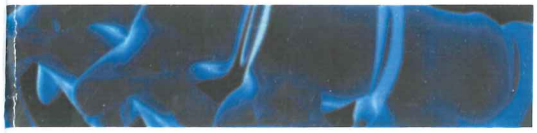

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The Team, From GOOD to GREAT!

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To go from good to great, first you must have a team.

To start, you need to pick the right people. Always select the best individuals for your team! If you select poor team members, they will never be good for your team. You can talk, work, counsel and train them but they will never be good team members. After selecting the right members, give them goals and objectives. You have to manage and motivate the team. Everyone needs to be aware of their responsibilities to the team! What are the most important tasks for them and for the organization? What are you responsible to accomplish every day, week and month?

Establish clear standards and objectives for your team members, not only for each person but for the entire organization!

The task needs to be done on time and on schedule, set a deadline for completion. People are more productive when they know a deadline must be met. What is the task? Everyone should know the tasks to be completed. Visualize the established goals and strive to successfully complete your tasks.

Anatomy of the Supraspinatus Muscle

The supraspinatus is a small muscle located on the superior aspect of the scapula which runs from the supraspinatus fossa to the greater tubercle of the humerus. The tendon inserts into the superior facet of the greater tubercle of the humerus. The supraspinatus is one of four muscles of the rotator cuff: 1. Teres minor 2. Infraspinatus 3. Supraspinatus 4. Subscapularis.

FUNCTION: Assist the deltoid muscle in abduction of the arm and demonstrate peak activity in the late cocking phase of throwing.

INNERVATION: The suprascapular nerve passes under the transverse scapular ligament at the suprascapular notch. The transverse scapular artery runs above the transverse scapular ligament. The suprascapular nerve gives branches to the supraspinatus and infraspinatus muscles. Nerve compression at the suprascapular notch affects the supraspinatus and infraspinatus muscles causing a decrease in abduction and loss of external rotation. Nerve compression at the spinoglenoid notch will only affect the infraspinatus muscles causing loss of external rotation.

Dimensions of the Supraspinatus Tendon: Tendon averages 25 mm wide with a medial lateral footprint of 12 mm at mid-tendon.

Examination Tests: Neer Impingement, Hawkin's, and Jobe's Tests.

Pathological Entities Involving the Supraspinatus Muscle: •Subacromial Impingement - Most common cause of shoulder pain (first stage of rotator cuff disease). - Pain with overhead activity and at night. - A continuation of the disease that includes tendonitis and tears. •Rotator Cuff Tears. •Rotator Cuff Anthropathy - Massive chronic cuff tear with arthritis. - Collapse of the humeral head. - Pseudoparalysis with escape of the humeral head anteriorly and superiorly. •Scapular Neuropathy - Ganglion or entrapment of the nerve at the suprascapular notch, involves both the supraspinatus and infraspinatus muscles. •PASTA (Partial Articular-sided Supraspinatus Tendon Avulsion). •Failure of the supraspinatus following total shoulder arthroplasty or hemiarthroplasty - Results in superior escape of the humerus.

Continued on page 2

TREATMENT: Repair of the tendon or revision of the prosthesis into reverse total shoulder arthroplasty.

Calcific Tendonitis - Calcification of the tendon. - Usually occurs in the tendons of the shoulder (rotator cuff tendons) causing pain and inflammation.

Chondrocalcinosis, Tumoral Calcinosis, Synovial Chondromatosis & Calcific Tendonitis

These four conditions sound similar in name, but are in fact four completely different entities.

