



Original Article

A Comparative Study of the Effects of Lateral Wedge Insole Shoe Modification on the Patients with Knee Osteoarthritis

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Abstract

Background: Knee osteoarthritis (OA) is the common form of disability in comparatively elderly patient. Lateral wedge shoe insole is an easy, simple and cost effective approach which can be applied as an adjunct to pharmacotherapy to treat the patients with OA knee. The objective of the study is to evaluate the effectiveness of using lateral wedge shoe insole on pain and physical functioning in patients with OA knee.

Method: A randomized prospective study was carried out in the department of Physical Medicine and Rehabilitation, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January, 2012 to March, 2012. Patients with OA knee by American College of Rheumatology Criteria were selected. Two intervention groups were compared. In patients of Group-A (32 patients) were treated with aceclofenac 100mg and, omeprazole 20mg bid, and daily instructions of activities of daily living (ADLs), isometric quadriceps muscle strengthening exercise. Patients of Group-B were given lateral wedge shoe insole along with above treatment. The change between two weeks post intervention and baseline WOMAC (Western Ontario and McMaster Universities) subscale and scores were calculated. There were 4 visits and in each visit, patients were assessed for pain, stiffness and physical function by WOMAC index.

Results: A total 65 patients with OA knee were included in this study. The mean age was 56.5±10 years. Male to female ratio was 1.32:1. Comparison of mean pretreatment and 8th week post treatment WOMAC physical function subscale score in Group A (4.9 ± 1.2 vs. 2.4 ± 0.8) showed significant improvement and in Group B (4.3 ± 1.2 vs. 1.9 ± 0.5) which also shows significant improvement more than group A. The result was compared and student t-test was done to see the level of significance. Method was found significant after treatment (p <0.05).

Interpretation: Effects of use of lateral wedge shoe insole in patients with knee OA is beneficial.

Key words: Knee osteoarthritis, lateral wedge insole, shoe modification

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Introduction

Osteoarthritis is the commonest form of arthritis and one of the most important causes of long term disability in adults.¹ OA has a worldwide distribution though there is a variation in the prevalence among different groups and genders.

However, OA mainly affects the elderly population. The prevalence of OA in population older than 60 years of age is more than 50%.² The common sites of joints to develop OA include the knee, hand, hip, spine and foot. Of these, OA of the knee is most commonly found.³ Common

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complaints in people with knee OA are pain exacerbated by movement or weight bearing, stiffness, swelling and deformity (genu varum or genu valgum) and restricted walking distance.¹ There is no cure for Osteoarthritis at present, and so objectives of management of symptoms of OA of the knee are to lessen pain and stiffness, maintain or improve mobility, and minimize disability. Different modalities in physiotherapy have been shown to help improve clinical symptoms and functions of knee OA, with fewer adverse effects than medical treatment. Lateral wedge shoe modification is among these non-invasive therapies which have been used to treat osteoarthritis of knee. During the mid-stance phase of gait, about 60 to 80 percent of the load is distributed through the medial compartment of the normal knee⁴, which is one of the reasons why knee OA frequently involves the medial compartment. Varus angulation deformity may occur in medial compartment knee OA and contribute to the progression of OA by causing increased load to the medial knee compartment, with subsequent damage to the articular cartilage and subchondral bone in that area.⁵ Clinicians have used surgical wedge osteotomy for many years to correct varus angulation by shifting weight away from the diseased knee compartment⁶. An alternative nonoperative approach⁷ has been to realign the weight-bearing load through footwear modification. Shoe modifications, such as lateral-wedge insoles or shock-absorbing shoes with insoles, have been recommended for conservative therapy of mild knee OA.⁸ In this study⁹⁻¹⁰, an

attempt has been made to find out the effects of lateral-wedge insoles on clinical parameters such as pain and functional status in patients with symptomatic medial compartment knee OA.

