

## Original Article

### Technical Skills Leading in Winning or Losing Volleyball Matches During Beijing Olympic Games

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#### Abstract:

Volleyball is included in sports where individual success of final efforts such as a successful attack or an effective block, is achieved by the harmonious collaboration of the preceded players' efforts. The purpose of this present study was to evaluate the importance of technical skills that led to the success of the national teams that took part in the Olympic Games of Beijing 2008. The sample was constituted by all the matches of the volleyball men teams that participated in the Beijing Olympic Games. Overall, 29 games were videotaped and evaluated. Collection of data included the use of the statistical recording program Data Volley 2. The parameters that were evaluated were: a) service, b) service reception, c) attack, and d) attack blocked. The statistical treatment of data was realised through non parametric statistical analysis. The results showed that, service points, reception errors, and attacks blocked emerged as important factors that were decisive for winning or losing a match.

**Key-words:** *Olympic Games, Beijing 2008, Volleyball, Non parametric statistics*

#### Introduction

Volleyball is a very popular sport worldwide, with millions of people participating and playing a game at least once a week (Kenny, & Gregory, 2006). High level volleyball athletes are characterized of both trunks' and limbs' high muscle power, as well as increased anaerobic lactacid and anaerobic alactacid capacity (Black, 1999; Cross, 1998). However, a volleyball game might provoke serum enzyme alterations, an indirect evidence of skeletal muscle damage (Mavrovouniotis et al., 2002), through the required repeated sudden, explosive and short attempts, of about 2 to 20 sec duration (Tant, 1997). A careful match attendant can specify certain characteristic phases that are repeated during a game (game episodes), that is, service, reception of service, pass, offence, block, and defense. These phases determine the skills that each player should possess so as to cope with success with the demands of the match (Kollath, 1996).

The block is probably the most difficult skill in volleyball. According to Demerchant (1992), block is more a mental activity rather than a somatic one. When properly structured, it covers a ground region that forces opponent spikers to improvise (Demerchant, 1995). Block is also the "first line" of defense and as for the opponents it is considered a simultaneously defensive and offensive movement aiming to stop the opponent attack and many times to gain a point (George, 1992). Coleman (1992) supports that block constitutes the first important factor of success during a volleyball match, followed by the attack as the second factor. Patsiaouras et al. (2009) investigated 6 national (male) teams at the world volleyball championship 2006, in Japan, and found out that technical elements such as "attack error", "jump services point", "quick ball error", and "jump serves", led to the prediction of the match outcome (winning or losing a match) whereas "attack after reception" and "quick ball attack" emerged as the decisive factors for team qualification.

The key for a successful block is the simplification of its total movement by "reading" the all available elements such as the direction of the opponent spiker, a foreseeing ability that results through experience (George, 1992). On the other hand, many studies report the significant contribution of the setter during a volleyball match, who, in most cases, is considered as the key for the team's victory (Bergeles, 1993; McGown, 1994; Stork, 1992; Zhang, 1996). Due to the fact that the setter is involved in all volleyball skills, he/she should possess all the necessary skills to cope with difficult situations and to predict the strategy that the opponent team intends to develop.

Also, he/she should know the attacking abilities of team's spikers against the opposite block. Knowledge of the opponent side is perhaps the most difficult point of setter's training. Initially he should know which blockers are placed in front of each rotation and how capable they are. Furthermore, he should be in position to neutralize the opponent block by selecting the most suitable pass. Finally, he should communicate with his spikers and regulate the pass according to their needs and the competence of the opponent block (Sprague, 1991).

The main obligation of the setter is to execute first-rate passes, something that requires an amount of abilities. An excellent pass will provide the possibility to the spiker to demonstrate his own abilities with success. In case an excellent pass is achieved the next objective is to learn the setter to pass intelligently, aiming to confront the strong points of the team against the weak points of the opponents and to mislead the block. Moreover, he should provide help to his blockers, so as to act against a single and/or not well structured block (Beal, 1993).

