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Original Article

Technical–tactical profile of an elite soccer goalkeeper

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Abstract
The analysis of individual game performance is a necessary part of the coach´s daily work. It can provide the coach with accurate and detailed information and data on the league requirements for the individual game performance of a player. This information is essential for the creation and optimization of the training process. In this study, we examined the technical–tactical profile of elite goalkeepers in professional soccer. The research group consisted of selected goalkeepers (n = 12) from four European soccer leagues (i.e., English, German, Spanish and Italian). The goalkeepers were observed at all home competition matches during the 2019/2020 season (a total of 406 matches). We recorded and evaluated the chosen aspects of the goalkeepers´ game performance, i.e., the number and success rate of defensive, offensive and all game activities. To acquire research results, we used the method of indirect observation of chosen game activities developed by the InStat technologies. We used one-way ANOVA tests, the post hoc Tuckey HSD test and the Z-score test for two population proportions to process and evaluate the research data. The level of statistical significance was set at the 5% level. We found significant differences in the number of goalkeepers´ game activities and in the success rate of defensive and offensive game activities. We did not find any significant differences in the overall success rate of game activities. This research confirms trends and developments in the goalkeepers´ game and indicates increasing demands placed on the goalkeepers´ game. These demands are mainly regarding the success rate of solving game situations.
Key words: soccer, goalkeeper, game performance, game activity, success rate, profile

Introduction

The player´s individual game performance is a unique phenomenon in a match, during which he participates
in the game performance of the whole team and tries to help his playmates achieve their common goal. The individual game performance has in the match two basic forms of expression. The technical activity comprises all player´s game activities in a match, with which he has to deal using his abilities. It represents the technical-tactical demands of the match on a player and is characterized by the complexity of the training load. The player´s physical activity in a match is most often expressed by the load volume and intensity. It means that the physical activity represents the complex of demands on the player´s organism, both physically and mentally. It is not an easy task to assess which one of these two areas has a bigger or more significant impact on the final game performance of a player in a match. Several authors (Lago-Penas et al. 2010, Castelano et al. 2012, Carling 2013, Hoppe et al. 2015, Nassis et al. 2015, Moalla et al. 2018) agreed that the technical activity in a match is for the player more important than the physical activity. It is so especially due to the fact that the technical activity and its impact on the match result can be easier quantified than the influence of physical activity on it. But we agree with Kokstejn and Muselaek (2019), that specific game actions (technical activity) and non-specific game actions (physical activity) are very deep connected to each other and have to be developed at the same time.

Compared to other game functions, the goalkeeper position is a unique one (Konefal et al. 2019, Obetko et al. 2019, Obetko et al. 2020). It reflects itself significantly in his individual game performance. The physical and technical activity of a goalkeeper and his role on the field is quite different from the roles of other players. Many authors confirmed this fact in their works (Di Salvio et al. 2008, Seaton & Campos 2011, Liu et al. 2015, Padulo et al. 2015, Konefal et al. 2019, Schwarz et al. 2019). Obetko et al. (2019) describe it as a critical player function, which has a significant impact on the team´s match result too. The main and currently also the traditional function of a goalkeeper in match is to stop the opponent from scoring a goal. However, in recent years, the goalkeeper´s game has also changed and evolved as a result of a change in rules. Besides, the requirements for the goalkeeper´s game have changed too. It is still the case that the core function of a goalkeeper is to prevent the goal, but nowadays is his cooperation with teammates in the offensive game phase also almost as important. It has increased the demands on the goalkeeper´s game from a technical point of view

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(Szwarc et al. 2010, Seaton and Campos 2011, Liu et al. 2015 Szwarc et al. 2019). These findings have to be reflected also in the content of the training process and his proportionality of the goalkeeper´s game activities during a match. Several studies confirm this fact too (Liu et al. 2015, Soares et al. 2018, White et al. 2018). The authors of these studies state that the current proportion of game activities within a one-year-long training cycle is approximately 60-70%, in favour of offensive game activities.

Many different factors influence the final match result and the goalkeeper's individual game performance in a match (Wilson et al. 2019). The goalkeeper´s game is characterized mainly by decision making, his mentality, technical skills and physical fitness (Otte et al. 2019). In other words, the final individual game performance in a match is only some form of integration of these factors. If a goalkeeper wants to constantly improve his performance, he has to improve these factors in a training unit. In several studies proved the authors the impact of various training stimuli on the development of certain/specific aspects of the individual game performance (Chtara 2017, Karahan 2020). However, soccer as a sport is constantly developing, pushing the envelope, and the demands on the technical, tactical, conditional but also the psychological, level of players are still higher and higher (Andrzejewski 2012, Chmura 2018). Therefore, soccer and individual game performance nowadays requires a complex process in the development of players. It is important also in order to achieve the improvement of several factors of individual game performance at the same time. It can be achieved in a training which is oriented on solving match situations, so-called game-situation based training. Implementing this type of training also according to Esposito et al. (2019), we can influence the technical, tactical, conditional, but also the psychological aspect of the player's individual game performance. Besides, this way we can affect the activity factors of team game performance too. To apply this type of training into the training plan, we have to know the personality of the concrete goalkeeper, but also the requirements of a league on his game performance. For this purpose, we use the diagnostics of individual game performance.

