

Effect of Burst Tens on Reflexology Points in Patients with Osteoarthritis Knee

Dr. Dhvani Shah (PT)¹, Dr. Komala Prabhu (PT)²

MPT, BPT, DNHE, MIAP, Assistant Professor, K.J. Somaiya College of Physiotherapy, Mumbai, Maharashtra, India

Cranio-Sacral Therapist, MPT, BPT, Consultant Craniosacral Therapist, Mumbai, Maharashtra, India

Abstract: ***Background:** Osteoarthritis is a chronic disease of the joint cartilage and bone, often thought to result from “wear and tear” on a joint. Reflexology is the technique of applying pressure to the reflexes on the feet or hands in order to stimulate body’s own healing processes. Reflex area on feet and hands are linked to other areas and organs of the body within the same zone. **Objective:** To study the effect of BURST TENS on the reflexology points in patients with osteoarthritis knee. **Methodology:** Experimental type of study wherein the 30 patients were divided into groups randomly. Experimental group were given burst tens (30minutes on 80Hz and intensity as tolerated by patient for 10 sessions) on the reflexology points on hands (PIP joints of middle and ring fingers of both the hands) along with medications whereas control group were given only medications. The vas, rom and lequesne scale score was taken before and after the treatment. **Results and Analysis:** The results showed that there was significant improvement in range of motion and reduction in vas and Lequesne scale score for the experimental group.*

Keywords: burst tens, reflexology, osteoarthritis knee, Lequesne scale

1. Introduction

Osteoarthritis is the second most common rheumatological disease and is one of the five leading causes of disability among elderly men and women. ⁽¹⁾ Osteoarthritis is a chronic disease of the joint cartilage and bone, often thought to result from “wear and tear”. It mostly affects the cartilage. Cartilage is the slippery tissue that covers the ends of bones in a joint. Healthy cartilage allows bones to glide over one another. It also absorbs energy from the shock of physical movement. In osteoarthritis, the surface layer of cartilage breaks down and wears away. This allows bones under cartilage to rub together, causing pain, swelling and loss of motion of the joint. Overtime, the joint may lose its normal shape. Also, bone spurs-small growth, called osteophytes may grow on the edge of the joint. Bits of bone or cartilage can break off and float inside the joint space. This causes more pain and damage ⁽²⁾ Osteoarthritis affects each person differently. In some people it progresses quickly, in others, the symptoms are more serious. Scientists do not know yet what causes the disease, but they suspect a combination of factors including being overweight, aging process, joint injury and stresses on the joints from certain jobs and sports activities. Osteoarthritis hurts people in more than their joints: their finances and lifestyles are also affected. Financial effects include cost of treatment and wages lost because of disability. Lifestyle effects include depression, anxiety, feeling of helplessness, limitations on daily activities, job limitations and trouble participating in everyday personal and family joys and responsibilities ⁽³⁾. Osteoarthritis can be diagnosed by x-rays (decreased joint space, abnormal increase in bone density, osteophytes) ; blood tests (to identify other causes of arthritis); MRI. The treatment of osteoarthritis is largely symptomatic and includes analgesics such as capsaicin cream, etc. The surgical treatment is indicated in severe stage. Non pharmacological treatment includes physiotherapy interventions, behavioural interventions, acupressure and weight reduction ⁽²⁾. Physiotherapy intervention include

modalities varying from TENS, SWD, IFT, etc, range of motion exercises, aerobic exercises, ergonomic advice and job modification.

Reflexology is the technique of applying pressure to the reflexes on the feet or hands in order to bring about a state of deep relaxation stimulate the body’s own healing processes and help the client return to a state of balance and state of well being. In 1913, Dr. William Fitzgerald, an American ENT surgeon, noted that pressure on specific part of the body could have anaesthetizing effect on a related area. Developing this theory, he divided the body into ten equal parts and vertical zones, ending in fingers and toes. He concluded that pressure on one part of a zone could affect everything else within that zone. Thus, reflex area on feet and hands are linked to other areas and organs of the body within the same zone ⁽⁵⁾. Since reflexology treats the whole person, not the symptoms of disease, most people benefit from the treatment. The therapy brings relief to a wide range of acute and chronic conditions and suitable for all ages. So, for migraine, stroke multiple sclerosis, pressure is applied to reflex points in the foot or hand that relates to the head and connecting areas. For neck, back and hip problems, sciatica and arthritis, will be treated in the musculoskeletal area and any circulatory problems will be treated in the heart reflex area and so on ⁽⁴⁾. What has been researched in much less detail and there are no recent researches on the combination of physiotherapy and reflexology on osteoarthritis knee. Therefore, the main purpose of this study is to see the adding effect of burst TENS on the reflexology points on the hands in patients with osteoarthritis knee.

