

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

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THE UNIVERSITY OF TOLEDO MEDICAL CENTER

ORTHOPAEDIC MONTHLY

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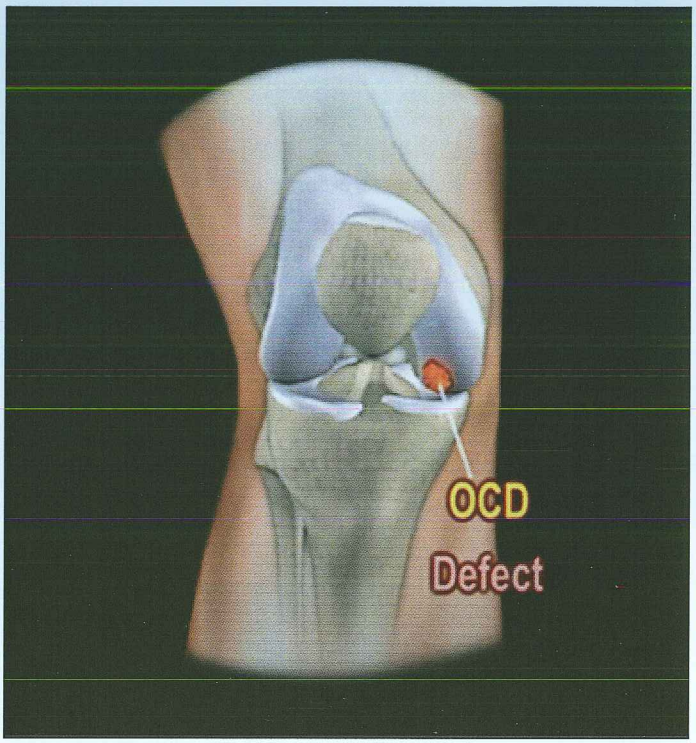
Osteochondritis Dissecan's of the Knee

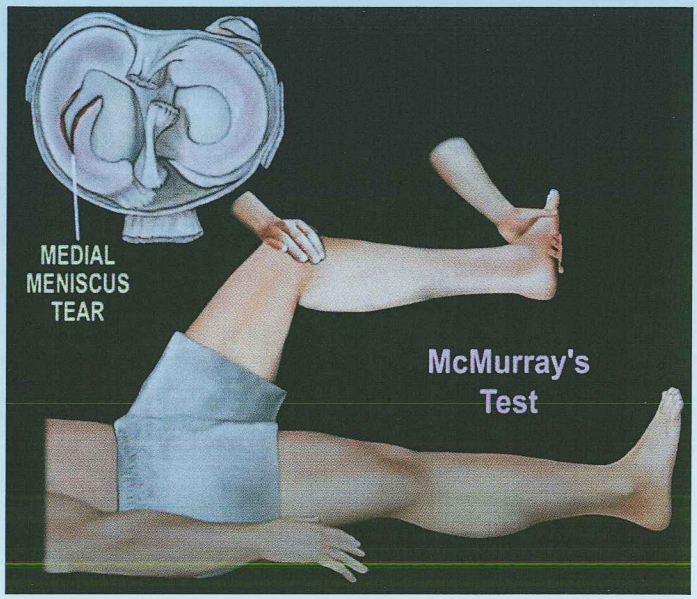
Osteochondritis Dissecans (OCD) is a condition that affects the articular cartilage and the subchondral bone of the knee. The lesion usually occurs in the knee on the lateral and posterior aspect of the medial femoral condyle (70% of lesions are in the postero-lateral aspect of the knee). The chances of the lesion occurring at the lateral femoral condyle and patellar aspect of the knee is rare. Lateral condyle and patellar lesions will have a bad prognosis. The mechanisms and causes of injury for OCD lesions may be multifactorial. It is usually caused by repetitive overloading causing fragmentation and separation of bony fragments. It can occur in juveniles with an open epiphysis usually during the ages 10-15 years old. Prognosis is usually very good when the patient has an open epiphysis. It can also occur in adults with a less favorable prognosis. Osteochondritis Dissecans of the knee is classified in four stages. Stage I is depressed OCD with intact cartilage and a small area of compressed subchondral bone. Stage II is a partially detached fragment. Stage III is the most common type and has a completely detached but non-displaced fragment. Stage IV is completely detached and displaced. The displaced fragment can be a loose body. Symptoms include activity related pain, poorly localized tenderness, effusion, and swelling and stiffness with or without mechanical symptoms. Mechanical symptoms indicate an advanced problem. The Wilson's Test is a test used to detect the presence of Osteochondritis Dissecans of the knee. To perform the Wilson's test, ask the patient to sit on a table with his legs dangling over the edge. The patient's knee should be flexed at a 90-degree angle. Grasp the patient's leg and internally rotate the tibia. Instruct the patient to extend the leg until pain is felt. The test is positive when the patient reports pain in the knee about 30-degrees from full extension. When rotating the leg back to its normal position, the pain disappears. Internal rotation causes impingement of the tibial eminence on the OCD lesion of the medial femoral condyle which causes the pain. External rotation moves the eminence away from the lesion, which relieves the pain. For x-ray images, do weight-bearing AP and lateral view radiographs and use the Tunnel View (intercondylar notch view). On MRI, check the size of the lesion, signal intensity surrounding the lesion, and the presence of any loose bodies. Prognosis correlates with age; the younger the age, the better the prognosis. Adults have a worse prognosis. Lesions in the lateral femoral condyle and patella have a worse prognosis. Synovial fluid



