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## **FOOTBALL: THE GOALKEEPER WITHIN A SYSTEMIC REALITY: A REVIEW**

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**Abstract.** The training for goalkeepers in today's soccer is vital importance for the collective performance in the competition. In this context, this article aims to develop a review of the new training methodologies and the way in which they learn in this sports-training process. A review was made of documents published in English and Spanish in journals indexed from 2000 until today's date, considering the most recent articles in the first place and some books focused on the training of new soccer preparation methodologies, training of goalkeepers and motor learning. There are many theories about how to maximize the goalkeeper's performance, and in which all the methodologies have greatly contributed to the preparation process, linked to the positions adopted to respond defensively and offensively, as well as to an invariability, unpredictability, decision-making supported by observational and cognitive processes (Walton et al., 2018). In this way, both coaches and field players can benefit from the actions carried out by the goalkeeper and the success that they may get in multiple contexts (Lamas et al., 2018). Lastly, it is necessary to get information about the effectiveness of the role of the goalkeeper and his influence on the collective tactical behavior, in order to enhance the skill to build the scores of his team and to prevent opponents' offensive situations (Vicente- Vila and Lago-Peñas, 2016) and which depending on the game structure and the cooperation-opposition leads to an interdependent performance in each goalkeeper. Therefore, goalkeeper training must be based on contextual and situational situations and for this, more research is needed to evaluate the different responses of goalkeepers in each of the training methodologies.

**Key words:** Goalkeeper training, soccer methodology, physical preparation, cognition, brain.

## **FÚTBOL: EL PORTERO DENTRO DE UNA REALIDAD SISTÉMICA: UNA REVISIÓN**

**Resumen.** El entrenamiento de porteros en el fútbol actual es de vital importancia para el rendimiento colectivo en la competencia. En este contexto, el presente artículo tiene como objetivo elaborar una revisión de las metodologías de entrenamiento y la manera en cómo aprende en este proceso deportivo-formativo. Para ello se hizo una revisión de trabajos publicados en inglés y español en revistas indexadas desde el año 2000 hasta la fecha, considerando los artículos más recientes en primer lugar y algunos

libros con un enfoque en el entrenamiento de las nuevas metodologías de preparación futbolística, entrenamiento de porteros y aprendizaje motor. Existen múltiples teorías acerca de la manera en cómo maximizar el rendimiento del portero, y en donde todas las metodologías tienen grandes aportes en el proceso de preparación, ligados al posicionamiento para responder defensivamente y ofensivamente, así como a una invariabilidad, imprevisibilidad, toma de decisiones sustentada en procesos observacionales y cognitivos (Walton et al., 2018). De esta manera, tanto los entrenadores como los jugadores de campo se podrán beneficiar de las acciones realizadas por el portero y el éxito que puede conllevar en múltiples contextos (Lamas et al., 2018). Finalmente es necesario obtener información acerca de la efectividad del rol del portero y su influencia en el comportamiento táctico colectivo, para así poder potenciar la habilidad en la construcción de las anotaciones de su equipo y en la prevención de las situaciones ofensivas del rival (Vicente-Vila y Lago-Peñas, 2016) y en el cual dependiendo de la estructura del juego y de la cooperación-oposición conlleva a una actuación interdependiente en cada portero. Por ello el entrenamiento del portero debe sustentarse en situaciones contextuales y situacionales y para ello hacen falta más investigaciones dirigidas a evaluar las diferentes respuestas de los porteros en cada una de las metodologías de entrenamiento.

**Palabras clave:** Entrenamiento de porteros, metodología fútbol, preparación física, cognición, cerebro.

## Introduction

Goalkeepers' training requires to be specific, since this player has certain competitive demands, functional and regulatory characteristics that are different, especially because of their technical, physical, cognitive and psychological executions (Isidre, 2004), nevertheless, in this preparation process, some questions arise, such as: How does the goalkeeper learn? What is his tactical function and role in the competition?

The activation level reproduces negative perceptions of his own performance, leading to the reproduction of a negative perception of himself (Mason & Seno, 2016) and that can be influenced by those around and regulated by the mirror neuron's mechanism (Izaguirre, 2017; Mora, 2008, 2013; Sousa, 2014).

