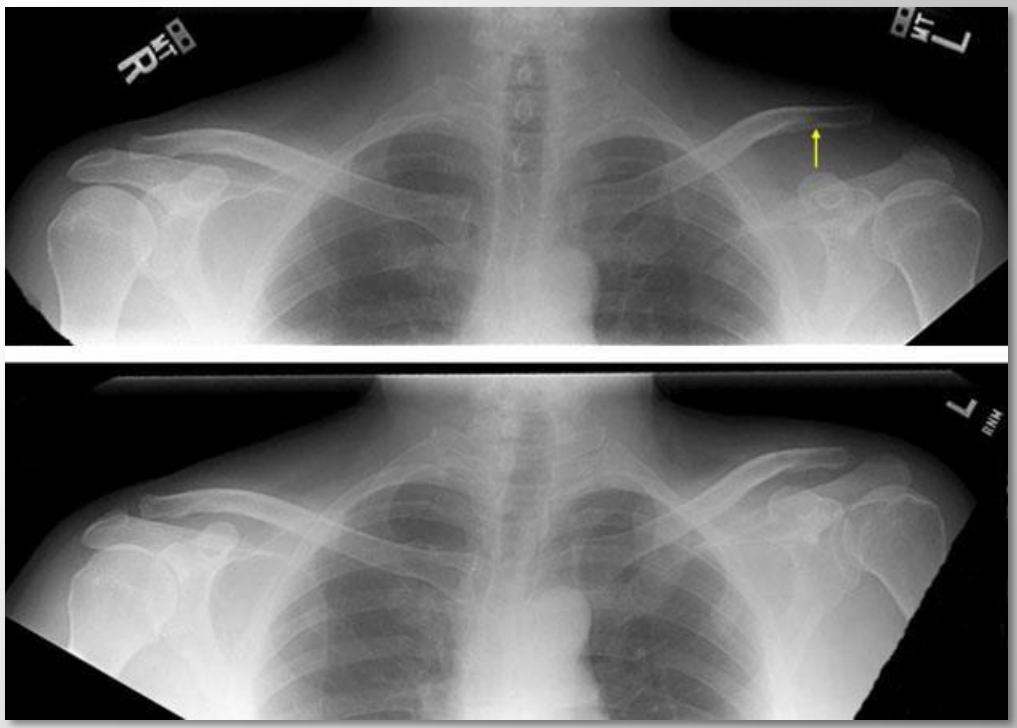
Projections:	
Clavicle– 2 View	• AP • Axial 15 - 20 deg cephalic
	• Entire clavicle with AC and SC joints • Marker and appropriate collimation



Acromioclavicular Joints

Projections:	
AC Joints– 2 View	• AP – No weight • AP – With weight
	• May use one image or take individual • Marker and appropriate collimation • No rotation or leaning of patient





Sternoclavicular Joints

Projections:	
SC Joints– 2 View	• PA – Center T3 • PA Oblique – Affected side only * • Affected side down oblique • Shallow 15 deg LAO/RAO
	• Marker and appropriate collimation

Shoulder Joint - Trauma

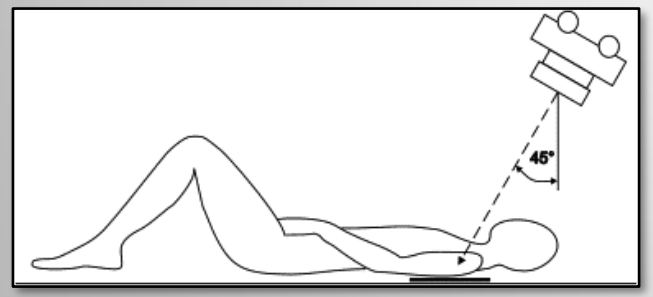
Projections:	
Shoulder - 2+ View	• AP – Internal • AP – External • Axillary view – **Trauma only** • *<u>Approved</u>* ***Modified Axillary*** *for trauma fx or dislocation– see next slide*
	• Marker and proper collimation • AP views include all of clavicle and scapula
Post reduction - 2 view	• AP (in sling) • Modified Axillary

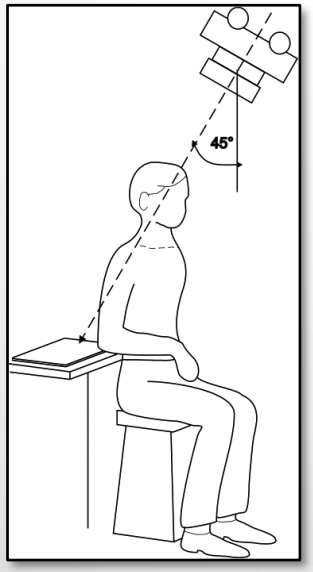
Modified Axillary – Shoulder Trauma

Projections:	

