DIFFERENT TYPES ARM SWING USED IN INDIAN VOLLEYBALL AN EPIDEMIOLOGICAL ANALYSIS

[1]Amritpal Singh Sidhu

[1]Physical Education Teacher, Govt. Model Sen. Sec. School,Sheron (Sunam) Sangrur PB, India

_____

ABSTRACT

Volleyball is of the popular game in India. In past some time Indian teams perform very well at international level very well. Spiking is key factor of scoring in volleyball. Purpose of this study is to identify and quantify the frequency with which a number of different attack spike motions are used by male athletes in a volleyball tournament held at Kerala 2015. Four different swing types have been identified by the researchers for this purpose. Study was conducted on 8 teams. Researcher found that the SA swing type is the most common attack in Indian volleyball pyaers.

Key Words: Volleyball, Epidemiological and Swing.

_____

INTRODUCTION:

Volleyball is one of the most popular games of the world. In India it also became popular from last some decades. Indian volleyball team performs very well at international level from last some couple of years in men section. A number of studies have examined the kinematics of the volleyball spike (,Oka et al., 1975; Maxwell, 1981; Chung, 1989; Rinderu, 1998; Rokito et al., 1998; Chung et al.,1990; Coleman et al., 1993; Christopher, 2001; Marquez et al., 2005, S. amritpal and Deol NS 2010, S. amritpal 2011). However, in all of these studies the spike has been described as occurring roughly within the sagittal plane, the arm swing is such that the ball is contacted directly in front of and above the hitting shoulder. Since the straight ahead hitting motion is similar to the motions studied in other overhead sports such as baseball, football, and javelin it has been the focus of most volleyball-related research and allows comparison with these other sports. The only kinematic data that has been reported concerns attack swings that direct the ball straight ahead, it is probable that other types of swings are used so the attacker can direct the ball and avoid the opposing team's block or defense and thus, increase their chances of scoring. Because attackers need to avoid the opposing team's defense, the variability in the arm motions seen during volleyball spike attack sequences are an essential skill of a successful

attacker. As a result, it is probable that elite level volleyball attackers use arm swings other than the straight ahead swing, the one most commonly reported on in literature. Other arm swings are used to direct the ball either across the athlete's body or away from their midline. These motions are not common in other overhead sports. Researcher tries to find out the pattern of different spiking motions of attacker by Indian volleyball players in men section.

CRITERION MEASURED:

The purpose of this study is to identify and quantify the frequency with which a number of different attack spike motions are used by male athletes in a volleyball tournament. Four different swing types have been identified by the researchers for this purpose:

1. The cross-body (CB) swing, where the arm is horizontally abducted during the acceleration phase so that the ball is contacted medially and anteriorly to the hitting shoulder directing the ball to the side opposite the striking arm.

2. The straight ahead (SA) swing, where the ball is contacted superiorly and slightly anteriorly of the hitting shoulder directing the ball ahead of the athlete.

3. The outside swing without a net present (OS), where the ball is contacted laterally and anteriorly to the hitting shoulder, while the attacker does not need to avoid the net (i.e. when a right handed hitter attacks from the left side of the net, and when a left handed hitter attacks from the right side of the net). This swing directs the ball to the same side as the striking arm.

4. The outside swing with a net present (OSN), where the ball is contacted laterally and anteriorly to the hitting shoulder, while the attacker needs to avoid the net (i.e. when a right handed hitter attacks from the right side of the net, and when a left handed hitter attacks from the left side of the net). This swing also directs the ball to the same side as the striking arm but requires some additional adjustments to avoid contacting the net with the arm.

Although both the N and OI approaches assume a similar attack approach, the angle used during an OI is more acute to the net.

METHODS AND PROCEDURE:

In National games 2015 India men's volleyball tournament were selected for the analysis. All games were recorded with two Panasonic digital video camera with 30 frames per second by the researcher. A total of eight teams were analyzed with a 2 players each team .camera placement was behind one end of the court, between the side-lines, and perpendicular to the net. A total of 18 sets from four matches met these criteria and were used for analysis. Only hits coming from the antennas (positions #2 and #4) would be used (Figure 1). Back court attacks were also not considered.

Figure 1
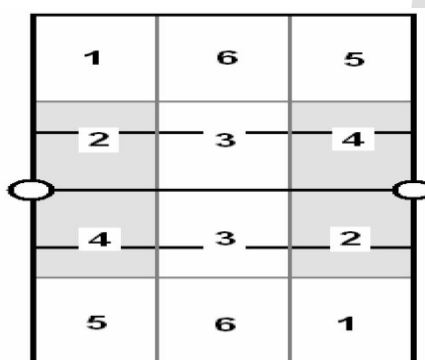
The four swing types previously mentioned (CB, SA, OS, and OSN) were the focus of this study. The protocol used the approach of the athlete before the hit and the resulting ball direction after the hit to determine which of the four swing-types was used, taking into account the handedness of the athlete and the court position from which the attack came.

For each attack coming from position #2 or #4, three pieces of information were recorded. First, the type of approach was defined.

Three approaches were possible:

1. Normal (N) – athlete approached at an angle from outside the court into his attack Position located inside the court (between approximately 45 and 90 degrees to the net).

2. Inside-Out (IO) – athlete approached at an angle that took him away from the middle Of the court, this regularly meant from inside the court towards the outside.

3. Outside-In (OI) – athlete approached at an angle that took him toward the middle of the court at an acute angle to the net (less than 45 degrees).

