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A Review of Anthropometrical, Physiological, Psychological and Training Parameters of Futsal

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Abstract

Futsal is an upcoming sport which is already widespread in several countries around Europe, Asia and South America. The current review includes topics about the history of the sport, its anthropometrical, physiological, psychological demands, characteristics of training, match analysis and coach as well as injury risks. It aims to present recent studies about futsal as the literature review showed that most of the current ones were only in Portuguese and Spanish language. This document acts as a guide for futsal trainers to organize their training sessions and their behavior to the needs of the sport. Furthermore, researchers may develop new interests and find out gaps about future research.

Keywords: Futsal, physiology, psychology, sports, injuries

Introduction

Nowadays futsal is a game which is widespread in Europe with a significant increase of spectators and a massive tv audience (Roxburgh, 2008). It was developed in Brazil and Uruguay in 1930 and the origin of its name is from the Portuguese language Futebol de salão. Professor Ceriani is the inspirer of the game who observed that young people were playing passionately a form of soccer with specific rules in basketball court with 5 players (Berdejo-del-Fresno, 2014; Cachón-Zagalaz, Rodrigo-Conde Salazar, Campoy-Aranda, Linares-Girela, & Zagalaz-Sánchez, 2012). A possible cause for the development of futsal was the lack of available soccer fields. Although it was initially developed in South America, in Portugal, in Spain and in Italy, during the last decade it was flourished in Asian countries such as Iran, Japan and Kuwait (Berdejo-del-Fresno, 2014). In Canada futsal started as a consequence of weather conditions which demand roofed places for playing soccer (Cachón, Lara, Cuadrado, & Morente, 2008; Cachón, Morente, & Lara, 2007). More than two millions males and females players participated in futsal leagues (FIFA, 2010). Many professional soccer players including Pele, Zico, Romario, Socrates, Ronaldo, and later David Luiz and Neymar started from futsal teams. In Greece the Hellenic Futsal League established in 1999 and it joined the Hellenic Football Federation in 2005 (Menichelli, 2012).

The game lasts two periods each lasting twenty minutes of actual playing time with a break of ten minutes in a minimum court 40X20m and goalposts 3X2m. It may last for 80% more than preset time because of clock stops. Each team consists of five players and nine substitutions with no restriction on the number of substitutions that may be made during a match. The clock does not stop and the substitutions may be made at any time from the demarcated substitution zones. Because of the small size and number of players as well as the minimal equipment that demanded for a futsal game (Cachón-Zagalaz et al., 2012) school consists an area to promote the sport (Bastos & Navarro, 2009; Costa, 2004). Furthermore, it is higher in youngsters' preferences who desire entertainment (Ilić, 2013) and socialization (Cavalcante, 2013) through sports. However very frequently there is a lack of equipped facilities for practicing sport (Altmann & dos Reis, 2013). Remarkable for the future of futsal is that the European football federation obliges all the professional soccer teams of the Greek Super League to develop futsal teams until 2018 (UEFA, 2014).

Literature review showed the lack of international studies in futsal as most of them are in Spanish and Portuguese which are limited used in Europe. The current review aims to aggregate studies in futsal to help coaches and trainers to use the findings to develop their knowledge for the sport. Furthermore, it would motivate new researchers to focus their research interests in futsal issues.

Anthropometrical characteristics of futsal players

Futsal is considered as a high intensity sport and therefore the physiological and physical requirements are major factors that concern coaches and trainers. Moreover teams with a high physical condition show a greater ability to apply the trained tactical actions than teams with low physical condition (Gheorghe & Ion, 2011). According to Burns (2003), endurance and speed are two main characteristics of futsal players. Both soccer and futsal players do not differ significantly concerning their anthropometrical and physiological characteristics, as the oldest ones are former soccer players (Jovanovic, Sporis, & Milanovic, 2011). However, futsal players are mostly mesomorphic (Bangsbo, 1994; Bissas, Cooke, Paradisis, & Liefeyth,

