



THE UNIVERSITY OF TOLEDO MEDICAL CENTER

ORTHOPAEDIC MONTHLY

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Distinguished Professor Awarded \$2.3 Million Grant

Dr. Vijay K. Goel, Distinguished University Professor Endowed Chair & McMaster-Gardner Professor of Orthopaedic Bioengineering Co-Director, for the Engineering Center for Orthopaedic Research Excellence at the University of Toledo has been awarded \$2,355,319 from the 2013 Ohio Third Frontier Innovation Platform Program for the E-Core Program. In addition to this donation, the program will also receive a cash match from university and industry. With this funding and in partnership with X Spine, Metro Medical Innovations and Turning Point, E-Core will be working on spine implants and exercise machines for spinal injury rehabilitation.

Additionally, The University of Toledo E-CORE has been presented \$25,000 for its development of a micro processing chip project that will detect infection. The University of Toledo will provide a cash match of the same amount.



Dr. Vijay K. Goel (left) and the University's E-Core Program were awarded a \$2.3 Million grant (Dr. Mohammad Elahinia shown on the right).

SI Joint Anatomical Considerations

Sacroiliac (SI) Joint Dysfunction is difficult to diagnose and treat. It refers to pain in the SI joint region that is caused from too much or too little movement. The SI joint is located between the sacrum and the ilium. Conditions associated with the cluneal nerves can often be confused with pain involving the Sacroiliac Joint. It is important for a physician to remember the placement of the superior cluneal nerves as well as the sacroiliac joint when harvesting bone from the iliac crest of the pelvis. Pain can arise from any of these anatomical sites and can cause confusion or misdiagnosis (superior cluneal nerves). The cluneal nerves (innervate the skin of the upper buttocks) are located about 6 cm from the posterior superior iliac spine. The greater sciatic notch is also located about 6 cm from the posterior superior iliac spine. If the incision goes beyond 6cm from the PSIS, it endangers the cluneal nerves. Also, the superior gluteal neurovascular bundle is in close proximity to the sacroiliac joint.

Issues with the piriformis muscle can be associated with sacroiliac joint problems. The piriformis muscle arises from the sacroiliac joint capsule at the anterior surface of the lateral process of the sacrum and gluteal surface of the ilium at the margin of the greater sciatic notch.

The L4 and L5 nerve roots run in front of the sacroiliac joint and may become injured. Harvesting a bone graft that violates the SI joint can cause pain in the sacroiliac region. A CT scan may be needed to diagnose this condition.

Major displacement and instability occurs in fractures or dislocation involving the SI joint. Excessive movement of the sacroiliac joint with tearing and stretching of the strong ligaments creates subtle instability associated with pain.

Sting Ray Injuries

With the warmer weather, more people take vacations and trips to the beach. There are some things that can dampen your fun while you're there; one being stingrays. Stingrays cause around 1,500 injuries per year. They will not attack people but they will defend themselves when threatened, especially once stepped on. Stingray injuries are caused by punctures of their tails which are strong serrated, bony spines or barbs. The tail contains a sheath that will discharge venom once it is ruptured. The effects of the venom can be lessened with heat. This rupture will occur when you step on one which causes their tails to be thrust upward and forward and point in the direction of the leg or foot which is the most common location of these types of injuries.

This venom is thermolabile, which means it decomposes with heat. The effects of the venom include constriction of the blood vessels and necrosis or death of tissue. The patient will feel extreme pain and may experience edema and swelling. Sometimes, the spine itself will still be inside of the wound and may cause an infection. The stingray is able to regrow the stinger if it is broken off. Fatalities from these types of injuries are rare, but are possible such as in the case of Steve Irwin.

If you are stung by a stingray, clean the injury with soap and water. You make sure the spine is completely removed and use of hot water (45°C or 110°F) in order to decrease the pain of the poison and cleanse the wound. Surgical exploration may be needed and the use of ultrasound is helpful in detecting fragment removal.



In order to prevent stingray injuries, it is recommended that you:

- Look for posted warning signs before entering the water.
- Poke around with stick in murky water before entering
- Slide your feet as it will notify the stingray of your presence and they will swim away. Taking steps will allow for the barb to create a puncture wound.
- Keep away from or be aware of stingray gathering places such as piers and shallow water.
- Never swim over moving stingray.
- Wear water shoes, stingray guards or wading boots.

