

National Society of Orthopedic Medical Assistants

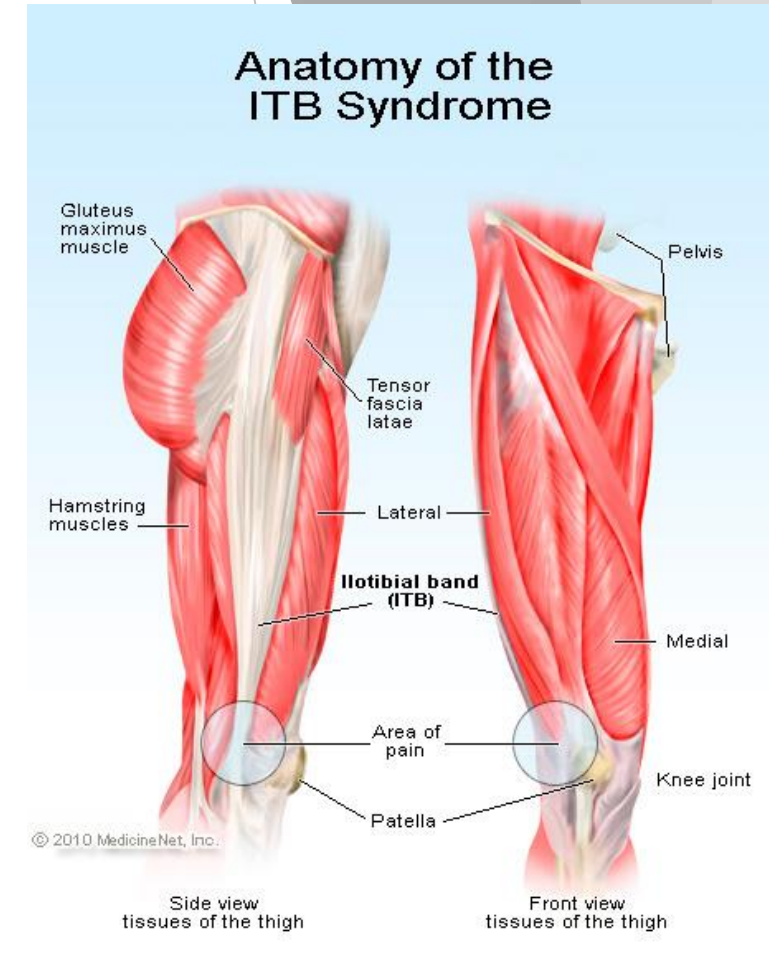
Orthopedic Lecture Series®

Bone/ Structures, Fracture Types and Skeletal Disorders/ Specialty Casts and Appliances/Surgical Procedures, Positioning and Devices

Lesson 9: Orthopedic Conditions – PART II

Iliotibial Band Syndrome

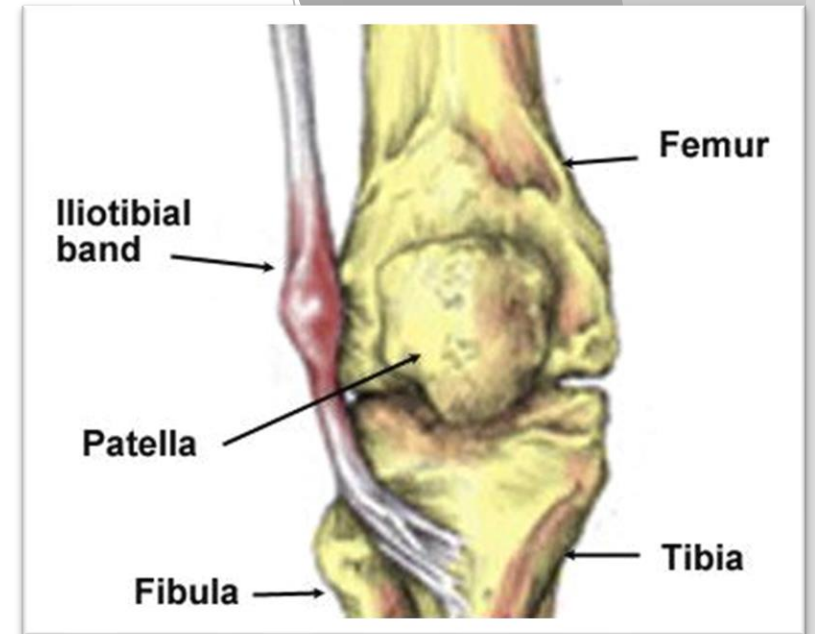
1. Iliotibial band syndrome
 - ▶ Also called iliotibial band friction syndrome (ITBS or ITBFS)
2. This condition causes lateral knee pain. and is commonly caused by running, cycling, hiking, and weight lifting.
3. The iliotibial band is a superficial strip of thickened tissue located on the outside of the thigh.
 - ▶ Its starting point is on the outside of the pelvis, and it runs over the hip and knee
4. During the action of running, the band moves from the back of the femur to the front.
5. The insertion point of the band is just below the knee joint.
 - ▶ The iliotibial band stabilizes the knee joint
6. Activity causes the iliotibial band to rub over the lateral femoral epicondyle.
 - ▶ This rubbing, combined with continued extension and flexion, may result in inflammation, or irritation