1996; Queiroga, Ferreira, & Romanzini, 2013) characteristic that is not related to their performance (Queiroga, Ferreira, Pereira, & Kokubun, 2008). Furthermore, they have increased muscle mass and balanced weight (Bangsbo 1994; Bissas, Cooke, Paradisi, & Liefeth, 1996; Queiroga et al., 2013). Futsal players have 177 cm height, 70-77 kg weight (Trabelsi, Aouichaoui, Richalet, & Tabka, 2014), 10-12% body fat percentage (Gorostiaga et al., 2009; Rodrigues et al., 2011; Trabelsi et al., 2014), and 30-40 cm flexibility (Bertolla, Baroni, Leal Junior, & Oltramari, 2007; Cyrino, Altimari, Okano, & de Faria Coelho, 2002). It has been found that high body fat percentage negatively affect dribbling ability of female futsal players (Kooshaki, Nikbakht, & Habibi, 2014). In addition their vertical jump is about 40-50 cm and the horizontal 220-240 cm (Cyrino et al., 2002; Fachineto, Ribeiro, Lezonier, & Mazieiro, 2008; Gorostiaga et al., 2009). Players aged 16-19 years old are mostly mesomorphic while the younger players are ecto-mesomorphic (Generosi, Baroni, Junior, & Cardoso, 2010).

Regarding playing position goalkeepers have greater height, body fat percentage and muscle mass while the wingers have the lowest height (Avelar et al., 2008; Queiroga et al., 2013). Specifically Avelar and colleagues (2008) concluded that goalkeepers have 182.4 cm height, 81.1 kg weight, 24.3 kg/m² BMI, 73.4 kg lean muscle mass and 9.2% body fat percentage, defenders have 170.5 cm height, 68.8kg weight, 23.7 kg/m² BMI, 62.5 kg lean muscle mass and 9.1% body fat percentage, wingers have 175.9 cm height, 76.3 kg weight, 24.6 kg/m² BMI, 69 kg lean muscle mass and 9.9% body fat percentage, pivots have 178.6 cm height, 77.7 kg weight, 24.4 kg/m² BMI, 70 kg lean muscle mass and 9.9% body fat percentage. Concerning developmental ages it was found that at ages 9-10 and 13-14 years old the differences between players are accentuated for both anthropometrical and physiological characteristics (Ré, Teixeira, Massa, & Böhme, 2003) which are stabilized at 16-19 years old (Dias et al., 2007). Adding that players aged about 20 years old do not significantly differ from adults, they could participate in adult futsal teams (Barbieri, Barbieri, Queiroga, Santana, & Kokubun, 2012). It seems that the anthropometrical profile of futsal players is a very important factor for the coaches to organize and evaluate their training process which should be adapted to players' needs (Giusti et al., 2012). Relative age effect is a problem observed at younger ages because of which the majority of players engaged in futsal are those who born the first quartiles of the year of birth because they frequently respond better in anthropometrical and physiological needs than others (Penna, Da Costa, Ferreira, & De Albuquerque Moraes, 2011; Penna & Moraes, 2010).

Physiological characteristics of futsal players

Many researchers have assessed the physiological demands of a futsal game by evaluating factors such as the heart rate (Barbero-Alvarez, Soto, Barbero-Alvarez, & Granda-Vera, 2008; Castagna et al., 2007), the lactic acid concentration in blood (Rampinini et al., 2007), and kinematic characteristics (Barbero-Alvarez et al., 2008). High intensity actions of futsal determine physiological needs (Barbero-Alvarez et al., 2008) and because of the limited distance the transition speed from defense to attack and the opposite is an important factor that affects the outcome (Burns, 2003). Furthermore, the unlimited substitutions allowed in futsal help to maintain the high intensity of the game (Medina, Salillas, Marqueta, & Virón, 2001).

Players cover about 4.300 m during the game (Barbero-Alvarez et al., 2008) which is similar to basketball (McInnes, Carlson, Jones, & McKenna, 1995) and handball (Perš, Bon, Kovačič,

Šibila, & Dežman, 2002). The covered distances have been increased to 5000 m for professional futsal players and 4.500 m for amateur players (Makaje, Ruangthai, Arkarapanthu, & Yoopat, 2012). Players have increased the covered distances from 108 m/min (Molina, 1992) and 113 m/min (Oliveira, 1999) to 117 m/min (Barbero-Alvarez et al., 2008). This distance is covered in higher speed in futsal compared to soccer (Bangsbo, 1993; Reilly, 1994) and other sports (Alexander & Boreskie, 1989; McInnes et al., 1995). However futsal players cover different distances according to their playing position. Specifically, goalkeepers cover 700 m, pivots 3.500 m, central defenders 4.500 m and wingers 7.000 m (Burns, 2003). It was also found that Brazilian players reduce the covered distance from 97.9 m/min to 90.3 m/min during the second half (De Oliveira Bueno et al., 2014). Their mean speed is 117-121 m/min while they cover 10 m every 2 seconds (Doğramacı, Watsford, & Murphy, 2011).

