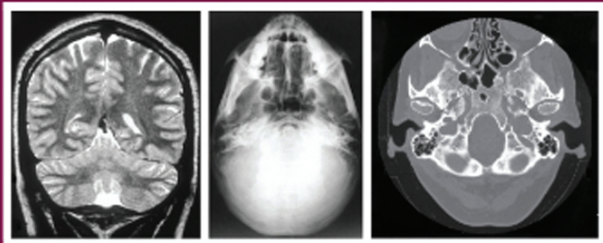


MERRILL'S

POCKET GUIDE to RADIOGRAPHY

Twelfth Edition

Eugene D. Frank
Bruce W. Long
Barbara J. Smith



The Following Abbreviations Are Used throughout the Pocket Guide

Abbreviation	Definition	Abbreviation	Definition
AC	Acromioclavicular	MCP	Metacarpophalangeal
AML	Acanthomeatal line	MTP	Metatarsophalangeal
AP	Anteroposterior	OID	Object-to-image-receptor distance
ASIS	Anterior superior iliac spine	OML	Orbitomeatal line
C	Cervical spine	PA	Posteroanterior
cm	Centimeters	PIP	Proximal interphalangeal
EAM	External acoustic meatus	RAO	Right anterior oblique
in	Inches	RPO	Right posterior oblique
IOML	Infraorbitomeatal line	RUQ	Right upper quadrant
kVp	Kilovolt (peak)	S	Sacrum
L	Lumbar spine	SID	Source-to-image-receptor distance
LAO	Left anterior oblique	T	Thoracic spine
LPO	Left posterior oblique	TMJ	Temporomandibular joint

MERRILL'S

POCKET GUIDE
to RADIOGRAPHY

M E R R I L L ' S

POCKET GUIDE
to RADIOGRAPHY

Twelfth Edition

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Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary.

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Merrill's Pocket Guide to Radiography concisely presents essential positioning information for the most frequently requested projections in a format designed for quick reference. This edition offers step-by-step explanations of methods to position the patient and body part for more than 150 of the most commonly requested radiography projections, including mobile.

Its format makes the *Pocket Guide* particularly easy to use, with each projection presented in a broadside, two-page spread. Each projection presentation includes the following information:

- Patient position
- Part position
- Central ray angulation
- Collimation
- kVp photograph of properly positioned patient
- Footnote that references information in the 11th edition of *Merrill's Atlas*

- CR information—a special digital radiography icon to alert the radiographer to projections that may need adjustment when CR or DR is used
- Exposure technique chart with space for writing manual and automatic exposure control (AEC) technical factors (a sample of this chart with instructions for completion may be found on the next page after the contents)
- Competency check-off for students—a special space in each projection for the instructor to fill in the date and sign off after the student has demonstrated competency for that projection
- Specific collimation sizing for use with DR systems

Features designed to enhance the utility of the *Pocket Guide* include section dividers with tabs, which make finding the beginning of each section easier, and abbreviations and external landmarks printed on the inside of the covers for quick reference.

Preface

The *Pocket Guide* has grown in use by students and radiographers since it was first published in 1989. Many new features have been added since that time. Recent additions have included digital radiography notations, digital collimation, charts for automatic exposure control (AEC) techniques, and compensating filter notations. The *Pocket Guide* can also be used to keep a record of student competencies. The 6th edition is the most full-featured edition with the inclusion of an optimal radiograph for each projection.

We are encouraged that the *Pocket Guide* is the most widely used guide among students. Users are encouraged to send us suggestions for improvements. We sincerely hope you will find this edition of the *Pocket Guide* useful in your everyday work as a radiographer.

Recognition of Previous Author

The authors thank Philip W. Ballinger, PhD, RT(R), FAEIRS, FASRT, the second author of *Merrill's Atlas*, for his work on the previous five editions of this *Pocket Guide*. Dr. Ballinger developed the concept of providing students with a pocket-sized “guide” containing the essential projections of the *Atlas* in 1987. The *Pocket Guide* has proven to be a very popular and valuable resource for radiography students since that time.

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How to Use the Technical Factors Chart

Part Thickness

A given technique always depends on the thickness of the body part.

A given technique always depends on the thickness of the body part.

mA
Set an mA that enables use of the small focal spot whenever possible.

Set an mA that enables use of the small focal spot whenever possible.

kVp
The kVp should be set to penetrate the body part and ensure a given contrast.

The kVp should be set to penetrate the body part and ensure a given contrast.

Time

Time always varies with part thickness and respiration considerations.

Time always varies with part thickness and respiration considerations.

CR, DR Exposure Indicator
Indicate the exposure index, S number, or REX number.

Indicate the exposure index, S number, or REX number.

HF, 1Ø, or 3Ø
Always indicate the generator phase. A 3Ø 12p requires 50% less mAs than a 1Ø 2p. A 1Ø 2p requires 50% more mAs than a 3Ø 12p.*

Always indicate the generator phase. A 3Ø 12p requires 50% less mAs than a 1Ø 2p. A 1Ø 2p requires 50% more mAs than a 3Ø 12p.*

[illegible]

AEC Factors									
Part Thickness (cm)	mA	kVp	AEC Detector	Density Comp.	SID	IR Size	CR, DR Exposure Indicator	Grid	HF 1Ø or 3Ø
21	200	80		0	48"	14 × 17	400	12:1	3Ø 12p

Detectors

Shade in the detector or detectors used for the body part.

Density Compensation

Indicate if a +1 or +2 or a -1 or -2 compensation is required for the exposure.

Digital Indicator

The exposure index for the system in use and projection should be entered here.

Example of the way technical factors would be entered for an AP projection of the pelvis in two different rooms. One room uses AEC, and the other uses manual technical factors.

**See imaging textbooks for other 1Ø and 3Ø variables.*

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Second through Fifth Digits

PA

Patient Position

- Seat patient at end of radiographic table.

Part Position

- Separate and center extended digit of interest with palmar surface of hand firmly against IR.
- Separate digits slightly.
- Employ lead shielding for radiation safety; this is recommended for all upper limb radiographs.

Central Ray

- Perpendicular entering PIP joint of digit being examined

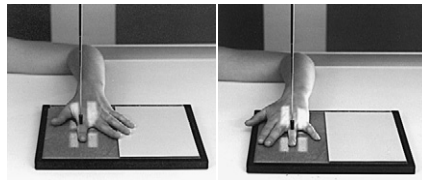
Collimation:

1 inch (2.5 cm) all sides of digit, including 1 inch (2.5 cm) proximal to MCP joint

COMPUTED RADIOGRAPHY



- Place digit in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield.



kVp: 54

Reference: 12th edition ATLAS p. 1:110.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Second through Fifth Digits

Lateral

Patient Position

- Seat patient at end of radiographic table.

Part Position

- Demonstrate position for patient. Ask patient to extend digit of interest and close rest of digits into a fist.
- Adjust digit of interest parallel to IR plane.
- Rest digit on lateral or medial surface as needed to obtain smallest possible OID.
- Immobilize extended digit. (Use cotton swab or tape.)
- Employ lead shielding for radiation safety.

Central Ray

- Perpendicular entering PIP joint

Collimation:

1 inch (2.5 cm) all sides of digit, including 1 inch (2.5 cm) proximal to MCP joint

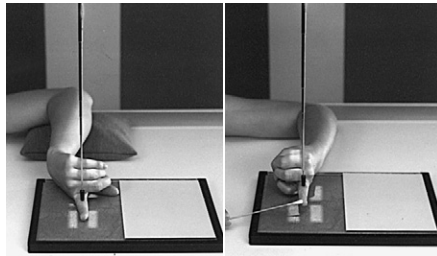
COMPUTED RADIOGRAPHY



- Place digit in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield.

kVp: 54

Reference: 12th edition ATLAS p. 1:112.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Second through Fifth Digits

PA oblique

Patient Position

- Seat patient at end of radiographic table.

Part Position

- Place patient's hand in lateral position, ulnar side down and centered to IR area.
- Rotate palm 45 degrees toward IR until digits are resting on support.
- Immobilize separated digits.
- Employ lead shielding for radiation safety.

Central Ray

- Perpendicular entering PIP joint

Collimation:

1 inch (2.5 cm) all sides of digit, including 1 inch (2.5 cm) proximal to MCP joint

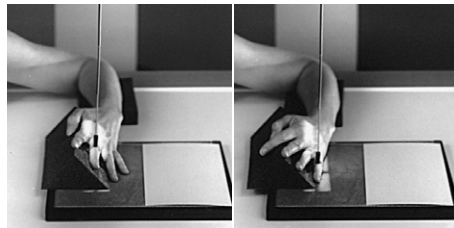
COMPUTED RADIOGRAPHY



- Place digit in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead.

kVp: 54

Reference: 12th edition ATLAS p. 1:114.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

First Digit (Thumb)

AP

Patient Position

- Seat patient at end of radiographic table.

Part Position

- Place affected hand in extreme internal rotation, with first digit centered to IR area.
- Adjust position of hand to secure true AP projection of first digit.
- Extend and secure digits two through five to eliminate superimposition over first digit.
- Employ lead shielding for radiation safety.

Central Ray

- Perpendicular entering MCP joint of first digit

Collimation:

1 inch (2.5 cm) all sides of digit, including 1 inch (2.5 cm) proximal to CMC joint

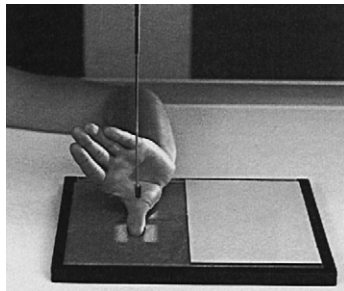
COMPUTED RADIOGRAPHY



- Place digit in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield.

kVp: 54

Reference: 12th edition ATLAS p. 1:116.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

First Digit (Thumb)

Lateral

Patient Position

- Seat patient at end of radiographic table.

Part Position

- Have patient rest palmar surface of hand on IR.
- Adjust arching of hand until true lateral position of first digit is achieved.
- Employ lead shielding for radiation safety.

Central Ray

- Perpendicular entering MCP joint of first digit

Collimation:

1 inch (2.5 cm) all sides of digit, including 1 inch (2.5 cm) proximal to CMC joint

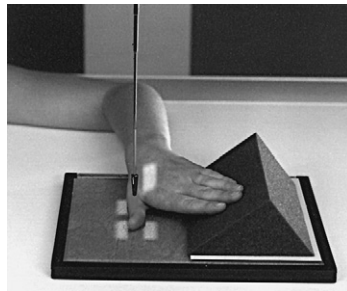
COMPUTED RADIOGRAPHY



- Place digit in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield.

kVp: 54

Reference: 12th edition ATLAS p. 1:116.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

First Digit (Thumb)

PA oblique

Patient Position

- Seat patient at end of radiographic table.

Part Position

- Abduct first digit.
- Place palmar surface of hand firmly against IR, and adjust first digit to oblique position.
- Employ lead shielding for radiation safety.

Central Ray

- Perpendicular entering MCP joint of first digit

Collimation:

1 inch (2.5 cm) all sides of digit, including 1 inch (2.5 cm) proximal to CMC joint

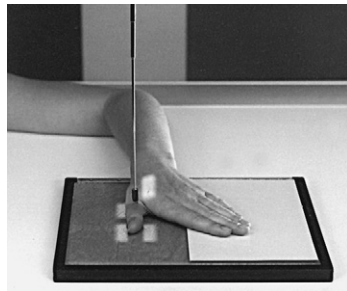
COMPUTED RADIOGRAPHY



- Place digit in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield.

kVp: 54

Reference: 12th edition ATLAS p. 1:117.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Hand PA

Patient Position

- Seat patient at end of radiographic table.

Part Position

- Rest forearm on table with palmar surface firmly against IR.
- Spread digits slightly.
- Employ lead shielding for radiation safety.

Central Ray

- Perpendicular to third MCP joint

Collimation:

1 inch (2.5 cm) all sides of hand including 1 inch (2.5 cm) proximal to ulnar styloid

COMPUTED RADIOGRAPHY



- Place hand in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.

kVp: 54

Reference: 12th edition ATLAS p. 1:124.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Hand

PA oblique

Patient Position

- Rest forearm on table with hand on IR in prone position, palm down.

Part Position

- Rotate hand laterally (externally), and place digits on 45-degree radiolucent support to show interphalangeal joints.
- Adjust digits parallel with IR.
- When metacarpals are area of primary interest, rotate hand laterally so that fingertips touch IR.

Central Ray

- Perpendicular to third MCP joint

Collimation:

1 inch (2.5 cm) all sides of hand including 1 inch (2.5 cm) proximal to ulnar styloid

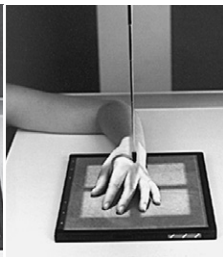
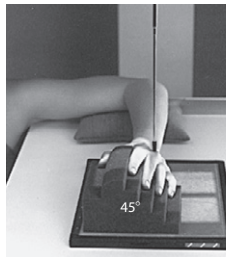
COMPUTED RADIOGRAPHY



- Place hand in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.

kVp: 57

Reference: 12th edition ATLAS p. 1:126.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Hand Lateral

Patient Position

- Rest ulnar surface of forearm on table with hand in true lateral position.

Part Position

- Extend digits with first digit (thumb) placed at right angles to palm of hand. As an option, have patient “fan” fingers and place on positioning sponge to reduce superimposition of phalanges (as illustrated).
- Center MCP joints to IR, and adjust palmar surface of hand perpendicular to IR.

Central Ray

- Perpendicular to second MCP joint

Collimation:

1 inch (2.5 cm) all sides of shadow of hand and thumb, including 1 inch (2.5 cm) proximal to ulnar styloid

COMPUTED RADIOGRAPHY



- Place hand in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.

kVp: 60

Reference: 12th edition ATLAS p. 1:128.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Wrist

PA

Patient Position

- Seat patient at end of table with axilla in contact with table.
- Have patient rest forearm on table.

Part Position

- Center wrist to IR area.
- Flex digits slightly to place wrist in contact with IR.

Central Ray

- Perpendicular to midcarpal area

Collimation:

2.5 inches (6 cm) proximal and distal to wrist joint and 1 inch (2.5 cm) on the sides

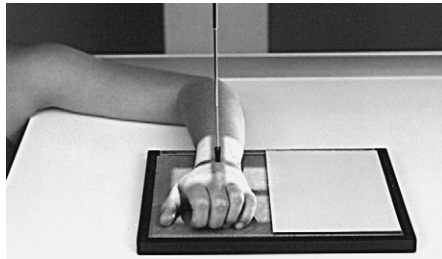
COMPUTED RADIOGRAPHY



- Place wrist in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.

kVp: 54

Reference: 12th edition ATLAS p. 1:132.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Wrist

Lateral

Patient Position

- Flex elbow 90 degrees, with forearm and arm in contact with table.

Part Position

- Center carpals to IR, and adjust hand so that wrist is in true lateral position.

Central Ray

- Perpendicular to wrist joint

Collimation:

2.5 inches (6 cm) proximal and distal to wrist joint and 1 inch (2.5 cm) on palmar and dorsal surfaces

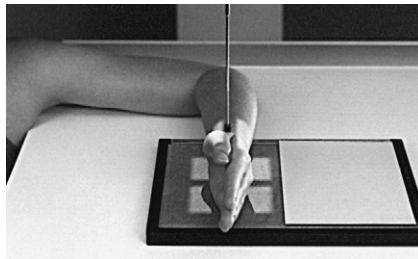
COMPUTED RADIOGRAPHY



- Place wrist in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.

kVp: 60

Reference: 12th edition ATLAS p. 1:134.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Wrist

PA oblique

Patient Position

- Seat patient at end of table with axilla in contact with table.
- Rest anterior surface of wrist on IR.

Part Position

- Center wrist to IR area.
- From true PA, rotate wrist approximately 45 degrees laterally (externally) and support on sponge.

Central Ray

- Perpendicular to IR entering midcarpal area just distal to radius

Collimation:

2.5 inches (6 cm) proximal and distal to wrist joint and 1 inch (2.5 cm) on sides

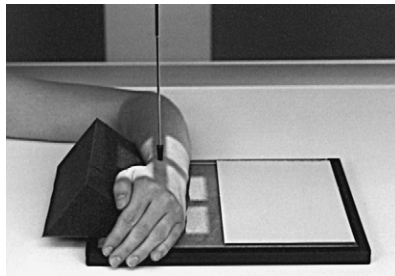
COMPUTED RADIOGRAPHY



- Place wrist in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.

kVp: 57

Reference: 12th edition ATLAS p. 1:136.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Wrist

PA: ulnar deviation

Patient Position

- Flex elbow 90 degrees, with forearm and arm in contact with table.

Part Position

- Center wrist to IR area.
- Bend hand outward until wrist is in extreme ulnar deviation.

Central Ray

- Perpendicular to scaphoid

NOTE: If necessary to delineate fracture, angle central ray 10 to 15 degrees proximally (toward elbow) or distally.

Collimation:

2.5 inches (6 cm) proximal and distal to wrist joint and 1 inch (2.5 cm) on sides

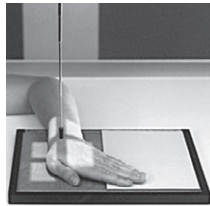
COMPUTED RADIOGRAPHY



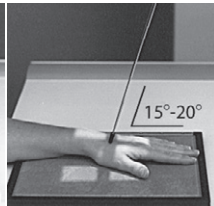
- Place wrist in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.

kVp: 54

Reference: 12th edition ATLAS p. 1:138.



Wrist with ulnar deviation.



Angulation of central ray.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

WRIST

PA axial **STECHER METHOD**

Patient Position

- Seat patient with arm and axilla in contact with table.

Part Position

- Place one end of IR on a support, and adjust so that finger end is elevated 20 degrees.
- Center wrist to center of IR.

Central Ray

- Perpendicular to table, and position to enter scaphoid

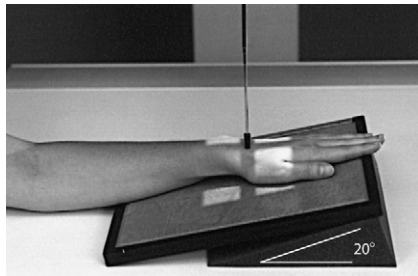
Collimation:

2½ inches (6 cm) proximal and distal to wrist joint and 1 inch (2.5 cm) on sides

COMPUTED RADIOGRAPHY



- Place wrist in central area of IR with four collimator margins.
- Cover exposed and unexposed areas with lead shield for two images on one IR.



kVp: 54

Reference: 12th edition ATLAS p. 1:140.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Carpal Canal

Tangential **GAYNOR-HART METHOD**

Patient Position

- Seat patient with forearm parallel with long axis of table.

Part Position

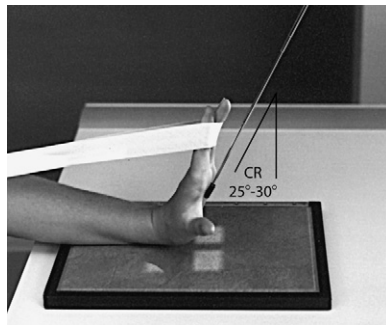
- Hyperextend wrist, and center it to center of IR.
- Place $\frac{3}{4}$ -inch radiolucent pad under lower forearm for support.
- Adjust hand position to make long axis of hand as vertical as possible.
- Have patient grasp digits with opposite hand to hold in extended position, or pull with a band (as shown).

Central Ray

- Direct to palm of hand 1 inch (2.5 cm) distal to base of third metacarpal at 25- to 30-degree angle

Collimation:

1 inch (2.5 cm) on the three sides of shadow of wrist



kVp: 65

Reference: 12th edition ATLAS p. 1:146.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Forearm

AP

Patient Position

- Seat patient at end of table with arm extended and entire limb in same plane.

Part Position

- Supinate hand, and center forearm to IR to include joint or joints of interest.
- Adjust rotation to place humeral epicondyles equidistant from IR.

Central Ray

- Perpendicular to midpoint of forearm

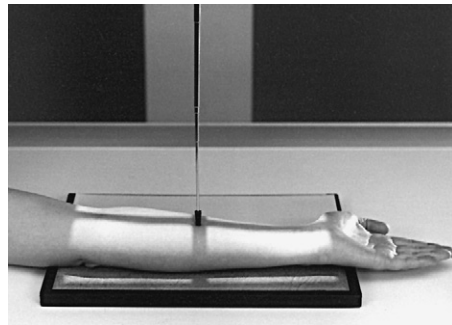
Collimation:

2 inches (5 cm) distal to wrist joint and proximal to elbow joint, and 1 inch (2.5 cm) on sides

COMPUTED RADIOGRAPHY



- Four collimator margins must be shown or none at all.



kVp: 60

Reference: 12th edition ATLAS p. 1:148.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Forearm

Lateral

Patient Position

- Seat patient at end of table with humerus and forearm in contact with table.
- Have patient flex elbow, and position entire limb in same plane.

Part Position

- Flex elbow 90 degrees, and adjust hand to lateral position (thumb up).
- Center forearm to IR to include joint or joints of interest.

