141 - RELATION BETWEEN PAIN COMPLAINTS AND POSTERO-INFERIOR MUSCLE FLEXIBILITY IN PROFESSIONAL AND NON-PROFESSIONAL SOCCER PLAYERS.

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INTRODUCTION

It is undeniable soccer's influence by the beginning of the 20th century, not only in national culture, but also worldwide. In Brazil, besides it was at first recognized as an elite sport, in the middle of the twenties, it became popular in a way that nowadays it reaches direct and indirectly, all Brazilian population[1].

As in any other sport, soccer has suffered changes in time, which concerns with its sports rules and with games techniques and strategies improvement, especially in professional teams. To support these advances, the elite soccer player training has become to have a higher requirement, with exhausting trainings searching the athlete and team's better performance[2].

Soccer is a vigorous sports practice, with a high injuries incident when compared to many other sports. Besides, the high rehabilitation cost of the injuries originated from this practice makes us think in prophylactics ways of injuries reduction[3,4].

In a context of injuries' prevention/cause that originated from sport is flexibility, which is one of the sports training component, as an influent factor for both meanings[5,6,7].

Flexibility refers to the tendineous lengthening extensibility to allow normal or physiological of articulation or member. In more restricted words, it is described as the difference of the muscular length when shortened and extended, once the lower the muscular extensibility, the lower the movement amplitude in a specific articulation. A good postero-inferior muscle flexibility in a professional soccer player or in a weekly player is very important, since it benefits a good soccer performance and some injuries prevention in this activity practice[10,5].

Basing on literature which disagrees about the postero-inferior muscular chain extensibility, it is found a relevant difference about the considered normal angulation to the coxofemoral articulation as representation of this flexibility[5].

In face of so many divergences about the coxofemoral angulation, the aim of this study was to compare the postero-inferior muscle's flexibility in professional and non-professional soccer player groups, relating it to the lumbar spine and inferior members pain complaints, as well as to verify which postero-inferior muscular chain stretching exercises were performed by the professional and non-professional soccer player groups, relating them to this muscle extensibility.

METHODS AND MATERIALS

This study sample was compounded by 26 male soccer players, with ages from 18 to 30 years old, and from these, 13 perform in professional and 13 are non-professional soccer players in Itajaí. These practice sport twice a week for a period not less than 1 year, not practicing other kinds of sports, except for working out. The volunteers signed a free and clarified term of consent, in which they affirm to be aware of the evaluation procedure that was realized. The data collection was realized by Biofotogrametria® to evaluate the postero-inferior muscular chain flexibility and by a questionnaire/interview. It was compound by the identification data, open and closed questions which involved pain complaints, injuries originated from the sports practice, previous pathological finds and types of preparation realized in each sports practice.

Biofotogrametria® is a quantitative analyses technique of the movement that allows people to effect the measures, by perspectives registered by a photography[11]. To obtain the image, a PENTAX Optio digital camera was used, positioned in level on a tripod of 65 centimeters height, with a distance of 3 meters from the evaluated person.

During the photographic register, the observed person remained wearing underwear and points were marked according to Santos (2001)[12] with adhesive labels of 13 millimeters of diameter in foot dorsal face, lateral malleolus, femoral condyle, middle third of the lateral aspect of the thigh, femoral greater trochanter, pelve's upper anterior iliac spine and axillary line 3 centimeters from the last point, all on the person's right side.

To register the first image, the person was asked to perform a maximum active truncus anterior flexion with the marked side turned to the digital camera until the pain limit, leaning their superior member on a chair with 65 centimeters height, 35 centimeters far from the person's foot, performing elbow flexion starting with an internal rotation of al the superior member. To obtain the second image, the person remained in orthostatic position and right hand leaning on the contralateral shoulder to static evaluation.

The pictures were analyzed by the program Alcimage 2.1®, which supplied automatically the value of the angles found. The photographic evaluation results were analyzed statistically by the "t test" and the questionnaire data obtained by the simple and the decussate frequency distribution.

RESULTS AND DISCUSSION

The average values of the coxofemoral articulation flexion angles obtained by the photographies analyses (Biofotogrametria®) besides the higher and lower angles, found in professional and non-professional groups of players illustrated on table 1:

Table 1: Flexion movement angles of the coxofemoral articulation.

