

An analysis of the efficiency of preparatory posture and anticipation actions performed by goalkeepers in the 2018 FIFA World Cup

Análisis de la eficiencia de la postura preparatoria y las acciones de anticipación realizadas por los porteros en la Copa Mundial de la FIFA 2018

Henrique Borgato Gryszczenko, Júlia Barreira, Gabriel Orega Sandoval, Luciano Allegretti Mercadante, Universidade Estadual de Campinas (Brasil)

Abstract. The objective of this study was to analyze the efficiency of goalkeeper in anticipation and preparatory posture during the 2018 FIFA World Cup. By analyzing video footage of official matches, we examined 669 shots taken throughout the competition. For each shot, we collected data on the goalkeeper's position (considering their preparatory posture and anticipation) and the outcome of the action (save or goal). Preparatory posturing was present in nearly all shots ($n=611$; 91%), while anticipation positioning was less frequently used ($n=409$; 61%). We did not find a significant association between preparatory posture and the outcome of the action ($\chi^2=1.333$; $p=0.248$). However, we did find a significant and moderate-sized association between anticipation positioning and the outcome of the action ($\chi^2=71.49$; $p<0.001$). In this situation, actions involving anticipation led to more goals conceded. Based on our findings, without taking into consideration the shooting situation, anticipation seems to have been less efficient in defending goals. These findings are important for coaches to incorporate into the training process to enhance the chances of success during matches.

Keywords: Performance analysis, Football, Elite Sport, Training, Competition

Resumo. O objetivo desse estudo foi analisar a eficiência das posições de expectativa e antecipação realizadas por goleiros durante a Copa do Mundo de 2018. Por meio da análise de vídeo dos jogos oficiais, foram analisadas 669 finalizações realizadas ao longo da competição. Para cada finalização coletamos a posição do goleiro (considerando sua posição de expectativa e antecipação) e o resultado da ação (defesa ou gol). A posição de expectativa esteve presente em quase todas as finalizações ($n=611$; 91%), já a antecipação foi menos utilizada ($n=409$; 61%). Não encontramos uma associação significativa entre a expectativa e resultado da ação ($\chi^2=1.333$; $p=0.248$). Entretanto, encontramos uma associação significativa e de tamanho médio entre a antecipação e resultado da ação ($\chi^2=71.49$; $p<0.00$). Nessa situação, ações com antecipação levaram a mais gols sofridos. Com base em nossos resultados, sem levar em consideração a situação de finalização, a antecipação parece ter sido menos eficaz na defesa dos gols. Essas informações são importantes para treinadores incorporarem no processo de treinamento e aumentarem as chances de sucesso durante o jogo.

Palavras-chave: Análise de desempenho, Futebol, Alto rendimento, Treinamento, Competição

Resumen. El objetivo de este estudio fue analizar la eficiencia de las posiciones de expectativa y anticipación adoptadas por los porteros durante la Copa del Mundo de la FIFA 2018. A través del análisis de vídeo de los partidos oficiales, se evaluaron 669 intentos de gol realizados a lo largo de la competición. Para cada intento de gol, se registró la posición del portero (considerando su posición de expectativa y anticipación) y el resultado de la acción (defensa o gol). La posición de expectativa estuvo presente en casi todos los intentos de gol ($n=611$; 91%), mientras que la anticipación se utilizó menos ($n=409$; 61%). No se encontró una asociación significativa entre la expectativa y el resultado de la acción ($\chi^2=1.333$; $p=0.248$). Sin embargo, se encontró una asociación significativa de tamaño medio entre la anticipación y el resultado de la acción ($\chi^2=71.49$; $p<0.00$). En esta situación, las acciones con anticipación llevaron a más goles encajados. Basándonos en nuestros hallazgos, sin tener en cuenta la situación de tiro, la anticipación parece haber sido menos eficiente en la defensa de goles. Esta información es importante para que los entrenadores la incorporen en el proceso de entrenamiento y aumenten las posibilidades de éxito durante el juego.