Central Ray

- Perpendicular to midpoint of forearm

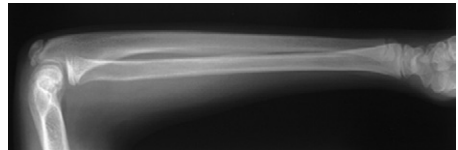
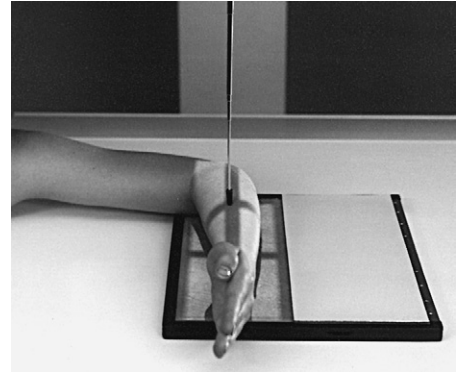
Collimation:

2 inches (5 cm) distal to wrist joint and proximal to elbow joint, and 1 inch (2.5 cm) on sides

COMPUTED RADIOGRAPHY



- Four collimator margins must be shown or none at all.



kVp: 60

Reference: 12th edition ATLAS p. 150.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Elbow

AP

Patient Position

- Seat patient at end of table with arm extended and entire limb in same plane.

Part Position

- Extend elbow, supinate hand, and center elbow joint to IR.
- Adjust humeral epicondyles to be equidistant from IR.
- Have patient lean slightly laterally if necessary to ensure AP alignment.

Central Ray

- Perpendicular to elbow joint

Collimation:

3 inches (8 cm) proximal and distal to elbow joint and 1 inch (2.5 cm) on sides

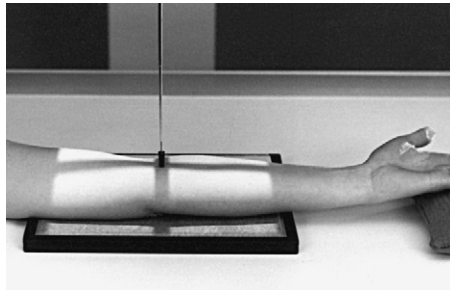
COMPUTED RADIOGRAPHY



- Four collimator margins must be shown or none at all.

kVp: 60

Reference: 12th edition ATLAS p. 1:151.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Elbow

Lateral

Patient Position

- Seat patient at end of table with elbow flexed 90 degrees.
- Have patient rest humerus and forearm on table, and position entire limb in same plane.

Part Position

- Center 90-degree flexed elbow joint to IR, and adjust wrist and hand in lateral position.
- Adjust humeral epicondyles perpendicular to IR.

Central Ray

- Perpendicular to elbow joint

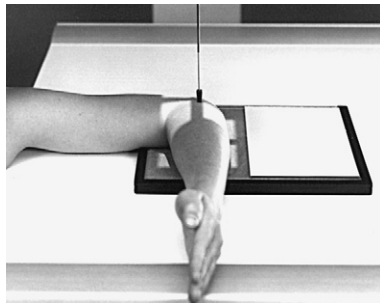
Collimation:

3 inches (8 cm) proximal and distal to elbow joint

COMPUTED RADIOGRAPHY



- Four collimator margins must be shown or none at all.



kVp: 60

Reference: 12th edition ATLAS pp. 1:152.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Elbow

AP oblique (medial rotation)

Patient Position

- Seat patient at end of table with arm extended and entire limb in same plane.

Part Position

- Pronate hand.
- Medially rotate arm.
- Adjust anterior surface of elbow (epicondyles) to 40 to 45 degrees.

Central Ray

- Perpendicular to IR entering elbow joint

Collimation:

3 inches (8 cm) proximal and distal to elbow joint and 1 inch (2.5 cm) on sides

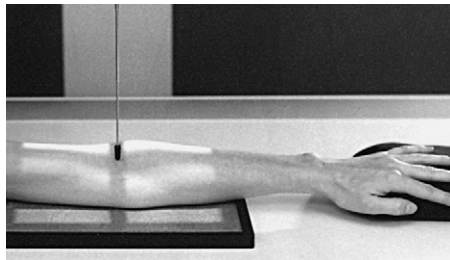
COMPUTED RADIOGRAPHY



- Four collimator margins must be shown or none at all.

kVp: 60

Reference: 12th edition ATLAS p. 1:154.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Elbow

AP oblique (lateral rotation)

Patient Position

- Seat patient at end of table with arm extended and entire limb in same plane.

Part Position

- Rotate hand laterally.
- Adjust posterior surface of elbow (epicondyles) to 40 degrees to IR.

Central Ray

- Perpendicular to IR entering elbow joint

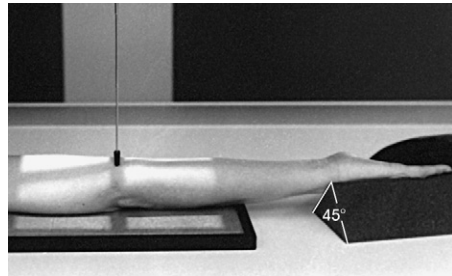
Collimation:

3 inches (8 cm) proximal and distal to elbow joint and 1 inch (2.5 cm) on sides

COMPUTED RADIOGRAPHY



- Four collimator margins must be shown or none at all.



kVp: 60

Reference: 12th edition ATLAS p. 1:155.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Elbow

AP partial flexion

Patient Position

- Seat patient at end of table with humerus resting on table for one image and forearm resting on table for second image.

Part Position

Distal humerus:

- Place humerus on table.
- Support forearm.
- Supinate hand if possible.
- Center elbow joint to IR.

Proximal forearm:

- Place dorsal surface of forearm on table.
- Center elbow to IR.

Central Ray

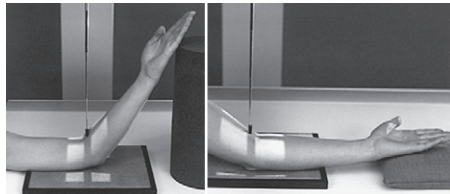
- Direct perpendicular to IR entering elbow joint

Collimation:

3 inches (8 cm) proximal and distal to elbow joint and 1 inch (2.5 cm) on sides

kVp: 65

Reference: 12th edition ATLAS pp. 1:156-157.



AP distal humerus. AP proximal forearm.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Humerus

AP

Patient Position

- Position patient erect or supine.

Part Position

- Unless contraindicated, supinate hand.
- Adjust humerus with epicondyles parallel with IR.
- If patient is recumbent, elevate and support opposite shoulder.
- Center humerus to IR.

Respiration:

Obtain radiograph during suspended respiration.

Central Ray

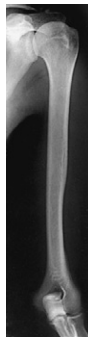
- Perpendicular to midpoint of humerus

Collimation:

2 inches (5 cm) distal to elbow joint and superior to shoulder and
1 inch (2.5 cm) on sides

kVp: 70

Reference: 12th edition ATLAS p. 1:167.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Humerus

Lateral

Patient Position

- Position patient erect or supine.

Part Position

- Unless contraindicated, slightly abduct arm.
- Center arm to IR.
- Medially rotate shoulder until epicondyles are perpendicular to IR.

Respiration:

Suspend.

Central Ray

- Perpendicular to midpoint of humerus

NOTE: An alternative method is to have patient assume lateral recumbent position, place IR against thorax, and use perpendicular central ray (see 12th edition ATLAS p. 1:171).

Collimation:

2 inches (5 cm) distal to elbow joint and superior to shoulder and 1 inch (2.5 cm) on sides

kVp: 70

Reference: 12th edition ATLAS p. 1:170.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Proximal Humerus/Shoulder

Transthoracic lateral LAWRENCE METHOD

Patient Position

- Position patient erect or supine.

Part Position

- Raise uninjured arm, and rest it on or beside head.
- Elevate uninjured shoulder as much as possible.
- Adjust patient to project humerus between vertebral column and sternum.
- Unless contraindicated, adjust humeral epicondyles perpendicular to IR.

Respiration:

Suspend.

Central Ray

- Perpendicular to midcoronal plane, exiting surgical neck of affected humerus. If patient cannot elevate unaffected shoulder, angle central ray 10 to 15 degrees cephalad.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 1:192.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Shoulder

AP

Patient Position

- Position patient erect or supine.

Part Position

- Center a point 1 inch (2.5 cm) inferior to coracoid process to IR.
- Adjust hand in (1) external rotation, (2) neutral rotation, or (3) internal rotation.

Respiration:

Suspend.

Central Ray

- Direct perpendicular to point 1 inch (2.5 cm) inferior to coracoid process

Collimation:

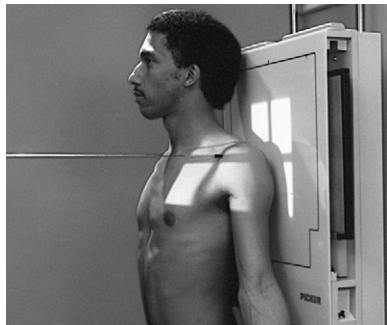
Adjust to 10×12 inches (24×30 cm).

COMPENSATING FILTER

- Shoulder filter greatly improves radiographic quality.

kVp: 75

Reference: 12th edition ATLAS p. 1:183.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Shoulder Joint

AP oblique GRASHEY METHOD

Patient Position

- Position patient erect or supine.

Part Position

- Center IR to scapulohumeral joint. The joint is 2 inches (5 cm) medial and 2 inches (5 cm) inferior to superolateral border of shoulder.
- Rotate body 35 to 45 degrees toward affected side.
- Abduct arm slightly with palm of hand on abdomen.

Respiration:

Suspend.

Central Ray

- Perpendicular to IR

Collimation:

Adjust to 8×10 inches (24×30 cm).

kVp: 75

Reference: 12th edition ATLAS p. 1:188.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Shoulder

Inferosuperior axial **LAWRENCE METHOD**

Patient Position

- Position patient supine with head, affected shoulder, and elbow elevated 3 inches (8 cm).

Part Position

- Abduct affected arm 90 degrees from body.
- Keep arm in external rotation, and support on pillow or sandbags.
- Place IR above shoulder as close to neck as possible.
- Turn patient's head away from side being examined.

Respiration:

Suspend.

Central Ray

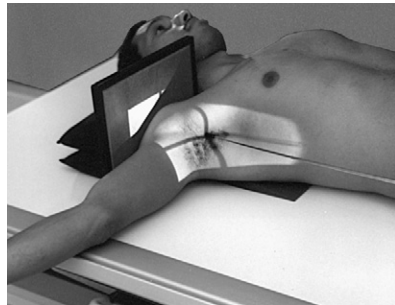
- Horizontally through axilla to exit region of acromioclavicular joint.
Direct 15 to 30 degrees medially.

Collimation:

Adjust 12 inches (30 cm) in length and 1 inch (2.5 cm) above anterior shadow of shoulder.

kVp: 75

Reference: 12th edition ATLAS p. 1:194.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Shoulder (Scapular Y)

PA oblique

Patient Position

- Position patient erect or prone oblique. Erect position is preferred when shoulder is tender.

Part Position

- Center anterior surface of affected shoulder to IR.
- Palpate scapular borders, and rotate patient so that midcoronal plane forms 45- to 60-degree angle from IR.

Respiration:

Suspend.

Central Ray

- Perpendicular to shoulder joint at level of scapulohumeral joint

Collimation:

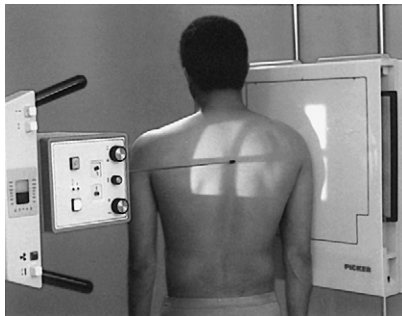
Adjust to 12 inches (30 cm) in length and 1 inch (2.5 cm) to lateral shadow.

COMPENSATING FILTER

- Shoulder filter greatly improves radiographic quality.

kVp: 85

Reference: 12th edition ATLAS p. 1:199.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Acromioclavicular Articulations

AP PEARSON METHOD

Patient Position

- Position patient upright if condition permits.

Part Position

- Adjust midpoint of IR to level of acromioclavicular (AC) joints.
- Center midsagittal plane of body to midline of IR if both AC joints can be shown on one radiograph. Otherwise, center to each individual AC joint for two separate exposures.
- To show AC separation, attach sandbags of equal weight to each wrist and obtain a second radiograph without weights.

Respiration:

Suspend.

Central Ray

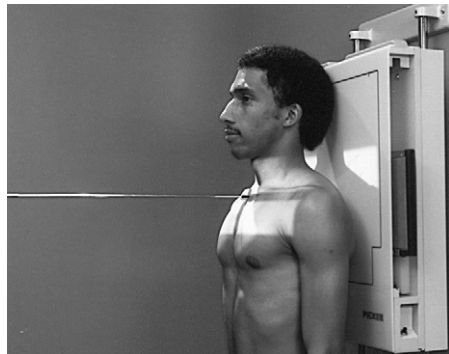
- Perpendicular to IR midway between AC joints (for one exposure)
or perpendicular to each AC joint (for two exposures)

Collimation:

Adjust to 6×17 inches (15×43 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:209.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Clavicle

AP

Patient Position

- Position patient erect or supine.

Part Position

- Center clavicle to center of IR, midway between midline of body and lateral border of shoulder.
- Turn patient's head away from affected side.

Respiration:

Suspend.

Central Ray

- Perpendicular to midshaft of clavicle

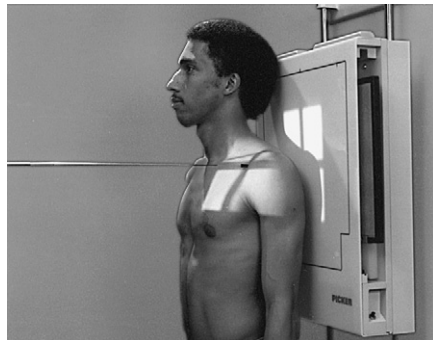
NOTE: If necessary to decrease part-IR distance and to improve recorded detail, obtain PA clavicle. Place patient facing grid using perpendicular central ray, and position using above-mentioned landmarks.

Collimation:

Adjust to 8×12 inches (18×30 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:213.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Clavicle

AP axial

Patient Position

- Position patient erect or supine.

Part Position

- Center clavicle to lower third of IR, midway between midsagittal plane and lateral border of shoulder.
- Turn patient's head away from affected side if necessary.

Respiration:

Suspend.

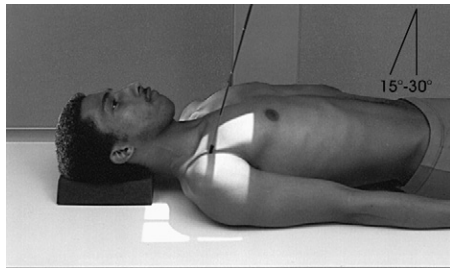
Central Ray

- Angled 15 to 30 degrees cephalad centered to midshaft of clavicle

NOTE: If necessary to decrease part-IR distance and to improve recorded detail, obtain PA axial clavicle. Place patient facing grid using 15 to 20 degrees caudal central ray angulation.

Collimation:

Adjust to 8×12 inches (18×30 cm).



kVp: 70

Reference: 12th edition ATLAS p. 1:214.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Scapula

AP

Patient Position

- Position patient supine or upright. Upright position is preferred when shoulder is tender.

Part Position

- Abduct arm to a right angle to body, flex elbow, and support hand.
- Center palpated scapular area to IR approximately 2 inches (5 cm) inferior to coracoid process.

Respiration:

Slow breathing

Central Ray

- Perpendicular to IR at mid-scapular area approximately 2 inches (5 cm) inferior to coracoid process

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 75

Reference: 12th edition ATLAS p. 1:216.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Scapula

Lateral

Patient Position

- Position patient prone oblique or upright. Upright position is preferred when shoulder is tender.

Part Position

- Place patient in oblique position 45 to 60 degrees, and center affected scapula to IR.
- Extend affected arm across anterior or posterior thorax to show body of scapula.
- Palpate medial and lateral borders of scapula, and adjust body rotation so that scapula is lateral and is projected free of rib cage.

Respiration:

Suspend.

Central Ray

- Perpendicular to IR, and position to medial border of protruding scapula

Collimation:

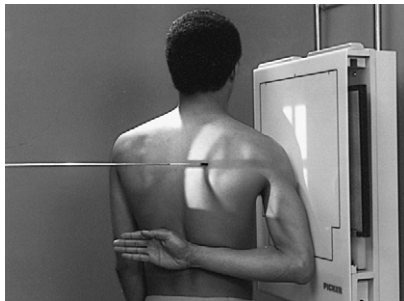
Adjust to 12 inches (30 cm) in length and 1 inch (2.5 cm) to lateral shadow.

COMPENSATING FILTER

- Shoulder filter greatly improves radiographic quality.

kVp: 85

Reference: 12th edition ATLAS p. 1:218.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

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Toes

AP or AP axial

Patient Position

- Position patient supine or seated on table, knees flexed with feet separated.

Part Position

- Center toes with plantar surface flat against IR.

Central Ray

- Angle 15 degrees posteriorly to show joint spaces.
- Position so that central ray enters third MTP joint.
- Use perpendicular central ray when joint spaces are not crucial.

Collimation:

1 inch (2.5 cm) on all sides of toes including 1 inch (2.5 cm) proximal to MTP joint

▼ COMPENSATING FILTER

- Image can be improved significantly with use of filter.

kVp: 60

Reference: 12th edition ATLAS p. 1:242.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Toes

AP oblique (medial rotation)

Patient Position

- Position patient supine or seated on table, knees flexed with feet separated.

Part Position

- Center toes over IR area, and medially rotate leg and foot until 30- to 45-degree angle is formed from IR to plantar surface of foot.

Central Ray

- Perpendicular, entering third MTP joint

Collimation:

1 inch (2.5 cm) on all sides of toes including 1 inch (2.5 cm) proximal to MTP joint

kVp: 54

Reference: 12th edition ATLAS p. 1:245.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Toes

Lateral

Patient Position

- Position patient lying on unaffected side.
- Use gauze, tape, or other positioning aid to separate toes.

Part Position

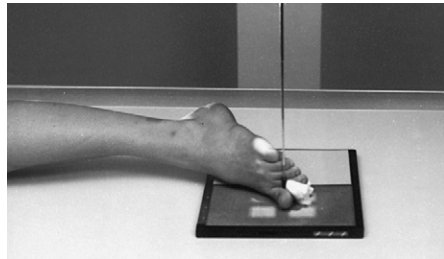
- Adjust foot to place affected toe parallel with film and in true lateral position.
- Use occlusal film by placing it, pebbled surface up, between toes.

Central Ray

- Perpendicular to MTP joint of great toe or PIP joint of lesser toes

Collimation:

1 inch (2.5 cm) on all sides of toe including 1 inch (2.5 cm) proximal to joint



kVp: 54

Reference: 12th edition ATLAS p. 1:246.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Foot

AP or AP axial

Patient Position

- Position patient supine or seated on table, knees flexed with feet separated.

Part Position

- Center foot, and adjust midline of foot parallel to long axis of IR with foot plantar surface firmly resting on IR.

Central Ray

- Angle 10 degrees posteriorly, entering base of third metatarsal for reduced elongation.
- Direct perpendicularly, if desired.

Collimation:

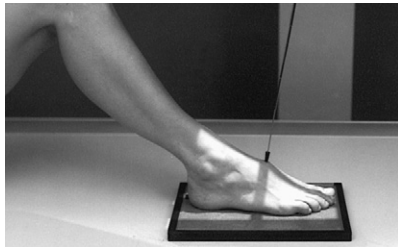
1 inch (2.5 cm) on sides and 1 inch (2.5 cm) beyond the calcaneus and distal tip of toes

COMPENSATING FILTER

- Image can be improved significantly with use of filter.

kVp: 60

Reference: 12th edition ATLAS p. 1:252.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Foot

AP oblique (medial rotation)

Patient Position

- Position patient supine or seated on table, knees flexed with feet separated.

Part Position

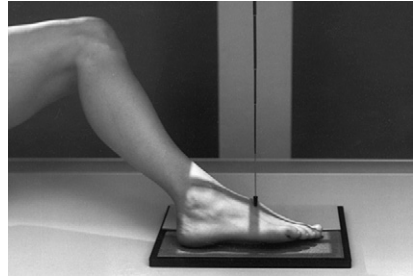
- Center foot to IR.
- Rotate leg medially until plantar surface of foot forms angle of 30 degrees to IR.

Central Ray

- Perpendicular to base of third metatarsal

Collimation:

1 inch (2.5 cm) on sides and 1 inch (2.5 cm) beyond the calcaneus and distal tip of toes



kVp: 60

Reference: 12th edition ATLAS p. 1:256.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Foot

Lateral (mediolateral)

Patient Position

- Position patient lying on affected side.
- Adjust leg and foot in lateral position with patella perpendicular to table.

Part Position

- Center foot and adjust plantar surface perpendicular to IR.
- Dorsiflex foot to form 90-degree angle with lower leg.

Central Ray

- Perpendicular to midpoint of IR, entering level of base of third metatarsal

Collimation:

1 inch (2.5 cm) on all sides of shadow of foot, including 1 inch (2.5 cm) above medial malleolus



kVp: 60

Reference: 12th edition ATLAS p. 1:260.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Calcaneus

Axial (plantar dorsal)

Patient Position

- Position patient supine or seated with leg fully extended.

Part Position

- Center IR to ankle.
- Have patient draw plantar surface of foot perpendicular to IR.

Central Ray

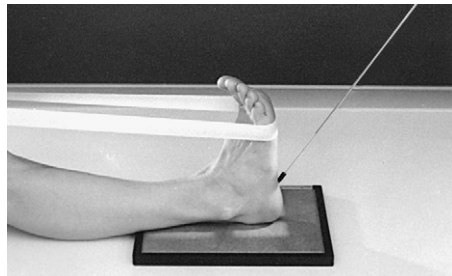
- Angle 40 degrees cephalad to long axis of foot so that central ray enters base of third metatarsal.

