72 - COMPARATIVE ANALYSIS OF LEVEL THROUGH THE KNEE PROPRIOCEPTIVE FLEXIMETRY IN SEDENTARY YOUNG WOMEN PRACTITIONERS AND PHYSICAL EXERCISE

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INTRODUCTION

Proprioception involves identifying receptor-sense the movement of the body and limbs. It also relates to the capture of signals generated by the body of an individual, receptors via the internal body. The function of these receptors is to assimilate, to discern and interpret the sensations, orienting movements and reactions made by the body, as well as its position in space (CONTREIRA & CORAZZA, 2009).

The development of the proprioceptive system is important to improve physical and motor skills, that are required to perform activities of daily living, to produce important information about the positions of the body parts in relation to each other, on the position of the body in space, on the various body movements and also about the objects that the body establishes contact (CONTREIRA & CORAZZA, 2009).

Individuals with proprioceptive deficits are predisposed to musculoskeletal disorders, because it changes the control of movements and abnormal tissues imposes stress related (CARVALHO et al, 2010). Doing regular exercise can be a good strategy to preserve and prevent the decline of proprioception (CONTREIRA & CORAZZA, 2009).

The regular practice of physical exercise can cause changes in the cardiovascular and respiratory systems, especially in no athletes or sedentary, improving absorption, transport, delivery and use of oxygen by the muscle. In addition, other physical aspects are developed motors such as coordination, rhythm, balance and agility (CONTREIRA & CORAZZA, 2009).

There are two tests used to assess proprioceptive acuity of knee: testing the threshold of perception of passive movement slow, which measures the kinesthetic, and repositioning test that evaluates the joint position sense. These tests preserve its essential features in various studies and differ as regards the angle measuring instrument, ranging from computer resources to traditional goniometer (CARVALHO et al, 2010).

In assessing proprioception measurement instruments must be reliable. One of the most reliable methods of measurement used in everyday life is goniometry (CARVALHO et al, 2010). Another method well known and reliable, but not much used is fleximetry, it uses the fleximeter, which is a unit gravitational used to assess the flexibility, and mostly also for measuring the range of motion and proprioception (LUSTOSA, 2008).

The purpose of this study was to measure and compare the joint position sense of the knee in young sedentary and physical exercise practitioners through fleximetry.

MATERIALS AND METHODS

The sample was composed of 24 college of Physiotherapy UNIOESTE - State University of Western Paraná (Campus Cascavel). The study, young women, aged between 18 and 25 years, irrespective of social class or race. The selection was made by formal invitation to his study sites, providing basic information about the research. All subjects signed an informed consent form (ICF), agreeing to participate in the study. The participants were instructed to attend to the study site with proper attire, which did not occur to limit the movement and that the reference point was visible.

The sample was divided into 2 groups, each consisting of 12 volunteers: Sedentary Group (SG) that did not practice physical exercise regularly and Group Practitioner (GP) defined as those who exercise for at least 30 minutes at least 2 times a week for more than 3 months.

The inclusion criterion was adopted to availability to participate in the reviews and on predetermined schedule. Were excluded from the sample: a) voluntary reporting any order of musculoskeletal involvement in the lower limbs (chronic or acute), occurred in the last five months, b) diabetic patients with neurological diseases or c) to report medication that affects the central nervous system or balance, as sedatives or tranquilizers; d) chronic alcoholics or had drunk alcohol in the 12 hours prior to testing. This information was obtained by interview applied to all participants prior to the measurement of joint values.

Evaluation Procedures

The measurement of proprioception was the assessment of joint position sense of the knee, with active repositioning of the lower limb after its dominant position by passive evaluator.

The joint measures were performed by a single reviewer, being a student of 4th year undergraduate Physiotherapy (researcher), previously trained. The measurements were performed in one location - in a room located in the Physiotherapy Clinic of Unioeste with a stretcher pattern featuring 0.90 x 1.80 and 0.65 cm height, for measures of knee extension. Before each test, a test was performed, demonstrating no value to record in order to familiarize the volunteers with the procedure and avoid mistakes learning.

The lower limb chosen for the test was the dominant identified as a "leg kick". To define it, the participant kicked a ball, with eyes open, in the same environment where proprioception was measured. The measurement was performed with the participants sitting on the edge of the gurney where the feet were suspended, the marking was made by the examiner, after palpation of the lateral malleolus of the fibula velcro was placed at this location to be done to fix the appliance. The apparatus was positioned perpendicular to the ground, and on the distal side of the leg with the marker 90 °. The participants were blindfolded to remove visual information. The test of repositioning assets with the guy sitting is what provides greater stability and isolation of the knee, it is a no-load test and is related to certain functional activities of the lower limbs such as the swing phase of gait, and simulate life situations daily (BEFORE, 2009).

