

Comprehensive Jump Training Program for Minimizing ACL Injuries in Volleyball Players

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INTRODUCTION

What is an ACL? An ACL, anterior cruciate ligament, is a ligament located within the knee joint that connects the femur to the tibia. The ACL's main purpose is to provide stabilization for the knee joint during movement.

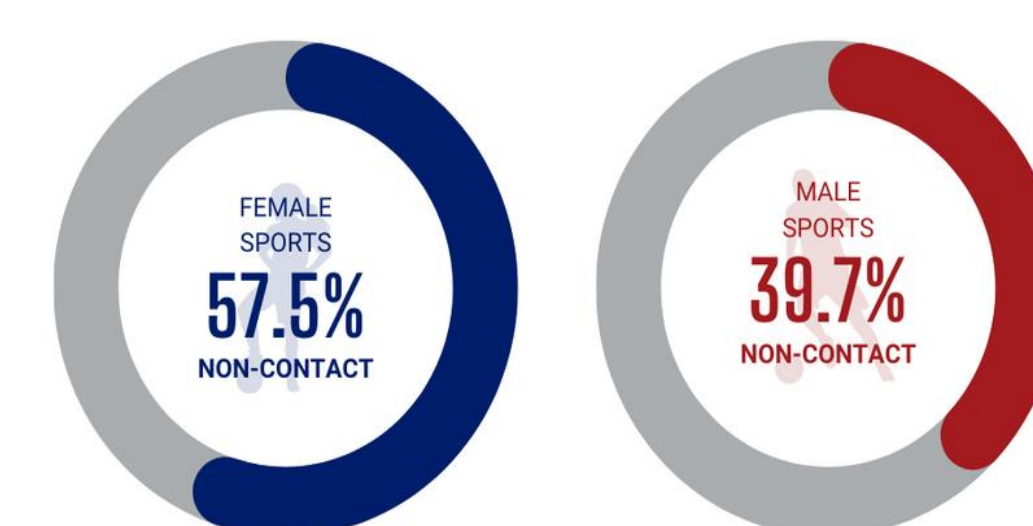


What is an ACL injury?

- Grade 1: Mild damage—ACL is slightly stretched but still offers support & stabilization.
- Grade 2: ACL is slightly stretched & partially torn (rare injury).
- Grade 3: ACL is completely torn—offers no support or stability to the joint.

Approximately 9% of females who play high school volleyball have reported an ACL injury (Joseph, 2013).

ACL INJURY MECHANISM



What can be done to prevent this issue? Healthy eating habits and performing exercises that strength your muscles are beneficial; however, the most beneficial way to prevent ACL injuries is efficient practice strategies that teach proper techniques.

Why are women affected more by ACL injuries than men? ACL injuries are more commonly seen in females rather than males. This is mainly due to different landing biomechanics and the genetic composition of a female's body (Montalvo 2019).

RESEARCH OBJECTIVE

The primary purpose of this research is to propose motor control-based volleyball-specific skills:

1) That promote proper landing techniques.

2) That may minimize the chances of ACL injuries within athletes.

3) That may be incorporated into regular volleyball practices.

4) That can be used by athletes of any age.

FINDINGS & DISCUSSION

Practice Drills to Prevent ACL Injury

External Focus of Control: Focus on the Effects of the Movement (Ericksen, 2024)

- Equipment needed: Two cones (1.5-2 ft)
- Drill: The cones will be placed about 3 feet apart. The player will perform their normal volleyball approach and landing; however, their hands will have to touch the top of the cones as they land. This will cause them to engage their core and have a slight bend in their knees. Landing with slightly bent knees and a tight core will benefit their knee joint and prevent ACL injury.



Augmented Feedback: Knowledge of Results and Knowledge of Performance (Petancevski, 2022)

- Equipment needed: Force/motion sensor
- The athlete will wear a motion/force sensor tracker to test their landing force and alignment when they are landing on the ground. The athlete should be landing very lightly on the ground to prevent too much force on the knee joint. The athlete will perform their approach and then focus on landing softly with a slight bend in their knees. The athlete will be able to see the results from the motion sensor. They will be provided with knowledge of results (the degree of achievement) and knowledge of performance (feedback providing information about the quality of the movement).



Random Practice: Different Tasks Performed in No Particular Order (Gill, 2018)

- This drill works on the athlete's ability to land properly in different situations within a volleyball game. The coach will be at the opposite side of the net as the athlete, and they will be yelling many different variations/skills for the athlete to perform. For example, "middle block", "outside approach", "right back approach", "right block", etc. The player will begin to get fatigued, but they should still work on using their correct form because this is how it will be in a real game—fatigue should not result to laziness. The randomization allows for better long-term effects in the athlete.



The techniques outlined above were created to promote proper landing techniques in volleyball players. These volleyball-specific techniques are based on motor control principles that are well-investigated and are used to promote fast and efficient learning of motor skills. These have been adapted to volleyball specifically so that coaches may incorporate them into normal practice strategies. The use of these techniques may help reduce ACL injuries, which are extremely common in volleyball. These techniques are sustainable for athletes of all ages and can be modified for other jumping sports, like basketball.

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