Collimation:

1 inch (2.5 cm) on three sides of shadow of calcaneus

COMPENSATING FILTER

- Image can be improved significantly with use of filter.



kVp: 65

Reference: 12th edition ATLAS p. 1:271.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Calcaneus

Lateral

Patient Position

- Position patient lying on affected side.
- Adjust leg and foot in lateral position with patella perpendicular to table.

Part Position

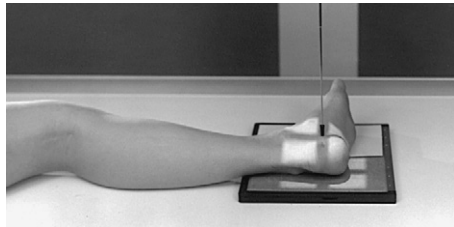
- Center calcaneus to center of IR.

Central Ray

- Perpendicular to midportion of calcaneus, about 1 inch (2.5 cm) distal to medial malleolus

Collimation:

1 inch (2.5 cm) past posterior and inferior shadow of heel; include medial malleolus and base of fifth metacarpal



kVp: 60

Reference: 12th edition ATLAS p. 1:274.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Ankle AP

Patient Position

- Position patient supine or seated on table with affected leg extended.

Part Position

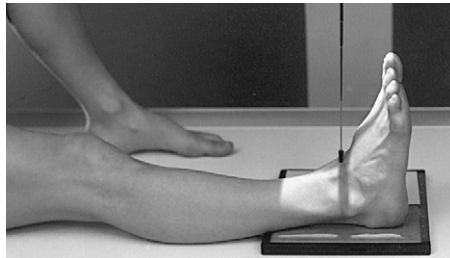
- Center ankle to IR.
- Adjust ankle joint in anatomic position to obtain true AP projection.
- Have patient flex foot, and adjust ankle with toes pointing vertically.

Central Ray

- Perpendicular to ankle joint, entering midway between malleoli

Collimation:

1 inch (2.5 cm) on sides of ankle and 8 inches (18 cm) lengthwise, including heel



kVp: 63

Reference: 12th edition ATLAS p. 1:279.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Ankle

Lateral (mediolateral)

Patient Position

- Position patient supine, then roll onto affected side.

Part Position

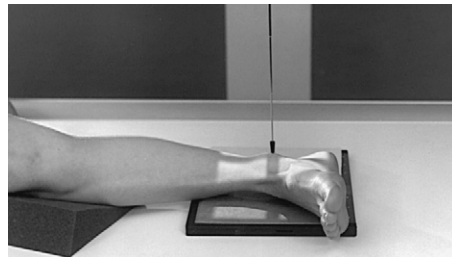
- Dorsiflex ankle to 90-degree angle, and adjust foot in lateral position.
- Center ankle to IR.

Central Ray

- Perpendicular to ankle joint, entering medial malleolus

Collimation:

1 inch (2.5 cm) on sides of ankle and 8 inches (18 cm) lengthwise, including heel and fifth metacarpal base



kVp: 59

Reference: 12th edition ATLAS p. 1:280.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Ankle

AP oblique (medial rotation)

Patient Position

- Position patient supine or seated on table.

Part Position

- Center ankle to IR.
- Dorsiflex foot, placing ankle at near right-angle flexion.
- Grasp lower femur with one hand and foot with other hand.
- Internally rotate entire leg and foot together until 45-degree rotation is achieved.

Central Ray

- Perpendicular to ankle joint, entering midway between malleoli

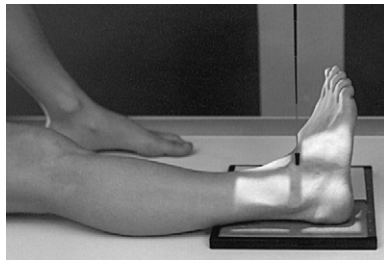
Collimation:

1 inch (2.5 cm) on sides of ankle and 8 inches (18 cm) lengthwise, including heel

NOTE: Obtain lateral oblique by rotating leg and foot 45 degrees laterally, as described in 12th edition ATLAS p. 1:286.

kVp: 63

Reference: 12th edition ATLAS p. 1:283.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Ankle (Mortise Joint)

AP oblique (medial rotation)

Patient Position

- Position patient supine or seated on table.

Part Position

- Center ankle to IR.
- Grasp lower femur area with one hand and foot with other hand.
- Assist patient by internally rotating entire leg and foot together 15 to 20 degrees until intermalleolar plane is parallel with IR.
- Place sole of foot at right angle to leg.

Central Ray

- Perpendicular, entering ankle joint midway between malleoli

Collimation:

1 inch (2.5 cm) on sides of ankle and 8 inches (18 cm) lengthwise, including heel

kVp: 63

Reference: 12th edition ATLAS p. 1:284.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Ankle

AP stress studies

Patient Position

- Position patient supine or seated on table with small support under knee.

Part Position

- Center ankle to IR.
- Position ankle for AP projection.
- Stress joint by placing it in position of extreme inversion or eversion, then immobilizing it.

Central Ray

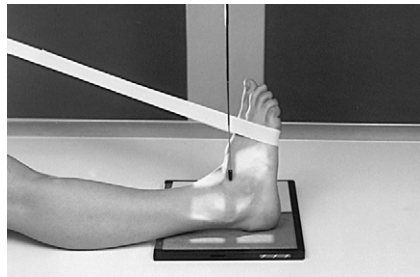
- Perpendicular to ankle joint, entering midway between malleoli.

Collimation:

1 inch (2.5 cm) on sides of ankle and 8 inches (18 cm) lengthwise, including heel

kVp: 63

Reference: 12th edition ATLAS p. 1:287.



Moderate inversion stress using tape;
lead glove recommended for
increased stress.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Leg AP

Patient Position

- Position patient supine with leg extended.

Part Position

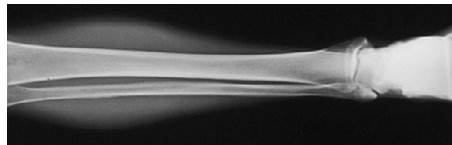
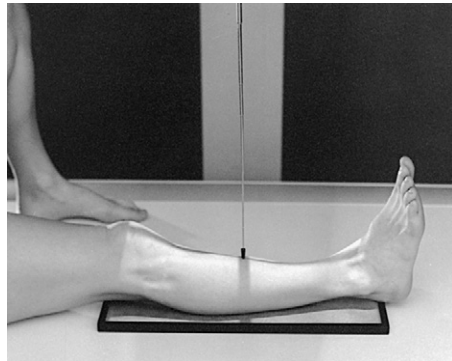
- Center leg to IR, and adjust leg so that femoral condyles are parallel to IR and foot is vertical; flex ankle to 90 degrees.
- Include both joints.

Central Ray

- Perpendicular to midpoint of leg

Collimation:

1 inch (2.5 cm) on sides and 1.5 inches (3.8 cm) beyond the ankle and knee joints



kVp: 63

Reference: 12th edition ATLAS p. 1:290.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Leg Lateral

Patient Position

- Position patient supine and lying on affected side.

Part Position

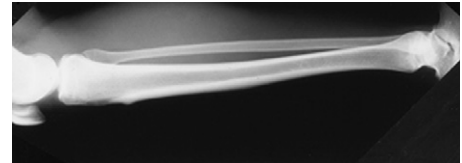
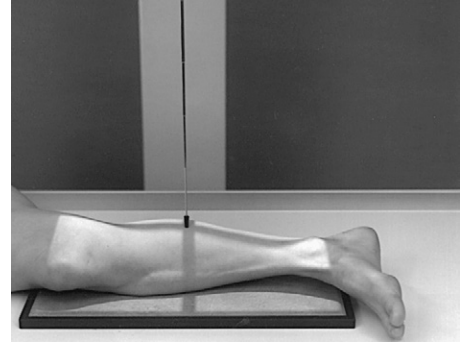
- Center leg to IR.
- Adjust leg to lateral position (patella perpendicular).
- Include both joints.

Central Ray

- Perpendicular to midpoint of leg

Collimation:

1 inch (2.5 cm) on sides and 1.5 inches (3.8 cm) beyond the ankle and knee joints



kVp: 63

Reference: 12th edition ATLAS p. 1:292.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Knee

AP

Patient Position

- Position patient supine with leg extended.
- Adjust patient's body so that pelvis is not rotated.

Part Position

- Center knee to IR at level $\frac{1}{2}$ inch (1.3 cm) below patellar apex.
- Adjust leg so that femoral condyles are parallel with IR.

Central Ray

- Enters point $\frac{1}{2}$ inch (1.3 cm) inferior to patellar apex
- Depending on ASIS to tabletop measurement, direct central ray as follows:

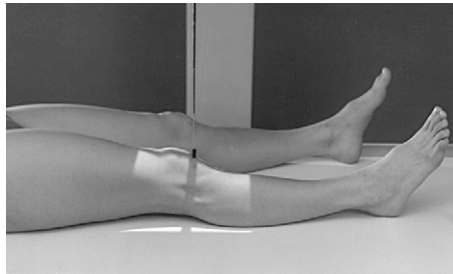
<19 cm	3 to 5 degrees <i>caudad</i> (thin pelvis)
19 to 24 cm	0 degrees
>24 cm	3 to 5 degrees <i>cephalad</i> (large pelvis)

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 65

Reference: 12th edition ATLAS p. 1:296.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Knee

AP weight-bearing

Patient Position

- Position patient upright facing x-ray tube with weight equally distributed on feet.

Part Position

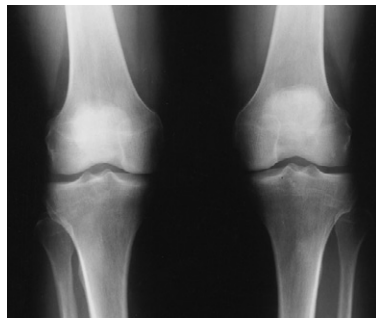
- Adjust center of IR $\frac{1}{2}$ inch (1.3 cm) below level of patellar apices.
- Have patient point toes straight ahead and slightly separate knees.

Central Ray

- Horizontal and perpendicular to IR, entering midway between knees at level $\frac{1}{2}$ inch (1.3 cm) below patellar apices

Collimation:

Adjust to 14×17 inches (35×43 cm).



kVp: 65

Reference: 12th edition ATLAS p. 1:302.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Knee Lateral

Patient Position

- Turn patient onto affected side with knee flexed 20 to 30 degrees.

Part Position

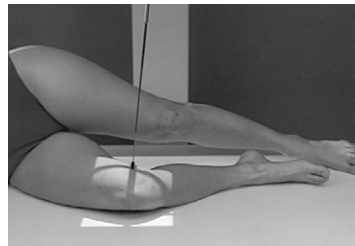
- Have patient flex knee, and center IR to knee joint, just below patellar apex.
- Position patella perpendicular to IR.

Central Ray

- Angle 5 to 7 degrees cephalad, entering knee joint 1 inch (2.5 cm) distal to medial epicondyle.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).



kVp: 65

Reference: 12th edition ATLAS p. 1:300.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Knee

AP oblique (lateral rotation)

Patient Position

- Position patient supine with hip of unaffected side elevated and affected knee extended.

Part Position

- Rotate affected limb externally until 45-degree rotation is achieved.
- Center knee to IR at level $\frac{1}{2}$ inch (1.3 cm) below apex of patella.

Central Ray

- Direct $\frac{1}{2}$ inch (1.3 cm) inferior to patellar apex.
- Angle varies as follows, depending on ASIS to tabletop measurement:

<19 cm	3 to 5 degrees <i>caudad</i>
19 to 24 cm	0 degrees
>24 cm	3 to 5 degrees <i>cephalad</i>

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 65

Reference: 12th edition ATLAS p. 1:305.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Knee

AP oblique (medial rotation)

Patient Position

- Position patient supine with affected knee internally rotated and extended.

Part Position

- Rotate limb medially until 45-degree rotation is achieved.
- Center knee to IR at level $\frac{1}{2}$ inch (1.3 cm) below apex of patella.

Central Ray

- Direct $\frac{1}{2}$ inch (1.3 cm) inferior to patellar apex.
- Angle varies as follows, depending on ASIS to tabletop measurement:

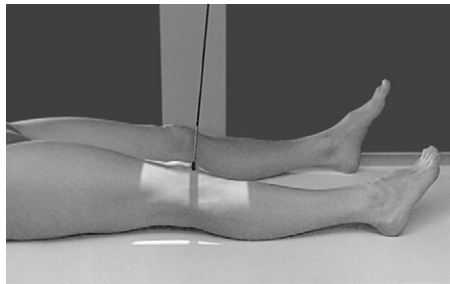
<19 cm	3 to 5 degrees <i>caudad</i>
19 to 24 cm	0 degrees
>24 cm	3 to 5 degrees <i>cephalad</i>

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 65

Reference: 12th edition ATLAS p. 1:305.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Intercondylar Fossa

PA axial HOLMBLAD METHOD*

Patient Position

- Have patient kneel on radiographic table with affected knee in contact with IR.

Part Position

- Center knee to IR by placing at level of patellar apex.
- Flex knee 70 degrees from full extension.

Central Ray

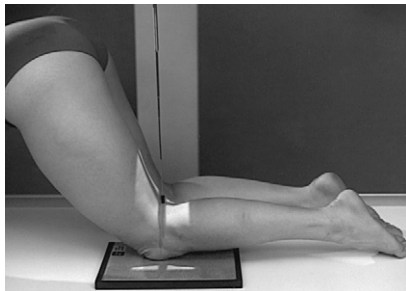
- Perpendicular to long axis of lower leg entering midpoint of IR

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 70

**See ATLAS for alternate body positions.
Reference: 12th edition ATLAS p. 1:306.*



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Intercondylar Fossa

PA axial CAMP-COVENTRY METHOD

Patient Position

- Position patient prone with hips equidistant from table.

Part Position

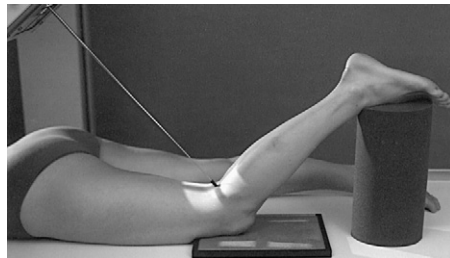
- Flex affected knee 40 to 50 degrees, and rest on suitable support.
- Adjust leg so that no medial or lateral rotation occurs.

Central Ray

- Perpendicular to long axis of leg, entering knee joint at popliteal depression (with central ray angled 40 to 50 degrees from vertical)

Collimation:

Adjust to 8×10 inches (18×24 cm).



kVp: 70

Reference: 12th edition ATLAS p. 1:308.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Patella

PA

Patient Position

- Position patient prone with knee extended.

Part Position

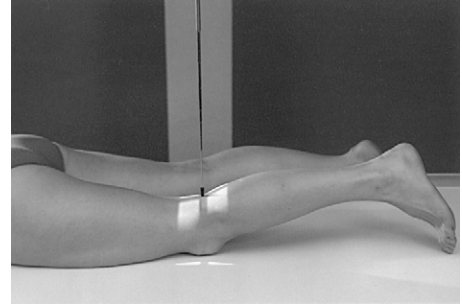
- Center patella and adjust leg to be parallel with IR plane.
- Heel is generally rotated 5 to 10 degrees laterally.

Central Ray

- Perpendicular, entering mid-popliteal area

Collimation:

Adjust to 6×6 inches (15×15 cm).



kVp: 65

Reference: 12th edition ATLAS p. 1:311.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Patella

Lateral (mediolateral)

Patient Position

- Position patient lying on affected side.

Part Position

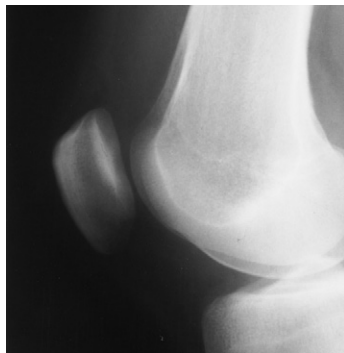
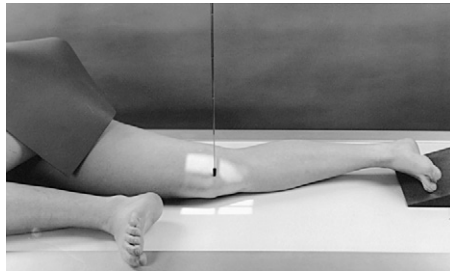
- Adjust affected knee to be flexed 5 to 10 degrees.
- Center IR to patella.
- Adjust body rotation so that patella is perpendicular to IR.

Central Ray

- Perpendicular to IR, entering knee at mid-patellofemoral joint
- Collimate to patella.

Collimation:

Adjust to 4×4 inches (10×10 cm).



kVp: 65

Reference: 12th edition ATLAS p. 1:312.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Patella

Tangential SETTEGAST METHOD

Patient Position

- Position patient prone with foot resting on table.

Part Position

- Have patient flex affected knee slowly until patella is perpendicular to IR, if condition permits.
- Adjust leg so that no rotation occurs, and immobilize.

Central Ray

- Perpendicular to joint space between patella and femur if patella is perpendicular
- If patella is not perpendicular, angulation depends on degree of flexion of knee, usually 15 to 20 degrees.

Collimation:

Adjust to 4×4 inches (10×10 cm).

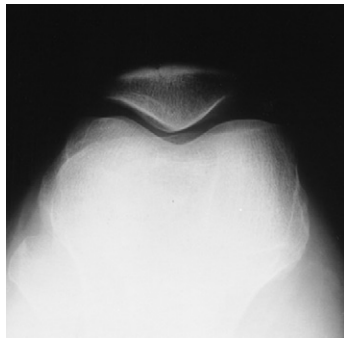
COMPUTED RADIOGRAPHY



- Ensure that collimation is extremely close to prevent unnecessary radiation from reaching IR phosphor.

kVp: 65

Reference: 12th edition ATLAS p. 1:316.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Femur

AP*

Patient Position

- Position patient supine with toes up.
- Adjust pelvis to place ASIS equidistant from table.

Part Position

- Center affected femur to midline of grid.
- Image distal femur by placing bottom of IR 2 inches (5 cm) below knee joint.
- Rotate limb internally to place it in true anatomic position.
- Apply gonad shielding.

Central Ray

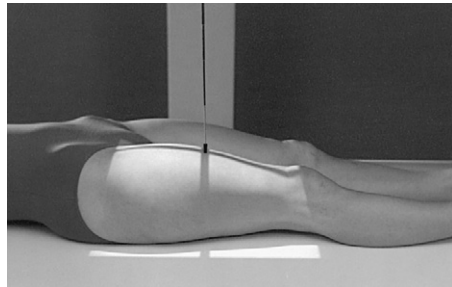
- Perpendicular to mid-femur and center of IR

Collimation:

1 inch (2.5 cm) on sides of shadow of femur and 17 inches (43 cm) in length

kVp: 70

**See ATLAS p. 1:319 for proximal femur.
Reference: 12th edition ATLAS p. 1:318.*



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Femur

Lateral

Patient Position

- Position patient lying on affected side with knee flexed about 45 degrees.

Part Position

- Center affected femur to midline of grid.
- Image distal femur by drawing uppermost limb forward and supporting it at hip level.
- Adjust femur so that epicondyles are perpendicular to tabletop.
- Place bottom of IR 2 inches (5 cm) below knee joint.
- Apply gonad shielding.

Central Ray

- Perpendicular to mid-femur

Collimation:

1 inch (2.5 cm) on sides of shadow of femur and 17 inches (43 cm) in length

kVp: 70

Reference: 12th edition ATLAS p. 1:320.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Femoral Necks

AP oblique MODIFIED CLEAVES METHOD

Patient Position

- Position patient supine.

Part Position

- Adjust pelvis so that no rotation occurs.
- Have patient flex hips and knees.
- Abduct thighs to approximately 45 degrees from vertical; brace soles of feet together.
- Shield gonads.

Respiration:

Suspend.

Central Ray

- Perpendicular, entering midline approximately 1 inch (2.5 cm) superior to symphysis pubis
- Perpendicular to femoral neck for unilateral

Collimation:

Adjust to 14×17 inches (35×43 cm).

NOTE: Adapt for unilateral examination by flexing and abducting affected limb.

kVp: 70

Reference: 12th edition ATLAS p. 1:342.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Hip AP

Patient Position

- Position patient supine.
- Adjust ASIS equidistant from table.

Part Position

- Rotate affected limb 15 to 20 degrees medially; center hip to IR.
- Shield gonads.

Respiration:

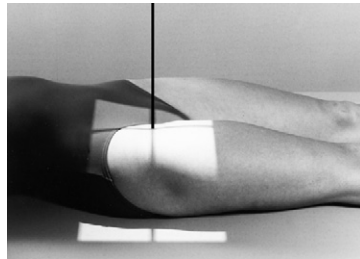
Suspend.

Central Ray

- Perpendicular to point 2½ inches (6 cm) distal on line drawn perpendicular to midpoint of line between ASIS and pubic symphysis

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).



kVp: 65

Reference: 12th edition ATLAS p. 1:346.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Hip

Lateral LAUENSTEIN AND HICKEY METHODS

Patient Position

- Start with patient supine, and turn patient slightly toward affected side to posterior oblique body position.

Part Position

- Flex affected knee and hip and rest on table; center affected hip to midline of grid.
- Have patient extend unaffected knee.
- Shield gonads.

Respiration:

Suspend.

