



THE UNIVERSITY OF TOLEDO MEDICAL CENTER

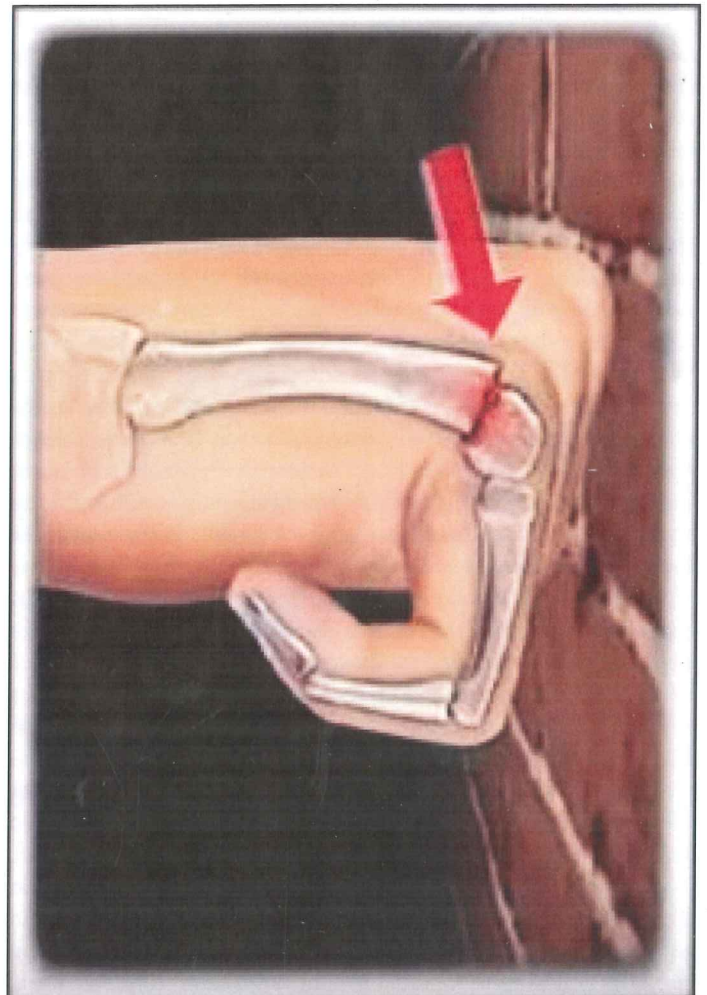
ORTHOPAEDIC MONTHLY

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Boxers Fracture

A boxer's fracture is a broken bone in the hand, normally occurring at the neck of the 5th metacarpal bone. Boxer's fracture usually occurs when striking a firm object such as a wall or an opponent during boxing. It usually happens with a clenched fist. The head of the metacarpal bone forms the knuckle during an enclosed fist. The end of the 5th metacarpal takes the force of the impact and breaks at its neck and then angulates towards the palm, creating a dorsal bump. Patients who sustain a boxer's fracture commonly complain of pain, swelling, and a deformity at the base of their small finger. X-rays are needed to diagnose the fracture and the angulation of the fracture. A true lateral radiograph is needed. The normal metacarpal neck angle is 15° , so if the angulation measures 40° on the x-rays, it is actually 25° of real angulation. The fracture usually displaces with the dorsal angulation and the metacarpal head is displaced palmarly, which can result in clawing. The 2nd and 3rd CMC joints are not mobile. If you break the second or third metacarpal neck, anything more than a mild deformity (10° - 20°) is not acceptable because the CMC joint cannot move. To accept some deformity, you need to have some compensatory mobility of the CMC joint. Compensatory movement takes place at the mobile CMC joints of the fourth and fifth fingers. The movement is 10 - 15° in the 4th CMC joint and 20 - 30° in the 5th CMC joint. This can help in guiding the treatment of metacarpal fractures. Less than 40° of the deformity in the 5th metacarpal shaft is acceptable. Less than 50° - 60° of angulation deformity in the 5th metacarpal neck is acceptable. The surgeon is less likely to correct the deformity in the 5th metacarpal because there is compensatory mobility of the CMC joint. The patient may end by a bump at the knuckle, but it usually does not have an effect on the hand function. Practically speaking, any deformity more than 50 degrees requires possible intervention to avoid pseudoclawing. The boxer's fracture is usually treated by a splint. It is used to allow the fracture to heal, especially if the deformity is not severe. It may need closed reduction and a splint to improve the deformity and apply the splint in the position of the hand function. (Extension of the wrist and flexion of the MCP joint). An ulnar gutter splint is usually used. The boxer's fracture is usually angulated (angulation is usually tolerable and the outcome is usually good). Occasionally, the fracture will have a rotational deformity. If this happens, it will need correction. Acceptable outcome is reported even when the angulation is as high as 50 or 60 degrees when the majority of the



