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## **Project HardCORE**

*A sports injury prevention program aimed at young female volleyball players in the Southern California Volleyball Club (SCVC) to help reduce risks for sports-related injuries from high intensity and duration repetitive jumps and landings using evidence-based strength training, balance, and coordination training protocols.*

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## **I. Executive Summary:**

Young female volleyball players are at higher risks for sports-related injuries from their young male counterparts largely due to disparities in strength, coordination, and balance. These disparities cannot be entirely attributed to gender. There is evidence to suggest that in landings, male and females employ similar landing strategies and avoid landing techniques that are associated with injuries (one foot landings). Therefore, the mechanisms that allow males to resist injury in volleyball are attributed to physiological characteristics such as muscular strength, balance, and coordination. By providing balance-specific, coordination specific, and strength-specific exercises to young female volleyball players, it is very likely that the disparities in injury incidence rates to lower to those of young male volleyball players.

Project HardCORE's long-term goal is to reduce the incidence of sports-related injury and improve athletic performance in young female volleyball players who are part of the Southern California Volleyball Club (SCVC) throughout their junior volleyball career. Our objective is to supply evidence-based strength, balance, and coordination training specific to female volleyball athletes and educate coaches on sport-specific training. The risks to injury are real and make the adoption of this program imperative to a high quality volleyball experience. The average cost of ACL tear reconstruction surgery ranges from \$35,000 to \$50,000 per surgery and the latest epidemiological records suggest .07 to .31 ACL injuries per 1000 jumps – meaning for every 100,000 jumps there are 7 – 31 ACL injuries that occur. The average 1.5-hour practice bout consists of 150-400 jumps depending on the position of the athlete. Our mission at the USC Biomechanics Research Lab includes studying human motion as well as disseminating and integrating the research findings to help various vulnerable populations prevent injury and increase the quality of life. We are extremely qualified as we use science to support our findings and validate our findings before subjecting athletes to any type of training programs. Other programs currently on the market do not tailor their programs to the athletes they work with and may very well cause maladaptive training techniques and may hinder the success of your child in subsequent volleyball learning experiences. We have partnered with USC Athletics in studying elite volleyball athletes and assess their club experiences with respect to their health histories and currently study and implement new biomechanically validated training protocols with success at the competitive and health fields.

**Objective #1: Female athletes enrolled in Project HardCORE will be able to identify proper core strengthening techniques and exercises and perform these exercise on their own.**

We will provide training on core activation prior to engaging in any core strengthening exercises. The primary focus will be on internal and external oblique activation that will be evaluated by tactile palpation in the plank form. Core strength will be evaluated by a timed prone plank, which will be verified by videotape recordings. Throughout the program, we will implement Pilates/yoga inspired exercises and will stress core activation in volleyball related tasks with medicine balls.

**Objective #2: Participants will demonstrate improved static and dynamic balance after practicing core activation prior to executing ball absorption/ball attacking techniques.**

We will provide training with single leg exercises to improve neuromuscular connections, improved ground recovery skills. Evaluation will consist of closed-eye stance exercises on hard floor and uneven surfaces much like concussion testing.

**Objective #3: Injury rates of those in Project HardCORE will decrease when compared to national rates.**

We can track this by having the coaches note injuries and observing playing activity at weekend tournaments. Follow-up questionnaires will be sent to participants throughout the program as a form of process evaluation. Serve speeds/attack speeds will be assessed using radar guns and ball suspension apparatuses to assess improvement.

We believe that Project HardCORE will best accomplish these objectives based on our access to specialized equipment and staffs to best maximize the club volleyball experience. Project HardCORE addresses the critical need of a specialized and tailored strength and conditioning program to young female volleyball athletes without the use of bulky machines and danger to weight room-derived injuries. Project HardCORE also serves the critical need to reduce risks to injury by modifying exercises like plyometrics in efforts to reduce any more jumping that will occur in practices following the sessions. This program is unique in that it is based on evidence from prior biomechanics programs we have implemented in the past.

## **II. Project Description**

### **a. Statement of Need**

### **b. Goals/Objectives/Activities**

### **c. Evaluation Plan**

### **d. Sustainability**