

ANALYSIS OF THE EFFECTS OF SITUATION TRAINING IN FOOTBALL

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Brief literature review:

Abstract

The work is of a professional nature based on research of current trends in football. In my work, my desire is to bring these trends closer to all those who love football and training. I sincerely hope that this paper will contribute to football theory and practice and that it will be useful. Coaches often do not have a lot of time to prepare for matches amid numerous obligations - some competitive, some sponsoring, and they are looking for programs that will make their work easier and bring the much-desired result. Today, the term situational training is very popular, under which we want to emphasize the specificity of training in relation to activity. Due to their specific character, games on a shortened space or as the literature says small side games (SSG) in football are often used as a training tool to improve the technical and tactical performance, as well as the fitness abilities of football players. The impact of games on a shortened space on fitness depends on a large number of organizational and methodical factors. Therefore, it is extremely important for coaches to know the chronic effects of training games in a shortened space will allow soccer coaches to design fitness programs more precisely.

Key words: tactics, soccer, small sided games, training

Introduction

One football team consists of eleven players, one of whom is a goalkeeper, and the other players are defined as defenders, midfielders and forward players, depending on the activity and position on the field where they play (Aksum et.al., 2020). Depending on the position on the field and the tasks they perform, the players of a football team can be divided into central, lateral, defensive players and forwards. This division of players on the football field also results in different demands of the players in terms of technical, tactical, morphological, functional, motor, and psychological performances (Marković, 2013). The football game requires a high degree of development of the players' physical abilities. During a football match, football players perform a large number of different movements with and without the ball, during which intervals of high and low intensity of work, of different duration, are permanently alternated. Success in football depends on a number of dimensions, among which the most important are anthropometric, motor and functional abilities, conative and cognitive dimensions, and motivational structures, on the one hand, and on the other hand, specific motor structures (acquisition of motor information, training processes of understanding and improvement) are extremely important motor structures). The modern way of

playing requires a high level of mastery of motor structures due to the diversity of the game in the defensive and attacking phases. Given that a football match lasts 90 minutes, which requires a very high level of development of aerobic capacity in football players, the football game is also characterized by the speed of change of rhythm and tempo, which conditions a high level of anaerobic capacity (Čolakhodžić et.al., 2016).

Football today is looking for players of universal character, considering all the components that are necessary for success in the game of football. In the evolution of the development of the football game, the game models have often changed. Today if we are talking about modern models of the football game, then it is necessary to emphasize that the game has become more mobile, faster, sharper, and the workload of the players has increased significantly, both in training and during the match. The analysis of the players' activities in the game solves basic, typical, but also atypical situations in the football game, which is closely related to the corresponding movement structure. In particular, it is necessary to highlight the assessments of time-space relationships that the player must, when solving situations, synchronize, and especially the time and space relationships in movement with the ball of the

opponents and his own players, without violating the rules of the game (Čolakhodžić et.al., 2016). Football training is the key and starting point for any progress and success in football.

Aim of this paper was to analyse variety of training methodologies in football that contribute to the development of situational efficiency of football players. Relevant literature was searched to find distinctive types and approaches.

Methods

Structural analysis gives us information about certain details within the match itself, as well as how certain situations are repeated during the performance. It is necessary to adapt the training process to the structural analysis of the football game, so, for example, if we receive information that a player runs 15-20 sprints 30 meters long during a match, we will develop the ability to repeat (rehearse) those sprints without impairing efficiency. Structural analysis serves to determine typical structures, substructures and structural units of a certain physical activity. In addition to technical-tactical elements, structural analysis provides information on the repetition of different ways of moving without and with the ball during a football match. Situations in the football game are constantly changing, phases of defense and phases of attack change, structures of movement and the very intensity of movement change. This means that the situations in the game are closely related to the corresponding movement structures. In particular, the spatial-temporal parameters of the football game should be highlighted, in which the player must coordinate his movement in accordance with the movement of the ball, the opponent, and his teammates, while also paying attention to the rules of the football game.

