

HUNTERDON
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LIVE LIFE BETTER

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The Overhead Athlete

Maximizing Performance • Preventing Injuries

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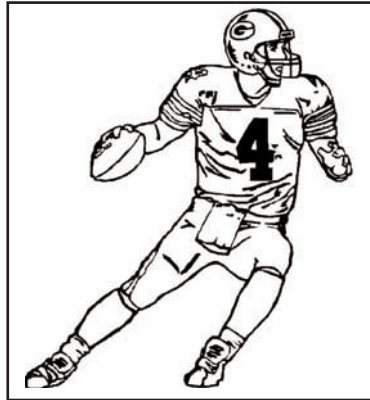
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Introduction

Performing overhead sports (throwing a baseball, spiking a volleyball, serving a tennis ball, etc.) requires strength and conditioning of the entire body in order to be successful, and more importantly, to prevent injury.

Importance of the “Core Muscles”

One study examined which body parts contributed to forward force in throwing a ball.

The results:

Legs/Trunk 51%

Scapula/Shoulder 13%

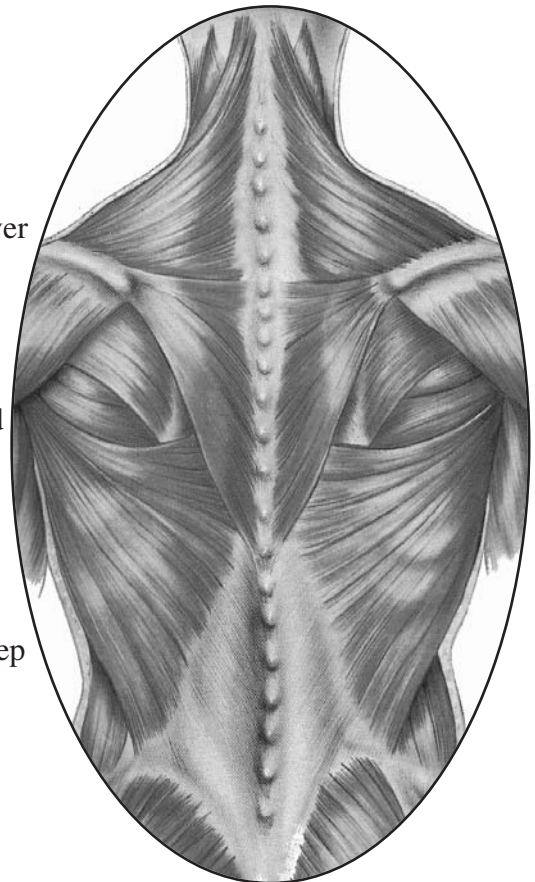
Elbow 21 %

Wrist 15%

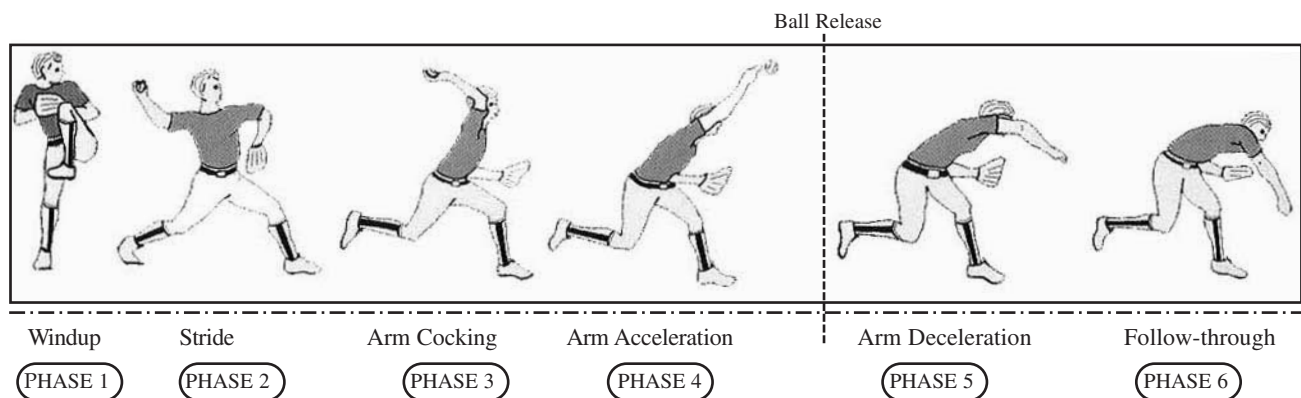
Thus, the legs and the core trunk muscles are responsible for over half of the velocity when you throw a baseball. So to maximize ball speed, you must train your legs and the core muscles.

Furthermore, a weakness or an injury to the lower extremities or trunk can cause a pitcher to put more stress on the elbow and shoulder to compensate for the deficiency in the core or the legs.

As an example, there was a recent professional baseball player who sprained his ankle, couldn't push off the mound as well, then subsequently injured the elbow trying to compensate to keep his speed within his target range.



