

# ***Common Problems with the Mediolateral Oblique: How to Help Your Technologist***

## **Part 2 – Not Enough Pectoralis and the Sagging Breast**

By Louise C. Miller, RTRM, FSBI

This is the second of a 3-part series on common positioning problems and how they can be addressed by your technologist.

### **How much pectoralis is enough?**

The pectoralis muscle serves as an anatomical landmark important to both the technologist and radiologist for ensuring proper positioning and thereby maximizing the amount of breast tissue included in the mammogram. Each of the following factors play an important role in maximizing the amount of breast tissue and pectoralis included in the image.



Louise C. Miller, RTRM,  
FSBI

### **Length of muscle:**

Visualization of the pectoralis muscle down to the level of the posterior nipple line (PNL) should be demonstrated on the mediolateral oblique (MLO) projection.

### **Width of muscle:**

There should be a wide margin of the pectoralis muscle in the axilla relative to the muscle width at or below the PNL on the MLO projection.

### **Shape/opacity of the muscle:**

The muscle should appear to be convex or straight and radiolucent on the MLO projection. A concave shape of the muscle may indicate that the muscle is not relaxed, which will hinder efforts to pull breast tissue away from the chest wall and thus will not appear radiolucent.

### **The appearance of the pectoralis is dependent on the following factors:**

1. Equipment setup
2. Patient position
3. Patient body habitus

The technologist should note any barriers to proper positioning on the history sheet. Comparison with prior images is critical as this will confirm the ability to accomplish positioning goals or any consistent limitations.

### **Maximizing visualization of the pectoralis muscle: problems and solutions**

**Problem 1:** Muscle is not visualized down to the level of the PNL, resulting in possible exclusion of medial breast tissue (Figure 1).

#### **Causes/solutions:**

**Equipment setup:** The angle is too steep. Lower the angle by 5°.

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**Patient position:** The patient must be facing forward, with both shoulders, hips, and feet oriented towards the machine.

**Problem 2:** The margin of muscle at the axilla is narrow, resulting in potential exclusion of posterior lateral/medial breast tissue (Figure 2).

**Causes/solutions:**

**Equipment setup:** The corner of the image receptor (IR) is placed too far forward in the axilla. Place the IR just anterior to the latissimus dorsi.

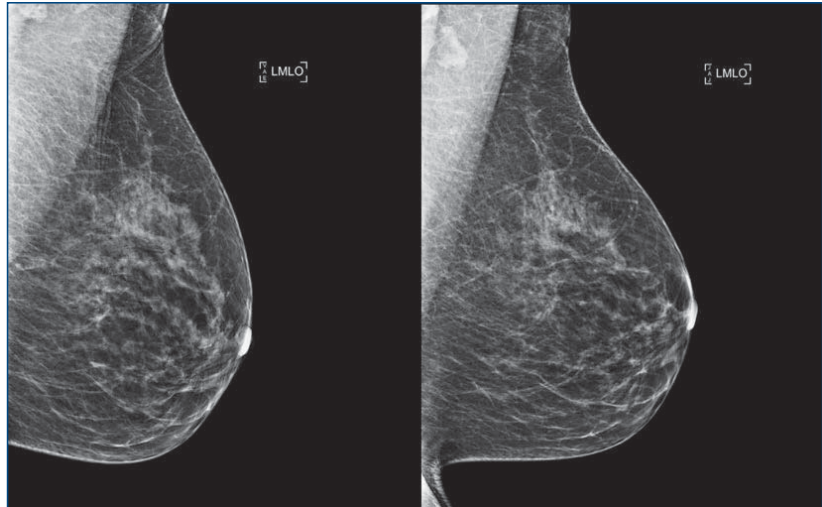
**Patient position:** The patient pulls her shoulder and thorax back when compression is applied. Maintain your hand on the patient's shoulder to push it forward and down. The compression paddle should lie slightly anterior to the suprasternal notch.

**Problem 3:** The muscle is concave and/or radiopaque.

**Causes/solutions:**

**Equipment setup:** The IR is too high, so the shoulder and arm are not relaxed. Lower the height of the IR so the top is parallel to the level of the sternoclavicular joint or halfway between the top of the shoulder and the axillary crease.

