126 - ANALYSIS OF PRESSURES PEDAL IN INDIVIDUALS BY LEPROSY BY BAROPODOMETRIC

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INTRODUCTION

Leprosy is an infectious disease with consequences dermatoneurological (Moreno, 2010; ALVES, 2010). For Dias et al. (2008), Brazil is the second country with the highest rates of leprosy in the world. And in 2007 was considered one of the countries that failed to achieve the goal of less than one case per 10,000 population, showing the impact of this disease as a public health problem (Ferreira et al, 2007).The major route of spread of the Hansen bacillus of an individual infected and untreated, are the upper airways and these, in turn, are the gateway to a healthy body (Mendonça et al., 2008). The causative agent is Mycobacterium leprae, an obligate intracellular bacillus host, which preferably has as nerve cells, particularly Schwann sheath (PUCCI et al, 2011), resulting in absent or decreased sensitivity of thermal, tactile and painful, especially the hands and feet. Due to inflammation of the nerves causing compression process is a mild and transient nerve damage will be a complete and irreversible injury (Gonçalves et al, 2008). The nerves are often attacked: the ulnar, the external popliteal sciatic or common peroneal, post tibial, facial, great auricular and radial (Lima et al, 2009). Is compromised autonomic fibers, sensory and motor, but these three can be affected when the lesion along the trunk reaches the peripheral nerves, causing the loss of all forms of sensation, paresis, paralysis and muscle atrophy (Garbin et al, 2003) . For this decrease or loss of sensitivity, particularly to plant, there may be limitations on the balance control (Alfieri, 2008). As Brentano et al (2010) no correlation between change in plantar sensitivity and balance disorders as well as the distribution of plantar pressure in patients with complaints of decreased sensitivity in patients with neurological or systemic diseases. One of the features to analyze plantar pressure and the balance is the baropodometry electronics. An objective examination and quantitative, which analyzes the pressures pedal on a platform composed of sensors that can capture, compare and measure the pressures in different regions of the plantar surface. (CHIPS, PRZYSIEZNY, 2008). Many studies have been done to analyze the distribution of workers baropodometry by Foot (Almeida et al, 2009), children (Rodrigues et al, 2008), diabetics (Santos et al, 2008), and sequelae of cerebrovascular accident (CVA), (SCHUSTER, 2008). But few studies were found involving leprosy (Greve, 1994, Lamb et al, 2010). The objective of this study was to analyze the baropodometry pedal pressure in patients with sequelae of leprosy seen at the Physical Rehabilitation Centre (FRC) of the State University of West Paraná (Unioeste).

METHODS

We studied 20 patients with sequelae of leprosy (14 men) over 18 years of age. Inclusion criteria were: individuals with leprosy, drug treatment, referred by CRE / CISOP (Centro Regional Specialties / Health Intermunicipal Consortium of Western Paraná) to CRF Unioeste. The non-inclusion criteria: a) individuals without medical treatment, b) presence of skin lesions in the plantar region, c) stroke sequelae, d) osteomioarticular dysfunction of the lower limbs. The research project was approved by the Ethics in Human Research of the State University of West Paraná - Unions (Opinion No. 076/2011-CEP) and each patient signed a consent form. Prior to the baropodometry, a form was completed to characterize the sample. One Foot Work baropodometry electronic PRO (Arkipelago) was used, the platform being calibrated with information on the individual body mass. Each individual in the standing position remained static over the platform, in support bipedal barefoot shoulder width apart, free base of support, arms along the body (Figure 1) keeping your eyes open. They were instructed to keep the vision at a fixed point marked on the wall look at the height of one meter away from the platform (Duarte Freitas, 2010). Three measurements were made, lasting 20 seconds each. Interval between evaluations of 30 / 2, remaining seated, without removing his feet from the platform.



Figure 01: Positioning for carrying out the examination

The variables analyzed in the left foot and right foot were: the percentage of plant load on the forefoot (A), hindfoot (R), mean pressure (MP) in the forefoot and hindfoot, and the peak plantar pressure in kgf / cm2. Statistical analysis of quantitative variables was represented by mean and standard deviation, the results of the qualitative variables were expressed as percentage (%).

