

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

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THE UNIVERSITY OF TOLEDO MEDICAL CENTER

ORTHOPAEDIC MONTHLY

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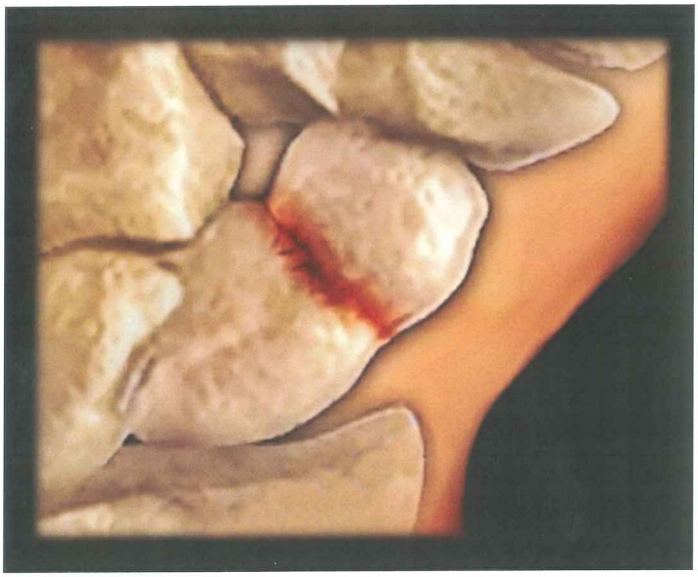
Scaphoid Fractures

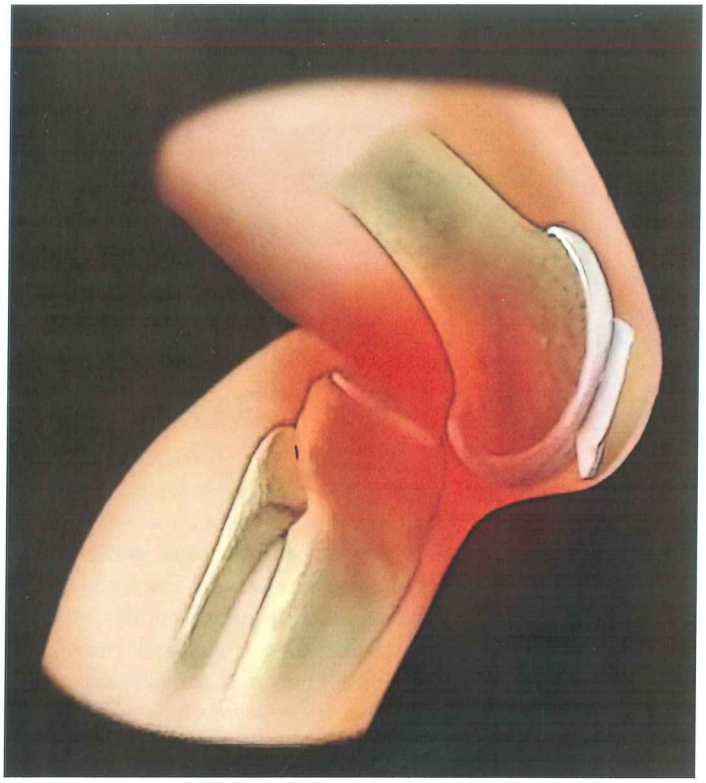
The scaphoid is the most common carpal bone to fracture. Fracture of the scaphoid usually occurs from a fall onto an outstretched hand. The patient usually experiences wrist pain and some swelling. The blood supply of the scaphoid bone is very unique. The fracture may have difficulty in healing. In fact, avascular necrosis of the proximal fragment may occur with fracture of the scaphoid bone. The scaphoid is a small bone, however if it fractured, there could be a bad result. Always look for tenderness at the anatomic "snuffbox" and pain on axial load. Even if the x-ray is negative, you should immobilize the wrist adequately with a thumb spica cast for a short period of time (10 days to 2 weeks). When a fracture of the scaphoid occurs, it can be slow to heal due to the limited circulation of blood to the bone. Scaphoid fractures can lead to nonunion and avascular necrosis due to interruption of the blood supply. The more proximal the fracture, the more likely that the fracture will develop nonunion and AVN. Axial load with hyperextension and radially deviation of the wrist. Types of scaphoid fractures include waist fractures, distal third fractures, proximal third fractures, and transverse fractures. About 65% of fractures are waist fractures. Waist fractures are the most frequent fracture site and has moderate risk of AVN and nonunion. A transverse fracture is more stable. Distal third fractures occur in about 10%; it is the most common location in children (controversial). Proximal third fractures have a high incidence of nonunion and AVN. Fractures of the proximal pole have a nonunion rate of 40-50%. Transverse fractures are more stable. Do AP view, lateral view, and scaphoid view at 30 degrees wrist extension and 20 degrees ulnar deviation on x-rays. If the x-rays are negative and there is a high clinical suspicion of a scaphoid fracture, then immobilize the fracture and repeat the x-rays in 2-3 weeks. Bone scan will give fracture diagnosis in 72 hours. MRI can be used for early diagnosis of the fracture. MRI is very sensitive and will diagnose fracture in less than 24 hours. MRI can also show the AVN and vascularity of the proximal fragment of the proximal pole. CT scan may be helpful in diagnosing healing of the fracture. To check for nonunion, you get the CT scan along the scaphoid axis. A thumb spica cast is used for stable, nondisplaced fracture or if the x-ray is negative, but there is a high index for suspicion of a scaphoid fracture. In this situation, you will put the thumb spica cast and reevaluate the patient in 2-3 weeks. Then remove the cast and get an x-ray. If the patient continues to have pain and the x-rays continue to be negative, then get an MRI



