Top 10 Ways to Prevent a UCL Tear for Pitchers

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The amount of minor league and major league pitchers who have torn their UCL this season could make up two baseball teams. The MLB has lost more money on UCL surgeries this year than the Houston Astros entire team salary. There is obviously a major health problem for pitchers in this game and it all can be prevented if individual teams set some guidelines and provided some useful information for their high velocity pitchers.

Yes, I believe most of these top level pitchers have no idea what kind of damage they are doing to themselves. Mainly because they are using all of their resources to handle the stress of competing at the top level of this game. If their teams could give them better guidelines and more information to help them protect themselves from themselves then I truly believe this rising problem of arm injuries in Major League Baseball would subside.

I also believe the MLB should consider lowering the mound to help reduce these excessive forces that these upper 90's pitchers are putting on their arms. It would also make pitching even more of a power game which would also make approaches like 3X Pitching more popular. Yes, lowering the mound is my new agenda but it would really weed out a lot of the pitchers with the poor lower half power and make the game more about pure power.

In this article, I will go over the top ten ways to prevent a UCL tear and then set some guidelines that would help pitchers stay out of harm's way. I will also list some of the top case studies on elbow injuries for your further research if needed.

Top Ten Ways to Prevent a UCL Tear for Pitchers

The list of ways to prevent a UCL tear here are referenced to the case studies at the bottom of the page. The picture below illustrates the mechanically differences in 1-5 from the list below.

1. Do Not Throw Sidearm (1)
2. Prevent Early Trunk Rotation (2)
3. Lower Your Shoulder Abduction Angle at Front Foot Strike (3)
4. Keep the Arm at the Scapular Plane From Arm Cocking into Maximum External Rotation (MER) (4)
5. Increase Shoulder Range of Motion While Keeping the Elbow at 90 Degrees During MER (5)
6. Stick to Strict Pitch Counts if You Throw Over 85mph Consistently (6,7)
7. Throw More Change-ups than Breaking Pitches (8)
8. Strengthen the Flexor Mass of the Throwing Forearm (9)
9. Do Not Pitch with Arm Pain (10)
10. Do Not Pitch All Year Round (10)


1
SIDEARM
3/4 SIDEARM
2
EARLY TRUNK ROTATION
LATE TRUNK ROTATION
3
HIGH SHOULDER ANGLE
LOW SHOULDER ANGLE
4
ARM BEHIND SCAP PLANE
ARM AT SCAP PLANE
5
LIMITED SHOULDER ROM
FULL SHOULDER ROM
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Pitching Guidelines to Protect Against UCL Damage

These guidelines are here to help a pitcher apply these top ten ways to prevent a UCL tear to a weekly routine. This would be best practice for pitchers to protect their elbows. Following the 3X Pitching Velocity Program through the off-season, pre-season and in-season programs would also follow these guidelines to help prevent a UCL tear.

1. Use a Baseball Specific/Season Specific Strength and Conditioning Program.
2. Use a Drill Based Throwing Program to Train the Movements Around an Efficient Set of Pitching Mechanics like the 3X Mechanics.
3. Have a Good Flexibility Training Program Post Game or Workout.
4. Use Video Analysis on a Weekly Basis to Analyze Your Current Mechanical Movements.
5. Stick to Strict Pitch Counts In-Season Similar to ASMI's Youth Position Statement.
6. Listen to Your Body and Give it What it Needs at All Times. If it Doesn't Want to Throw or Train for the Day then Don't.
7. Avoid Throwing Many Breaking Pitches. Work to Throw Around 80-90% Fastballs and Change-Ups.
8. Avoid Using Anti-Inflammatory Drugs. Icing is Better Than these Drugs. Do not Ice More than 12 Minutes On.
9. Take a 4 Month Long Off-Season Every Year to Rest, Recover and Rebuild.

Pitching Case Studies on Elbow Injuries

The excerpts here are linked to the top ten ways to prevent a UCL tear for pitchers above. These excerpts reference the entire case studies cited below for further research.

