

IS THERE A NEED TO INCREASE THE NUMBER OF SUBSTITUTIONS IN MODERN PROFESSIONAL FOOTBALL?

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Abstract

Football is the most important and popular sport in the world, being influenced by several aspects and generating a billion dollar financial income. The constant scientific advancement of the modality allows a rapid evolution of football, being important to constantly review aspects of its dynamics and, consequently, its laws. The aim of this work is to analyze and argue, based on several aspects, e.g., evolution of the modality, physiological aspects, incidence of injuries, relationship with the media and economic aspects, etc., if there is a need to increase substitutions in modern professional football matches. In order to achieve this objective, a wide bibliographic research on the most important aspects of football was used. As demonstrated throughout the text, according to the constant changes that have occurred in various aspects related to football over the years, there is a need for changes in the regulations to meet the need and provide a greater evolution of the modality. In this way, we believe that the increase in the number of substitutions can be very beneficial for football in general, mainly to make the modality more dynamic and attractive to the spectators.

Keywords: EVOLUTION OF FOOTBALL / PHYSIOLOGY / INJURIES / MEDIA / SOCCER.

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INTRODUCTION

On October 26, 1863, 11 practitioners of a strange game played with only their feet gathered at the Freemason's Tavern in London. That night they had three goals: to permanently separate football from rugby, a sport also played with the hands; to found The Football Association; and lay the foundations for the 17 rules govern football today. As much as the rules have changed, since that historic meeting, the essence of the game has hardly changed (Unzelte, 2002).

Former referee and FIFA instructor Emídio de Mesquita says, "it is not true the rules of football are static". However, most people with decision-making power in the most popular sport on the planet - and afraid of losing popularity has never been achieved by sports in constantly changing, such as volleyball or basketball - prefer not to change; or change very little.

It is difficult to do revolutions in a sport in which all decisions are up to one entity, the International Football Association Board (IFBA). Created in 1886 (before FIFA itself which dates back to 1904), the IFBA meets every year to discipline and, eventually, change the laws of the game. There are 20 members entitled to 8 votes. The countries of the United Kingdom, where football emerged, are represented by 16 delegates, but are entitled to only 4 votes. FIFA's votes, through its 4 representatives, are unitary and are worth the other 4. For any rule to be modified, two-thirds of the total is required, or 6 out of those 8 votes (Unzelte, 2002).

For almost a hundred years, substitutions during a football match were not allowed. Substitutions did not exist until the late 1950s. In the event of an injury, the player who managed to stand would remain on the pitch just to "make number" or the team would play with 10 players. With the number of injuries increasing, FIFA decided to allow substitutions. Change of athletes in official matches, only from 1958, when FIFA decided to try for the first time (only in youth tournaments) the change of goalkeeper at any time of the match, plus another player, limited to first half. In 1965, the maximum replacement of two athletes in official matches was approved, restricted to cases of injury. Exchanges regardless of the substitutes' physical state, which gave coaches greater freedom to change tactics during matches, were only regulated in 1968. In 1970, FIFA approved 2 substitutions for the Mexico World Cup, even for reasons tactics. The substitutions, at the time two, became three on March 2, 1994, provided that one of the substitutes was the goalkeeper. In 1996, the three substitutes could already include or not the goalkeeper (Unzelte, 2002). The substitution of players during a match has been one of the most important changes in the laws of football (Varela-Quintana, Del Corral & Prieto-Rodríguez, 2016).

Currently, football is the most popular sport in the world, being influenced by several factors (economic, cultural, political, etc.) and generating a billion dollar financial income. The constant scientific advancement in football, in the most diverse areas, allows a fast evolution of the modality, being important constantly to review the characteristics and aspects of its dynamics. Thus, the aim of this paper is to analyze and argue, based on some of these factors (physiological aspects, injuries, media relations and economic aspects, etc.), if there is a need to increase substitutions in high-performance football matches.

THE EVOLUTION OF FOOTBALL

Current football has different characteristics as football a few decades ago. The constant scientific advance in the modality, in various fields of knowledge (e.g., advances in the physiology; the emergence and/or improvement of training methods; the emergence of new match strategies; etc.), makes football a constantly changing and evolving sport. These changes are becoming faster and more frequent. Thus, it is important to analyze how the matches' actions in football change its tactical-strategic dynamics over time (Barreira, Garganta, Castellano, Prudente & Anguera, 2014).

