

## **The effect of changing the rules on score fluctuation and match duration in the FIVB women's beach volleyball**

George Giatsis,

Department of Physical Education & Sport Science, Aristotle University of Thessaloniki, Thessaloniki.

Email: [ggiatsis@phed.auth.gr](mailto:ggiatsis@phed.auth.gr)

### **Abstract**

The purpose of this study was to investigate the differences between the two scoring systems, Rally Scoring (RS) and Side Out scoring (SO), in the duration and the score fluctuation of matches in Federation Internationale de Volleyball (FIVB) Women's Beach Volleyball (BV). In this research the duration and the points of 1253 matches were recorded from 22 tournaments of the FIVB Women's BV World Tour. The 2000 FIVB tournaments followed the SO system and the 2001 FIVB followed the RS system. Since the 2001 FIVB was played in 2 winning sets, it was divided in two sub-groups concerning the final score (RS<sub>2-0</sub> and RS<sub>2-1</sub>). The 2000 FIVB was played in a single set of 15 points. The one way ANOVA indicated that there were significant differences ( $F_{(3,1835)} = 268.091$ ,  $p < .001$ ) in total duration of matches between the tournaments. The Post Hoc Scheffe indicated significant differences between the SO ( $M = 35.5$ ,  $SD = 9.9$  min) and the RS ( $M = 41.6$ ,  $SD = 10.2$  min) and the SO and the RS<sub>2-1</sub> ( $M = 53.8$ ,  $SD = 7.2$  min). In SO matches the losers won ( $M = 8.1$ ,  $SD = 3.7$  points), while in the RS mean match phases were ( $M = 83.5$ ,  $SD = 17.4$ ). 46.4% and 12.7% of the matches included a set with the minimum difference of points in the RS and SO respectively. In conclusion, RS increased match duration due to the third set and the matches were more wavering and spectacular as more sets finished with the minimum difference of points. However, the physical demands of the game were increased due to the greater number of rallies.

**Key words:** beach volley, scoring rules, fluctuation of score, side-out, rally score.

## 1 Introduction

The game of Beach Volleyball (BV) had a significant impact on the promotion of Volleyball in general over the last years. It grew in the United States during the last 70 years from a recreational sport into a professional sport (Couvillon, 2002). In 1983 the creation of the Association Volleyball Professional (AVP) (Stevenson, 1987) promoted the organization of the sport at a professional level. The number of spectators increased and the sport attracted the interest of sponsors. Over the last 15 years the Federation Internationale de Volleyball (FIVB) organized the World Tour and the World Championship where the best teams from all over the world participate in 11-13 tournaments per year. The BV was established as an Olympic sport in the 1996 Atlanta Olympic Summer Games. Due to the integration of the game into the Olympic program, it can be argued that the BV will develop rapidly at an international level.

The Beach Volleyball (BV) like Indoor Volleyball (IV) is a net court game. Although BV and IV have many features in common, the nature of the game is quite different. Court games can be classified according to the temporal nature of the matches, into sports which have set time limits (i.e. soccer, rugby) and sports in which a set number of matches, sets holes or games have to be played (i.e. tennis, golf) (MacLaren, 1990). The playing situation is a “2 against 2” game on a BV court. The season consists exclusively of tournaments. Each team plays 3 to 7 games per tournament. The new scoring system is the rally scoring system (RS) (FIVB, 2001) where every rally is a point for the team that won the point and to win a match a team must win 2 sets of 21 points (if it is necessary, a third set to 15 points will be played). The old rules included the “side out” (SO) scoring system (FIVB, 1996; USA Volleyball, 2000) according to which a team, in order to win a point, had to serve and score. The team that scored 15 points in a single game with a two-point advantage won the game but there was also a 17 point cap. The “side out” scoring system was used until the Sidney Olympic Games.

Since television is a major factor which contributed to the growth and the success of the sport, game duration was a problem for the TV broadcasting of BV with the SO system. In order to meet the demands of television networks, the AVP introduced the rally – clock (8-9 min) to control the duration of a match (AVP, n.d; Homberg and Papageorgiou, 1995). An FIVB committee by taking into consideration results from several studies, which found that the mean duration of matches was long (Baacke, 1988; Dyba, 1982; Lecompte et al., 1979; Viitasalo et al., 1987), decided to apply some changes and decrease the mean game duration by changing the scoring rules in IV (FIVB, 1999).

As far as the final score of the two scoring systems in men’s game is concerned, Giatsis and Zetou (in press) concluded that in the 2001 FIVB Men’s BV World Tour 50% of the matches had one set with a minimum difference of 2 points, while 35% of the total sets had the minimum difference. In comparison with the SO, in the 2000 FIVB Men’s BV World Tour 12% of the matches ended with the minimum difference of points. The above researches demonstrated that the RS increases the excitement and the interest in the matches.

