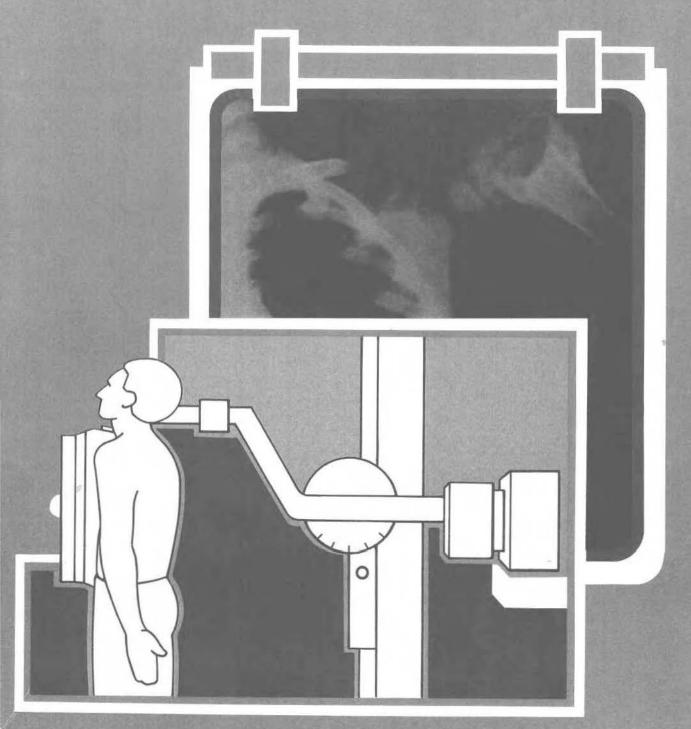
World Health Organization Basic Radiological System

Manual of Radiographic Technique



WORLD HEALTH ORGANIZATION



The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this organization, which was created in 1948, the health professions of some 165 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

By means of direct technical cooperation with its Member States, and by stimulating such cooperation among them, WHO promotes the development of comprehensive health services, the prevention and control of diseases, the improvement of environmental conditions, the development of health manpower, the coordination and development of biomedical and health services research, and the planning and implementation of health programmes.

These broad fields of endeavour encompass a wide variety of activities, such as developing systems of primary health care that reach the whole population of Member countries; promoting the health of mothers and children; combating malnutrition; controlling malaria and other communicable diseases including tuberculosis and leprosy; having achieved the eradication of smallpox, promoting mass immunization against a number of other preventable diseases; improving mental health; providing safe water supplies; and training health personnel of all categories.

Progress towards better health throughout the world also demands international cooperation in such matters as establishing international standards for biological substances, pesticides and pharmaceuticals; formulating environmental health criteria; recommending international nonproprietary names for drugs; administering the International Health Regulations; revising the International Classification of Diseases, Injuries, and Causes of Death; and collecting and disseminating health statistical information.

Further information on many aspects of WHO's work is presented in the Organization's publications.

WORLD HEALTH ORGANIZATION BASIC RADIOLOGICAL SYSTEM

MANUAL OF RADIOGRAPHIC TECHNIQUE

World Health Organization Basic Radiological System

Manual of Radiographic Technique

by

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WORLD HEALTH ORGANIZATION
GENEVA
1986

ISBN 92 4 154179 2

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The authors alone are responsible for the views expressed in this publication.

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PREFACE

This Manual of Radiographic Technique is for use with the World Health Organization Basic Radiological System. Unlike most books on radiography, it is compiled with the assumption that the person who uses it—usually the BRS operator—has little knowledge of X-ray equipment or experience of how to X-ray a patient. No attempt is made to teach the theory of radiography; rather a visual sequence is presented which should be followed exactly, without deviation or personal variation. Although it can be used with any X-ray equipment, it is specifically designed for use with X-ray machines that comply with the WHO-BRS specification. After a short period of training the operator should be able to use the manual to carry out the techniques it illustrates.

The range of basic radiographic techniques described is sufficient to enable more that 90% of the problems diagnosable through radiography to be routinely examined. If the instructions are followed exactly, the resulting radiographs will be in standard projections, easily repeated for comparison, and understood by physicians and health workers throughout the world.

Descriptions of how to X-ray the urinary tract and the gall-bladder, both needing the help of a physician, are included. Techniques for fluoroscopy are not included because it is not possible to carry them out with the basic radiological system.

Since films and X-ray cassettes vary, the exposures required for each examination must be adjusted to local conditions by a fully qualified radiographer/X-ray technologist when the machine is installed. If the film-cassette combination is changed, readjustment of the exposure will be necessary for the best results.

Each technique has been tested on a number of basic radiological system units. Some are easier to carry out than others and it is hoped that all who use this manual will comment on their problems and experiences, particularly if a technique is found to be difficult or cannot be accurately reproduced. Many of the ideas communicated are new. It is, therefore, important for the members of the WHO-BRS Advisory Group¹ who worked on the manual to be informed of successes or failures, so that future editions can be corrected. Comments should be sent to the Chief Medical Officer, Radiation Medicine, World Health Organization, 1211 Geneva 27, Switzerland.

When used by trained radiographers, techniques more complex than those shown in this manual can be carried out with the basic radiological system, serving the particular needs of specialists in various fields of medicine.

The members of the WHO-BRS Advisory Group are grateful to all those who helped with advice and comments, particularly the staff of the Department of Radiology, University of Lund, Lund, Sweden, and the Department of Radiology, University of California, Davis, CA, United States of America.

¹ The members of the WHO-BRS Advisory Group are as follows: Mr. E. Borg, Sana'a, Yemen; Professor W. P. Cockshott, McMaster University, Hamilton, Ontario, Canada; Dr. V. Hegedüs, University of Copenhagen, Glostrup, Denmark; Dr. T. Holm, University Hospital, Lund, Sweden; Dr. J. J. Lyimo, Kilimanjaro Christian Medical Centre, Moshi, United Republic of Tanzania; Professor P. E. S. Palmer, University of California, Davis, CA, United States of America; and Professor E. Samuel, University of Edinburgh, Scotland.

The Group was also responsible for compiling the technical specifications of the BRS, as well as a *Manual of Radiographic Interpretation for General Practitioners* and a *Manual of Darkroom Technique*, both published by WHO.

PLEASE READ THESE YELLOW PAGES AS SOON AS YOU CAN AND BEFORE YOU REQUEST ANY X-RAY EXAMINATION NEEDING AN INJECTION OF A RADIOLOGICAL CONTRAST DRUG

- The yellow pages contain EMERGENCY instructions.
- They tell you how to treat any drug reactions that may occur.
- It is the duty of every health care practitioner to train all BRS operators to recognize and manage any patient who has an adverse reaction to a drug.

(The same pages are included in the BRS *Manual of Radiographic Interpretation for General Practitioners.*)

- (1) X-RAYS ARE ESPECIALLY DANGEROUS FOR THE DEVELOPING FETUS.
- (2) TRY NOT TO X-RAY ANY FEMALE WHO HAS MISSED A MENSTRUAL PERIOD OR IS KNOWN TO BE PREGNANT, EXCEPT IN THE CASE OF ACUTE TRAUMA OR DISEASE. IN THAT EVENT **ALWAYS SHIELD THE ABDOMEN WITH A LEAD APRON**, EVEN WHEN X-RAYING A LIMB OR THE SKULL. EVEN WITH THE ABDOMEN SHIELDED TAKE AS FEW EXPOSURES AS POSSIBLE: TRY NOT TO HAVE TO REPEAT THE EXAMINATION.
- (3) IF A FEMALE OF CHILD-BEARING AGE IS PRESENTED FOR AN X-RAY OF THE PELVIS OR ABDOMEN REFER TO THE DOCTOR TO SEE IF IT IS KNOWN WHETHER SHE IS PREGNANT OR HAS MISSED A PERIOD. IF THE ANSWER IS "YES" **THE DOCTOR DECIDES** WHETHER THE NECESSITY TO X-RAY OUTWEIGHS THE RISK INVOLVED.

RADIATION PROTECTION THE RISK OF HARM FROM X-RAYS

X-RAYS ARE ONLY DANGEROUS IF YOU ARE CARELESS.

Care means adhering to the following rules:

- Stand behind the control panel when the X-ray exposure is made.
- Make sure that lead aprons and lead gloves are worn if the patient needs to be held.
- If possible, do not allow anyone else in the X-ray room. If other persons must be present, keep them behind the control panel when the exposure is made.
- When supplied, wear your film badge always. Have it checked regularly.
- Never take an X-ray unless ordered by a DOCTOR or other qualified medical person.

X-rays may cause harm. You cannot FEEL OR SEE THEM: you may not know you are in the X-ray beam, but REPEATED exposure to X-rays, even those that are scattered off the patient or the X-ray equipment, and even in small doses, can cause permanent damage to the health of the X-ray operator or anyone else. Remember again, it is not only the direct beam of X-rays that may be harmful, but also the scattered rays.

You must NEVER make an X-ray exposure when you are anywhere near the X-ray tube: you must always be behind the control panel. There you are safe.

You must NOT allow anyone except the patient to be in the X-ray room, unless the patient needs to be supported or a child needs to be held. When that is necessary, the parent or friend must wear a lead apron and lead gloves whenever he or she is near the patient while the X-ray is being taken. Do NOT let a nurse or any other member of the hospital staff hold a patient while an exposure is being made.

The risk for patients being X-rayed is very low because they are exposed to X-rays infrequently, and because only a small part of the body is exposed for each picture. But try to get all the details right the first time so that there is no need for a second exposure.

The greatest risk from X-rays is for the operator and the doctor and nurses, who may be exposed repeatedly over the years while they are working. But there is no danger if YOU and THEY ARE CAREFUL.

X-RAYS MAY CAUSE HARM EVEN THOUGH YOU DO NOT SEE OR FEEL THEM.

REACTIONS TO INTRAVENOUS DRUGS USED FOR UROGRAPHY

Contrast drugs are used for urography (the kidneys, ureters, and bladder). THESE DRUGS MUST ONLY BE INJECTED BY A DOCTOR OR WITH THE DOCTOR'S PERMISSION. There must be a doctor in the hospital and immediately available whenever these drugs are given, until the X-ray examination is finished (although, provided the doctor can be reached quickly, he or she need not actually be in the X-ray room).

The drugs used in urography must be injected into a vein: they make it possible to see the kidneys, ureters, and bladder, which are normally invisible on radiographs. All these drugs are complex iodine compounds; they can produce reactions in the patient that range from mild to very serious, and can—in rare instances—even cause death.

Reactions to drugs can occur at the beginning of the injection, or shortly afterwards, or may even be delayed for 20–40 minutes after the injection. The reaction does not depend on how much of the drug has been injected; a small amount may cause as much reaction as a large amount. There is no way to test the patient before the injection.

Mild reactions are not uncommon (do not be misled by an epileptic fit), but very serious reactions are fortunately rare. Anyone may react: drug reactions are not specifically associated with any other form of allergy, although patients such as asthmatics may react more readily than those who have no history of allergy. No one can be sure that he will not react. If patients have had this type of X-ray examination before and have reacted, try to find out which drug was used. They are less likely to react a second time if a different contrast drug is injected. But when patients have reacted previously you must be ready for another reaction.

APPROPRIATE TREATMENT MUST ALWAYS BE READILY AVAILABLE (ANTI-HISTAMINES, STEROIDS, EPINEPHRINE, ATROPINE, AND INTRAVENOUS SALINE) BEFORE CONTRAST DRUGS ARE INJECTED.

THE DRUGS USED FOR INTRAVENOUS CHOLANGIOGRAPHY ARE MORE LIKELY THAN OTHERS TO CAUSE REACTIONS; THE SAME TREATMENT APPLIES.

TWO BASIC RULES:

- (1) MAKE SURE THAT THE DRUGS ARE AVAILABLE FOR TREATMENT IMMEDIATELY BEFORE THE CONTRAST INJECTION.
- (2) WHEN CONTRAST DRUGS HAVE BEEN INJECTED INTRAVENOUSLY, NEVER LEAVE THE PATIENT UNATTENDED UNTIL THE EXAMINATION IS COMPLETED AND THE PATIENT FEELS WELL. NO PATIENT WILL HAVE A SERIOUS REACTION AFTER 60 MINUTES.

BE WISE:

IF THE PATIENT HAS A HISTORY OF REACTION TO PREVIOUS CONTRAST INJECTIONS OR A HISTORY OF SEVERE ALLERGY, REFER HIM TO A MAJOR HOSPITAL FOR THE EXAMINATION.

MAKE SURE THAT YOU HAVE INTRAVENOUS ATROPINE, ANTIHISTAMINE, INTRAVENOUS EPINEPHRINE, AND SOLUBLE STEROIDS AVAILABLE WITH SYRINGES IN OR CLOSE TO THE X-RAY ROOM WHENEVER CONTRAST DRUGS ARE BEING GIVEN.

MILD CONTRAST REACTIONS

The patient will complain of a sensation of heat and pressure in the abdomen, may sneeze, develop urticaria (raised patches on the skin), feel nauseous, and become restless.

Treatment

Reassure the patient. Tell him not to worry, the reaction will soon go away. Loosen the patient's clothing if it is tight. Tell the patient to take deep breaths in and out and to relax.

Stay with the patient and watch carefully until symptoms diminish. If the reaction does not improve in a few moments, send for a doctor or nurse.

STRONGER CONTRAST REACTIONS

The patient may vomit, become very short of breath (dyspnoea) and the skin may be pale. He may start to sweat and be very restless. The pulse may be rapid.

Treatment

Keep calm and reassure the patient.

Raise the patient's head and shoulders if he is short of breath.

If vomiting occurs, turn the patient's head to one side to prevent aspiration of vomit.

If there are signs of collapse (pale skin, sweating, rapid pulse) raise the patient's feet and lower the head (if this is possible on the X-ray table). More important, KEEP THE PATIENT LYING DOWN.

Stay with the patient all the time.

Send for qualified help if symptoms do not improve very quickly (after a few minutes).

SEVERE CONTRAST REACTIONS

Pale skin, sweating, very shallow breathing, rapid and very weak pulse. Loss of consciousness, cardiac arrest.

SEVERE CONTRAST REACTIONS ARE AN EMERGENCY SITUATION. YOU MUST ACT QUICKLY.

- Call for the doctor and nurse.
- Keep the patient warm and start artificial respiration if the patient stops breathing.
- If oxygen is available, give it to the patient if breathing is difficult.
 Make sure the airway is open.
- When the doctor and nurse arrive, tell them where the emergency drugs are kept.

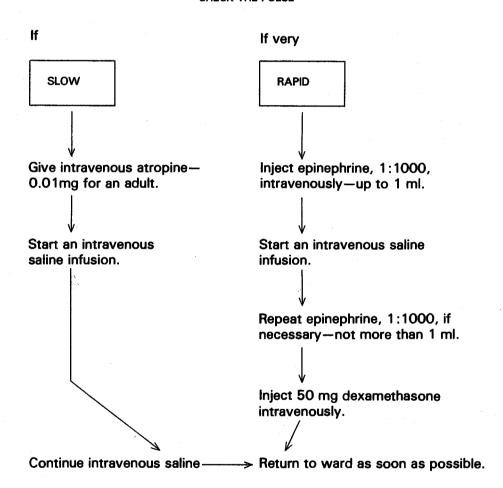
Physician's response

Check the general condition of the patient:

- Is the patient breathing?
- Is there a good airway?
- Is the heart beating?

If not, start cardiopulmonary resuscitation: restore the airway if necessary (see page 17 et seq.).

CHECK THE PULSE



FIRST AID AND PATIENT CARE FOR THE BRS OPERATOR

INTRODUCTION

- (1) Remember
- You are responsible for the patient in the X-ray department.
- (2) You must recognize when the patient's condition is getting worse and
 - Call immediately for the nurse or doctor (or both).
- Until help is available, you must know what to do and what NOT to do, and you must know how to help the nurse and doctor when they arrive.
- Always work in a calm and quiet way and always reassure the patient. Even ordinary patients who are not very sick may feel apprehensive in an X-ray room. Children may be very frightened. There is no need for this, because they are in no danger, but they are in strange surroundings and need to be reassured.

LOOKING AFTER THE PATIENT

- Seriously ill patients must be kept lying down, unless they are very short of breath and are more comfortable sitting up.
- If the patient is vomiting, turn him on to his side to keep the throat clear so that he can breathe. Do not move seriously injured patients, but turn their head only.
- Do not move accident patients more than is absolutely necessary.
 If you must move them, be careful not to make their injuries worse.

READ THESE INSTRUCTIONS.

PRACTISE ARTIFICIAL RESPIRATION.

PRACTISE MOVING THE PATIENT.

- Whenever the patient has had a serious accident, assume that there is internal injury to the brain, chest, spine, or abdomen. Be extra careful and gentle.
- Do not let patients get cold. Keep them covered and warm. Try to keep the door shut if it is cold outside the X-ray room.

PRIORITIES

- Is the patient breathing?
- Is the patient conscious?
- Is the patient bleeding?

DO NOT X-RAY A SERIOUSLY ILL OR SEVERELY INJURED PATIENT ALONE. ALWAYS HAVE QUALIFIED HELP WITH YOU. NEVER LEAVE A SERIOUSLY ILL OR INJURED PATIENT UNWATCHED WHILE YOU ARE DEVELOPING THE FILMS OR HAVE TO LEAVE THE X-RAY ROOM FOR ANY OTHER REASON. GET A NURSE, ORDERLY, OR SOME OTHER TRAINED PERSON TO STAY WITH THE PATIENT ALL THE TIME.

WHAT TO DO IF THE PATIENT STOPS BREATHING

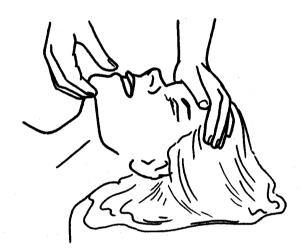
- Always check to make sure that an unconscious person is breathing; do this often. He may stop breathing quietly without any cough or other noise. This can happen quite suddenly without warning.
- If the patient stops breathing, make sure that the air passage is open. Gently tilt the head backwards and lift the chin upwards (see next page). If the patient is wearing dentures, remove them.
- Close the nose with your fingers, and hold the jaw up with the other hand. Give mouth-to-nose or mouth-to-mouth artificial respiration at the rate of 12–15 breaths per minute (see pages 17-20).
- When the patient starts breathing, and if he is not too badly injured, turn him into the lateral safety position (see pages 22-23).

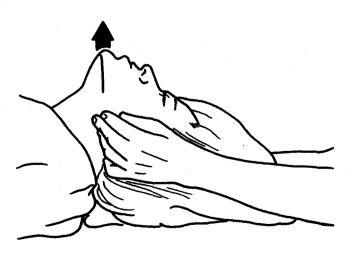
IMPORTANT RULES

- (1) TALK TO THE PATIENT TO SEE IF HE IS CONSCIOUS BEFORE YOU GIVE RESPIRATION.
- (2) CHECK THE MOUTH AND THE THROAT TO MAKE SURE THAT NOTHING IS BLOCKING THE AIRWAY (FOOD, DIRT, VOMIT). CLEAN THE MOUTH AND THROAT IF NECESSARY.
- (3) IF THE PATIENT IS NOT BREATHING, START ARTIFICIAL RESPIRATION WHEN YOU HAVE CLEANED THE AIRWAY.
- (4) IF YOU CANNOT CLEAN THE AIRWAY COMPLETELY, TURN THE PATIENT'S HEAD TO ONE SIDE, WHICH IS USUALLY ENOUGH TO ALLOW AIR TO ENTER THE CHEST.
 - (5) CALL FOR HELP—FOR A NURSE AND DOCTOR—IMMEDIATELY.
 - (6) LOOSEN THE PATIENT'S TIGHT CLOTHING.

ARTIFICIAL RESPIRATION

Clearing the Airway





The muscles of an unconscious person are completely relaxed. The tongue, being a muscle that is fixed to the lower jaw, will fall back and close the throat if the patient is kept lying on his back.

To remove this obstruction:

- (1) Kneel next to the patient's head.
- (2) Put one of your hands onto the patient's forehead and the other under the patient's chin.
- (3) Lift the lower jaw of the patient upwards and tilt the head backwards until the chin is higher than the nose.
- (4) This gives a free air-passage by lifting the tongue away from the back wall of the throat.
- (5) Keeping the head in this position, listen and look to check whether breathing has started again.

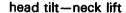
If breathing starts, turn the patient to the lateral safety position (see pages 22-23).

If there is no breathing continue with artificial respiration.

You can revive a patient by blowing air through his nose into his lungs, or through his mouth into his lungs. For babies and small children (see page 20), this must be done very carefully.

You must practise this and know exactly how to carry out artificial respiration. You must also REMEMBER TO CLEAR THE AIRWAY before you start (see previous page).

Mouth-to-Nose Respiration







Tilt the head so that the chin is higher than the nose.

Close the mouth of the patient by pushing the lower lip upwards with your thumb.

Open your mouth wide, take a deep breath and place your mouth firmly around the patient's nose.

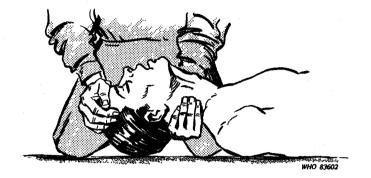
Blow air into the patient's lungs. Take your mouth away from the nose. This must be done every 5 seconds until regular breathing is restored.

Lift your head, look at the patient's chest to see whether the ribs are moving. If not, take another deep breath and blow once more through the patient's nose.

Continue until the patient starts breathing without help.

BLOW AIR INTO THE PATIENT'S LUNGS EVERY 5 SECONDS UNTIL REGULAR BREATHING STARTS AGAIN OR UNTIL A QUALIFIED PERSON TELLS YOU TO STOP.

Mouth-to-Mouth Respiration



Put one hand under the patient's neck and the other hand on the patient's forehead.

Tilt the patient's head backwards until the chin is higher than the nose, lifting the neck as you push the forehead down.

Sometimes the patient will then start breathing. Watch the chest carefully in case this has happened.

If the patient has not started breathing, then you must start artificial respiration immediately.



Keep the head extended by lifting the neck; pinch the patient's nose with your thumb and forefinger.

Take a deep breath and place your mouth firmly over the patient's mouth.

Blow air into the patient's lungs. Take your mouth away from the patient and your thumb and forefinger away from the nose. (Keep the other hand under the neck.)

Look at the ribs. The chest will collapse when you stop blowing air and this will tell you that you have been successful in getting air into the lungs. If the ribs do not move inward, check the airway to make sure that it is not blocked and lift the hand under the neck to make sure that it is sufficiently extended.

If the patient does not start breathing again, take another deep breath and start the routine once more.

BLOW AIR INTO THE PATIENT'S LUNGS EVERY 5 SECONDS UNTIL REGULAR BREATHING STARTS AGAIN OR UNTIL A QUALIFIED PERSON TELLS YOU TO STOP.

Artificial Respiration for Babies

When you have to help a baby to start breathing, you lift the head back gently, but not as far as for an adult or a large child.

A baby's face is so small that you may not be able to close the nose and blow through the mouth alone. You may have to blow through both at the same time.

Put your mouth firmly around the baby's *mouth and nose* and blow gently every 3 seconds (about 20 breaths per minute). Watch to see how the chest moves. Small puffs of air will probably be enough for infants.



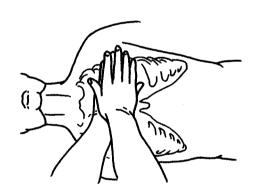
WHEN THE HEART STOPS

BEGIN AT ONCE:

CHECK THE CAROTID (NECK) ARTERY FOR THE PULSE. IF THIS IS ABSENT:

- (1) Turn the patient on to his BACK—supine.
- (2) Open the air passages (use an artificial airway and bag and mask with oxygen if available and you are trained to do so).
- (3) Place both hands flat on the lower end of the sternum (one hand above the other).
- (4) Keep your arms straight above the sternum. Press straight down.
- 80 COMPRESSIONS PER MINUTE (ADULTS) with full relaxation in between each compression.







(5) INFANTS NEED 100 COMPRESSIONS PER MINUTE: use fingertips to compress. DO NOT PRESS TOO HARD on a baby or small child.

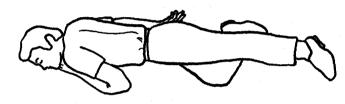
Ventilate (with air or oxygen) after every 5 cardiac compressions (more in children).



LATERAL SAFETY POSITION

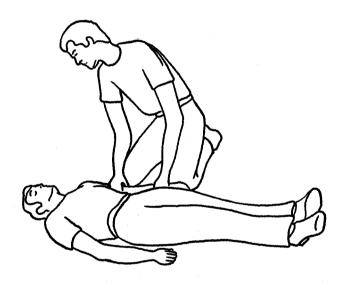
When a person is unconscious his muscles are completely relaxed. The tongue (which is also a muscle and is fixed to the lower jaw) falls backwards if the patient is lying on his back and it will block the throat and prevent breathing.

To open the airway, turn the patient on to his side, tilting him forward as shown in the drawings. In this position the tongue cannot fall back and any blood, phlegm, or vomit can run out of the mouth without blocking the airway.

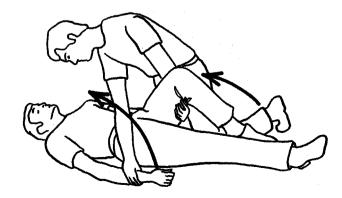


This is how you move the patient.

- (1) Kneel down on the side to which you are going to turn the patient.
- (2) Stretch the patient's nearer arm along his body and put the palm of the patient's hand under the buttocks.

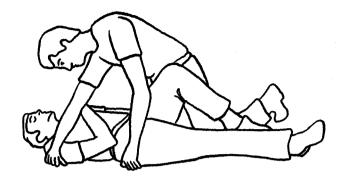


(3) Bend the leg of the patient that is nearer to you at the hip and the knee, putting your hand under the knee and lifting. At the same time, fold the arm furthest away from you across the chest so that the fingers are close to the side of the patient's head that is nearer to you.



(4) Put one of your hands on the shoulder of the patient that is further away from you and the other on the hip that is further away from you.

Turn the patient toward you, pulling steadily and rolling the patient over the arm that is nearer to you.



(5) When the patient is lying on his side (facing you), take your hand off his shoulder and support the head while you move the rest of the body towards you.



- (6) When the patient is lying on his stomach, pull the lower arm (the arm over which the patient rolled) and let it lie alongside. Put the other hand under the cheek.
- (7) Then move the patient's head so that it is tilted backwards with the neck extended, to maintain the free air-passage. Adjust the patient's legs, one over the other as shown in the drawing.



NOTES

EXPLANATIONS

1. The techniques illustrated are:

BASIC or ADDITIONAL

An ADDITIONAL view is taken only when:

- (a) the condition of the patient does not permit a basic view; or
- (b) the diagnostic information provided by the basic view is inadequate.

2. The position of the patient 1 is shown as:

ERECT—standing or sitting up.

SUPINE—lying on the back.

PRONE—lying on the stomach.

OBLIQUE—turned a little, usually at a 40° angle.

LATERAL—lying with the side close to the cassette.

3. Each left-hand page shows:

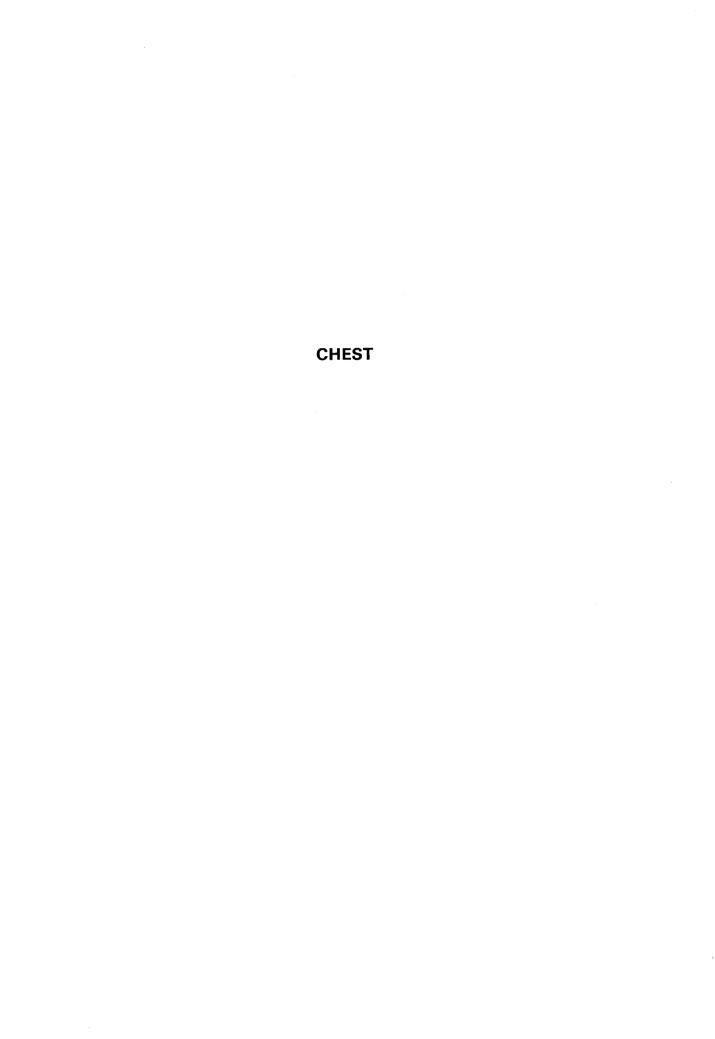
- (1) THE POSITION OF THE X-RAY EQUIPMENT.
- (2) THE CASSETTE SIZE.
- (3) THE CASSETTE POSITION 2 WITH AN INDICATION OF WHETHER A RIGHT $^{\circledR}$ OR LEFT $^{\r}$ MARKER SHOULD BE USED.
- (4) THE COLLIMATOR SIZE.
- (5) EXPOSURE FACTORS (kV and mA · s) IN RE-LATION TO THE DIAMETER—THICKNESS— (in cm) OF THE PART OF THE BODY TO BE X-RAYED OR, IN THE CASE OF THE HEAD, THE SIZE OF THE SKULL.
- (1) THE POSITION OF THE PATIENT.
- (2) AN EXAMPLE OF THE RADIOGRAPH THAT SHOULD BE OBTAINED.

4. Each right-hand page shows:

AP = antero-posterior PA = postero-anterior

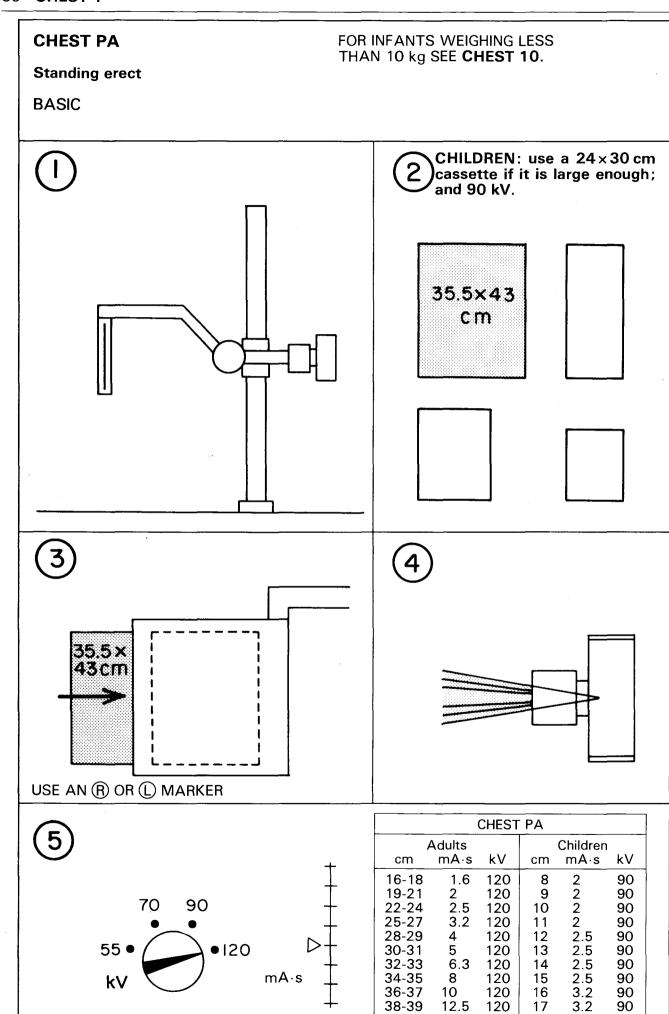
¹ For the sake of convenience, the masculine gender has been used throughout this manual when employing a pronoun to refer to "the patient", except where it is obvious that the patient is a woman.

²A horizontal arrow —> indicates that the cassette is placed within the cassette holder; otherwise the cassette is placed directly underneath or against the part of the body to be X-rayed.



CHEST

LUNGS AND HEART	Pages
Patient able to stand	
1. Chest PA	30-31 32-33
Patient unable to stand but able to sit	
3. Chest AP	34-35 36-37
Patient lying down, unable to stand or sit	
5. Chest AP	38-39
Other additional views	
6. Chest apical (lordotic) AP	40-41 42-43
RIBS	
A Chest PA 1, Chest AP 3, or Chest AP 5, as described above, must always be taken first.	
Patient able to either stand or sit	
8. Ribs oblique AP	44-45
Patient lying down, unable to stand or sit	
9. Ribs oblique AP	46-47
INFANTS WEIGHING UP TO 10 kg LUNGS AND HEART	
10. Chest AP	48-49



40-41

16

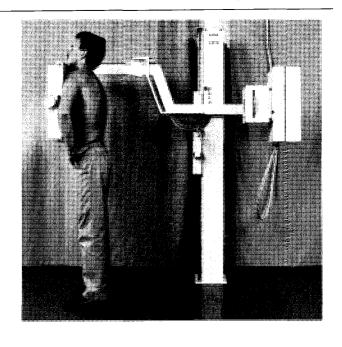
120

CHEST PA

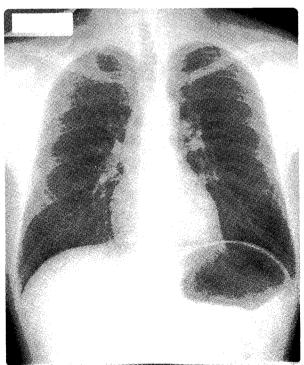
Standing erect

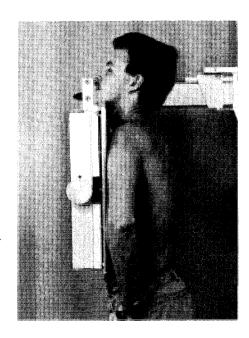
- 1. Make sure the patient's shoulders are well pressed forward.
- 2. Tell the patient to breathe in deeply and hold the breath.
- 3. Expose.
- 4. Tell the patient to breathe normally.

FOR INFANTS WEIGHING LESS THAN 10 kg SEE **CHEST 10**.

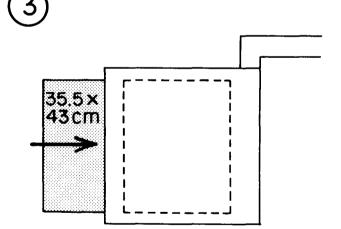


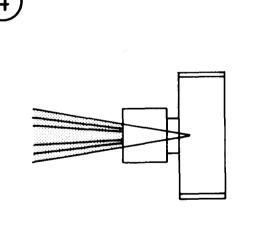


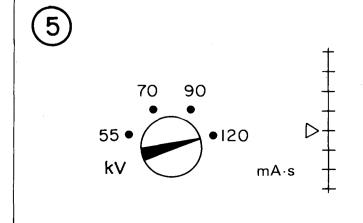




32 CHEST 2 **CHEST LATERAL LEFT (OR RIGHT)** Standing erect **ADDITIONAL** CHILDREN: use a 24×30 cm cassette if it is large enough; and 90 kV. 35.5×43 cm





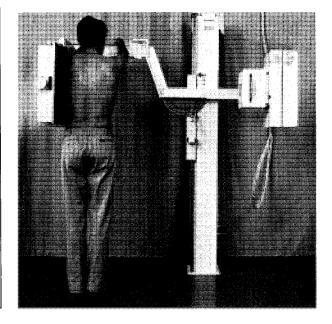


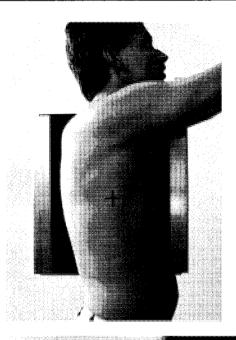
CHEST LATERAL LEFT (OR RIGHT)					
,	Adults			Children	ı
cm	mA⋅s	kV	cm	mA⋅s	kV
27	3.2	120	8	2	90
28-29	4	120	9	2	90
30-31	5	120	10	2	90
32-33	6.3	120	11	2	90
34-35	8	120	12	2.5	90
36-37	10	120	13	2.5	90
38-39	12.5	120	14	2.5	90
40-41	16	120	15	2.5	90
			16	3.2	90
			17	3.2	90

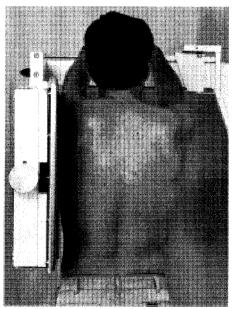
CHEST LATERAL LEFT (OR RIGHT)

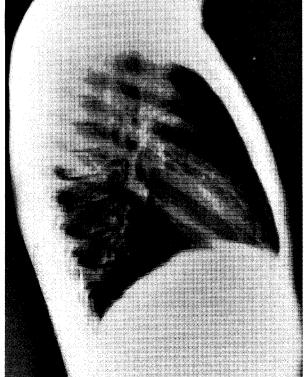
Standing erect

- 1. Tell the patient to breathe in deeply and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.





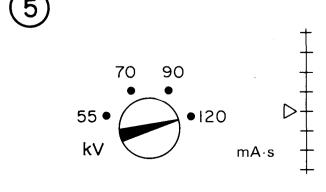




TOP (APEX) OF THE LUNGS MUST BE VISIBLE.

MAKE SURE THE LOWER PART OF THE DIAPHRAGM IS VISIBLE.

34 **CHEST 3 CHEST AP** FOR INFANTS WEIGHING LESS THAN 10 kg SEE CHEST 10. Sitting erect **BASIC** CHILDREN: use a 24×30 cm cassette if it is large enough; and 90 kV. 35.5×43 cm 35.5 x 43 cm USE AN ® OR © MARKER



CHEST AP					
Adults		Children			
cm	mA⋅s	kV	cm	mA⋅s_	kV
16-18	1.6	120	8	2	90
19-21	2	120	9	2	90
22-24	2.5	120	10	2	90
25-27	3.2	120	11	2	90
28-29	4	120	12	2.5	90
30-31	5	120	13	2.5	90
32-33	6.3	120	14	2.5	90
34-35	8	120	15	2.5	90
36-37	10	120	16	3.2	90
38-39	12.5	120	17	3.2	90
40-41	16	120			

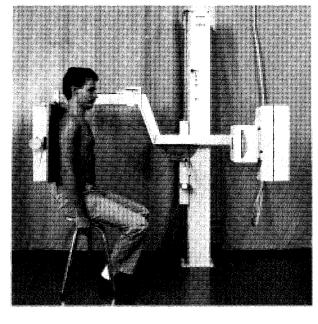
CHEST AP

Sitting erect on a stool or trolley

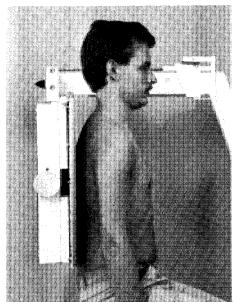
USE THIS POSITION ONLY WHEN THE PATIENT IS UNABLE TO STAND.

- 1. Tell the patient to breathe in deeply and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

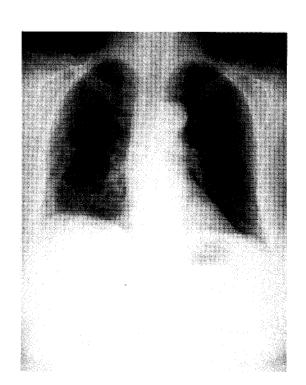
FOR INFANTS WEIGHING LESS THAN 10 kg SEE **CHEST 10**.





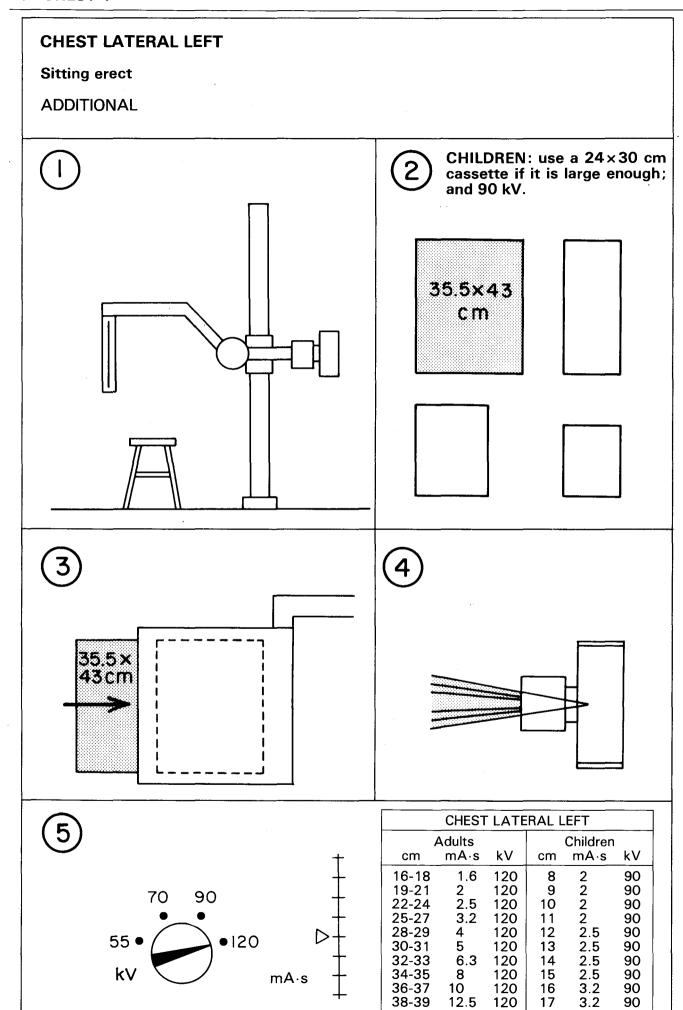


KEEP SHOULDERS FORWARD.



CHILDREN NEED TO BE HELD FIRMLY ERECT WITH SHOULDERS FORWARD.
THE PERSON SUPPORTING THE CHILD SHOULD

WEAR A LEAD APRON AND LEAD GLOVES.



12.5

40-41

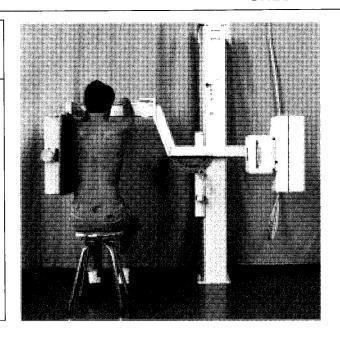
CHEST LATERAL LEFT

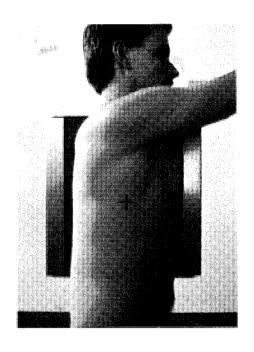
Sitting erect on a stool, trolley, or bed

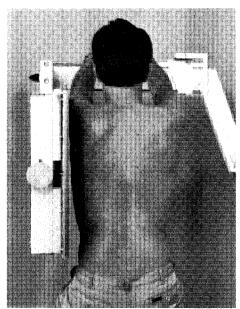
USE THIS POSITION **ONLY** WHEN THE PATIENT IS UNABLE TO STAND.

