



THE UNIVERSITY OF TOLEDO MEDICAL CENTER

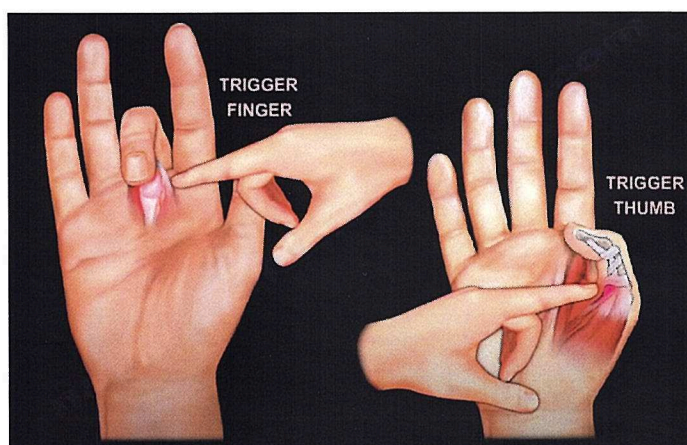
ORTHOPAEDIC MONTHLY

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Trigger Finger & Trigger Thumb

By Nabil A Ebraheim MD & Richy Charls MD

Trigger finger is a condition where the flexor tendon of the involved finger becomes thick and irritated as it slides through its tendon pulley causing a thickened nodule and triggering of the tendon. This causes less smooth motion of the tendon through the pulley which manifests as “popping”, “snapping”, or “catching” with finger flexion/extension as the tendon is able to disengage with the inflamed pulley upon finger straightening. Symptoms proceed in a typical progressive fashion with pain often seen before triggering. Pain from trigger finger is usually not well localized and nonspecific but generally around the level of the A1 pulley which will be tender to palpation. Following pain, the patient will complain of catching and then will proceed to locking that is fixed which occurs when the tendon is unable to pass through the sheath. This can lead to the formation of a fixed, flexed finger. Repetitive injuries or occupation with repetitive finger flexion are risk factors for the development of trigger fingers most commonly affecting the ring and long fingers. Trigger finger is also more common in females older than 50 years old. 60% or more of patients with trigger fingers usually have associated carpal tunnel syndrome. Trigger finger also tends to occur more in diabetics who have increased propensity for bilateral disease, increased risk for multiple digits in the same hand being affected, and a worse disease prognosis as diabetic patients are more prone to develop stiffness and have a higher rate of recurrence of the condition after surgical release. In addition to diabetes, there are some other medical conditions that can be associated with trigger fingers such as gout, pseudogout, rheumatoid arthritis, sarcoidosis, and hypothyroidism. The most important prognostic indicator for a good result with non-operative treatment is the duration of triggering before coming to see a physician. Conservative treatment is usually first line for this condition and includes splinting, nonsteroidal anti-inflammatory medications (NSAIDs), rest, and activity modification. This will give some relief to the patient. Injections are another option if conservative management is not giving sufficient relief as around 60-80% of nondiabetic patients can get better with injections into the flexor tendon sheath. For the injection, up to three injections can be given and the injection should be into the flexor tendon sheath and not into the tendon itself. To perform the injection, mark the proposed injection site near the A1 pulley. After the site is marked, use a 25-gauge needle and



advance the needle through the midline down to the bone. The practitioner injecting the medication will want to stay in the midline as the neurovascular bundle is on the side of the tendon and the pulley. At this point, pull the needle back slightly and inject the medication freely into the flexor tendon sheath or into the pulley. For diabetic patients receiving an injection, a HbA1c (Hemoglobin A1c) should be obtained in these patients before considering injection or any surgical intervention and the dose of the steroid should be adjusted so as not to significantly raise blood glucose levels. Of note, an irreducible locked trigger finger with flexion contracture of the PIP joint should not be treated conservatively or even by injection as this will need surgery. Nonetheless, the majority of patients with trigger finger get better with injection or surgery. Surgery is done if there is failure of non-operative treatment. Surgery involves either open or percutaneous release of the A1 pulley done under local anesthesia to allow intraoperative assessment and to communicate with the patient to confirm that adequate release was done. Percutaneous release of the A1 pulley can be done for the fingers but not for the flexor pollicis longus tendon in the thumb because the radial digital nerve almost crosses in the middle of the surgical field and can be injured. When releasing the A1 pulley, the release should be done at the level of the MP joint at the MP flexion crease.

