



CODEN [USA]: IAJPBB

ISSN: 2349-7750

## INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

<http://doi.org/10.5281/zenodo.3497433>

Available online at: <http://www.iajps.com>

Research Article

### IMPROVEMENT IN PAIN AND QUALITY OF FUNCTIONING WITH AND WITHOUT LATERAL WEDGE IN PATIENTS HAVING KNEE OSTEOARTHRITIS –A SINGLE CENTER STUDY

Abdul Salam <sup>1</sup>, Tahir Mahmood <sup>2</sup>, Sumaira Perveen <sup>3</sup>, Asad Aziz<sup>4</sup>, Komal Tariq <sup>5</sup>

<sup>1</sup>HOD/Assistant professor, Department of Physical Therapy, Imran Idress institute of Rehabilitation Sciences Sialkot, [abdulsalamrana@yahoo.com](mailto:abdulsalamrana@yahoo.com), <sup>2</sup>Lecturer /Physical Therapist, Agile Institute of Rehabilitation sciences, Bahawalpur, Punjab-Pakistan, [tahirmahmmmodphysio@gmail.com](mailto:tahirmahmmmodphysio@gmail.com), <sup>3</sup>Boston physiotherapy & Wellness Clinic Lahore, [sumairach25fpu@gmail.com](mailto:sumairach25fpu@gmail.com), <sup>4</sup>Physiotherapist, Eureka Clinic [®] Pakistan, [asad.aziz234@outlook.com](mailto:asad.aziz234@outlook.com), <sup>5</sup>DPT, The University of Faisalabad ,MS MSK [UOL], Physiotherapist, [komaljutt358@gmail.com](mailto:komaljutt358@gmail.com)

Article Received: August 2019

Accepted: September 2019

Published: October 2019

#### Abstract:

**Background:** Osteoarthritis is a well known disease of joint, mostly effecting knee and compromised knee functioning leading g to decreased Quality of life. This is due to loss articular cartilage and disorder to destruction of joint surfaces .Rate among females is higher than males.

**Objective:** The study was focused to use the lateral wedge on pain and quality of knee functioning so that biomechanics of joint should be changed and evaluated.

**Methodology:** This was randomized study continued after ethical approval from Azra Naheed Medical College Ethical Committee .The subjects include were in age range of more than 45 ,both male and females ,radiological diagnosed with Osteoarthritis grade and II.The sample was 40 subjects with 20 in each group .The experimental group received lateral wedge with routine treatment and control group received only routine Physical therapy treatment .The outcome tool used was KOOS knee survey and VAS for pain evaluation. The data was collected at baseline and every second week. Statistical software used was SPSS 25.version.The data was analyzed with use of repeated measurement ANOVA and independent t test for pre mid and post value comparison. The significance was taken at  $P < 0.05$ .

**Results:** The study's results by using KOOS knee survey and pain evaluation scale that there was much improvement in experimental using lateral wedge group rather than control group having routine physical therapy The p value  $< 0.05$  indicating for kneesymptoms [ $P < 0.00$ ]knee function [ $P < 0.00$ ] pain and sports /recreational activities [ $P < 0.00$ ]

**Conclusion:** The study concluded that knee function can be improved conservatively with common techniques using routine intervention but the lateral wedge can be effective more than use of routine physical therapy managements.

**Key words:** Quality of function, Knee Osteoarthritis, Pain , Lateral Wedge/ insoles

#### Corresponding author:

**Dr. Tahir Mahmood PT**

Lecturer/Physical Therapist

Agile Institute of rehabilitation sciences

Bahawalpur, Punjab-Pakistan

[tahirmahmmmodphysio@gmail.com](mailto:tahirmahmmmodphysio@gmail.com)

QR code



Please cite this article in press Tahir Mahmood PT et al., *Improvement In Pain And Quality Of Functioning With And Without Lateral Wedge In Patients Having Knee Osteoarthritis –A Single Center Study.*, Indo Am. J. P. Sci, 2019; 06[10].