Palabras clave: Análisis de rendimiento, Fútbol, Alto Rendimiento, Entrenamiento, Competición

Fecha recepción: 18-12-23. Fecha de aceptación: 30-05-24

Henrique Gryszczenko

henrique.borgatog@gmail.com

Introduction

The goalkeeper plays a crucial role in the sporting success of football teams and has been receiving increasing attention from the scientific literature. Most of the studies conducted have investigated the physiological demands and anthropometric characteristics of these players (Otte et al., 2019; Rodrigues Alves et al., 2022). These studies have provided valuable information for the physical training of athletes and have shown how the requirements of this position have evolved over the years (Ziv & Lidor, 2014; Ajamil et al., 2018; Gonzalez Rodenas et al., 2020; Altavilla, 2023). However, the goalkeeper's performance is influenced by various actions beyond their physical conditioning, indicating the need for research that explores their

characteristics from other perspectives. Among these new demands are the technical and tactical aspects of their actions (Obetko et al., 2022).

Match analysis has addressed the technical and tactical demands of games and identified success indicators for goalkeepers (Seaton & Campos, 2011; Tienza-Valverde et al., 2023). These analyses can capture defensive, offensive, and transition moments, highlighting the importance of the actions for the match outcome (Mercado-Hernández et al., 2022; Santos et al., 2022). Although the goalkeeper can contribute in all these phases of the game, their greatest contribution lies in the defensive phase (Tienza-Valverde et al., 2023). According to Sainz et al. (2006), the goalkeeper's body position when performing defensive actions is specific information that helps understanding their performance in

the game, as well as provides knowledge for the development of training tailored to the game's demands. Preparatory posture and anticipation action are among the potential performance indicators that can be investigated (Ibrahim et al 2019; Savelsberg et al., 2002).

The preparatory posture is characterized by the goalkeeper's body posture with flexed knees and hips and arms positioned alongside the body before performing a defensive movement (Cordeiro, 2018). We find similar body positioning in other sports, such as volleyball and tennis, where the athlete adopts this posture to receive a serve or attack from the opponent. Just like in basketball, the posture with flexed knees and arms alongside the body offers better conditions for blocking and marking, preventing the opponents' progression. Ibrahim et al. (2019) in kinematics analyses of diving saves of elite goalkeepers in football, found that the preferred preparatory posture was characterized by a stance width (SW) of 33% of leg length, 62° knee flexion angle (KA), and 63° hip flexion angle. This action is suggested to be beneficial for their performance, as it facilitates the jumps or diving to save the balls (Gallo, et al 2010, Ibrahim et al 2019). Nevertheless, the preparatory posture has been investigated by few authors, both during the game and in penalty shootout situations, indicating that goalkeepers frequently perform this gesture in their matches and suggesting that this preparatory posture can contribute to the goalkeeper moving with greater speed and precision, thereby increasing the chances of success (Ibrahim et al, 2019; Savelsberg et al., 2002).

Anticipation is characterized by the goalkeeper's movement to perform a defensive action before the contact of the opponent with the ball and directs it towards the goal. The conditions for the goalkeeper to anticipate or not at the moment of a shot can vary significantly according to the game situation (e.g. set pieces or in-play ball).

In set piece situations, such as free kicks or penalties, the goalkeeper can choose to anticipate or not once they have a clear view of the trajectory of the ball and they can start their defensive movement at the moment they deem appropriate. On the other hand, during in-play ball, the goalkeepers face three different conditions: i) being stationary and adopting an anticipatory movement and choosing whether to anticipate or not; ii) being already in motion which makes not possible to adopt a preparatory posture, and consequently, anticipation; iii) successive saves, in which after making a save, there is a new need for defense, not allowing adequate positioning time. In this last case, the goalkeeper cannot be in a preparatory posture and does not have a choice as to whether to anticipate or not.

