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The Efficacy of Short Wave Diathermy (SWD) in Decreasing the Cost Effect & Time in Treatment of Osteoarthritis (OA) Knee

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Original Research Article

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Abstract: Osteoarthritis (OA) is by far the most common form of arthritis. It is strongly associated with ageing and is a major cause of pain and disability in older people. Joint pain and stiffness are the most common symptom for OA patients. Physical medicines, many drugs, short wave diathermy (SWD) many more therapies are use treat of OA. By using this following study author wants to evaluate and identify the cost efficiency and time management of SWD of treating OA. Grouping of study population were divided into 2 groups such as: Group A (44 patients) ,Group B (40 patients) , where in experiment Group A patients treated with 10 minutes SWD and Group B treated with 20 minutes SWD. After treatment mean decrease of pain in group A and group B respectively at week six was 77.07% and 87.81%, significant $p<0.001$ and Mean decrease of stiffness A and group B respectively at week six was 71.43% and 90.30%. Overall, the study reported that the treatment is effective and efficient for a meaningful decrease in pain in patients with knee OA. The treatment for OA using SWD did not cost an inordinate amount of the patient's or therapist's time. Therefore, if the clinic already has access to a diathermy machine and caution is taken to avoid contraindications and precautions the benefits outweigh the costs. The recommendation of this study is that using SWD with 20 minutes is very effective and cost friendly treatment for OA.
Keywords: Osteoarthritis, Short wave diathermy, Physical medicin, Knee OA.

INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease, occurring primarily in older individuals, characterized by erosion of the articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis, and a range of biochemical and morphologic alterations of the synovial membrane and joint capsule.The most common symptoms are joint pain and stiffness. Initially, symptoms may occur only following exercise, but over time may become constantOther symptoms may include joint swelling, decreased range of motion, and, when the back is affected, weakness or numbness of the arms and legs. The most commonly involved joints are those near the ends of the fingers, at the base of the thumb, neck, lower back, knee, and hips.Causes include previous joint injury, abnormal joint or limb development, and inherited factors.Risk is greater in those who are overweight, have one leg of a different length, and have jobs that result in high levels of joint stress [1]. Osteoarthritis is believed to be caused by mechanical stress on the joint and low grade inflammatory processes. OA Knee is commonly treated in Physical Medicine and Rehabilitation Department with drugs, thermotherapy, exercises, and proper instruction of ADLs. Short Wave Diathermy (SWD) is one of the most useful deep heating modality in treatment of OA Knee.

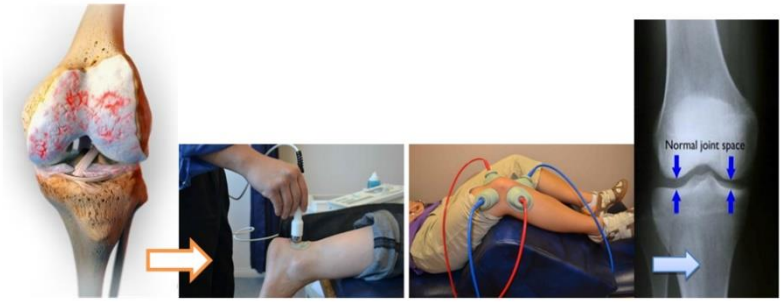

Fig-1a, 1b and 1c: shows patient knee during Osteoarthritis and after treatment of Shortwave diathermy effect on OA[2]

Shortwavediathermy (SWD) is one of several physical therapy modalities and used predominantly as a pain reduction modality in the clinical practice. Ideal treatment time is 20-30 minutes .Some Institute in our country practice 10 minutes SWD in treatment of OA Knee, because of time accommodation and limited resources for huge rush of patients. So in this condition a question arise that, whether 10 minutes SWD in treatment of OA knee is as effective as 20 minutes SWD. With all possible searches no such study was found for evaluation of comparative effects of 10 minutes and 20 minutes SWD in treatment of osteoarthritis knee. This comparative study was done to see the effects of 10 minutes SWD and 20 minutes SWD on OA knee**.**

OBJECTIVES

General Objective

- The purpose of this study was to evaluate the cost effectiveness & time management in treatment of OA Knee.