and reapply the thumb spica cast and follow the patient closely. It is controversial whether to use a short or long arm thumb spica cast. The period of immobilization and healing time of the fracture is decided by the location of the fracture. When you see a scaphoid fracture or if you suspect it, you need to immobilize it early. Delay in immobilization of more than 4 weeks will increase the rate of nonunion. The patient with percutaneous screw fixation will heal faster and return to work will occur earlier. In athletes, you will do percutaneous fixation. It is better than a prolonged period of cast immobilization with increased risk of delayed union, nonunion, or AVN with nonsurgical treatment. Surgery can be open reduction internal fixation or percutaneous screw fixation. Indications for surgery include: unstable fracture, fracture of the proximal third, fracture with more than 1mm displacement, DISI deformity, radiolunate more than 15 degrees, humpback deformity more than 15 degrees, scaphoid fracture associated with perilunate dislocation, comminuted fractures, or unstable vertical or oblique fractures. Complications include avascular necrosis (AVN) of the proximal pole, nonunion, malunion, arthritis, scaphoid nonunion advanced collapse (SNAC).

Knee Dislocations

Dislocation of the knee is a serious problem. It should be recognized early and managed appropriately. Knee dislocation is considered an orthopedic emergency. It is important to recognize the dislocation, do reduction, and perform serial neurovascular exam before the reduction and after the reduction. Approximately 50% of knee dislocations spontaneously reduce before formal evaluation. Morbid Obesity can be a risk factor for knee dislocation. Because the joint capsule is torn, knee swelling may not occur with knee dislocation. The knee dislocations associated with sports injuries have a lower incidence of neurovascular injury than those associated with a high energy mechanism. There is a classification developed by Dr. Schenck based on the direction of displacement of the tibia and on the severity of the ligamentous damage. The dislocation of the knee usually involves at least two ligaments. Anterior knee dislocation is caused by a hyperextension mechanism that causes failure of the posterior capsule, the PCL, and sometimes the ACL. Anterior knee dislocations are the most common types. Posterior dislocations are seen in dashboard injuries. The posterior dislocation has the highest rate of vascular injury (about 25%), and sometimes will be a complete tear of the popliteal artery. Lateral dislocation has the highest rate of peroneal nerve injury. Posterolateral dislocation is the most common rotatory dislocation, and it is usually irreducible. In rotatory dislocations, the PCL remains intact as the tibia rotates about the femur. A dimple on the medial side indicates posterolateral dislocation, which means that the dislocation can be irreducible and the medial femoral condyle button goes through the joint capsule. The physical examination and diagnostic studies can direct the treatment in a timely fashion. There could be an obvious deformity. See if there is a dimple sign. You need to check the pulses, get the x-ray, and reduce the knee immediately regardless if there is a pulse or no pulse. When you check the pulses, compare it to the other side. You have to do serial exam of the pulses and the whole idea is to make sure to discover if there is a vascular injury