To measure the angle values, the evaluator used a fleximeter SANNY® brand like, characterized the presence of a plastic cylinder with angles of 0-360 ° and has on its end the presence of a Velcro fastening device in the segment to be measured. Then, the values were tabulated and processed in a spreadsheet (Microsoft Excel 2007 for Windows).

Testing joint position sense

Assuming an angle of 90° of knee flexion, the leg was moved passively in voluntary movement of knee extension angle to reach the pre-determined by the toss (the degrees were between 10° and 60°) and, in this, the member held for 3 seconds and then returned to the neutral position, was repeated three times passive motion. The evaluator subjectively maintained a speed average of about two seconds for every 10º.

After 10 seconds the subject was instructed to actively carry out the movement and stop it reaching the target position. The angles achieved were observed and recorded by the examiner. During the test, the volunteers received verbal stimuli to focus on the position of the knee joint and thus avoid the time spent in movement could serve as a strategy for repositioning. The evaluator stood to collect, facing perpendicular to the axis of fleximeter.

Statistical Analysis

For statistical analysis we used the statistical package SPSS (v.11.0), with significance level (p=0.05). We performed the analysis of the data normality by the Shapiro-Wilk test for smaller samples of 50 subjects, and if the groups did not show normal distribution, we used the Mann-Whitney test to check the difference in mean error between groups.

RESULTS

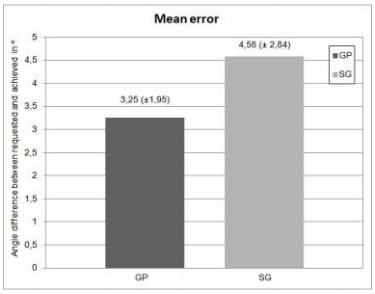
Table 1 presents the demographics of the two groups, noting that the practitioner group showed higher body mass than sedentary group, which makes the BMI group practitioner also be higher.

Table 1 - Anthropometric characteristics of groups practitioner (GP, n=12) and sedentary (SG, n=12)

Group	Age (years)	Mass (Kg)	Stature (m)	BMI (Kg/m²)
GP	21,2±1,05	59±4,74	1,66±0,05	21,21±1,39
SG	20,7±0,75	56,25±5,64	1,67±0,05	20,7±1,73

The average error of the two groups can be seen in Figure 1, showing a superiority of SG in relation to GP, although it was not found statistically significant differences (p=0.271). In this test, the smaller the average error, the better the level of proprioception.

Figure 1 - Mean error (difference of angles in °) groups practitioner (GP, n=12) and sedentary (SG, n=12)

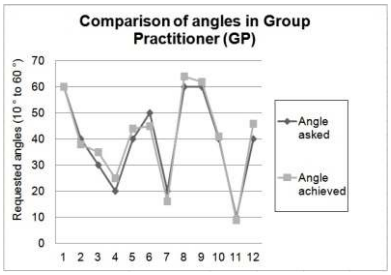


In Figures 2 and 3, it is observed angles required and achieved by each individual Group Practitioner (GP) and the sedentary group respectively.

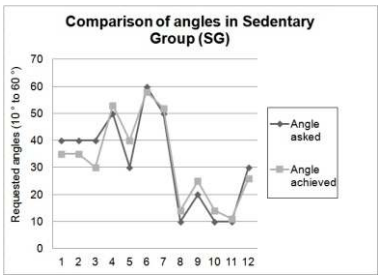
Comparing the results of angular error of GP and SG groups among the individuals of each group, the values did not show statistically significant differences (p=0.271).

The same occurred with comparing GP with SG showing no statistically significant differences between groups (p=0.249).

Graph 2 - Presentation of the angles of each individual GP



Graph 3 - Presentation of the angles of each individual SG



DISCUSSION

The analysis shows that the groups had similar performance, with the highest prevalence of error in sedentary group (SG). We found more satisfactory results in the group practicing, reinforcing the idea that regular exercise improves the components involved in proprioception.

According to Table 1, there was no major differences that may be significant, but there are some anthropometric differences among the groups, as the GP participants who have greater weight / body mass. There are few studies in the literature that performed a comparative evaluation between a group of active individuals and not body mass involving assets with proprioception. Of those who were no statistical analysis comparing anthropometric data.

