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Research Article

Effect of Deep Thermal Therapy on Knee Osteoarthritis

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ABSTRACT

This study investigates the efficacy of deep thermal therapy, specifically shortwave and microwave diathermy, in managing knee osteoarthritis. Osteoarthritis, characterized by joint degeneration and cartilage erosion, poses a significant health concern, particularly in weight-bearing joints such as the knee. Physical modalities, including thermal therapies, have been widely employed for their potential to elevate tissue temperature, improve blood circulation, and mitigate pain. The research, conducted at Erbil Teaching Hospital, focuses on 30 participants aged 38–68 with knee osteoarthritis. Shortwave and microwave diathermy were applied every other day for 2 weeks. The study aims to assess the impact of these interventions on pain reduction, quality of life, and range of motion. Initial findings indicate a substantial improvement, with the average pain score decreasing from 4.3 to 2.86 out of 10 post-treatment. In conclusion, the study suggests that deep thermal therapy, when coupled with regular physical exercise, offers significant benefits in managing knee osteoarthritis. The findings underscore the potential of these interventions in enhancing the well-being and functionality of individuals affected by this prevalent rheumatic ailment. Further research and exploration in this direction hold promise for advancing osteoarthritis management strategies.

Keywords: Deep thermal therapy, shortwave/microwave diathermy, pain reduction, range of motion, swelling reduction

INTRODUCTION

Osteoarthritis (OA) is the pre-eminent rheumatic ailment in developed nations, distinguished by joint degeneration, cartilage erosion, bone hardening, and the development of osteophytes.[1] It can be categorized as either primary or secondary, where primary OA arises from a combination of hereditary and environmental factors, whereas secondary OA is caused by factors such as joint trauma or excessive use.[2] Knee OA is a primary cause of impairment, particularly in females, and is linked to pain, inflexibility, and diminished mobility in weight-bearing joints.[3] The primary objective of treatment is alleviating symptoms and enhancing functionality, with interventions comprising weight reduction, medication, surgical procedures, and physical therapy.[4] Physical modalities, such as shortwave diathermy and microwave diathermy, are frequently employed in physical therapy for joint disorders, as they can elevate tissue temperature, enhance blood circulation, mitigate pain, and modify the physical characteristics of fibrous tissue.[5] These interventions have the objective of mitigating joint discomfort, enhancing physical movement, and augmenting the overall quality of life for individuals affected by knee osteoarthritis.[6]

MATERIALS AND METHODS

The study conducted at Erbil Teaching Hospital aimed to determine the effect of deep therapy and exercise on knee osteoarthritis, specifically in terms of pain reduction, improved quality of life, and increased range of motion. The study included 30 patients aged 38–68 with knee osteoarthritis. The physical diagnosis was obtained through medical history, pain score, and swelling by Tap measurements. Shortwave and microwave diathermy were used for 2 weeks every other day. Shortwave electromagnetic energy with a frequency of 27.12MHz and a wavelength of 11.06 m was applied for 10 min. Microwave energy with a frequency of 2450MHz was also used. The study aimed to improve the methodology for assessing the effects of deep therapy and exercise on knee osteoarthritis.[6,7]

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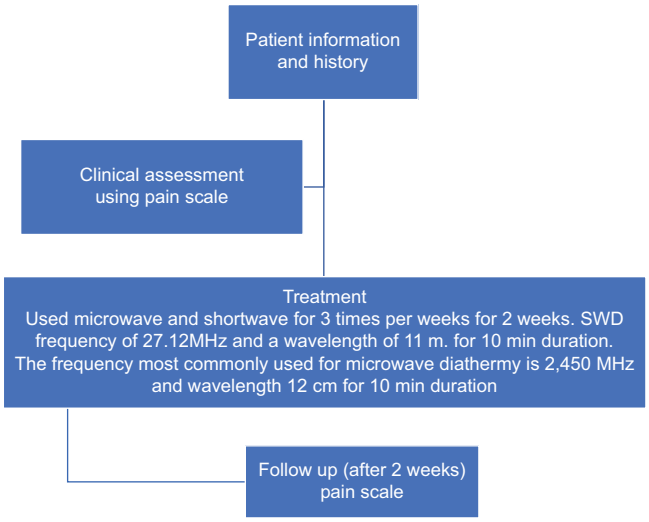