Wisiak (2006) observed 110 penalty kicks from national and international championships and found that goalkeepers anticipated in 89.1% of the kicks, with goalkeeper anticipation present in all successfully defended kicks. Gryszczenko (2016) found similar statistics in 86 penalty kicks from national teams, as in all the kicks analyzed, in which goalkeepers had anticipated, indicating an increase in this movement pattern over the years. In both studies, goalkeepers chose

to anticipate the defensive action in relation to the opponent's shot, and consequently, made their saves from this condition. More recently, Andrew & Causer (2022) in a study involving athletes from different sports - soccer players, invasion sports players (e.g. Rugby) and other sport players (e.g. Swimming), administered an anticipation response test in penalty kick situations. The athletes were divided and compared by the skills levels of practice, and through a video-based of soccer penalty kicks and by an anticipation test, participants should select the direction of the ball to the goal. They concluded that football players exhibited superior anticipation responses against the athletes of other sports, suggesting an inherent connection between anticipation, penalty kicks, and skills cultivated in soccer.

The studies presented above suggest a potential relationship between preparatory posture and goalkeeper performance, as well as anticipation and successful actions. However, there are still some gaps to be investigated. First, these relationships were initially investigated in penalty situations, indicating the potential for further examination in actual games, such as international championships and the World Cup. Analyzing the goalkeepers participating in a World Cup edition can provide significant insights for the discussion and development of studies on this position, as it is the premier international tournament for national teams in the sport, with significant sporting, social, and economic importance. Furthermore, the competition is contested by the best athletes from each country, ensuring a high level of competitiveness and technical skill among goalkeepers. Secondly, the relationship between preparatory posture and anticipation has not yet been investigated and may provide new insights into the interaction between these variables and the success of goalkeepers' actions.

Therefore, the objectives of this study were to characterize the defensive actions of goalkeepers in World Cup matches concerning the preparatory posture and anticipation, and to analyze their relationship with the defensive success of these actions.

Methods

The present study analyzed all 669 defensive actions performed by goalkeepers following the opponent's shots on the goal at the 2018 FIFA World Cup® in Russia. The competition consisted of 32 national teams, qualified through continental qualifiers, which contested 64 official matches. The matches were played in group format (n=48) and on knockout stage (n=16). The games were recorded in videos from media broadcasts, thus freely accessible. The game videos were used to collect goalkeeper action data using Kinovea® software (version 0.8.15, scout module). The Figure 1 shows an example of the procedure used in data collection.

To ensure data collection reliability, the games were watched twice by the same observer. Furthermore, three matches (randomly selected) were analyzed by a second evaluator to verify the reproducibility of data collection.

The Kappa (K) values ranged from .83 to 1.00 for the preparatory posture, anticipation and the outcome of the action. The data was organized and processed in Excel® spreadsheets.

All 41 goalkeepers who participated in the matches of the 2018 FIFA World Cup were included in this study. As inclusion criteria, we only analyzed shots directed at the goal, requiring the goalkeeper to make a save or resulting in a goal. Defensive actions performed by goalkeepers on balls that were not directed at the goal, such as intercepting crosses into the box and opponent's long passes, were not considered for this study. The type of opponent's shot (in-play or set piece) was not taken into account, nor was the location of the shot (inside the box, penalty area, outside the box).

To analyze all the actions, the concepts of preparatory posture and anticipation, related to the goalkeeper's body position and initial movement, were initially defined, in addition to defensive actions following the opponent's shots on goal. Table 1 presents the variables collected in this study and their subcategories.

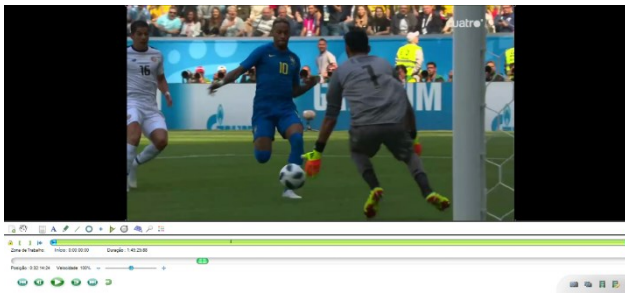


Figure 1. Screenshot of the data collection procedure using Kinovea software.