Central Ray

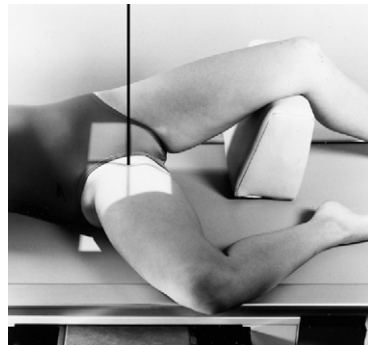
- Perpendicular to hip at point midway between ASIS and pubic symphysis for Lauenstein method and at cephalic angle of 20 to 25 degrees for Hickey method

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 65

Reference: 12th edition ATLAS p. 1:348.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Hip

Axiolateral DANELIUS-MILLER METHOD

Patient Position

- Position patient supine with level of greater trochanter elevated to center of IR.

Part Position

- Have patient flex knee and hip of unaffected side.
- Elevate patient's foot, and rest on suitable support.
- Adjust pelvis so that no rotation occurs.
- Rotate affected leg medially 15 to 20 degrees unless contraindicated.

Respiration:

Suspend.

Central Ray

- Perpendicular to long axis of femoral neck and IR

Collimation:

Adjust to 10×12 inches (24×30 cm).

COMPENSATING FILTER

- Image is improved and can be performed with one projection if filter is used.

kVp: 80

Reference: 12th edition ATLAS p. 1:350.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Pelvis and Upper Femora

AP

Patient Position

- Position patient supine.

Part Position

- Center midsagittal plane to grid; adjust so that ASIS are equidistant from table.
- Rotate feet and lower limbs medially 15 to 20 degrees unless contra-indicated.
- Center IR approximately 2 inches (5 cm) superior to pubic symphysis and 2 inches (5 cm) inferior to ASIS.
- Use gonad shielding as appropriate.

Respiration:

Suspend.

Central Ray

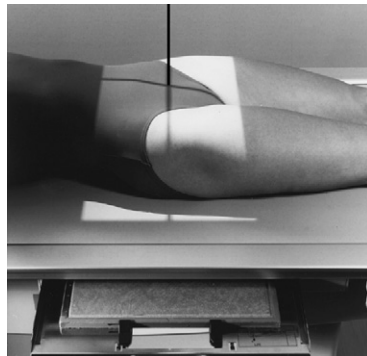
- Perpendicular to midpoint of IR

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:337.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

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Atlas and Axis

AP (open mouth)

Patient Position

- Position patient erect or supine.

Part Position

- Center midsagittal plane to midline of table, arms at sides, shoulders in same plane.
- Center IR at level of axis.
- Open mouth wide; adjust head so that line from lower edge of upper incisors to mastoid process is perpendicular to IR.

Respiration:

Have patient phonate “ah” during exposure.

Central Ray

- Perpendicular to center of IR, entering open mouth

Collimation:

Adjust to 5 × 5 inches (13 × 13 cm).



kVp: 75

Reference: 12th edition ATLAS p. 1:383.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Dens

AP FUCHS METHOD

Patient Position

- Position patient supine.

Part Position

- Adjust head so that midsagittal plane is perpendicular to IR.
- Extend chin until a line between chin and tip of mastoid process is perpendicular to IR.
- Center IR to level of tips of mastoid process.

Respiration:

Suspend.

Central Ray

- Perpendicular to center of IR, entering midsagittal plane just distal to tip of chin

Collimation:

Adjust to 5×5 inches (13×13 cm).



kVp: 75

Reference: 12th edition ATLAS p. 1:382.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cervical Vertebrae

AP axial

Patient Position

- Position patient erect or supine.

Part Position

- Center midsagittal plane to IR.
- Have patient place arms at sides.
- Center IR at level of C4, and adjust a line between upper occlusal plane and mastoid tip perpendicular to IR.

Respiration:

Suspend.

Central Ray

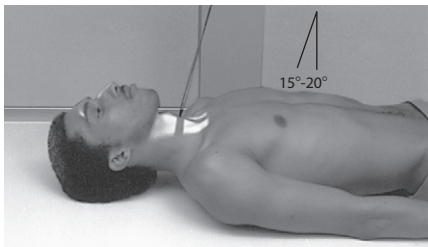
- Angle 15 to 20 degrees cephalad, entering slightly inferior to thyroid cartilage and exiting C4.

Collimation:

Adjust 10 inches (24 cm) lengthwise and 1 inch (2.5 cm) beyond skin shadow on sides.

kVp: 75

Reference: 12th edition ATLAS p. 1:386.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cervical Vertebrae

Lateral GRANDY METHOD

Patient Position

- Position patient seated or standing in lateral position.

Part Position

- Center coronal plane through mastoid processes to IR.
- Adjust shoulders to same horizontal level and body to true lateral position.
- Have patient elevate chin slightly, and relax shoulders. If necessary, attach weights to wrists to help lower shoulders.

Respiration:

Suspend.

Central Ray

- Horizontal and perpendicular to IR, entering C4
- Use SID of 72 inches (180 cm), which is recommended measure.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 1:388.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cervical Vertebrae

Hyperflexion and hyperextension lateral

Patient Position

- Position patient seated or standing in lateral position.

Part Position

- Center spine to IR.
- Keep midsagittal plane of head and neck parallel with plane of IR and ask patient to do the following: (1) Drop head forward and draw chin as close as possible to chest to place cervical vertebrae in hyperflexion—expose—and (2) elevate chin as much as possible to place cervical vertebrae in hyperextension.

Respiration:

Suspend.

Central Ray

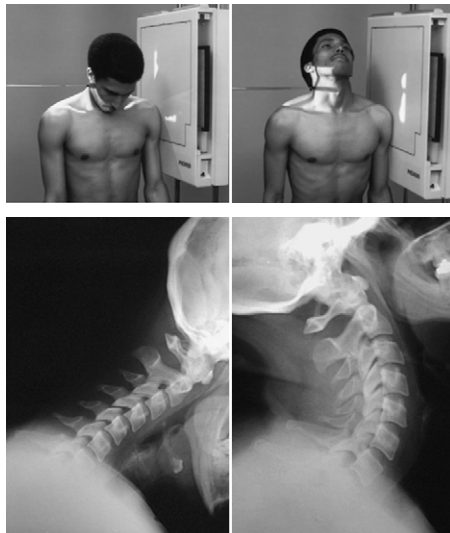
- Horizontal and perpendicular to IR, entering C4
- Use SID of 72 inches (180 cm), which is recommended measure.

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 75

Reference: 12th edition ATLAS p. 1:390.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cervical Vertebrae

AP axial oblique (RPO and LPO)

Patient Position

- Position patient seated or standing.

Part Position

- Rotate body to 45 degrees with side of interest farther from IR.
- Have patient extend chin slightly while looking forward.
- Center spine to IR.
- Center IR to C3.
- Take both side obliques.

Respiration:

Suspend.

Central Ray

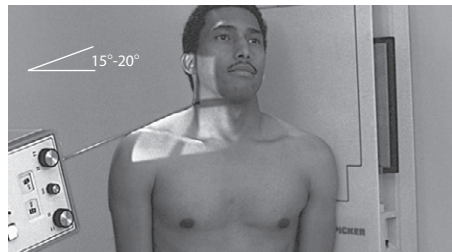
- Angle 15 to 20 degrees cephalad, entering C4.
- Use SID of 60 to 72 inches (152 to 183 cm).

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 1:392.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cervical Vertebrae

PA axial oblique (RAO and LAO)

Patient Position

- Position patient erect or prone.

Part Position

- Rotate body 45 degrees with side of interest closer to IR.
- Extend chin slightly.
- Center spine to IR.
- Center IR to C5.
- Take both side obliques.

Respiration:

Suspend.

Central Ray

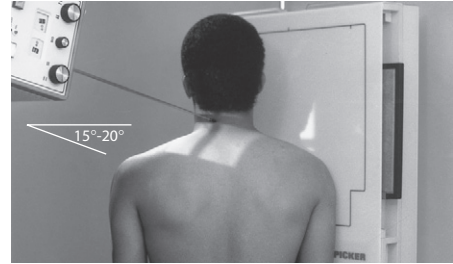
- Angle 15 to 20 degrees caudad, entering C4.
- Use SID of 60 to 72 inches (150 to 180 cm).

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 1:394.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cervical Vertebrae

Trauma lateral (dorsal decubitus)

Patient Position

- Position patient supine.
- Do not move patient or remove cervical collar without consulting physician.

Part Position

- Place IR next to patient's shoulder, and center at level of C4.
- Do not rotate or extend neck.
- Depress shoulders as much as possible. If necessary, loop a bandage around patient's feet and affix ends to wrists so that extending knees depresses shoulders.

Respiration:

Suspend.

Central Ray

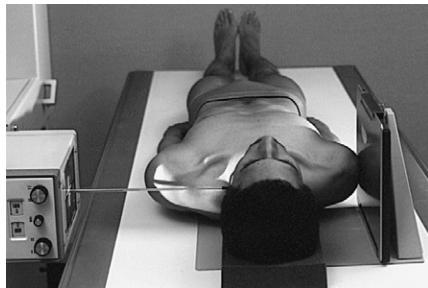
- Angle horizontal and perpendicular, entering C4.
- Use SID of 60 to 72 inches (150 to 180 cm).

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:33.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cervical Vertebrae

Trauma AP axial oblique

Patient Position

- Position patient supine.
- Do not move patient or remove cervical collar without consulting physician.

Part Position

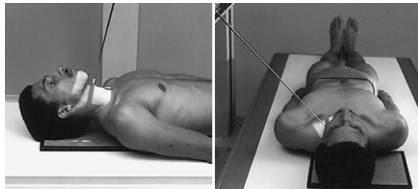
- Brace head and neck and lift only enough to slide IR under neck.
- Place IR under backboard if patient is on backboard.
- Center IR to mastoid on side opposite x-ray tube. (This allows angled central ray to project image of side of interest in center of image.)

Central Ray

- Adjust 45 degrees medial and 15 to 20 degrees cephalad, entering level of C4.

Collimation:

Adjust to 8×10 inches (18×24 cm).



kVp: 75

Reference: 12th edition ATLAS p. 2:35.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Cervicothoracic Region

Lateral SWIMMER'S TECHNIQUE

Patient Position

- Position patient seated, standing, or lateral recumbent.

Part Position

- Center midcoronal plane to IR.
- Elevate arm adjacent to vertical IR holder, and rest it on head.
- Rotate this shoulder forward or backward according to patient's condition. Rotate opposite shoulder in opposite direction.
- Adjust head and body so that midsagittal plane is parallel with IR.

Respiration:

Suspend.

Central Ray

- Perpendicular to C7-T1 interspace
- Use 5-degree caudal angulation if shoulders cannot be adequately depressed.

Collimation:

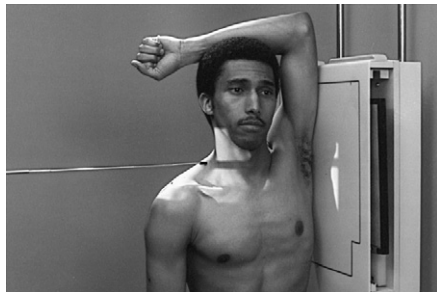
Adjust to 10×12 inches (24×30 cm)

▼ COMPENSATING FILTER

- Always perform with specially designed compensating filter.

kVp: 80

Reference: 12th edition ATLAS p. 1:401.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Thoracic Vertebrae

AP

Patient Position

- Position patient recumbent or supine.

Part Position

- Center midsagittal plane to IR.
- Position top of IR 1½ to 2 inches (3.8 to 5 cm) above shoulders.
- Have patient hold arms at sides, shoulders in same plane.
- Flex hips and knees to reduce dorsal kyphosis.

Respiration:

Shallow breaths or suspended expiration

Central Ray

- Perpendicular to IR. The central ray should be approximately midway between jugular notch and xiphoid process.

Collimation:

Adjust to 7 × 17 inches (18 × 43 cm).

COMPENSATING FILTER

- Always perform with specially designed compensating filter.

kVp: 80

Reference: 12th edition ATLAS p. 1:403.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Thoracic Vertebrae

Lateral

Patient Position

- Position patient lateral recumbent or erect.

Part Position

- Center posterior half of thorax to midline of grid.
- Place top of IR $1\frac{1}{2}$ to 2 inches (3.8 to 5 cm) above relaxed shoulders.
- Elevate head to spine level. Extend arms forward.
- Place radiolucent support under lower thoracic region until spine is horizontal to tabletop.

Respiration:

Shallow or suspended expiration

Central Ray

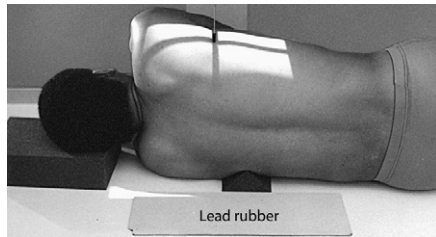
- Perpendicular to center of IR at level of T7. Central ray enters posterior half of thorax.

Collimation:

Adjust to 7×17 inches (18×43 cm)

kVp: 80

Reference: 12th edition ATLAS p. 1:406.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Lumbar-Lumbosacral Vertebrae

AP

Patient Position

- Position patient supine.
- Flex hips and knees for patient comfort and to reduce lumbar lordosis.

Part Position

- Center midsagittal plane to grid.
- Flex knees and hips enough to place back in firm contact with table.
- Center IR at iliac crests (L4).

Respiration:

Suspend.

Central Ray

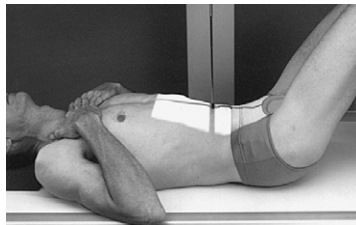
- Perpendicular to center of IR, entering at level of iliac crests

Collimation:

Adjust to 8×17 inches (18×43 cm).

kVp: 80

Reference: 12th edition ATLAS p. 1:412.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Lumbar-Lumbosacral Vertebrae

Lateral

Patient Position

- Position patient lateral with hips and knees flexed.

Part Position

- Center IR to level of iliac crests.
- Center midcoronal plane of body to grid.
- Extend arms forward.
- Place radiolucent support under lower thorax; adjust spine parallel to table.
- Place lead rubber behind patient to absorb radiation.

Respiration:

Suspend.

Central Ray

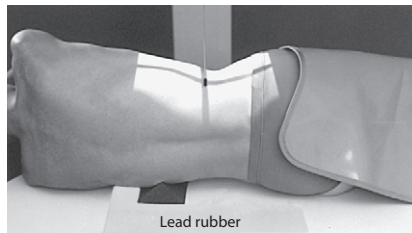
- Perpendicular to IR, entering midcoronal plane at level of iliac crests

Collimation:

Adjust to 8×17 inches (18×43 cm).

kVp: 90

Reference: 12th edition ATLAS p. 1:416.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

L5-S1 Lumbosacral Junction

Lateral

Patient Position

- Position patient lateral with hips and knees extended or slightly flexed.

Part Position

- Extend arms forward.
- Place radiolucent support under lower thorax; adjust spine parallel to table.
- Check for true lateral position.

Respiration:

Suspend.

Central Ray

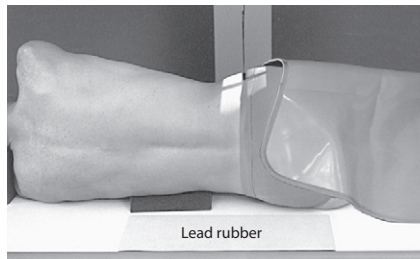
- On coronal plane 2 inches (5 cm) posterior to ASIS and 1½ inch inferior to crest
- Have central ray parallel to interiliac line; caudal or cephalic angulation of 5 to 8 degrees may be required.

Collimation:

Adjust to 6 × 8 inches (15 × 20 cm).

kVp: 95

Reference: 12th edition ATLAS p. 1:418.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Zygapophyseal Joints

AP oblique (RPO and LPO)

Patient Position

- Position patient posterior oblique, with side of interest closer to IR.

Part Position

- Adjust and support body obliquity to 45 degrees.
- Have patient place arms in a comfortable position, and center spine to midline of grid.
- Take both side obliques.

Respiration:

Suspend at end of expiration.

Central Ray

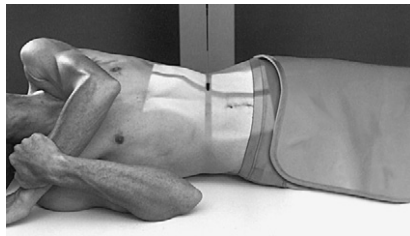
- Perpendicular and entering 2 inches (5 cm) medial to elevated ASIS and 1½ inches (3.8 cm) above iliac crest (L3)
- Center IR to central ray.

Collimation:

Adjust to 9 × 14 inches (23 × 35 cm).

kVp: 85

Reference: 12th edition ATLAS p. 1:420.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Lumbosacral Junction and Sacroiliac Joints

AP axial FERGUSON METHOD

Patient Position

- Position patient supine, lower limbs extended.

Part Position

- Center midsagittal plane to grid.
- Extend lower limbs or flex hips and abduct to remove from path of central ray.

Respiration:

Suspend.

Central Ray

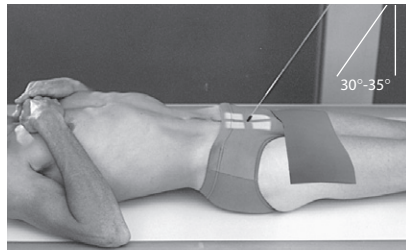
- Angle 30 to 35 degrees cephalad through lumbosacral joint so that central ray enters about 1½ inches (3.8 cm) superior to pubic symphysis.
- Center IR to central ray.

Collimation:

Adjust to 8 × 10 inches (18 × 24 cm).

kVp: 85

Reference: 12th edition ATLAS p. 1:424.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Sacroiliac Joints

AP oblique (RPO and LPO)

Patient Position

- Position patient supine and lying on unaffected side.

Part Position

- Elevate and support side of interest 25 to 30 degrees from table.
- Align sagittal plane passing 1 inch (2.5 cm) medial to elevated ASIS, and center to grid.
- Take both side obliques.
- Center IR at level of ASIS.

Respiration:

Suspend.

Central Ray

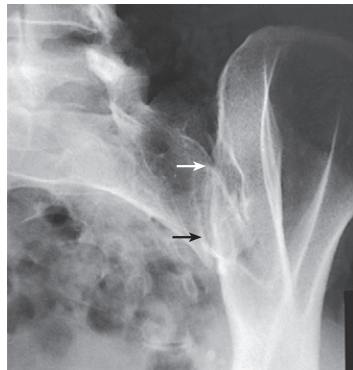
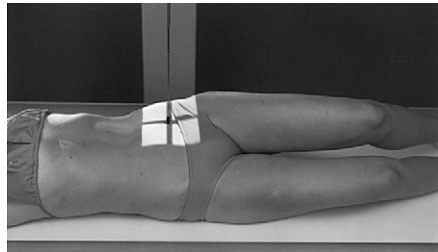
- Perpendicular to IR, entering 1 inch (2.5 cm) medial to elevated ASIS

Collimation:

Adjust to 6×10 inches (15×24 cm).

kVp: 80

Reference: 12th edition ATLAS p. 1:426.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Sacrum

AP axial

Patient Position

- Position patient supine.

Part Position

- Center midsagittal plane to center of grid.

Respiration:

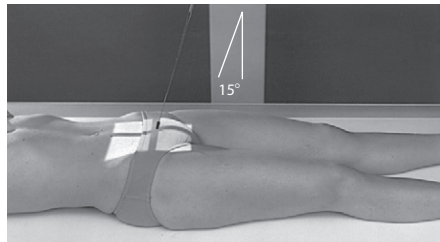
Suspend.

Central Ray

- Angle 15 degrees cephalad and center on point 2 inches (5 cm) superior to pubic symphysis.
- Center IR to central ray.

Collimation:

Adjust to 8×10 inches (18×24 cm).



kVp: 80

Reference: 12th edition ATLAS p. 1:430.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Sacrum

Lateral

Patient Position

- Position patient lateral with hips and knees flexed.

Part Position

- Support body to place long axis of spine horizontal.
- Prepare for positioning of central ray by centering sacrum to midline of grid.

Respiration:

Suspend.

Central Ray

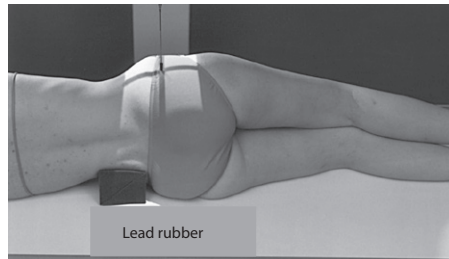
- Perpendicular to level of ASIS and at a point $3\frac{1}{2}$ inches (9 cm) posterior
- Center IR to central ray.

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 90

Reference: 12th edition ATLAS p. 1:432.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Coccyx

AP axial

Patient Position

- Position patient supine.

Part Position

- Center midsagittal plane to center of grid.

Respiration:

Suspend.

Central Ray

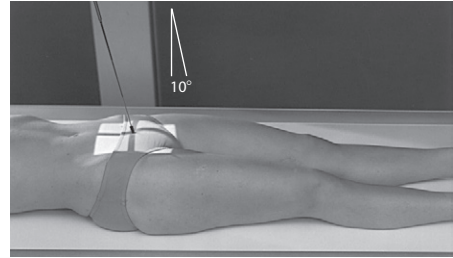
- Angle 10 degrees caudad and 2 inches (5 cm) superior to pubic symphysis.
- Center IR to central ray.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 80

Reference: 12th edition ATLAS p. 1:430.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Coccyx

Lateral

Patient Position

- Position patient lateral with hips and knees flexed.

Part Position

- Support body to place long axis of spine horizontal.
- Prepare for positioning of central ray by centering coccyx to midline of grid.

Respiration:

Suspend.