Classic football (40-50 years ago) was often more beautiful than modern football due to the athletes' physical capacity. As everyone moved much less, there was much more space. It is impossible to compare the game style of yesteryear with that of today, concepts such as space occupation and compacting of lines did not exist and, currently, are fundamental points for the football at a high level (Barros & Diuana, 2016).

In the 1980s, high-level players ran an average of 8km per match. Today, athletes are able to cover up to 14km per match. In addition to moving around a lot more, today's athletes do everything faster. If until the 1980s players reached a top speed of 13km/h, today it is possible to see players reaching the 37km/h mark in a match! (Barros & Diuana, 2016).

Training for high-level players has undergone substantial changes compared to few decades ago. The number of matches and training sessions has increased significantly. Thus, a change in training loads has also been changed, due to the entry of new concepts for the practice of current football (Leite & Cavalcanti Neto, 2003), transforming the style of football, with a replacement of the emphasis on technique by physical and tactical components (Raymundo, Reckers, Locks, Silva & Hallal, 2005).

Regarding the average number of goals in football matches, matches in the past had more goals, meaning, among other things, the use of match models more focused on attack, while in more recent matches there are fewer goals (Barreto & Almeida, 2017). Some studies compared the average number of goals in football World Cup matches between 1930 and 2014 (88 years, 20 tournaments) showed the average number of goals scored has been dropping substantially over the years (Leite, 2013; Leite & Barreira, 2014). This fact shows an evolutionary trend in football. Probably, the main factors contribute to this drop in the average of goals scored and the evolution of football are improvements in the physical, technical and tactical preparation of the players.

Barreira et al. (2014) analyzed the evolution of the attack in elite football from 1982 to 2010 and concluded that over time the patterns of play performed by elite football teams demonstrated the match it became more collective, i.e., the occurrence of dribbling and ball driving actions in the central corridor of the field tended to be replaced by short passing and crossing actions from the side corridors.

Some studies carried out in football World Cups showed other evolutionary trend for some indicators. Kuhn (2005) analyzed the World Cups of 1954, 1974, 1998 and 2002 (~50 years), and found the players covered a larger area of the field, the ball possession of the goalkeepers increased, there are passes more successful in the first touch, long passes and greater speed of the ball. Pollard and Reep (1997) found an increase in the number of ball possession with more than 4 passes between 3 World Cups: 5% (1958), 15% (1986) and 20% (1994). Wallace and Norton (2014) studied the final World Cup matches from 1966 to 2010 and found the speed of the ball increased by 15% in the 44-year period, and the density of the players at the centre of the match increased by 35%, stating these data suggest common evolutionary pressures may be driving play structures.

Other studies have also made comparisons between indicators in domestic football leagues. Williams, Lee and Reilly (1999) compared the intensity in the matches of the 1991-92 and 1997-98 seasons of the English Premier League and found a higher incidence of dribbling, passing, crossing and running with the ball in the 1997-98 season. Another study on the English Premier League compared 7 seasons, from 2006-07 to 2012-13. The authors found in the last season the total distance covered was ~2% greater; the running distance at high intensity increased ~30%; the number of high-intensity stocks increased ~50%; the sprint distance and the number of sprints increased ~35% and 85%, respectively; the proportion of explosive sprints, the number of passes (~40%), the number of successful passes (~8%) and the number of short and medium passes also increased in the 2012-13 season compared to 2006-07 (Barnes, Archer, Hogg, Bush & Bradley, 2014).

According to Barnes et al. (2014), the trend for increased physical and technical performance is a reflective of an evolution within the match which may be a consequence of development physical, technical and tactical preparation of players. Other team sports such as handball and Australian football have been shown to have evolved over time, possibly due to a combination of law changes and improvements in physical, technical and tactical preparation (Bilge, 2012; Norton, Craig & Olds, 1999).