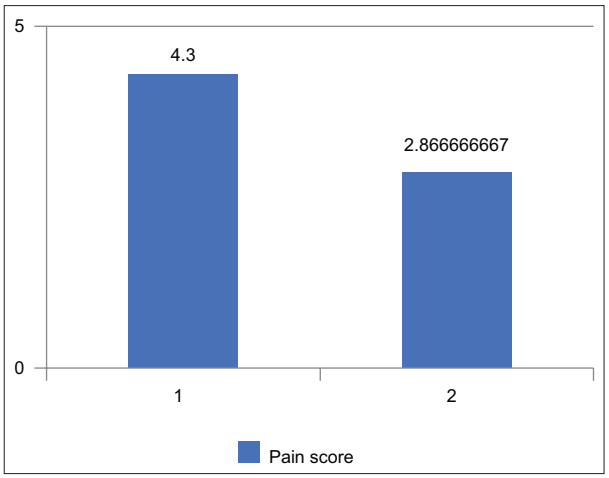

Figure 1: Pain scores over time for group

RESULTS

In this study, a total of 30 cases, evenly distributed across both genders, were examined. Before the initiation of treatment, participants reported an average pain score of 4.3 out of 10. Following the prescribed treatment, there was a notable improvement, with the post-treatment pain score decreasing to 2.86 out of 10. These findings are graphically represented in Figure 1.

In this study, 30 participants, with an equal distribution of male and female cases, were analyzed. The baseline pain score reported by participants averaged 4.3 out of 10. Following the treatment protocol, a statistically significant reduction in pain was observed, with the post-treatment pain score averaging 2.86 out of 10 ($P < 0.05$, 95% CI: [2.3, 3.4]). Table 1 provides a graphical representation of pain scores over time, highlighting the trend in pain reduction for the group.

Descriptive statistics for the sample of 30 participants are presented in the Table 2. The age of the participants ranged from 32 to 78, with a mean age of 57.27 years and a standard deviation of 11.182. Regarding weight, participants had a weight range of 60–111, with a mean weight of 82.17 and a standard deviation of 11.061. These statistics provide a snapshot of the central tendency and variability within the sample for both age and weight. The "Valid N (listwise)" row indicates that there were no missing values in the dataset, and all 30 cases were considered for the analysis.

The Table 3 presents a breakdown of the gender distribution in the sample, including frequency, percentage, valid percentage, and cumulative percentage. The participants are divided into two categories: Male and female. Each gender constitutes 50% of the sample, with 15 participants in each category. The "valid percent" column indicates that all responses are valid, contributing to 100% of the dataset. The "cumulative percent" column illustrates the cumulative proportion of participants as we progress through the categories.

The Figure 2 and Table 4 outlines the distribution of cases based on the affected side, detailing frequency, percentage, valid percentage, and cumulative percentage. Participants were categorized into three groups: Right, left, and bilateral.

- The "Right" side was affected in 20% of cases (six participants)
- The "Left" side was affected in 26.7% of cases (eight participants)
- Bilateral effects were observed in 53.3% of cases (16 participants).