Specific objective

- To present SWD usefulness publically properly
- To compare between 10 minutes SWD therapy to 20 minutes SWD

MATERIALS AND METHODS

- Study Type: It was a cross sectional and descriptive type study.
- Study Period and Area: During the period between February 2013 to January 2014 (Duration 1 year) in the Department of Physical Medicine and Rehabilitation, BSMMU, Dhaka, Bangladesh this Randomized Controlled trial was conducted .A total of 94 diagnosed patients with OA knee enrolled into the study.
- Methods: 84 patient randomly assigned to 1 of 2 groups (Group A= 44, and Group B= 40) Group A: NSAIDs (Naproxen 250mg twice daily) + Exercises +ADL + 10 minutes SWD (experimental). Group B: NSAIDs (Naproxen 250mg twice daily) + Exercises +ADL +20 minutes SWD (control).During this study both group received SWD three sessions (every alternate day) per week for six weeks, and outcome measured weekly for six weeks by OA specific translated and validated Bengali instrument-Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaire. The results were expressed as percentage and mean ± SD and level of significance was set at 0.05 and $p<0.05$ was considered as the level of significant. For analyze two population mean andobserved data with data we would expect to obtain according to a specific hypothesis t- test and chi-squared (X2) test were done.

RESULTS

In this study 44 patients in group-A and 40 patients in Group-B have completed the study. The Mean decrease of pain in group A and group B respectively at week six was 77.07% and 87.81%, significant $p<0.001$

In Figure 1 shows percent decrease in pain score from pretreatment to post treatment followup weekly at 1-6 where the Mean decrease of pain in group A and group B respectively at week six was 77.07% and 87.81%, significant $p<0.001$. Following figure is given below:

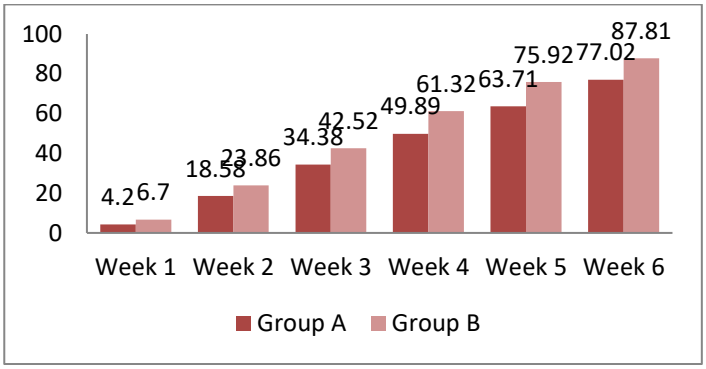

Fig-1: percent decrease in pain score from pretreatment to post treatment follow up weekly at 1-6

In table-1 shows Physical functionscore by WOMAC in Group A and Group B where the Mean increase of physical function in group A and group B respectively at week six was 74.22% and 82.94%, significant at p<0.001. Following table is given below:

Table-1: Physical function score by WOMAC in Group A and Group B

Physical function score by WOMAC	Group A Mean±SD	Group B Mean±SD	P value
Week 0	1009.32±115.39 (n=47)	1011.81±93.95 (n=47)	0.909^{ns}
Week 1	979.89±128.88 (n=47)	961.81±119.45 (n=47)	0.477^{ns}
Week 2	838.37±117.91 (n=46)	800.00±113.39 (n=46)	0.115^{ns}
Week 3	696.88±122.53 (n=46)	634.65±86.90 (n=40)	0.009**
Week 4	548.73±127.01 (n=44)	467.25±69.14 (n=40)	0.001**
Week 5	406.66±125.50 (n=44)	312.18±64.97 (n=40)	0.0001***
Wee 6	265.41±99.24 (n=44)	175.75±56.31 (n=40)	0.0001***

In figure-3 shows shows percent decrease stiffness scorefrom pretreatment to post treatment follow up weekly at 1-6, Mean decrease of stiffness in group A and group B respectively at week six was 71.43% and 90.30%, significant at p<0.001.

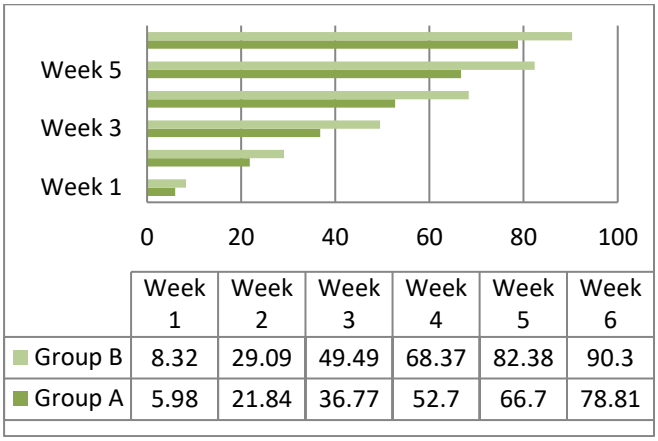

Fig-3 :Mean decrease of stiffness in group A and group B respectively at week six was 71.43% and 90.30%, significant at p<0.001

DISCUSSION

Osteoarthritis is a form of arthritis that features the breakdown and eventual loss of the cartilage of one or more joints.In the present study a total of 94 patients of OA knee were duly participated in the study. During study 10 patients dropped due to irregular follow-up. Out of them male 40 (47.61%) female 44 (52.38%), and male female ratio was 1:1.1.