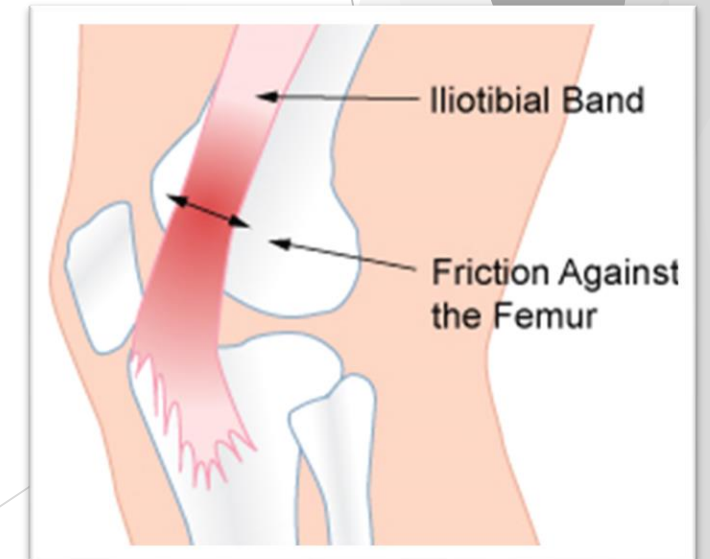
http://www.medicinenet.com/iliotibial_band_syndrome/article.htm

Iliotibial Band Syndrome

7. There is a range of symptoms associated with iliotibial band syndrome.
- ▶ Symptoms can occur anywhere along the length of the band
 - ▶ Symptoms may include:
 - Stinging sensation felt on the outside of the knee, or along the length of the iliotibial band
 - Swelling of the band where it crosses from the front to the back of the femur
 - Pain below the knee
8. The pain associated with the disorder may worsen with activity.
9. Pain may persist after the activity has been stopped.
10. Iliotibial syndrome can also occur where the band attaches to the hip.
- ▶ Pain at this site is not likely due to a sports injury, but occurs often with pregnancy as the connective tissues in the area loosen.
11. Iliotibial band syndrome in the hip is also common in the elderly.
12. Iliotibial band syndrome often presents with pain on palpation of the lateral knee.
- ▶ Pain increases when the patient is standing with the knee flexed to an angle of 30 degrees



<http://www.sportsinjuryclinic.net/sport-injuries/knee-pain/iliotibial-band-syndrome>



<http://ourhealthnetwork.com/conditions/iliotibial-band-syndrome/>

Iliotibial Band Syndrome



<http://www.positivehealth.com/article/bodywork/muscle-energy-techniques-mets-applied-to-knee-pain>

13. Physical examination involves the use of Ober's test.

- ▶ This test is used to determine the tightness of the iliotibial band
- ▶ The patient is asked to lie on the table on the unaffected side of the body
- ▶ The unaffected hip and knee are flexed to 90 degrees
- ▶ The examiner aligns the affected leg with the rest of the patient's body by abducting and extending the leg
- ▶ The affected leg is then adducted
- ▶ If the iliotibial band is of normal length, the leg will adduct without pain
- ▶ If the iliotibial band is abnormally short, adduction will be difficult and cause pain to the lateral knee
- ▶ Tightness prevents the smooth functioning of the iliotibial band contributing to the development of iliotibial band syndrome

Ober's Test - video

Iliotibial Band Syndrome

14. Iliotibial band syndrome can be prevented by building strength in the muscles of the hips.
- ▶ Exercises to stretch the iliotibial band and gluteal muscles can aid in preventing the development of this condition
 - ▶ Runners with iliotibial band syndrome are advised to reduce running distance for a period of time, and to run only on flat ground
 - After the cessation of pain, distance can be increased gradually
 - Persistent pain requires complete rest from running for about 2 weeks
 - If pain still persists, rest for another month is advised
 - As the injury improves, activity can be resumed slowly and gradually
 - Changing the running route may help prevent recurrence of symptoms as running the same route constantly may put more stress on one side of the body
 - Rest, cold compresses, and elevation should be used to treat acute symptoms
 - NSAIDS will relieve inflammation and pain
 - Corticosteroid injections may be prescribed.