Football is in itself a variable sport with uncertainties whose main objective is to trespass the ball from the goal line that the goalkeeper is protecting. Before this player's task, that is to prevent these situations, there are many interrelated factors in the interindividual performance of the sports success, among which these aspects are highlighted: morphological and functional factors, sleep and food disorders, individual and group games, cooperation and opposition (Walton, Keegan, Martin & Hallock, 2018), environmental conditions and manifestations of the conditional capacities, cognitive variations, emotional and volitional variations, creative-expressionist variations (Muñoz-Parreño, 2016); which means that by developing actions sustained in unique and predictable repetitions, a series of motor-perceptual mechanisms that have benefited from the long-time goalkeeper's training are triggered. The learning process is not sustained in cyclic nor in a repetitive process, but has two main mechanisms. A so-called explicit mechanism that is linked to all those cognitive processes and another one that is implicit associated with the motor or verbal learning processes that does not depend on such processes (Mitchell, 2006; cited in Machado et al., 2008).

## Methodology

The search for the books and articles for this review was made in the following databases: PubMed, Google Scholar, ScienceDirect and the football physical trainers journal APF, in order to find more specific literature; also, the search was done using the following terms in Spanish and English: goalkeeper, football, training methodologies in football, sports performance and a combination with the terms related to the physical training and motor learning and development, from the year 2000 to June 2018; the search was done in the aforementioned journal and, as well, the medical Emtree's terms on methodology, perceptual-motor capacities, physiology and sports performance complete the search. 63 most relevant studies were chosen, in accordance with the criteria of three (3) independent researchers experts in training goalkeepers. The different parameters considered to include the studies for the researcher was the development of studies focused on the goalkeepers' training methodology, the impact of the unmentioned variables on other studies for their training and year of publication, choosing the most updated studies as primordial for this study.

Table 1

*Determination of the information selection process, based on the number of articles, their topic and keywords*

Number of articles	Topics	Keywords
20	The goalkeeper as a living being	Emotion, perception, dynamic systems, perceptual-motor capacities
5	The goalkeeper's brain	Brain, thinking, neuronal information
6	Training methodologies and factors to be taken into account in the goalkeeper's preparation	Sports technique, uncertainty, tactical periodization, global methodology
9	How does the goalkeeper learn?	Useful information, stimuli, structures
13	Considerations to be taken into account in the goalkeeper's training in a systemic methodology	Complexity, game, communication, reality.
10	Importance of the goalkeeper joining the different collective practices	Roles, tasks, intervention, competency,

## Results

### *The goalkeeper as a living being*

Football is a collective sport, characterized by random dynamics and an improvisation, being chaotic and in which there are roles, tasks and specific positions in charge of meeting multiple functions. The goalkeeper is, without a doubt, a complex structure to be analyzed, in which the diversity to act in the match, backing the regulations (Álvarez, 2012) and due to the space-time dimensions condensed in certain limitations and a specificity to its individuality within the collective performance, in which the decision-making is notably influenced by the implicit perception (Noël, Van der Kamp, Masters & Memmert, 2016) of his own space, time and role played.

Likewise, the football's fractal scenario generates an hologram reality, alternating and transforming the match's vision (Cervera, 2011) which leads the goalkeeper to live with informational uncertainty principles (Álvarez, 2012) and in which the totality of structures must be considered (Muñoz-Parreño, 2016b), linked to the game cycle (attacking organization, counter-attack, defensive organization, organized defensive) (Monteleone & Ortega, 2015), hence highlighting the technical, physical and psychological capacities of being focused, serving the adaptive process regarding the interindividual, intraindividual and intergroup reality (De la Vega, 2003; Muñoz-Parreño, 2016c) and in which the emotion/feelings relationship generates an assertive/wrong response in this position (Izaguirre, 2017) and leads to rethinking about a holistic vision of the goalkeepers in the match to substantially support the collective practice, to keep evolving in his competitive role.

The goalkeeper must think about himself as a player with a unique role within the match, which is why his intervention is vital to be able to process the random and dynamic information, to that aim, he needs to analyze and distinguish the kind of main and significant stimuli from the environment, extending their effectiveness to the player's function development (Mason & Seno, 2016) from the detection of the launching preindex in a dynamic environment (Pascual & Peña, 2006) and permeated by the chaotic attracting agents, repellents and synergies (Torrents, 2005) in charge of boosting his motor-perceptual capacities to be able to decide-execute each one of the continuous interactions established in the competition. In this sense, the multiple situations enhance a non-linear relationship between order/disorder (Gómez, 2011), resulting into problematic situations, to be responded in brief time spaces due to the demand of the capacity to think of and for the universality and transversality in his processing before complex situations (Balagué & Torrents, 2011) and in this way, approaching a context-situation response.

