

## Original Article

### Analysis of the frequency of a goalkeeper's individual playing activities without the ball in top level football

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#### Abstract:

This paper focuses on the field of a goal-keeper's playing activity in football. The scientific part of the thesis deals with the frequency of all playing activities of the monitored goal-keepers in world competitions. (Confederation Cup 2013, World Cup 2014, Champions League 2013, 2015). The authors have created a record which enabled them to register all individual playing activities in the matches. (Honz, 2016) Statistically, the goal-keepers of the winning teams did more offensive playing activities than defensive ones. For the goal-keeper it is important to master all the playing activities, irrespective of how often they are performed in the match.

**Keywords:** football, playing activities without the ball, goal-keeper, frequency

#### Introduction

Individual playing activities (further IPA) are the basic skills of every player and a goal-keeper. An intrinsic feature of their skill as players is the ability constantly to assess given playing situations and to react appropriately. (Peráček&Pakusza, 2011). Up to now, the majority of data applied to IPA analysis have largely concerned playing activities with the ball, while playing activities without the ball have been virtually ignored. Hence, it does not reflect the goalkeeper's complex playing activity performance and therefore it is necessary to divide it further into the individual dimensions of playing activities with the ball (defensive and offensive playing activities) and playing activities without the ball (managing defensive play, communication, and alike).

Development of the analytical study of the goalkeeper's playing activities without the ball was unequal in terms of defensive and offensive playing activities. Only recently has it started to get equal attention. The authors believe that analysis of playing activities without the ball (in both offensive and defensive phases), is still neglected, especially in the research field, although less in practice. Nevertheless, it is clear that there is an incompatibility problem in both areas.

#### *Aim*

The aim of the research was to contribute to widening the knowledge of the frequency of individual playing activities occurring without the ball.

#### *Hypotheses*

The frequency of occurrence of IPA without the ball will be different. In the group of goalkeepers in the winning teams a higher statistical occurrence of IPA without the ball is expected, i.e. more management of play and communication and IPA in a standing position than in the group of goalkeepers of the losing teams.

#### *Tasks*

To find out and compare the occurrence frequency of individual goalkeepers' playing activities performed without the ball in winning and losing teams during monitored matches.

#### Material & methods

The research attempted to identify the physical effort expended in the particular playing activities of top individual football goalkeepers in a match. From the methodological point of view, one group and one research period were chosen. In practice it was a non-experimental situation, in which it was determined under what circumstances the ex-post-facto research SP (Sports Performance) = f. (S). t<sup>1</sup> was carried out. We monitored the playing effort of an individual in particular playing activities – play management and communication, and standing as the function of a particular i-state. We derived from the thesis that the playing performance is a situationally conditioned phenomenon which is created by all the goalkeeper's interactions with his environment during a match. Therefore it cannot be measured exactly, but it can be analysed objectively by different methods (Süss, 2006). We concur with Přidal (2001) that the objective analysis of a match based on an evaluation of the quality of individual playing activity during the encounter is the most appropriate method to evaluate the performance of an individual and a team.

The research sample was composed of 38 goalkeepers participating in the World Championship, Champions league and Confederations Cup. During the 2014 World Championship in Brazil we evaluated 29 goalkeepers, in UEFA Champions league matches in 2013 and 2015 there were 15 and at the FIFA Confederations Cup in 2013 3 goalkeepers were evaluated. In total 50 matches were monitored and evaluated. All of them are excellent goalkeepers, the majority of them representing their countries or top football clubs.

In the thesis indirect monitoring was used. The chosen matches were monitored and analysed from the record. The monitoring focused on the playing performance of the goalkeepers. We monitored 50 matches – 32 WCH matches in 2014, 9 CHL matches in 2013, 7 CHL matches in 2015 and 2 Confederations Cup matches in 2013. In order to register variables –goalkeepers' IPAs – a record sheet was used. Each match featured on a separate sheet. In case of doubt, the recording was stopped or the playing situation was played again. Thereby ensuring the quality of registration and objective evaluation of the IPAs in the match. For verification purposes each match was monitored and evaluated twice. The team's success was measured by victory or loss of the match.