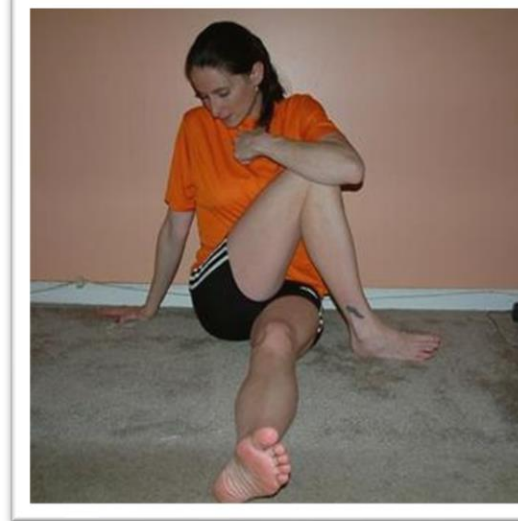
http://running.competitor.com/2014/08/injury-prevention/keeping-runners-knee_143



http://www.medicinenet.com/iliotibial_band_syndrome/page3.htm

Iliotibial Band Syndrome

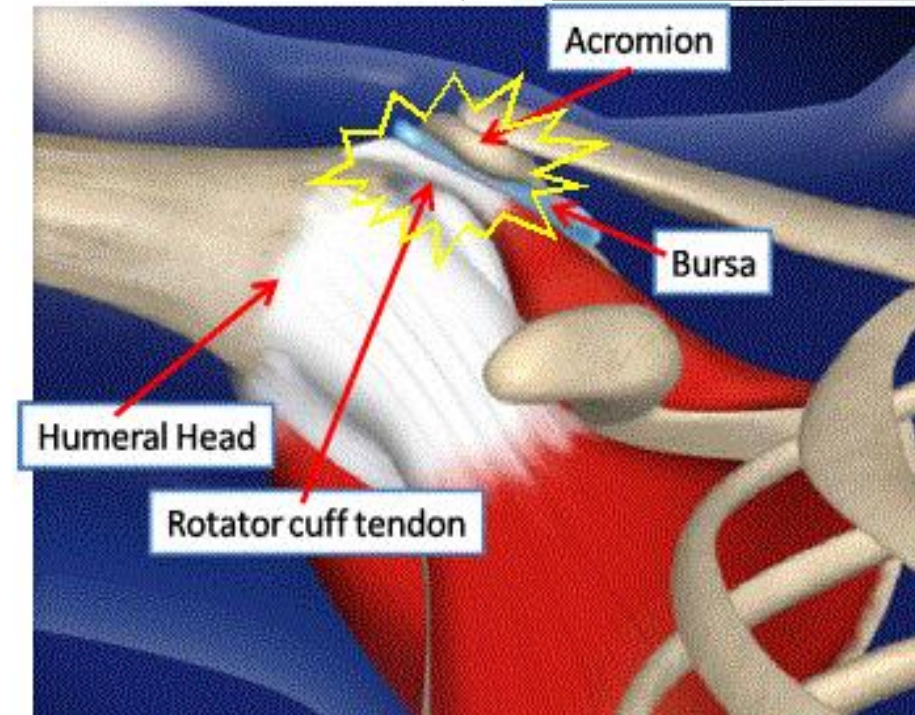
15. Surgery is rarely used to treat iliotibial band syndrome.
- ▶ It is only used in cases where the condition persists after 6 -12 months of conservative treatment
 - ▶ It should be a treatment of last resort, and only used when all other treatment have failed to produce relief
 - ▶ Patients who refuse to change their exercise routine are generally the population treated by surgery
 - ▶ Surgery is only performed after arthroscopic examination has ruled out other possible causes for the pain
 - ▶ Surgical treatment involves an iliotibial band release-excision performed using arthroscopic techniques
16. Rehabilitation includes
- ▶ Stretching
 - ▶ Gradual introduction of exercise
 - ▶ Deep tissue massage
 - ▶ Non-steroidal anti-inflammatory drugs (NSAIDS)
 - ▶ Strengthening exercises for the quadriceps femoris, and gluteus medius muscles