Central Ray

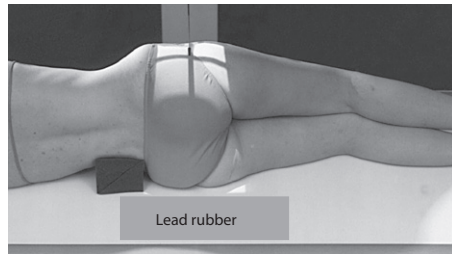
- Perpendicular to a point $3\frac{1}{2}$ inches (9 cm) posterior to ASIS and 2 inches (5 cm) inferior
- Center IR to central ray.

Collimation:

Adjust to 6×8 inches (15×20 cm).

kVp: 80

Reference: 12th edition ATLAS p. 1:432.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Thoracolumbar Spine: Scoliosis

AP, PA, or lateral **FERGUSON METHOD**

Patient Position

- Position patient erect, seated, or standing.

Part Position

- Position bottom of IR to include approximately 1 inch (2.5 cm) of iliac crests.
- Adjust midsagittal plane perpendicular to midline of grid.
- Have patient relax arms at sides.
- Obtain first image with patient in normal upright position.
- Elevate foot or hip of convex side of curve 3 to 4 inches (8 to 10 cm) for second image.
- Do not support patient in this position.

Respiration:

Suspend.

Central Ray

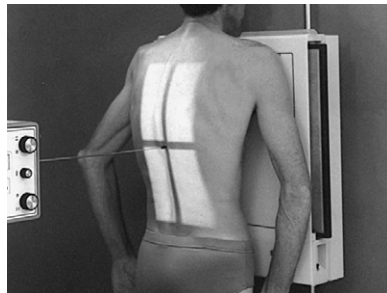
- Perpendicular to midpoint of IR

Collimation:

Adjust to 12×17 inches (30×35 cm).

kVp: 90

Reference: 12th edition ATLAS p. 1:438.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

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Chest PA

Patient Position

- Position patient standing or seated erect with back of hands on hips.

Part Position

- Center midsagittal plane with chin extended and eyes straight ahead.
- Have patient roll shoulders forward.
- Place top of IR $1\frac{1}{2}$ to 2 inches (3.8 to 5 cm) above relaxed shoulders.
- Have patient flex arms and rest backs of hands on hips.

Respiration:

Suspended full inspiration (after second inspiration)

Central Ray

- Perpendicular to the center of the IR. Use SID of 72 inches (183 cm).

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 110

Reference: 12th edition ATLAS p. 1:504.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Chest

Lateral

Patient Position

- Position patient standing or seated erect with side against IR.

Part Position

- Place midsagittal plane parallel with IR.
- Have patient rest adjacent shoulder against IR holder with arms raised and crossed over head.
- Place top of IR $1\frac{1}{2}$ to 2 inches (3.8 to 5 cm) above shoulder.
- Center thorax to IR.

Respiration:

Suspended full inspiration (after second inspiration)

Central Ray

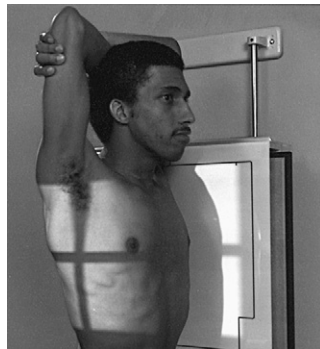
- Direct perpendicular to IR entering patient at level of T7. Use SID of 72 inches (183 cm).

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 125

Reference: 12th edition ATLAS p. 1:508.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Chest

PA oblique (LAO and RAO)

Patient Position

- Position patient standing or seated erect. Side farther from IR is usually the side of primary interest.

Part Position

- Adjust coronal plane 45 degrees from plane of IR.
- Place top of IR 1½ to 2 inches (3.8 to 5 cm) above shoulders.
- Have patient roll shoulder nearest IR posteriorly and place hand on hip.
- Have patient place arm farther from IR on top of IR holder.
- Center thorax to IR. Both 45-degree obliques may be taken.

Respiration:

Suspended full inspiration (after second inspiration)

Central Ray

- Perpendicular to IR at level of T7. Use SID of 72 inches (183 cm).

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 125

Reference: 12th edition ATLAS p. 1:512.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Chest

AP oblique (RPO and LPO)

Patient Position

- Position patient erect or supine. Side closer to IR is usually side of primary interest.

Part Position

- Adjust coronal plane 45 degrees from plane of IR.
- Place top of IR 1½ to 2 inches (3.8 to 5 cm) above shoulders.
- Have patient roll shoulder nearest IR anteriorly and place hand on head.
- Have patient place arm farther from IR on hip.
- Center thorax to IR. Both 45-degree obliques may be taken.

Respiration:

Suspended full inspiration (after second inspiration)

Central Ray

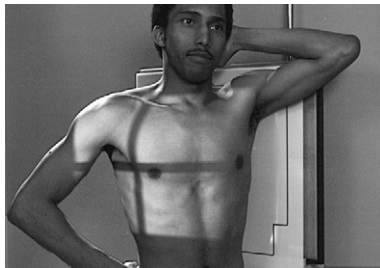
- Perpendicular to center of IR at a level 3 inches (8 cm) below jugular notch (level of T7). Use SID of 72 inches (183 cm), which is recommended measure.

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 125

Reference: 12th edition ATLAS p. 1:516.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Chest

AP

Patient Position

- Position patient supine or erect, arms at sides.

Part Position

- Center IR to midsagittal plane, and adjust upper border to be 1½ to 2 inches (3.8 to 5 cm) above shoulders.
- If possible, have patient flex elbows, pronate hands, and place hands on hips.

Respiration:

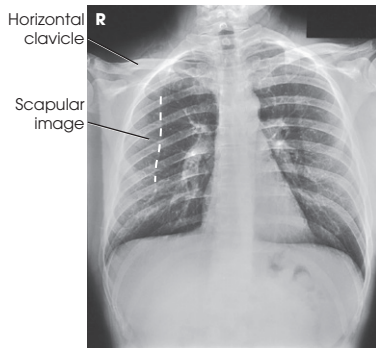
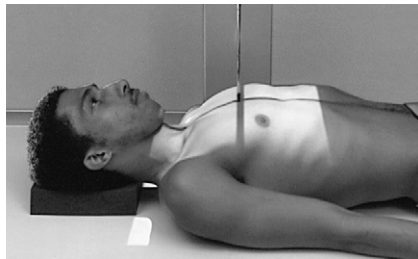
Suspended full inspiration (after second inspiration)

Central Ray

- Perpendicular to center of IR at level 3 inches (8 cm) below jugular notch (level of T7). Use SID of 72 inches (183 cm).

kVp: 125

Reference: 12th edition ATLAS p. 1:518.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Pulmonary Apices

AP axial (lordotic) LINDBLOM METHOD

Patient Position

- Position patient standing approximately 1 ft (30 cm) in front of IR. When patient is properly positioned, top of IR should be approximately 3 inches (8 cm) above shoulders.

Part Position

- Center midsagittal plane with no rotation.
- Have patient flex elbows, hands with palms out on hips.
- Have patient lean backward in extreme lordotic position.

Respiration:

Suspended full inspiration (after second inspiration)

Central Ray

- Perpendicular to IR. Use SID of 72 inches (183 cm).

COMPUTED RADIOGRAPHY



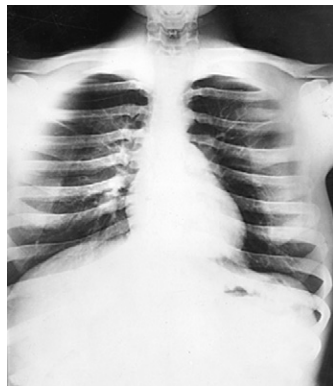
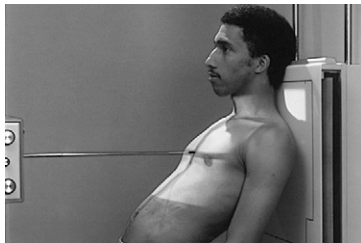
- Ensure collimation is extremely close to prevent unnecessary radiation from reaching IR phosphor.

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 125

Reference: 12th edition ATLAS p. 1:520.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Lungs and Pleurae

AP or PA (lateral decubitus)

Patient Position

- Position patient lateral recumbent.

Part Position

- Position patient on affected or unaffected side depending on condition.
- Elevate the chest on firm pad (generally “fluid down” or “free-air up”).
- Have patient extend arms above head; adjust thorax in true lateral position.
- Place top of IR approximately $1\frac{1}{2}$ to 2 inches (3.8 to 5 cm) above shoulders.

Respiration:

Suspended full inspiration (after second inspiration)

Central Ray

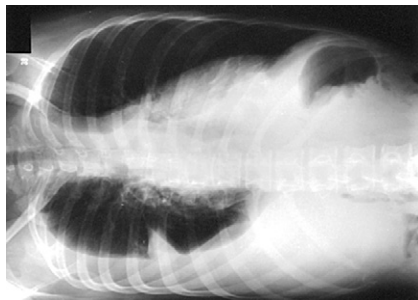
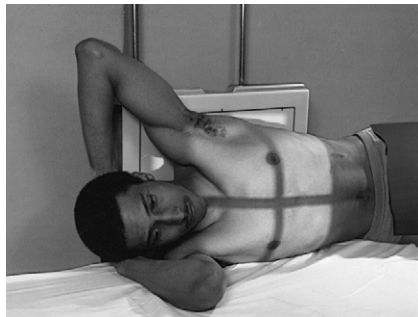
- Horizontal and perpendicular to center of IR at level 3 inches (8 cm) below jugular notch (at T7 for PA)

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 125

Reference: 12th edition ATLAS p. 1:524.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Lungs and Pleurae

Lateral (dorsal or ventral decubitus)

Patient Position

- Position patient prone or supine.

Part Position

- Elevate thorax 2 to 3 inches (5 to 8 cm) on firm pad, and center with affected side closer to IR.
- Have patient extend arms above head.
- Place top of IR 1½ to 2 inches (3.8 to 5 cm) above top of shoulders.
- Center midcoronal plane to center of grid.

Respiration:

Suspended full inspiration (after second inspiration)

Central Ray

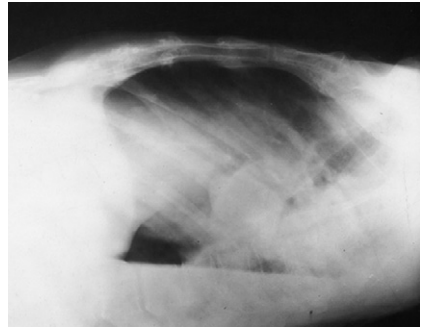
- Horizontal and centered to IR at level of midcoronal plane and 3 inches (8 cm) below jugular notch (T7 for ventral decubitus)

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm)

kVp: 125

Reference: 12th edition ATLAS p. 1:526.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Ribs PA

Patient Position

- Position patient erect or prone.

Part Position

- Center midsagittal plane to grid with chin extended and eyes straight ahead.
- Place top of IR approximately 1½ inches (3.8 cm) above shoulders.
- Have patient roll shoulders forward and rest back of hands on hips.

Respiration:

Suspended full inspiration to depress diaphragm

Central Ray

- Perpendicular to center of IR. This places the central ray at level of T7.

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:474.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Ribs

AP

Patient Position

- Position patient erect or supine.

Part Position

- Center midsagittal plane to midline of grid.
- *Above diaphragm:* Place top of IR $1\frac{1}{2}$ inches (3.8 cm) above relaxed shoulders.
- *Below diaphragm:* Center thorax with bottom of IR at level of iliac crests.
- Rotate shoulders anteriorly.

Respiration:

Above diaphragm: Suspended full inspiration

Below diaphragm: Suspended full expiration

Central Ray

- Perpendicular to center of IR

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:476.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Ribs

AP oblique (RPO or LPO)

Patient Position

- Position patient erect or supine.

Part Position

- Rotate patient's body 45 degrees with affected side toward IR.
- Center a plane midway between midsagittal plane and lateral surface of body.
- Abduct arm nearer IR, and place hand on head.
- Abduct opposite limb, and place hand on hip.
- Center top of IR $1\frac{1}{2}$ inches (3.8 cm) above relaxed shoulder (for above diaphragm) and with lower edge of IR at level of iliac crest (for below diaphragm).

Respiration:

Above diaphragm: Suspended full inspiration

Below diaphragm: Suspended full expiration

Central Ray

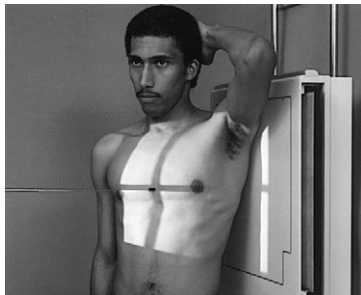
- Perpendicular to center of IR

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:478.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Ribs

PA oblique (RAO or LAO)

Patient Position

- Position patient erect or prone.

Part Position

- Rotate patient's body 45 degrees with affected side away from IR.
- Center a plane midway between midsagittal plane and lateral body surface.
- Abduct and extend arm nearer IR and rest on hip.
- Abduct opposite arm and rest on film holder or head.
- Center top of IR 1½ inches (3.8 cm) above relaxed shoulder (for above diaphragm) and with lower edge of IR at level of iliac crest (for below diaphragm).

Respiration:

Above diaphragm: Suspended full inspiration

Below diaphragm: Suspended full expiration

Central Ray

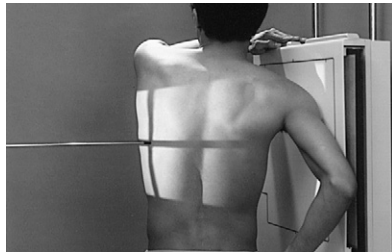
- Perpendicular to center of IR

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:480.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Sternum

PA oblique (RAO)

Patient Position

- Position patient prone for RAO (right PA oblique).

Part Position

- Center sternum to grid.
- Rotate patient's body 15 to 20 degrees to prevent superimposition of vertebral and sternal images.
- Center IR midway between jugular notch and xiphoid process at level of T7.

Respiration:

Shallow breathing or suspended expiration

Central Ray

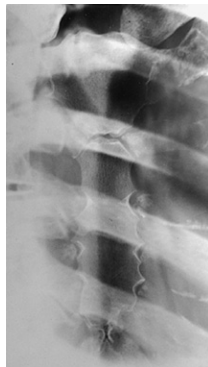
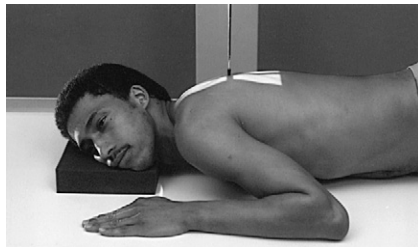
- Perpendicular to T7. Central ray enters elevated side of posterior thorax approximately 1 inch (2.5 cm) lateral to midsagittal plane.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 65

Reference: 12th edition ATLAS p. 1:458.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Sternum

Lateral

Patient Position

- Position patient seated, standing lateral, or recumbent.

Part Position

- Place top of IR 1½ inches (3.8 cm) above jugular notch.
- Have patient rotate shoulders and arms posteriorly for erect positioning; place arms above head for recumbent positioning.
- Center sternum to grid. Adjust to true lateral position.

Respiration:

Suspended deep inspiration

Central Ray

- Perpendicular to center of IR entering lateral border of midsternum.
Use SID of 72 inches (183 cm).

COMPUTED RADIOGRAPHY



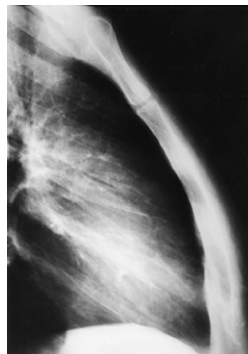
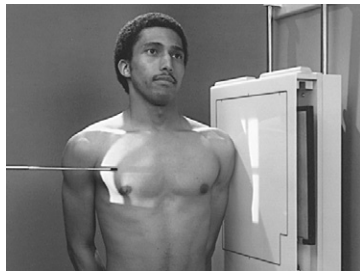
- Ensure that collimation is extremely close to prevent unnecessary radiation from reaching IR phosphor.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 70

Reference: 12th edition ATLAS p. 1:462.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Sternoclavicular Articulations

PA

Patient Position

- Position patient prone.

Part Position

- Center IR to spinous process of T3.
- Adjust midsagittal plane to midline of grid.
- Have patient place arms along sides of body with palms facing upward
- For bilateral examination, have patient rest chin on table.
- For unilateral examination, have patient turn head toward affected side and rest cheek on table.

Respiration:

Suspended expiration

Central Ray

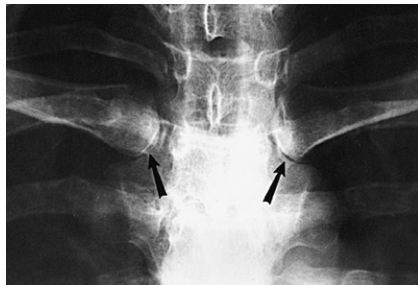
- Perpendicular to center of IR entering T3.

Collimation:

Adjust to 6×8 inches (15×20 cm).

kVp: 65

Reference: 12th edition ATLAS p. 1:466.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Sternoclavicular Articulations

PA oblique (RAO or LAO) BODY ROTATION METHOD

Patient Position

- Position patient prone or seated erect.

Part Position

- Keeping affected side adjacent to IR, rotate patient's body enough to project the vertebrae posterior to sternoclavicular joint closer to IR.
- Center joint to grid.

Respiration:

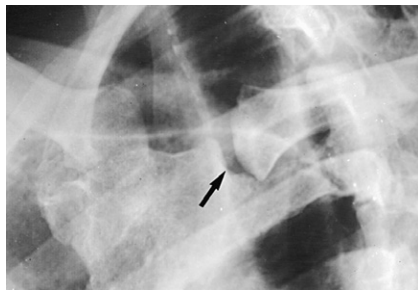
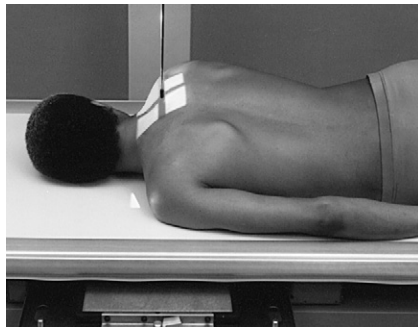
Full expiration to obtain a more uniform density

Central Ray

- Perpendicular to sternoclavicular joint closer to IR. Central ray enters T2 to T3 and 1 to 2 inches (2.5 to 5 cm) laterally toward joint.

Collimation:

Adjust to 6 × 8 inches (15 × 20 cm).



kVp: 65

Reference: 12th edition ATLAS p. 1:467.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

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Abdomen:

- AP (supine), 220
- AP (upright), 222
- AP (lateral decubitus position), 224
- Lateral, 226
- Lateral (dorsal decubitus position), 228

Esophagus:

- AP or PA, 230
- PA oblique (RAO), 232
- Lateral, 234

Stomach and Duodenum:

- PA, 236
- PA oblique (RAO), 238
- AP oblique (LPO), 240
- Lateral, 242
- AP, 244

Small Intestine:

- AP or PA, 246

Large Intestine:

- PA, 248
- PA axial, 250
- PA oblique (LAO and RAO), 252
- Lateral, 254
- AP, 256
- AP axial, 258
- AP oblique (LPO and RPO), 260
- AP or PA (lateral decubitus position), 262
- Lateral, AP or PA, oblique (upright), 264

Urinary System:

- AP oblique (RPO and LPO), 266

Bladder:

- AP or PA axial, 268
- AP oblique (RPO or LPO), 270
- Lateral, 272

Abdomen

AP (supine)

Patient Position

- Position patient supine.

Part Position

- Center midsagittal plane to grid.
- Maintain shoulders in same transverse plane.
- Support under knees.
- Center IR at level of iliac crests, and ensure that pubic symphysis is included.
- Apply gonad shielding as appropriate.

Respiration:

Suspend.

Central Ray

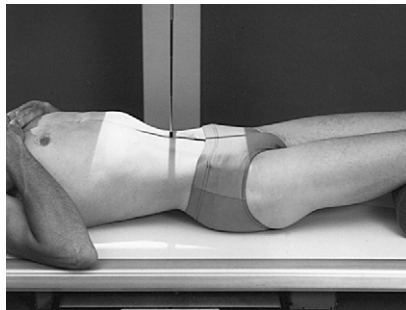
- Perpendicular to IR midline at level of iliac crests

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:91.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Abdomen

AP (upright)

Patient Position

- Position patient erect.

Part Position

- Center midsagittal plane to grid device.
- Maintain shoulders in same transverse plane.
- Center IR 2 inches (5 cm) above iliac crests to include diaphragm.
- Apply gonad shielding as appropriate.

Respiration:

Suspend.

Central Ray

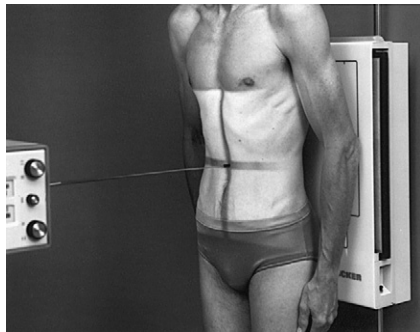
- Horizontal and 2 inches (5 cm) superior to iliac crests to center of IR

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:93.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Abdomen

AP (lateral decubitus position)

Patient Position

- Position patient lateral recumbent (usually left side down) on pad.
- Place patient's arms above level of diaphragm with knees slightly flexed.