Another important factor for the development and evolution of a sport is the use of technologies. Several sports started to count on the support of technology during the disputes, without hindering their growth (Gantois, 2015). Recently, an important aspect for the evolution of the law in football has been the use of VAR (Video Assistant Referee) technology, being realized on May 8, 2018, the incorporation of VAR

into the official laws of football by IFBA (Galak, Zoboli & Dantas Júnior, 2018). Although it is an evolution for the modality, football was too late in relation to other sports (such as tennis, rugby, volleyball, etc.) already used technology to assist referees in their decisions (Galak et al., 2018). The introduction of VAR to enable certain referee decisions of important consequence to be reviewed will, in theory, correct a decision seen to be clearly wrong (Leite & Pollard, 2018). Other technologies are also used in high-performance football to monitor athletes' performance, such as displacement analysis through GPS (Global Position System), mapping through video capture, cardiac frequency meter, accelerometer, gyroscope, etc. (Gasparini & Álvaro, 2017). These technologies are essential to improve performance in match performance (Flôres, Santos, Carlson & Gelain, 2019).

Analysis of data from several studies shows football is undergoing ever faster changes. This evolution could, probably, be even greater and more appropriate if the laws of the game were changed to keep up with such changes. Thus, changing the law to allow an increase in the number of substitutions during the match can contribute in several aspects to a greater evolution of the modality.

PHYSIOLOGY OF MODERN FOOTBALL

The physical demands on a professional football player are high (Bengtsson, Ekstrand & Häggglund, 2013) and the intensity of the match is increasing. Thus, the physiological demands in football have been studied intensively (Bangsbo, 1994; Stolen, Chamari, Castagna & Wisloff, 2005; Bangsbo, Iaia & Krstrup, 2007).

Football is a sport with intermittent characteristics, strenuous intensity, emphasizing the force components, speed and endurance (Gorostiaga, Llodio, Ibáñez, Granados, Navarro, Ruesta, et al., 2009). Due to the long period of a football match, much of its energy release, approximately 90% of the total match time, comes from aerobic metabolism (Bangsbo, 1994; Stolen et al., 2005). During a match the athletes run on average of 10-13km (Bangsbo, Norregaard & Thorsoe, 1991; Bangsbo, Mohr & Krstrup, 2006; Helgerud, Engen, Wisloff & Hoff, 2001a), with some players covering up to 14km (Bengtsson et al., 2013), at an average intensity of work next to the anaerobic threshold, 80-90% of maximum heart rate (Helgerud et al., 2001a).

The literature indicates as a reference for football VO_{2max} values between 50-75ml·kg⁻¹·min⁻¹ according to the different field positions (Bangsbo, 1994; Stolen et al., 2005). Presenting high VO_{2max} values in football seems to be more interesting in positions require greater match volume, as players who play in midfield (Di Salvo, Baron, Tschan, Calderon-Montero, Bachl & Pigozzi, 2007).

Football is an activity involves both aerobic and anaerobic exercises (Osgnach, Poser, Bernardini, Rinaldo, & Prampero, 2009), thus, the elite football players have high demands aerobic during a match and extensive anaerobic requirements during periods of a match, leading to major metabolic changes (Bangsbo et al., 2007).

Anaerobic activity constitute the most crucial moments of the match, contributing directly to the win, ball possession and scoring or conceding goals (Helgerud, Rodas, Kemi & Hoff, 2001b; Reilly, Bangsbo & Franks, 2000). Approximately, a quarter of the total distance covered in a match is covered in high intensity runs (Bradley, Sheldon, Wooster, Olsen, Boanas & Krstrup, 2009; Mohr, Ktustrup & Bangsbo, 2003). During a football match, elite players are involved in about 150-250 actions (Bangsbo et al., 2007) of 15-20m high intensity exercise (Bangsbo et al., 2006; Osgnach et al., 2009). A sprint occurs, approximately, every 90s, each lasting on average 2-4s (Bangsbo et al., 1991; Reilly et al., 2000). Sprints constitute 1-11% of the total distance covered during a match (Bangsbo et al., 1991; Stolen et al., 2005), corresponding to 0.5-3% of the effective play time, i.e., the time the ball is in play (Helgerud et al., 2001b; Stolen et al., 2005). These sprints are almost always less than 30m, half of them being lesser than 10m (Valquer, Barros & Sant'anna, 1998).