Shoulder Impingement

1. Shoulder Impingement

- ▶ Common cause of shoulder pain in adults
- ▶ It is caused by the shoulder blade exerting pressure on the rotator cuff as the arm is raised
 - The acromion of the shoulder blade pushes on the muscles of the rotator cuff causing pain, and hindering the motion of the shoulder
 - The pressure created by the shoulder blade may cause bursitis, or tendonitis
 - A tear of the rotator cuff may also be present
 - This condition is commonly seen in athletes engaged in sports requiring overhead motion
 - The motions involved in tennis, baseball, and swimming may cause the shoulder impingement
 - Certain jobs may also increase the risk of developing shoulder impingement
 - Paper hanging, construction, and painting may increase risk for the condition
 - The condition may also occur for no apparent reason



Shoulder Impingement

2. The symptoms of shoulder impingement may be mild at first, and become increasingly severe.
- ▶ A low level of discomfort may be present continuously
 - ▶ Pain may radiate from the front of the shoulder down the arm
 - ▶ Reaching movements, or lifting, may cause sudden pain
 - ▶ Shoulder impingement can cause localized swelling and tenderness
 - ▶ As the condition progresses, the condition may cause pain at night
 - ▶ It may result in the loss of strength, and affect range of motion
 - Pain may be experienced on lifting, or lowering the arm
 - ▶ Pain may be experienced on lifting, or lowering the arm
 - ▶ Activities requiring the arms to be used behind the back may cause extreme pain
 - ▶ In severe cases, the condition may result in a frozen shoulder
 - ▶ The area of injury may be tender to the touch



<http://www.me-jaa.com/October2013/Shoulder.htm>

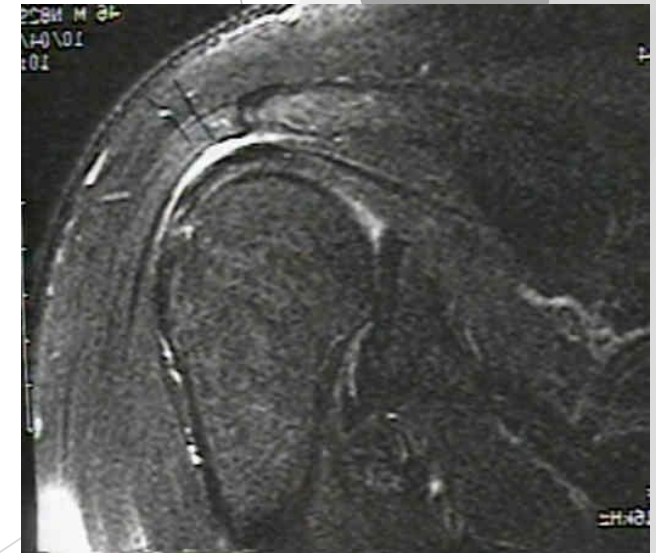
Shoulder Impingement

3. An examination for shoulder impingement includes a physical examination to determine areas of pain, and to determine the range of motion possible

- ▶ Radiographs and other imaging studies will determine if there are any bony abnormalities
 - For example, an outlet view radiograph may show a bone spur on the leading edge of the acromion which is sometimes the cause of the condition
- ▶ An MRI can be used to examine the area for signs of inflammation, or fluid, in the bursa and rotator cuff
 - MRI can identify any torn sections of the rotator cuff
- ▶ An impingement test which involves the injection of a regional anesthetic can be used to confirm the diagnosis of shoulder impingement

