



ORIGINAL RESEARCH PAPER

Rheumatology

EFFICACY OF LATERAL WEDGING IN FOOTWEAR IN MEDIAL COMPARTMENT OSTEOARTHRITIS KNEE

KEY WORDS: Osteoarthritis (OA)

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ABSTRACT

INTRODUCTION: In Knee osteoarthritis (OA) Shoe modifications, such as lateral-wedge insoles or shock absorbing shoes with insoles, have been recommended for conservative therapy of mild knee OA but with little objective data on Indian patients.

OBJECTIVE : this prospective study was done to study the effect of lateral heel sole wedging (insole) in the patients of OA of knee (medial compartment) and its relation to function, pain and stiffness parameters status on VAS and WOMAC scale and to see the requirement of the number of Aceclofenac tablets.

METHODS: 60 patients fulfilling the inclusion criteria were enrolled and divided into intervention group A (30) and nonintervention Group B (30) with random allocation. Paired t-test, Wilcoxon sign rank test and Man Whitney U test were applied at significant p-value of <0.05%.

RESULTS: the reduction of mean difference in pain on VAS and WOMAC scale, improvement in Mean difference in function parameters the mean reduction of pain in standing/ walking, bending and ascending/descending at WOMAC scale was significantly higher in intervention group. Also the mean reduction in the need for aceclofenac was significantly lower in intervention group evident from fourth week onward to fifth and sixth week.

CONCLUSION: The lateral wedging in shoes in medial joint osteoarthritis is beneficial and it can be cost-effective conservative treatment modalities in early osteoarthritis patients, particularly in developing countries as it can reduces the requirement of NSAIDS and improve functional level of patients by reducing pain in various activities.

INTRODUCTION:

Knee osteoarthritis (OA) is a disease common in older adults. Current treatment is aimed at minimizing pain, maintaining or improving joint mobility, and decreasing functional impairment. In the pathogenesis of knee OA, biomechanical stresses that affect the articular cartilage and subchondral bone have been implicated as important inciting factors (1, 2, 3). During the midstance phase of gait, about 60 to 80 percent of the load is distributed through the medial compartment of the normal knee (4) which is one of the reasons knee OA frequently involves the medial compartment. Varus angulation deformity may occur in medial compartment knee OA & contributes to the progression of OA (5).

An alternate nonoperative approach 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 (6, 7).

Material and methods: A Prospective comparative follow up [cross-sectional] study done in PMR department AIIMS Delhi with follow-up at six weeks to study the effect of lateral heel Sole wedging of ¼ inch height & rubber (insole) in the patients of OA knee and its relation to Function, pain and stiffness Parameters status on VAS after 20 meters walk scale of 0 to 10 and WOMAC scale and to see the requirement of the number of Aceclofenac tablets required by patients in insole group Consecutive Patients of either sex, of age between 35 to 75 years suffering from knee OA fulfilling the American college of Rheumatology criteria of classification of osteoarthritis, (8) having grade I, II and III on Kellgren & Lawrence (9)

grading system of patients involving the medial compartment of knee.

Bilateral Knees were taken after taking Informed consent from patient and ethical clearance. The patients with congenital abnormality, deformity or having any systemic diseases, involvement of other compartments like lateral/ pat ell of emoral compartment is ruled out also patients of grade 4 OA knee and those having contrain dication to aceclofenac are ruled out. This study is done in AIIMS New Delhi PMR department from January 2008 to November 2009

The participating patients were divided in two groups: group A and group B (30) in each group by randomly allocating to the two groups. Group A is intervention arm patients in this group were given lateral heel and sole wedging (insole). A 1/4inch wedge of rubber material insert was given on the lateral side of insole of shoes in footwear. Along with this they were be given aceclofenac 100mg twice daily for 1 week then to continue aceclofenac & hot fomentation on as required basis and no other pain killer oral and topical were be used. In the group B The patients were be given aceclofenac 100mg twice daily for a week then were to continue tab. Aceclofenac & hot fomentation on as required basis and no other pain killer oral and topical were be used along with strengthening exercise is given in both groups. The baseline assessment was done with WOMAC, a valid and disease specific questionnaire that separately defines severity of pain [5 grades], stiffness [2 grades] and knee function [17 grades] experienced during the 24 hours before assessment. The VAS version of the WOMAC was used. Information about analgesic use during the 24 hours before the assessment was also collected. All The mean reduction in the

