97 - EVALUATION BAROPODOMETRIC IN OBESE

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INTRODUCTION

The obesity can be defined as excess body fat localized or generalized, that can be caused by nutritional imbalance or combined with genetic or endocrine and metabolic disorder, which can cause commitment to health. The consequences of the development of obesity are numerous and among the are postural changes, knees and feet, there may be change the body balance, therefore, this study aims to evaluate through baropodometry changes that occur in the musculoskeletal system of individuals who are obese, which is a quantitative and objective examination, which examines the pressures podais on a platform composed of sensors able to capture, compare and measure the pressures in different regions of the plantar surface. The results obtained by examining through images and graphics are used to measure the different forms and postural strategies adopted by the feet and body for the maintenance of static postures and dynamic, being possible to identify the possible causes of postural disorders.

METHODS

Quantitative cross-sectional study that evaluated 20 obese subjects, 15 women and 5 men, with averages of age 42.85 ± 10.38 years, weight 112 ± 20 kg, height 1.62 ± 0.09 m Body Mass Index of 43.17 ± 7.42 kg/cm2 and their controls, 20 subjects matched for gender, with a mean age 38.5 ± 8.67 years, weight 63.9 ± 7.43 kg , height 1, 67 ± 0.08 me a body mass index of 24.71 ± 0.08 kg/cm2 . This study was conducted in the laboratory of terapy Universidade Estadual do Oeste do Paraná - UNIOESTE with individuals who perform the preoperative protocol for obesity surgery at the Clinic for Rehabilitation of Faculdade Assis Gurgacz - FAG .

The research project was approved by the Ethics Committee on Human Research of the Faculty Assisi Gurgacz - FAG (Opinion 13/2013), and each participant signed a consent form. Participants remained under the AM3 platform baropodometry Arkipelago® (picture 01), real estate in bipedal posture so comfortable for 30 seconds, feet aligned to the hips and away, the free base of support, without shoes, his mouth half-open arms along the body, eyes open and with eyes fixed on a point in the same time(picture 02).



Picture 01: AM3 platform baropodometry Arkipelago®



Picture 02: positioning for the execution of the test baropodometric

Values were measured static baropodometry: Load plantar forefoot and rearfoot (%); plant load left and right (%), mean pressure left and right (kgf/cm2) and contact surface (%). Applying descriptive statistics showing mean and standard deviation of the same due to be normal distribution.

RESULTS

The average plant load in the forefoot in obese subjects was 39 ± 4% and hindfoot of 61 ± 4% and in non-obese 49 into forefoot and rearfoot ± 10% 51 ± 10%, in obese individuals, it can be observed in the left foot planting a load of 55 ± 9 and 45 ± 9 right and normal subjects in the left foot and right 56 ± 6 44 ± 6 (table 01). In relation to the mean pressure, we found that in obese, the left foot exerts pressure kgf/cm2 and 0.29 ± 0.08 0.21 ± 0.05 kgf/cm2 right and left foot nonobese 0, 20 kgf/cm2 ± 0.03 and 0.16 ± 0.03 kgf/cm2 right (table 02). The contact surface of obese subjects was observed in obese individuals, the left foot 48 ± 3% and 52 ± 3% right and in the evaluation of non-obese, left foot 51 ± 3% and 49 ± 3% (Table 03).

Table 01 - Values of mean and standard deviation of the variable load plantar forefoot, hindfoot, left and right according to the classification of body mass index

	Plant Load (%)		Plant Load (%)	
	Rearfoot	Forefoot	Left	Right
Obese	39 ± 4	61 ± 4	55 ± 9	45 ± 9
Normal	49 ± 10	51 ± 10	56 ± 6	44 ± 6

Table 02 - Values of mean and standard deviation of the mean pressure variable left and right according to the classification of body mass index

	Medium Pressure (kgf/cm^2)	
	Left	Right
Obese	0,29 ± 0,08	0,21 ± 0,05
Normal	0,20 ± 0,03	0,16 ± 0,03

Table 03 - Values of mean and standard deviation of the variable contact surface left and right according to the classification of body mass index

	Contact Surface (%)	
	Left	Right
Obese	48 ± 3	52 ± 3
Normal	51 ± 3	49 ± 3

DISCUSSION

With this study we found that people who are obese have a higher discharge plant in rearfoot when compared with the control group, weight bearing on the left side for both groups, average contact pressure higher than the control group; contact surface relatively close were not different from normal.

When compared to previous studies, it can be noted that the literature does not agree with the discharge of greater weight in hindfoot, diagnosing the discharge occurs more in the forefoot. A study by Fabris (2006) with 67 women, we found that the obese group showed a general increase of plantar pressure, and the forefoot with increased discharge and broadly based, overweight individuals also showed higher surface area support, with a peak pressure higher compared with the group of non-obese, but being smaller than the obese group. With this one can assume that the peak pressure in the forefoot is due to the context of forward displacement of the center of body balance.

