Lisa Bartels, PT, DPT, PRC

Lisa came to Lincoln Nebraska in 1995 to accept an athletic scholarship and work towards an undergraduate degree in biology. She was a member of the University of Nebraska volleyball team from 1995-1997. Lisa was personally introduced to the field of physical therapy when she sustained significant injuries during her collegiate career. After finding success with a treatment approach termed Postural Restoration, Lisa decided to attend physical therapy school. She received her Doctorate of Physical Therapy from the University of Nebraska Medical Center in 2005. Following her training, she went to work at the Hruska Clinic for four years, and then accepted an opportunity to practice at the Rejuvenation Center in Omaha. Lisa joined Crossroads Physical Therapy in 2011.

Lisa has been certified in using Postural Restoration techniques since 2008. Lisa has been a consultant to several university sports medicine departments and authored numerous articles regarding biomechanics and preventative training strategies.

I originally came to Nebraska because of Terry Pettit and Nebraska Volleyball. I was a member of the 95, 96, and 97 teams. I got injured very badly and that's how I became interested in pursuing a career as a physical therapist.

Today a large part of my clientele are high school and collegiate athletes (various sports including volleyball)… some of them are rehabilitating, but many of them are “pre-habing”. In other words they are coming to me to learn preventative training strategies- their goal is to get stronger, faster, and not get injured.

My goal for this article is to breakdown for you all the correct muscle mechanics of a healthy volleyball shoulder. I will explain and demonstrate what a volleyball shoulder needs to do to stay healthy, instruct/demonstrate safe and effective exercise and explain which exercises and muscles you need to use sparingly or avoid all together.

The ideal sports training environment

In an ideal situation, preventative training strategies and sports conditioning should meld together as one entity.

How do we accomplish both?

1.) Make the exercises functional - at least some of them should somewhat resemble the movements made in volleyball.

2.) Conditioning sessions should be similar to sports practice.
   a. Fundamentals (passing, serving, blocking)
   b. Scrimmage (create various game like situations)
      (you need to teach your volleyball players muscle fundamentals before you have them do exercises “that put it all together”)

3.) Identify good muscles from the bad
a. Which muscles when overused can predispose our young people to injury.
b. Which muscles foster healthy shoulder mechanics.

What Must A Volleyball Shoulder Do?

#1 The volleyball athlete must be able to get their hand above their head. This sounds obvious but it is an important consideration. (Sounds obvious, right?)
It’s a triplanar function that is fairly biomechanically complicated but it could be summed up with one word - Abduction. The movement of a part of the body away from the midline of the body. The arm, in abductions is raised away from the center of the body.

#2 The volleyball shoulder must Rotate. The movement of a part of the body turning on its longitudinal axis. The arm, our example, joins the palm of the hand in illustrating this motion; the palm turns on its longitudinal axis and turns upward with the forearm in supination or downward in pronation.
Once the arm is overhead (abducted), it must externally rotate and extend (to cock the arm back), followed by powerful internal rotation.

The Good Muscles - What are the key muscles that allow for healthy abduction and rotation?

#1 Subscapularis
It maintains the flexibility of the posterior rotator cuff and posterior shoulder capsule (why is this so important?) It prevents abnormal and excessive force via the anterior shoulder- specifically the biceps tendon and labrum. It is the most important shoulder internal rotator.

#2 Triceps
It does more than straighten the elbow. It helps extend the shoulder. It has a big attachment to the shoulder blade (helps oppose anterior chest wall and biceps.)

#3 Posterior Deltoid/Lower Trapezius
Its like the glut max of the shoulder complex -the big gun. It’s the most important external rotator. It cocks the shoulder back- concentric. It helps slow internal rotation - eccentric

#4 Serratus Anterior
Known as the “boxer muscle” but in volleyball this has major implications for blocking because it improves an athletes ability to reach over and seal the net. It helps to push the shoulder blade up when they abduct.

The Bad Muscles - What are the muscles that can rob the shoulder of healthy range of motion?

#1 Latissimus - This is the big problem child.

