



A COMPARATIVE STUDY ON CRYOTHERAPY AND WAX THERAPY ALONG WITH EXERCISE IN TREATMENT OF EARLY OSTEOARTHRITIS KNEE

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ABSTRACT

Background and purpose: osteoarthritis of knee is a commonly observed type of condition in south India, the knee movements are important for walking, squatting and other functional day today activities. Physiotherapy plays a vital role in the management of patients with osteoarthritis, by means of exercises, and thermotherapy/ cryotherapy. The aim of this study is to relieve pain by comparing wax therapy and cryotherapy with exercise for early stage of osteoarthritis knee. Methods: twenty subjects were recruited, age from 35 to 50 years. Their physical activities were measured before and after treatment. The main outcome measurements was VAS a scale. The 20 subjects were divided into 2 groups; group A and group B. group A received wax bath therapy and group B received cryotherapy. Treatment last for 7 days. Each session lasted up to 30 min. Both the wax bath therapy and cryotherapy were found to be effective in treating early stage of osteoarthritis knee. The group B subjects in this study achieved more significant results compare to group A subjects. These results support the value of cryotherapy with exercise management for management of early stage of osteoarthritis knee

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INTRODUCTION

Osteoarthritis can be defined as degenerative condition affecting synovial joints, articular cartilage in a joint.[1] OA knee is commonly observed type in India, this may be because of the way of living with more activities being done on the floor. OA knee is debilitating and uncomfortable for the person who has it. If left untreated the condition would interfere with their day to day activities.[2] physiotherapy plays an important role in relieving the pain the preventing the problems associated with early stage of osteoarthritis knee.

In the early stages of osteoarthritis, however, the articular cartilage is not attenuated but thicker than normal. An increase in water content, reflecting damage to the collagen network, leads to swelling of the cartilage, and is associated with an increase in the net rate of synthesis of proteoglycans, the matrix macromolecules that contribute elasticity to the cartilage and endow it with its ability to resist compression.

The increase in proteoglycans synthesis, which represents a repair effort by the chondrocytes, may result in an increase in the total proteoglycan concentration of the tissue. Thus the earlier stage of osteoarthritis is characterized by hypertrophic

repair of the articular cartilage. In early stage of osteoarthritis there is generalized ache around the knee. Stiffness after prolonged periods in one position and when getting up in the morning. [2]

Cryotherapy is local cold application for therapeutic purposes, and has therapeutic effects as a result of its influences on hemodynamic, neuromuscular and metabolic processes. Cryotherapy can be used in early stage of osteoarthritis of knee for control of inflammation, relief of pain, reduction in muscle spasm and increase in range of motion.[5] These are achieved by the decreasing tissue temperature slows the rate of the chemical reactions that occur during the inflammatory response. Decrease in tissue temperature may directly or indirectly reduce the sensation of pain by gating pain transmission with activation of cutaneous thermal receptors. It reduces muscle spasm by an effect on the muscle spindle itself. [3]

Wax bath therapy is an application of molten paraffin wax on the body parts with temperature maintained at 40-44^oC, it stimulate superficial capillaries and arterioles, causing local hyperemia and reflex vasodilatation, thus increase the circulation and reduce the pain and relax the muscles. Mild heating appears to have a sedative effect on the sensory nerve ending. [4]

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Regular exercise to be very effective for relieving the pain and stiffness of osteoarthritis and may help slow the progression of the disease, and also helps to maintain a healthy weight, that reduce the stress on joints .exercise strengthens the muscles that support the joints, which helps protect the joint from further damage and can reduce the pain of arthritis, improves the flexibility of joints.[6]

The prevalence of OA knee increases with age and eventually leads to pain, joint stiffness, progressive deformity and functional impairment, which in turns; negatively affect the individual quality of life. The focuses are nowadays physiotherapy management on early stage of osteoarthritis to prevent pain and improve the quality of life. Although researches are available for cryotherapy and wax therapy on pain management, further investigation is required to know the comparison of effect of wax therapy and cryotherapy in early stage of osteoarthritis. Therefore the aim of this study is to compare cryotherapy and wax therapy along with exercise to reduce pain and improve overall functional activity in people with early stage of osteoarthritis knee.