Table 1. Variables collected in this study and their subcategories.

Variable	Categories
Teams	Names of the national teams that competed in the match
Goalkeeper	Name of the goalkeeper that performed the action
Time	Time of the match that occurred the action
Competition stage	Group; Knockout
Preparatory posture	Used; non used
Anticipation	Used; non used
Defensive action	a) with control, where the goalkeeper saves the ball and retains possession of it; b) without control followed by possession by the opposing team; c) without control followed by possession by the defending team; d) without control followed by the ball going out of play; e) with a foul on the goalkeeper, and f) a conceded goal.

Preparatory posture and Anticipation

This category is related to the goalkeeper's body position before a defensive action and their initial reaction to perform the action. They were defined as follows:

Preparatory posture: It consists of the goalkeeper's body position before any movement performed by, he or she in the defensive action. In order to jump, dive, or move, their knees and hips need to flex. If they are flexed at the moment the opponent shoots the ball, with their arms by their side,

it indicates that the goalkeeper is in the preparatory posture. (Cordeiro, 2018; Ibrahim, 2019).

Anticipation: Defined based on the moment when the goalkeeper starts their movement to perform a defensive action. It was considered anticipation when the goalkeeper loses contact with one of their feet off the ground before the opposing player directs the ball towards the goal (Gryszczyński, 2016; Savelsberg et al., 2002).

Defensive actions

Defensive actions were considered to be either a goal save or an attempt when a goal is scored. A goal save was defined when the goalkeeper prevents the ball from reaching the goal after the opponent's shot.

After identifying defensive actions, the results of goal saves were also collected within six subclasses: a) with control, where the goalkeeper saves the ball and retains possession of it; b) without control followed by possession by the opposing team; c) without control followed by possession by the defending team; d) without control followed by the ball going out of play; e) with a foul on the goalkeeper, and f) a conceded goal.

Statistical Analysis

The data were summarized and presented in relative and absolute frequencies. The association between variables was analyzed using the Chi-Square test. The effect size was calculated using Cramer's V and interpreted as follows: null < 0.1; small 0.1 < effect size < 0.3; medium 0.3 < effect size < 0.5; large effect size > 0.5 (Cohen, 1988). To compare the efficiency of the defensive actions between the group and knockout stages, we normalized the values of defensive actions in each group based on the number of games played by each team and used the average per game for each action. The unpaired Student's t-test was used to analyze the difference between them. The significance level was set at $p < 0.05$, and all analyses were performed using the GraphPad Prism software program, version 8.4.3.

Results

In total, 669 goal attempts were analyzed, with 500 (74.7%) categorized as goalkeeper saves. The majority of defenses occurred with the preparatory posture ($n=611$; 91%), including both actions with and without anticipation. When analyzing anticipation separately, we found that most defenses occurred without anticipation ($n=409$; 61%). The relationship between anticipation and preparatory postures is presented in Table 2. We found a significant association between the variables, with most defenses occurring in with preparatory posture and without anticipation.

Table 2. Association between anticipation and preparatory postures

	Without anticipation	With anticipation	Chi-Square
Without preparatory posture	49 (84%)	9 (16%)	$\chi^2=14.57$
With preparatory posture	360 (59%)	251 (41%)	$p<0.001$

Table 3 shows the frequency of preparatory posture and anticipation by goalkeeper in terms of saves or conceded goals. It is noticeable that the preparatory posture is adopted in most goal attempts. However, this position did not show a significant relationship with the efficiency of the action performed (Cramer's $V = 0.04$). Regarding anticipation, we found a significant and moderate association with the action's efficiency (Cramer's $V = 0.32$). In this case, non-anticipation was associated with a higher rate of saves, while anticipation was more associated with conceded goals.

