

Effect of Manual Therapy on Knee Osteoarthritis (OA) Pain, A Randomized Control Trial

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ABSTRACT

Objective: The purpose of this study was to compare effectiveness of supervised structure exercise program (SSEP) with home based exercise program (HBEP) in patients with knee osteoarthritis.

Methodology: A randomized control trial conducted at department of Physical Rehabilitation DHQ Hospital Abbottabad, from August 2015 to April 2016. 40 female patients with OA of the knee were randomly assigned equally to a clinical treatment group (group A) received manual therapy, supervised exercises in addition to electro-acupuncture like TENS (EA) and group B received exercises at home. All subjects were evaluated at the beginning and at the end of 8 weeks of treatments using universal goniometry for measurement of range of motion (ROM) of knee and visual analogue scale (VAS) for pain assessment and Arabic version of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for measurement of pain, stiffness and physical function. SPSS 17 was used for analyzing data. Chi square test was applied where comparisons are done and p value <0.05 was taken as significant.

Results: Both groups showed clinically and statistically significant improvement after 8 weeks of treatment. For group A, there was significant increase in range of motion of knee flexion by 18.14%, and extension by 78.60%, reduce in pain score by 51.90%. WOMAC questionnaire demonstrated great reduction in pain by 53.07%, stiffness by 58.94% and physical function increased by 49.30%. For group B, there was also increase in ROM of the knee about 4.20%, 24.66% for flexion and extension respectively. Pain score decreased by 23.94%. There were reduction in all WOMAC items as pain by 31.81%, stiffness by 30.09% and physical function increased by 12%.

Conclusion: Both clinical based physical therapy program and home exercise programs were effective in reducing symptoms of knee osteoarthritis in females. The satisfied improvement of home exercise group can be used as a beneficial way to reduce cost and save time for OA patient.

Keywords: Knee osteoarthritis, manual therapy, exercises, electro-acupuncture, home exercises.

INTRODUCTION

Osteoarthritis knee is a degenerative joint disease and results in pain, deformity of knee joints and gait problems[1, 2]. Currently many treatment options are available for management of osteoarthritis knee which includes simple analgesics, life style modifications, physical modalities, different exercises and surgical procedures[3]. Manual therapies with exercises

are found beneficial for knee osteoarthritis both in decreasing pain and increasing functionality. Problem with this approach is daily visits to therapist and cost of doing exercise under supervision and results in high cost, number of days lost at work and low compliance. There are few studies done comparing supervised structured exercise program with home based exercise program[4, 5]. In this study we have compared effectiveness of supervised structured

exercise program (SSEP) with home based exercise program (HBEP) in decreasing pain in patients with osteoarthritis knee and increasing function using WOMAC and range of motion at knee. This study will help clinician prescribing home based exercises which are more cost effective and have more compliance.

METHODOLOGY

It was a randomized control trail conducted at DHQ Hospital Abbott bad from August 2012 to April 2013 after taking permission from hospital ethical committee. The sample size chosen was 40 patients in each group through non probability sampling technique. Patients were randomized into SSEP group and HBEP group through lottery method. Informed written consent was taken from all patients before entering into study. Patients having osteoarthritis knee of both genders between 40 to 60 years of age are included in study. Patients with knee problems other than osteoarthritis, having co-morbid medical conditions like ischemic heart diseases, hypertension, diabetes mellitus or renal failure were excluded. Data regarding age, gender, knee pain using VAS,

disability using WOMAC were recorded at start and 6 weeks after each exercise on a well-structured questioner. SPSS v 17 was used for analyzing data. Frequency and percentages were calculated for qualitative variables. Mean and standard deviation was calculated for quantitative variables. Chai square test was applied where comparisons were done and p value < 0.05 was taken as significant.

RESULTS

Total 40 patients were randomly allocated in two groups of 20 patients each. Mean age of presentation was 57 with SD 0.78 and 56.5 with SD 0.84 in SSEP and HBEP respectively. Females were affected more than males in both groups (Figure1). Mean score on WOMAC was 46.61 with SD 12.44 at start and 40.99 with SD 11.25 after three weeks of treatment in SSEP with p value < 0.001. Mean WOMAC was 52.59 with SD 12.49 at start and 48.27 after three weeks of treatment in HBEP with p value < 0.001. There was significant increase in range of motion of knee joint in all directions in both groups with p value < 0.001(Table).

