



THE UNIVERSITY OF TOLEDO MEDICAL CENTER

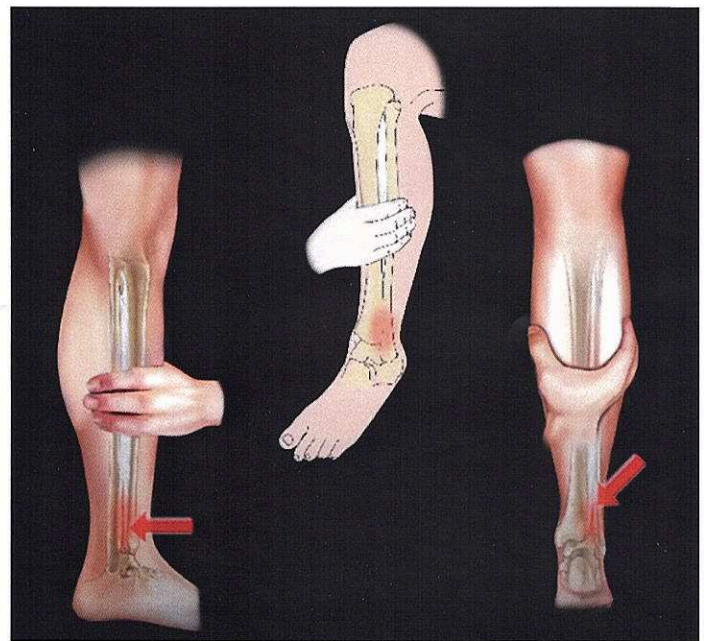
ORTHOPAEDIC MONTHLY

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BY NABIL A EBRAHEIM MD

Squeeze Test in Orthopedics

There are multiple squeeze tests that we use in the diagnosis of orthopedic conditions. For squeeze test for high ankle sprain or syndesmotic injury, compression of the tibia and fibula at the mid-calf area causes pain at the syndesmosis. If this maneuver causes pain at the syndesmosis, then this is suggestive of a syndesmotic injury or a high ankle sprain. The gold standard for a syndesmotic injury is the external rotation stress radiograph. For the squeeze test for distal biceps tendon avulsion, the elbow is held at 60-80 degrees. The forearm is slightly pronated and resting comfortably. The examiner stabilizes the patient's elbow with one hand while the other hand of the examiner squeezes across the distal biceps muscle. Normally, if the biceps tendon is intact, there will be some supination of the patient's forearm or wrist. When we call the test a "positive test", this means that there is failure to observe supination of the patient's forearm. No supination of the forearm will occur if the biceps is torn. The hook test is the gold standard when checking for distal biceps tendon rupture. The examiner will use his index finger to hook the lateral edge of the biceps tendon while the elbow of the patient is flexed to 90 degrees and in full supination. If the distal biceps tendon is intact, the examiner will be able to hook the tendon with his index finger; however, there may be some false positives (thinking the tendon is intact, but it is not intact). If there is a partial tear of the biceps tendon, if you feel the brachialis tendon and if there is an intact lacertus fibrosus, the examiner may think that the index finger is able to hook the tendon, and this is a false positive. When there is a complete tear of the distal biceps tendon, the tendon will be absent, and you cannot hook it with the index finger. When there is a partial tear of the distal biceps, the examiner will be able to hook the index finger around the tendon. For the squeeze test for diagnosis of Morton's Neuroma, the patient will have pain, and the pain will be worse with wearing too narrow toe box shoes. Too tight of shoes will squeeze the metatarsals together and create irritation of the neuroma. The patient feels better by removing the shoes and massaging the foot. If the examiner squeezes the metatarsals together, the patient will have pain and will have occurrence of the symptoms. This is called a positive web space compression test. Compression of the forefoot with one hand and simultaneously applying upward pressure on the affected web space with the thumb will produce pain and palpable click. The squeeze test for diagnosis of Achilles tendon tear is the Thompson test. The Thompson test is a provocative test