METHODOLOGY

This study was conducted in outpatient department of physiotherapy, Government College of Physiotherapy, Government Institute of Rehabilitation Medicine, KK Nagar Chennai, in this quasi experimental study a sample 20 subjects diagnosed as osteoarthritis knee in early stage were allocated into two different groups by simple random sampling..inclusion criteria are both gender with moderate obesity age between 35-50 years having insidious onset of unilateral symptomatic early stage of tibio femoral arthritis .subjects were excluded if they had pain more than 6 months, any history of intra articular steroid injection, deformities in knee joint, hip or spinal disorder causing referred pain in or around the knee. Rheumatoid arthritis and other arthritic conditions. Subjects who fulfilled the inclusion criteria were divided into two groups, each groups contains 10 subjects. Group A was delivered with wax therapy along with exercise; group B was delivered with cryotherapy along with exercise therapy. The study procedure were explained to the subjects and the informed consent was obtained prior to study, before starting the training, pre-test scores are measured by using VAS scale study duration seven days, 30 minutes per session (for both groups) Group A subjects received wax bath therapy, the treatment area is exposed and clothing from the area is removed and inspected, patient was seated on a back rest chair with knee placed on a stool. The lint cloth is immersed in wax and then further brushing more wax on the lint cloth using a paint brush and later on applied around the knee.

Treatment parameters

Temperature of paraffin wax: 40-44⁰ c
 Duration: 15 minutes
 Number of days: 7 days
 Total number of sittings: 7 sittings
 Method: Wrapping method

Group B subjects received cryotherapy, the treatment area is and inspected, patient was seated on a back rest chair with knee placed on a stool. A towel is placed around the treatment area and rubber sheet below the knee to wipe away water on

the skin in the treatment area during treatment. The plastic bag containing ice is applied over the painful area of knee. During this time the patient will feel local cold, burning and then aching sensation before the area finally become numb.

Treatment parameters

Temperature of ice: 32°F
 Duration: 20 minutes
 Number of days: 7 days
 Total number of sittings: 7 sittings
 Method: Ice massage

Both groups are encouraged to do knee strengthening exercise followed by the modalities with 1 to 2 sets of 6 to 8 repetitions.

1. Isometric quadriceps exercise
2. Straight leg rising
3. Isometric hamstring exercise
4. Short arc terminal knee extension
5. Adductor strengthening exercise

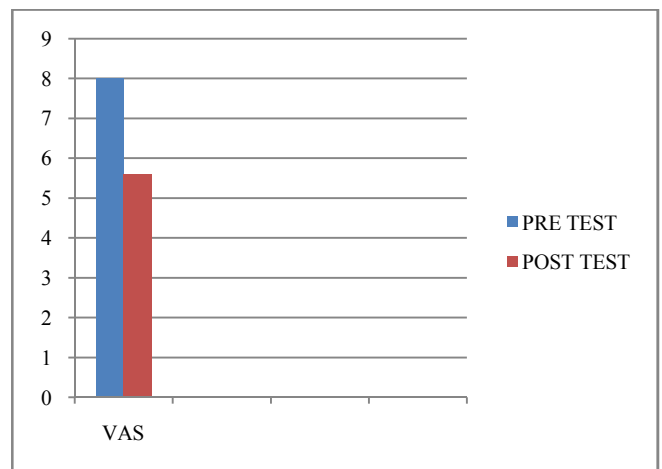
Data Analysis

Table 1 Comparison of VAS scale before and after treatment for GROUP-A

Serial No	Patient Name	Vas Score Before The Treatment Wax Bath And Exercise	Vas Score After The Treatment Wax Bath And Exercise	Difference
1.	CASE-1	7	5	2
2.	CASE-2	8	5	3
3.	CASE-3	9	7	2
4.	CASE-4	7	5	2
5.	CASE-5	7	6	2
6.	CASE-6	8	6	2
7.	CASE-7	9	6	3
8.	CASE-8	9	7	2
9.	CASE-9	8	5	3
10.	CASE-10	8	4	4

Mean Pain Score: Mean(x)=Ex/n

Serial No	Pre treatment	Post treatment	Mean difference
1.	8.0	5.6	2.5



Graph 1 Comparison of VAS scale before and after treatment for Group-A(Wax Therapy)

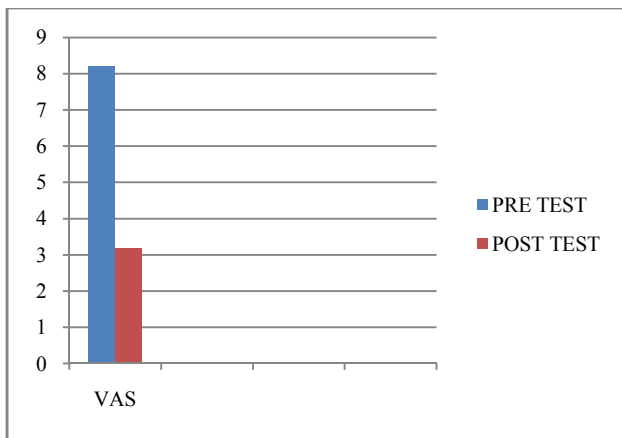
Table 2 Comparison of VAS scale before and after treatment for Group-B