The theory of dynamic systems and the feedback loop is in the goalkeepers' training is a systemic reality, that is able to integrate in itself, that is to say, the goalkeeper is a multifunctional biological being, with the ability to interact in the different match's phases through different functions, an example of that is that he uses the hands for the throw-in or to pass the ball in an offense or uses them to deviate, catch the ball or to do so in a defensive tactic (Torrents, 2005), therefore, the training will need to count on the tools needed to analyze emergencies (Pol, 2011), detect interferences, (Balagué et al, 2014) and extend the links with the responses to the underlying phenomena of the competition, the match's environment, the social relationships and the uncertainty (Gómez, 2011). The goalkeeper must develop a motor act driven by three elemental unities: perception, decision and execution (Sainz de Branda et al, 2005), highlighting the perception to efficiently act in space and time

(Dominguez, 2015), his tactical role is important for he is considered a dichotomous structure between synergy and emergency (Balagué & Torrents, 2005), giving responses to the game's questions from a system that able to organize and boost itself, resolving every big question with the fluctuating-informational triad, being transported by the person accepting the effect and stored in the memory and linked to the result of the developed motor response (Gil, 2008).

### ***The goalkeeper's brain***

The brain is a structure in which the information, sensation, perceptions and dependent representations of the learning process are constantly exchanged, that is to say, the brain is permeated by the social cultural relationships and in the goalkeeper's case, the sports learning (Izaguirre, 2017).

The goalkeeper will have to analyze and process in every action the information through his perceptual and motor internal capacities and his emotional status from the external environment, in which, in order to intervene in the game, he observes in every action the way, orientation, variation, movement, depth (Mora, 2008) and the ball's relationship with time, space, route and trajectory, be it in the air or on the floor (Isidre, 2005).

The goalkeeper's thought to carry out a task is reflected in the joint activation of the supplementary motor cortex, the pre motor cortex and the parietal lobe (Izaguirre, 2017), likewise, the tonsil as brain structure contributes to the emotional storage of the contextual information for the infinite connections produced in the different areas of the brain and so being able to control, regulate and keep the emotions and the cognition (Izaguirre, 2017; Mora, 2008, 2013) in the multiple tasks that it executes in the training and in the competition.

Implementing a methodology based on the game offers an adequacy of the segment coordination, eye-foot vision to reduce the angle the attacker has to finish the action (Shafizadeh, Davids, Correia, Wheat & Hizan, 2015) as well as the brain enneagram aimed at learning the technique and driven by the myelination processes of brain axons, they are essential to increase the speed of the neuronal information, with anatomical and physiological changes (Izaguirre, 2017).

### ***Training methodologies and factors to be taken into account in the goalkeeper's preparation***

A methodology focused on the specialization of the sports technique through the repetition and sustained in a variety of throw-ins with multiple variables in height, strength, velocity, angle and trajectory, solved by the goalkeepers in the competitions through automatisms and an efficient anticipation guided by the procedural memory is carried out by the motor cortex and the brain's basal ganglia (Izaguirre, 2017).. These works strengthen the neuronal networks of the left brain, consequently boosting the conscious learning and the attention focus (Mora, 2013). Nevertheless, it is key to consider the influence of this repetitive methodology in a position with plenty of uncertainty, to enhance practices in charge of boosting not only the individual ability, but also the specific football competency as well as the global one (Sánchez-Sánchez, Carretero, Assante, Casamichana & Los Arcos, 2016) and consequently be able to strengthen the sensitive and neuronal processes (Izaguirre, 2017; Mora, 2013), the sports and training processes in this invasive sport (González, García, Pastor & Contreras, 2011) and specifically the competencies suggested in the football's training

based on a randomized game, which allows the athlete to calculate, store and use the information to act in a simultaneous reality.

The global methodology is useful and necessary for the goalkeeper from general situations, sharing game dynamics with his teammates (Sainz de Baranda et al., 2005) and in which the uncertainty strengthens the right brain or the one in charge of promoting creativity and imagination through the strengthening of the multivariate attention that is unconsciously developed (Mora, 2013).

The tactical periodization for the goalkeeper's process must respect the times in his training process, in other words, the goalkeeper is a social and collective being who conditions and is conditioned thanks to a particular way of playing, is able to shape and create the game's role model required in every team (Inarejos & Gómez, 2014), and for this reason, the way how the child/teenager learns must be taken into account. The development phase in which the youth's brain comes from a concrete to an abstract thinking is known as adolescence, characterized by a second synaptic pruning in charge of removing the less used (Izaguirre, 2017) neuronal interconnections, and it is in this phase where this methodology should be more relevant in the goalkeepers' training process.

