

“Innovation of Physiotherapy Community on Increasing Physical Activity during Pandemic Covid-19”

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**PHYSIOTHERAPY MANAGEMENT IN INDIVIDUAL WITH WRIST DROP
AFFECTED BY LEPROSY: A CASE REPORT**

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Abstract

Introduction: Leprosy is a skin disease caused by *Mycobacterium leprae*, which is an intracytoplasmic parasite on macrophages and Schwann cells. This bacterium attacks the peripheral nerves, especially the Schwann cells. *Mycobacterium leprae* was first discovered by a Norwegian named Gerhard Armauer Hansen. One of the consequences of peripheral nerve disorders in people with leprosy is drophand/wrist drop/finger drop caused by damage in radial nerve.

Case Presentation: A male patient aged 29 years, at the Kelet's Hospital, Jepara, Central Java, on January 11, 2021 in a bed rest phase, had a fever of 37.8 C. His diagnose was wrist drop affected by leprosy. The condition of the skin was dry and peeled and indicated wrist drop. Previously, the patient had treated at one of the health centers in Juwana city, Central Java, and received the 4th MDT, the haemoglobin was 7 and already received a blood transfusion. Thus, the patient was referred to Kelet's Hospital to get better treatments and the doctor suggested to do physiotherapy treatment.

Management and Outcome: The interventions used the virgin coconut oil (VCO) Oil, passive, active assisted and stretching for 3 sessions. The impairments were limitation movement for wrist flexion and extension. The evaluation carried out the Manual Muscle Testing (MMT) to measure the muscle strength of wrist flexion and extension and the xerosis problem value applied by Overall Dry Skin Score (ODSS).

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Discussion: After 3 sessions, the physical examination declared muscle strength for wrist flexion and extension had the same pattern was 3 of 5 and xerosis problem had not decreased yet. The second treatment reported muscle strength was not increasing, however the skin condition was more moist. The third evaluation found a reduction of xerosis condition, as well as increased muscle strength for wrist flexion and extension were 4 of 5.

Conclusion: A management of physiotherapy used VCO Oil and exercise therapy applied passive, active assisted and stretching in patients with wrist drop affected by leprosy, reported giving positive effects to xerosis condition and able increase muscle strength of flexion and extension of wrist joint.

Keywords: leprosy, xerosis, wrist drop, exercise, muscle strength.

Introduction

Leprosy is a skin disease caused by *Mycobacterium leprae*, which is an intracytoplasmic parasite on macrophages and Schwann cells. This bacterium attacks the peripheral nerves, especially the Schwann cells. *Mycobacterium leprae* was first discovered by a Norwegian named Gerhard Armauer Hansen (Kundakci, 2019). The peripheral nerves involved are the auricular magnus, nerves of ulnar, median, radialis, peroneus communis, and tibialis posterior (Paul, 2019).

One of the consequences of peripheral nerve disorders in people with leprosy is drop hand/wrist drop/finger drop caused by damage to the radial nerve. This nerve damage causes the wrist to become paralyzed and unable to perform normal movements, the wrist tends to be palmar flexed. To reduce, inhibit and kill bacteria, patients are given Multi Drug Therapy (MDT) (Paul, 2019). Radial nerve damage is rare, if damage occurs it is usually damaged along with the median and ulnar nerves. Claw on the finger is not seen significantly, because the extensor is not able to move to extension of the MCP joint (Paul, 2019). Moreover, the wrist drop occurs due to



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damage to the ulnar nerve and median nerve which can cause clawhand and clawthumb deformities so that the radial nerve is also affected (Calixto, 2016). Drophand is caused by damage to the radial nerve, which regulates movement of the triceps muscle due to several conditions. This nerve also controls the extension movement of the wrist and assists movement in the fingers (Han, 2014).

Method

A case report conducted to this study by exploring the effect of some interventions (VCO Oil, passive exercise, active assisted exercise, and stretching) in a specific case of wristdrop affected by leprosy. This study had been approved by the Health Sciences Faculty, Universitas Muhammadiyah Surakarta (1292.7/C.8-III/FIK/VIII/2021).

Case Presentation

A 29-year-old male patient who works as an entrepreneur came to the outpatient clinic of one of the Kelet's Hospital in Jepara on January 11, 2021 on bed rest with complaints of fever 37.8 C. The condition of the body's skin is dry and peeled, and complained of difficulty moving the left hand (feeling weakness in the hand) up and down. Previously, the patient had received treatment at the public health center at Juwana city, Central Java and received the 4th MDT (Multi Drug Therapy), had the haemoglobin of 7, thus already received a blood transfusion. After received the treatments from the public health center, the patient was referred to Kelet's Hospital to get better treatments. At the hospital the doctor suggested to do physiotherapy treatment.

Management and Outcome

Some of the interventions given based on the patient's problems are coconut oil (VCO) or commonly called by baby Oil to maintain and increase the moisture of the patient's because of

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dry skin condition. The coconut oil is recommended in this method because coconut oil contains many benefits such as eliminating bacteria, removing dirt, odor, and increasing cell repair. One of the exercises needed to handle this wrist drop is passive exercise, active assisted exercise and stretching. Passive exercise can reduce tissue adhesions and shortened muscle, able to elongate the muscle and return to normal muscle function, then increase ROM. Active assisted is an active movement that is quickly loaded from an external force, causing a sudden stretch and muscle contraction (Kisner, 2012). Stretching exercise is a treatment to accelerate healing from injuries or disease which is implemented using active and passive movement. Stretching is activity to stretch muscles to increase muscle flexibility and ROM elevating improve joint function (Mortazavi & Nadian-Ghomsheh, 2018).