Due to the high usage of the preparatory posture, we analyzed the action's outcome in this situation when performed with or without anticipation (Table 4). We found a significant association with a moderate effect (Cramer's $V = 0.39$) between anticipation in the preparatory posture and the action's outcome. Within actions with preparatory

Table 4.

Association between anticipation in the preparatory posture situation and the outcome of the action

Anticipation	Control	Rebound to opponent	Rebound to team	Out of bounds rebound	Foul	Goal	Chi-square
Without	213 (59%)	27 (8%)	28 (8%)	40 (11%)	2 (0%)	50 (14%)	$\chi^2=101.4$
With	54 (21%)	24 (10%)	32 (13%)	32 (13%)	1 (0%)	108 (43%)	$p<0.001$

The comparison between the group and knockout stages is shown in Figure 2. Significant statistical difference was found between the eliminated and qualified teams with a higher number of anticipations per match in group stage.

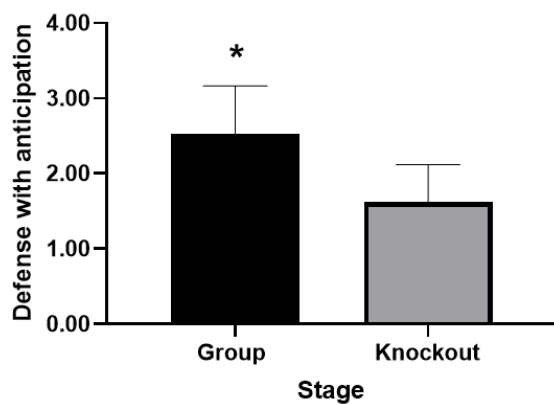


Figure 2. Defense with anticipation in the group and knockout stages. Legend: * difference statistically significant in Student's T test ($p<0.05$).

Discussion

The preparatory posture and anticipation are conditions of the goalkeeper have already been investigated in specific moments of the game such as penalty kicks, but have been relatively less discussed in defensive actions during the game (Gallo 2010, Murgia et al. 2014, Cordeiro, 2018, Ibrahim et al., 2019). To the best of our knowledge, this is the first study to investigate these actions in World Cup matches. In our study, we observed a significant association between anticipation and the defense outcome, with non-anticipation being more favorable for saving the shots. On the other hand, we did not find an association between preparatory

posture, those that did not utilize anticipation were more effective.

Furthermore, there are situations during the game with consecutive shots in a single attack or situations in which the goalkeeper is in motion at the moment of the shot, preventing the adoption of the preparatory posture. However, these situations account for only 9% of the shot attempts. Even in these conditions, the effectiveness of the goalkeeper in saving the goal without anticipation was higher (86%) than when goalkeepers anticipate (55%).

Table 3.

Distribution of goalkeeper actions in shot attempts, without and with the preparatory posture, distinguishing between goal saves and conceded goals

		Defense	Goal	Total	Chi-square
Preparatory posture	Without	47 (81%)	11 (19%)	58 (100%)	$\chi^2=1.333$
	With	453 (74%)	158 (26%)	611 (100%)	$p=0.248$
Anticipation	Without	352 (86%)	57 (14%)	409 (100%)	$\chi^2=71.49$
	With	148 (57%)	112 (43%)	260 (100%)	$p<0.001$

posture and the defense outcome. Considering the data collection method and the objectives of this study, it is possible to compare the results obtained with other studies that have analyzed the behavior of goalkeepers in specific situations.

In our study we found that with non-anticipation was more favorable for saving the shots compared to anticipation. This finding is contradictory with previous studies pointing out goalkeepers perform better when they anticipate the opponent's shot in penalties kicks (Wisiak, 2006; Gryszczenko, 2016). In this situation, successful goalkeepers in anticipation were those who, by waiting longer to initiate the diving movement, spent more time focusing on the kicker's supporting leg (McMorris & Colenso 1996, Geert et al. 2002, 2005). Additionally, based on analyzed penalty kick videos, goalkeepers anticipate more effectively when the kicker uses the right foot rather than the left. In this way, due to the stationary situation of the penalty, it is possible for the goalkeeper to have access to more pre-kick information that favors their anticipation movement. Still, penalty kick situations are unique because the ball is close to the goal, and due to the speed of the ball, the goalkeeper must initiate their defensive movement before the moment of the kick.

