



THE UNIVERSITY OF TOLEDO MEDICAL CENTER

ORTHOPAEDIC MONTHLY

VOLUME 4, ISSUE 2 FEBRUARY 2010

UT Orthopaedic Residents Score 94th Percentile on AAOS In-Training Examination

In mid-January, the American Academy of Orthopaedic Surgeons (AAOS) released the in-training examination results for the 2009-2010 academic year. The orthopaedic residents were ranked in the 94th percentile, continuing the trend of high scores for the past seven years. The residents took the exam Saturday, November 14, 2009.

For the program to achieve this high score, they need to score above the mean in each of the 12 exam categories. This means the program cannot be excellent in some topics and weak in other topics. To achieve a ranking in the 90th percentile or above, the program must be above the mean in every category for the group, with no resident scoring below the 50th percentile.

This success in education lies in using an easy system that can be applied. In the Department of Orthopaedic Surgery, this technique is called the salami technique. Every day, one slice is taken, even if it is only a thin slice; it is one slice more than everyone else. This will definitely make the difference at the end of the preparation period for the in-training exam. For example, the resident's slice is one hour

per day for several months. At the end of the period, they will have studied approximately 50 hours more for the exam than the majority of residents in other programs. A little bit every day will make the difference. Homework or assignments are not given; but a structured approach is utilized in the department. In the UT Department of Orthopaedic Surgery, an objective to finishing reviewing all 14 topics in a reasonable time (1 hour per day) is set. The residents are asked to get up early and participate in the study sessions.

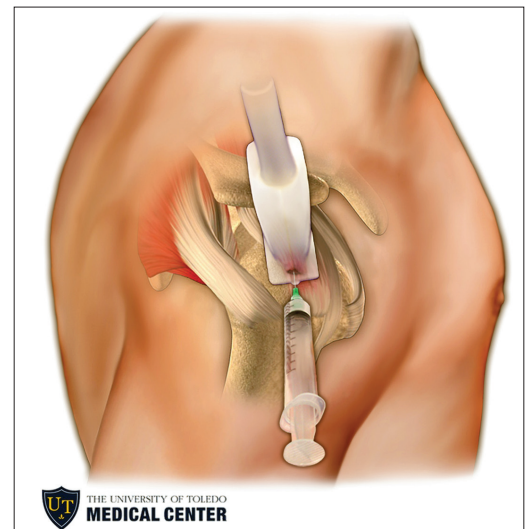
We wish UT's orthopaedic residents congratulations on a job well done!

UT's Orthopaedic Residency Program is a five-year program fully accredited by the Accreditation Council for Graduate Medical Education (ACGME). In 2007, the program was awarded an increase in resident complement by the ACGME for its quality of education. For the second year, we'll be offering four, first-year positions for the 2010 residency match. There are currently 16 orthopaedic residents in the program.

Part I: Adult Stem Cell and Platelet-Rich Plasma: Value and Controversy

Most of the advances in orthopaedics have been in the area of minimally invasive surgery utilizing guided techniques, robotics and manufactured materials to promote bone healing. Very little attention, however, has been given to understanding and utilizing biological factors that facilitate the natural healing processes of the body. For example, a rotator cuff tear or tennis elbow is initially treated with conservative treatment such as physical therapy, non-steroidal anti-inflammatory medications and cortisone injections with a variable degree of success. The success is usually short-lived. Attention has recently been directed toward the body's natural biological ability to heal itself and to how we can provide a local environment to facilitate this process. The two most important advances in orthopaedics are the use of adult mesenchymal stem cells and platelet-rich plasma.

Blood is composed of red blood cells (which carry oxygen to the cells), white blood cells (which help kill bacteria and infection), and platelets. Platelets are rare cells, but are essential in hemostasis (which means causing bleeding to stop) and act as scaffolding for tissue repair. PRP refers to blood plasma with a high concentration of platelets containing pivotal growth factors and tools for repair and regeneration. Platelets attract stem cells and produce growth factors. These growth factors are attached to the cell and change the structure and



PRP ultrasound injection of the shoulder

Continued on inside page

the function of the cell. Significant changes to the cell can be made up to the DNA level. Platelets are the directors, and stem cells are the construction workers. To create PRP, blood is taken from the patient and filtered and separated through a process called centrifugation. The more the blood is concentrated, the more growth factors and healing power there will be.

Ultrasound-guided delivery is the preferred method for injection into the damaged or injured area. PRP ultrasound-guided injections are used frequently for tennis elbow (lateral epicondylitis), patellar tendonitis and partial ligament tears or partial cuff tears. These injections have also been used for the Achilles tendon, but have not been as effective. The technique must be used adequately to be effective. Ultrasound-guided PRP injections appear promising and may eliminate the need for surgery, but more studies are needed. The pitfall, however, is that some insurances do not currently pay for it.

