

Differences in the course of result between the winning and losing teams in top handball

¹Faculty of Kinesiology, University of Split, Croatia

Original scientific paper

Abstract

Starting from the assumption that there are some differences in the course of result in relation to the final result outcome, the aim of this research is to determine in what time segment of a match the partial result mostly makes a difference between winning and losing a match. The research was done on the sample of 101 matches of the World Championship for Men held in 2009 in Croatia, and included all of the matches which ended in a victory or a defeat. The variables are defined by the number of scored goals and the achieved score difference in six ten-minute time segments of a match. In the context of data processing, we calculated basic descriptive and distribution statistic parameters. The differences between the number of scored goals and the achieved score difference in six ten-minute periods of a match between the winning and the losing teams were determined by variance analysis. Variance analysis confirmed statistically significant differences in both groups of the variables. The winning teams score most goals in the penultimate segment of the game (40-50 min) and they achieve the biggest score difference in the second (10-20min) and the penultimate period (40-50min). The winning teams score least goals in the first ten minutes of the match, and they achieve the smallest score difference in the last ten minutes of the match. The losing teams score most goals in the last sixth and least goals in the first sixth of a match. Contrary to the winning teams, the losing teams achieve the biggest negative difference in the second and the fifth, and the smallest one in the last sixth of a match. The results of the research reveal the need to give special attention to tactical preparing and leading of the match in the training process, i.e. to those segments of the match which have special significance for the final result outcome.

Keywords: **differences, result, handball**

Sažetak

Polazeći od pretpostavke postojanja razlika u tijeku rezultata spram konačnog rezultatskog ishoda, cilj je ovog istraživanja utvrditi u kojem vremenskom razdoblju utakmice parcijalni rezultat najviše razlikuje pobjedu od poraza. Istraživanje je provedeno na uzorku od 101 utakmice Svjetskog prvenstva za muškarce koje je održano 2009. g. u Hrvatskoj, a obuhvaćene su sve utakmice tog prvenstva koje su završile pobjedom ili porazom. Varijable su definirane brojem postignutih golova i ostvarenom rezultatskom razlikom u 6 desetominutnih vremenskih segmenata utakmice. U okviru obrade podataka izračunati su osnovni deskriptivni i distribucijski statistički parametri. Razlike u broju postignutih golova i ostvarenoj rezultatskoj razlici u 6 desetominutnih razdoblja utakmice između pobjedničkih i poraženih ekipa utvrđene su analizom varijance. Analiza varijance potvrdila je statistički značajne razlike u obje grupe varijabli. Pobjedničke ekipe najviše pogodaka postižu u predzadnjem segmentu utakmice (40-50 min), a najveću rezultatsku razliku ostvaruju u drugom (10-20 min) i predzadnjem razdoblju (40-50 min). Najmanje pogodaka pobjedničke ekipe postižu u prvih deset minuta utakmice, a najmanju rezultatsku razliku ostvaruju u zadnjih deset minuta utakmice. Porazene ekipe najviše pogodaka postižu u posljednjoj, a najmanje u prvoj šestini utakmice. Suprotno od pobjedničkih, porazene ekipe najveću negativnu razliku ostvaruju u drugoj i petoj, a najmanju u posljednjoj šestini utakmice. Rezultati istraživanja ukazuju na potrebu da se u trenažnom procesu, taktičkoj pripremi i vođenju utakmice posebna pozornost posveti ovim segmentima utakmice koji su od posebnog značaja za konačni rezultatski uspjeh.

Ključne riječi: **razlike, rezultat, rukomet**

Introduction

Games, particularly sport games, participated by a great number of players who face each other on an individual, group and collective level in repeated moving, are methodologically demanding to analyse. Numerousness of objects, complexity of moving, variety of positions and an unlimited variability of tactical performances ask for a quality approach to the analysis of a sport game and its decomposition to smaller segments.

Handball game can be observed as a set of situation-related events partly determined by the structure of technical-tactical activity, by the influence of the opponents and external conditions, by dimensions of the athletes' system, but mostly by the managing network – the rules of the handball game. Events in a handball game present the interaction of various moves and they are determined by numerous factors (kinesiological, spatial, temporal and anthropological). However, they are not always linearly predictable since handball game has plenty of situations manifested in a random or chaotic manner. For instance, event "score" is determined by numerous activities of a defence player,

an attack player and the goalkeeper, therefore this event cannot be predicted with certainty. Although physically a player scores in the moment when the ball is over the goal line by its major part, officially it becomes an event when the judge, based on his subjective assessment, confirms it with a whistle blow. At the same time, this is the only event presented by a numerical change of the result.