appearing behind the lesion on MRI correlates with a worse prognosis. Fluid signal on MRI behind the lesion indicates that the fragment is unstable and is less likely to heal. Nonoperative treatment is observation, limitation of activity, crutches, trial of non-weight bearing for six weeks, and close follow-up. Stable lesions in children with open physis are an indication of nonoperative treatment. The majority will heal as long as the physis is open (good prognosis). Operative treatment is indicated if the fragment is detached, unstable or loose in patients where the physis has already closed, is near closing, or if there is failure of the non-operative treatment. Surgical treatment usually includes arthroscopy and removal of the loose fragment, fixation of the unstable lesion, or microfracture (drilling of the lesion). Arthroscopic drilling of the subchondral bone is done in children who approach skeletal maturity. Drilling of the lesion has a high success rate especially if the lesion is stable.

McMurray's Test Meniscal Tear

McMurray's test is a commonly used test in orthopaedic examination to test for tears of the meniscus. The McMurray's test is a rotational maneuver of the knee that is frequently used in the examination of the patient to help in the diagnosis of meniscal tears. Meniscus injuries are very common. When the patient sustains an injury of the knee and has a meniscal tear, usually the patient complains of knee pain localized to the medial or lateral side of the knee. The patient may also have locking and clicking. Sometimes the patient will have an effusion and sometimes this effusion is small (swelling of the knee). Joint line tenderness is the most sensitive finding. Joint line tenderness can be on the medial side (medial meniscal tear) or on the lateral side (lateral meniscal tear). There will be minimal swelling of the knee and possible extension lag (locked knee) due to a displaced bucket handle tear of the meniscus. Pain at a higher level than the joint is usually associated with medial collateral ligament tear. If an MCL tear is present, it is usually avulsed from the medial femoral condyle. The MCL is rarely avulsed from the tibia. Pain at a lower level is usually associated with the pes anserine bursitis. McMurray's test is a knee examination test that shows pain or a painful click as the knee is brought from flexion to extension with either internal or external rotation of the knee. The McMurray's test uses the tibia to trap the meniscus between the femoral condyles of the femur and the tibia. When performing the McMurray's test, the patient should be lying supine with the knee hyperflexed. The examiner then grasps the patient's heel with one hand and places the other hand over the knee joint. To test the medial meniscus, the knee is fully flexed, and the examiner then passively externally rotates the tibia and places a valgus force. The knee is then extended in order to test the medial meniscus. To test the lateral meniscus, the examiner passively internally rotates the tibia and places a varus force. The knee is then extended in order to

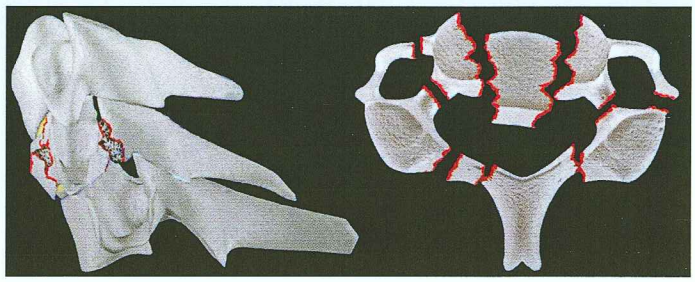


test the lateral meniscus. A positive test is indicated by pain, clicking or popping within the knee joint and may signal a tear of either the medial or lateral meniscus when the knee is brought from flexion to extension. There are mixed reviews for the validity of this test. There are other clinical tests that are as good as the McMurray's test, however MRI is making the diagnosis of a meniscal tear easier. MRI is very sensitive, and it also excludes other associated injuries. I find that the McMurray's test is valuable in getting insurance approval for performing an MRI. If you state that the McMurray's test is positive, then the insurance will approve the MRI. Nowadays though, the McMurray's test does not give us a lot of valuable clinical information, because we get the information from other tests.