Part Position

- Adjust midsagittal plane perpendicular to and centered to grid device.
- Center IR at level of iliac crests.
- Center 2 inches (5 cm) above iliac crests if diaphragm is to be included.
- Apply gonad shielding as appropriate.

Respiration:

Suspend.

Central Ray

- Horizontal and perpendicular to midpoint of IR

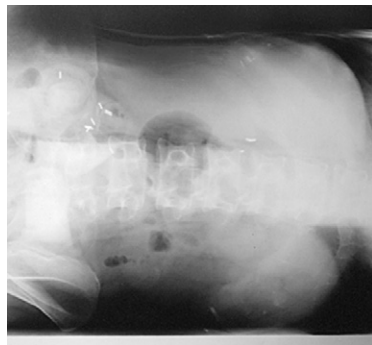
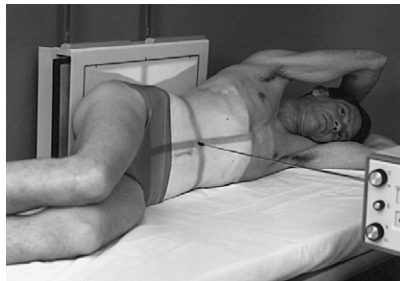
NOTE: Show side up for air and side down for fluid.

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:93.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Abdomen

Lateral

Patient Position

- Position patient lateral recumbent or upright.

Part Position

- Center midcoronal plane to grid.
- Have patient flex elbows and place hands under head.
- Center IR at level of iliac crests or approximately 2 inches (5 cm) superior to crests if diaphragm is to be included.

Respiration:

Suspend.

Central Ray

- Perpendicular to midpoint of IR

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 90

Reference: 12th edition ATLAS p. 2:95.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Abdomen

Lateral (dorsal decubitus position)

Patient Position

- Position patient supine.

Part Position

- Have patient place arms across upper chest or under head. Patient may slightly flex knees.
- Center vertical grid device to midcoronal plane at level 2 inches (5 cm) superior to iliac crests.

Respiration:

Suspend.

Central Ray

- Horizontal and perpendicular to center of IR, entering midcoronal plane 2 inches (5 cm) above iliac crests

DIGITAL RADIOGRAPHY



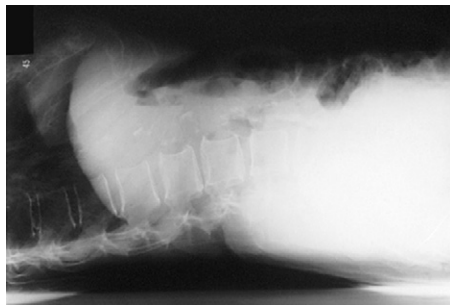
- Because of the higher kVp used for this projection, ensure collimation is extremely close.

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 95

Reference: 12th edition ATLAS p. 2:96.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Esophagus

AP or PA

Patient Position

- Position patient supine or prone.

Part Position

- Center midsagittal plane to grid.
- Have patient place arms above the head in a comfortable position.
- Adjust shoulders and hips equidistant from table.
- Place top of IR at level of mouth.
- Turn head slightly to facilitate drinking barium mixture, and give barium to patient.

Respiration:

Suspend.

Central Ray

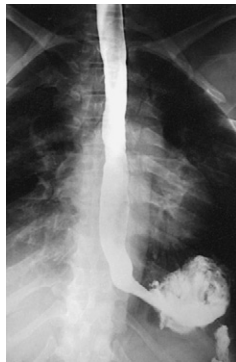
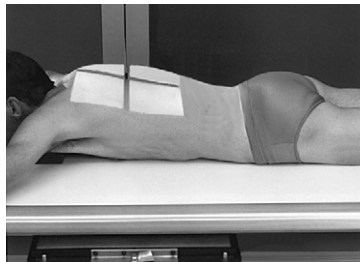
- Perpendicular to midpoint of IR at level of T5-T6

Collimation:

Adjust to 12×17 inches (30×43 cm).

kVp: 110

Reference: 12th edition ATLAS p. 2:120.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Esophagus

PA oblique (RAO)

Patient Position

- Position patient recumbent with the side-down arm at the side and the side-up arm on the pillow.

Part Position

- Elevate left side to obliquity of 35 to 40 degrees.
- Support patient on flexed knee and elbow.
- Place top of IR at level of mouth.
- Align esophagus and center elevated side through plane 2 inches (5 cm) lateral to midsagittal plane and give barium to patient.

Respiration:

Suspend.

Central Ray

- Perpendicular to midpoint of IR at level of T5 or T6

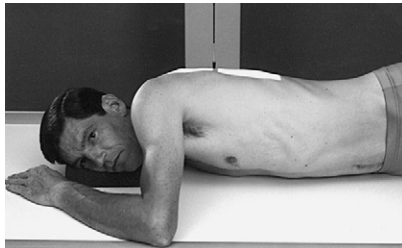
NOTE: If patient cannot assume prone position, a similar image can be obtained by using LPO position, modified as described previously.

Collimation:

Adjust to 12×17 inches (30×43 cm).

kVp: 110

Reference: 12th edition ATLAS p. 2:120.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Esophagus

Lateral

Patient Position

- Place patient's arms forward, with forearm on the pillow near the head.

Part Position

- Center midcoronal plane to grid.
- Have patient bring arms forward and slightly flex hips and knees.
- Place top of film at level of mouth.
- Give barium mixture to patient.

Respiration:

Suspend.

Central Ray

- Perpendicular to midpoint of IR at level of T5-T6

Collimation:

Adjust to 12×17 inches (30×43 cm).

kVp: 110

Reference: 12th edition ATLAS p. 2:120.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Stomach and Duodenum

PA

Patient Position

- Position patient prone.

Part Position

- Center IR at estimated level of L1-L2.
- Center (1) halfway between midline and left lateral border of abdominal cavity for 10- × 12-inch (24- × 30-cm) IR or (2) in mid-sagittal plane for 14- × 17-inch (35- × 43-cm) IR.

Respiration:

Suspend.

Central Ray

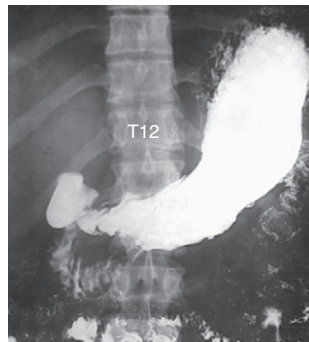
- Perpendicular to IR at level of L1-L2

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm) or 11 × 14 inches (28 × 36 cm) if a 14- × 17-inch (35- × 43-cm) IR is used.

kVp: 100

Reference: 12th edition ATLAS p. 2:126.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Stomach and Duodenum

PA oblique (RAO)

Patient Position

- Position patient recumbent with the right arm at the side and left arm by head.

Part Position

- Elevate left side, and support patient to obliquity of 40 to 70 degrees. (Hypersthenic patients require the greatest rotation.)
- Center IR at level of L1-L2.
- Position patient so that a sagittal plane passing midway between vertebrae and lateral border of elevated side is centered to grid.

Respiration:

Suspend.

Central Ray

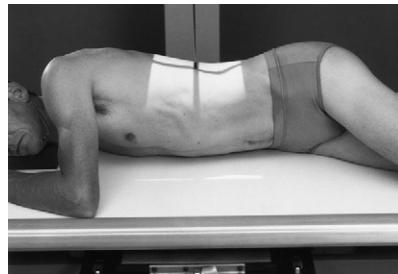
- Perpendicular to center of IR midway between vertebral column and lateral border of abdomen at level of L1-L2

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm) or 11 × 14 inches (28 × 36 cm) if a 14- × 17-inch (35- × 43-cm) IR is used.

kVp: 100

Reference: 12th edition ATLAS p. 2:130.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Stomach and Duodenum

AP oblique (LPO)

Patient Position

- Position patient recumbent with left arm by head and right arm behind body.

Part Position

- Elevate right side, and support patient to obliquity of 30 to 60 degrees. (Hypersthenic patients require the greatest rotation; 45 degrees is sufficient for asthenic patients.)
- Position patient so that sagittal plane passing midway between vertebrae and left margin of abdomen is centered to IR.
- Center IR at level of L1-L2.

Respiration:

Suspend.

Central Ray

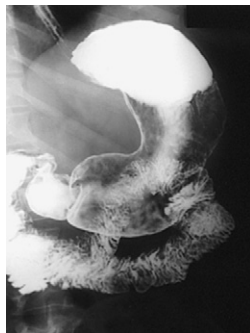
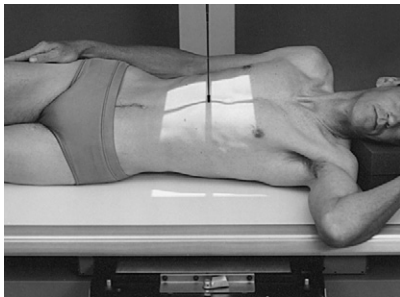
- Perpendicular to center of IR midway between vertebral column and left lateral border of abdomen at level of L1-L2

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:132.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Stomach and Duodenum

Lateral

Patient Position

- Position patient recumbent (right lateral) or erect (left lateral).

Part Position

- Adjust body so that plane passing between midcoronal plane and anterior abdominal surface is centered to grid.
- Center IR at level of L1-L2.
- Adjust to true lateral.

Respiration:

Suspend.

Central Ray

- Perpendicular to center of IR midway between midcoronal plane and anterior surface of abdomen at level of L1-L2 for recumbent or L3 for upright position

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 110

Reference: 12th edition ATLAS p. 2:134.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Stomach and Duodenum

AP

Patient Position

- Position patient supine.

Part Position

- Adjust patient so that midline of grid coincides (1) halfway between midline and lateral border of abdomen for 10- × 12-inch (24- × 30-cm) IR or (2) at midsagittal plane for 14- × 17-inch (35- × 43-cm) IR.
- Center IR at level of L1-L2.

Respiration:

Suspend.

Central Ray

- Perpendicular to IR at level of pylorus (L1-L2)

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm) or 14 × 17 inches (35 × 43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:136.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Small Intestine

AP or PA

Patient Position

- Position patient supine or prone.

Part Position

- Center midsagittal plane to grid.
- Center IR at level of iliac crests (may be slightly higher for early time exposures).

Respiration:

Suspend.

Central Ray

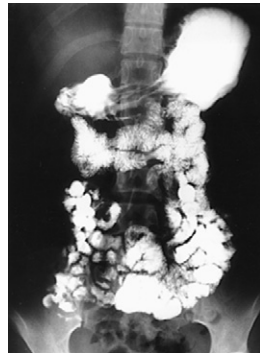
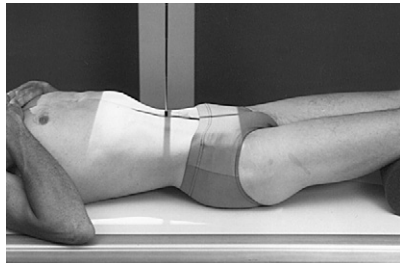
- Perpendicular to IR entering level of iliac crests (or slightly above)

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:141.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

PA

Patient Position

- Position patient prone.

Part Position

- Center midsagittal plane to grid.
- Center IR at level of iliac crests.

Respiration:

Suspend.

Central Ray

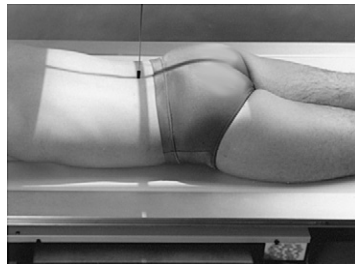
- Perpendicular to IR entering level of iliac crests

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:156.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

PA axial

Patient Position

- Position patient prone.

Part Position

- Center midsagittal plane to grid with center of IR at level of iliac crests.

Respiration:

Suspend.

Central Ray

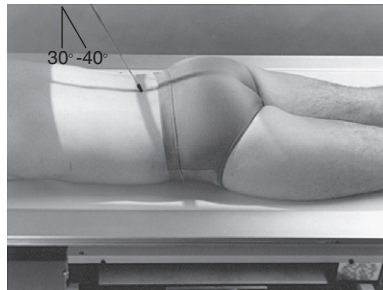
- Angle 30 to 40 degrees caudad. To show retrosigmoid area using smaller IR, direct central ray so that it enters midline at level of ASIS.

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:158.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

PA oblique (LAO and RAO)

Patient Position

- Position patient PA oblique.

Part Position

- Rotate patient 35 to 45 degrees either right or left side up.
- Flex knee for stability.
- Center body to midline of grid.
- Adjust center of IR at level of iliac crests.

Respiration:

Suspended expiration

Central Ray

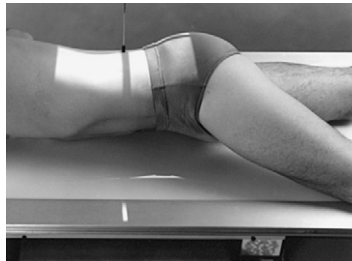
- Perpendicular to IR entering elevated side 1 to 2 inches (2.5 to 5 cm) lateral to midline of body on elevated side and at level of iliac crests

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:160.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

Lateral

Patient Position

- Position patient lateral recumbent.

Part Position

- Adjust body to true lateral position (right or left side down).
- Center midcoronal plane of abdomen to center of grid.
- Center IR to ASIS.
- Have patient flex knees and hips slightly and bring arms forward.

Respiration:

Suspend.

Central Ray

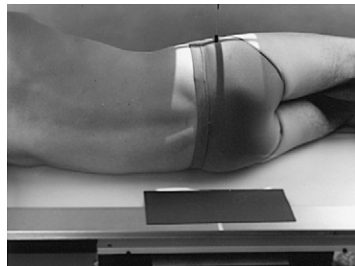
- Perpendicular to IR entering midcoronal plane at level of ASIS

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 120

Reference: 12th edition ATLAS p. 2:161.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

AP

Patient Position

- Position patient supine.

Part Position

- Center midsagittal plane to grid.
- Center IR at level of iliac crests.

Respiration:

Suspend.

Central Ray

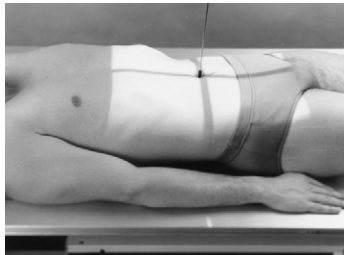
- Perpendicular to IR, entering midsagittal plane at level of iliac crests

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:162.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

AP axial

Patient Position

- Position patient supine.

Part Position

- Center midsagittal plane to grid.
- Center IR at level of 2 inches (5 cm) above iliac crests.

Respiration:

Suspend.

Central Ray

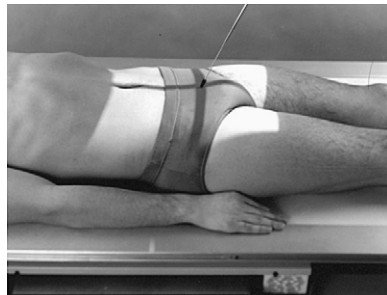
- Angle 30 to 40 degrees cephalad, entering approximately 2 inches (5 cm) below level of ASIS. (When retrosigmoid is of interest, central ray enters inferior margin of pubic symphysis.)

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:163.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

AP oblique (LPO and RPO)

Patient Position

- Position patient AP oblique.

Part Position

- Rotate patient 35 to 45 degrees from AP position either right or left side up.
- Center abdomen to grid.
- Adjust center of IR to level of iliac crests.

Respiration:

Suspend.

Central Ray

- Perpendicular entering elevated side 1 to 2 inches (2.5 to 5 cm) lateral to midline of body at level of iliac crests

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:164.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

AP or PA (lateral decubitus position)

Patient Position

- Position patient recumbent on either right or left side.
- Elevate dependent side on firm pad.

Part Position

- Place arms above head with knees slightly flexed.
- Center midsagittal plane to grid.
- Center IR to midsagittal plane at level of iliac crests.

Respiration:

Suspend.

Central Ray

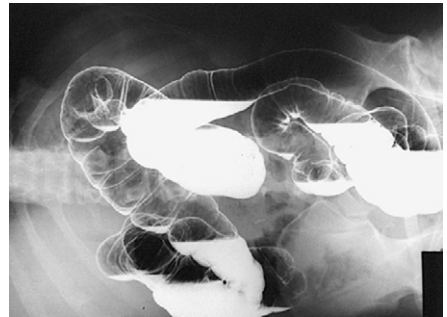
- Horizontal and perpendicular to IR at level of iliac crests

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 110

Reference: 12th edition ATLAS pp. 2:167-168.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Large Intestine

Lateral, AP or PA oblique (upright)

Patient Position

- Position patient erect frontal, lateral, or oblique.

Part Position

- Adjust arms to remove from area of interest, and distribute weight equally on feet.
- Center IR at level of iliac crests and (1) midsagittal plane for AP or PA projection, (2) midway between midsagittal plane and lateral aspect of side of interest for oblique positions, or (3) midcoronal plane for lateral position.

Respiration:

Suspend.

Central Ray

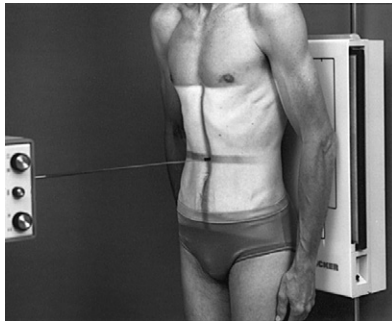
- Perpendicular to IR at level of iliac crests

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 100

Reference: 12th edition ATLAS p. 2:170.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Urinary System

AP oblique (RPO and LPO)

Patient Position

- Position patient supine.

Part Position

- Rotate patient 30 degrees from IR plane.
- Place support under elevated side as needed.
- Adjust hips and shoulders to be in same planes.
- Center spine to grid.
- Center IR at level of iliac crests.

Respiration:

Suspend.

Central Ray

- Perpendicular to level of iliac crests entering elevated side approximately 2 inches (5 cm) lateral to midline

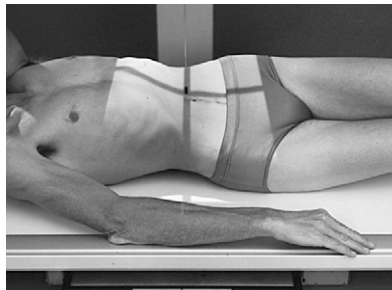
NOTE: For AP, PA, lateral, and decubitus positioning for the urinary system, see similar abdomen positions in this section.

Collimation:

Adjust to 14 × 17 inches (35 × 43 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:208.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Bladder

AP or PA axial

Patient Position

- Position patient supine.

Part Position

- Center midsagittal plane to grid (1) 2 to 3 inches (5 to 7.5 cm) above pubic symphysis to show the bladder or (2) at pubic symphysis for voiding studies.
- Adjust shoulders and hips to be equidistant from IR.
- Have patient place arms across upper chest or at sides.
- Have patient extend legs.

Respiration:

Suspend.

Central Ray

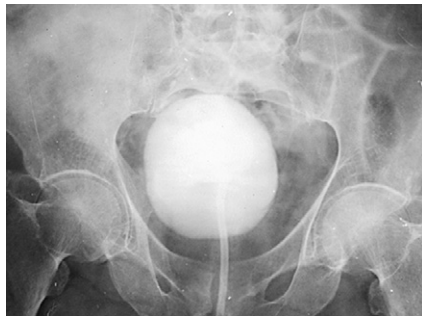
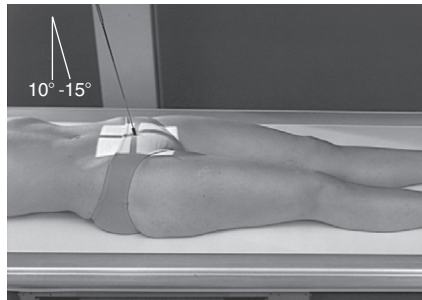
- Adjust 10 to 15 degrees caudad (1) at level 2 to 3 inches (5 to 7.5 cm) above pubic symphysis to show bladder or (2) at pubic symphysis for voiding studies.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:218.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Bladder

AP oblique (RPO or LPO)

Patient Position

- Position patient supine.

Part Position

- Rotate patient 40 to 60 degrees from supine.
- Center IR 2 to 3 inches (5 to 7.5 cm) above upper border of pubic symphysis and 2 inches (5 cm) medial to ASIS.
- Have patient abduct uppermost thigh to prevent its superimposition on bladder area.

Respiration:

Suspend.

Central Ray

- Perpendicular entering elevated side 2 inches (5 cm) medial to mid-sagittal plane (1) at level 2 to 3 inches (5 to 7.5 cm) superior to pubic symphysis or (2) at pubic symphysis for voiding studies

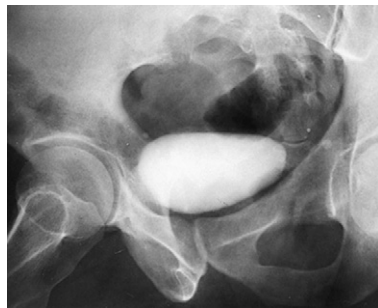
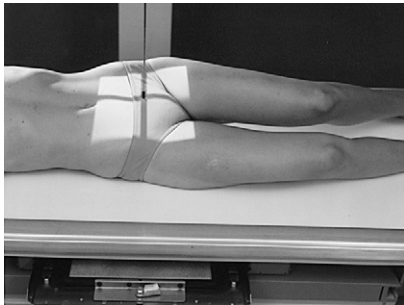
NOTE: RPO position is also used for male cystourethrography.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:220.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Bladder

Lateral

Patient Position

- Position patient lateral recumbent (either left or right).

Part Position

- Center midcoronal plane to grid.
- Have patient flex hips and knees.
- Adjust patient's arms forward with hands under head.
- Center IR 2 inches (5 cm) above pubic symphysis.