4. Treatment

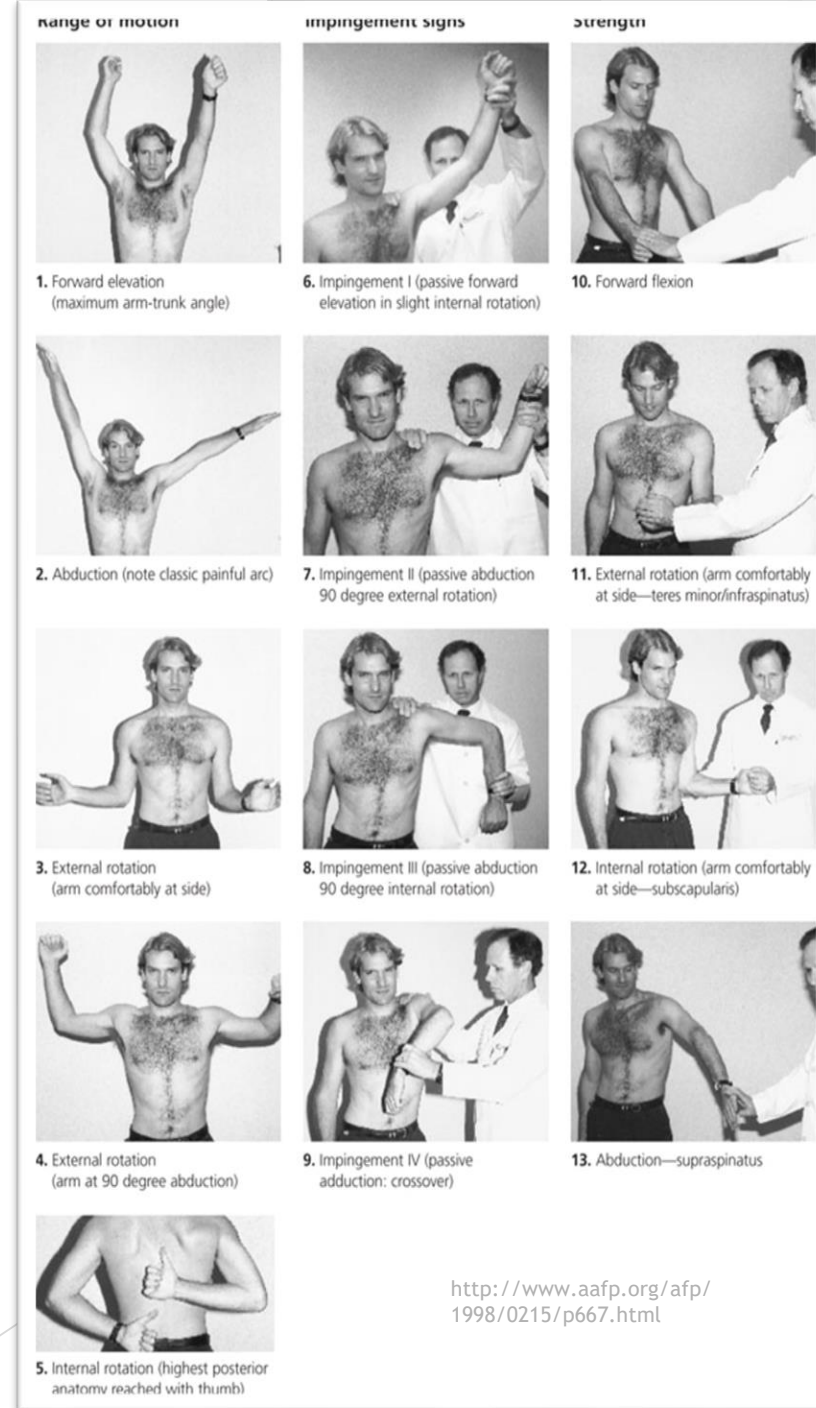
- ▶ Conservative treatment for shoulder impingement is tried first
 - Rest and the avoidance of overhead movements that cause pain are recommended at this stage
 - Nonsteroidal anti-inflammatory drugs may be prescribed for pain
 - Stretching exercises may be recommended to improve range of motion if the shoulder
 - A cortisone injection may relieve pain, and help restore range of motion
 - Conservative treatment may take several weeks to months to have an effect
- ▶ Surgical treatment may be advised if conservative methods fail to resolve the problem.
 - The goal of this surgery is to increase the space available for the rotator cuff
 - Surgery may be arthroscopic, or use open techniques
 - Possible surgical procedures include subacromial decompression, and anterior acromioplasty
 - In most cases of surgery, the anterior edge of the acromion is removed to create more space



Shoulder Impingement

5. Rehabilitation

- ▶ Rehabilitation following surgery may involve the use of a sling.
 - This will take the weight off of the affected area, relieve pain, and allow healing
 - When the pain starts to subside, the sling can be removed
 - Although the sling should be removed as soon as possible to get the shoulder moving, it should not be removed too soon
 - The healing tissue must be protected
- ▶ Exercises will help restore the range of motion of the shoulder, and the strength in the arm and shoulder
- ▶ Therapy will start with passive motion
- ▶ The rehabilitation program will be individualized based on needs and surgical findings
- ▶ It may take 2 to 4 months for complete recovery, and for the pain to subside completely



Medial Epicondylitis

► A condition known by many names

- Little Leaguer's elbow
- Reverse tennis elbow
- Golfer's elbow

1. This condition is a tendonitis affecting the flexor wad at the anterior medial epicondyle of the humerus.

► It is the most frequent cause of pain in the medial elbow although it occurs less frequently than lateral epicondylitis