Analysis of individual game performance is nowadays seen as a necessary tool for the coach while doing his job. Relevant data gained using modern software shows us the demands which are put on the player in a match, but also reveals the strengths and weaknesses of his playmates and opponents. It also helps by the planning and the possible adjustments of the training process in order to increase the performance level of players (Bradley et al. 2013, Clemente et al. 2013, Arruda et al. 2015, Sannicandro et al. 2016, Filetti et al. 2017, Pascual-Verdú & Carbonell-Martínnez 2018, Konefal et al. 2019, Szwarc et al. 2019, Zhou et al. 2020). The coach always tries to increase the performance level of his players. The indicator of a trend in a certain area should always be the best players in the given player positions, ideally in the best long-term leagues in Europe, or in the world and the above mentioned leagues certainly belong to these. Professional soccer teams in Europe are at the same level and there are minimal differences between the best teams. Therefore, we assume that between the observed goalkeepers there will be no significant differences regarding the monitored indicators of individual game performance.

Material & methods

Characteristics of the research group

The research group was comprised of selected goalkeepers (n = 12) from the 4 top European leagues - English Premier League, Spanish Primera División, German Bundesliga and Italien Serie A. From each league, we selected goalkeepers (n = 3) who were monitored in all matches of the 2019/2020 season in which they played. We chose goalkeepers who achieved in the season, according to the Instat software, the best ranking – Instat index in their league. Goalkeepers included in this research group had to play in a minimum of 20 matches in the season.

The average age of monitored goalkeepers was 28.5 ±3.94 years. The average height of the monitored goalkeepers was 191.42 ±3.99 cm and the average weight was 89.1 ±3.4 kg.

Data acquisition and processing

To acquire the research data, we used the indirect monitoring of match video recordings by the Instat technology. In our research, we focused on the following aspects of the goalkeeper´s individual game performance:

- Total number and success rate of goalkeeper´s game activities
- Number and success rate of defensive and offensive game activities of goalkeeper

The goalkeeper´s game activities were divided according to the adjusted/changed methods (Babic & Holienka 2019) and the InStat software into the following categories:

- Offensive game activities
- Defensive game activities

Individual game activities were evaluated according to the video recording (electronic data carrier) using signs +/- into prepared record sheets based on the adjusted methods (Babic & Holiennka). The number of matches was not the same because we monitored the goalkeepers in all the soccer matches, they played in the season 2019/2020.

The English Premier League goalkeepers were observed in 102 matches, the Spanish Primera División goalkeepers in 108 matches, the goalkeepers of Italian Serie A in 100 matches and the German Bundesliga goalkeepers in 96 matches.

Statistical evaluation of data

By the monitored goalkeepers, we evaluated the differences in the following game performance indicators: the number of all game activities, the success rate of all game activities, the number of defensive game activities, the success rate of defensive game activities, the number of offensive game activities and the success rate of offensive game activities. To verify the hypothesis, in which we did not assume any significant differences in selected game performance indicators, we used the one-way ANOVA test (to evaluate the differences in the number of game activities) and the post hoc Tukey HSD test. Using the Z-score test for two population proportions, we evaluated the differences in the success rate of game activities. The level of statistical significance was set at $p < 0.05$.

