
The Features Of Collegiate Volleyball Player

Volleyball is a sport played with two teams consisting of six players on each side of the court divided by a net. The players use their hands to hit the ball back and forth over the net until it cannot be hit by the opposing team and hits the floor or goes out of bounds. This report will be analyzing a freshman female athlete playing volleyball at the collegiate level. The athlete has been playing volleyball for seven years, consisting of club and high school volleyball, has four years of experience with resistance training, and possesses skill in performance of free weight and machine exercises. A specialized strength and conditioning program would be beneficial for this athlete because it would focus on the improvement of strength, speed, and power as well as endurance to perform at a high level for a long period of time. Improving upon these qualities will give this athlete the best chance of becoming an overall better player.

Movement Analysis

Volleyball consists of many skills and movements such as setting, serving, spiking, passing, etc. The skill that will be broken down in this paper is the spike. A spike: "is a specific skill of volleyball with high coordinative demands that is characterized by several phases: a run, the countermovement jump, a set of explosive overhead actions in the air, and a landing phase" (Oliveira, Moura, Rodacki, Tilp, & Okazi, 2020). Focusing specifically on the overhead actions, the primary muscles involved in this movement are the teres minor, infraspinatus, supraspinatus, and anterior deltoid. These muscles are used to hold the humerus in place while performing the overhead movement (Rokito, Jobe, Pink, Perry, & Brault). For the running, countermovement jump, and landing phase the primary muscles used are the glutes, hamstrings, quadriceps, and calves (Maughan & Shirreffs, 2017).

When performing the movement of a spike, the athlete will flex the hip, knee, ankle, elbow, and shoulder joints when going into a squat stance and then move into extending those joints and propelling their body upwards. The arms will swing forward when jumping up and the shoulders and elbows will be extended overhead. When cocking the arm back, the shoulder will slightly abduct and externally rotate, the elbow will be flexed, and then move into full extension when performing the hit of the ball. The planes this movement occurs in are the sagittal plane when performing flexion and extension of the joints, frontal plane with adduction of the shoulder, and the transverse plane when externally rotating the shoulder (Haff & Triplett, 2016, p.26).

The two main factors to focus on when analyzing a spike are the trajectory and the velocity (Ferris, Signorile, & Caruso, 1996). In a study conducted at the University of Leige, it was found that the height that the player contacts the ball significantly effects the velocity of the spike. Athletes that are able to vertically jump higher will be able to produce a greater velocity when hitting the ball (Forthomme, Croisier, Ciccarone, Crielaard, & Cloes, 2005). In order to increase the velocity of the spike, the athlete would need to improve on their vertical jump height by prioritizing training that works on strength and power.

Physiological Analysis

The ability of a volleyball player to exhibit power, speed, and agility throughout a game is

imperative. Volleyball is considered both anaerobic and aerobic. The primary energy system utilized by a volleyball player is the ATP-PC system along with some use of glycolysis (Maughan & Shirreffs, 2017). The ATP-PC system, or phosphagen system, is utilized for high-intensity movements and relies on the breakdown of ATP and creatine phosphate for energy. Glycolysis involves the use of carbohydrates to resynthesize ATP in the body (Haff & Triplett, 2016, p.46). It is important to train the anaerobic system to be able to perform explosive jumps, improve power for attacks and hits, and maintain speed and agility to quickly shift positions on the court. Training the aerobic system is beneficial as well to make sure the athlete is able to perform these skills throughout the entire match with minimal rest.

When implementing a strength training program, an athlete will see improvements in muscular strength, power, and overall performance. In terms of performance, “resistance training has been shown to increase running economy, vertical jump, and sprint speed” which are all beneficial for a volleyball player (Haff & Triplett, 2016, p.106). It is imperative to increase muscular strength in these athletes because it will result in an increase in muscular force production, and “increasing the strength of a muscle or group of muscles may facilitate an improvement in sporting performance” (Kraemer, Duncan, & Volek, 1998). Including plyometrics in the athlete’s training program would promote an increase in muscle force production and power by incorporating quick and powerful movements that will activate the use of the stretch-shortening cycle. The stretch-shortening cycle can be defined as the “stimulation of the stretch reflex to facilitate a maximal increase in muscle recruitment over a minimal amount of time” (Haff & Triplett, 2016, p.473).

Although the main focus for this athlete would be strength and power, it is important to incorporate aerobic training as well to ensure the athlete can play at her best capacity for the entire duration of a game. One of the benefits an athlete would see from aerobic training would be an increase in their absolute lactate threshold. Increasing the lactate threshold would allow the athlete to be able to perform at a higher intensity for a longer amount of time, such as being able to perform successive vertical jumps throughout an entire match (Haff & Triplett, 2016, p.126).

References

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