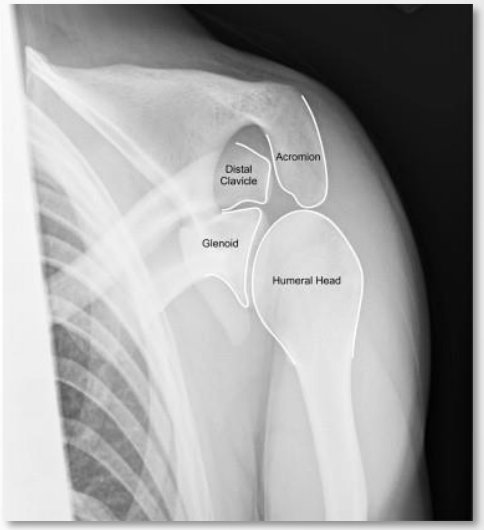
Modified Axillary	• Patient positioned upright or supine (as pictured)
	  • Center at glenohumeral articulation
	  • 45 degree caudal angle

	Marker and appropriate collimation





Normal articulation



Posterior dislocation

Anterior dislocation

Shoulder Joint – Non-Trauma

Projections:	
Shoulder - 2+ View	• AP – Internal • AP – External • Y view – for non recent injury pain and if patient cannot abduct • *Add any additional views requested by ortho MD's (Grashey, glenohumeral view) etc.*
	• Marker and proper collimation • AP views include all of clavicle and scapula • * - Y- view positioning has **humerus straight down superimposed with scapula**

Scapula

Projections:	
Scapula - 2 View	• AP – Arm Abducted if possible • Neutral arm if patient cannot abduct • Scapula Lateral Y view
	• Marker and appropriate collimation • Y- view positioning has humerus across body **free of superimposition of scapula**

Humerus

Projections:	
Humerus - 2 View	• AP • Lateral
	• Marker and appropriate collimation
	• AP is external rotation of arm and elbow is true AP • Lateral is internal rotation with elbow lateral and bent 90 deg

Elbow

Projections:	
Elbow – 3+ View	• AP • * - External Oblique 45 deg **lateral** rotation of arm • Lateral
	• Marker and appropriate collimation • Orient image in line with IR (no tilted images if possible)
	• AP - elbow is true AP, no rotation • Oblique - radial head clear of ulna • Lateral - bent 90 deg, no rotation, condyles superimposed

Forearm

Projections:	
Forearm - 2 View	• AP • Lateral
	• Marker and appropriate collimation – ***orient as pictured here***
	• AP - elbow is true AP, no rotation • Lateral - bent 90 deg, no rotation with condyles superimposed

Wrist

Projections:	
Wrist - 3+ view	• PA • PA Oblique - 45 deg • Lateral • ** - Optional - Scaphoid Ulnar deviation for trauma* ***with pain in this region – no longer mandatory***
	• Marker and appropriate collimation • Orient image in line with IR (no tilted images if possible)
	• All protocol views include distal radius, ulna and proximal half of metacarpals • Lateral - slight external rotation of hand to superimpose radius and ulna

Bone Age

Projections:	
Bone Age - 1 view	• Left PA Hand and Wrist - center base of hand
	• Marker and appropriate collimation • Orient image in line with IR (no tilted images if possible)
	• Hand to include distal radius and ulna

Hand

Projections:	
Hand - 3+ view	• PA • PA Oblique - 45 deg • Lateral - fan fingers
	• Marker and appropriate collimation • Orient image in line with IR (no tilted images if possible)
	• All protocol views include distal radius and ulna • Lateral - fan lateral with superimposed metacarpals

Hands Arthritis Complete

Projections:	

Hands / Arthritis Complete – 7 views	• Bilateral hands – single images (not imaged together)
	  • PA
	  • PA Oblique - 45 deg
	  • Lateral - fan fingers
	• Ball-catcher bilateral hands-one image

	• Appropriate marker and collimation
	• All protocol views include distal radius and ulna • Lateral - fan lateral with superimposed metacarpals • Ball catcher includes both hands on one image as pictured
• Please do not take both hands on one image, individual positioning is crucial for accurate interpretation	

