Occupational therapeutic interventions with the application of the Exercise Activity Protocol (PAE) for the physical rehabilitation of patients with leprosy sequelae: Experience report

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ABSTRACT

Introduction: Leprosy is an infectious disease, of slow and progressive evolution and with high disabling power, which can result in temporary and/or permanent physical deformities. This study aimed to report the experience of students from the State University of Pará (UEPA) of the Occupational Therapy course in interventions with the application of the Exercise Activity Protocol (EAP) in patients with leprosy sequelae in the hands. Method: This is an experience report, elaborated through occupational therapeutic care from the extension project "Rehabilitation and Assistive Technology: Exercise Activity Protocol for patients with disability due to leprosy", carried out at the Specialized Rehabilitation Center (CER III)/Teaching and Assistance Unit of Physical Therapy and Occupational Therapy (UEAFTO)/Laboratory of Assistive Technology (LABTA), located at the Center for Biological and Health Sciences (CCBS) of UEPA. Results: A significant muscle strength deficit was observed, characterized by difficulties in performing Activities of Daily Living and Instrumental Activities of Daily Living. Discussion: The activities carried out aimed to ensure comprehensive health care for patients with leprosy sequelae by associating rehabilitation and assistive technology. Final considerations: The experience provided a better understanding of leprosy and its biopsychosocial consequences, causing deformities and physical disabilities, which contributed to the professional development and academic training of the students.

Keywords: Occupational Therapy, PAE, Leprosy.

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INTRODUCTION

Leprosy is an infectious disease, with a slow and progressive evolution and high disabling power, which can result in temporary and/or permanent physical deformities. It is caused by *Mycobacterium leprae*, an acid-fast bacillus-type bacterium that affects peripheral nerves and, specifically, Schwann cells (Brasil, 2017).

According to the World Health Organization, its transmission occurs through direct contact and prolonged contact with untreated leprosy, through the release of droplets from the nose and mouth (WHO, 2023).

Leprosy is classified, according to WHO recommendations, as paucibacillary, with the presence of up to five skin lesions and with negative intradermal scraping, or multibacillary, with the presence of six or more skin lesions and positive intradermal scraping (Brasil, 2022). Its early diagnosis is the main measure to prevent disabilities arising from leprosy (Costa, 2023).

The deformities and physical disabilities resulting from leprosy have inflammatory mechanisms and neurological alterations as the main causes, classified as primary and secondary. The primary ones refer to sensory, motor and autonomic deficits, and the secondary ones are retractions, traumatic injuries and post-traumatic infections, resulting from the absence of prevention after the primary process (Brasil, 2008).

The involvement of peripheral nerves, sensory, autonomic or motor fibers, leads to changes in sensitivity, skin dryness, the appearance of fissures and ulcers, and muscle weakening or stiffening, which cause deformities characteristic of leprosy, such as foot drop and claw hand (WHO, 2020).

Treatment encompasses disability prevention measures, physical and psychosocial rehabilitation (Araújo, 2003). The occupational therapist is a professional qualified to train, rehabilitate and promote the health and well-being of their clients with needs, related or not to disabilities (Gomes; Teixeira; Ribeiro, 2020).

The work of this professional for the physical rehabilitation of leprosy patients aims to prevent disabilities, promote autonomy, independence and greater functionality in their daily occupations (Loureiro; Barreto; Maksud, 2015).

By using methods, resources and techniques, occupational therapeutic intervention enables the maintenance or recovery of deficient functions to reestablish or improve the functional and occupational performance of individuals with leprosy sequelae (Dias; Rodrigues, 2016).

The Exercise Activity Protocol (EAP) is a therapeutic resource developed for the physical rehabilitation of leprosy individuals with physical disabilities in the hands resulting from neural damage. It is performed through activities that exercise deficient areas of the musculoskeletal system

in order to maintain and/or reestablish their functions and enable improvements in occupational performance (Sá, 2014).

Therefore, this study aims to report the experience of students from the Occupational Therapy course at the State University of Pará (UEPA) in interventions with the application of PAE in patients with leprosy sequelae at the level of the hands.

METHODOLOGY

This is an experience report, of quantitative and qualitative character, elaborated through occupational therapeutic care from the extension project "Rehabilitation and Assistive Technology: Exercise Activity Protocol for patients with disability due to leprosy", resolution No. 3956/23-CONSUN/UEPA.