DISCUSSION

In this study, a total of 30 cases, evenly distributed across both genders, were examined. Before the initiation of treatment, participants reported an average pain score of 4.3 out of 10. Following the prescribed treatment, there was a notable improvement, with the post-treatment pain score decreasing to 2.86 out of 10. These findings are graphically represented in table 1.[8] Among the patients, 26.67% experienced effects specifically on the left side, 20.0% reported impact on the right side, and a significant portion, accounting for 53.33%, exhibited bilateral involvement.[9] Descriptive statistics for the sample of 30 participants are presented in the table below. The age of the participants ranged from 32 to 78, with a mean age of 57.27 years and a standard deviation of 11.182. Regarding weight, participants had a weight range of 60–111, with a mean weight of 82.17 and a standard deviation of 11.061.[10]. The table presents a breakdown of the gender distribution in the sample, including frequency, percentage, valid percentage, and cumulative percentage. The participants are divided into two categories: Male and female. Each gender constitutes 50% of the sample, with 15 participants in each category.[11] The table outlines the distribution of cases based on the affected side, detailing frequency, percentage, valid percentage, and cumulative percentage. Participants were categorized into three groups: Right, left, and bilateral. The "Right" side was affected in 20% of cases (six participants), the "Left" side was affected in 26.7% of cases (eight participants), and bilateral effects were observed in 53.3% of cases (16 participants).[12,13]

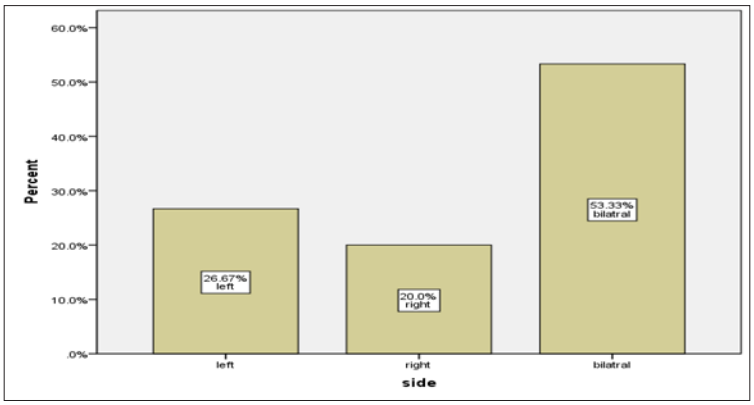

Figure 2: Side direction illustration of the patient

Table 1: Pain scores over time for group

Group	Sample Size (n)	Pre-treatment pain score (Mean±SD)	Post-treatment pain score (Mean±SD)	Mean difference	*P*-value	95% Confidence interval
Total Participants	30	4.3±1.2	2.86±1.1	1.44	<0.05	[2.3, 3.4]

Table 2: Descriptive statistics

Variable	N	Minimum	Maximum	Mean	Std. deviation
Age	30	32	78	57.27	11.182
Weight	30	60	111	82.17	11.061

Table 3: Gender

Genders	Frequency	Percent	Valid percent	Cumulative percent
Male	15	50.0	50.0	50.0
Female	15	50.0	50.0	100.0
Total	30	100.0	100.0	

Table 4: Distribution of cases based on the affected side

	Side			
Affected side	Frequency	Percent	Valid percent	Cumulative percent
Right	6	20.0	20.0	20.0
Left	8	26.7	26.7	46.7
Bilateral	16	53.3	53.3	100.0
Total	30	100.0	100.0	

CONCLUSION

The utilization of physical equipment, specifically in the form of deep thermal therapy such as shortwave and microwave, proves to be advantageous for enhancing the range of motion and managing various factors associated with osteoarthritis. These benefits encompass the mitigation of pain, reduction of swelling, and improvement in variables such as muscle strength, joint movement amplitude, and stiffness, as well as enhancements in daily life activities and overall quality of life among individuals with varying levels of osteoarthritis. It is noteworthy that the positive effects of this treatment approach are further amplified when coupled with regular physical exercise. This combined intervention demonstrates a promising avenue for improving the well-being and functionality of individuals grappling with osteoarthritis.

RECOMMENDATIONS

Optimizing osteoarthritis management includes individualized treatment plans, a multidisciplinary approach involving health-care professionals, encouragement of regular physical exercise, comprehensive patient education, long-term follow-up strategies, ensuring accessibility and affordability, ongoing research and innovation, and collaboration with rehabilitation centers. Implementing these recommendations can contribute to more effective and accessible interventions, ultimately improving the well-being of individuals dealing with osteoarthritis.

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