RESULTS

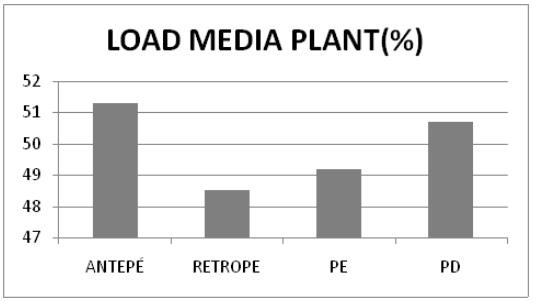
The demographic variables were divided into categorical and quantitative, shown in Table 01 and Table 02. There was a predominance of males, and 50% of the sample is in the overweight category. The average age was 52, 6 ± 11 years. The bottom most affected according to reports from each participant was the left foot. The time of physical therapy, had an average of one year and six months follow-up of a physiotherapist, and the mean disease duration was four and a half years.

Demographics Data		N	%
Gender	Female	6	30
	Male	14	70
BMI	Underweight	0	0
	Normal weight	6	30
	Overweight	10	50
	Obesity	4	20
Affect lower limb	Rigth	7	35
	Left	8	40
	Both feet	3	15
	No	2	10

Table 01: Distribution of demographic variables: gender, BMI (Body Mass Index)

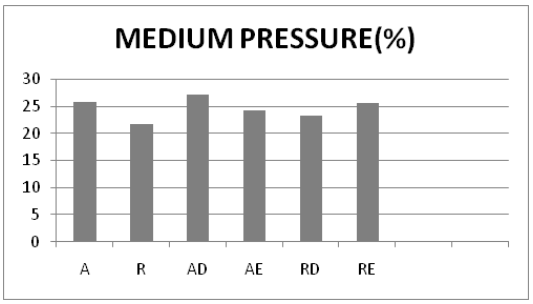
	Média ± DP
Age (years)	52,6 ± 11
eight (Kg)	79,8 ± 18
Altura (m)	1,67 ± 0
IMC (Kg/m$^{2)}$	28,4 ± 5
*	56,0 ± 51
**	18,7 ± 10

Table 02: Mean values and standard deviation of age, height, weight, BMI (Body Mass Index), time * drug therapy for leprosy in months ** physiotherapy treatment time in months



Graphic 01: Percentage of load distribution plantar forefoot, hindfoot, left foot (PE) and right foot (PD)

The load average plantar forefoot was 51.3 ± 8% of the hindfoot of 48.8 ± 8%. In the left foot was 49.2 ± 4% and the right foot was 50.7 ± 4%. According to the normal range 60% of patients had plantar load distribution between the right and left foot normal (Figure 01). The mean pressures in the regions of the foot are shown in the graph 02. Comparing only the anterior portion to the back of the foot, it appears that there is greater pressure on the forefoot with a mean of 25.7 ± 2% of pressure. If comparing the pressures of the forefoot for greater pressure on the right forefoot with an average of 27.0 ± 7%. In the peak plantar pressure, 60% (12 patients) of the sample had a greater pressure on the forefoot (1.24 Kgf/cm2), with the majority (8 patients) had an average of 1.2 in the forefoot Kgf/cm2 right, and the remainder received an average of 1.3 Kgf/cm2 in the anterior portion of the left foot. Eight participants had a greater pressure on the hindfoot, and 4 with an average of 1.4 Kgf/cm2 on the left and four with an average of 1.2 Kgf/cm2 right hindfoot. In the right and left foot peak pressure was 0.3 kgf/cm2.



