School of Radiography

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Routine Radiographic Procedure Manual

HERITAGE VALLEY KENNEDY
SCHOOL OF RADIOGRAPHY

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UPPER LIMB PROJECTIONS

A. BONE AGE

1. PA right hand, including wrist 10x12
2. PA left hand, including wrist 10x12

B. ELBOW

For pathology:
1. AP & lateral 10x12

For trauma:
1. AP & lateral 10x12
2. AP medial & lateral obliques 10x12

- Comparison: AP & lateral projections for patients 21 years of age or younger
- If patient can only partially extend elbow, do AP partial flexion of distal humerus & AP partial flexion of proximal forearm
- If patient's elbow is acutely flexed, do AP projection of distal humerus in acute flexion
- Special radial head projection:
    1. Pt. in lateral elbow position
    2. C.R. angled 45 degrees toward shoulder, entering area of radial head
- Special olecranon process projection: See Merrill's

C. FINGER (if ordered finger only)

1. PA, PA oblique & lateral 8x10

- three projections done of affected finger only
- Coned down to include entire finger & metacarpophalangeal joint
- All three projections done on one 8 x 10 cassette, crosswise

D. FOREARM

1. AP & lateral 14x17

- Include both joints

E. HAND

1. PA & PA oblique	10x12
2. Fan Lateral	8x10

- Rechecks: do full hand routine
- Comparison: PA & Fan lateral done on patients 3 yrs of age and younger

F. HAND, ATTENTION FINGER

- Do all three projections of the entire hand

- Do coned down lateral projection of affected finger only to include entire finger and metacarpophalangeal joint

- PA & oblique both done on one 10x12

- Fan lateral hand and lateral finger done on 8x10 cassette

G HUMERUS

1. AP	14x17
2. Lateral	14x17

For trauma:

1. AP	14x17
2. Transthoracic lateral	14x17

- Include both joints on all projections

H. WRIST

1. PA, PA oblique, & lateral	10x12

- Comparison: PA & lateral on patients 16 yrs of age & younger
- If carpal tunnel is indicated, do tangential projection
- If navicular is questioned, do navicular view (Stecher)

SHOULDER GIRDLE PROJECTIONS

A. ACROMIO-CLAVICULAR JOINTS

1. AP without weights (bilateral)	14x17 or (2) 10x12's
2. AP with weights (bilateral)	14x17 or (2) 10x12's

- Must be done erect
- Use 72"SID
- Mark films appropriately (with or without weights)

B. CLAVICLE

1. AP	10x12
2. AP axial	10x12

- Angle 15 - 30 degrees cephalad for axial projection (thin patients require more of an angle)
- Comparison: AP & AP axial on patients 16 years of age and younger

C. SCAPULA

1. AP	10x12
2. Lateral	10x12

- Comparison: AP & lateral on patients 16 years of age and younger

D. SHOULDER

1. AP internal rotation	10x12
2. AP external rotation	10x12
3. Y-lateral	10x12

SHOULDER, CONTINUED

Fracture:

1. AP, as is	10x12
2. Transthoracic lateral	10x12
3. Y-lateral (for dislocation)	10x12
4. Axillary	8x10

- Comparison: AP internal and external rotation on patients 16 years of age and younger UNLESS dislocation is demonstrated or suspected. If dislocation is demonstrated or suspected, also do comparison Y- lateral projection.

LOWER LIMB PROJECTIONS

A. ANKLE

1. AP & medial oblique	10x12
2. Lateral	8x10

- Comparison: AP and lateral projections done on patients 16 years of age and younger
- Recheck: AP & lateral only

B. FEMUR

1. AP upper	14x17
2. AP lower	10x12
3. Frog lateral upper	10x12
3. Lateral lower	14x17

- Include both joints
- Be sure to overlap
- Comparison: AP & lateral done for patients 16 years of age or younger

C. FOOT

1. AP & medial oblique	10x12
2. Lateral	
- additional lateral toe, if indicated	

- No separate toes to be done on AP & Oblique (if toes are indicated)
- Comparison: AP & lateral done on children 3 years of age and younger
- Rechecks: do full foot routine

D. FOOT, WEIGHT-BEARING

1. AP	10X12
2. Lateral	10X12

Weight Bearing Composite Method for Foot
10X12

- AP requires two projections. The first is done with tube in front of the patient with a CR angle of 15 degrees toward the tarsals. The second projection is made on the same cassette. The patient is instructed not to move the foot. The tube is positioned behind the patient with a CR angle of 25 degrees

toward the toes. The CR enters the posterior aspect of the ankle exiting at the level of the lateral malleolus.