or not, because if there is a vascular injury and there is a delay more than 8 hours in reestablishing the arterial blood flow, that will result in an amputation rate of 85%. The patient may have severe pain and instability, and the exam will be difficult because of guarding and apprehension. Look at the pulses and the x-rays. Look for asymmetry of an irregular joint space on the x-rays. After you reduce, you immobilize, get x-rays, and make sure the dislocation is reduced. Up to 1/3 of knee dislocation have associated injuries that require more urgent attention. Knee dislocation is a high energy injury that will have popliteal artery injury, nerve injury, multiple fractures, head and chest trauma, and compartment syndrome. You may have hyperextension of the knee, popliteal ecchymosis, foot drop, or vascular issues, and the patient may also be normal. To handle a knee dislocation, examine the pulses and then you reduce the knee. After you reduce the knee, you examine the pulses and get post reduction A.B.I. (ankle brachial index). The ankle brachial index (A.B.I.) is very important in the knee dislocation. The systolic blood pressure measured is divided by that measured at the brachial artery. A ratio less than 0.9 is considered abnormal and needs further investigation. Scenario 1: Good pulses and symmetrical, A.B.I. is more than 0.9, then observe for 24-48 hours with serial neurovascular exam. Scenario 2: After the reduction, if the distal pulses are asymmetrical,



or the A.B.I. is less than 0.9, then you will do some kind of a study to see why this is occurring (get a CTA or arteriogram). Scenario 3: If you have absent distal pulses or clear, hard signs of limb ischemia, do not waste time by doing arteriogram. Take the patient to the operating room, do emergency exploration and then on the table, do arteriogram and the patient will probably need fasciotomy. You will stabilize the knee with and external fixator. If the patient has a fracture dislocation, then you will reduce the fracture and get post-reduction CT scan. In general, you will get an MRI before you plan the definitive fixation. When you try to do a closed reduction and you cannot do the closed reduction, then you have a rotatory dislocation. You should take that patient to the operating room and do the reduction through the anteromedial approach. Make sure that circulation is O.K. before you take the patient to the operating room and make sure you have a vascular surgeon back up. If the patient has a normal pulse, normal color, and the temperature of the leg and foot is normal for 48 hours, then you can avoid angiography. If the circulation is bad, you are taking the patient to surgery, you will do the external fixator, you will repair the popliteal artery, and you will do the four compartment fasciotomy. Temporary external fixator can be used if the joint is unstable or if there is persistent subluxation or severe soft tissue injury. External fixator should be used on a temporary basis before repair or reconstruction of the ligaments. There is an improved outcome with early treatment less than 3 weeks. Nonoperative treatment of knee dislocation gives an inferior result than operative treatment. The most important first step to rule out vascular injury, is to examine the pulses and compare to the other side. If you examine the pulses and then you have doubt, and you get the A.B.I. and it is greater than 0.9 then the chance of arterial injury does not exist.