Peroneal Tendon Subluxation/Dislocation

The peroneal tendons (peroneus brevis and peroneus longus) run on the outside of the ankle. These two tendons fit in a groove just behind the fibula. Patients with peroneal tendon subluxation usually describe pain in the outer part of the ankle or just behind the lateral malleolus. Retromalleolar swelling with pain and giving way to the ankle should alert the clinician to the possibility of peroneal tendon subluxation. The patient may also feel a 'pop' and click on the outer side of the ankle.

Testing for peroneal tendon subluxation is usually done with dorsiflexion/eversion of the foot against resistance. The ankle may feel as if it is unstable and sometimes the patient will be able to demonstrate the subluxation of the tendons. The peroneal tendons are held in their position behind the fibula predominately by the superior peroneal retinaculum.

Peroneal tendon subluxation usually occurs more in younger individuals. It is usually a sports related injury such as with soccer and skiing and the injury is capable of being missed. The condition can either be acute or chronic recurrent. It also may be associated with a shallow fibular groove or a weak superior peroneal

retinaculum, and the retinaculum is usually peeled off of the bone from the injury. An X-ray may show an avulsion fracture of the fibula called a rim fracture.

The 'fleck sign' is an indication for peroneal tendon subluxation. An MRI or ultrasound is very helpful in viewing the subluxation. The condition may be associated with a longitudinal tear of the peroneus brevis tendon (the tendon is near the fibula and may hit the fibula as it subluxes, causing a tear).

Acute subluxations are usually treated with a cast or immobilization and the results are average. Surgery can also be performed to repair the retinaculum if there is a rim fracture or if the injury is in conjunction with other conditions such as a calcaneal fracture. Surgery will also be performed if there is a +/- deepening of the fibular groove.

Chronic recurrent/painful subluxations are treated with a soft tissue procedure to reconstruct the superior peroneal retinaculum. A +/- bony procedure by deepening the groove may also be done. A repair of the longitudinal tear of the peroneus brevis can be done by suturing the tendon side to side.

Pseudogout

Pseudogout or chondrocalcinosis is the deposition of calcium pyrophosphate dehydrate crystals in the hyaline cartilage or fibrocartilage. CPPD stands for Calcium pyrophosphate dehydrate disease. When these crystals are released into the fluid of the joints, it causes sudden arthritis symptoms such as pain, tenderness, stiffness, redness, swelling and warmth in the joints.

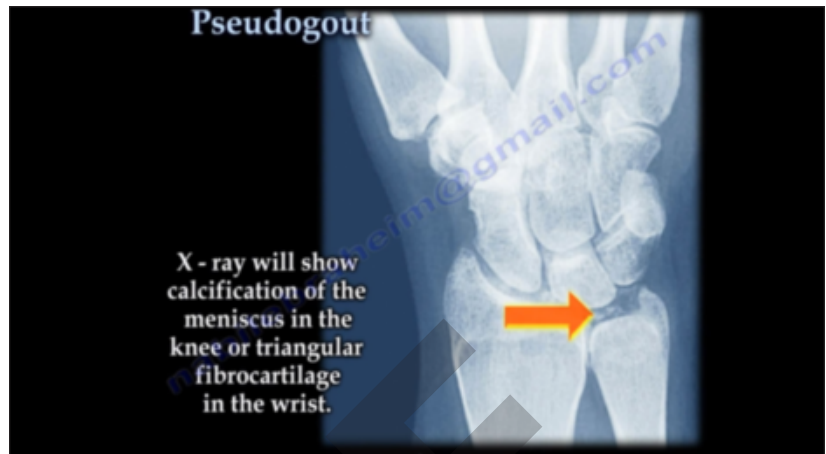
The condition occurs more in older age groups and 1/3 of the patients are over 75 years of age. X-ray changes of chondrocalcinosis is seen in the knees on radiograph. Gout affects the more distal joints while pseudogout tends to affect the more proximal joints. X-ray will show calcification of the meniscus in the knee or triangular fibrocartilage in the wrist.