Thus VO₂max change among athletes of different playing position. Although futsal players indicate a VO₂max higher than 70-75% (Castagna, D'Ottavio, Vera, & Álvarez, 2009; Makaje et al., 2012; Rodrigues et al., 2011), goalkeepers play at 60-70% of VO₂max, wingers and pivots at 81-100% and defenders at 71-90% (Arins & Silva, 2007). Similarly, the energy expenditure of wingers and pivots is about 350 calories, defenders' 250 calories and goalkeepers' 110 calories (Arins & Silva, 2007). Probably this is the reason that pivots are usually the first who substituted in games with high intensity demands (Soares & Tourinho Filho, 2006). Goalkeepers need the lowest VO₂max compared to other positions (Baroni & Leal, 2010). Other studies concluded that futsal players indicate heart rate max more than 85% and mean heart rate about 90% per game (Barbero-Alvarez et al., 2008; Makaje et al., 2012). Castagna and colleagues (2007) concluded that mean intensity of a futsal game is about 84% of heart rate max and 75% of VO₂max. However, players indicate a reduction in variables such as mean heart rate, heart rate max and covered distance in high intensity actions, during the second half (Barbero-Alvarez et al., 2008; De Oliveira Bueno et al., 2014). Barbero-Alvarez and colleagues (2008) distinguished physiological needs of a futsal game claiming that players spend 0.3% of time in low intensity actions (under 65% of heart rate max), 16% in moderate intensity actions (65-85% of heart rate max) and 83% in high intensity actions (more than 85% of heart rate max).

Moreover futsal players perform one sprint every 79 seconds while they change their movements every 3.3 seconds during the game (Da Costa, Palma, Pedrosa, & Pierucci, 2012; Castagna et al., 2009; Doğramacı & Watsford, 2006). It was also found that players cover longer distance by walking or standing during the second half compared to the first half (30% and 28% respectively) (De Oliveira Bueno et al., 2014). It has been found that elite futsal players increase low intensity actions and decrease high intensity actions in the second half, finding that is probably affected by tactics and experience of the players who save power for the end of the game (Doğramacı, Watsford, & Murphy, 2011).

An important performance indicator is agility (Milanović, Sporiš, Trajković, & Fiorentini, 2011) which probably affect futsal performance as direction changes are frequently. Furthermore, experience is an important parameter that affects the level of the players (Serrano, Santos, Sampaio, & Leite, 2013). In addition, futsal training improve both agility and speed (Wibawa, Kanca, Sudarmada, & Or, 2015). Concerning technical skills it has been found that youngsters who start from futsal placed in positions with high technical needs when they move to soccer game. Specifically, it has been found that 46.3% of futsal players become midfielders, 19.4% wingers, 19.4% forwards and 14.9% defenders when they move to soccer (Sá, De Melo Cardoso, Da Silva, & Navarro, 2012).

Futsal statistics suggest that anaerobic metabolism is frequently above lactic threshold during a game (Barbero-Alvarez et al., 2008; Karahan, 2012) and lactic acid concentration in blood is 5.3-5.5 mmol/L (Castagna et al., 2009; Makaje et al., 2012). It is obvious that elite futsal players cover longer distances in high intensity movements finding that emphasizes the need to apply training programs in improvement of aerobic and anaerobic functions such as sprint resistance (Doğramacı et al., 2011; Spencer et al., 2004; Young, McDowell, & Scarlett, 2001). Anaerobic functions seem to distinguish futsal players who indicate higher anaerobic threshold than soccer players (Junior, Pinto, Souza, Magini, & Martins, 2006).

Psychological characteristics of futsal players

Sport psychology examines the psychological characteristics of players, trainers and coaches by applying its findings on the field. Psychological skills are trained so as to improve players' performance. Generally, sports improve not only performance but also other psychological parameters such as happiness, independence, interpersonal relations, and positivism feelings (Zamanian, Haghighi, Forouzandeh, Sedighi, & Salehian, 2011). Although researchers have examined psychological parameters such as motivation, anxiety, personality, team, leadership and injury recovery in soccer there is a significant lack of research in futsal. Specifically, futsal players have to cooperate with a common aim of achieving team targets (Travassos, Araújo, Vilar, & McGarry, 2011), the literature review showed a significant gap concerning factors that affect performance (Moore, Bullough, Goldsmith, & Edmondson, 2014). The following studies are about futsal and its psychological parameters.