Graphic 02: Values of the average pressure (%) of the forefoot (A) and hindfoot (R), anterior right foot (AD) and left (LA), right hind foot (RD) and left (RE)

DISCUSSION

The subjects studied have characteristics that will corroborate the literature, such as individuals' average age of 52.6 years and male predominance (Soysal, 2004; GOMES, 2007; KHADILKAR, 2008). This dominance was also found in a study by Tan et al (2010) in 201 patients with leprosy (131 men). The author concludes that men are more likely the more severe forms of the disease. It was verified that both the mean pressure and peak plantar pressure were higher in the anterior portion of the foot. The pressure in the forefoot was 51.3%, and the normal range, according to the literature is approximately 40% (TRIBASTONE, 2001). The anterior displacement of the body weight may be a predisposing factor for ulcerations, since the abnormal distribution of load on the plantar surface leads to trauma in the region of higher pressure (Pereira et al, 2006) A study by Cassel et al (2002),

98 % of the subjects showed ulcerations with peripheral neuropathies in the anterior portion of the foot. A study by Baker et al (2010) found that these individuals had ulcers in the forefoot due to peak pressure found in this place. An important feature found in this study is that 50% of respondents are overweight, this may have influenced the values of pressures in the forefoot, as found in the literature, a report that determines the abdomens anterior displacement of the center of gravity. Fabris et al (2006), analyzed by baropodometric pedal pressure in obese and nonobese patients, and concluded that those with excess weight values of plantar pressures were higher in the anterior portion of the foot. According to subjects studied, 40% reported having left limb most affected by the disease, and the results obtained, the right foot showed a higher discharge plant against the left. This may be due to lack of proprioceptive information of the affected limb, generating a high overhead in the non affected by the disease. Similar data were obtained in the work of Schuster et al. (2008) where the pedal pressure in patients with sequelae of stroke, showed a tendency to increased weight bearing in the non-affected. This can occur due to nerve demyelination that occurs by the invasion of bacilli in Schwann cells (CHACHA et al, 2009), responsible for the electrical insulation of axons, ensuring better conduction of nerve impulses. When there is destruction there is sensory loss (Siqueira, 2007; MILK et al, 2011), limiting the information in influencing afferent and efferent responses altered, producing responses received and inefficient cargo control, creating a high impact on the feet to contact with the soil (BACARIN, 2006).

CONCLUSION

It is concluded from this study that the sample has higher values of plantar pressure in the anterior portion of the foot, the latter having a predisposition for plantar ulcer formation in this region, since an abnormal distribution of load on the plantar surface leads to trauma in region of higher pressure.

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ANALYSIS OF PRESSURES PEDAL IN INDIVIDUALS BY LEPROSY BY BAROPODOMETRIC

SUMMARY

Introduction: Leprosy is an infectious disease caused by Mycobacterium leprae, which mainly affects the peripheral nerves and can cause absent or decreased sensitivity especially of the feet and hands. In individuals with neurological and systemic change is no correlation between plantar sensitivity and balance disorders as well as the distribution of pedal pressure, as is the case of individuals with leprosy. Objective: To analyze the baropodometry pedal pressure in patients suffering from leprosy treated at the Physical Rehabilitation Centre of the State University of West Paraná (Unioeste), Cascavel campus. Methods: 20 patients suffering from leprosy were assessed using an electronic baropodometric PRO Foot Work (Arkipelag), the platform is calibrated with information on the individual body mass. Each subject was evaluated in the standing position on the platform with your feet shoulder width apart, arms at your sides and bare feet. Results: The average load baropodometry revealed plantar forefoot was 51.3 ± 8% of the hindfoot of 48.8 ± 8%. In the left foot was 49.2 ± 4% and the right foot was 50.7 ± 4%. Comparing the anterior and posterior portions of the foot, there was more pressure on the forefoot (25.7 ± 2% pressure). Comparing the pressures of the forefoot, there was greater pressure on the right forefoot (27.0 ± 7%) in the peak plantar pressure, 60% (12 patients) of the sample had a greater pressure on the forefoot (1.24 kgf / cm2), and the majority (8 patients) had an average of 1.2 Kgf/cm2 the right forefoot, and the remainder received an average of 1.3 Kgf/cm2 in the anterior portion of the left foot. Eight participants had a greater pressure on the hindfoot, and 4 with an average of 1.4 Kgf/cm2 on the left and four with an average of 1.2 Kgf/cm2 right hindfoot. In the right and left foot peak pressure was 0.3 kgf/cm2. Conclusions: We conclude from this study that the sample has higher values of plantar pressure in the anterior portion of the foot, the latter having a predisposition for plantar ulcer formation in this region, since an abnormal distribution of load on the plantar surface leads to trauma to the area of higher pressure.