Results

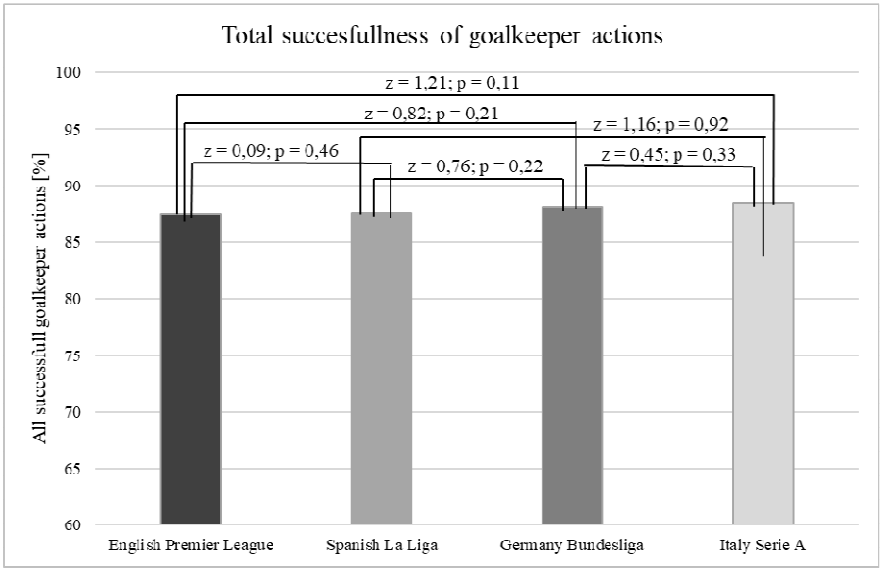

Fig. 1 – Comparison of the total success rate of goalkeepers´ game activities in selected European leagues

The total success rate of game activities in observed leagues was ranged from 87.51% (English Premier League) to 88.49% (Italian Serie A). In the total success rate of goalkeepers´ game activities – figure 1, we did not find any significant differences.

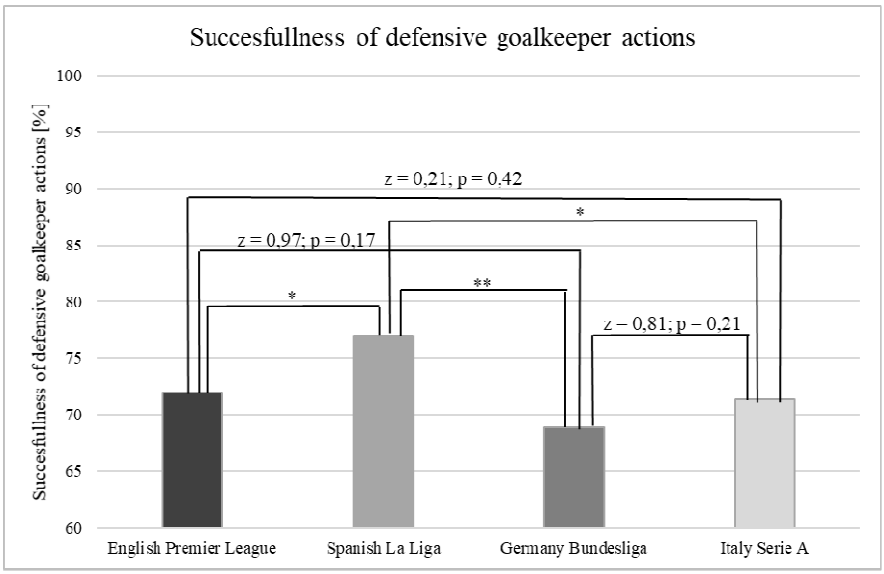

Fig. 2 – Comparison of the success rate of goalkeepers´ defensive game activities in selected European leagues

Figure 2 shows the success rate of goalkeepers´ defensive game activities in monitored leagues. The success rate of defensive game activities ranged from 68.86% (German Bundesliga) to 76.98% (Spanish La Liga). We did not find any significant differences between the English and Italian league, between the English and German league and between the German and Italian league in the success rate of goalkeepers´ defensive game activities. However, we found statistically significant differences in the success rate of defensive game

activities between the English and Spanish league ($z = 1.62$; $p < 0.05$), the Spanish and Italian league ($z = 1.93$; $p < 0.05$) and the Spanish and German league ($z = 2.63$; $p < 0.01$).

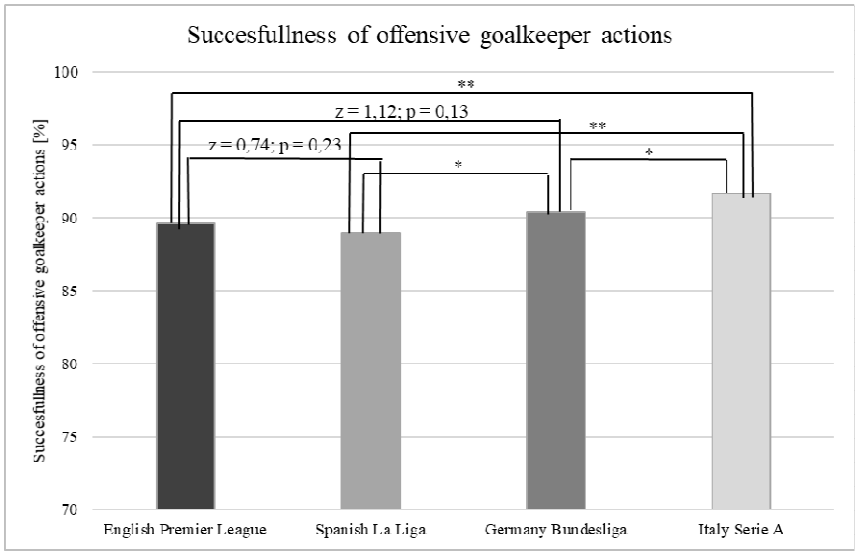

Fig. 3 - Comparison of the success rate of goalkeepers´ offensive game activities in selected European leagues

