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Effectiveness of Cross Friction Massage, Manual Therapy, Gastro Soleus Complex Stretch on Foot for Heel Pain in Menopause Women

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Abstract
Plantar fasciitis is a common musculoskeletal problem and is a frequent source of heel discomfort. Plantar fasciitis is a widespread ailment, but its exact mechanism and aetiology are yet unknown. Most people agree that it is related to recurrent micro-trauma. However, because of the hormonal changes that follow menopause, it is more common in postmenopausal women. Because estrogen maintains the suppleness and length of the plantar fascia, the decrease in oestrogen levels is important. The inferior heel area, especially in the vicinity of the medial plantar process, as well as the medial, lateral, and lower posterior parts of the calcaneus are frequently affected by heel pain. Weight-bearing activities are usually when the patient experiences the most severe pain, and the majority of the time, a shift in the quantity or intensity of physical activity occurs before the patient experiences symptoms. This study aims to show the effectiveness of three treatment protocols for plantar fasciitis: foot and ankle manipulation combined with cross-friction massage and gastrocsoleus complex stretching.

Keywords: Menopausal women, Plantarfasciitis, Manual mobilization, Cross friction massage

Introduction

As their bodies go through hormonal changes that signal the end of their reproductive years, menopausal women go through a big adjustment in their lives. Some women experience minimal disruptions during menopause, while others may encounter more difficult symptoms that significantly affect their day-to-day activities. The creation of collagen, which is necessary for the organisation and connection of tissues, is influenced by estrogen. Our tendons lose suppleness when our estrogen levels drop throughout menopause. This is significant as the body's connective tissues are concentrated in our feet. Heel discomfort is among the most prevalent foot ailments[1].

A firm, fibrous structure of connective tissue that originates from the calcaneus's medial tuberosity is the primary cause of heel pain. The plantar fascia acts as a shock absorber under increased tensions and provides essential static support for the foot's longitudinal arch. Its ability to extend is constrained, too[2]. It additionally assists to enhance ankle balance and serves as a strong pad when weight is placed on the

foot. People nowadays get heel pain quite frequently. It is more prevalent among postmenopausal women due to the hormonal changes that precede menopause[3].

Sedentary lifestyles can also cause heel pain; overuse is not the only cause of it. Heel pain is associated with a number of risk factors, including obesity, a sedentary lifestyle, running excessively, bearing weight for an extended period of time, flat feet, overtraining, low estrogen levels, recent stress fractures, wearing inadequate footwear, and going barefoot. It is important to detect symptoms and signs early in order to control these risk factors. Pain on the bottom of the foot and tenderness when walking your first stride upon waking up are the most common indicators[4].

Women may have symptoms like hot flashes, exhaustion, and irregular or nonexistent menstrual periods during the perimenopause. Subsequently, there is a drop in estrogen and androgen hormone levels, that may result in a variety of adverse effects, including disturbed mood, reduced energy, pubic hair loss, decreased bone density, and interruptions to sexual function. These changes result from the body's decreasing quantities of androgens and estrogens[5].

Heel pain is caused by a decline in estrogen levels since the hormone is crucial for maintaining the length and suppleness of the plantar fascia. Also, it was reported as the prevalence of heel pain was 0.4374%[6].

Plantar heel pain is linked to a condition affecting the insertion point of the plantar fascia, characterized by small tears, breakdown of collagen tissue, and the formation of scar tissue. Individuals experiencing plantar heel pain typically describe a gradual onset of sharp pain under the heel and along the inner edge of the plantar fascia to where it attaches at the inner prominence of the heel bone[7].

Pain tends to peak in the morning during the initial steps after waking up, or after extended periods of inactivity such as sitting or lying down, as well as at the start of physical activity. It generally subsides as activity levels increase, like during walking or running, but often returns later in the day[8].

The majority of instances of plantar heel pain improve over time with conservative treatment methods. Stretching is often used as a conservative treatment for plantar heel pain.. Typically, during the initial weeks, individuals are recommended to rest, reduce activity levels, take pain relievers, and engage in stretching exercises. Other interventions may include iontophoresis, ultrasound therapy, and mobilization/manipulation techniques[9].

Transverse massage, sometimes referred to as cross friction massage, is a technique used to avoid excessive formation of scar tissue and decrease adhesions in regions of trauma or inflammation. Plantar fascia flexibility may be improved by soft tissue methods that stretch it and progressive cross friction massage at its origin to break down scar tissue. For the purpose of improving joint range of motion, stretching is an essential therapeutic and exercise training technique. Numerous stretching programs have been the subject of extensive research, which has shown how beneficial they are in improving flexibility. It is thought that plantar fasciitis impairs the range of motion and function at the ankle joint, which can be improved by manipulating restricted joints in the ankle.A term of trial therapy for manipulative therapy is recommended, since chiropractic manipulation may prove to be a successful conservative treatment for plantar fasciitis cases[10].

