INFLUENCE OF ATTACKING EFFICIENCY ON THE OUTCOME OF HANDBALL MATCHES IN THE PRELIMINARY ROUND OF MEN' S OLIMPIC GAMES 2008

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Abstract
The purpose of this research is to determine parameters influence of attacking efficiency on the score of handball matches at men's tournament Olympic Games in Peking 2008. The exemplar of entity makes 12 national selections 30 matches (60 competitors) of the first contest cycle at the men's tournament Olympic Games in Peking 2008. Data will be resumed with descriptive statistic package and regression analysis. The result outcome gives us tree variables to be exacted: shot from nine meters field, shot from semi-free ball successful on defined criteria. Standard indicators of situational efficiency which describes a set of predictor variables were: a shot from 9 feet successfully, shot from 9 feet unsuccessfully, with the wings of a successful shot, shot from the wing failed, shot from 6 feet successfully, shot from 6 feet failed, shot from a counterattack successfully, shot from the unsuccessful counterattack, shot from 7 feet successfully, shot with a 7 meter failure, the successful passage of the shot, shot from a passage failure. Criterion variable was defined final score of the game. This study was confirmed that handball game became faster with important phases such as: counterattacking, high level of technical skills and concentration. These phases are very important for winning or losing game, so coaches have to include new technologies and modality of training.

Key words: *handball, seniors, Olympic Games, performance, regression analysis*

Introduction

Handball is a game which requires from players continuous movement with and without a change of direction, intertwined with sprints, high jumps, landings and various duels with an opponent (Pavlin, Šimenc, Delija, 1982). Handball game is marked by a variety of typical and atypical situations in the game. Therefore, a detailed knowledge of certain situations in the game, or situational efficiency parameters of each player in a competitive and situational conditions is needed (Vuleta et al., 2003). Hierarchical structure of success factors in sports could be modeled from the viewpoint of analysis of the dimensions of athletes (Milanovic, 2010), which consists of four levels of interrelated factors. At the first level of the pyramid are the basic anthropological characteristics that are condition for the development of specific skills and knowledge of handball players that are on second level. At the third level of the performance hierarchical model is the situation-related efficacy (performance realized by the application of technical-tactical elements) that determines directly the final outcome of a match (the fourth level of the model). Situational efficiency indicators are collected by the existing methods of registration during the events or with subsequent viewing of videos. Each is a specific manifestation of all abilities, characteristics, skills and other characteristics of an athlete, coaches and other related logistics. That is why confronting the two opponents produces a similar, but never identical match courses or a result progress (Vuleta et al., 2005).

Using parameters derived from the aim of handball game can be assessed the situational effectiveness of games, individuals or team. If we recognize the performance that bring good results, it is possible to get better results based on indicators of situational efficiency in attack, defense and transition play in handball. However, a standardized method for the registration of such data which could give us an accurate understanding of the events on the field during and after match, has not been defined yet. Videos have a significan value for by handball experts because they can assess and analyze technical - tactical and other elements in the game.

The aim of research was to determine the effect of the parameters of situational efficiency in the overall success of the men's handball matches of the tournament of the Beijing Olympics. The analysis included the parameters of situational efficiency obtained in a handball Olympic games in Beijing 2008. in the preliminary round of the competition, which was played on league-system by groups. The primary objective of this study was to determine the extent to which the observed variance of situational efficiency indicators differ between the groups in the preliminary round of competition. The secondary objective of this paper was to analyze the level of impact of situational parameters on the performance of the team which is possible to define by the final outcome of the match (goal - difference that includes victory, defeat and tie).

Methods

The sample of cases

The sample of cases was comprised of 30 matches played by 12 national teams in the preliminary round of the 2008 Olympic games in Beiijing. The tournament was played on league and cup system, which means that the preliminary part of the group was played according to league system (each with each) where the top four teams have qualified for the second round. In this part of the competition teams have played with each other on the principle: A1 - A4, A2-B3, B1-A4, B2-A3. Quoterfinal matches were followed by semifinal duels: winning match A1-B4 against B2-A3, and the winners of the match A2-B3 against the winners of the match B1-A3. The defeated teams from quoterfinal duels have played matches for the 5-8 seat. Winners of semi final duels have played in final, and defeated for the third or fourth place.

