

THE UNIVERSITY OF TOLEDO MEDICAL CENTER

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THE UNIVERSITY OF TOLEDO MEDICAL CENTER

ORTHOPAEDIC MONTHLY

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Saturdays at the Orthopaedic Center

Since the opening of the Orthopaedic Clinic in October of 2007, our team has been working tirelessly to ensure that our patients are able to obtain treatment, quality care, and access in a timely fashion. Our Orthopaedic Center provides unmatched access to patients. Some of the many ways we do so is by providing same day appointments, seeing walk-in patients, and expanding our clinic days through Saturday, so working patients who prefer appointments on Saturdays are able to see a physician.

Here at the University of Toledo Medical Center, we recognize that Orthopaedic conditions can be especially painful and may require immediate attention, so by extending our clinic days, we are able to serve the community better.

Our facility is known for its passion for patient-centered care and convenience. We provide complimentary coffee and snack bar for patients, free valet parking, and access to imaging services here on site, as well as providing patients with education on their condition, and financial counseling.

Our clinical activity results in academic research papers which reaches people around the globe. This exchange promotes new ideas

and different approaches to clinical problems, increasing our treatment options and allowing our patients to obtain the best level of university quality care.

Internal Impingement of the Shoulder

Internal impingement of the shoulder is a pathology on the undersurface of the rotator cuff (joint side). An internal impingement is a PASTA lesion plus a SLAP tear. PASTA, (Partial, Articular surface, Supraspinatus Tendon, Avulsion) is a partial tear on the articular side. A SLAP (Superior, Labrum Tear, Anterior to Posterior of the biceps root) tear is a tear at the top of the glenoid labrum.

Internal impingement is different than a subacromial impingement, which is pathology underneath the acromion—the bursal side of the cuff. Internal impingement may involve: Scarring and tightness of the posterior capsule, the patient will have diffuse pain on the posterior aspect of the shoulder, and can lead to GIRD. Internal impingement is mainly seen in overhead throwing athletes. A thrower with shoulder pain should be evaluated for internal impingement. The greater tuberosity of the humerus abuts the posterosuperior glenoid, which entraps the rotator cuff between the glenoid and the humeral head.

The stages involved in throwing: •Wind up •Early Cocking •Late cocking •Acceleration •Follow-through

Internal impingement occurs during the Late Cocking and Early Acceleration stages of throwing. The posterior undersurface of the supraspinatus tendon impinges on the posterosuperior glenoid labrum. This occurs during maximum abduction and external rotation of the shoulder with late cocking and early acceleration.

Loss of more than 25° of internal rotation at 90° compared to the other side—the loss of internal rotation is due to posterior capsular contracture. The external rotation increases which may lead to the stretching and thinning of the anterior capsule and glenohumeral ligament.

Continued on page 2

The center of rotation of the humeral head shifts posteriorly and superiorly which leads to impingement of the labrum and the rotator cuff as the arm is abducted and externally rotated.

Glenohumeral Internal Rotation Deficit (GIRD) usually occurs in the throwing shoulder. The loss of internal rotation is measured in degrees and the scapula must be stabilized during measurements.

The Bennett lesion is equal to mineralization or exostosis of the posterior inferior glenoid. This lesion may be found on the AP view or axillary view on an x-ray due to hypertrophy, scarring, and traction of the capsule.

An MRI arthrogram of the shoulder (PASTA+SLAP) will show rotator cuff partial articular pathology (PASTA lesion) and labral pathology (posterosuperior labrum involvement).

Treatment for the Internal Impingement of the Shoulder can be operative and nonoperative. Nonoperative is preferred and consists of: avoiding aggravating activity, physical therapy for up to six months and posterior capsular stretching with sleeper stretches—a posterior capsular stretch performed with an internal rotation stretch at 90° abduction with scapular stabilization—as well as rotator cuff strengthening therapy. A majority of patients will improve with nonoperative treatment. However, when nonoperative treatment fails, an arthroscopic debridement or repair of the labrum plus debridement of the undersurface of the rotator cuff lesion can be done; the cuff can be repaired if the tear is greater than 50%. A posterior capsular release is done in patients with GIRD if conservative treatments fail.

De Quervain Syndrome

De Quervain syndrome is the stenosing tenosynovitis of the first dorsal compartment of the wrist. The muscles of the first dorsal compartment of the wrist allow thumb motion. The two tendons involved are the abductor pollicis longus and the extensor pollicis brevis (the extensor pollicis longus is located in the third compartment).

With De Quervain syndrome, there will be pain and swelling over the radial side of the wrist (thumb side). This condition occurs due to inflammation of the synovial sheath that surrounds the two tendons that control movement of the thumb, thickening, and stenosis of the synovial sheath. A physician will confirm the findings by doing the Finkelstein's test.