In a study of 25 grade I obese and 25 non-obese made by Birtane and Tuna (2004) we observed significantly higher relative pressure of forefoot plantar force full and total area of contact in relation to the group of non-obese , and this can be explained by the difference of physiological load on the foot, even in individuals not presenting pain, loss of function and structural disorders.

According to Almeida (2009) with 50 workers, only six of them being obese, we found that obese workers showed maximum peak plantar pressure higher in both feet against workers with normal IMC, primarily caused by overloads that can lead the biomechanical changes and joint stress, resulting in disease in the foot, knee, hip and lumbar spine.

Podais changes were also found in children, and in a study of 10 obese children and 10 non- obese performed by Filippin et al (2007), the obese group showed higher contact areas both in the erect posture as in gait, with major differences found in the region of the midfoot, but showed similar values in the form of foot contact in standing posture and gait, and greater discharge retro-foot, mid-foot and forefoot lateral side. Introducing yet increased peak pressure, especially in the midfoot stance and forefoot, the midfoot followed the march. Thus the overweight crowding have a medial longitudinal arch and increased overhead due to the foot plantar surface modification generated by the adaptation mechanisms performed long term overloads in which we sought compensatory mechanisms to maintain the structure of the arch. Thus, obese children may increase the risk of developing pains, discomforts and diseases in the feet, especially considering the foot immature child.

CONCLUSION

With this study we found that there are few studies related to changes baropodometric obese adults, and these do not corroborate this study, and this study demonstrates that obese individuals compared to normal subjects, exhibit alterations in plant discharge in hindfoot and higher average pressure and contact, so further studies are needed to prove the changes podais related changes in the musculoskeletal system of these individuals.

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EVALUATION BAROPODOMETRIC IN OBESE

ABSTRACT

Introduction: Obesity is considered a disease of the group of chronic non communicable diseases, and various influencing factors in eating behavior, such as external factors related to the family and their characteristics, attitudes of parents and friends, social and cultural values, media, fast food, knowledge of nutrition and food fads, but also internal factors such as psychological needs and characteristics, body image, values and personal experiences, self-esteem, food preferences, health and psychological development. The consequences of the development of obesity are numerous and among them are mainly postural changes, knees and feet, there may be changes in body balance. Objective: To evaluate baropodometry through the changes that occur in the musculoskeletal system of obese individuals, analyzing the pressures podais in different regions of the plantar surface and compared with individuals who do not exhibit obesity. Methods: We evaluated 20 obese subjects, 15 women and 5 men, aged between 28 and 69 years and their controls, with 20 subjects matched for age and gender, and participants remained under platform baropodometry, real estate in bipedal posture for measurement of the load in plantar forefoot and hindfoot; plant load left and right, left and right mean pressure and contact surface. Results: With this study we found that people who are obese have a higher discharge plant in rearfoot when compared with the control group, weight bearing on the left side for both groups , average contact pressure higher than the control group; contact surface relatively close, with no significant differences from normality. Conclusion: we found that obese individuals compared to normal subjects, exhibit alterations in discharge plant in hindfoot and higher average pressure and contact, so further studies are needed to prove the changes podais related changes in the musculoskeletal system of these individuals.

KEYWORDS: Obesity. Baropodometry. Alterations.

EVALUATION CHEZ LES OBÈSES BAROPODOMÉTRIQUE

RÉSUMÉ

Introduction: L'obésité est considérée comme une maladie du groupe des maladies chroniques non transmissibles et les divers facteurs qui influencent les comportements alimentaires, tels que des facteurs externes liés à la famille et leurs caractéristiques, les attitudes des parents et des amis, des valeurs sociales et culturelles, les médias, la restauration rapide, la connaissance de la nutrition et de l'alimentation des manies, mais aussi des facteurs internes tels que les besoins et les caractéristiques psychologiques, l'image corporelle, les valeurs et les expériences personnelles, l'estime de soi, les préférences alimentaires, la santé et le développement psychologique. Les conséquences du développement de l'obésité sont nombreuses et parmi eux sont principalement des changements de posture, les genoux et les pieds, il peut y avoir des changements dans l'équilibre du corps. Objectif: évaluer baropodométrie à travers les changements qui se produisent dans le système musculo-squelettique des personnes obèses, en analysant les pressions podais dans différentes régions de la surface plantaire et par rapport aux personnes qui ne présentent pas de l'obésité. Méthodes: Nous avons évalué 20 sujets obèses, 15 femmes et 5 hommes, âgés entre 28 et 69 ans et leurs contrôles, avec 20 sujets appariés pour l'âge et le sexe, et les participants sont restés sous baropodômetro, immobilier en posture bipède pour mesure de la charge dans plantaire avant-pied et l'arrière-pied, plante charge gauche et à droite, à gauche et à droite de la pression moyenne et la surface de contact. Résultats: Avec cette étude, nous avons constaté que les gens qui sont obèses ont une installation d'évacuation supérieur à l'arrière du pied par rapport au groupe de contrôle, roulement de poids sur le côté gauche pour les deux groupes, la pression de contact moyenne supérieure à celle du groupe de contrôle; surface de contact relativement proche, avec aucune différence significative de la normalité. Conclusion: nous avons constaté que les personnes obèses par rapport aux sujets normaux, des modifications d'exposition dans une usine de décharge dans l'arrière-pied et de la pression et de contact moyen plus élevé, de sorte que d'autres études sont nécessaires pour prouver les changements podais changements connexes dans le système musculo-squelettique de ces personnes.