The success rate of goalkeepers´ offensive game activities ranged from 88.97 % to 91.66 % (Figure 3). We did not find any significant differences between the English and German league, nor between the Spanish and English league in the success rate of goalkeepers´ offensive game activities. However, we found statistically significant differences in the success rate of offensive game activities between the Spanish and German league ($z = 1.93$; $p < 0.05$), the Italian and German league ($z = 1.71$; $p < 0.05$), the Italian and English league ($z = 2.68$; $p < 0.01$) and the Italian and Spanish league ($z = 3.46$; $p < 0.01$).

Tab. 1 – Comparison of monitored leagues regarding the number of goalkeepers´ game activities during a match

	League	Matches [n]	Number of actions [n]	Mean	SD	F	Stat. significance (p)
All actions	Premier League	102	3227	31.64	6.89	39.59	**p < 0.05***
	La Liga	108	3591	33.25	7.71		
	Bundesliga	96	3937	41.01	8.42		
	Serie A	100	3086	30.86	5.98		
	Comparison of significant differences						
	Comparison		Means	Q		Stat. significance (p)	
	Premier League – La Liga		31.64 – 33.25	2.22		p = 0.40	
	Premier League – Bundesliga		33.25 – 41.01	12.92		**p < 0.01****	
	Premier League – Serie A		31.64 – 30.86	1.07		p = 0.87	
	La Liga – Bundesliga		33.25 – 41.01	10.70		**p < 0.01****	
	La Liga – Serie A		33.25 – 30.86	3.30		p = 0.92	
	Serie A - Bundesliga		30.86 – 41.01	13.99		**p < 0.01****	

The average number of game activities ranged from 31.64 (PL) to 41.01 (Bundesliga) game activities for a match (Table 1). Using the one way ANOVA we found significant differences between the individual leagues regarding the number of goalkeepers´ game activities ($F = 39.50$; $p < 0.01$). Subsequently, the post hoc Tuckey HSD test showed us between which leagues there were statistically significant differences. We found significant differences in the number of goalkeepers game activities between the PL and Bundesliga ($Q = 12.92$; $p < 0.01$), between the La Liga and Bundesliga ($Q = 10.70$; $p < 0.01$) and between the Serie A and Bundesliga ($Q = 13.99$; $p < 0.01$).

Tab. 2 – Comparison of the number of defensive game activities by monitored goalkeepers in selected European leagues

	League	Matches [n]	Number of actions [n]	Mean	SD	F	Stat. significance (p)
Defensive actions	Premier League	102	381	3.74	1.83	8.39	**p < 0.05***
	La Liga	108	417	3.86	1.90		
	Bundesliga	96	424	4.42	2.09		
	Serie A	100	499	4.99	2.18		
	Comparison of significant differences						
	Comparison		Means	Q		Stat. significance (p)	
	Premier League – La Liga		3.74 – 3.86	0.63		p = 0.97	
	Premier League – Bundesliga		3.74 – 4.42	3.43		p = 0.07	
	Premier League – Serie A		3.74 – 4.99	6.31		**p < 0.01****	
	La Liga – Bundesliga		3.86 – 4.42	2.80		p = 0.20	
	La Liga – Serie A		3.86 – 4.99	5.68		**p < 0.01****	
	Serie A - Bundesliga		4.99 – 4.42	2.88		p = 18	

In Table 2 is given the comparison of the number of goalkeepers´ defensive game activities in the individual monitored leagues. The average number of defensive game activities for a match ranged from 3.74 to 4.99. Using the one-way ANOVA test we found significant differences in the number of goalkeepers´ defensive game activities in observed leagues (Table 2; $F = 8.39$; $p < 0.05$). Then using the Post hoc Tuckey HSD test we found significant differences in the number of defensive game activities between the PL and Serie A ($Q = 6.31$; $p < 0.01$) and between the La Liga and Serie A ($Q = 5.68$; $p < 0.01$).