Anatomical analysis provides information on which parts of the soccer player's body are most involved and most at risk. Of the joints in soccer players, the most vulnerable are: knee, ankle, spine, especially the lumbar and cervical spine. Of the muscles and muscle groups, the most loaded are: the muscles that extend and adduct the upper legs and flex and extend the lower legs. Two regions of the body in football are particularly susceptible to injury. These are the groin belt and the Achilles tendon. In accordance with the defined critical regions of the body, physical training should influence the development of strength and flexibility of the most important parts of the locomotor apparatus for football. With high-quality and timely intervention, that is, the use of adequate training operators in a certain part of the season, it is possible to reduce the chances of an injury occurring or to completely avoid injury to football players. Football requires players to have proportional

development of all muscle regions of the body, therefore it is very important that doctors and experts have a good insight into the very anatomy of each individual player (Turpin, 1998).

Functional analysis brings us information about the activity of energy processes and the neuromuscular system in football (oxygen transport system, phosphagen and glycolytic system). The main indicator of the state of training of the oxygen transport system (cardiovascular and respiratory) is the intake of oxygen (VO₂). The value of the relative oxygen intake of German first league players is from 60 to 67 ml/min/kg (Verheijen, 1998), with the maximum heart rate reaching a value of 185 to 195 beats per minute (Weineck, 2000).

Athletes get energy for muscle work from nutrients made up of carbohydrates, fat and proteins. A quarter of the energy obtained from nutrients is converted into muscle work, while the rest of the energy is converted into heat. However, it is important to point out that the energy for muscle work is mostly obtained from carbohydrates and fats. (Bajramović et.al., 2015). The phosphagen energy process is one of two anaerobic energy systems. It contains a small amount of energy stored in the form of ATP (Adenosine Triphosphate) and KP (Creatine Phosphate). The amount of ATP stored in the muscle allows a soccer player to perform at maximum intensity for 2-3 seconds (Viru, 1999). After the consumption of ATP energy sources, the organism receives energy for work from KP, which extends the duration of high-intensity work by 10-15 seconds in lactate conditions of muscle work. It takes 60-90 seconds to restore phosphagen energy stores (Viru 1999). The restorative process takes place while the soccer player is standing, walking or trotting because he draws energy for these actions from carbohydrates and fats (Weineck, 1994). The importance of the phosphagen system can be seen from the structural analysis because, as we know, a football player makes 100 to 200 sprints per game in an interval of 5-10 meters (Verheijen, 1997). Soccer is an aerobic-anaerobic sport with certain phases of low (submaximal and maximal) load such as: sprints, changes of direction, jumps, stops. Aerobic and anaerobic abilities are fundamental in the exercise of endurance. The basic type of load in the soccer game is represented by player movements without the ball (running, jumping, turning, falling, lifting), and specific movements with the ball (passing, receiving, leading, dribbling and feinting, shots on goal and taking away). All of this represents the basis for planning and programming the fitness training of football players.

