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Introduction

The ulnar collateral ligament reconstruction is a tendon transfer procedure. No muscles are transected during this process which allows for a faster recovery time since there is less surgical trauma. Post-operatively, the body requires time to accept the transfer and establish adequate blood supply in the new tissue. The focus of this rehabilitation program is to provide gradually increasing stresses on the transferred material to allow the tendon to adapt to the forces the ulnar collateral ligament would typically withstand. According to Wolf's Law, the strength of the tissues matrix is directly proportional to the stresses placed upon them during their development.

Approximately one year is needed for the transferred tissues to assume their new functions completely. The patient tends to protect and compensate for their limited ability, which promotes dysfunction of the upper extremity as a whole. Therefore, it is important to address the function of the shoulder girdle (i.e., scapulothoracic, glenohumeral and acromioclavicular joints), along with the return of full elbow function (i.e., range of motion, strength and endurance).

In general, avoid any valgus stress during the rehabilitation period until actual pitching starts. Many athletes wish to resume playing golf during their rehabilitation period but valgus forces are not permitted. Putting is allowed, as is chipping, as advised by your physician. No drives are allowed for six months. Before this time, hitting a divot may pull out the repair altogether.

0 to 7 days:

- Splint is worn for one week
- Squeeze a *soft* ball on the first post-operative.
- No valgus stress to the elbow.
- Full active forearm pronation and supination range of motion.
- Full active wrist radial and ulnar deviation range of motion. Gentle stretching of wrist and fingers is okay.
- Active and active assistive wrist flexion and extension range of motion exercises.
- Full active shoulder range of motion — flexion, abduction, internal and external rotation.

1 to 4 weeks:

- Discontinue splint in one week.
- A sling may be worn for one more week, if necessary.
- Two weeks post:operation, begin a Total Body Conditioning Program after incision is closed (starting earlier, you run the risk of getting perspiration in or on the wound, increasing the risk of infection).
- Gradually achieve full elbow range of motion.

1 to 2 months:

- Athlete should have full range of motion at elbow, wrist, forearm and shoulder joints.
- One month post-operation, add. light weights for resistive elbow and forearm exercises (i.e., elbow flexion and extension, forearm pronation and supination).

2 to 3 months:

- Continue active, resistive exercises for the entire upper extremity, including the rotator cuff.
- Continue lower body and trunk conditioning program.

3 to 4 months:

- If there is no swelling and the athlete has full, pain free elbow range of motion, the athlete may begin easy tossing (no wind-up), start with 25-30 throws, building up to 70 throws an gradually increase the throwing distance.

NOTE: The Throwing Program is performed 3 — 4 times per week,. Apply ice after each throwing session to help decrease the inflammatory response to microtrauma.

<u># of THROWS</u>	<u>DISTANCE (ft)</u>
20	20 (warm-up phase)
25 — 40	30-40
10	20 (cool down.phase)

4 to 5 months;

- Continue the Throwing Program by tossing the ball with an easy wind-up on the alternate days.

<u># of THEROWS</u>	<u>DISTANCE (ft)</u>
10	20 (warm-up)
10	30—40
30 — 40	50
10	20-30 (cool down)

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Tommy John Rehabilitation Protocol

5 to 6 months:

- Continue increasing the throwing distance to a maximum of 60 feet.
- Continue tossing the ball with an occasional throw at no more than half speed.

<u># of THROWS</u>	<u>DISTANCEM</u>
10	30 (warm-up)
10	40 - 45
30 - 40	60 - 70
10	30 (cool down)

6 to 7 months:

- During this step gradually increase the distance to 150 feet maximum.

<u>PHASE I:</u>	<u># of THROWS</u>	<u>DISTANCE(ft)</u>
	10	40 (warm-up)
	10	50 - 60
	15 - 20	70 - 80
	10	50 - 60
	10	40 (cool down)

<u>PHASE H:</u>	<u># of THROWS</u>	<u>DISTANCE(ft)</u>
	10	40 (warm-up)
	10	50 - 60
	20 - 30	80 - 90
	20	50 - 60
	10	40 (cool down)

<u>PHASE HI:</u>	<u># of THROWS</u>	<u>DISTANCE(ft)</u>
	10	40 (warm-up)
	10	60
	15 - 20	100 - 110
	20	60
	10	40 (cool down)

<u>PHASE IV:</u>	<u># of THROWS</u>	<u>DISTANCE(ft)</u>
	10	40 (warm-up)
	10	60
	15 - 20	120-150
	20	60
	10	40 (cool down)

Tommy John Rehabilitation Protocol**7 to 8 months:**

- Progress to throwing off the mound at $\frac{1}{2}$ to $\frac{3}{4}$ speed. Try to use proper body mechanics, especially when throwing off the mound:
 - Stay on top of the half.
 - Keep the elbow up.
 - Throw over the top.
 - Follow through with the arm and think.