Table 1.	Lowest angle obteined	Average angle values of the coxofemoral movement	Highest angle obtained
Professional players	35,13º	44,42º	62,04º
Non-professional players	24,76º	39,89º	61,40º

It is observed that the average coxofemoral angle shown in both groups was inferior to the considered ideal by the literature finds. In the professional players group the average angle is 45,48º below the 90º considered by most authors. The non-professional group showed 50,11º below this ideal angulation. It's also observed that the highest angulation obtained by the study (62,04º) is still not close to the normal angulation, and the lowest angle (24,76º) represents 27,51% of the considered ideal. Besides the professional team is with a better angulation than the non-professional team, there is no significance between the values found.

Speaking about the normal angulation of the coxofemoral flexion movement, Bienfait[13] suggests that for a good postero-inferior muscular chain flexibility, the person must reach the coxofemoral flexion of 90º position, with the knees extended.

According to Kapandji[14] the hips flexion is described as the movement which produces the contact of the anterior aspect of the thigh with the truncus. To the author, when the knees are extended, the flexion does not exceed 90º, due to hamstring muscles tension.

Kendall[15] quotes that in the anterior inclination, the normal hamstrings length reaches 80º. The author says that around 35º of flexion the pelvis leans backwards.

Schobert apud Viel[16] relates the hips flexion impossibility beyond 60º by the influence of the hamstrings muscles tension. After

multiple measurements, the author discovered that when hips are flexed and reach 90º, as in sitting position, pure hips flexion of 90º is not obtained, but only 60º; the 30º left of the movement are realized by the low lumbar region, which represents the lumbar ratification in this position.

According to Achour Júnior[17] when the truncus is over flexed, trying to reach the hands to the ground, the convexity is generally exceeded in the thoracic region, and reverses normal lumbar lordosis, and because of that the lack of hamstrings flexibility is compensated by the thoracic spine flexibility, and the obtained angle measured wrongly.

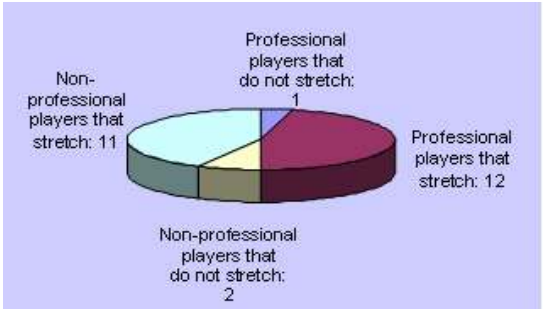
Feldman et al.[18] relates that the poor hamstrings flexibility and the muscles truncus strength decrease, are risk factors to the low lumbar spine pains.

Relating to pain, only 3 players related skeletal muscle uncomfort in the lumbar region and none has presented pain or inferior members injuries which could be related to the postero-inferior muscular chain extensibility loss, not established in this sample the relation between these variables. This finding disagrees with the literature, which relates the shorten with the pain, though it cannot be considered conclusive, because this study approached firstly players of two soccer team groups, not obtaining a satisfactory sample.

It is believed, however, that in spite of the flexibility being under the ideal in every player, the fact of practicing a regular physical activity possibilities the spine muscles resistance maintenance, which guarantees the absence of pain despite the low postero-inferior muscular chain extensibility[19].

From the players who realize stretching exercises before the soccer practice, 46,15% belong to the professional group and 42,30% to the non-professional group, as shown in graphic 1:

Graphic 1: Stretching exercises before the soccer practice.



Regarding the stretching exercises realize after soccer practice, 42,3% of the professional soccer players support this practice, decreasing this percentage to 23,07% in non-professional players group, as shown in graphic 2:

Graphic 2: Stretching exercises after the soccer practice.



The coxofemoral angulation average in professional players that do not realize stretching after the practice (42,78º) is slightly under the group average (44,42º). Therefore, the average angle of the coxofemoral movement in non-professional players that do not realize stretching (30,9º), is shown considerably inferior to the general average of the group (39,89º) showing a higher muscular shorten than the ones who practice stretching.

All the players who realize muscular stretching exercises before this soccer practice, perform at least one type of specific exercise to postero-inferior muscles. Regarding professional players, because of the physical preparation and tactics occurs in groups, stretching exercises were realized the same way by all the players, shown by the exercises in picture 1, 2 and 3, as well as maintenance time of the stretching position (15 seconds) during only one repetition.



