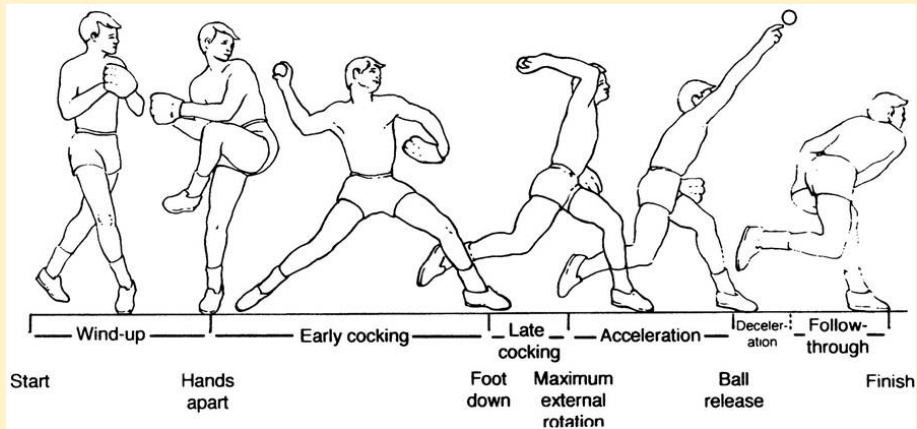

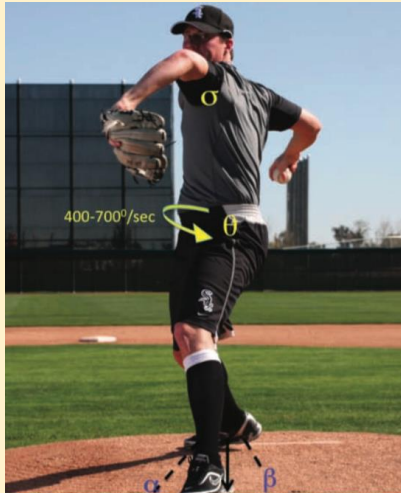



Pitching Pain



Numerous parts of the shoulder are utilized and strained while throwing: the rotator cuff, the glenoid, the ligaments, the labrum, and the biceps. The biomechanics of pitching or throwing has roughly 6 stages, all of which impact the arm in a different way, and may result in pain or injury following overuse.

Stage	Description	Injury Potential
Wind up	 <ul style="list-style-type: none"> • Storage of energy • Center of gravity is over the back of the leg • Rotation of the upper trunk • Begins with the movement of the back leg and completes with the elevation of the lead leg and separation of glove and ball 	<ul style="list-style-type: none"> • Rarely a cause of injury
Early Cocking	 <ul style="list-style-type: none"> • Begins with the lead leg at max height, ends with the lead foot contacting back with the ground • Torso and pelvis rotate in opposite directions • Transfer of the energy of the lower body into the upper extremity 	<ul style="list-style-type: none"> • Shoulder stiffness can result in over and under trunk rotation, creating back or hip pain

<p>Late Cocking</p>	<ul style="list-style-type: none"> • Begins with the lead foot contacting back with the ground and ends with the point of maximal external rotation • Maximum valgus torque generated: 64 Nm • Equivalent to 40lb of weight in the hand 	<ul style="list-style-type: none"> • Pain during this stage of throwing is frequently related to problems with the ulnar collateral ligament (UCL) or an anterior labral tear
<p>Acceleration Phase</p>	<ul style="list-style-type: none"> • Between maximum external rotation and ball release • Rotation from 175 degrees of external rotation to 100 degrees of internal rotation in 42-58 milliseconds • Rotational velocity of 7000-9000 degrees per second 	<ul style="list-style-type: none"> • UCL pain typically present during this phase • Pain may also result from early arthritis in the back of the elbow
<p>Deceleration Phase</p>	<ul style="list-style-type: none"> • Between ball release and maximum humeral internal rotation and elbow extension • Most violent phase of throwing cycle • Maximum joint loading • Posterior shoulder muscle and biceps/brachialis activity is decelerating the shoulder and elbow 	<ul style="list-style-type: none"> • SLAP tears and posterior labral tears are problematic during this phase
<p>Follow-Through</p>	<ul style="list-style-type: none"> • Body continues to move forward • Ends with the player in the fielding position 	<ul style="list-style-type: none"> • Unlikely culprit of injury