



## orthopedic assessment of strains & sprains

There is a saying in the world of medicine: “Never treat without a diagnosis.” This concept could be slightly modified for the world of clinical orthopedic massage therapy (COMT): “Never treat without an accurate assessment.” The essence of COMT is that treatment is not oriented toward general wellness, but is being done to remedy a specific myofascial complaint. This requires an accurate assessment.

### THREE KEY ORTHOPEDIC TESTS

There are many special orthopedic assessment tests that can be learned, and it is certainly good to know as many of them as possible. However, the majority of clients who present for clinical orthopedic work have hypertonicity and strains of musculature and/or ligament

complex (ligament/joint capsule/fascial) sprains, and can be assessed with three key orthopedic tests: active range of motion (AROM), passive range of motion (PROM), and manual resistance (MR).

AROM is done by asking the client to actively move the target joint through a range of motion by contracting the musculature of that joint (Figure 1). With PROM, the client remains relaxed as the therapist brings the client’s joint through the range of motion (Figure 2). MR is performed by asking the client to

attempt to move the joint through a range of motion, but adding resistance with your hand so that the client cannot succeed in moving the joint (Figure 3). In each case, the test assesses a certain tissue of the body by placing a physical stress on it. If the tissue is healthy, no pain/discomfort will be experienced and the test is considered to be negative. If the tissue is unhealthy, the client will experience pain/discomfort and the test is positive. Understanding which tissues are stressed with each assessment test allows for the therapist to critically reason and accurately determine the client's condition. This allows for more efficient and effective treatment. Note: Each client's sensitivity to pain and when he or she reports pain varies, therefore it should always be kept in mind that orthopedic assessment tests are not always 100% accurate.

#### **ACTIVE RANGE OF MOTION (AROM)**

AROM stresses/assesses the client's mover musculature by requiring it to concentrically contract; if the mover musculature is strained, spasmed, or injured in any way, pain will be felt. It also requires the joint to move through a range of motion; this stresses/assesses the ligament complex by moving and stretching it. So if the ligament complex is sprained or injured, it will also cause pain. And it stresses/assesses the antagonist musculature because it causes it to be lengthened/stretched as the joint moves through its range of motion. If the antagonist musculature is strained/spasmed/injured, it will also cause pain. Therefore, AROM will show positive if the client has a mover muscle strain, a ligament complex sprain, and/or an antagonist muscle strain. For this reason, AROM is considered to be a screening test that is performed

## **JOINT SURFACES**

When a joint is moved, if the bony joint surfaces are unhealthy (for example, degenerative joint disease, also known as osteoarthritis), pain will be present and the assessment test will be deemed positive. The health of the bony joint must be considered when making the assessment. A pathologic joint surface will show positive with AROM and PROM, but not MR (because the joint surface is not moved); in this regard, it is similar to the presentation of a sprain. Differentiating between the bony joint surface and the ligament complex is challenging, but can be done. Making this discernment is accomplished by keeping in mind that ligament sprains usually exhibit pain when they are stretched, whereas joint surfaces exhibit pain when they are compressed. Therefore, if we add compression to the joint, it will show positive for the joint surface and not the ligament complex; whereas if we stretch the soft tissue on one side of the joint, it will show positive for the ligament complex and not the joint surface. For example, if we right laterally flex the cervical spine, this compresses the right facet joints and stretches the left facet joint ligament complex. If the right facet joint is unhealthy, the client will experience pain on the right side; whereas, if the client has a ligamentous sprain on the left, the client will experience pain on the left side.

## **CONTRACTILE & NON-CONTRACTILE TISSUES:**

The terms contractile tissue and non-contractile tissue are often used when describing the soft tissues of the body. Classically, it has been stated that musculature is contractile, and the ligament complex is non-contractile. However, it is now understood that fascia has the ability to contract due to the development and presence of myofibroblastic cells. But this new understanding of fascial contraction does not affect our assessment using AROM, PROM, and MR assessment tests because fascial contraction is not voluntary, therefore we do not engage fascial contraction during AROM and MR. Fascial contraction is mediated through local tissue factors instead of the nervous system and is very slow to engage, requiring many minutes, whereas muscular contraction via the nervous system is instantaneous.