Mokhtari and colleagues (2013) examined the relationship between futsal coach and team cohesion (Mokhtari, Mashhoodi, & Rahmati, 2013). The researchers concluded that coaches improve team cohesion through motivation (mental preparation and self-confidence improvement), tactic instructions (important decisions and maximizing abilities of athletes during the game), technical instructions (skill teaching and technical error detection), and personality building (fair play promotion). Female futsal teams as well as older male players desire higher social cohesion (Gomes, Pereira, & Pinheiro, 2008) which is related to the satisfaction they feel (do Nascimento Junior, Vieira, de Souza, & Vieira, 2011). Furthermore, satisfaction by technical instructions and coaching tactical advices increase perceptions of cohesion (do Nascimento Junior et al., 2011).

An important factor that affects performance is anxiety which is usually increased by the significance of the game and the difference between individual skills and required skills of a game (Mottaghi, Atarodi, & Rohani, 2013). Spielberger (1966) claimed that there are two kinds of anxieties, state and trait anxiety. State anxiety refers a transitory emotional condition which is characterized by subjective perceived feelings of tension and apprehension and increased autonomic nervous system activity. On the other hand, trait anxiety reflects to a general feeling to react with anxiety to perceived threats of the environment, and is a relatively stable condition for a person. Futsal first team players feel higher somatic anxiety while substitutions feel higher cognitive anxiety (Bocchini, Morimoto, Rezende, Cavinato, & da Luz, 2008). Furthermore, players' anxiety changed throughout the season as they indicated higher cognitive anxiety in the first game and higher somatic anxiety in the last game (Zanetti & Machado, 2010). Anxiety is also associated to the psychological burnout of futsal players that frequently lead them to the retirement of sports (Bai & Dana, 2013). However coaches are possible to reduce players' anxiety through organized training under realistic conditions and high frequency games (Mottaghi, Atarodi, & Rohani, 2013). Furthermore positive

coaching reactions and motivation climate which develop creativity by eliminating fear of failure reduce anxiety and burnout risks (Bai & Dana, 2013). Furthermore, spectators presence increases anxiety feelings of the players with low self-efficacy while it reduces anxiety of players with high self-efficacy (Junior, Moreno, Souza, Prado, & Machado, 2007). An interesting finding about the anxiety of futsal players was by Geisler and Kerr (2007). Specifically, they concluded that Canadian futsal players feel higher anxiety before the game while Japanese feel higher anxiety after a failure. Furthermore, Canadians feel higher satisfaction after a win and lower satisfaction after a defeat while Japanese feel lower satisfaction after a win and higher satisfaction after a defeat. These findings suggest that culture affects the perceptions of anxiety of the players (Geisler & Kerr, 2007).

Other studies examined the relationship of success with imagery and self-confidence which is improved by successful experiences (Hall, 2001; Vealey & Greenleaf, 2001). Sepasi and colleagues (2012) concluded that imagery and self-confidence affect futsal performance (Sepasi, Nourbakhsh, Zarasvand, & Javadi, 2012). Hallal and colleagues (2004) examined the variables forcing young players to the retirement of futsal. Specifically, players aged 11-12 years old retire from futsal because of their difficulty to combine studies and sports, the lack of reinforcement by the coach and the reduced communication with him. Similarly, players aged 13-14 years old retire from futsal because of their difficulty to combine studies and sports, the lack of reinforcement by the coach, and the preference of player for another sport. Players aged 15-17 years old retire from futsal because of their difficulty to combine studies and sports, the lack of reinforcement by the coach, and the financial difficulties. Totally, it is obvious that the relationship between players and coach as well as the lack of leisure time force the young players to retire of futsal (Hallal, Nascimento, Hackbart, & Rombaldi, 2004). Players' age, expectations, entertainment and motivation are some factors that increase the adherence of the youngsters to play futsal (De Santana & Dos Reis, 2008; Hernandez, Voser, & Lykawka, 2004).