Tab. 3 – Comparison of the number of offensive game activities by monitored goalkeepers in selected European leagues

	League	Matches [n]	Number of actions[n]	Mean	SD	F	Stat. Significance (p)
Offensive actions	Premier League	102	2846	27.90	6.55	44.93	**p < 0.05***
	La Liga	108	3174	29.39	7.19		
	Bundesliga	96	3513	36.59	8.09		
	Serie A	100	2587	25.87	5.39		
	Comparison of significant differences						
	Comparison		Means	Q		Stat. significance (p)	
	Premier League – La Liga		27.90 – 29.39	2.18		p = 0.41	
	Premier League – Bundesliga		27.90 – 36.59	12.74		**p < 0.01****	
	Premier League – Serie A		27.90 – 25.87	2.98		p = 0.15	
	La Liga – Bundesliga		29.39 – 36.59	10.56		**p < 0.01****	
	La Liga – Serie A		29.39 – 25.87	5.16		**p < 0.01****	
	Serie A - Bundesliga		25.87 – 36.59	15.71		**p < 0.01****	

Table 3 represents the comparison of the number of offensive game activities in the individual leagues. Using the ANOVA test we found statistically significant differences in the number of offensive game activities between the selected leagues ($F = 44.93$; $p < 0.05$). The results from the Post hoc Tuckey HSD test showed significant differences in the number of offensive game activities between the PL and Bundesliga ($Q = 12.74$; $p < 0.01$), between the La Liga and Bundesliga ($Q = 10.56$; $p < 0.01$), between the La Liga and Serie A ($Q = 5.16$; $p < 0.01$) and between the Serie A and Bundesliga ($Q = 15.71$; $p < 0.01$).

Discussion

This research aimed to found out which requirements put the best club leagues in professional soccer on the goalkeeper´s individual game performance and what is the technical-tactical profile of goalkeeper´s game performance in a match. Based on our results, we found that the technical-tactical profile of the goalkeeper´s individual game performance has been during recent years moving towards the dominance and superiority of goalkeeper´s offensive game activities over the defensive ones (De Baranda 2008, Liu et al. 2015, Berto & Magalhaes 2017, Serrano et al. 2018, West 2018). This trend of recent years was shown also in our research. Peráček et al. (2008a, 2008b) analysed the goalkeeper´s game performance in significant international matches and 2005/2006 seasons of the Champions League and found that the ratio of goalkeeper´s offensive game activities to the defensive game activities is approximately 50:50 %. On the contrary, in our research dominated in goalkeeper´s game performance the offensive game activities to the defensive ones in a ratio of approximately 75-80%.

When comparing this trend with the near past time, it is quite similar. However, compared to the past, the difference is in the number of game activities (Serrano et al. 2018, West 2018). There is a moderate increase in the number of game activities, which the goalkeepers perform during a match. In all matches that we monitored in our research (406), we recorded by goalkeepers the total number of 13841 game activities, which on average represents 34 game activities per match. Moreover, we recorded significant differences in the number of goalkeepers´ game activities among the individual leagues. But these data and facts do not show us the relevant differences in the number of game activities of a goalkeeper. The differences in the number could be especially seen when we would monitor the goalkeepers´ defensive and offensive game activities in a match separately. The number of offensive game activities by goalkeepers is over the years decreasing. While during the European Championships in 2012 was by the tournament finalists recorded an average of 16.33 shots per match (Shafizadeh et al. 2013), in the Bundesliga (2014-2017) recorded Konefal et al. (2019) an average of 7.58 shots per game, which is 54% less than the average of the 2012 European Championship finalist. Serrano et al. (Serrano et al. 2018) also recorded in their analysis of six consecutive years (between 2011 and 2017) of the Spanish La Liga a decrease in the number of goalie interventions.

In the last monitored 2016/2017 season, there were even only three defensive game activities on average per match. One of the reasons for this case is that teams get to a smaller number of finishing. According to De Baranda et al. (2008), only about 4% of all offensive game phases are finished by shooting into the goal. Therefore, the number of goalkeepers´ interventions is lower than in the past. On the other hand, the number of offensive game activities by the goalkeeper increases. Especially when speaking about short and medium distance passes. This trend was confirmed by several authors, who analysed the number of passes in the German Bundesliga (Konefal et al. 2019), Spanish La Liga (Serrano et al. 2018) or English Premier League (Bush et al. 2015). They found that the number of passes in individual player functions, including goalkeepers, is constantly increasing. In the English Premier League, the number of passes in some player positions increased by 50 to 70% (Bush et al. 2015). They found that the number of passes in individual player functions, including goalkeepers, is permanently increasing. The number of ball passes in the English Premier League increased in some player positions from 50 to 70% (Bush et al. 2015). According to West (2018), this is because of the philosophy change, or rather the change in the team game style, which means that the goalkeepers are required to be more involved in the offensive phase of the game. We agree with this fact. It is confirmed also by the conclusion of the study by Liu et al. (2015). They found by the monitoring of the Spanish La Liga goalkeepers in the 2012/2013 season that the number of offensive game activities was an average of 20 activities per match. In our research, we found an overall average of 30 offensive activities per game, which was the same results as by the Spanish La Liga. This is proof that significant differences have emerged over the years and that there are differences not only over the years, but according to Wang and Qin (2020) there are significant differences in technical activity between different leagues.