Each handball event has an outcome related to the aiming direction. The event outcome also leads to the consequence which may be determined by rules of the game or may be produced by situation-related circumstances. The consequence may also be positive, negative or neutral and presents the starting point for the next event. E.g. the outcome of the shot on goal can be positive or negative. If the aim is accomplished, i.e. if one scores, the consequence is unconditionally negative, i.e. the ball loss, for it belongs to the opponent according to the rules. However, if the outcome of this event is not positive, i.e. the goal is not scored because the goalkeeper has defended it or the ball hit the doorframe, the

outcome is negative, and the consequences of this outcome can be negative (after the rebound, the ball was won by one of the players from the opposed team) or positive (the ball was won by a player from the attacking team).

If we put aside the entropy of the result caused by unpredictable external factors which the participants cannot immediately influence, such as the judge's decisions, scoring a goal, being a resultant of cumulative situation-related activities of the confronted opponents, in addition to technical-tactical factors, is primarily determined by the level of players' anthropological potential (Kovač & Đukić, 1980; Czerwinski, 1995; Hianik, 2008).

A few researches have been published recently analysing the efficiency of the attack finalisation and the influence of different aspects of the attack finalisation on the final result of a match (Srhoj et al. 2001; Rogulj et al. 2004; Rogulj et al. 2009).

However, we lack in research analysing the course of the result and its influence on the final result outcome of a match.

Starting from the undoubted importance of the course of the result for the final result outcome (Rogulj, 2000; Rogulj et al. 2002), but also from the fact that this problem has not been studied enough, the aim of this research is to establish, on a relevant sample of top matches, in which time period of the match the partial result mostly makes a difference between the winning and the losing teams.

Methods

The research was done on the sample of 101 matches at the World Championship for Men held in Croatia in 2009. The sample involves all the matches of the championship which ended in a victory or a defeat. The variables are defined by the number of achieved goals, i.e. by the result increase and the achieved score difference in six 10-minute time segments of the match. In the aspect of data processing we calculated basic descriptive and distribution statistic parameters. The differences in the number of scored goals and the achieved score difference in six 10-minute periods of a match between the winning and the losing teams have been determined by variance analysis.

Results

Table 1 presents basic descriptive and distribution parameters of prediction variables. It is evident most scores were achieved in the last (4,82), and least in the first sixth of the match (4,16). Nearly the same number of scores is achieved between the twentieth and the fortieth minute. All the variables have satisfactory and balanced distribution parameters of symmetry and curvature. With the increase of the number of scores in relation to the time course of the match, the result dispersion is slightly increasing as well (standard deviation), therefore the greatest scoring dispersion is present in the last sixth as well as the greatest variability of score differences.

Table 1. Descriptive and distribution parameters (n=202)

VAR	MEAN	MIN	MAX	SD	SKE	KUR
INC/10	4,16	0,00	9,00	1,67	,18	-,18
INC/20	4,56	0,00	9,00	1,86	-,14	-,37
INC/30	4,55	0,00	9,00	1,70	-,11	-,33
INC/40	4,57	1,00	10,00	1,91	,37	-,40
INC/50	4,73	0,00	9,00	1,80	,20	-,23
INC/60	4,82	1,00	12,00	1,98	,28	,42
DIF/10	,00	-6,00	6,00	2,59	,00	-,50
DIF/20	,00	-7,00	7,00	2,92	,00	-,59
DIF/30	,00	-8,00	8,00	2,71	,00	-,02
DIF/40	,00	-9,00	9,00	2,93	,00	,18
DIF/50	,00	-8,00	8,00	2,86	,00	,75
DIF/60	,00	-8,00	8,00	3,00	,00	,03

Table 2 displays the results of the variance analysis of the variable for the number of scored goals in six 10-minute segments of the match between the winning and the losing teams. We established a statistically significant difference between result efficient and non-efficient teams in all the variables of the result increase. The

winning teams score most goals in the penultimate segment of the match (40-50 min) and the least in the first ten minutes of the match. The losing teams score most goals in the last, and least in the first sixth of the match (graph 1).

Table 2. Variance analysis of result increase

VARIABLE	MEAN WINNING	MEAN LOSING	F	p
INC/10	4,80	3,54	30,22	,00*
INC/20	5,49	3,70	56,12	,00*
INC/30	5,21	3,88	32,07	,00*
INC/40	5,36	3,82	33,89	,00*
INC/50	5,58	3,88	51,08	,00*
INC/60	5,38	4,27	14,99	,00*

Table 3 displays results of the variance analysis for the variables of the score difference in six 10-minute segments of a match between the winning and the losing teams. We have established a statistically significant difference between result efficient and result non-efficient teams in all the variables of the score difference. The winning teams have the biggest score

difference in the second (10-20 min.) and the penultimate period of the match (40-50 min.) and the smallest one in the last ten minutes of the match. Contrary to the winning teams, the losing teams have the greatest negative score difference in the second and the fifth, and the smallest one in the last sixth of the match.

