

# Keeping it in the Strike Zone

HOW TO  
PREVENT  
INJURY



VANDERBILT  UNIVERSITY  
MEDICAL CENTER

# Table of Contents

The Examination . . . . .	2
Pitching Mechanics . . . . .	4
Core Exercises . . . . .	5
Scapular Stretches . . . . .	7
Scapular Exercises . . . . .	8
Summary . . . . .	10
Pitch Counts . . . . .	12

## Introduction

Here at Vanderbilt Sports Medicine, we have found several things that can help you avoid arm trouble and reach your baseball potential. In this booklet, we will first show you some of the shoulder problems we often find in the clinic and how they can affect you on the mound. Next, we will show you the best exercises to fix those problems. Finally, we'll give you some tips on how to avoid overuse injuries and reach your goals.

# The Examination

There are three common things we find when a pitcher comes to the clinic with shoulder pain.

1. **Tightness** in the throwing shoulder that is different from the non-throwing shoulder when it's turned downward.
2. **Winging** of the shoulder blade that is different than the non-throwing shoulder.
3. **Weak core strength:** Leg and abdominal weakness and/or balance problems.

These three things can be helped with proper rehabilitation and lead to a complete recovery.

## Tightness

In the first part of the exam the physician holds the pitcher's shoulder blade and turns the non-throwing arm from 0 to 70 degrees (*photo A*).

In the second picture, the physician can only rotate the arm 20 degrees downward, because the muscles around the shoulder blade of his throwing arm shoulder blade are too tight (*photo B*).

**Photo A**



*Non-pitching Arm*

**Photo B**



*Pitching Arm*

# The Examination

## Winging

The second part of the exam tests for winging of the shoulder blade. Winging is when the throwing arm does not move freely up and down, but instead “wings outward” because of a loss of flexibility. The shoulder blade of the throwing arm will appear to be riding higher than the shoulder blade of the non-throwing arm.



## Core Strength

The final part of the exam tests the pitcher's core strength by having him stand on his stance foot with arms outstretched while he tries to squat down. If his core is weak it will be hard to balance while squatting on one leg.



# Pitching Mechanics

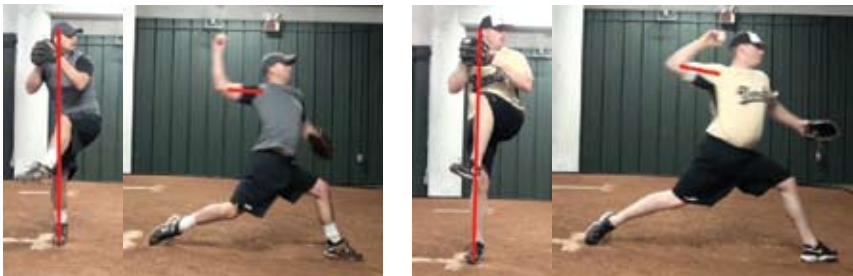
## Poor Delivery

In the pictures below we can see that both pitchers do not use the full power of their legs and core as they stride towards home plate. Their leading legs drift toward first base, and their elbows drop below shoulder level. All the energy they could use for the pitch is lost because of poor mechanics. They throw with their arms only and put more stress on their elbows.



## Good Delivery

Below are two examples of a good delivery. The pitcher comes to a point of balance before he strides towards the plate with his body following smoothly. His elbow is up and all of his explosive energy goes forward - NOT towards first base.



# Exercises

The following exercises are designed to help you correct the four parts of your body that may be weak and affect your pitching. First we focus on your core because it moves energy from your legs and hips into your throwing arm. Other important areas are your shoulder blade muscles, the muscles on the front and back of your shoulder, and your chest muscles. Our research clearly shows that baseball injuries often happen because of weakness and overuse. We believe that if you do these exercises in your workout routines, you will do better in your playing career.

## Core Exercises

To strengthen your core, select two or three of these exercises. Try to complete two sets of 15 repetitions twice each day. Each week change your exercise routine around to work other areas and make your core stronger.

### Side Plank

Lie on either side with your legs outstretched and your lower elbow on the table in line with your shoulder. Tighten your stomach muscles and then lift your hips off the table. Keep your legs and upper body in line with your shoulder positioned right over your elbow. Keep the other arm against your side.



### Bird Dogs

Begin this exercise on what we call the 4-point kneeling position. Tighten your stomach. Extend a leg while lifting the opposite arm. Hold for three seconds and then return to the starting position. Repeat with the opposite leg and arm.