The sample of variables

The set of predictor variables consisted of the frequencies of either successful shots (goals scored) or shots missed, which were taken by backcourt players, wingers and pivots from their playing positions and from fastbreaks. Variables of situational efficiency were: Field shots scored – from the backcourt positions -ŠUT9MUS, Field shots missed – from the backcourt positions- ŠUT9MNE, Wing shots scored – from the wings' position- ŠUTKRUS, Wing shots missed – from the wings' position- ŠUTKRNE, Goal area line shots scored- from the pivot position- ŠUT6MUS, Goal area line shots missed – from the pivot position- ŠUT6MNE, Fast break shots scored – from a counter-attack - ŠUTKOUS, Fast break shots missed – from a counter-attack- ŠUTKONE, seven meter shot scored- penalty shot - ŠUT7MUS, seven meter shot missed- penalty shot - ŠUT7MNE, breakthrough shot scored - ŠUTPRUS, breakthrough shot missed- ŠUTPRNE.

The success of individual teams can be defined in different ways and outcomes of certain matches (victory, defeat, a draw). Handball is characterized by the pre-agreed values that are added to teams with regard to the result (2 points for win, 0 points for lost, 1 point for draws). As a criterion of success for individual teams a goal-difference at the end of the game can be taken. Goal difference at the end of each game as a criterion of success of each team has additionall weight for previous criterion with the difference in the number of scored goals in relation to the number of goals conceeded by the opposing team (eg . +5 for a victory with 5 goals difference, -2 for defeat with 2 goals, 0 for a tie). The criterion variable for the purposes of this paper was defined as goal difference at the end of a match.

Statistical analysis

Data analysis was performed using The Statistical Package for Social Sciences (v17.0, SPSS Inc. Chicago, IL).

Descriptive statistics with its fundamental measures of central tendency and dispersive parameters gave an overview of performance (situation efficacy) parameters. The differences in performance indicators among different competition groups were established by the univariate and multivariate analyses of variance. Simple regression analysis was used to investigate the contribution of individual performance parameters to the eventual game outcome (goal-difference). Statistical significance was set to $p \leq 0.05$.

Results and discussion

Table 1. Descriptive statistic of the performance parameters in the preliminary round

	Mean	Std.Dev	Min	Max
ŠUT9MUS	7.78	3.494	1	16
ŠUT9MNE	12.17	5.349	2	22
ŠUTKRUS	3.03	2.270	0	9
ŠUTKRNE	2.38	1.851	0	8
ŠUT6MUS	6.17	2.793	2	12
ŠUT6MNE	2.95	2.045	0	10
ŠUTKOUS	5.25	3.062	0	16
ŠUTKONE	2.12	1.530	0	5
ŠUT7MUS	2.28	1.637	0	7
ŠUT7MNE	0.8	0.777	0	3
ŠUTPRUS	2.42	1.871	0	9
ŠUTPRNE	1.05	1.032	0	4

Field shots scored – from the backcourt positions -ŠUT9MUS, Field shots missed – from the backcourt positions- ŠUT9MNE, Wing shots scored – from the wings' position- ŠUTKRUS, Wing shots missed – from the wings' position- ŠUTKRNE, Goal area line shots scored- from the pivot position- ŠUT6MUS, Goal area line shots missed – from the pivot position- ŠUT6MNE, Fast break shots scored – from a counter-attack - ŠUTKOUS, Fast break shots missed – from a counter-attack- ŠUTKONE, seven meter shot scored- penalty shot - ŠUT7MUS, seven meter shot missed- penalty shot - ŠUT7MNE, breakthrough shot scored - ŠUTPRUS, breakthrough shot missed- ŠUTPRNE.

Table 2. Multivariate analysis of variance

	Wil. Lam.	Rao s R	Df 1	Df2	p-level
AB	0.71	2.62	8	51	0.017

Table 3. Basic statistic parameters of predictor and criterion variables in group A

	Mean	SD	Min	Max
ŠUT9MU	6.57	3.66	1	16
ŠUT9MN	11.93	6.06	2	22
ŠUTKRU	3.37	2.70	0	9
ŠUTKRN	2.13	1.72	0	6
ŠUT6MU	6.83	2.76	2	12
ŠUT6MN	3.10	2.32	0	10
ŠUTKOU	5.90	3.69	0	16
ŠUTKON	2.27	1.60	0	5
ŠUTPRU	2.5	2.19	0	9
ŠUTPRN	0.83	0.83	0	3
GOLRAZ	0	9.37	-19	19