From the non-professional players who performed muscular stretching for postero-inferior muscles, nine of them realized according to the exercises in picture 1, and two of them to the exercises in picture 2. The stretch position maintenance showed relevant variation in this group, varying from 10 seconds (27,27% of the players), 15 seconds (36,36% of the players), 20 seconds (27,27% of the players) and 30 seconds (9,09% of the players). Regarding the repetition series of the stretch position, only one player performed 3 roles of stretching (9,09%), onde player performed two roles (9,09%) and the rest of the group performed stretching postural maintenance once (81,88%). It could not be used as a parameter the players who realized more than one stretching postural maintenance for being a not expressive number.

The coxofemoral angulation of the professional individuals was not compared with the time of maintenance of the stretching position, for being the same time for all the group. However, the average of the coxofemoral angulation of the non-professionals players who realize 10 seconds of maintenance (3 players) was 36,29º, 15 seconds (4 players) was 49,26º, 20 seconds (3 players) was 39,38º and 30 seconds (only 1 player) was 39,54º. Being the angular average of this group 39,89º, the evaluated non-professional group that perform 15 seconds of stretching position maintenance, presented an angulation average above the group's, as well as those who maintained per 10 seconds reached the average of 36,29º, being this under of the average of the group.

There is a relevant discord which refers to the stretching position maintenance time, as well as its repetitions. Corbin and Fox apud Monteiro and Farinatti[20] e Weineck[21] quote that static stretching exercises that last from 10 to 60 seconds with only one repetition would be effective.

According to Hamil and Knutzen[22] and Achour Júnior[17], an improvement in the amplitude of movement can be obtained moving

the stretched member a little beyond the terminal position, keeping in this position for at least 30 seconds.

Bandy and col. apud Fernandes et al.[23] realized a study with 93 individuals with ages between 21 and 39 years that had limited flexibility in the hamstrings, and the results pointed that the stretching maintenance per 30 seconds was more effective than 15 and 60 seconds, as well as it did not change when increased the number of daily repetitions.

Tanaka and Farah[24] observed that in studies realized objecting to compare the duration of the stretching with the flexibility increase, demonstrated not to have significant difference between 10 and 20 seconds of maintenance.

To get the superior hamstrings extensibility, it is needed constant efforts, since in some hours the flexibility of this muscle returns to the initial when not prolongated adequately, therefore this muscular group presents a natural rigidity due to the fibrous structures that compose them[25].

The effect of the hamstrings stretching in the prevention of injuries is not totally clarified. Although, this muscles stretching could have important function in the reduction of the tension of these muscles, for the improvement of the muscular length, making the muscle become more resistant to the stretching injuries[26].

It has to be considered, however, that the stretching quality is important. The maintenance of a position for a longer time with the individual with biomechanic compensations, certainly decrease the stretching effectiveness, because it would not be reaching the necessary tissue adaptations, leading it to a not expressive profit of the muscular extensibility[20].

CONCLUSION

The found results through this application show that:

•The coxofemoral articulation flexibility average by the movement angle to the professional players group was 44.42º and to the non-professional players group was 39.82º. These angles describing an important postero-inferior muscular chain shortening whereas literature shows the movement angle considered ideal is 90°.

•The individual that presented the better coxofemoral angulation was included in the professional players group with 62.04º of movement amplitude and the individual that presented more distant values of the ideal belonged to the non-professional group presenting a coxofemoral articulation angulation of 24.76º.

•Despite of all players have a lower flexibility than the considered ideal, only three players mentioned complaints of skeletal muscle pain in lumbar spine and inferior members. This application did not have relation between the postero-inferior musculature shortening and pain complaints in these areas.

•In this application, the postero-inferior chain flexibility had influence of the specific stretching practice realized after the game or the training, thus these players had more flexibility than those who did not have this custom.

Little is known about soccer injuries prophylaxis by stretching exercises, thus this is a large field to applications performance whereas the different ideas in relation to the good and the bad effects of the stretching as exercise during preparation to practice.

A player flexibility degree measure, professional or non-professional, helps the physical therapists in his decisions about procedures, which can aim the prophylaxis or athlete rehabilitation.