In Figure -1, Shows pain score assessed by WOMAC. Mean (±SD) pain score of group A and group B patients, respectively, at week 0 (before treatment) was 250±32.32.06 and 251.81±31.95 (not significant) and at week 6 was 58.89±26.49 and 31.43±17.40 (significant at P<0.001). The mean decrease of pain score from week 0 (pretreatment) in group A and group B, respectively, at post treatment follow-up at week 1 was 11.11 (4.50%) and 15.96 (6.70%) (Significant at P<0.05), and at week 6 was 193.39 and 223.20 (significant at P<0.001). Jan *et al.* [5], found that SWD is effective in treatment of OA knee regarding decreasing pain and improve function. At all the weekly follow-up, mean pain score significantly decreased in group B patients. Percentagewise, the improvement of pain scores from week. Figure -2 Shows stiffness score assessed by WOMAC. Mean (±SD) stiffness score of group A and group B patients, respectively, at week 0 (beforetreatment) was 89±47.13.96 and 92.98±18.90 (not significant), and at week 6 was 18.34±8.44 and 9.78±7.41 (significant at P<0.001). The mean decrease of stiffness score from week 0 (pretreatment) in group A and group B, respectively, and at weekly posttreatment follow up at week 1 was 5.11 (5.98%) and 7.02 (8.32%) (not significant), , and at week 6 was 71.43 (78.81%) and 86.48 (90.30%) and (significant at P<0.001). A study was done by Bansil *et al*. [11] in India, found that SWD was effective in treatment of OA knee and they showed that SWD provides a wider coverage of all structures of knee and gives effective soothing effect. Percentagewise, the improvement of stiffness score from week 0 (pretreatment) to all posttreatment weekly follow up was higher in group B.

Table-2 Shows physical function score assessed by WOMAC. Mean (±SD) physical function score of group A and group B patients, respectively, at week 0 (before treatment) was 1009.32±115.39 and 1011.81±93.95 (not significant), and at week 6 was 265.41±99.24 and 175.75±56.31 (significant at P<0.001). The mean decrease (improvement) of physical function score from week 0 (pretreatment) in group A and group B, respectively, and at weekly post treatment follow-up at week 1 was 29.43 (3.05%) and 50.00 (5.23%) (Significant at P<0.01) and at week 6 was745.95 (74.22%) and 855.00 (82.94%) (Significant at P<0.001). Fukuda *et al*. [4], found that Pulsed SWD reduction in pain and improvement of function of OA Knee. Percentagewise, the improvement of physical function score from week 0(pretreatment) to all post treatment weekly follow-up was higher in group B. At the end of 6th week significant improvement of symptoms of both the groups (A+B) were found. And in comparison between two groups, the significant improvement was found in the group of B patients who received 20 minutes Short Wave Diathermy plus NSAIDS. Other study reported ThatRepetitive Shortwave Diathermy (20 min in each session) reduced Sinusitis in Patients with Knee Osteoarthritis [5]. Ideal treatment time of SWD is 20-30 minutes [6]. From the present study it may be concluded that, 10 minutes and 20 minutes SWD in treatment of OA knee is effective. However 20 minutes is more effective than 10 minutes. In many study reported that there would be a significant financial cost if the clinic did not already own a diathermy machine. According P and P Cito the cost of the Diathermed II, the machine used in the study was $4,600 and there would be additional costs to have the machine calibrated and serviced. Overall, the study demonstrated that the treatment is effective for a meaningful decrease in pain in participants with knee OA. The treatment did not cost an inordinate amount of the patient's or therapist's time. Therefore, if the clinic already has access to a diathermy machine and caution is taken to avoid contraindications and precautions the benefits outweigh the costs. Additionally, results show that there is a greater positive effect using low-dose as compared to high dose diathermy. Therefore using low-dose diathermy has the greatest benefit for pain caused by knee OA. The time and duration for the treatment is a reasonable amount that would be allowed by insurance.As long as a clinic already had this device there is minimal additional requirements for clinical expertise or time needed to provide the treatment, as long as the therapist has basic knowledge for using the machine. A correctly applied treatment should not cause discomfort and there were no pain/burns from treatment reported in the study. Additionally, the success of the treatment did not rely on patient participation. Overall the treatment protocol is feasible [3, 8, 9,10].

Limitations

- During the study duration of time ,size of sample was very small
- Only unilateral Knee OA were included
- Patient cannot maintain proper ADL in our socioeconomic condition.

CONCLUSION

From the present study it may be concluded that, 20 minutes SWD in treatment of OA knee is cost effective and time management will very suitable for using this SWD therapy for OA patients.

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