

# Influence of the Attack End Conduction on Match Result in Handball

V. Srhoj, N. Rogulj and R. Katić

Faculty of Natural Sciences, Mathematics and Education, University of Split, Split, Croatia

## ABSTRACT

*The influence of 18 predictive variables on final match result in the character of the criterion variable has been analyzed for the purpose to establish the significance of positional direction of the attack end conduction on the situation-related resulting successfulness in top quality handball. It has been done on the sample of 80 matches from 1999 Men's World Handball Championship in Egypt. The frequency and the effectiveness of shooting from different playing positions are defined by these predictive variables. It is evident from investigation results that predictive variables significantly explain resulting successfulness. Significant influence on final match result is given by all variables defining the effectiveness of the realization (achieved goals), except from the pivot attacker position. Also particularly significant influence on final match result is given by variables of the realization from back attacker positions and from individual action by the break-through and from the fastbreak. Variables relating to the frequency of shooting from particular position have no significant influence on the result meaning that resulting successfulness does not depend on quantity but on quality of shots.*

## Introduction

Games, and especially sport ones in which a great number of players participate and collide in constant movement on individual, group and collective level, present unique phenomenon not simple to analyze. Numerousness of objects, complexity of the movement, variety of positions and situations and unlimited variability of strategic solutions require a

qualitative approach to the sport game analysis and its decomposition to smaller segments.

Handball is one of the most complex ball games characterized by precisely defined goal, richness of natural movement forms, diversity of the motion structures, stressed situation-related colliding and the need for creative and organized conduction of technical-tactical elements in situation-related conditions.

The match result is a product of interactive activity of colliding teams and external influences of the environment. The influence of colliding actors is manifested through situation-related game elements conditioned by numerous dimensions of the handball subjects system, i. e. players. These indicators are precisely described by rules of the game and also favorable for visual registration and statistic documentation.

Results of up to now investigations show that teams significantly differ in technical-tactical game indicators, especially in relation to the criterion of resulting successfulness. Also, they show that situation-related variables in great measure determine final match result. In the determination of final result of the handball match, the highest prognostic quality is stated by variables of the attack end conduction.

The attack end performed by shooting presents the resultant of overall activity of attacking team but also of opposing activity of defending team as well. Therefore, the successfulness of the conduction of the shot on the goal directly influents on resulting course and final match result.

In up to now researches of variables that treat the attack end it was established as follows:

- different effectiveness of shooting in relation to particular player positions and playing field zones and different modes of shooting<sup>1–4</sup>;
- significant differences in the frequency and the efficiency of shooting in relation to resulting successfulness of the team<sup>5–8</sup>;
- significant influence of attack end variables on final match result<sup>9,10</sup>.

This investigation has been conducted on the supposition that all ways of conducting the attack end doesn't participate with same contribution in structuring the match result. Its intention has been to analyze the influence of differently positionally oriented ways of the realization on final match result in top quality handball.

## Materials and Methods

The investigation has been conducted on the sample of 80 matches from 1999 Men's World Handball Championship in Egypt, what means that the sample of entities contains 160 collective indicators of the situation-related activity of mutually collided opponents.

Predictive variables are presented by 18 indicators of positional direction of the attack end conduction. Indicators have been collected by official statistic surveillance, or to say, by the computer protocol analysis of the match course from this competition\*.

The analysis includes the following predictive variables:

- GORIWI – number of goals from right wing position
- SHRIWI – number of shots from right wing position
- GOSEME – number of goals from seven meters
- SHSEME – number of shots from seven meters
- GOLEWI – number of goals from left wing
- SHLEWI – number of shots from left wing
- GOPIVO – number of goals from the pivot attacker position
- SHPIVO – number of shots from the pivot attacker position

---

\* Original data can be found in official statistic bulletins from XVI Men's World Handball Championship 1999 in Egypt – MIC informations systeme GmbH.

- GORIBA – number of goals from the position of right back attacker
- SHRIBA – number of shots from the position of right back attacker
- GOCEBA – number of goals from the position of central back attacker
- SHCEBA – number of shots from the position of central back attacker
- GOLEBA – number of goals from the position of left back attacker
- SHLEBA – number of shots from the position of left back attacker
- GOBRTH – number of goals from individual action by the break-through
- SHBRTH – number of shots from individual action by the break-through
- GOFABR – number of goals from the fastbreak
- SHFABR – number of shots from the fastbreak

The criterion variable is presented by final result of handball match expressed as numerical difference between accepted and achieved goals.