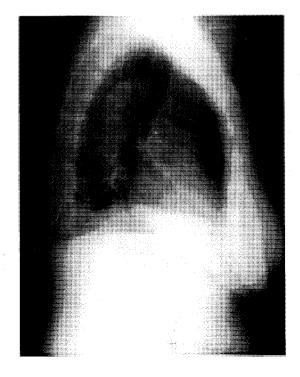
UNLESS ASKED TO DO OTHERWISE BY THE DOCTOR ALWAYS USE THE **LEFT** LATERAL POSITION.

- 1. Tell the patient to breathe in deeply and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.



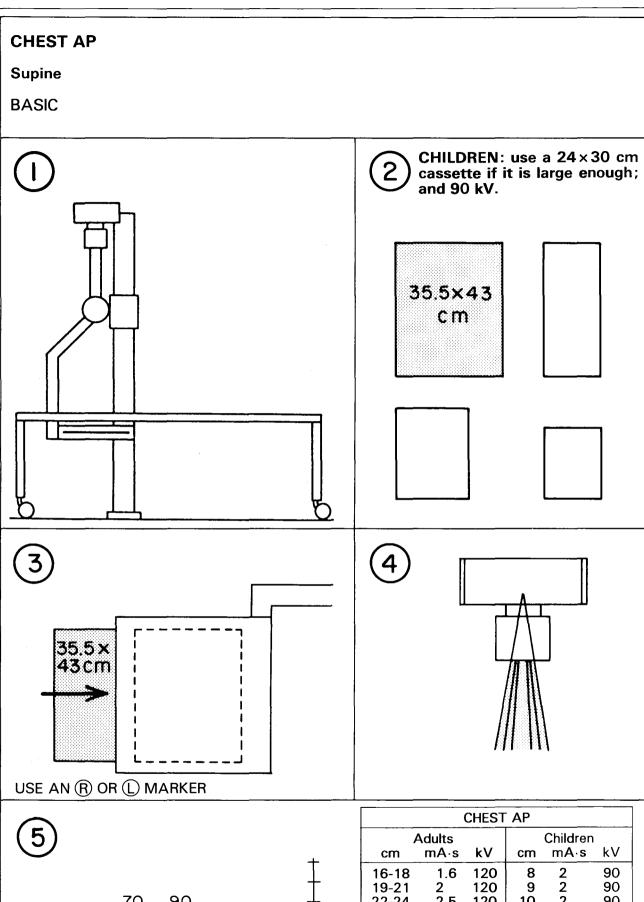


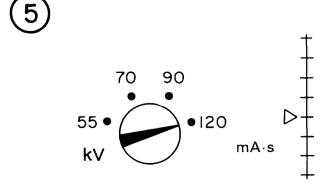




CHILDREN NEED TO BE HELD FIRMLY ERECT.

THE PERSON SUPPORTING THE CHILD SHOULD WEAR A LEAD APRON AND LEAD GLOVES.





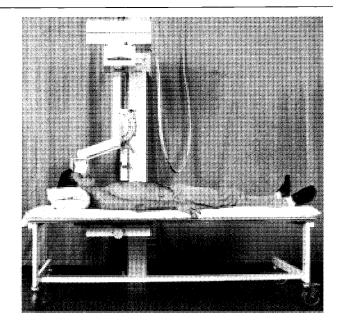
CHEST AP					
,	Adults			Children	
cm	mA⋅s	kV_	cm	mA⋅s	kV
16-18	1.6	120	8	2	90
19-21	2	120	9	2	90
22-24	2.5	120	10	2	90
25-27	3.2	120	11	2	90
28-29	4	120	12	2.5	90
30-31	5	120	13	2.5	90
32-33	6.3	120	14	2.5	90
34-35	8	120	15	2.5	90
36-37	10	120	16	3.2	90
38-39	12.5	120	17	3.2	90
40-41	16	120			

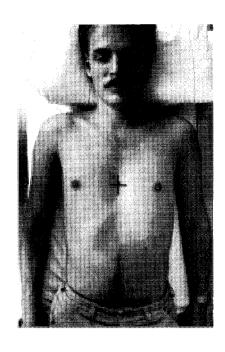
CHEST AP

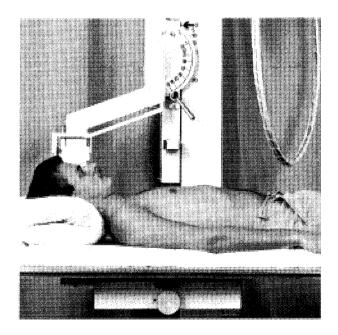
Supine

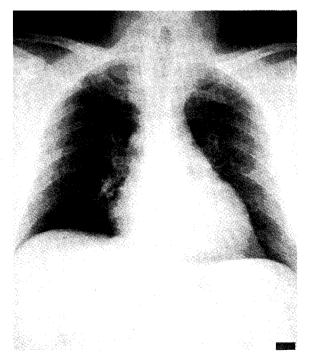
USE THIS POSITION **ONLY** WHEN THE PATIENT IS UNABLE TO SIT OR STAND.

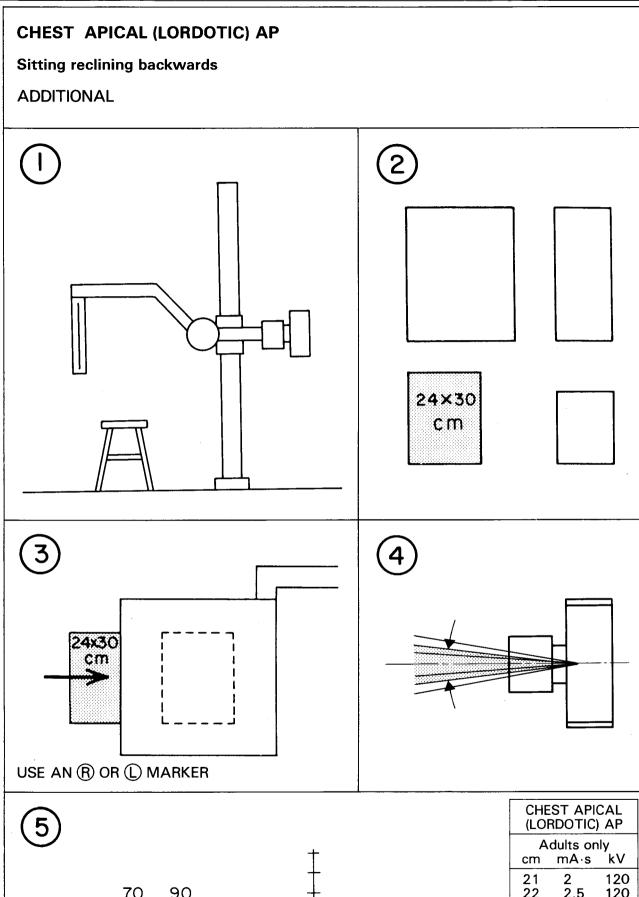
- 1. Tell the patient to breathe in deeply and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

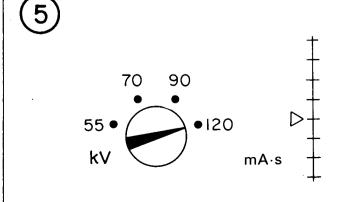








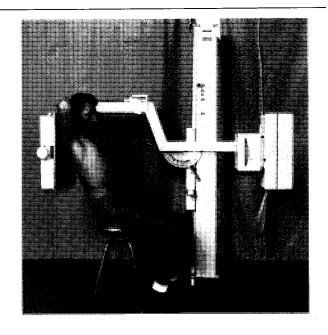




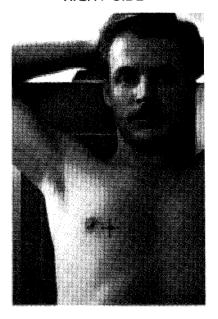
(LORDOTI	
Adults	
cm mA·s	s kV
21 2 22 2.5 23 2.5 24 2.5 25 3.2 26 3.2 27 3.2 28 4 29 4 30 5	

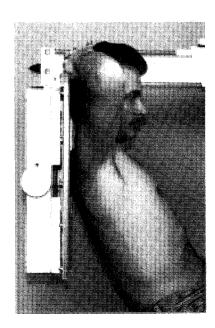
CHEST APICAL (LORDOTIC) AP Sitting reclining backwards

- Tell the patient to breathe in deeply and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.



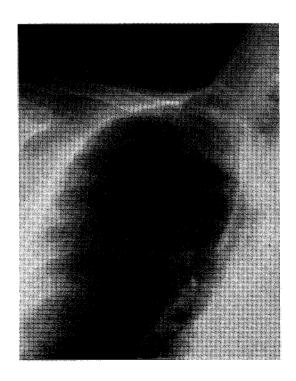
RIGHT SIDE





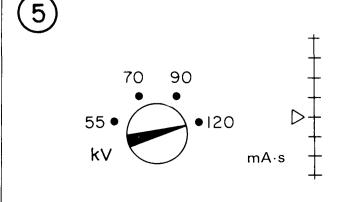
LEFT SIDE







CHEST LATERAL DECUBITUS AP or PA Lying on the right or left side; horizontal beam **ADDITIONAL** 24×30 cm 24×30 cm USE AN (R) OR (L) MARKER



CHEST LATERAL DECUBITUS AP or PA		
cm	mA⋅s	kV
17 18 19 20 21 22 23 24 25 26 27	1.6 1.6 2 2 2.5 2.5 2.5 2.5 3.2 3.2 3.2	120 120 120 120 120 120 120 120 120 120

CHEST LATERAL DECUBITUS AP or PA

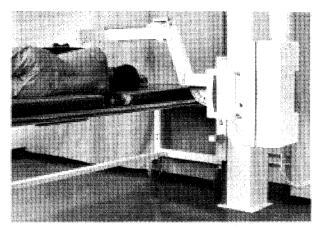
Lying on the right or left side; horizontal beam

Additional views used to detect fluid in the pleurae Patient must lie against the cassette holder on 2 pillows on the side

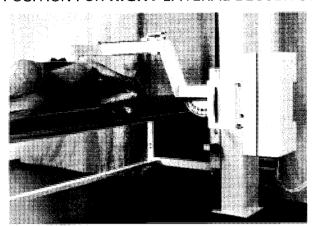
where the fluid is suspected.

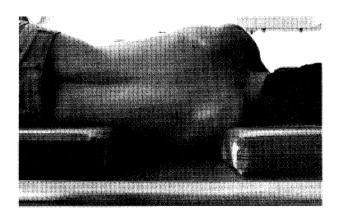
- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

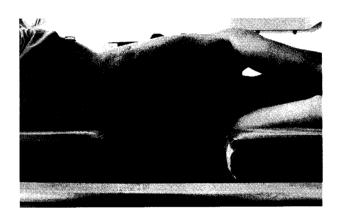
POSITION FOR LEFT LATERAL DECUBITUS.



POSITION FOR **RIGHT** LATERAL DECUBITUS.



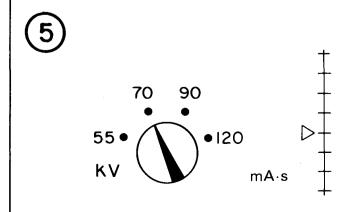








44 CHEST 8 RIBS OBLIQUE AP Standing or sitting erect; left and right oblique (2 views to be taken) **BASIC** A CHEST 1, CHEST 3, OR CHEST 5 MUST ALWAYS BE TAKEN FIRST. 35.5×43 cm35.5× 43cm



USE AN R OR L MARKER

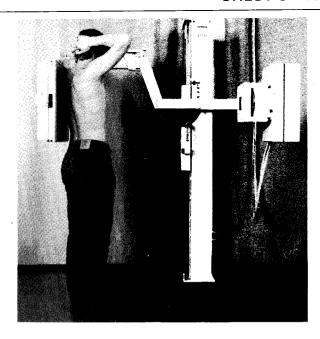
RIBS OBLIQUE AP			
cm	mA⋅s	kV	
12-15	10	70	
16-18	12.5	70	
19-21	16	70	
22-24	20	70	
25-27	25	70	
28-29	32	70	
30-31	40	70	
32-33	50	70	
34-35	63	70	
36-37	80	70	
38-39	100	70	
40-41	125	70	

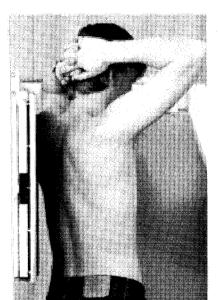
Standing or sitting erect; left and right oblique (2 views to be taken)

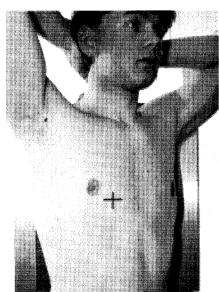
A CHEST 1, CHEST 3, OR CHEST 5 MUST ALWAYS BE TAKEN FIRST.

IF THE PATIENT IS UNABLE TO RAISE HIS ARMS THEY SHOULD BE HELD OUT FROM THE BODY.

- 1. Tell the patient to breathe in deeply and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

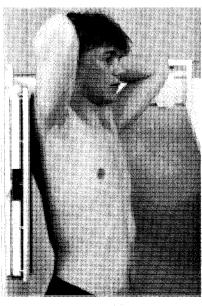


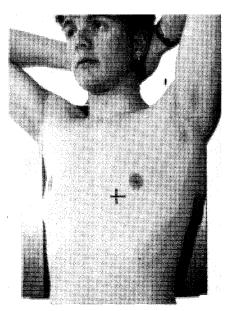






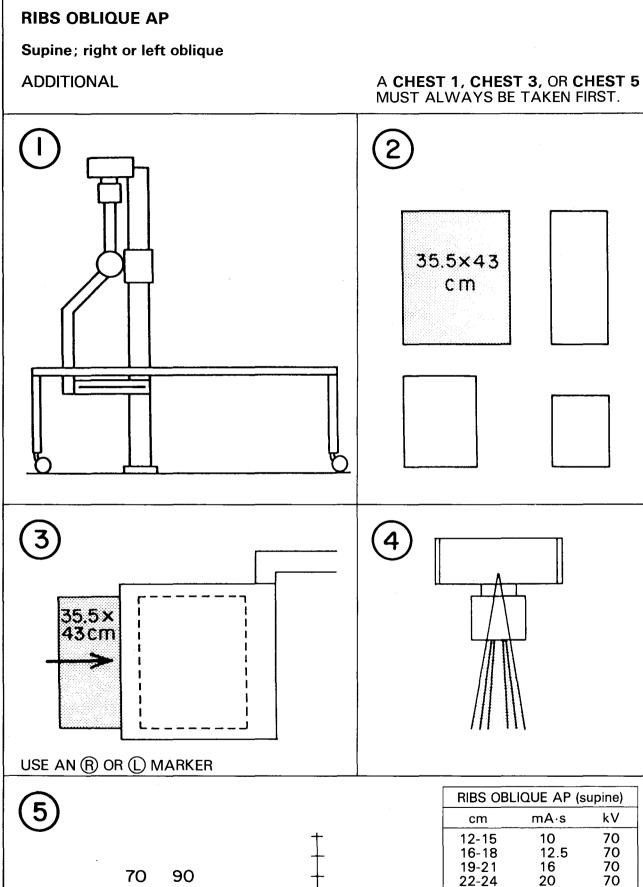
LEFT OBLIQUE







RIGHT OBLIQUE



-		RIBS OBL	LIQUE AP (
))		cm	mA⋅s
	70 90 55 • • • 120 D = 120 mA·s	12-15 16-18 19-21 22-24 25-27 28-29 30-31 32-33 34-35 36-37 38-39 40-41	10 12.5 16 20 25 32 40 50 63 80 100 125

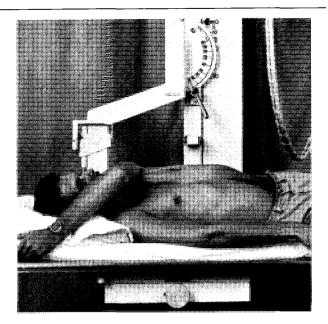
RIBS OBLIQUE AP

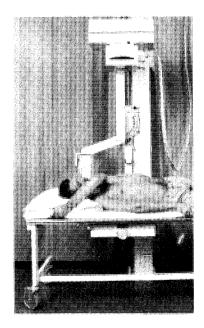
Supine; right or left oblique

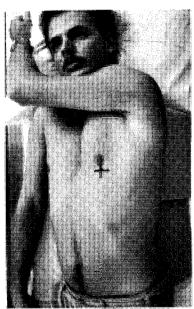
A CHEST 1, CHEST 3, OR CHEST 5 MUST ALWAYS BE TAKEN FIRST.

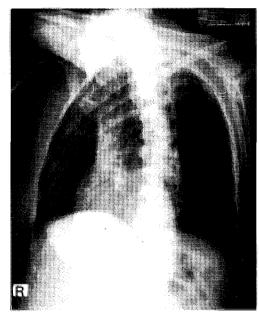
SUPPORT THE PATIENT WITH A PILLOW UNDER THE **NORMAL** SIDE.

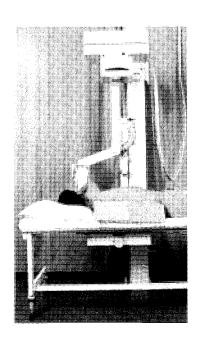
- 1. Tell the patient to breathe in deeply and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.



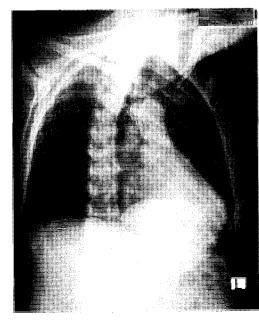


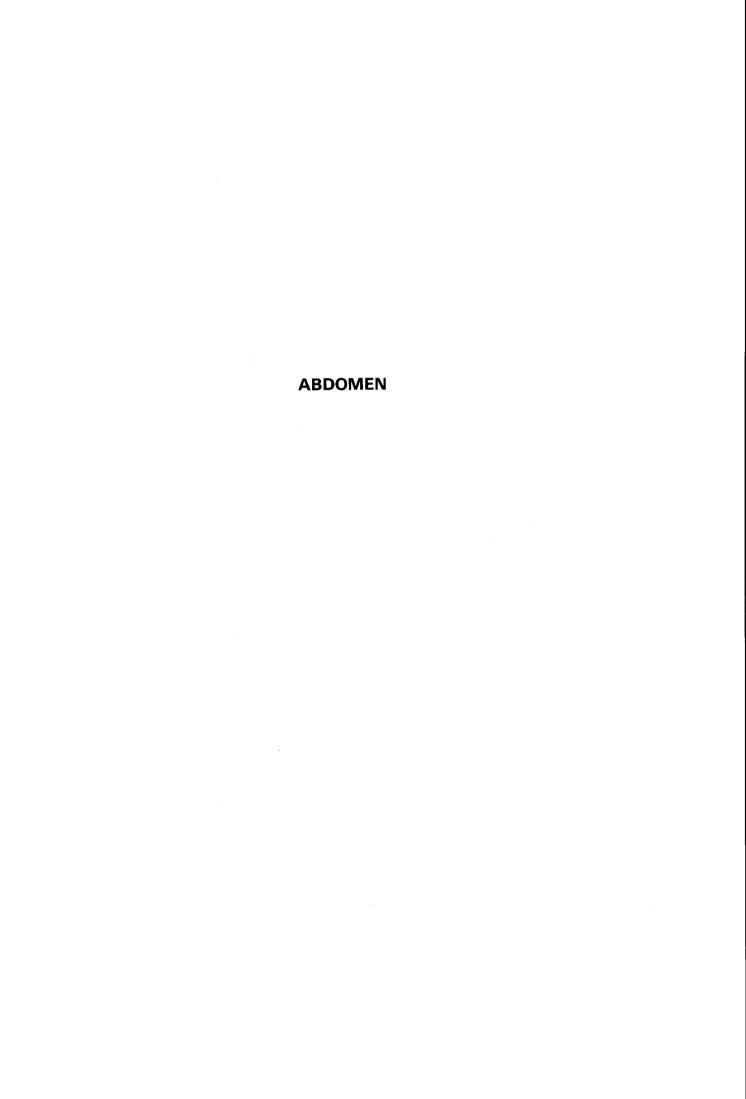






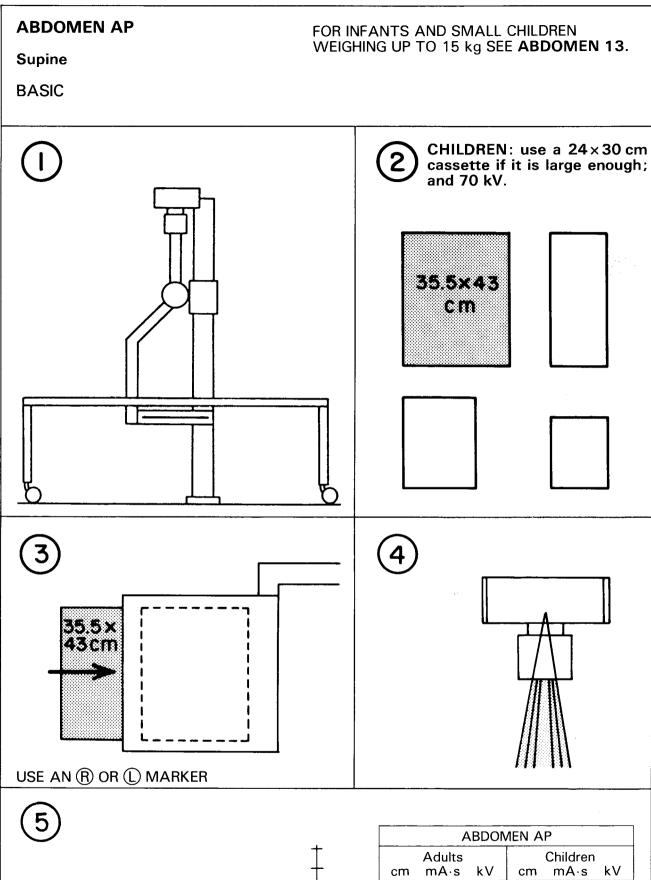


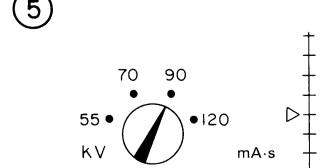




ABDOMEN

ABDOMEN: GENERAL	Pages
X-rays of the abdomen are usually taken with the patient lying down; erect views are taken only when the clinical diagnosis is ''acute abdomen''———————————————————————————————————	
1. Abdomen AP	54-55
Patient, diagnosed as ''acute abdomen'', able to stand	
2. Abdomen PA	56-57
Patient, diagnosed as ''acute abdomen'', unable to stand	
3. Abdomen lateral decubitus	58-59
URINARY TRACT	
X-rays of the urinary tract are always taken with the patient lying down.	
4. Urinary tract survey AP	60-61
5. Urinary bladder and inner pelvis	62-63 65-71
6. Intravenous urography	05-71
GALL-BLADDER (CHOLECYSTOGRAPHY)	
An examination requiring the administration of a contrast medium, as directed, the day before the following views are taken:	
7. Gall-bladder prone	74-75 76-77
8. Gall-bladder lateral decubitus	78-77 78-79
PREGNANCY	
When obstructed labour (disproportion) is suspected NOT TO BE TAKEN BEFORE THE 37th WEEK OF PREGNANCY	
10. Pregnancy lateral erect	80-81
To view the position of the fetus NOT TO BE TAKEN BEFORE THE 37th WEEK OF PREGNANCY	
11. Pregnancy PA	82-83
To view fetal maturity NOT TO BE TAKEN BEFORE THE 33rd WEEK OF PREGNANCY	84-85
12. Pregnancy oblique	04-03
INFANTS AND SMALL CHILDREN WEIGHING UP TO 15 kg	
13. Abdomen AP	86-87





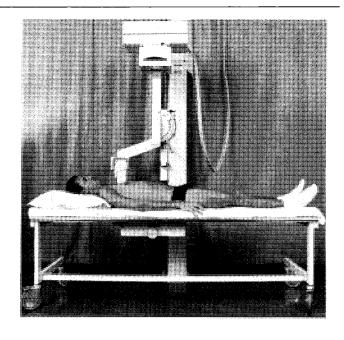
ABDOMEN AP					
Adults				Children	
cm	mA⋅s	kV_	cm	mA⋅s	kV
16	20	90	10	16	70
17	25	90	11	20	70
18	32	90	12	25	70
19	40	90	13	32	70
20	40	90	14	40	70
	15 50 70				

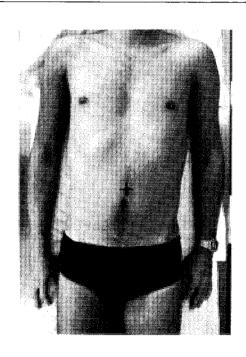
ABDOMEN AP

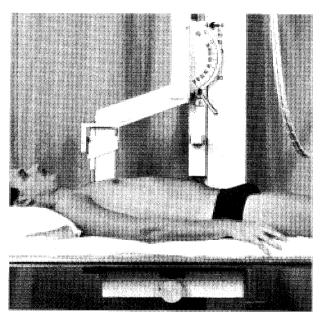
Supine

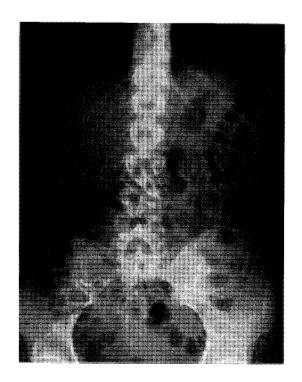
- 1. Tell the patient to breath OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

FOR INFANTS AND SMALL CHILDREN WEIGHING UP TO 15 kg SEE **ABDOMEN 13.**









THE DIAPHRAGM MUST BE VISIBLE; IF IT IS NOT TAKE ANOTHER ABDOMEN 1.

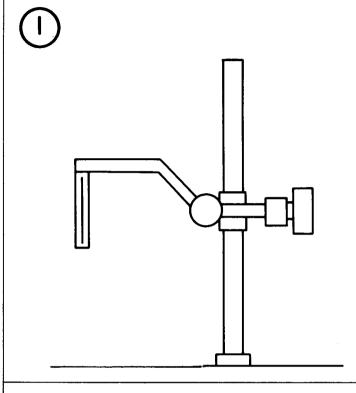
THE PUBIC SYMPHYSIS MUST BE VISIBLE; IF IT IS NOT TAKE A URINARY BLADDER VIEW (ABDOMEN 5).

ABDOMEN PA: "ACUTE ABDOMEN" (e.g., intestinal obstruction or perforation of the gut)

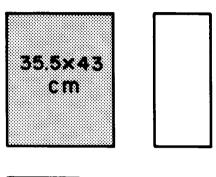
Standing erect

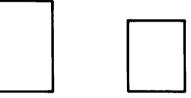
ADDITIONAL

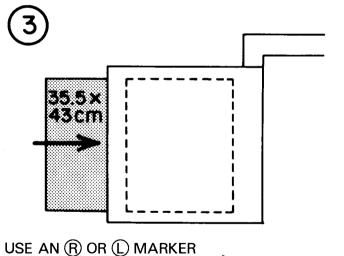
FOR INFANTS AND AND SMALL CHILDREN WEIGHING UP TO 15 kg SEE ABDOMEN 13.

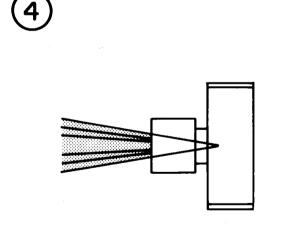


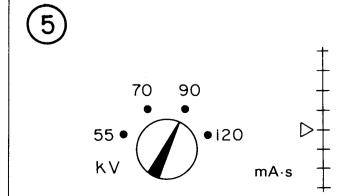
CHILDREN: use a 24×30 cm cassette if it is large enough; and 70 kV.









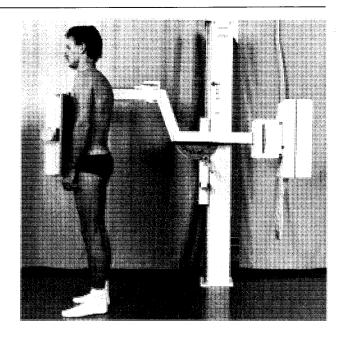


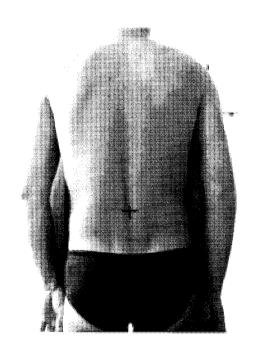
ABDOMEN PA				
Adults cm mA·s kV		cm	Children mA·s	kV
21 50 22 63 23 80 24 100 25 125 26 160 27 200	90 90 90 90 90 90	10 11 12 13 14 15	16 20 25 32 40 50	70 70 70 70 70 70

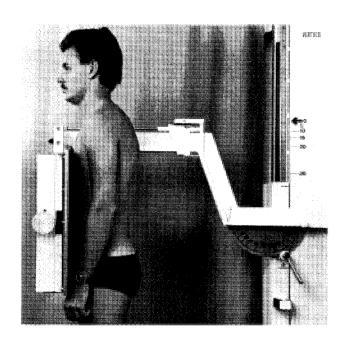
ABDOMEN PA: "ACUTE ABDOMEN" Standing erect

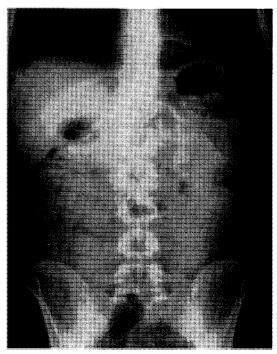
- 1. Press the patient's abdomen against the cassette holder.
- 2. Tell the patient to hold the breath.
- 3. Expose.
- 4. Tell the patient to breathe normally.

FOR INFANTS AND SMALL CHILDREN WEIGHING UP TO 15 kg SEE ABDOMEN 13.





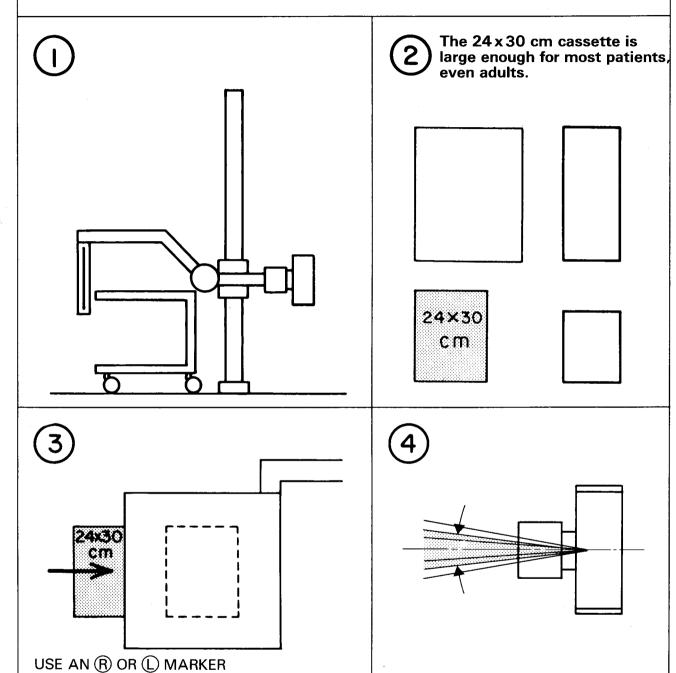


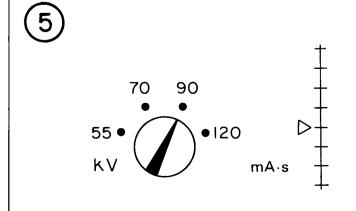


MAKE SURE THE DIAPHRAGM IS VISIBLE ON BOTH SIDES.

ABDOMEN LATERAL DECUBITUS: "ACUTE ABDOMEN" (e.g., intestinal obstruction or perforation of the gut) when the patient is unable to stand Lying first on the left side then on the right side (2 views to be taken)

ADDITIONAL





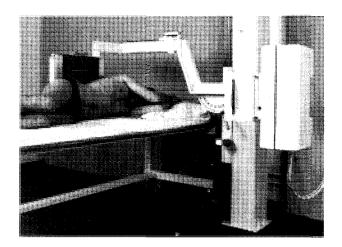
ABDOMEN LATERAL DECUBITUS			
cm	cm mA⋅s kV		
21	50	90	
22	63	90	
23 80 90		90	
24 100 90			
25 125 90			
26 160 90		90	
27 200 90			

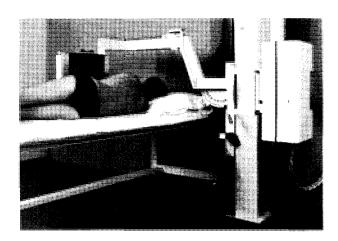
ABDOMEN LATERAL DECUBITUS

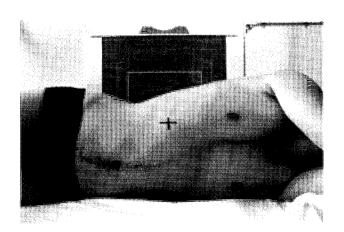
Lying first on the left side then on the right side (2 views to be taken)

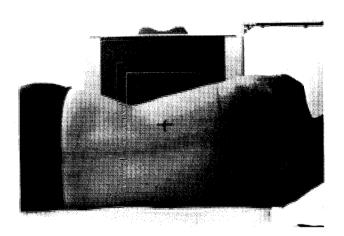
PATIENT MUST LIE AGAINST THE CASSETTE HOLDER ON A MATTRESS.

- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.





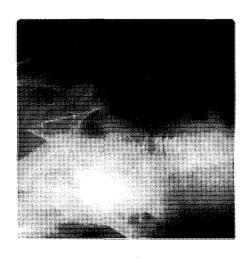


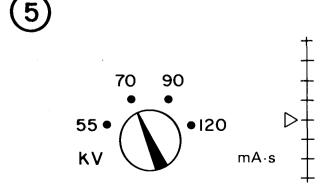


PATIENT LYING ON A MATTRESS

Although the 24 x 30 cm cassette is large enough for most patients, even adults, a 35.5 x 43 cm cassette was used to produce these radiographs.



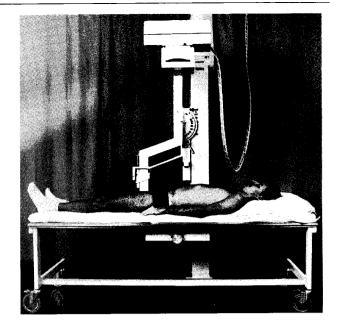


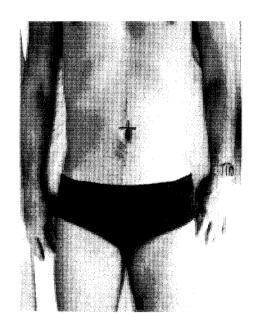


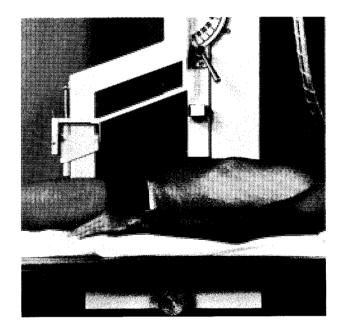
URINARY TRACT SURVEY •			
cm	mA⋅s	kV	
11 12	20 25	70 70	
13 14	32 40	70 70	
15	50	70	
16 17	63 80	70 70	
18	100	70	
19 20	125 160	70 70	
21	200	70	

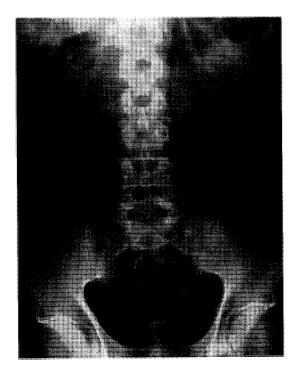
URINARY TRACT SURVEY AP Supine

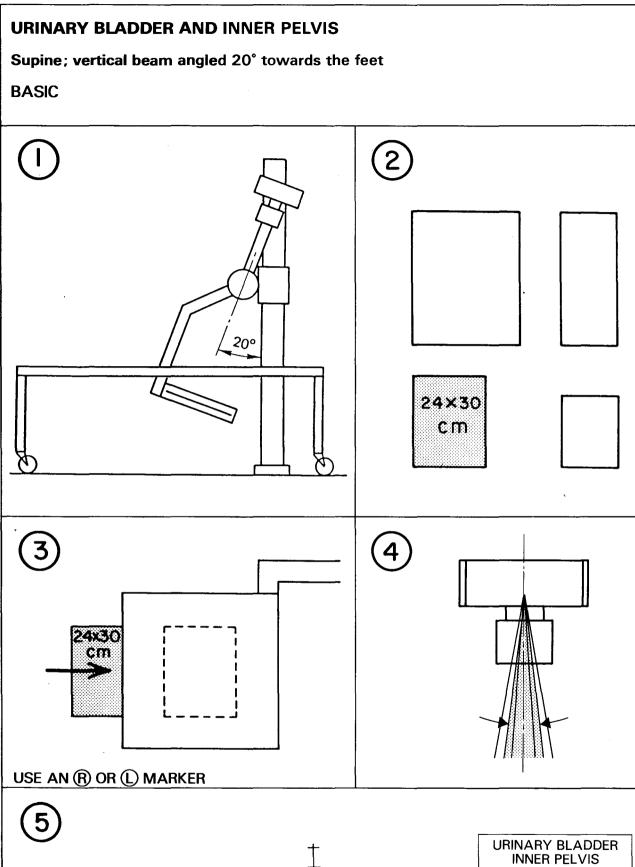
- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

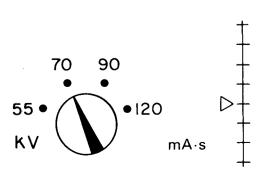










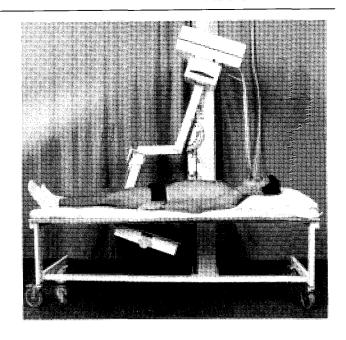


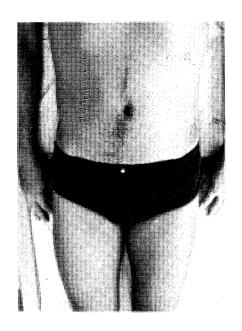
URINARY BLADDER INNER PELVIS			
cm	cm mA·s kV		
16	63	70	
17	80	70	
18	100	70	
19	125	70	
20	160	70	
21	200	70	

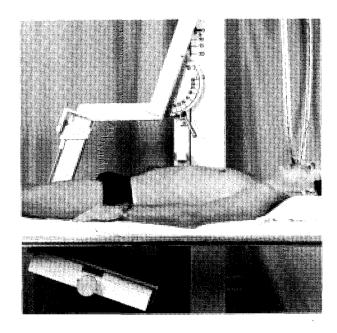
URINARY BLADDER AND INNER PELVIS

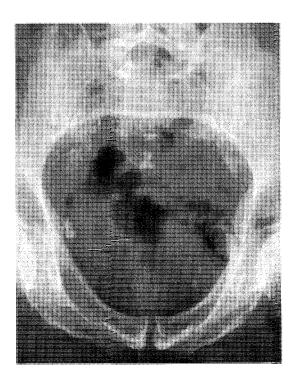
Supine; vertical beam angled 20° towards the feet

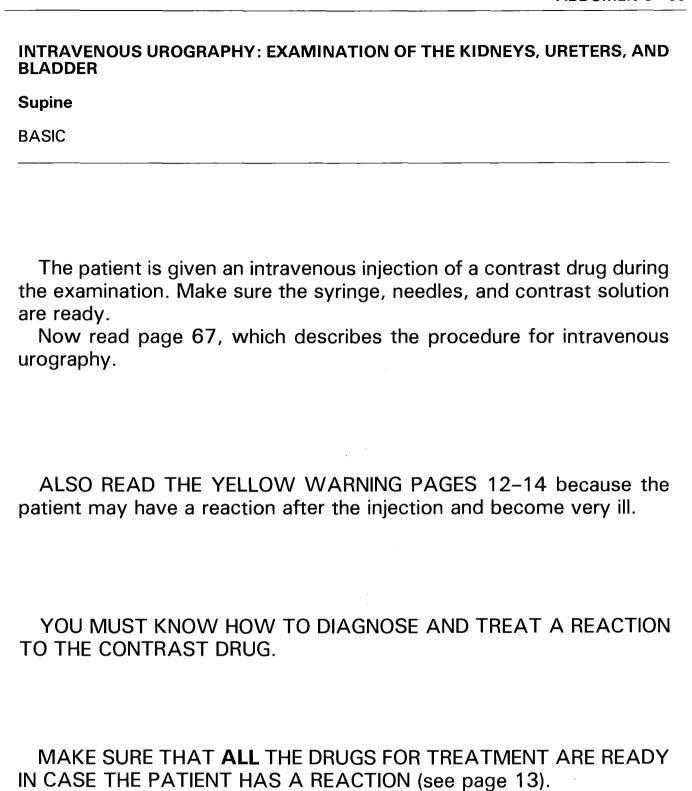
- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.











DOSE OF CONTRAST DRUG: ASK THE DOCTOR. THE NORMAL ADULT DOSE IS BETWEEN 40 ml AND 100 ml. FOR CHILDREN AGED BETWEEN 2 AND 15 YEARS THE DOSE IS UP TO 1 ml PER KILOGRAM OF BODY-WEIGHT.

PROCEDURE FOR INTRAVENOUS UROGRAPHY

READ THIS SUMMARY BEFORE YOU START

ABDOMEN 6.1 (see page 68)

- 1. Ask the patient to empty the bladder or, if there is a catheter into the bladder, release the clip and drain the urine into a container.
- 2. Take a urinary tract survey with the patient lying supine (ABDOMEN 4).

Film 1

If the pelvis is not completely visible on the radiograph adjust the X-ray machine Film 1A and take a urinary bladder and inner pelvis view (ABDOMEN 5).

ABDOMEN 6.2 (see page 69)

- 4. When Film 1 (and Film 1A if taken) have been checked by the **doctor**, and the X-ray machine has been adjusted if necessary after Film 1A, the **doctor** gives the injection.
- 5. YOU MUST NOTE THE TIME the injection is given.
- 6. As soon as the injection is given, take a urinary tract survey with the patient lying Film 2 supine (ABDOMEN 4).
- 7. Ten minutes later take another urinary tract survey with the patient lying supine Film 3 (ABDOMEN 4).

ABDOMEN 6.3 (see page 70)

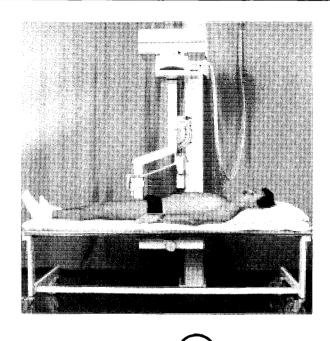
- If the doctor confirms that the radiographs are SATISFACTORY, proceed directly to point 11 below.
 - If the kidneys, ureters, and bladder are not sufficiently visible, and the doctor confirms that the radiographs are **NOT SATISFACTORY**, proceed to point 9.
- 9. Turn the patient into a prone position (lying on the abdomen) and take a prone Film 3A abdomen view (ABDOMEN 6.3) 15 minutes after Film 3; that is 25 minutes after the injection was given.
- Turn the patient back into the supine position (lying on the back).