As the number of goalkeeper´s game activities is getting smaller, almost every game situation in a match can be for the team critical. That´s why the requirements for the quality, or the success rate during the performance of defensive game activities, considerably increase. Therefore, the main role of the goalkeeper in the match comes to the fore. Despite certain trends, it has still not changed over the years. His role is primarily to stop the opponent from scoring a goal. Although the main goalkeeper´s task is to prevent the opposing team from scoring a goal, we cannot ignore the trends and tendencies in this sphere. We found that in recent years there has been not only a strong increase in the number of offensive game activities, but especially an important increase in the quality of their implementation. This can be seen when comparing the Spanish La Liga goalkeepers´ success rate of offensive game activities in the 2012/2013 season, in which they achieved a success rate of 58.9% (Liu et al. 2013). In their further research, Serrano et al. (2018) found that in the Spanish La Liga increased (between 2011 and 2017) goalkeepers´ success rate from 63% to 77%.

In our research, we recorded the success rate of offensive game activities of the Spanish La Liga goalkeepers at the level of 88.97% and the overall success rate of goalkeepers´ offensive game activities in all monitored leagues was at the level of 90.87%. This is a significant improvement that West (2018) attributes to the change in the demands on the goalkeeper's game due to the change in the philosophy and game performance of the team, to which all player functions had to be adapted, not just the goalkeeper's function. These new

emands were reflected in the work of Barnes et al. (2014), who found that the number of players in the English Premier League, who have a pass success rate below 70%, fell between 2006 and 2013 from 26% to 9%.

However, if we compare the goalkeeper´s individual game performance from a complex point of view, we will find that between the individual leagues that we observed in our research, we did not find any significant differences in the overall success of the goalkeepers´ game activities. The table of top European and world players in this player function is very wide and there are only minor differences between them, which are based on a comprehensive analysis not evident.

Conclusion

Only accurate data on sports science can provide us with answers to the questions regarding the demands of the game on the team game performance and the individual performance of players. Nowadays, the list of the world's top players in Europe is very wide and the differences between the individual leagues are minimal. Therefore, a comprehensive and detailed analysis is needed to reveal the individual specifics, differences and demands on individual game performance. It serves not only for coaches to find out the requirements but also as a tool for creating and optimizing the training process.

Using a comprehensive analysis of the individual game performance of goalkeepers, we did not find any significant differences in the most important aspect of the goalkeeper's game, thus the success rate of performing game activities. To identify the differences and subtle specifics, we deepened the analysis and performed a more detailed analysis of the goalkeeper's performance based on selected aspects of game performance. During the elaboration of this in-depth analysis, we managed to find significant differences in the success rate of game activities (defensive - offensive) but especially in the number of game activities, as we found significant differences between individual leagues.

Based on the acquired results, we can say that even though there are only small differences between the goalkeepers of different leagues on a professional level, from a complex and global point of view are the differences minimal, and above all, the demands on the goalkeeper's game are constantly increasing, especially in terms of the success rate of game activities.

Acknowledgments

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References

Andrzejewski M., Chmura J., Dybek T. & Pluta B. (2012). Sport exercise capacity of soccer players at different levels of performance. *Biology of Sport,29*(3), 185-191. ISSN 2083-1862.

Arruda A. F., Carling C., Zanetti V., Aoki M. S., Coutts A. J. & Moreira A. (2015). Effects of a very congested match schedule on body-load impacts, accelerations, and running measures in youth soccer players. *International Journal of Sports Physiology and Performance,10*(2), 248-252. ISSN 1555-0273.

Babic M. & Holienka M. (2019) Systematika herných činností brankára vo futbale. *Telesná výchova & šport,29*(4), 15-29. ISSN 1335-2245.

Barnes C., Archer D. T., Hogg B., Bush M. & Bradley P. S. (2014). The evolution of physical and technical performance parameters in the English Premier League. *International Journal of Sports Medicine*,35(13), 1095-1100. ISSN 0172-4622.

Berto E. & Magalhaes F. (2017). Quantitative analysis of the football goalkeeper`s actions. *Revista Brasileira de Futsal e Futebol,9*(34), 273-281. ISSN 1984-4956.

Bradley P. S., Lago-Penas C., Rey E. & Gomez Diaz A. (2013). The effect of high and low percentage ball possession on physical and technical profiles in English FA Premier League soccer matches. *Journal of Sports Science,13*(12),1261-70. ISSN 2332-7839.

Bush M., Barnes C., Archer D. T., Hogg B. & Bradley P. S. (2015). Evolution of match performance parameters for various playing positions in the English Premier League. *Human Movement Science,39*(1), 1-11. ISSN 1872-7646.