2. Methodology

It was experimental type of study with 30 subjects from K.J.Somaiya College of Physiotherapy. The patients with Osteoarthritis Knee (Grade 1-3) according to Kellgren Lawrence Grading for knee Osteoarthritis were included in the study. The patients included were of any traumatic

condition, any infective disease of knee, any neurological conditions affecting higher functions, co-ordination, balance, grade 4 osteoarthritis knee and non-ambulatory patients. The informed consent was taken from the patients. The patients were divided into 2 groups on basis of chit method. Group 1 (Experimental group) was given Burst Tens on reflexology points on the hands and also medications were on. Group 2 (Control Group) was given only medications. The subject was made to sit comfortably on the chair and the specially designed electrodes which were with the adjustable sizes were placed on the proximal interphalangeal joints of the middle and ring fingers of both the hands (reflexology points of osteoarthritis knee). Double channel Burst TENS with frequency of 80 Hz for 30 minutes was given for 10 sessions daily. VAS and ROM was calculated after every session. Lequesne Scale score was calculated at the start and end of last session.

3. Results and Analysis

Paired t- test (within groups) and un-paired t-test (in between groups) were performed for VAS and ROM. Wilcoxon test (within group) and Mann-Whitney Test (between two groups) were performed for Lequesne Scale. The results showed that Vas Score decreased significantly for the experimental group as compared to the controlled group ($p < 0.0001$, $t = 14.882$). The results also showed that ROM increases significantly for the experimental group as compared to controlled group ($p < 0.0001$, $t = 9.886$). With the Wilcoxon test and Mann-Whitney Test, it was seen that Lequesne Scale score was decreased significantly for the experimental group ($p < 0.0001$).

4. Discussion

When there is pain in any part of the body, we generally try to get relief by rubbing or pressing that part. If we take this natural reflex into consideration, we should not be surprised at the evolution of relexology. According to the reflexology, body is divided into different zones represented by a point in the foot or hand. Nerve endings are embedded in the feet and hands that than travel to the spinal cord and to the various parts of the body. Thus stimulating these points releases endorphins and monoamines, which works to control pain and induce relaxation. It has also been shown to improve circulation and assist in the removal of waste products from body. The increase in blood flow also enables vital nutrients to reach the cells of the body, which greatly improves oxygenation⁽⁵⁾ In this study, Burst TENS is used over reflexology points on hands instead of pressure. TENS has effect on pain through gate control theory. Burst TENS is series of pulses, repeated 1-5 times a second, commonly twice. Each train or burst consists of a number of individual pulses at the usual conventional effect of both conventional and acupuncture TENS. It is used for chronic pain and osteoarthritic pains are generally chronic in nature. Hence burst TENS has been used in this study. Some low threshold mechanoreceptors from skin and elsewhere pass, without synapsing, up the posterior column of spinal cord. A beta fiber gives off collaterals which impinge on nociceptor cells of A delta and C fibers in laminae of the posterior horn. A beta fibers are large diameter fibers which are capable of being stimulated at low current intensities and high

frequencies. Morphine acts on C fiber system and hence controls tissue damage pain. This occurs because morphine imitates naturally occurring groups of neurotransmitters, enkephalin, endorphins and dynorphine. In the substantia gelatinosa (laminae II) there are interneurons which can produce enkephalin to inhibit the C system cells in this region. Collateral branches of A delta fibers in the posterior horn connect with this interneurons and stimulate them. Thus stimulation of A delta fibre by electrical pulses will damp down C fiber system-type pain. Thus, adding effect of TENS on reflexology decreases Visual Analog Scale (VAS) score. In patients with osteoarthritis knee, the range of motion is restricted due to pain. Now, as the pain decreases, the patient is able to flex knee more. Thus, it's seen that, there is considerable increase in range of motions in the experimental group as compared to the controlled group. As per repeated measures of annova, range of motion was increased significantly after 10 days as compared to post treatment and 5 days in the experimental group. The functional abilities like standing for long, walking, staircase climbing, squatting, walking on uneven ground are limited because of pain and limited range of motions. As the pain decreases and range of motion increases, the patient becomes more functional and scores of Lequesne scale decreases for the experimental group as compared to the controlled group.

5. Conclusion

There is difference in Visual Analogue Scale (VAS), Range of Motion (ROM), Lequesne Scale Scores in group of patients taking medications and BURST TENS on reflexology points on the hands compared to the patients taking only medications.

6. Limitations

The limitations of the study were small sample size, daily documentation of Lequesne scale was not done, follow up was not done post 3weeks treatment to check if effect is maintained and effect of TENS on other local and reflex points were not seen.

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