In actions during regular gameplay, the conditions are different, and this early movement can hinder the goalkeeper's performance in making saves. Unpredictable plays and quick decision-making during the game can make it difficult to capture all this information and minimize the potential for anticipation. Although no articles on anticipations and the preparatory posture during regular gameplay were found, we suppose that the anticipation during the match may also represent an advantage to the attacker once he can make a decision, choosing the direction and speed of the ball, according to the previous displacement of the goalkeeper. Based on our

findings, goalkeepers adopt the preparatory posture whenever possible before shot attempts. Still, this action was not related to the defense outcome. In a previous study, Ibrahim et al. (2019) showed a positive relationship between preparatory posture and defending the shot. They reported that the goalkeeper's ideal preparatory posture can contribute to better performance in vertical jumps, saving dives and faster move in vertical or horizontal. Although this position appears to positively favor the goalkeeper's physical performance, we may not have found this association in the study due to the high level of the players analyzed, representing their national teams in the World Cup, and the low occurrence of defenses without the preparatory posture.

When the preparatory posture is adopted in association with the choice to anticipate or not, Table 4 highlighted the importance of not anticipating for increased effectiveness and favoring the possibility of the goalkeeper gaining control of the ball. Maintaining the preparatory posture and not anticipating can increase the goalkeeper's effectiveness and lead to better team results. When there is anticipation, even with the preparatory posture, only 21.5% of the shot attempts result in the goalkeeper gaining control of the ball. Furthermore, with preparatory posture without anticipation, 71% of the shot attempts are successful, while only 29% are unsuccessful. However, in the shot attempts in which the goalkeeper assumes the preparatory posture but anticipates, only 35% of the attempts to save the goal are successful.

We also found that the goalkeepers in the knockout stage anticipated less in their defensive actions compared to the goalkeepers in the group stage (Figure 2). Goalkeepers of the qualified teams were able to maintain the preparatory posture until the decision not to anticipate. It would be overly simplistic to indicate that the team's performance was influenced solely by this variable. However, this result, combined with previous studies, indicates that goalkeepers from teams that advance to the knockout stage tend to outperform those from teams that only compete in the group stage (Mercado-Hernández et al., 2022).

While this study has contributed to understanding the efficiency of preparatory posture and anticipation actions of goalkeepers in the elite of world football, it is essential to acknowledge its limitations. We did not analyze the location where the shot took place, which would have allowed us to consider the distance between the opponent and the goalkeeper. This condition could have also contributed to the discussion of whether the goalkeeper anticipates by choice or due to the opponent's attacking condition. According to their distance, the goalkeepers may not have time to position themselves in the preparatory posture or to anticipate. Based on these findings, we suggest that future studies incorporate additional variables into the analysis, such as the origin of the ball, the distance from the goal, and the possibility of associating the techniques used for goalkeeping in different conditions. We also recognize that there are small variations in the preparatory posture and anticipation actions that were not addressed in this study and

could be explored by future investigations. Similarly, studies investigating individual actions of goalkeepers could also contribute to reinforcing this variability in the role. Finally, studies like this could also be conducted in women's football, a practice that has been growing over time but has a less extensive literature compared to men's football (Kryger et al., 2020).

Conclusion

It is well-known that goalkeepers play a significant role in the outcome of a game, and certain actions can influence their performance. We have observed that the preparatory posture is widely used by goalkeepers but is not decisive for goalkeeping, while anticipation indicates significant changes in performance during the game. The preparatory posture combined with non-anticipation has proven to be effective for saving shots. As a practical implication, this result suggests that goalkeepers should consider adopting this combination whenever possible, aiming for improved goalkeeping efficiency and favorable outcomes, such as the goalkeeper gaining control of the ball or making a partial save without a rebound. Furthermore, this study also indicates the need for further research exploring the relation between preparatory posture, anticipation, and the characteristics of the shot, such as the origin of the ball and the distance from the goal.