Carling C. (2013). Interpreting physical performance in professional soccer match-play: should we be more pragmatic in our approach? *Sports Medicine,43*(8):655-63. ISSN 2198-9761.

Castellano J., Casamichana D. & Lago C. (2012). The Use of Match Statistics that Discriminate Between Successful and Unsuccessful Soccer Teams. *Journal of Human Kinetics,31*,139-47. ISSN 1640-5544.

Chmura P., Konefał M., Chmura J., Kowalczuk E., Zajac T., Rokita A. & Andrzejewski M. (2018). Match outcome and running performance in different intensity ranges among elite soccer players. *Biology of Sport,35*(2):197-203. ISSN 2083-1862.

Chtara M., Rouissi M., Haddad M., Chtara H., Chaalali A., Owen A. & Chamari K. (2017). Specific trainability in elite young soccer players: efficiency over 6 weeks` in-season training. *Biology of Sport,37*(2),137-148. ISSN 2083-1862.

Clemente F. M., Couceiro M. S., Martins F. M., Ivanova M. O. & Mendes R. Activity profiles of soccer players during the 2010 world cup. *Journal of Human Kinetics,38*. 201-11. ISSN 1640-5544.

De Baranda P. S., Ortega E. & Palao J. M. (2008). Analysis of goalkeepers` defense in the World Cup in Korea and Japan in 2002. *European Journal of Sports Sciene,8*(3):127-134. ISSN 1746-1391.

Di Salvo V., Benito P. J., Calderon F. J., Di Salvo M. & Pigozzi F. (2008) Activity profile of elite goalkeepers during football match-play. *Journal of Sports Medicine and Physical Fitness,48*(4),443-6. ISSN 0022-4707.

Esposito G., Ceruso R. & D'elia (2019). The importance of a technical-coordinative work with psychokinetic elements in the youth sectors of soccer academies. *Journal of Physical Education and Sport,19*(suppl. 5), 1843-1851. ISSN 2247-8051.

Filetti C., Ruscello B., D'Ottavio S. & Fanelli V. (2017). A Study of Relationships among Technical, Tactical, Physical Parameters and Final Outcomes in Elite Soccer Matches as Analyzed by a Semiautomatic Video Tracking System. *Perceptual and Motor Skills, 124*(3),601-20. ISSN 0031-5125.

Hoppe M. W., Slomka M., Baumgart C., Weber H. & Freiwald J. (2015). Match Running Performance and Success Across a Season in German Bundesliga Soccer Teams. *International Journal of Sports Medicine,36*(7), 563-6. ISSN 0172-4622.

Karahan M. (2020). Effect of skill-based training vs. small-sided games on physical performance improvement in young soccer players. *Biology of Sport,37*(3),305-312. ISSN 2083-1862.

Köklü Y., Sert Ö., Alemdaroglu U. & Arslan Y. (2015). Comparison of the physiological responses and time-motion characteristics of young soccer players in small-sided games: The effect of goalkeeper. *Journal of Strength and Conditiong Research,18*(1):327-334. ISSN 1064-8011.

Kokstejn J. & Musalek M. (2019). The relationship between fundamental motor skills and game specific skills in elite young soccer players. *Journal of Physical Education and Sport,19*(suppl. 1), 249-254. ISSN 2247-8051.

Konefał M., Chmura P., Zając T., Chmura J., Kowalczuk E. & Andrzejewski M. (2019) Evolution of technical activity in various playing positions, in relation to match outcomes in professional soccer. *Biology of Sport,36*(2),181–9. ISSN 2083-1862.

Lago-Penas C., Lago-Ballesteros J., Dellal A. & Gomez M. (2010). Game-Related Statistics that Discriminated Winning, Drawing and Losing Teams from the Spanish Soccer League. *Journal of Sports Science and Medicine,9*(2),288-93. ISSN 1303-2968.

Liu H., Gómez M. A. & Lago-Penas C. (2015). Match performance profiles of goalkeepers of elite football teams. International *Journal of Sports Science and Coaching*, *10*(4),669-682. ISSN 1747-9541.

Moalla W., Fessi, M. S., Makni E., Dellal A., Filetti C., Di Salvo V. & Chamari, K. (2018) Association of Physical And Technical Activities With Partial Match Status In A Soccer Professional Team. *Journal of Strength and Conditioning Research,32*(6),1708-1714. ISSN 1064-8011.

Nassis G.P., Brito J., Dvorak J., Chalabi H. & Racinais S (2015). The association of environmental heat stress with performance: analysis of the 2014 FIFA World Cup Brazil. *British Journal of Sports Medicine,49*(9),609-13. ISSN 1473-0480.

Obetko M., Babic M. & Peracek P. (2019). Changes in disjunctive reaction time of soccer goalkeepers in selected training load zones. *Journal of Physical Education and Sport, 19(suppl. 2*),420-6. ISSN 2247-8051.