In every one of the different work methodologies, the learning mechanism that strengthens the goalkeeper's training process the best is the one carried out through the imitation (Domínguez, 2015) developed since childhood, going through youth until adulthood. This mechanism made thanks to the mirror neurons located at the inferior frontal gyrus and in the superior temporal sulcus would make it easy to achieve the objectives (Izaguirre, 2017), likewise, it is convenient to consider the compatibility between the brains and the exchange of information linked to the development of the multiple cognitive functions (Mora, 2013).

### ***How does the goalkeeper learn?***

The goalkeeper is an especially co-adaptive and key being in the game since he is able to boost the hippocampus' activity, thanks to which he gets to efficiently and effectively move, achieving an absolute mastering of his intervention area, using experimented coordinates in time and thanks to the development of the space location transforms the complex reality into simple actions (Izaguirre, 2017).

In the training process, the link established between the team's collectivity and the goalkeeper's individuality should be considered. His acting will depend on the objectives to be worked on according to the competition's analysis, the experience and the unipersonal thinking of every coach, and taking into account the performance of exercises in a reduced space or preferential simulating situations (Pol, 2011), in which the goalkeeper's intervention frequency is much greater if compared to other exercises in much more extended spaces, which reduce his intervention and affect other variables of the team game related to the aerial dynamics and specially the header (Casamichana & Castellano, 2009; Owen, Twist & Ford, 2004), vital indicators in the current football to achieve the results.

The knowledge acquired in every training is the useful information, and the input needed to boost the goalkeeper's performance and his role within the game dynamics carried out by the plastic potential of his diverse motor and sensitive systems (Mora, 2008) hence allowing the differentiation of the stimuli received via the energy in electromagnetic waves (everything that is seen before), pressure waves (everything that was listened to), mechanical changes (total interventions with the arms or body) and

chemical particles (pleasure and joy of what has been done) (Izaguirre, 2017), it is transformed thanks to the work of the electric energy sensitive receptors to be later co-adapted into action potentials; this electric information is rapidly and instantaneously transferred by the axons and dendrites until reaching the brain areas (Machado et al., 2008), in charge of storing and deciphering the received information to later produce perceptual-motor actions in response to the game (Izaguirre, 2017).

According to Spitzer (2005) the attention process specifically linked to anything concrete in the game, be rival players, but specifically the ball's position, it strengthens the neuron connections and the activation and functioning of the structures as to trigger assertive responses, using the cognitive structures to solve problems, the volitional-emotional structures to intensify everything that is made consciously (Muñoz-Parreño, 2016c), the coordinative and technical structure in being able to move in harmony, efficiently and effectively; this efficiency will boost the conditional structure to exclusively use the energy needed in every action (Muñoz-Parreño, 2016b) and, lastly, the affective-social structure produces relationships, synergies, association and this creates an optimal verbal and gesture communication in charge of boosting a conscious growth of the individualities to increase the collective sports performance (Muñoz-Parreño, 2016c) before the game's complexity.

In this way, this position on the field is quite particular, for its complexity is diminished by a detriment of its dynamic relationships (Torrents, 2005), modifying and transforming the football structure with every intervention, unconscious processes to raise his ability to develop motor responses more rapidly in compensation for the game demands, the interaction structures where the interdependent synergy relationships originate and emerge before the present context and future programming (Pol, 2011), flexible and variable that allow him to adapt to the demands and needs of the competition and his team randomly and variability focused on the magnitude's diversification and the frequency of uncertainty or possibility of change, generating a knowledge of the situation in real time (Balagué & Torrents, 2011).

The football goalkeeper's is the position on the field in which his needs respond to a series of technical, tactical, regulatory, cognitive, perceptual, motor, physical elements, since his participation is key to guarantee his team's success within the competition. This position within the competition has some distinctive and specific characteristics that give the goalkeeper a particular way of socializing in the game. The main characteristics of the goalkeeper are condensed into multiple capacities and abilities, that are at the same time interrelated to obtain the maximum performance, among them, one can highlight: a great anaerobic capacity of the power and capacity of the energetic anaerobic systems, explosive strength and vertical jump capacity, muscle strength, speed and agility, as well as the coordination differentiating elements, rhythm, coupling, orientation and balance related to visual and motor capacities that are not learned or that are reflexes (Mulqueen & Woitalla, 2011).