Table 4. Correlation matrix for predictor and criterion variables

	ŠUT9MUS	ŠUT9MNE	ŠUTKRUS	ŠUTKRNE	ŠUT6MUS	ŠUT6MNE	ŠUTKOUS	ŠUTKONE	ŠUTPRUS	ŠUTPRNE	GR
ŠUT9MUS	1.00										
ŠUT9MNE	0.51	1.00									
ŠUTKRUS	-0.40	-0.70	1.00								
ŠUTKRNE	-0.36	-0.32	0.32	1.00							
ŠUT6MUS	-0.09	-0.15	-0.08	0.03	1.00						
ŠUT6MNE	-0.09	-0.22	0.23	-0.13	-0.26	1.00					
ŠUTKOUS	-0.20	-0.51	0.24	0.39	-0.01	0.01	1.00				
ŠUTKONE	-0.30	-0.58	0.28	0.25	0.24	-0.03	0.49	1.00			
ŠUTPRUS	-0.53	-0.60	0.43	0.06	0.16	0.08	0.27	0.11	1.00		
ŠUTPRNE	-0.09	-0.15	-0.00	-0.42	0.21	0.01	-0.08	-0.02	0.22	1.00	
GOLRAZL	-0.30	-0.76	0.50	0.38	0.23	-0.07	0.73	0.59	0.46	0.04	1.00

Table 8. Correlation matrix of predictor and criterion variables

	ŠUT9MUS	ŠUT9MNE	ŠUTKRUS	ŠUTKRNE	ŠUT6MUS	ŠUT6MNE	ŠUTKOUS	ŠUTKONE	ŠUTPRUS	ŠUTPRNE	GR
ŠUT9MUS	1.00										
ŠUT9MNE	0.50	1.00									
ŠUTKRUS	0.05	-0.13	1.00								
ŠUTKRNE	0.09	0.16	0.26	1.00							
ŠUT6MUS	-0.23	-0.35	-0.12	-0.35	1.00						
ŠUT6MNE	-0.22	-0.39	0.18	0.08	0.04	1.00					
ŠUTKOUS	-0.35	-0.15	0.28	0.02	0.03	0.03	1.00				
ŠUTKONE	-0.00	-0.03	0.20	0.02	-0.51	-0.01	0.22	1.00			
ŠUTPRUS	-0.20	-0.08	-0.36	-0.37	0.21	0.21	-0.30	-0.09	1.00		
ŠUTPRNE	-0.21	-0.56	0.18	0.04	0.07	0.07	0.03	0.10	-0.09	1.00	
GR	0.19	-0.08	0.27	0.20	0.24	0.24	-0.02	-0.16	-0.05	0.10	1.00

In Table 4 parameters of descriptive statistics show that Olympic games in Beeing were more efficient with 1619 conceded goals compared to Athens with 1619 conceded goals (Kriste, 2006).

The total average number of shots directed toward the opposing goal was about 48, with the percentage of successful shots approximately 55%. The analysis of successful and unsuccessful shots on the goal indicates the following: unsuccessful field shots (730) is greater than the number of successful (467) with somewhat larger deviations. With an average of about 20 shots from the field (background position) with the percentage of realization of about 39%, with the wing positions where 182 shots have been successfull and 143 shots missed. Of the total number of shots - 325, the average of about 5 shots was directed to the opponent's with a 56% of efficiency. Of that number, there were 370 successful shots from 6m and 177 unsuccessful, which indicates to the defensive actions of players or goalkeeper. An avarage of 9 shots with 68 % of realization, out of which 442 shots from counter attack with a total of a successful shots of 315, so it could be concluded that about 5 counter attacks have ended successfully compared to 2 unsuccessful, which indicates to a good physical preparation of defensive players and their good transition from offence to defence. There were 71% successfully realized counterattacks from the total number of shots.

Table 5. Results of regression analysis for the contribution of shot variables on criterion variable goal-difference