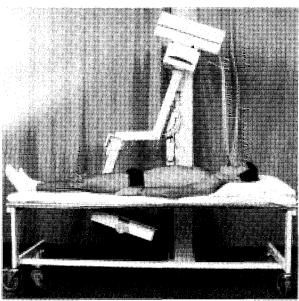
ABDOMEN 6.4 (see page 71)

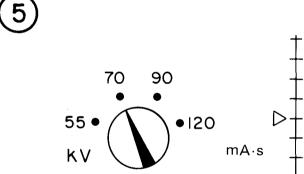
- Take a urinary bladder and inner pelvis view (ABDOMEN 5) with the bladder Film 4 full.
- 12. Ask the patient to empty the bladder (urinate), or release the catheter, and take a Film 4A second view.
- 13. Show all the radiographs to the doctor; keep the patient on the X-ray table until they have been checked.
 - REMEMBER, when developing the films, to mark the time on each one so that the interval between the injection and the exposure is clear.

INTRAVENOUS UROGRAPHY: EXAMINATION OF THE KIDNEYS, URETERS, AND BLADDER

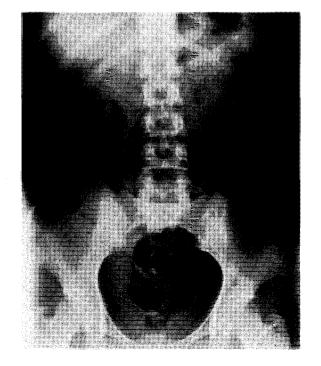
- 1. Ask the patient to empty the bladder. If there is a catheter into the bladder, release the clip and drain the urine into a container.
- 2. Take Film 1, and Film 1A if necessary: abdomen and pelvis with the patient lying supine (ABDOMEN 4 and ABDOMEN 5).



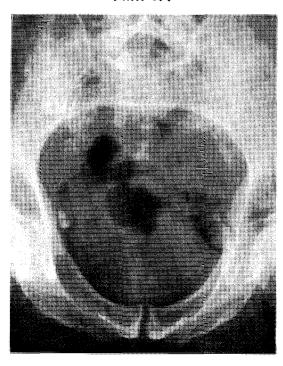




Film 1



Film 1A

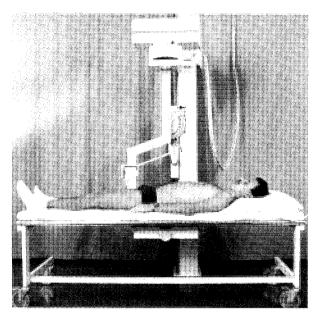


Intravenous urography (continued)

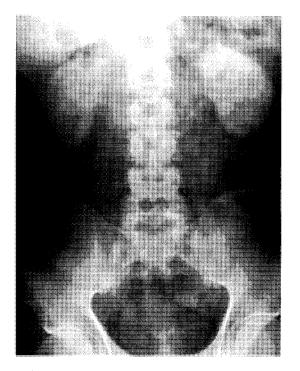
When Film 1, and Film 1A if it has been necessary to take it, have been checked by the doctor, the doctor gives the patient the injection.

- 1. MAKE A NOTE OF THE TIME THE INJECTION IS GIVEN.
- 2. Immediately after the injection is given make sure the doctor moves behind the control screen or out of the X-ray room.
- 3. Take Film 2: a urinary tract survey with the patient lying supine (ABDOMEN 4).
- 4. AFTER 10 MINUTES take Film 3: a urinary tract survey with the patient lying supine (ABDOMEN 4).

Film 2 and Film 3



Film 2



35.5×43 cm 90 70 55 **•** 120 mA·s kV

Film 3



SHOW FILM 2 AND FILM 3 TO THE DOCTOR. THE KIDNEYS, URETERS, AND BLADDER SHOULD BE VISIBLE. WHEN THE DOCTOR HAS SEEN THE RADIOGRAPHS TURN TO THE NEXT PAGE.

Intravenous urography (continued)

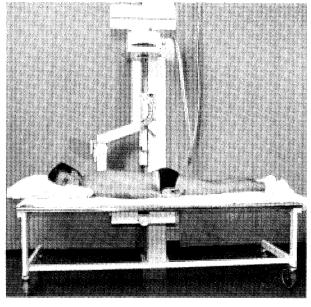
If the doctor confirms that the radiographs (Film 2 and Film 3) are **SATISFACTORY** turn to the opposite page and take Film 4.

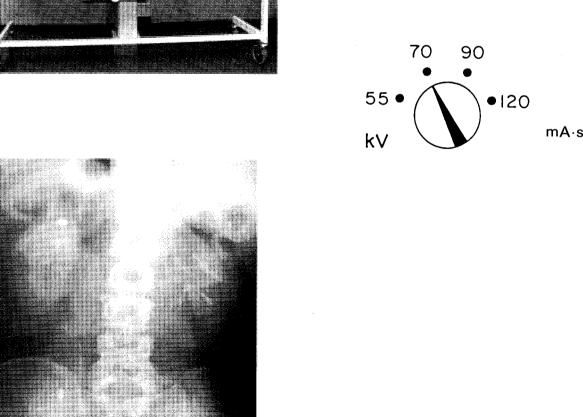
If the doctor says the films are NOT SATISFACTORY:

- 1. Turn the patient over into a prone position (lying on the abdomen with the head pointing in either direction) and make sure the tube is pointing to the centre of the lumbar spine. Do not alter the position of the machine or the exposure.
- 2. Twenty-five minutes after the injection was given take Film 3A: a PRONE ABDOMEN.
- 3. Turn the patient back into the supine position (lying on the back) and take Film 4 (see ABDOMEN 6.4).

Film 3A

35,5×43 cm

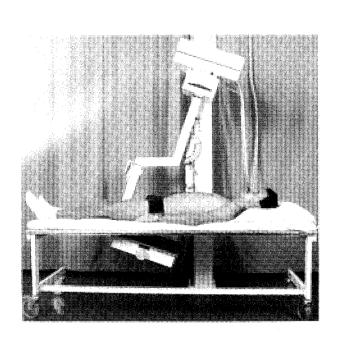




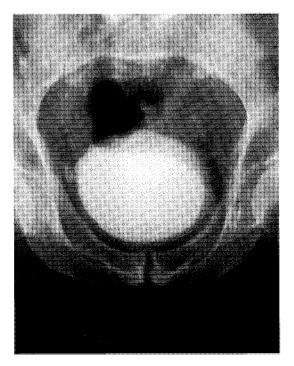
Intravenous urography (continued): bladder film

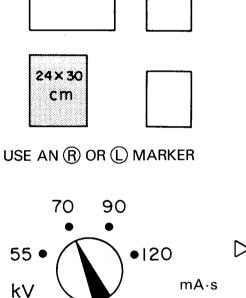
- 1. Take Film 4 (ABDOMEN 5).
- 2. Check the quality of the film.
- 3. As soon as a SATISFACTORY radiograph is obtained, send the patient to urinate (empty the bladder), or release the catheter.
- 4. Take Film 4A (ABDOMEN 5).

Film 4 and Film 4A

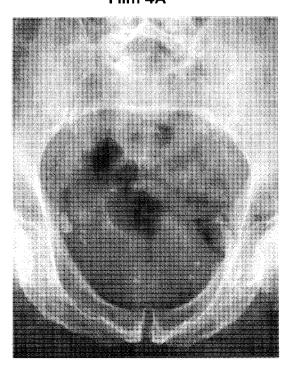


Film 4





Film 4A



CHOLECYSTOGRAPHY: THE GALL-BLADDER WITH CONTRAST MEDIUM

The contrast medium is usually in the form of tablets. If it is not in the form of tablets, but in liquid form, the directions on the bottle should be followed.

When the contrast medium is in the form of tablets (usually iopanoic acid or equivalent) the patient should take the dose indicated on the package. The tablets should be swallowed with water in the evening, 12 hours before the examination. After that the patient should not eat and should drink only water until after the X-ray films have been taken the next morning.

Gall-bladder not visible 12 hours after administration of the tablets

If the doctor cannot see the gall-bladder on radiographs taken 12 hours after the tablets were administered, there are several possible explanations.

- 1. Ask the patient whether the tablets were in fact swallowed.
- 2. Ask if the patient had diarrhoea or vomiting, as this may have impaired absorption of the tablets.
- 3. If the first dose has not caused significant upset, ask the doctor if the patient is to take a second dose of tablets the same evening.
- 4. If a second dose of tablets is taken, take another X-ray 12 hours after the second dose.

If the gall-bladder is still not visible it is probably diseased.

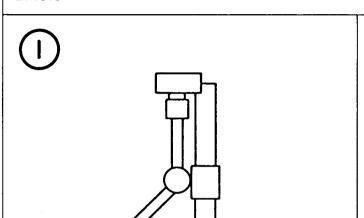
Cholecystography (continued)

GALL-BLADDER PRONE

Prone left anterior oblique

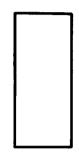
BASIC

FIRST FILM: 12 HOURS AFTER THE PATIENT HAS SWALLOWED THE TABLETS OR, IF THE CONTRAST MEDIUM IS IN LIQUID FORM, AS DIRECTED ON THE BOTTLE.



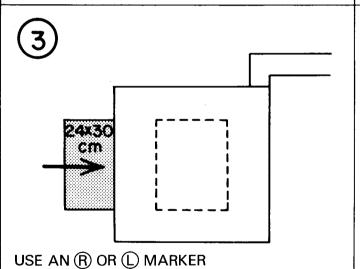




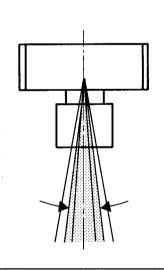


24×30 Cm

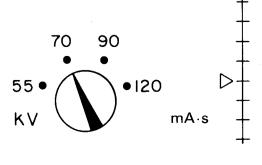








5

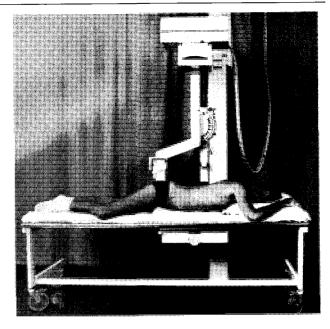


GALL-BLADDER PRONE				
cm mA⋅s kV				
16	63	70		
17	17 80 70			
18	100	70		
19 125 70				
20	160	70		
21	200	70		

Cholecystography (continued) **GALL-BLADDER PRONE** Prone left anterior oblique

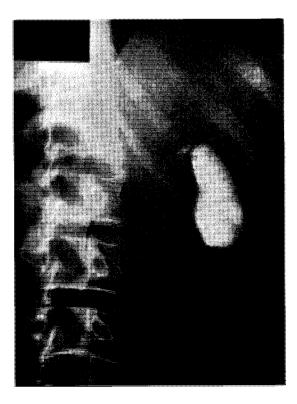
FIRST FILM: 12 HOURS AFTER THE PATIENT HAS SWALLOWED THE TABLETS OR, IF THE CONTRAST MEDIUM IS IN LIQUID FORM, AS DIRECTED ON THE BOTTLE.

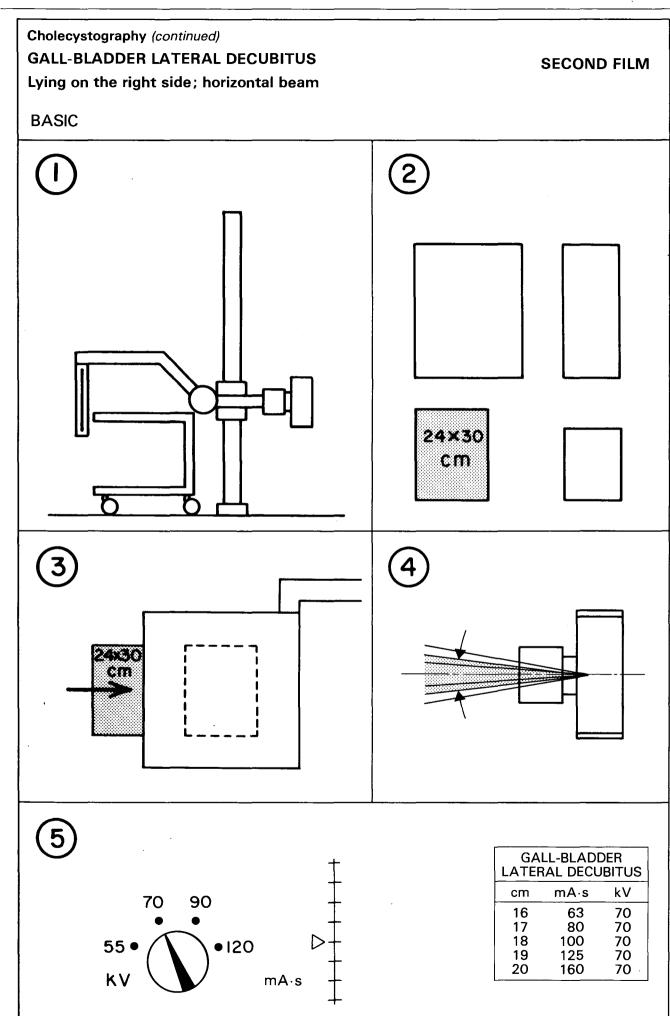
- 1. Lift the patient's right shoulder as shown.
- 2. Tell the patient to breathe OUT and hold the breath.
- 3. Expose.
- 4. Tell the patient to breathe normally.











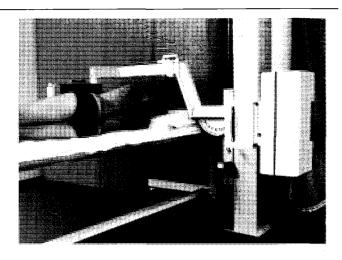
Cholecystography (continued)

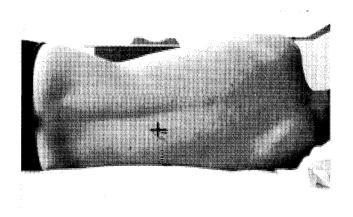
GALL-BLADDER LATERAL DECUBITUS Lying on the right side; horizontal beam

SECOND FILM

- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

SHOW THE **RADIOGRAPHS** ABDOMEN 7 AND ABDOMEN 8 TO THE DOCTOR BEFORE TAKING ANY FURTHER EXPOSURES.

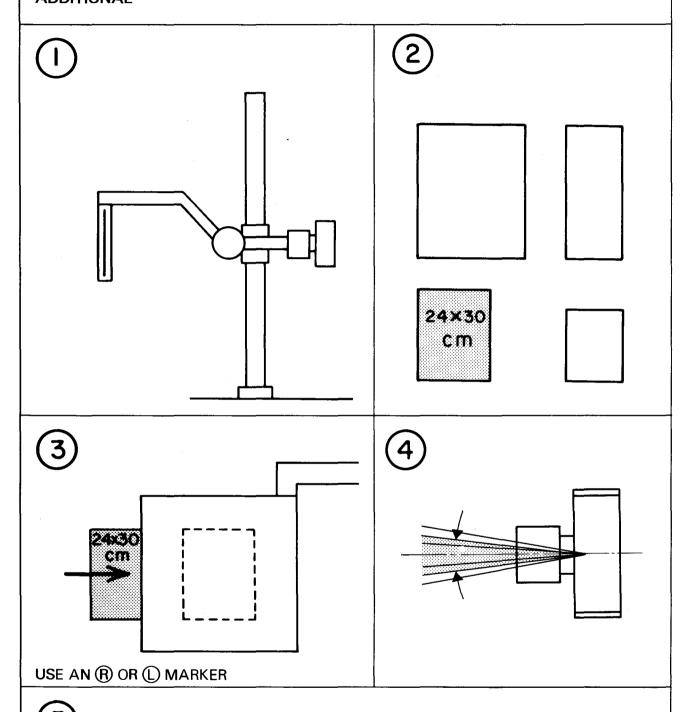


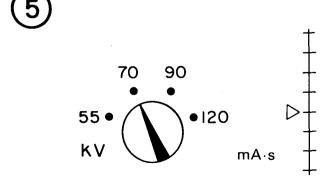




Cholecystography (continued)
GALL-BLADDER ERECT
Standing left anterior oblique
ADDITIONAL

IT IS NOT ALWAYS NECESSARY TO TAKE THIS VIEW. TAKE ONLY IF REQUESTED BY THE DOCTOR AFTER THE RADIOGRAPHS OF **ABDOMEN 7** AND **ABDOMEN 8** HAVE BEEN CHECKED.



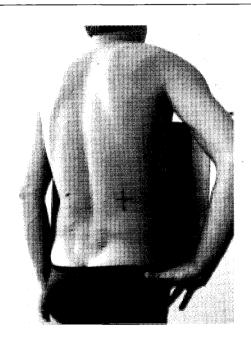


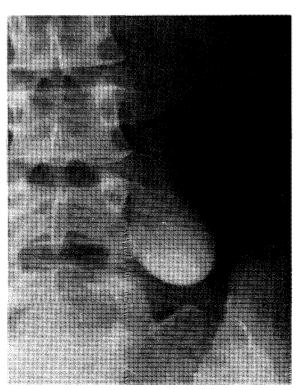
GALL-BLADDER ERECT				
cm	mA·s	kV		
16	63	70		
17	17 80 70			
18	18 100 70			
19	19 125 70			
20 160 70				
21 200 70				

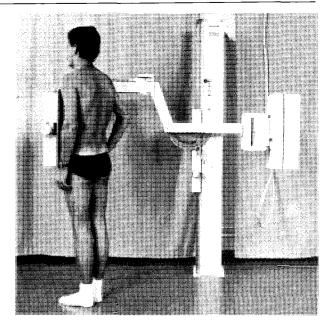
Cholecystography (continued) GALL-BLADDER ERECT Standing left anterior oblique

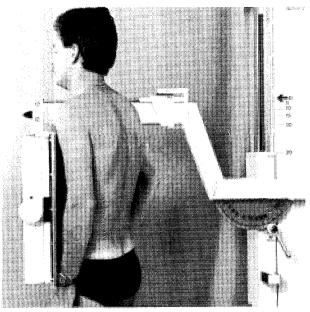
IT IS NOT ALWAYS NECESSARY TO TAKE THIS VIEW. TAKE ONLY IF REQUESTED BY THE DOCTOR AFTER THE RADIO-GRAPHS OF **ABDOMEN 7** AND **ABDOMEN 8** HAVE BEEN CHECKED.

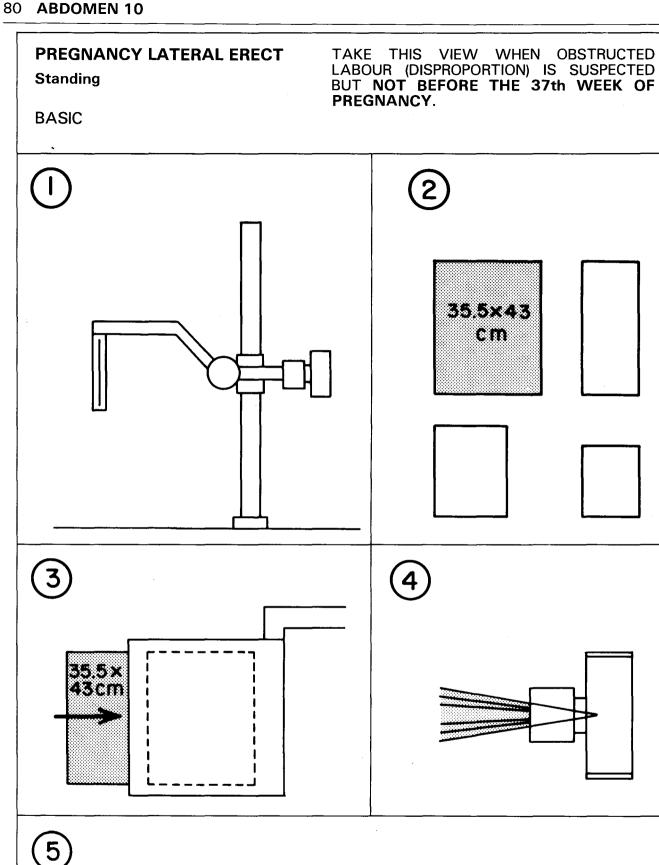
- 1. Tell the patient to stand with left side against cassette holder, as shown.
- 2. Tell the patient to breathe OUT and hold the breath.
- 3. Expose.
- 4. Tell the patient to breathe normally.

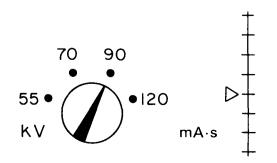












PREGNANCY LATERAL ERECT			
cm mA⋅s kV			
24	100	90	
25 125 90			
26 160 90			
27 200 90			

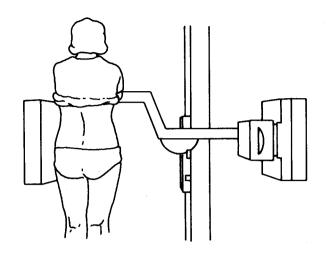
PREGNANCY LATERAL ERECT **Standing**

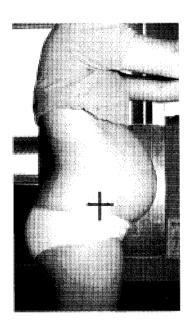
TAKE THIS VIEW WHEN OBSTRUCTED LABOUR (DISPROPORTION) IS SUSPECTED BUT NOT BEFORE THE 37th WEEK OF PREGNANCY.

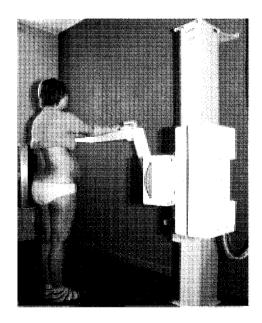
IF THE ABDOMEN IS PROTUBERANT USE A BINDER TO COMPRESS.

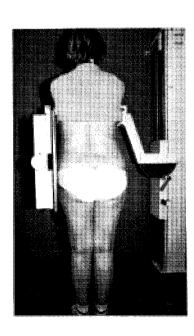
THE PATIENT MUST EMPTY HER BLADDER BEFORE THE X-RAY IS TAKEN.

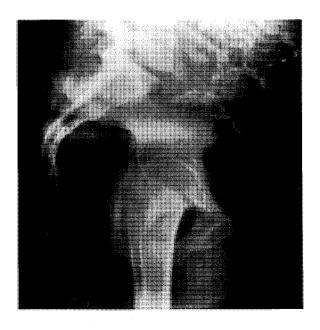
- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

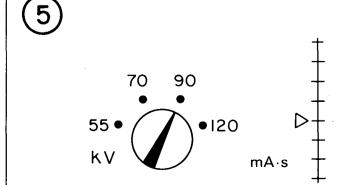












USE AN (R) OR (L) MARKER

PREGNANCY PA		
cm	mA⋅s	kV
24	100	90
25	125	90
26	160	90
27	200	90

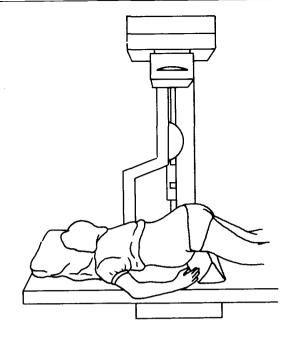
PREGNANCY PA

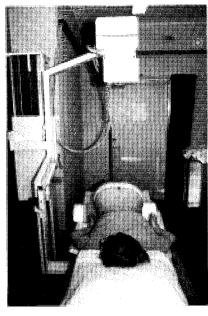
Prone with support under the pelvis (if the patient finds it impossible to lie prone, use the supine position)

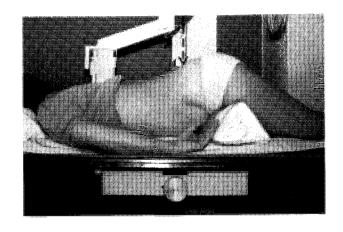
TAKE THIS VIEW TO SHOW THE POSITION OF THE BABY BUT **NOT BEFORE THE 37th WEEK OF PREGNANCY**.

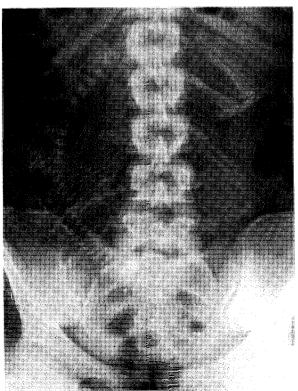
THE PATIENT MUST EMPTY HER BLADDER BEFORE THE X-RAY IS TAKEN.

- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.







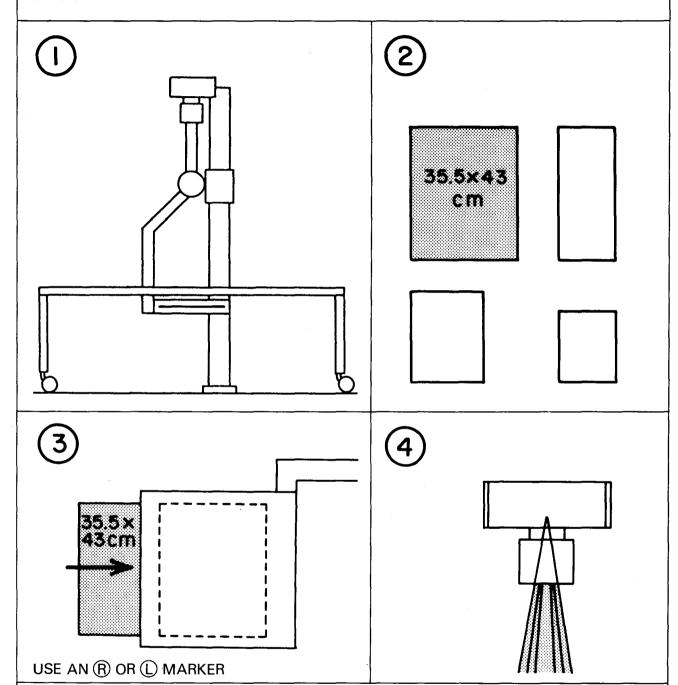


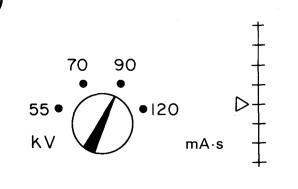
PREGNANCY OBLIQUE

Prone; with pelvis rotated 30°-40° to either side

BASIC

TAKE THIS VIEW TO SHOW THE AGE (MATURITY) OF THE BABY OR TO MAKE SURE THE BABY IS NORMAL BUT NOT BEFORE THE 33rd WEEK OF PREGNANCY.





Pl	REGNANC OBLIQUE	
cm	mA⋅s	kV
24	100	90
25	125	90
26	160	90
27	200	90

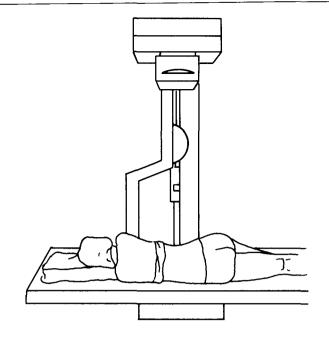
PREGNANCY OBLIQUE

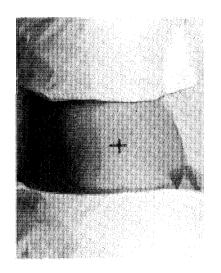
Prone; with pelvis rotated 30°-40° to either side (this is the preferred position; the alternative, with the patient in the supine position, should be avoided if possible)

TAKE THIS VIEW TO SHOW THE AGE (MATURITY) OF THE BABY OR TO MAKE SURE THE BABY IS NORMAL BUT NOT BEFORE THE 33rd WEEK OF PREGNANCY.

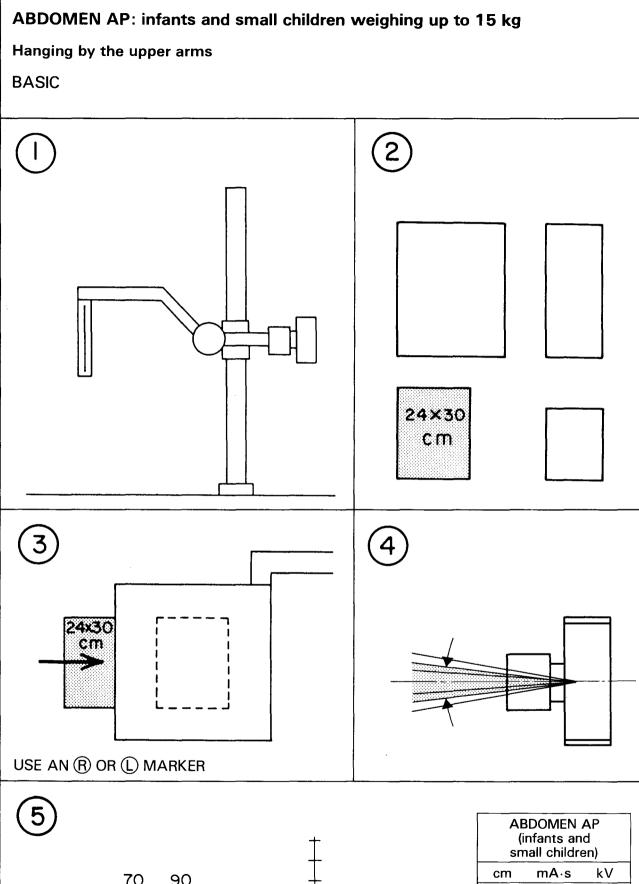
THE PATIENT MUST EMPTY HER BLADDER BEFORE THE X-RAY IS TAKEN.

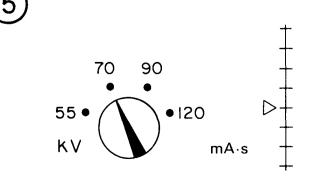
- 1. Tell the patient to breathe OUT and hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.











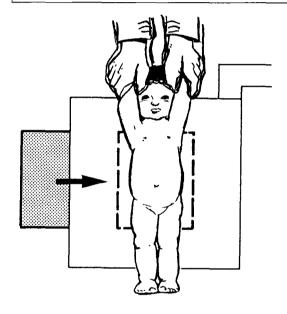
(i	BDOMEN A Infants and nall childre	ď
cm	mA⋅s	kV
7	8	70
8	10	70
9	12.5	70
10	16	70
11	20	70
12	25	70
13	32	70

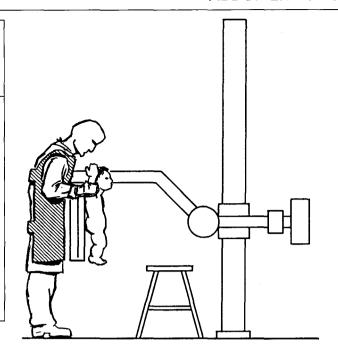
ABDOMEN AP: infants and small children weighing up to 15 kg Hanging by the upper arms

THE CHILD IS HELD HANGING BY THE UPPER ARMS (IF NECESSARY ITS FEET CAN BE SUPPORTED BY A STOOL) WITH ITS BACK RESTING AGAINST THE FRONT OF THE CASSETTE HOLDER.

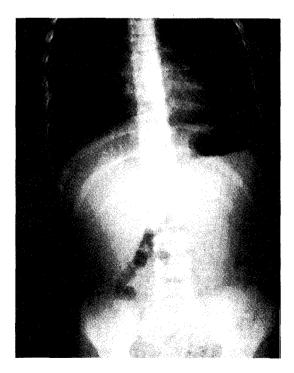
THE PERSON HOLDING THE CHILD, PREFERABLY ONE OF ITS PARENTS, MUST WEAR A LEAD APRON AND LEAD GLOVES.

- 1. Centre to the navel.
- 2. Expose when the child is not moving.





PERSON SUPPORTING THE CHILD MUST WEAR A LEAD APRON AND LEAD GLOVES.^a

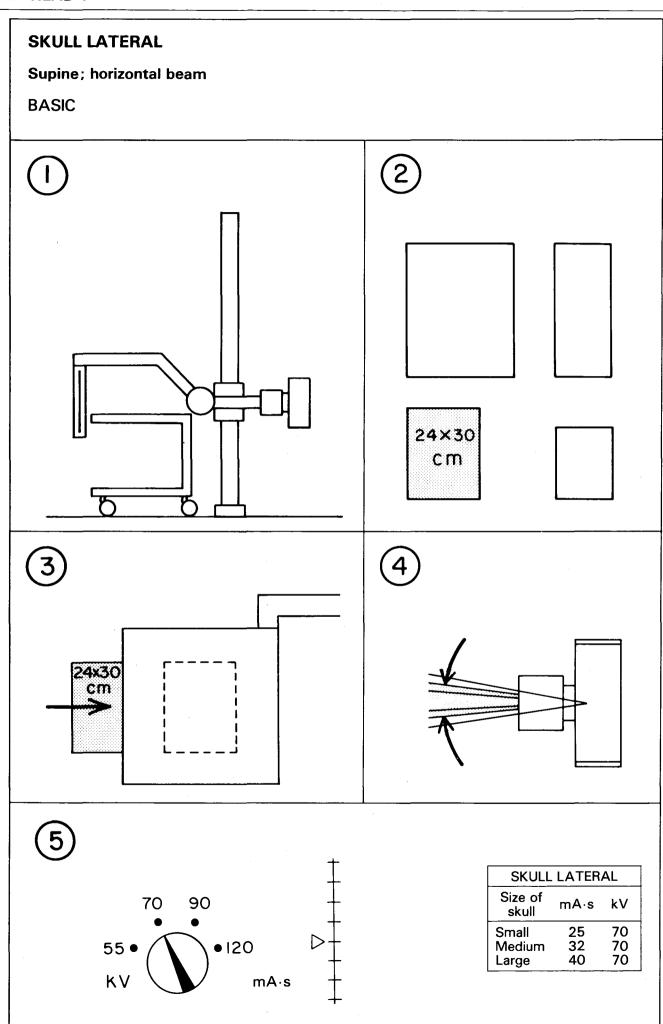


^a For the sake of clarity, the gloves are shown as being transparent.

HEAD

HEAD

SKULL		Pages
X-rays of the skull are always taken with the patient lyi	ng down.	
1. Skull lateral		92-93 94-95
NEVER USE this position when there is a possibility or when the patient is unconscious.		
3. Skull AP		96-97
Use when the patient cannot be X-rayed in the pro-		
4. Skull (occiput) semiaxial (Towne's projection)		98-99
SINUSES, FACE, AND NOSE		
Patient sitting		
5. Sinuses and face PA		100-101
6. Sinuses and face semiaxial, or nose PA		102-103
7. Sinuses, face, or nose lateral		104-105
Patient lying down, unable to sit		
Sinuses, face, or nose AP	Use Skull AP (HEAD 3 above)	
Sinuses, face, or nose lateral	Use Skull lateral (HEAD 1 above)	
MANDIBLE		
Patient sitting		
8. Mandible PA		106-107
9. Mandible oblique lateral		
Patient lying down, unable to sit		
10. Mandible AP		110-111
11. Mandible oblique lateral		

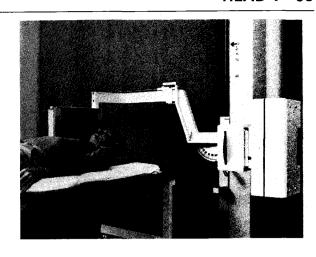


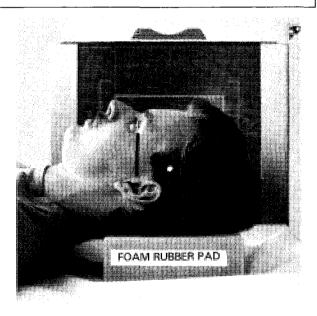
SKULL LATERAL

Supine; horizontal beam

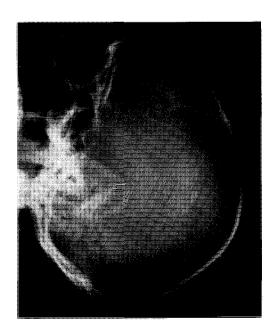
THE PATIENT'S HEAD SHOULD BE RAISED ON A FOAM RUBBER PAD.

REMOVE DENTURES, HAIR-GRIPS, OR ANYTHING ELSE IN THE HAIR.

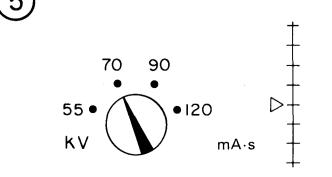








94 **HEAD 2 NEVER USE** WHEN THERE IS A POSSIBILITY THAT THE FACIAL BONES MAY BE FRACTURED OR WHEN THE PATIENT **SKULL PA** Prone; vertical beam angled IS UNCONSCIOUS; USE HEAD 3 20° towards the feet INSTEAD. **BASIC** 20° 24×30 cm24x30 cm



USE AN (R) OR (L) MARKER

SKI	ULL PA	
Size of skull	mA·s	kV
Small	63	70
Medium	80	70
Large	100	70

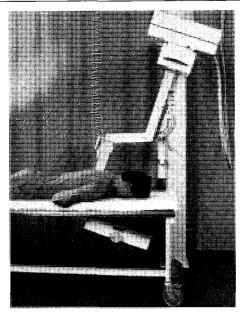
SKULL PA

Prone; vertical beam angled 20° towards the feet

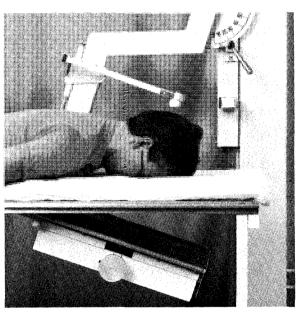
NEVER USE WHEN THERE IS A POSSIBILITY THAT THE FACIAL BONES MAY BE FRACTURED OR WHEN THE PATIENT IS UNCONSCIOUS.

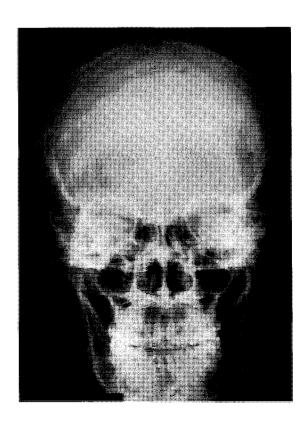
REMOVE DENTURES, HAIR-GRIPS, OR ANYTHING ELSE IN THE HAIR.

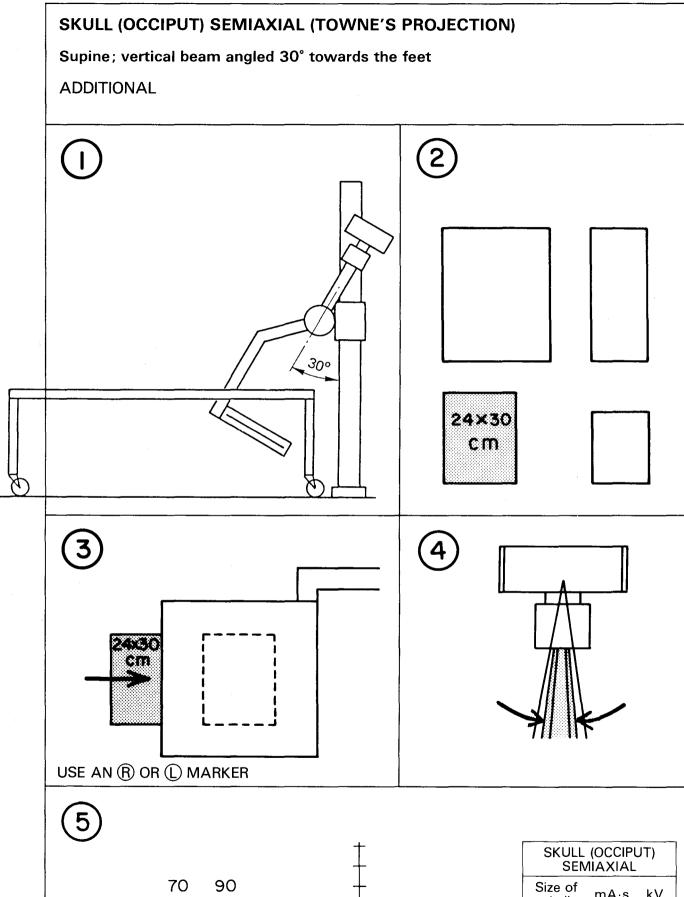
NOSE AND FOREHEAD SHOULD BE AGAINST THE TABLE AND HANDS UNDER THE CHEST.











•120

mA·s

55 ●

k٧

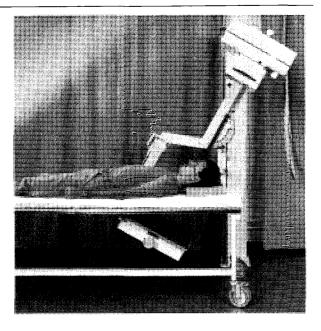
	OCCIPU IIAXIAL	
Size of skull	mA⋅s	kV
Small	63	70
Medium	80	70
Large	100	70

Supine; vertical beam angled 30° towards the feet

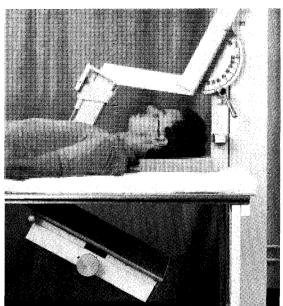
THE PATIENT'S HEAD SHOULD BE RAISED ON A FOAM RUBBER PAD.

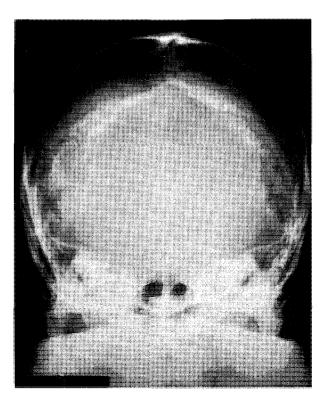
REMOVE DENTURES, HAIR-GRIPS, OR ANYTHING ELSE IN THE HAIR.

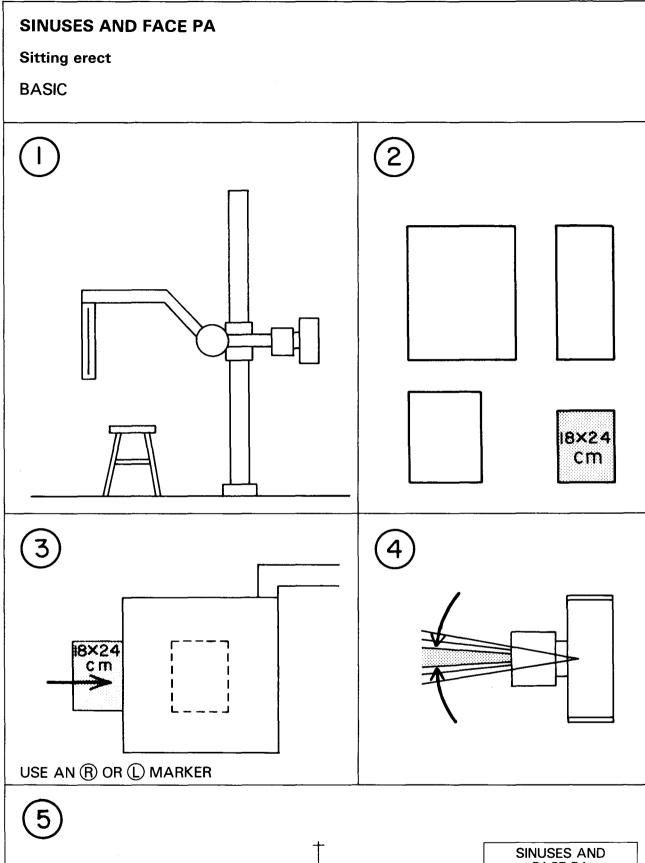
Centre to the top of the head 7–8 cm from the nasion (root of the nose).