**Patient position:** The arm, shoulder, elbow, and/or hand are tense. Make sure the shoulder, elbow, arm, and hand are relaxed. The elbow should be bent and behind the IR, with hand resting on the machine.



The pectoralis does not extend below the nipple line (left). Visualization is improved after lowering the angle (right).

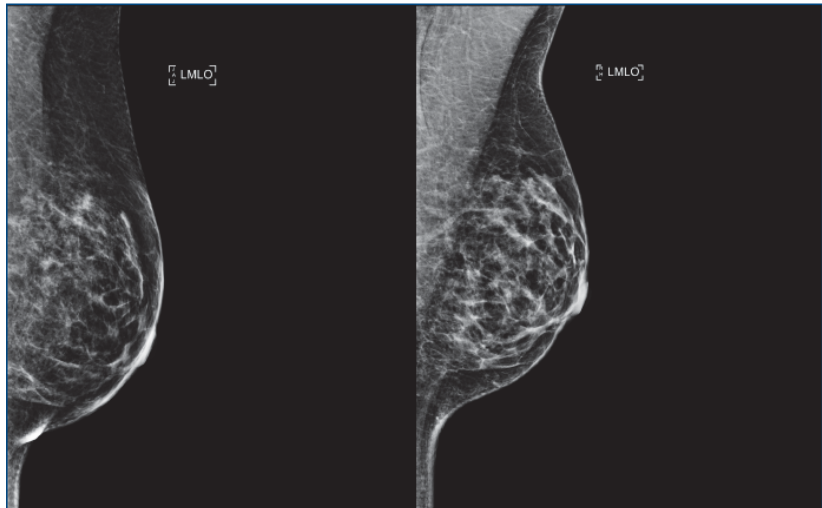


Figure 2: The pectoralis is narrow in the axilla (left). It is thicker after adjustment of the image receptor (right).

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### **The sagging breast**

Our goal for all mammographic imaging is to maximize visualization of breast tissue. On the MLO it is incumbent on the technologist to position the breast in its true anatomical position, with the PNL as close to perpendicular to the chest wall as possible. A technique employed by the technologist and often referred to as the “up and out” position helps us accomplish this goal. This maneuver, in combination with adequate compression, will help to separate the fibroglandular tissue and thus minimize superimposition. Proper compression also helps to decrease motion blur and reduces radiation exposure. This presents an especially challenging obstacle for the technologist when positioning patients with extremely large and heavy breasts, who often have large, fatty axillae. Even with maximum tolerable compression, the upright position of the patient and resulting effects of gravity make it virtually impossible to maintain the breast in the up and out position despite the technologist’s best efforts. If this is the case, an anterior compression view should be acquired.

**Problem 4:** The breast is not maintained in the up and out position, resulting in potential superimposition of structures in the anterior breast, increased probability of motion, and increased and unnecessary radiation exposure.

#### **Causes/solutions:**

**Equipment setup:** Compression should be applied only until the breast tissue is taut, and it should not be painful.

**Patient position:** The technologist must hold the breast in the up and out position until the compression is complete. Visualize the PNL as close to perpendicular to the chest wall as possible. The technologist should anchor the breast with the base of the thumb, pushing up and out in the inframammary fold and lower inner quadrant area until compression is completed. The breast may need to be hyperextended during compression or it will fall back down.

### **Summary**

Regardless of the experience and expertise of the technologist, the perfect image cannot be produced 100% of the time. According to a study published by Basset et al in 1993,<sup>1</sup> the pectoralis was within 1 cm or below the PNL on the MLO projection only 81% of the time because of variations in body habitus and patient conditions. Improvement was seen in 68% after standardized positioning training. Technology has changed and so have positioning techniques. Unfortunately, given the availability of online education and lack of updated positioning training requirements by the Mammography Quality Standards Act or our licensing organizations, most technologists do not receive updated hands-on positioning training until it is critical or mandated by the ACR as part of the accreditation process. Hopefully this series of articles will be helpful as we all work together to create a high standard of excellence in breast imaging. ❖

### **REFERENCE**

1. Bassett LW, Hirbawi IA, DeBruhl, N, Hayes MK. [Mammographic positioning: evaluation from the view box](#). *Radiology*. 1993;188(3):803-806.