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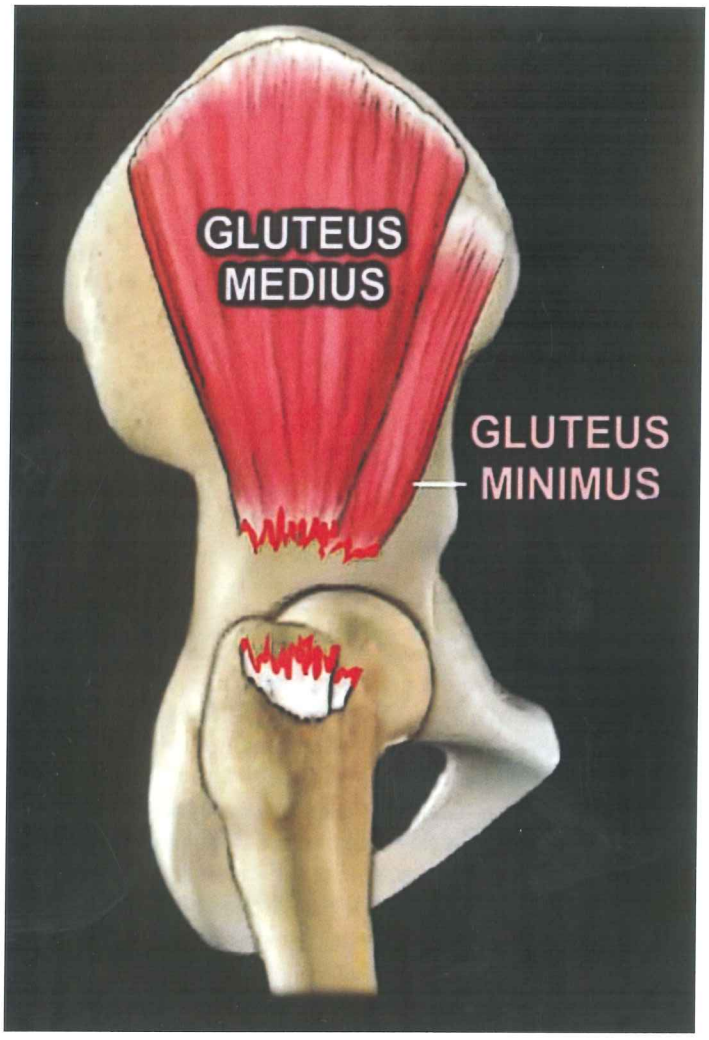
Injury to the popliteal artery can occur in up to 40% of cases. The average is 16%. Peroneal palsy occurs in about 25% of knee dislocations, it has a poor prognosis for return of function. Only 50% of patients have return of function. If no clinical or electrical evidence of nerve continuity exists by 3-4 months, surgical intervention for direct or intercalary nerve repair or tendon transfer of the tibialis posterior tendon to the dorsum of the foot is indicated. Injury to the common peroneal nerve will result in sensory dysfunction at the top of the foot and the patient will not be able to dorsiflex the ankle or the big toe (patient will have foot drop). The patient with knee dislocation should have a comprehensive examination because of the risk of other serious injuries. The potential for loss of a limb or irreversible damage to the limb is present with any knee dislocation. The prolonged warm ischemia time is a problem in knee dislocation associated with vascular injury with an amputation rate of approximately 20%. Stiffness is a common problem following knee dislocation treatment.