Burton (2009), by using equation technique tried to find in which way most points are gained in a volleyball match. Nevertheless, the statistical technique that he used was quite difficult, based on an increasingly subjective judgment and so far there are no statistical programs available that are reliable enough to help the better evaluation of technical skills. Of course, with the use of this technique somebody could examine players' performance according to their rotation and followingly determine which rotations and technical skills need improvement (Burton, 2009). Nevertheless, it is important to know with which technical elements most points are gained in volleyball matches, plus to realise the existing technical skills' differences between the volleyball national teams that took part in the Olympic Games of Beijing 2008.

Given that some of the above mentioned technical elements are important for the outcome of volleyball matches, the purpose of this present study was to evaluate the importance of technical skills that led to the success of the national men teams that took part in the Olympic Games of Beijing 2008 and to identify statistically significant differences between the participant teams.

## Method

The total number of games videotaped and analyzed were 29 (10 ended 3-0, 34.5%, 13 ended 3-1, 44.8% and 6 ended 3-2, 20.7%). Statistical recording of matches' results was made by using the official statistical logistic package Data Volley 2 Professional of Data Project Sr.I Company (2005) on the behalf of the European Volleyball Confederation (CEV, 2005). Reliability of the study was achieved through inter-observer agreement between the two observers who were expert volleyball coaches with over 10 years of experience and the running head of this research who was also a qualified and experienced volleyball coach. Cohens inter-rater reliability was  $k = .94$  (Paschali et al., 2004; Data Project, 2005) as it was derived from observation using the video of the games, with an inter-observer reliability of at least 80 per cent considered as acceptable (Kazdin, 1992). Observation reliability was checked via Spearman correlation factor, which was found to be high ( $R = .96$ ).

The specific logistic program records only quantitative and not qualitative data, for example, it documents the number of high ball attacks that take place during a match, but not the quality of pass leading to third ball attacks. In other words, the logistic program records all the technical elements that are involved during a volleyball match and groups these elements into basic factors, plus it records all the mistakes and points obtained with the use of the following factors that were evaluated and used for statistical analysis in this study. For this study 3 basic elements were considered that can help mostly a team to win points and consequently a match, that is: a. service (total number of service, point after service execution, services error -point for the opponent), b. service reception (service reception total, excellent service perception service perception error-point for the opponent, point obtained by attack following service reception), c. attack (total attack number, points after attack, attack error-point for the opponent, and d. attack blocked. Additional statistical analysis of the results took place by using the SPSS 15.0 statistical package.

## Statistical Analysis

Descriptive methods of data analysis were included for the purposes of this study. Non-parametric tests (Jonckheere-Terpstra, and Kolmogorov-Smirnov Z test) were used for the statistical analysis regarding winning or losing a match as dependent variables.

## Results

Kolmogorov-Smirnov test showed that the data was normally distributed. Jonckheere-Terpstra test revealed statistically significant differences between the teams winning a match compared to those losing a match for the factors of service points, total reception, reception errors, and attack blocked (2-tailed, Table 1).

**Table 1.** Distribution and factors affecting results.

| Factors              | N  | Kolmogorov-Smirnov |      | J-T    |       |      |
|----------------------|----|--------------------|------|--------|-------|------|
|                      |    | Z                  | p    | M      | SD    | p    |
| Total services       | 58 | 1.31               | .064 | 304    | -1.81 | .070 |
| Service error        | 58 | .53                | .95  | 447.50 | .42   | .67  |
| Service points       | 55 | 1.24               | .092 | 240    | -2.35 | .019 |
| Total receptions     | 58 | 1.18               | .12  | 555    | 2.09  | .036 |
| Reception errors     | 55 | 1.21               | .91  | 519.50 | 2.41  | .016 |
| Reception excellence | 58 | 1.05               | .22  | 300    | -1.88 | .061 |
| Total Attacks        | 58 | .66                | .78  | 484    | .99   | .32  |
| Attack errors        | 58 | 1.18               | .12  | 531.50 | 1.75  | .081 |
| Attacks blocked      | 58 | .65                | .77  | 645.50 | 3.51  | .00  |
| Attack points        | 58 | .39                | .10  | 397.50 | -.36  | .72  |

Furthermore, Monte Carlo sampling method was used for the point estimation of all statistics (1-tailed) and revealed significant differences for total services, excellence of receptions, and attack errors (Table 2).