Basic central and dispersive statistic parameters, arithmetical mean (X), standard deviation (SD), and minimal and maximal value of results (MIN, MAX) have been computed. Relations between predictive variables and the criterion variable have been established by classical regression analysis in the manifestation area.

### Results and Discussion

From Table 1, where basic description parameters are presented, relatively flat disposition of the attack end conduction is significant in relation to all positions. Evidently, top quality handball is characterized by optimal and equal utilizability

TABLE 1  
THE BASIC CENTRAL AND DISPERSIVE STATISTIC PARAMETERS

Variable	X	SD	Min	Max
GORIWI	2.26	1.69	0.00	8.00
SHRIWI	4.08	2.44	0.00	12.00
GOSEME	2.70	1.66	0.00	8.00
SHSEME	3.92	1.88	0.00	9.00
GOLEWI	2.15	1.73	0.00	7.00
SHLEWI	3.98	2.41	0.00	12.00
GOPIVO	3.51	2.04	0.00	12.00
SHPIVO	5.10	2.52	1.00	18.00
GORIBA	1.89	1.46	0.00	7.00
SHRIBA	5.13	3.09	0.00	14.00
GOCEBA	4.08	2.27	0.00	12.00
SHCEBA	10.66	4.58	2.00	28.00
GOLEBA	1.91	1.53	0.00	7.00
SHLEBA	5.04	2.97	0.00	14.00
GOBRTH	2.02	1.74	0.00	8.00
SHBRTH	2.47	2.05	0.00	13.00
GOFABR	4.60	3.26	0.00	23.00
SHFABR	6.15	3.86	0.00	27.00

of play positions and different ways of realization. Almost identical frequency of the shooting is espied in relation to both sides of playing field (left wing and left back in relation to right wing and to right back). The greatest frequency of the attack end conduction has been noted in the player on the position of central back attacker. It is understandable, because this player, having favorable position, mostly is in possession of a ball and has the greatest possibilities for the realization. The effectiveness is expressed by the ratio of realized and directed shots. In accord with expectations, the highest one is present in the attack end conduction from clean situations which is not influenced by opposed defense player and from short distance (fastbreak, seven meters, break-through, pivot attacker). The lowest effectiveness is present in the attack end conduction from positions being unfavorable for realization because of long shooting distance and the activity of opposed defense player (back attackers) or because of small shooting angle (wing attackers).

From Table 2, where results of the regression analysis are presented, it can be seen that selected system of predictors in great measure ( $DEL = 0.76$ ) explains the match result in the character of the criterion variable.

According to the expectation, all variables describing the effectiveness of the attack end conduction are represented by the number of achieved goals and realize significant influence on final match result. The exception is the variable of the realization from the pivot attacker position. It is understandable since the goal represents the resultant of overall cumulative individual, group and collective activity. And that is the case not only in the phase of the team being in possession of a ball but also indirectly as the goal being resultant of the influence of precedent defensive activity. This activity is compre-

hended as initial basis for the conduction of the attack that has ended with the goal. Achieving the goal represents the realization of momentary partial aim of the game and directly structures the match result. In accord with the game rules the goal is the only element of the game that has been responsibly assigned nominal numerical value which cumulatively represents the result of engaged team.

Variables of the realization from all of back positions, from the break-through and from the fastbreak have the greatest contribution in creating the result. As similar results have been gained also in up to now investigations, it is possible to suppose that mentioned ways of the attack end conduction have special significance for resulting successfulness of the team.