Materials and Methods

A randomized control trial of 65 patients of OA knee According to updated ACR criteria 2003 and 2005 for OA knee attended at Department of Physical Medicine & Rehabilitation, BSMMU from 1st January 2012 to 31st March, 2012 They were divided into two groups randomly by the way of lottery. In Group-A (control group) NSAID (Aceclofenac 100mg bid) with Omeprazole 20mg bid and Quadriceps strengthening exercise 10 repetitions two times daily were given. In Group-B Treatment of Group-A plus lateral wedge shoe modification was given. We fitted subjects with comfortable, lightweight shock-absorbing shoes that are easy to attach with lateral wedge. Full-length lateral-wedge insoles were constructed from a custom cork. The material used to provide shock absorption and high resistance to compressive deformation. The wedges were custom made according to patient's shoe/sandal size with a mediolateral incline of 4° for the lateral-wedge insole. Five patients were excluded for faulty shoe pattern and non-compliance of the patient, for the study accuracy finally we selected 65 patients who used the shoes according to our advices. After the treatment of the patients as per schedule, the patients were followed up two weekly for two months and the outcome were recorded in the assessment data sheet.

Results:

All the cases were managed as outpatients. The age range of the patients in the study varied from aged <50 to >60 years in respective of both sexes. The mean age of the patients of both sexes was 56.5 ± 10.1 years.

Table 1: Age distribution of both male and female patients (n=65)

Age	Group-A	Group-B	Total	Test statistics
< 50 years	6 (18.8)	12(36.4)	18(27.7)	$\chi^2 = 3.5$ P = 0.32
50 - 59 years	16(50.0)	10(30.3)	26(40.0)	
60 - 69 years	7(21.9)	7(21.2)	14(21.5)	
>= 60 years	3(9.4)	4(12.1)	7(10.8)	
Mean age	56.5 ± 10.1	54.3 ± 11.3	55.4 ± 10.7	

Out of total 65 patients irrespective of sexes it was observed that most patients that is 26(40%) belonged to age group of 50 to 59 years.

Table 2: Occupation distribution of patients (n=65)

Occupation	Frequency	Percentage
Housewife	19	29.23
Service	16	24.61
Business	13	20.0
Farmer	7	10.76
Retired	10	15.38
Total	65	100.0

Out of total 65 patients 19(29.23%) which is most in number was Housewife.

Table 3: Socioeconomic Condition distribution of patients (n=65)

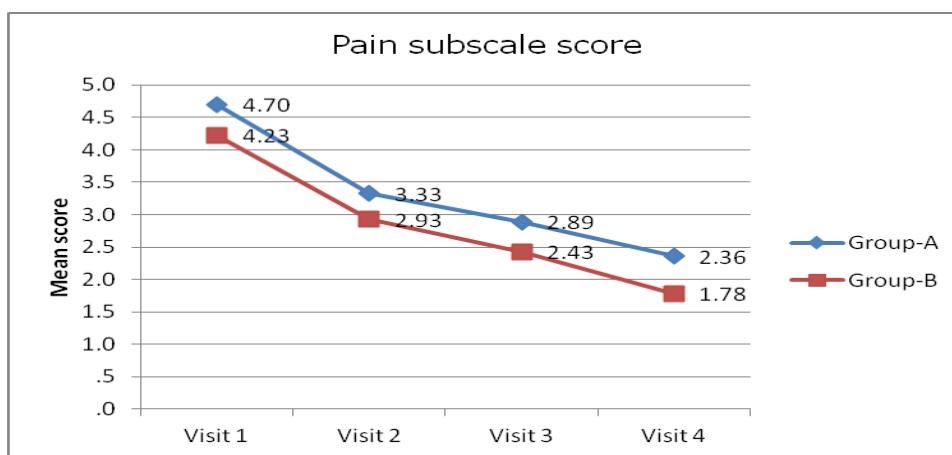
Socioeconomic Condition	Frequency	Percent
High	07	10.76
Middle	40	61.53
Low	18	27.69
Total	65	100.0

Out of total 65 patients irrespective of sexes 40(61.53%) which is maximum in number belonged to middle class population. (Table No.4)