Table 3. Variance analysis of score result

VARIABLE	MEAN WINNING	MEAN LOSING	F	p
DIF/10	1,26	-1,26	58,64	,00*
DIF/20	1,80	-1,80	106,72	,00*
DIF/30	1,34	-1,34	56,02	,00*
DIF/40	1,54	-1,54	66,50	,00*
DIF/50	1,71	-1,71	97,96	,00*
DIF/60	1,11	-1,11	28,14	,00*

Discussion

A smaller number of scored goals at the opening of a match in the first ten minutes may be explained by the fact that at the beginning, regardless of the relation between the quality of two teams, most frequently there is an appropriate caution and respect for the opponent, which results in long organised attacks based on the basic principles of the game with the aim of creating a favourable opportunity for a certain realisation of the attack finalisation from close range (Rogulj, 2003). On the other hand, both teams are primarily focused on defence which is played with maximum engagement and motivation at the beginning of the match, trying to show the opponent they will not allow an easy realisation. Evidently, in these conditions of organised, engaged and most frequently aggressive defence with a stressed motivation and gradual, long-lasting and careful attack, we cannot expect a large number of scores (Czerwinski, 1998). A high level of energy potential possessed by the players at the beginning of the match is certainly favourable to this situation and it also enables them to play actively and aggressively in defence, while on the other hand, it decreases a possibility to make technical fouls and lose the ball in attack both of which are the starting point for the realisation of fast attacks to a disorganised defence and for "easy scoring" (Brčić et al. 1997; Talović et al. 2007).

From the tenth minute of a match on, a number of scored goals slightly increases and this increase is kept on the same level during the next half an hour of the game. It is evident that the middle part of the match is marked by a stable result increase which is primarily caused by an equal influence of both teams. A more noticeable increase in the number of scored goals is observed in the penultimate sixth of a match in winning teams, and particularly in the last sixth of the match in the losing teams (graph 1).

It is known for a fact that in the conditions of a greater score difference in the finalisation of the match, which is quite common in the matches between the teams of different qualities, the teams with an extremely positive result most frequently lacks in motivation (Hergeirsson, 2008). The fact that in a large number of cases a team has already won or lost the match before the last sixth, makes the "winning" team play with less engagement in defence which enables the opposed team of creating a more favourable situation for an unobstructed realisation. Disorganised and disengaged defence also enables to shorten positioning attack and

enables a larger number of shots for the opposed team by the end of the match. A larger number of shots is also enabled by decreased energy potential producing a large number of technical fouls and balls losses in attack, and they are a starting point for the realisation of fast counterattacks characterised by a high level of realisation efficiency (Thorlund et al. 2008).

The winning teams score less goals in the last sixth than in the penultimate sixth partly for the reason they play in this phase of the game with young players or substitutes or, in the conditions of result uncertainty, they test certain innovative tactical variants (graph 1).

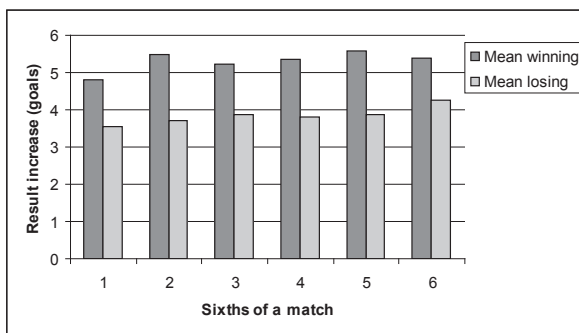
Variance analysis of score differences achieved in certain time segments of a match showed that the winning teams differ from the losing teams mostly in the score difference achieved between the tenth and the twentieth minute and the one achieved between the fortieth and the fiftieth minute of the match. For the final result success, it is important to increase the result difference all the time during the match, but primarily in the second and the fifth sixth of the match. Therefore, the victory is primarily "ensured" after the first ten minutes mainly spent in getting to know each other and in cautious and careful playing. With this kind of playing, technical and tactical features much less influence the result, and not even the condition component is of a great significance.

However, after the opening phase of the match, according to the research results, it is important to put in maximum efforts and engagement with the purpose of playing as efficiently as possible and to achieve as favourable result as possible in the following ten minutes. During this period of the match, the playing becomes fully competitive and both of the teams play openly, most frequently without any tactical calculations and with the equal engagement in all phases of playing (attack, defence and transition), therefore it is crucial to make as great score difference as possible in such conditions. In the next half an hour, i.e. from the twentieth to the fortieth minute, the teams achieve somewhat less, but rather an equal contribution of score differences which are achieved in certain segments of a match and for the final result success.