STATISTIC	VALUE
MULTIPLE R	0.92
MULTIPLE R2	0.85
ADJUSTED R2	0.77
F(10.19)	10.57
P	0.00
STD.ERR. OF ESTIMATE	4.52

Table 6. Partial results of regresion analysis

	BETA	St.Err.	B	St.Err.	T(19)	p-level
Intercpt			-2.87	9.21	-0.31	0.76
ŠUT9MUS	0.09	0.12	0.24	0.32	0.76	0.45
ŠUT9MNE	-0.46	0.20	-0.70	0.31	-2.26	0.03
ŠUTKRUS	0.14	0.14	0.47	0.48	0.99	0.34
ŠUTKRNE	-0.06	0.13	-0.33	0.72	-0.46	0.65
ŠUT6MUS	0.15	0.10	0.52	0.35	1.47	0.16
ŠUT6MNE	-0.17	0.10	-0.68	0.41	-1.60	0.12
ŠUTKOUS	0.50	0.13	1.27	0.31	4.07	0.00
ŠUTKONE	0.05	0.13	0.24	0.79	0.30	0.77
ŠUTPRUS	0.05	0.14	0.22	0.60	0.36	0.72
ŠUTPRNE	-0.13	0.11	-1.42	1.24	-1.14	0.27

From a 7 meter line, there were 285 shots out of which of which an average of 137 shots was successfully realized, an avarage of 3 shots with the successful implementation of about 67% which is slightly lower values of the criteria of 80%.

Table 7. Basic statistic parameters of predictor and criterion variables in group B

	Mean	SD	Min	Max
ŠUT9MU	9.00	2.89	5	15
ŠUT9MN	12.4	4.62	6	21
ŠUTKRU	2.70	1.72	0	6
ŠUTKRN	2.63	1.97	0	8
ŠUT6MU	5.50	2.71	2	11
ŠUT6MN	2.80	1.75	0	6
ŠUTKOU	4.60	2.14	2	10
ŠUTKON	1.97	1.47	0	5
ŠUTPRU	2.33	1.51	0	6
ŠUTPRN	1.27	1.17	0	4
GR	0	3.02	-7	7

Table 9. Results of regression analysis for the contribution of shot variables on criterion variable final goal-difference

STATSTIC	VALUE
MULTIPLE R	0.60
MULTIPLE R2	0.36
ADJUSTED R2	0.02
F(10.19)	1.06
p	0.43
STD.ERR. OF ESTIMATE	3.00

Table 10. Partial results of regresion analysis

	Beta	Std.Err	B	Std.Err	t(19)	p-level
Intercept			-13.4	6.02	-2.15	0.04
ŠUT9MUS	0.37	0.24	0.38	0.25	1.52	0.14
ŠUT9MNE	0.08	0.30	0.05	0.19	0.27	0.79
ŠUTKRUS	0.16	0.21	0.29	0.38	0.76	0.45
ŠUTKRNE	0.30	0.22	0.47	0.34	1.40	0.17
ŠUT6MUS	0.53	0.28	0.59	0.31	1.88	0.07
ŠUT6MNE	0.34	0.24	0.58	0.41	1.40	0.18
ŠUTKOUS	0.08	0.22	0.11	0.32	0.34	0.73
ŠUTKONE	0.16	0.28	0.34	0.57	0.59	0.56
ŠUTPRUS	0.12	0.23	0.24	0.46	0.53	0.60
ŠUTPRNE	0.06	0.23	0.15	0.60	0.24	0.80

Breakthrough shots on this tournament were a total of 208, from which 145 were successful which was less than 3 breakthroughs per game. Multivariate analysis of variance (Table 2) indicates the overall differences in effectiveness of the situational parameters for the two competing groups. Based on the analysis, results show that the effectiveness of situational parameters differ between the groups so the interpretation of the results for predictor variables were accessed for each group. Based on the results shown in Table 5, the hypothesis H0 can be rejected with the statement that the differences between the variance of the observed indicators of situational efficiency in competitive groups AB preliminary competitions were statistically significant. Based on descriptive analysis of situational efficiency indicators in the group A of the preliminary competition it was was found that the number of goals scored (about 27) is identical compared to the average of the preliminary competition (about 27).

