

Title: UCL Injuries in the Overhead Athlete - Anatomy, Risk Factors, And Interventions

- Anatomy
 - UCL Complex
 - Anterior Bundle
 - Primary restraint to valgus force
 - Two bands make up the anterior bundle
 - Anterior Band
 - Initially thought to be taught in extension, but recent anatomical studies show it may be taught throughout elbow ROM
 - Posterior band
 - Taught with increased elbow flexion
 - Inserts into the sublime tubercle, but also a little more distal into the ulnar ridge
 - Very close to some muscular attachments!!!
 - Posterior and oblique/transverse bundles
 - Limited contribution to throwing stability
 - Dynamic Stabilizers
 - Flexor pronator mass
 - Flexor Carpi Ulnaris, Flexor digitorum superficialis, pronator teres, flexor carpi radialis, and the brachialis
 - What role do they play
 - Believed to enhance the stability of the medial elbow against valgus force (throwing produce more force than the UCL's failure rate)
 - This group has tendonous attachments to the medial capsule and portions of the UCL
 - Flexor Carpi Ulnaris overlaps about 21% of the anterior bundle's distal attachment
 - Flexor Digitorum Superficialis attached along about 45% of the anterior bundles distal attachment
 - Pronator teres attaches into the distal attachment of the anterior bundle along the ulnar ridge
 - Brachialis has attachments to the same septum of the pronator teres and the flexor digitorum superficialis
 - Flexor Carpi Ulnaris and flexor digitorum superficialis share a tendonous septum
 - What does all this mean and why is it relevant?
 - All these muscles work together to protect the medial elbow from valgus force
 - EMG levels have shown peak activities around the acceleration phase/ release phases in pitching

- Activation of the muscle group decreases valgus opening
 - Cued Max grip strength decreases medial joint space when valgus load is applied
 - Contraction of the index and middle fingers also were able to decrease joint space
 - Highlights the importance of the flexor digitorum superficialis
- Risk factors for UCL injury
 - Most of these studies have looked ROM, demographic, or participation data
 - Fatigue/increased workload has been shown to be a risk for medial elbow injury
 - Fewer days between consecutive games/high pitch counts per game
 - In softball literature pitching consecutive days shows decreases in shoulder strength and increase in shoulder pain
 - One bout of softball pitching shows increased fatigue of the wrist flexors/pronators
 - Demographic data
 - Playing in warmer climates
 - Increased exposure
 - Back to workload
 - ROM
 - Literature is very mixed
 - Some studies show TROM deficit and GIRD to be risk factors and some show it is not
 - A Meta-analysis in pitchers found that if the dominate arm was not 5 degrees larger than the non dominate arm they were more likely to be injured
 - Another review found that if the non dominate arm had higher internal rotation than the dominate arm than their would be an increased risk
 - That's just baseball it can get even more iffy in other sports
 - What if these measures are applied with the application of load?
 - Would we see this become a stronger risk factor?
- UCL injury prevention
 - Strengthen the kinetic chain!!
 - Can not be underestimated!
 - Ensure the kinetic chain is mobile
 - There is evidence that decreased neck mobility can increase the risk of elbow injury

- Prevention exercises that focus on whole body mobility and strength have been shown to decrease elbow injury risk
 - A lot of these programs have forgotten about the importance of the wrist and finger flexors
 - Flexor digitorum superficialis has been viewed to be the most important dynamic stabilizer followed by the flexor carpi ulnaris
 - The throwers ten program does not include this in the program
 - Strengthen finger flexion/grip
 - Work on Ulnar deviations