Kountouris and Laios, (2000) in a similar study carried out on IV found that after the implementation of the new scoring rules there was a reduction in the duration of each match and a reduction in the variability of the respective times. Furthermore, the researchers found that a large percentage of games finished by a score of 3-2 sets. The

results of a research carried out by Urena (2001) who compared the duration of matches using both scoring systems in the Spanish BV Championship were similar. In a recent research by Kountouris, Laios, Katsikadelli and Aggelonidis (2001) it was established that the implementation of the new volleyball rules were widely accepted and approved by players, coaches, spectators, referees, managers, spectators and reporters as the matches became more interesting because of the fast changes in the score and the increase in excitement.

BV players must be in perfect physical condition to correspond to the demands of the tournaments. Giatsis (2001) reported that on men's BV matches an average of 150 jumps per team executed in one hour. In addition, a maximum of 450 jumps were recorded from one player in one day.

The purpose of this study was to investigate the differences between the two scoring systems (RS) and (SO) in the duration and fluctuation of score in the FIVB Women's Beach Volleyball matches.

## **2 Methods**

### **2.1 Sample**

The data used in this study regarding the duration of matches, the points and the number of sets were collected from 582 matches of 22 FIVB Beach Volley tournaments during the 2000 and 2001 period. The games were played according to the old (SO) and the new (RS) scoring system. RS games were divided into two sub-groups depending on the final score (2-0 and 2-1) All the data were collected from the official records of the standard international score sheets kept during the matches and presented on the FIVB website.

### **2.2 RS matches**

In RS matches the following parameters were analyzed: a) mean sum of points, b) mean duration of matches and c) distribution of games according the final score of sets.

In RS matches ending 2-1 sets the points of the losing team on the 3<sup>rd</sup> set (tie-break) were recorded.

### **2.3 SO matches**

In SO matches the following parameters were analyzed: a) mean duration of the matches, b) mean points of the losing teams.

### **2.4 Statistical Analysis**

One-way ANOVA was used to analyze the differences in the duration of games between the two groups of different scoring rules and between the groups of different final score in the rally scoring system. When a significant difference was identified, a *post hoc* Scheffe analysis was conducted to determine the difference. The mean difference was significant at the .05 level. Also, the Pearson correlation was used to find whether statistically significant exists between the points and the duration of matches in both scoring systems.

### 3 Results

The Pearson correlation analysis shows a statistically significant correlation,  $r(582) = .964, p < .001$ ,  $r(671) = .754, p < .001$ , between total match points and duration in the 2001 FIVB and 2000 FIVB championships respectively. Table 1 illustrates the descriptive statistics for the total duration of matches in both scoring systems.

Table 1. Description of match duration in RS and SO scoring systems

Group	N	M	SD	Min	Max
Rally Score					
All Matches	582	41.6	10.2	19	80
Matches with 2-0 result	415	36.6	6.3	19	74
Matches with 2-1 result	167	53.8	7.2	30	80
Side out					
All Matches	671	35.5	9.9	12	73

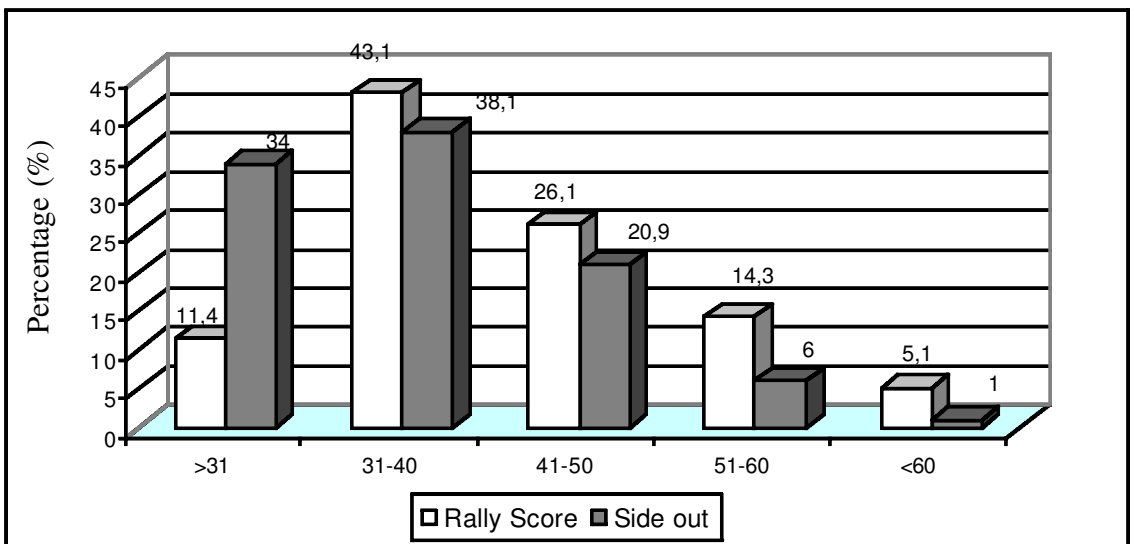


Figure 1. Percentage distribution of match duration in rally score and side out scoring systems