FOR MORE ON FASCIAL CONTRACTION, SEE THE BODY MECHANICS COLUMN, FASCIAL CONTRACTION, IN THE FALL 2008 ISSUE OF THE MTJ.





**FIGURE 1**  
ACTIVE FLEXION RANGE OF MOTION OF THE GLENOHUMERAL JOINT.

first. If it is negative, the client has no strain or sprain and theoretically the other two assessment tests do not need to be done. However, if it is positive, we know that the client either has a strain, a sprain, or both. PROM and MR are then performed to determine exactly which condition(s) the client has.

**PASSIVE RANGE OF MOTION (PROM)**

The mover musculature remains relaxed during PROM, therefore it is not assessed. However, because

the joint moves through a range of motion, the ligament complex is stressed; therefore sprained ligaments will show as positive. Similarly, joint motion causes the antagonist musculature to be stretched; therefore if it is strained, it will show as painful.

**MANUAL RESISTANCE (MR)**

MR stresses/assesses the mover musculature because it is required to isometrically contract. However, neither the ligament complex nor the antagonist musculature is stressed/assessed because the joint does not move.

**MAKING THE ASSESSMENT**

Making an accurate assessment is like assembling the



Understanding which tissues are stressed with each assessment test allows for the therapist to critically reason and accurately determine the client's condition.

**FIGURE 2**  
PASSIVE FLEXION RANGE OF MOTION OF THE GLENOHUMERAL JOINT.

pieces of a puzzle. Each test result gives us a piece. The key is to understand what each test does so that we can critically think through and reason what each result means. In effect, we are detectives that place these pieces into the puzzle to determine our client's condition. Following are the conclusions that follow from performing these assessment tests. Figure 4 places this information into flow chart form.

#### **PERFORM AROM**

If AROM is negative, the client does not have a strain or a sprain because all tissues were stressed/assessed and no pain was reported.

If AROM is positive, we know that the client either

has a strain of mover musculature, a sprain of the ligament complex, a strain of antagonist musculature, or a combination of these conditions because all of these tissues were stressed and therefore assessed. We now need to perform PROM to discern between these conditions.

#### **PERFORM PROM**

If PROM is negative, then the client does not have a ligament sprain and does not have an antagonist musculature strain, because this test



## MANUAL RESISTANCE

MR is meant to stress and assess only the musculature being asked to contract, not other tissues. Therefore, for MR assessment to be accurate, it is extremely important for resistance to be sufficiently strong so that the joint is not allowed to move. If the joint does move, then ligaments and the antagonist musculature will be stretched, and therefore also stressed and assessed, making a clear assessment of the contracting musculature more difficult to determine.

FIGURE 3 MANUAL RESISTANCE TO FLEXION RANGE OF MOTION OF THE GLENOHUMERAL JOINT.

stresses these tissues and they were not painful. If the client does not have a ligament sprain or antagonist strain, the client must have only a strain of the mover musculature.

If PROM is positive, then we know that the client has either a sprain of the ligament complex and/or a strain of the antagonist musculature because these tissues were stretched and assessed. It must be kept in mind that the client may also have a mover strain as well.

