



THE UNIVERSITY OF TOLEDO
MEDICAL CENTER

APPROVED FOR THE AMA PRA CATEGORY 1 CREDIT; SEE INSERT FOR DETAILS

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

ORTHOPAEDIC MONTHLY

VOLUME 4, ISSUE 1 NOVEMBER 2013

UTMC ASSOCIATE PROFESSOR RECEIVES \$1.9 MILLION GRANT

Dr. A. Champa Jayasuriya, an Associate Professor, in the Department of Orthopaedic Surgery at the University of Toledo Health Science Campus, recently received an R01 research grant from the National Institute of Dental and Craniofacial Research (NIDCR) at the National Institute of Health (NIH). This \$1.9 million grant provides five year support to explore bone repair using novel multifunctional bone putty.

A unique design criterion is developed to synthesize bone putty to achieve a novel multifunctionality that serves for better repair and/or regeneration of damaged or lost craniomaxillofacial and other bone tissues. Each material selected for bone putty provides bone-specific properties to enhance bone growth. The multifunctional properties cannot be achieved with currently available bone graft substitutes.

The goal of this grant is to create bone putty that has bone-specific multifunctionality using benign biomaterials and mild processing techniques and that will restore and heal bone defects at local sites. This bone putty has an ability to deliver a precise amount of growth factor over time at the local bone defect site. One of the main advantage of this approach compared with traditional block scaffolds, is that this bone putty can be administered by injection, creating the possibility of filling defects of different shapes and sizes through minimally invasive surgery.

Dr. Jayasuriya plans to assess this bone putty for the biocompatibility



Dr. A. Champa Jayasuriya recently received a \$1.9 million research grant.

and rate and extent of osteogenesis (bone formation) toward an osteoblast (bone forming cell) phenotype and production of mineralized matrix in vitro. The bone putty will also be assessed in vivo implanting into an animal defect.

Dr. Jayasuriya is the principal investigator for the grant, Dr. Nabil Ebraheim and Dr. Beata Czernick in the Department of Orthopaedic Surgery and Dr. William Gunning in the Department of Pathology are the collaborators/consultants for the grant.

Telemedicine Implementation

The University of Toledo Medical Center's Orthopaedic Department is embarking on a new way of interacting with patients via telemedicine. Telemedicine is a form of telecommunication along with other IT programs to treat/check in with patients from a distance. For example, one of its offerings is using technology such as similar to Skype or Facetime to speak with patients about their individual conditions, which can at time be more convenient for all parties involved.

This type of system allows patients to cut down on their travel time for follow-ups. In addition, it will also aid in minimizing the cost of travel to and from nursing homes or hospice as well as the stress this

may cause our older patients. There are also capabilities for the doctors to receive urgent patient notices if a condition is suspected of needing treatment.

The Orthopaedic Department is seeking the correct approvals to implement this new system in its most secure and effective form as soon as possible. They will be working with Godfrey Ovwigho, VP of IT/CIO, and his IT team for this project. The University of Toledo Medical Center will be one of the first hospitals in the Nation to utilize this type of program.



Compartment Syndrome Diagnosis

A traumatic injury can often trigger acute compartment syndrome. The patient will complain of severe pain and narcotic requirements are usually increased. The trauma from injury or surgery will cause the limb to continue to swell.

Inspection and examination for the signs and symptoms of compartment syndrome should be done early and carefully. If the patient has pain, swelling and pain with passive stretch more than expected from the injury or surgery, there is high probability that the patient is developing compartment syndrome. The 5P's of compartment syndrome are pain/swelling, pulselessness, parasthesia, paralysis, and pallor. These are considered to be late findings and one should never wait for all 5 symptoms to appear.

If compartment syndrome is suspected, compartment pressures should be measured. The value of the diastolic blood pressure in a

patient under anesthesia with suspected compartment syndrome is questionable. A localized injury, especially a fracture, creates a pressure gradient in the surrounding tissue that peaks within 5cm of the injury. Intra-compartmental pressure should be taken within this range to avoid misdiagnosis.