Ball-catcher View

Fingers

Projections:	
Fingers - 3 view	• PA - distal adjoining metacarpal to tip of affected finger only • PA Oblique - 45 deg affected finger • Lateral - affected finger
	• Annotate affected Digit 1st -5th accordingly • Appropriate marker and collimation • Orient image in line with IR (no tilted images if possible) • Lateral - finger without superimposition of other fingers
Pediatric Fingers - 3 view	• PA hand ages 0-17 • Oblique finger as above • Lateral finger as above

Fingers – Pediatric

Age 0-17

Projections:	
Fingers - 3 view	• PA – Hand • Oblique Finger - 45 deg affected finger distal adjoining metacarpal to tip of affected finger only • Lateral - affected finger
	• Thumb is oblique on PA hand, include PA thumb vs oblique if thumb is affected finger • Annotate affected Digit 1st -5th accordingly • Appropriate marker and collimation • Orient image in line with IR (no tilted images if possible) • Lateral - finger without superimposition of other fingers

Upper Extremity Infant (1-12 Months)

Projections:	
Upper Ext infant - 2 view	• AP Wrist to Humerus include – distal aspect both joints • Lat Wrist to Humerus – distal aspect of both joints • *Oblique sufficient if cannot get true lateral*
	• Appropriate marker and collimation • Orient image in line with IR (no tilted images if possible)

Spinal Column

Projections: Bolded items are protocol	
Cervical Spine	
	2-3 View
	4+ - 6+ Views
	Soft tissue neck
Thoracic Spine	
	3 View
Lumbar Spine	**2-3 View**
	4+ View with flexion and extension and or obliques
Sacrum / Coccyx	**3 View**
SI Joints	**3 view**

SPINE AND PELVIS PACS PRESENTATION	
Images should be properly marked with tech initials and oriented as listed below Before sending to PACS for Radiologist interpretation:	
Spine	
	Oriented head up with left side to right monitor on AP's (anatomic)
	Lateral spine images, head up - anterior spine facing **LEFT SCREEN**
	X-table images orient head up - annotated as X-Table

Cervical Spine 2-3 view

Projections:	
C-Spine 3 View	• Lateral - C1-T1 • AP • Odontoid • Swimmers if C7-T1 not seen – change order to 4 view – see 4 view
	• No rotation, spinous process centered, AP • Entire section of spine, **collimated to spine**, marked
Pediatrics	• No odontoid view - age 5 and under

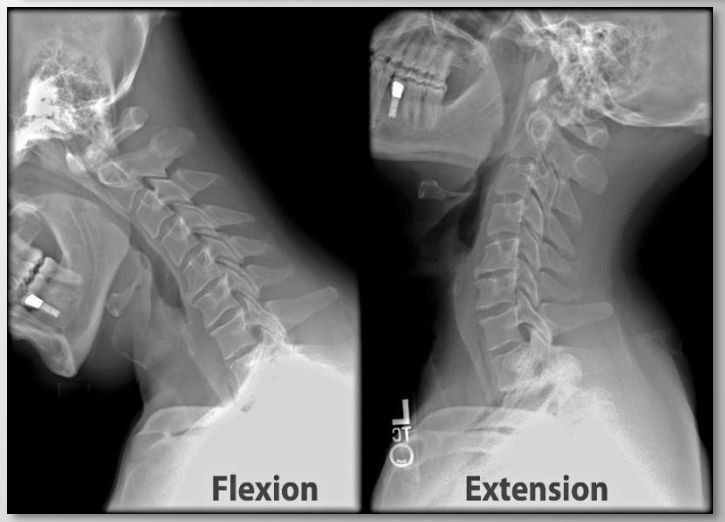
Cervical Spine
4-6+ views

Projections:	

C-Spine 4-6+ Views	• Lateral
	  • Swimmers if needed
	• AP
	• Odontoid
	• Bilateral obliques
	  • Or - Flexion / Extension if requested
	  • Possible complete - 8 views

	• No rotation, spinous process centered, AP • Entire section of spine, **collimated to spine**, marked