Multiple reports are also encouraging about the use of adult mesenchymal stem cells to generate tissue healing. Adult mesenchymal stem cells can multiply and differentiate to the desired cells in the proper environment. There are very few cells that remain undifferentiated and primitive in the body, but they can be changed to reparative cells that become differentiated according to the body's needs.

Adult mesenchymal stem cells have two characteristics. First, they divide, multiply and make copies of themselves. Second, they can differentiate into the desired cells such as bone cells, cartilage cells and cells that heal torn muscles and tendons, etc. These cells can be obtained

Sacroiliac Joint: The Forgotten Joint

The sacroiliac joint is the joint connecting the spine to the pelvis. It can be found between the sacrum (the triangular-shaped bone in the lower portion of the spine) and the ilium of the pelvis. Strong ligaments join these two bones together. Unlike other joints in the body, the sacroiliac joint does not have much movement. However, the sacroiliac joint is a weight-bearing joint, essential in transferring the load of the spine to the lower extremity. Unfortunately, the majority of physicians are not familiar with the joint, even though it's the cause of an estimated 15-20 percent of all lower back pain. Lower back pain also can come from the spine and hip. These three areas overlap, and patients may have more than one source of pain in the area.

The sacroiliac joint can be affected by different problems, including degenerative diseases, inflammatory problems, trauma, infection and mechanical dysfunction. Another source of pain in the sacroiliac joint is cluneal nerve entrapment. HLAB 27 may be helpful in treating degenerative and inflammatory processes.

Sacroiliac joint pain is resistant to identification by all studies and exams. The only proven effective method to diagnose sacroiliac joint pain is through injection and a positive response from the injection. X-rays, MRIs and CT-scans are not usually helpful. The Faber test and Patrick's test during physical examination are usually helpful, but not diagnostic. To conduct a Faber test, a physician forces external rotation of the affected hip in the supine position, which causes pain in the sacroiliac joint.

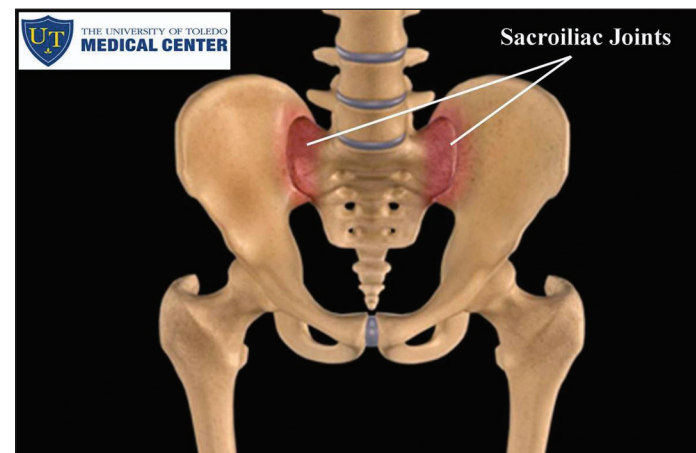
Patients with sacroiliac joint pain will usually point with their fingers to one side or both sides near the posterior iliac spine. The pain is mostly localized on the side, not the midline.

from marrow, blood or other sources. They can be concentrated and counted to ensure an adequate amount or isolated and grown to be injected into the involved or injured area.

There is currently insufficient information related to the medium different types of cells need to be grown in. For example, what is the best medium to grow cartilage cells compared to bone cells? Cartilage cells are needed in the case of arthritis, and bone cells are needed in the case of a non-union.

Growing mesenchymal stem cells will require several days after obtaining the specimens. This procedure is costly, and insurance does not currently pay for it, but initial studies are very promising. The whole concept begins with the idea that all cells grow from these primitive cells. If there is a high concentration of these primitive cells and they are delivered into the involved area in a medium that will transform them into the desired cells, they can multiply and be delivered into the injured/damaged area and assume their desired duty and function. These cells are usually from the patient's own body, so there are no problems with rejection.

More research and studies are needed to judge the efficacy of the process. It's important to note that these mesenchymal stem cells are not embryonic and that this is not cloning. Every person has a bank of valuable mesenchymal stem cells that we can isolate, grow, nourish and — with the appropriate medium — inject into an injured/damaged area to help in healing and regaining function.