The evaluation concerned:

The frequency of IPAs occurring in all matches, in both winning and defeated teams

The kind of IPA (all playing activities with and without the ball)

The team's degree of success in a won or lost match.

To administer and evaluate data, basic characteristics of position of the median and spread (variation interval of measured values) and an analysis of the frequency of monitored IPAs were used.

## Results

### The frequency of individual playing activities without the ball

This part of the thesis presents the occurrence frequency of all IPAs performed by football goalkeepers from the research sample.

Table 1 The occurrence frequency of all individual playing activities of goalkeepers in football

Individual playing activities	Frequency	Percentage
IPA without the ball	2310	33.35 %
DIPA with the ball	1510	21.80 %
OIPA with theball	3106	44.85 %
Summed up	6926	100 %

50 football matches saw 6926 individual playing activities carried out. (Table No. 1) Within these activities we monitored IPAs without the ball, defensive IPAs with the ball (DIPA) and offensive IPAs with the ball (OIPA). IPAs without the ball were represented by 2 playing activities: managing the play and communication, and playing activity in a standing position. (Table 2). The occurrence frequency of IPAs without the ball was 2310, i.e. one third of the occurrence frequency in the group (33, 35%) and it was also the second highest IPA occurrence frequency overall. The arithmetical average of the group was 46, 20 IPAs, minimum 1, maximum 36, variety rank 35 and median 44. Out of two IPAs without the ball a higher occurrence frequency of IPAs in a standing position was recorded. (Table 2, Fig.1).

The above-mentioned individual playing activity (IPA) was recorded 1858 times, which represents 80.43% of all playing activities without the ball, and therefore it comes in first place among such activities. The arithmetical average was calculated as 37.16 of IPA, the minimum being 5, the maximum 36, the variation range - 31 and the median - 36. The sample group of 100 goal-keepers of both winning and losing teams produced the following scores: 1 goal-keeper realized 5 standing IPAs, 15 goal-keepers stood 8 – 11 times, 21 goal-keepers 16 – 19 times, 19 goal-keepers 20 – 13 times, 11 goal-keepers 24 – 27 times, 10 goal-keepers 28 – 31 times and 3 goal-keepers 32 times and 1 goal keeper as many as 36 times.

Table 2 The occurrence frequency of a football goalkeeper's IPAs without the ball.

Playing activities without a ball	Play management and communication	Standing up	Summed up
Winners			
Frequency	240	871	1111
Percentage	53.10 %	46.90 %	48.10 %
Arithmetical average	4.8	17.2	22.22
Decisive deviation	2.83563	7.00755	7.93157
Minimum	1	8	1
Maximum	15	36	36
Median	4	16	20
Variety range	14	28	35
Losers			

Frequency	212	987	1199
Percentage	46.90 %	53.10 %	51.90 %
Arithmetic average	4.24	19.74	23.98
Decisive deviation	2.42908	6.68171	7.42167
Minimum	1	5	1
Maximum	15	32	32
Median	4	20	24
Variety range	14	27	31
Summed up / %	452/19.57 %	1858/80.43 %	2310
Kolmog.-Smirn. test	P=0.068096	<u>P=0.022218</u>	

Values marked in grey are statistically important.