Respiration:

Suspend.

Central Ray

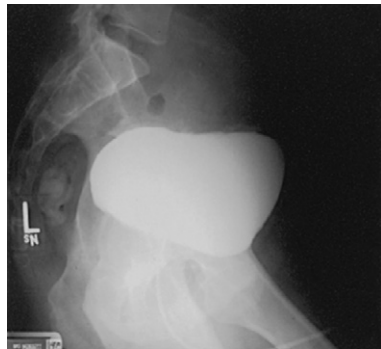
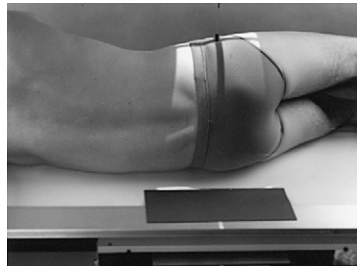
- Perpendicular to IR, entering 2 inches (5 cm) above pubic symphysis

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 95

Reference: 12th edition ATLAS p. 2:222.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

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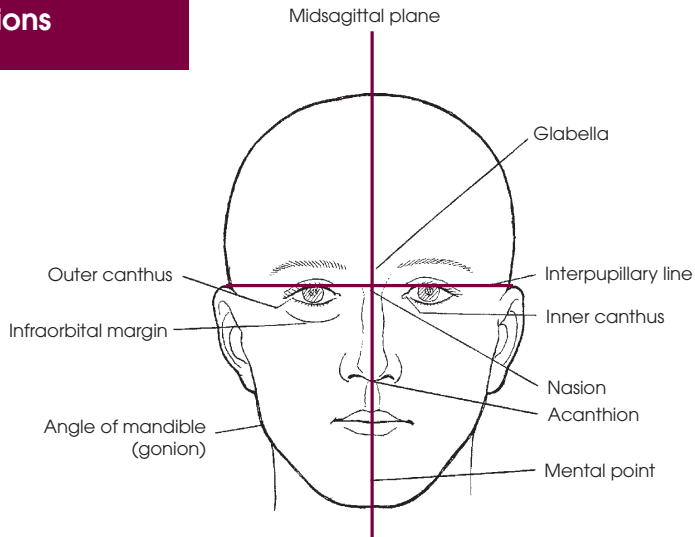
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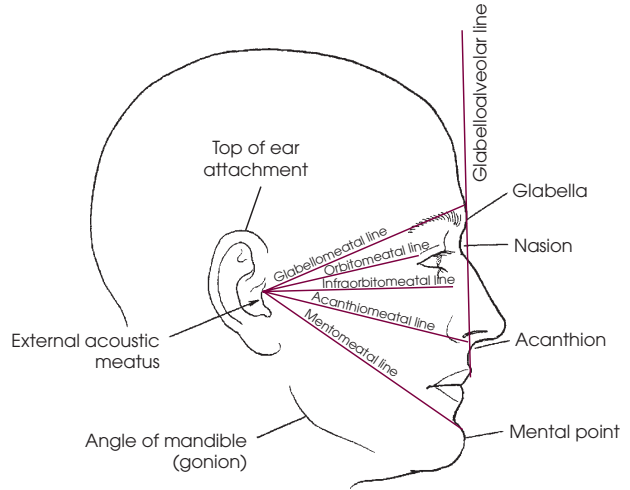
Cranial Lines, Planes, and Abbreviations

Abbreviations Used in This Section

- AML: acanthomeatal line
EAM: external acoustic meatus
IOML: infraorbitomeatal line
OML: Orbitomeatal line



Reference: 12th edition ATLAS p. 2:286.



Cranium

PA and PA axial CALDWELL METHOD

Patient Position

- Position patient seated erect or prone.

Part Position

- Have patient rest head on forehead and nose.
- Position midsagittal plane perpendicular to midline of grid device.
- OML is perpendicular to IR.

Respiration:

Suspend.

Central Ray

- PA: Perpendicular to IR exiting nasion
- Caldwell method: Angle 15 degrees caudad exiting nasion.
- Center IR to central ray.

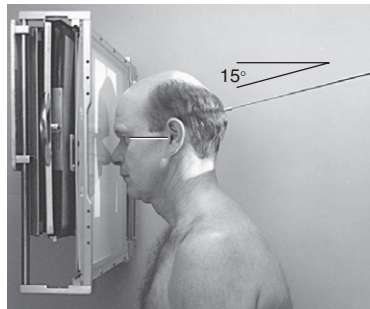
NOTE: If patient is obese or hypersthenic, a small radiolucent sponge may be needed under the forehead.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:296.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cranium

AP and AP axial

Patient Position

- Position patient supine.

Part Position

- Position midsagittal plane and OML perpendicular to IR.
- Place arms at sides or across chest.

Respiration:

Suspend.

Central Ray

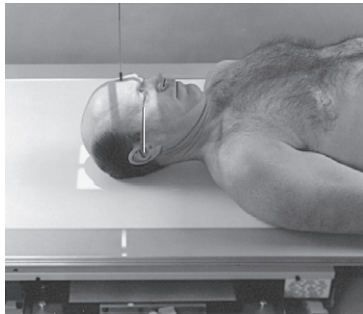
- *AP*: Perpendicular to nasion
- *AP axial*: Angle 15 degrees cephalad.
- Center IR to central ray.

Collimation:

Adjust to 10 × 12 inches (24 × 30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:300.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cranium

Lateral

Patient Position

- Position patient seated erect or semiprone.

Part Position

- Position midsagittal plane parallel to IR.
- IOML is perpendicular to front edge of IR.
- Interpupillary line is perpendicular to IR.

Respiration:

Suspend.

Central Ray

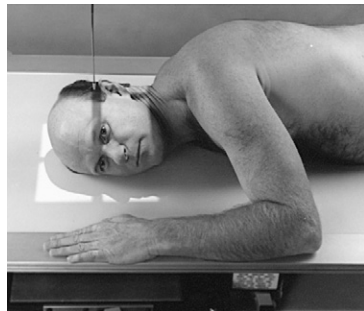
- Perpendicular entering 2 inches (5 cm) superior to EAM
- Center IR to central ray.

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:292.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cranium

AP axial TOWNE METHOD

Patient Position

- Position patient seated erect or supine.

Part Position

- Center midsagittal plane to midline of grid device, and adjust to make perpendicular.
- Have patient flex neck, and adjust OML perpendicular to IR.
- When patient cannot flex neck, place IOML perpendicular.
- Place top of IR at level of cranial vertex.

Respiration:

Suspend.

Central Ray

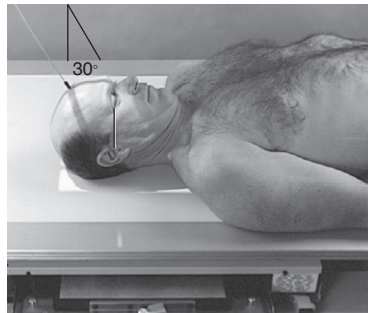
- Direct through foramen magnum with caudal angle of 30 degrees to OML or 37 degrees to IOML. Central ray enters approximately $2\frac{1}{2}$ inches (6.4 cm) superior to glabella and passes through level of EAM.

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:302.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cranium

PA axial HAAS METHOD

Patient Position

- Position patient seated erect or prone.

Part Position

- Have patient rest head on forehead and nose.
- Place arms in comfortable position.
- Adjust shoulders to lie in same transverse plane.
- Adjust head so that midsagittal plane and OML are perpendicular to IR.

Respiration:

Suspend.

Central Ray

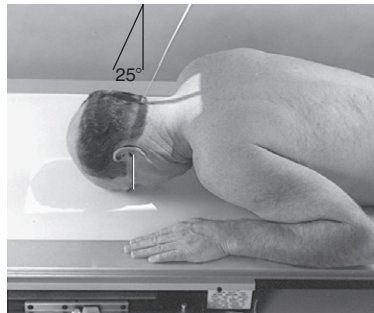
- Direct 25 degrees cephalad entering $1\frac{1}{2}$ inches (3.8 cm) inferior to external occipital protuberance (inion) and exiting $1\frac{1}{2}$ inches (3.8 cm) superior to nasion

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:308.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Cranium

Submentovertical SCHÜLLER METHOD

Patient Position

- Position patient seated erect at head unit or supine on elevated table support.

Part Position

- Have patient extend neck and rest head on vertex.
- Center and adjust midsagittal plane perpendicular to IR.
- Adjust IOML parallel to plane of IR if possible.
- Immobilize head.

Respiration:

Suspend.

Central Ray

- Direct through sella turcica perpendicular to IOML entering between angles of mandible.
- Central ray passes through a point $\frac{3}{4}$ inch (1.9 cm) anterior to level of EAM.

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:310.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Optic Canal and Foramen

Parietoorbital oblique RHESE METHOD

Patient Position

- Position patient seated erect or semiprone.

Part Position

- Center affected orbit to IR.
- Have patient rest head on zygoma, nose, and chin.
- Adjust AML perpendicular to IR.
- Rotate midsagittal plane 53 degrees from IR.

Respiration:

Suspend.

Central Ray

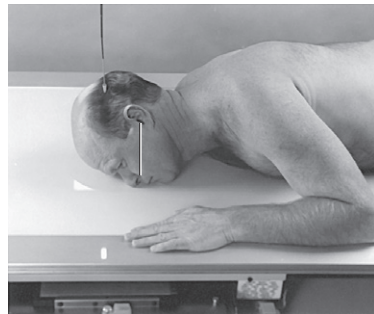
- Perpendicular entering approximately 1 inch (2.5 cm) superior and 1 inch (2.5 cm) posterior to elevated top of ear attachment exiting orbit closest to IR
- Ensure that collimation is extremely close.
- Center IR to central ray.

Collimation:

Adjust to 6×8 inches (15×20 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:290.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Facial Bones

Lateral

Patient Position

- Position patient seated erect or semiprone.

Part Position

- Position zygomatic bone to center of grid.
- Adjust midsagittal plane parallel to IR.
- IOML is parallel with transverse axis of IR.
- Interpupillary line is perpendicular to IR.

Respiration:

Suspend.

Central Ray

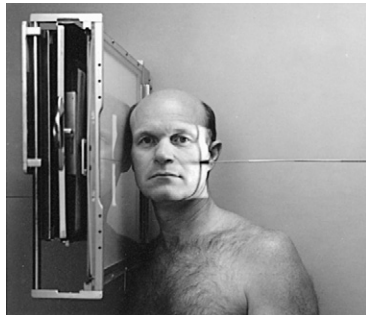
- Perpendicular entering lateral surface of zygomatic bone halfway between outer canthus and EAM.
- Center IR to central ray.

Collimation:

Adjust to 6×10 inches (15×24 cm).

kVp: 70

Reference: 12th edition ATLAS p. 2:325.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Facial Bones

Parietoacanthial WATERS METHOD

Patient Position

- Position patient seated erect or prone.

Part Position

- Center and adjust midsagittal plane perpendicular to IR, and have patient rest head on extended chin.
- Hyperextend neck and adjust OML to form 37-degree angle to IR plane.
- Mentomeatal line is approximately perpendicular to IR.
- Usually patient's nose is about $\frac{3}{4}$ inch (1.9 cm) from grid device.
- Center IR to acanthion.

Respiration:

Suspend.

Central Ray

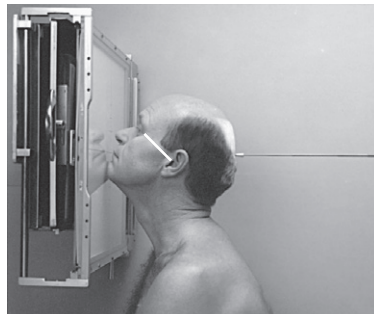
- Perpendicular exiting acanthion

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:328.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Facial Bones

Acanthoparietal REVERSE WATERS METHOD

Patient Position

- Position patient supine.

Part Position

- Center and adjust midsagittal plane perpendicular to IR.
- Adjust extension of neck so that OML forms 37-degree angle with plane of IR. If necessary, place a support under patient's shoulders to help extend the neck.
- Mentomeatal line is approximately perpendicular to plane of IR.
- Adjust head so that midsagittal plane is perpendicular to plane of IR.

Respiration:

Suspend.

Central Ray

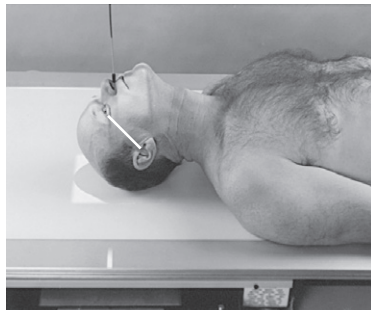
- Perpendicular to enter acanthion
- Center IR to central ray.

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:332.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Nasal Bones

Lateral

Patient Position

- Position patient seated erect or semiprone.

Part Position

- Center nasion to IR.
- Adjust midsagittal plane parallel to IR.
- IOML is parallel with transverse axis of IR.
- Interpupillary line is perpendicular to IR.

Respiration:

Suspend.

Central Ray

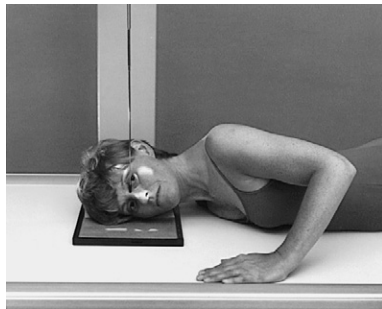
- Perpendicular entering $\frac{1}{2}$ inch (1.3 cm) distal to nasion
- Ensure that collimation is extremely close.

Collimation:

Adjust to 3×3 inches (8×8 cm) with field extending from glabella to acanthion and $\frac{1}{2}$ inch (1.3 cm) beyond tip of nose.

kVp: 50

Reference: 12th edition ATLAS p. 2:336.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Zygomatic Arches

Submentovertical

Patient Position

- Position patient seated erect or supine on elevated table support.

Part Position

- Hyperextend neck, and have patient rest head on vertex.
- Center and adjust midsagittal plane perpendicular to IR.
- Adjust IOML parallel with IR if possible.

Respiration:

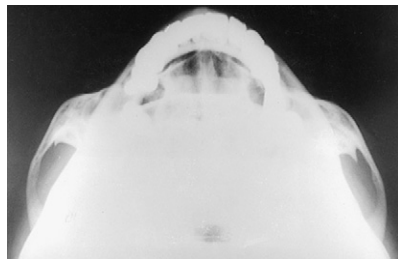
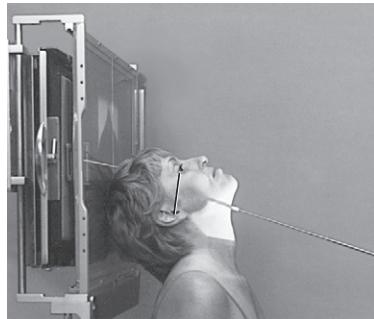
Suspend.

Central Ray

- Perpendicular to IOML entering midway between zygomatic arches
- Central ray enters approximately 1 inch (2.5 cm) posterior to outer canthi.

Collimation:

Adjust to 8×10 inches (18×24 cm).



kVp: 65

Reference: 12th edition ATLAS p. 2:338.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Zygomatic Arch

Tangential

Patient Position

- Position patient seated erect or supine on elevated table support.

Part Position

- Hyperextend neck, and have patient rest head on vertex.
- Center and adjust midsagittal plane perpendicular to IR.
- Adjust IOML as parallel as possible with IR.
- Rotate midsagittal plane 15 degrees toward side being examined, then tilt top of head approximately 15 degrees away from side being examined so that central ray is tangent to zygomatic arch.
- Center zygomatic arch to IR.

Respiration:

Suspend.

Central Ray

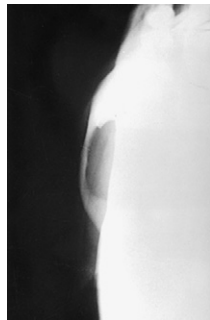
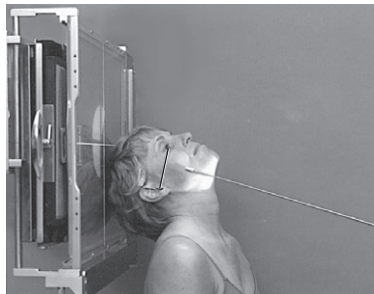
- Perpendicular to IOML entering affected zygomatic arch at a point 1 inch (2.5 cm) posterior to outer canthus

Collimation:

Adjust to 8 × 10 inches (18 × 24 cm).

kVp: 65

Reference: 12th edition ATLAS p. 2:340.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Zygomatic Arches

AP axial MODIFIED TOWNE METHOD

Patient Position

- Position patient seated erect or supine.

Part Position

- Center midsagittal plane to grid device, and adjust to perpendicular position.
- Flex neck, and adjust OML perpendicular to IR.

Respiration:

Suspend.

Central Ray

- Angle 30 degrees caudad entering glabella approximately 1 inch (2.5 cm) superior to nasion. (Direct 37 degrees caudad if IOML is perpendicular to IR.)
- Center IR to central ray.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 70

Reference: 12th edition ATLAS p. 2:342.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Mandibular Rami

PA

Patient Position

- Position patient seated erect or prone.

Part Position

- Have patient rest forehead and nose on grid device.
- Adjust head so that midsagittal plane is perpendicular to IR.
- OML is perpendicular to IR.

Respiration:

Suspend.

Central Ray

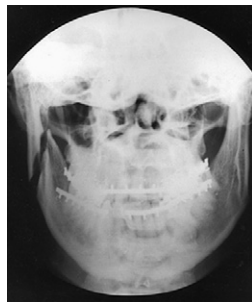
- Perpendicular to exit acanthion
- Center IR to central ray.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:344.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Mandibular Rami

PA axial

Patient Position

- Position patient seated erect or prone.

Part Position

- Position midsagittal plane perpendicular to IR.
- OML is perpendicular to IR.
- Have patient rest forehead and nose on IR holder.

Respiration:

Suspend.

Central Ray

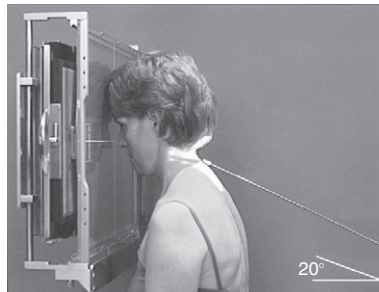
- Angle 20 to 25 degrees cephalad exiting at acanthion.
- Center IR to central ray.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:345.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Mandible

Axiolateral oblique

Patient Position

- Position patient seated erect, semisupine, or semiprone.

Part Position

- Place head in lateral position with interpupillary line perpendicular.
- Extend neck enough that long axis of mandibular body is parallel with transverse axis of IR, preventing superimposition of cervical spine.
- If projection is being performed on tabletop, position IR so that complete body of mandible is positioned on IR.
- Adjust rotation of head so that area of interest is parallel to IR as follows: (1) for *ramus*, keep head in true lateral position; (2) for *body*, rotate head 30 degrees toward IR; (3) for *symphysis*, rotate head 45 degrees toward IR.

Respiration:

Suspend.

Central Ray

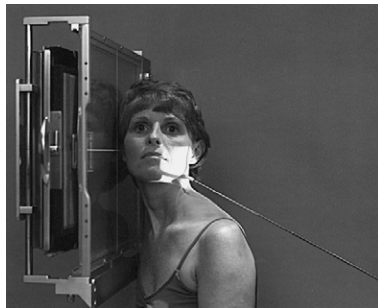
- Angle 25 degrees cephalad to pass directly through mandibular region of interest.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:348.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Temporomandibular Articulations

AP axial

Patient Position

- Position patient seated erect or supine.

Part Position

- Adjust head so that midsagittal plane is perpendicular to IR.
- Flex neck to place OML perpendicular to IR.
- After first exposure with patient's mouth closed, do not permit patient to move. Change IR, and make second exposure with mouth fully open.

Respiration:

Suspend.

Central Ray

- Angle 35 degrees caudal centered to temporomandibular joints entering approximately 3 inches (7.6 cm) superior to nasion.
- Center IR to central ray.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 80

Reference: 12th edition ATLAS p. 2:352.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Temporomandibular Articulation

Axiolateral oblique

Patient Position

- Position patient seated erect or semiprone.

Part Position

- Center a point $\frac{1}{2}$ inch (1.3 cm) anterior to EAM to IR.
- Rotate midsagittal plane 15 degrees toward IR.
- Adjust AML parallel with transverse axis of IR.
- Interpupillary line is perpendicular to IR.
- After first exposure, do not permit patient to move. Change IR, and make second exposure with mouth fully open.

Respiration:

Suspend.

Central Ray

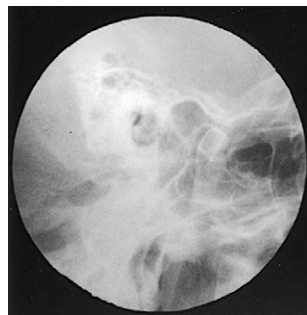
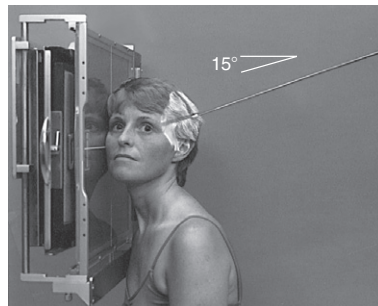
- Angle 15 degrees caudad exiting temporomandibular joint closer to IR.
- Central ray enters about $1\frac{1}{2}$ inches (3.8 cm) superior to upside EAM.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:354.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Paranasal Sinuses

Lateral

Patient Position

- Position patient seated erect.