### ***Considerations to be taken into account in the goalkeeper's training in a systemic methodology***

In the specialization process, the development of systemic works focused on the proliferation of diverse and open situations leads the goalkeeper to understand his role, generating a social interaction with the consequent understanding of his position. All of this is permeated when isolated analytical works are developed without an interconnection with what the goalkeeper needs, first, this is influenced by the paradigmatic coach's and goalkeeper's vision before every situation and second, by the

order, distribution and application done in every training (Gómez, 2011) and depending on what the coach planned-did; this classification into intensification programs by repetitions do not favor the self-organization (Balagué et al, 2014; Torrents, 2005) that indeed provides the multi-possible systemic approach because every athlete learns in his own way, regardless if he receives the same stimuli; this will allow to settle the quantification and not the qualification of these divergences contemplated in the competition-preparation process (Gil, 2008).

The same game complexity is a goalkeeper variable to be considered in every one of the practices which is why it is the best stimulus to optimize our goalkeeper's attention process will be when we systematically link it to most of the collective practices, because the game or the global actions where chaos proliferates, unpredictability and the randomness of the collective actions (Gómez, 2011) trigger acute attention processes to be able to co-adapt to the game (Balagué & Torrents, 2005; Cervera & Coba, 2012); this attention process does not only generate a psychological process, projecting a quantifiable neurobiological process (Izaguirre, 2017) in the goalkeeper's brain, in order to move more intensely and with more speed those brain connections through the areas in charge of paying attention and links to the object, in this case with the ball and their continuous movement within the field, for, in this way, an information storage process (Izaguirre, 2017) is achieved, improving the learning and the adaptation to the different uncertain actions promoted by the competition. To improve the training process in our goalkeeper, care must be taken to ensure that his attention capacity is based on the game, on his teammates, on his position, on the ball's movement, but foremost in evaluating their options, opportunities and intervention areas in it (Muñoz-Parreño, 2016a). In this same line and following the study of (Sainz de Baranda, Ortega, Palao, 2008) it was determined that the balls aimed at the goal on the floor level were the more repetitive actions in the game and in which the goal was the most used area by the goalkeeper in the general compendium of the actions made.

All the responses made by the goalkeeper, no matter if it is the technical, cognitive or physical characteristic and considering the football in ecological and undividable unity (Gómez, 2011), they make every action triggering a relationship with the tactical behavior and at the same time makes a response aimed at an interaction of the intention-need to make it (Sevil, Práxedes, García-González, Moreno & Del Villar Álvarez, 2017). For this reason, the work orientation in a conditional structure (changes in rhythm and direction, accelerations, stops, falls, stops, races and above all jumps), must be correlated to an objective boosting the teammate's game and paying attention to the applicability of such tasks and the environment (Mason & Seno, 2016), in which they are developed, that is to say, the objective is for the goalkeeper to be away from the action conditioned by the context, boosting the ability to help transform it consciously (Pol, 2011), although many times the unconscious mind creates activation footprints for the sports performance. The goalkeeper prepares to compete and for the real competition, in other words, a work in which the goalkeeper lives with the game reality, it will be the most powerful stimulus thanks to the great adrenaline release (Izaguirre, 2017).

The goalkeeper is a relational being, so he needs to constantly live with the intentionality of the one who shoots and with the sphere's trajectory, in other words, the goalkeeper is an emotional being. When we develop purely analytical works or repetition works, mainly during childhood, this memorization and repetition phase is key for it creates positive somatic markers, essential to trigger perception mechanisms that are vital to this position. On the other hand, the analytical model proposed by



Lamas, Drezner, Otranto & Barrera (2018) to evaluate the decisions taken by the goalkeeper reveals that the positioning before the shot reveals that the position in the actions that ended in a goal improved a 21.87% and in the goalkeeper saves it was optimized an 88.33%. However, the emotion driven by the individual trainings focused on responses or automatism is not entirely efficient since it restricts some real components that can only be present at the game and it is here where the feelings can allow to perform actions via solutions deriving from the sports process and motor background and in this way be able to adapt them to the environment (Izaguirre, 2017). For this reason, every training for the goalkeeper must be considered an emotional act, supported in the limbic system interaction and the set of sensory perceptions stored as to determine whether the executed task is or is not important to him (Mora, 2013). At the same time, whether the information received by the NCS reproduces a greater quantity of impulses by unit of time, this will also trigger a greater release of noradrenaline, hence creating a greater quantity of electrochemical impulses in the subsequent cell (Häfelinger & Schuba, 2010), boosting a strengthening of the cerebral cortex's associative areas, in charge of the construction of the mental processes (Mora, 2013).

