

RESEARCH ARTICLE

THE EFFECT OF SWEDISH MASSAGE AND CONTRAST HYDRIATIC APPLICATIONON PAIN, EDEMA AND EFFUSION IN KNEE OSTEOARTHRITIS PATIENTS

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Abstract

Knee osteoarthritis (KOA) is a prevalent degenerative joint diseasecausing pain and disability. This study focused on 40 patients (age 33-85) with mild to moderate radiographic KOA. Swedish Massage (SM) and Contrast hydriatic applications were administered, aiming to manage pain, edema, and effusion effectively and economically.

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Pain intensity, edema, and effusion were assessed using a visual analogue scale (VAS), edema grading system, and Knee Joint Stroke Test, respectively. Paired "t" tests compared pre and post-scores. Results demonstrated a significant reduction in pain, edema, and effusion after Swedish massage and contrast hydriatic application.

Before treatment, the mean pain level was 6.48 ± 0.22 , reducing significantly to 1.58 ± 0.16 post-treatment. Edema decreased from 2.58 ± 0.14 to 0.5 ± 0.09 , and knee joint effusion reduced from 0.8 ± 0.09 to 0.26 ± 0.06 after treatment. These findings support the hypothesis that Swedish massage with alternating hot and cold applications effectively reduces pain, swelling, and effusion in KOA patients, enhancing their daily activities and overall quality of life. Participants also reported improved knee joint mobility, relaxation, emotional well-being, and a positive impact on their overall quality of life. This study advocates the incorporation of these interventions into the management of KOA due to their simplicity, safety, and cost-effectiveness.

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Introduction: -

Knee osteoarthritis (KOA) is the most common degenerative joint disease and a major cause of pain and disability in adult individuals. More than 20 million people in the US suffer from knee osteoarthritis (OA). By 2030, global statistics reveal over 100 million people worldwide suffer from OA, which is one of the most common causes of disability ^[1]Pathological changes seen in OA joints include progressive loss and destruction of articular cartilage, thickening of the subchondral bone, formation of osteophytes, variable degrees of inflammation of the synovium, degeneration of ligaments and menisci of the knee. Cartilage is the protective tissue that covers the ends of the bones. With KOA, this cartilage breaks down, causing the bones within the joint to rub together. This can cause knee joint pain, stiffness in the knee joint, loss of flexibility, inflammation, tenderness, crepitus, or grating, crackling and other symptoms. As KOA becomes more advanced, the pain associated with it may become more intense. Over time, swelling in the joint and the surrounding area may also occur.

However, the detailed molecular mechanisms of KOA initiation and progression remain poorly understood, and, currently, there are no interventions available to restore degraded cartilage or decelerate disease progression. But around the world a few different types of medication are used for treating KOA, like oral pain relievers, topical pain relievers, Nonsteroidal anti-inflammatory drugs (NSAIDs), Corticosteroids and Cymbalta. In severe cases of KOA, physicians advise to go for arthroplasty to replace or repair damaged knee joints. Current treatment options for knee osteoarthritis have limited effectiveness and potentially adverse side effects. But physical activity strengthens the muscles around the knee joints, and it may help relieve stiffness.

Today, massage therapy is a major treatment method in the world and millions of individuals use massages to decrease pain and pressure and obtain the general feeling of well-being. The start of modern massage therapy in the world is credited to the Swedish doctor Pehr Henrik Ling who introduced remedial Swedish massage techniques^[7] Contrast hydriatic application is a familiar rehabilitation tool, but many people have never heard of therapeutic contrasting: quickly changing tissue temperature from hot to cold and back again. For injury recovery, contrasting is a good, safe, and simple idea which forces your tissues to adapt to sudden changes, which is stimulatory and requires a lot of metabolic activity and circulatory changes. Basically, contrasting constitutes a gentle tissue workout: stimulation without stress, strong sensations without movement, which may be helpful for a body part that badly needs some rest while it heals^[8].

Swedish Massage (SM) and Contrast hydriatic application or Contrast hydrotherapy or alternative cold, hot applications are being utilized by KOA sufferers, and represent attractive, potentially effective options to manage pain, edema and effusion. Swedish Massage (SM) and Contrast hydriatic application are generally used to relieve pain from musculoskeletal disorders and it offer a safe, simple, economical and effective complement to the management of KOA.

Aims and Objectives: -

A quasi-experimental intervention study to analyze the effectiveness of Swedish Massage and Contrast hydriatic application on pain, edema and effusion therapy in knee osteoarthritis patients.