Additional Views

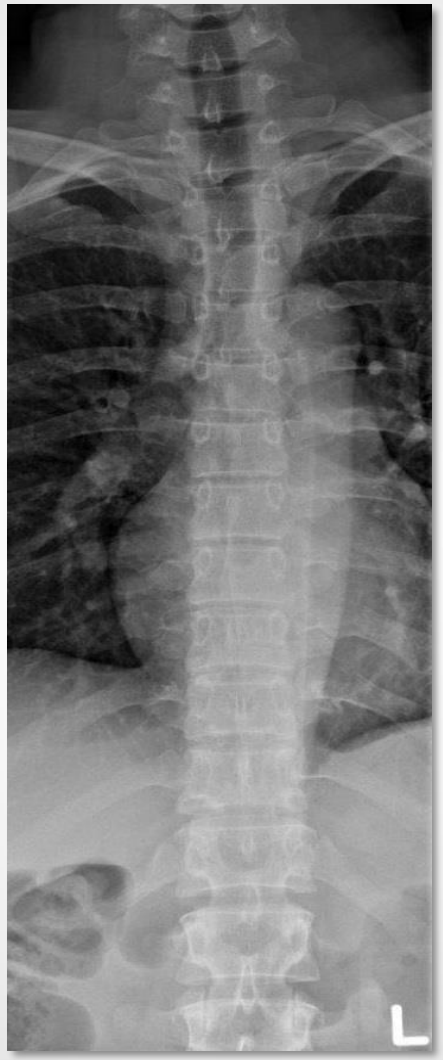


Soft Tissue Neck

Projections:	
Soft Tissue Neck	• **Lateral** • **AP**
	• Pediatrics - Foreign body or croup
	• For Croup can do with quiet breathing

Thoracic Spine

Projections:	
Thoracic Spine	• **Lateral** • **AP** • **Swimmers** – if done together with C-spine exam - include swimmers with the C-spine exam **only** and mark in tech notes for T-spine.
	• No rotation, spinous process centered, AP
	• Entire section of spine, **collimated to spine**, marked



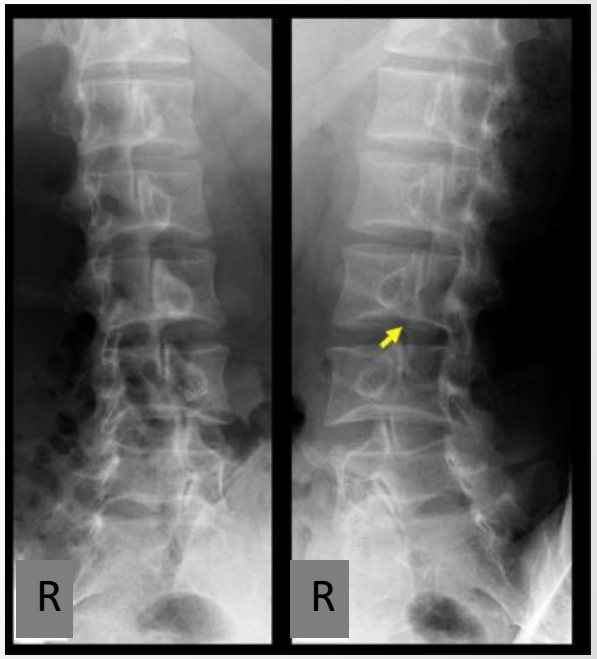
Lumbar Spine - 3 View

Projections:	
Lumbar Spine - 3 view	• **Lateral** • **AP** • **L5-S1 Spot**
	• No rotation, spinous process centered, AP
	• *Entire section of spine, **COLLIMATED TO SPINE**, marked.
Pediatrics	• No L5-S1 spot view - age 10 and under

Lumbar Spine
4-6+ views

Projections:	
L-Spine 4-6+ Views	• Lateral- neutral (see 3 view) • AP • Spot • Bilateral obliques, **OR** Flexion and extension instead of obliques – ***Flexion and Extension is <u>default</u> if not specified.***
	• No rotation, spinous process centered, AP
	• Entire section of spine, **COLLIMATED TO SPINE**, marked