Results

Table 1. Analysis of the effects of situational training in soccer

RESEARCH	PARTICIPANTS	AIM	SAMPLE VARIABLES	RESULTS
Arcos et.al., 2015	17 (M) young football players (U-16) of the first Spanish division	Comparing the effects of short-field games (SSG) and interval training (IT) on improving aerobic fitness and physical enjoyment in professional youth football players during the last 8 weeks of the league season	Continuous multi-level running test (beep), jump test (counter movement jump CMJ), heart rate, Borg's RPE scale of subjective feeling of exertion	The results show that the SSGs were as good as the IT group in maintaining aerobic fitness in young soccer players in the last weeks of the season. The players in the SSGs group had greater physical enjoyment in contrast to the IT group.
Gaudino and assoc., 2014	26 (M) English Premier League players 26 (M) English Premier League players	To what extent the game format possession of the ball in short-field games (SSG-P), game with goals and goalkeepers (SSG-G), and the number of players (5vs5, 7vs7, 10v10) affect the physical demands of short-field games (SSGs) in professional football players	Total distance traveled, distance traveled in relation to movement speed and maximum speed	The increase in the value of the variables increases with the size of the field and the number of players (10v10 > 7v7 > 5v5; $p < .05$). Increase in games with goals and goalkeepers (SSG-G) than in games with possession (SSG-P). Energy consumption, metabolic activity is higher in SSG-P than in SSG-G.
Vilar et.al., 2014	15 (M) amateur football players	To examine the influence of the dimensions of the field in games on a shortened space on the creation of chances, retention of ball possession, passes for teammates and shots on goal.	Distance traveled, shot, pass	The existence of fewer opportunities to retain possession of the ball on smaller pitches, compared to medium and larger pitches. The different dimensions of the field did not affect the players' ability to shoot at the goal or pass to their teammates
Ade et.al., 2014	16 (M) professional young footballers of the English Premier League	To determine the physiological reactions, time-motion characteristics and reproduction of various speed-endurance production (SEP) and speed-endurance maintenance (SEM) exercises	Heart rate, blood lactate level, Borg's RPE scale of subjective feeling of effort and time-space characteristics	SEP and SEM running exercises caused greater responses ($P < .05$) on heart rate, blood lactate level and RPE than shortened space games (SSG). Less total space traveled ($P < .01$) and less space traveled in high-intensity zones in SEP and SEM SSG than in the corresponding running exercises. SEM SSG and running exercise (SEM) produced higher ($P < .05$) blood lactate concentrations than SEP SSG and running exercise (SEP).
Casamichana et.al., 2014	12 (M) semi-professional players	The influence of the duration of the exercise and the number of allowed touches during possession of the ball on the time-motion characteristics and physiological reactions of football players in games on a shortened space of 6 vs 6 players for a duration of 12 minutes	Average heart rate (HRS), intensity zones, distance covered, distance covered in different speed zones, number of accelerations of different intensities, maximum speed and work-rest ratio	In the SSGSI (free play) format, there was a decrease in the intensity of physiological indicators in the second 6-minute period (6-12 min), while this decrease was not observed when two touches per possession of the ball SSG2D were allowed. During the second period (6-12 min) in the SSG2D format, there was an increase in the value of the mean heart rate and an increase in the time spent in the high intensity zones.
Halouani et.al., 2014	12 (M) young football players	Examining the effects of the stop ball rule (ZL-SSG) versus small goals (MG-SSG) on the physiological demands of a 3 vs 3 player short space game (SSG) in young soccer players	Heart rate (HR), blood lactate level (La), Borg's RPE scale of subjective feeling of exertion	ZL-SSG caused an increase in mean heart rate (178 ± 3 vs. 174 ± 3 bpm; $P < 0.05$), an increase in blood lactate levels (4.66 ± 0.98 vs. 4.16 ± 1.02 mmol; $P < 0.05$) in contrast to MG-SSG. However, there was no significant difference between ZL-SSG and MG-SSG in the subjective feeling of exertion score of the RPE scale.
Hodgson Et.al., 2013	8 (M) University football players	Determining movement characteristics and technical requirements in games on reduced space on small, medium and large pitches	Distances covered by sprinting, running at high speed, low, medium and high acceleration. Frequency of technical requirements (passes, turns, dribbles, shots, headers, and interceptions)	SSGs played on medium and large pitches have greater physical demands in contrast to small pitches, with significantly more distance traveled in all movement categories. The total distance covered in the acceleration category ranges from 230 ± 111 (small field size) to 356 ± 72 m (medium field size). The small dimensions of the field had a greater impact on the technical requirements of the players, more passes, shots, in contrast to medium and large fields.
Owen et.al., 2013	10 (M) professional players from the Scottish Premier League	Comparison of technical activity and physical movements in various shortened games in professional football	Total distance traveled, distance traveled per minute, maximum speed, distance traveled in various speed categories, technical elements: (pass, dribble, shot, header)	The research results show significant physical differences ($p < 0.05$) between SSGs, MSGs and LSGs. SSGs require significantly faster game speed compared to other formats, but significantly less repeated high-intensity efforts, high-intensity running, sprinting compared to LSGs. The results also showed significant differences in technical elements (passes, dribbling, shots, headers).

