Angulation Roentgenograms in Obscure Lung Lesions: A Standardized Technique

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Postero-anterior films of the chest frequently fail to reveal satisfactory evidence of the pathology which may be present. To obtain a better perspective of the lung lesions, it is often necessary to resort to lordotic and oblique films. The value of such positional roentgenograms, however, has been limited because the importance of definite methods of standardizing these films has not received sufficient consideration.

Sherman W. Atwell1 recently stressed the importance of standardized oblique roentgenography of the chest, and observed that properly positioned oblique films can “open” obscure areas of the hilum, apex, and other parts of the lung. He has described an apparatus for standardizing films in the oblique projection.

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FIGURE 1: Lordotic positioning apparatus attached to cassette holder with patient in correct position.

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The value of the lordotic position in the clarification of obscure lung
lesions is well recognized. Clinicians, however, do not avail themselves
sufficiently of this projection, possibly because of the fact that text-books
have not stressed its importance and because no generally accepted tech-
nique has been described. The exact angulation of the lordotic position
when a chest film is taken seldom receives proper consideration, and con-
sequently it is difficult to duplicate accurately a lordotic film at a subse-
quent examination. Moreover, no mechanism is in general use which enables
the radiologist to determine definitely, for comparative purposes, the degree
of angulation of the lordotic position of the patient. We have found that
a variation of five degrees in the lordotic positioning of a patient may make
an important difference in the pathology observed on the film. The detec-
tion of the presence of a lung cavity may depend on this small degree of
angulation.

Difficulties may also be met within chest films taken in the oblique

![Figure 2: Detailed diagram of lordotic positioning apparatus; B, denotes details of metallic arc.](image-url)
position. Here again there is no general acceptance of a standardized technique for duplicating the x-ray film, or of measuring the degree of angulation of the patient.

We have devised a mechanism for each of these positions which will permit the exact determination of the degree of angulation in the lordotic as well as oblique x-ray film of the chest.

The lordotic positioning apparatus consists of a metallic frame which can be easily attached to the cassette holder by means of metallic hooks or other attaching means at its upper end (Figure 1). The manner of attaching the apparatus will vary to conform with the different x-ray units. A board is hinged to the metallic frame and adjusted, by means of a stud, to a metal arc which is notched at 5 degree intervals to give the exact angulation. This metal arc has a radius or six and one-half inches and permits lordotic angulation from 30 to 55 degrees. Figure 2 presents a diagram of the lordotic positioning apparatus and gives its exact measurements.

In positioning the patient for a lordotic film the back rests against the angled board and the cassette holder, the elbows are directed anteriorly to bring the scapulae away from the lung fields, as will be noted in Figure 1. In taking such a film the cassette is placed at the same height as for a postero-anterior chest roentgenogram; however, the tube is lowered seven inches and angled upward 10 degrees. Other technical factors include,
focal-film distance of 48 inches, 10 milliamper-seconds, and the KVP is increased 4 kilovolts above that used in the PA view for that patient. The average angulation used is 45 degrees; however, a thin thorax is best positioned at 55 degrees, a deep chest at 30 or 35 degrees.

The oblique positioning apparatus consists of a similar frame with the Board attached at the center of its vertical axis. The degree of angulation is measured by a protractor which is fixed to the upper end of the apparatus (Figure 3). This apparatus is so constructed that it can also be attached to the fluoroscopic carriage (Figure 4). After the desired position is obtained fluoroscopically and the angulation definitely noted, the apparatus is then placed on the cassette holder and an x-ray film of the patient is taken in the same position as determined during fluoroscopy. Figure 5 gives a detailed diagram of the apparatus which is designed to be used on both the fluoroscopic carriage and cassette holder.

In taking such a film the technique is similar to that for a postero-anterior film; however, the KVP is increased 8 kilovolts to compensate for the obliquity of the patient and the added distance between the patient and the cassette.

A number of films are presented which demonstrate the possibilities of lordotic and oblique roentgenograms with variable predetermined degrees of angulation (Figures 6, 7 and 8).

FIGURE 4: Oblique positioning apparatus attached to fluoroscopic carriage with patient in position.
FIGURE 5: Detailed diagram of oblique positioning apparatus.

FIGURE 6: Arrow points to cavity in lordotic roentgenogram not visible in PA view.
SUMMARY

The diagnostic limitations of postero-anterior films of the chest and the value of standardizing lordotic and oblique projections are discussed.

A relatively simple method for obtaining predetermined angulation roentgenograms is presented.

Types of angulation apparatus are described for both lordotic and oblique films.

The possibilities of this method of chest roentgenography in obscure chest lesions is demonstrated.

Tomographic films frequently clarify chest lesions, but the required equipment is expensive and often not available. Moreover, the procedure

FIGURE 7: Arrow points to cavity in lordotic view, not evident in PA film.

FIGURE 8: Giant cavity clearly outlined in oblique roentgenogram as compared to PA view.
is quite intricate and takes a good deal of time. Angulation films will in many instances eliminate the necessity for tomograms.

**RESUMEN**

Se discuten las limitaciones de las radiografías en postero-anterior y el valor de la estandarización de las proyecciones lordótica y en oblicua.

Un método relativamente sencillo para obtener una angulación prede-terminada en las roentgenografías se presenta.

Se describen los tipos de aparatos de angulación tanto para la posición en lordosis como en oblicua.

Se demuestran las posibilidades de este método de radiografía del torax en las lesiones obscuras.

Las películas tomográficas frecuentemente aclaran estas lesiones del torax pero el equipo requerido es costoso y a menudo no se obtiene. Mas aún, le procedimiento es complicado y requiere mucho tiempo. Las películas en angulación en muchos casos eliminan la necesidad de tomogramas.

**RESUME**


Ils présentent une méthode relativement simple pour obtenir des radiographies selon différentes positions.

Ils donnent la description des techniques pour les positions en lordose et en oblique.

Les possibilités de cette méthode de radiographies pulmonaires dans les cas où les lésions ne sont pas nettes sont ainsi démontrées.

Fréquemment les tomographies permettent de préciser les lésions thoraciques, mais elles nécessitent un équipement cher et souvent impossible à se procurer. En outre, la technique en est souvent très compliquée, et prend beaucoup de temps. Les radiographies en différentes positions, dans bien des cas, permettent qu'on se passe de tomographies.

**REFERENCE**