Gluteus Medius Tendon Tear

The gluteus medius tendon tear is recognized more as a cause of hip pain and if this tear causes disability to the patient, then the treatment is repair of the tear. However, if the repair is not possible because the patient has advanced muscle atrophy or there is a big gap between the tendon and its insertion, then we will do transfer of the gluteus maximus muscle to the greater trochanter. The pathology of the hip abductor is common. It is grouped under the greater trochanter pain or bursitis, and there is a spectrum between bursitis and tendonitis, tendinosis, to a partial tear, to a complete tear, to a massive chronic neglected tear. These tears happen more with hip arthritis, and it is clinically silent. It is part of the greater trochanter pain syndrome, where the patient will have chronic lateral hip pain and tenderness over the greater trochanter and the pain can mimic other serious causes of hip pain, including stress fracture, AVN, arthritis, and piriformis syndrome. The lateral hip pain may not be limited to the greater trochanter. It may extend into the buttock or even to the lower back, and this may complicate the clinical picture more. The role of hip abductor tendon tear as a cause of hip pain is underestimated. Usually the condition is dismissed as trochanteric bursitis. When an elderly patient complains about trochanteric bursitis, especially if it is chronic and not getting better with treatment, careful examination is necessary and imaging may be necessary. So the patient will come with symptoms of lateral or posterior hip pain with tenderness over the greater trochanter. The patient will have a limp and will have weakness of abduction and Trendelenburg Gait. The symptoms and exam may be nonspecific or may even be confusing. The strength may be 4/5 or even 5/5. The patient may present many months or years after the onset of the symptoms. The condition may be totally occult. MRI may be necessary to diagnose the tear. MRI may show partial tear to tendonitis or tendinosis or even retraction of the tear with atrophy of the muscle which may need soft tissue release for repairing the tendon. The MRI may show significant muscle atrophy, and the patient may need gluteus maximus transfer. If an elderly patient has a hip replacement and continues to complain of symptoms of greater trochanteric pain and walks with a limp, consider in the differential diagnosis a gluteus medius tendon tear. An MRI can really be helpful, even in the presence of prosthesis in the hip. Before we talk about the treatment of the tear, we need to talk about what is the role of the gluteus medius and gluteus minimus muscles. The gluteus medius and minimus muscles are important in stabilizing the ipsilateral hip in the stance phase of the gait cycle. The weakened gluteus medius allows the opposite side of the pelvis to tilt downwards during stance on the weakened side. It's like the pelvis wants to run away. The other side of the pelvis tips down. The trunk leans towards the weakened side, which is called abductor lurch during the stance phase. This occurs because the trunk is basically trying to help the weak side of the pelvis (giving the muscle assistance). This really helps the weak side by moving the center of gravity near the fulcrum on the weak side. This shortens the moment arm from the center of gravity to the hip joint, and this will reduce the force and the effort.



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Gluteus Medius Tendon Tear continued

We need to understand the area of insertion of the tendons on the greater trochanter. The greater trochanter has four facets: the gluteus minimus, the gluteus medius, and the gluteus maximus. The gluteus minimus inserts into the anterior facet. The gluteus medius inserts into the lateral and superoposterior facets. The gluteus maximus inserts into the posterior facet. Early repair is better. The tendon goes into a progressive phase of deterioration from tendinosis to partial tear, degeneration to complete tear, retraction, fatty infiltration, and atrophy. You need to think about the condition and treat it before it reaches that chronic, advanced stage. Nonoperative treatment of the hip abductor like tendinosis, tendonitis, or bursitis is successful in the majority of patients. Surgical repair for partial or complete hip abductor tendon tears is also successful in relieving the pain and improving the function of the patient. Not all tears are repairable, even with soft tissue release. A complete tear plus muscle atrophy and fatty degeneration represents a bad prognosis and a difficult, complex situation for the patient. When the tear cannot be repaired or the cause of the muscle atrophy is superior gluteal nerve injury, then a muscle transfer is necessary. You can use Achilles tendon allograft or the vastus lateralis muscle, or transfer of the upper half of the gluteus maximus tendon to the abductor foot print to stabilize the pelvis during ambulation. The anterior fibers of the gluteus maximus has a running course similar to the fibers of the gluteus medius and minimus and transferring it to the abductor foot print will be very helpful to the patient. More and more of this technique is used for chronic, advanced, irreparable tear of the gluteus medius tendon, especially with advanced fatty atrophy.

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