Table-4: Assessment of WOMAC Pain subscale score of the study group patients.**T-Test: pain subscale score**

	Group-A	Group-B	T value	P Value
Visit 1	4.7 ±1.3	4.2 ±1.2	1.499	.139
Visit 2	3.3 ±0.9	2.9 ± 0.5	2.110	.039*
Visit 3	2.9 ± 0.8	2.4 ± 0.8	2.238	.029*
Visit 4	2.4 ± 0.8	1.8 ± 0.7	2.936	.005*

* P statistically significant

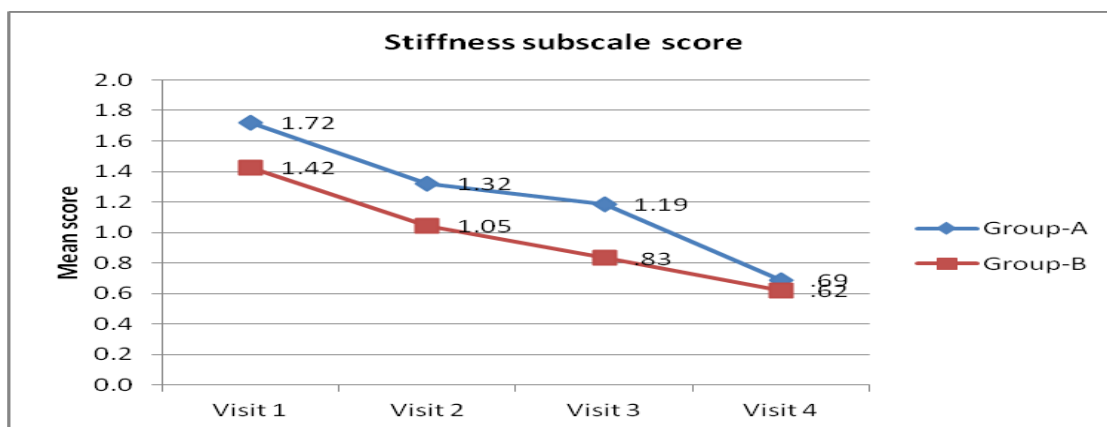


There was significant improvement after treatment in group A. In respect to time point improvement, marked improvement was started to occur after first visit that is (4.7#1.3 to 2.4#0.8) and the improvement gradually increases day by day. And after the end of treatment there was significant improvement found in our study. This indicates that treatment with exercise plus NSAIDs plus ADL instructions is effective for improvement of OA knee joints. There was significant improvement after treatment in group B also. In respect to time point improvement, marked improvement started to occur after first visit that is (4.2#1.2 to 1.8#0.7) and the p value decreases from (.139 to .005) that is statistically significant. And after the end of treatment there was significant improvement found in our study. This indicates that treatment with exercise plus NSAIDs plus ADL plus lateral wedge shoe modification is effective for improvement of OA knee joints which is more significant than the study group A.

Table-5: Assessment of WOMAC stiffness subscale score of the study group patients.**T-Test: Stiffness subscale score**

	Group-A	Group-B	T value	P Value
Visit 1	1.7 ± 0.9	1.4 ± 0.9	1.253	.215
Visit 2	1.3±0.7	1.0 ± 0.7	1.508	.137
Visit 3	1.2± 0.7	0.8 ± 0.7	2.115	.038*
Visit 4	0.7± 0.6	0.6 ± 0.6	.438	.663