2. Medial epicondylitis affects twice as many men as women.

3. It occurs most often in individuals between 20 - 49 years of age, but can occur in all age groups.

4. Certain sporting activities, like golf, baseball, and tennis raise the risk of developing medial epicondylitis.

5. Repetitive work can also cause the condition

► Although most often caused by overuse, it frequently begins as a result of an acute injury



http://www.aspetar.com/journal/viewarticle.aspx?id=16#.VSg6PvnF_DY

Medial Epicondylitis

7. Symptoms

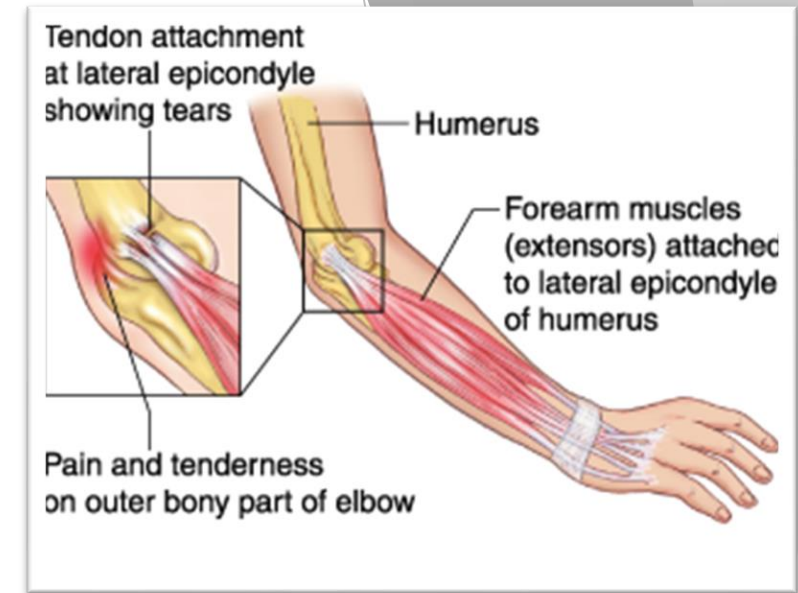
- ▶ Main symptom of medial epicondylitis is pain over the medial epicondyle
 - This pain worsens with flexion and pronation of the wrist
 - The ulnar nerve may be involved as evidence by a tingling or numbness that spreads into the ring, and little fingers
 - This tingling or numbness may be intermittent, or constant
 - Soreness to the touch over the anterior part of the medial epicondyle is the most commonly reported symptom
 - Symptoms of neuropathy of the ulnar nerve are often evident
 - These symptoms may include decreased sensation in the areas served by the ulnar nerve
 - Severe cases may be associated with weakness, and muscle atrophy

8. An individual with medial epicondylitis feels pain with resisted wrist flexion, and perhaps with resisted elbow flexion

9. In an examination, radiographs are generally taken of the elbow to determine if there are any associated problems, such as osteoarthritis, avulsions, or loose bone fragment

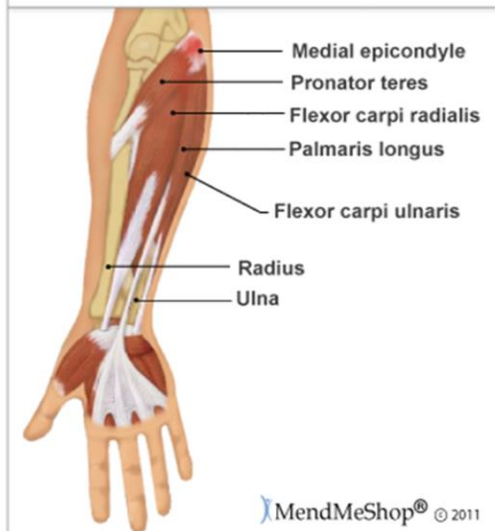
- ▶ Antero-posterior and lateral views are usually sufficient to diagnose this condition, but if loose bodies are suspected, oblique views of the joint are advised

10. Loose bodies may be suspected due to clicking sensation in the elbow joint, or if the joint appears to be catching



<http://www.mguidelines.com/epicondylitis-medial-and-lateral>

Medial Epicondylitis (Golfer's Elbow)



<http://www.aidyourtendon.com/tendinitis-injuries/elbow-forearm-tendonitis/golfers-elbow.php>

Medial Epicondylitis

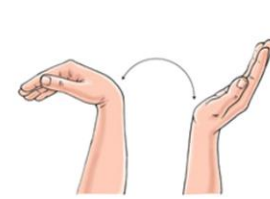
11. Valgus stress radiographs are indicated if medial instability appears to be a possibility

- ▶ An MRI is not usually considered necessary for the diagnosis of this condition
- ▶ A nerve conduction study and electromyography are advised if the ulnar nerve is involved