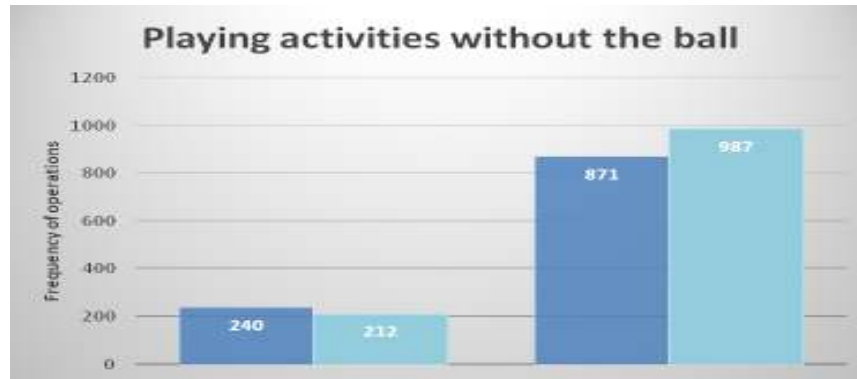


Fig. 1. Occurrence frequency of IPAs without the ball.

A considerably lower frequency score was recorded in IPA of play management and communication. In the sample of IPA without the ball it was recorded 452 times, which means 19.57%. Almost all renowned trainers consider play management activity and communication to be one of the basic goal-keeping skills. The arithmetical average was 9.04 of IPA, the minimum being 1, while the maximum was 15, the variation range being 14 and the median 8. 16 goal-keepers applied these IPAs from 1 to 2 times, 48 goal-keepers 3-4 times, 30 goal-keepers 5 – 8 times, 2 goal-keepers 10 times, other 2 12 – 13 IPAs and 2 goal-keepers 15 IPAs.

The study focused on the performance of IPAs without the ball during the matches of both winning and losing teams. The prediction was that the frequency of IPAs without the ball would be different in winning and losing teams respectively. We expected that the goal-keepers of winning teams to have a higher ratio of IPAs without the ball.

**The frequency of individual playing activities without the ball by goal-keepers of the winning teams**

The overall frequency of IPAs without the ball represented 1111 IPAs of goal-keepers (GK) of the winning teams - that is 48.10%. This represents the arithmetical average of 22.22 IPAs – the minimum being 1 and the maximum 36; the variation range 35 and the median 20 IPA.

From the total frequency of 1,111 IPA without the ball (by goal-keepers of the winning teams) the most frequent activity was standing up, with frequency 871 times - that is 46.90%. The arithmetic average per match was 17.42, the minimum being 8 and the maximum 36 IPA; the median is 16 and the variation range 28 IPAs. A higher arithmetical average was noted in 20 goal-keepers of the winning teams. 6 goal-keepers had an average of 18 – 21 IPAs and 8 goal-keepers had 22- 25 IPA, while 6 goal-keepers performed 27 – 36 IPAs.

A lower arithmetical average per match was recorded by 30 goal-keepers of the winning teams: 11 goal-keepers showed 8 – 11 IPAs, the same number of goal-keepers 12 – 14 IPAs and 8 goal-keepers presented 15 – 17 IPAs. The second place in the frequency of IPA without the ball by the goal-keepers (GK) of the winning teams was play management and communication. GK of the winning teams practiced this IPA only 240 times – 53.10%. The average occurrence per match was 4.8 times, the minimum was 1 playing activity, while the maximum 15 IPA. The median value was 4, the variation range 14. A higher arithmetical average than 4.8 was recorded by 21 GK of the winning teams, 17 GK had the average of 5 – 8 IPAs and 4 GK recorded 10 – 15 IPAs. A lower arithmetical average than 4.8 IPAs was recorded in 29 GK of the winning teams – 6 GK had 1 – 2 IPAs and 23 GK had 3 – 4 IPAs.

**The frequency of individual playing activities without the ball by goal-keepers of the losing teams**

The total frequency score of the IPA without the ball (2310) referred to GK of both winning and losing teams. These GK showed a higher value – 1199 IPAs, which represents 51.90%. The recorded difference was 88 IPAs. The arithmetical average was 23.98 IPAs – the minimum being 1, while the maximum 32 IPAs, the median 24 and the variation range was 31 IPAs. The evaluation of the frequency of IPA in GK of the losing teams showed that standing up activity had the highest frequency (a similar occurrence as in the winning teams).