The consultations were carried out at the Physical Therapy and Occupational Therapy Unit (UEAFTO) and at the Assistive Technology Laboratory (LABTA), located at the Center for Biological and Health Sciences of the State University of Pará (UEPA).

The study was carried out with a 35-year-old female patient MESS with neural damage in her hands, who was being treated at UEAFTO – UEPA. Initially, muscle strength (FM) was measured by dynamometry. The subsequent sessions consisted of: (1) inspection of peripheral nerves of the face, upper limbs, and lower limbs; (2) application of PAE and (3) hydration and lubrication. 4 consultations were carried out, which took place from September to November 2023.

Concomitantly with the treatment with the application of the EAP, assistive technology devices were made according to the needs presented by the patient at the LABTA – UEPA.

The PAE, developed by Sá (2014), is based on biomechanical bases and the physical-functional rehabilitation method and is characterized by aiming at quantitative gains in the muscle strength performance component when applying the activity as exercise in patients with physical disabilities at the level of the hands resulting from leprosy.

It is divided into 3 phases. The first is represented by patient adherence and reception and is intended to obtain demographic and clinical data. This is followed by measurement of handgrip strength and grip strength in forceps of the dominant and non-dominant hands by means of dynamometry, using dynamometers of *Jamar*® and *Preston Pinch Gauge*®. The result is obtained from three consecutive measurements (Sá, 2014).

The second phase, called Clinical Treatment with Exercise Activity, involves the application of the EAP, which is distributed in 6 stages: (1) Exercise activity – posture for handgrip; (2) Exercise activity – palmar grip of the right and left hands; (3) Exercise activity – posture for gripping pinch; (4) Exercise activity – gripping with pinch right and left hands; (5) Exercise activity – posture for interdigital grip and (6) Exercise activity – right and left hand interdigital grip.

In the third phase, the handgrip and gripping strengths in forceps by dynamometry are reassessed after the end of the sessions with the PAE protocol. The mean values are compared with those obtained prior to the application of the EAP, in order to support the therapeutic measures necessary for the treatment.

RESULTS

In the initial measurement, a significant deficit of Muscle Strength (FM) was observed, which, according to the patient, is characterized by difficulties in performing their Activities of Daily Living and Instrumental Activities of Daily Living satisfactorily, such as work, use of public transportation, activities at home and rest/sleep.

Dynamometry showed the following values, showing the aforementioned FM deficit in handgrip (MD) = 3 and (ME) = 0 and tripod clamp grip (MD) = 1.33 and (ME) = 0; lateral clamp grip (MD) = 0.33 and (ME) = 0; and pulp-to-pulp gripping (MD) – 1st with 2nd = 0, 1st with 3rd = 0, 1st with 4th = 0 and 1st with 5th = 0 and (ME) – 1st with 2nd = 0, 1st with 3rd = 0, 1st with 4th = 0 and 1st with 5th = 0.

Figure 1. MESS patient performing handgrip strength assessment with Jamar®'s dynamometer.

Source: Personal archive, 2023.

Tables 1, 2, 3 and 4 show the results of the measurements performed by means of dynamometry of handgrip, gripping in tripod, lateral and pulp-to-pulp grips.

Table 1. Result of Jamar®'s dynamometric measurement for the patient's handgrip – 1st measurement.

Handgrip	Average
Right Hand	3
Left Hand	0

Source: Personal archive, 2023.

Table 2. Result of the dynamometric measurement of the Preston Pinch Gauge® for the patient's tripod forceps – 1st measurement.

Tripod tweezers	Average
Right Hand	1,33
Left Hand	0

Source: Personal archive, 2023.

Table 3. Result of the dynamometric measurement of the Preston Pinch Gauge® for the patient's lateral forceps – 1st measurement.

Side clamp	Average
Right Hand	0,33
Left Hand	0

Source: Personal archive, 2023.

Table 4. Result of the dynamometric measurement of the Preston Pinch Gauge® for the patient's pulp-by-pulp forceps – 1st measurement.