References

- Ajamil, D. L., Navascués, J. C., Idiákez, J. A., Anguera, M. T., & Cadirat, J. R. B. (2018). Análisis de la eficacia del portero de fútbol cadete (14 a 16 años). *Apunts. Educación física y deportes*, 1(131), 60-79.
- Altavilla, G. (2023). Analysis and comparison of the goalkeeper's role in past and modern soccer: a pilot study. *Journal of Physical Education and Sport*, 23, 564-568.
- Andrew, M., & Causer, J. (2022). Does anticipation of penalty kicks in soccer transfer across similar and dissimilar sports? *Cognitive Processing*, 23(3), 459-465.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cordeiro, V. S. (2018). *Caracterização das ações ofensivas e defensivas dos goleiros das categorias Sub 15, 17 e 20 de um clube profissional da cidade de Florianópolis (TCC - Graduação)*. Universidade Federal de Santa Catarina, Centro de Desportos, Educação Física - Bacharelado.
- Gallo, C. R., Zamai, C. A., Vendite, L., & Libardi, C. (2010). Análise das ações defensivas e ofensivas e perfil metabólico da atividade do goleiro de futebol profissional. *Conexões*, 8(1), 16-37.
- Gonzalez Rodenas, J., Aranda Malaves, R., Tudela Desantes, A., Sanz Ramirez, E., Crespo Hervas, J., & Aranda Malaves, R. (2020). Past, present and future of goal scoring analysis in professional soccer (Pasado, presente y futuro del análisis de goles en el fútbol profesional). *Retos*, 37, 774-785. <https://doi.org/10.47197/retos.v37i37.69837>
- Gryszczenko, H. B. (2016). *Análise das cobranças de pênaltis em jogos de seleções nacionais masculinas*. Universidade Estadual de Campinas, Faculdade de Ciências Aplicadas.