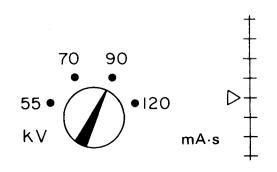








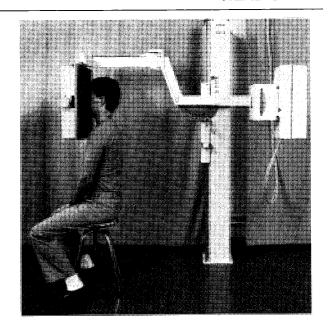


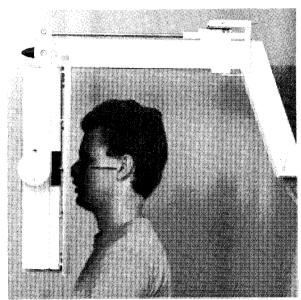


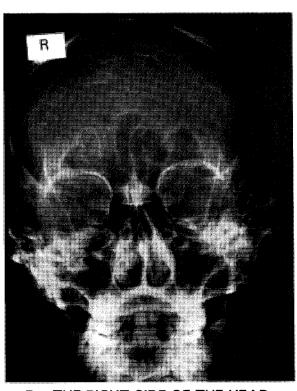
SES AN	D
mA⋅s	kV
25	90
25	90
32	90
	MA·s 25 25

SINUSES AND FACE PA Sitting erect

REMOVE DENTURES, HAIR-GRIPS, OR ANYTHING ELSE IN THE HAIR.

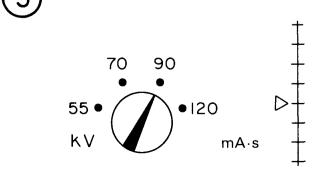






R = THE RIGHT SIDE OF THE HEAD.

SINUSES AND FACE SEMIAXIAL, OR NOSE PA Sitting erect; if the patient is unable to sit, use the supine position (HEAD 3) **BASIC** 18×24 cm 18×24 USE AN (R) OR (L) MARKER



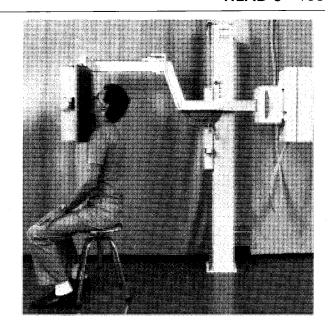
SINUSE SEMIAXIA	S AND F	
Size of skull	mA⋅s	kV
Small	25	90
Medium	32	90
Large	40	90

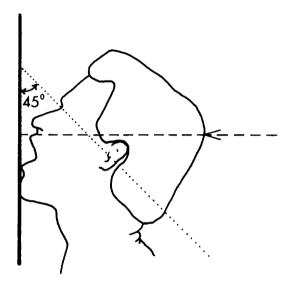
SINUSES AND FACE SEMIAXIAL, OR NOSE PA

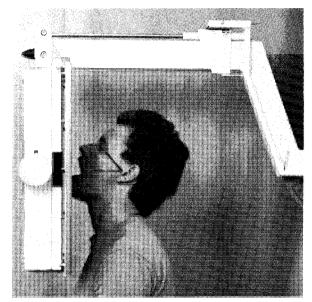
Sitting erect; if the patient is unable to sit, use the supine position (HEAD 3).

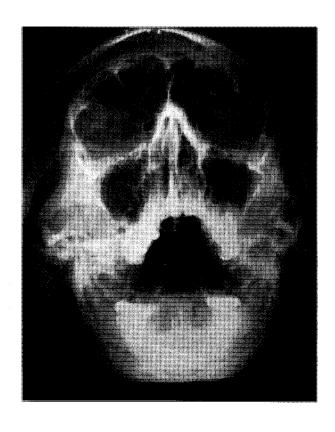
REMOVE DENTURES, HAIR-GRIPS, OR ANYTHING ELSE IN THE HAIR.

- 1. Tell the patient to open the mouth as widely as possible and place the chin against the cassette holder.
- 2. Tilt the patient's head back 45°.
- 3. Expose.







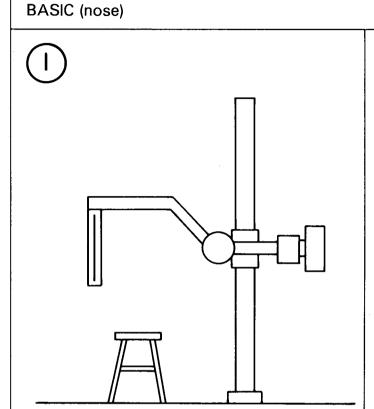


SINUSES, FACE, OR NOSE LATERAL

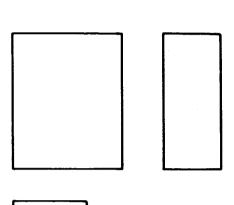
DO NOT USE FOR CHILDREN

Sitting erect; if the patient is unable to sit, use the supine position (HEAD 1).

ADDITIONAL (sinuses and face)

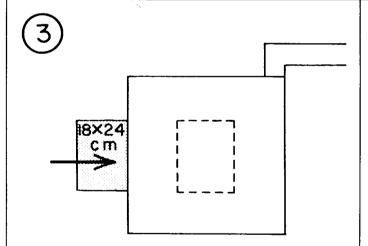


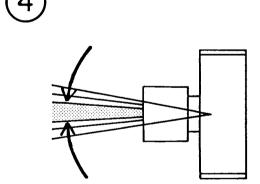


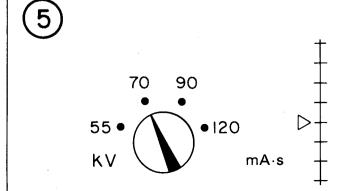












S, FACE	
mA⋅s	kV
16	70
16	70
25	70
	mA·s 16 16

^a For the **NOSE** use 16 mA·s and 55 kV for all sizes of skull.

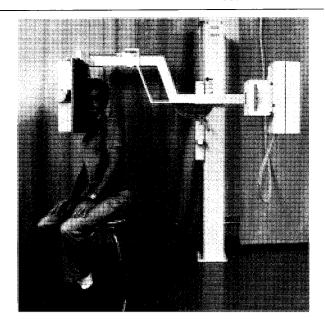
SINUSES, FACE, OR NOSE LATERAL

Sitting erect; if the patient is unable to sit, use the supine position (HEAD 1).

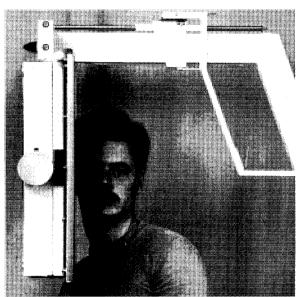
DO NOT USE FOR CHILDREN

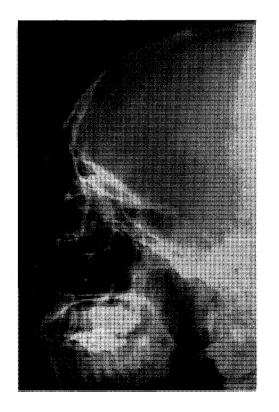
REMOVE DENTURES, HAIR-GRIPS, OR ANYTHING ELSE IN THE HAIR.

RIGHT SIDE OF THE PATIENT'S HEAD NEXT TO THE CASSETTE HOLDER.

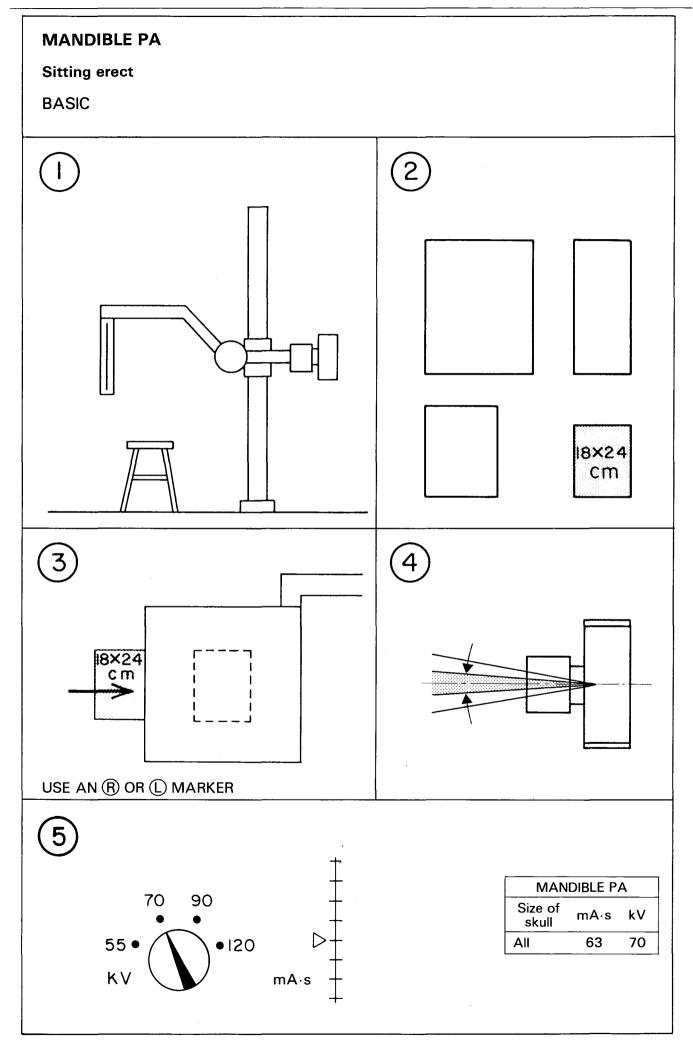








USE THE SAME PROJECTION FOR THE **NOSE** BUT WITH **16 mA·s** AND **55 kV**.

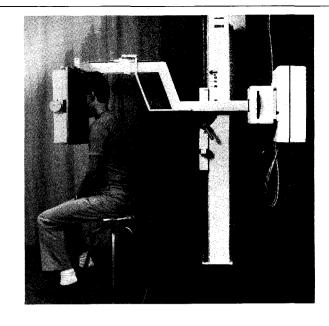


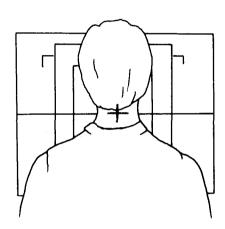
MANDIBLE PA

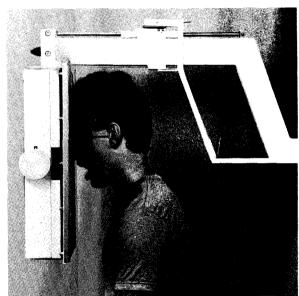
Sitting erect

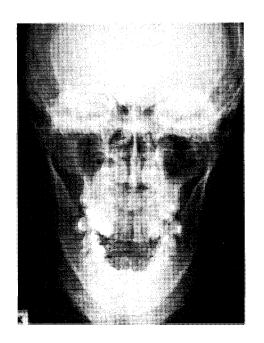
REMOVE DENTURES, HAIR-GRIPS, OR ANYTHING ELSE IN THE HAIR.

- 1. Tell the patient to open the mouth as widely as possible and place the forehead and nose against the cassette holder.
- 2. Expose.









MANDIBLE OBLIQUE LATERAL Sitting erect **BASIC** 18×24 ¢m 18×24 USE AN (R) OR (L) MARKER MANDIBLE OBLIQUE LATERAL 70 90 Size of mA⋅s kV skull •120 ΑII 12.5 70 $mA\!\cdot\! s$

EXHIBITION OF MODERN ILLUSTRATED SCIENTIFIC AND SCHOLARLY PUBLICATIONS

Conditions for participation

- 1. The exhibition will take place in Leyden University Library from October 30, 1987 January 17, 1988 on the occasion of the fourth centenary of this library.
- 2. Only one publication of each publisher will be exhibited in principle.
- 3. Submitted works must be illustrated scientific or scholarly publications, published after 1983, in which image and text must form a functional unity, aimed at the transfer of scientific and scholarly knowledge.

 No limitations are put on the kind of illustrative material: photographs, drawings, graphics, diagrammes etc. etc. are all permitted.

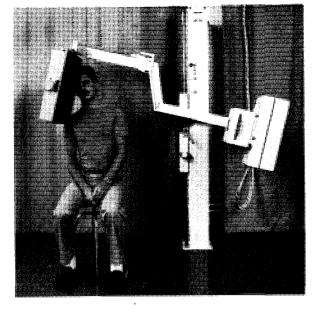
 University course books will be considered a scientific or scholarly publication for the purposes of this exhibition.
- 4. The publisher is requested to provide an explanation of his reasons for choosing the particular publication.

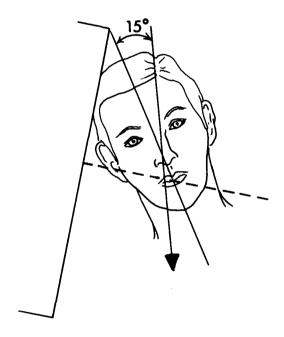
 Relevant, factual details must be provided: personal details of designer, illustrator, author etc. etc.; details about the origination and production of the work, typeface etc.
- 5. The publisher will receive three copies of the catalogue free of charge.
- 6. If the publisher so requests, the publication will be returned after the end of the exhibition. All other submitted works will be kept in the University Library in a separate collection, not available for normal loan purposes.
- 7. Submissions and correspondence to be sent to:
 Leiden University Library
 att. mr. A.J.M. Linmans
 P.O. Box 9501
 2300 RA LEIDEN
 The Netherlands
- 8. Submissions must be received before July 31, 1987 at the above-mentioned address.

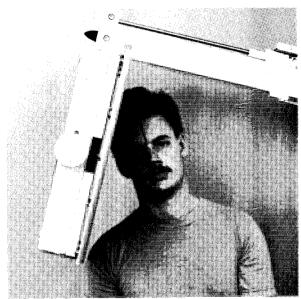
MANDIBLE OBLIQUE LATERAL Sitting erect

REMOVE DENTURES AND EARRINGS.

- 1. Angle the beam at 15° as shown.
- 2. Ask the patient to sit with the side of the head to be X-rayed nearest to the cassette holder.
- 3. Tilt the head inwards 15° as shown, so that the head and shoulder rest against the cassette holder.
- 4. Expose.











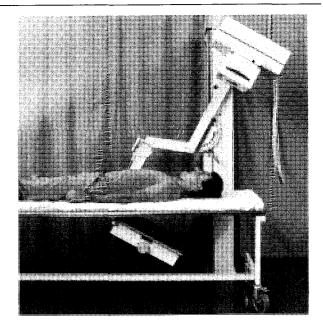
MANDIBLE AP Supine; vertical beam angled 30° towards the feet **ADDITIONAL** 300 24×30 çm 24×30 cm USE AN \circledR OR $\char{\bigcirc}$ MARKER MANDIBLE AP 70 90 Size of mA⋅s k۷ skull • I2O 55 ● ΑII 63 70 ΚV $mA\!\cdot\! s$

MANDIBLE AP

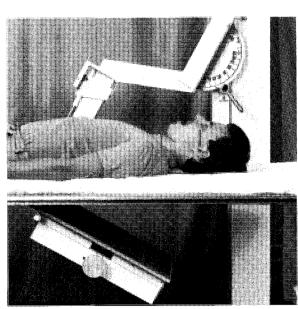
Supine; vertical beam angled 30° towards the feet

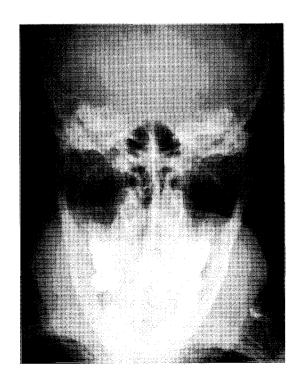
REMOVE DENTURES, HAIR-GRIPS, AND ANYTHING ELSE IN THE HAIR.

- If the patient is unable to keep the mouth open place a wedge of soft wood or cork between the jaws.
- 2. Expose.



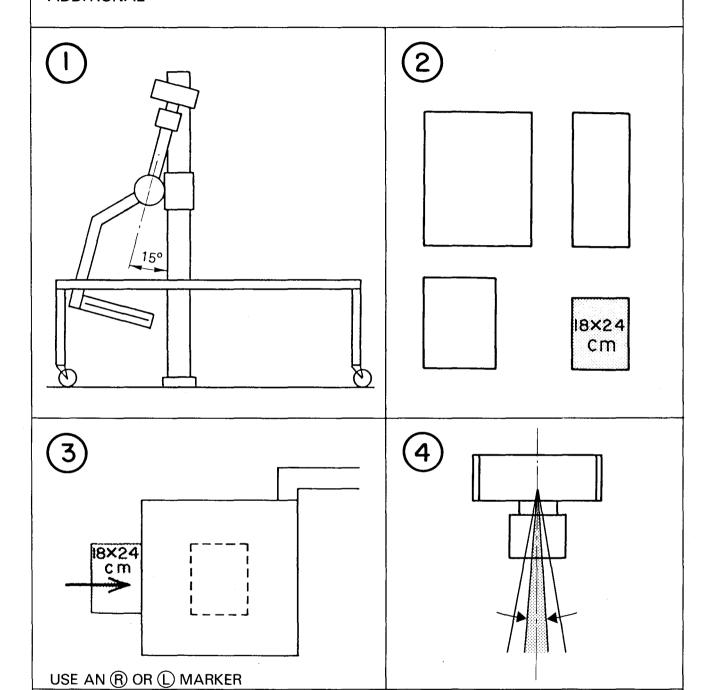


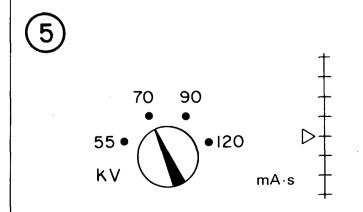




MANDIBLE OBLIQUE LATERAL

Lying on the right (or left) side; vertical beam angled 15° towards the head ADDITIONAL





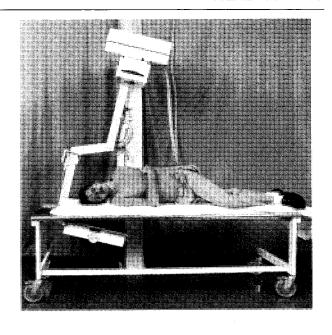
	NDIBLE LATE	RAL
Size of skull	mA·s	kV
All	12.5	70

MANDIBLE OBLIQUE LATERAL

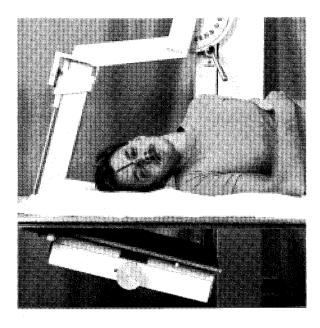
Lying on the right (or left) side; vertical beam angled 15° towards the head

REMOVE DENTURESAND EARRINGS.

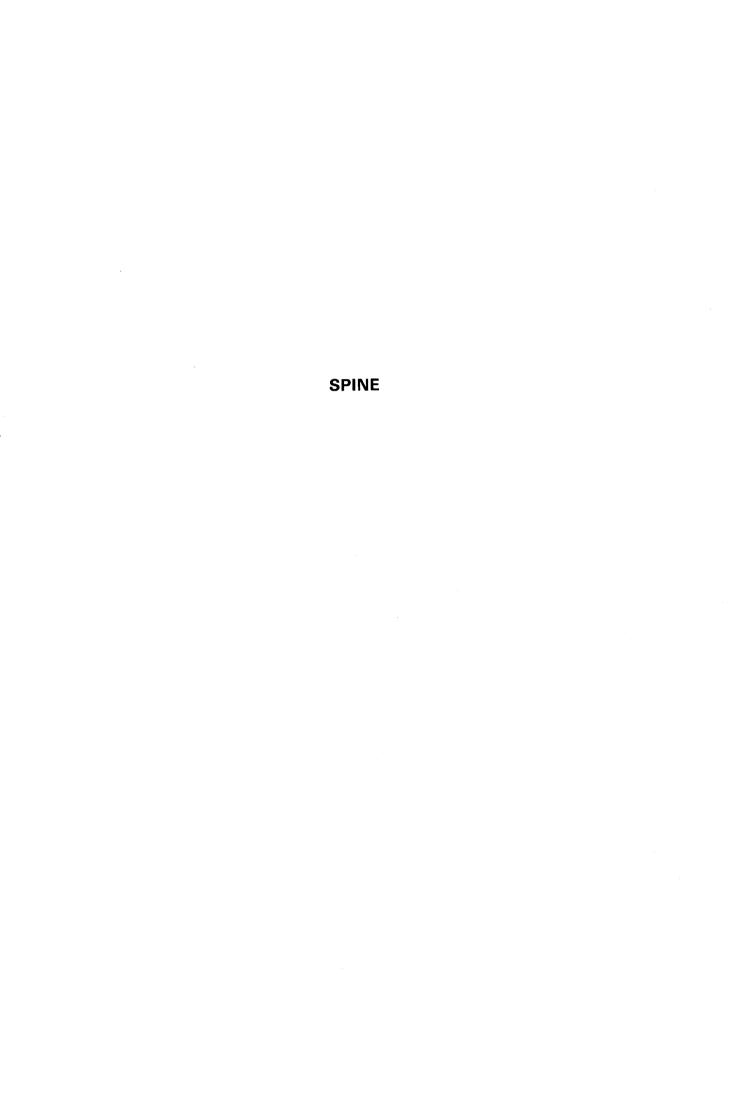
- 1. Place the patient with the side to be X-rayed nearest to the table.
- 2. Tilt the patient's head 15° towards the table.
- 3. Expose.







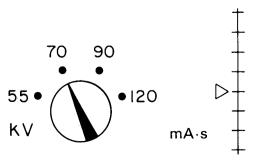




SPINE

CERVICAL SPINE	Pages
Patient able to sit	
1. Cervical spine PA	120-121
Patient lying down, unable to sit	
 4. Cervical spine AP: after injury 5. Cervical spine lateral: after injury 6. Odontoid process AP: first and second cervical vertebrae 	126-127
CERVICOTHORACIC REGION	
7. Cervicothoracic region lateral	130-131
THORACIC SPINE	
X-rays of the thoracic spine are always taken with the patient lying down.	
8. Thoracic spine AP	
LUMBOSACRAL SPINE	
X-rays of the lumbosacral spine are always taken with the patient lying down.	
 10. Lumbar spine AP	138-139
13. Sacrum AP: lumbosacral junction and sacroiliac joints	

CERVICAL SPINE PA Sitting erect **BASIC** 18×24 cm 18×24 c m USE AN (R) OR (L) MARKER 70 90

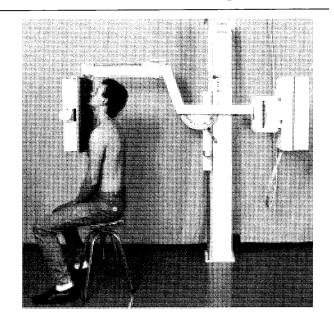


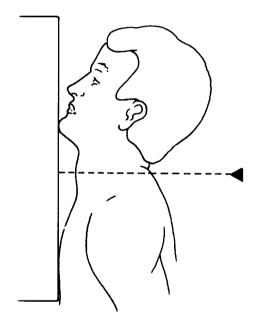
mA⋅s	kV
20	70
25	70
32	70
40	70
50	70
	20 25 32 40

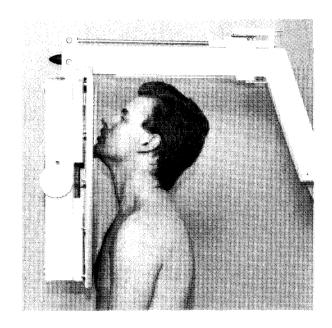
CERVICAL SPINE PASitting erect

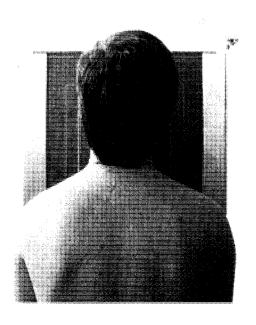
REMOVE HAIR-GRIPS AND ANYTHING ELSE IN THE HAIR.

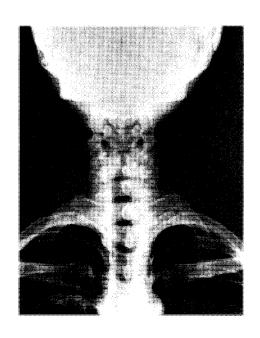
- 1. Tell the patient to place the chin against the cassette holder.
- 2. Tell the patient to hold the breath.
- 3. Expose.
- 4. Tell the patient to breathe normally.

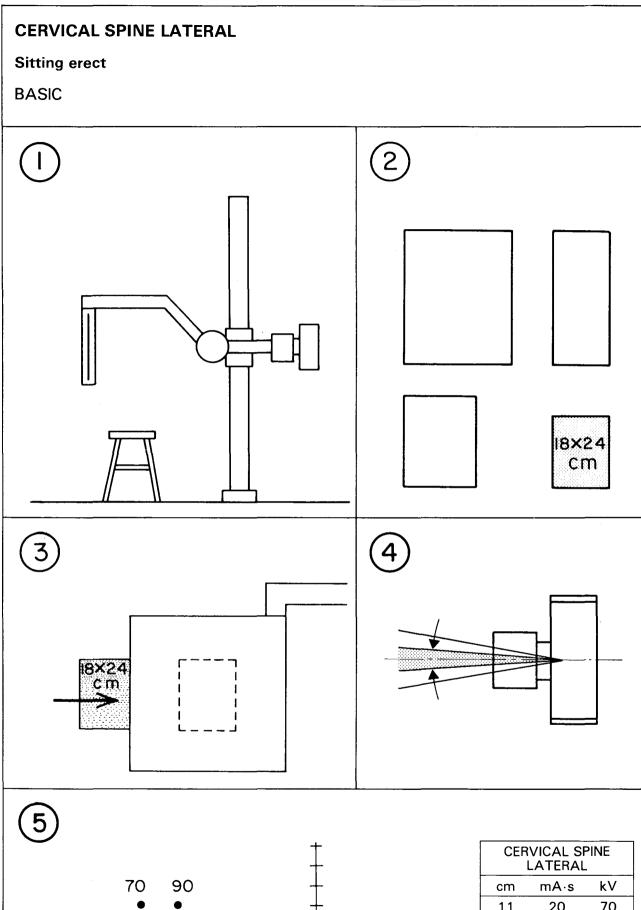












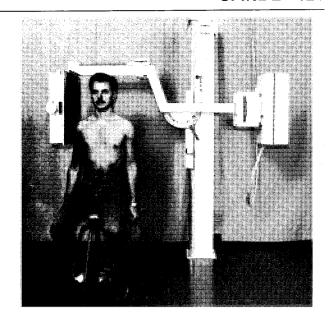
	‡		VICAL SF LATERAL	
70 90	+	cm	mA⋅s	kV
55 • 120 m/	\ \ \ \ \ \ \	11 12 13 14 15	20 25 32 40 50	70 70 70 70 70

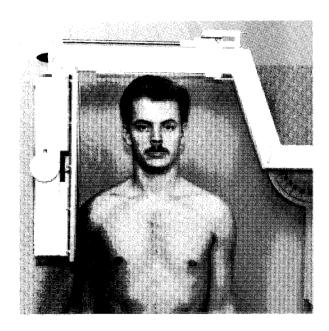
CERVICAL SPINE LATERALSitting erect

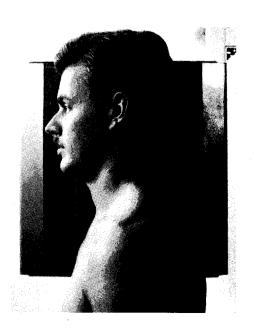
THE PATIENT'S SHOULDERS SHOULD BE AS RELAXED AS POSSIBLE WITH THE ARMS AGAINST THE SIDES.

REMOVE HAIR-GRIPS AND EARRINGS.

- 1. Tell the patient to hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

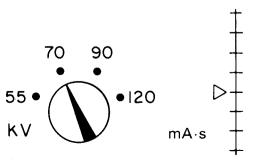








CERVICAL SPINE OBLIQUE DO NOT USE FOR CHILDREN Sitting erect **ADDITIONAL** 24×30 cm24x30 cm USE AN (R) OR (L) MARKER



CERVICAL SPINE OBLIQUE		
cm	mA⋅s	kV_
11	20	70
12	25	70
13	32	70
14	40	70
15	50	70

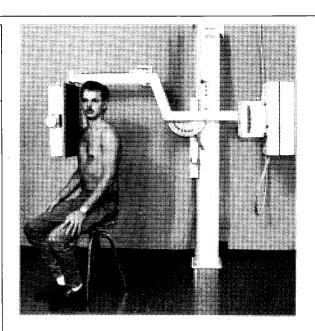
CERVICAL SPINE OBLIQUE

Sitting erect

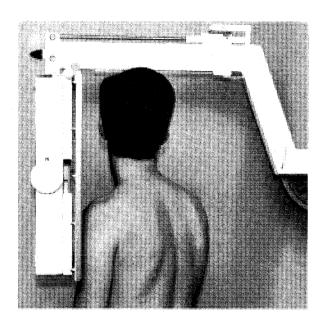
DO NOT USE FOR CHILDREN

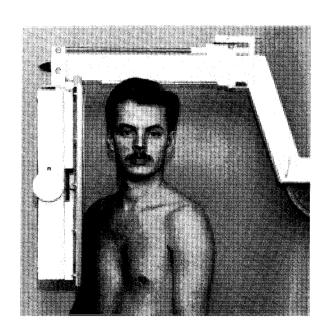
ROTATE THE
PATIENT SO THAT
HE IS SITTING AT A
45° ANGLE TO THE
CASSETTE
HOLDER.

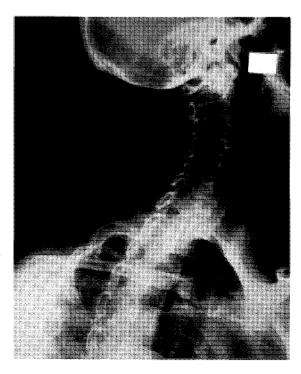
- 1. Tell the patient to hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

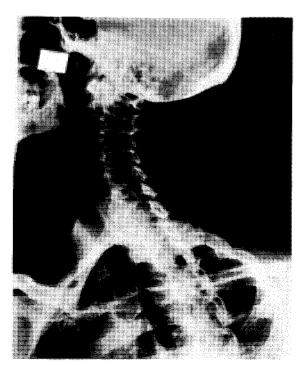




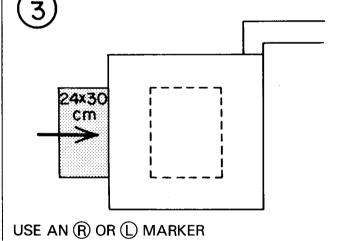


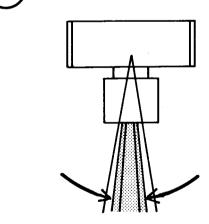


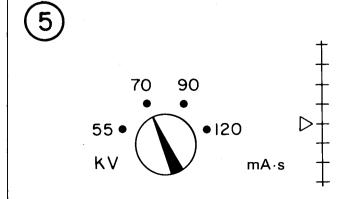




124 **SPINE 4 CERVICAL SPINE AP: after injury** Supine; vertical beam angled 15° towards the head **ADDITIONAL** CHILDREN: use an 18×24 cm cassette. 150 24×30 сm 24×30 ¢m





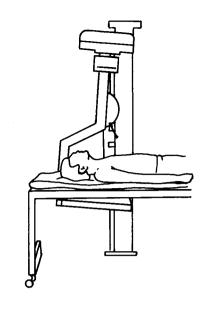


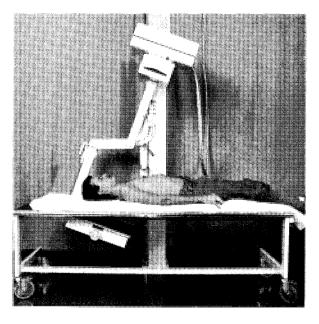
CERVICAL SPINE AP (after injury)			
cm	mA⋅s	kV	
11 12 13 14 15	20 25 32 40 50	70 70 70 70 70	

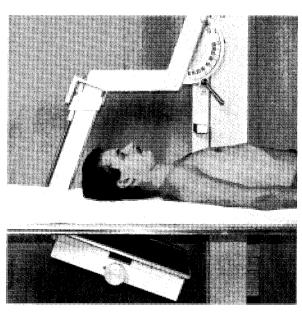
CERVICAL SPINE AP: after injury Supine: vertical beam angled 15°

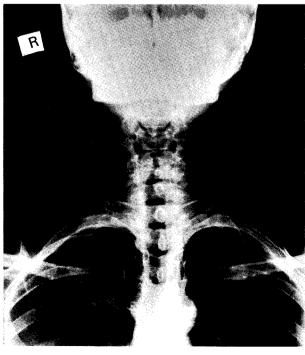
Supine; vertical beam angled 15° towards the head

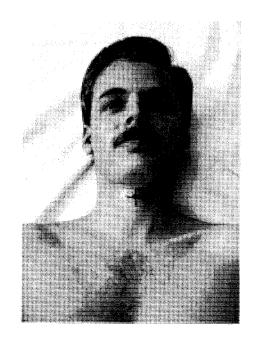
- 1. Tell the patient to hold the breath if possible.
- 2. Expose.
- 3. Tell the patient to breathe normally.



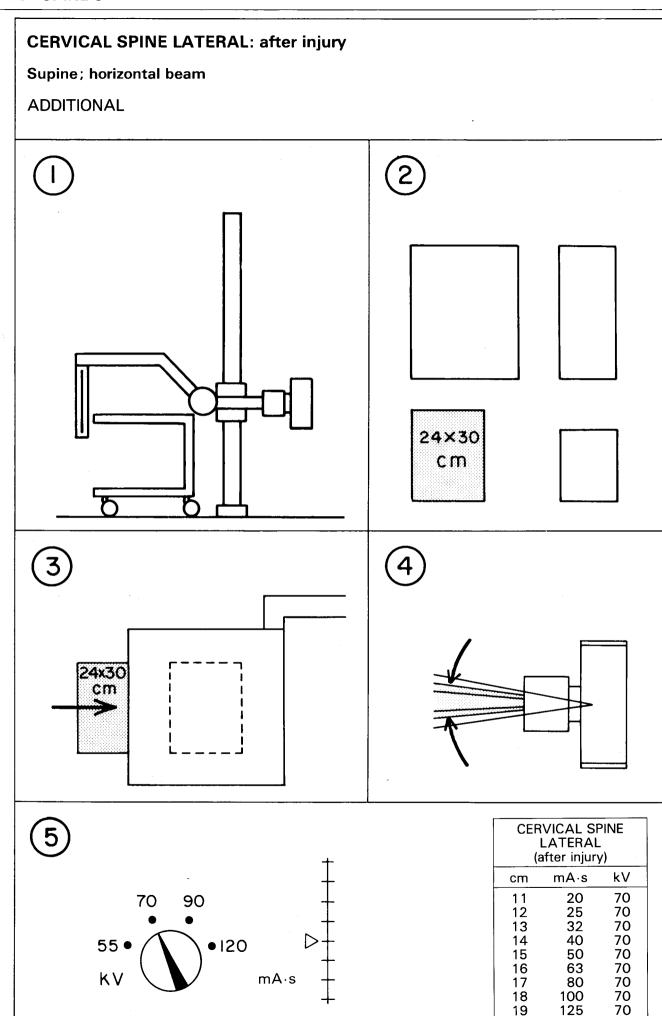








R = THE RIGHT SIDE OF THE SPINE.



CERVICAL SPINE LATERAL: after injury

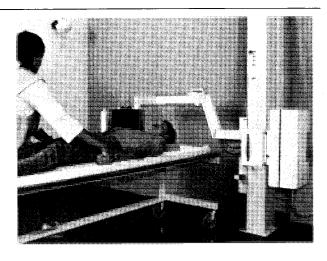
Supine; horizontal beam

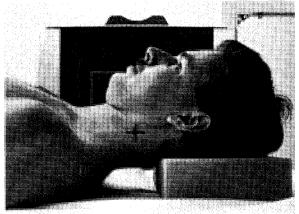
SUPPORT THE HEAD WITH A PAD IF THE INJURY IS NOT TOO SERIOUS.

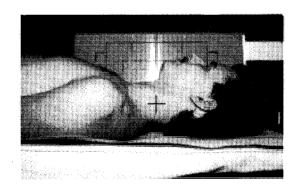
IF A NECK FRACTURE IS SUSPECTED THE HEAD SHOULD **NOT** BE LIFTED ONTO A PAD BY THE OPERATOR WITHOUT THE DOCTOR'S PERMISSION.

- 1. Tell the patient to hold the breath if possible.
- 2. Expose.
- 3. Tell the patient to breathe normally.





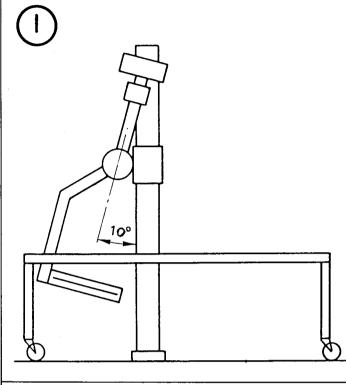


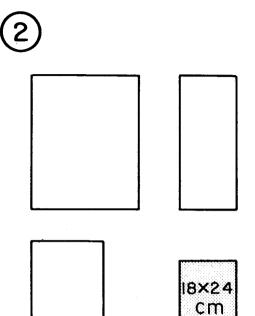


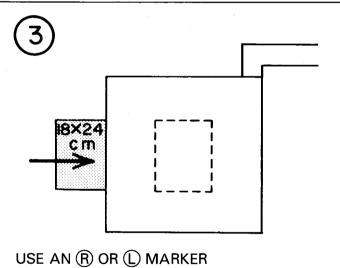


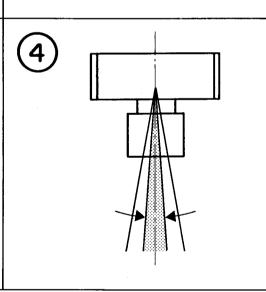
ODONTOID PROCESS AP: first and second cervical vertebrae Supine; vertical beam angled 10° towards the head

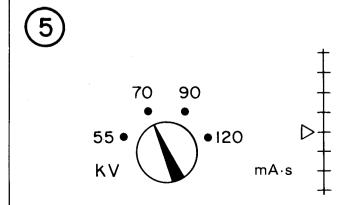
ADDITIONAL









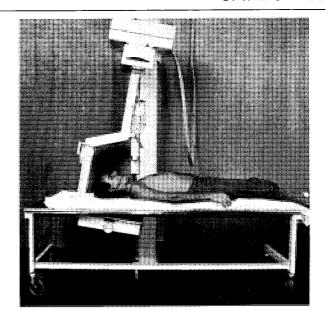


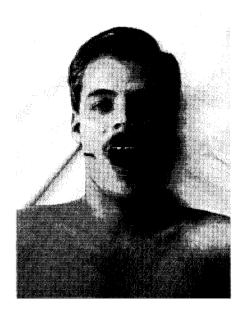
ODONTOID PROCESS AP		
cm	mA⋅s	kV
11	20	70
12	25	70
13	32	70
14	40	70
15	50	70
16	63	70
17	80	70
18	100	70
19	125	70

ODONTOID PROCESS AP: first and second cervical vertebrae

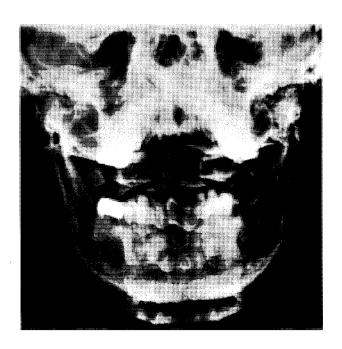
Supine; vertical beam angled 10° towards the head

- If the patient is unable to keep the mouth open place a wedge of soft wood or a cork between the jaws.
- 2. Tell the patient to hold the breath.
- 3. Expose.
- 4. Tell the patient to breathe normally.









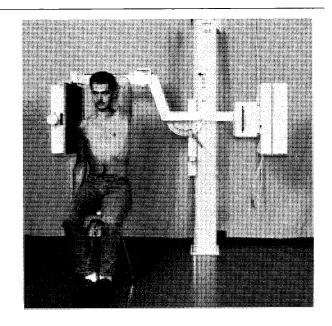
CERVICOTHORACIC REGION LATERAL Sitting erect **ADDITIONAL** 24×30 cm 24x30 cm CERVICOTHORACIC REGION LATERAL $mA\!\cdot\! s$ kV cm 63 63 k۷

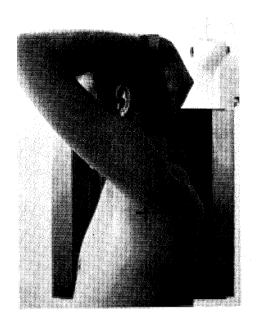
 $mA\!\cdot\! s$

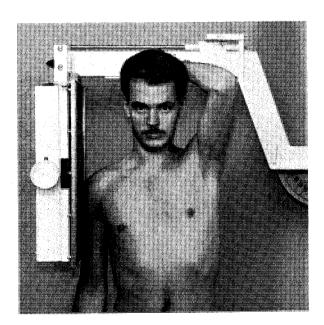
CERVICOTHORACIC REGION LATERAL

Sitting erect

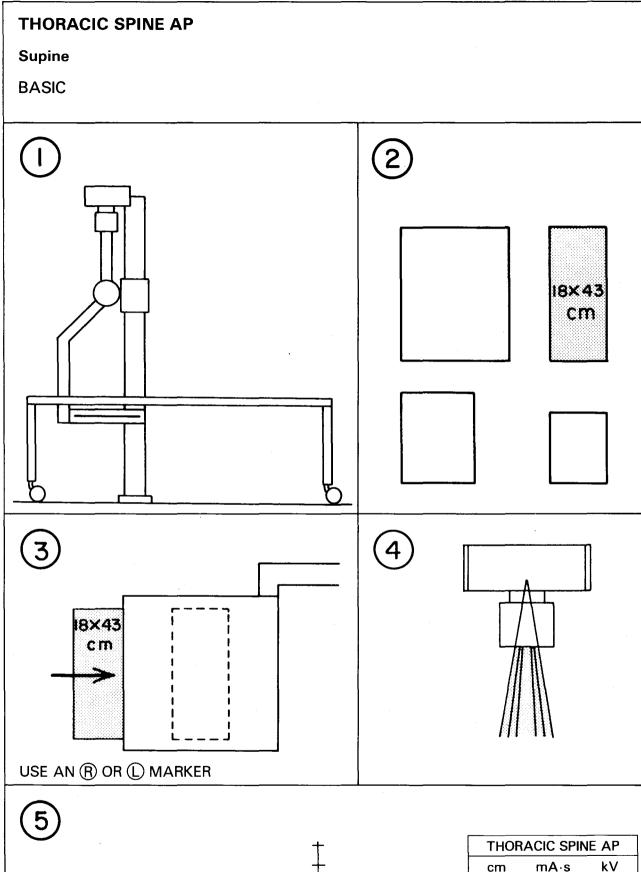
THE SAME VIEW CAN BE ACHIEVED WITH AN INJURED PATIENT LYING SUPINE.

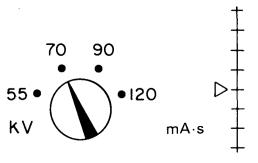










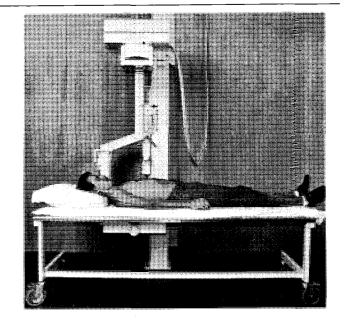


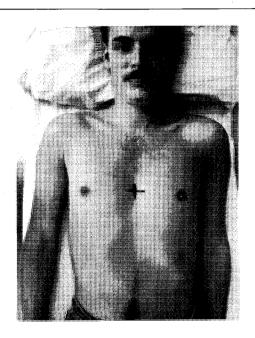
THORACIC SPINE AP		
cm	mA·s	kV
16	63	70
17	80	70
18	100	70
19	125	70
20	160	70
21	200	70

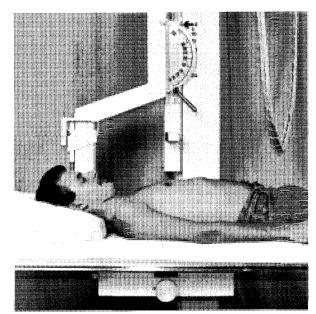
THORACIC SPINE AP

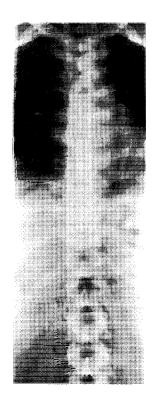
Supine

- 1. Tell the patient to hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.

