



## ***The VIP Program: Volleyball Injury Prevention***

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DANIEL P. BOCKMANN, DC, CSCS - MICHAELA SETTLEMEYER, CSCS

This prevention program consists of a warm-up, strengthening, dynamic mobility, plyometric and flexibility training components to address potential deficits in the strength and coordination of the stabilizing muscles of the knee, as well as upper and lower extremities and trunk. While it is specifically tailored for volleyball athletes, these preparation principles apply equally well to other sports.

It is important to note that sports injuries can be caused either by functional problems (poor conditioning, coordination or biomechanics) or by technique problems (poor fundamental performance of the sport). This program is designed to reduce injury and improve performance by eliminating the functional problems side of the equation. Fundamental techniques for each sport must still be employed to optimize injury prevention and performance.

As regards anterior cruciate ligament (ACL) injury specifically, coaches and trainers should also continue to enforce good jump/landing technique to reduce tibial shear forces, namely:

- 1) Jump straight up (no broad jumping)
- 2) Land on your toes, not your heels
- 3) Bend your knees deeply on landings

Employing these techniques alone has been shown to reduce shear forces in the knee by 56%, significantly reducing ACL ligament strain. (*Alterations to movement mechanics can greatly reduce anterior cruciate ligament loading without reducing performance*, Journal of Biomechanics, Myers/Hawkins 19 Oct 2010)

A standard approach to addressing ACL injuries has been to put athletes through a multi-week series of “camps” where the athlete progresses through a preventative rehab or “prehab” strengthening program in the off-season in the hopes of preventing injuries during the regular season. The inherent problem with this approach is athlete compliance once the camp is completed. Unless the athlete continues the prehab program throughout the season, the preventative benefits they received from the camp diminish quite quickly.

Rather than addressing ACL injury prevention in one lengthy camp, the Volleyball Injury Prevention (VIP) program provides a very brief, easily administered and comprehensive program that can be performed immediately before each practice and game, throughout the season.

By adding the VIP Program as a pre-play warm-up, any athletic program gains both a performance warm-up and a powerful injury prevention program, at little or no additional time expense.

This program should be completed 3 times a week, and is suitable for athletes that are 12 or over. Do not perform single leg plyometrics with younger athletes until they demonstrate substantial control of the movements.

The pre-play portion of this injury prevention program (Sections 1 – 4) can be performed in less than 10 minutes, and the post-play portion (Section 5) can be completed in 5 minutes, though the first session may take slightly longer as you acquaint yourself with the movements and

transitions. Next to each drill you'll see estimated time requirements for that activity, which will help keep your warm-up on a timely schedule. Minimize downtime between drills to maintain elevated heart rate and thus maximize the benefits of the warm-up.

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## Section 1: Warm-Up

The warm-up is a low intensity introduction to movement, designed to increase blood flow to the muscles involved in the sport you're about to play. Warmer muscles are more elastic and less prone to tear, and these movements help to refamiliarize your body with your sport.

**A. Jog out, backpedal back:** Elapsed time: 0 – 30 seconds

(side to side on volleyball court – 9 meters)

Purpose: Low intensity, safe introduction to running before play.

Instruction: Stay on balls of feet during jog, keeping hip/knee/ankle in straight alignment without the knee caving in or the feet whipping out to the side. Extend back from the hip during backpedal with your glutes, rather than just bending at the knees.

5 UP & BACKS

**B. Scissor line jumps:** Elapsed time: 30 – 45 seconds

(Standing on sideline)

Purpose: To increase circulation and heart rate, warm ankles and calves.

Instruction: Small jumps in place, alternating right foot front/left foot back and left foot front/right foot back. Stay on balls of the feet, keeping ground contact brief.

15 SECONDS

**C. Sagittal line jumps -> hops:** Elapsed time: 45 seconds –

1:30

(Standing on sideline)

Purpose: To increase circulation and heart rate, warming ankles and calves.

Instruction: 15 seconds of small jumps (both feet) front & back over the line, keeping feet shoulder width apart, progressing to front & back hops (one foot), 15 seconds each leg.

45 SECONDS

**D. Frontal line jumps -> hops:** Elapsed time: 1:30 – 2:15

(Standing on sideline)

Purpose: To increase circulation and heart rate, warming ankles and calves.

Instruction: 15 seconds of small jumps (both feet) left & right over the line, keeping feet shoulder width apart, progressing to left & right hops (one foot), 15 seconds each leg.

45 SECONDS

**E. Heel/toe raises with Dragonflies:** Elapsed time: 2:15 – 2:30

(Standing on sideline)

Purpose: Muscle activation of shins, calves and shoulders.

Instruction: Feet shoulder-width apart and arms raised to the sides at shoulder height with palms forward. Rocking body weight forward and back from heels into toe raises, while performing small up & down pulses with the arms and keeping shoulder blades pinched together.