Serial no	Patient Name	Vas Score Before The Treatment Cryotherapy And Exercise	Vas Score After The Treatment Cryotherapy And Exercise	Difference
1.	CASE-1	8	3	5
2.	CASE-2	9	4	5
3.	CASE-3	8	4	4
4.	CASE-4	8	2	6
5.	CASE-5	7	3	4
6.	CASE-6	9	4	5
7.	CASE-7	7	2	5
8.	CASE-8	9	3	6
9.	CASE-9	9	4	5
10.	CASE-10	8	3	5

Mean Pain Score: Mean(x)=Ex/n

Serial no	Pre treatment	Post treatment	Mean difference
1.	8.2	3.2	5.0

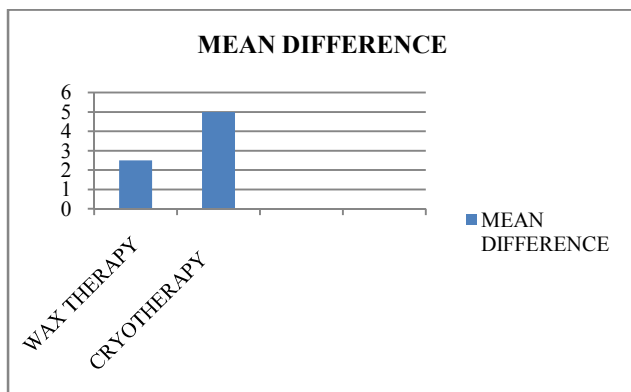
Graph 2. Comparison of VAS scale before and after treatment for GROUP-B(Cryotherapy)



RESULT ANALYSIS

Mean difference of pain reduction between before and after treatment using wax bath therapy and cryotherapy with exercise.

Groups	Before treatment	After treatment	Mean difference
Group -a(wax therapy)	8.0	5.6	2.5
Group-b(cryotherapy)	8.2	3.2	5.0



The above graph reveals that, patient are treated with cryotherapy shows more pain reduction than patients treated with wax therapy

INTERPRETATION OF RESULTS

The results obtaining by delivering wax bath therapy for 10 subjects and cryotherapy for 10 subjects were analyzed. Subjects belonging to both the groups experienced pain relief. However, considering the mean score for both the groups, there is a significant reduction in pain in GROUP B (CRYOTHERAPY) when compared to GROUP A (WAX THERAPY)

DISCUSSION

In the selected sample of 20 subjects, the outcome shows the efficiency of cryotherapy over wax bath therapy. This study conclude that cryotherapy is superior to wax therapy. cochrane review states that ice massage appeared to be beneficial for knee strength, range of motion, and function. Cold packs were useful for reducing knee swelling. Hot packs did not reduce swelling. (3) Brosseau L *et al.* (2011) performed a study on thermotherapy for treatment of osteoarthritis and concluded that ice massage showed a significant benefit in improving ROM and function, in the treatment of knee OA. Application of cold packs resulted in significant reduction in knee edema when compared with control or heat. A limited number of randomized controlled trails reported that ice massage has beneficial effects on knee range, function and muscle strength and that cold packs are effective in reducing swelling. ice therapy can be used in patient where swelling is a problem. Cryoapplication increases maximum isometric muscle tension (Low & Reed). sanya & bello *et al* (1999) states locally applied cold has been shown to increase the isometric strength and endurance of the quadriceps .palastanga (1988) suggests that because cold induces deep aching pain signals conveyed by C fibers activity it could contribute to pain reduction by stimulating the release of endorphins and encephalin.

CONCLUSION

Both the wax bath therapy and cryotherapy were found to be effective in relieving pain in early stage of osteoarthritis .but through this study, cryotherapy has proved itself to be superior to wax bath therapy in reducing pain in treated patients. There by this study concludes that cryotherapy is more efficient than wax bath therapy when it comes to early stage of osteoarthritis knee. This study can be done on rheumatoid arthritis, and periartthritis shoulder on larger number of subjects with long term follow up.

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