In RS matches 28.6% ended 2-1sets and 71.4% ended 2-0 sets. Table 2 shows the descriptives of points in RS and SO scoring systems. In RS the total mean number of points was ( $M = 83.5, SD = 17.4$ ). In matches with a 2-0 result the mean number of

points was ( $M = 73.9$ ,  $SD = 8$ ) and in matches with a 2-1 result the mean number of points was ( $M = 107.4$ ,  $SD = 9.6$ ). The mean number of points of the losing team on the third set was ( $M = 11.8$ ,  $SD = 3.5$ ). In the SO, the mean number of points won by the losing team was ( $M = 8.1$ ,  $SD = 3.7$ ).

Table 2. Description of Points in RS and SO Scoring Systems

Group	<i>n</i>	M	SD	Min	Max
Rally Score					
All Matches	582	83.5	17.4	50	139
Matches with 2-0 result	415	73.9	8	50	115
Matches with 2-1 result	167	107.4	9.6	79	139
Tie Break (Losing team)	167	11.8	3.47	6	25
Side Out					
Losing Team	671	8.1	3.7	0	16

Using the SO system, in 29.2% of the matches the losing team won less than 5 points, while 29.2% won more than 10 points (Figure 2)

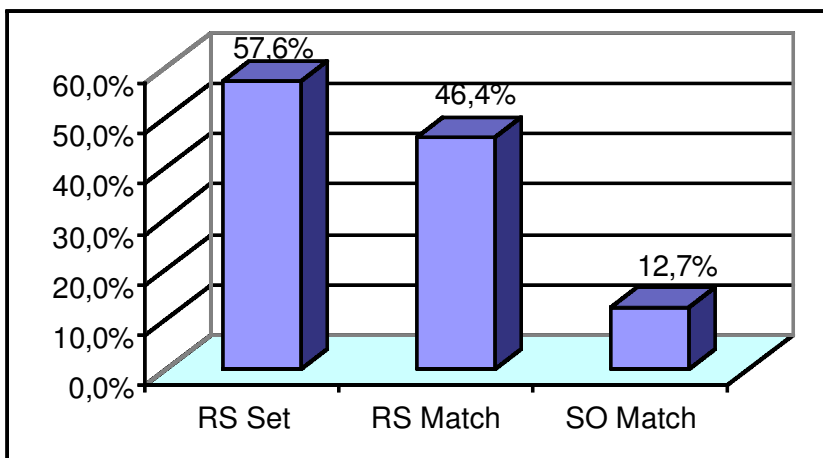


Figure 2. Distribution of matches (RS and SO matches) including a set with the minimum difference of points. Distribution of sets (RS set) with the minimum difference of points. Values are percentages.

Figure 3 shows the percentage of matches ending with the minimum difference of points in the RS and SO system. In the RS, 46.4% of the matches included a set with the minimum difference of points and 57.6% of the sets ended with the minimum difference of points. Similarly, in the SO, 12.7% of the matches ended with the minimum difference.

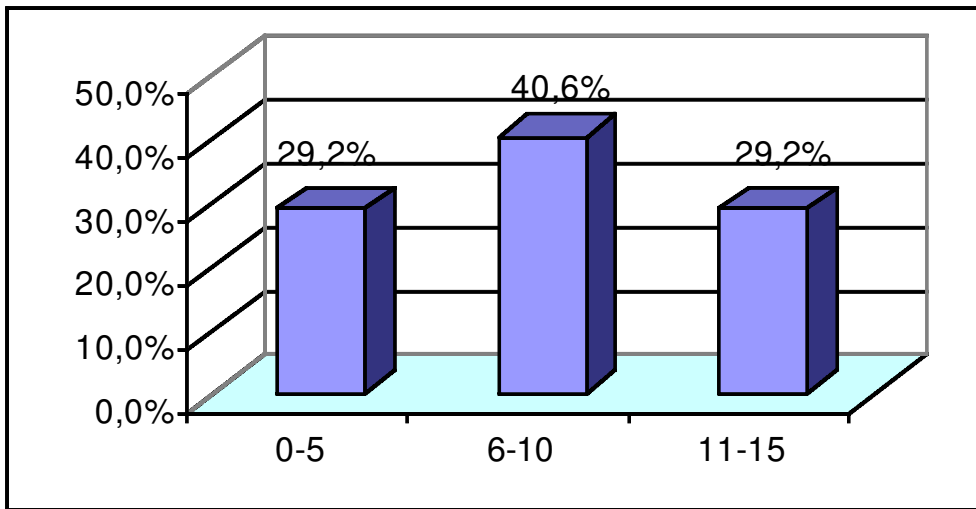


Figure 3. Percentage distribution of matches according to the losing teams' points in the SO. Values are percentages.

