Lateral Scapula Radiography

Introduction

The lateral scapula ("Y" view) of the shoulder is one of those "signature" views that radiographers approach in a variety of ways. The techniques can be divided into AP and PA. The techniques can be further divided according to the patient's arm position. The best approach is the one that works for you and achieves the imaging objectives. Note that I have presented almost all of the images as a right shoulder- this is to facilitate comparison only. This page considers the lateral scapula radiographic techniques in a trauma setting- information on the objectives and techniques of the outlet view of the shoulder are not specifically considered.

The Lateral Scapula Projection Needs a Clinical Context

Radiography is best performed with a clinical context in mind- the lateral scapula projection is no exception to this general principle. A trauma lateral scapula projection is completely different to a Neers (outlet) projection both in its technique and objectives. If the anatomy and potential pathology are understood, the radiography will be more meaningful.

Anatomy

The acromion and coracoid form a "Y" or "peace sign" shape with the body of the scapula. The head of the humerus should be normally centred to the middle of the "Y" shape as shown. The acromion and distal end of the clavicle form a "roof" over the shoulder joint and prevent superior displacement of the humeral head. A group of muscles and their tendons known as the rotator cuff surround the shoulder and contribute to movement of the humerus.

The PA Approach

These images all taken with the patient in the PA oblique position. They could be performed equally well in the AP position.

<table>
<thead>
<tr>
<th>Hand on Hip</th>
<th>Arm by Side</th>
<th>&quot;Napoleon&quot; Technique</th>
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The disadvantage of this position is that the patient’s chest is in a very lateral position. This position requires a greater X-ray exposure than the other two techniques.

This position superimposes the patient’s humerus over the body of the scapula. This is not ideal for trauma radiography where you are attempting to achieve an unobstructed view of the scapula (OK for Neer’s view).

This is my preferred lateral scapula positioning. For the left scapula, I would ask the patient to place his/her left hand on the right shoulder as shown (cross arm adduction). The left scapula tends to roll into the lateral position with very little rotation of the chest.

The photograph is taken from a textbook titled "radiographic Image Analysis". The position looks too lateral. I would also question the term "proper". Although this is my preferred position, there are other legitimate positioning techniques depending on your objectives.

**Caudal Angulation**

When do you use caudal angulation and how much?

Patients tend to lean/stoop forward when positioned for lateral scapula radiography. How much caudal angle to use is a matter of practice and judgment. It is prudent to err on the side of too much caudal angle rather than too little.
The Supine AP Approach

Trauma patients will often present in the supine position with little scope for movement of any kind. To achieve a lateral scapula in a supine patient, the patient is rolled affected side up and a triangular positioning sponge inserted. This approach can be very challenging for a variety of reasons:

- if the patient is unable to adopt the Napoleon position, considerable rotation of the patient will be required to achieve a true lateral scapula position
- if a non-grid technique is employed, the image may be degraded by lack of contrast
- if a stationary grid is employed, grid cut-off is a common problem
- patient may be unable/unwilling to be rolled

The answer sometimes is to use an alternate view- IS or SI

In order to minimise the rotation of the patient required to achieve a true AP position, have the patient adopt the "Napoleon" Position

<table>
<thead>
<tr>
<th>Patient's Affected Arm in Neutral Position</th>
<th>Patient's Affected Arm in the &quot;Napoleon&quot; Position</th>
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</table>

With the patient's arm in the neutral position, the patient must be rotated considerably to achieve a true lateral scapula position. This has disadvantages in terms of difficulty of positioning, radiation dose and contrast/scatter degradation of the image.

With the patient's arm in the "Napoleon" position, there is very little rotation of the chest required to achieve a true lateral scapula position.

Good Projection when Achieved
One of the shortcomings of the lateral scapula projection is that it is frequently accepted by radiographers despite malposition. To assess gleno-humeral alignment, the position barely satisfies. When the malposition is corrected, the observer can be confident that there is no subluxation/dislocation of the gleno-humeral joint.

What Went Wrong?
<table>
<thead>
<tr>
<th>Image 4</th>
<th>Image 5</th>
<th>Image 6</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Image 4" /></td>
<td><img src="image2.png" alt="Image 5" /></td>
<td><img src="image3.png" alt="Image 6" /></td>
</tr>
</tbody>
</table>

Remarkably similar to image 3.
Anterior dislocation of the humeral head
Slightly under-rotated and severely foreshortened.

Similar to image 5 but a little worse.
Fractured neck of humerus noted.

Extreme malpositioning.
This is an extreme example of foreshortening. If this was a PA projection, the patient is leaning forward too much (understatement). Note that the glenoid and humeral head appear at the inferior aspect of the scapula.
Note also tendon screws.
Probably underexposed.
Lack of image contrast associated with non-grid technique.

<table>
<thead>
<tr>
<th>Image 7</th>
<th>Image 8</th>
<th>Image 9</th>
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<td><img src="image4.png" alt="Image 7" /></td>
<td><img src="image5.png" alt="Image 8" /></td>
<td><img src="image6.png" alt="Image 9" /></td>
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</table>

...what went wrong- not much
This is a satisfactory position. The patient is leaning slightly too far forward (assuming PA projection). Note that the humeral head and glenoid are projected a little inferiorly in relation to the "Y" (compare with image 1). There is also more scapula seen above the humeral head/glenoid than in image 1.

The humeral head is dislocated anteriorly. The malpositioning is resulting in an extremely foreshortened scapula. Note how much of the scapula is projected above the glenoid. This position tends to occur in the erect PA position when the patient leans forward to position their shoulder on the erect bucky/IR. You can generally anticipate this effect and angle caudally to some degree as a matter of routine.
A very good position spoiled only by bra hardware. Bra strap is also visible. Fortunately, the bra hardware is not overlapping the bony shoulder anatomy.