E. KNEE

1. AP	10x12
2. AP axial (Tunnel)	10x12
3. Lateral	10x12
4. Tangential patella (if pain or injury to patella)	8x10

- Comparison: AP & lateral 18 years of age and younger

F. KNEE, WEIGHT-BEARING

1. AP erect (bilateral)	14x17
2. AP axial (Tunnel) of affected knee only	10x12
3. Lateral of affected knee only	10x12

G. LOWER LEG

1. AP	14x17
2. Lateral	14x17

- Include both joints
- No comparisons

H. OS CALSIS

1. Axial plantodorsal	8x10
2. Lateral	8x10

- Plantodorsal - CR forms a 40 degree angle with the long axis of the foot

HIP JOINT AND PELVIC GIRDLE

A. HIP

1. AP of affected hip	10x12
2. AP oblique of femoral neck (frog)	10x12

HIP- Trauma

1. AP of affected hip- as hip lies
2. Cross-table lateral of hip

- If patient has hip prosthesis, all of pin must be included
- Recheck after hip surgery: do AP and lateral only

B. PELVIS

1. AP	14X17
2. AP oblique (Frog)	14X17

- Femora abducted 45 degrees from vertical for frog

C. PELVIS, INLET/OUTLET, FERGUSON VIEW

1. AP pelvis with CR angled 30 degrees cephalad	14X17

D. PUBIC BONES (ANTERIOR PELVIC BONES)

1. AP	8X10
2. AP axial	8X10

- For males: angle CR 20 - 35 degrees cephalad (steeper angle for steeper pelvic tilt due to pronounced lordotic lumbar curve)
- For females: angle CR 30 - 45 degrees cephalad (steeper angle for steeper pelvic tilt due to pronounced lordotic lumbar curve)

CHEST PROJECTIONS

A. CHEST, ROUTINE

1. PA	14x17
2. Left lateral	14x17

B. CHEST, DECUBITUS

1. AP or PA projections done with pt in decubitus positions	14x17

- elevate thorax on sponge to include all anatomy of "side down" usually done bilaterally, however follow physician's order

C. CHEST, ASBESTOSIS SCREENING

1. PA	14x17
2. PA oblique in RAO position	14x17
3. PA oblique in LAO position	14x17
4. Left lateral	14x17

- Check films with radiologist

D. CHEST, PORTABLE

1. AP	14x17

- Done either erect or supine -- do not do semi-erect

E. CHEST, RECUMBENT

1. AP	14x17

- Use maximum SID obtainable

F. CHEST, STRETCHER

1. AP	14x17
2. Left lateral	14x17

G. CHEST, WHEELCHAIR

1. AP erect	14x17
2. Lateral erect (if possible)	14x17

BONY THORAX PROJECTIONS

A. RIBS

1. AP	14x17
2. AP oblique projection, pt. in RPO position	14x17
3. AP oblique projection, pt. in LPO position	14x17

- Should be done prone if injury is anterior
- For upper ribs, take exposure after full inspiration
- For lower ribs, take exposure after full expiration
- Include PA projection of chest if physician orders, ribs with chest
- Include PA & lateral projection if physician orders, ribs with 2view chest

B. STERNOCLAVICULAR JOINTS

1. PA	8x10
2. PA oblique projection, pt. in RAO position	8x10
3. PA oblique projection, pt. in LAO position	8x10

- Pt. rotated 10 - 15 degrees for obliques (demonstrates joint closest to film)

C. STERNUM

1. Left lateral	10x12
2. PA oblique projection, pt. in RAO position	10x12
3. PA oblique projection, pt. in LAO position	10x12