According to literature, it took 96-120 hours of rest to achieve pre-match values for 20m sprint performance as well as normalize blood markers of muscle damage (creatine kinase) and inflammation (uric acid). Consequently, for players involved in 2 matches within 3-4 days, one could expect reduced match-

related physical performance, as characterized by total distance covered, high-intensity distance, sprint distance, and number of sprints during the second match (Ispirlidis, Fatouros, Jamurtas, Nikolaidis, Michailidis, Douroudos, et al., 2008).

Team sports requires players to perform frequent acceleration and deceleration actions (Akenhead, Hayes, Thompson & French, 2013; Harper, Carling & Kiely, 2019), being one of the main factors contribute to muscle wear, increasing severe fatigue and the risk of injuries. Akenhead et al. (2013) showed, on average, 18% of total distance covered is done so whilst accelerating or decelerating at a rate $>1\text{m}\cdot\text{s}^{-2}$; a comparison between the first 15 minutes and the end of the match showed a reduction of 15-21% in the acceleration and deceleration rates. Thus, time-dependent reductions in distances covered suggest the ability to accelerate and decelerate is severely impaired during the match. Harper et al. (2019) also found a small reduction in the frequency of high ($>2.5\text{m}\cdot\text{s}^{-2}$) and very high ($>3.5\text{m}\cdot\text{s}^{-2}$) intensity accelerations and decelerations from the first to the second half periods of match play.

Studies comparing effort rates between the first and second half have shown a reduction in athletes' performance. There is a 5-10% reduction in the total distance covered in the second half compared to the first half (Bradley & Noakes, 2013; Rienzi, Drust, Reilly, Carter & Martin, 2000). In addition, the ability to perform high intensity efforts, is an important indicator of physical performance, also showed reductions of between 15-45% in the last 15 minutes of a match in comparison with the first four 15 minute periods in professional players (Bradley & Noakes, 2013; Padrón-Cabo, Rey, Vidal & García-Núñez, 2018). Thus, it has been shown the amount of running, high intensity running and covered distance is lower in the second half than in the first half of the match (Mohr et al., 2003; Bangsbo et al., 1991).

This deterioration in performance at the end of the match can be related to a number of factors such as: decreased level of muscle glycogen, accumulation of metabolic by-products, failures in the nervous system and in the stimulus-contraction mechanism (Mohr, Krstrup & Bangsbo, 2005; Rahnama, Reilly & Lees, 2004; Weineck, 2000).

The physiological demands are high, which increase fatigue, interfering in the physical, technical and psychological performance of the players and, consequently, in their motor and tactical actions in the match (Rahnama et al., 2004; Reilly, 2003; Weineck, 2000). According to Reilly (1997), the decline, mainly of explosive strength, would have the worst implications for the players' actions at the end of the match, where they will make short runs and jump less vigorously in relation to the beginning of the match.

Thus, due to the high intensity of the match and resultant physiological fatigue, the players' performance decreases at the end of the matches. Probably, the increase in the number of substitutions can maintain the intensity of the match until the end and, consequently, allow new options for the coaches, making the match more dynamic, attractive and unpredictable.

FOOTBALL INJURIES

Football practice is complex and involves a high risk of injury (Cristiano Netto, Arliani, Thiele, Cat, Cohen, & Pagura, 2019; Hawkins, Hulse, Wilkinson, Hodson, & Gibson, 2001), being a concern for football players and teams in terms of health, performance and financial cost (Dupont, Nedelec, McCall, McCormack, Berthoin & Wisloff, 2010; Woods, Hawkins, Hulse, & Hodson, 2002). The frequency of injuries in professional football players in a season is high (Raymundo et al., 2005), this amount of time lost can be devastating because players left out due to injury limit the possibility of the team's optimal performance (Ekstrand, Hägglund & Waldén, 2011).