Part Position

- Adjust head to true lateral position.
- Midsagittal plane is parallel, and interpupillary line is perpendicular to IR.
- Adjust IOML horizontal and parallel with transverse axis of IR.

Respiration:

Suspend.

Central Ray

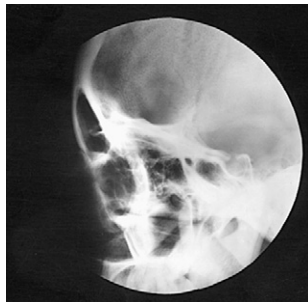
- Horizontal and perpendicular entering $\frac{1}{2}$ to 1 inch (1.3 to 2.5 cm) posterior to outer canthus
- Center IR to central ray.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 70

Reference: 12th edition ATLAS p. 2:370.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Frontal and Anterior Ethmoidal Sinuses

PA axial CALDWELL METHOD

Patient Position

- Position patient seated erect.

Part Position

- Tilt vertical grid device down 15 degrees.
- Have patient rest head on forehead and nose.
- Position midsagittal plane perpendicular to midline of IR.
- OML is perpendicular to IR.
- This positioning places OML 15 degrees from horizontal central ray.

Respiration:

Suspend.

Central Ray

- Horizontal to center of IR exiting nasion

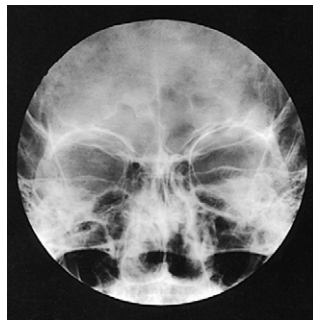
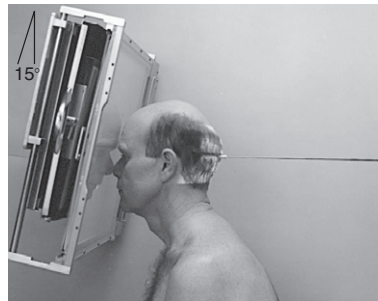
NOTE: If grid device cannot be tilted, place a radiolucent sponge between forehead and grid so that OML remains 15 degrees from horizontal x-ray beam.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:372.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Maxillary and Sphenoid Sinuses

Parietoacanthial WATERS METHOD

Patient Position

- Position patient seated erect.

Part Position

- Center and adjust midsagittal plane perpendicular to IR, and have patient rest head on extended chin.
- Adjust OML to form 37-degree angle to IR. Mentomeatal line is approximately perpendicular to IR.
- Center IR to acanthion.
- *Open mouth option:* Have patient fully open mouth to show the sphenoid and maxillary sinuses.

Respiration:

Suspend.

Central Ray

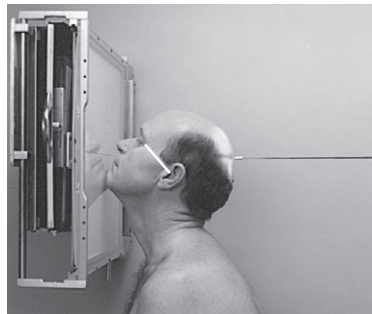
- Horizontal and perpendicular to IR exiting acanthion

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:374.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Ethmoidal and Sphenoidal Sinuses

Submentovertical

Patient Position

- Position patient seated erect at head unit.

Part Position

- Extend head, and have patient rest it on vertex.
- Center and adjust midsagittal plane perpendicular to IR.
- Adjust IOML parallel with IR.

Respiration:

Suspend.

Central Ray

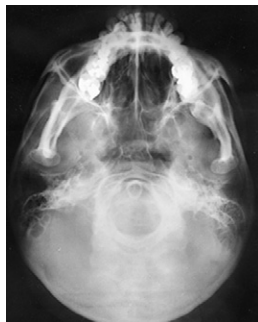
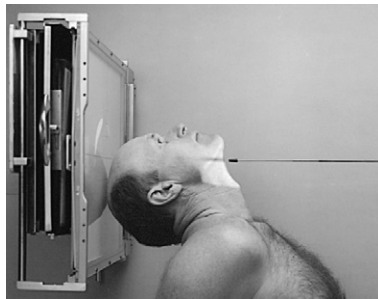
- Horizontal and perpendicular to IOML
- Central ray enters approximately $\frac{3}{4}$ inch (1.9 cm) anterior to level of EAM.

Collimation:

Adjust to 8×10 inches (18×24 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:378.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Petromastoid Portion

Axiolateral oblique **MODIFIED LAW METHOD**

Patient Position

- Position patient seated erect or semiprone.

Part Position

- Position head in lateral position with affected side closer to IR.
- From true lateral position, rotate midsagittal plane (face) 15 degrees toward IR.
- IOML is parallel with transverse axis of IR.
- Interpupillary line is perpendicular to IR.

Respiration:

Suspend.

Central Ray

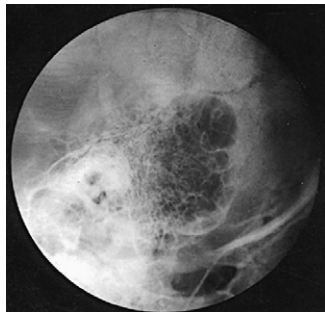
- Angle 15 degrees caudad entering approximately 2 inches (5 cm) posterior and 2 inches (5 cm) superior to EAM farthest from IR.
- Center IR to central ray.

Collimation:

Adjust to 6×8 inches (15×20 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:290.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Petromastoid Portion

Axiolateral oblique (posterior profile) **STENVERS METHOD**

Patient Position

- Position patient seated erect or prone.

Part Position

- Have patient rest head on forehead, nose, and zygoma.
- Adjust IOML parallel to IR and midsagittal plane at 45 degrees.

Respiration:

Suspend.

Central Ray

- Angle 12 degrees cephalad entering 3 to 4 inches (7.6 to 10 cm) posterior and ½ inch (1.3 cm) inferior to upside EAM.
- Central ray should exit 1 inch (2.5 cm) anterior to downside EAM.
- Center IR to central ray.

Collimation:

Adjust to 6 × 8 inches (15 × 20 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:290.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

Petromastoid Portion

Axiolateral oblique (anterior profile) **ARCELIN METHOD**

Patient Position

- Position patient seated erect or supine centered to table.

Part Position

- Rotate midsagittal plane 45 degrees away from side being examined.
- IOML is perpendicular to IR.

Respiration:

Suspend.

Central Ray

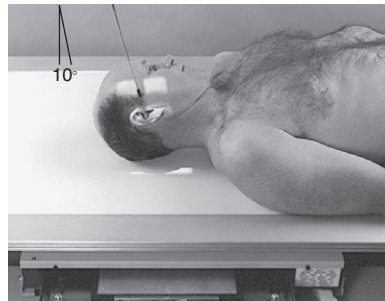
- Angle 10 degrees caudad entering approximately $\frac{3}{4}$ inch (2 cm) superior and 1 inch (2.5 cm) anterior to EAM.
- Center IR to central ray.

Collimation:

Adjust to 6 × 8 inches (15 × 20 cm).

kVp: 75

Reference: 12th edition ATLAS p. 2:290.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

AEC Factors

Part Thickness (cm)	mA	kVp	AEC Detector	mAs	Density Comp.	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

Instructor: _____

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Chest:

AP, 332

AP or PA (right or left lateral
decubitus), 334

Abdomen:

AP, 336

AP or PA (left lateral decubitus),
338

Pelvis:

AP, 340

Femur:

AP, 342

Lateral (dorsal decubitus), 344

Cervical Spine:

Lateral (right or left dorsal
decubitus), 346

Chest and Abdomen: Neonate:

AP, 348

Lateral (right or left dorsal
decubitus), 350

Chest AP

Patient Position

- Position patient upright or to greatest angle tolerated.
- Position critically ill or injured patients supine.

Part Position

- Center midsagittal plane to IR.
- Position IR under patient with top about 2 inches (5 cm) above relaxed shoulders.
- Internally rotate patient's arms to prevent scapular superimposition of lung field if not contraindicated.
- Ensure that patient's upper torso is not rotated.

Respiration:

Inspiration.

Central Ray

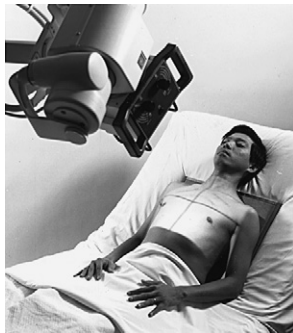
- Perpendicular to center of IR

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 85

Reference: 12th edition ATLAS p. 1:518.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Chest

AP or PA (right or left lateral decubitus)

Patient Position

- Position patient lateral recumbent.
- Place firm support under patient to elevate body 2 to 3 inches (5 to 7.5 cm).
- Raise both arms up and away from chest region.
- Ensure that patient cannot fall out of bed.

Part Position

- Perform AP projection whenever possible.
- Adjust patient to ensure true lateral position.
- Place IR behind patient and below support.
- Adjust grid so that it extends 2 inches (5 cm) above shoulders.

Respiration:

Inspiration.

Central Ray

- Horizontal and perpendicular to center of IR

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 85

Reference: 12th edition ATLAS p. 1:524.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Abdomen

AP

Patient Position

- Position patient supine using horizontal bed placement.

Part Position

- Position grid under patient.
- Keep grid from tipping side to side by placing it in center of bed and stabilizing with blankets if necessary.
- Center midsagittal plane to grid.
- If emphasis is on upper abdomen, center grid 2 inches (5 cm) above iliac crests or high enough to include diaphragm.

Respiration:

Suspended.

Central Ray

- Perpendicular to center of grid at level of iliac crests

Collimation:

Adjust to 14×17 inches (35×43 cm).



kVp: 74

Reference: 12th edition ATLAS p. 2:91.

Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Abdomen AP or PA (left lateral decubitus)

Patient Position

- Place patient in left lateral recumbent position.
- If necessary, place firm support under patient to elevate body.
- Ensure that patient cannot fall out of bed.

Part Position

- Adjust patient to ensure true lateral position.
- Place grid vertically in front of patient for PA or behind patient for AP. Support grid to prevent grid cutoff.
- Position grid so that its center is 2 inches (5 cm) above iliac crests to ensure that diaphragm is included.

Respiration:

Suspended.

Central Ray

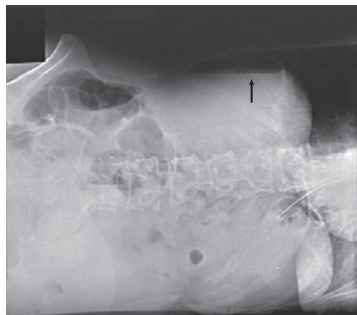
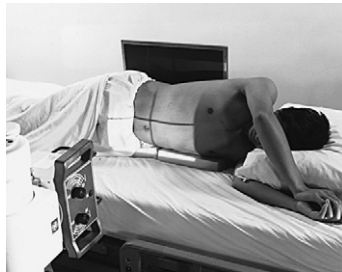
- Horizontal and perpendicular to center of grid

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 74

Reference: 12th edition ATLAS p. 2:96.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Pelvis AP

Patient Position

- Position patient supine.

Part Position

- Position grid under pelvis so that center is midway between ASIS and pubic symphysis (about 2 inches [5 cm] inferior to ASIS).
- Center midsagittal plane to midline of grid. Pelvis should not be rotated.
- Rotate patient's legs medially 15 degrees when not contraindicated.

Respiration:

Suspend.

Central Ray

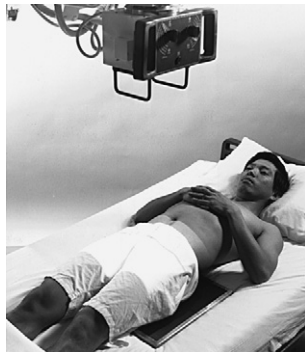
- Perpendicular to midpoint of grid. Central ray should enter patient 2 inches (5 cm) above pubic symphysis and 2 inches (5 cm) below ASIS.

Collimation:

Adjust to 14×17 inches (35×43 cm).

kVp: 74

Reference: 12th edition ATLAS p. 1:337.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Femur AP

Patient Position

- Position patient supine.

Part Position

- *Cautiously* place grid lengthwise under patient's femur with distal edge of grid low enough to include fracture site and knee joint.
- Elevate grid with towels under each side to ensure proper grid alignment with x-ray tube.
- Center grid to midline of femur.

Respiration:

Suspend.

Central Ray

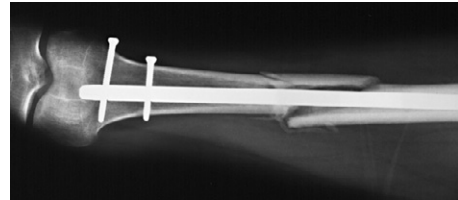
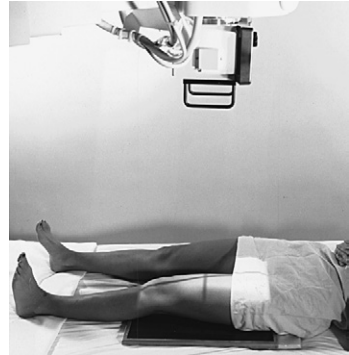
- Perpendicular to long axis of femur; center to grid
- Ensure that central ray and grid are aligned to prevent grid cutoff.

Collimation:

Adjust to 1 inch (2.5 cm) on sides of shadow of femur and 17 inches (43 cm) in length.

kVp: 70

Reference: 12th edition ATLAS p. 1:318.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Femur

Lateral (dorsal decubitus)

Patient Position

- Position patient supine.

Part Position

- Determine whether mediolateral or lateromedial projection is to be performed.
- Place grid in vertical position next to lateral aspect of femur.
- Place distal edge of grid low enough to include knee joint.
- Stabilize grid firmly in position (patient may hold).
- Support and elevate unaffected leg.
- Ensure that grid is placed perpendicular to epicondylar plane.

Respiration:

Suspend.

Central Ray

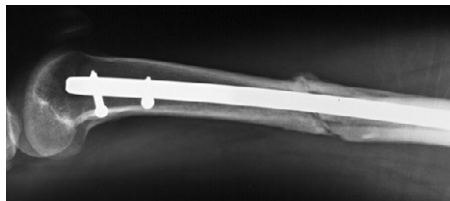
- Perpendicular to long axis of femur; center to grid

Collimation:

Adjust to 1 inch (2.5 cm) on sides of shadow of femur and 17 inches (43 cm) in length.

kVp: 70

Reference: 12th edition ATLAS p. 1:320.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Cervical Spine

Lateral (right or left dorsal decubitus)

Patient Position

- Position patient supine with arms extended along sides of body.
- *Do not remove cervical collar without consent of physician.*

Part Position

- Ensure that upper torso and head are not rotated.
- Place grid lengthwise on right or left side, parallel to neck.
- Place top of grid 1 to 2 inches (2.5 to 5 cm) above EAM.
- Immobilize grid in vertical position.
- Have patient relax shoulders and reach for feet if possible.

Respiration:

Full expiration.

Central Ray

- Horizontal and perpendicular to center of grid
- Use SID of 60 to 72 inches (158 to 183 cm).

Collimation:

Adjust to 10×12 inches (24×30 cm).

kVp: 62

Reference: 12th edition ATLAS p. 1:388.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Chest and Abdomen: Neonate

AP

Patient Position

- Position patient supine in center of IR. If IR is directly under infant, cover with soft, warm blanket.

Part Position

- *Carefully* position x-ray tube over infant.
- Ensure that chest and abdomen are not rotated.
- Move infant's arms away from body, and bring legs down and away from abdomen.
- Leave infant's head rotated.

Respiration:

Inspiration

Central Ray

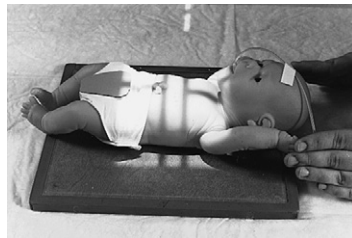
- Perpendicular to midpoint of chest and abdomen

Collimation:

Adjust to 1 inch (2.5 cm) on all sides of chest and abdomen.

kVp: 64

Reference: 12th edition ATLAS pp. 3:194-196.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

Chest and Abdomen: Neonate

Lateral (right or left dorsal decubitus)

Patient Position

- *Carefully* place x-ray tube to side of bassinet.
- Position infant supine on radiolucent block covered with soft, warm blanket.

Part Position

- Ensure that infant's chest and abdomen are centered to IR and not rotated.
- Move infant's arms above head.
- Place IR lengthwise and vertical beside infant, then immobilize IR.
- Leave infant's head rotated.

Respiration:

Inspiration

Central Ray

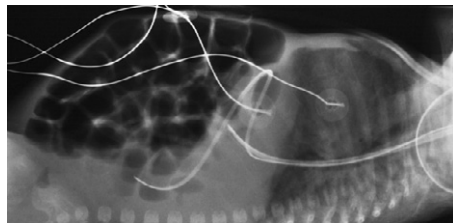
- Horizontal and perpendicular to midpoint of chest and abdomen along midcoronal plane

Collimation:

Adjust to length of chest and abdomen and 1 inch (2.5 cm) above abdomen.

kVp: 72

Reference: 12th edition ATLAS pp. 3:197-198.



Manual Factors

Part Thickness (cm)	mA	kVp	Time	mAs	SID	Image Receptor Size	CR, DR Exposure Indicator	Grid	HF, 1Ø or 3Ø

Notes: _____ Competency: ____/____/____

_____ Instructor: _____

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SID Conversion, 354

Grid Conversion Factors, 356

SID Conversion

When SID* is changed, mAs must be changed to compensate for differences in radiation intensity. To use, locate the original SID on the left-hand vertical column of the accompany chart. Read across the chart to the column under the desired (new) SID. Multiply the original mAs by the conversion factor (from box) to obtain the new mAs (e.g., using 15 mAs at 40 inches changing to 60 inches, $15 \text{ mAs} \times 2.25 = 33.75 \text{ mAs}$ at 60 inches SID).

**Source-to-image-receptor distance.*

Desired SID

Distance	36"	40"	44"	48"	52"	56"	60"	64"	68"	72"
36"	1.0	1.23	1.5	1.78	2.09	2.42	2.78	3.16	3.57	4.0
40"	0.81	1.0	1.21	1.44	1.69	1.96	2.25	2.56	2.89	3.24
44"	0.67	0.83	1.0	1.19	1.4	1.62	1.86	2.12	2.39	2.68
48"	0.56	0.69	0.84	1.0	1.17	1.36	1.56	1.78	2.01	2.25
52"	0.48	0.59	0.72	0.85	1.0	1.16	1.33	1.51	1.71	1.92
56"	0.41	0.51	0.62	0.73	0.86	1.0	1.15	1.31	1.47	1.65
60"	0.36	0.44	0.54	0.64	0.75	0.87	1.0	1.14	1.28	1.44
64"	0.32	0.39	0.47	0.56	0.66	0.77	0.88	1.0	1.13	1.27
68"	0.28	0.35	0.42	0.5	0.58	0.68	0.78	0.89	1.0	1.12
72"	0.25	0.31	0.37	0.44	0.52	0.6	0.69	0.79	0.89	1.0

Grid Conversion Factors

When converting from one grid ratio to another, use the following formula:

$$\frac{mAs\ 1}{mAs\ 2} = \frac{GCF\ 1}{GCF\ 2}$$

Where: *mAs 1* = original mAs

mAs 2 = new mAs

GCF 1 = original grid conversion factor

GCF 2 = new grid conversion factor

Grid Ratio	60 kVp	85 kVp	110 kVp
No grid	1	1	1
5:1	3	3	3
8:1	3.75	4	4.25
12:1	4.75	5.5	6.25
16:1	5.75	6.75	8

*Adapted from Characteristics and applications of x-ray grids, Cincinnati, 1992, Liebel-Flarsheim division of Sybron Corporation.
Approximate values based on clinical tests of pelvis and skull.*

Closely collimated radiographs require an increase in exposure to maintain a comparable density to compensate for the decrease in scatter radiation reaching the image receptor. Approximate changes in exposure are suggested as follows:

Collimating from	To	Increase mAs by
14 × 17 inches (35 × 43 cm)	10 × 12 inches (24 × 30 cm)	25%
14 × 17 inches (35 × 43 cm)	8 × 10 inches (18 × 24 cm)	40%
14 × 17 inches (35 × 43 cm)	5 × 7 inches (13 × 18 cm)	60%

Orthopedic Cast Technique

Radiographic techniques generally need to be increased to penetrate orthopedic casts. The amount of exposure increase depends on the thickness of the cast, cast material, and x-ray energy. The following techniques are suggested as guidelines for initial adjustment:

	Increase Exposure by
For dry plaster cast	2 × mAs, or + 10 kVp
For wet plaster cast	3 × mAs, or 2 + mAs and + 10 kVp
For fiberglass cast	+ 5 to + 8 kVp

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Notes:

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Notes

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External Landmarks Related to the Body Structures at the Same Level

Body Structure	External Landmarks	Body Structure	External Landmarks
Cervical Area		Lumbar Area	
C1	Mastoid tip	L2, L3	Inferior costal margin
C2, C3	Gonion (angle of mandible)	L4, L5	Level of most superior aspect of iliac crests
C3, C4	Hyoid bone		
C5	Thyroid cartilage		
C7, T1	Vertebra prominens		
Thoracic Area		Sacrum and Pelvic Area	
T1	Approximately 2 in (5 cm) above level of jugular notch	S1, S2	Level of anterior superior iliac spines (ASISs)
T2, T3	Level of jugular notch	Coccyx	Level of pubic symphysis and greater trochanters
T4, T5	Level of sternal notch		
T7	Level of inferior angles of scapulae		
T9, T10	Level of xiphoid process		