Not so fortunate with the bra hardware positioning: - under-exposed, - foreshortened, - humerus overlying scapula.

Foreshortened and under-rotated. The patient needs to be further rotated towards a lateral position.

This is a well-positioned lateral scapula in a child taken upright in the Napoleon position. Note that there is a subtle clavicle fracture. Further images here.

Good position.

Scapular Pathology
<table>
<thead>
<tr>
<th>Description</th>
<th>Image Description</th>
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<tbody>
<tr>
<td>There is a fracture of the scapula immediately inferior to the glenoid. There also appears to be a fracture of the distal clavicle (not marked)</td>
<td><img src="image1.jpg" alt="Image of scapula with marked fracture" /></td>
</tr>
<tr>
<td>There is a fracture of the neck of humerus (arrowed)</td>
<td><img src="image2.jpg" alt="Image of humerus with marked fracture" /></td>
</tr>
<tr>
<td>There is a fracture involving the glenoid (not arrowed)</td>
<td><img src="image3.jpg" alt="Image of glenoid with marked fracture" /></td>
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<td>There is a grade 3 dislocation of the AC joint (not arrowed). There also appears to be a clavicle fracture (top arrow) and a fracture fragment inferior to the clavicle (bottom arrow). Note that the lateral scapular projection is notorious for throwing up false AC joint dislocations - not a good view for assessing the AC joint.</td>
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<td>There is a fracture of the neck of humerus. The humeral head is inferiorly subluxed. This is known as a pseudosubluxation and is caused by distention of the shoulder joint capsule by blood.</td>
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</tbody>
</table>
There is a fracture of the acromion (arrowed). Fractured coracoid process (arrowed).

**Concomitant Pathology and Incidental Findings**

Shoulder radiography can be fertile territory for concomitant pathology and incidental findings. The following cases provide some typical and unusual examples.

This elderly demented patient was referred for radiography of his shoulder following a fall at the nursing home. The patient's combative behaviour associated with his dementia necessitated an adaptive approach to his shoulder radiography. The patient's shoulder imaging was all performed bedside with the patient in a supine position. AP and lateral views of the shoulder where achieved with opposite 45 degree tube angulations to produce two compromise views at 90 degrees. This image is the 'lateral scapula' image which is imperfectly positioned as expected. The radiographer noted the large pleural effusion (black arrow) and asked the referring doctor if a chest X-ray could be included in the series. The chest image revealed a large pleural effusion and significant right lower lobe collapse and consolidation. An underlying malignancy was considered to be a possible cause.

The radiographer's diligence in identifying the pleural effusion facilitated timely chest radiography, and obviated the need to call the patient back from the nursing home the next day for further imaging.

The compromise AP shoulder image demonstrates no acute bony injury. There is a veiled opacity underlying the right lung associated with the right pleural effusion. This is difficult to appreciate without the other lung for comparison.
Modified Technique for Trauma Patients

This patient presented in an erect sitting position with very limited movement. The radiographer used the modified lateral scapula technique by sitting him forward and placing a 45 degree sponge and X-ray cassette behind him and directing the X-ray beam as shown above. The image successfully demonstrates an anterior shoulder dislocation.

This technique can be employed with patients who have very limited movement. The basis of the technique is to angle the X-ray beam rather than the patient. I have seen this technique used successfully in a patient who was sitting on a trolley/bed/barouche/gurney.

Can the Lateral Scapula Projection Reliably Demonstrate Shoulder Dislocation?

My department has utilised the lateral scapula projection as the view of choice for the demonstration of shoulder dislocations for the last 30 years. There are departments that strictly forbid the lateral scapula view for assessment of shoulder dislocation. They can’t both be correct ... or can they?

The exponents of the lateral scapula view would argue that this patient...
suggest that this GH joint is normally aligned and I would tend to agree with them.

The counter argument is that there are several conditions where the results can be equivocal. Amongst these conditions are the pseudosubluxation and the posterior dislocation.

The Counter-Argument

These images lack quality— they were taken on night shift using a bedside technique in ICU. The referring doctor was specifically looking for gleno-humeral joint dislocation.

- There is evidence of shoulder arthropathy.
- The humeral head appears inferiorly subluxed.
- There is a defect in the humeral head medially which may represent a reverse Hill-Sachs lesion.

The lateral scapula view is underexposed. Despite this image quality issue, the humeral head is demonstrated to be neither clearly dislocated nor enlocated. This case demonstrates the argument against the lateral scapula view.

The IS view demonstrates a humeral head subluxation. This is a radiographer initiated supplementary view intended to clarify the alignment of the glenohumeral joint.

Discussion

In one study, it was found that ".... the axillary view and scapular "Y" view visualized associated pathology equally well" (1)

The Neer’s (outlet) View

This is the Neer’s position. Note that the intention and coning are to demonstrate the subacromial space

This may not be a textbook Neer’s view, but it does demonstrate a subacromial spur (arrowed)

With normal humeral elevation, the subacromial structures are compressed up against the acromion. If there is a bony spur projecting into the acromial space (as shown above), the subacromial structures can become damaged/inflamed.
Summary
The lateral scapula view is one of those views that is a pleasure to perform once it is mastered. There is a great deal of satisfaction in being able to produce a high quality lateral scapula image with consistency.

Relevant wikiRadiography Links
- Shoulder - SI vs Lateral Scapula
- Clavicle Radiography

References

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