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Trigger Finger & Trigger Thumb continued

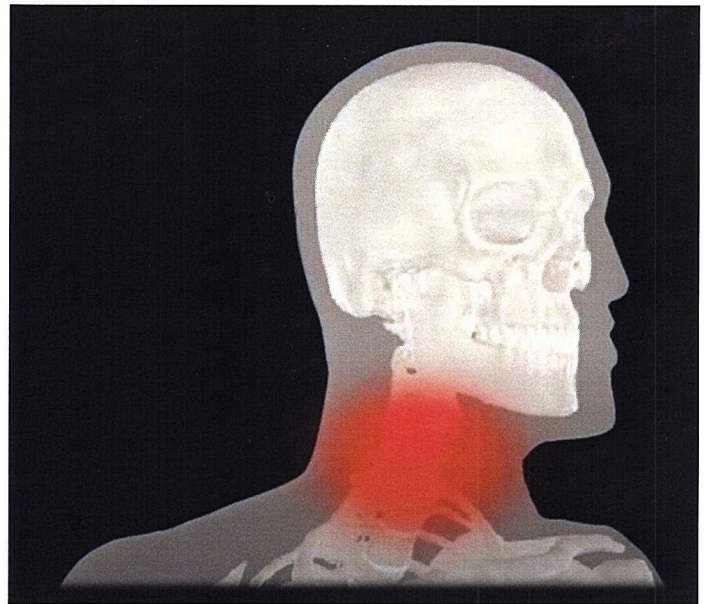
The surgeon must be sure to not surgically release or injure the A2 and A4 pulleys which are important structures preventing bowstringing of the flexor tendon. Note that patients with rheumatoid arthritis may need excision of a slip of the flexor

digitorum superficialis. After the A1 pulley is cut and released, the flexor tendon is released. The patient is then asked to actively flex the finger confirming that there is no persistent triggering.

Whiplash Injuries Causes & Symptoms

By Nabil A Ebraheim MD & Dalton Blood MD

Whiplash is a neck injury that occurs due to forceful, rapid back and forth movement of the head and neck and receives its name from its similarity to the motion of a whip. A common cause of whiplash is rear-end motor vehicle accidents, where even 5 mph collision speeds create rapid acceleration/deceleration forces which cause significant injury as the head moves with great force in less than a quarter of a second. The sudden motion causes the tendons, ligaments, and muscles to stretch and tear. The most common structures damaged are the paraspinal muscles, intervertebral discs, supraspinous ligament, and interspinous ligaments. The variety of anatomic structures involved can lead to a wide range of symptoms in patients including dizziness, fatigue, blurred vision, difficulty sleeping, difficulty concentrating, memory loss, neck pain, and irritability. Neck stiffness, difficulty moving the head, headaches and muscle spasms in the neck, shoulders and in the arm are some of the most common. The patient usually develops the symptoms within the first few days after the injury. They could also experience shooting pain, numbness, tingling, or weakness of the arms and hands. A thorough physical exam assessment for these signs should be performed. The physician should inspect the patient's posture and neck; palpate the cervical spinous processes, the paraspinal muscles, and the anterior soft tissue of the neck; and examine the range of motion of the neck within the pain tolerance. The patient would also need a complete neurological examination including strength, sensation, and reflex testing. Cervical spine x-rays should be obtained. If the x-rays are negative, conservative therapy should be initiated. Usually conservative treatment would include ice therapy, muscle relaxant, physical therapy, and neck massage. Soft cervical collar treatment for a few weeks at night may help reduce muscle spasms. While most whiplash injuries are mild, serious ligament injury can be mistaken



for a whiplash injury. If conservative treatment fails to provide adequate pain relief, the patient should have an MRI to look for a ligament injury that may require surgery. Depending on the structures damaged, the whiplash injury may take a variable amount of time for the patient to recover. Muscle injuries take about 4-6 weeks to heal, and ligament injuries may take up to 3 months to heal. Whiplash is usually a short-lived and self-limiting condition, but in small groups of patients, the symptoms persist beyond 6 months, and it may become chronic and disabling. Patients should continue to be active and return to work as soon as they are able.