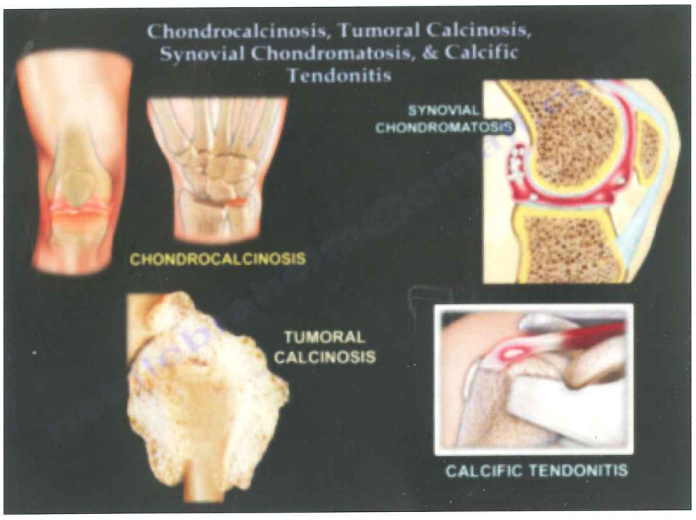
Chondrocalcinosis or pseudogout is a metabolic disease caused by the deposition of calcium pyrophosphate dihydrate crystals in the hyaline cartilage or fibrocartilage (CPPD). It usually affects older patients. The pseudogout crystals are rhomboid shaped and positively birefringent. Crystals appear blue when placed under a polarized light. The uric acid crystals are needle-like and negatively birefringent. Calcification of the fibrocartilage structures such as the meniscus in the knee or the triangular fibrocartilage complex (TFCC) in the wrist will be found.

•Chondrocalcinosis - Calcification of the cartilage (hyaline cartilage or fibrocartilage). - "Chondro" means cartilage. - "Calcinosis" means calcification.

Tumoral Calcinosis is a rare condition that may be hereditary. It occurs more often in people of African descent and females.

•Tumoral Calcinosis - Calcium deposition which resemble a tumor. - Calcium is deposited in the soft tissue within the periarticular area around the joint. - Calcium accumulates outside the joint. - Usually seen in patients with dialysis (especially long-term renal dialysis). - Growth does not contain any malignant cells. - Usually painless. - Swelling around the joint may limit movement and ambulation of the patient. - Located around the shoulders and hips. - Wide excision performed to avoid recurrence.

•Synovial Chondromatosis - Problem with the synovium (intra-articular). - Commonly associated with cartilaginous metaplasia. - Normally occurs in males. - Occurs in weight-bearing joints (hip, ankle and knee). - X-ray will show loose bodies inside the joint. - Condition is benign and non-cancerous. - Usually only requires symptomatic treatment unless the condition is painful. - Open or arthroscopic removal of all loose bodies, if the condition is painful.



•Calcific Tendonitis - Calcification of the tendon. - Generally occurs within the rotator cuff tendons of the shoulder. - Causes pain and inflammation. - Occurs more often in females and diabetics. - Supraspinatus tendon is most often involved. - Diagnosed by x-ray. - Typically found about 1-1.5 cm from the insertion of the supraspinatus tendon. - MRI will show a low signal intensity of calcium deposits. - Calcification and degeneration are usually associated with subacromial impingement.

The Musculocutaneous Nerve

The musculocutaneous nerve supplies muscle, has a cutaneous branch and arises from the lateral cord of the brachial plexus. - It is the primary nerve supply to the muscles of the anterior compartment of the upper arm and supplies sensation to the lateral half of the forearm. - The nerve is the distal contribution to the lateral cord of the brachial plexus and predominately arises from the C5 and C6 level with some contribution from C7. - Contains fibers from the upper trunk. - Lies laterally to the axillary artery and starts the lower border of the pectoralis minor muscle. In the axilla, the nerve travels distally and laterally to pierce the coracobrachialis muscle approximately 3-8 cm distal to the tip of the coracoid.

INNERVATION: After passing through and deep to the coracobrachialis muscle, the nerve then continues distally, superficial to the brachialis muscle and deep to the lateral border of the distal biceps muscle. The musculocutaneous nerve supplies the brachialis, biceps, and coracobrachialis muscles. The brachialis muscle is supplied by both the musculocutaneous and radial nerves. The radial nerve supplies a small portion of the lateral aspect of the brachialis muscle.