Additional Views

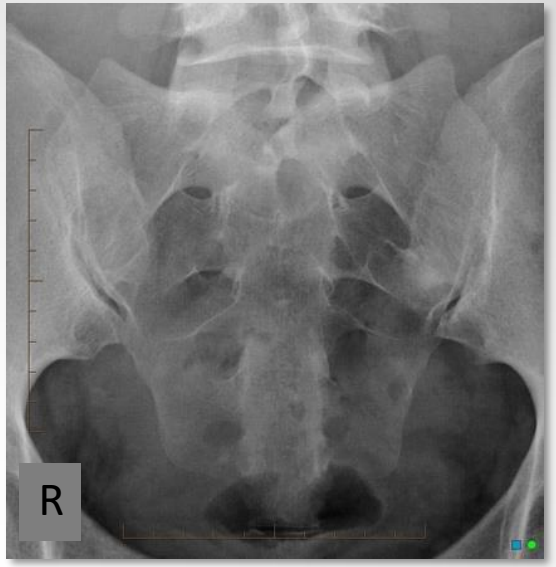


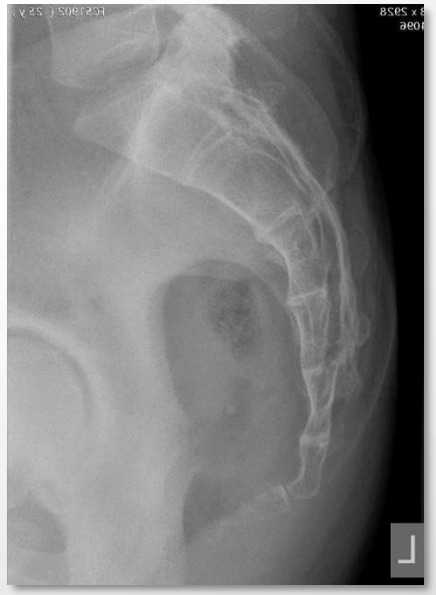
Thoraco-Lumbar Spine

Projections:	
• T/L Junction - 2 view	• AP and Lat
	• Center T12 / L1 • Include T8 through L3-L4
	• **COLLIMATED TO SPINE**, marked
• **Projection validity is questionable, recommend other spine imaging T or L. Looking to remove order from Epic.**	

Sacrum / Coccyx

Projections:	
Sacrum/Coccyx	• AP Sacrum – 15 deg cephalic • AP Coccyx – 10 deg caudal • Lateral Sacrum • Lateral Coccyx
	• No rotation, spinous process centered, AP • One lateral for both





Sacroiliac Joints

Projections:	
SI Joints – 3 View	• AP Sacrum – 30-35 deg cephalic • Anterior Obliques – shallow 25-30 deg patient oblique, center on side up
	• No rotation, spinous process centered, AP

Pelvis and Hips

Projections: Bolded items are protocol	
Pelvis	
	1 View
	2-3 View
Hips	
	2 View
	3 View
	Bilateral
	Pediatrics

EXTREMITY PACS PRESENTATION	
Images should be properly marked with tech initials and oriented as listed below Before sending to PACS for Radiologist interpretation: • Review QA expectations for each projection • Each should look as close as possible to example image • Send brief history in Epic Tech Notes including mechanism of injury • If altering protocol for patient condition or cooperation list reasons in history	
Pelvis / Hips	Orient anatomic with left hip on right of screen
Femur / Knees Tib-Fib / Ankle	AP - Oriented proximal joint at top of screen with anterior side anatomic (left side of joint to right monitor)
	Lateral images anatomic – Top up with anterior Left facing right screen, Right facing left screen – Flip and annotate X-table images appropriately
Feet	AP / Oblique toes face up, top of screen
	Lateral feet face anatomic – anterior right to left screen and left to right screen
	• **Radiologists request Minimum two view on post reduction**

Pelvis 1 View

Projections:	
Pelvis 1 View	• **AP pelvis**
	• No rotation, symmetric Obturators and Ala, centered pubic symphysis • All pelvic bones, entire symphysis included with bilateral hips, greater trochanters
	***Post operative imaging may be a low pelvis centered over the hips omitting top of crests – as pictured here*

Pelvis 2-3 views

Projections:	
Pelvis 2-3 views	• AP pelvis • Inlet/outlet 30 deg caudal/Cephalic OR • Judet view 45 deg oblique - affected side up and down – ***MD should specify additional views if not, default to one view***
	• No rotation, symmetric Obturators and Ala, centered pubic symphysis for AP • Accurate centering and angle for special views
• If not specified by ordering Dr, default / change to one view protocol or call to clarify order.	

inlet

outlet

Judet

Hip – Unilateral /Trauma

Projections:	
Hip Unilateral - 2+ view (Trauma) is with pelvis	• **AP pelvis** - this can be ordered with or without pelvis **- protocol is <u>WITH</u>** • **AP affected hip** - to include symphysis • **Lat affected hip** • *Optional, frog leg, or cross-table lateral*
	• AP - rotate feet internally, if possible, with patient condition • **Lat - orient image landscape as pictured** • Keep feet rotated internally if possible