Currently, it has been difficult to balance the preparation and demands of football players. The advancement of sports medicine leads to better knowledge of the physiology of effort and allows specific and individualized protocols for each athlete (Cohen, Abdalla, Ejnisman & Amaro, 1997). Thus, there has been a decrease in the preparatory period for the main competitions, a more frequent problem due to the exhausting football schedule (Raymundo et al., 2005). The increasingly early start of competitive activities, the increased training load and frequency of matches are examples of factors can contribute to the increase of injuries in football (Cohen et al., 1997; Santos, 2010).

Physical fatigue can arise from the repetition of matches in a short period. Professional football players are usually required to play competitive matches with a recovery of just 2-3 days (Dellal, Lago-Peñas, Rey, Chamari & Orhant, 2015). Players on elite teams compete in several leagues simultaneously and it is common to play 2 matches per week for several weeks. A period with a congested match schedule can lead to fatigue, increasing the risk of injury and poor performance in the following period (Dellal et al., 2015; Ekstrand et al., 2011). According to Dupont et al. (2010), the injury rate among players playing 2 matches per week (25.6 injuries/1000h of exposure) is up to 6 times higher than the injury rate for players playing 1 match per week (4.1 injuries/1000h of exposure).

Most professional teams have a congested schedule with many matches and many days and nights travelling (Ekstrand, Walden & Hägglund, 2004). In some places (e.g., Brazil), many of the away matches are preceded by long travels, which certainly end up disfavours the recovery process, so fundamental in high performance sports (Bengtsson et al., 2013). When playing football intensely, with intervals of 2-3 days between matches, combined to trainings and travels, it is not possible for athletes to demonstrate all the qualities and neuromotor skills, techniques, fundamentals and match strategy because they are always in constant stress and without the necessary recovery (Gil, 2018).

Miranda (2008) states the intensity of training and competitions, combined with inadequate rest, can install signs of fatigue and exhaustion, demonstrating the lack of a good activity-rest relationship can lead the athlete to have biochemical and muscular changes promote pain and functional disability. Studies have shown it takes several days to fully recover following a football match. Remaining fatigue up until 72 hours after a football match has been shown in terms of decreased physical performance as well as through increased levels of blood markers indicating muscle damage and oxidative stress (Ascensão, Rebelo, Oliveira, Marques, Pereira & Magalhães, 2008).

This suggested fatigue also increases the players' mental load. Psychological fatigue, more pronounced as a consequence of sustained physical effort, leads to tactical and motor errors (Reilly, 2003; Weineck, 2000), leading to insufficient performance and an increased risk of injury (Kibler, Chandler & Stracener, 1992). It is possible many matches lead to a lack of motivation and mental exhaustion - i.e., players are unable to adequately prepare for matches and training sessions (Kentta, Hassmen & Raglin, 2001). It may be the main stressor is not the 90 minutes of match, but mental preparation for matches, travels, possible changes in weather and climate changes (Ekstrand, Karlsson & Hodson, 2003), battle for objectives (not be demoted from division, qualify for continental leagues), pressure from fans and press, self-criticism for better performance, etc. According to Brandão (2000), stress in football players is a complex and multifactorial process, which can negatively influence the athlete's performance. Bompa (2005) considers that the greater the player level, the greater will be the demand and the stress during a match.

Most injuries in football are muscular; the increasing demand of the physical capacity increases the risk of injuries, both due to excessive training and matches, as well as sudden movements in a short period of time (Bjordal, Arnly, Hannestad & Stand, 1997). Currently, most injuries are related to rotation movements and muscle explosion, every 6 seconds the football players make an unexpected movement (Lopes, 2011). 95% of muscle injuries occurred in non-contact situations and tend to occur more frequently at the end of each half, it can be speculated fatigue may be an explanation for these findings (Ekstrand et al., 2011).

In addition to the player's health problem, there is also a sporting and economic loss linked to injuries and the time away resulting of them. Some studies analyzed the risk, types and financial repercussions of injuries in English football (Hawkins et al., 2001; Woods et al., 2002; Woods, Hawkins, Hulse & Hodson, 2003). According to Hawkins et al. (2001), each injury caused, on average, absence from 4 matches, and each week about 10% of a team was unable to train because of injury (Hawkins et al., 2001; Woods et al., 2002). The average number of days lost due to injury was 24.2 and based on the incidence of injuries/month the average number of injuries/team/season was 39.1 (Hawkins et al., 2001).