- Pt. Rotated 15 - 20 degrees for obliques
- Use breathing technique for oblique projections

SPINE PROJECTIONS

A. CERVICAL

1. Lateral	10x12
2. PA oblique, RAO position (erect)	10x12
3. PA oblique, LAO position (erect)	10x12
4. AP	8x10
5. Open mouth (odontoid)	8x10

-Lateral and obliques done using 72" SID
-Do Swimmer's (only if needed for C-7)
-Do Fuch's or Judd (only if needed for odontoid process)

B. CERVICAL, FLEXION & EXTENSION

1. Lateral in hyperflexion	10x12
2. Lateral in hyperextension	10x12

-Often done with routine cervical spine study

C. COCCYX

1. AP axial	8x10
2. Left Lateral	8x10

-Angle CR 10 degrees caudad for AP axial

D. LUMBAR

1. AP	14x17
2. AP axial sacrum	10x12
3. AP oblique in RPO position	14x17
4. AP oblique in LPO position	14x17
5. Left lateral	14x17
6. L5/S1, "spot"	8x10

-Patient rotated 45 degrees for obliques
-Thick elastic around waist should be removed

E. LUMBAR, FLEXION/EXTENSION

1. Lateral in hyperflexion	14x17
2. Lateral in hyperextension	14x17

-Do in upright bucky, if ordered erect
-Sometimes done with full lumbar spine study

F. SACROILIAC JOINTS

1. AP axial sacrum	10x12
2. AP oblique in RPO position	8x10
3. AP oblique in LPO position	8x10

-Angle CR 15 degree cephalad for AP axial
-Patient rotated 25-30 degrees for obliques

G. SACRUM

1. AP axial	10x12
2. Lateral	10x12

-Angle CR 15 degrees cephalad for AP axial

H. SCOLIOSIS STUDY

1. Erect PA of thoracic & lumbar spine	14x17
2. Left erect lateral of thoracic & lumbar spine	14x17

-Include all of thoracic & lumbar spine
-May need to use additional cassettes
-If a complete spine is ordered, all views are taken of each area
-In pediatric cases, PA and laterals only may be accepted. check with radiologist

I. THORACIC SPINE

1. AP	14x17
2. Left lateral	14x17
3. Swimmer's	10x12

-Utilize breathing technique for lateral

SKULL, SINUSES, & SALIVARY GLANDS

A. FACIAL BONES

1. AP axial, Townes	10x12
2. PA	10x12
3. PA axial, Caldwell (15 degree caudad CR angle)	10x12
4. Parietoacanthial, Waters	10x12
5. Erect parietoacanthial, Waters	10x12
5. Recumbent lateral	10x12
6. Erect lateral	10x12

B. MANDIBLE

1. AP axial, Townes	10x12
2. PA	8x10
3. Right axiolateral oblique	8x10
4. Left axiolateral oblique	8x10

- CR angle of 25 degrees cephalad for axiolateral obliques

C. MASTOIDS

1. AP axial, Townes	10x12
2. PA	8x10
3. Right and left axiolateral oblique, Stenvers	8x10
4. Right and left axiolateral oblique, Laws (or Shullers)	8x10

- If patient isn't allergic to tape, taping auricles forward for Stenvers and Laws will result in better film
- Stenvers: Pt prone or erect; rest head on forehead, nose & cheek; MSP forms 45 degree angle to film; CR is 12 degrees cephalad entering 3- 4" posterior and 1/2" inferior to upside EAM
- Laws: Pt in RAO or LAO position; head in true lateral; rotate MSP 15 degrees toward table; CR angled 15 degrees caudad entering 2" posterior and 2"superior to upside EAM

D. NASAL BONES

1. PA	8x10
2. Parietoacanthial, Waters	8x10
3. Right and left laterals	8x10

- All projections coned

E. OPTIC FORAMEN

- Done same as orbits

F. ORBITS

1. PA	8X10
2. Parietoacanthial	8x10
3. Right parieto-orbital (Rhese)	8x10
4. Left parieto-orbital (Rhese)	8x10
5. Lateral of affected side	8x10