Or

Hip – Unilateral Non-Trauma

Projections:	
Non-Trauma	• AP • Lat • Can be ordered with or without pelvis - image as ordered
	• AP - rotate feet internally, if possible, with patient condition

Hip – Bilateral

Adult age 18+

Projections:	
Hip Bilateral - 2+ view is with pelvis	• AP pelvis - this can be ordered with or without pelvis - protocol is **WITH** • **AP both hips** individually • **Lat both hips individually**
	• AP - rotate feet internally
	• Lat orient image landscape • Keep feet rotated internally if possible
• Please do not take both hips on one image, individual positioning is crucial for accurate interpretation	

Pediatric Hips – non trauma

Age 0-17

Projections:	
• **Pediatric Hips**	• AP Pelvis include both hips AP • AP Pelvis include both hips frog leg lateral
	• Appropriate marker and collimation • Remove diaper before imaging
• **Exam should be modified to the pediatric order if placed incorrectly for age group protocol.**	

Lower Extremities

Projections: Bolded items are protocol	
Femur	
	2 View
Knee	
	2 View
	3 View
	3+ Orthopedic request
Tib-Fib	
	2 View
Ankle	
	3 View
Foot / Toes/ Heel	
	2 View
	3+ View

EXTREMITY PACS PRESENTATION	
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Femur / Knees Tib-Fib / Ankle	AP - Oriented proximal joint at top of screen with anterior side anatomic (left side of joint to right monitor)
	Lateral images anatomic – Top up with anterior Left facing right screen, Right facing left screen – Flip and annotate X-table images appropriately
Feet	AP / Oblique toes face up, top of screen
	Lateral feet face anatomic – anterior right to left screen and left to right screen
	• **Radiologists request Minimum two view on post reduction**

Femur

Projections:	
Femur – 2 View	AP and lateral - if necessary, use 4 images • hip down • knee up • Entire femur w/both joints
	• Appropriate marker and collimation

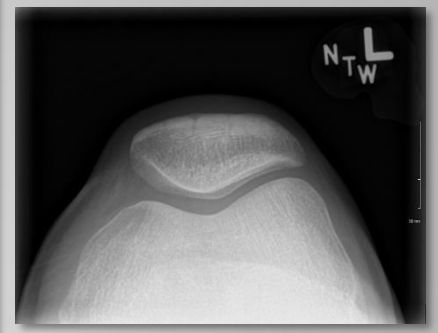
Knee-Trauma

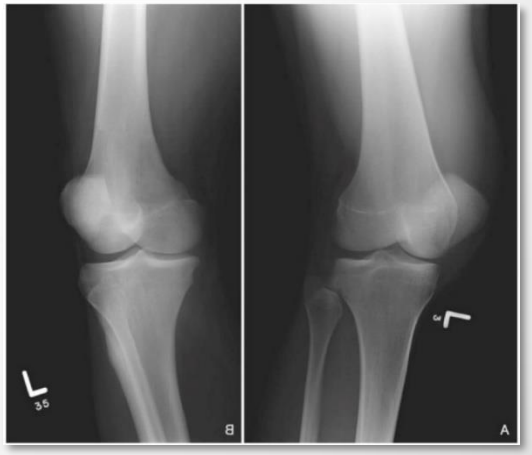
Projections:	

• **Knee - Trauma 3 View**	• AP
	• Lat
	• Sunrise
	  • Add medial and lateral obliques if tibial plateau fracture is suspected
	  • Will need to revise order to 4 view

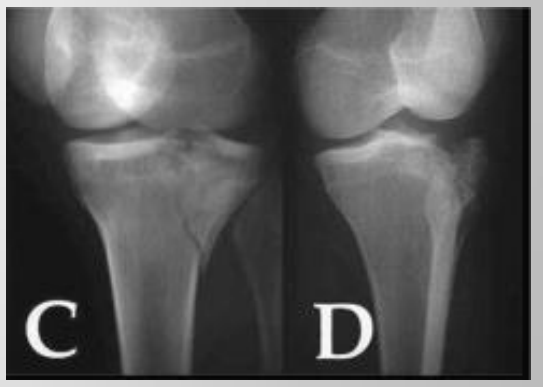
	• Annotate if x-table and flip accordingly
	• Orient Lateral anatomic
	  • Left knee faces right screen
	  • Right knee faces left screen
	• Appropriate marker and collimation

• Please do not take both knees on one image, individual positioning is crucial for accurate interpretation	