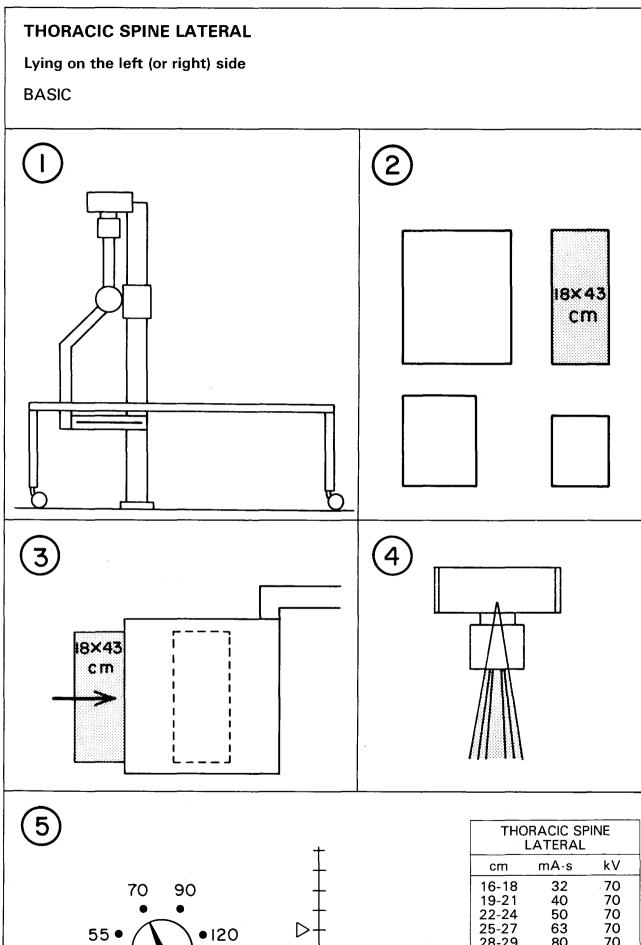








ΚV

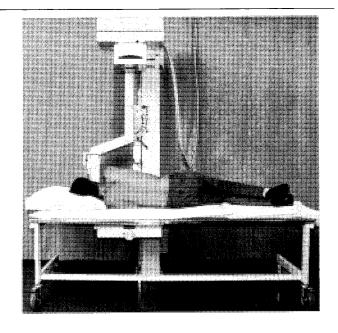


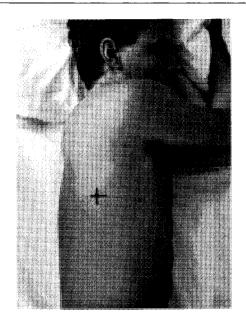
 $mA\!\cdot\! s$

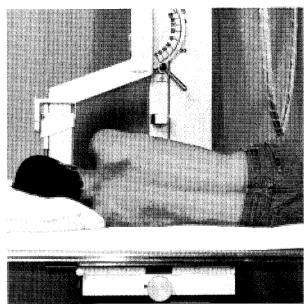
	LATERAL	
cm	mA⋅s	kV
16-18	32	.70
19-21	40	70
22-24	50	70
25-27	63	70
28-29	80	70
30-31	100	70
32-33	125	70
34-35	160	70

THORACIC SPINE LATERAL Lying on the left (or right) side

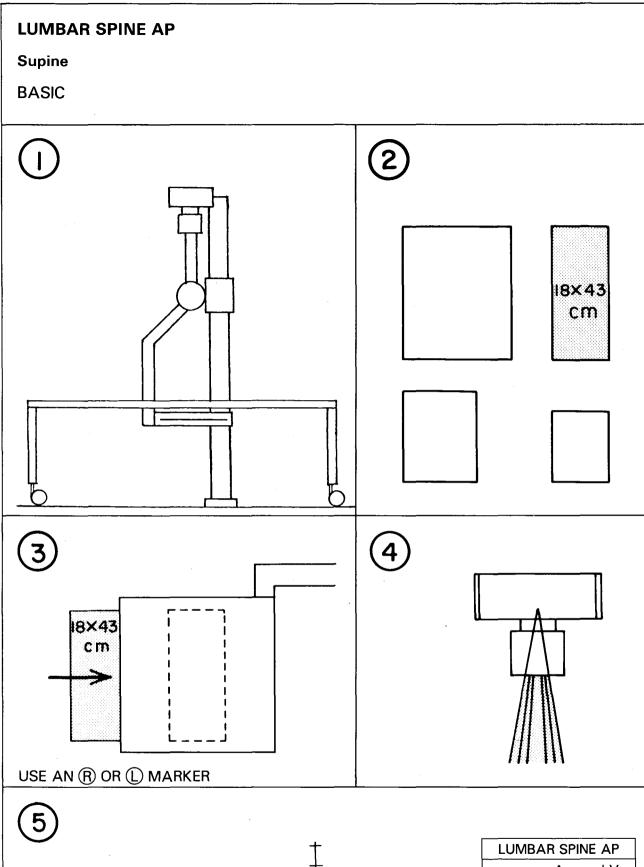
- 1. Tell the patient to breathe IN gently during the exposure.
- 2. Expose while the patient is breathing in.
- 3. Tell the patient to breathe normally.

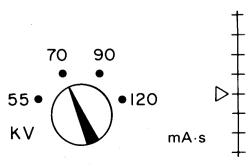












LUMBAR SPINE AP		
cm	mA⋅s	kV
15	50	70
16	63	70
17	80	70
18	100	70
19	125	70
20	160	70

LUMBAR SPINE AP

Supine

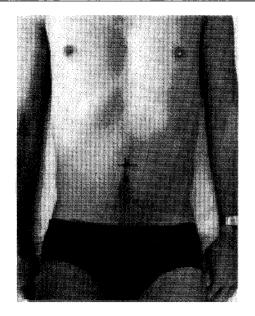
THE PATIENT'S KNEES SHOULD BE BENT SO THAT THE BACK IS FLAT ON THE TABLE.

AFTER INJURY

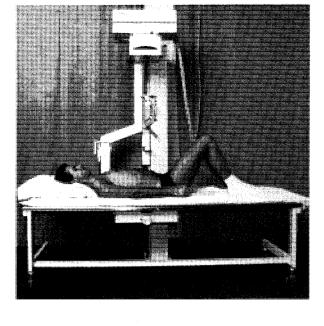
X-RAY IN EITHER THE AP OR THE PA POSITION WITH AS LITTLE MOVEMENT AS POSSIBLE.

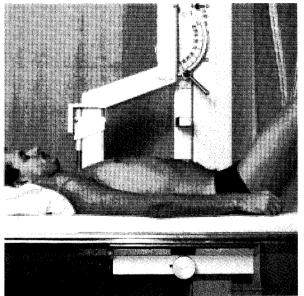
DO NOT TURN THE PATIENT OVER.

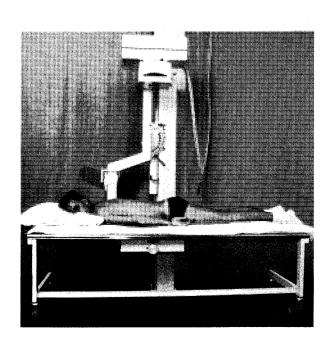
- 1. Tell the patient to hold the breath if possible.
- 2. Expose.
- 3. Tell the patient to breathe normally.





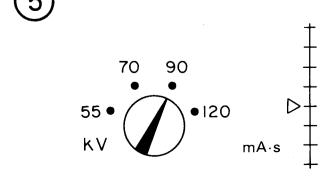






R = THE RIGHT SIDE OF THE SPINE.

LUMBAR SPINE LATERAL: no injury USE 70 kV FOR CHILDREN Lying on the left (or right) side **BASIC** 18×43 çm 18×43 cm

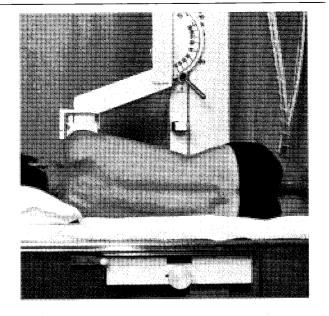


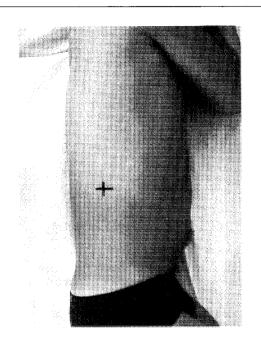
LUMBAR SPINE LATERAL		
cm	mA⋅s	kV ^a
24	100	90
25	125	90
26	160	90
27	200	90
28	50	120
29	63	120
30	80	120
31	100	120
32	125	120
33	160	120
34	200	120

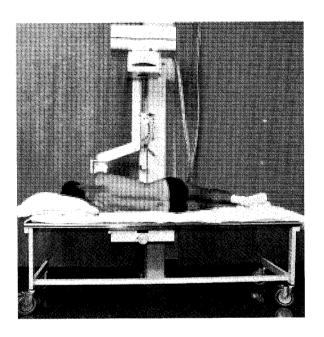
^a Use 70 kV for **children**.

LUMBAR SPINE LATERAL: no injury Lying on the left (or right) side

- 1. Tell the patient to hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.



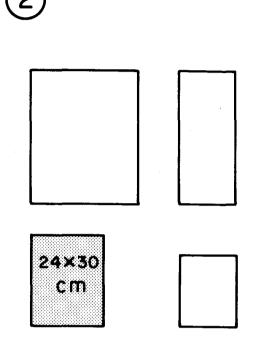


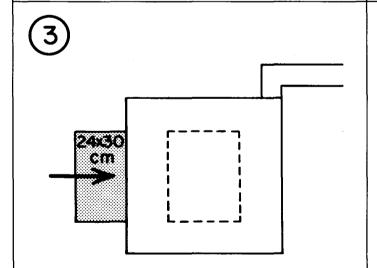


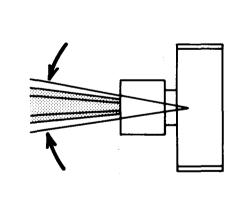


140 **SPINE 12** LUMBAR SPINE LATERAL: after injury Supine; horizontal beam **ADDITIONAL** cm

USE **ONLY** AFTER INJURY USE 70 kV FOR CHILDREN







(5)		
		1
	70 90	+
_		
	65 • () • 12	20 -
ŀ	(V	mA·s ‡

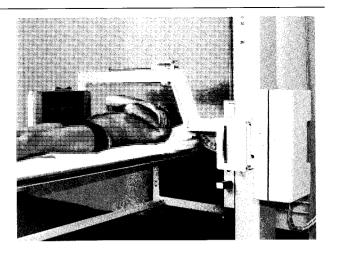
LUMBAR SPINE LATERAL (after injury)		
cm	mA⋅s	kV ^a
24	100	90
25	125	90
26	160	90
27	200	90
28	50	120
29	63	120
30	80	120
31	100	120
32	125	120
33	160	120
34	200	120
^a Use 70 kV for children .		

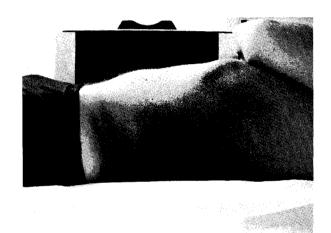
LUMBAR SPINE LATERAL: after injury

Supine; horizontal beam

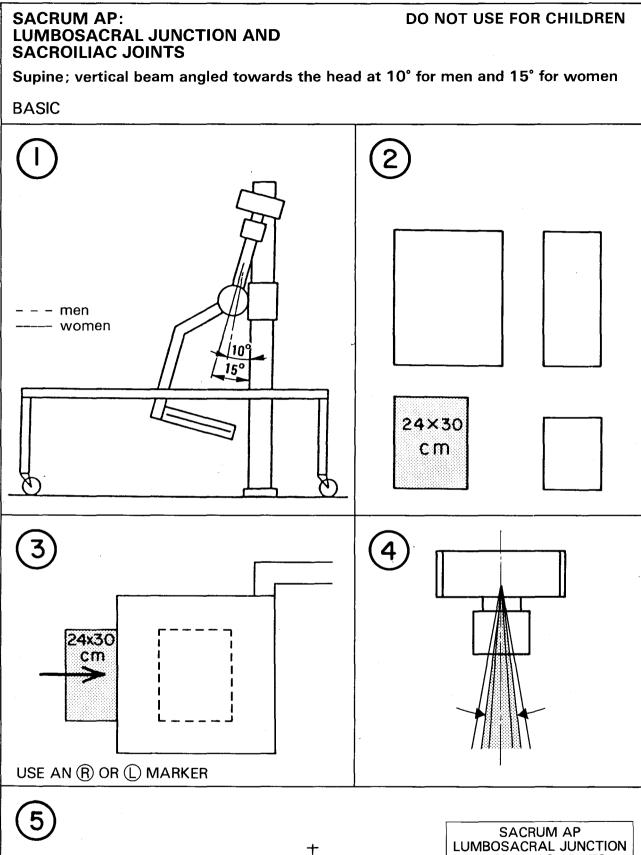
USE ONLY AFTER INJURY

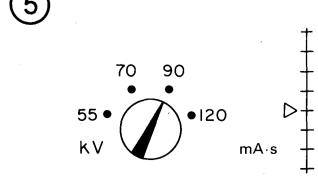
- 1. Tell the patient to hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.









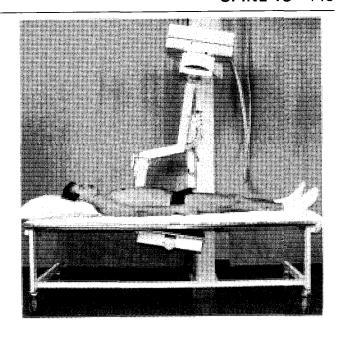


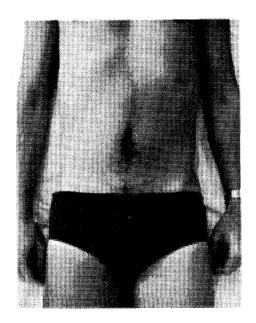
SACRUM AP LUMBOSACRAL JUNCTION SACROILIAC JOINTS			
cm mA⋅s kV			
22	63	90	
23	80	90	
24	100	90	
25	125	90	
26	160	90	
27	200	90	

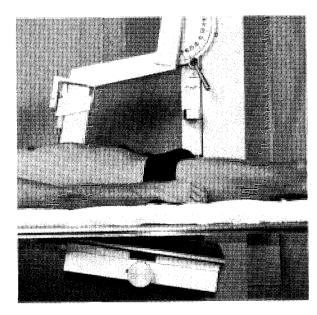
SACRUM AP: LUMBOSACRAL JUNCTION AND SACROILIAC JOINTS

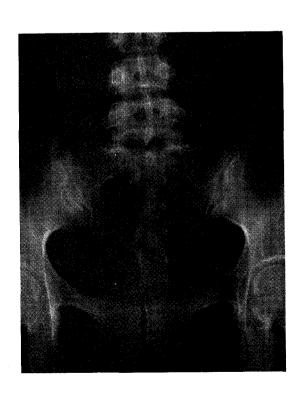
Supine; vertical beam angled towards the head 10° for men and 15° for women

- 1. Tell the patient to hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.









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LUMBOSACRAL JUNCTION LATERAL DO NOT USE FOR CHILDREN Lying on the left (or right) side **BASIC** 18×24 cm 18×24 c m LUMBOSACRAL JUNCTION LATERAL mA·s cm k۷ 24 100 90 70 90 25 125 90 26 160 90 90 120 120 120 27 28 29 30 200 50 63 120 55 ●

 $mA\!\cdot\! s$

80

120

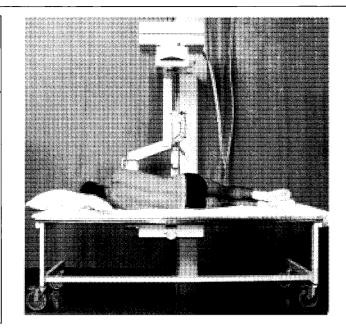
100

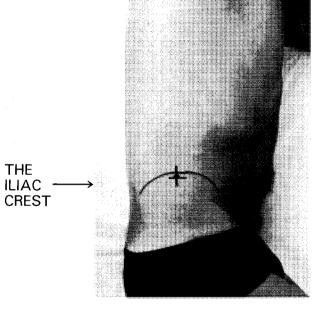
31

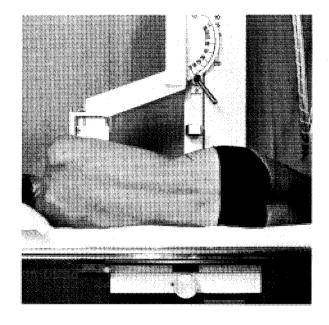
LUMBOSACRAL JUNCTION LATERAL

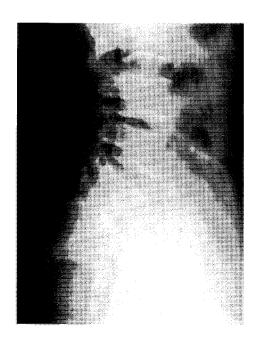
Lying on the left (or right) side

- 1. Tell the patient to hold the breath.
- 2. Expose.
- 3. Tell the patient to breathe normally.









ARM

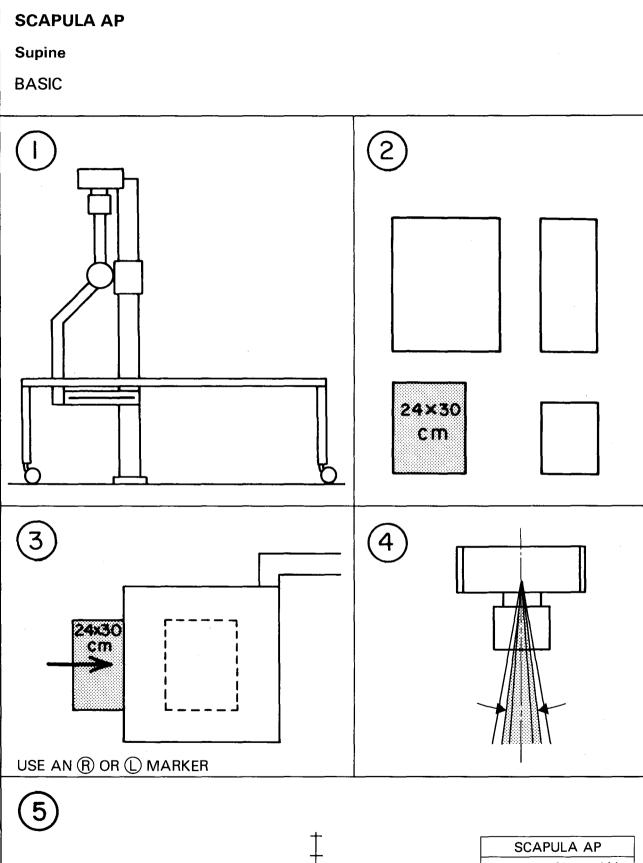
ARM

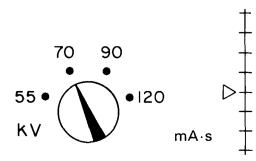
CLAVICLE	Pages
1. Clavicle AP	150-151
SCAPULA	
Scapula AP	
SHOULDER JOINT	
X-rays of the shoulder joint are taken with the patient lying down, unless there is pain.	
4. Shoulder AP	156-157
5. Shoulder AP abducted	158-159
Patient with the arm in pain (after injury)	100 101
6. Shoulder AP	160-161 162-163
HUMERUS	
X-rays of the humerus are taken with the patient lying down, unless there is pain.	
8. Humerus AP and lateral	164-165
Patient with the arm in pain (after injury)	
9. Humerus AP	166-167 168-169
	100-109
ELBOW	
11. Elbow AP	170-171
12. Elbow lateral	
Two views to be taken.	174-175
FOREARM	
14. Forearm AP	176-177
15. Forearm lateral	178-179 180-181
17. Forearm lateral: after injury	182-183
WRIST	
18. Wrist PA and ulnar deviation	184-185
19. Wrist lateral	186-187
20. Scaphoid: after injury	188-189

ARM (continued)

HAND	rayes
21. Hand PA and obliques	
22. Thumb AP1	. 192-193
23. Thumb lateral ¹	. 194-195
24. Single finger lateral	. 196-197

¹ One film divided in two may be used to take this view.



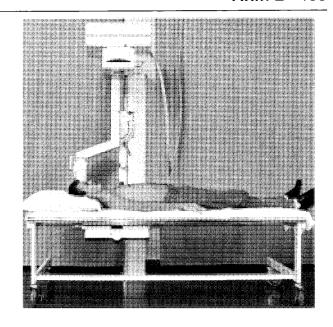


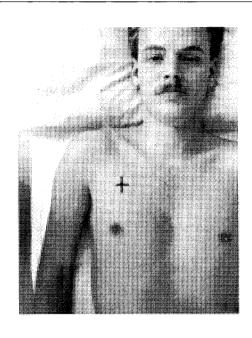
SCAPULA AP		
cm	mA⋅s	kV
11 12 13 14 15	20 25 32 40 50	70 70 70 70 70

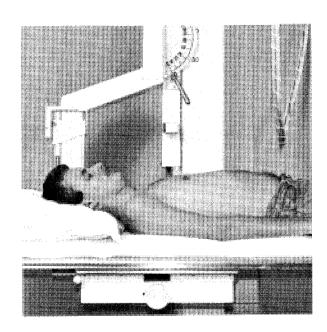
SCAPULA AP

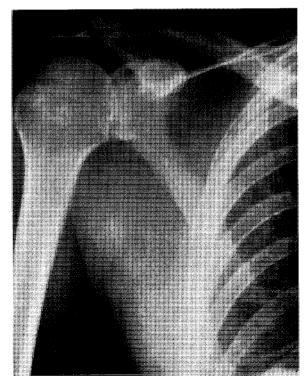
Supine

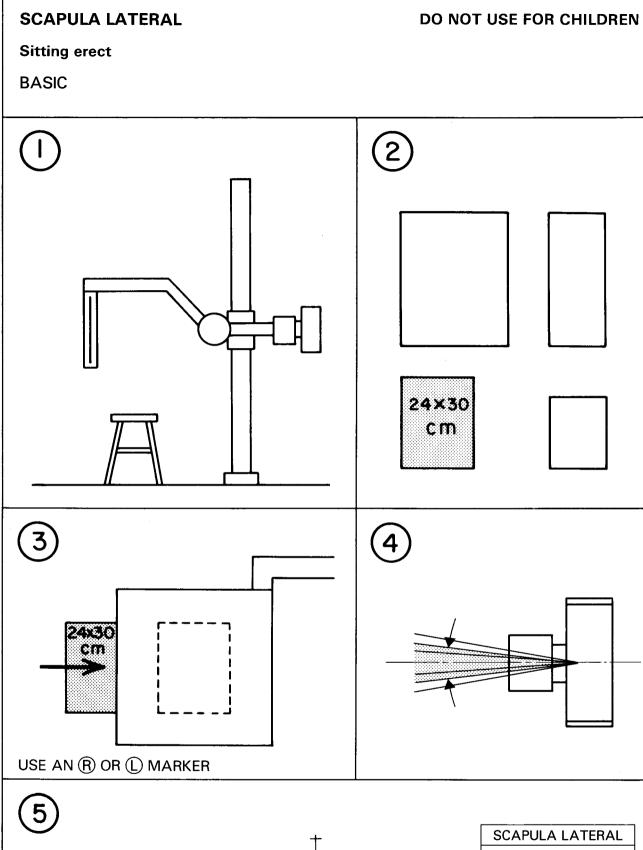
IF THE PATIENT IS IN PAIN USE THE POSITION SHOWN IN **ARM 6**.

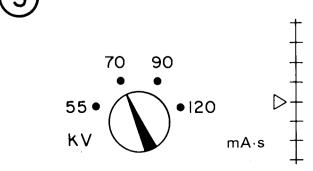












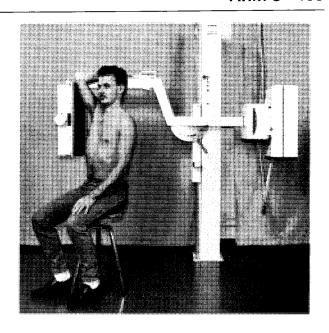
SCAPULA LATERAL		
cm	mA⋅s	kV
15	50	70
16	63	70
17	80	70
18	100	70
19	125	70
20	160	70

SCAPULA LATERAL

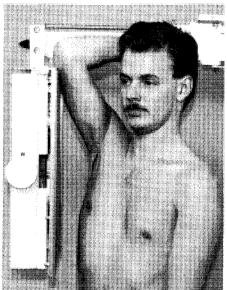
Sitting erect

UNLESS THE PATIENT IS IN PAIN RAISE THE ARM WITH THE HAND BEHIND THE HEAD.

SEE LAST 2 PHOTOGRAPHS FOR AN ALTERNATIVE POSITION WHEN THE ARM IS PAINFUL.

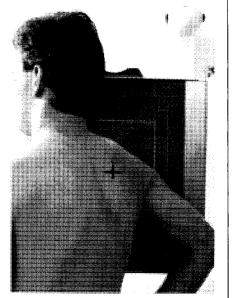








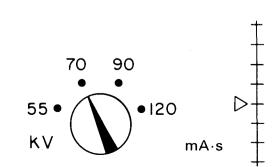








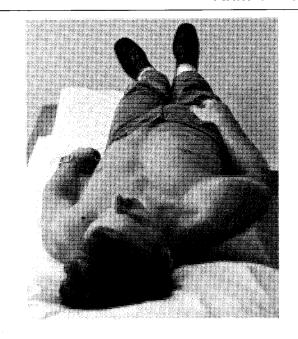
SHOULDER AP Supine; vertical beam angled 10° towards the feet (2 views to be taken) **BASIC** 100 18×24 cm INFANTS AND SMALL CHILDREN: lie in the supine position directly on the cassette on top of the cassette holder. 18×24 c m USE AN (R) OR (L) MARKER



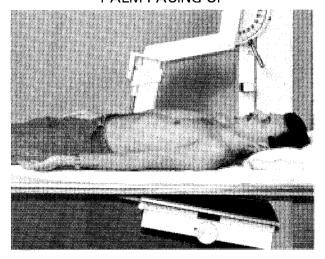
SHOULDER AP					
Adults			Infants and small children		
cm	mA⋅s	kV_	cm	mA⋅s	kV
7	8	70	4	2.5	55
8	10	70	5	3.2	55
9	12.5	70	6	4	55
10	16	70	7	5	55
11	20	70_	8	6.3	55

Supine; vertical beam angled 10° towards the feet (2 views to be taken)

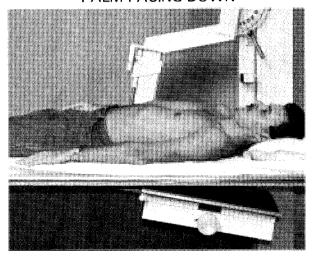
- 1. Place a pillow under the NORMAL shoulder.
- 2. Turn the patient so that the shoulder to be X-rayed lies flat on the table.
- 3. Rotate the arm outwards palm of the hand facing up.
- 4. Expose.
- 5. Rotate the arm inwards palm of the hand facing down.
- 6. Expose.



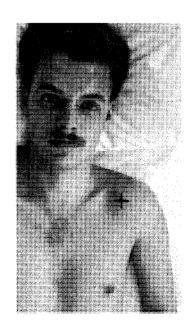
PALM FACING UP

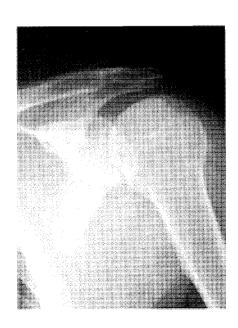


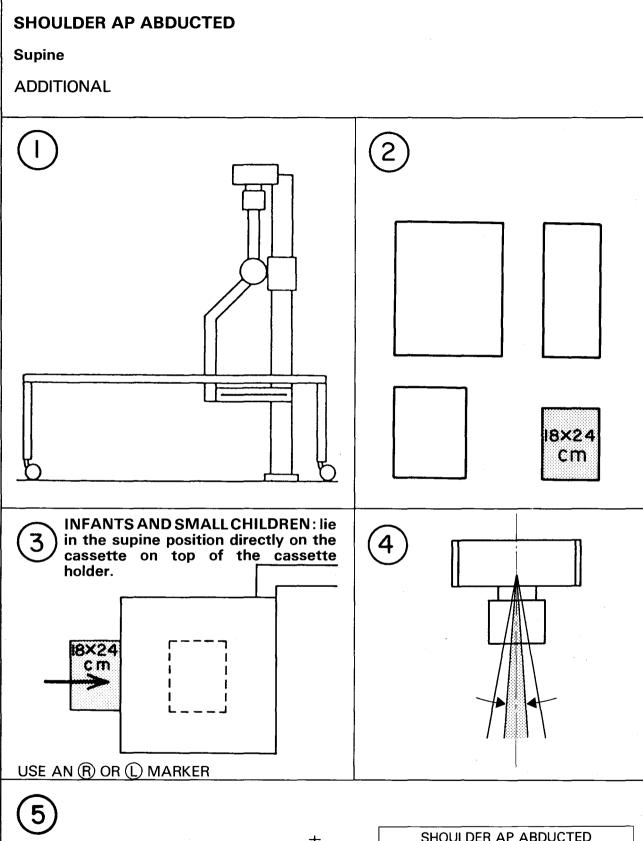
PALM FACING DOWN

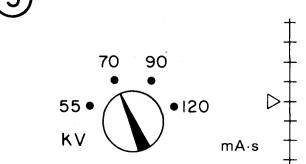






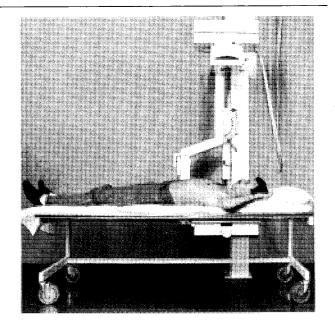


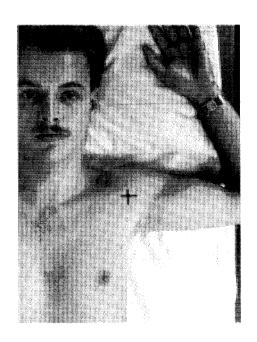


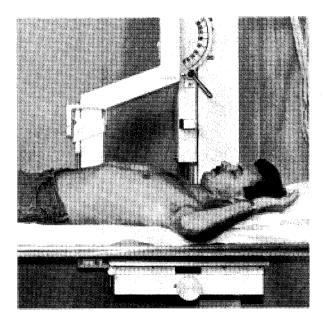


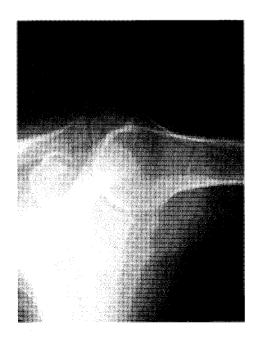
SHOULDER AP ABDUCTED						
Adults			Infants and small children			
cm	mA⋅s	kV	cm	mA⋅s	kV	
7	8	70	4	2.5	55	
8	10	70	5	3.2	55	
9	12.5	70	6	4 5	55	
10	16	70	7	5	55	
11_	20	70	8	6.3	55	

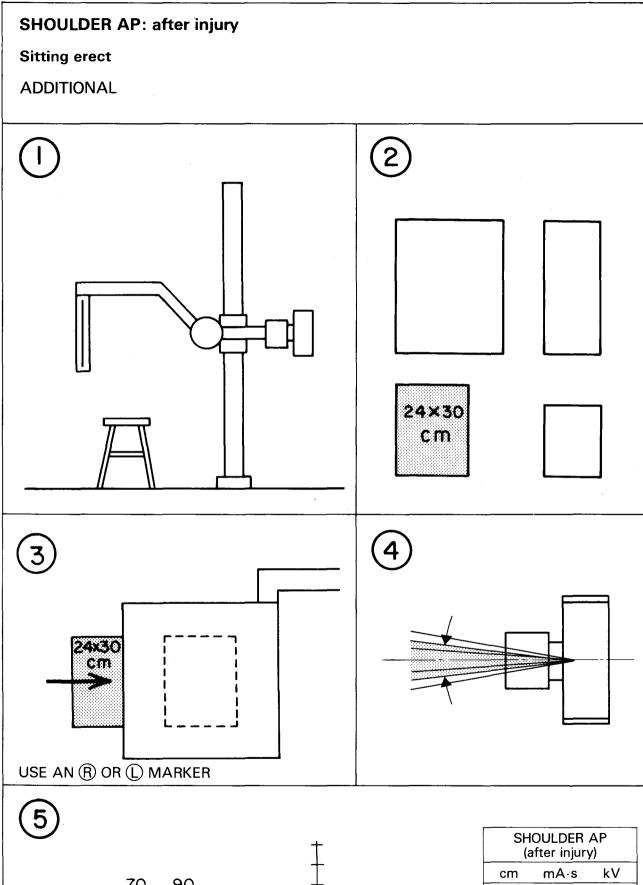
SHOULDER AP ABDUCTED Supine

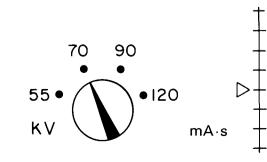








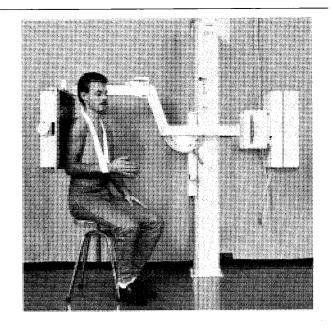


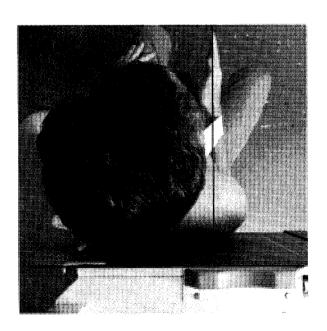


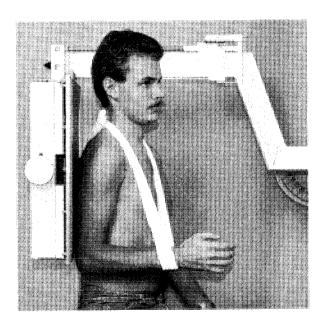
SHOULDER AP (after injury)				
cm mA⋅s kV				
8	10	70		
9	12.5	70		
10	16	70		
11	20	70		
12	25	70		
13	32	70		

SHOULDER AP: after injury Sitting erect

THE PATIENT'S FOREARM SHOULD BE AT RIGHT ANGLES TO THE CASSETTE HOLDER.

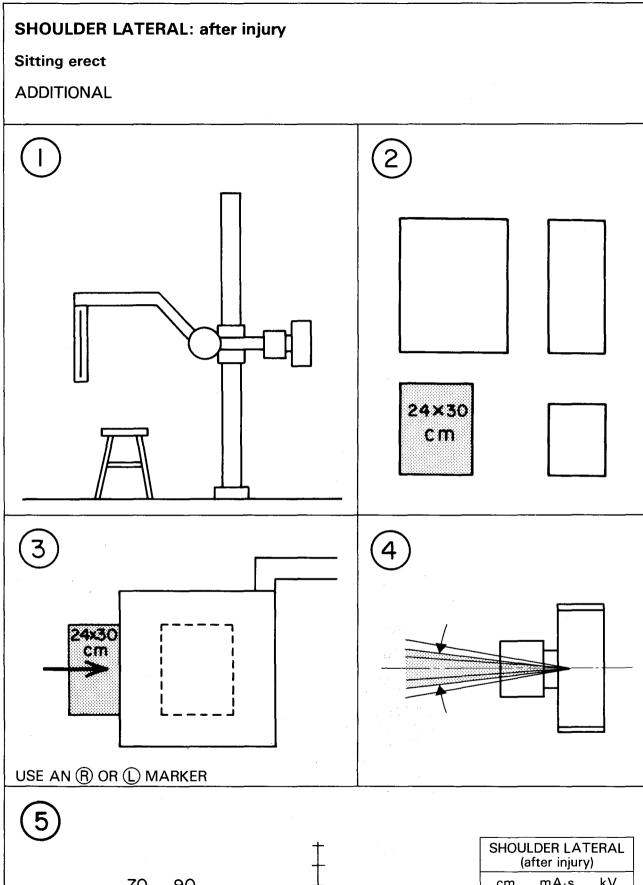


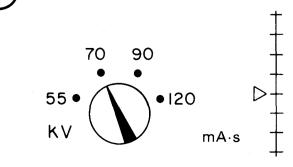








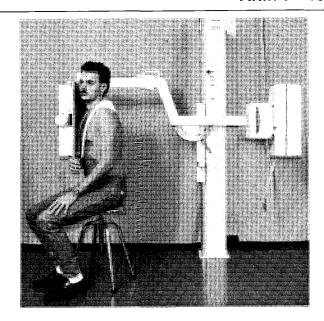




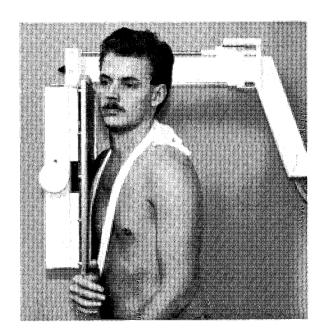
SHOULDER LATERAL (after injury)				
cm	cm mA⋅s			
11	20	70		
12	25	70		
13	32	70		
14	40	70		
15	50	70		

SHOULDER LATERAL: after injury Sitting erect

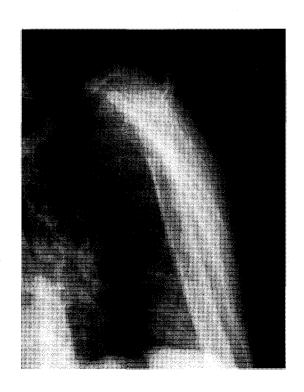
THE PATIENT'S FOREARM SHOULD BE PARALLEL TO THE CASSETTE HOLDER.

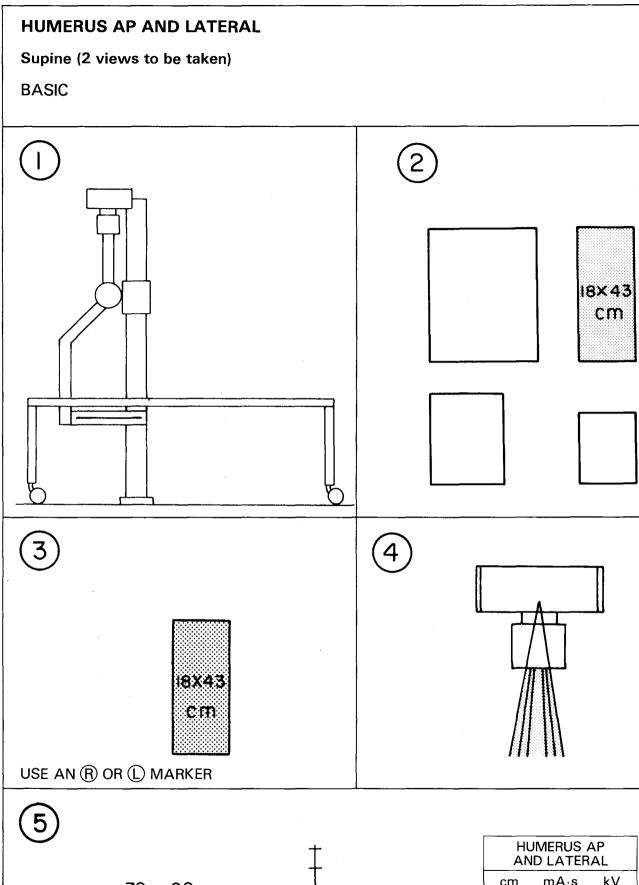


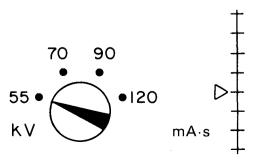








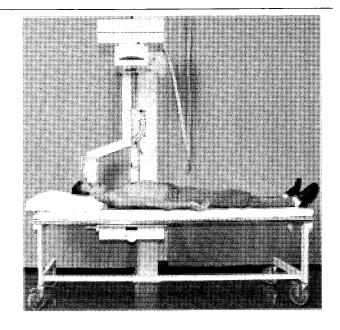


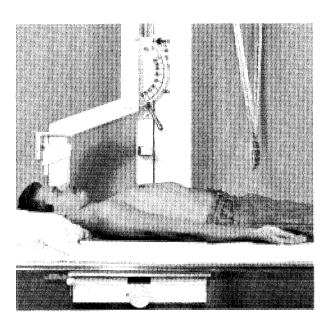


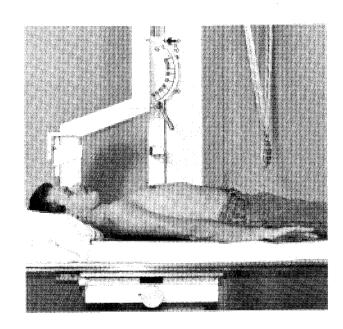
HUMERUS AP AND LATERAL			
cm mA⋅s kV			
6	4	55	
7	5	55	
8	6.3	55	
9	6.3	55	
10	8	55_	

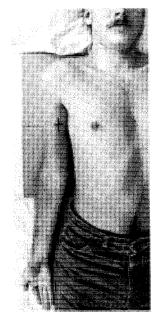
HUMERUS AP AND LATERAL Supine (2 views to be taken)

- Rotate the arm outwards, palm of the hand facing up.
- 2. Expose.
- 3. Rotate the arm inwards, palm of the hand angled downwards (see photograph).
- 4. Expose.









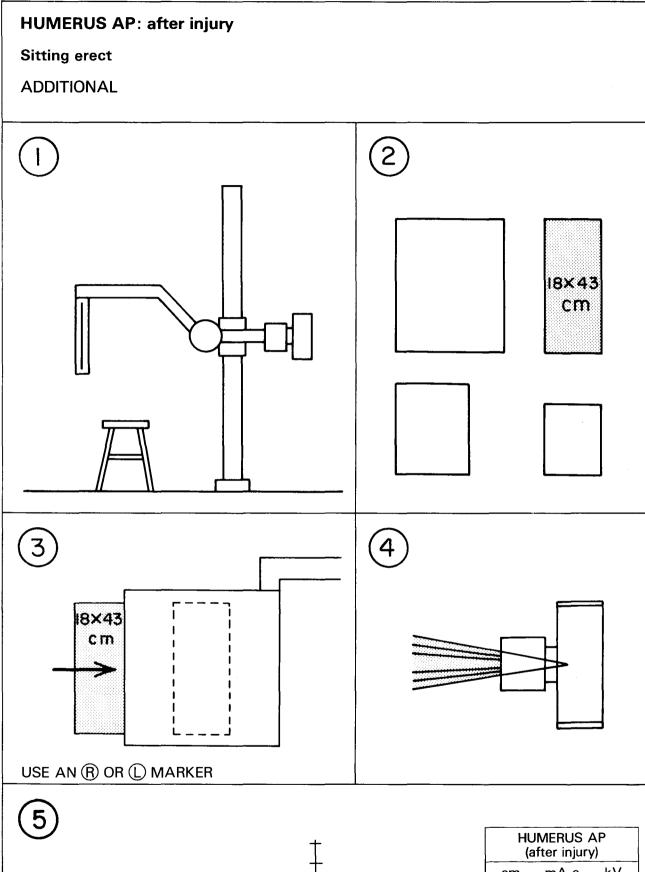


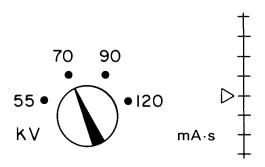






LATERAL: PALM OF THE HAND ANGLED DOWNWARDS.