In this manner, the necessity of more applications using the Biofotogrametria® is observed, because it is still an evaluation method diffused, however it is of easy accessibility and much authentic to the anthropometric evaluations.

Acknowledgment: We are thankful for Prof. Dr. Mário Antonio Baraúna, idealizer of the Biofotogrametria® method, and those who direct or indirectly contributed for the accomplishment of this study.

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RELATION BETWEEN PAIN COMPLAINTS AND POSTERO-INFERIOR MUSCLE FLEXIBILITY IN PROFESSIONAL AND NON-PROFESSIONAL SOCCER PLAYERS.

ABSTRACT

Muscular flexibility can be defined as the difference between the relaxed and extended position of the muscle. With soccer evolution, injuries are likely to appear due to the fact that every player is trying to overcome their own limits. In this context, flexibility is very important for injuries prevention and performance improvement. The main goal of this study was to compare the posterior inferior muscle's flexibility in professional and non-professional soccer player groups, relating it to the lumbar spine and inferior members pain complaints. The data were collected by a questionnaire-interview approaching pain, injuries occurrence and kinds of training, as well as body images analysis by Biofotogrametria®. Points were marked on the players' pelvis and right inferior members according to Santos (2001), requesting them to flex the truncus until the pain limit. To register images, a PENTAX digital camera was used. The data analysis was realized by the simple and decussate frequency distribution. It was verified that the coxofemoral articulation was shown as 44,42º for professional players and 39,89º for non-professional players, being both under the ideal flexibility (90º). Only 3 players related lumbar spine pain or inferior members' injuries episode which could be related to the shorten of the posterior inferior chain, not finding in this study the relation between these. Conclusion: Besides there's no relation between pain and flexibility, it is observed the necessity of improving warm up exercises in non-professional as well as in professional teams, because literature brings the importance of extensibility for injuries prevention and athletes' performance improvement.

Keywords: flexibility; pain; soccer.

LA RELATION DE LA DOULEUR E LA FLEXIBILITÉ DU MUSCLE INFERIEUR POSTERIEUR DANS LES GROUPES PROFESSIONNELS ET NONPROFESSIONNELS DE JOUEUR DE FOOTBALL.

RÉSUMÉ

La flexibilité musculaire peut être définie comme la différence entre la position relaxe et tendu du muscle. Avec l'évolution du football, les dommages sont susceptibles de sembler dus au fait que chaque joueur essaye de surmonter leurs propres limites. Dans ce contexte, la flexibilité est très importante pour l'empêchement de dommages et l'amélioration d'exécution. Le but principal de cette étude était de comparer la flexibilité du muscle inférieur postérieur dans les groupes professionnels et nonprofessionnels de joueur de football, la rapportant à la colonne lombaire et aux plaintes inférieures de douleur de membres. Les données ont été rassemblées par questionnaire-interviewent la douleur, les dommages occurrence et les genres d'approche de formation, aussi bien que l'analyse d'images de corps par Biofotogrametria®. Des points ont été marqués sur le bassin des joueurs et les membres inférieurs de droite selon Santos (2001), les invitant à fléchir le truncus jusqu'à la limite de douleur. Pour enregistrer des images, on a pris un appareil photo digital, le PENTAX. L'analyse de données a été réalisée par la distribution de fréquence simple et croisée en X. On l'a vérifié que l'articulation coxofemoral a été montrée comme 44,42º pour les joueurs professionnels et 39,89º pour les joueurs nonprofessionnels, étant tous deux sous la flexibilité idéale (90º). Seulement 3 joueurs ont rapporté la douleur de colonne lombaire ou l'épisode des dommages des membres inférieurs qui pourraient être liés au raccourcissement de la chaîne inférieure postérieure, ne trouvant pas dans cette étude la relation entre ces derniers. Conclusion: Sans compter que lui n'y a aucune relation entre la douleur et flexibilité, on l'observe la nécessité d'améliorer des exercices de préchauffage dans nonprofessionnel aussi bien que dans les équipes professionnelles, parce que la littérature apporte l'importance de l'extensibilité pour l'empêchement de dommages et l'amélioration de l'exécution des athlètes. Mots-clés: douleur; flexibilité; football.

