



Chest Radiography Patient Positioning – Short Note

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Introduction

Human anatomy is a complex structure the organs and anatomical positions are complicated in terms of location. To diagnose diseases different diagnostic imaging procedures are conducted by the physicians. The diagnostic accuracy depends highly upon the quality of the radiographs. The radiotechnologist plays a key role in improving the quality of radiographs and therefore increasing the diagnostic accuracy. The awareness of various techniques and positions are required to get desired results. The knowledge of various projections and patient position accordingly are important part of diagnostic procedures. During any examination chest radiographs are the most commonly performed procedure. The chest radiograph is combination of different densities in the form of black and white colour. Images of lungs, heart, spine, blood vessels, airways and sternum are produced on a chest radiograph. The chest radiographs are not easy to read but a radiograph with right amount of exposure provide a great amount of information to the reader. This article discusses radiographic positioning of the chest for the radiotechnologist and x-ray technicians.

Patient Preparation for chest radiograph

The patient is asked to remove all radio-opaque materials (necklace, earrings etc.) from the upper body. It is recommended to tell the patient to wear a hospital gown and if needed tie their hair up.

Positioning and Projection

The x-rays are electromagnetic radiation that follow straight path with rays diverging from the source. The structures which are nearer to the x-ray detector provide better visualization on the radiograph and structures which are away from the detector or the x-ray film shows magnification of the structure. The projections depend upon the route of x-ray beam entering a body. The Anterior-Posterior projections means that x-rays are passing from the posterior aspect and exiting from anterior aspect of the body. Similarly Anterior-Posterior projection denotes x-rays passing from anterior side first and exiting from posterior side. Lateral projections mean x-rays passing from lateral aspect of body and exiting from other side. An axial view means x-ray passes from the long axis of body. Oblique view means x-rays passing through an angled plane to coronal or transverse plane of body.

Basic terminology related to chest positioning are:

- Anterior: the front side of a body. Posterior: the back side of a body.
- Superior: the upper part of a body. Inferior: the bottom of a body.
- Proximal: towards the center of a body. Distal: away from the center of a body.
- Medial: denotes towards the midline. Lateral: denotes away from the midline.
- Prone: a lying down position in which chest is down and back is up. Supine: lying on back.
- Cranial: towards head. Caudal: towards feet.

Basic Projections in Chest Radiography	
Projection	Patient Position
PA (Posterior-anterior)	Erect, supine, semi-erect
AP (Anterior-posterior)	Erect, supine, semi-erect
Lateral	Erect

PA Projection

It is the most commonly performed chest projection. In this projection the patient's back is towards the x-ray tube. The x-rays enter the body from the dorsal side. The PA projection can be performed in any patient position like erect, supine, semi-erect and oblique. The position depends upon the condition of the patient and requirement of the study. The basic projection for a chest radiograph is in erect position. The erect position is recommended because it has certain advantages, the patient position is easy, due to gravity effect maximum lung area is visualized, fluid level is well-defined and respiration control is easy. But for very ill patients standing in erect position is not possible in those cases radiographs can be taken in semi-erect or supine position.

The PA position allow compression of breast tissue, reduction of heart magnification and reduction of radiation dose to thyroid gland.

Images are taken on arrested deep inspiration. The full inspiration ensures visualization of lung cavity on a radiograph and hence providing more details to the reader. To assess whether the radiograph is taken in full inspiration we can count number of ribs in a radiograph it should be six anterior ribs and ten posterior ribs.



AP Projection

The anterior side of patient is towards the x-ray tube. This projection is only recommended when patient is unable to perform PA projection. Often used frequently in acute conditions in intensive care units. A magnified mediastinal shadow is produced due to increased distance between heart and image receptor. Images are to be taken in full inspiration. Images can be taken in sitting or supine position.

Precautions and Suggestions to improve the quality of radiograph

- A brief detail of the procedure along with rehearsal if required should be given to the patient for best results.
- Respiratory movement should be repeated two to three times before the procedure to see whether the patient is enabling to hold his breath except in very sick patients or in emergency.
- When command to hold the breath is given it should be ensured that patient is able to understand the command. More caution is to be taken in elderly patients having hearing problems and in case a patient is a migrant and is not able to understand the language, proper guidance is required.
- Patients who are unable to do basic arm position technique they are motivated to enclose the arms around the chest stand.
- The exposure time should be less so that patient can hold the breath. Hence x-ray equipment with better efficiency are needed to be installed.

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