If a physician wants to exclude the sacroiliac joint, a diagnostic injection is usually done. It is unrealistic to diagnose the sacroiliac joint as the source of lower back pain without an injection. Patients may have had a diagnosis of lumbar strain for years before excluding sacroiliac joint dysfunction. Insurance may resist the diagnosis of sacroiliac joint because it was never in the initial diagnosis of the patient, but it can't be diagnosed without an injection. Injections can be done in an outpatient or office setting or under fluoroscopy, CT scan or ultrasound. Diagnostic injection does not have to utilize fluoroscopy if the physician is well-versed in sacroiliac joint anatomy and is skilled

Continued on page 3

with the injection technique. Physicians will be able to get it close enough to the joint, and a positive response will be observed. Once the diagnosis is confirmed, more therapeutic injections or radiofrequency ablations can be done under fluoroscopy, CT scan or ultrasound.

Sacroiliac injections may be diagnostic and therapeutic; however, relief will not last long. Radiofrequency ablation has a positive effect on patients by giving them a longer period of relief, but it is also temporary. During a radiofrequency ablation, the nerves that provide sensation to the joint are burned with a needle called a radiofrequency probe. This serves to eliminate sensation from the joint, essentially making the

Tarsal Tunnel Syndrome

Tarsal tunnel syndrome is a compression of the tibial nerve or its associated branches as it passes through the tarsal tunnel. The medial malleolus (the ankle bone) and the flexor retinaculum (band of fibrous tissue) form a tunnel allowing the passage of nerves, tendons and veins. This tunnel, which the tibial nerve passes through, is known as the tarsal tunnel.

Tarsal tunnel syndrome is the result of compression of the tibial nerve. It can also be the result of the following:

- Inflammation in the tissues around the tibial nerve
- Ankle sprains
- Fractures in the foot and ankle
- Diabetes
- Rheumatoid arthritis
- Flat feet

Patients with tarsal tunnel syndrome will likely experience the following:

- Burning or numbness
- Swelling
- Pain along the inner side of the foot
- Pain where the nerve is squeezed or pinched

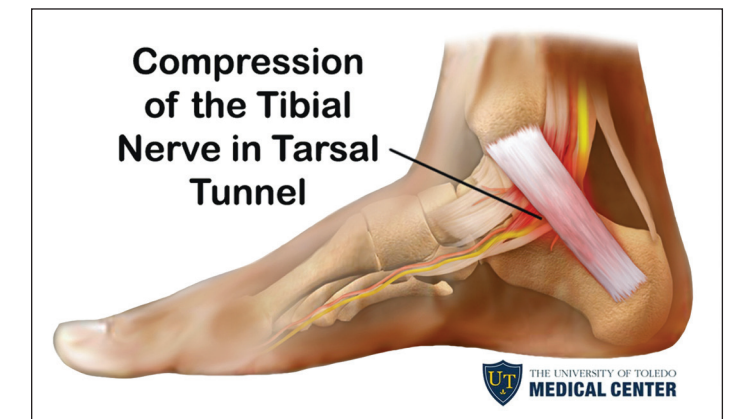
To diagnose tarsal tunnel syndrome, physicians will perform an extensive history and physical examination. During physical examination, physicians will look to see if patients have a positive Tinel sign. A patient with a positive Tinel sign will report a tingling sensation when the skin above the nerve is palpated (tapped). Nerve conduction and velocity tests may also be utilized to confirm tarsal tunnel syndrome. These studies measure how fast nerve impulses travel

Piriformis Syndrome

Piriformis syndrome is a condition in which the piriformis muscle irritates the sciatic nerve, causing pain in the buttocks that radiates down the leg.

To better understand piriformis syndrome, it is helpful to identify the anatomy of the surrounding areas. The piriformis muscle begins at the sacrum and extends to the greater trochanter. It is the muscle responsible for providing external rotation for the hip and leg. The sciatic nerve, which is responsible for providing motor and sensory function to the lower extremities, passes underneath the piriformis muscle on its way out of the pelvis toward the lower extremities.

joint numb. Sacroiliac joint stabilization by screws or stabilization and fusion by screws and bone graft can only be done if patients respond well to injections or radiofrequency ablation. The key is that the relief must be real, but temporary before fusion is done which is needed in a rare percentage of patients. Physicians should use stabilization or arthrodesis of the joint after failure of all other measures. Some patients, however, will continue to have pain after fusion of the sacroiliac joint. It is imperative to exclude spine and hip pathologies when dealing with sacroiliac joint pain. It is also imperative to exclude the sacroiliac joint as the source for low back pain when dealing with spine pathologies.