12. Treatment

- ▶ Occupational and physical therapy are recommended treatments of medial epicondylitis
- ▶ Rest, icing of the injury, compression, and bracing are used to reduce inflammation and decrease pain.
- ▶ Rest is generally recommended for 1-6 weeks
- ▶ The use of ice is particularly important with acute injuries
 - The area over the ulnar nerve should not be iced, however
- ▶ Compression of the elbow by means of a medial counterforce brace, with a pad placed over the flexor pronator wad is the usual treatment for this condition
- ▶ A wrist splint may be worn to keep the wrist in a neutral position to allow it to rest
- ▶ If the ulnar nerve is also involved, a nighttime elbow extension splint may be advised
 - This splint allows 30-45 degrees of flexion, and protects the nerve from further damage
- ▶ After the injury has become less painful, exercises are recommended to strengthen the flexor-pronator muscles
- ▶ Ultrasound treatments may be recommended

Medial Epicondylitis (Golfer's Elbow) Rehabilitation Exercises



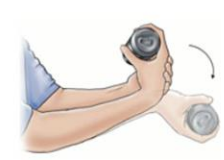
Wrist active range of motion: Flexion and extension



Wrist stretch



Forearm pronation and supination



Eccentric wrist flexion



Eccentric wrist extension



Grip strengthening



Forearm pronation and supination strengthening



Resisted elbow flexion and extension

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Wrist Drop

▶ A symptom with many causes

1. In this condition, the wrist and fingers cannot be extended, and hang loose when the arm is held out, palm down.
2. Wrist drop may occur when the extensor muscles and their tendons, or the radial nerve supplying the extensor muscles are not working properly.
 - ▶ It is most often caused by damage to the radial nerve
3. Wrist drop can be caused by lead poisoning, as lead poisoning can damage the radial nerve
4. Repetitive motion can cause wrist drop by damaging the radial nerve
 - ▶ Prolonged pressure on the radial nerve, perhaps caused by the use of crutches, or by habitual leaning on the elbow, can cause wrist drop by damaging the radial nerve
5. Neuromuscular disease can also cause wrist drop
6. The condition is found in individuals of all ages
7. The assessment for wrist drop involves nerve conduction velocity studies to determine if the radial nerve is the source of the problem.
 - ▶ X-rays can be used to rule out the presence of bone spurs and fractures which may be pressing on the radial nerve
 - ▶ MRI may be used to distinguish between possible causes of the problem
8. Treatment depends upon the cause of the condition.
 - ▶ Initial treatment may involve splinting of the wrist, and occupational, or physical therapy
 - ▶ Surgical intervention to remove bone spurs may be required to remove pressure from the radial nerve
 - ▶ Other causes of pressure on the radial nerve may also need surgical intervention
 - ▶ Neuromuscular disorders require medication



Physical Examination for Suspected Fracture

1. In examination for a suspected fracture, any unnecessary pain, or discomfort, to the patient must be avoided.
 - ▶ First, the history of the injury must be obtained
 - ▶ Next, the affected area should be visually examined for signs of damage, such as deformity, swelling, or skin breakdown
2. A neurovascular examination is in order as damage to blood vessels, or nerve tissue is a serious complication
 - ▶ Particular attention should be paid to the area distal to the fracture
 - The lack of a pulse in this area, or a lack of sensation, is a serious finding, and the orthopedic surgeon should be informed
 - ▶ The areas distal and proximal to the injury should be palpated with particular attention paid to nearby joints
 - ▶ A thorough examination can ensure additional fractures aren't overlooked
 - A physical examination can help determine what imaging studies should be completed, and ultimately what treatment option should be considered



MRI

1. MRI

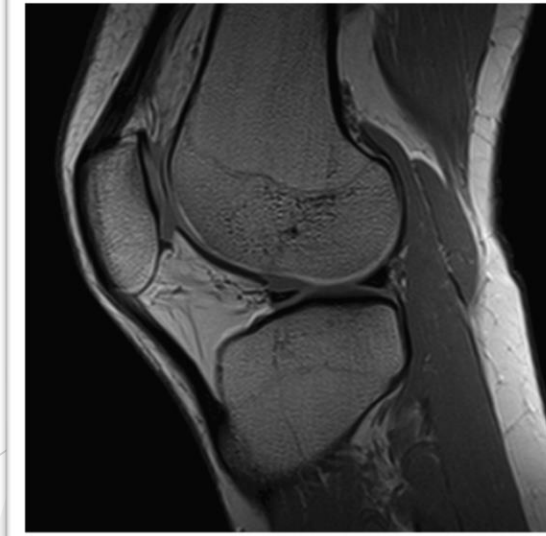
- ▶ Magnetic resonance imaging (MRI) allows accurate diagnostic visualization of the internal structures of the body
- ▶ It can produce cross-sectional images
- ▶ Uses radiofrequency waves and a magnetic field to produce its images
- ▶ Best used in the examination of soft tissue structures, but can also be used to visualize bony structures