The financial loss attributable to absence of injured players during the 1999-2000 season in the English football leagues was calculated in 74.7 million Pounds, analyzing only the two main levels (Woods et al., 2002); and was calculated to be about 125 million Euros, an average of 1.4 million Euros per team,

when analyzed the four main levels (Hawkins et al., 2001). The average cost of a player from the first team in a professional team being injured for 1 month is estimated at around 500.000 Euros (Ekstrand, 2013).

Major players who are unfit to play due to injury can lead to reduced team income, due to reduced match attendances, and reduced prize money as a result of a low league position and/or an early national cup exit (Woods et al., 2002). It is crucial that players, especially those of “first choice”, lose as few matches as possible (Woods et al. 2003). For this reason, many federations have initiated and supported research aimed at preventing injuries and keeping players on the field (Ekstrand, 2013).

Thus, we can suggest the increase in the number of substitutions increases the turnover within the match, which may contribute to decrease the occurrence of injuries in football players and help to preserve the spectacle; since better players may stay more often available to participate in the matches of their respective teams.

THE RELATIONSHIP BETWEEN FOOTBALL AND THE MEDIA

Sports worldwide have become a big business and, in this context, football is a great reference when it comes to profits and fans (Reis, Remédios, Telles & DaCosta, 2014). The economic importance of football began many years ago, standing out: (i) the insertion of advertisements in stadiums; (ii) the inclusion of sponsorships in team uniforms; (iii) the diffusion of football through the media and, consequently, the dissemination of brands and products through sport; (iv) the insertion of sponsorships in the uniforms of referees and assistants.

The popularization of football in recent decades has become an activity linked to mass consumption, based on market relations, i.e., capitalist (Kupper, 2019). The media, mainly TV, are tied to economic interests at the same time they cause sociocultural effects through the football (Reis et al., 2014). Although it is impossible to generalize the influence of football, in some way, most people are exposed to their codes and cultural signs (Lippi, Souza & Neira, 2008).

Currently, in football there is a strong advertising scheme, which promotes this popular sport, integrating the relationships between consumers, sponsors and the spectacle (Reis et al., 2014). We are all potential consumers of spectacle sport, if not as fans in the stadiums, at least as spectators on television (Betti, 1998). According to Leite (2011), football is the most popular sport, being the main modality used by the media for the diffusion of the “telespectacle” and product advertising.

The “spectacularization” of football is done with the intention of increasing the audience in this or that broadcaster. There are dozens of cameras, replays, sports commentators, arbitration experts, among other attractions to keep the spectator in the broadcasts. This technological war between broadcasters ends up seducing the spectator to stay in the comfort of their home, in front of their television (Sanfelice, 2004). The advertising spaces for the matches broadcast on television are worth millions, after all, large audiences are directly equivalent to large values for every second aired (Gastaldo, 2000), with a progressive increase of the number of advertisements, both in the interval and during the transmission of matches (Leite, 2011).

Football shows going beyond the limits of the field. In a country has a tradition in this sport, investing in sponsorship creates an active and dynamic image and yields good profits. The event itself ends up lending companies this concept, becoming the football a big business for the media and its sponsors (Sanfelice, 2004). According to FIFA data, football generates more than US\$ 300 billion a year (Kupper, 2019).

The media works the football in many different ways, exploiting it as its biggest source of income, representing significant figures, both for teams and for the media (Sanfelice, 2004). According to Diniz and Machado (2008), teams are dependent of the money from the media, as well as the media also depend a lot on this relationship with football to attract spectators and sponsors. The interdependence between football and the media is strengthened by means of live matches and pay-view television broadcasting, news coverage, sponsorship agreements, advertising, increased the value of players and it made the football an commercial option more attractive (Leoncini & Silva, 2005), being need to maintain, develop, and strengthen the relationship between football teams and the media (Miskyw, 2014).