Positions of back attackers dominantly contribute to the organization as well as to the realization of the attack, because of favorable area positions as follow: favorable shooting angle and good survey of the game, great available space for the conduction of attacking activity, proportionally greater quantitative participation of players on back positions in attacking activity as frequent contact with a ball is in distinction from other play positions. Besides direct shooting, players on back positions have favorable possibilities for the conduction of individual actions with the break-through against directly opposed defense player. This kind of the realization, also, significantly influences on the match result, probably for the reason that in the best way represents motorical abilities required for the conduction of this kind of the attack end. These abilities are, in the first place, explosive strength and the agility. They dominantly determine general playing quality and the situation-related successfulness of the attacker. Moreover, in the break-through, defense

TABLE 2  
THE RESULTS OF REGRESSIVE ANALYSIS

Variable	R	Q(R)	Part-R		P	SIG-	Q( )
GORIWI	0.33	0.00	0.17	0.16	5.34	0.08	0.04
SHRIWI	0.17	0.03	-0.07	-0.06	-1.07	0.08	0.40
GOSEME	0.31	0.00	0.17	0.16	5.05	0.08	0.04
SHSEME	0.26	0.00	0.06	0.05	1.38	0.08	0.50
GOLEWI	0.43	0.00	0.18	0.16	6.92	0.07	0.03
SHLEWI	0.35	0.00	0.06	0.06	2.03	0.08	0.45
GOPIVO	0.29	0.00	0.04	0.03	1.01	0.08	0.65
SHPIVO	0.20	0.01	0.12	0.11	2.20	0.07	0.15
GORIBA	-0.13	0.11	0.27	0.20	-2.56	0.06	0.00
SHRIBA	-0.50	0.00	-0.37	-0.31	15.70	0.06	0.00
GOCEBA	0.08	0.32	0.40	0.31	2.44	0.06	0.00
SHCEBA	-0.27	0.00	-0.25	-0.21	5.53	0.06	0.00
GOLEBA	-0.07	0.36	0.26	0.19	-1.35	0.06	0.00
SHLEBA	-0.36	0.00	-0.16	-0.13	4.54	0.07	0.06
GOBRTH	0.27	0.00	0.27	0.37	9.99	0.11	0.00
SHBRTH	0.18	0.02	-0.22	-0.29	-5.18	0.11	0.01
GOFABR	0.60	0.00	0.27	0.46	27.54	0.14	0.00
SHFABR	0.58	0.00	-0.04	-0.06	-3.42	0.14	0.66
	DLT	RO	S-DLT	F	DF1	DF2	P
	0.76	0.87	0.49	24.75	18	141	0.00

R = correlation coefficients; Q(R) = significance of correlation coefficients; Part-R = partial correlation coefficients; = regression coefficients; P = contribution percentage of each independent variables to explanation variance of dependent variable; SIG- = standard error of ; Q( ) = significance of regression coefficients; DLT = coefficient of multiple determination; RO = coefficient of multiple correlation; S-DLT = adjusted RO-square; F = F-value; DF1, DF2 = degrees of freedom; P = p-value

players often have no success in completely preventing the attacker with contact ways. That is why defense players are forced on irregularities sanctioned by corresponding penalties in accordance with judicial ruling. The most often, judicial ruling is the exclusion of defense player for 2 minutes, indirectly reflecting on the result as well.

The conduction of fast attacks on non-organized defense, or to say of the fastbreaks and the half-fastbreaks, has great influence on the determination of the match result. Point is that this is quantitatively frequent way of the real-

ization that directly depends on dominant motorical and other dimensions of handball subjects depicting playing quality, and especially on speed strength and speed endurance. So this way of the attack end conduction dominates in the creation of resulting difference on matches of qualitatively different opponents and the most reliably polarizes teams with from those without good results.

It can be seen that total number of performed shots regardless of the position of directing has no significant influence on the result in distinction from successfully performed shots, or goals. It is

obvious that resulting successfulness is not conditioned by quantity but quality of shots. Variables depicting total number of directed shots can be considered as quantitative indicators of general engagement of attacking activity directed on the attack end conduction. However, the fact is that this engagement alone is not sufficient for the production of results but its quality is. This quality is represented by effective realization materialized by the goal as final aim of the attack.