Optional



Tibial-plateau fracture

Knee/Non-trauma

Projections:	
• **Knee - routine non-injury / pain - 2 View**	• AP • Lateral
	• Annotate if x-table and flip accordingly • Appropriate marker and collimation
• Bilateral Knees / 2-3 views or 4+	• AP – individual images • Lat – individual images • AP standing bilateral additional 1 film if ordered per ortho
• Please do not take both knees on one image unless included as additional view; individual positioning is crucial for accurate interpretation	

Tib-Fib

Projections:	
Tib-Fib - 2 view	• **AP/Lateral include both proximal and distal joints**
	• Annotate if x-table and flip accordingly • Appropriate marker and collimation
• **Please attempt to hang straight prior to sending to Pacs, so not on angle**	

Ankle

Projections:	
Ankle – 3 View	• **AP** • **Oblique/mortise** • Shallow oblique - 15-20 deg medial rotation center on joint • **Lateral**
	• Annotate if x-table and flip accordingly • Align IR perpendicular to plane of body part if possible • Appropriate marker and collimation
• Radiologist request : Limit use of 2 view code / use tube angle for oblique if patient cannot rotate.	

Foot

Projections:	
Foot – 3 View	• **AP** • **Oblique - medial** • **Lateral**
	• Annotate if x-table and flip accordingly • Align IR perpendicular to plane of body part if possible • Orient toes up on PA & Obl • Appropriate marker and collimation
Be sure that foot is true lateral with all metatarsals aligned and foot dorsiflexed • Limit use of 2 view try to get oblique image, if necessary, use tube angle	

Toes

Projections:	
Toes – 3 View	• **AP - through distal foot** • **Oblique toes - medial through distal foot** • **Lat affected toe - separate as much as possible** • orient anatomic like foot lateral
	• Annotate if x-table and flip accordingly • Align IR perpendicular to plane of body part, if possible, no twisted images • Appropriate marker and collimation

Calcaneus

Projections:	
Calcaneus – 2 view	• **AP axial 40 deg cephalic angle** • **Lat**
	• Annotate • Align IR perpendicular to plane of body part if possible • Appropriate marker and collimation

Lower Extremity Infant (1-12 months)

Projections:	
Lower Ext infant - 2 view	• AP include ankle to Hip – distal aspect both joints • Lat Ankle to Hip– distal aspect of both joints
	• Appropriate marker and collimation • Remove or replace wet or full diaper

Miscellaneous

Projections: Bolded items are protocol	
• **Bone/Skeletal Surveys**	• Adult
	• Pediatric
• **Standing leg length**	
• Scanogram	
• **Scoliosis**	
• **Shunt series**	
• **Retained Surgical Instrument**	

PACS PRESENTATION	
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Bone/Skeletal Surveys

• **Adult** • **Myeloma/Metastatic/Genetic Survey**	

• **Adult**	• Lat Skull
	• PA/AP chest
	• Spine
	  • Lat C-spine
	  • Lat T-spine
	  • Lat L-spine
	• Lateral Sacrum/Coccyx - 1 image
	• AP Pelvis
	• AP Humerus Bilateral
	• AP Forearm Bilateral
	• AP Femur Bilateral
	• AP Tib-Fib Bilateral

	• Appropriate marker and collimation on all images
• **15 images - bilateral shot individually not together**	

• **Pediatric Complete** • **Skeletal Survey < or > 2 yrs. (Non-Accidental Trauma)**	

• **Pediatrics**	• AP / Lat Skull
	• AP / Lat Thorax
	• AP Abdomen
	• Spine
	  • Lat C-spine
	  • Lat T-spine
	  • Lat L-spine
	• AP Pelvis
	• AP Humerus Bilateral
	• AP Forearm Bilateral
	• AP Femur Bilateral
	• AP Tib-Fib Bilateral
	• PA Hands Bilateral
	• AP Feet Bilateral

	• **Phone call to Peds Radiologist before releasing child** • Appropriate marker and collimation on all images
• **21 images - bilateral shot individually not together**	