Spine Emergencies

If the transverse atlantal ligament ruptures, you can see that the spine becomes translationally unstable in the sagittal plane, and the odontoid will be displaced posteriorly. The ADI will increase more than 3mm, and the spinal cord area will be narrowed, and you may get spinal cord compromise as the odontoid process moves posteriorly towards the spinal cord. This rupture of the transverse ligament is usually apparent on the x-rays or CT scan as the odontoid moves posteriorly, and the ADI increases, compromising the spinal cord. If the condition is not diagnosed properly, it can result in spinal cord compression, respiratory arrest and a catastrophic outcome. This condition usually requires surgery because ligaments do not heal (they need to be fused), so it will probably require posterior atlanto-axial arthrodesis.

Facet dislocations of the cervical spine include unilateral facet dislocation and bilateral facet dislocation. In unilateral facet dislocation, displacement of the vertebrae is less than 50% of the cervical body width and may need surgery. Bilateral facet dislocation is more serious; the displacement is greater than 50% of the vertebral body width. Obtain a preoperative MRI to rule out disc herniation associated with facet dislocations.



Spinal cord compression is more common with cervical spine injuries and thoracic spine injuries. Bone within the canal increases the risk of spinal cord compression and injury. Neurogenic shock resulting from spinal cord injury may complicate resuscitation of the patient and should be differentiated from hypovolemic shock. Look for hypotension and bradycardia in neurogenic shock. Emergency management involves resuscitation and hemodynamic stabilization of the patient with a concurrent, adequate and frequent neurologic examination. Definitive treatment is usually stabilization of the unstable spinal injuries.

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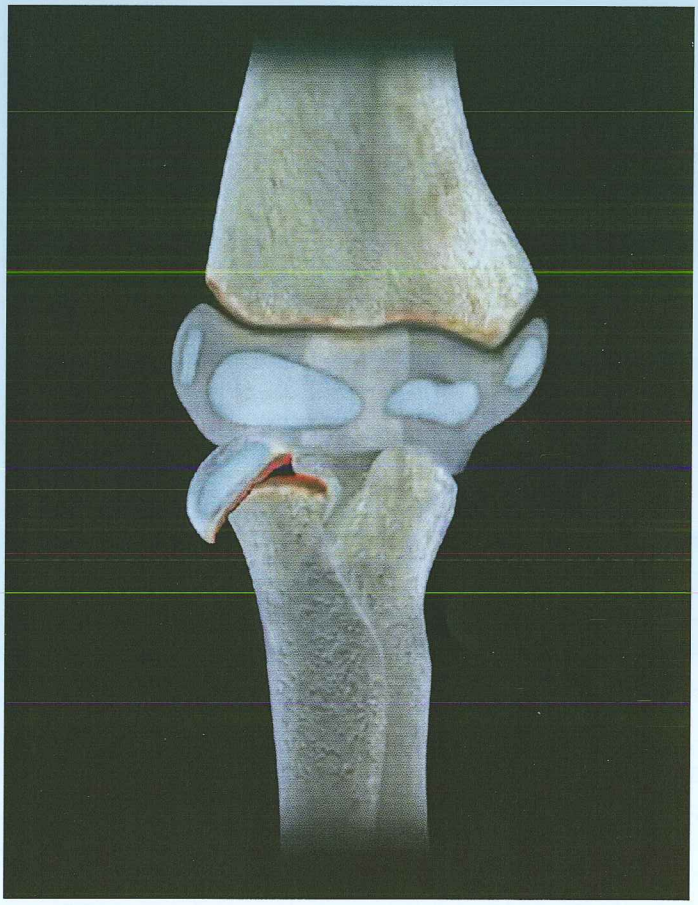
Cauda equina syndrome results from injury to the lumbosacral nerve roots within the spinal canal. It presents with involvement of the bladder, bowel, and lower limbs and usually results from fractures or central disc herniation. Central disc herniation or bony fragments result in compression of the nerve roots. Early diagnosis of the condition is important for eventual improvement on the outcome. Treatment is urgent decompression by the removal of the central disc herniation or decompression and stabilization of the fracture.