### Conclusion

The influence of indicators of positional direction of the attack end conduction on final match result has been analyzed on sample of 80 top quality handball matches from 1999 World Championship. Indicators of the attack end conduction have been represented in terms of 18 predictive variables, while the criterion variable has been expressed as resulting difference of achieved and accepted goals. Investigation results show that selected

predictors significantly explain resulting success in the character of the criterion variable ( $DEL = 0.76$ ). Significant contribution to the explanation of the criterion variation is given by variables relating to the effectiveness of the attack end conduction. These variables are represented by the number of achieved goals, except from the pivot attacker position. Also, particularly significant contribution, mentioned before, is given by variables of the realization from back attackers positions, from individual action by the break-through and from the fastbreak. These variables representing the resultant of cumulative activities of engaged team the most convincingly represent significance on which playing quality, and resulting quality as well, depends. On the other hand, variables relating on indicators of general engagement of attacking activity directed on the attack end conduction have no significant influence on the result. This means that resulting successfulness is not conditioned by quantity but quality of shots.

### REFERENCES

1. GAJIĆ, V., *Sportska praksa*, 3–4 (1972) 4. — 2. ŠAFARYKOVA, J., *Rukomet*, 2 (1978) 32. — 3. ZNOJ, V.: *Analiza in modelne značilnosti kružnega napadalca na 17. svetovnem prvenstvu v rokometu za moške na Češkoslovaškem*. B.A. Thesis. (Fakulteta za šport, Ljubljana, 1990). — 4. CZERWINSKI, J., *EHF Periodical Handball*, 2 (1998) 10. — 5. KOVAČ, J., M. ĐUKIĆ, *Fizička kultura*, 2 (1980) 140. — 6. IGNJATOVA, V. J., *Rukomet*, 8 (1984) 50. — 7. BRČIĆ, B., N. VISKIĆ-ŠTALEC, Ž. JAKLINOVIĆ FRESSL, *Kineziologija*, 29 (1997) 55. — 8. ROGULJ, N., *Kineziologija*, 32 (2000) 63. — 9. ROGULJ, N.: *Utjecaj situacijskih struktura kretanja na konačni rezultat rukometne utakmice*. M.Sc. Thesis. (Fakultet za fizičku

kulturu, Sarajevo, 1990). — 10. CZERWINSKI, J., *EHF Periodical Handball*, 2 (1995) 16. — 11. KAMPOMANN, K., K. SASSENBERG, G. WESTPHAL, *Rokomet*, 11 (1975) 3. — 12. MULLER, M., H. STEIN, I. KONZAG: *Handball Spielend Trainieren*. (Sportverlag GmbH, Berlin, 1992). — 13. RIPALL, H., Y. KERLIRZIN, J. STEIN, B. REINE, *Human Movement Science*, 14 (1995) 325. — 14. SECO, J., *EHF Periodical Handball*, 2 (1998) 35. — 15. TABORSKY, F., *EHF Periodical Handball*, 2 (1996) 7. — 16. VULETA, D.: *Kineziološka analiza tehničko-taktičkih sadržaja rukometne igre*. Ph.D. Thesis. (Fakultet za fizičku kulturu, Zagreb, 1997).

V. Srhoj

*Faculty of Natural Sciences, Mathematics and Education, University of Split, Tselina 12, 21000 Split, Croatia*

## **UTJECAJ PROVEDBE ZAVRŠNICE NAPADA NA REZULTAT UTAKMICE U RUKOMETU**

### **S A Ž E T A K**

Utjecaj 18 prediktivnih varijabli na krajnji rezultat utakmice u ulozi kriterijske varijable analiziran je u cilju ustanovljavanja značajnosti pozicijske usmjerenosti završetka napada na rezultat rukometne utakmice. Istraživanje je provedeno na uzorku od 80 utakmica Svjetskog muškog rukometnog prvenstva u Egiptu 1999. godine. Učestalost i učinkovitost u pucanju s različitih igračkih pozicija definirani su ovim prediktivnim varijablama. Očito je iz rezultata istraživanja kako prediktivne varijable značajno objašnjavaju uspješnost u rezultatima. Značajan utjecaj na krajnji ishod utakmice ostvaruju sve varijable koje definiraju učinkovitost realizacije (postignuti golovi), osim onog u poziciji kružnog-napadača. Također, posebno značajan utjecaj na krajnji rezultat utakmice ostvaruju varijable realizacije s pozicija vanjskih napadača, iz individualne akcije prolazom i iz protunapada. Varijable povezane s učestalošću pucanja na gol s određene pozicije nisu ostvarile značajan utjecaj na rezultat, što znači da rezultatska uspješnost nije ovisna o kvantiteti već o kvaliteti pucanja na gol.