Standing IPAs were recorded 987 times (53.10%) in the GK of the losing teams. This number is 116 IPAs higher than by GK of the winning teams. This also means a higher arithmetical average – 19.74 (by 2.32 IPAs), a lower minimum value – 5 (by 3 IPAs), a lower maximum value – 32 (by 4 IPA), but a higher median i.e.20 (by 4 IPA), with the variation range being almost the same - 28 to 27 respectively). An arithmetical average higher than 19.74 IPAs was recorded in 26 cases of GK of losing teams, 10 GK had the average number 20 – 23 of IPAs, 7 GK had 24 – 26 IPAs, 9 GK 28 – 32 IPAs. An arithmetical average lower than 19.74 was reported in 24 GK, 3 GK had 5 – 10 IPAs, 10 GK had 11 – 14 IPAs and 11 GK had 15 – 19 IPA.

The statistical difference in the frequency of standing IPAs between the GK of the winning teams and GK of the losing teams was  $P < 0.05$  in favour of the GK of the losing teams.

The second highest frequency of IPA was play management and communication. This IPA was 28% lower in the GK of the losing teams than in GK of the winning teams. This figure represents 212 cases, which equals 46.90%. The arithmetical average per game was a little lower (by 0.56%), the minimum and the maximum was the same (1 or 15 resp.), the median was the same (4), as well as the variation range (14 IPA). An arithmetical average higher than 4.24 per game was reported by the GK of the losing teams, i.e. 13 GK showed 5 – 8 IPA on average, while 2 GK had 9 – 15 IPA. An arithmetical average lower than 4.54 was seen in 35 GK of the losing teams: 11 GK performed 1 – 2 IPAs and 24 GK 3 – 4 IPA. The differences between the IPA of GK of winning and losing teams were statistically insignificant –  $p > 0.05$ . IPA activities without the ball, standing, were more frequent in goal-keepers of the losing teams compared to GK of the winning teams.

### Discussion

The work aimed to widen the knowledge of the occurrence and frequency of IPA without the ball in football goal-keepers.

The majority of scientific works all over the world do not cover the complete range of the goal-keepers' playing behaviour (Buchtel, Ejem and Vorálek, 2011). For the sake of completeness we should also include the situations in which the goal-keeper performs little or no physical activity – thanks to psychological processes (concentration, thinking) he fully participates in the football game. From the point of view of team success we found considerable differences in the frequency of IPA. The highest frequency was observed in attacking IPAs with the ball (3106 cases, which is 44.85%), a lower frequency was recorded in IPA without the ball – 2310 (33.35%), while defensive IPA with the ball had the lowest frequency (1510 – 21.80%).

### Conclusions

Individual playing activities without the ball constituted more than one third (2310 IPAs – 33.35%) of the total frequency in the whole set of activities. Goal-keepers of the winning teams recorded a lower frequency (1111 IPAs – 48.10%), while the goal-keepers of the losing teams scored higher (1199 IPAs – 51.90%).

IPAs without the ball - standing, produced the highest frequency score (1858 IPAs – 80.48%). The goal-keepers of the winning teams had a lower frequency score (871 IPAs – 46.90%), while the goal-keepers of the losing teams showed a higher frequency (987 IPAs – 53.10%). The differences found were insignificant.

From the strategy point of view during the football match we recommend to the trainers of the teams:

To observe and analyse the characteristics of the play performance with regard to the game results. This analysis could reveal the reasons of victory or loss during the football match.

For the training process it is extremely important to know which play situations are repeated in particular phases of the game, what play activities and quality parameters are relevant.

As there were some changes in the ratio of offensive and defensive play activities during the period of study, we recommend some changes in the training content not only in the category of TOP level football, but also in other competitive and age categories. For training practice we recommend also technical and tactical parameters of all IPAs, with regard to perspective development: To put emphasis on the play management and communication skills in the IPA without the ball and to agree on the fact that the procedures should be agreed and practised in advance.

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