Measuring the pressure is the most reliable method to confirm clinical diagnosis of compartment syndrome. It is the most important step in establishing the presence of an early or impending compartment syndrome. Once the diagnosis is made, an urgent fasciotomy should be done. The most common compartment to test for compartment syndrome of the leg is the anterior tibial compartment.

Tests for Examining Lower Back Pain

Clinical evaluation tests are used to assess patients with low back pain. These tests include Straight Leg Raising, Contralateral Straight Leg Raising, Femoral Stretch, Faber, Myelopathic signs (Clonus and Babinski's), Movements of the Spine, and Waddell's Signs (non-organic findings).

The Straight Leg Raising test is an evaluation of a painful limb that causes sciatica and radicular pain. The test is positive when the pain occurs with less than 60° of hip flexion. The test can be modified by bending the patient's knee. When the knee is bent, the pain gets better due to the relaxing of the sciatic nerve. Once the patient feels the pain, the leg is lowered slightly and the foot dorsiflexed. The dorsiflexion of the foot will also reproduce sciatic pain.

The Contralateral Straight Leg Raising Test is a test where the non-involved or contralateral leg, is elevated which will cause back and leg pain on the affected or involved side. If the test is positive, the herniated disc is usually large, extruded or sequestered.

The Femoral Stretch Test involves a hip extension that is done when the patient is lying on their stomach or on their side. This test is also called reverse straight leg raising and is rarely done. A positive test means that the L3, L4 nerve roots are involved, while most disc herniations will affect the L5-S1 nerve roots. This test will stretch the femoral nerve and is positive when pain is felt on the ipsilateral anterior thigh.

The Faber Test is done with the patient lying on their back on the examination table. The leg of the affected side is placed into external rotation with the foot crossing the knee of the opposite leg. Pressure will be applied gently, but firmly on the flexed knee and the anterior superior iliac crest (the wide section of the pelvis). Pain in the sacroiliac area indicates a problem with the sacroiliac joints. This test is suggestive, but not confirmative on injuries. An SI joint injection is confirmatory for SI joint problems.

Movements of the Spine or range of motion is also used in examining low back pain. If flexion or leaning forward causes pain, it suggests that there is a disc related disorder. With extension or leaning backward, pain will be caused if there is spinal stenosis, spondylolisthesis or facet disease. In people suffering with spinal stenosis who pain experience during spine extension, relief will be felt from leaning forward.

A positive Clonus or Babinski sign indicates an upper motor neuron lesion that will not occur from a lumbar spine cause. A check of the thoracic and cervical spine will be done to look for spinal cord involvement. The lower lumbar spine deals with nerve roots, not the spinal cord itself. The Clonus sign involves a non-voluntary, sustained movement of the ankle muscles with a firm, passive, continuous stretch. A Babinski sign is a test performed by stimulating the opposite portion of the sole of the foot. The test is positive when running a sharp instrument along the lateral border of the forefoot away from the heel produces extension of the big toe and fanning of the other toes. This test is negative if no reaction occurs or if the toes all bunch up.

Waddell's sign is a set of physical signs used to indicate if chronic low back pain is due to non-organic or psychological components. The five categories of test for this include simulation test, tenderness test, flip test, non-anatomic weakness and sensory findings, and overreaction. Non-organic physical exam findings determine if the patient is over exaggerating or overreacting with non-anatomic findings.

Each doctor will decide which tests are appropriate for their patient's circumstances.

Shoulder Exam– Range of Motion

Range of Motion (ROM) is the distance that a movable object may normally travel while still properly attached to another object. In this case, we are referring to the movement of the arm with a properly placed joint. Two different rotations are tested when finding the range of motion of the shoulder; external and internal rotation.

Abduction is tested by moving the arm away from the body while keeping the thumb pointing upward. The normal range of motion is between 150° and 180°. When checking shoulder flexion, the arm is moved in front of the body 180°.

External rotation, also referred to as lateral rotation, is the movement or rotation away from the center of the body. The normal range for external rotation is around 90°. There are two ways to check the external rotation:

-Bend the elbow to 90°, keeping it close to the abdomen, and swing the forearm away from the body (similar to opening a cabinet door).