Training

The results showed that elite futsal players indicate higher aerobic capacity, VO₂max and anaerobic threshold level (Álvarez, D'ottavio, Vera, & Castagna, 2009; Castagna et al., 2009). Specifically the limits to play for a top level team are about 50-55 ml kg⁻¹ min⁻¹ of VO₂max (Castagna et al., 2009). Thus trainers have to focus their training targets to increase the aerobic capacity of their players. Although many training programs do not use the ball to improve the aerobic and anaerobic capacity (Polman, Walsh, Bloomfield, & Nesti, 2004), Karahan (2012) concluded that an 8-week high intensity interval training program with ball improve both of them. Specifically, VO₂max, anaerobic capacity and fatigue were improved 9.6%, 10.7% and 22.1% respectively. This training program was suggested for the final stage of preparation period. However nowadays trainers prefer small sided games which benefit holistically futsal players. Trainers are possible to change field size, players' number and game's rules to improve either aerobic or anaerobic capacity (Balsom, 1999; Bangsbo, 1998; Hoff, Wisloff, Engen, Kemi, & Helgerud, 2002). It is suggested to coaches to use small sided games to improve technical, tactical, and physiological characteristics throughout realistic conditions (Serrano, Shahidian, Sampaio, & Leite, 2013). When trainers increase field size and reduce players' number they enhance also the physiological demands of the players (Duarte, Batalha, Folgado, & Sampaio, 2009; Duarte, Sampaio, Batalha, Maças, & Abrantes, 2007). Sampaio and colleagues (2007) as well as Duarte and colleagues (2009) confirmed that

changes on the field size, game time, and players' number affect the physiological demands of futsal training (Duarte et al., 2009; Sampaio, Macas, Abrantes, & Ibanez, 2007). They compared heart rate and technical skills of futsal players after 10min 4vs4 games and 4min 3vs3 and 2vs2 games on the half with a 4min break between the repetitions. Players indicated the lowest heart rate in 4vs4 game. Thus when trainers aim to increase the exercise intensity they could reduce the number of players. Lower number of players also increases the technical demands of the game. On the other hand the duration did not affect the maximum heart rate of the players. Although maximum heart rate does not significantly change in lower duration games there is a higher workout proportion in high intensity actions such as sprints (>85%). In contrast players spend higher percentage of moderate intensity actions (65-85%) in high duration games. However, Tessitore and colleagues (2006), concluded that games 30X40m demand higher intensity than games 50X40m (Tessitore, Meeusen, Piacentini, Demarie, & Capranica, 2006) finding that is probably explained by the higher number of players that they used (6vs6). As far as technical actions it was found that players use their individual technique in short duration games and team play in long duration games. Furthermore, it was found that small sided games with short number of players improve individual technique as well as tactical knowledge as players have to response quickly on realistic game conditions (Duarte et al., 2009). However, other studies concluded that a 4vs4 game present similar physiological demands with a 3vs3 game with shorter field size (Balsom 1999; Rampinini et al., 2007). Rampinini and colleagues (2007) also found that coaching encouragement increase game intensity, heart rate and lactic acid concentration. This finding is probably useful for futsal games because there is a short distance between the coach and his players in the field.

Match analysis

The most important aim of a futsal team is to find a way to achieve a goal (Fukuda & De Santana, 2012). Leite (2013) concluded that 75% of the teams which scored first won the game, finding that highlights the importance of achieving a goal early in a game (Leite, 2013). The shorter field demands many 1vs1 duals during the game (Vaeyens, Lenoir, Williams, & Philippaerts, 2007). Researchers, claim that coaches have to encourage 1vs1 duals close to opponents' area because defending teams present more negative reactions and attackers have more chances to shoot the ball. Furthermore, supporting players provide secure to the player with the ball and higher chances to achieve a goal (Amaral & Garganta, 2005). Researchers conclude that trainers frequently focus on 1vs1 conditions on their workouts (Chen, 2011). The distance between attacking and defending players is a very important factor because when it is longer the attackers have more chances either to achieve a goal or pass an assist. Further the speed of the attacker is very important to win a dual. Thus it is suggested a short distance between attackers with or without ball and their defenders independently from the field area (Vilar et al., 2014). Attacking game focuses to the creation of width and depth so as to increase the space between the defenders and make more shoots. In contrast defenders frequently use delay and compactness defending principle and not depth (Costa et al., 2010). Zhao and colleagues (2010) concluded that defenders use mainly ball stealing and pass blocking to prevent their defending area. In addition their defensive style is harder in the second half (Zhao, Fan, & Xin, 2010). It is suggested to coaches to improve defense which gives more positive results (Flores & Rech, 2012).