The Finkelstein's test is conducted by having the patient make a fist with the fingers closed over the thumb and the wrist is bent towards the little finger. An ulnarly directed force is then applied to the wrist to stretch the involved tendons. This is a provocative test that is done to stretch the involved tendons and see if the condition is painful or not. A positive test result is indicated by sharp, local pain over the radial aspect of the wrist.

Some activities that may cause De Quervain Syndrom include:

•Twisting and wringing out wet towels •Hammering •Skiing

•Lifting heavy objects •People who care for babies and young children commonly experience De Quervain due to the holding and carrying of the child.

The physician should differentiate between De Quervain Syndrome, Intersection Syndrome, and Wartenberg's Syndrome. The Finkelstein's Test is used to diagnose De Quervain syndrome in patients who have pain on the radial side of the wrist.

Intersection Syndrome is not a well-known condition and is

identified when there is pain felt on the top of the forearm where the two muscles that connect to the thumb crossover the underlying wrist tendons.

The pain is typically located at about 4cm from the wrist joint.

The two tendons of the wrist are the extensor carpi radialis longus and the extensor carpi radialis brevis. Pain is increased by extension and flexion of the wrist—more on the top of the forearm. The pain experienced in Intersection syndrome is more proximal than the pain associated with De Quervain syndrome.

In Wartenberg's Syndrome, there is irritation of the superficial branch of the radial nerve. Pain is located at about 8 cm proximal to the radial styloid. The patient will be unable to tolerate wearing a tight bracelet or wristwatch, and will experience pain, numbness, tingling, and paresthesia on the posterior aspect of the thumb. The patient will not complain about weakness. If you tap over the area of the nerve, the patient will have these symptoms, which indicates a positive Tinel's sign.

Cervical Spine Radiculopathy

When a patient goes to the doctor with the complaint of neck pain, if the pain is due to nerve root irritation with the pain radiating to the ipsilateral upper extremity, the doctor will try to see if the patient has a cervical disc herniation with irritation of the nerve root.

Continued on page 3

Keep in mind that cervical spine problems and shoulder problems overlap. The doctor will examine the patient carefully. Each nerve that is involved will show its effect on motor power, sensation, and reflexes.

For example, if there is a disc herniation at C5-C6 and C6-C7, each level will get the nerve at the lower number. So, for the herniation at the level of C5-C6, there is the C6 nerve root. The C6 nerve root has an impact on the thumb, index fingers, and wrist extension (extensor carpi radialis longus and brevis). The Biceps are affected by a combination of C5, C6 together, whereas wrist extension is just C6— this is the Brachioradialis reflex.

The herniated disc at C6-C7, which affects the C7 nerve root and primarily impacts the sensations involved in the middle finger, the motor functions of the triceps, as well as wrist flexion and finger extension. The reflexes will be tested at the triceps.

The Spurling's test is performed to assess cervical nerve root pain and impingement. To start the exam, the clinician will stand behind the patient—the patient can be either sitting or standing. There should be extension, lateral flexion, and some rotation of the neck towards the affected side. A downward compressive force to the top of the patient's head is applied (axial loading). A positive test will reproduce the pain in the upper extremity when the compressive force is applied and causes radiating pain down the patient's arm. Radiating pain will be attributed to nerve root impingement or compression on the same side (ipsilateral side).

Another test, known as the shoulder abduction test, requires the patient to place their hands over their head. The patient's symptoms should be relieved by the shoulder abduction. This test helps to differentiate between cervical spine pathology and other causes of shoulder pain.

It is an important test for cervical radicular compressive diseases. The relief of the symptoms occurs due to decreased tension on the nerve roots. If there is a relief of symptoms by shoulder abduction, then the cause of shoulder pain is not a shoulder pathology, rather pain coming from cervical nerve root pathology due to nerve root irritation. Patients with cervical nerve root irritation could be treated conservatively up to 3 months with therapy, nonsteroidal anti-inflammatory drugs (NSAIDS), and 75% of these patients will improve with nonoperative treatment. Surgery should be done if the patient has persistant pain for 6-12 weeks or if there is a progressive neurological deficit.

Brachial Plexus Branches

The long thoracic nerve arises from 3 nerve roots (C5, C6, C7). This nerve supplies the serratus anterior muscle. Paralysis of the long thoracic nerve will cause medial winging of the scapula.