In order to diagnose pseudogout, several endocrine and metabolic diseases should be ruled out. These diseases include:

Hyperparathyroidism -glands in the neck produce too much parathyroid hormone

Hypophosphatasia – affects development of bones and teeth

Hemochromatosis – too much iron builds up in the body



Rheumatoid arthritis- inflammation of the joints and surrounding tissues, may also affect organs

Hypothyroidism – thyroid gland does not make enough thyroid hormone.

Pseudogout is commonly seen in the knee and wrist, but it may also occur in the acetabulum labrum, symphysis pubis and annulus fibrosus of the disc. The treatment for pseudogout includes NSAIDs (non-steroidal anti-inflammatory drugs) and steroid injections.

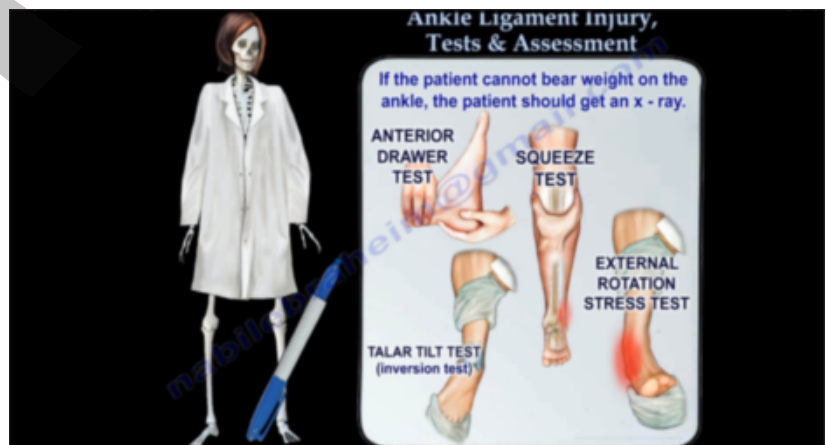
Ankle Ligament Injury; Tests and Assessments

The sciatic nerve, which runs from the lower back, through the buttocks to the lower limbs, may become compressed or irritated by the piriformis muscle. The piriformis muscle is one of the six lateral hip rotators. Normally the sciatic nerve passes beneath the piriformis muscle. This muscle arises from the sacroiliac joint capsule at the anterior surface of the lateral process of the sacrum (tailbone) and gluteal surface of the ilium (broad part of the hip bone) at the margin of the greater sciatic notch.

The piriformis muscle is inserted into the superior border of the greater trochanter (located at the top of the femur). Because the piriformis muscle also arises from the capsule of the SI joint (sacroiliac joint), the association of piriformis syndrome and SI joint pain exists. The piriformis muscle functions to laterally rotate (turn away from the body) the hip as well as abducts the hip (move out to the side) if it is flexed.

Be aware of possible anatomical variations of the sciatic nerve in relationship to the piriformis muscle. There are 4 anatomical variations of the sciatic nerve. This nerve is composed of the tibial and peroneal divisions which are usually bound together, but sometimes may divide as they pass the piriformis muscle.

Relations of the sciatic nerve to the piriformis muscle include:



1. Normal Relationship with the sciatic nerve passing beneath the piriformis muscle.
2. Piriformis divided into two parts with the peroneal division of the sciatic nerve passing between the two parts of the piriformis muscle.
3. Peroneal division of sciatic nerve passes over the muscle and the tibial division passes beneath the undivided piriformis muscle.
4. The entire nerve passed through the divided piriformis muscle.

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Ankle Ligament Injury continued

Symptoms:

Localized buttock pain increased by sitting and driving, occasionally develops from blunt trauma to the buttocks

Tenderness in the sciatic notch

Pain increased by bicycling or running in young individuals

Radicular symptoms with pain and parasthesia, however, it is not common

Pain may be present when palpating directly deep into the area of the greater sciatic notch. The Lasegue's maneuver should reproduce the pain by flexing the hip to 90° and extending the knee.

When the sciatic nerve is compressed by the piriformis muscle, fibrous bands or by vascular anomalies, pififormis syndrome will occur. These issues will be diagnosed with an MRI.

Several treatment methods are available, including:

Aquatic therapy

Physiotherapy

NSAID medication

Injections

Surgical release of the piriformis muscle and decompression of the sciatic nerve is the last resort.

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