2. This technique is highly accurate in detecting abnormalities and injuries.

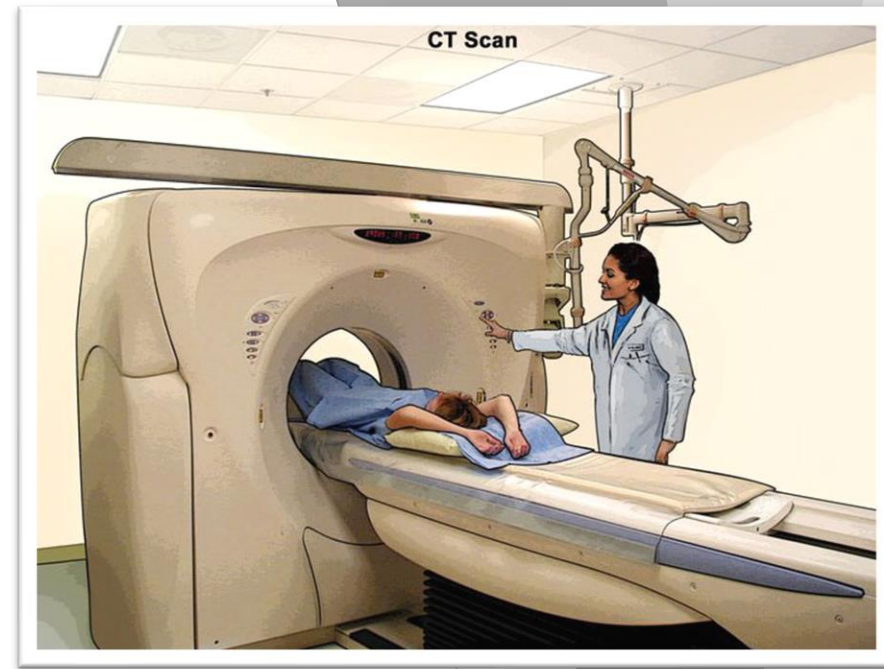
3. MRI does not use radiation to produce images, and this can alleviate concern about extensive testing

4. MRI drawbacks:

- ▶ Can take up to an hour to complete which becomes a problem for patients who are claustrophobic
- ▶ Patients with certain metallic implants, such as pacemakers and vascular filters, cannot have MRIs because the magnetic field can be strong enough to disturb the functioning of these implants, or to displace them



- ▶ Computed tomography uses radiation to produce cross-sectional images
 - ▶ Capable of producing a series of images
 - ▶ A rapid exam which makes it much more tolerable than MRI for some patients
1. The radiation used in CT, however, is a concern for some patients.
 - ▶ Ionizing radiation is potentially cancer causing
 2. CT produces better images of bones and fractures than MRI is capable of producing
 - ▶ Soft tissue may not show up as clearly as desired
 3. To counteract this phenomenon, an injected contrast can allow better visualization.
 - ▶ Some patients may react to the contrast with allergic symptoms
 4. Patients with certain types of implants may not be able to have MRI, and may be referred for a CT scan instead.



<http://www.cancer.gov/cancertopics/diagnosis-staging/ct-scans-fact-sheet>



<http://www.radiologyinfo.org/en/info.cfm?pg=abdominct>

Bone Growth Stimulators

- ▶ An appliance that delivers a low level electrical current to a fracture site
- 1. This device is thought to increase metabolic activity in the injured area resulting in faster healing, and more robust bone formation.
- 2. Research suggests that the bone growth stimulator can have positive effects on acute and slow healing fractures
- 3. Certain bones are more likely to heal poorly, perhaps resulting in nonunion
 - ▶ Poor healing can be due to fracture location, fracture shape, and blood supply
 - ▶ For this reason, bone growth stimulators are often used on acute fractures of the scaphoid, fifth metatarsal base, and tibia
- 4. Different types of stimulators are worn for different lengths of time.
 - ▶ Proper education ensures best results from a particular device
 - ▶ The stimulator must be fitted to the patient's injury in a way which places the highest concentration of electrical current as close to the fracture as possible



http://www.brettonmedical.com/product_details.php?DonJoy-Long-Bone-BGS-8



http://www.brettonmedical.com/product_details.php?DonJoy-Spinalog-BGS-9



http://www.cfaas.com/phyRes_non_invasive_fracture.php