As far as coaching strategic of futsal teams it was found that 24.3% of goals achieved throughout organized attacks, 23.1% counter attacks, 24.3% set pieces and 21.8% because of the participation of the goalkeeper (Fukuda & De Santana, 2012). Similarly, Bueno and Alves (2012) concluded that 31% of goals achieved after organized attacks, 28% counter attacks, 23% set pieces, 10% 1vs1 duels and 10% opponents' faults (Bueno & Alves, 2012). Furthermore, Silva (2011) found that most goals achieved in arithmetic superiority. However Marchi and colleagues (2010) concluded that only 10% of counter attacks converted into goals (Marchi, Silva, Scramin, Teixeira, & Chiminazzo, 2010). It has been found that 41% of goals achieved in the first half and 58% in the second half (Fukuda & De Santana, 2012). Chen (2011) found that 43% of attacks come from individual efforts, 30% of a combination game, 12% from counterattacks, 5% from rebounds, 4% from stealing, 3% from wing attacks, and 3% from a dynamic game. Furthermore, 47% of shoots was from the area between centre and the second penalty mark, 34% between penalty mark and the second penalty mark, 7% from the corner of the penalty area, 6% from the penalty area, and 5% behind the centre. It is obvious that counter attacks is a very common play for futsal teams. Specifically, it was found that in 78% of counter attacks participated only the player who stole the ball while in 20% participated more players or the goalkeeper (Santana, 2007). Stealing a ball or passing wrongly is the commonest way to begin a counter attack (Aburachid, Silva, Soares, Santos, & Greco, 2010). One more reason for the high frequency of achieved counter attacks is that there are not specific tactics to stop them (Istchuk & De Santana, 2012).

As far as the participation of the goalkeeper as the 5th player it has been found that when teams use it they usually achieve their object (Ganef, Reis, De Almeida, & Navarro, 2009). Cunha and colleagues (2009) concluded that attack effectiveness of adult teams achieved more attacks but the goals that they achieved were fewer than U15 teams. Younger players indicate higher effectiveness as their attacks/goals rate was 3.72% while adult rate was 1.94%. Furthermore, researchers found that both adult and U15 teams indicate similar percentage of the attacking play systems but youngsters' set pieces system was more effective than adults' (Cunha, Souza, Abras, Backes, & Costa, 2009). In conclusion, it is obvious that futsal teams have to develop counter attack systems to improve their performance.

Coach

An important factor that affects team performance is the role of coach and his coaching style. The relationship between coaches and players which very frequently affect the performance (Rhind & Jowett, 2010) is an area that researchers have focused their interests in the last decade (Jowett & Wylleman, 2006). Specifically it is described as a situation that knowledge, feelings, and behaviors of coaches and players interact and change over time (Jowett & Poczwardowski, 2007). Futsal coach trains his players by giving them advices and psychological support (Menichelli, 2012). A coaching style may be oriented on a behavior that improves friendship, trustment and respect between the coach and his players while a different coaching style may be focused on an autocratic behavior oriented on the task and the performance of his players. Oliveira and colleagues (2004) concluded that futsal players prefer higher levels of democratic bahaviors compared to soccer players (Oliveira, Voser, & Hernandez, 2004).

It is obvious that coaches play a crucial role in the lives of young players by affecting their sport experiences either negatively or positively (Bruner, Hall, & Côté, 2011). Futsal coaches indicate higher level of anxiety and decision making effectiveness, but lower self-

effectiveness and cognitive skills than soccer coaches (Costa, Ferreira, Penna, Samulski, & Moraes, 2012). They also reveal higher effectiveness in decision making (Marcon & Saad, 2013). Thus, coaches' education is a primary factor for the development of leadership characteristics that facilitate coach-player interaction and the learning function (Serrano, Shahidian, Sampaio, & Leite, 2013). They need a deep knowledge of leadership styles so as to adapt their behaviors according to the needs of the team (Tondnevis, Mozaffari, & Hajianzahaie, 2012). They have also to develop an environment in which the players are able to increase their creativity and ingenuity so as to understand and utilize their tactical knowledge (Moreira, Da Silva Matias, & Greco, 2013).