15 SECONDS

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## Section 2: Strengthening

This portion of the program is designed to strengthen the muscles that stabilize and support the hip, knee and ankle, as well as the shoulders and core. These exercises get progressively more intense, therefore attention to technique is especially important to ensure the success and safety of the athletes.

### A. Air squats:

Elapsed time: 2:30 – 2:45

(Standing on sideline)

Purpose: Muscle activation of quads and glutes .

Instruction: Start with feet shoulder-width apart and arms raised to shoulder height in front of you. Lower smoothly into a parallel squat, keeping knees from buckling inward and keeping them behind your toes, as well as keeping chest up and butt out.

15 SECONDS

### B. Good mornings:

Elapsed time: 2:45 – 3:15

(Standing on sideline)

Purpose: Muscle activation of glutes, hamstrings, calves and back.

Instruction: Start with feet shoulder-width apart, hands on hips, butt out and knees slightly unlocked. Keeping the upper body in the same position and eyes forward, push hips back until a stretch is felt in the hamstrings, then return to starting position.

30 SECONDS

### C. Single-leg Romanian Deadlifts (RDLs):

Elapsed time: 3:15 – 3:45

(Standing on sideline)

Purpose: Muscle activation of glutes, back, hamstring and hip stabilizers.

Instruction: Start standing on one foot with arms raised to the side at shoulder height and palms forward. Keeping opposite leg straight, raise it behind you as high as possible, allowing the torso to tilt forward, while keeping the leg in line with the torso. Then return to starting position.

15 SECONDS EACH LEG

### D. Wall angels:

Elapsed time: 3:45 – 4:00

(Standing on sideline)

Purpose: Muscle activation of rotator cuff and shoulder girdle.

Instruction: Stand with elbows at shoulder height. Keeping forearms vertical, pull them back as far as tolerated. Maintaining vertical position of forearms, reach upward and actively push toward the ceiling. Then lower elbows to the sides while keeping shoulder blades pinched.

15 SECONDS

### E. Hand plank rotations:

Elapsed time: 4:00 – 4:30

(“Up” push-up position on sideline)

Purpose: Muscle activation of pecs, core and shoulder girdle.

Instruction: Start in “up” push-up position with shoulders directly over hands and body in a straight line. Rotate shoulders around hands clockwise for 15 seconds while maintaining body position. Repeat in counter-clockwise direction.

15 SECONDS EACH DIRECTION

## Section 3: Transit Dynamic Mobility

Transit dynamic mobility involves performing momentum-based movements designed to challenge the physical limits of the tissues involved. This increases the muscles' and joints' ability to tolerate the types of forces exerted on the body in volleyball. Unlike static "stretch-and-hold"-type stretches, dynamic mobility movements are released immediately, which mimics the way these movements occur in sport.

### A. **Quad stretch walk:**

Elapsed time: 4:30 – 4:45

(Sideline to sideline)

Purpose: To prepare quad and hip flexors for dynamic loading during play.

Instruction: Pull foot to buttock by grasping laces with same-side hand and keeping knee pointing toward the ground, then release and step forward. Alternate this pattern while striding across the court.

15 SECONDS

### B. **Butt kickers:**

Elapsed time: 4:45 – 5:00

(Sideline to sideline)

Purpose: To prepare hamstrings and glutes for dynamic loading during play.

Instruction: Actively "kick" one foot toward the same side buttock, attempting to make contact with the buttock, then release the contraction while stepping forward. Alternate this pattern while striding across the court.

15 SECONDS

### C. **Straight-leg march:**

Elapsed time: 5:00 – 5:15

(Sideline to sideline)

Purpose: To prepare hamstrings and hip flexors for dynamic loading during play.

Instruction: Raise one leg in front of you as high as possible while keeping both knees locked and torso upright, then lower the leg, alternating this pattern while striding across the court.

15 SECONDS

### D. **High-knees:**

Elapsed time: 5:15 - 5:30

(Sideline to sideline)

Purpose: To prepare quads, hip flexors and calves for dynamic loading during play.

Instruction: Raise one bent knee quickly as high as possible while keeping torso upright, then lower the leg, alternating this pattern while striding across the court.

15 SECONDS

### E. **Elbow-to-instep**

Elapsed time: 5:30 – 5:45

(Sideline to sideline)

Purpose: To prepare groin, hip flexors and glutes for dynamic load during play.

Instruction: Take largest possible step forward and place hands on floor, inside the foot and knee. Keeping heel flat on the ground and back leg straight, attempt to lower elbow to the instep of the forward foot.

15 SECONDS

### F. **Heel walk with T-swing**

Elapsed time: 5:45 – 6:00

(Sideline to sideline)

Purpose: To prepare the lower legs, shoulders and chest for dynamic loading during play.

Instruction: Walk on heels while maintaining a straight body line (hips in line with body). Raise straightened arms up to shoulder height with palms up, then swing them across the body and back, maintaining the same height, while walking on heels.