Depiction of tarsal tunnel syndrome

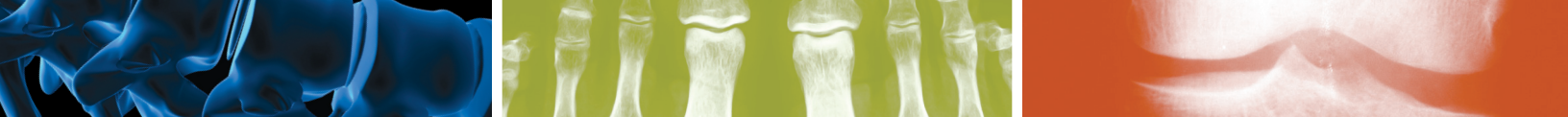
along a nerve. If the impulses travel slowly across the ankle, it is a sign of tarsal tunnel syndrome.

Physicians will first try conservative treatment to alleviate symptoms. These conservative measures include anti-inflammatory medications, orthotics and injections. If conservative treatment fails, surgical intervention may be needed. Similar to carpal tunnel release, the goal of tarsal tunnel surgery is to release the flexor retinaculum. To do this, the orthopaedic surgeon will make a small incision in the skin behind the inside of the medial malleolus. The nerve is then located and released by cutting the flexor retinaculum. The surgeon will then examine the nerve to make sure it moves uninhibited. This can be achieved in an outpatient surgical setting.

Problems arise when the sciatic nerve is pushed against the bone of the pelvis due to spasms or tightening of the piriformis muscle. When the sciatic nerve is irritated, patients will likely experience the following symptoms:

- Pain that begins in the buttocks and radiates down the legs
- Sensation of tingling down the leg
- Tenderness in the area of the muscle
- Reduced range of motion of the hip joint
- Difficult sitting for prolonged periods of time

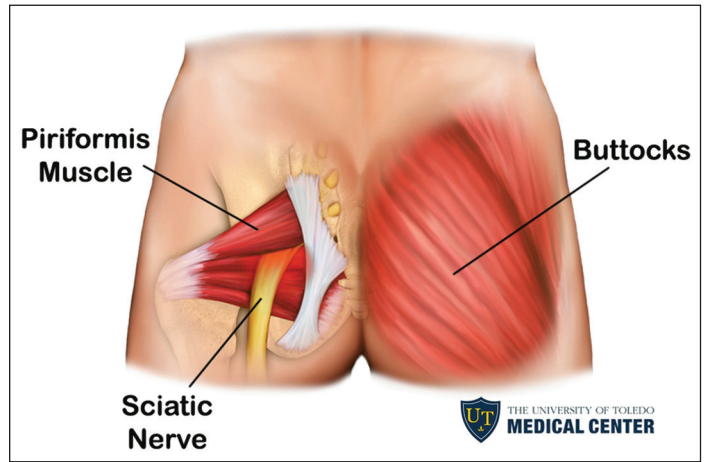
Continued on back page



Piriformis Syndrome continued

To identify piriformis syndrome, physicians will perform an extensive history and physical. Physicians will check muscle strength, reflexes and skin sensation; they will also check your gait and posture. The most accurate way to diagnose piriformis syndrome, however, is through diagnostic injections. Injections into the piriformis muscle may be given utilizing ultrasound, fluoroscopy or CT scan. If the patient's pain is relieved following the injection, it is likely the piriformis muscle is the culprit. In addition, X-rays may be taken to rule out other problems in these areas.

Treatment for piriformis syndrome can range from conservative to surgical. Physicians will first try to manage piriformis syndrome conservatively utilizing anti-inflammatory medications, physical therapy and injections. If conservative measures fail, surgical intervention may be needed. The goal of surgical intervention is to release or loosen the piriformis muscle. This is achieved by either cutting the muscle where it attaches to the greater trochanter or cutting through the piriformis muscle. By releasing or loosening the piriformis muscle, pressure is taken off the sciatic nerves and symptoms should subside.



THE UNIVERSITY OF TOLEDO MEDICAL CENTER
ORTHOPAEDIC MONTHLY

Editors: Dr. Nabil Ebraheim, department chairman and professor of orthopaedics, and Dave Kubacki, assistant to the chairman.

Department of Orthopaedic Surgery
 3000 Arlington Ave
 Toledo, Ohio 43614
 For appointments, call 419.383.3761.

Neither Dr. Ebraheim nor Dave Kubacki have any relationships with industry to disclose.

UTMC 517 210 25C

Non-Profit
 Organization
 U.S. POSTAGE
 PAID
 Toledo, OH
 Permit No. 161

Department of Orthopaedic Surgery
 The University of Toledo
 3000 Arlington Ave
 Toledo, Ohio 43614

