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RESEARCH ARTICLE

EFFECT OF REVULSIVE COMPRESS ON KNEE ASSOCIATED SYMPTOMS AMONG KNEE JOINT OSTEOARTHRITIS PATIENTS

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ABSTRACT

Introduction: Osteoarthritis (OA) is the most prevalent and far common debilitating form of Arthritis which can be defined as a degenerative condition affecting Synovial joint. Revulsive compress is a hydrotherapy technique traditionally which is used for reducing pain and other associated symptoms of knee Osteoarthritis. This study was carried out to determine the effect of Revulsive compress on knee osteoarthritis associated problems.

Methodology: The study was carried out in Sree Ramakrishna medical college hospital for Naturopathy and Yoga, kulasekharam, India. A convenient sample of 15 adult patients with bilateral knee osteoarthritis was selected for the study after obtaining written consent. All the samples underwent Revulsive compress for continuous 14 days. Three tools were utilized to collect the data on pre and post intervention which includes 0-10 Numeric pain rating scale, 0-4 edema scale and Goniometry for assessing range of motion.

Results: The study shows that knee osteoarthritis symptoms were significantly reduced in the numeric pain scale score (t 13.163, sig 2 tailed .000) to 46.5%, edema scale score (t 4.583, sig 2 tailed .000) to 62.5% and the range of motion significantly get increased (t -4.660, sig 2 tailed .000) to 18% after the application of revulsive compress. The Revulsive compress had significant effect in reducing the knee osteoarthritis symptoms and pain.

Conclusion: The method of Revulsive compress is the safe appropriate protocol of treatment to relieve symptoms and pain associated with knee osteoarthritis. This study needs to be support with long term effect of Revulsive compress with large sample size.

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INTRODUCTION

Osteoarthritis (OA) is the far common debilitating form of arthritis which can be defined as a Degenerative Disorders of Multifactorial etiology characterised by the loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis and range of biochemical and morphological alteration of the synovial membrane and joint capsule (Muhlen, 2000; Silman, 2001). Osteoarthritis is also result from failure of chondrocyte to maintain homeostasis between synthesis and degradation of extracellular matrix components. Osteoarthritis cartilage is characterised by an increase in anabolic and catabolic activity (Heijink *et al.*, 2012; Goldring and Goldring, 2007). It affects the weight bearing joints in the knees, hips and hands. Overall prevalence of knee OA was found to be 28.7% in India. Its prevalence increase with age and generally affect

women more frequently than man. OA is strongly associated with ageing and heavy physical occupational activity (Chandra Prakash Pal *et al.*, 2016). Multiple treatment options are available for patients with OA of knee including exercise, obesity management, oral pharmacological therapy, knee joint replacement and hydrotherapy (Zhang W. Moskowitz and Nuki, 2007). Hydrotherapy is the use of water in different physical conditions and chemical compositions (water, ice, steam) with many methodologies both traditional and scientific to treat and prevent health problems as well as to keep people healthy. It is one of naturopathic treatment modality used widely in ancient cultures India, Egypt and China (Mooventhan and Nivethitha, 2014). The goal of treatment is to alleviate the signs and symptoms of disease and if possible to show its progression. Revulsive compress is a simple technique used to increase circulation to the applying part and also it detoxify the applied part by removing the metabolic waste, inflammatory by products and other toxins (Michael Edwards, 2008; www.naturopathicfoundation.ca2/11/2017). Experimenting with Revulsive compress should be a standard part of rehabilitation

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from many musculoskeletal disorders. It is also much easier and more practical and more effective to apply to the limbs (Paul Ingraham, 2009; Kellog, 1902). This study aims to reduce the knee osteoarthritis associated symptoms by applying revulsive compress.

MATERIALS AND METHODS

Setting

The study was conducted at the Sree Ramakrishna Medical College Hospital for Naturopathy and Yoga, India.

Study Participants

Convenient sampling of 15 patients (10 females & 5 males) with a diagnosis of osteoarthritis of both knee joint attending the Sree Ramakrishna Medical college Hospital for Naturopathy and yoga were selected for the study. For every samples the study was conducted for a period of 14 days. All the samples underwent daily 15 minutes of revulsive compress on the both knee joint twice (each application for 15 minutes during morning and evening). The intervention was given by trained Naturopathy professionals. All patients were subjected to a complete clinical and radiological examination by a specialist doctor and finally a diagnosis of osteoarthritis of knee joint was made. Written consent was obtained from all the patients. The study was approved by Institutional Ethics committee of SRKMCNYS (Approval No: 7-1/SRKMCNYS/IMR/IEC 19/2016-17).

Inclusion criteria;

1. Between the age group of 45 – 65.
2. Both sexes.
3. No history of previous knee arthroplasty or any other orthopaedic surgical procedure.
4. Have no history of receiving corticosteroid injection.
5. Free from diminished sensation to heat or cold in knee area.