In this group the percentage of successful completion is approximately 56%. It can be concluded that the teams in this group were more efficient - an average of 27.33 goals per game of total 820 that a slightly higher number of shots from both groups (1619). The result can be explained by to the "outsider" (China) in this group, which eventually even had a goal difference of -60, so it turns out that on average per game they were losing with -12 goals. There were about 7 successful shots on avarage from field (9m) and about 12 unsuccessful shots, with realization of 35%, which is below the average for backcourt players. Wings shot efficiency was about 3 succesfull and about 2 unsuccessful from total of 165 shots with the percentage of realization of 61% which indicates on the small number of shots from the wing. This was due to the defensive actions of players. Correlation coefficients which describes the relation between a set of predictor and criterion variables each separetly, and with a defined criterion variables at a significance level $p < .05$ have showed some significant corelation but without deeper analysis. Based on the results from Table 7 it could be seen significant connection between the variables Field shots missed, Wing shots scored, Wing shots missed, Fast break shots scored, Fast break shots missed and Breakthrough shots scored with the final goal-difference with slightly higher values wich indicate a possible impact, but it should be processed by regression analysis. Using regression analysis the total and partial impact of the observed variables on the success of 'achievements was determined. The analysis addressed the impact of variables on the criterion score - the difference. Table 8 shows that the multiple correlation coefficient is 0.92 which indicates a significant correlation with the criterion predictor ($p = 0.00$). Total variability of the system predictor and criterion variables is about 85% (multiple $R2 = 0.85$) or 77% (adjusted $R2 = 0.77$). The remaining 23% of variability in the final outcome can be explained by the technical and tactical actions, efficacy of gatekeepers and other undefined factors. Based on the results we can conclude that the variables Field shots missed (0.46), and Fast break shots scored (0.50) significantly affect the criterion goal-difference (Table 9). It is important to emphasize that the variable Field shots missed has a negative sign, and variable Fast break shots scored has a positive sign. Fast break shots scored is a variable that has the largest impact on goal-difference criterion (0.50) which indicates that the successful fast break shots are the biggest contributor to the goal-difference. Next largest influence on goal-difference has a variable Field shots missed (0.46) which shows that teams that have a smaller number of unsuccessful shots from field, have more quality and diverse selection of shots and greater precision. Partial regression coefficients in the observed predictor variables are statistically significant in two variables, which indicates that they have just been crucial to the criterion goal-difference.

Characteristics of teams that is conditioned on the success of goal-difference criterion was very good in transition stages of handball game: good counterattack, varied shot selection and good organization of the attack as well as return to the defense after unsuccessfull attack. Results of the maximum number of goals (33) and the minimum number of scored goals (21) points to the fact that this group was more homogenuos than group B (maximum 36 and minimum 14). This group is weaker also in the percentage of realization with 54.35% goals in average per match than group A (56.63%). From these results it can be concluded that in this group defensive action had impact on development results. The fact that in this group, several unsuccessful field shots show how defensive action and goalkeepers played well. Percentage of successful implementation is about 42% which is much higher in group A compared to about 35%. In wings shots there were 81 successfull and 79 unsuccessful kicks with the percentage of realization of about 50% which is below than exspected because the expected percentage is about 75% - 80%. In a breakthrough shots, the percentage of successful shots was about 76% so it also represents an important factor in creating the final result. Table 11 shows that there is no significant correlation of variables with the criterion variable - goal-difference. Table 12 show that the multiple correlation coefficient is 0.60 which indicates of a significant correlation with the criterion set of predictor ($p = 0.43$). Total variability of the predictor and criterion variables is about 36% (multiple R2=.36) or cca. 2% (adjusted R2=.02).

The remaining 98% of variability in the final game outcome can be explained by the technical and tactical actions, gatekeepers efficacy, and other undefined factors. Table 13 shows the partial effects of predictor variables on the performance criteria associated with the F-test to assess their significance. Based on the results we can conclude that none of the variables has impact on the criterion of goal-difference. Partial regression coefficients in the observed predictor variables showed that neither variable was statistically significant so we can not conclude what variables have the highest projection on goal-difference criterion. After the analysis and obtained results, the hypothesis which predicts the absence of a statistically significant impact on the criterion defined by goal-difference at the end of the game was rejected, while the hypothesis H1 that predicts differences in the impact of predictor variables in relation to performance criteria was confirmed. The limitation of this study was that defensive actions should be included in research. Unfortunately, the registration system offer very little information in that domain, and only hypothetical conclusions based on available data remains. Research has confirmed that the handball game has speed up the counterattack phase - transition and the high level of technical performance with a maximum concentration of each of the key factors distinguishing winning and defeated teams. Therefore today's coaches in training should identify new technologies and modalities of training for just those technical elements of handball that are important for success.

References

Brčić, N., Viskić-Štalec, N., & Jaklinović, F.Ž. (1997). Prediktivna vrijednost varijabli za procjenu tehničko – taktičkih elemenata rukometne igre. *Kinesiology*, *29*(1), 55-64.

Gruić, I., Vuleta, D., & Milanović, D. (2006). Performance indicators of teams at the 2003 Men's World Handball Championship in Portugal*. Kinesiology, 38*(2), 164-175.

