

Flexibility of Posterior Muscle Chain in Amateur Soccer Athletes

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Abstract— Soccer is a sport characterized by short duration and high intensity motor actions, alternated with periods of motor action of longer duration and lower intensity. Those particularities can cause a high number of injuries, since they require a high physical capacity of the athlete, becoming a reason of concern on part of team. Thus, the objective of this study has been to assess the flexibility of the posterior muscle chain of amateur soccer athletes. That is a cross-sectional and descriptive study, linked to the research entitled "Physiotherapeutic performance in orthopedic and sports dysfunctions". For development of the research were evaluated 32 male athletes, aged between 17 and 20 years and with current contract in the club. Participant athletes have been interviewed individually, and the questionnaire developed by researchers was applied and Wells bench linear test (sit and reach) was used to assess the level of flexibility of the posterior muscle chain. According to the study, 56.26% of the athletes presented flexibility at an unsatisfactory level, while only 18.74% presented high flexibility. It was observed that only in midfield the athletes presented a predominance of above-average flexibility (23.52%) and in all other positions the highest percentage index was for poor flexibility. It has concluded the posterior muscular chain in soccer athletes presents a high index of flexibility classified as bad, which can impair performance and generate injuries, provoking a large number of disadvantageous events.

Keywords— Posterior Muscle Chain. Flexibility. Soccer.

I. INTRODUCTION

Soccer is one of the most popular sports in the world and it has been gaining more and more followers to this practice. According to International Federation of Soccer (FIFA), the sport has around 200 million practitioners in 186 countries registered [1]. It is a sport

practice characterized by short duration and high intensity motor actions, alternated with periods of motor actions of longer duration and lower intensity [2].

Those particularities can lead to a high number of injuries, since they require a high physical capacity of the athlete, becoming a reason of concern on part of team. Injuries to lower limbs (LLI) correspond to the most frequent ones in soccer, mainly bruises and muscular injuries [3; 4; 5]. A study by Macedo et al. (2017) emphasize that flexibility deficit may be associated with muscular injuries and the presence of global shortening of posterior chain can result in 14 times the chances of sports injuries.

According to Veiga, Daher and Morais (2011), field soccer player generally adopts a hip and knee semiflexure posture during the game, and this posture can be static, making the posterior muscular chain susceptible to shortening. Therefore, limited flexibility and imbalance of forces, those athletes are more exposed to injuries such as muscular stretches, bruises and ligament ruptures.

Since regular practice of soccer has presented significant lesion rates, this study aims to evaluate the flexibility of the posterior muscle chain of amateur soccer athletes, which will allow the enrichment of scientific literature, enabling the professional physiotherapist new understandings and interpretations treatment and prevention based on evidence.

II. MATERIALS AND METHODS

This is a cross-sectional and descriptive study, linked to research entitled "Physiotherapeutic performance in orthopedic and sports dysfunctions", approved by the Research Ethics Committee, through opinion No. 2,418.72.

The research took place in a soccer club in Vitória da Conquista-Bahia; and the researchers

authorized to collect data went to the club, then the participants have been informed about objectives of research, as well as volunteer participation, starting data collection after signing the Term of Free and Informed Consent. Participating athletes were interviewed individually, and the questionnaire elaborated by researchers containing information such as name, age, height, position in field and possible injuries that may have occurred was applied to them, and after, evaluation of level of flexibility through sit and reach test (Wells Bank).

For development of research were evaluated 32 male athletes, aged between 17 and 20 years old and with an existing contract in the club, being adopted as an inclusion criteria those athletes who are in the club for more than 3 months. Participants were interviewed individually, and the questionnaire elaborated by researchers containing information such as name, age, height, position in field and history of the athlete's absence for at least one day after their occurrence, limiting their participation in training and games obtained by high reporting, and after, evaluation of level of flexibility [8; 9].

To assess the level of flexibility of the posterior muscle chain, we used the Wells bench linear test (sit and reach). The bench measures 35 cm in height and 40 cm in length and has a standard ruler at the top, exceeding the footrests by 15 cm. The evaluated athlete should be barefoot and sit facing the apparatus with the soles of feet touching the box, knees should be completely extended and feet propped up. Arms should be fully extended on surface of the box with hands overlapping (with fingers coinciding) and in contact with the sliding marker. He should flex his torso slowly trying to push the marker as far as possible. There are 03 (three) attempts, keeping each distance for at least 01 (one) second, considering the average of values reached. The evaluator should observe and ensure that the evaluated does not flex the knees and that the movement is being performed according to the protocol. Following the parameters of the Canadian Standardized Test of Fitness (CSTF), subjects aged 15-19 years were classified as excellent (> 43cm), above average (38-42cm), average (34-37cm), below mean (29-33cm) and bad (<28cm) [10; 11].