Tools

On day one before giving the revulsive compress we measured the pain, edema and Range of motion by using following tools. The measurement was done by trained professionals who had no idea about the current study.

- To assess pain intensity we used Numeric pain scale developed by the Mc.Caffery and Beebe (Mc Caffery and Beebe, 1993).
- To assess edema we used the chart for pitting edema adapted from the Guelph (Chart for pitting edema adapted from Guelph general hospital congestive heart failure pathway).

- To assess ROM (Range of Motion) we used Goniometry developed by Dr. William Zisman (Cynthia C. Norkin, D. Joyce White 4th edition).

Intervention

The Revulsive Compress is a Hydrotherapeutic modality were the application was applied through the packs over layers of linen cloth around the affected Knees The intervention consisted of four minute of hot application by a linen cloth followed by one minute of cold by a separate linen cloth . This cycle was repeated three times in a total session of 15 minutes. Each participants asked to complete the course of treatment revulsive compress of 14 days (15 minutes application twice a day, morning and evening). The water temperature in both basin was maintained constantly at 38°C (± 1) for hot and for cold 15°C (± 1) was monitored continuously by a digital water thermometer.

Biological Evidence

The application of Revulsive compress on affected knee joint will induce a strong excitatory effect in the peripheral nervous system mainly proprioceptors this in term will stimulate the function of nonnociceptors (A β fibers) which may form a synapses with an projection neuron situated in the dorsal horn of spinal cord. The inhibitory interneuron that also synapses on projection neuron. The A β fibers forms an excitatory connection with the inhibitory interneuron thus decreasing the projection neuron's firing and transmission of pain impulses to the brain. That will bring analgesic effect (Denegar *et al.*, 2010; Kandel *et al.*, 2000). The application of revulsive compress will induce a circulatory reaction (alternate vasoconstriction and vasodilatation) without thermic reaction within a short time after the heat is withdrawn. The circulatory reaction is muchmore lasting following cold application. Due to this alternate vasoconstriction and vasodilatation will condition the smooth muscles of blood vessels (endothelium) and vascular permeability by that it will induce tissue oncotic pressure to pull water into the circulation to reduce edema (Kellog, 1902; Guyton 12th edition). The application of revulsive compress

Table 1. Paired Difference

	Mean	Standard Deviation	Standard Error	95% confidence interval of the differences		t	df	Si 2 tailed
				Upper	Lower			
Numeric pain scale score	3.267	.961	.248	2.734	3.799	13.163	14	.000
Edema scale score	1.000	.845	.218	.532	1.468	4.583	14	.000
ROM	-15.333	12.743	3.290	-22.390	-8.277	-4.660	14	.000

increase the viscoelastic properties of collagenous tissues (i.e., decrease joint stiffness) and causes decreased muscle spindle activity and increased Golgi tendon organ firing via both alpha and gamma motor neuron pathways. These neurologic effects manifest as reduced muscle guarding and increased muscle relaxation by that the joint movement get improved (James Knierim Chapter 1).

RESULTS

15 participants (10 females and 5 males) between the age group of 45-65 yrs old with bilateral knee osteoarthritis were involved in the study everyone were successfully completed the course of treatment for about 14 days duration (15 minutes application twice a day). Result of mean difference between

pre and post numeric scale score, edema scale score and range of motion was shown in Table- 1. Result of pre and post measurement revealed there were significant reduction in the Numeric pain scale score (t 13.163, sig 2 tailed .000) to 46.5%, Edema scale score (t 4.583, sig 2 tailed .000) to 63.5% and the range of motion significantly get increased (t -4.660, sig 2 tailed .000) to 18% after the application of revulsive compress. The study showed that there were statistically significant differences in reduction of total numeric pain scale score and edema scale score with increase in range of movement of knee joint before intervention and after the intervention.

DISCUSSION

A Revulsive compress for 15 minutes has shown that there were statistically differences between the total numeric pain scale score, edema scale and range of movement on pre intervention and post intervention in a knee osteoarthritis patients which indicates that Revulsive compress may have potential role in treating knee osteoarthritis associated problems. The result of our study and observation are based on a single arm pre-post design, have no control group for short term observation on knee osteoarthritis patients and did not examine long term effects of Revulsive compress. All 15 participants showed a significant reduction in pain, edema and increase in range of movement of knee joints. In respect to the effect of Revulsive compress, Dengar *et al.* (2010) confirmed that contrast therapy provided the greatest improvement in total pain score. Amal *et al* study concluded that there are wide effect for contrast therapy for knee osteoarthritis associated symptoms such as reduction of inflammation, decreased pain, edema and stiffness. These findings support the result and hypothesis of present study.

Conclusion

This study suggests that Revulsive compress may be widely used for the management of knee osteoarthritis associated symptoms such as pain, edema and restricted range of movement. Application of Revulsive compress is non-invasive and generally safe. This study needs to be support with long term effect of Revulsive compress with large sample size.

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