In addition to the second, the score difference achieved in the penultimate sixth of the match, from the fortieth to the fiftieth minute, is of extreme importance for the final victory. A signifi-

cant contribution of this phase of the match to the result success has been confirmed in some previous researches (Rogulj et al. 2002; Rogulj et al. 2004; Vuleta et al. 2005). This is evidently an extremely important, perhaps even a crucial segment which accumulates all the previous struggling and the activeness of both opposed teams in which they put in use the total maximum anthropological potential of their players. Due to given reasons, this phase of a match usually leads to the “break” of the score and results in a greater result sparating of one of the teams which is crucial for winning (graph 1). The smallest score differences between the winning and the losing teams are present in both the starting and the finishing phase of the match. Namely, due to already stated reasons, at the beginning of a match, the difference in the quality between the teams is less obvious, as well as in the finalisation of the match since the more quality team has probably already ensured the victory and is therefore playing with less engagement.

Graph 1. Display of result increase by individual segments of a match



Conclusion

By subliming the research results we can conclude that, quite expectedly, the achieved result increase and the achieved score difference in all ten-minute time segments of the match on the level of statistical significance is what makes a difference between the winning and the losing teams. However, in some parts of the match, it is extremely important to score as much as possible and to achieve as big result difference as possible, since it ensures the highest probability for the final result success. Therefore, knowledge obtained by this research can have a useful practical application in terms of giving special attention, both in tactical preparing and while leading the team in a competition, to those time segments of the match which are most crucial for winning. Further on, the research results may also be applied in a training process in a way that in the temporal distribution of weight loading and contents within a certain training unit, the intensity and extensity of weight loading is dosed and increased in the parts of training which match the time segments of a match most important for winning.

References

- Brčić, B., N. Viskić-Štalec, Ž. Jaklinović-Fressl. “ Analiza pogrška u rukometnoj igri ”. Proceedings of 21st Croatian Handball Federation Coaches conference, Pula, 1997.
- Czerwinski, J. “The influence of technical abilities of players on the tactical selection in the handball game”. European Handball 2 (1995):16-19.
- Czerwinski, J. “Statistical analysis of the men’s European Championship held in Italy in 1998”. European Handball, 2 (1998):10-18.
- Hergeirsson, T. “8th Men’s European Handball Championship - Qualitative trend analysis”. EHF Periodical, 2008.
- Hianik, J. “The relation between successful game activity and the final match result in handball” (paper presented at 5th International Scientific Conference on Kinesiology, Zagreb, Croatia, 2008, 917-921).
- Kovač, J., M. Đukić, “Tehničko-taktički elementi napada i rezultatski uspjeh u rukometu”, Fizička kultura, 2(1980):140-141.
- Rogulj, N. “Differences in situation-related indicators of handball game in relation to the achieved competitive results of the teams at 1999 World Championship in Egypt”. Kinesiology 32 (2000) (2):63-74.
- Rogulj, N., D. Vuleta, D. Milanović. “Utjecaj parcijalnog na konačni rezultat rukometne utakmice” (proceeding of the scientific conference – Dopunski sadržaji sportske pripreme, Zagreb, 2002). (320-325).
- Rogulj, N. “Učinkovitost taktičkih modela u rukometu”. (Phd. diss., University of Zagreb, 2003) (235-246).
- Rogulj, N., V. Srhoj, Lj. Srhoj, “The contribution of collective attack tactics in differentiating handball score efficiency”, Collegium Antropologicum 28/ 2(2004): 739-746.
- Rogulj, N. V. Srhoj, “ Influence of the collective attack tactics on handball match outcome”. Fizička kultura 37(2009): 15-20.
- Srhoj, V., N. Rogulj, R. Katić, “Influence of the attack end conduction on match result in handball”, Collegium Antropologicum 25/ 2(2001): 611-617.
- Talović, M., E. Kazazović, A. Kolasević, “Analiza efikasnosti igre u napadu i obrani rukometnog kluba „Bosna“ Sarajevo”. Proceedings of 2nd International Symposium of New Technologies in Sports, 2007. (133-136).
- Thorlund, J. B., L. B. Michalsik, K. Madsen, P. Aagaard, “Acute fatigue-induced changes in muscle mechanical properties and neuromuscular activity in elite handball players following a handball match”, Scand J Med Sci Sports 2008 18(2008): 462–472.

Vuleta, D., D. Milanović, I. Gruić, K. Ohnjec, "Influence of the goals scored on final outcomes of matches of the 2003 World Handball Championships for Men in Portugal". Proceedings of 4th International Scientific Conference on Kinesiology, Opatija, 2005. (470-473)

Submitted: April, 110. 2011.

Accepted: May, 27, 2011.

Corresponding Author: **Nikola Foretić**

Faculty of Kinesiology, University of Split

Nikole Tesle 6, 21000 Split, CROATIA

mob: 00385 98 666 136

e-mail: nikolaforetic@hotmail.com