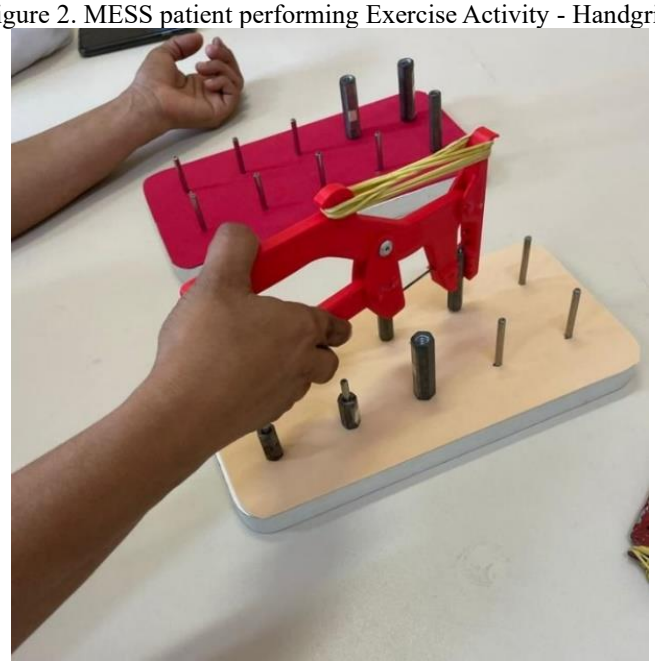
Pulp-to-pulp tweezers	1st with 2nd finger	1st with 3rd finger	1st with 4th finger	1st with 5th finger
Right Hand	0	0	0	0
Left Hand	0	0	0	0

Source: Personal archive, 2023.

In peripheral nerve inspections, pain was signaled by palpation of the radial, medial nerve, and ulnar nerves of the left upper limb (LVS). Pain has been reported to persist for approximately 6 months, accompanied by warmth, edema, and flushing. Thus, in relation to the continuous pain and signs described, a clinical picture of neuritis was suspected, and the application of EAP in MSE was suspended.

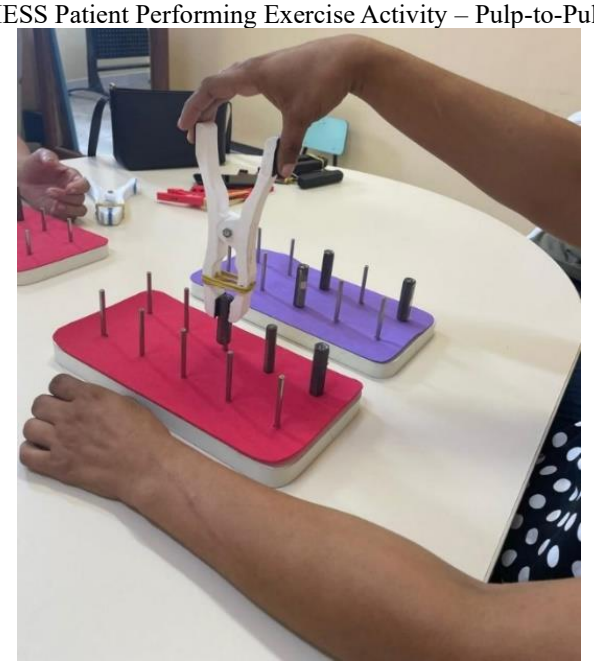
The PAE establishes the performance of 3 sets, with the number of repetitions adapted according to the patient's clinical condition. During the sessions with the application of the EAP, the patient reported asthenia and lethargy when performing the series with the right upper limb. Despite the difficulties presented, the patient fully performed two sets of exercise activities.

Figure 2. MESS patient performing Exercise Activity - Handgrip.



Source: Personal archive, 2023.

Figure 3. MESS Patient Performing Exercise Activity – Pulp-to-Pulp Tweezers.