15 SECONDS

**G. Toe walk with I-swing**

Elapsed time: 6:00 – 6:15

(Sideline to sideline)

Purpose: To prepare calves, shoulders and lats for dynamic loading during play.

Instruction: Keeping arms straight, swing them up above the head, then down past the sides (in an “I” pattern) while walking across the court on toes.

15 SECONDS

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SECTION 4: PLYOMETRICS

Plyometrics are exercises designed to improve speed and power, thus enhancing athletic performance. Utilizing plyometrics in the warm-up continues the progression of steadily increasing muscle activation, and familiarizes the athlete with explosive movements before the start of play.

**A. Squat jumps – quarter, half, full**

Elapsed time: 6:15 – 6:30

(Sideline to sideline)

Purpose: Activate quads, glutes, calves and prepare them for performance-level exertion.

Instruction: Pushing hips back and keeping weight on heels, reach arms back and lower body into a quarter-depth squat. Continuously jump out of a quarter squat for 5 seconds, then seamlessly transition to a half-depth squat for 5 seconds, then a full-depth squat for 5 seconds.

15 TOTAL SECONDS

**B. Low shuffle**

Elapsed time: 6:30 – 6:40

(Sideline to sideline)

Purpose: Prepare legs for the dynamic lateral movement needed during play and bring them to optimal performance level.

Instruction: Start on sideline facing the net. Lower the hips into low defensive position with weight on the balls of the feet. Pushing with trailing leg and maintaining a low position, shuffle across to opposite sideline and return.

10 SECONDS

**C. High skips**

Elapsed time: 6:40 – 6:50

(Sideline to sideline)

Purpose: Prepare legs for the dynamic linear movements needed during play and bring them to optimal performance level.

Instruction: Starting on sideline, hop from one foot as high as possible while driving the opposite knee upward to gain height, then land on the launch foot; immediately perform the same action on the opposite side. Continue across the court and return.

10 SECONDS

**D. Lateral bound**

Elapsed time: 6:50 – 7:05

(Sideline to sideline)

Purpose: Prepare legs for the dynamic lateral movements and power needed during play.

Instruction: Start on sideline facing the net. Raise inside foot and leap from outside foot as far laterally as possible, landing on inside foot only. Immediately load and leap back to the original foot. Repeat alternating lateral bounds.

15 SECONDS

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## SECTION 5: STATIC STRETCHING

*(NOTE: ONLY PERFORM THIS SECTION AFTER PLAY IS COMPLETED)*

Static stretching should only be performed if the range of motion (ROM) at a particular joint is limited. Should optimal ROM exist, the respective stretch is unnecessary and should not be performed.

Should specific ROM deficits exist, perform the corresponding stretch for that body part after practice or competitive play is completed – not as a part of the warm-up. This ensures a safer and more effective stretch while tissues are warm and elastic, as well as prevents the decrease of power and explosiveness caused by pre-play static stretches.

### **A. Partner external rotation / pectoral stretch**

Purpose: Release pecs and internal rotators to combat forward shoulder “roll”, promoting enhanced power development and lower incidence of injury.

Instruction:

Partner 1 (P1): Seated on ground. Raise elbows to shoulder height at the sides, keeping forearms vertical and elbows at 90 degrees.

Partner 2 (P2): Stand behind P1 and grasp wrists while placing knee between shoulder blades. Gently pull the wrists backward until a significant but painless stretch is communicated by P1. Hold for 30 seconds. Release, then perform stretch on P2.

1 MINUTE

### **B. Supine hamstring stretch**

Purpose: Lengthen hamstrings to allow optimal range of motion in hips, pelvis and back, promoting enhanced power development and lower incidence of injury.

Instruction:

Start lying on back. Raise leg and interlace fingers behind bent knee, keeping opposite knee locked and flat on floor. Slowly straighten the raised leg by contracting the quad, flexing the toe toward the shin. Approach ROM tolerance gradually and hold at maximum tolerated angle (but no greater than 90 degrees) for 30 seconds. Repeat on other side.

1 MINUTE

### **C. Partner prone quad stretch**

Purpose: Lengthen quadriceps to allow optimal ROM in hips and knees, promoting enhanced power development and lower incidence of injury.

Instruction:

P1: Lay on stomach.

P2: Grasp partner’s ankle and press the heel toward the buttock. Approach ROM tolerance gradually as guided by P1, then hold at maximum tolerated angle for 30 seconds.

1 MINUTE

### **D. Calf stretch on wall**

Purpose: Lengthen gastrocnemius and soleus muscles to allow optimal ROM in the knees and ankles, promoting enhanced power development and lower incidence of injury.

Instruction: Start with one heel on the floor and toe angled upward (toward the shin) against the wall. Keeping knee locked, push hips forward toward the wall and hold at the maximum tolerated angle for 30 seconds, to address the gastrocnemius. Repeat with a bent knee to target the soleus. Repeat on other side.

2 MINUTES