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items are rated on a numerical rating scale of 0 (no symptoms/disability) to 10 (maximal symptoms/disability). The un weighted arithmetic mean of at least 4/5 pain, 1/2 joint stiffness, and 14/17 disability items make up the WOMAC scales, where by 0 again represents the best and 10 the worst health condition. In, the patients of osteoarthritis of medial compartment of knee and follow up was done after a period of six weeks duration. Assessments performed at the end of 6 weeks included adverse events, frequency of aceclofenac use frequency use of the insert, and the WOMAC⁴⁴⁻⁴⁵ scale.

Results: Total sixty cases in both groups were enrolled but out of sixty, six cases dropped out. Among the 54 cases consisting of 21 male and 33 females, the mean age was 50.07 years and mean duration of symptoms was 41.57 months. 30 cases

(55.6%) were of grade I osteoarthritis and 18 (33.3%) with grade II osteoarthritis and 6 (11.1%) with grade III osteoarthritis. Both the groups are comparable in age, sex and duration of symptoms. The patients in group A wore lateral wedge with mean duration of 7.38 ± 1.038 hours standard deviation, ranging from minimum of five hours to maximum of ten hours. Compliance to lateral wedge wearing was good and in our study none of the patient reported any adverse effect or discomfort with lateral wedge insole the reduction of mean difference for pain on VAS and WOMAC scale along with pain subcomponents viz., pain while walking on flat surface, pain while going upstairs and pain in bed at 6 weeks from baseline in group A was significantly higher than group B. The mean difference reduction for subcomponent pain in sitting/lying and pain on standing upright was not significant. As shown in table 1

Table 1 Pain parameters

Parameter	Group A mean±s.d		Group B mean±s.d		Mean difference group A	Mean difference group B	P value
	0 week	6 week	0 week	6 week			
Pain on VAS	4.34±1.98	2.76±1.921	4.04±2.26	3.08±2.43	1.586	.96	<.002
Pain on WOMAC	2.769±1.162	1.76±.872	2.541±1.038	1.90±.95	1.008	.639	<.004

Though mean difference reduction in stiffness at 6 weeks from baseline in lateral wedging group was higher than lateral wedging group but it was not statistically significant.

group B. The mean reduction was also significantly more in group A as compared to group B for subcomponents viz. bending to floor, walking on flat, rising from sitting, getting in/out of car, going shopping and rising from bed. Though it was also more in group A than B for other subcomponents of function viz. descending stairs, ascending stairs, putting on socks and taking off socks but was not significant statistically.

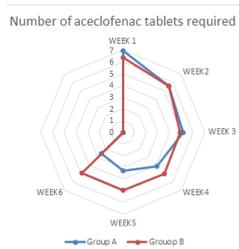
The reduction in mean difference in function parameters at 6 weeks from baseline in group A was significantly higher than

WOMAC FUNCTION PARAMETERS TABLE 2

Parameter mean ± S.D	Group A		GROUP B		intragroup Mean difference b/w 0-6 weeks		Significance level between groups
	Time of assessment		Time of assessment		Group A	Group B	p-value at 6-week
	0-week	6-week	0-week	6 week			
descending stairs	4.24±1.35	3±1.25	3.72±2.03	2.84±1.97	1.21	.88	.005
ascending stairs	5.55±1.66	4.14±1.48	5.24±1.39	4.0±1.56	1.41	1.2	.289
Rising from sitting	2.93±1.64	1.86±1.32	2.52±1.58	1.68±1.46	1.06	.84	.148
standing	2.38±1.63	1.45±1.57	1.88±1.33	1.24±1.16	.93	.64	.096
bending to floor	1.24±1.12	.55±.87	1.04±1.39	.72±1.17	.68	.32	.045
walking on flat	3.38±1.42	2.21±1.37	2.68±1.70	1.88±1.50	1.17	.80	.021
getting in/out of car	3.79±1.97	2.45±1.84	3.28±1.96	2.48±1.75	1.34	.80	.003
going shopping	3.24±1.84	2.24±1.50	2.76±1.94	2.12±1.76	1.0	.64	.037
putting on socks	.31±.604	.1±.31	.48±1.87	.4±1.63	.20	.08	.304
rising from bed	1.86±1.32	1.03±1.14	1.72±1.86	1.12±1.64	.82	.60	.035
taking off socks	.21±.77	.1±.55	.4±1.80	.32±1.6	.10	.08	.769
lying in bed	2.28±2.29	1.55±1.82	2.12±2.31	1.6±2.14	.72	.52	.255
getting in/out of bath	2.79±2.22	1.79±1.74	2.44±2.31	1.76±1.80	1.0	.68	.179
sitting	3±2.29	1.93±1.99	2.68±2.28	1.96±1.90	1.069	.72	.058
getting on/off toilet	3.41±1.88	2.41±1.47	3.24±1.56	2.24±1.33	1.0	1.0	.436
Heavy domestic duties	1.59±1.72	.90±1.44	1.36±1.65	.8±1.47	.68	.56	.550
	.31±.541	.14±.351	.48±1.04	.24±.83	.17	.24	.542