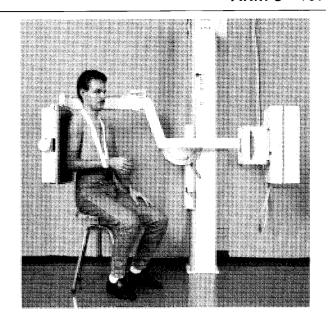




HUMERUS AP (after injury)			
cm mA⋅s kV			
7	8	70	
8	10	70	
9	12.5	70	
10 16 70			
11	20	70	
12 25 70			

HUMERUS AP: after injury Sitting erect

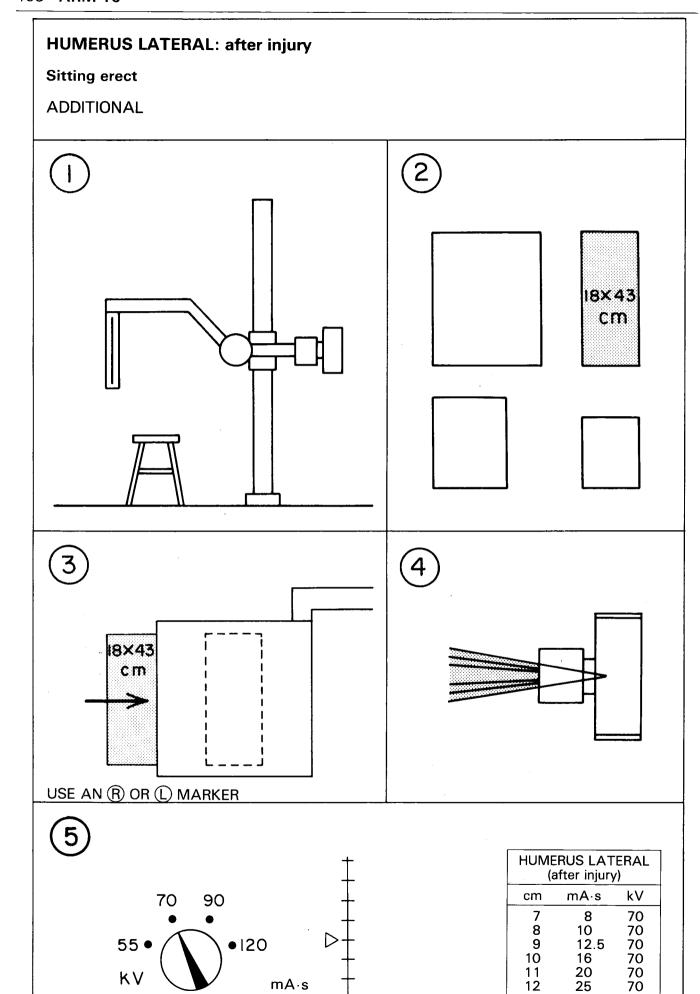
THE PATIENT'S FOREARM SHOULD BE AT RIGHT ANGLES TO THE CASSETTE HOLDER.





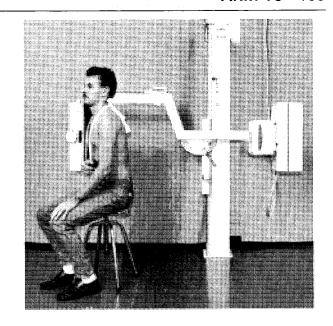


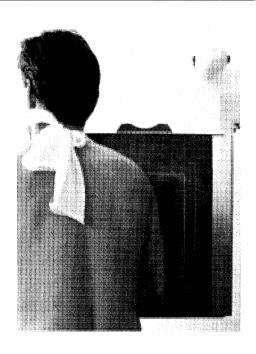


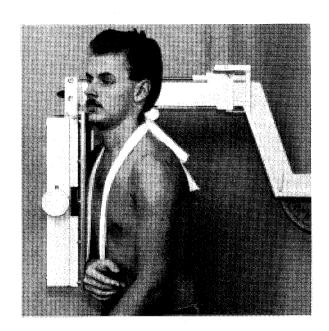


HUMERUS LATERAL: after injury Sitting erect

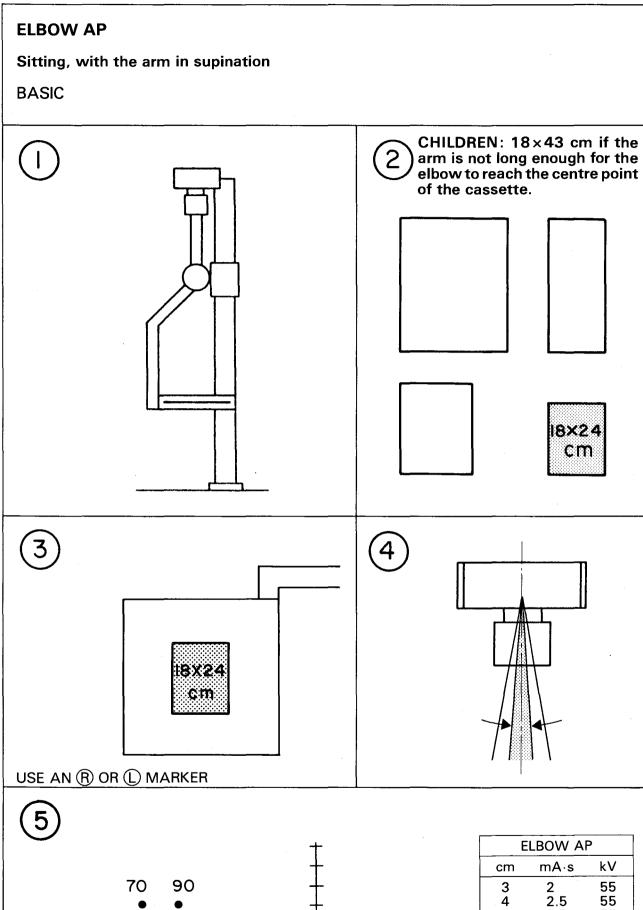
THE PATIENT'S FOREARM SHOULD BE AGAINST THE CASSETTE HOLDER.











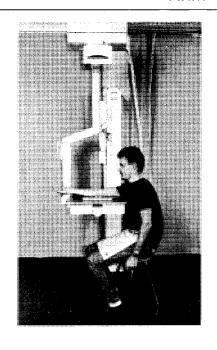
+	
70 90 +	
• • •	
55 • • 120 D	
kV mA·s	

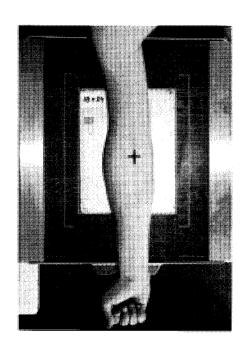
ELBOW AP			
cm mA⋅s kV			
3	2	55	
4 5	2.5	55	
	3.2	55	
6	4	55	
7	5	55	
8	6.3	55	

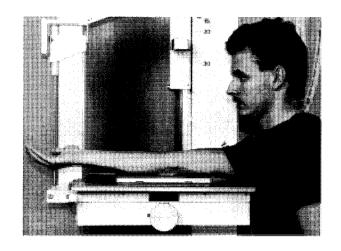
ELBOW APSitting, with the arm in supination

THE PALM OF THE PATIENT'S HAND SHOULD BE FACING UP.

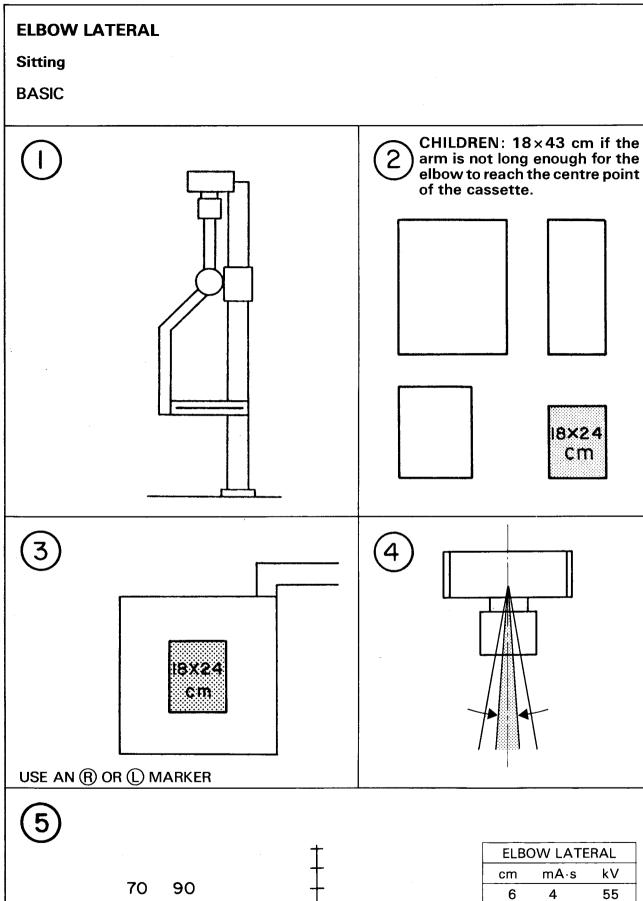
IN THE CASE OF A **CHILD**, IF THE ARM IS NOT LONG ENOUGH FOR THE ELBOW TO REACH THE CENTRE POINT OF THE CASSETTE, USE SIZE **18** × **43** cm.

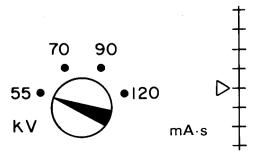












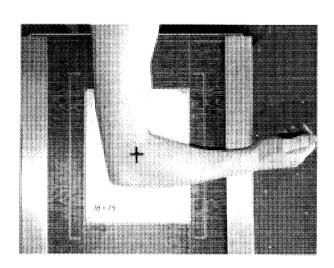
ELBOW LATERAL		
mA⋅s	kV	
4	55	
5	55	
6.3	55	
6.3	55	
8	55	
	mA·s 4 5 6.3 6.3	

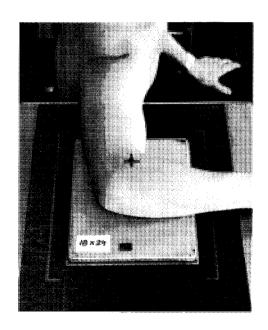
ELBOW LATERAL

Sitting

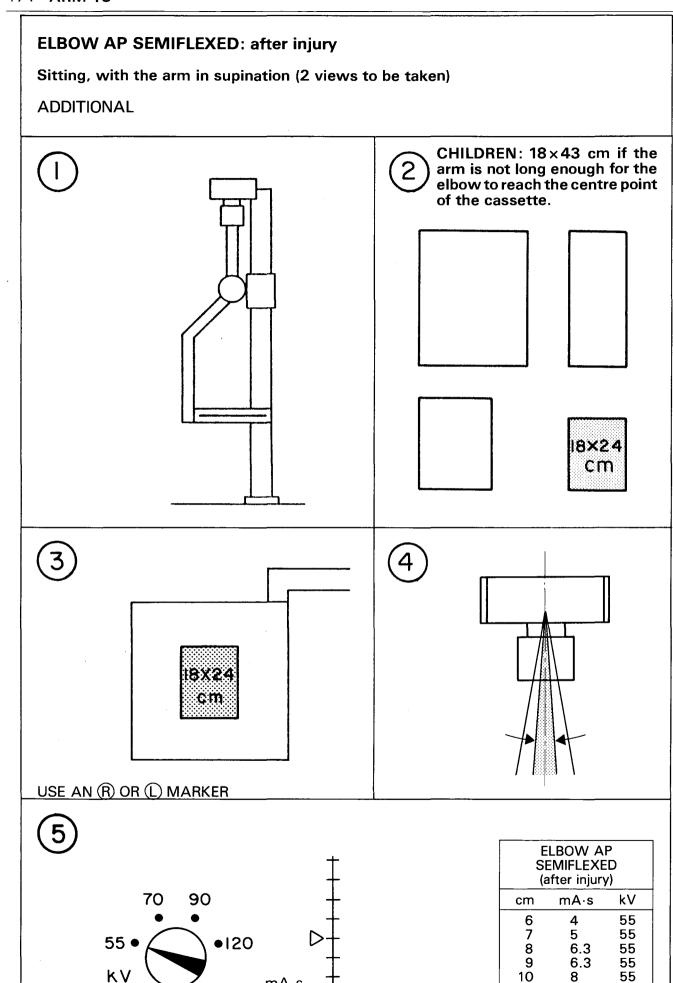
IN THE CASE OF A **CHILD**, IF THE ARM IS NOT LONG ENOUGH FOR THE ELBOW TO REACH THE CENTRE POINT OF THE CASSETTE, USE SIZE **18** × **43** cm.











mA·s

11

10

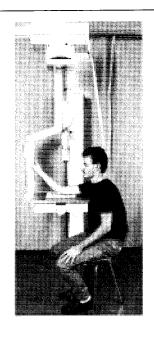
55

ELBOW AP SEMIFLEXED: after injury

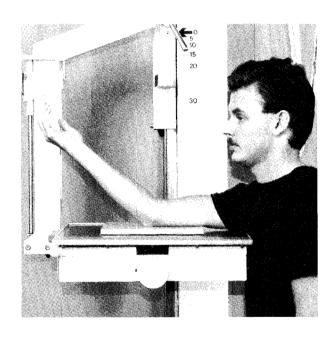
Sitting, with the arm in supination (2 views to be taken)

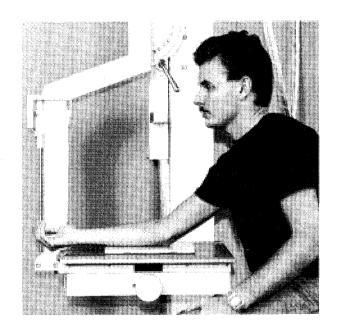
ALWAYS TAKE 2 VIEWS, WITH THE ARM IN THE POSITIONS SHOWN IN THE PHOTO-GRAPHS.

IN THE CASE OF A **CHILD**, IF THE ARM IS NOT LONG ENOUGH FOR THE ELBOW TO REACH THE CENTRE POINT OF THE CASSETTE, USE SIZE **18** × **43** cm.



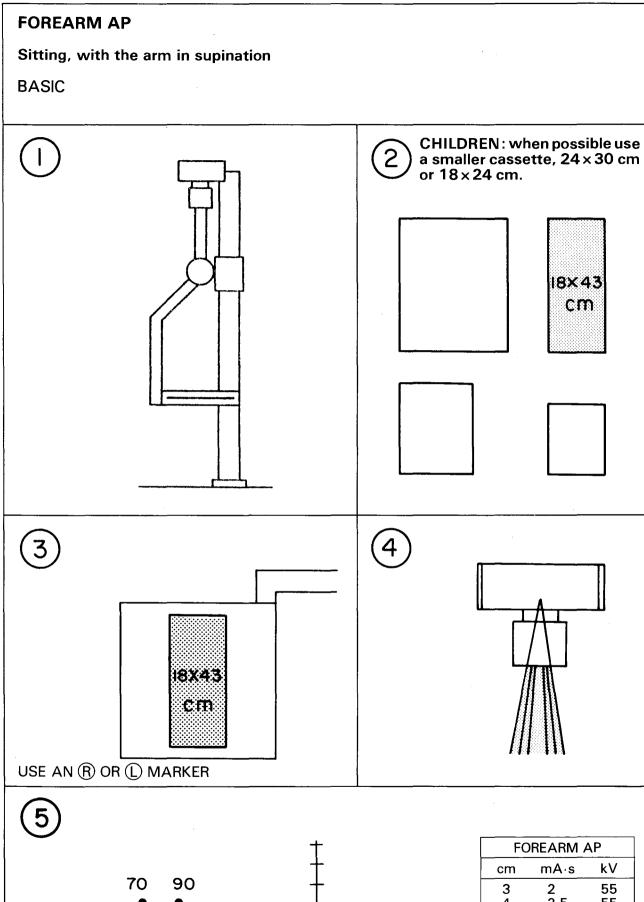












				-
			+	-
70	90		4	_
•	•		4	_
55 •	•120		D-1	-
			4	_
kv 📞	7	mA⋅s	4	_
_			4	_
			7	_

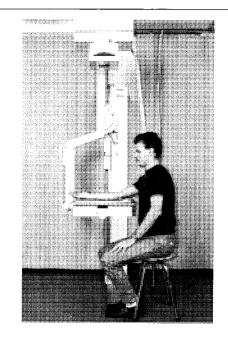
FOREARM AP		
cm	mA⋅s	kV
3	2	55
4 5	2.5	55
5	3.2	55
6	4	55
7	5	55

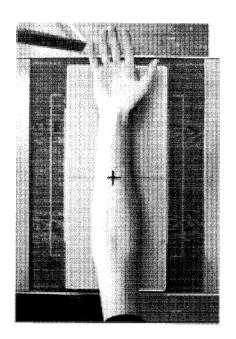
FOREARM AP

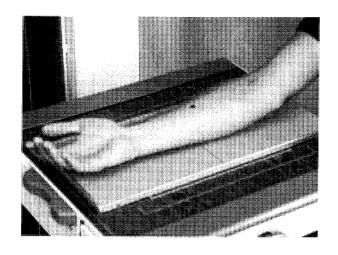
Sitting, with the arm in supination

THE PALM OF THE HAND SHOULD BE FACING UP.

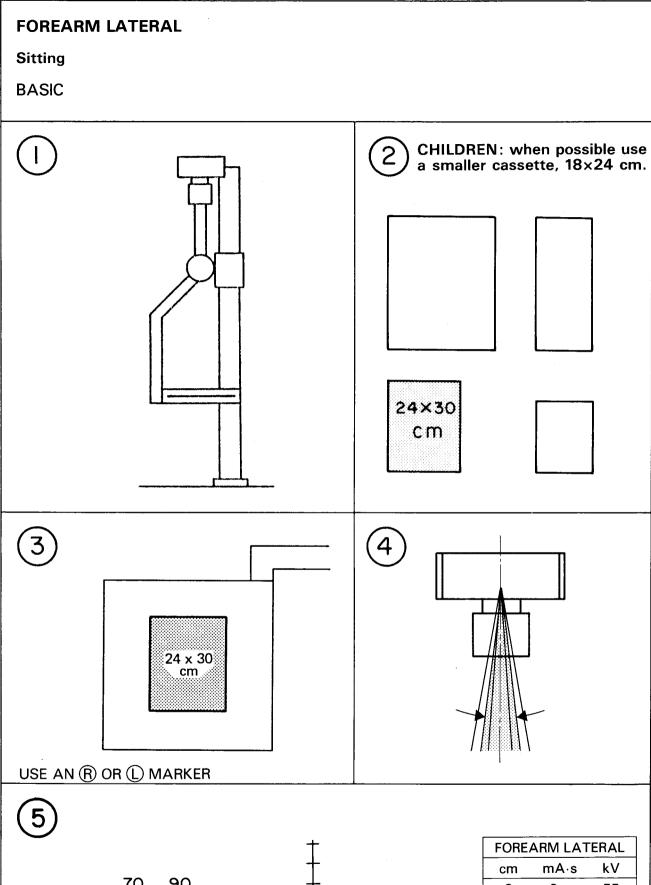
IF THE ARM IS INJURED USE THE POSITION SHOWN IN **ARM 16**.











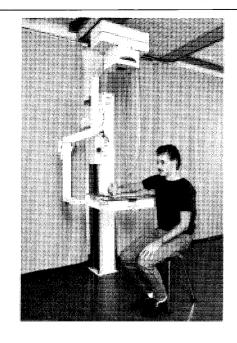
FOREARM LATERAL		
cm	mA⋅s	kV
3	2	55
4	2.5	55
5	3.2	55
6	4 5	55
7		55
8	6.3	55

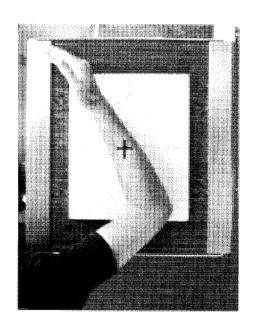
FOREARM LATERAL

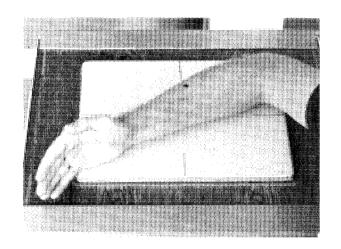
Sitting

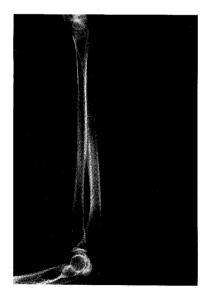
THE THUMB SHOULD BE UPPERMOST, AS SHOWN.

IF THE ARM IS INJURED USE THE POSITION SHOWN IN **ARM 17**.

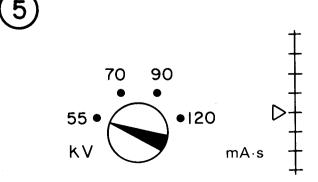








FOREARM PA: after injury Sitting, with the arm in pronation and the elbow flexed **ADDITIONAL** CHILDREN: when possible use a smaller cassette, 18×24 cm. 24×30 ¢m If the arm is in plaster; cassette in the cassette holder. 24 x 30 cm USE AN (R) OR (L) MARKER



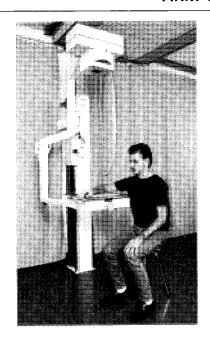
FOREARM PA (after injury)				
cm mA⋅s kVª				
3	2	55		
4	2.5	55		
5	3.2	55		
6 4 55				
7	5	55		
8	6.3	55		
9	· ·			

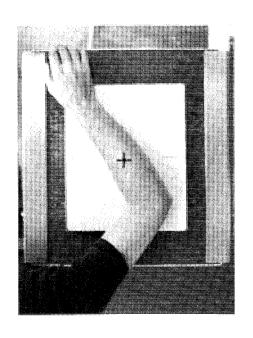
^aUse 70 kV if the arm is in plaster.

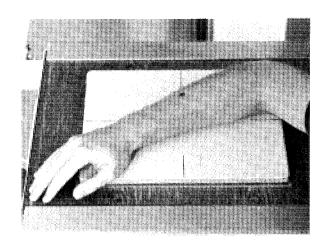
FOREARM PA: after injury Sitting, with the arm in pronation and the elbow flexed

THE PALM OF THE HAND SHOULD BE FACING DOWN.

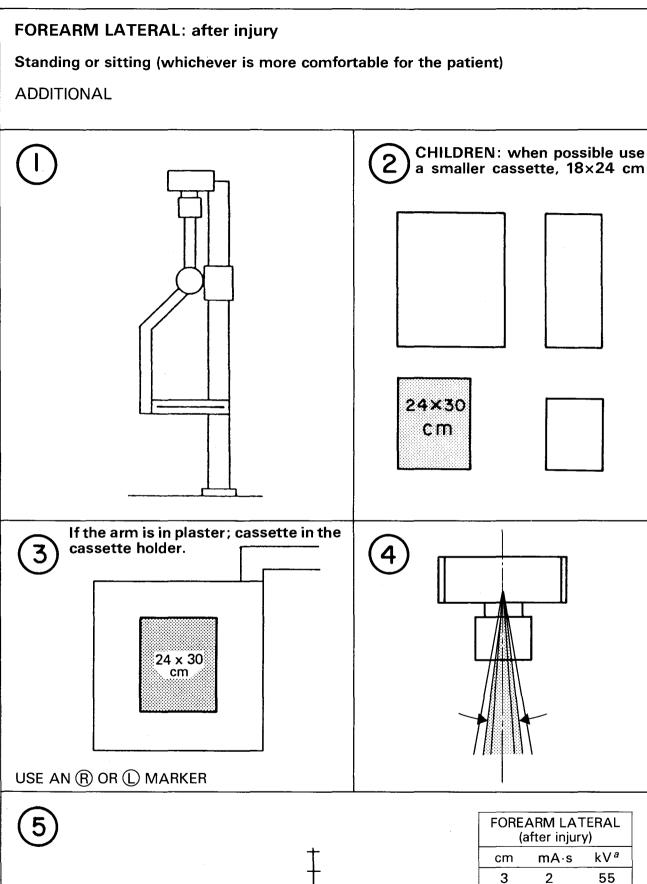
IF THE ARM IS IN PLASTER PUT THE CASSETTE IN THE CASSETTE HOLDER AND USE 70 kV.

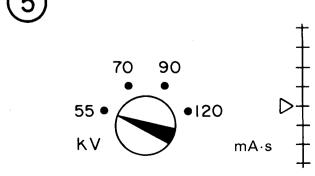












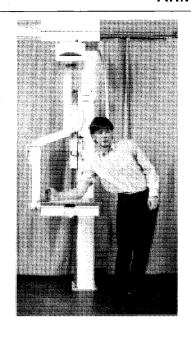
FOREARM LATERAL (after injury)			
cm mA⋅s kVª			
3	2	55	
4	2.5	55	
5	3.2	55	
6	4	55	
7	5	55	
8	6.3	55	
9	6.3	55	

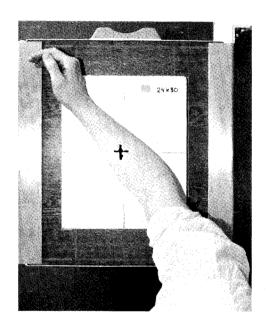
^aUse 70 kV if the arm is in plaster.

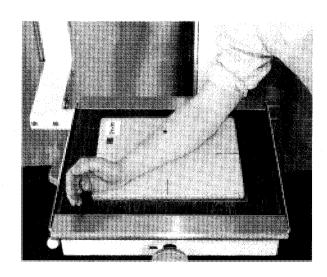
FOREARM LATERAL: after injury Standing or sitting (whichever is more comfortable for the patient)

THE THUMB SHOULD BE UPPERMOST.

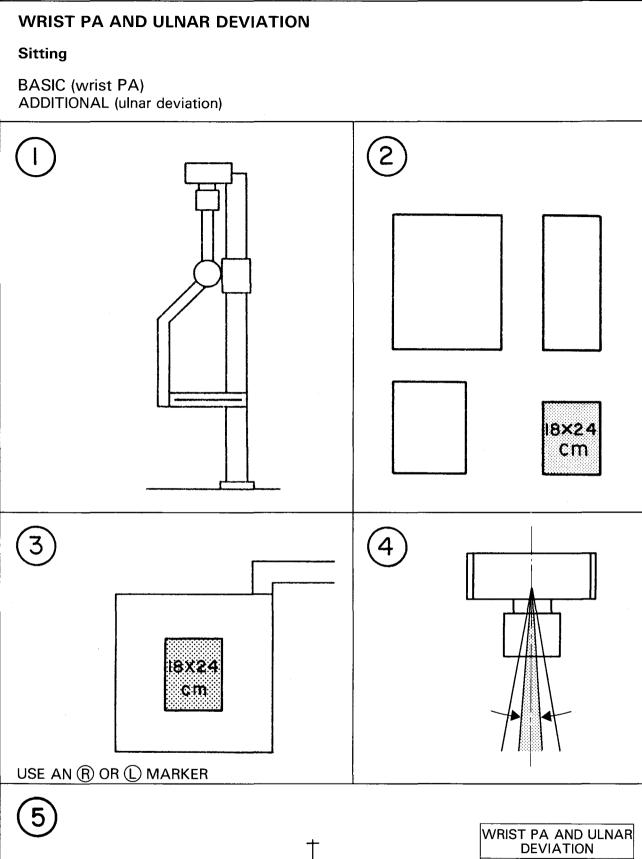
IF THE ARM IS IN PLASTER PUT THE CASSETTE IN THE CASSETTE HOLDER AND USE 70 kV.

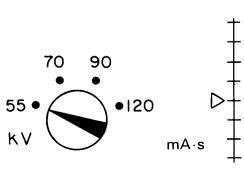












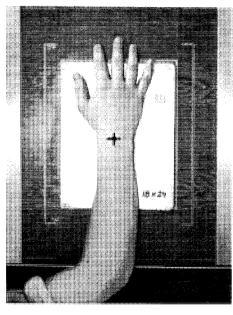
WRIST PA AND ULNAR DEVIATION			
cm mA⋅s kV			
1	1.6	55	
2	2	55	
3	2	55	
4	2.5	55	
5	3.2	55	
6	4	55	
7	5	55	

WRIST PA AND ULNAR DEVIATION Sitting 2 SEPARATE VIEWS

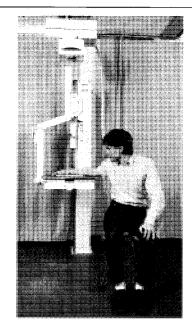
WRIST PA: HAND SHOULD BE STRAIGHT WITH THE PALM FACING DOWN.

ULNAR DEVIATION: TAKE ONLY WHEN REQUESTED BY THE DOCTOR; HAND SHOULD BE TURNED OUTWARDS WITH THE PALM FACING DOWN.

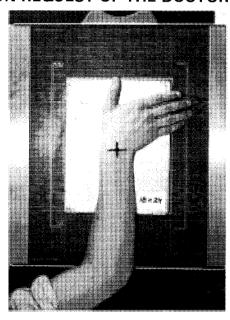
WRIST PA BASIC



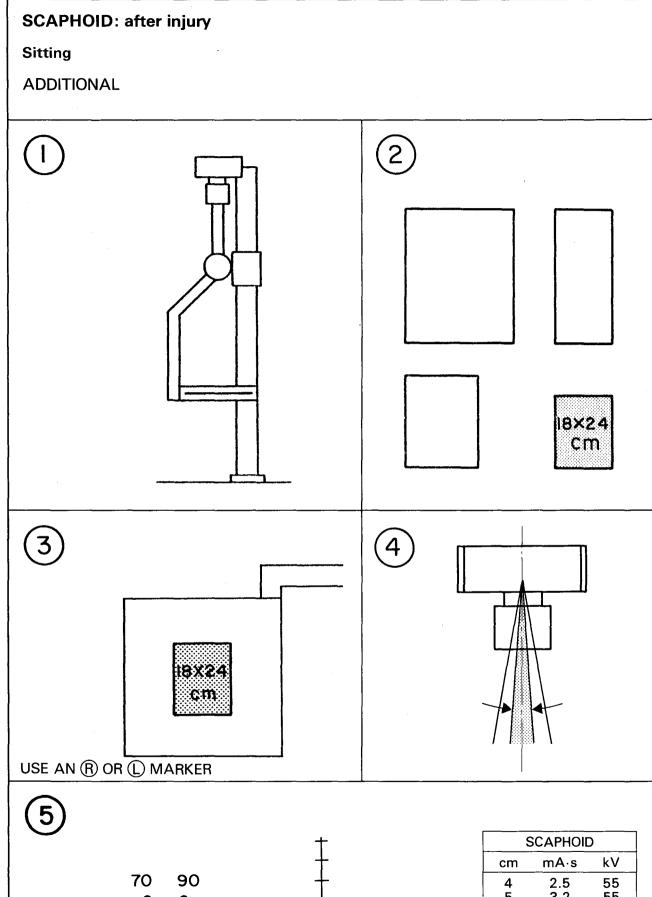




ULNAR DEVIATION
ADDITIONAL
ON REQUEST OF THE DOCTOR

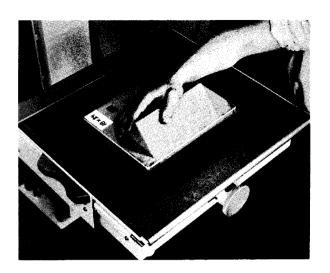


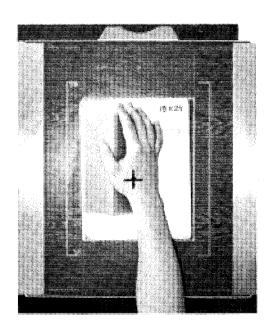


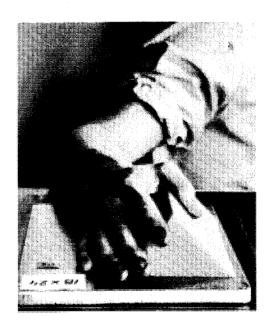


70 90 • •	<u> </u>
55 • • 120 KV	O D+

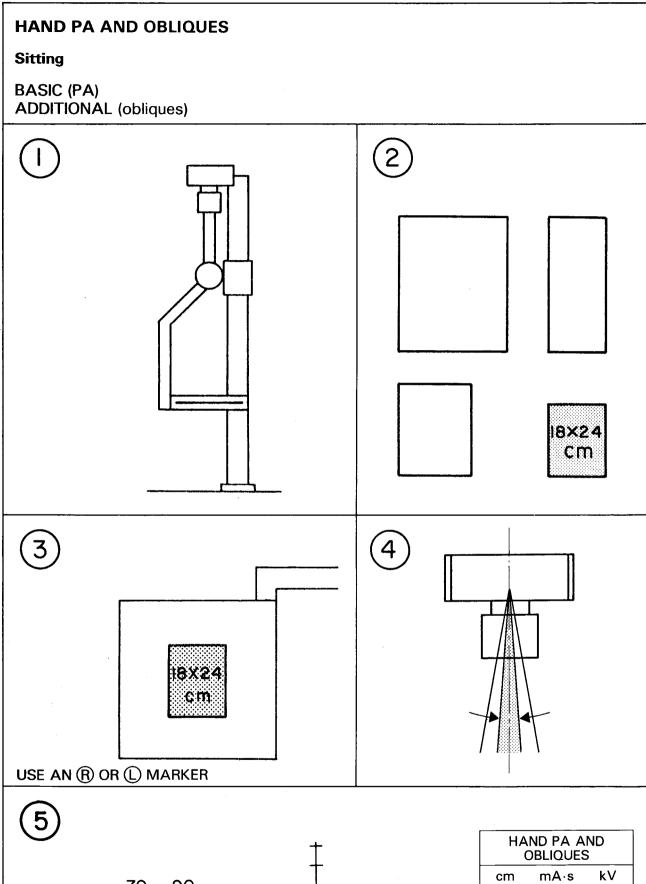
SCAPHOID		
cm	mA⋅s	kV
4	2.5	55
4 5	3.2	55
6	4	55
7	5	55
8	6.3	55
9	6.3	55

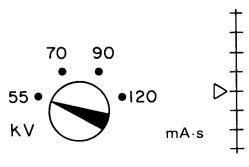












HAND PA AND OBLIQUES		
cm	mA⋅s	kV
1	1.6	55
2 3	2	55
3	2	55
4	2.5	55
5	3.2	55
6	4	55

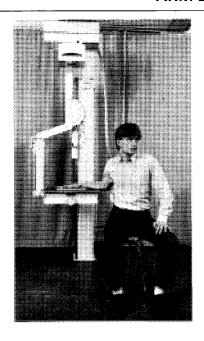
HAND PA AND OBLIQUES

Sitting

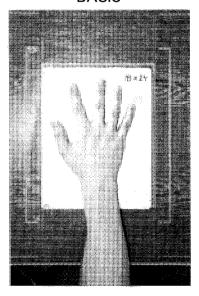
3 SEPARATE VIEWS

THE PA VIEW IS THE BASIC VIEW. TAKE AN OBLIQUE VIEW ONLY WHEN REQUESTED BY THE DOCTOR.

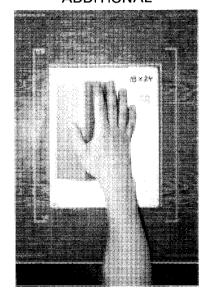
IF A SINGLE FINGER LATERAL VIEW IS TAKEN (ARM 24), A HAND PA VIEW SHOULD ALSO BE TAKEN; AND OBLIQUES IF REQUESTED BY THE DOCTOR.



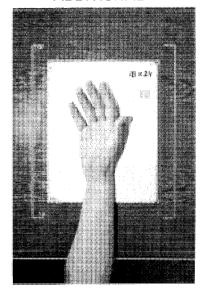
PA BASIC



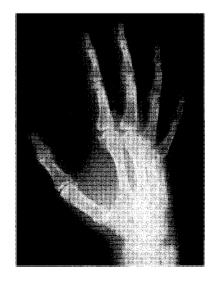
PA OBLIQUE ADDITIONAL



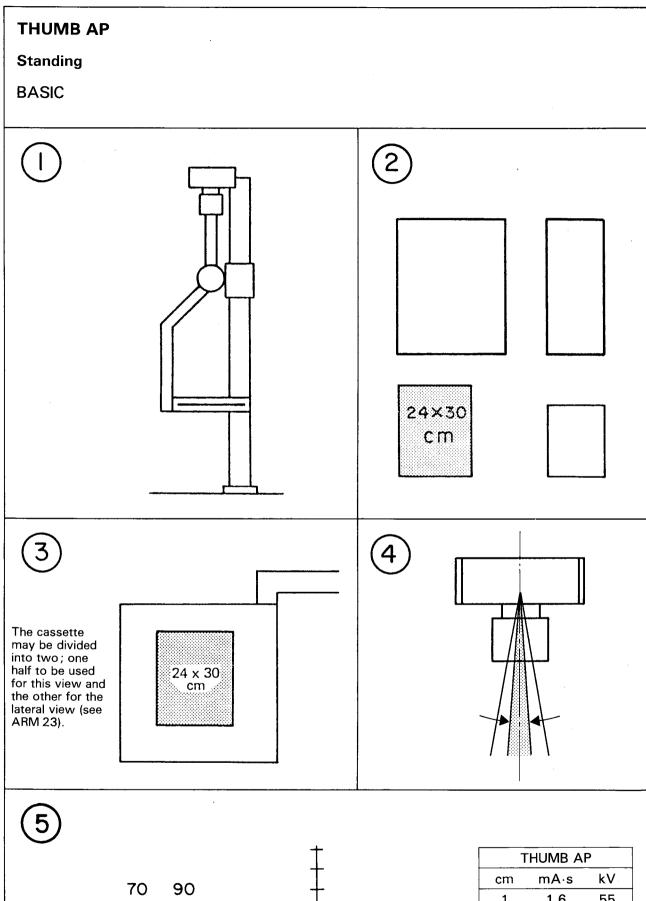
AP OBLIQUE ADDITIONAL

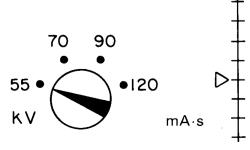












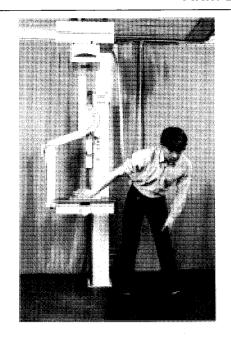
THUMB AP		
mA⋅s	kV	
1.6	55	
2	55	
2	55	
2.5	55	
3.2	55	
	mA·s 1.6 2 2 2.5	

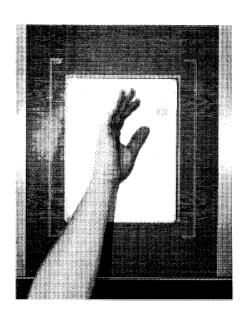
THUMB AP

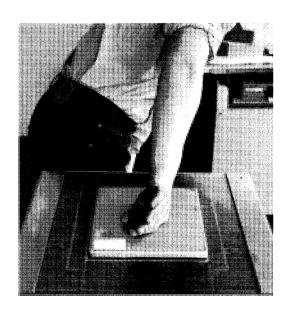
Standing

HALF THE CASSETTE MAY BE USED FOR THE THUMB AP; THE OTHER HALF FOR THE THUMB LATERAL (SEE **ARM 23**).

SAVE FILM BY DOING THIS WHENEVER POSSIBLE.









THUMB LATERAL Sitting BASIC 24×30 c m The cassette may be divided into two; one half to be used for this view and the other for the AP view (see ARM 22). This diagram shows how it can be divided, using the lead strip provided. USE AN (R) OR (L) MARKER

70 90 55 • • • • • • • • • • • • • • • • • •	
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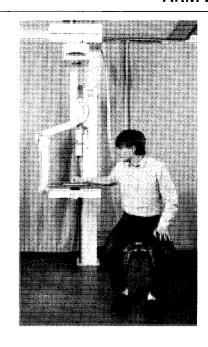
THUMB LATERAL		
cm	mA⋅s	kV
1	1.6	55
2 3	2	55
3	2	55
4 5	2.5	55
5	3.2	55
6	4	55

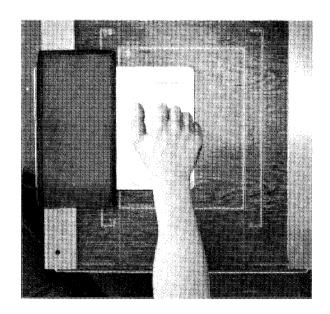
THUMB LATERAL

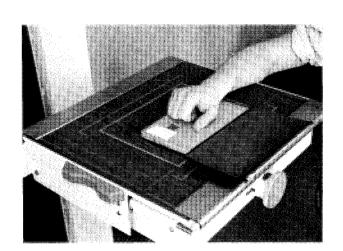
Sitting

HALF THE CASSETTE MAY BE USED FOR THE THUMB LATERAL AND THE OTHER HALF FOR THE THUMB AP (SEE ARM 22).

SAVE FILM BY DOING THIS WHENEVER POSSIBLE.





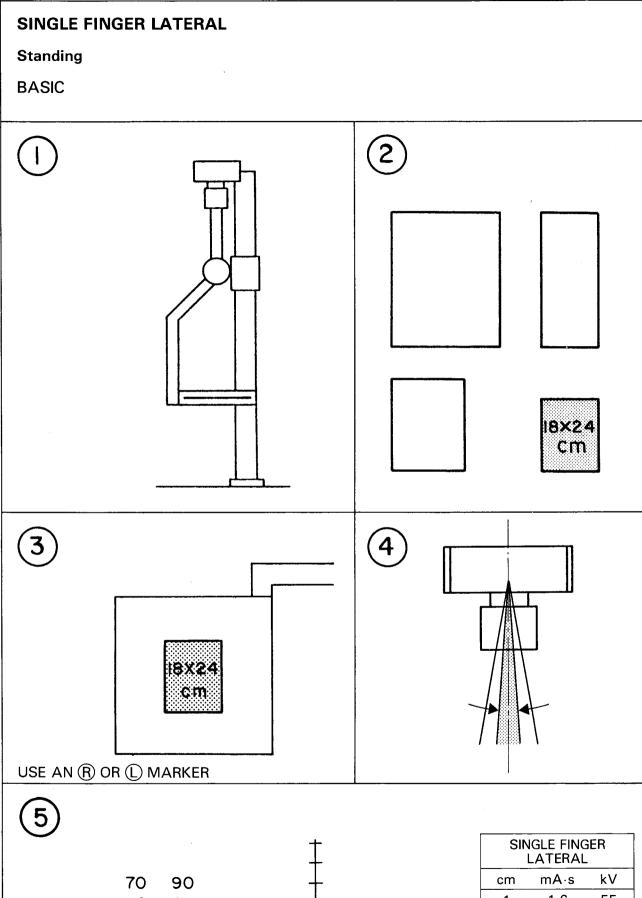


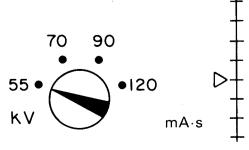






THUMB AP (ARM 22)





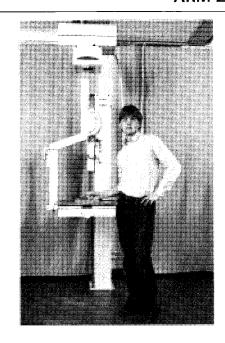
SINGLE FINGER LATERAL		
mA⋅s	kV	
1.6	55	
2	55	
	55	
2.5	55	
3.2	55	
	MA·s 1.6 2 2 2.5	

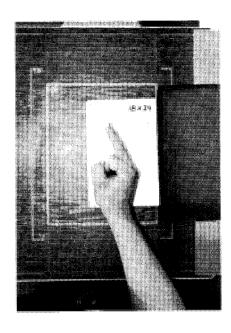
SINGLE FINGER LATERAL Standing

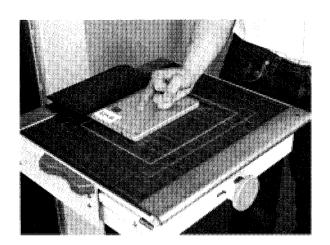
EXTEND THE FINGER TO BE X-RAYED HORIZONTALLY.

