Pump up your musculoskeletal assessment

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A complete musculoskeletal assessment can tell you a lot about your patient’s body structure and function. In this article, we’ll review the techniques and assessment skills needed to perform this vital examination with confidence.

Get the big picture
To assess the musculoskeletal system, you carefully inspect your patient, examining the symmetry of the joints, muscles, and bones and checking for swelling, redness, and ease of movement. Then you palpate over the joints, noting any areas of warmth or tenderness. Lastly, you assess the patient’s range of motion (ROM), noting strength, crepitus, and any limitations.

As you observe each joint, watch for obvious deformities, such as bowlegs or knock-knees. You’ll notice a malalignment of bones in conditions like Dupuytren’s contracture—a flexion contracture of the ring finger caused by plaque overlying the flexor tendon in the hand.

The acute involvement of only one joint might suggest trauma, septic arthritis, or gout. Rheumatoid arthritis typically involves several joints, and is symmetrically distributed.

Next, you need to palpate each specific area. A boggy or doughy feeling and swelling in the joints, muscles, or bones could be a sign of synovitis (an inflammation of the synovial membrane) or an effusion from excess synovial fluid in a joint, such as in arthritis or an infection. Palpat ing tenderness over tendons may be indicative of tendinitis. If you palpate an effusion over an area where a muscle or tendon rubs against bone, your patient has bursitis (inflammation of the disk-shaped synovial sacs adjacent to muscles, tendons, and bones, which are necessary for these structures to glide over each other).

Now let’s look at musculoskeletal assessment in more detail.

Starting at the top
Ready to begin? First, examine and palpate the temporomandibular joint (TMJ). Swelling, tenderness, or decreased ROM suggests an inflamed joint. To locate and palpate the TMJ, place the tips of your index fingers just in front of the tragus of each ear and ask the patient to open his mouth. Your fingertips should “drop” into the joint as the mouth opens. Note any swelling, or tenderness. Was ROM smooth? Snapping or clicking may be felt or heard in a normal assessment.

Also, ask the patient to jut his jaw forward, extending the bottom teeth in front of the top teeth. Swelling, tenderness, and decreased ROM may suggest arthritis. Palpable clicking may indicate meniscus injury, synovial swelling from trauma, or dislocation.

Next, observe the neck for symmetry, noting any bulges. Palpate for lumps or tender areas. Ask the patient to perform ROM of the head, turning his head side to side, then moving it up and down. Note ease of movement, ability, and any complaints of pain or tenderness.

Shoulder to shoulder
As you examine both shoulders, be sure to observe them anteriorly and posteriorly. Note any swelling, deformity, muscle atro-
phy, or fine muscle tremors.

Observe the color, skin alterations, or any abnormal positioning of the shoulders. A variety of pathologies can cause abnormal positioning of one or both shoulders. Muscle atrophy, for example, may indicate lesions in the cervical nerves. Scoliosis may cause elevation of one shoulder. Anterior dislocation of the shoulder is a painful experience, and the patient’s shoulder will be flattened instead of rounded. Posterior dislocation is relatively rare, but if it’s present, a prominent humeral head indicates it.

Next on your assessment checklist is palpating, in order, the top of the shoulder (the acromioclavicular joint), the lateral aspect of the shoulder, the deltoid rotator cuff, and, finally, the anterior shoulder for the bicipital tendon.

Lastly, the patient should perform ROM for this joint. Ask him to raise his arms above his head, then extend them sideways—palms up and down—and lower his arms back to his sides. Observe the patient’s movements during this exercise. An inability to perform these movements may indicate bursitis, sprains, tendinitis, or rotator cuff tears.

Moving down the line
Time to move on to the elbows. Support the patient’s forearm and flex the elbow at a 70-degree angle. Palpate the medial and lateral epicondyles and the olecranon process of the ulna. Inspect the contours of the elbow. Note any nodules or swelling. Tenderness in the lateral epicondyles may indicate lateral epicondyritis (tennis elbow) or medial epicondylitis (pitcher’s or golfer’s elbow).

The ROM checklist for this joint includes flexion and extension at the elbow and pronation and supination of the forearm. Ask the patient to bend and straighten the elbow, testing flexion and extension. Then, with the patient’s arms at his sides and his elbows flexed, ask him to turn his palms up and then down.

Hand and wrist movement
You’ll want to inspect the patient's wrists and hands for contour and symmetry. Take note of any nodules, redness, swelling, or deformities. Palpate the wrist and finger joints and observe any bogginess or tenderness. Be especially gentle when examining elderly patients and those with a history of arthritis.

Now, let’s test these joints for ROM. Ask the patient to rotate his wrist, moving the entire hand. Next, ask the patient to hold his hand up toward you, as if motioning you to stop. His fingertips should first face the ceiling (extension), and then extend toward the floor (flexion).

If these movements cause pain or numbness, the patient may have carpal tunnel syndrome. Other tests you can perform include Phalen’s maneuver and observing for Tinel’s sign.