In this way, there is a need to try to develop a training focused on a game intentionality or repercussion, why emotions are the sub-structures in charge of processing all the interactions produced in the learning and the memory (Mora, 2013), turning the goalkeeper into a contextual being who lives for and by the contest and depends on his capacity to interact with the environment, his teammates, his individual and collective responses, consequently having the opportunity to learn, forget what is learned, modify and transform the reality that is daily recreated in each one of his practices (Pol, 2011).

The communicative phase used by the goalkeeper is essential in the competition, through direct praxic communication carried out thanks to a motor act (Sousa, 2014) demanding the intervention on the ball and the motor counter communication to be able to interact with the possible actions made by the goalkeeper (pass, reception, blocking, pressing, deflection, etc.) and an indirect correlated praxic communication between gestures and praxis (Parlebas, 2001) developed in the teammates or opponents, will be the triggering phases of the subsequent execution of a necessary anticipatory response to perform a motor action (Tenorio, 2015), related to the requirements in every game situation. The main objective of gestures and praxis is to provide intragroup uncertainty (Hernández, 2000) in order to make it easier for the intergroup certain communication in the communication and generation of responses aimed at the same collective objective (Cruz, Vargas, Vargas & Estrada, 2014). In the training processes developed by the goalkeeper it is important to prioritize the adaptation to this type of communicative acts, highlighting the importance of gestures as the first motor communication symbol (Tenorio, 2015), mainly in stops, long serves or to ask for the ball and be the support to restart the match (Álvarez, 2012; Dóniga & Rivilla, 2015) and praxis due to the importance that the improvement in the observational processes entails, leading to an optimal interpretation of the fame, on the what (depth), the how (time), the where (space) and the what for (intention) and the why (action), they will be the result of the motor response to develop a complex action in itself (Tenorio, 2015).

### ***Importance of the goalkeeper joining the different collective practices***

The goalkeeper is a social-collective being who needs to reinforce all his structures, mainly his psychological processes, strengthening the bonds with his pairs and consequently creating an efficient system for the communication (Sousa, 2014), the

problems resolution and the performance of the different game roles (Gómez-Millán, 2016), consequently overcoming his conscious voluntary intentions to make determined movements (Sousa, 2014) and in which any adversity will hinder the learning process, complicating the evolution of our goalkeeper (Mallo, 2014), human being and sportsman in an invariable game and as (Panzeri, 2011) it goes from an improvisation resulting from the circumstances and situations in the game, in which the only thing that decides is the uncertainty.

Other variable to be taken into account is the one found in the studies of (Castellano, Casamichana & Dellal; Hulka, Weisser & Belka e, 2016; Köklü, Sert, Alemdaroglu & Arslan, 2015), considering the modification of the diverse tasks where the goalkeeper is included in the training and the alteration of the response in the team conditional structure, and then, the physiological responses, existing a diminish in the lactate concentration and maxHR%, when the tasks' dynamic was made in reduced, wide or normal spatial dimensions. At the same time, it is essential to stand out the higher variations in the physiological responses found in those reduced spaced situations or possession game actions in which the goalkeeper is not used in the collective training (Casamichana, Suarez-Arrones, Castellano & Román-Quintana, 2014). Counteracting the goalkeeper's response to his competence, the study of (Dellal et al., 2008) found that, when an 8 vs 8 is performed, associating the goalkeeper with the group dynamic increased the maxHR% 11% approximately and these data show the great variability of the conditionings offered in the game itself and specially the joint work between the goalkeeper with the collective and the dependency on the physiological variables that one tries to have under control (Asçi, 2016) in which the physical, technical, psychological and tactical indicators vary in an intersubjective way related to the intermittent short-term performance made by the competition and the same level demanded for every game model, joined by the uncontrollable invariability of the players' movement, the ball's trajectory, the coach's instructions on what are the tasks to be developed and the goalkeeper's (Dellal et al., 2008) intervention area in this activities. In this same line (Shafizadeh et al., 2015) suggests the importance of the variability in the tasks proposed by the coach and developed by the goalkeeper, in order for the abilities and capacities needed proliferate and projected over time to improve his ability to intercept the attacks to the goal, hence achieving a high correlation between the interception and the success of the actions, from the analysis of the speed in the sphere's movement in a limit of time.