MOTS-CLÉS: l'obésité. Baropodométrie . Changements.

EVALUACIÓN DE OBESO BAROPODOMETRIC

RESUMEN

Introducción: La obesidad se considera una enfermedad del grupo de las enfermedades crónicas no transmisibles, y los diversos factores que influyen en la conducta alimentaria, como los factores externos relacionados con la familia y sus características, las actitudes de los padres y amigos, los valores sociales y culturales, los medios de comunicación, la comida rápida, el conocimiento de la nutrición y los alimentos modas, sino también factores internos como las necesidades y las características psicológicas, la imagen corporal, los valores y las experiencias personales, la autoestima, las preferencias de alimentos, la salud y el desarrollo psicológico. Las consecuencias del desarrollo de la obesidad son múltiples y entre ellas se encuentran principalmente cambios posturales, las rodillas y los pies, puede haber cambios en el equilibrio del cuerpo. Objetivo: Evaluar baropodometría a través de los cambios que se producen en el sistema músculo-esquelético de las personas obesas, el análisis de los podais presiones en diferentes regiones de la superficie de la planta y en comparación con los individuos que no presentan obesidad. Métodos: Se evaluaron 20 sujetos obesos, 15 mujeres y 5 hombres, con edades entre 28 y 69 años y sus controles, con 20 sujetos emparejados por edad y sexo, y los participantes se mantuvo bajo baropodômetro, inmobiliarias en postura bípeda para la medición de la carga en plantar del antepié y retropié, la planta de carga izquierda y derecha, izquierda y derecha y la presión media de la superficie de contacto. Resultados: En este estudio se encontró que las personas obesas tienen una planta de descarga superior en retropié en comparación con el grupo control, la carga de peso en el lado izquierdo para ambos grupos, la presión media de contacto mayor que el grupo control; superficie de contacto relativamente cerca, sin diferencias significativas de la normalidad. Conclusión: se encontró que las personas obesas en comparación con sujetos normales, presentan alteraciones en la planta alta en el retropié y mayor presión y el contacto medio, por lo que se necesitan más estudios para demostrar los cambios que podais cambios relacionados en el sistema músculo-esquelético de estos individuos.

PALABRAS CLAVE : Obesidad . Baropodometría . Cambios.

AVALIAÇÃO BAROPODOMETRICA EM OBESOS

RESUMO

Introdução: A obesidade é considerada uma doença integrante do grupo de Doenças Crônicas Não-Transmissíveis, tendo vários fatores influenciadores no comportamento alimentar, como por exemplo, fatores externos, relacionados à familia e suas características, atitudes de pais e amigos, valores sociais e culturais, mídia, alimentos rápidos, conhecimentos de nutrição e manias alimentares; mas também fatores internos como necessidades e características psicológicas, imagem corporal, valores e experiências pessoais, auto-estima, preferências alimentares, saúde e desenvolvimento psicológico. As consequências do desenvolvimento da obesidade são numerosas e dentre eles se encontram principalmente alterações posturais, de joelhos e pés, podendo ocorrer alteração no equilíbrio corporal. Objetivo: Avaliar através da baropodometria as alterações que ocorrem no sistema locomotor de indivíduos com obesidade, analisando as pressões podais nas diferentes regiões da superfície plantar e comparar com indivíduos que não apresentam obesidade. Método: Foram avaliados 20 indivíduos obesos, sendo 15 mulheres e 5 homens, com idade entre 28 e 69 anos e seus controles, com 20 indivíduos pareados por gênero e idade, sendo que os participantes permaneceram sob o baropodômetro, imóveis na postura bípede para a mensuração da carga plantar em antepé e retropé; carga plantar esquerda e direita; pressão média esquerda e direita e superfície de contato. Conclusão: Com este estudo foi possível verificar que pessoas que apresentam obesidade apresentam maior descarga plantar em retropé quando comparado com o grupo controle; descarga de peso do lado esquerdo para ambos os grupos; pressão media de contato maior do que grupo controle; superfície de contato relativamente próxima, não apresentando diferenças da normalidade. Conclusão: foi possível verificar que indivíduos obesos, quando comparados a indivíduos normais, apresentam alterações na descarga plantar em retropé e maior e pressão média de contato, sendo necessário assim maiores estudos para a comprovação das alterações podais relacionadas as mudanças no sistema locomotor destes indivíduos.

PALAVRAS-CHAVE: Obesidade. Baropodometria. Alterações.