

## A STUDY OF TWO KINDS OF ARM-SWINGING MOTION IN THE FRONT SPIKE OF CHINESE WOMEN'S VOLLEYBALL TEAM PLAYERS

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**KEY WORDS:** Chinese Women's Volleyball Team Players, raising spike, swinging spike

**INTRODUCTION:** This study quantitatively analyzed the spiking of the nine main attackers of the Chinese Women's Volleyball Team players in the Eleventh World Women's Volleyball Tournament in Beijing.

**METHODS:** A 200 pictures/second super-speed telecamera and a Japanese NAC movias- 100 a type of film analyzing instrument were used to analyze the acquired data, film resources and the locus pictures of the moving points.

**RESULTS:** The following shows film analysis of spiking actions by the Chinese women volleyball players: Arm-swinging type, Arm-raising type, players, flash speed players flash speed Li 14.26 m/s Sun 13.77 m/s Wang 14.04 m/s Li 13.65 m/s Yang 13.53 m/s Wu 13.27 m/s Lai 12.65 m/s Wang 13.23 m/s Jiang 13.93 m/s V 13.62 m/s V 13.37 m/s

The fastest speed is the action by arm-swinging: 14.26 m/s and its equivalent is 13.62 m/s more than the action by arm-raising:13.37 m/s. And get the electric drawing of muscles of two kinds of arm-swinging motion front spike. (see Figure 4). Chinese women's team players have two ways of spiking: one is the arm-swinging type, and the other is the arm-raising type.

*Arm-swinging type:* After leaping, the spiker's arm first bends naturally to chest height and no higher. Then her elbow turns around the axis of the shoulder joint from the back down position to the front up and accelerates to spike. (See Figure 1. The spiker, Li Yueming, is an international level sports star).

*Arm-raising type:* After leaping, the spiker's elbow first bends naturally towards the backside of the head, then swings around the axis of the shoulder joint and accelerates to spike in the front up direction. (See Figure 2. The spiker, Li Guojun, is an international level sports star).

**CONCLUSIONS:** It is concluded that the swinging spike is smooth and coherent. The spiker can spike while leaping, which brings about a satisfactory spiking speed. Spiking has great concealment and suddenness, and the swinging motion is suitable for a speedy attack. With this type of spiking style the Chinese players create the actions of front-fly, back-fly, and back-slide, resulting in fewer shoulder muscle injuries. (See Figure 3). The raising spike swing is steady and accurate. This brings out in full the spiker's leaping and physical strength. This method of spiking is good for strong attacks and distance attacks. More muscle injuries result from this type of spiking, however. According to a survey of the Chinese Women's Volleyball Team players and players from the Beijing Physical Education Academy, statistics show that when players adopt the arm-raising type, the injury rate of their shoulder muscles is 45%, clearly higher than the action by arm-swinging (35%). So

we suggest that players adopting arm-raising should increase the training of their front tri-muscle part's strength and flexibility. (High-speed film and video recorder films of spiking by Chinese Women's Volleyball Team players can be presented at the conference.)

**REFERENCE:**

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