Method of study: -

The study was conducted in Nandha Naturopathy and Yoga Medical College and Hospital, Erode, Tamilnadu, Indiafor investigated the outcomes of Swedish Massage and Contrast hydriatic application on pain, edema and effusion in knee osteoarthritis patients. The sample consisted of patients (n = 40) who were diagnosed with primary knee osteoarthritis and visited our hospital. All participants provided written informed consent.

Inclusion criteria:

Participants in the study will be women and men aged between 33–85 years, clinical knee osteoarthritis according to the American College of Rheumatology Clinical Criteria and Kallgren and Lawrence (KL) radiographic osteoarthritis grade 2 and 3 (mild to moderate radiographic osteoarthritis)

Exclusion criteria:

Volunteers are excluded who are present with severe knee osteoarthritis according to the KL classification (grade 4), Other known major musculoskeletal impairments in the lower extremities or the back or prostheses in any joint of

the lower extremities, known serious coronary heart diseases or cancer, body mass index >35, scheduled for surgery in any joint, known mental or psychological diseases, known drug abuse, contraindications for MRI. Also excluded those who miss two consecutive sessions without justification, as well as volunteers who are absent from 10% of the intervention sessions.

After satisfying the inclusion criteria recruitment of the patients with initial screening will be collected covering personal and socioeconomic data, lifestyle, medications, identification of the existence of other diseases, anthropometric assessments, and baseline blood pressure.

The study was conducted over a period of 10 days. Before starting the treatment protocol, pre- assessment dates of pain, edema and effusion were recorded. Then performed Swedish massage for 15 minutes. Initially gingelly oil was applied to protect the skin from friction. Then begin with Effleurage that is a circular stroking movement. After 10 to 12 strokes of the effleurage, go with Petrissage. This technique consists of deeper kneading movement. The massage therapist manually compresses the soft tissues in and around the knee in a rhythmic fashion. The most common ways of performing petrissage in knee include kneading and lifting. Petrissage helps to stretch and loosen muscles and promote blood circulation. Once the petrissage is completed, then start with friction. As the name suggests, this technique involves rubbing on the knee by using the thumbs or fingers in a circular or linear rhythm. Then perform tapotement movements like slapping, hacking, and tapping. Tapotement promotes the release of endorphins, which helps torelax the thigh muscles and helps in lymphatic drainage. Once tapotement is over, nerve compression in and around the knee joint and popliteal area is applied. Finally end up with knee joint movements (passive flexion and extension). After finishing Swedish massage, immediately apply hot compressor (37°C or 99°F) for 2mins and ice-cold compressor (5°C or 40°F) for 3 mins. Repeat this procedure 3 times (15 mins). After 10 days the post assessment dates of pain, edema and effusion were recorded.

Assessment Instrument:

The intensity of the pain is recorded by using a visual analogue scale (VAS). This consists of a 10cm line containing numbers ranging from 0 to 10, where 0 represents "no pain" and 10 represents "worst possible pain.

Edema assessment by using edema a grading system is often used to determine the severity of the edema on a scale from +1 to +4. It is assessed by applying pressure on the knee area and then measuring the depth of the pit (depression) and how long it lasts (rebound time).

Grade	Depth	Rebounding Time
0	Nil	No pitting
1	2- Millimeter (mm) depression	Immediate
2	3-4 mm depression	15 seconds or less
3	5-6 mm depression	15-30 seconds
4	8 mm depression	more than 30 seconds

Effusion assessment by grading scale of the knee joint based on the stroke Test. A stroke test is performed with the patient in supine and with the knee in full extension and relaxed. Starting at the medial tibiofemoral joint line, the examiner strokes upward 2 or 3 times toward the suprapatellar pouch to move the swelling within the joint capsule to the suprapatellar pouch. The examiner then strokes downward to the distal lateral thigh, just superior to the suprapatellar pouch, towards the lateral joint line. A wave of fluid may be observed within seconds on the medial side of the knee. Effusion of the knee joint is quantified using a 5-point scale.

Zero: - No wave produced on down stroke

- 0.5+: Small wave on medial side with down stroke
- 1+: Larger bulge on medial side with down stroke
- 2+: Effusion spontaneously returns to medial side after upstroke (no down stroke necessary)
- 3+: So much fluid that it is not possible to move the effusion out of the medial aspect of the knee.

The main outcome of the study was to identify the variations in pain, edema and effusion. Statistical analysis was performed by using Graph pad trail version 3.