<u>PHASE I:</u>	<u># of THROWS</u>	<u>DISTANCE(ft)</u>
	10	60 (warm up)
	10	120 —150 (lobbing)
	30	45 (off the mound)
	10	60 (off the mound)
	10	40 (cool down)

<u>PHASE II:</u>	<u># of THROWS</u>	<u>DISTANCE,(ft)</u>
	10	50 (warm-up)
	10	120 —150 (lobbing)
	20	45 (off the mound)
	20	60 (off the mound)
	10	40 (cool down)

<u>PHASE III:</u>	<u># of THROWS</u>	<u>PISTANCE(ft)</u>
	10	50 (warm-up)
	10	60
	10	120 — 150 (lobbing)
	10	45 (off the mound)
	30	60 (off the mound)
	10	40 (cool down)

<u>PHASE IV:•</u>	<u># of THROWS</u>	<u>DISTANCE (ft.)</u>
	10	50 (warm-up)
	10	120 - 150 (lobbing)
	10	45 (off the mound)
	40 - 50	60 (off the mound)
	10	40 (cool down)

Tommy John Rehabilitation Protocol**9 to 10 months:**

- At this time, if the pitcher has successfully completed the above phase without pain or discomfort and is throwing approximately $\frac{3}{4}$ speed, the pitching coach and trainer may allow the pitcher to proceed to the next step of "Up/Down Bullpens". Up/Down Bullpens is used to simulate a game situation. The pitcher rests in between a series of pitches to reproduce the rest period in between innings.

Up/Down Bullpens: (% ⁻³⁴ speed)

<u>DAY 1:</u>	<u># of THROWS</u>	<u>DISTANCE (ft.)</u>
	10 warm-up	120 - 150 (lobbing)
	10 warm-up	60 (off the mound)
	40 pitches	60 (off the mound)
	<i>REST 10 MINUTES</i>	
	20 pitches	60 (off the mound)

DAY 2: *OFF*

<u>DAY 3:</u>	<u># of THROWS</u>	<u>DISTANCE (ft.)</u>
	10 warm-up	120 - 150'(lobbing)
	10 warm-up	60 (off the mound)
	30 pitches	60 (off the mound)
	<i>REST 10 MINUTES</i>	
	10 warm-up	60 (off the mound)
	20 pitches	60 (off the mound)
	• <i>REST 10 MINUTES</i>	
	10 warm-up	60 (off the mound)
	20 pitches	60 (off the mound)

DAY 4: *OFF*

<u>DAYS:</u>	<u># of THROWS</u>	<u>DISTANCE (ft.)</u>
	10 warm-up	120 - 150 (lobbing)
	10 warm-up	60 (off the mound)
	30 pitches	60 (off the mound)
	<i>REST 8 MINUTES</i>	
	20 pitches	60 (off the mound)
	<i>REST 8 MINUTES</i>	
	20 pitches	60 (off the mound)
	<i>REST 8 MINUTES</i>	
	20 pitches	60 (off the mound)

10 to 12 months:

- At this point, the pitcher is ready to begin a normal routine, from throwing, batting practice to pitching in the bullpen. This program should be adjusted as needed by your physician, athletic trainer or physical therapist.

ELBOW MCL RECONSTRUCTION REHABILITATION PROTOCOL

	RANGE OF MOTION	IMMOBILIZER	THERAPEUTIC EXERCISE
PHASE I 2 - 4 weeks	Passive ROM to tolerance	Brace locked at 0 - 90 and to be worn at all times	Scapular stabilizing exercises, gentle rotator cuff strengthening, gentle hand/wrist/shoulder ROM
PHASE II 4 - 6 weeks	Begin AAROM to full flexion*	Brace locked at 0 - 90 and to be worn at all times	Advance exercises in phase I
PHASE III 6 - 12 weeks	Progress to full motion without discomfort	None	Continue with scapular and rotator cuff strengthening, begin forearm resistance exercises -first in flexion and then advance to extension
PHASE IV 3 - 5 months	Full and pain-free	None	Continue with shoulder strengthening, begin aggressive rotational exercises, light tossing, and sport-specific activities

*No forced full flexion