According to Leoncini and Silva (2005), the different markets linked to the sportive spectacle are: i) the producer market: encompassing practice organizations, teams; and those responsible for the administration and organization of the spectacle to be sold, leagues or federations; ii) consumer market: fans and spectators, end consumers; iii) industrial intermediary market: companies that do sports marketing, companies of sports materials or other segments that sponsor teams or events, promoting their brands; iv) player market: mobilizes large amounts of money (transfers of players between teams); v) resale intermediary market: mass media in general.

The use of VAR in football, in addition to the technical aspect and the correction of wrong decisions, also brings with it an economic bias. According to Galak et al. (2018), VAR is a complex phenomenon insofar as it is also crossed by marketing interests of sponsors, trade in players, sale of sports products. It is claimed several teams invest a large financial amounts and cannot risk the loss of money caused by decisive refereeing errors.

For the consumer watches the football match, the spectacle must be interesting and attractive. Thus, for the media it is important the main players of each team are on the field as many matches as possible, these athletes increase the attraction for the spectacle and attract a larger audience; without the main athletes the spectacle is less attractive. We believe the increase in the number of substitutions can increase the turnover of players within the same match; preserve the integrity of the best players for subsequent matches, leaving the main players available more times per season; allow the coach to have more tactical options; keep the spectacle more dynamic and attractive.

THE IMPORTANCE OF SUBSTITUTIONS IN FOOTBALL

The substitution of a player during a match could be understood as a determinant factor to the final result (Bradley, Lago-Peñas & Rey, 2014; Del Corral, Barros & Prieto-Rodríguez, 2008; Gómez, Lago-Peñas & Owen, 2016; Varela-Quintana et al., 2016). On a large scale and with the accumulation of matches during the tournaments, all the substitutions (as determinants of the result) are indispensable strategies for improving performance (Flôres et al., 2019).

Several studies analyzed the influence of substitutions during a football match found important results, standing out: (i) coaches usually make 3 substitutions during a match; (ii) the first and second substitutions tend to happen in the half time and between 60 and 90 minutes (Bradley et al., 2014; Gómez et al., 2016); (iii) the third substitution occurs predominantly during the period of 76 to 90 minutes (Gómez et al., 2016); (iv) substitutions are generally more offensive (Padrón-Cabo et al., 2018; Rey, Lago-Ballesteros & Padrón-Cabo, 2015), involving midfield (~57%) and attackers (~27%) players (Gómez et al., 2016); (v) substitutes cover approximately 10-27% greater distance in high intensity running (Bradley et al., 2014; Padrón-Cabo et al., 2018); (vi) when the team is losing substitutions happen before when they are drawing or winning (Gómez et al., 2016; Rey et al., 2015); (vii) substitutions can be physical, to reduce fatigue, or strategic, for tactical changes (Bradley et al., 2014; Rey et al., 2015; Varela-Quintana et al., 2016); (viii) home teams usually make substitutions before away teams (Del Corral et al., 2008; Gómez et al., 2016); (ix) the substitution strategies depend on contextual variables: the better the quality of the opposing team, substitutions will occur later (Gómez et al., 2016);

Regarding the goals scored, Flôres et al. (2019) analyzed 258 football matches in leagues and national cups from 16 countries. The authors found the substitute players scored ~10% of the total goals scored, which represents ~25% of the goals scored after the first substitution.

The large number of matches and the short period of physical recovery end up physically tiring the players. Thus, substitution is of great importance in the short, medium and long term, improving individual and collective performance during the season (Flôres et al., 2019). The insert of a new player in the field through substitutions, together with the physical aspects, can be an essential tool providing tactical changes through the different characteristics of the available athletes (Flôres et al., 2019).

It is clear a fourth or fifth substitution would have an impact on the dynamics of the match, especially with the possibility of major tactical changes if allowed during the 90 minutes. But it is also a way

to improve the technical quality in a match increasingly demands the physical aspect of the players (Lobo, 2015). Due to the high intensity and characteristics inherent in the football match, the number of substitutions is an important issue should be further discussed (Flôres et al., 2019), and can be very beneficial for the sport.

In 2018 the IFBA made several changes to the rules of football for the next two years. Among the main highlights are two changes regarding substitution: unlimited substitutions in the base category; permission for a fourth substitution during the extra time dispute. This signals possible changes may happen in the near future.