Now, it’s time to put those important fingers under a magnifying glass. As you inspect the finger joints, look for any deformities. Palpate the area where the thumb emanates from the hand. Palpate the hand bones distal to the wrist joint, then each of the 10 metacarpal (finger) joints, followed by the fingers. Again, you’re checking for tenderness, swelling, and bogginess. Nodules in the distal interphalangeal (DIP) joints indicate osteoarthritis. Nodules in the proximal interphalangeal (PIP) joints and metacarpophalangeal (MCP) joints more likely indicate rheumatoid arthritis.

To assess ROM of the finger joints, ask the patient to “make a fist” to test flexion, and “make a stop sign” to test extension. To evaluate the thumb, ask the patient to bend the thumb capsule
Cartilage
Joint space filled with synovial fluid
Bone
thumb into the palm of his hand to observe flexion, then to move it away from the palm for extension.

One vertebra at a time
Before we move on to the lower extremities, let’s look at the spine. You can examine the spine either at the beginning of your assessment or in conjunction with your evaluation of the lower extremities.

As you inspect the spine, look at the position of the patient’s head, neck, and trunk, which you can observe while the patient enters the room. What about his gait?

Next, evaluate the patient’s head movement. Ask the patient to look up, then down, then side to side as slowly and as far as he can comfortably move. Is the patient’s movement smooth and coordinated?

A thorough inspection of the patient’s back is next on the checklist. Provide a private setting before you begin. Ask the patient to stand upright in his natural position. His head should be midline, and his shoulders and pelvis should be level. Neck stiffness can signal arthritis, muscle strain, or other underlying pathology that should be investigated further. A lateral deviation and rotation of the head suggests contraction of the sternocleidomastoid muscle.

As you palpate the spinous processes of the vertebra with your thumb, note any tenderness or deformities. In the lower lumbar area, check closely for any step-offs, that is, where one spinous process is unusually prominent or recessed in relation to the one above it. These may compress the spinal cord.

Also palpate the muscles for tenderness or spasm. Muscles in spasm may feel firm or knotted and may be visible.

Ask the patient to bend at the waist as far as he comfortably can (flexion), with his arms hanging downward. Assess the spinous processes again, noting any deformities. If the vertebrae aren’t in a straight line when the patient bends or if the iliac crests aren’t regular in height, the patient may have scoliosis. Also check for deviations of the spine, as in kyphosis or lordosis (see illustration).

Working your way down, rotate the spine at the hip, externally then internally. Check lateral bending and extension.

Congratulations! You’ve just put the spine to the test—the ROM test, that is.

From hip to toe
We’re almost finished the musculoskeletal assessment. Last but not least, we’ll examine the hips, legs, feet, and ankles.

Palpate the hips and note any tenderness or swelling. ROM of the hip joint should include extension, flexion, abduction, and adduction, as well as rotation. Restriction of internal rotation can be a sensitive indicator of arthritis. External rotation may also be limited.

As you watched the patient walk into the room, was his knee extended at heel strike and flexed during all other stages of swing and stance? (See The Stance Phases of Gait.) Observe the alignment of the knees. Ask the

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The stance phases of gait

![Heel strike](image1) ![Foot flat](image2) ![Midstance](image3) ![Push-off](image4)

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memory jogger
Here’s an easy way to keep “adduction” and “abduction” straight:

- **Adduction** is moving a limb toward the body’s midline; think of it as adding two things together.
- **Abduction** is moving a limb away from the body’s midline; think of it as taking something away, like abducting or kidnapping.
patient to sit. In this position, bony landmarks are more visible, and the muscles, tendons, and ligaments are more relaxed and easy to palpate. Palpate the knee; thickening, bogginess, or warmth suggests synovitis or arthritis.

The bulge sign will help you detect minor fluid in the knee. With the knee extended, place your hand above the knee and apply pressure displacing, or milking, fluid downward. Now, tap the knee with your other hand just behind the lateral margin of the patella. If the patient has fluid under the patella, you’ll see and feel it.

Another sign of major fluid effusion is the balloon sign. This is done by placing your thumb and index finger on either side of the patella and compressing it against the femur causing fluid to balloon into the spaces next to the patella palpated by your thumb.

Finally, perform ROM to the knee to include adduction and abduction.

Now we’re in the home stretch; just the ankles and feet remain. Inspect both of these areas for swelling, redness, nodules, and other deformities. Check the arch of the foot and look for deformities of the toes. Also note any edema, calluses, bunions, corns, ingrown toenails, plantar warts, ulcers, hair loss, or unusual pigmentation.

Use your fingertips to palpate the bony and muscular structures of the ankles and feet. Palpate each toe joint by compressing it with your thumb and fingers. Feel along the Achilles tendon for nodules and tenderness, and palpate the heel for tenderness.

Finally, perform ROM to the ankle joint by stabilizing the heel, then everting and inverting the forefoot. Ask the patient to point and flex if he can, or you can do this for him.

Skilled and prepared
That completes your head-to-toe assessment of the musculoskeletal system. Now, you’re equipped with some of the basic tools to perform this important diagnostic examination.

Learn more about it