- Rhese: Pt prone or erect; rest nose, cheek, & chin on table; AML perp to table; MSP forms 53 degree angle to table; CR perpendicular entering 1" uperior & 1" posterior to upside TEA
- Optic canal should lie in outer lower quadrant of "side down" orbit

G. PARANASAL SINUSES

1. PA, Caldwell	8x10
2. Parietoacanthial, Waters	8x10
3. Lateral of affected side	8x10
4. SMV	8x10

- All projections done erect
- Not all projections done on children 6 years of age and younger, check with radiologist

H. PETROUS PYRAMIDS

1. Right and left Mayers	8x10
2. Right and left Stenvers	8x10
3. Right and Left Schullers	8x10
4. SMV	

- refer to Merrills

I. SALIVARY GLANDS

1. For Parotid glands:

1. PA, soft tissue	8x10
2. Lateral, soft tissue	8x10
3. Axiolateral oblique for mandibular ramus	8x10

- Use contrast if doing Sialogram and do PA & lateral

2. For Submaxillary and Submandibular glands:

1. PA	8x10
2. Axiolateral oblique mandibles	8x10

- Refer to Merrills

J. TEMPOROMANDIUBLAR JOINTS

1. Right axiolateral with mouth open	8x10
2. Right axiolateral with mouth closed	8x10
3. Left axiolateral with mouth open	8x10
4. Left axiolateral with mouth closed	8x10

- CR angle 25 degrees cephalad, entering upside gonion
- When mouth is open mandibular condyle will be OUT of mandibular fossa
- Mark films as open or closed

K. SKULL

1. AP axial, Townes	10x12
2. PA	10x12
3. Parietoacanthial, Waters	10x12
4. Recumbent lateral of unaffected side	10x12
5. X-table lateral of affected side	

L. ZYGOMATIC ARCHES

1. AP axial, Townes	10x12
2. Parietoacanthial, Waters	8x10
3. Tangential Projection	8x10
- can be done superior-inferior or inferior-superior	8x10

ABDOMINAL PROJECTIONS

A. ABDOMEN

1. AP 14x17

- Include from diaphragms to base of bladder

B. ABDOMINAL SERIES:

1. AP abdomen, supine 14x17
   (to include from diaphragm to base of bladder)
2. AP abdomen, erect 14x17
   (to include diaphragm on both sides)
3. Left lateral decubitus 14x17 grid
   (to include diaphragm on both sides)

- Include projections of chest only if specified on physician's order
- All projections should be taken after expiration
- Free air is best demonstrated if pt. lies on left side 15 minutes prior to exam
- If abdomen is ordered erect, do full abdominal series

C. FOR ANEURYSM:

1. AP abdomen, supine 14x17
2. Lateral abdomen 14x17

D. FOR FOREIGN BODIES:

1. AP & lateral chest
2. AP & lateral abdomen

- All artifacts should be removed (pins, snaps)
- Nasopharynx to pubis should be included on films
- Do chest & abdomen on one image if possible

E. FOR RENAL CALCULI:

1. KUB 14x17
2. AP bladder, if needed 10x12

- Be sure to include from top of kidneys to base of bladder
- Should be done after expiration

FLUOROSCOPY

- Fluoro is done with the digital camera in C-room
- Overhead projections for UGIs and esophagrams are not always required by the radiologist

Radiologists may vary fluoroscopic procedures, according to their preference

A. BARIUM ENEMA, DOUBLE CONTRAST (AIR)

1. AP abdomen (survey) 10x12

- Connect air tubing and pump
- Enema tip inserted
- Digital fluoroscopy done by radiologist

Images taken:

2. AP 14x17
- take AP high crosswise, if needed 14x17
3. AP oblique with patient in LPO position 14x17
4. AP oblique with patient in RPO position 14x17
5. Right lateral 14x17
6. Right lateral decubitus 14x17 (grid)
7. Left lateral decubitus 14x17 (grid)
8. PA 14x17
9. AP angled sigmoid 14x17
10. Cross-table lateral rectum (ventral decubitus position) 14x17 (grid)
-enema tipped removed