**Table 2.** Mean and SD of the factors.

| Factors              | N  | Result | M      | SD    | p*   |
|----------------------|----|--------|--------|-------|------|
| Total services       | 58 | win    | 91.28  | 13.40 | .036 |
|                      |    | lost   | 83.17  | 18.25 |      |
| Service error        | 58 | win    | 14.45  | 3.97  | .33  |
|                      |    | lost   | 15.03  | 4.56  |      |
| Service points       | 55 | win    | 5.11   | 2.33  | .009 |
|                      |    | lost   | 3.52   | 1.89  |      |
| Total receptions     | 58 | win    | 68.00  | 16.09 | .018 |
|                      |    | lost   | 76.76  | 11.26 |      |
| Reception errors     | 55 | win    | 3.44   | 1.87  | .006 |
|                      |    | lost   | 5.07   | 2.32  |      |
| Reception excellence | 58 | win    | 51.79  | 7.84  | .029 |
|                      |    | lost   | 47.48  | 7.47  |      |
| Total Attacks        | 58 | win    | 96.55  | 20.89 | .16  |
|                      |    | lost   | 101.48 | 19.26 |      |
| Attack errors        | 58 | win    | 7.31   | 2.97  | .042 |
|                      |    | lost   | 8.59   | 2.60  |      |
| Attacks blocked      | 58 | win    | 7.48   | 3.95  | .00  |
|                      |    | lost   | 11.31  | 3.87  |      |
| Attack points        | 58 | win    | 50.10  | 9.56  | .36  |
|                      |    | lost   | 48.45  | 11.14 |      |

\* Monte Carlo analysis based on 1-tailed test of significance.

**Discussion**

The purpose of the present study was to examine the technical elements that emerge as important factors for a match result during the Olympic games of Beijing 2008. Non parametric test analysis showed that teams that won a match exhibited significantly more total services, service points, reception excellence and total number of receptions, but less reception errors, less attack errors and less attacks blocked compared to their opponent teams that lost the match.

Block did emerge as a significant factor of the final outcome, a finding that is in agreement with Palao et al. (2004). It seems that attacks block creates certain games situations that causes great obstacles to the opponent team to defend appropriately and counterattack.

Reception errors and service points are very close in terms of degree of significance of winning or losing a match, a finding that implies their straight relation. A higher number of total receptions during a match demonstrate a team that struggles to defend efficiently against a team that executes good services, leading to the adoption of defensive play that reduces the possibilities to win the match. Although not strictly connected, total successful services and reception excellence indicate a high performance team with players having the ability to execute difficult for the opponent services maximizing in this way the possibilities to perfectly receive a weaker attack. Moreover, an interesting finding is that a higher number of total attacks characterized losing teams that participated in the Olympic games of Beijing 2008. Instead, less attack errors was a decisive factor for winning teams that chose attack accuracy with less errors and not a shallow performance based on many non functional attacks. Consequently, coaches should always advice and remind athletes during a game not to act with enthusiasm, rather to remain focused and pay the necessary attention to proper technical execution of attacking efforts, in agreement with Zetou et al. (2007).

Interesting is the fact that counterattack did not constitute a decisive factor for a match result as it was, also, noted by the previous studies of Zetou et al. (2006), Zetou et al. (2007), and Charitonidis et al. (2007), nor did attack that follows service reception emerged as a technical skill that could predict as a factor a World Championship win, as it was noted in the study of Patsiaouras et al. (2009).

In relation to the rest of the technical elements (service errors, total attacks, and attack points) examined, no significant results were noticed, leading to the assumption that none of these elements differs significantly between the teams participating in the Olympic Games 2008.

### Practical Implications

The results of the present study showed that volleyball coaches should focus more on the individual and team offensive tactics and especially on those related to service and blocks, as the points gained by blocking the attacks represent a significant factor to win a match along with the reception errors. It appears that in modern volleyball, adopting an offensive approach possibly helps teams to take situation into their own hands, instead of trying to deteriorate opponent's performance only through solid defense. For this reason, high level training should shift to the better implementation of offensive tactics that deteriorate error receptions and increases the possibilities for effectively blocking the opponent spikes.

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