- Hernández, V. M., Bastías, D. D., & Ramírez, F. G. (2022). Diferencias en las acciones defensivas y ofensivas de porteros clasificados y no clasificados a la Copa del Mundo FIFA 2018. *Retos: nuevas tendencias en educación física, deporte y recreación*, (44), 928-935.
- Ibrahim, R., Kingma, I., de Boode, V. A., Faber, G. S., & van Dieën, J. H. (2019). Kinematic and kinetic analysis of the goalkeeper's diving save in football. *Journal of Sports Sciences*, 37(3), 313-321.
- Ibrahim R, Kingma I, de Boode V, Faber GS, & van Dieën JH (2019). The Effect of Preparatory Posture on Goalkeeper's Diving Save Performance in Football. *Frontiers in Sports and Active Living*, 1, Article 15.
- Kryger, K., Wang, A., Mehta, R., Impellizzeri, F. M., Massey, A., & McCall, A. (2022). Research on women's football: a scoping review. *Science and Medicine in Football*, 6(5), 549-558.
- McMorris, T., & Colenso, S. (1996). Anticipation of professional soccer goalkeepers when facing right- and left-footed penalty kicks. *Perceptual and Motor Skills*, 82(3), 931-934.
- Mercado-Hernández, V., Duclos-Bastías, D., & Giakoni-Ramírez, F. (2022). Diferencias en las acciones defensivas y ofensivas de porteros clasificados y no clasificados a la Copa del Mundo FIFA 2018 (Differences in defensive and offensive actions of qualified and non-qualified goalkeepers at the 2018 FIFA World Cup). *Retos*, 44, 928-935. <https://doi.org/10.47197/retos.v44i0.90807>
- Murgia, M., Sors, F., Muroli, A. F., Santoro, I., Prpic, V., Galmonete, A., & Agostini, T. (2014). Using perceptual home-training to improve anticipation skills of soccer goalkeepers. *Psychology of Sport and Exercise*, 15(6), 642-648.
- Obetko, M., Peráček, P., Mikulič, M., & Babic, M. (2022). Technical-tactical profile of an elite soccer goalkeeper. *Journal of Physical Education and Sport*, 22(1), 38-46.
- Otte, F., Ditmer, T., & West, J. (2023). Goalkeeping in modern football: Current positional demands and research insights. *International Sport Coaching Journal*, 10(1), 112-120. DOI: 10.1123/iscj.2022-0012.
- Otte, F. W., Millar, S. K., & Klatt, S. (2019). How does the modern football goalkeeper train? An exploration of expert goalkeeper coaches' skill training approaches. *Journal of Sports Sciences*, 38(11-12), 1465-1473.
- Rodrigues Alves, M. A., Stefanello, J. M. F., Oliveira, E., Arthur, D. P., & Travassos, B. (2022). Herramientas de evaluación del rendimiento técnico, táctico y físico en el fútbol femenino: una revisión sistemática (Technical, tactical and physical performance assessment tools in women's soccer: a systematic review). *Retos*, 46, 586-596. <https://doi.org/10.47197/retos.v46.93537>
- Sainz de Baranda, P., Ortega, E., & Palao, J. M. (2008). Analysis of goalkeepers' defense in the World Cup in Korea and Japan in 2002. *European Journal of Sport Science*, 8, 127-134.
- Savelsbergh, G. J. P., Williams, A. M., Van Der Kamp, J., & Ward, P. (2002). Visual search, anticipation and expertise in soccer goalkeepers. *Journal of Sports Sciences*, 20(3), 279-287.
- Savelsbergh, G. J. P., Van der Kamp, J., Williams, A. M., & Ward, P. (2005). Anticipation and visual search behaviour in expert soccer goalkeepers. *Ergonomics*, 48(11-14), 1686-1697.
- Santos, J., Sousa, P. M., Pinheiro, V., & Santos, F. J. (2022). Analysis of offensive and defensive actions of young soccer goalkeepers. *Human Movement*, 23(1), 18-27.
- Savelsbergh, G. J., Williams, A. M., Kamp, J. V. D., & Ward, P. (2002). Visual search, anticipation and expertise in soccer goalkeepers. *Journal of Sports Sciences*, 20(3), 279-287.
- Seaton, M., & Campos, J. (2011). Distribution competence of a football club's goalkeepers. *International Journal of Performance Analysis in Sport*, 11, 314-324.
- Shamardin, V. N., & Khorkavyy, B. V. (2015). Organizational structure of technical and tactical training of skilled goalkeepers in football. *Pedagogical Psychology Medical-Biological Problems of Physical Training and Sports*, 2, 75-79.
- Tienza-Valverde, A., Hernández-Beltrán, V., Espada, M. C., Bravo-Sánchez, A., Santos, F. J., & Gamonales, J. M. (2023). Analysis of individual performance indicators of football goalkeeper. *Apunts Sports Medicine*, 58(219), 100420.
- Wang, Y., Ji, Q., & Zhou, C. (2019). Effect of prior cues on action anticipation in soccer goalkeepers. *Psychology of Sport and Exercise*, 43.
- Wisniak, M. (2006). *Análise cinematográfica de cobranças de pênaltis*. Universidade Estadual Paulista, Instituto de Biociências de Rio Claro.
- Ziv, G., & Lidor, R. (2011). Physical characteristics, physiological attributes, and on-field performances of soccer goalkeepers. *International Journal of Sports Physiology and Performance*, 6, 509-524.

Datos de los/as autores/as:

Henrique Borgato Gryszyzenko
 Júlia Barreira
 Gabriel Orenga Sandoval
 Luciano Allegretti Mercadante

henrique.borgatog@gmail.com
 juliab@unicamp.br
 g216386@dac.unicamp.br
 lucianom@unicamp.br

Autor/a – Traductor/a
 Autor/a – Traductor/a
 Autor/a
 Autor/a