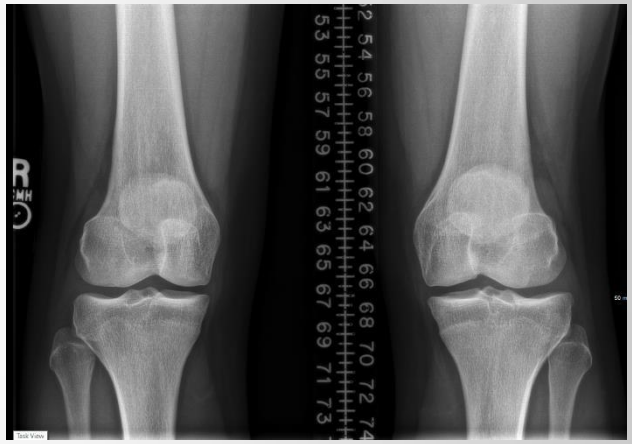
• **Pediatric Limited** • **Skeletal Survey < or > 2 yrs.**	
• **Pediatrics**	• AP Thorax • Bilat Oblique Ribs • AP Humerus Bilateral • AP Forearm Bilateral • AP Femur Bilateral • AP Tib-Fib Bilateral • PA Hands Bilateral • AP Feet Bilateral
	• Appropriate marker and collimation on all images
• **15 images - bilateral shot individually not together**	

Standing Leg Length

• **Projections**	
• Leg Length - 1-3 views	• AP Iliac Crest to ankle with ruler fixed behind patient • Position patella facing forward
	• Stitch images together – unable to perform at hospital – only 3P ortho, 3MOP and MBCHC – GH and TG • Appropriate marker and collimation all images

Scanogram

• **Projections**	
• Scanogram	• AP Hips • AP Knees • AP Ankles
	• Ruler affixed to table down center and patient on top of ruler • Tape patient down at knees and ankles to maintain AP positioning • Take the 3 separate images without moving patient on table or ruler



Scoliosis

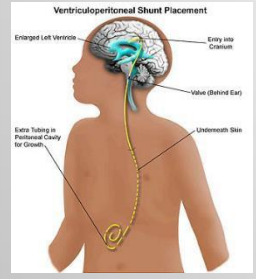
• **Projections**	
• Scoliosis	• AP • Lat
	• Stitch images together – unable to perform at hospital – only 3P ortho, 3MOP and MBCHC • Appropriate marker and collimation all images
• Stitching software not available at all locations	

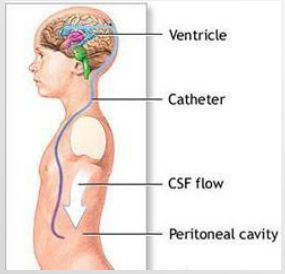
Shunt Series

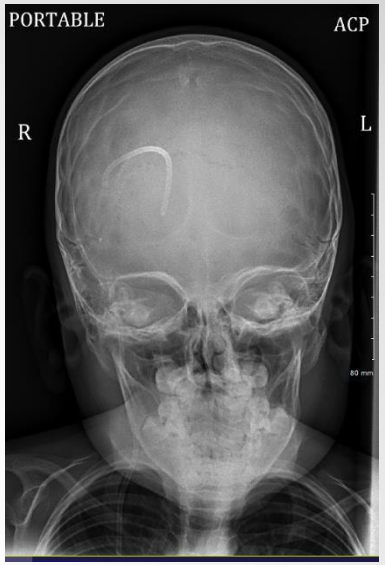
• **Projections**	

• Shunt Series	• AP/ Lat Entire Shunt
	  • AP / Lat Skull to C-spine
	  • AP / Lat Chest
	  • AP / Lat Abd

	• Appropriate marker and collimation all images







Retained Surgical Instrument/Object

Projections:	

• **RSI**	• Cranium
	  • AP – top of skull to below mandible and bilateral skin border
	  • Lateral - at request of Radiologist

	• Chest
	  • AP - Apices to Angles and bilateral skin borders
	  • Oblique - at request of Radiologist

	• Abdomen/Pelvis
	  • AP - Diaphragm to pubis and bilateral skin borders
	  • Oblique - at request of Radiologist

	• Vagina
	  • AP - inferior gluteus to above crest and bilateral skin borders
	  • Inlet view of pelvis – at request of radiologist

	• Spine
	  • AP Cervical, Thoracic or Lumbar - site of surgery and skin borders
	  • Lateral – at request of Radiologist

	• Extremity
	  • AP - include above and below ROI and bilateral skin borders
	  • Lateral - at request of Radiologist

• The X-ray needs to encompass the entire operative site and more than one X-ray may be required • The order must clearly state that it is a STAT intraoperative X-ray to rule out Retained Foreign Body and include a description of the missing item and a call back number for the surgeon • Portable X-ray (Flat Plate) images provide better quality and should always be done if possible