fractures are treated without surgery. Some studies have found that there is no difference in the outcome in pain, satisfaction, range of motion, and grip strength when you compare buddy taping with splinting. There is some opinion that you should just give the patient buddy tape and schedule an appointment as needed, and the patient will do just fine with an optional follow-up.

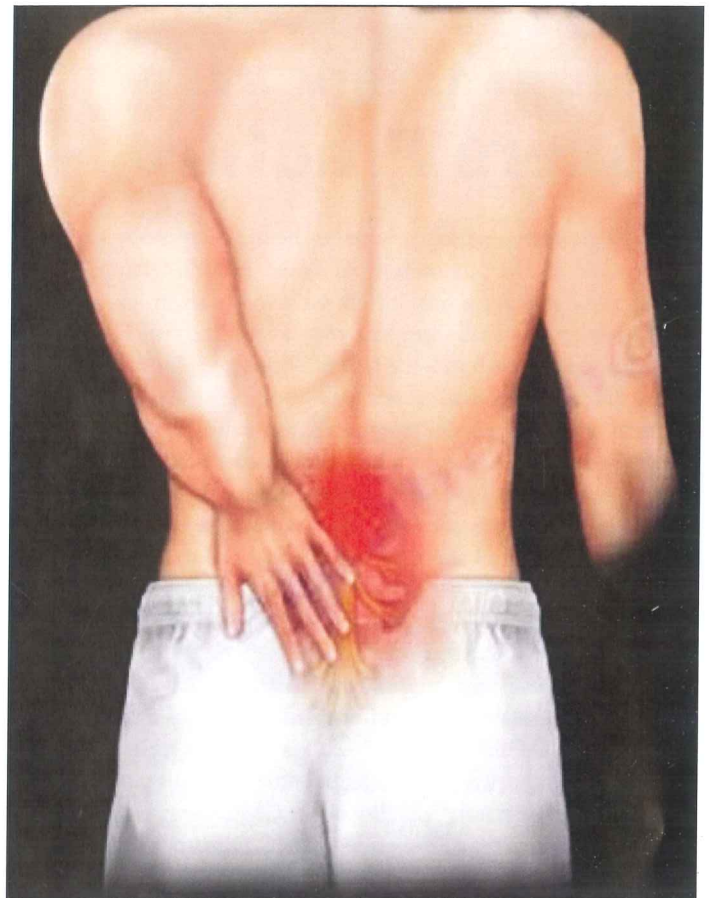
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Some doctors believe that the reduction, casting, a scheduled appointment and more x-rays may be unnecessary, adding more of a burden to the patient as well as to the healthcare system. It may seem to some as though management of the boxer's fracture is not a big deal. However, some doctors believe the opposite, that they should

follow the patient closely. Surgery is rarely done. When it is indicated, it is done utilizing intramedullary k-wires percutaneously, or use percutaneous k-wire fixation stabilizing the 5th metacarpal the 4th metacarpal.