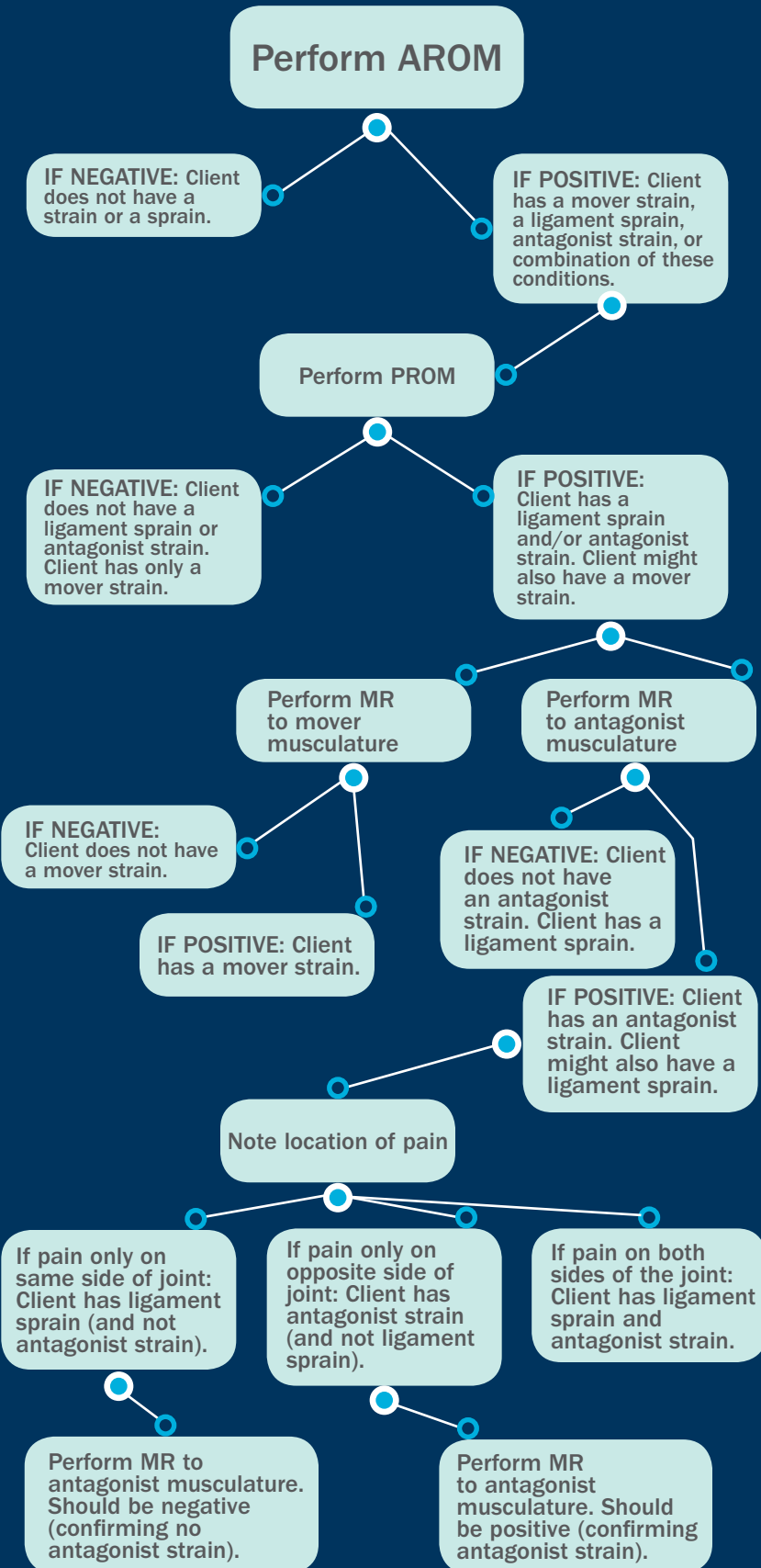
### PERFORM MR TO MOVER MUSCULATURE

To determine if they do also have a strain of the mover musculature, perform MR to the mover musculature. This causes it to contract, thereby stressing and assessing it. If it is negative, they do not have a mover strain. If it is positive they also have a mover strain; now we need to determine if the positive PROM was due to a ligament sprain or an antagonist strain, or both.