Data in the literature show that deficits in proprioceptive mechanisms would be associated with a decline in functional performance. As the studies that showed a relationship between proprioception and function are transverse, can not establish the direction of this association, although some authors suggest that the decrease in proprioceptive acuity leads to a decline in functional performance. However, these results can be interpreted differently (AQUINAS, 2004).

Euzet and Gahery (1995) found a better proprioception in trained individuals compared with sedentary. In the study by Goodman (1998) also observed a significant association between proprioceptive acuity and quadriceps muscle strength.

These findings can be explained by the relationship between a good muscle function and an adequate responsiveness of spindles, which are the main structures responsible for proprioception. Therefore, it is possible that the decrease in the functional level, with consequent worsening of muscle function, leading to reduced accuracy proprioceptive, and not vice versa.

In another finding, Xu et al. (2004), evaluating proprioception of knee and ankle of elderly practicing Tai Chi compared to sedentary, swimmers and runners, observed that in tests of these joints, there are significant differences between practitioners of Tai Chi and other groups, proving that even with different exercise techniques, there may be improvements and maintenance of postural balance in relation to other modalities and sedentary.

It is believed then that the lowest energy expenditure brought about by physical inactivity hampers the improvement of components proprioceptive, balance and coordination.

Rocacki and Franco (2011) when trying to play a position previously established for the upper limbs, the young participants had an average error in angles greater than 90° (pronounced shoulder flexion) test proprioceptive. They suggest that probably the infrequent use of such positions in daily activities difficult to obtain more accurate information about the segmental positions. What differs from our study because the knee joint is often stimulated in daily activities.

Petrella et al. (1997) investigated proprioception in the knee joint in young and older active and sedentary. Significant differences were observed between young and active seniors, young and old sedentary and active and sedentary elderly, these findings which led the authors to conclude that proprioception is diminished with age and that physical activity can mitigate this decline.

The perceptual-motor elements are enhanced with physical activity, among which we highlight the coordination and proprioception need to be constantly stimulated. These elements are key to harmony and efficiency in the execution of body movements in both sports as practices in everyday activities, such as moving from one location to another, running, climbing stairs, dressing, bathing, holding objects (CONTREIRA and CORAZZA, 2009).

However there are few studies on the subject. Thus it is suggested further studies to better understand how exercise works on the proprioceptive mechanisms and the effects on it.

CONCLUSION

We conclude from this study that individuals physically active tend to have better outcomes on knee proprioception, with smaller angular errors compared to sedentary individuals.

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COMPARATIVE ANALYSIS OF LEVEL THROUGH THE KNEE PROPRIOCEPTIVE FLEXIMETRY IN SEDENTARY YOUNG WOMEN PRACTITIONERS AND PHYSICAL EXERCISE

ABSTRACT

Proprioception refers to the system's ability to capture sensory signals generated by the body of an individual, via receptors located internally in the body. The regular practice of physical exercise may be a beneficial strategy to preserve proprioception. The fleximetry is used to evaluate the flexibility and most often is also used to measure the amplitude of motion. The purpose of this study was to measure and compare the joint position sense of the knee in young sedentary women and physical exercise practitioners through fleximetry. The sample consisted of 24 women, academic in university, aged between 18 and 25 years of age without history of lower limb injury. The volunteers were divided into 2 groups of 12 people: Sedentary Group (SG) and Group Practitioner (GP). The measurement of proprioception was performed by assessing the joint position sense of the knee through fleximetry with active repositioning of the dominant lower limb after passive position by evaluator. The analysis shows that the groups had similar performance, with the highest prevalence of error in sedentary group (SG), but without statistically significant differences. We found more satisfactory results in the group practicing, reinforcing the idea that regular exercise improves the components involved in proprioception.

KEYWORDS: knee, proprioception, workout.

ANALYSE COMPARATIVE DE NIVEAU PAR LE BIAIS DU GENOU FLEXIMETRY PROPRIOCEPTIVE DANS PRATICIENS SÉDENTAIRES DES JEUNES FEMMES ET L'EXERCICE PHYSIQUE