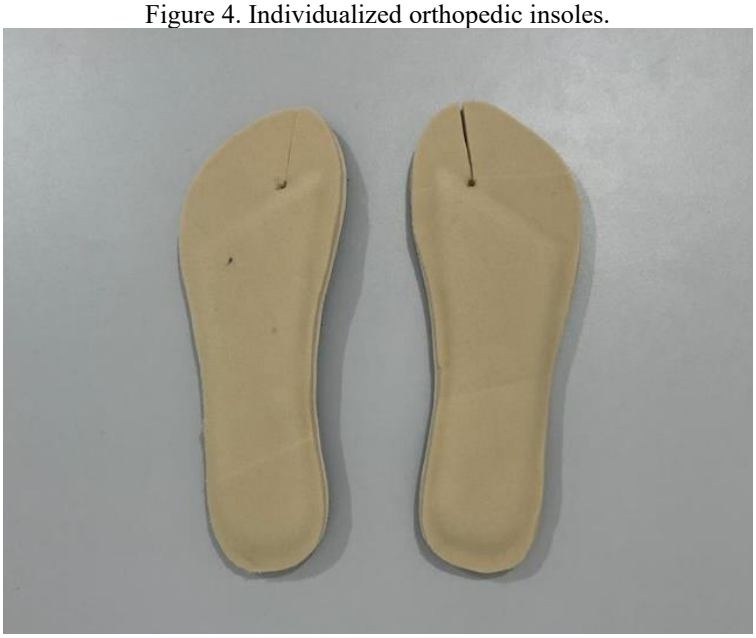


Source: Personal archive, 2023.

In the evaluation recommended by the PAE, motor, sensory and autonomic alterations were observed in the upper and lower limbs, such as thenar and hypothenar hypotrophy and median ulnar mobile claw in the right hand, in addition to loss and decrease of protective sensitivity in both feet, specifically in the midfoot and hindfoot and dryness in both hands, knees, legs and feet.

Throughout the sessions**,** according to the patient's demand, it was found that a pair of orthopedic insoles should be made. These were made at LABTA, UEPA's Fixed Orthopedic Workshop, produced from the patient's anthropometric measurements, aiming at the prevention of fissures and ulcers, using 5mm and 2mm Ethylene Vinyl Acetate (EVA), foam and nappa leather.

Figure 4. Individualized orthopedic insoles.



Source: Personal archive, 2023.

DISCUSSION

The objective of this study was to present the experience acquired through occupational therapeutic interventions associated with the application of EAP, whose effectiveness is reported by Carvalho *et al*. (2023); Pires *et al*. (2023) and Sá (2014) for the physical rehabilitation of upper limbs of patients with leprosy sequelae.

Of the 4 consultations performed, 3 were intended for the execution of the exercise activity established by the PAE. It is important to highlight the performance of a minimum of 10 sessions in order to achieve the desired therapeutic effects (Sá, 2014).

During the performance of the exercise activity, characteristic symptoms of neuritis were reported, which, according to the WHO (2020) refers specifically to the inflammation of the nerve, involving the immune system of the sick person, considered as the main cause of nerve damage, when in an advanced stage of the disease.

This inflammation is accompanied by severe pain, edema, motor and sensory deficits, and the main nerves affected are: facial nerve, trigeminal nerve, ulnar nerve, median nerve, radial nerve, common peroneal nerve, and tibial nerve (Brasil, 2008).

It is noteworthy that the patient was referred for consultation at the Doctor Marcelo Cândia Reference Unit for evaluation and confirmation of the suspicion of neuritis, temporarily suspending the exercise activity with the MSE.

The activities carried out by the extension project aimed to ensure comprehensive health care for patients with leprosy sequelae by associating rehabilitation and assistive technology.

Guidance was given for the practice of self-care measures, especially hydration and lubrication for treatment, aiming at the remission of dryness in the hands, arms and feet. It was

recommended to perform it 2 to 3 times a day, as recommended by the Ministry of Health (Brasil, 2010) and adopted by Sá (2014).

The manufacture of a pair of insoles was intended for use with sandals, as chosen by the patient, and this is the footwear preferentially used in her daily life. The adaptation aimed to relieve pressure in painful areas, as well as comfort and safety during its use when performing daily activities.

The absence of the patient in the occupational therapeutic sessions was characterized as the main difficulty for the production of this study, reducing the number of consultations performed.

FINAL THOUGHTS

In this experience report, occupational therapeutic interventions with the application of the EAP enabled comprehensive care for the needs presented by patients with leprosy sequelae.

The experience acquired through the care provided a better understanding of leprosy and the biopsychosocial consequences of leprosy deformities and physical disabilities. In addition, it contributed to the professional development and academic training of students.

It is important to highlight the scarcity of scientific studies that correlate the implications of leprosy sequelae in occupations performed by patients who present them. Thus, it is suggested that research be carried out on the subject mentioned above in order to construct knowledge about occupational losses resulting from leprosy.

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