PARTICULARITIES

In addition to the aspects previously mentioned, other aspects also are important and can interfere in the final result of a football match. Next, some of these aspects briefly will be addressed:

Climate: probably, this is the main aspect of change between different countries around the world. Possible adaptations and changes in weather and climate can be one of the main stressors for the football player (Ekstrand et al., 2003). Thus, climatic conditions can be contributing factors to the advantage of playing at home (home advantage - HA) (Pollard & Armatas, 2017; Pollard, Silva & Medeiros, 2008). According to Pollard, Armatas and Sani (2017), home teams take advantage of playing in high humidity locations. In Brazil, it was demonstrated the greatest HA of the Brazilian league was used by Paysandu, a team played in Belém, on the Amazon River, in especially hot and humid conditions. An average daily temperature above 30° C throughout the year, associated with high humidity, can certainly have an adverse effect on the away teams (Pollard et al., 2008). The characteristics of football, associated with unfavourable climatic conditions, can cause intense dehydration, resulting in reduced physical performance (Godois, Raizel, Rodrigues, Ravagnani, Fett, Voltarelli, et al., 2014). According to Barros (2014), for every 1% of dehydration in the body, there is a 5% decrease in performance. Dehydration is more pronounced in hot and humid places, but in winter situations, when the average temperatures are lower, there is a possibility of dehydration, due to low fluid intake associated with heat loss through convection and conduction mechanisms (Sociedade Brasileira de Medicina do Esporte, 2003). In addition to doing sweat less, the low temperatures cause physiological changes in the body decrease the feeling of thirst, which can also generate dehydration and be harmful to health, especially in high-performance athletes.

Altitude: The effect of altitude on athletic performance is well known. In football, altitude has a significant negative impact on physiological performance (MacSharry, 2007; Nassis, 2013), it has been suggested altitude levels as low as 1.200m can negatively affect endurance, with a 3.1% reduction in the total distance covered (Nassis, 2013). It is known that countries play home matches at high altitude have high HA (MacSharry, 2007; Pollard & Armatas, 2017), this phenomenon is more evident, mainly in South America (Pollard et al., 2008). According to Wehrlein and Hallen (2006), in endurance athletes VO_{2max} decreases ~0.5-1% for each 100m of altitude above sea level. A country where HA is very high is Bolivia, a country in which many matches are played at very high altitudes, above 3.000m, a situation known to favour the home team, when playing with a lower altitude team. This is most evident in international matches, where most opponents are of much lower altitudes. In the matches played in the qualifying phase for 3 World Cups (2006, 2010 and 2014), Bolivia won 41 points, of which 38 (93%) were at home and only 3 away. Kenya and Ecuador were other high altitude teams with high HA (Pollard & Armatas, 2017). According to Pollard and Armatas (2017), a difference in altitude between the home team's stadium and the away's team capital was the biggest contribution to the increase in AH. It was estimated at about 0.115 points for every 1.000m above the away team's altitude. This means that the three countries play at stadiums over 2.500m (Bolivia, Colombia and Ecuador) can expect a benefit of up to 0.288 points per match due to altitude (Pollard & Armatas, 2017). McSharry's (2007) study made a statistical analysis of 1.460 international matches, between teams from ten countries in South America during the period from 1890 to 2004, founding teams from high

altitude countries scored more and conceded fewer goals as the altitude of the match increased. For each 1.000m of variation in altitude, the difference is ~0.5 goals in favour.

CONCLUSION

As explained previously, football is a sport influenced by several aspects. Throughout the text, we approached the ones we consider most important to try to justify the need to increase the number of substitutions in professional football matches. Thus, we can conclude the increase in the number of substitutions may be important for football, allowing: i) a greater evolution in physical, technical, tactical and psychological terms, consequently, making the match more dynamic and attractive; ii) greater turnover during the match, maintaining the intensity until the end of the match, making it more dynamic, attractive and unpredictable; iii) result in a possible reduction in the amount of injuries due to a possible decrease in physical and psychological fatigue; iv) preserve the integrity of the main players, making the show more interesting and attractive for dissemination through the media; v) improve individual and collective performance in adverse conditions (cold, heat or altitude).

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