1. Fourteen pitchers displayed a sidearm delivery, exhibiting an average elbow valgus torque of 66 ± 24 N?m, which was significantly higher (P = .02) than that of those who threw with the more common over-hand, or "3/4," slot position (46 ± 29 N·m) (1).
2. Thus, subsequent between-group analysis revealed that 34 of the 69 pitchers included in the sample initiated trunk rotation before front-foot contact, whereas 35 did so afterward. Although there were no significant differences in demographics or ball velocity between groups (P > .10), the pre–foot contact players exhibited significantly more elbow valgus torque (59 ± 27 N?m) than the post–foot contact players did (42 ± 29 N?m, P = .02) (1).
3. Elbow valgus was most affected by the shoulder abduction angle at SFC….Mean shoulder abduction at SFC for the 40 pitchers was 109° +- 33°…The magnitude of elbow valgus stress was increased by greater degrees of shoulder abduction at SFC (2).
4. Elbow valgus was most affected by maximum horizontal adduction angular velocity…Mean peak shoulder horizontal adduction angular velocity was 933° +- 320°/s…The magnitude of elbow valgus stress was increased by increased horizontal adduction angular velocity (2).
5. Elbow valgus was most affected by elbow angle at peak valgus stress and peak shoulder external rotation torque. Elbow angle at peak valgus torque averaged 98° +- 21° and maximum external rotation torque averaged 111 +- 17 Nm for the 40 athletes. The

magnitude of elbow valgus stress was increased by increased (ie, more flexed) elbow angle at peak valgus torque and decreased external rotation torque (2).

6. There was a statistically significant association between higher pitch velocity and injury (P 5 .0354). The 3 pitchers with the fastest pitches (with speeds of 42.02, 42.02, and 44.25 m/s) were the 3 who had ulnar collateral ligament tears that required reconstruction (3).
7. There was a 6% increase in the odds of elbow pain per 10 pitches thrown in a given game; over 75 pitches, odds of elbow pain increased over 50% (4).
8. At the shoulder, internal rotation torque, horizontal adduction torque, abduction torque, and proximal force were significantly less in the change-up than in the other 3 pitches (5).
9. Exercise and conditioning of the medial elbow musculature, specifically the flexor digitorum superficialis muscle and the flexor carpi ulnaris muscle, may prevent injury or assist in rehabilitation of medial elbow instability, especially in overhand throwing athletes (6).
10. The injured group pitched significantly more months per year, games per year, innings per game, pitches per game, pitches per year, and warm-up pitches before a game. These pitchers were more frequently starting pitchers, pitched in more showcases, pitched with higher velocity, and pitched more often with arm pain and fatigue (7).

Pitching Elbow Reference:

1. Aguinaldo AL, Chambers H. – **Correlation of throwing mechanics with elbow valgus load in adult baseball pitchers.** – Am J Sports Med. 2009;37(10):2043–2048.
2. Werner SL1, Murray TA, Hawkins RJ, Gill TJ. – **Relationship between throwing mechanics and elbow valgus in professional baseball pitchers.** – J Shoulder Elbow Surg. 2002 Mar-Apr;11(2):151-5.
3. Brandon D Bushnell, Adam W Anz, Thomas J Noonan, Michael R Torry, Richard J Hawkins – **Association of maximum pitch velocity and elbow injury in professional baseball pitchers.** – Harbin Clinic Orthopaedics and Sports Medicine, Rome, GA 30165, USA. – The American journal of sports medicine (Impact Factor: 3.61). 04/2010; 38(4):728-32.
4. Lyman S1, Fleisig GS, Waterbor JW, Funkhouser EM, Pulley L, Andrews JR, Osinski ED, Roseman JM. – **Longitudinal study of elbow and shoulder pain in youth baseball pitchers.** – Med Sci Sports Exerc. 2001 Nov;33(11):1803-10.
5. Fleisig GS1, Kingsley DS, Loftice JW, Dinnen KP, Ranganathan R, Dun S, Escamilla RF, Andrews JR. – **Kinetic comparison among the fastball, curveball, change-up, and slider in collegiate baseball pitchers.** – Am J Sports Med. 2006 Mar;34(3):423-30. Epub 2005 Oct 31.
6. Davidson PA1, Pink M, Perry J, Jobe FW. – **Functional anatomy of the flexor pronator muscle group in relation to the medial collateral ligament of the elbow**. – Am J Sports Med. 1995 Mar-Apr;23(2):245-50.
7. Olsen SJ 2nd1, Fleisig GS, Dun S, Loftice J, Andrews JR. – **Risk factors for shoulder and elbow injuries in adolescent baseball pitchers.** – Am J Sports Med. 2006 Jun;34(6):905-12. Epub 2006 Feb 1.