Differential Diagnosis of Trigger Finger

By Nabil A Ebraheim MD & Austin Williams MD

Trigger finger is a condition where inflammation of the flexor tendons of the fingers causes impingement of the tendons through tunnels in the finger called pulleys, and when this occurs, there is difficulty extending the fingers and associated pain. However, it is important to be aware of other conditions with a similar clinic picture. The first of these is a lumbrical plus finger. When the patient tries to flex the fingers, the involved digit will be extended. This is a paradoxical extension of the IP joint when attempting finger flexion. Sagittal band injuries can also cause finger triggering. In sagittal band injury, the snapping occurs due to subluxation and relocation of the

extensor tendon. It is important to be aware of this condition in order to avoid unnecessary trigger finger releases. The snapping and subluxation of the tendon is noticed at the top of the knuckle when moving from extension to flexion. The typical scenario is that the patient is unable to actively extend the finger from a fully flexed position, but the finger can be maintained in place once it is passively extended. In both trigger finger and sagittal band injury, the long finger is most commonly affected.

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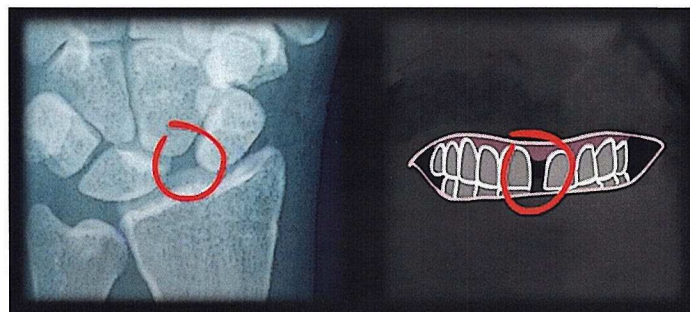
Joint contracture is another condition with a similar picture to trigger finger. With joint contracture, the patient may have a history of trauma. The patient will be unable to actively or passively extend the finger if a contracture is present. Flexor tenosynovitis also may appear similar to trigger finger from a distance, but it is crucial to identify this condition, as it is an orthopedic emergency. The four positive Kanavel signs of flexor tenosynovitis include fusiform swelling of the finger, flexed posture of the finger, tenderness along the flexor tendon sheath, and inability to actively extend the finger

due to intense pain when attempting to straighten the finger. A flexor digitorum profundus avulsion can also present similarly to trigger finger. The avulsed tendon ends can retract proximally and may become entrapped at the level of the PIP joint, causing a flexion contracture of the PIP joint. Lastly is posterior interosseous nerve syndrome. With posterior interosseous nerve syndrome, there will be lack of active extension of the fingers, and the finger may have a flexed posture. Tenodesis is present with nerve injury, but not with tendon rupture.

Perilunate & Lunate Dislocation

By Nabil A Ebraheim MD & Megan Mooney MD

Perilunate injuries can be easily missed on initial presentation, roughly 25% of the time. How do you know if you have a perilunate injury or lunate dislocation? There are several radiographic signs that can indicate disruption of normal lunate anatomy. On the anteroposterior radiographs, assessment of Gilula lines can be used to evaluate carpal alignment and may indicate ligamentous or osseous disruption. When the lunate dissociates from the scaphoid, the interval between increases and is readily identified and referred to as the “Terry-Thomas sign”, an indication of scapholunate ligamentous injury. Additionally, the “ring sign” may be visible which represents a volar flexion moment of the scaphoid. The lunate may appear more triangular as opposed to its normal trapezoidal appearance, which is referred to as the “piece of pie sign”. Evaluation of the collinearity of the radius, lunate, and capitate on the lateral images is essential. Take time to trace the small bones of the carpus and determine the relationship to the radius. If the lunate is subluxed or dislocated, there will be disruption this collinearity and the lunate may appear more prominent volarly and the remainder of the carpus more dorsal. The “spilled tea cup sign” may also be seen on the lateral view which demonstrates the volar tilt of the dislocated lunate by the intact palmar ligaments. Measurement of additional radiographic angles can also aid in identification of a perilunate injuries, and more specifically scapholunate ligamentous injuries. The normal