Around the elbow region, the musculocutaneous nerve punctures the superficial fascia, lateral to the distal biceps tendon insertion and the nerve terminated as the lateral antebrachial cutaneous nerve, supplying the lateral half of the forearm.

Function of the muscle (biceps): Flexion of the elbow and supination of the forearm, when the elbow is flexed.

Continued on page 3

The Musculocutaneous Nerve continued

Musculocutaneous nerve palsy causes weakness in elbow flexion, weak forearm supination and numbness in the anterolateral forearm that stops at the wrist.

Differential Diagnosis: A rupture of the distal biceps tendon can be diagnosed by an MRI or clinically, by performing the hook test.

C6 Radiculopathy: The patient will complain of radicular pain and numbness in both the thumb and index finger. - Other muscles associated with C6 will also be affected.

Humeral Shaft Fractures

There are several important points involving humeral shaft fractures:

•Humeral shaft fractures are treated without surgery in the majority of cases. - Nonoperative treatment gives a satisfactory outcome. - Perfect alignment of the humerus is not important for acceptable function results.

•Radial nerve palsy is not uncommon. - Check for neurovascular deficit before and after reduction (especially wrist and finger extension). - Holstein-Lewis fracture is commonly associated with neuropraxia of the radial nerve (in approximately 22% of cases).

•Plating of the humerus is better than IM rod.

ANATOMICAL CONSIDERATIONS:

1. Muscle Insertions & Fracture Deformity - A fracture located in between muscle insertions may cause a fracture deformity. - A fracture in the proximal third, that is distal to the pectoralis major muscle attachment and proximal to the deltoid tuberosity, will lead to adduction of the proximal fragment. - A fracture that is distal to the deltoid tuberosity will lead to abduction of the proximal fragment (due to pull from the deltoid muscle) and shortening of the fragment (due to pull from the biceps and triceps muscles).

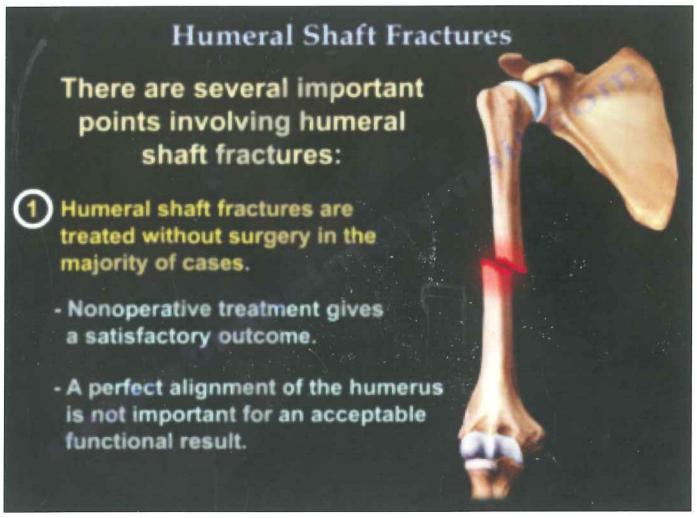
2. Radial Nerve Anatomy - Within the spiral groove, the radial nerve is located about 14 cm proximal to the lateral epicondyle and 20 cm proximal to the medial epicondyle. - The radial nerve enters the anterior compartment of the arm approximately 10 cm proximal to the elbow joint.

TREATMENT: •Nonoperative - Used in the majority of cases. •Acceptable alignment - Less than 20° anterior or posterior deformity is acceptable. - Less than 30° varus/valgus is acceptable. - Less than 3 cm of shortening is acceptable.

How is conservative treatment done? •Coaptation splint - In the majority of cases. •Hanging arm cast - Occasionally used. •Humeral fracture brace - 7-10 days when the swelling and pain decrease.