Gruić, I. (2006). *Situacijska efikasnost muških rukometnih ekipa na svjetskom prvenstvu u Portugalu 2003*. /Disertation/. Zagreb: Kineziološki fakultet.

Gruić, I., Vuleta, D., & Milanović, D. (2007). Pokazatelji situacijske učinkovitosti sudionica Svjetskog prvenstva za rukometaše. *Kinesiology*, *38*(2), 164-175.

Ohnjec, K. (2006). *Situacijska efikasnost ženskih rukometnih ekipa na Svjetskom rukometnom prvenstvu u Hrvatskoj 2003.* /Disertation/. Zagreb: Kineziološki fakultet.

Ohnjec, K., Vuleta, D., Milanović, D., & Gruić, I. (2008). Pokazatelji situacijske učinkovitosti ekipa sudionica Svjetskog prvenstva za rukometašice. *Kinesiology*, *40*(1) 69-79.

Rogulj, N. (2000). Differences in situation-related indicators of the handball game in relation to the achived competitive results of teams at 1999 Word Championship in Egypt. *Kinesiology*, *32*(2), 63-74.

Rogulj, N., Vuleta, D**.,** Milanović, D., Čavala, M., & Foretić, N. (2011). The efficiency of elements of collective attack tactics in handbal. *Kineziologia Slovenica, 17*(1), 5–14.

Sporiš, G., Vuleta, D., Vuleta, D. jr., & Milanović, D. (2010). Fitness Profiling in Handball: Physical and Physiological Characteristics of Elite Players. *Collegium antropologicum. 34*(3), 1009-1014.

Srhoj, V., Rogulj, N,. Padovan, M., & Katić, R. (2001). Influence of the attack end conduction on match result in handball. *Collegium Antropologicum*, *25*(2), 611-617.

Smajlagić, I., & Vuleta, V. (2006). Analiza nekih pokazatelja situacijske efikasnosti Hrvatske rukometne reprezentacije na Svjetskom prvenstvu 2003.g. In: Proceedings of 15. Summer school of kinesiologists Republic of Croatia, Rovinj, 2006.

Vuleta, D. (1997) *Kineziološka analiza tehničko-taktičkih sadržaja rukometne igre*. /Disertation/. Zagreb: Kineziološki fakultet.

Vuleta, D., Milanović, D., & Sertić, H. (2003). Utjecaj varijabli šutiranja na gol na konačan rezultat rukometnih utakmica Europskog prvenstva 2000.g. *Kineziologija*, *35*(2), 168-183.

Vuleta, D., & Milanović, D. (2004). *Rukomet – znanstvena istraživanja*. Zagreb: Kineziološki fakultet.

Vuleta, D., Milanović, D., & and Collegues (2009). Science in Handball. Zagreb: Faculty of Kinesiology University of Zagreb.

UTJECAJ NEKIH VARIJABLI ŠUTIRANJA NA KONAČAN REZULTAT RUKOMETNIH UTAKMICA PRELIMINARNOG DIJELA TURNIRA OLIMPIJSKIH IGARA 2008. GODINE

Sažetak

Cilj ovog rada bio je utvrditi utjecaj parametara situacijske efikasnosti na rezultat rukometnih utakmica na muškom dijelu turnira Olimpijskih igara u Pekingu 2008. Uzorak entiteta čini 12 nacionalnih selekcija, u ukupno 30 utakmica (60 protivnika) preliminarnog dijela muškog turnira Olimpijskih igara u Pekingu 2008. Za obradu podataka koristit će se statistički paket Utjecaj situacijskih parametara na kriterij gol-razlika analiziran je regresijskom analizom. Dobiveni rezultati ukazuju na statistički značajan utjecaj prediktorskih varijabli, šut sa devet metara neuspješno te šut iz polukontre uspješno na definiran kriterij. Kriterijska varijabla definirana je konačnim ishodom utakmice gol – razlika. Istraživanje je potvrdilo da se rukometna igra ubrzala da su faza protunapada - tranzicije te visoka razina tehničke izvedbe uz maksimalnu koncentracije jedni od bitnih faktora razlikovanja pobjednika i poraženih ekipa . Zato bi današnji treneri na treninzima trebali utvrditi novije tehnologije i modalitete treninga za upravo one tehničke elemente radu pokazale važnima za konačni uspjeh.

Ključne riječi: *rukomet, seniori, Olimpijske igre, situacijska efikasnost, regresijska analiza*

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