KEYWORDS: leprosy; baropodometry; plantar pressure.

ANALYSE DES PRESSIONS PÉDALE DANS LES INDIVIDUS PAR BAROPODOMETRY PAR LA LÈPRE

RÉSUMÉ

Introduction: La lèpre est une maladie infectieuse causée par Mycobacterium leprae, qui affecte principalement les nerfs périphériques et peut provoquer une sensibilité absents ou diminués en particulier des pieds et des mains. Chez les individus avec les changements neurologiques et systémiques n'existe aucune corrélation entre la sensibilité plantaire et troubles de l'équilibre ainsi que la distribution de pression sur la pédale, comme c'est le cas des personnes atteintes de la lèpre. Objectif: analyser la pression de la pédale baropodometry chez les patients souffrant de la lèpre traités au Centre de réadaptation physique de l'Université d'État de l'Ouest du Paraná (Unioeste), campus de Cascavel. Méthodes: 20 patients souffrant de la lèpre ont été évalués en utilisant un travail électroniques baropodometric Pied PRO (Arkipelag), la plate-forme est calibré avec des informations sur la masse du corps individuel. Chaque sujet a été évaluée dans la position debout sur la plate-forme avec votre largeur d'épaule pieds écartés, bras à vos côtés et les pieds nus. Résultats: La charge moyenne baropodometry révélé plantaires avant-pied était de 51,3 ± 8% de l'arrière-pied de 48,8 ± 8%. Dans le pied gauche était de 49,2 ± 4% et le pied droit était de 50,7 ± 4%. En comparant les parties antérieure et postérieure du pied, il n'y avait plus de pression sur l'avant-pied (25,7 ± 2% de pression). En comparant les pressions de l'avant-pied, il y avait une plus grande pression sur la droite l'avant-pied (27,0 ± 7%) dans le pic de pression plantaire, 60% (12 patients) de l'échantillon avaient une plus grand pression sur l'avant-pied (1,24 kgf / cm2), et la majorité (8 patients) avaient une moyenne de 1,2 Kgf/cm2 le droit avant du pied, et les autres ont reçu une moyenne de 1,3 Kgf/cm2 dans la partie antérieure du pied gauche. Huit participants ont eu une pression plus élevée dans l'arrière-pied, 4 avec une moyenne de 1,4 Kgf/cm2 la gauche et quatre avec une moyenne de 1,2 Kgf/cm2 droite arrière-pied. Dans le pic de pression du pied droit et gauche a été de 0,3 kgf/cm2. Conclusions: Nous concluons de cette étude que l'échantillon a des valeurs élevées de pression plantaire dans la partie antérieure du pied, ce dernier ayant une prédisposition à la formation d'ulcères plantaires dans cette région, depuis une distribution anormale de la charge sur la surface plantaire conduit à traumatisme à la zone de haute pression.

MOTS-CLÉS : la lèpre ; barpodometry ; pression plantaire

PEDAL ANÁLISIS DE LAS PRESIONES EN LOS INDIVIDUOS POR BAROPODOMETRY POR LA LEPRA

RESUMEN

Introducción: La lepra es una enfermedad infecciosa causada por Mycobacterium leprae, que afecta principalmente los nervios periféricos y puede causar la ausencia o disminución de la sensibilidad especial de los pies y las manos. En los individuos con cambios neurológicos y sistémicos no hay correlación entre la sensibilidad plantar y trastornos del equilibrio, así como la distribución de la presión del pedal, como es el caso de las personas con lepra. Objetivo: analizar la presión en el pedal baropodometria en pacientes con lepra atendidos en el Centro de Rehabilitación Física de la Universidad Estatal del Oeste de Paraná (Unioeste), campus de serpiente de cascabel. Métodos: 20 pacientes enfermos de lepra se evaluaron mediante un sistema electrónico de trabajo baropodômetro pie PRO (Arkipelag), la plataforma se calibra con la información sobre la masa corporal individual. Cada sujeto fue evaluado en la posición de pie en la plataforma con sus pies separados, los brazos a los lados y los pies descalzos. Resultados: El promedio de carga baropodometria reveló plantar del antepié fue de 51,3 ± 8% de la parte posterior del pie de 48,8 ± 8%. En el pie izquierdo fue de 49,2 ± 4% y el pie derecho fue de 50,7 ± 4%. Comparando las partes anterior y posterior del pie, había más presión sobre la parte delantera del pie (25,7 ± 2% de presión). Al comparar las