Result: -

The results, after applying paired "t" test to compare between pre and post score of pain, edema and effusion. **Table. 1: -** Demographic Status of the Patient (n=40).

Study Variables	Category	Frequency	Percentage %
	33-43	13	32.5
	44-53	9	22.5
Age in Years	54-63	11	27.5
	64-73	5	12.5
	74-83	1	2.5
	84-93	1	2.5
Gender	Male	17	42.5
	Female	23	57.5

Table. 2: - Stages of knee Osteo arthritis (n=40).

	Grade	Frequency	Percentage %
Stages of KOA	Π	22	55
	III	18	45

Table 3: - Observed on patient (n=40).

Assessment tool	Pre	Post
	(Day-1)	(Day-10)
Visual analogue pain scale	6.48±0.22	1.58±0.16***
Edema scale	2.58±0.14	0.5±0.09***
Knee joint Effusion	0.8±0.09	0.26±0.06***

Values are in Mean + SEM (n=40) - *** P < 0.005, ** P < 0.01, * P < 0.001

Discussion: -

The goal of the present study was to examine the effects of Swedish massage and Contrast hydriatic application on pain, edema and effusion in knee osteoarthritis patients. The findings of this study show a strong correlation between reduction of pain levels after Swedish massage followed by hot and cold application to the OA knees and statistically significant differences in pain, edema and effusion scores before and after massage. In addition, participants reported improved range of motion of the knee joint, relaxation effects, emotional wellbeing and overall improved quality of life.

Before the treatment, the mean pain level recorded by the patients was 6.48 ± 0.22 . After Swedish massage and Contrast hydriatic application the mean pain level was 1.58 ± 0.16 . The observed reduction in pain was statistically significant. In addition, there is a significant reduction in oedema as measured by oedema scale- from 2.58 ± 0.14 before treatment to 0.5 ± 0.09 after treatment. Furthermore, the knee joint effusion as measured by the stroke test showed a reduction from 0.8 ± 0.09 before treatment to 0.26 ± 0.06 after treatment. (Table 3)

Research has documented the use of massage therapy as an effective tool for pain management.^{[3][4][6]}The gatecontrol theory of pain postulates that massage may be effective in "closing the gate"—that is, inhibiting the transmission of noxious stimuli by stimulating large nerve fibres that have been shown to alter pain perception.^[2]

The use of hot and cold applications in medical history goes back to ancient times. For example, Hippocrates in his book titled "Management of Acute Disease ", he recommended the application of the hot water -filled caps made of clay or metal for the pain in the costal joints, and to place a soft material between skin and cap to prevent the burns. In addition, he mentioned the dry and heat applications that consisted of a heated corn in the blanket made of wool.

Different types of materials related to general and local heat and cold applications have been produced by medical technology since Hippocrates.

Heating therapy increases tissue temperature, blood flow, metabolism and connective tissue extensibility. There are also reports that heating therapy increases the activity in all the Ia and many of the Ib afferents, decreases the activity of most group II spindle afferents, decreases muscle spasms, and increases the speed of nerve conduction. Other studies indicated that heating therapy is more effective than placebo in relieving pain, decreasing disability, decreasing muscle tension, and improving range of motion.^[5]

There is evidence that cooling therapy decreases tissue blood flow due to vasoconstriction, and that it also reduces tissue metabolism, oxygen utilization, and inflammation. Cooling therapy decreases the velocity of nerve conduction in superficial tissues by slowing the firing of muscle spindle afferents and reflex responses, thus decreasing muscle spasms and pain.

One of the limitations of the present study is the lack of collection of physiological data, including heart rate, blood pressure, and oxygen levels as both massage and hydrotherapy treatments can affect the above-mentioned physiological parameters. The absence of data on the physiological indicators of pain means that the study relied on participant perceptions without additional external measures to verify participant responses to massage therapy. Pain is an inherently subjective experience that includes physical and emotional elements.

The current study, designed to gather data on the research hypothesis, did not use a control group. The selection of additional patients combined with randomization to groups, would have required substantial additional resources. However, future studies on massage therapy in an acute care setting may benefit from the addition of a control group.

Conclusion: -

Evidence based studies support the effectiveness of Swedish massage and Contrast hydriatic application as nonpharmacological methods for controlling pain and edema in OA knees. The current study supports the research hypothesis that Swedish massage followed by alternate cold and hot applications can be easily implemented to reduce pain, swelling, range of pain, effusion of the OA knees thereby improving participants activities of daily living.

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