Table 1. The Dose of treatment for a patient with leprosy

Intervention	Dose				Information
	Frequency	Intensity	Type	Time	
VCO Oil	3 times a week	-	-	15 minutes	VCO applied to the patient's skin that feels dry. The use of coconut oil is recommended in this method because coconut oil contains many benefits such as eliminating bacteria, removing dirt, odor, and increasing cell repair.
<i>Passive</i>	3 times a	10	Hold and	5-10	<i>Passive exercise</i>

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<i>exercise</i>	week	repetitions, 2 sets	relax exercise	minutes	performed on dorsal flexion, palmar flexion, ulnar deviation, and radial deviation on the left side.
<i>Active Assisted Exercise</i>	3 times a week	10 repetitions, 2 sets	Isometric exercise	5-10 minutes	Active assisted is carried out in dorsal flexion movements with the therapist providing resistance, so that muscle contraction occurs.
<i>Stretching</i>	3 times a week	10 repetitions, 2 sets	Stretching exercise	10-15 minutes	Patients are directed to perform wrist extension stretch (to stretch the muscles in the palm of the hand and fingers are tense), wrist flexion stretch, wrist supination.

Result

Table 2 . Evaluation of ODSS Xerosis

Mark	T1	T3
Hand	4/4	¾

Table 3. The evaluation of muscle strength

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MMT	T1	T3
Hand		
Fleksi	3	4
Ekstensi	3	4

Table 4. The Evaluation of ROM

MMT	T1	T3
Wrist	S: 20° -0° -30°	S: 20° -0° -45°

Three times treatment by VCO oil and physical exercises (passive, active assisted and stretching) showed the xerosis measured by ODSS changed better, which was originally coarse-textured to fine-coarse scales. Likewise the muscle strength increased 3 to 4 of 5 of total value. The ROM for wrist joint performed increase, especially for wrist flexion increase 15 degrees. The results are described in the table 2.

Discussion

The Virgin Coconut Oil (VCO) oil functions to maintain and increase the moisture of the patient's skin that feels dry. The VCO oil has been proven to be effective and safe when applied as a moisturizer for mild to moderate xerosis (Lin, 2018). The coconut oil is recommended in this method because coconut oil contains many benefits such as eliminating bacteria, removing dirt, odor, and increasing cell repair. The VCO Oil contains various nutrients in the form of fat-soluble vitamins (A, D, E, K and provitamin A) and as good nutrition to be able to moisturize the skin as well as to facilitate skin regeneration (Yusuf, 2019).

On the other hand, the Passive exercise can reduce the adhesion and shortened tissue, further able to elongate as well return to normal muscle function thus increase the ROM of the



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joint. By doing this passive exercise, facilitate the muscles to move as normal movements as previously. By directing the patient to move his hand and the physiotherapist helps patient to contract the muscle by stimulation activation (Kisner, 2012). Passive movement will stimulate motor neurons (brain) with the release of transmitter (acetylcholine) to stimulate cells to activate calcium so that protein integrity occurs. When calcium and troponin C are activated, actin and myosin close each other and contraction occurred. This physiology process of contraction is able to maintain the skeletal muscle function and increase muscle tone. Passive ROM exercises can cause stimulation thereby increasing the activity of the chemical, neuromuscular and muscular. Smooth muscle in the extremities contains actin and myosin filaments which have chemical properties and interact with each other. The interaction process is activated by calcium ions and ATP, which is further broken down into ADP to provide energy for muscle contraction of the extremities. Repeated motion exercises make concentration to perform repetitive movements with the best possible quality (Bakara & Warsito, 2016).

Furthermore, the Active Assisted is an active movement that rapidly loaded from an external force, causing a sudden stretch, the elongation of the fiber is detected by the muscle spindle, which elicits a dynamic response. Then sent through afferent nerves that synapse with alpha motor nerves, then sent to skeletal muscle fibers and cause the muscles to contract. The strength of the muscle spindle response is determined by the average stretching. In practice, describes as faster and stronger a movement is applied to the muscles, the more powerful movements during muscle contraction will appear and can provide an increase in muscle strength. In this case, after active assisted has provided an increase in muscle strength (Matthew, 2010).

Stretching is an exercise that used to improve the function of joint muscle, besides that is also useful to train muscle to stay strong and flexible. Every change in the muscle is always detected by proprioceptors to be informed to central nervous system instruction are issued to adjust the muscle condition. The role of these proprioceptors is to transmit a continuous stream

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of information to the central nervous system. Proprioceptors are located in muscle, tendons, and joints including surrounding protective tissues such as capsules, ligaments, and in the labyrinth of the inner ear. There are 3 parts of the proprioceptors, namely the muscle proprioceptors which consists of the muscle spindle and golgi tendon organ, the joint and skin proprioceptor and the labyrinth and neck proprioceptor. Of the three proprioceptors that contribute to muscle strength are muscle proprioceptors which consist of muscle spindles and golgi tendon organs. So every moment can not be separated from the role of muscle spindles and golgi tendon organs (Kisner, 2012)

Conclusion

A management treatment of physiotherapy enrolled the VCO Oil and exercises were reducing the impairments of patient with wrist drop affected by leprosy. Whereas the skin appeared more elastic and moist. Moreover passive, active assisted and stretching showed have positive effects included increasing muscle strength and ROM of wrist as well.

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