The new game's trend is leading the goalkeeper to increasingly intervene in the opponent (Álvarez, 2012) and specifically, his tactical role has a lesser or greater influence depending on the game model of this team and of the opponent, because the goalkeeper's intervention will largely depend on them; in other words, the global performance in the competition is present at different levels and influenced by the opponent's opposition, the result and the place in the positions' table of the opponent team, and above all the game context the goalkeeper has to confront in the following match (Liu, Gómez & Lago-Peñas, 2015), likewise, the average number of attack-defense tactics per march is approximately 17.55 actions per game, in which the defensive actions (6.19) are doubled by the offensive actions (11.36). This proves the acquired protagonist role of the goalkeeper in his tactical role to strengthen the game model (Álvarez, 2012; Pérez, Domínguez, Rodríguez, López & Muñoz, 2016).

On of the most important aspects to value the individual performance of the goalkeeper and the defensive zone and in general, is through the actions on set plays, suggesting the inclusion of these trainings and their focusing on the specificity training

(Inarejos & Gómez, 2014) and mainly supported thanks to a game reality, promoting the physical and psychological demands that induce the fatigue and the goalkeeper's protagonist role (Fernández-Hermógenes, Cameiro y García de Alcaraz, 2017; Lapresa, Chivite, Aranda, Anguera & Barbero, 2018).

The emotional status is very important in this game position since emotionality is released during training and above all in the game, any obstacle of the neuron connection of the frontal lobe tonsil (Izaguirre, 2017) can lead a difficulty for the goalkeeper to develop efficient neuron connections in the electrochemical circuit (Mora, 2013), triggering failures to the synapses aimed at the efficiency of the tasks to be performed, hindering at the same time the observation, analysis and execution processes and causing problems for the goalkeeper's competencies.

In the training planning process, workloads must be adjusted according to the training's variability and paying attention to the after-match recovery, due to the fact that, in recent studies, a diminish in the recovery in the next 24-48 hours was observed (Malone et al., 2018), and considering all the variables in the game position, the competition, the role to meet within the collective and mainly the needs and abilities of every goalkeeper (Knoop et al, 2013).

The training process tries to reproduce the variables of the game, which cannot be repeated in the space-time and in which no motor action seen from a holistic view is like any other, the segmented or without any tactical orientation makes no sense because the human body does not respond to the simplistic vision of what is linear, that is to say, the human being is spontaneous, creative, co-adaptive and variable, so his regulatory processes are overlapped to be able to grow, develop and create the needed answers. Likewise, recent studies have proven the influence of the neurons on his ability to remember what has been developed through the different synapses changes, transformations developed from microstructural modifications at a neuronal level, due to the influence on the RNA synthesis, mainly on the proteins and different macromolecules (Mora, 2013). For this reason, training in specificity is an input that is able to recreate more accurately the demands of the competition (Inarejos & Gómez, 2014) consequently looking for a greater expansion of the memory (Izaguirre, 2017; Mora, 2013).

## **Discussion and conclusions**

The game is related to the uncertainty, new, and what is new will cause the goalkeeper's brain to structure and organize in every practice, which is why ever practice must be a substantially enriching element for he who is learning (Sousa, 2014). In this sense, developing isolated works, with no direct and random opposition that the game provides makes the competitive adaptations less likely, demanded by every alternating situation that conditions every player within the competition and makes the goalkeeper's psychomotor behavior to be modified.

The game's specific gestures must not settle the opposition, reference of spaces, teammates and rivals, diversification and context variety for a same response, boosting the use of isoinertial similar forces (Gómez, 2011), adaptation to unpredictable behaviors, co-adaptation to error (Pol, 2011) and their implication in the "systematic repetition of exercises x series x repetitions", in this sense the error, the failure and the

non-voluntary mistake lead the player to not foresee and develop the anticipation due to normally visible failures in the game and the consequent goal.

It is essential not to develop standardized models of an ideal technique when no repetition will be similar to the preceding one, the latency periods, refractory (absolute and relative) and neuromuscular activation periods are indistinctly variable on time (García-Manso, 2015). Regardless of the training process, every task must be oriented towards boosting a knowledge focused on detecting and selecting the information on the goalkeeper's intervention place and area, hence, facilitating the understanding of the place where most of the actions take place; these works boosts and facilitates learning (Lex, Essig, Knoblauch & Schack, 2015).

In the study of Jara, Ortega, Gómez & Sainz de Baranda (2018), they claim that if the objective is that the goalkeeper joins his defensive block in a synergy and also the offensive contribution from the play with the feet, it is key to promote dynamics in reduced spaces that also serve as specific training for the goalkeeper and the individual and collective development of the players, which is premise for the harmony and correlation between player-goalkeeper must prioritize the motor execution, interpretation, anticipation and a decision making where the certainty (Pol, 2011) does not proliferate in the game.