Case report

A 50-year-old female in her postmenopausal phase presented to the Physiotherapy Department with complaints of severe heel pain which affected her day to day activities, particularly exacerbated in the morning upon taking the first step of the day gradually relieves as she engaged in activity throughout the day. The Numerical Pain Rating Scale indicated the pain was sever (8). It worsened with standing for

prolonged period of time, walking on uneven surface, getting down of stairs. Physical examination revealed tenderness around the calcaneus, and the Windlass test was positive, indicating a probable diagnosis of plantar fasciitis.

Patient received a combination of the three protocol, including mobilization and manipulation of the foot and ankle, stretching of the gastrosoleus complex and cross friction of the plantar fascia. The schedule included three visits in the first week, two visits in the second week, and a final visit in the third week.Several manual therapy techniques were used for treating foot conditions. These include mortise separation, mortise shear, foot figure eight, metatarsal shear, hallux mobilization technique, tarsal-metatarsal shear, general calcaneal technique, and cross-friction massage. Mortise separation involves moving the foot into dorsiflexion, internal rotation, and eversion. Mortise shear is done with one hand proximal and the other distal to the mortise joint, shearing it anterior to posterior. The foot figure eight involves stabilizing the ankle while moving the forefoot and midfoot through inversion with abductionand eversion. Metatarsal shear translates each metatarsal head back and forth. Hallux mobilization is done with one hand stabilizing the foot and the other mobilizing the hallux. Tarsal-metatarsal shear is performed by grasping the foot firmly and shearing the joints in a dorsal to plantar and backward direction. General calcaneal technique involves circular motion of the calcaneus. Cross-friction massage targets the plantar fascia insertion with deep friction massage. Additionally, stretching protocols for the gastrocnemius and soleus muscles involve leaning against a wall with one leg forward and the other back, with heels on the ground, and leaning forward to feel a stretch in the calf area, repeated three times a day for three weeks.

Discussion

Plantar fasciitis is a syndrome caused by repeated trauma to the plantar fascia at its attachment to the calcaneus, leading to pain and dysfunction. It can frequently become a source of frustration for both patients and clinician**s.** Menopause is linked to changes in body composition, including a reduction in fat-free mass and an increase in fat mass. The human foot, which plays a crucial role in the biomechanical function of the lower extremities, is the only part of the body that interacts with external surfaces. As a complex multi-jointed structure, the foot provides support and balance during standing and ensures body stability during movement.

The primary focus here is on the hormonal factors contributing to heel pain. An imbalance in hormones during the menopausal phase can have a significant impact on the body and joint processes. This can result in problems such as weakened ligaments and tendons, low bone density, and misaligned joints.

This study demonstrates the effectiveness of cross friction massage, manual therapy, gastrosoleus complex stretch on foot for heel pain in menopause women. The results are analyzed in terms of Numerical Pain Scale Rating (NPRS), Lower Extremity Functional Scale (LEFT), Foot Functional Index.(FFI). Participant in the study attended regular physiotherapy sessions at the department throughout the week which lasted for an hour. Each session lasted 30-45 minutes for 3 weeks 1 session in first week, 2 session in second week, 3 session in third week.

The findings above indicate a reduction in pain perception. It is suggested that this pain relief is due to central pain modulation, following the pain control theory, where stimulation of large-diameter fibers in the substantia gelatinosa of the spinal cord inhibits type A delta and C nerve fibers. Additionally, this method reduces pain-inducing metabolites and breaks down cross-bridges or adhesions in the connective tissue (Hasan et al., 2016). Furthermore, it is proposed that this approach accelerates healing at a physiological level (Joseph et al., 2012). This explains the improvements observed in Foot Function Index,

Numerical Pain Scale Rating (NPRS), Lower Extremity Functional Scale (LEFT).
The stretching protocol described involved a dorsiflexion stretch aimed at addressing tightness in the gastrocnemius and soleus muscles. Passive stretching has been shown to improve ankle range of motion (ROM) by altering the muscle-tendon unit (Nakamura et al., 2012). As a result, increased ROM in the direction of the passive stretch would be expected. Combining this stretching with cross friction appears to offer the most benefit to the patient overall. The pain relief from cross friction may enable greater ROM during stretching, explaining the improvement observed with this combination.

Conclusion

The study found that combination of the three protocol, including mobilization and manipulation of the foot and ankle, stretching of gastro soleus, cross friction massage helps in heel pain for women during there menopausal phase. Manipulation improves foot movement, Cross friction massage improved mobility and passive stretching increases range of motion and decrease pain.

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