Second, the direction of the struck ball was recorded. This was done in terms of court location and allowed for three different directions: down the line, cross-court, and sharp cross-court. Because only balls hit from positions #2 and #4 were used, a similar protocol was used for both.

For position #2:

1. Balls hit to positions #4 and #5 were considered down the line.

2. Balls hit to positions #1 and #6 were considered cross-court.

3. Balls hit to position #2 were considered sharp cross-court.

And for position #4:

1. Balls hit to positions #1 and #2 were considered down the line.

2. Balls hit to positions #5 and #6 were considered cross-court.

3. Balls hit to position #4 were considered sharp cross-court.

Table 1 - Table used to determine correct swing-type for each attack sequence. Handedness of athlete and location of hit (positions #2 or #4) used to locate correct box, and approach and ball direction used to determine swing-type. Hit direction is shown in left hand column of each box according to position. R4 – right-handed hitter attacking from position #4, R2 – right-handed hitter attacking from position #2, L4 – left-handed hitter attacking from position #4, L2 – left-handed hitter attacking from position #2, N – normal approach, IO – inside-out approach, OI – outside-in approach, CB – cross body swing, SA – straight ahead swing, OS – outside swing with no net, and OSN – outside swing with net.

R4	N	IO	OI
4 – 1, 2	CB	SA	CB
4 – 5, 6	SA	OS	CB
4 – 4	OS	OS	SA

L4	N	IO	OI
4 – 1, 2	OSN	SA	OSN
4 – 5, 6	SA	CB	OSN
4 – 4	CB	CB	SA

R2	N	IO	OI
2 – 4, 5	OSN	SA	OSN
2 – 1, 6	SA	CB	OSN
2 – 2	CB	CB	SA

L2	N	IO	OI
2 – 4, 5	CB	SA	CB
2 – 1, 6	SA	OS	CB
2 – 2	OS	OS	SA

FINDING AND DISCUSSION:

Table 2 - Means of frequency of hit types per set during the 2015 National games men championship.

SA – straight ahead swing, CB – cross-body swing, OS + OSN – combined outside swing without net and outside swing with net, OS – outside swing without net, and OSN – outside swing with net.

	SA	CB	OS+OSN	OS	OSN
Frequency	7	4	4	3	3

The mean frequencies of hits per set during the 2015 National games Volleyball men Championships were calculated for each of the four swing types identified (Table 1). The straight ahead swing was used more often by the attackers than any other swing per set. The cross body swing occurred significantly more than both of the outside swings but with a similar frequency to the combined outside swings (OS+OSN). Although the results show that the SA swing type is the most common attack, it is clear that a number of different swing types are used (table 2). Likely, elite-level volleyball players use different swing types to increase their chances of scoring.

It is interesting that when combined (OS+OSN); the frequency of outside swings is similar to the frequency of CB swings. This demonstrates that although the SA swing type is most frequently used, elite level volleyball players may hit the ball using either an outside- or cross-body-type swing with a similar frequency. It is possible then that elite players are most comfortable or confident using a SA swing (which is reflected in the frequency with which this swing is used),

IFPRBS

and that swings are used less frequently the further kinematicaly removed they are from this neutral S A swing type

It is somewhat surprising that the OS swing type was used more frequently than the OSN swing type. It was expected that the added attention required making Contact with a ball while not committing a net foul during the OSN swing would make this swing less desirable than the OS swing type, which requires little attention to not commit a net foul. However, it has been proposed that during a cross-body swing, less internal rotation is required which decreases the chances of subacromial impingement and thus pain (Jacobson & Benson, 2001). It is clear that straight ahead swing is finding most in Indian men volleyball followed by cross body swing and then outside swing. More research needs to be conducted on the mechanics used during the full range of swing-types that are used in the sport of volleyball.

References

Christopher, G. A. (2001). Shoulder biomechanics in volleyball spiking: Implications for injuries. Ph.D. Dissertation, Brigham Young University.

Chung, C. (1989). The kinematics and kinetics of the shoulder and elbow joints during the volleyball spike. Proceedings from the International Society of Biomechanics Symposium XII.

Chung, C., Choi, K., & Shin, I. (1990). Three-dimensional kinematics of the striking arm during the volleyball spike. Korean Journal of Sport Science, 2, 124-151.

Coleman, S. G., Benham, A. S., & Northcott, S. R. (1993). A three-dimensional cinematographical analysis of the volleyball spike. Journal of Sports Sciences, 11(4),295-302.

Jacobson, R. P., & Benson, C. J. (2001). Amateur volleyball attackers competing despite shoulder pain: Analysis of play habits, anthropometric data and specific pathologies. Physical Therapy in Sport, 2(3), 112-122.

Maxwell, T. (1981). A cinematographical analysis of the volleyball spike of selected top- calibre female athletes. Volleyball Technical Journal, 7(1), 43-54.

Oka, H., Okamoto, T., & Kumamoto, M. (1975). Electromyographic and cinematographic study of the volleyball spike. In P. V. Komi (Ed.), Biomechanics (V-B ed., pp. 326-331). Baltimore: University Park Press.

Rinderu, E. T. (1998). A biomechanical analysis of the attack strike in the volleyball game. Journal of Biomechanics, 31, 180.

Rokito, A. S., Jobe, F. W., Pink, M. M., Perry, J., & Brault, J. (1998). Electromyographic analysis of shoulder function during the volleyball serve and spike. Journal of Shoulder and Elbow Surgery, 7(3), 256-263.