Ulnar Collateral Ligament Reconstruction

1. Defined

a. The ulnar collateral ligament is critical for valgus stability of the elbow. It serves as the primary elbow stabilizer and as such, serves a very important role with overhead sports. Injury to the UCL is generally of the chronic, repetitive type.
b. There are a wide range of techniques used to reconstruct the UCL. Some of the graft choices include using autografts from the Palmaris longus, gracilis, plantaris, toe extensors, Achilles tendon, and the ITB, in addition to cadaver tissue as well. Most of the graft choices could be described either as a 'docking' surgical method or 'figure 8' fixation.
c. The procedure is commonly referred to as 'Tommy John Surgery'. Tommy John was the first pitcher to return to major league baseball after having this surgery. He returned in 1974 to a very successful career.
d. Currently, the successful return rate for athletes after this surgery is generally considered to be over 80-85%. The average return time is over 11 months according to the most recent literature.

2. Goals

a. Minimize swelling and postoperative pain
b. Protect the healing graft and donor site
c. Restore range of motion
d. Restore strength
e. Functional progression to desired activities

3. Rehabilitation Principles (UCL specific)

a. Patient progression is time and function based and any deviation from clinical guidelines should be relayed to physician and documented.
    i. Incorporation and revascularization
b. The Ulnar Collateral Ligament is divided into three separate components: the anterior, posterior, and transverse bundles. Because of the posterior orientation of the anterior bundle, it is taut throughout the elbow range of motion. It provides the main ligamentous support to valgus strain at the elbow.

c. The medial epicondyle of the humerus connects to the olecranon and coronoid process of the elbow. Valgus force separates these structures, especially during the deceleration phase of overhead activity.
d. When the elbow is in full extension, the anterior capsule provides approximately 70% of the restraint to joint distraction, whereas the UCL provides approximately 78% of the resistance to distractive forces at 90 degrees of elbow flexion.
e. Injury to the medial capsular ligaments can result in increased traction forces on the medial portion of the elbow and can change in length of the ulnar nerve. This change in length may result in neuropathy or ulnar nerve subluxation.
f. Strengthening the flexor pronator mass can serve large benefits in reducing UCL stress as this tissue complex can lower the valgus stress on the UCL.
g. Although it has been speculated that abnormal throwing mechanics are a likely predisposing factor, recent research has inferred that the throwing quantity and deficiencies in scapular and/or rotator cuff strength may be even bigger factors.

4. Post op functional guidelines

a. Driving
   i. Refer to physician preference for driving

b. Work
   i. Refer to physician preference
   ii. Sedentary up to 1-2 weeks
   iii. Medium to high physical demand level will be physician preference

c. Jogging on the treadmill
   i. Check physician preference

d. Acceleration training
   i. check physician preference
   ii. 3-4 months (12-16 weeks) and possibly in a functional brace

e. Sports
   i. Most sports –7-12 months
      a. Dependent upon factors such as pain/swelling, activity specificity, MD preference, strength, and functional tolerance. Golf may start earlier, depending upon MD preference.

5. Post op equipment guidelines

a. Polar care
   i. Physician dependent
   ii. As needed for pain and inflammation

b. Post-op Brace

i. In most cases, braced for 6-8 weeks after surgery. Often in a hinged, adjustable brace for ROM progression.

c. Functional Brace

i. Physician dependent

6. Clinical Restrictions

a. No ROM greater than what MD has prescribed
b. No active usage until MD allows
c. Must use brace as long as MD prescribes
d. Follow rehab timeframe that MD indicates/prefers

7. RehabilitationGuidelines

a. Weeks 1-4

i. **Precautions:**

a. avoid IR/ER for shoulder and pro/sup of wrist
b. avoid running or treadmill
c. must wear brace

ii. **Clinical Guidelines**

1. control post-op swelling and effusion
2. start to restore ROM (working toward non-painful 15-120 degrees by end of fourth week) – AAROM and PROM
3. gripping exercises
4. isometrics for wrist, elbow, shoulder, and scapula
5. brace usage as ordered by MD
6. Shoulder ROM except IR/ER