### DETERMINE LOCATION OF PAIN WITH PROM AND PERFORM MR TO ANTAGONISTIC MUSCULATURE

To discern between a ligament sprain and antagonist strain (or to determine if both are present), two things can be done. First, determine the location of pain dur-

**FIGURE 4**  
**FLOW CHART RUBRIC FOR**  
**ANALYSIS OF AROM, PROM,**  
**& MR RESULTS**

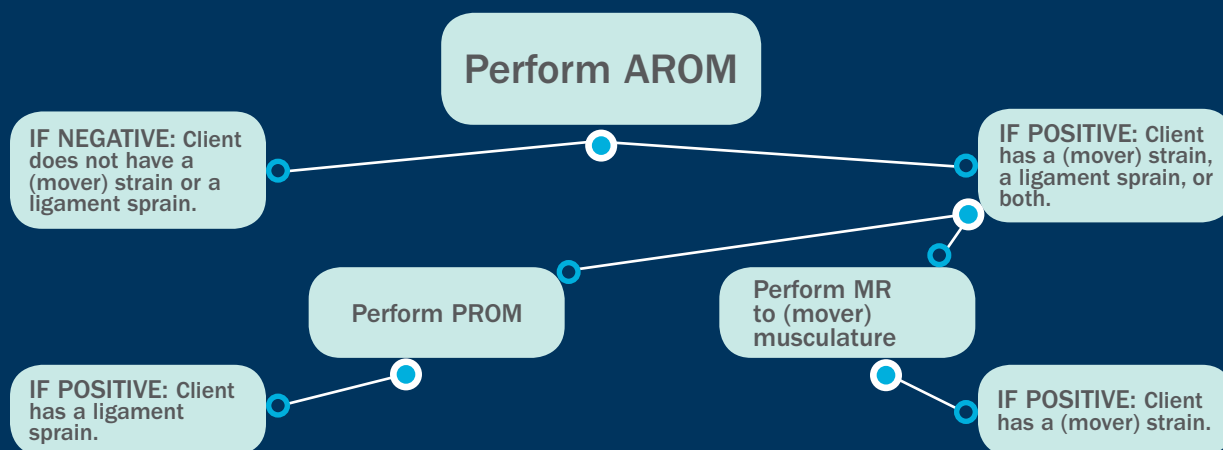


Making an accurate assessment is like assembling the pieces of a puzzle. Each test result gives us a piece.

## A SIMPLER APPROACH

Discussions of AROM, PROM, and MR often do not include consideration of the antagonist musculature. This simpler method of assessment can potentially lead to errors because strains of the antagonist musculature will be missed and can be blamed on ligament sprains. Therefore this method of assessment might not be as accurate; however it is much simpler. Using this simpler approach, AROM stresses/assesses (mover) musculature and the ligament complex; PROM stresses/assesses the ligament complex only; and MR stresses/assesses (mover) musculature only. Therefore positive AROM tells us that the client has a strain and/or a sprain; positive PROM then tells us if they have a sprain, and positive MR tells us if they have a strain (Figure 5).

## FIGURE 5 FLOW CHART RUBRIC FOR ANALYSIS OF AROM, PROM, AND MR WITHOUT CONSIDERATION OF THE ANTAGONIST MUSCULATURE



ing PROM. Was it on the same side of the joint as motion occurred, the opposite side, or both?

- If the pain was on both sides of the joint, the client has a ligament sprain and an antagonist strain.
- If the pain is located only on the same side of the joint, they have a ligament sprain and not an antagonist strain. Now perform MR to the antagonist musculature: It should be negative confirming that the client does not have an antagonist strain.
- If the pain is located only on the other side of the joint in the an-

tagonist musculature, the client has an antagonist strain and does not have a ligament sprain. Now perform MR to the antagonist musculature: It should be positive confirming that the client does have an antagonist strain.

### PUTTING IT ALL TOGETHER

Even though AROM, PROM, and MR assessment tests for mover and antagonist musculature, and the ligament complex are simple and straightforward, there are times when the combinations of positive and negative results for these tests can be a bit complicated. However, if we understand what is being stressed and assessed in each test, and we reason through the results, we can form an accurate and complete assessment of muscular strains and ligaments sprains with which our clients present. This will allow for thorough and effective clinical orthopedic massage therapy. ■



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