used in the diagnosis of Achilles tendon tear. When the calf muscle is squeezed, normally there should be plantar flexion of the foot. Lack of plantar flexion of the foot when the calf muscle is squeezed indicates tear of the Achilles tendon. For the squeeze test for diagnosis of triceps tendon rupture, the patient is lying prone with the elbow at the end of the table, and the forearm will be hanging down freely. The examiner will squeeze the triceps muscle. The test is considered positive if the patient is unable to extend the elbow against gravity. Stress fracture of the calcaneus may be misdiagnosed as plantar fasciitis. Stress fracture of the calcaneus usually occurs in female runners. The patient will have some swelling and tenderness, especially with medial and lateral compression of the hindfoot. For the squeeze test for diagnosis of stress fractures of the calcaneus, the compression squeeze test is helpful. A positive squeeze test could mean that there is a stress fracture of the calcaneus. You may need to get an MRI if the x-ray is negative. You will see a fracture in T1 as a linear streak or a band of low signal density in the posterior calcaneal tuberosity. On T2, you will find an increased signal.

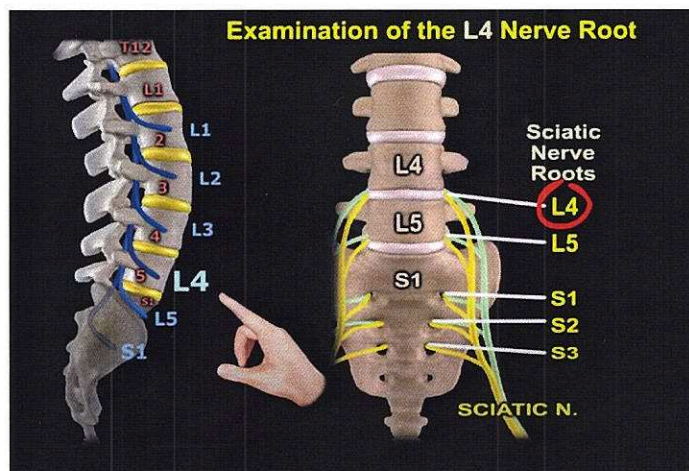
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The squeeze test for diagnosis of groin in injuries and measurement of adductor muscle strength is the adductor squeeze test. If the adductor muscles are weak, it becomes a risk factor for groin injuries,

so the adductor squeeze test is used as a screening tool to detect adductor muscle weakness, and it may help in decreasing the risk of groin injuries.

Examination of L4 Nerve Root

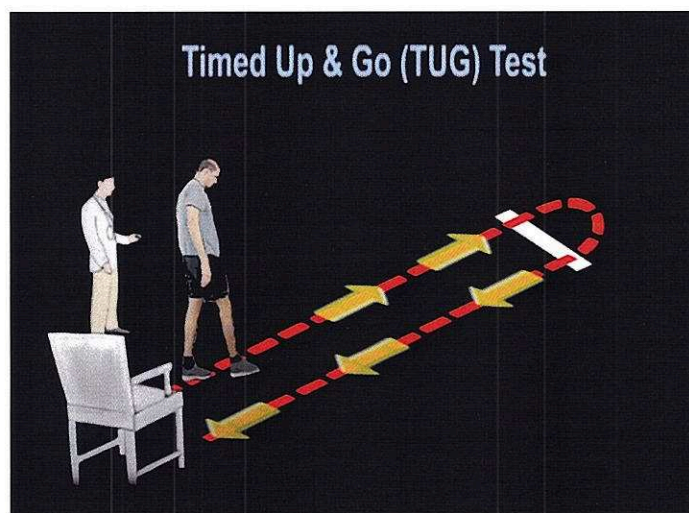
The L4 nerve root has sensory distribution on the medial side of the foot. The patellar tendon reflex or the knee jerk reflex is an L4 reflex. The patellar tendon reflex is L2, L3, L4 but it is predominantly an L4 reflex. The quadriceps are four muscles. The quadriceps is an L4 reflex. We usually examine the tibialis anterior for dorsiflexion of the ankle and for foot inversion. There are other muscles involved such as the quadriceps muscles. The quadriceps muscles get their innervations from L2, L3, & L4 through the femoral nerve, but the quadriceps is predominantly innervated by the L4 nerve root. Weakness of the quadriceps can indicate a femoral nerve irritation or an L4 nerve root irritation. Practically, we use the tibialis anterior for dorsiflexion of the ankle to test for injury to the L4 nerve root. If the patient has a foot drop, then the tibialis anterior is probably not working. Posterolateral disc herniation at the level of L3, L4 is rare, and it will affect the traversing L4 nerve root. Foraminal disc herniation at the level of L3, L4 will affect the exiting nerve root (L3 nerve root). You may find a positive femoral stretch test in a patient with L3, L4 posterolateral disc herniation. You may not find a positive straight leg raise test (tension sign) in this patient. Posterolateral disc herniation at the L4-L5 level will cause an L5 nerve root irritation. The extensor digitorum longus is a toe extensor. The extensor hallucis longus causes big toe extension. A far lateral