*P statistically significant



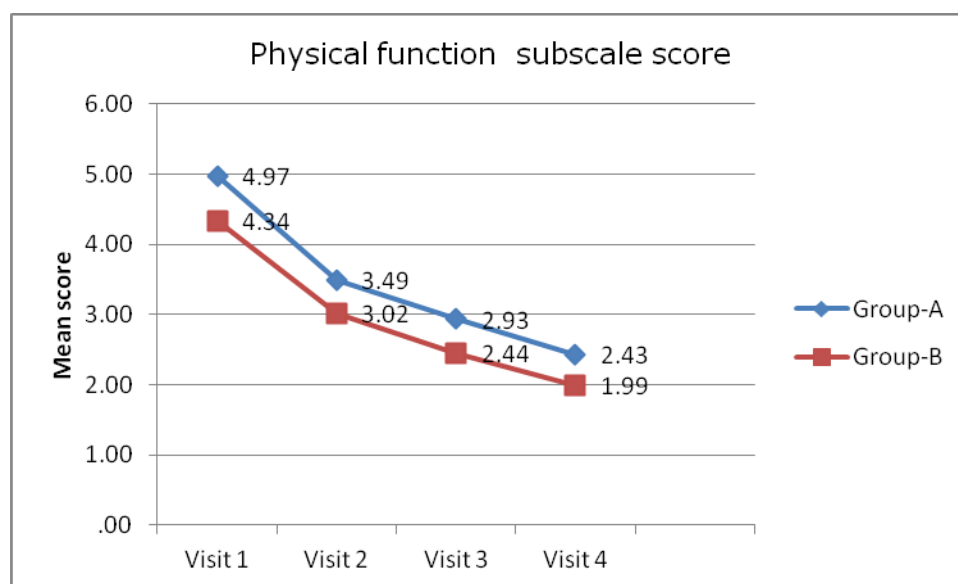
Comparison of above Table showed that improvement from pretreatment and post treatment score in Group A (1.7 ± 0.9 vs 0.7 ± 0.6) and in group B was (1.4 ± 0.9 vs 0.6 ± 0.6). In both group the improvement is noted but statistically it is not significant.

Table-6: Assessment of WOMAC physical function subscale score of the study group patients.

T-Test: Physical function subscale score

	Group-A	Group-B	T value	P Value
Visit 1	4.9 ± 1.2	4.3 ± 1.2	2.2	.035*
Visit 2	3.4 ± 1.0	3.0 ± 0.8	2.1	.044*
Visit 3	2.9 ± 0.8	2.4 ± 0.5	2.8	.007*
Visit 4	2.4 ± 0.8	1.9 ± 0.5	2.5	.014*

* P statistically significant



Comparison of mean pretreatment and 8th week post treatment WOMAC physical function subscale score in Group A (4.9 ± 1.2 vs. 2.4 ± 0.8) showed significant improvement and in Group B (4.3 ± 1.2 vs. 1.9 ± 0.5) which also shows significant improvement more than group A. This indicates that treatment with exercise plus NSAIDs plus ADL plus lateral wedge shoe modification is effective for improvement of OA knee joints which is more significant than the study group A.

Discussion

In the present study a total of 65 patients of OA knee fully participated in the study. Out of them 28(43.1%) were female and 37(56.9%) were male and male to female ratio 1.32:1 was. In a study in Chittagong, Bangladesh by Shakoor MA et al¹¹ it was found that out of 162 patients 66(40.7%) of the patients were female and 96(40.7%) were male. Female to Male ratio was 0.68:1. Delson DT et al¹² mentioned, female male ratio is 1.58:1 in the Framingham osteoarthritis study. In this study stated this ratio is 1.4:1. In our study the mean age of the patients were 55.0 ± 10.7 years. Out of 65 patients in the study most of the patients of OA knee was at the age group 50 to 59 years, twenty six (40%) were in this group. And then eighteen (27.7%) patients were in the age group of below 50 years. In developing country like Bangladesh, most of the housewives use to do their household work in knee bending position. By these studies it is evident that the housewives become more conscious about their health. In the present study most of the patients were from the middle class group (85%). Most of the study subjects came from Dhaka Metropolitan City. The significant improvement of symptoms within both the groups began to appear at the end first week. Significant difference of improvement was found to begin between the groups at this stage. The trend of improvement continued throughout the whole period of eight weeks. At the end of 8th weeks significant improvements of symptoms were found. And in comparison between the two groups the significant improvement was found in the group who received NSAID, Exercise and ADL instructions and lateral wedge insole than those who were not advised lateral wedge insole.

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