However research shows that coaches do not pay much attention to the satisfaction of young players (Serrano, Shahidian, Sampaio, & Leite, 2013). In addition they do not use funny games and exercises to approach their players (Serrano, Shahidian, Sampaio, & Leite, 2013). Specifically, it is suggested youngsters aged 6-13 years old to be trained through funny games and small sided games (Bruner et al., 2011). Although Gomes and colleagues (2008) found that a factor which determines the behavior of the coach is the age demands of his players, coaches do not take it into account. It has been found that futsal coaches of 10-13 years old teams take all the decisions relating to training, placing great emphasis on the players' technique but without focusing on progressive change and specialization of athletes (Saad, 2002). Furthermore, Tagliari and Vieira (1996) claimed that coaches use the same leaders, positions and substitutions in most of the games without giving the chance to players to develop all their talents. Positive coaching behaviors (reinforcement, social support, and democratic behavior) develop the creativity of players while negative behaviors (focusing on mistakes, punishments and autocratic behaviors) increase anxiety and sport retirement (Bai & Dana, 2013; Bai, Sheikh, Rad, & Anzahaie, 2013). When coaches focus in behaviours characterized by social support, positive feedback and democratic behavior they reduce the anxiety and the burnout feelings of their players (Bai & Dana, 2013; Price & Weiss, 2000). Dimas De Oliveira and De Souza (2009) assessed technical and instructions that futsal coaches provide their players during games and training. They found that coaches behave positively through motivation and encouragement and negatively through ironic comments for their players. They also concluded that coaches provide high level technical and instructions to their players. Concerning learning effects it has been found that players improve their technical skills higher through many repeats but without improving their tactical ingenuity (Pinto & De Santana, 2005). Polidoro and colleagues (2013) claimed that technical learning improved through video analyses of their skills (Polidoro, Maccioni, & Raiola, 2013).

Nikbin and colleagues (2014) concluded that when futsal players perceive that their coaches behave equitably they develop relationships based on the trustness which improves their performance (Nikbin, Hyun, Iranmanesh, & Foroughi, 2014). Futsal players prefer a coach with deep knowledge of the game (Andre, 2013). Gomes and colleagues (2008) examined the preferences of futsal players about their coach leadership style. Specifically they found that both males and females prefer their coaches to provide them with high level of positive and reinforcement and democratic behavior. In addition female players prefer higher levels of social support than male players by their coaches. Similarly, younger players prefer coaches who provide them with high social support (Oliveira et al., 2004).

Futsal game aims to promote mental health of young players and the coaches have to protect this value. They should not aim only to the no limits win but they have also to amplify the required values for the human development by providing an environment based on the creativity and the improvisation of young players (Da Silva & Ulbrich, 2011).

Injuries

Futsal not only belongs to the top-ten sports with the most serious injuries but also holds the first position in injuries each 10.000 hours of training. Although futsal injuries percentage is 3% higher than soccer (Schmikli, Backx, Kemler, & Van Mechelen, 2009) a few studies are focused in this area. In a research which compared injuries of soccer and futsal players during world cups it was found that futsal injuries presented a higher percentage. Most of futsal injuries were caused without any touch with the opponent, finding that is probably explained by the frequent and intense direction and speed changes which the sport demands (Junge & Dvorak, 2010). In contrast most injuries of female futsal players are caused because of the opponent's actions (Rahnama, Bambaiechi, Taghian, & Abarghoueinezhad, 2010). However, most of the injuries of females are bruisers and soft contusions (Rahnama et al., 2010). Leg sprains and cracks constitute the main injuries of male futsal players (Junge & Dvorak, 2010). Furthermore, futsal players very frequently suffer from knee injuries (Baroni, Generosi, & Junior, 2008). Kurata and colleagues (2007) concluded that 32% are ankle-injuries, 26% muscle-injuries (contusions), and 18% knee-injuries (Kurata, Junior, & Nowotny, 2007). Van Hespren and colleagues (2011) found that Dutch first league futsal players reveal 38% knee-injuries, 38% sprain-injuries, 41% injury-relapses, 74% superficial-injuries while the mean recovery time is four weeks (Van Hespren, Stege, & Stubbe, 2011). Many injuries occur on the achilles and patellar tendon (Abate, Schiavone, & Salini, 2012) while supination is also a reason for knee injuries (Cain, Nicholson, Adams, & Burns, 2007).