WHEN THIS VIEW IS TAKEN A HAND PA VIEW (ARM 21) SHOULD ALSO BE TAKEN; AND OBLIQUES (ARM 21) IF REQUESTED BY THE DOCTOR.

THE RADIOGRAPHS BELOW SHOW SEPARATE VIEWS OF THE 2nd AND 4th FINGERS.











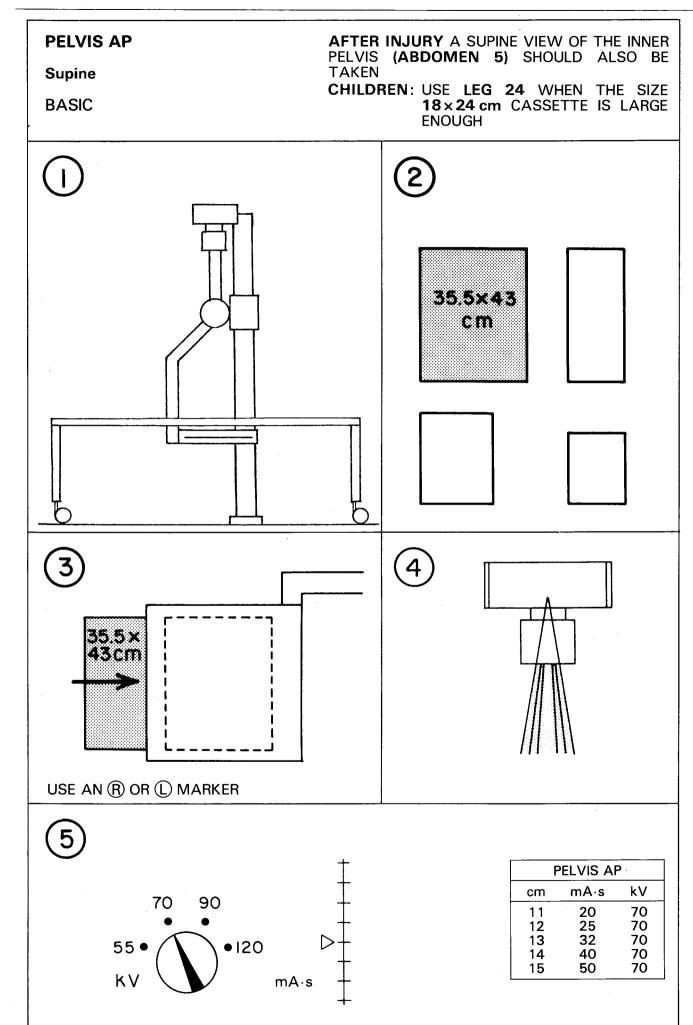


4th FINGER

LEG

LEG

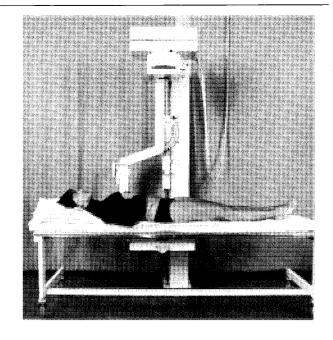
Pages With some exceptions X-rays of the leg are taken with the patient lying supine. **PELVIS AND HIP JOINTS FEMUR** 5. Femur AP **KNEE LOWER LEG FOOT** INFANTS AND SMALL CHILDREN

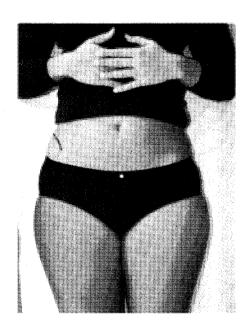


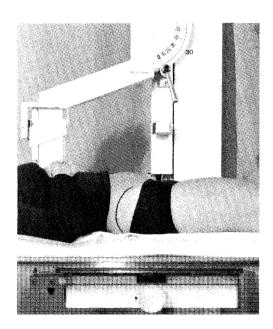
PELVIS AP

Supine

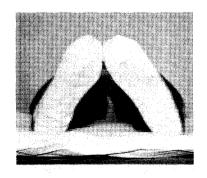
- 1. If the patient is NOT INJURED, turn the feet with heels apart and toes together, as shown below.
 - If the patient is INJURED, DO NOT turn the feet to this position.
- 2. Expose.

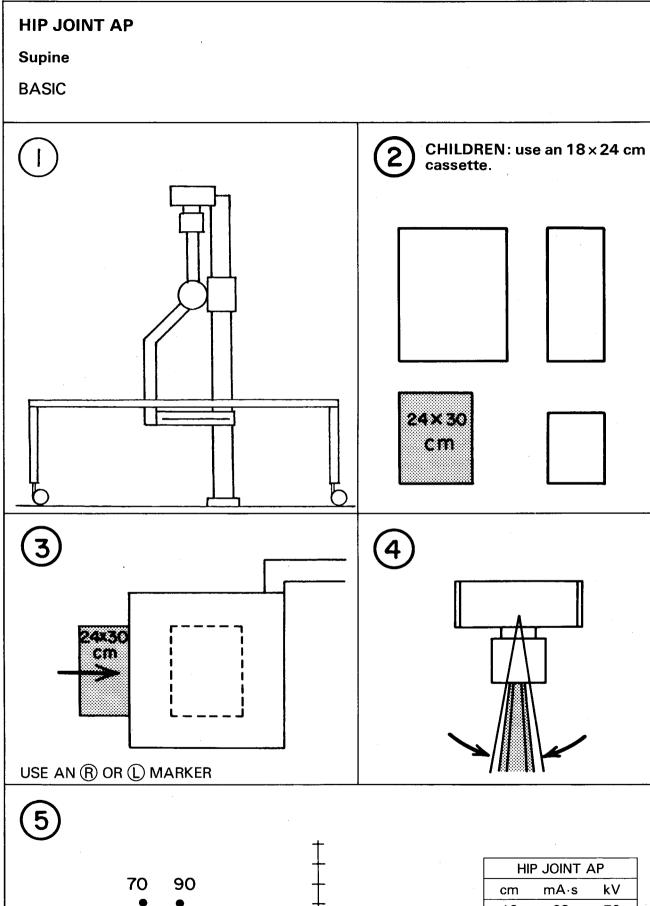












•120

 $mA\!\cdot\! s$

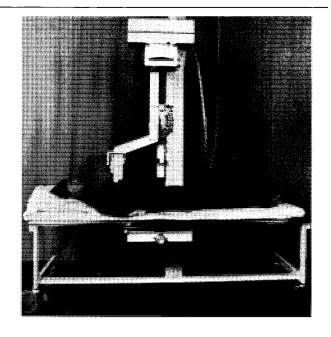
55 ●

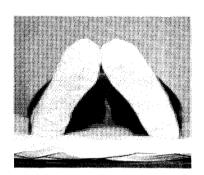
cm r		
0111 1	nA⋅s	kV
16	63	70
17	80	70

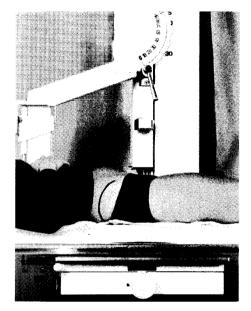
HIP JOINT AP

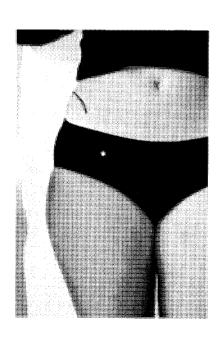
Supine

- 1. If the patient is NOT INJURED, turn the feet with heels apart and toes together, as shown below.
 - If the patient is INJURED, DO NOT turn the feet to this position.
- 2. Expose.

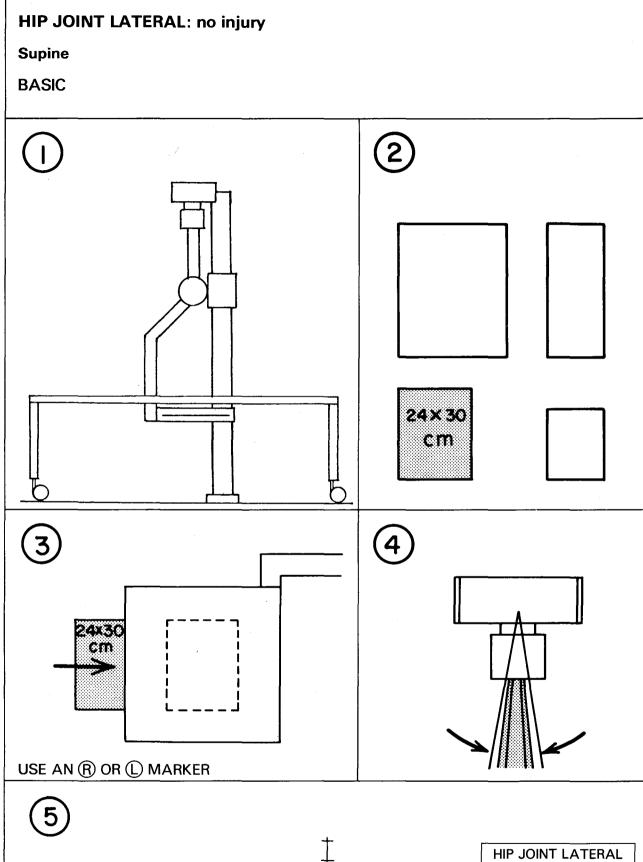


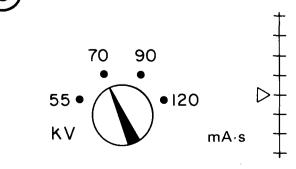








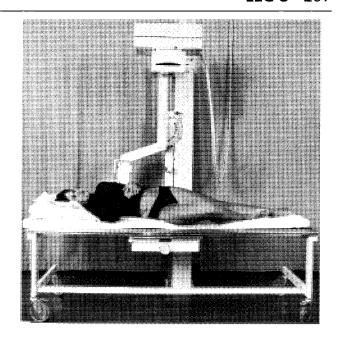




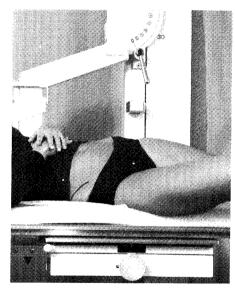
HIP JOINT LATERAL		
cm	mA⋅s	kV
12	25	70
13	32	70
14	40	70
15	50	70

HIP JOINT LATERAL: no injury Supine

- 1. Turn the patient carefully on to the affected side so that the leg is flat on the table.
- 2. Expose.

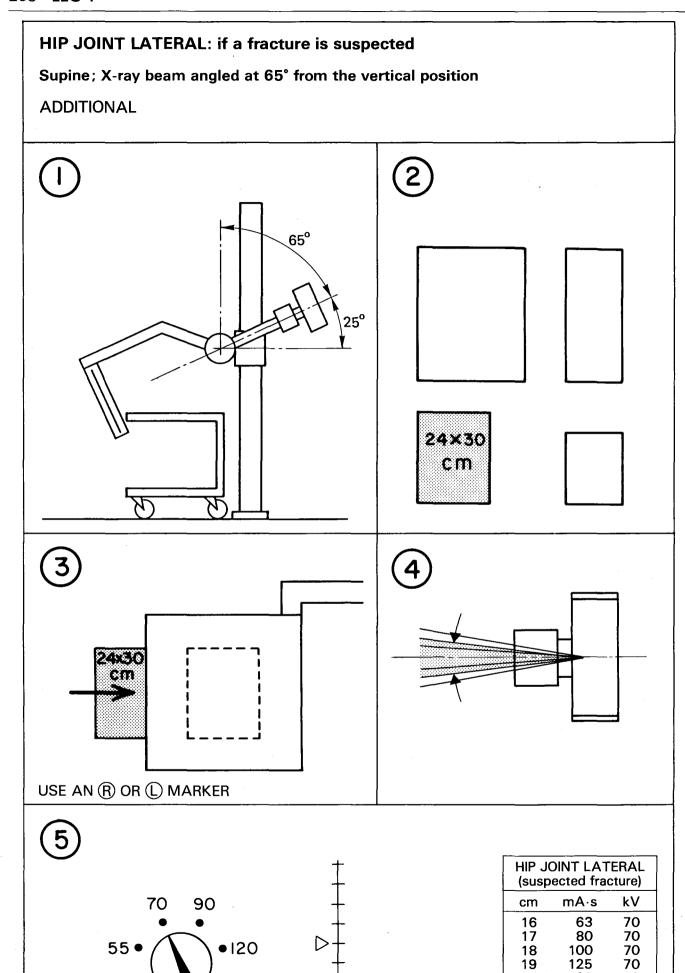








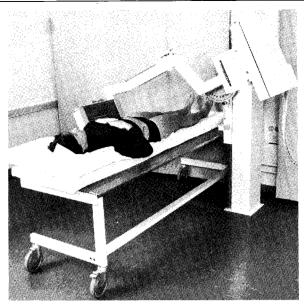
ΚV



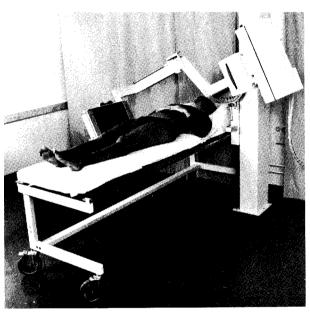
 $mA\!\cdot\! s$

HIP JOINT LATERAL: if a fracture is suspected

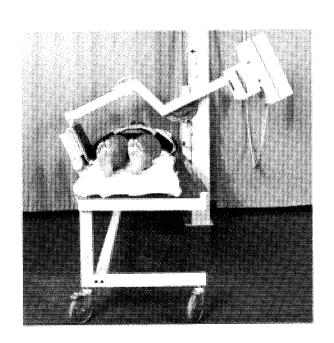
Supine; X-ray beam angled at 65° from the vertical position



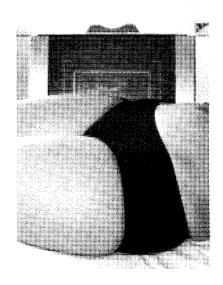
POSITION FOR THE LEFT HIP JOINT.

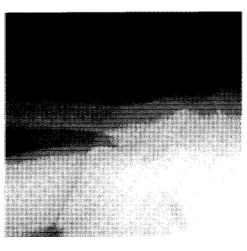


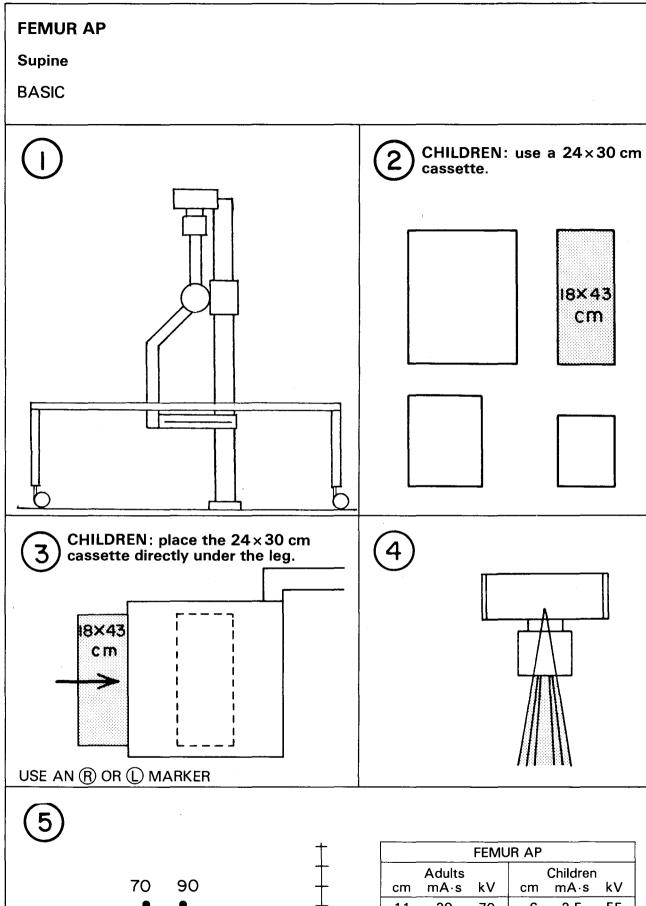
POSITION FOR THE RIGHT HIP JOINT.

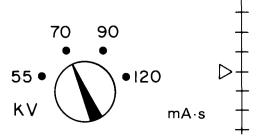






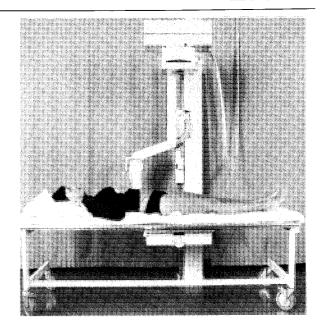




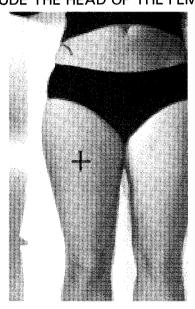


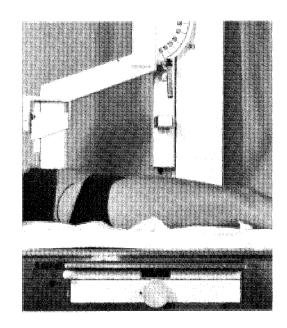
FEMUR AP					
cm	Adults mA·s	kV	cm	Children mA·s	kV
11 12 13 14 15	20 25 32 40 50	70 70 70 70 70	6 7 8 9 10	2.5 3.2 4 5 6.3	55 55 55 55 55

FEMUR AP Supine

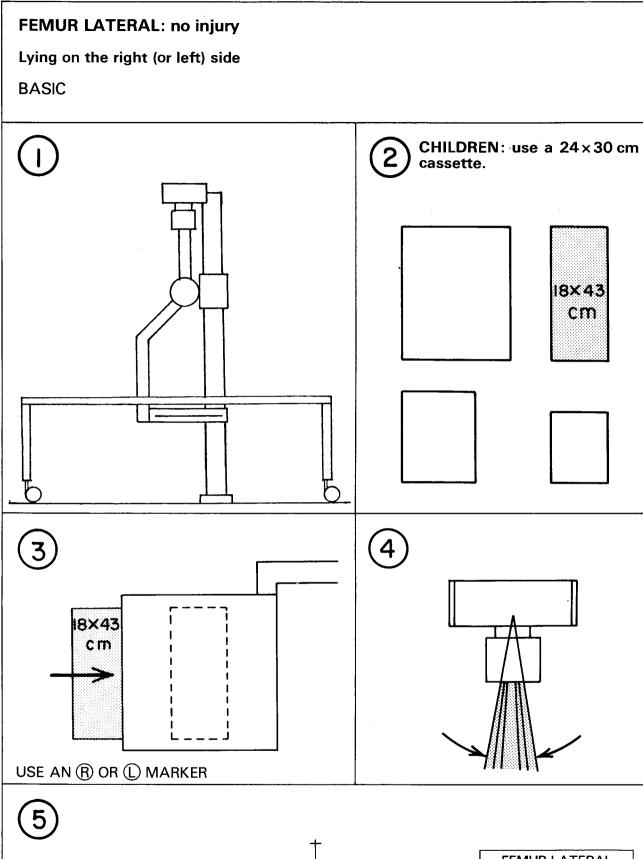


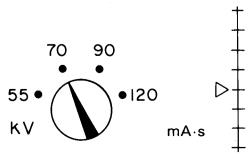
INCLUDE THE HEAD OF THE FEMUR.







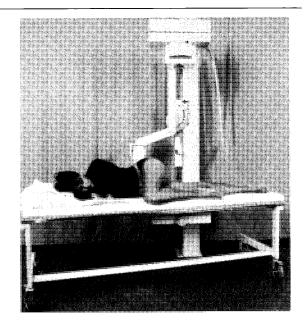




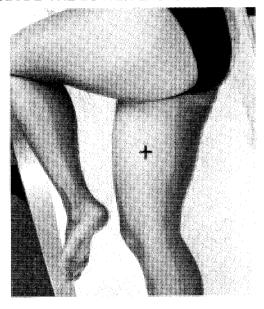
FEMUR LATERAL		
cm	mA⋅s	kV
12	25	70
13	32	70
14	40	70
15	50	70

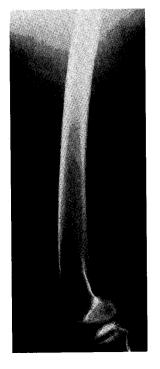
FEMUR LATERAL: no injury Lying on the right (or left) side

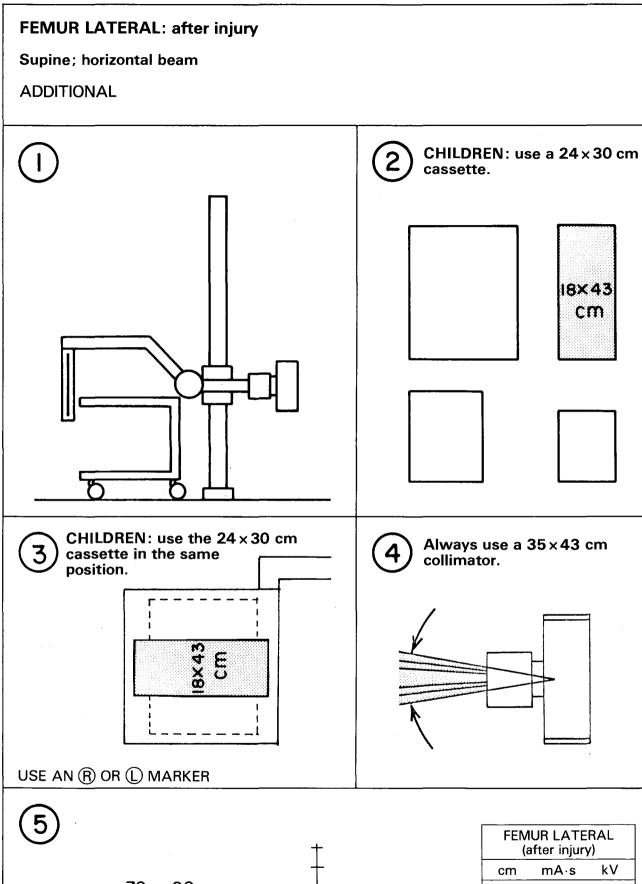
- 1. Place the patient with the leg to be X-rayed underneath.
- 2. Bend the normal leg.
- 3. Expose.

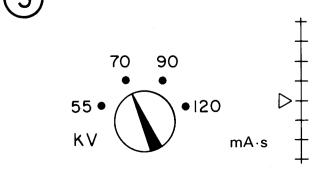


INCLUDE THE LOWER END OF THE FEMUR.







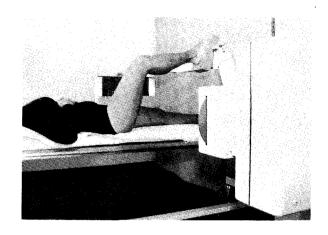


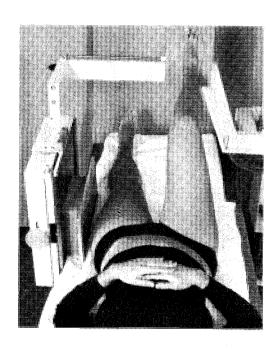
FEMUR LATERAL (after injury)		
cm	mA⋅s	kV
11	4	70
12	5	70
13	6.3	70
14	6.3	70
15	8	70
16	8	70
17	10	70

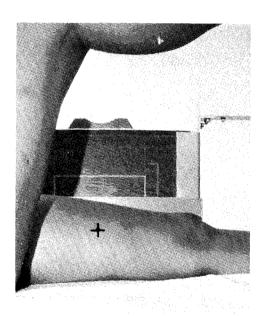
FEMUR LATERAL: after injury

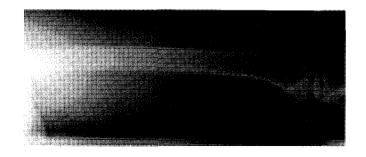
Supine; horizontal beam

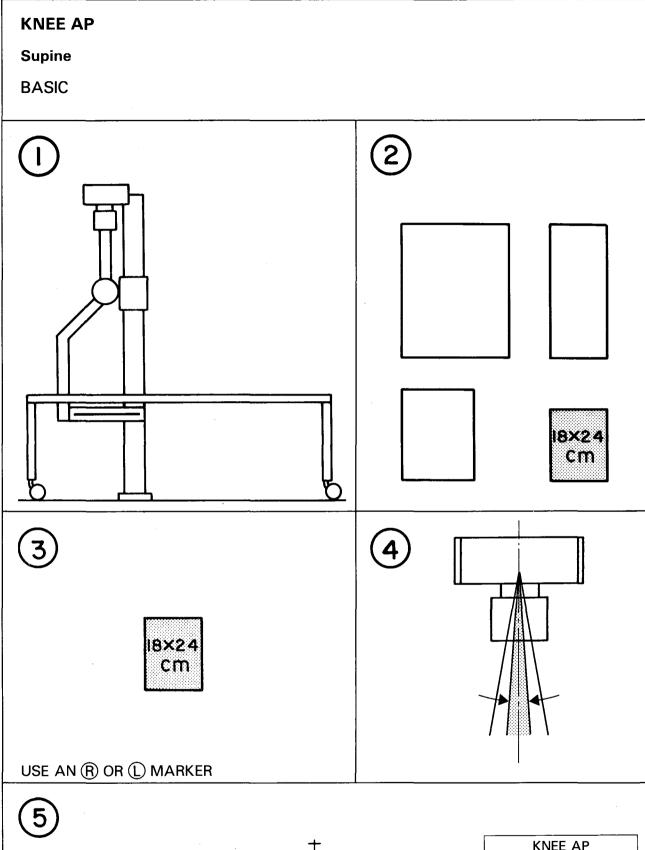
- 1. Support the cassette so that it is straight.
- 2. Place the patient so that the injured leg is nearest to the cassette.
- 3. Bend the UNINJURED leg.
- 4. Expose.

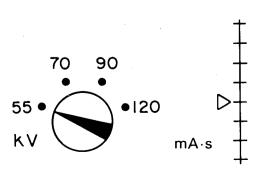










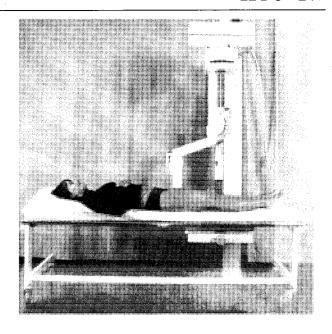


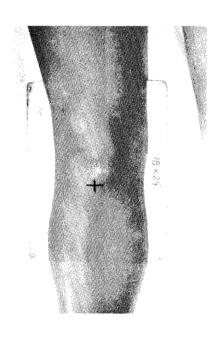
KNEE AP		
cm	mA⋅s	kV
7	5	55
8	6.3	55
9	6.3	55
10	8	55
11	10	55
12	12.5	55

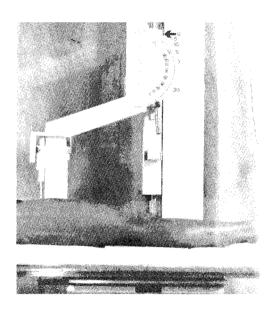
KNEE AP

Supine

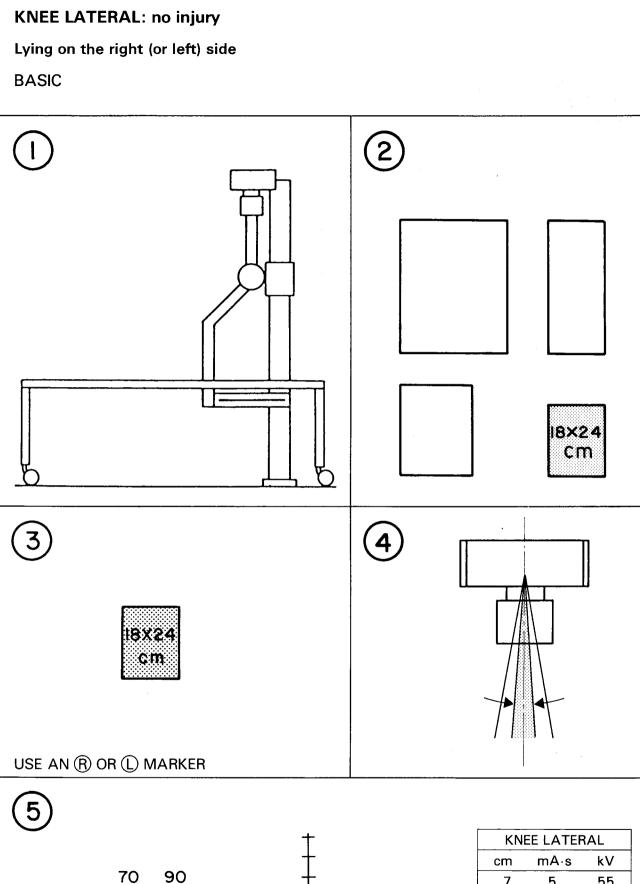
TO FIND SMALL FRACTURES ADDITIONAL OBLIQUE VIEWS MAY BE USED.

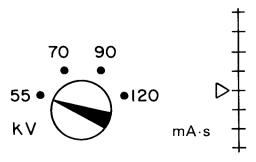








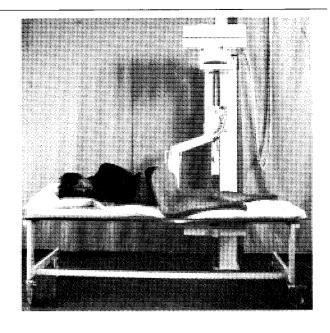


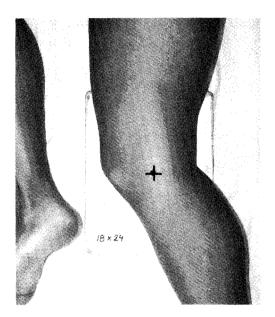


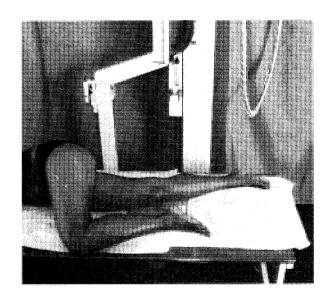
KNEE LATERAL		
cm	mA⋅s	kV
7	5	55
8	6.3	55
9	6.3	55
10	8	55
11	10	55
12	12.5	55

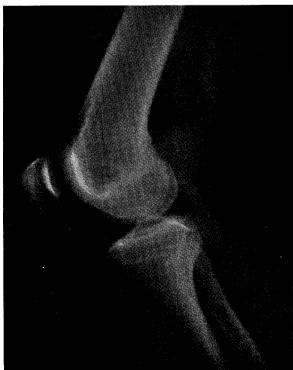
KNEE LATERAL: no injury Lying on the right (or left) side

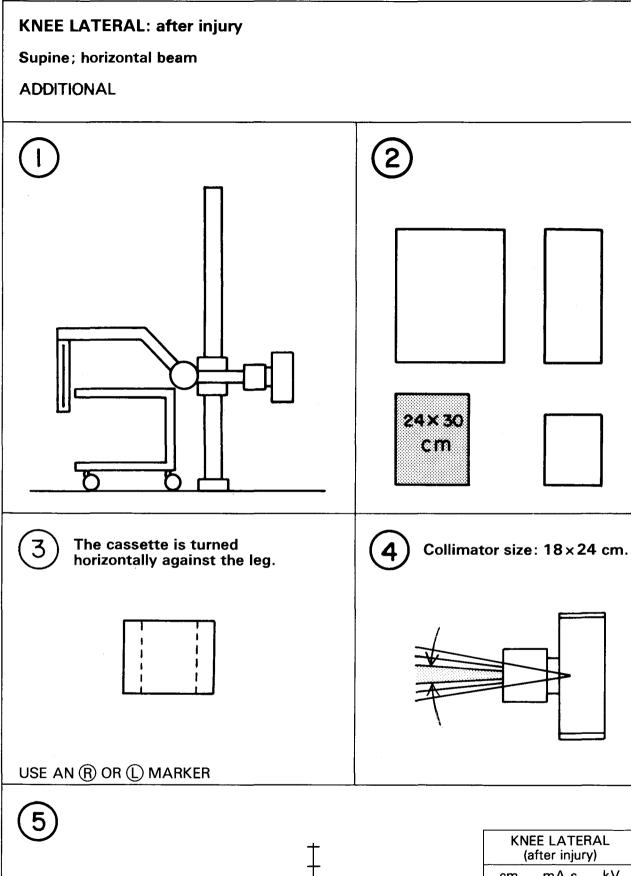
- Place the patient with the leg to be X-rayed underneath.
- 2. Bend the normal leg.
- 3. Expose.

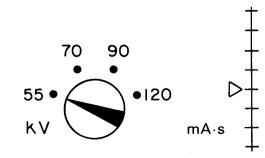










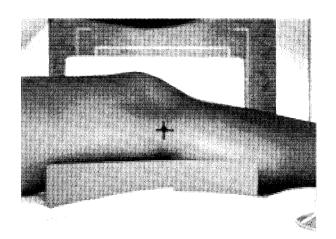


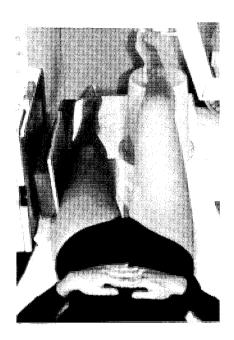
KNEE LATERAL (after injury)		
cm	mA⋅s	kV
7	5	55
8	6.3	55
9	6.3	55
10	8	55
11	10	55
12	12.5	55

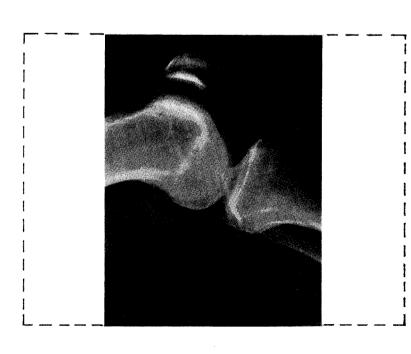
KNEE LATERAL: after injury Supine; horizontal beam

- 1. Support the cassette so that it is straight.
- 2. Place the patient so that the injured leg is nearest to the cassette.
- 3. Raise the UNINJURED leg, as shown, so that it is higher than the cassette.
- 4. Expose.

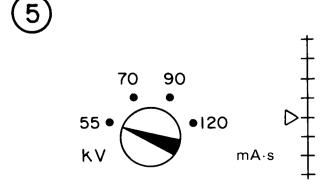








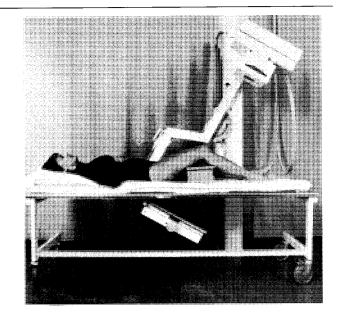
KNEE INTERCONDYLAR SPACE Supine; vertical beam angled 30° towards the head **ADDITIONAL** €30∘ 18×24 cm 18X24 cm. USE AN (R) OR (L) MARKER

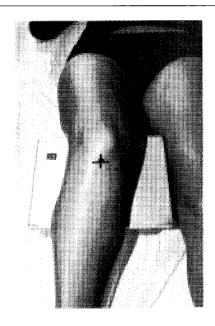


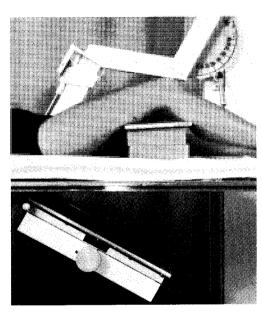
KNEE INTERCONDYLAR SPACE		
cm	mA⋅s	kV
8	3.2	55
9	3.2	55
10	4	55
11	5	55
12	6.3	55
13	8	55
14	10	55
15	10	55

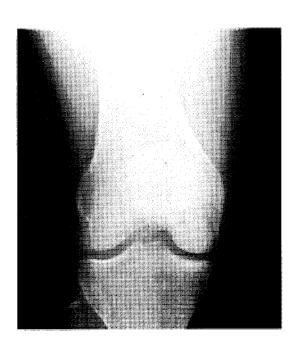
KNEE INTERCONDYLAR SPACE Supine; vertical beam angled 30° towards the head

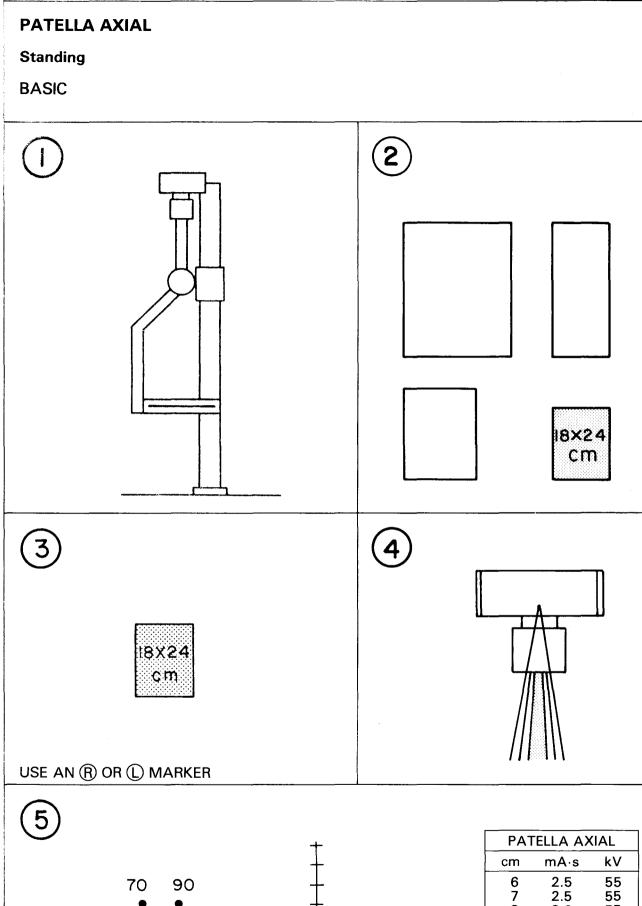
PLACE THE CASSETTE UNDER THE KNEE ON A FIRM SUPPORT 18-20 cm HIGH

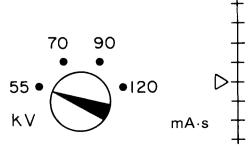










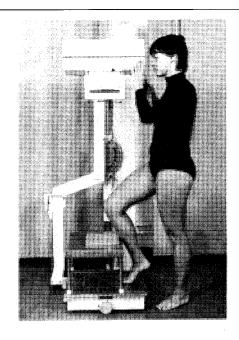


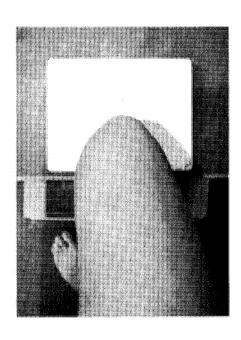
PATELLA AXIAL		
cm	mA⋅s	kV
6	2.5	55
7	2.5	55
8	3.2	55
9	3.2	55
10	4	55
11	5	55
12	6.3	55

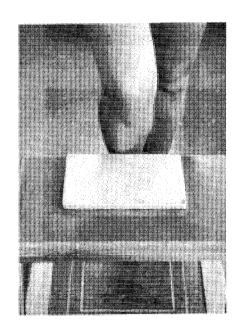
PATELLA AXIAL

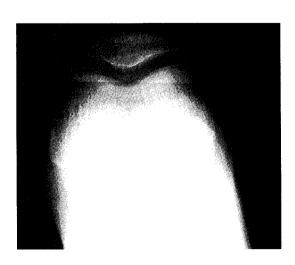
Standing

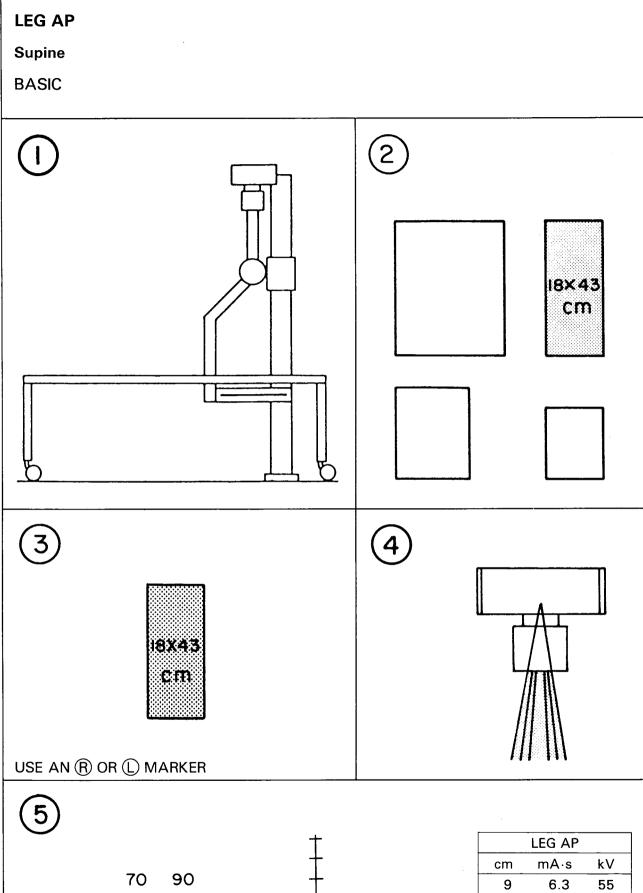
- 1. Place the cassette on top of the cassette holder on a stool as shown.
- 2. Expose.