Overhand Throwing Phases



Structures at Risk: The Shoulder and Elbow

The elbow and shoulder are the most frequently injured areas in the body in the overhead athlete. One study reported that in 9-14 year old pitchers and catchers, over 50% had elbow pain at some point in their brief, young careers.

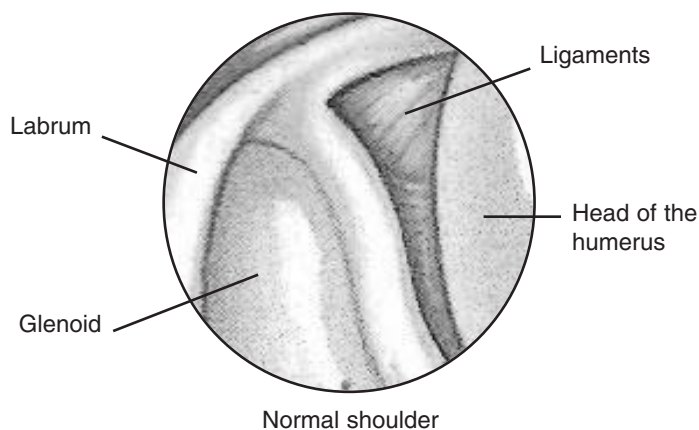
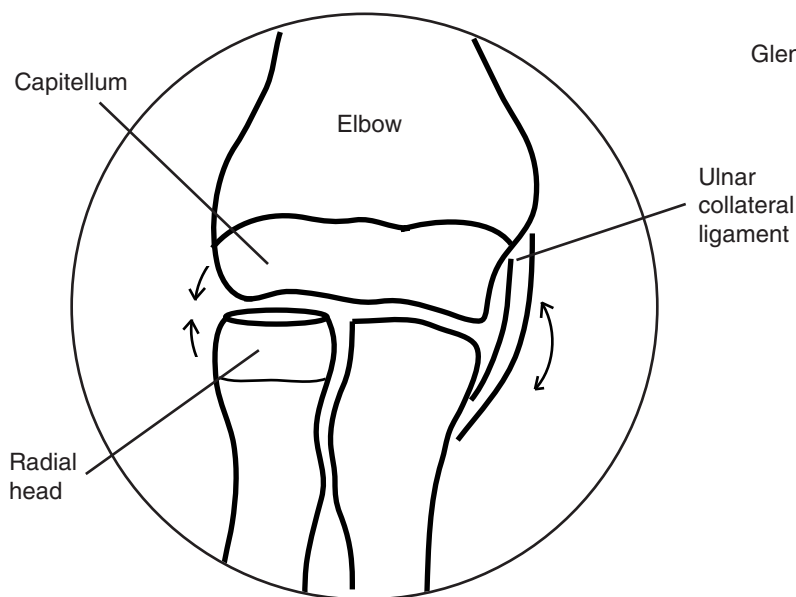
During overhead movements:

The elbow experiences:

- high tension loads on the medial (inner) side, particularly the ulnar collateral ligament.
- high compression on the lateral (outer) side (particularly the capitellum and radial head) and the posterior (back) aspect of the joint.

The shoulder experiences:

- stretch on the anterior (front) ligaments.
- stretch on the rotator cuff tendons and biceps tendon
- compression on the glenoid labrum (cartilage shock absorber)



Diagnosing Shoulder and Elbow Problems in the Overhead Athlete:

History - onset of symptoms, changes in overhead activity or technique, changes in symptoms.

Examination - most sensitive to detect loss of motion, stiffness, and stretched ligaments.

X-rays - can show bone changes that are sometimes present.

MRI - can be helpful but is not always accurate, eg, in one study 70% of asymptomatic pitchers had an abnormal elbow ligament on MRI.

MRI-Arthrogram - can be better to detect torn shoulder labrum.

Diagnostic Arthroscopy - the only way to be certain of pathology inside a joint.

USA BASEBALL RECOMMENDATIONS		
Age	Max. pitches per game	Max. games per week
8-10	50	2
11-12	65	2
13-14	75	2
15-16	90	2
17-18	105	2

AGE RECOMMENDATIONS FOR LEARNING VARIOUS PITCHES	
Pitch	Age (yr)
Fastball	8 ± 2
Change-up	10 ± 3
Curve ball	14 ± 2
Knuckle ball	15 ± 3
Slider	16 ± 2
Fork ball	16 ± 2
Screw ball	17 ± 2

Year Round Training Program

Off Season:

- Cardiovascular conditioning
- Flexibility stretching - hip flexion, low back extension/rotations, shoulder internal rotation, scapular retraction
- Strength training 3x / week - lower extremities, core, shoulder, arm, forearm. Vary the workouts between low resistance/high repetition and high resistance/low repetition
- Work on mechanics.

Pre Season:

- Flexibility stretching
- Strength training 2x/week / Power running
- Power training - faster speeds, higher loads & less repetitions
- Increase overhead activity (eg. throwing) gradually

In Season:

- Flexibility stretching
- Maintenance strength training 1x/week

Post Season:

- Most high-level overhead athletes take about 1 month off except general conditioning. Let the body recover from the rigors of the season.