Radial Head & Neck Fractures in Children

Fractures of the radial head and neck in children are not common. The fracture can be non-displaced, displaced, tilted, or translocated. These types of fractures are rare. They usually occur around 9 years of age, usually due to valgus force. The fracture may involve the physis (growth plate). It is a Salter-Harris Type II fracture, or the fracture may involve the radial neck at the metaphysis. There is a mnemonic statement that can be used to remember the names and order of the elbow ossification centers: CRITOE. 1, 3, 5, 7, 9, 11 are the approximate ages when the ossification centers appear around the elbow. Capitellum 1 year, Radial head 3 years, Internal epicondyle (medial) 5 years, Trochlea 7 years, Olecranon 9 years, External epicondyle (lateral) 11 years. An AP and lateral view of the elbow including the forearm should be taken. The radial head should align with the capitellum in all views. Radiocapitellar view may be helpful to view the radial head. The radiocapitellar view is an oblique lateral view; the elbow will be flexed to 90-degrees with the thumb pointing upwards, and the beam is directed 45 degrees proximally. Nondisplaced fractures of the radial head may not be seen on x-ray and then you are going to look for the fat pad sign. If you find the posterior fat pad, this is not normal and means that there is a fracture. In radial neck fractures, part of it is extra-articular, so if there is a fracture there, the fat pad sign may not be present even if there is a fracture. Treatment for a non-displaced fracture is immobilization. Immobilization is used if angulation is less than 30 degrees; up to 30 degrees of angulation is acceptable. Closed reduction is used if angulation is greater than 30 degrees. Reduction of the radial neck fracture is done with elastic bandage around the forearm and elbow or with extension of the elbow, traction, supination, and direct varus pressure over the radial head. Push the radial head medially and push the radial shaft laterally. If the reduction is acceptable, treat with immobilization. After reduction, the radial head usually stays in its position by the periosteum. K-wire joystick may be used for reduction in some cases. You will attempt closed reduction first before you use K-wire percutaneous reduction. Use the k-wire percutaneous reduction if the closed reduction failed. Open reduction can be done if more than 45 degrees or residual angulation after failure of reduction, either closed or by percutaneous methods. Complications include synostosis, loss of motion, osteonecrosis, and nonunion. Synostosis is fusion of the radius to the ulna; reflected periosteum is a possible cause of the synostosis. Osteonecrosis occurs due to interruption of the blood supply. Nonunion is rare. Interposition of the periosteum is a possible cause of nonunion. Risks and complications increase with open reduction. Open reduction should be the last resort in radial head and neck fractures in children. The worst outcomes are seen in children older than 10 years. With fracture of the radial head in children, repeat neurovascular examination should be done. Compartment syndrome of the forearm should be suspected in case of increased pain or increased analgesia requirements.



Fat Embolism

Fat embolism can occur when fat globules are released from the bone, usually during long bone fractures. These fat globules can travel to the lungs and obstruct the pulmonary vessels. Release of these fat globules can also occur during reaming of the intramedullary canal.

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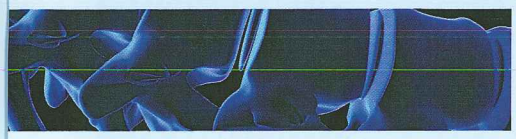

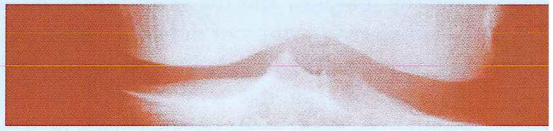

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These fat globules also cause the release of inflammatory mediators which cause endothelial lung damage and hypoxemia. Fat embolism usually occurs in trauma patients with multiple fractures, especially the fractures which involve the pelvis and long bones. Fat embolism occurs more with closed fractures. The fat globules may also travel to the skin capillaries. The classic triad for fat embolism includes respiratory changes, neurologic signs, and petechial rash. The fat globules affect the pulmonary vessels, and the patient will have difficulty in breathing (dyspnea, hypoxia). You see this from the history, the physical examination of the patient, the patient's vital signs and blood gases. The fat globules may travel to the brain: this is called cerebral embolism. The patient may have confusion or alteration of the mental status. In severe cases, the patient may have seizures. The fat globules can affect the dermal capillaries. Patient history is important in diagnosis. The mortality rate involving fat embolism is about 10%. Fat embolism usually occurs earlier than deep venous thrombosis (DVT). Patients with femur fractures, nonoperative treatment, overreaming of the fracture, or pathologic fractures are at risk for fat embolism. Patients with pathological fractures are especially at risk in bilateral femur fractures; try not to fix bilateral pathological femur fractures in the same sitting. Multiple trauma patients are always at risk of fat embolism. There are diagnostic signs. Major respiratory signs include shortness of breath- hypoxemia (oxygen saturation less than 60mmHg) or pulmonary edema. Major neurological signs include confusion, agitation, altered mental status, or drowsiness. Major petechial rash signs include axillae, conjunctiva, or palate. Rash occurs in about 20-50% of cases and usually appears within 36 hours. Rash is usually self-limiting and usually disappears in about 7 days. Minor signs include tachycardia, pyrexia, anemia, thrombocytopenia, or fat in the urine. Early stabilization of long bone fractures will reduce risk of fat embolism. High index of suspicion is needed for diagnosis. Treatment of fat embolism is supportive treatment such as oxygen or in severe cases, mechanical ventilation with high levels of PEEP. The outcome of the patient post fat embolism depends on the pre-injury condition of the heart and the lungs.

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