RÉSUMÉ

Proprioception désigne la capacité du système pour capturer des signaux sensoriels produits par le corps d'un individu, par l'intermédiaire de récepteurs situés à l'intérieur du corps. La pratique régulière de l'exercice physique peut être une stratégie utile pour préserver la proprioception. La fleximetry est utilisé pour évaluer la souplesse et le plus souvent est également utilisée pour mesurer l'amplitude du mouvement. Le but de cette étude était de mesurer et de comparer le sens de position articulaire du genou chez les jeunes praticiens d'exercice physique par sédentaires et fleximetry. L'échantillon se composait de 24 femmes, d'université, âgés entre 18 et 25 ans, sans antécédents de blessure des membres inférieurs. Les volontaires ont été répartis en 2 groupes de 12 sujets: groupe sédentaire (GS) et le Groupe de praticiens (GP). La mesure de la proprioception a été réalisée en évaluant le sens de position articulaire du genou par fleximeter avec repositionnement actif du membre inférieur après sa position dominante en passif évaluateur. L'analyse montre que les groupes avaient des performances similaires, avec la plus forte prévalence de l'erreur dans le groupe sédentaire (SG), mais sans différence statistiquement significative. Nous avons trouvé des résultats plus satisfaisants dans le groupe pratiquant, ce qui renforce l'idée que l'exercice régulier améliore les composants impliqués dans la proprioception.

MOTS-CLÉS: genou, proprioception, l'exercice.

ANÁLISIS COMPARATIVO DE NIVEL MEDIO DE LA RODILLA FLEXIMETRY PROPIOCEPTIVA EN MUJERES JOVENES SEDENTARIAS PROFESIONALES Y EJERCICIO FÍSICO

RESUMEN

Propiocepción se refiere a la capacidad del sistema para captar las señales sensoriales generados por el cuerpo de un individuo, a través de los receptores localizados internamente en el cuerpo. La práctica regular de ejercicio físico puede ser una estrategia beneficiosa para preservar la propiocepción. El fleximetry se utiliza para evaluar la flexibilidad y la mayoría de las veces también se utiliza para medir la amplitud de movimiento. El propósito de este estudio fue medir y comparar el sentido de posición articular de la rodilla en jóvenes practicantes de ejercicio físico a través de sedentarios y fleximetry. La muestra estuvo conformada por 24 mujeres, universitarios, de edades comprendidas entre los 18 y 25 años de edad, sin antecedentes de lesiones de miembros inferiores. Los voluntarios fueron divididos en 2 grupos de 12 pacientes: Grupo Sedentario (GS) y el Grupo Profesional (GP). La medición de la propiocepción se realizó mediante la evaluación del sentido de posición articular de la rodilla a través de flexímetro con reposicionamiento activo de las extremidades inferiores después de su posición dominante al pasivo evaluador. El análisis muestra que los grupos tuvieron un rendimiento similar, con la prevalencia más alta de error en el grupo sedentario (SG), pero sin diferencias estadísticamente significativas. Encontramos resultados más satisfactorios en el grupo de ejercicio, lo que refuerza la idea de que el ejercicio regular mejora los elementos que intervienen en la propiocepción.

PALABRAS CLAVE: rodilla, propiocepción, ejercicio.

ANÁLISE COMPARATIVA DO NÍVEL PROPRIOCEPTIVO DO JOELHO ATRAVÉS DA FLEXIMETRIA EM MULHERES JOVENS SEDENTÁRIAS E PRATICANTES DE EXERCÍCIOS FÍSICOS

RESUMO

A propriocepção refere-se à capacidade do sistema sensorial de captar sinais gerados pelo corpo de um indivíduo, através de receptores localizados internamente no organismo. A prática regular de exercícios físicos pode ser uma estratégia benéfica para preservar a propriocepção. A fleximetria é utilizada para avaliar a flexibilidade e na maioria das vezes é utilizada para medir também a amplitude de movimento. A proposta deste estudo foi mensurar e comparar o senso de posição articular do joelho em mulheres jovens sedentárias e praticantes de exercícios físicos, através da fleximetria. A amostra foi composta por 24 mulheres, universitárias, com idade entre 18 e 25 anos de idade, sem histórico de lesão em MMII. As voluntárias foram divididas em 2 grupos de 12 indivíduos: Grupo Sedentárias (GS) e Grupo Praticante (GP). A mensuração da propriocepção foi realizada através da avaliação do senso de posição articular do joelho através do fleximetro, com reposicionamento ativo do membro inferior dominante após seu posicionamento passivo pelo avaliador. A análise dos resultados mostra que os grupos tiveram desempenho similar, com maior prevalência de erro no grupo sedentárias (GS), mas sem diferenças estatisticamente significativas. Foram encontrados resultados mais satisfatórios no grupo praticante, o que reforça a idéia de que o exercício físico regular melhora os componentes envolvidos na propriocepção.

PALAVRAS-CHAVES: joelho, propriocepcão, exercício físico.