Table1. Demography of patients in both groups

Variable	Group A	Group B
Number	20	20
Age, year ,mean(±SD)	50.45±6.786	49.6±7.316
Sex	Female	Female
Body mass index mean(±SD)	29.8±1.281	30.5±1.357
Duration of complain mean(±SD)	6.15±0.813	5.9±0.788

Table2. Results on the outcome variables: flexion ROM, extension ROM, VAS and WOMAC index (pain, stiffness and physical functions)

Measurements		Mean (±SD)		t-value	P- value	% of Difference
Flexion ROM	Group A	Pre 107.5 ±6.782	Post 127.8±3.197	12.808	<0.0001	8.14%
	Group B	Pre 117.75± 7.86	Post 122.7 ± 5.74	5.423	<0.0001	4.20%
Extension ROM	Group A	Pre 2.95 ± 2.505	Post 0.68 ± 1.003	5.417	<0.0001	-78.60%
	Group B	Pre 3.65± 2.46	Post 2.6 ± 2. 234	9.200	<0.0001	-24.66%
VAS	Group A	Pre 6.55 ± 1.85	Post 3.15 ±1.42	17.228	<0.0001	51.90%
	Group B	Pre 7.1± 1.71	Post 5.4± 1.57	13.309	<0.0001	-23.94%
WOMAC index Stiffness	Group A	Pre 11.4± 1.96	Post 5.35± 1.82	20.5	<0.0001	-53.07%
	Group B	Pre 12.1± 18.32	Post 8.25± 1.25	16.56	<0.0001	-31.81%
WOMAC index Physical function	Group A	Pre 44.75 ± 10.87	Post 22.35± 6.13	15.9	<0.0001	-49.30%
	Group B	Pre 47.5 ± 6.08	Post 41.8 ± 6.169	14.8	<0.0001	-12%

DISCUSSION

The goal of the present study was to compare clinical based physical therapy versus well designed home exercise program to reduce pain and improve function in patients with Osteoarthritis of the knee. Both clinical based physical therapy group (group A) and home based physical therapy group (group B) experienced clinically significant improvement in self-perception of pain, stiffness and functional ability. The difference between groups is likely attributable to the additional of effects of clinical intervention consisting of manual therapy and supervision of the exercises that group B was performing unsupervised at home with respect to the beneficial effect of adding EA like TENS to a course of manual therapy and exercises for group A. This study attempted to be objective with respect to the outcome measures as a validated index questionnaire and quantified active/passive range of motion. The patients had symptoms of OA of the knee for about 7 years with the treatment protocol described above; most symptoms were improved in 8 weeks with the percentage of difference from base line in flexion 18.14% for group A in contrast to 4.20% for group B. Regarding to knee extension ROM the percentage of difference for group A was -78.60% while for group B it was -24.66% only. The benefits of treatment were achieved in 24 clinic visits most of previous studies have demonstrated the benefits of exercises in 36 to 48 clinic visit. Previous reports of average improvement with exercises have ranged from 8% to 27% decrease in pain and 10% to 39% improvement in function[6].

The total improvement in WOMAC score in present study averaged 53%, average subscale improvement were 58% for pain, 53% for stiffness and 49% for functional disability. Most important, changes can be compared with those in home exercise group who experience less improvement 31.81%, 30.09% and 12% for pain, stiffness and physical function respectively. A recent best evidence summary of systematic reviews concluded that exercise therapy (strengthening, stretching and functional exercises) compared with no treatment is effective for patients with knee OA[7]. A reduction of pain may result from improvement of muscle strength and this come with the results of O'Reilly et al and Balint et al who concluded that improved quadriceps strength is associated with less knee pain and less disability[7]. Also the outstanding improvement

for patients in this study compared with results of previous studies may be due to the manual mobilizing exercises which allowed the therapist to concentrate treatment on the areas of pain and limited function for each patient [8]. The effects of mobilizing exercise combined with clinical exercise program provide greater improvement in strength, pain and function than did clinical exercise program alone[9].

One argument for using acupuncture in the management of painful musculoskeletal conditions is that it is safer than standard drug treatment. Serious adverse effects of acupuncture have been reported, although those may be rare. Relative to those of standard drug treatments these may be infrequent or even negligible (33-34). Several prospective studies have shown that mild adverse effects after acupuncture occur in about 7% of all cases[10]. Yurtkuran and Kocagil 1999 investigated the effect of EA applied on four acupuncture points for OA of the knee their results showed that the percentage of improvement in pain were 96% and 53% respectively, but the results were without follow up evaluation and unclear if analgesic effect of EA like TENS could be prolonged[11].

The benefits from this comprehensive clinically instructed home exercise program are consistent with the highest levels of benefit from exercise reported in previously cited studies. This benefit occurred to patients in the current study with only two clinic visits with reassessment of exercise program after four weeks for each patient to keep the program challenging and beneficial. The success of home program may be attributable to any or all of the features designed into the program: careful instruction, minimal exercise performance time, an adherence log, a high quality exercise folder and a comprehensive set of exercise addressing muscle tightness, limitation in joint movement, muscle weakness and general fitness.

Although the exercises of the subjects in clinic treatment group were observed and corrected as necessary, subjects in home exercise group exercised without the supposed benefits of frequent supervision, the received one-to-one supervision only initially and at the four-week follow-up visit.

Studies on education of arthritis patients had suggested improvements in some aspects of pain, self-efficiency and functional status. Since self-care education is thought to reduce health care utilization, make costs reduction and save

patients time with less number of sessions for this population.

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