Radziminski et.al., 2013	20 (M) young football players (U16) divided into two groups (running group - TG and group playing on a shortened area - SSG)	The effects of high-intensity running training and short-field games on the physical capacities and level of specific technical elements of young football players	VO ₂ max, sprint tests (5, 10, 30 m), Wingate test (maximum strength and work capacity), 150 m shuttle run test and technical elements (passing, shooting, heading and dribbling)	Significant increase in maximal oxygen consumption (VO ₂ max) in both groups ($p = 0.025$). The differences between the shuttle run test and the sprint tests were not significant except in the 5 m sprint test in the running group (TG). An improvement in maximal strength and overall working capacity was observed in both groups. A significant improvement in specific technical elements was observed only in SSG.
Köklü et.al., 2013	16 (M) young football players	To examine the physiological changes of young football players using short space games (SSG) 3 vs 3 players and 4 vs 4 players on different dimensions of the field	Heart rate (HR) and Borg's RPE scale of subjective feeling of exertion	Players have a significantly higher level of heart rate values, maximum heart rate and RPE scale in 3 vs 3 games on large pitches as opposed to medium and small pitches. The results of the 4 vs 4 player game on a large field showed a higher heart rate, maximum heart rate and RPE scale values compared to the 4 vs 4 game on a small field.
Brandes et.al., 2012	17 (M) professional young football players	To determine the physiological response to different reduced space games using 3 reduced space game (SSG) formats, 2 vs 2 players, 3 vs 3 players and 4 vs 4 players	Time-varying characteristics, heart rate (HR) and blood lactate level (La)	The results show that the greatest physiological reactions were obtained in the game of 2 vs 2 players (HR: 186 ± 7 b-min, HRmax: $93.3 \pm 4.2\%$, La: 5.5 ± 2.4 mmol-L). Then in the game 3 vs 3 players (HR: 184 ± 8 b-min, HRmax: $91.5 \pm 3.3\%$, La: 4.3 ± 1.7 mmol-L) and in the game 4 vs 4 players (HR: 179 ± 7 b-min, HRmax $89.7 \pm 3.4\%$, La: 4.4 ± 1.9 mmol-L). Pronounced differences were found in most physiological indicators, but also in the time spent in different speed zones: walking (5.3 km/h), moderate running speed (10.3–13.9 km/h), and maximum sprint (≥ 26.8 km/h).
Ngo et.al., 2012	12 (M) football players	To examine the effects of different defensive roles: with player marking (MI) and without player marking (B-MI) during play in a shortened area SSG: 3 vs 3 players	Heart rate (HR) and Borg's RPE scale of subjective feeling of exertion	In SSG games with player marking (MI) there are significantly higher heart rate values compared to games without player marking (B-MI). The results also show a significant heart rate during the game with player marking (MI) with goals but also without goals, unlike the other format without player marking (B-MI). In games with (MI) with goals, there are higher values of (RPE) scale compared to the game without player marking (B-MI).
Owen et.al., 2012	15 (M) professional football players Scottish Premier League	To examine the effects of periodization of short-field games (SSG) during a 4-week competitive break on changes in physical performance, i.e.: speed, aerobic capacity, and sprinting in professional European football players	Anthropometry, sprint test (RSA): 6x20m, VO ₂ max, heart rate (HR) and blood lactate level	A four-week training of short space games (SSG) had a significant effect on increasing sprint test indicators (RSA), faster 10 m sprint time. SSG led to a significant improvement in running economy through a reduction in maximal oxygen consumption (VO ₂ max) and heart rate (HR) at running speeds of 9, 11, and 14 km/h. There is an insignificant effect on subcutaneous fat tissue.
Dellal et.al., 2011	20 (M) international football players	To examine the relationship between different levels of playing in football (amateur vs. professional players) and to determine the physiological responses, movement characteristics and different technical requirements during the execution of different short-space games (SSGs).	Heart rate (HR), blood lactate level (La), Borg's RPE scale of subjective feeling of exertion, distance traveled, and technical requirements	In most SSG games, amateur soccer players had a lower percentage of successful passes ($p < 0.01$), higher values of the RPE scale and blood lactate level (La) were recorded, they lost more possessions ($p < 0.001$) and covered less total distance traveled with sprinting and high-intensity running. Heart rate (HR) results, however, were similar to those of professional football players.
Katis et.al., 2009	34 (M) young football players	Examining the player's movement actions during two game formats on a reduced space, and their influence on a series of field tests of endurance and technical tests	30 m sprint, handball throw (shot), Illinois agility test, dribbling test, horizontal jump, heart rate (HR), passes, shots, headers, sliding starts and goals	ANOVA analysis showed higher values of heart rate in the game 3 vs. 3 compared to 6 vs. 6 players ($p < 0.05$). The number of short passes, shots, sliding starts, dribbling and scored goals is significantly higher in SSG 3 vs. 3 formats compared to 6 vs. 6 ($p < 0.05$). While in the 6 vs. 6 game, more long passes and headers were performed ($p < 0.05$). After the 3 vs. 3 games, there was a significant drop in sprinting and agility ($p < 0.05$), while after completing both game formats, there was a significant change in throws and horizontal jump ($p < 0.05$).