RELACIÓN DE LA DOLOR COM LA FLEXIBILIDAD DE LA MUSCULATURA POSTERO-INFERIOR DE LOS JUGADORES DEL FÚTBOL PROFESIONALES E NO-PROFESIONALES

RESUMEN

La flexibilidad muscular puede ser definida como la posición relajada y extendida Del músculo. El fútbol viene evolullendo y junto con esa evolución, lesiones pueden aparecer debido al facto de que cada jugador busca superar sus próprios limites. En este contexto, la flexibilidad es de grande importancia para prevenir lesiones y mejorar la performacis. Este estúdio tuvo como objetivo, comparar la flexibilidad de la musculatura postero-inferior Del grupo de jugadores profesionales y no-profesionales relacionándolas con quejas de dolores en la columna lombar y miembros inferiores. Los dados fueron colectados a partir de un cuestionario-entrevista que abordaban dolor, ocurrencia de lesiones y tipos de entrenamiento, así como el análisis de imágenes corporales por la Biofotogrametria®. Fueron demarcados puntos en la pelvis y miembro inferior derecho de los jugadores segundo Santos (2001), solicitándoles que realizaran la flexión anterior del tronco, hasta el limite del dolor. Para el registro de las imágenes fue utilizada una cámara fotográfica digital de la marca PENTAX. La análisis de los dados obtenidos fue realizada a través de la distribución de frecuencia simples y cruzada. Se verifico que la flexibilidad de la articulación coxofemoral en el grupo de jugadores profesionales fue de 44,42º y para los jugadores no-profesionales de 39,89º, estando abajo de la considerada ideal (90º). Apenas 3 jugadores relataron episodio de dolor en la columna lombar o lesiones en miembros inferiores que pudieran estar relacionados con el encurtamiento de la cadena postero-inferior, no encontrándose en este estudio una relación entre las variables. Conclusión: a pesar de no haber existido relación entre dolor y flexibilidad, se observa la necesidad de incrementar los ejercicios de alongamiento tanto en equipos amadores como en los profesionales, pues la literatura trala importancia de la extensibilidad en la prevención de lesiones y en mejorar la performacis de los atletas. Palabras clave: dolor; flexibilidad; fútbol.

RELAÇÃO DA DOR E FLEXIBILIDADE DA MUSCULATURA PÓSTERO-INFERIOR DE JOGADORES DE FUTEBOL PROFISSIONAIS E NÃO-PROFISSIONAIS.

RESUMO

A flexibilidade, muscular pode ser definida como a diferença da posição relaxada e estendida do músculo. Com a evolução do futebol, lesões poderão surgir devido ao fato de cada jogador estar buscando superar seus próprios limites. Nesse contexto, a flexibilidade é de grande importância na prevenção de lesões e na melhora da performance. Este estudo teve como objetivo, comparar a flexibilidade da musculatura pôstero-inferior do grupo de jogadores de futebol profissionais e não-profissionais relacionando-a com queixas de dor na coluna lombar e membros inferiores. Os dados foram coletados a partir de um questionário-entrevista abordando dor, ocorrência de lesões e tipo de treino, bem como a análise de imagens corporais pela Biofotogrametria®. Foram demarcados pontos na pelve e membro inferior direito dos jogadores segundo Santos (2001), solicitando aos mesmos que realizassem a flexão anterior de tronco, até o limite da dor. Para o registro das imagens foi utilizada uma câmera fotográfica digital da marca PENTAX. A análise dos dados obtidos foi realizada através da distribuição de freqüência simples e cruzada. Verificou-se que a flexibilidade da articulação coxofemoral no grupo de jogadores profissionais foi de 44,42º e para os jogadores não-profissionais de 39,89º, estando ambos abaixo da considerada ideal (90º). Apenas 3 jogadores relataram episódio de dor na coluna lombar ou lesões nos membros inferiores que pudessem estar relacionados com o encurtamento da cadeia póstero-inferior, não encontrando-se neste estudo relação entre estas variáveis. Conclusão: Apesar de não ter havido relação entre dor e flexibilidade, observa-se a necessidade de incrementar os exercícios de alongamento tanto em times amadores quanto em profissionais, pois a literatura traz a importância da extensibilidade na prevenção de lesões e na melhora da performance dos atletas.

Palavras-chave: dor; flexibilidade; futebol.