iii. **Clinical Expectations by the end of week 4**

1. ROM: -15 degrees to 120 degrees
2. Minimal edema and pain
3. Independence with home exercise routine
4. Maintenance of overhead shoulder ROM

b. Weeks 5-8:

i. **Precautions:**

a. Minimize valgus stress
b. Must wear brace until MD clears for D/C
c. May want to wait until week 7 for assertive ER stretching and perhaps even ER strengthening

ii. **Clinical guidelines**

1. Progress toward eventual full ROM for elbow flex/extension and progress/maintain shoulder ROM
2. Begin isotonic exercises for wrist, elbow, and shoulder (including prone scapular strengthening)
3. Progressive pronation/supination, ER/IR can be introduced (isometrics-isotonics).
4. Scapulo-thoracic strengthening
5. Rhythmic stabilization exercises

6. Gripping Exercises
7. Begin and progress some proprioceptive exercises with upper extremities
8. Most likely d/c brace by end of week 8

iii. **ClinicalExpectations by the end of week 8**

1. ROM: 0 degrees to 140 degrees
2. Significant gains with pronation/supination as well as IR/ER
3. 4/5 strength throughout upper extremity
4. Mild swelling and discomfort only

c. Week 8-12:

i. **Clinical guidelines**

1. Initiate and progress theraband shoulder program
2. Ensure full elbow and shoulder ROM
3. Manually resisted PNF patterns when strength sufficient
4. Continue the strengthening of elbow and rotator cuff with progressive resisted exercises
5. Progress core strengthening and proprioceptive exercises for core (may initiate and progress plyometrics)
6. Increase cardiovascular endurance

ii. **Clinical Expectations by the end of week 12**

1. Full ROM
2. 4+ strength
3. Minimal dyskinesia
4. No swelling – minimal soreness
5. Patient nearing GAP referral

d. Week 13-?:

i. **Clinical guidelines (when clinically appropriate)**

1. Progress PRE's and proprioceptive/plyometric strengthening
2. Initiate and progress 90/90 theraband exercises
3. May possibly begin interval throwing program at week 16
4. At 7-8 months, may begin throwing/pitching from flat ground
5. At 8 months, may begin throwing from the mound

6. At 9-12 months, may refine and normalize pitching from the mound

***All throwing should be pain free / rest and recovery are essential for proper progression / 4-6 month program, depending on position (BOOST appropriate when normalized range of motion, 4+/5 strength and minimal soreness – BOOST appropriate when ready to begin throwing)**

References

1. Wilk, K.E.Rehabilitation of the elbow in the throwing athlete. *Journal of Orthhopaedics and Sports Physical Therapy* 1993; 17: 305-317.
2. Holtzapfel, Andrew. *Surgical and Non-Surgical Rehabilitation of UCL Injuries*. Wellington Sports Medicine Conference, 2012 (presenter).
3. Donnell S. Patellofemoral dysfunction-extensor mechanisms malalignment. *CurrOrthop*. 2006;20:103-111.
4. Fleisig, G.S, Escamilla, R.F. Biomechanics of the elbow in the throwing athlete. *Oper*. *Tech. Sports Med*., 1996; 4: 62-68.
5. Escamilla, R.F. Pitching biomechanics as a pitcher approaches muscle fatigue during a simulated baseball game. *American Journal of Sports Medicine*. 35;23-33.
6. Andrews, J, Harrelson, G, Wilk K. Physical Rehabilitation of the Injured Athlete. 2008; pgs: 237-245. 4th edition. Elsevier Saunders (Philadelphia, Pennsylvania).
7. Andrews, J.R. Valgus extension overload in the pitching elbow (Injuries to the Throwing Arm). 1985; pgs: 250-257. Saunders (Philadelphia, Pennsylvania).
8. Blackburn, T. EMG analysis of posterior rotator cuff exercises. Journal of Athletic Training 1990; 25: 40-45.
9. Fry, K, Sherry, M. Rehabilitation Guidelines for Elbow UCL Reconstruction. University of Wisconsin Sports Medicine Department. 2011 (pgs. 1-6).
10. Ellenbecker TS, Wilk K. Current concepts in rehabilitation following ulnar collateral ligament reconstruction. Sports Health (2009); 1(4):301-313.