Data have been tabulated and analyzed on a software version 20.0 SPSS (Statistical Package of Social Science), using descriptive statistics. For descriptive analysis of data, absolute and relative frequencies, mean and standard deviation had been used.

III. RESULTS AND DISCUSSION

Thirty-two athletes, aged 17 to 20 years old, with a mean of 18.03 ± 0.89 years have been evaluated in the current study. According to the study, 56.26% of athletes have presented flexibility at an unsatisfactory level (poor or below average), while only 18.74% have had high (above average or excellent) flexibility, as it can be seen in Table 1.

Table 1. Classification of athletes' flexibility according to Canadian Standardized Test of Fitness. Vitoria da Conquista / BA, 2019.

Flexibility	n	%
Bad	13	40,63
Below-average	5	15,63
Average	8	25
Above-average	5	15,62
Excellent	1	3,12
Total	32	100

Source: Research data.

According to the positions analysis, it was observed that only in midfield the athletes presented a predominance of above-average flexibility (23.52%) and in all other positions the highest percentage index was for poor flexibility, as demonstrated by in Table 2.

Table 2. Classification of flexibility according to field position. Vitoria da Conquista / BA, 2019.

	midfielder (%)	striker (%)	back (%)	defender (%)
Excellent				1(25)
Above average	4(23,52)		1(20)	
Average	5(29,41)	1(16,67)	2(40)	
Below average	1(5,90)	2(33,33)		1(25)
Bad	7(41,17)	3(50)	2(40)	2(50)
			5	
Total	17 (100)	6 (100)	(100)	4 (100)

Source: Research data.

Flexibility, according to Achour Junior (2011) is the name attributed to motor capacity, defined as muscle-articular amplitude at an optimum level, without injury. That ability has an important role in neuromuscular function, as it is responsible for maintaining an adequate range of motion of joints, as well as facilitating the improvement of sports techniques, because it generates greater mechanical muscular capacity allowing a lower energy expenditure in use and can be considered a preventive factor in sports [7].

It has been verified, in current study, that 56,26% of athletes have presented flexibility at an unsatisfactory level (bad or below average), corroborating with the findings of Veiga, Daher and Morais (2011), in which they have pointed out that athletes have already presented a greater predisposition to decrease flexibility and that, independently of athletes with or without injury, they had reduced flexibility above 60%. In agreement with our work, Ferreira and Crispiniano (2012) found index equivalent to 98% of presence of hamstring shortening in 20 players.

In soccer players flexibility is an important factor to be evaluated, since it is a sport that requires acceleration and deceleration movements with sudden changes of direction, which causes friction that can lead to injuries mainly in the hamstring muscles. According to Achour Junior (2011), injuries in that muscle group represent 40% of the cases in soccer players and studies show that shortening of the posterior chain results in 14 times more chances of establishing sports injuries in adult life [6; 12]. It is noteworthy that injuries are a serious problem for the player, causing them to be removed for treatment, resulting in financial losses for the club, the athlete and others involved in his career, in addition to the late return and fear of returning activities [5]

The predominance of poor flexibility is also demonstrated when it is evaluated according to the position in field, since in the present study it was observed that in all positions the greater portion of athletes presented with below-average or poor flexibility. According to the literature, each player has a different level of metabolic demand, which requires and generates different adjustments in the processes of power production, flexibility and energy consumption [14; 15].

Despite the aforementioned reality, it was possible to identify that the midfield position was the one that presented more individuals with flexibility above the average (23.52%) in comparison to the other positions. It is noteworthy that, according to literature, when the athlete has optimal levels of flexibility, there is an improvement in joint amplitude, strength and speed of movement during sports activity, making them easier to perform and more precise [7]. Those aspects can be further substantiated by studies such as that of Santos Filho (2002), which describes that physical characteristics of midfielders are aerobic resistance, strength, coordination, agility and speed of reaction, while defenders present resistance, strength, coordination, flexibility, drive and agility.

It is valid to conjecture the hypothesis that differentiated training protocols among positions of

athletes may influence the anatomo-physiological and biomechanical aspects of the athletes.

In this sense, as a limitation of the present study, we highlight the question of the type of study developed, which was a descriptive study, which proposed only to track the posterior chain flexibility in soccer athletes, so it was not possible to generate analysis statistic with relation of chance and comparison.

IV. CONCLUSION

In that way the flexibility of the posterior chain in soccer athletes presents a high index of flexibility classified as bad, which can damage performance and generate injuries, causing a plenty of disadvantageous events, such as distance of athlete from training and games, expenses financial support for the club and sponsors and late return to official activities.

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