

## Alternate Axial Shoulder Projections

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Acromial spurring, bursitis, impingement, rotator cuff strains, tendonitis and traumatic injuries to the shoulder are familiar reasons for shoulder pain. To assist in the diagnosis, plain-film radiography is indispensable for studying shoulder abnormalities. Similarly, radiographs help to demonstrate the relationship of the glenoid fossa and the proximal humerus.

Common anteroposterior projections of the shoulder include internal and external rotational views. However, to obtain an axillary view of the proximal humerus, several different approaches have been described. The inferosuperior axial projections (Lawrence and West Point methods) require the patient to be in a recumbent position with the arm abducted.<sup>1-3</sup> These projections are time-consuming for the radiographer and cumbersome to place the x-ray tube in the required positions. Other modifications include the inferosuperior axial (Clements modification) and the superoinferior axial projections as described by Greathouse, Ballinger and Frank.<sup>2,3</sup> The Clements modification method places the patient in a lateral recumbent position and requires an awkward placement of the x-ray tube and cassette. Moreover, the superoinferior axial projection results in image magnification unless a curved cassette is used. Though these projections are useful and necessary in a number of instances, the axial projection can be obtained in a quicker and more efficient manner.

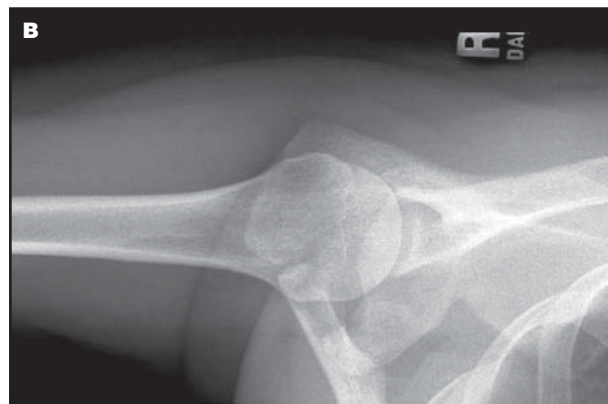
This article describes 2 such methods of imaging the shoulder in an axial position. Both methods are advantageous because they are quick and easy

to perform and require limited movement of the x-ray tube. The drawback is that these methods can only be performed on ambulatory and mobile patients. The reason for this limitation is that both methods require the patient to raise an arm above the head and to bend at the waist.

In any case, these positions demonstrate less magnification when compared with the traditional superoinferior axial projections due to the decrease in object-to-image receptor distance (OID). The exception would be if a curved cassette is used as described by Ballinger and Frank.<sup>3</sup> Regardless, the positions are beneficial and demonstrate the same anatomy when compared with the more traditional maneuvers.



**Fig. 1.** Erect oblique 5° to 10° right anterior oblique with arm extended method. **A.** Patient positioning. **B.** Resulting image.



## Methods

### *Erect Superoinferior Projection with Extended Arm*

For the initial projection, the patient is erect, standing facing the upright Bucky, and is positioned in a 5° to 10° slightly anterior oblique direction. The arm is raised upward and the head is turned away from the affected arm. The x-ray beam is perpendicular to the radiographic imaging receptor and is directed to the shoulder joint. (See Fig. 1A.) The resulting radiograph shows the relationship of the glenoid fossa and the head of the humerus as well as the coracoid process. (See Fig. 1B.) The acromion and acromioclavicular joint are superimposed over the humeral head.

### *Leaning Superoinferior Projection with Extended Arm*

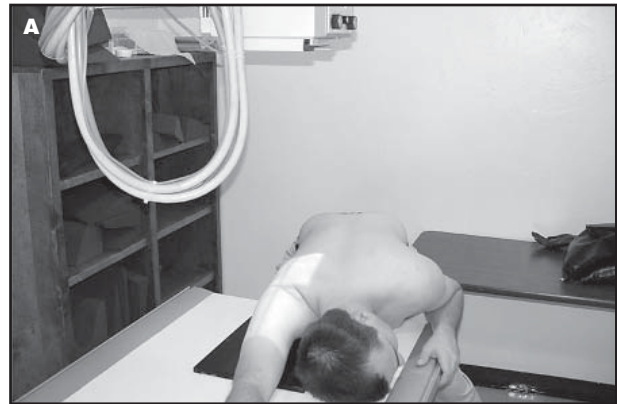
For the second projection, the patient sits on a stool and leans over the end of the x-ray table. (See Fig. 2A.) The arm is raised upward and the head is turned away from the affected arm. Again, the patient is positioned in a slight 5° to 10° anterior oblique direction. The x-ray beam is directed perpendicular to the radiographic imaging receptor and the shoulder joint. The resulting radiograph shows the relationship of the glenoid fossa, the head of the humerus and the coracoid process (see Fig. 2B), and is comparable to the upright example (see Fig. 1B).

## Discussion

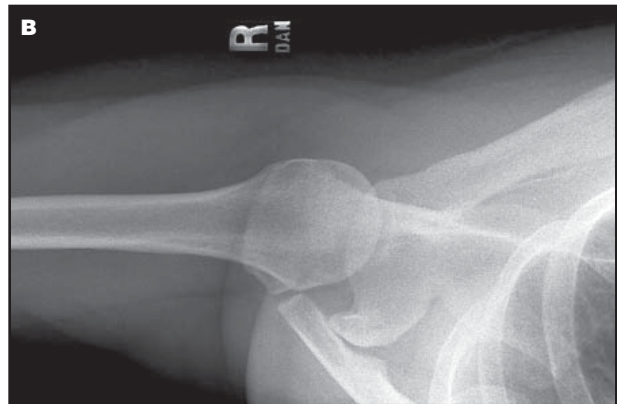
These positions are easy to perform on mobile patients and require little manipulation of the x-ray tube. They differ from other methods in that the arm is fully extended. Again, it is important to emphasize that this technique should be employed only on patients who can perform an arm extension maneuver. Additionally, these positions can be completed with a Bucky and grid, which helps to improve image quality by minimizing scatter radiation.

A second point to consider is that the OID is significantly reduced compared with the superoinferior method described by Ballinger and Frank,<sup>3</sup> reducing magnification of the image. Both of these positions demonstrate the joint relationship of the proximal humerus and glenoid fossa; thus, the acromioclavicular articulation and the neck of the coracoid processes are well visualized.

In conclusion, these methods are reliable and useful when radiographing ambulatory and mobile patients. The resulting radiographs demonstrate the same anatomy as the more traditional methods and allow for greater flexibility. ♦



**Fig. 2.** Leaning oblique 5° to 10° right anterior oblique with arm extended method. **A.** Patient positioning. **B.** Resulting image.



## References

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2. Greathouse JS. *Delmar's Radiographic Positioning Procedures*. Albany, NY: Delmar Publishers; 1998:166-169.
3. Ballinger PW, Frank ED. *Merrill's Atlas of Radiographic Positions and Radiologic Procedures*. 9th ed. St Louis, Mo: Mosby-Year Book Inc; 1999:168-174.