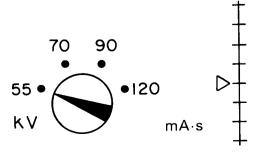






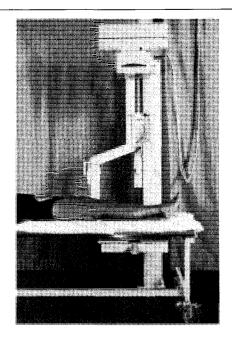


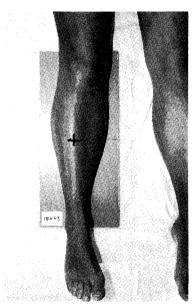


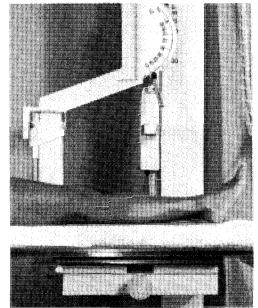


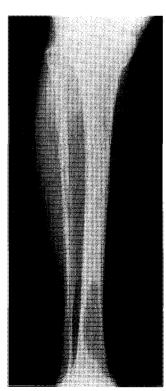
LEG AP		
mA⋅s	kV_	
6.3	55	
8	55	
10	55	
12.5	55	
16	55	
	mA·s 6.3 8 10 12.5	

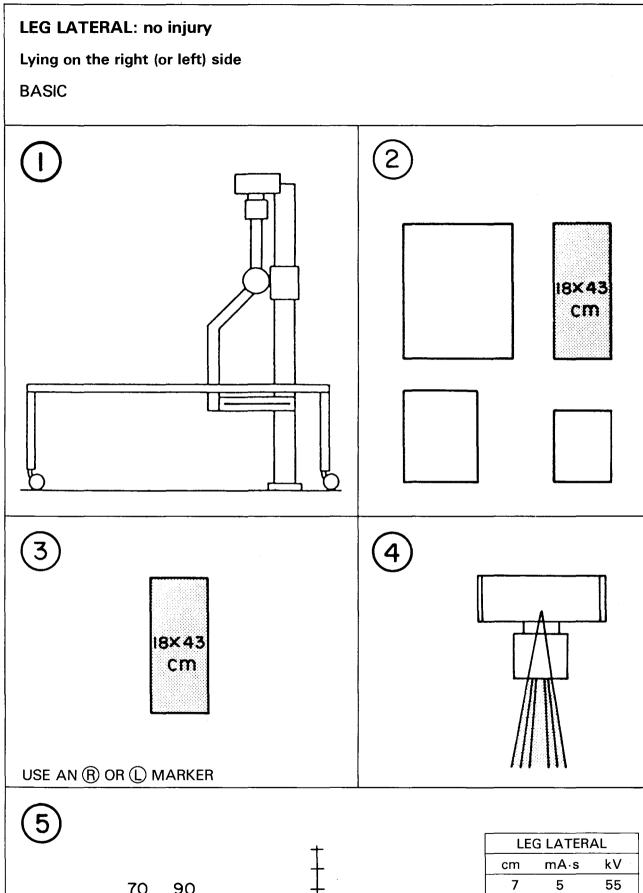
LEG AP	Supine

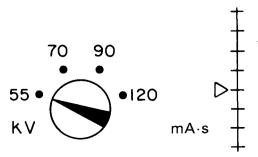








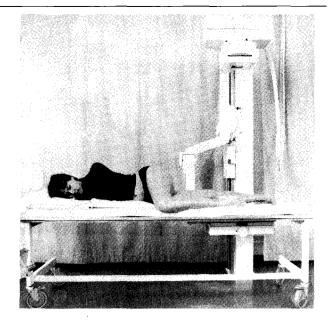


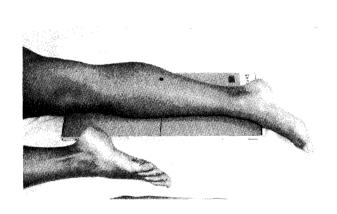


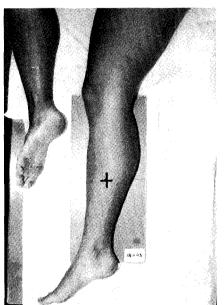
LEG LATERAL		
cm	mA⋅s	kV
7	5	55
8	6.3	55
9	6.3	55
10	8	55
11	10	55
12	12.5	55

LEG LATERAL: no injury Lying on the right (or left) side

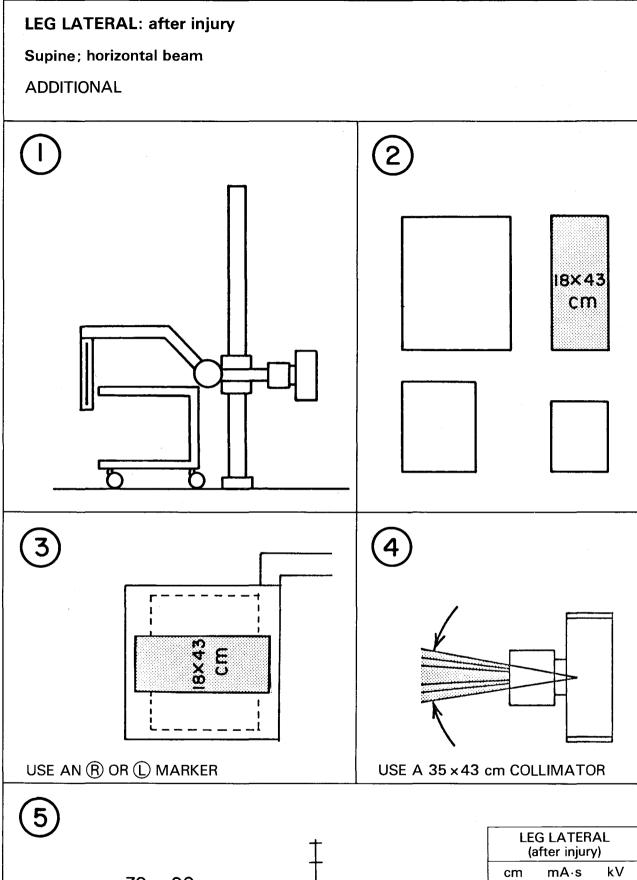
- Place the patient with the leg to be X-rayed underneath.
- 2. Bend the normal leg.
- 3. Expose.

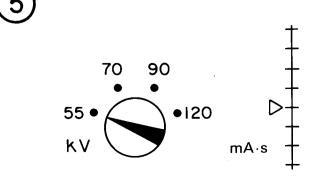








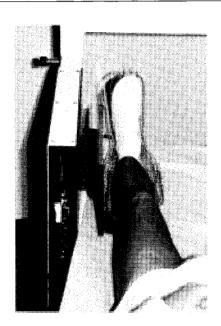


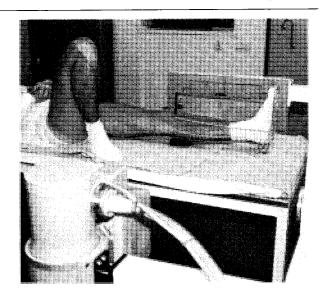


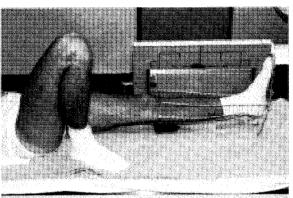
LEG LATERAL (after injury)		
cm	mA⋅s	kV
7	5	55
8	6.3	55
9	6.3	55
10	8	55
11	10	55
12	12.5	55

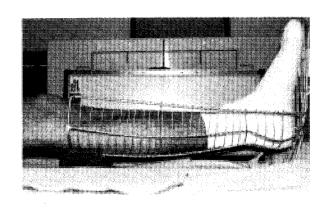
LEG LATERAL: after injury Supine; horizontal beam

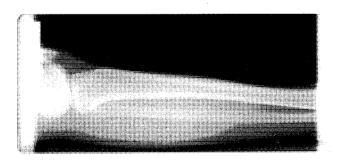
- 1. Support the cassette so that it is straight.
- 2. If there are splints on the injured leg, leave them on.
- 3. Bend the UNINJURED leg.
- 4. Expose.

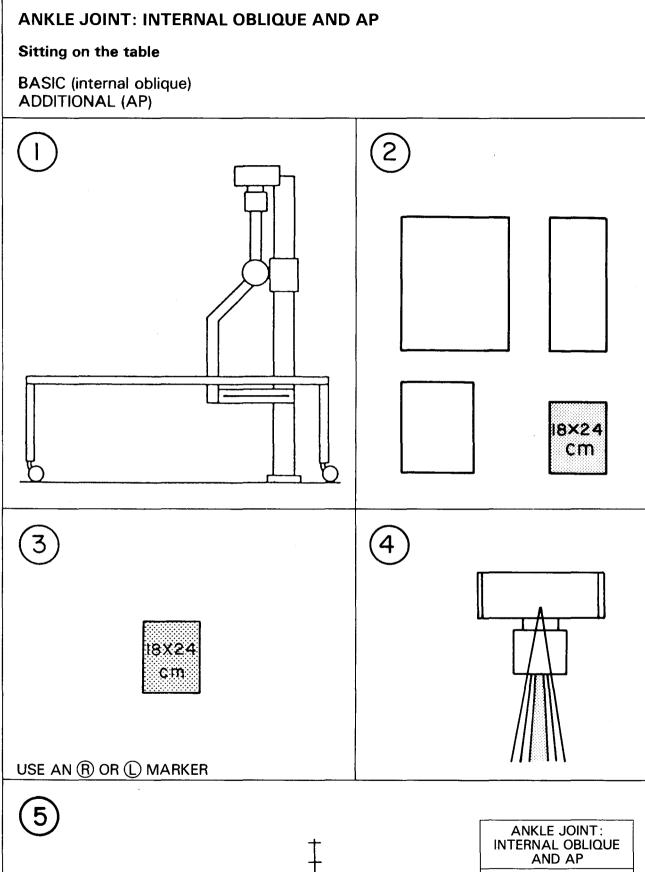


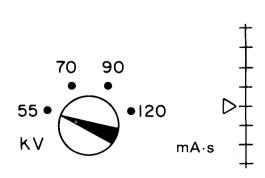












ANKLE JOINT: INTERNAL OBLIQUE AND AP		
cm	mA⋅s	kV
6	4	55
7	5	55
8	6.3	55
9	6.3	55
10	8	55
11	10	55

ANKLE JOINT: INTERNAL OBLIQUE AND AP

Sitting on the table

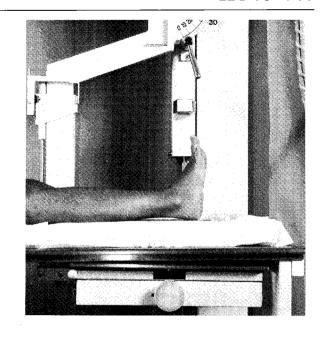
2 SEPARATE VIEWS

THE INTERNAL OBLIQUE VIEW IS THE BASIC VIEW. TAKE A PA VIEW ONLY WHEN REQUESTED BY THE DOCTOR.

IF IT IS NECESSARY TO TAKE AN ANKLE JOINT LATERAL VIEW (LEG 17) AS WELL AS AN INTERNAL OBLIQUE VIEW, USE A 24×30 cm CASSETTE DIVIDED BY MEANS OF THE LEAD STRIP PROVIDED: ONE HALF FOR THIS VIEW AND THE OTHER HALF FOR THE LEG 17.

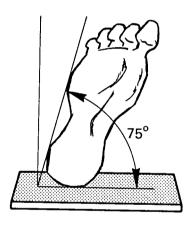
INTERNAL OBLIQUE: REST THE PATIENT'S HEEL ON THE CASSETTE AND TURN THE FOOT INWARDS AT A 15° ANGLE.

AP: REST THE PATIENT'S HEEL ON THE CASSETTE AND KEEP THE FOOT STRAIGHT.



AP
ADDITIONAL
ON REQUEST OF THE DOCTOR





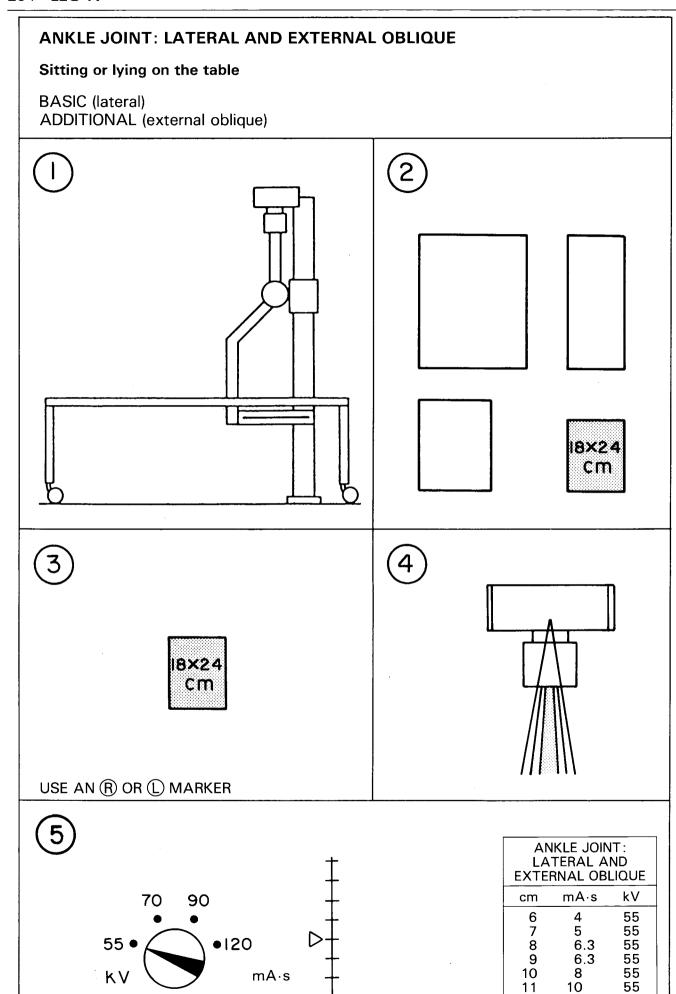












ANKLE JOINT: LATERAL AND EXTERNAL OBLIQUE

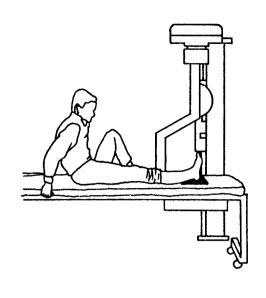
Sitting or lying on the table

THE LATERAL VIEW IS THE BASIC VIEW. TAKE AN EXTERNAL OBLIQUE ONLY WHEN REQUESTED BY THE DOCTOR.

IF IT IS NECESSARY TO TAKE AN ANKLE JOINT INTERNAL OBLIQUE (LEG 16) AS WELL AS A LATERAL VIEW, USE A $24\times30~\text{cm}$ CASSETTE DIVIDED BY MEANS OF THE LEAD STRIP PROVIDED: ONE HALF FOR THIS VIEW AND ONE HALF FOR THE LEG 16.

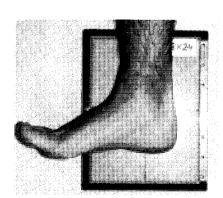
LATERAL: TURN THE PATIENT'S FOOT OUTWARDS SO THAT IT RESTS AGAINST THE CASSETTE.

EXTERNAL OBLIQUE: REST THE PATIENT'S HEEL ON THE CASSETTE AND TURN THE FOOT OUTWARDS AT A 60° ANGLE.



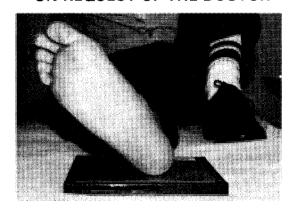
LATERAL BASIC

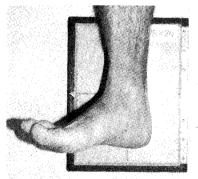




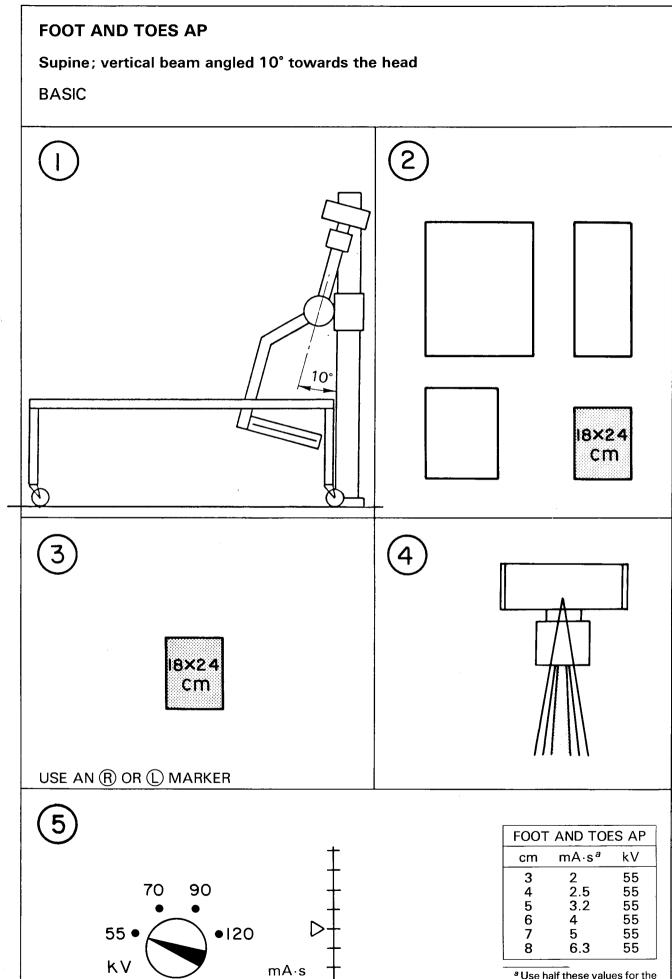


EXTERNAL OBLIQUE
ADDITIONAL
ON REQUEST OF THE DOCTOR









^a Use half these v	alues for the
toes alone.	

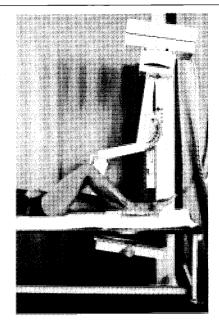
FOOT AND TOES AP

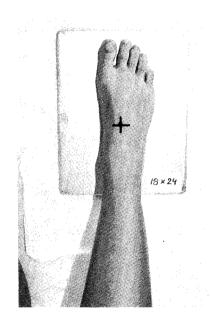
Supine; vertical beam angled 10° towards the head

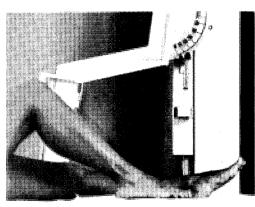
PATIENT'S LEG TO BE BENT SO THAT FOOT RESTS FLAT ON THE CASSETTE.

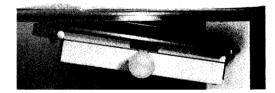
IF ONLY THE TOES ARE TO BE X-RAYED, USE HALF THE mA·s VALUES GIVEN FOR THE FOOT.

THE DIFFERENT VALUES HAVE BEEN USED FOR THE TWO RADIOGRAPHS ON THIS PAGE.







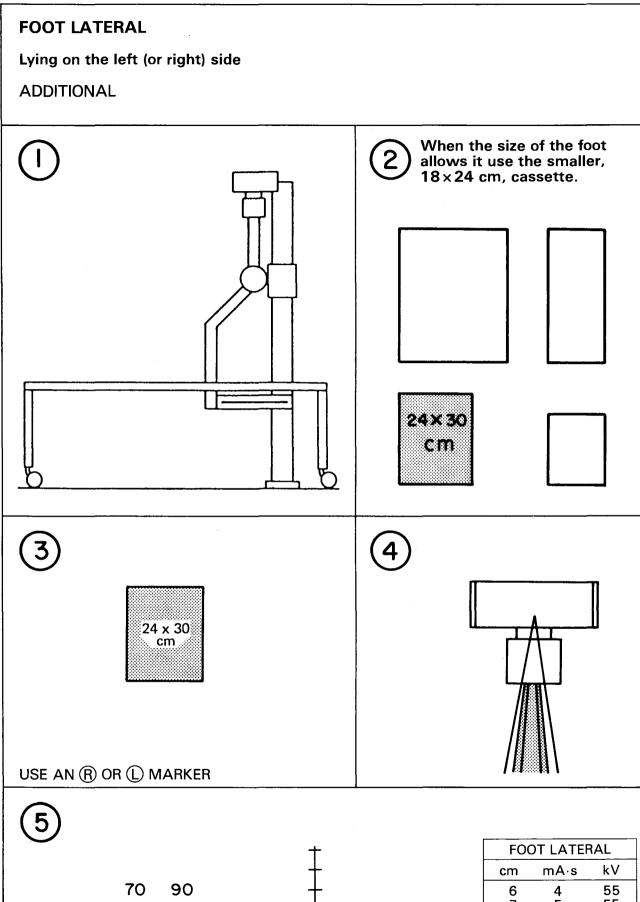




TAKEN WITH THE CORRECT EXPOSURE FOR THE TOES.



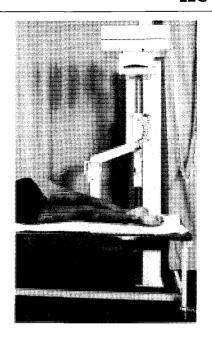
TAKEN WITH THE CORRECT EXPOSURE FOR THE METATARSAL AND TARSAL BONES.

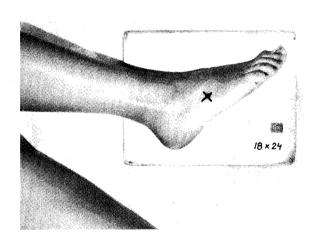


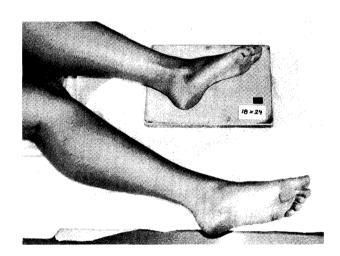
70 90 55 • • 120 kV mA·s

FOOT LATERAL		
cm	mA⋅s	kV
6	4	55
7	5	55
8	6.3	55
9	6.3	55
10	8	55
11	10	55

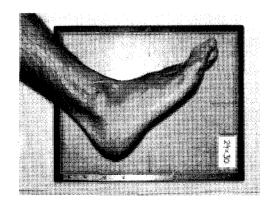
FOOT LATERAL
Lying on the left (or right) side











FOOT AP OBLIQUE Sitting on the table; vertical beam angled 15° towards the head **BASIC** 15° 18×24 cm 18×24 ¢m USE AN (R) OR (L) MARKER (5)

		İ
70	90	+
•	•	+
55 •	•120	D+
kV	mA.	s +

FOOT AP OBLIQUE							
cm	mA⋅s	kV					
3	2	55					
4	2.5	55					
4 5	3.2	55					
6	4	55					
7	5	55					
8	6.3	55					
9	6.3	55					

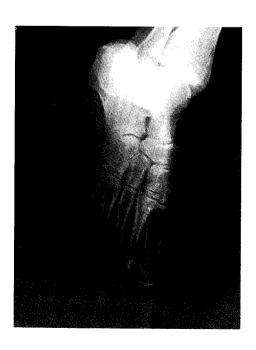
FOOT AP OBLIQUE

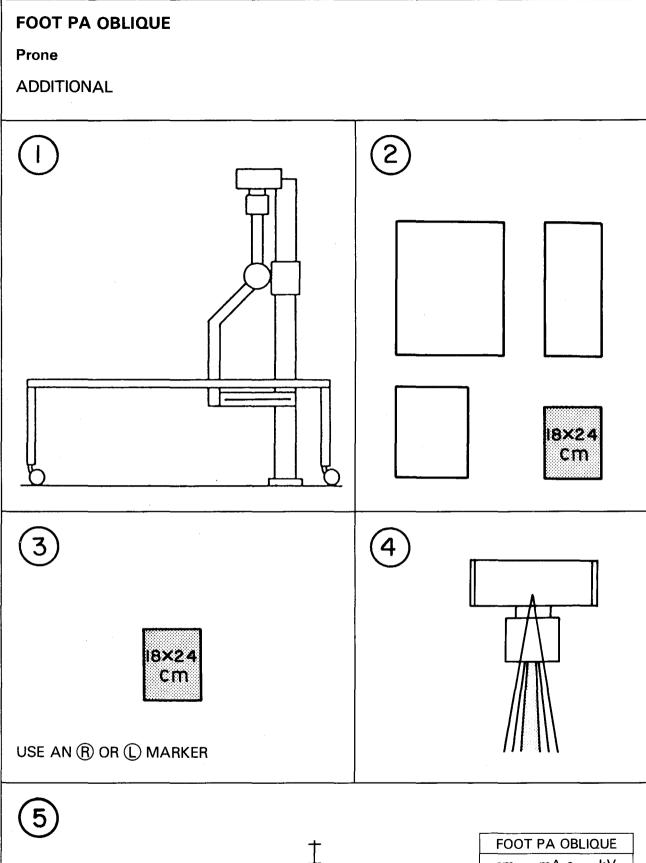
Sitting on the table; vertical beam angled 15° towards the head

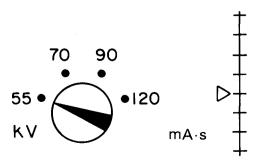






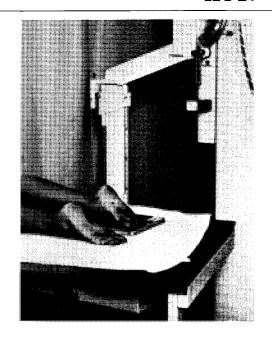


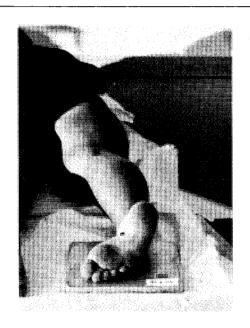


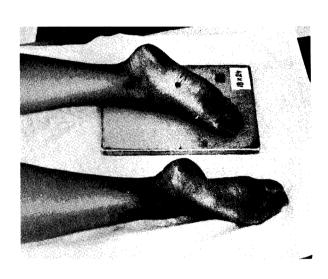


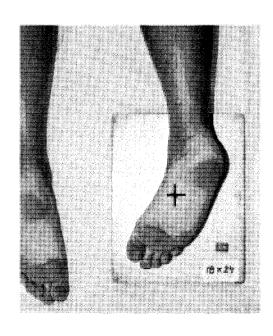
FOO ⁻	T PA OBL	IQUE
cm	mA⋅s	kV
3	2	55
4 5	2.5	55
	3.2	55
6	4	55
7	5	55
8	6.3	55

FOOT PA OBLIQUE Prone

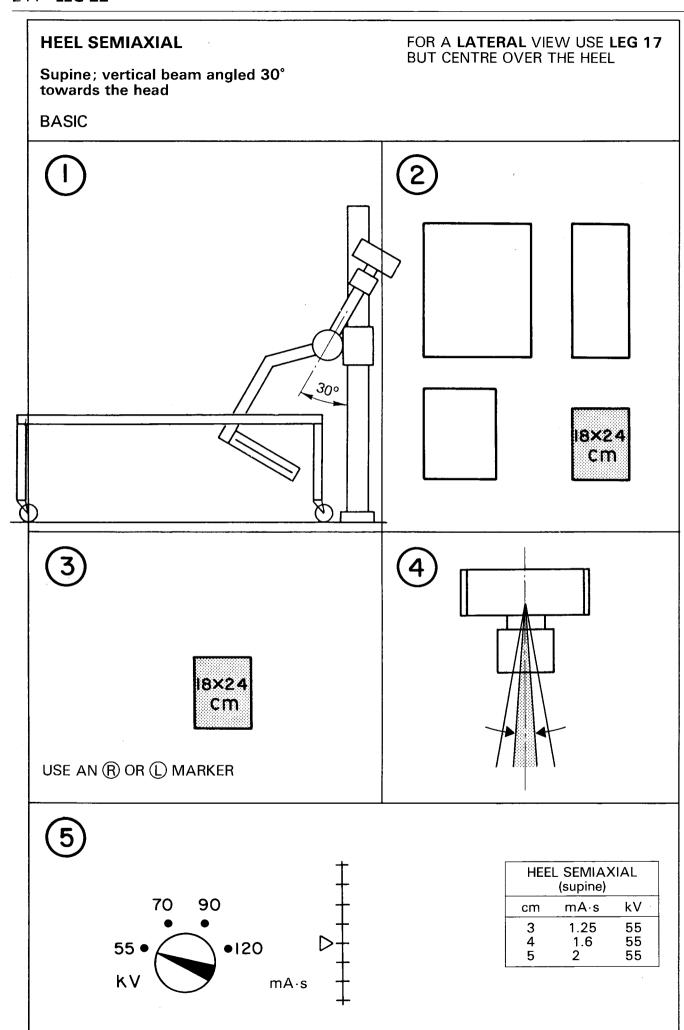












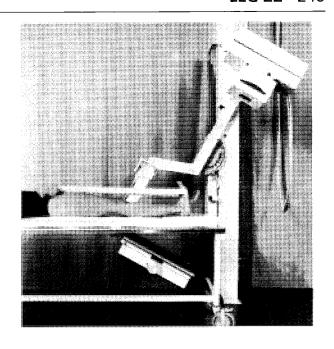
HEEL SEMIAXIAL

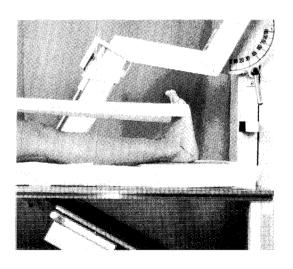
Supine; vertical beam angled 30°

towards the head

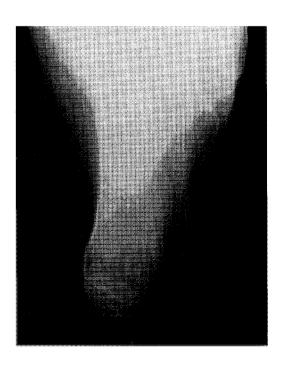
WHEN THE PATIENT IS INJURED USE EITHER THIS POSITION OR THAT SHOWN FOR **LEG 23**, WHICHEVER CAUSES THE LEAST PAIN.

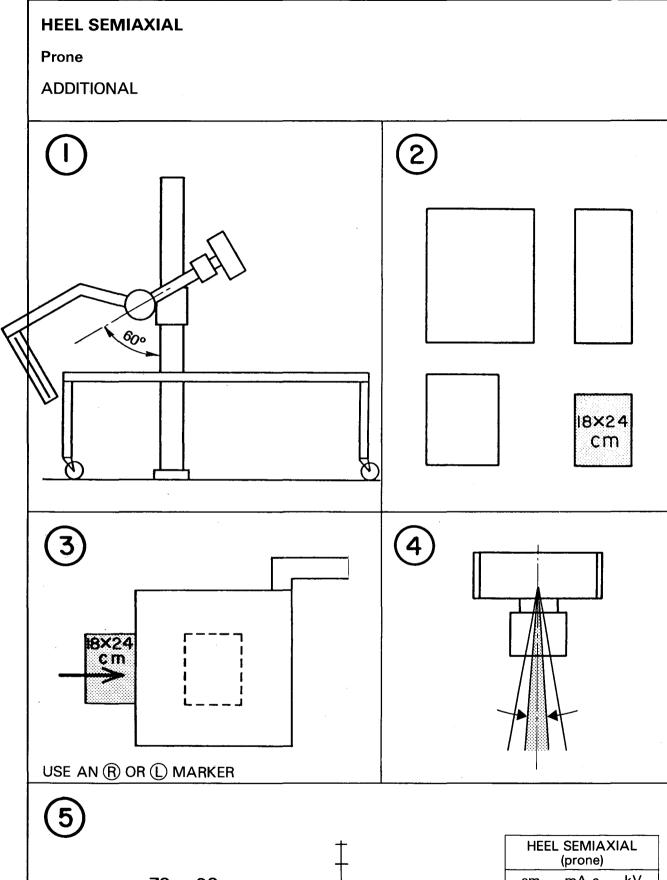
THE FOOT SHOULD BE KEPT FLEXED BY MEANS OF A SLING HELD BY THE PATIENT.

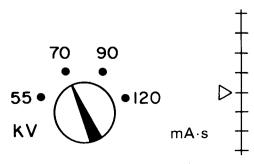










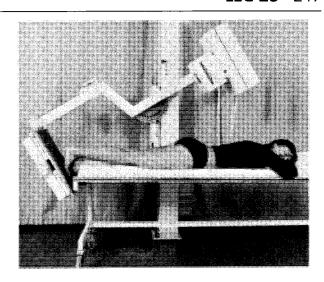


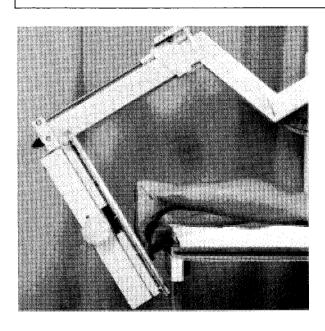
HEEL SEMIAXIAL (prone)								
cm	mA⋅s	kV						
6	6.3	70						
7	7 8 70							
8	10	70						
9								
10	16	70						

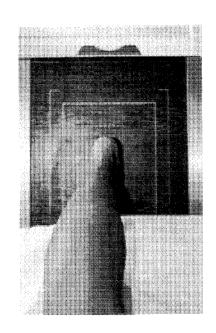
HEEL SEMIAXIAL

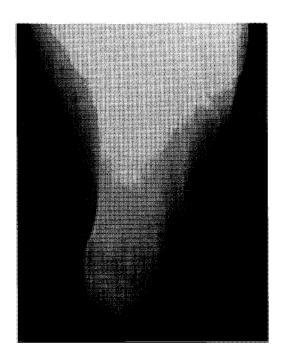
Prone

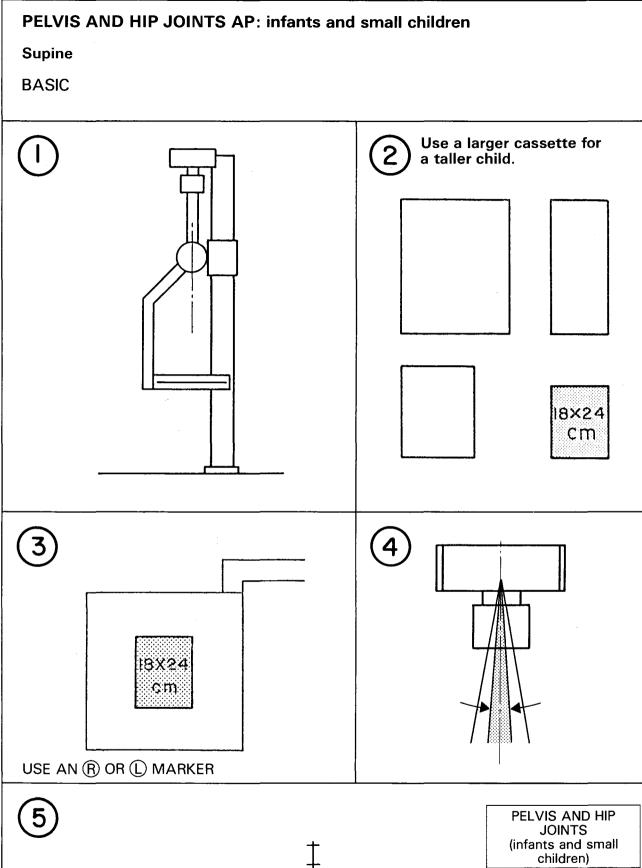
WHEN THE PATIENT IS INJURED USE EITHER THIS POSITION OR THAT SHOWN FOR **LEG 22**, WHICHEVER CAUSES THE LEAST PAIN.

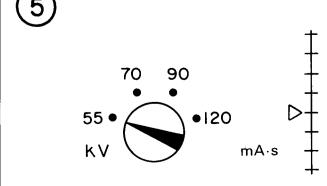












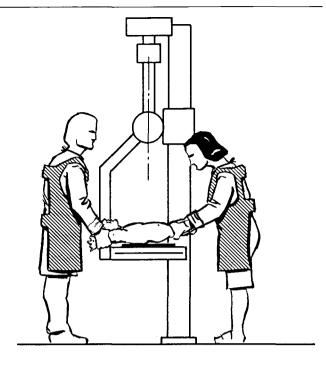
PELVIS AND HIP JOINTS (infants and small children)						
cm	mA⋅s	kV				
6 7 8 9 10 11	4 5 6.3 6.3 8 10 12.5	55 55 55 55 55 55 55				

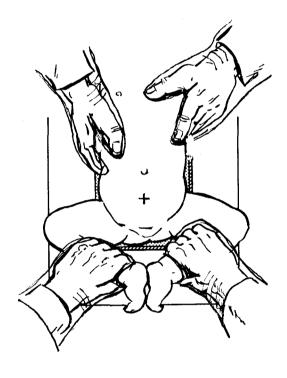
PELVIS AND HIP JOINTS AP: infants and small children Supine

THE CHILD MUST BE SUPPORTED BY THE LEGS AND EITHER THE ARMS OR THE TORSO.

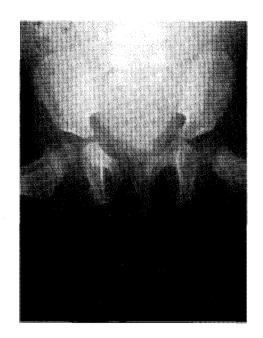
THOSE SUPPORTING THE CHILD, PREFERABLY THE PARENTS, MUST WEAR A LEAD APRON AND LEAD GLOVES.

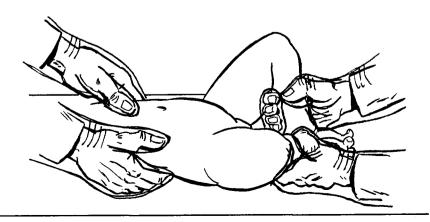
- 1. Place the cassette on top of the cassette holder.
- 2. Lie the child on its back on the cassette.
- 3. Flex the knees and abduct the hips.
- 4. Centre a little above the pubic symphysis.
- 5. Expose when the child is not moving.



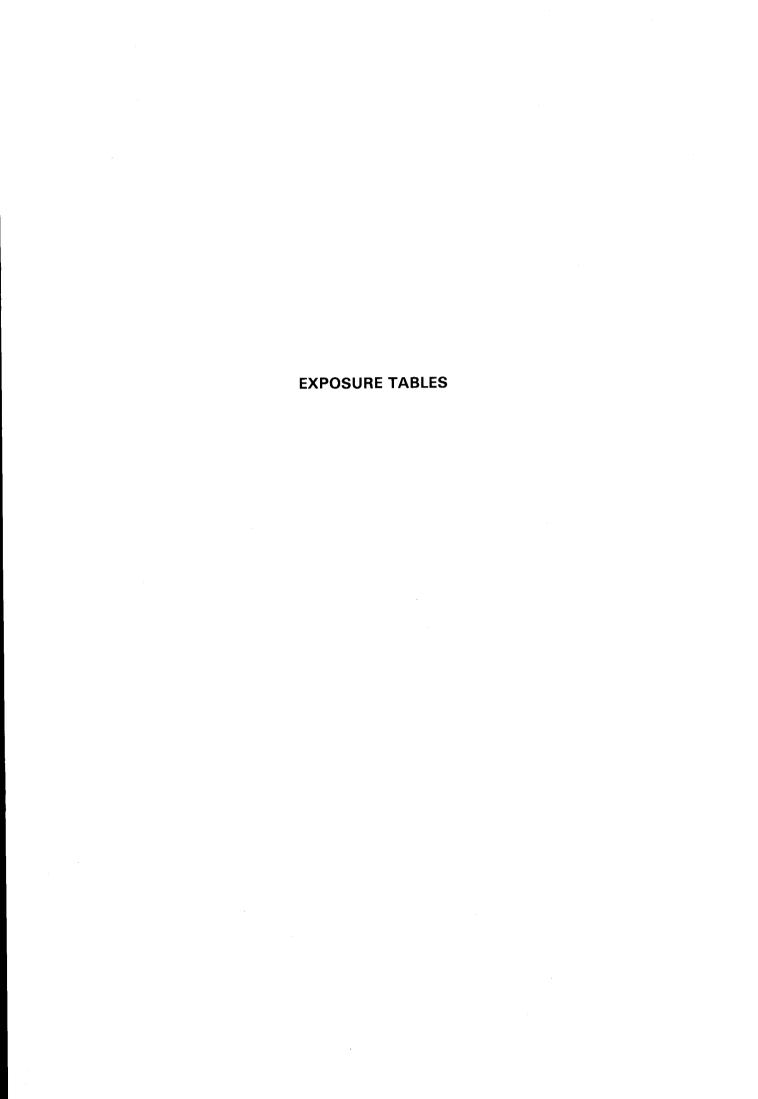


USE A LEAD APRON AND LEAD GLOVES. a





 $^{^{\}it a}$ For the sake of clarity, the gloves are shown as being transparent.



EXPOSURE TABLES

IN RELATION TO THE DIAMETER—THICKNESS—OF THE PART OF THE BODY TO BE X-RAYED

For the WHO Basic Radiological System with a 10:1 lead/aluminium grid, using standard blue-sensitive X-ray film in aluminium cassettes with fast calcium-tungstate screens (0.5 mR exposure)

THE PARTS OF THE BODY WITHIN THE THORACIC CHEST

		kV	cm	mA·s	Position of cassette			kV	cm	mA⋅s	Position of cassette
CHEST	Adults	120	16-18 19-21 22-24 25-27 28-29 30-31 32-33 34-35 36-37 38-39 40-41	1.6 2 2.5 3.2 4 5 6.3 8 10 12.5	In the cassette holder	RIBS OBLIQUE	Erect and supine	70	12-15 16-18 19-21 22-24 25-27 28-29 30-31 32-33 34-35 36-37 38-39	10 12.5 16 20 25 32 40 50 63 80 100	In the
CHEST	Children	90	8-11 12-15 16-17	2 2.5 3.2		THORACIC SPINE		70	40-41 16-18 19-21	125 32 40	cassette holder
CHEST Infants weighing up to 10 kg	70	8-11 12-14	2 2.5	Directly under the patient on the cassette holder	LATERAL AND			22-24 25-27 28-29 30-31 32-33 34-35	50 63 80 00 125 160		
						CERVICO- THORACIC SPINE LATERAL		90	36-37 38-39 40-41	40 50 63	

THE HEAD

_	kV	Size of skull	mA·s	Position of cassette		kV	Size of skull	mA⋅s	Position of cassette
SKULL LATERAL	70	Small Medium Large	25 32 40		SINUSES AND FACE LATERAL	70	Small Medium Large	16 16 25	In the
SKULL PA AND	70	Small	63		NOSE LATERAL	55	All	16	cassette
AP SEMIAXIAL		Medium Large	80 100	In the	MANDIBLE PA AND AP	70	All	63	holder
SINUSES AND FACE PA	90	Small Medium Large	25 25 32	cassette holder	MANDIBLE OBLIQUE LATERAL	70	All	12.5	
SINUSES AND FACE SEMIAXIAL AND NOSE PA	90	Small Medium Large	25 32 40						

THE LEG: SPECIAL EXPOSURES

	kV	cm	mA⋅s	Position of cassette			kV	cm	mA⋅s	Position of cassette
KNEE	55	8	3.2	Directly under	HEEL	Supine	55	3	1.25	Directly under the
INTERCONDYLAR		9	3.2	the knee or	SEMIAXIAL	-		4	1.6	heel
SPACE*		10	4	patella			5	2		
		11	5		HEEL.	Prone	70	6	6.3	In the
AND		12	6.3			FIONE	70	9		
		13	8		SEMIAXIAL			/	8	cassette
PATELLA		14	10		PRONE			8	10	holder
AXIAL ^a		15	10					9	12.5	
AVIAL.								10	16	

^a Focus film distance = 100 cm.

ALL OTHER VIEWS

Diameter (thickness)	under the	e directly e patient of the e holder	Cassette in the cassette holder					
cm	55 kV mA⋅s	70 kV mA⋅s	70 kV mA⋅s	90 kv mA⋅s	120 kV mA⋅s			
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 36 37 37 38 37 37 37 37 37 37 37 37 37 37 37 37 37	1.6 2 2.5 3.2 4 5 6.3 6.3 8 10 12.5	2 2 2.5 3.2 4 5 6.3 6.3 8	8 10 12.5 16 20 25 32 40 50 63 80 100 125 160 200 250	20 25 32 40 40 50 63 80 100 125 160 200 250	25 32 40 50 63 80 100 125 160 200 250			

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This manual was prepared with the collaboration of an international group of radiologists with wide experience in both developed and developing countries. As one of a series of three designed to help those working at the primary health care level with the WHO Basic Radiological System, it is intended for the use of operators who may have little prior knowledge or experience of X-ray equipment.

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