Functional bracing works by providing a hydraulic compressive force applied uniformly throughout the diaphyseal segment of the humerus, it also results in healing in the majority of cases. About 90% successfully heal with a functional humeral brace with minimal complications. Varus deformity is common. With functional bracing, the force of gravity on the fracture usually produces satisfactory alignment. Contraindication of a functional brace if the patient is unreliable or uncooperative or if there is a brachial plexus, vascular, or severe bony or soft tissue injury.

SURGERY INDICATION: •Open fractures •Vascular injury •Floating elbow •Loss of reduction •Polytrauma patient •Brachial plexus injury.



SURGERY: •Plate fixation - More stable and less reoperation or complications. •Rod fixation - Less stable, more reoperation. - Plate fixation is better than rod. •External fixation - Not commonly used.

COMPLEX FRACTURE: Types of fixation •Plate - Best functional outcome. The rotator cuff is not violated so there will not be shoulder pain. •Rod - May result in shoulder stiffness and pain around the shoulder.

External Fixator - Near the fracture is not advisable and rarely used. There is more of a risk of injury to the radial nerve. - Away from the fracture, you may have less stability but it is safer. Anterolateral approach - Proximal ⅔ of the humerus. Posterior approach - Distal ⅓ of the humerus.

PLATING TECHNIQUE: •Pre bend the plate (allows compression on the near and far cortex). •Usually 4.5 mm plate and screws are used. •The humerus is subject to larger rotational forces (staggered screw placement is ideal). •Lag screws and neutralization plate for oblique fracture. •Use bridge plate for comminuted fracture.

Posterior approach for plating in the distal third of the humerus: •Posterior surface is flat. •Anatomically easier approach. •Biomechanically better. •Generally, plating of the humerus allows for immediate weight-bearing with crutches or walker.

Locking Plate: Osteoporotic patients. - Sometimes a 3.5 mm locking plate is used instead of a 4.5 mm plate. IM Rod Indication: - Segmental fracture. - Osteoporotic fracture. - Pathologic fracture. - Comminuted fracture.

IM rod fixation causes higher complication rates and shoulder pain.

Continued on back page

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Humeral Shaft Fractures continued

IM rodding will result in callus or endochondral ossification (more callus than with plating). Distal screws may have complications with plating. - Proceeding anteriorly to posteriorly, can cause injury to the musculocutaneous nerve. - While, performing laterally to medially risks injury to the radial nerve. External fixation is used in infected or contaminated cases with bad soft tissue injuries. Sometimes it is used temporarily. Watch the position of the radial nerve when inserting the screws.

COMPLICATIONS: 1. Varus - Common, especially after conservative treatment (will not affect function).

2. Nonunion - Check 25-hydroxyvitamin D. - Plate and bone graft are usually used. - If a rod has been used, remove it and perform a plate and graft. - If the nonunion is hypertrophic, use a compression plate alone. - Vascularized free fibular bone graft: - Use with internal fixation for failed conventional techniques, especially if there is a bone gap more than 5 cm.

3. Radial Nerve Palsy - Incidence varies (about 15%). - Primary radial nerve palsy occurs from an injury. - Increased incidence with distal third (Holstein-Lewis) and midshaft transverse fractures. - With closed fractures, this is a neuropraxia of the radial nerve. - With open fractures, consider laceration of the radial nerve (neurotmesis). - Open fracture is an absolute indication to explore the radial nerve, (when associated with radial nerve palsy). - Explore the radial nerve and fix the fracture. - The usual treatment for a closed fracture with complete radial nerve palsy is a cast, brace and observation. - Secondary radial nerve palsy can occur after surgery or from reduction (either explore or watch for radial nerve recovery in both cases). - 90% will recover in 3-4 months. - Splint the wrist and obtain EMG and nerve studies in about 6 weeks. Fibrillation is bad, polyphasic is good. - Monitor the brachioradialis muscle (first muscle to recover), while the extensor indicis is the last. - Wrist extension radial deviation recovers first. - Explore the nerve if the nerve fails to recover within 4-6 months.

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Dr. Ebraheim and Amanda Ferguson do not have any relationships with industry to disclose.

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