Low Back Pain

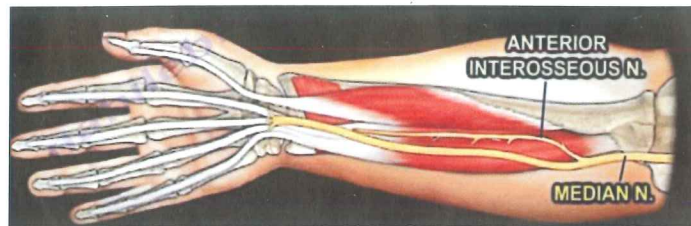
What are the important facts about low back pain? No definitive etiology is found in about 85% of the patients. 90% of patients with a single episode of low back pain return to work within 6 weeks, and most patients get better with time. The history of low back pain is the single most important factor predicting future occupational low back pain. Low back pain is the second most common cause of work absenteeism. Persistent back pain more than 6 months constitutes more than 4% of the cases. Disability is closely linked to compensation and litigation. The least amount of pressure on the disc is measured with the person lying supine. The highest disc pressure is measured while sitting and 20 degree forward leaning with 20 kg load in the arm. By keeping the weight of the load close to the body, this reduces the compressive forces being placed on the lumbar spine. Exercises performed during sitting probably have less pressure being placed on the discs. What are the physical factors that lead to low back pain? Vibration caused by horseback riding increases the load on the discs. The back muscles work constantly to keep your posture straight. Caring for horses could be bad for the back due to the bending and the lifting associated with their care. Any structure in the spine and close to the spine can hurt, causing what seems to be low back pain. These structures include facet joints, intervertebral discs, spinal canal/nerve roots, sacroiliac joints, muscles, ligaments, nerves, hip joint/piriformis syndrome, and trochanteric bursitis. Red flags for cancer include patients over the age of 50, pain at rest and at night, unexplained weight loss, history of cancer, bone destruction involving the pedicle is pathognomonic. Look for the winking owl sign of the vertebrae. The red flags for infection include diabetes mellitus, intravenous drug abuse, fever, urinary tract infection, and previous surgery on the spine. The physical examination includes the initial assessment, focus on the red flags such as fractures, tumor, infection, or cauda equina syndrome. Symptoms and signs of cauda equina syndrome are back pain more than leg pain, bladder or bowel disturbances, bilateral leg pain and weakness, saddle anesthesia (rectal and genital area sensory changes). In the absence of red flags, imaging studies are usually not helpful in the first 4-6 weeks. It is hard to explain to the patient why you did not get an x-ray, although not getting an early x-ray is good patient care, it may lead to suboptimal patient satisfaction. Intensive work-up may not be necessary in the early stages of routine low back pain. Conservative treatment of low back pain include anti-inflammatory medication and muscle relaxants which are usually helpful, and a soft brace or corset. Physical therapy is an important aspect of the



treatment and should be done as soon as pain control is achieved. The combination of physical therapy and return to work is important. If a patient sustained chronic, disabling occupational low back pain without any intensive rehab, there is a 50% chance of going back to work if the person is out of work for 6 months. The chance of returning to work drops to 20% if the person is out of work for 1 year. The chance of returning to work is almost none if the person is out of work for 2 years. It is important to do therapy and encourage the patient to go back to work. The best treatment for acute low back pain is to continue with the ordinary daily activities within the limits permitted by the pain. The best treatment is for the patient to go back to work.