presiones de la parte delantera del pie, se observó una mayor presión sobre la parte anterior del pie derecho (27,0 ± 7%) en el pico de presión plantar, el 60% (12 pacientes) de la muestra tuvo una mayor presión sobre la parte delantera del pie (1,24 kgf / cm2), y la mayoría (8 pacientes) tenían un promedio de 1,2 Kgf/cm2 la parte delantera del pie derecho, y el resto recibió un promedio de 1,3 Kgf/cm2 en la porción anterior del pie izquierdo. Ocho participantes tuvieron una mayor presión sobre la parte posterior del pie, y 4 con un promedio de 1,4 Kgf/cm2 a la izquierda y cuatro con una media de 1,2 Kgf/cm2 retropié derecho. En el pico de presión derecha y pie izquierdo fue de 0,3 kgf/cm2. Conclusiones: Se concluye de este estudio que la muestra tiene valores más altos de la presión plantar en la parte anterior del pie, este último con una predisposición a la formación de la úlcera plantar en esta región, ya que una distribución anormal de la carga en la superficie plantar lleva a trauma en el área de mayor presión

PALABRAS CLAVE: lepra; baropodometria, la presión plantar

ANÁLISE DAS PRESSÕES PODAIS PELA BAROPODOMETRIA EM INDIVÍDUOS COM SEQÜELAS DE HANSENÍASE

RESUMO

Introdução: Hanseníase é uma doença infecto-contagiosa, causada pelo Mycobacterium leprae, que afeta principalmente os nervos periféricos, podendo provocar ausência ou diminuição da sensibilidade principalmente dos pés e das mãos. Em indivíduos portadores de doenças neurológicas e sistêmicas, há correlação entre alteração da sensibilidade cutânea plantar e distúrbio do equilíbrio, bem como na distribuição das pressões podais, como é o caso de indivíduos com hanseníase. Objetivo: analisar as pressões podais pela baropodometria em pacientes com seqüelas de Hanseníase atendidos no Centro de Reabilitação Física da Universidade Estadual do Oeste do Paraná (Unioeste), campus de Cascavel. Métodos: 20 pacientes com seqüelas de hanseníase foram avaliados através de um baropodômetro eletrônico Foot Work PRO (Arkipelago), sendo a plataforma calibrada com a informação sobre a massa corporal individual. Cada sujeito foi avaliado em posição ortostática, sobre a plataforma, com os pés separados na largura dos ombros, braços ao longo do corpo e pés descalços. Resultados: a baropodometria revelou média de carga plantar em antepé de 51,3±8% a de retropé de 48,8±8%. No pé esquerdo foi de 49,2±4% e a do pé direito foi de 50,7± 4%. Comparando as porções anterior e posterior do pé, verificou-se maior pressão no antepé (25,7±2% de pressão). Comparando as pressões dos antepés, observou-se maior pressão no antepé direito (27,0±7%) Em relação ao pico de pressão plantar, 60% (12 pacientes) da amostra teve uma maior pressão no antepé (1,24 Kgf/cm2), sendo que a maioria (8 pacientes) teve uma média de 1,2Kgf/cm2 no antepé direito, e o restante obteve uma média de 1,3 Kgf/cm2 na porção anterior do pé a esquerda. Oito participantes tiveram uma maior pressão no retropé, sendo 4 com uma média de 1,4 Kgf/cm2 no esquerdo e 4 com média de 1,2 Kgf/cm2 no retropé direito. No pé direito e esquerdo o pico de pressão foi de 0,3 Kgf/cm2. Conclusões: Conclui-se com este estudo que a amostra estudada apresenta maiores valores de pressão plantar na porção anterior do pé, tendo estes uma pré-disposição à formação de úlcera plantar nesta região, visto que uma distribuição anormal de carga na superfície plantar leva ao trauma na região de maior pressão.

PALAVRAS-CHAVE: hanseníase; baropodometria; pressão plantar.