-Abducting, lifting the arm straight up from your side and externally rotating the upper limb to 90°.

Internal rotation, also referred to as medial rotation, is the movement or rotation towards the center of the body. The normal range for internal rotation is around 70°-90°. There are three methods for testing internal rotation:

-Abduct and internally rotate the arm to 90°.

-Measuring the highest spinal process level that can be reached by the thumb (normal is T7).

One should always check the ROM actively and passively. Also,

always differentiate the true shoulder joint motion from the scapulothoracic motion (stabilize the scapula and assess the motion).

A normal joint capsule is elastic and allows for great range of motion. This, however, is not always the case. The most common cause of painful limitation of the shoulder is adhesive capsulitis, or frozen shoulder, which is caused by inflammation and thickening of the shoulder capsule. Adhesive capsulitis characterized as painful, progressive loss of shoulder motion that affects both active (movement without assistance) and passive movements (movement with assistance) of the shoulder joint. This occurs due to:

-Inflammation

-Fibrosis

-Scarring

-Contraction of the capsule

Some conditions that are associated with frozen shoulder are:

-Diabetes

-Dupuytren's Contracture

-Thyroid Problems

-Autoimmune Disease

-Stroke

-Rheumatoid Arthritis

-Trauma or Post-Surgery

Seek the help of your physician if you are suffering from painful, limited range of motion

Ankle Ligament Injury; Tests and Assessments

The ligaments of the ankle are complex. Injuries to these ligaments are called ankle sprains. A sprain of the ankle is classified as either a high or low ankle sprain; low being the most common. Low sprains of the ankle can be confused with other conditions around the ankle such as damage to cartilage, dislocations of tendons, fractures of bones, and high ankle sprains (high syndesmotic injury).

A few tests that check for injury of this ligament are the Anterior Drawer Test, Squeeze Test, Talar Tilt test (inversion test), and External Rotation Stress Test. If the patient cannot bear weight on the ankle, they should get an x-ray.

Injury to the deltoid ligament occurs on the medial side of the ankle joint (ankle bone facing the middle of the body) and is usually associated with a fracture. Injury to the lateral side ligaments (ankle

bone facing the outside of the body) is referred to as a low ankle sprain.

The weakest ligament on the lateral side is the anterior talofibular ligament. The Anterior Drawer Test tests the competency of this ligament. This test is performed in plantar flexion (toes bent down, away from knee to create an angle over 90°) and compared to the other side. A shift of an absolute value of 9mm on the lateral x-ray or 5mm compared to the other side is positive.

The calcaneofibular ligament is usually injured after the anterior talofibular ligament. The Talar Tilt Test is used to test this ligament. The normal tilt is usually less than 5°.

The final area of injury is the syndesmosis. A syndesmosis is an

Continued on back page



THE UNIVERSITY OF TOLEDO
MEDICAL CENTER

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

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



Ankle Ligament Injury continued

area of bones that are connected with a lot of fibrous tissue that forms a ligament. Injury to this area is referred to as a high ankle sprain. Contrary to a low ankle sprain, a high ankle sprain may require surgery.

Two tests that check for a high ankle sprain are the squeeze test and external rotation test. The squeeze test is the first test used. If a high sprain, pain will be present at the syndesmosis when squeezing the tibia and fibula at the mid-calf. The second test, the External Rotation Stress Test is performed by placing the ankle in a neutral position. While applying external rotation stress, a radiograph of the Mortise View should be obtained. If there is more than 5mm of tibulofibular clear space or more than 4mm of medial clear space, there is a positive result for syndesmotic injury.

One or more of these mentioned methods will be used by your physician in order to diagnose your injury.

THE UNIVERSITY OF TOLEDO MEDICAL CENTER
**ORTHOPAEDIC
MONTHLY**

Editors:

Dr. Nabil Ebraheim,
department chairman
and professor of orthopaedics,
and **Amanda Kaverman**,
assistant to the chairman.

Neither Dr. Ebraheim nor
Amanda Kaverman have any
relationships with industry to
disclose.

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

For appointments, call
419.383.3761.