# Core Exercises

## Front Plank

Start in the push up position with your elbows on the table in line with your shoulders. Now tighten your stomach muscles and lift your hips off the floor until your legs and upper body are in a straight line. Stay still with your shoulders positioned over your elbows. Try to hold this position for 30 seconds.



## Single Leg Hip Bridge

Lie flat on the table with your knees bent. Keep your feet together and flat on the table. Slowly raise your hips from the table. Keep your stomach muscles tight throughout the whole process. In the up position, slowly extend one leg while keeping your stomach tight. Hold for three seconds and return your knee to the bent position. Repeat with the opposite knee.



## Single Leg Squat

Put a weight in each hand, balance on one leg, and slowly squat until your back side is just above knee height. When standing back up, push from your hip, not from your knees. Return to the starting position. Repeat with the opposite leg.



# Scapular Stretches

We recommend you complete **both the stretches and strengthening exercises** to correct your scapular problems.

There are three scapular stretches that you should do every day. Hold each stretch for 20 seconds and repeat twice. Remember to do these stretches for BOTH arms.

## Cross Body Stretch

Take your pitching arm and bring it across your body while holding the elbow with the opposite hand. Pull that arm across your chest until a gentle stretch is felt in the back of your shoulder. Hold for 20 seconds.



## Sleeper Stretch

Lie on your throwing arm on the table. Place your arm at a right angle to your body. Using your other hand, push down on your wrist and hand towards the table as shown. Hold for 20 seconds. Relax and repeat.



## Chest Stretch

Stand in front of the doorway facing forward. Place the front of your arm and the inside of your elbow on the surface of the wall. Place your elbow about the same height as your shoulder. Now step forward with the opposite leg. Lean into the wall allowing your shoulder to be pushed back and turn your body away from your arm. Hold the stretch for about 20 seconds.





# Scapular Exercises

Complete each of these exercises **three times each week - not daily**. Start with two sets of eight repetitions and work up to two sets of 20.

Start with a two or three pound dumbbell and increase as you are able. You should not use more than 10 pounds for these exercises.

## Prone Row

Hold a weight in your hand while lying on your stomach with your arm straightened towards the ground. Slowly raise your elbow until it's at the level of the table. Hold briefly, and then slowly return to the starting position.



## Richardson Row

Stand with your feet shoulder-width apart while keeping your back flat. Bring your elbows to shoulder height, turn your hands forward and extend them straight in front. Slowly return to the starting position.



## Horizontal Abduction

Lie face down on the table, and let your arm hang down holding a weight. Keeping your thumb up, raise your arm and hand to shoulder height. Keep your elbow straight and squeeze your shoulder blades together. Return to the starting position.



# Scapular Exercises

## Elbow Lift

Lie on your stomach with your pitching arm on top of your back as shown. Keep your elbow bent and then lift your entire arm up towards the ceiling. You should start with no weight on this exercise.



## Shoulder 'Punch'

Lie flat on your back as shown with a weight in your hand extended straight up above your body. Punch straight to the ceiling and return to the starting position. Keep your elbows straight.



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## Baseball and School

Reaching your baseball potential starts in your school classroom. The world is full of talented athletes who failed to meet the academic standards needed to finish school and move their game to the next level. A sound mind in a sound body ensures you can be able to compete academically and athletically. You have to be able to meet your academic goals before you can take the mound and achieve your pitching goals. Study hard, it's more important than the pitch count.

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# Summary

Never throw after your body becomes tired. We know that pitchers who do are **36 times** more likely to end up in surgery.

When you reach your pitch count limit and want to stay in the game, you should avoid the catcher's position. You'll have to return every pitch and it's a long throw to second base.

During the season, drink lots of water and get at least 8 hours of sleep each night.

If you have arm or shoulder pain, ask your coach to check your shoulder blade and single-leg squat. If your muscles are weak, add the scapular and core exercises to your workouts.

## **When throwing:**

1. Balance at the top of your leg lift - then drive forward.
2. When turning your body towards home - avoid tilting.
3. Try to "open up" smoothly towards home - don't delay.
4. Step directly towards home; don't let your leg "drift".
5. Avoid letting your elbow "drop" during delivery.

# Pitch Counts

## USA Baseball's Recommended Pitch Counts:

### **9-10 year old pitchers**

1. 50 pitches per game
2. 75 pitches per week
3. 1000 pitches per season
4. 2000 pitches per year

### **11-12 year old pitchers**

1. 75 pitches per game
2. 100 pitches per week
3. 1000 pitches per season
4. 3000 pitches per year

### **13-14 year old pitchers**

1. 75 pitches per game
2. 125 pitches per week
3. 1000 pitches per season
4. 3000 pitches per year

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