Obetko M., Peracek P., Mikulic M, & Babic M. (2020). Effect of selected types of warm-up on disjunctive reaction time of soccer goalkeepers. *Journal of Physical Education and Sport, 20*(4),1903-08. ISSN 2247-8051.

Obetko M., Peracek P., Sagat P. & Mikulic M. (2019). Impact of age and agility performance level on the disjunctive reaction time of soccer goalkeepers. *Acta Facultatis Educationis Physicae Universitatis Comenianae*, 59(2), 224-38. ISSN 2585-8777.

Otte F., Millar S. & Huttermann S. (2019). How does the modern football goalkeeper train? An exploration of expert goalkeeper coaches` skill training approaches. *Journal of Sports Medicine*,13(July), 1-9. 0090-4201.

Padulo J., Haddad M., Ardigo L. P., Chamari K. & Pizzolato F. (2015) High frequency performance analysis of professional soccer goalkeepers: A pilot study. *Journal of Sports Medicine and Physical Fitness,*55(6),557-62. ISSN 0022-4707.

Pascual-Verdú N. & Carbonell-Martínez J. (2018). Analysis of technical and tactical principles in women's soccer. *Journal of Physical Education and Sport,18*(3), 1488-1494. ISSN 2247-8051.

Peracek P., Hrnciarik P. & Kostolansky A. (2008a). Hodnotenie herného výkonu brankára. *Futbalovy Magazin,16*(9), 18-21. ISSN 1335-4914.

Peracek P., Hrnciarik P. & Kostolansky A. (2008b). Hodnotenie herného výkonu brankára. *Futbalovy Magazin,16*(10), 18-21. ISSN 1335-4914.

Sannnicandro I., Cofano G. & Rosa A. (2016). Heart rate response comparison of young soccer plyers in "cage" small-sided and 8vs8 games. *Journal of Physical Education and Sport,16*(4), 1122-1127. ISSN 2247-8051.

Seaton M. & Campos J. (2011). Distribution competence of a football clubs goalkeepers. *International Journal of Performance Analysis in Sport*,11(2),314-324. ISSN 1474-8185.

Serrano C., Paredes-Hernandez V., Sanchez-Sanchez V., Gallardo-Perez J., Silva R. D., Porcel D., Colino E., Garcia-Unanue J. & Gallardo L. (2018). The team`s influence on physical and technical demands of elite goalkeepers in La Liga: a longitudinal study in professional soccer. *Research in Sports Medicien,26*(4), 1-15. ISSN 1543-8627.

Shafizadeh M., Taylor M. & Penas C. L. (2013). Performance consistency of international soccer teams in euro 2012: a time series analysis. *Journal of Human Kinetics,38*, 213-226. ISSN 1640-5544.

Soares V.N., Cren Chiminazzo J. G., Bergonsi J. T., Fernandes P. T. (2018). Analysis of the technical actions of a football goalkeeper: A preliminary study. *Revista Brasileira de Futsal e Futebol,10*(38),307-13. ISSN 1984-4956.

Szwarc A., Jaszczur-Nowicki J., Aschenbrenner P., Zasada M., Padulo J. & Lipinska P. (2019). Motion analysis of elite Polish soccer goalkeepers throughout a season. *Biology of Sport*,36(4),357–363. ISSN 2083-1862.

Szwarc A., Lipinska P. & Chamera M. (2010). The Efficiency model of goalkeeper`s actions in soccer. *Baltic Journal of Health and Physical Activity,2*(2),132-8. ISSN 2080-9999.

Wang S. & Qin Y (2020). Differences in the match performance of Asian women's football teams. *Journal of Physical Education and Sport,20*(suppl. 3), 2230-2238. ISSN 2247-8051.

West J. (2018). A review of the key demands for a football goalkeeper. *International Journal of Sports Science and Coaching,13*(6), 1215-1222. ISSN 1747-9541.

White A., Hills S. P., Cooke C. B., Batten T., Kilduff L. P., Cook C. J., Roberts C. & Russell M. (2018). Match-play and performance test responses of soccer goalkeepers: A review of current literature. *Sports Medicine,48*(11),2497-2516. ISSN 2198-9761.

Wilson R. S., Smith N. M. A., Santiago P. R. P., Camata T., Ramos S. D. P., Caetano F. G., Cunha S. A., Souza A. P. S. D. & Moura F. A. (2018). Predicting the defensive performance of individual players in one vs. one soccer games. *Plos One,13*(12),1-13. ISSN 1932-6203.

Zhou C. H., Gómez M-Á. & Lorenzo A. (2020). The evolution of physical and technical performance parameters in the Chinese Soccer Super League. *Biology of Sport,37*(2):139-145. ISSN 2083-1862.