disc herniation at the level of L4, L5 will affect the L4 nerve root (the exiting nerve root). In summary, an L4 nerve root irritation will give you weakness of dorsiflexion of the ankle, the patellar reflex will be affected and the sensation on the medial side of the foot will be affected. The patient will have difficulty in squatting due to weakness of the quadriceps muscle.

Timed Up & Go (TUG) Test

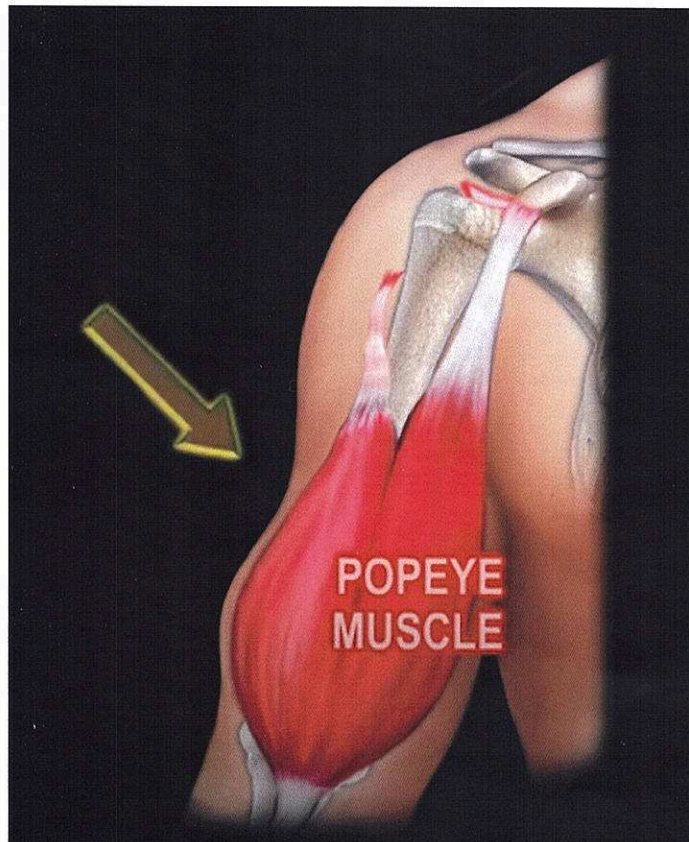
The purpose of the test is to assess the mobility of the patient. The patient will wear regular foot wear and can use a walking aid if needed. The TUG test begins by having the patient sit in a chair. The examiner identifies a line on the floor which is 3 meters or about 10 feet away from the chair. The person will walk through the test once before being timed so that they become familiar with the test. Tell the patient "When I say GO, stand up from the chair and walk to the line on the floor at your normal pace." Tell the patient to then "turn around" and "walk back to the chair at your normal pace" and then tell the patient to "sit down." Always have somebody stay beside the patient during the test for safety. On the word GO, the examiner will begin timing the patient performing the test. The patient is timed while they rise from an arm chair. Stop timing after the patient sits back down and record that time. Stop timing after the patient sits back down and record that time. The TUG test is used to screen those individuals with an increased risk of falling. The TUG test is used to screen those individuals with an increased risk of falling. An older adult who takes longer than 12 seconds to complete the TUG test is at risk for falling. The TUG test has a sensitivity of 80% and a specificity of 100%. The causes of falling are



multifactorial (can be environmental or activity related). Falls are the leading cause of injury and activity limitation in older adults.