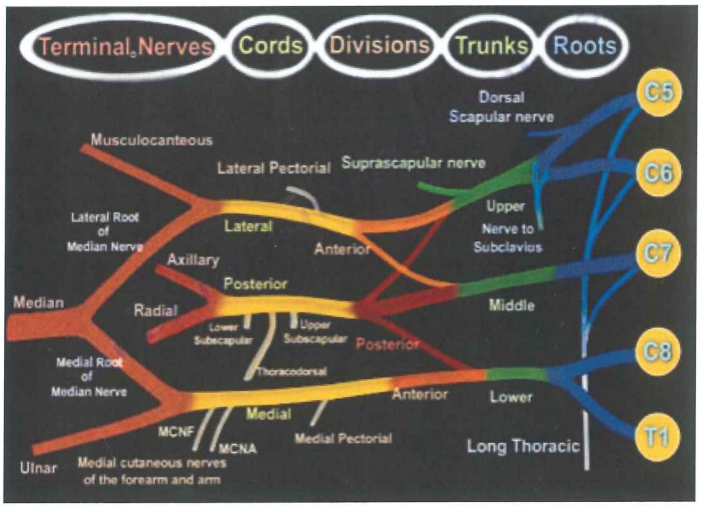
Another branch, the Dorsal Scapular Nerve, derives from the C5 nerve root. This nerve supplies the rhomboid major, rhomboid minor, and the levator scapulae muscles—it is very important due to it differentiating the preganglionic from the postganglionic brachial plexus injury.

A preganglionic brachial plexus injury has a poor recovery potential and it occurs proximal to the dorsal root ganglion. There will be rhomboid paralysis in addition to other findings such as Horner's syndrome and scapular winging. When an injury occurs to the dorsal scapular nerve, it causes rhomboids winging of the scapula and loss of shoulder abduction.

The subclavius nerve is very small and supplies a small muscle: the Subclavius muscle. Three branches arise from the nerve roots, but only one branch arises from the trunk: the suprascapular nerve.

This nerve comes from the C5, C6 nerve root and branches to the supraspinatus muscle and the infraspinatus muscle. Entrapment of the nerve can occur within the suprascapular notch or the spinoglenoid notch.

The lateral pectorial nerve arises from the lateral cord. It is a muscular nerve that pierces the slavipectoral fascia and supplies the pectoralis major muscle. Three branches arise from the posterior cord. The upper subscapular nerve supplies part of the subscapularis muscle; the thoracodorsal nerve forms at the posterior cord between the lower and upper subscapular nerves, running through the axilla passing obliquely laterally and downwards; the thoracodorsal nerve passes in front of the lower part of the subscapular artery to reach the



deep surface of the latissimus dorsi muscle at the inferior angle of the scapula. The lower subscapular nerve supplies the lower part of the subscapularis and teres major muscles.

The medial pectoral nerve arises from the medial cord of the brachial plexus and supplies the muscles of the pectoralis minor and major.

The medial cutaneous nerve of the arm and forearm arises from the medial cord of the brachial plexus and supplies the medial arm and the medial forearm. The musculocutaneous nerve arises from the lateral cord of the brachial plexus and supplies all muscles in the anterior compartment of the arm, the coracobrachialis, and brachialis muscles on the lateral side of the arm, allowing lateral forearm sensation. Injury to this nerve may produce weakness of elbow flexion and forearm supination.

Continued on back page

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Brachial Plexus Branches continued

The axillary nerve arises from the posterior cord of the brachial plexus and supplies the deltoid and teres minor muscles, giving sensation over the shoulder area.

The radial nerve arises from the posterior cord of the brachial plexus. It supplies all muscles in the posterior compartment of the arm and forearm. It also supplies sensation over the posterior arm, forearm, and the dorsal aspect of the radial part of the hand. The radial nerve allows for extension of the wrist and the fingers. If the radial nerve is injured, you may get wrist drop.

The ulnar nerve arises from C8 and T1 nerve roots which form the medial cord of the brachial plexus. The ulnar nerve gives sensation to the ulnar one-and-a-half digits, the ulnar part of the palm, and the wrist. The ulnar nerve supplies all intrinsic muscles of the hand except the three thenar muscles and the two lateral lumbricals. Just past the elbow, the nerve gives branches to the flexor carpi ulnaris and the medial half of the flexor digitorum profundus. In the forearm, the ulnar nerve divides into the dorsal and palmar cutaneous branches. In the hand, the nerve further divides into superficial and deep branches. The superficial branch of the ulnar nerve divides into palmar digital nerves after it passes under and supplies the palmaris brevis muscle. The deep branch of the ulnar nerve innervates the 3 hypothenar muscles, the medial 2 lumbricals, the 7 interossei, the adductor pollicis, and the deep head of the flexor pollicis brevis. The palmar cutaneous branch of the ulnar nerve provides sensation to the palm of the hand (the finger sensation is provided by the superficial branch). The dorsal cutaneous branch gives innervation to the medial dorsal aspect of the hand and the one-and-a-half fingers.

The median nerve originates from the lateral cord and the medial cord of the brachial plexus. The median nerve supplies all muscles in the anterior compartment of the forearm except the flexor carpi ulnaris and the medial half of the flexor digitorum profundus. This nerve supplies motor innervation to the 1st and 2nd muscles and the majority of the muscles in the thenar group. It innervates the skin on the palmar side of the thumb, the index finger, the middle finger, and half of the ring finger.

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Dr. Ebraheim, Amanda Critton, Julie Anderson and Ellen Finch do not have any relationships with industry to disclose.

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