It has been found that 56% of knee injuries happen during training, 38% during the game and 6% during recreational games, finding that is probably explained by the high frequency of training sessions. Furthermore, 67% of injuries happen during training game, 31% during aerial duals, 19% during ground duals, 13% during dribbling, and 6% after passing or shooting a ball. On the other hand 19% of goalkeeper injuries happen during their effort to stop a shoot by putting their knee on the ground. Baroni and colleagues (2008) claimed that futsal players are not used on aerial duals because futsal is a sport played mainly on the ground. Moreover, 38% of injuries happen in the beginning and in the middle of competitive period while only 6% happen in the end of the competitive period.

It is suggested that players have to use both legs during training because when they use only one leg for technical actions it is possible to injure the support leg. In addition, technical and neuromuscular coordination training reduce the injury probabilities (Junge & Dvorak, 2004; Stasinopoulos, 2004). Moreira and colleagues (2011) found that players who play two significant games in row have an increased risk to develop an infection of the upper respiratory tract due to reduced concentration of immunoglobulin. Thus it is suggested these players to get rest and reduce the training intensity between the games (Moreira, Arsati, De Oliveira Lima-Arsati, De Freitas, & De Araujo, 2011). It is also suggested a reduction to the frequency of high intensity microcycle throughout the season as well as to the number of weekly training sessions so as to reduce the injury risk (Medina, Lorente, Salillas, & Marqueta, in press). Concerning hematological changes it was found that a futsal game creates inflammation, activates the neutrophils but with reduced activity and increases the concentration of the blood plasma (De Moura et al., 2012). On the other hand futsal players indicate higher level of bone density and lower osteoporosis risk (Mousavi, Khayambashi, & Rahnama, 2010; Rahnama, Bambaiechi, Khayambashi, & Jafarpour, 2009). Steffen and colleagues (2010) suggested three strategies for injury protection according to which coaches have to use appropriate sport equipment, realistic exercises and drills, as well as pleometric training exercises.

Conclusions

The current review shows that futsal is a rising game which already presents a high increase of spectators and tv audience. Futsal coaches should take into account the anthropometrical, physiological and psychological profile of their players so as to organize and evaluate their training process individually. Concerning the physiological profile of players they cover longer distances in high intensity movements finding that emphasizes the need to apply training programs to improve both aerobic and anaerobic functions such as sprint resistance. It has been found that a 8-week high intensity interval training program with ball improve both of them. Small sided games is also a method to improve aerobic and anaerobic capacity. Specifically, trainers are possible to change field size, players' number and game's rules to improve either aerobic or anaerobic capacity. For example, when trainers increase field size and reduce players' number they enhance also the physiological demands of the players. In addition, coaching encouragement increases game intensity, heart rate and lactic acid concentration. They have also to provide their players with high levels of technical and tactical instructions, motivation, encouragement, cohesion, self-efficacy, and satisfaction so as to cover their psychological needs. They may reduce players' anxiety through organized training under realistic conditions and high frequency of games. In addition, when coaches focus in behaviours characterized by social support, positive feedback and democratic behavior they reduce the anxiety and the burnout feelings of their players. Moreover, both males and females prefer their coaches to provide them with high level of positive and reinforcement and democratic behavior. In addition female players prefer higher levels of social support than male players by their coaches. However they do not like ironic comments that usually their coaches use to their interaction. Totally, the relationship between players and coach as well as the lack of leisure time because of studies force young players to retire from futsal. One more reason that is related to the retirement of sports is the relative age effect according to which players of the same age group differ significantly from each other concerning their anthropometrical and physiological characteristics. Finally, it is suggested youngsters aged 6-13 years old to be trained through funny games and small sided games. As far as the match analyses the review shows that coaches have to train players on 1vs1 duals on the opponents' area, as well as their speed which is considered a very important factor to win a dual. On the other hand it is suggested to coaches to improve defense which gives more positive results as well as counter attack tactics because there are not specific tactics to stop them. During training the review shows that players improve their technical skills better when their coaches use video analyses. Although many repeats is a way to improve their skills, they do not improve their tactical ingenuity. As far as injuries of futsal players they suffer mainly from leg sprains and cracks, as well as knee injuries and some muscle injuries. Researchers suggest that resting between high difficulty games, and a reduction of the frequency of high intensity microcycle throughout the season as well as to the number of weekly training sessions is a way to reduce the injury risk. Furthermore, technical and neuromuscular coordination, realistic exercises and drills, as well as plyometric training reduce the injury probabilities.

Conflict of Interest

The author has not declared any conflicts of interest.

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