Part 1 - Latissimus is a huge powerful adductor- the opposite of abduction. The raised arm is moved down toward the midline of the body. It pulls the arm down to the body or the body up to the arm. This action describes two of the trendiest exercises we are all doing today; pulldowns and pull ups. This is exactly the opposite of what a volleyball shoulder must do.

Part 2 - Latissimus is also a powerful internal rotator of the shoulder. How does it do this? The lat insertion is on the front of the arm- lower than subscapularis. The problem- if the lat gets too tight it can actually translate/pull the ball of the shoulder socket forward. This create a domino effect. The shoulder joint loses passive range of motion in two very important directions, abduction and internal rotation. This changes the position and mechanical advantage of the entire shoulder girdle. Most effected is subscapularis and its ability to internally rotate the shoulder and keep the posterior shoulder flexible. A healthy shoulder should have at least 50 degrees of internal rotation, 60-70 would be even better. Without normal internal rotation the external rotators can not function correctly to slow down the attack arm. The biceps attempts to do this. This frequently evolves into bicipital tendonitis which can unfortunately lead to a labrum tear (SLAP lesion).
#2 Chest muscles/Pecs - Together the pec major and latissimus are the largest adductor/extensor muscles.

The Pec major has a large attachment to the clavicle. It can cause a rounded shoulder posture which feeds the latissimus overuse problem. You must develop strength in the opposing muscles before you start full body lifts such as the bench press.

Exercises to use sparingly or avoid

- Pull ups
- Pull downs
- Burpees
- Push- ups
- Biceps curls
- Bench press

Menu of Exercises:

Presented and demonstrated are the "fundamental exercises" developing the four key muscle areas of a healthy shoulder.

1.) Subscapularis - Pool noodle ball drops with spin ins
2.) Triceps - Back lying dumbbell press
3.) Posterior deltoid - Pool noodle spin backs –resisted
4.) Serratus anterior
   - Rocker board
   - Back lying mini punches

Once you have laid a base the key is to integrate exercises that put it all together. Integration not isolation. This is critical bringing the shoulder in concert with the rest of the body. Presented will be four additional exercises.

1.) Standing IR & ER – Resisted
2.) Dumbbell Shoulder Press
3.) Modified Plank
4.) Standing D2 Flexion – Resisted

The final take away is to ask yourself the following questions:

- What muscle or muscles am I targeting with this exercise?
- Is this exercise functional for the sport of volleyball?
- Do I have any rotation and abduction exercises in my program?
Here are the “fundamental” exercises for the key volleyball muscles. This lays a base

1.) **Subscapularis** - Pool noodle ball drops with spin Ins
2.) **Triceps** - Backlying dumbbell press
3.) **Posterior Deltoid** - Pool noodle spin backs -resisted
4.) **Serratus**
   a. Rockerboard
   b. Backlying mini punches

Once you have laid a base the key is to integrate exercises that put it all together. Integration not isolation. This is critical bringing the shoulder in concert with the rest of the body. Presented will be four additional "put it together" exercises.

The “put it together” exercises for the volleyball player

1.) **Standing resisted IR/ER**
   30/90 degrees of abduction
   Can be done with a partner
2.) **Dumbbell Shoulder Press**
   a. Low weight/High reps
   b. Alternate arms so the abs engage
3.) **Modified Plank**
   a. Hands On (NOT forearms)
   b. Dip Option
   c. Walk Up Option
4.) **Standing D2 Flexion -Resisted**

The final take away is to ask yourself the following questions:
• What muscle or muscles am I targeting with this exercise?
• Is this exercise functional for the sport of volleyball?
• Do I have any rotation and abduction exercises in my program?
• Remember that you are coaching an immature muscular-skeletal system in many cases.
• Be careful of the extreme workout-boot camp mentality.
• Teach muscle fundamentals first and gradually build from a solid foundation.

More Information Please!
Lisa will be presenting this information at the AVCA Convention in Kansas City. Mark on your calendar- Friday, December 15  11:45 – 12:45 p.m. Don't miss it.
Can't make it to Kansas City? You can get the video of Lisa's presentation from: [GlazierVolleyballClinics.com](https://GlazierVolleyballClinics.com)
Contact Lisa at: [lisa_bartels@hotmail.com](mailto:lisa_bartels@hotmail.com)