The difficulties generated by the goalkeeper's role in the competition and even in the training usually cause some comments or corrections rather focused on the problem's depth and not in the error's solution, reproducing an stress in the goalkeeper's mind-body; this stressful action affects the tonsil's functionality, who reproduces a hyper-alert and excessively defensive behavior and also counterproductive for the learning (Izaguirre, 2017), these actions also alter the adrenal system, hindering the training process (Sousa, 2014).

The goalkeeper should always be looked at as a biological being (Mora, 2008), in which his essence needs a continuum of systems, devices, connections and interchange of information and fluids that, by interacting between them, reproduce the competitive movement (Balagüe & Torrents, 2011). To do so, thinking of actions that are purely focused in the technique, physics, cognition or coordination does not know the freedom levels, self-organization, fluctuations, variations and multi-stability of the structure (Torrents, 2005). To make any movement, the goalkeeper needs the interconnection of the cerebellum and the motor cortex, sending information to the cerebellum, which is connected with the neurons' wiring connected with the different muscles (Sousa, 2014) and giving the information via the axons and dendrites it goes from an electrochemical signal to an electric signal carried out by the action potentials and activate the muscle contraction process, in this hypercomplex way our goalkeeper works, interacts, is wrong, and, above all, learns.

The adaptations that our goalkeeper reaches, both for the real stimuli of the competition and the real-simulated ones in the trainings makes not only the muscles to strengthen but also that many of their compensations before the muscle demands improve (Inarejos & Gómez, 2014), rather, the stimulus's functional spectrum is condensed in the multiple systems and organs that have worked (respiratory, cardiovascular, renal, hepatic, neuromuscular systems, etc.), a process by which the affectation is produced at the level of the motor centers inside the central nervous system in all the structures (conscious, unconscious or reflective) and at a neuromuscular level producing a metabolic activation through the diverse energetic substrates that are mobilized through the bloodstream (García-Verdugo, 2007), this

complex fractal reality must be evaluated in a holistic way in the goalkeeper as to determine the influence of his multifaceted and factorial (cognitive, physical, neural) endurance in the game. Lastly, it is key to contextualize that any endurance, seen as capacity to support and keep the goalkeeper's work quality, triggers a series of diverse stimulations that will not usually be similar to those of the competition, a factor due to which the use of high workloads will reduce the capacity to execute explosive movements (Gómez, 2011).

### ***Conclusions***

The football as sport has seen the development and extension of new training methodologies has increasingly caused the goalkeeper's association with the fundamental axis in the practice, trying to find those responses related to the evaluation of the competition's performance, this has allowed the study of a scenario for multiple researches, especially those linked to determining the activity profile of the goalkeeper during the matches through the diverse categories with technical, conditional, tactical, psychological approaches, etc.

One of the elements to be considered in the football goalkeeper's function within the game cycle is his location, which he keeps before the continuous fluctuations the competition goes through, this premise was evaluated in the Spanish Professional Football League and it was found that the goalkeepers in high level teams had a better performance than those who are in intermediate and low-level teams, key factors to characterize the demands of the goalkeeper paying attention to the competency level, the context and the demands that are transformed every match (Liu et al., 2015), this will help understand the goalkeeper's intervention process within the game's systematic structure and will also allow to be able to program the training in response to his own team, opponent's needs and the needs of the particular game needs that denotes a specific way of defending and providing a participative role for the athlete.

The specificity and individuality principle entails that every position responds to certain natural characteristics of the game and their later unpredictable development, in which it is found that the matching analyses aimed at designing the random and unpredictable responses are increasingly a factor to be born in mind, therefore, it is necessary that further researchers differentiate the contributions of every methodology to the goalkeeper's training according to age, competency level and learning processes.

The football goalkeeper's functions are associated with his participatory range and possible alternatives and continuous adaptations to the competency and the totality of his functions, influenced by the training methodology used in his training process. For this reason, it is necessary to evaluate invariability as one of the main topics in the goalkeepers' training process, which is why most of the future projects and studies have to focus on the determination of the decision-making's efficacy (Lex et al., 2015; Lamas et al., 2018), as well as the process in which information is captured and analyzed thanks to cognition, which is still an unsolved thematic in order to determine the relationship between the cognitive capacity and the sports performance as to determine the extent to which the goalkeeper (Walton et al., 2018) benefits from each one of the training methodologies whose aim is to train the goalkeeper.

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