Anterior Interosseous Nerve

The anterior interosseous nerve is a famous nerve because this nerve allows the patient to be able to do the O.K. sign. When the anterior interosseous nerve is injured or affected, the patient will not be able to do the O.K. sign. The anterior interosseous nerve branches from the median nerve of the brachial plexus. It arises from the median nerve about 4-6 cm distal to the elbow (approximately 1/3 of the way down the forearm). The anterior interosseous exits from the anterolateral aspect of the median nerve and runs between the radius and ulna on the interosseous membrane between and below the muscles of the flexor digitorum profundus and the flexor pollicis longus. The anterior interosseous nerve innervates three muscles in the forearm the flexor pollicis longus, the flexor digitorum profundus, and the pronator quadratus. The flexor digitorum profundus (FDP) has a dual innervation: lateral part- anterior interosseous nerve, and medial part- ulnar nerve. The anterior interosseous nerve passes dorsal to the pronator quadratus muscle with the anterior interosseous artery and provides innervation to the volar wrist capsule. Terminal branches of the anterior interosseous nerve innervates the carpal joint capsule. The integrity of the anterior interosseous nerve is tested by performing the O.K. sign or the circle signal. Ask the patient to do this by touching the tips of the index finger and the thumb together. The integrity of the anterior interosseous nerve allows flexion of the distal phalanx of the thumb and the index finger. When the nerve is injured or affected, the patient will not be able to bring together the distal phalanx of the thumb and the index finger. Testing the integrity of the anterior interosseous nerve by touching together the middle finger and the distal phalanx of the thumb is not reliable. With injury of the nerve there will be loss of motor function however, there will be NO loss of sensory function. Treatment for this type of injury is usually observation with EMG testing. In anterior interosseous nerve entrapment, the median nerve conduction study will be normal, however the needle EMG of the anterior interosseous innervated muscles will be abnormal. Exploration and release of the nerve can be considered if no improvement in the nerve function is seen in 4-6 months. In the differential diagnosis, being unable to do the O.K. sign may also be a result from a high median nerve injury. The presence of sensory symptoms indicates a median nerve injury. The Froment's sign is a test performed to determine the presence of an ulnar nerve injury. 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. This muscle is innervated by the ulnar nerve and with ulnar nerve injury, the adductor pollicis muscle becomes weak and the patient cannot adduct the thumb. The flexor pollicis longus muscle substitutes for this movement by flexing the thumb. Bending of the thumb when pinching a piece of paper is a sign of an ulnar nerve injury. The Benediction sign is another sign that can occur with anterior interosseous nerve injury. This occurs when you ask the patient with an anterior interosseous nerve injury to make a fist. The first and second fingers will have difficulty in flexing while the other digits will flex. The position of the hand is similar to the position taken during a hand blessing. The Benediction sign is different from the ulnar claw hand which occurs due to damage to the ulnar nerve and is seen when attempting to extend all of the digits. With the ulnar claw hand you will find that the 4th and 5th fingers take a flexed position. Problems with the anterior interosseous nerve must also be differentiated from acute brachial plexus neuritis and the patient may have pain in the affected extremity. The Martin-Gruber anastomosis occurs through a communicating nerve branch between the median nerve and the ulnar nerve in the forearm. The connection carries motor nerve fibers and it can go from the anterior interosseous nerve to the ulnar nerve. The Martin-Gruber anastomosis nerve fibers are most often of an efferent nature, contributing to the motor innervation of the hand through the ulnar nerve. The axons will leave the median nerve or the anterior interosseous nerve, crossing through the forearm to join the main trunk of the ulnar nerve, innervating the intrinsic muscles of the hand. It can be confusing clinically and also on EMG. It is a confusing presentation with clinical implications. It could be a good explanation for difficult challenges, especially in the differential diagnosis. If the communicating nerve arises from the anterior interosseous nerve then a patient with a nerve palsy may present with intrinsic hand weakness, normally supplied by the ulnar nerve.

Posterior Dislocation Sternoclavicular Joint

The SC joint is supported by strong ligaments. Dislocations of the SC joint can occur due to injury to these strong ligaments. Dislocation of the sternoclavicular joint can be an anterior dislocation, which means the clavicle moves to the front or anteriorly (common) and this dislocation is benign and does not cause any problems in the majority of patients. The posterior dislocation is dangerous; it can affect the trachea, esophagus, veins and arteries. If you suspect posterior dislocation of the SC joint because of pain or

swelling in this area, a CT scan is the best study for assessment of this joint and for establishing the diagnosis and for assessment of any associated injuries. In Figure 1, the CT scan showed posterior dislocation of the clavicle in a patient who sustained a shoulder injury 3 days prior to obtaining the CT scan. This injury was occult and not seen on the routine x-rays of the chest. The patient was evaluated because of swelling of the upper extremity.

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The Doppler showed DVT of the left upper extremity and a CT scan with contrast was ordered. Unexpectedly, the CT scan showed the clavicle to be posteriorly dislocated, compressing the vein and causing the DVT. Closed reduction with backup from a cardiac surgeon is the usual treatment, however, you may need to do open reduction in some cases with repair of the ligaments. Once you reduce the joint, the joint is usually stable. Posterior dislocation can be a difficult diagnosis. It could be associated with more serious problems such as dyspnea, dysphagia, tachypnea, and compression of the great vessels. Sometimes it may be associated with DVT of the upper extremity. The good news is that posterior dislocation is not common. On the other hand, the anterior dislocation is common, it has an obvious bump, benign injury and does not affect the function. If you try to do a closed reduction on an anterior dislocation, you will not be able to maintain that reduction. A posterior dislocation of the SC joint will be stable after reduction.



Figure 1

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