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PHYSICAL THERAPY INTERVENTION IN PATIENTS WITH DIABETIC FOOT

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ABSTRACT

Field research of descriptive and exploratory scope involving a clinical case of physical therapy intervention in patients with diabetic foot. The presence of feet with ulcerations and deep tissue infection associated with neuropathic and/or ischemic abnormalities in diabetic individuals is one of the main complications of diabetes mellitus and is currently considered one of the biggest problems of public health. The aim of this research is to evaluate the benefits of physical therapy in diabetic patients with foot neuropathy. The methodology consisted of a physical therapy evaluation with manual lymphatic drainage, sequential electronic drainage, along with kinesiotherapy with free passive and active exercises, assisted active exercises, and proprioception exercises. There was an increase in the range of motion and consequent decrease of edema and improvement of sensitivity. The study led to the conclusion that physical therapy in the treatment of patients with diabetic foot brought important benefits, since there was improvement in the patients' clinical picture, with positive results that allowed the return to their activities.

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INTRODUCTION

Diabetes Mellitus is a chronic disease affecting carbohydrate metabolism caused by a disorder of the normal mechanism of action of insulin. It is characterized by hyperglycemia, glycosuria and altered metabolism of proteins and fats, leading to polyuria, polydipsia, weight loss, ketosis, acidosis, coma, as well as excessive amount of urine, intense thirst, and neuropathy in peripheral limbs. This disease basically results from a disturbance in carbohydrate metabolism, because insulin does not adequately reaches its metabolic effects. Some of the consequences of the disease include vascular lesions, mainly arterial lesions, which lead to reduced pulses and vascular insufficiency, and also the presence of clinical signs of ischemia, with appearance of ulcers and gangrene, especially in the lower limbs, provoking some neurological lesions involving peripheral nerves and alterations or loss of sensibility of the feet (IDF, 2015). Diabetic foot is one of the main complications of *Diabetes Mellitus*. Ulcers in the feet results from the combination of several factors including vasculopathy and neuropathy, which, together with disorders of foot biomechanics, infections and inadequate care favor the

appearance of diabetic foot (SOUZA; BATISTA; VILAR, 2014). The risk of amputations in lower limbs related to *Diabetes Mellitus* is high; it is estimated that 10% of diabetic patients develop foot ulcers at some point in their life, and approximately 50% to 70% of non-traumatic amputations in diabetic subjects are due to this problem (DOBRI *et al.*, 2017). Prevention of diabetic foot should be part of the general care of diabetic individuals, emphasizing correct nutrition, strict glycemic control, and modification of risk factors, including smoking cessation, and attention to trophic changes in the skin and foot deformities (SBD, 2015). In this context, the objective of this study was to evaluate the benefits of physical therapy in patients with diabetic foot, because early physical therapy can prevent and detect changes in lower limbs of diabetic patients, avoiding prolonged hospitalizations and amputations.

MATERIALS AND METHODS

The study was developed through an exploratory and descriptive field research of qualitative nature, and the analysis through a case study. The research was carried out at the Institute of Rheumatology, in the city of São Luís - MA, from April to June 2009. The physical therapy interventions included 01 patient with chronic neuropathy in diabetic foot ulceration, who underwent 20 consultations, twice a week,

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with each session lasting 60 minutes. Patient authorization was collected through the Informed Consent Term. Initially, the physical therapy evaluation was performed and, then, the interventions were made based on the treatment protocol prepared by the author. The case study was carried out with a 77-year-old female patient, Spanish, widowed, retired, non-smoker, non-alcoholic, sedentary, obese, with history of prior systemic arterial hypertension controlled by medication and presenting type II *diabetes mellitus* controlled by use of insulin, which was applied in the morning and at night. In 2000, she underwent surgery for varicose veins. At the beginning of 2008, she was not walking because of frequent falls and there were sores on her feet. Shortly thereafter, she sought a vascular surgeon, and lymphedema in the lower limbs was detected. She was referred to physical therapy, and this made her feel an improvement. On February 19, 2009, the patient was admitted to the physical therapy clinic of the Institute of Rheumatology. In the first stage, the patient underwent physical therapy evaluation, and in this moment she reported pain in the lower limbs (LL) and instability, edema, wound and neuropathy in the feet, presenting limited movement due to pain. The pre-treatment protocol used, pressurization, pneumatic pumps, sequential electronic drainage with an Impulse system pulsed current and motor excitation device which has a sequential stimulus passage in the various channels, with the parameterization of 20 minutes, surrounding the sick area with 190 mmHg. Manual lymphatic drainage, with parameter of 20 minutes, 10 minutes in the left lower limb (LLL) and 10 minutes in the right lower limb (RLL), potentiating analgesic effects and reduction of the edema (LELUC; LEDUC, 2007). During the treatment, there were no other wounds, and strengthening exercises were also applied to the whole lower limb, with three sets of ten seconds on the right lower limb and three sets of ten seconds on the left lower limb; active exercise with three series of ten repetitions for each movement aiming to gain range of motion and increase muscle strength, and with proprioception exercise to improve coordination, balance and strengthening (SILVA, BRONGHOLI, 2007).

RESULTS

After physical therapy, the patient was re-evaluated through the pain scale (EVA, handmuscle strength and perimetry test). The main results were as follows: in the handmuscle strength test, the patient presented grade two (possible active movement, precarious muscle activity) for the flexor, plantar flexion, inversion and eversion movements. After treatment, muscle strength was reevaluated and there was an increase to grade three (regular muscle activity), characterized by active movement, overcoming the force of gravity. The perimetry of the ankle, using a tape measure was 25 cm in the right and 23 cm in the left ankle before treatment, and 23 cm in the right and 21 cm in the left ankle after treatment, resulting from the decrease of edema in both ankles. At the beginning of the treatment, it was identified that the pain of the patient, based on the one-dimensional pain scale, was ++ / 5, which is equivalent to moderate pain intensity. After treatment, the patient reported pain reduction to +/- 5.

DISCUSSION

Therapy may be initiated with lower limb elevation with the aim of improving blood circulation, associated with manual lymphatic drainage, which may minimize edema in the ankle

region and potentiate analgesic effects, compressive bandaging (to prevent reflux of lymph), use of pneumatic pumps - a feature also known as pre-therapy (drainage obtained through the use of a sequential compression system that assists in the improvement of blood circulation in the region), electrotherapy using TENS with the function of improving sensitivity and relief of pain, and kinesiotherapy using Theraband, Swiss ball, springs and common balls, aiming to achieve a better muscular strengthening and balance (indicated because muscular contractions will exert compression in the tissue, favoring lymphatic drainage) (COMIM *et al.*, 2015). The results showed that, after physical therapy, the patient presented significant improvement in pain, and gained strength and range of motion, similar to the study of Barnile (2013), where there was a good progress of the case and a beneficial effect of physical therapy on the patient. The results showed that the treatment, which had no interurrences, helped reducing pain, improved strength and sensitivity in the patient's feet, restored the range of motion, improved blood circulation in the region, and restored a better quality of life. Physical therapy as a treatment in diabetic mellitus patients with foot neuropathy brought benefits evident in the improvement of the patient's clinical condition, with positive results, enabling her to return to her activities. However, further studies in this area, with the characteristics of the case reported, are necessary to make it possible to establish generalizations about the benefits of physical therapy in diabetic patients with foot neuropathy.

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