#### 4 Discussion

It seems that the changes in the Beach Volleyball rules increased the duration of the matches. The fact that the FIVB changed the scoring rules from side out to rally scoring led to an increase in the duration of matches and at the same time the game became more spectacular as more sets finished with the minimum difference of points..

Using the RS system, the mean duration of matches increased by 5% compared to SO matches with a significant difference. The increase was due to the third set introduced by the new system. This is demonstrated by the fact that the mean duration of RS matches ending by a score of 2-0 sets was the same as the mean duration of SO matches. On the contrary, RS matches ending by a score of 2-1 sets lasted longer than SO matches by 34%. Using the RS system, a large percentage of matches (28.6%) ends by a score of 2-1 sets and as a result the increase in the duration of matches between the RS and the SO was significantly different.

The new rules increased the percentage of sets ending with a minimum difference of two points. Using the old system, the SO, the matches that were considered spectacular on the basis of the minimum difference of points were 12.7% approximately. In addition, the matches in which the losing team won more than 10 points were 29.2%. Using the SO system, a team could win the match although it was behind by many points. However, the matches the spectators found spectacular were those with the minimum difference of points (Kountouris et al., 2001).

The majority of RS matches ended by a 2-1 result, a fact that stresses the uncertain nature of the game. Also, 57.6% of the sets ended with the minimum difference, while 46.4% of the matches included a set with the minimum difference. That is one of the most important elements of the study since if a team manages to be so close to winning the set, then it will be very close to winning the match. These results show that the new system contributed to narrowing the gap between good and average teams and increased the spectacular nature of the matches (Kountouris, 2001; Urena, 2001). The drawbacks of the rally scoring system are that if a team gets a difference of 5-6 points, it is very difficult to turn the game around, which was the case in the SO

system. Nevertheless, in the top-level competition of the FIVB, the World Tour, the percentage of RS matches with an uncertain outcome was very high. In addition, in the SO system 29.2% of the matches ended 15-5, which shows that the outcome of these matches was indifferent. As far the third set in the RS is concerned, the score was 15- 11.8 on average, while 36.8% of the matches ended with the minimum difference of points, a fact that confirms the spectacular nature and the uncertainty regarding the outcome of the matches using this system. There was also a third set ending 27-25 points.

Despite the uncertainty concerning the duration of SO matches there was a statistically significant correlation between the two variables like in the RS. Thus, we may come to the conclusion that the increase in the mean duration of the matches brought about an increase in the mean number of rallies. This in turn increased the physical demands for the athletes and for this reason the training program should be adopted accordingly. Top-level teams should get prepared according to the maximum possible demands of a match (Kiraly and Shewman, 1999). According to the mean number of rallies if a player hits all the balls during the side out phase, is the specialized blocker and performs jump serves, she will perform 83 jumps at least, plus the jumps performed when a rally continues. In addition, our research included matches with more than 130 rallies. This number of rallies can be highly increased the demands of a tournament, as on World Tour the players may play up to seven matches in three days (Giatsis, 2001).

The results of this research are in accordance with those of a similar research on the FIVB Men's Beach Volleyball carried out by Giatsis and Zetou (in press). Thus we come to the conclusion that the changes in the rules affect in the same way the game in both men and women.

The final conclusion is that the change in the scoring system increased the mean duration of BV matches and made the sport more spectacular in relation to the final score as more sets finished with the minimum difference.. This fact supports the FIVB in its decision to apply this change. The FIVB by modifying the rules achieved its objectives, the quality of the matches increased, more spectators were attracted to the game and thus even more sponsors participated in this supply and demand process. On the other hand, the athletes should be adequately prepared and for this reason there should be a change in the duration of their training program and the number of repetitions during the practice of technical skills according to the new conditions.

Nevertheless, despite the fact that the IV changes of the rules caused a large decrease of the match time (Kountouris and Laios, 2000; Urena, 2001), in BV these times increased. One of the most important factors that led the FIVB to change the game was for the shortening of the time fluctuation, for the T.V. But due to the increase of the average match time and of the great fluctuation that exists on matches with 2-1 score, the problems still exist. Possibly new rules must be set to decrease the time such as in the Brazilian Championship (CBV) where the first two sets end in 18 points which results in lesser playing time.

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