B. BARIUM ENEMA, SINGLE CONTRAST:

1. AP abdomen (survey) 14x17

- Use powdered barium mixed with 1500CC of cold water
- Enema tip inserted
- Digital fluoroscopy done by radiologist

BARIUM ENEMA, SINGLE CONTRAST, CONTINUED

Images taken:

2. AP	14x17
- take AP high crosswise, if needed	14x17
3. AP oblique with patient in LPO position	14x17
4. AP oblique with patient in RPO position	14x17
5. Right lateral	14x17
6. PA	14x17
7. AP sigmoid	14x17

- Enema tip should be removed before patient gets off table

8. AP abdomen, post evacuation	14x17

C. ESOPHAGRAM (BARIUM SWALLOW)

- Use thick (E-Z-HD Barium) & thin (E-Z Paque Barium)
- Some radiologists use air crystals
- Barium tables sometimes used

- Pt. usually started in erect position

-Overheads that may be taken while the patient drinks barium include:

1. PA esophagus (coned)	14x17
2. PA oblique of esophagus (coned) pt. in RAO position	14x17
3. PA oblique of esophagus (coned) pt. in LAO position	14x17
4. Lateral esophagus (coned)	14x17

D. MODIFIED BARIUM SWALLOW (COOKIE SWALLOW)

- done in conjunction with Speech Pathologist
- video camera used

E. SMALL BOWEL STUDY

1. AP abdomen survey	14x17

- Pt. drinks Ultra-R Barium Sulfate Suspension mixed with water

SMALL BOWEL STUDY, CONTINUED

- Timed images:
  - 0 minute
  - 15 minute
  - 30 minute
  - 1 hr

-Always check with radiologist after each image is taken
- Ultra-R is powdered and must be mixes with H2O

F. UGI

1. AP abdomen, survey 14x17
2. Table put in erect position, patient in upright position
3. Radiologist gives pt. air crystals
4. Digital fluoro taken with pt. drinking thick Ba
5. Table then placed horizontal, pts. rolls
6. Pt. drinks thin Ba while in RAO position

Images that may be taken upon radiologist's request:

1. AP 14x17
Centered slightly above crest to include fundus of stomach
2. Rt. lateral 10x12
3. PA oblique with pt. in RAO position 10x12

- Thick barium is E-Z-HD Sulfate Suspension
- Thin barium is E-Z Paque Barium Sulfate Suspension

G. UGI/SMALL BOWEL

- Follow UGI routine
- After UGI, pt. drinks Ultra-R
- Take timed AP abdomen for Immediate image and then 30 minutes and then take a projections every 1 hour until Barium reaches the ileocecal valve

UGI/SMALL BOWEL, CONTINUED

Timed overheads:

0 minute
15 minute
30 minute
1 hr

- Check all timed images with radiologist
- AP and AP oblique spot images of the TI spots may be done using the compression paddle

MISCELLANEOUS PROJECTIONS

A. BONE SURVEY

1. PA skull	10x12
2. Lateral skull	10x12
3. AP thoracic spine	14x17
4. Lateral thoracic spine	14x17
5. AP lumbar spine	14x17
6. Lateral lumbar spine	14x17
7. AP pelvis	14x17
8. AP bilateral femora	10x12 & 14x17
9. AP bilateral humeri	14x17
10. AP bilateral ribs	14x17

B. SOFT TISSUE NECK

1. AP	10x12
2. Lateral	10x12

- Instruct patient to inhale a steady stream of air through nose while projection is imaged

C. Contra-Lateral

The following exams and ages of patients require comparison or "Contra-lateral" projections:

Hand -3 yrs of age and younger (PA & lateral)
Wrist -16 yrs of age and younger (PA & lateral)
Ankle -16 yrs of age and younger (AP & lateral)
Shoulder -16 yrs of age and younger (AP internal & external, unless dislocation is demonstrated or suspected, then comparison Y-lateral also)

Scapula -16 yrs of age and younger (AP & lateral)
Clavicle -16 yrs of age and younger (AP & AP axial)
Femur -16 yrs of age and younger (AP & lateral)
Knee -18 yrs of age and younger (AP & lateral)
Elbow -21 yrs of age and younger (AP & lateral

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