Discussion

Researchers are looking for how to achieve the best possible performance in football, that is, how to make the best possible effect. Today's trends are integral training, and in the previous chapters we have seen many studies dealing with this issue. The challenge is to use the relationships of field size, number of players, time frame, pace, rules, goal, coaching to get a certain stimulus.

Research shows that if the size of the field increases and the number of players remains the same, the load indicators are significantly higher, as opposed to when the field size decreases and the number of players remains the same, the load is significantly lower and decreases. Coach's instructions and rules when performing exercises on a shortened field can contribute significantly to this load. In games on a shortened space where the rules of the game were strictly determined by two touches, there was a significant increase in load indicators such as heart rate, and the activity took place in high-intensity zones. And with the rule of the game free touches, the values decreased significantly. Situational exercises on a shortened space proved to be extremely good compared to aerobic training, where the goal was to improve the aerobic abilities of football players. The effects of situational exercises on a shortened space with a goalkeeper and goals were also examined, where these exercises showed an increase in energy consumption, distance run, metabolism than in games in which there was only possession of the ball without these rules.

These exercises showed an exceptional contribution to high-intensity activities, where research compared the effects of high-intensity training and game training in a reduced space. The results showed that there is no great deviation in the results, where both types of training led to an improvement in VO₂max and an increase in work capacity. These exercises have an extremely good effect on the technical requirements in the football game, where a large number of kicks, headers, sliding starts, shots on goal, dribbling, etc. have been recorded. In short-field games (SSG), amateur football players had a lower percentage of successful passes, higher values of the RPE scale and blood lactate level (La) were recorded, they lost more ball possessions and covered less total distance traveled with sprinting and high-intensity running.

Games on smaller pitches are more technically demanding and require faster play, in contrast to medium and larger pitches where long runs and longer distances are more pronounced. The existence of fewer opportunities to retain possession of the ball on smaller pitches, compared to medium and larger

pitches. In SSG games with player marking (MI) there are significantly higher values of heart rate and RPE scale of subjective feeling of effort compared to games without player marking (B-MI).

These studies show to a great extent all the benefits of situational training and precisely explain their effects on the defender and football in a wider sense.

The coach's knowledge in the use of parameters and his understanding of the game along with the quality of the players and coaching determine success and performance in training.

Conclusion

Football as a phenomenon from its creation until today is in constant development and expansion, new training technologies and new approaches to training are being developed every day. The influence of science in sports is increasing, and the most effective programs are being sought that will facilitate the work of coaches and enable players to achieve a higher level of performance. Coaches and football players should be in line with the times and development, recognize these approaches and programs in time and thus react better. One of today's high-quality training methods is situational training, where the goal is to bring football training closer to real competition conditions. On the basis of everything, the aim of the work is to analyze the effects of situational training, and situational training in general, and clarify the significance and effects of this type of training on the football player and the overall game, based on the collected data and research.

The final product that is expected from training is an effect, it can be negative or positive, what effects football training will have on football players depends only on what we really "serve" to football players.

In accordance with the defined topic, 15 scientific research papers were analyzed which are related to the topic itself and these researches are not older than 10 years. Today's trends in training technology are situational trainings, these trainings are very economical and enable better preparation of football players for the efforts that follow in competitive conditions, because in this way training approaches competitive conditions. Many abilities can be influenced by the application of games in a shortened space. Changes in fitness abilities and technical and tactical knowledge were recorded. Research shows that if the size of the field increases and the number of players remains the same, the load indicators are significantly higher, as opposed to when the field size decreases and the number of players remains the same, the load is significantly lower and decreases. From the research papers, we learned that these

changes can be influenced by many factors, for example, the number of players, the size of the field, the presence of the goalkeeper, motivation, goals, coach's instructions, etc.

When writing this paper, the broad picture was taken into account in order to offer as much information as possible in a short space. This work gathered in one place and summarized the previous knowledge and research about situational coaching in football as well as about the effects of situational coaching, which can provide readers with significant professional and scientific information. has great theoretical value.

In addition to the theoretical value, the work has a great influence on the practical value, considering the number of researches that were analyzed and the analyzed effects of those researches. Trainers and all those who are interested in this work can reduce the research time in a very simple and high-quality way and thus use this work in practice.

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