scapholunate angle is less than 60 degrees, averaging 47 degrees. An angle that is greater than 60 degrees is considered abnormal, which is due to the palmar flexion of the scaphoid relative to the dorsally tilted lunate. Scapholunate injury represents the first stage of perilunate injury and may progress to the final stage of lunate dislocation according to the Mayfield Classification. In the final stages, the lunate is located volarly relative to the dorsally dislocated carpus and may result in acute carpal tunnel syndrome. Therefore, it is important to perform a thorough neurovascular examination in any patient with a suspected perilunate injury to assure there is no interval development of acute carpal tunnel syndrome, which represents an orthopedic emergency.

Nerve Injuries

By Nabil A Ebraheim MD & Phillip Stokey MD

Nerves originate from the spine. They provide sensation to the skin and allow motor power and function to the muscles. When nerves are injured, many structures are affected. Medial winging of the scapula usually occurs due to long thoracic nerve injury. The axillary nerve injury can occur due to dislocation of the shoulder joint. Anterior interosseous nerve injury can occur due to fractures and dislocations around the elbow. Making an O.K. Sign with the fingers is a test for anterior interosseous injury. The O.K. sign is used to check for paralysis of the anterior interosseous nerve due to entrapment or compression injury. Patients with paralysis of the anterior interosseous nerve will be unable to make the O.K. Sign. The patient cannot bend the IP of the thumb or the DIP of the index finger. The patient will have wrist extension, but will not have

finger extension. Posterior interosseous nerve injury can occur due to Monteggia fractures, and the patient cannot extend the fingers. In a normal radial nerve function, the patient will be able to extend the wrist and extend the fingers and the thumb. When you have a radial nerve injury, which usually occurs due to fractures of the humerus (especially the distal third of humeral shaft), the patient will have wrist drop, and the patient will also be unable to extend the fingers and the thumb. Compression of the median nerve usually occurs in carpal tunnel syndrome. The patient will have tingling, numbness, and pain of the area indicated by the diagram. It is usually the area of the thumb and index finger.

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continued

Multiple provocative tests are used to diagnose carpal tunnel syndrome such as compression test, Tinel's test, and Phalen's test, in addition to the typical distribution of the area of the symptoms. Tinel's test is positive when you tap on the nerve and this will worsen the tingling in the fingers. Thenar atrophy could indicate a severe condition of carpal tunnel syndrome. When carpal tunnel syndrome is not improved by conservative treatment and splinting, injection may be tried. If injection is successful, it indicates that surgery for carpal tunnel release will be successful. Surgery of carpal tunnel release can be open or endoscopic. A skin incision is made, the transverse carpal ligament is opened, and the median nerve is released. Cubital tunnel syndrome occurs due to compression of the ulnar nerve at the elbow. With ulnar nerve injury, the patient cannot cross the fingers or abduct the fingers. In ulnar nerve injury, Froment's test is usually positive. When pinching a piece of paper between the thumb and the index finger, the thumb IP joint will flex if the adductor pollicis muscle is weak due to the ulnar nerve injury. The adductor pollicis muscle is innervated by the ulnar nerve. There will be numbness and tingling on half of the ring finger and the entire little finger. Claw hand deformity is a symptom of a lower ulnar nerve entrapment or injury. The injury is below the elbow and typically causes flexion and clawing of the 4th and 5th fingers. Cubital tunnel syndrome is usually treated by ulnar nerve release around the elbow or less commonly by transposition of the nerve. The femoral nerve supplies the quadriceps muscles which extends the knee. Injury to the femoral nerve will result in a weak quadriceps muscle and the patient will be unable to extend the knee. The differential diagnosis will be quadriceps or patellar tendon tear. The sciatic nerve is divided into two branches: common peroneal nerve and posterior tibial nerve. Injury to the common peroneal nerve will result in a foot drop. Posterior tibial nerve injury or compression usually occurs in tarsal tunnel syndrome. This will result in pain and numbness in the plantar aspect of the foot.

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