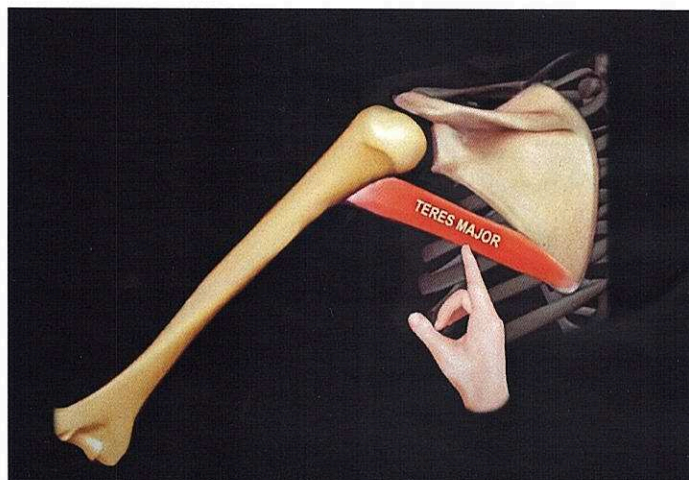
Proximal Biceps Tendon Rupture/Popeye Deformity

The biceps tendon of the long head arises from the superior labrum at the top of the glenoid. The long head of the biceps then passes underneath the transverse humeral ligament in the bicipital groove between the lesser and greater tuberosity of the humerus. The biceps tendon inserts into the proximal radius at the radial tuberosity at the elbow. The long head of the biceps takes advantage and is inserted proximally. The short head of the biceps is inserted distally. The short head of the biceps arises from the coracoid process. The biceps tendon may rupture at the top of the bicipital groove, or it may rupture at the radial tuberosity in the elbow. Proximal rupture occurs at the bicipital groove. The muscle moves distally, or down, towards the elbow (Popeye muscle). There is minimal loss of function with a long head rupture because the short head of the biceps remains attached to the coracoid process and remains intact. The diagnosis of complete ruptures is often obvious because of the deformity of the arm muscle. You will find a large ball of muscle in the arm. The Popeye muscle is not from eating a lot of spinach. The Popeye muscle is due to a biceps tendon tear. Proximal biceps tendon rupture is usually treated conservatively or rarely, surgically. Nonoperative treatment is usually done for the elderly patient. Most patients will become asymptomatic after 4-6 weeks. In fact, the majority of patients will experience relief of their pain after the biceps tendon ruptures. In regards to the surgical treatment, reattaching the torn section of the tendon to the bone (tenodesis) is usually done in association with other reconstructive surgery, and it is rarely done for cosmesis. In general, proximal biceps tendon rupture is usually a nonsurgical situation.



How Do You Examine for the Teres Major Muscle?

The patient is adducting the elevated upper arm against resistance. You can see the muscle belly of the teres major and can actually feel it. Above this muscle is the teres minor muscle, and in between the two muscles (teres major and teres minor), you will find the quadrangular space that contains the axillary nerve and the posterior humeral circumflex artery. A vague pain posteriorly in this location may indicate entrapment of the axillary nerve in the quadrangular space. The triangular space will be more medial, and the triangular interval is slightly distal as indicated in this diagram. The teres major muscle causes three movements of the shoulder joint: it pulls the humerus towards the trunk (adduction), it turns the humerus medially (internal rotation), and it pulls the humerus posteriorly (extension/retroversion). The teres major muscle is innervated by the lower subscapular nerve (C5, C6) of the brachial plexus. Both the upper and lower subscapular nerves (C5, C6) innervate the subscapularis muscle.



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Department of Orthopaedic Surgery
The University of Toledo
3000 Arlington Ave., MS 1094
Toledo, Ohio 43614



How Do You Examine for the Teres Major Muscle? continued

The upper and lower subscapular nerves (C5, C6) come from the posterior cord of the brachial plexus. The subscapular muscle carries the name subscapular, so it gets innervation from the upper and lower subscapular nerves. The thoracodorsal nerve is in the middle. The teres major muscle is lower than the subscapular muscle, so it is innervated by the lower subscapular nerve.

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Planners/Editors:

Editor/Planner: Dr. Nabil Ebraheim, Professor and Chairman, Department of Orthopaedic Surgery;
Planners: Amanda Critton; Abigail Overhulse; and Sara Bell

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Department of Orthopaedic Surgery, The University of Toledo 3000 Arlington Ave., MS 1094 Toledo, Ohio 43614

Questions or Appointments, call 419.383.3761