

Upper Extremities Biomechanics and Treatment

Dr. John G. Schoenenberger

Shoulder

- When looking at the shoulder and the scapula, there has been a misconception for a number of years
- The rotator cuff muscles are downward stabilizers, so when you look at a shoulder that is anterior inferior could it really be a rotator cuff problem? **NO**
- If the rotator cuff was not working the shoulder would actually go up.

- What we see is that the scapula laterally rotates and goes into an anterior retro tilt forward. Think of it as a blade it rotates lateral and tips forward.
- The glenoid fossa gets retro tilted moving forward which is why a person has difficulty raising their arms along with external rotation
- Shoulder changes occur as the shoulder stretches and contracts the pectoral minor which puts stress on the brachial flexes controlling intervention the circulatory system of the blood down the arm.

- The forced couple of the shoulder is important because it provides the extremity with an upper rotation with the Acromium away from the humerus and forward elevation of the shoulder thereby preventing impingement. The clavicle moves medial and inferior in the shoulder subluxation. The clavicle and first rib need to be adjusted.
- An impingement will cause spur which will lead to irritation in the joint
- When the scapula moves or protracts laterally it pinches the **Auxiliary nerve** which innervates the posterior deltoid.

- Backpacks, holsters, and purses will put pressure at the notch increasing pressure to the **Suprascapular nerve**.
- 2/3 of the shoulder capsule is innervated by the suprascapular nerve.
- *** So adjusting the shoulder mechanisms is very important in maintaining its stability.
- Important to know there are different facets of the shoulder mechanics and they all need to be addressed.

Costoclavicular Syndrome

- Affects the brachial plexus **Thoracic Outlet Syndrome**
- Medical does a Roo's transactalary procedure (cut out the first rib).
- **** Our goal is not to remove but to move it
- By adjusting the ribs and clavicle will allow better blood flow
- When there are improper shoulder mechanics, the rhomboid are stretched and pulls the spine to the ipsilateral side (levator scapular to the cervical spine) increases tension leading to spinal subluxations.

Elbow

- ***** Most problems with the elbow do not originate from the elbow itself. They originate from the wrist, (same relationship as the knee to the foot).
- Mechanical changes of the wrist result in counter stress on the radius and Ulnar.
- There are a number of entrapment sites.
- It can be from scarring tissue in the flexor retinaculum ligament /superficialis bridge
- Cubital Tunnel Syndrome is when the Ulnar is anterior which can be caused by fibrosis in the forearm effecting the interosseous nerve

Wrist

Carpal Tunnel

- Compression of the median nerve
- Carpal tunnel is anatomical position carpal tunnel syndrome is the condition.
- Causes: 1. decrease in the size of the canal or 2, an increase in the size of things in the canal.
- Flexor Retinaculum is the roof of the canal and also the floor of the tunnel Guyon.
- Flexo Carpal Ulnaris pushes down the carpal tunnel
- As the carpals move palmary or inferior causing contraction or stress to the ligament retinaculum and the tunnel of Guyon which would lead to an ulnar problem.

- Adjusting the carpals improving their normal mechanics will take pressure off of the median nerve.

- What you face with carpal tunnel surgery, when they cut the retinaculum ligament to widen the canal by 8-10 cm, it makes the joints more unstable. The ligament holds the carpals in place when you increase the distance the carpals are more unstable.
- Anytime you stretch a ligament between 2 structures scar tissue begins to form in attempt to hold the carpals in place.
- Scar tissue will fill in the canal and which makes less room in the canal again causing constriction on the nerve roots. So the paradox is that when surgery is performed the ligament becomes thicker from scar tissue and you end up creating less space in the canal than you had in the first place.
- Most of the pain from the elbow is coming from the wrist.
- Subluxations in the wrist are going to torque the elbow the same as the ankle and knee in the lower extremity.