need for aceclofenac was significantly lower in group A as compared to group B from fourth week onward to fifth and sixth week, though mean tablets required in group A was less than group B, it was not significant statistically.

Chart 1



DISCUSSION:

The reduction in mean difference at 6 weeks from baseline in lateral wedging group was significantly higher than non-intervention group for pain score on VAS & WOMAC scale along with pain subcomponents viz., pain while walking on flat surface, pain while going upstairs and pain in bed.

The mean difference reduction for subcomponent pain in sitting/lying and pain on standing upright was not significant. The reduction in pain is most likely due to decrease in adduction moment. It seems that wedges increase the valgus moment arm at the subtalar joint, causing a lateral shift in the center of pressure location (10). This lateral shift likely decreases the length of the knee joint moment arm.

These findings of our study are in concurrence Ogata et al

(11). While studying the relationship between radiographic severity of OA, had also found that the amplitude of first acceleration peak decreased with the usage of valgus insoles in all 50 knees with medial OA, and the mean reduction in first acceleration peak amplitude with the usage of insoles was 23.7%.& found pain relief so recommend the usage of insoles T Pham (12) also noted in his study on 156 patients prospective randomized controlled study to compare the clinical effects of laterally wedged insoles and neutrally wedged insoles in patients with medial femoro-tibial joint OA at the end of 2 years he found that the NSAIDS requirement is lower in lateral wedge group as compare to neutral wedge insole. (71±173 days vs. 127±193 days, P=0.003.so they Conclude the reduced NSAIDs intake and the better compliance in the treatment group are in favor of a beneficial effect of laterally-wedged insoles in medial OA knee. laterally wedged insoles are proposed for the treatment of knee medial compartment osteoarthritis. The clinical effect is probably limited, but the treatment may reduce the digestive and renal side effects of prolonged use of non-steroidal anti-inflammatory drugs.

Barrios JA, et al (13). They found while studying the clinical efficacy of individually prescribed laterally wedged orthosis and walking shoes in the treatment of medial knee osteoarthritis by using a prospective, single-blind, block-randomized controlled design on Sixty-six subjects both groups were improved at each follow-up in the WOMAC subscales for pain, stiffness (p<0.001) and physical function. Both groups also improved in 6-minute walk test distance, stair negotiation test time, and stair negotiation test pain change Van Raaij et al (14) in there study also concluded that & suggest lateral wedge insole may be alternative for valgus brace & conservative treatment for medial joint knee osteoarthritis.

Hameed et al (15) in there study of lateral wedge insoles on 48 knees also suggested clinically symptomatic improvement significant p values on most of womac subscales & suggest lateral wedging as conservative treatment in early medial knee osteoarthritis.

CONCLUSION:

From the study following conclusions could be drawn lateral wedging in shoe in a patient of medial joint OA knee reduces the requirement of non-steroidal anti-inflammatory agents. Lateral wedging in shoes improves function in day to day life and improves quality of life by reducing pain. In nutshell it can be said that the lateral wedging in shoes in medial joint osteoarthritis is beneficial and it can be a good conservative treatment modalities in early osteoarthritis patients. Particularly in developing countries especially India it might a better alternative as well as the cost effective treatment modalities of osteoarthritis that can reduce the requirement of NSAIDS and improve functional level of patients by reducing pain in various activities.

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