**INTRODUCTION:**

Osteoarthritis the most common degenerative disease affecting the women more than that males with ratio of 2:1. All the tissues in the joint become more active than normal, as if your body is trying to repair the damage [1]. The bone at the edge of your joint grows outwards, forming bony spurs called osteophytes. The synovial membrane may swell and produce extra fluid, causing the joint to swell – this is called an effusion or sometimes water on the knee. The capsule and ligaments slowly thicken and contract [2]. The risk factors will be increase in age, trauma, genetically make up, Malalignment of knee and mainly load increasing at the joint leading to change in biomechanics of bone i.e. obesity, imbalance in physiological process and density of bone. [3]. There is evidence available that argue that the obesity is like a syndrome which is complex that leads to abnormal stimulation of pro-inflammatory & neuro-endocrine mechanisms that change the control of food intake, Metabolic changes and expression of fat IL-6, TNF, IL-8, IL-1 are all sealed with white adipose tissue is activated but IL-10 is decreased [4].

Women, in age more than 55 years, have more severe OA in the knee as compared to the other joints of body. The postmenopausal factors and gender differences prevalence of OA in knee joint [5]. The incidence found to be investigated knee OA on the basis of radiographic evaluation of the bone has been investigated in 2282 in elderly people of Japan in aged above than 60 years of age [817 males and 1,465 females] residing in the cities. Prevalence was high that was decided on the basis of radiograph results of Knee involved in arthritic changes [6]. The incidence was more in females than that of the men. [7]. Knee arthritic symptoms were mostly was in the general young was less but mostly found in women of older age. In a study Greece community, knee OA symptoms were observed 6% [95% CI 5.6-6] [8].

The incidence percentage was very high in the females than that of males and ratio was increased significantly with respect to age. Symptoms of OA in knee were not high and common in urban compared to rural and suburban study population. The results Logistic regression showed a prominent association of women sex and age above 50 years with all sites of involved OA of knee. [9]. Including obesity and decrease level of education were linked in knee OA involved population [10]. There were Knee symptoms, radiographic changes in knee OA, knee OA with its symptoms, and severe radiographic knee OA were added in 3018 participants of study [33%] in population of African and Americans [38% men]. The

Diagnosis of OA and its severity disease was calculated based on Kellgren-Lawrence radiographic grade above 2, severe radiographic knee OA classified as 3 grades and 4 grades, and symptomatic knee OA as knee symptoms in a knee with radiographic OA. The symptoms in knee were found in 43% of population. 28% of patients having symptoms had changes in their radiographs of knee. A crackling noise is produced [called “Crepitus”] when the involved joint is palpated or moved and people may feel spasms in muscles and contractions in their tendons. The joints may also have fluid in them [11]. Some people experience that increased in pain is due to decrease in temperature, high humidity, or a drop in the pressure, but researches have shown both results [12].

The study was focused to use the lateral wedge so that biomechanics of joint should be changed and evaluated. The study on such strategies leading to conservative treatment on knee OA is less focused. This study will help out to improve pain and knee function, symptoms among patients with knee osteoarthritis.

**MATERIAL & METHODS:**

This study was experimental study design with randomized trial conducted after approval of Ethical Committee Azra Naheed medical College Lahore. We enrolled 40 patients using sampling technique. The duration of study was 6 months after approval of synopsis. RCT design was used. There were two groups with 20 subjects in each having knee osteoarthritis with medial joint space reduction. Male and Female adults with osteoarthritis between 40-60 years of age Chaudary Muhammad Research and teaching Hospital [CMARTH] with Clinically and radiologically diagnosed cases of medial compartment knee OA grade I and II. We excluded Rheumatoid arthritis, fracture, tumor, or trauma etc, with any other systemic co-morbidities, age less than 40 and more than 60 and with any mental retardation. Informed consent was obtained. The study included 40 subjects with knee osteoarthritis fulfilling the inclusion and exclusion criteria.

In conventional physical therapy isometric exercises of knee mainly Quadriceps and other exercises were used. Therapeutic Ultrasound for the tender point around the knee joint and isometric exercises of quadriceps in both groups was applied 5 times in a week for time period of 6 weeks. Duration of each session was 35 minutes. Ultrasound therapy as per the patient's requirement with an intensity of 1.5

watts/cm<sup>2</sup> for 5 minutes in continuous mode at the tender point around the knee joint used for 15 min help to relieve pain and swelling. Isometric exercise might be the most appropriate and easy to understand by the patients and can be easily and safely performed for 15 min. SWD was used for 15 min help to relieve pain and swelling. Further, Lateral wedge was applied in Experimental group throughout the week in day time. The focus was to provide of basic level of PT to maintain the patient's current activity level and quality of life with the help of conventional physical therapy. Demographic data i.e age, gender, BMI and base lines of patient were taken at zero visits. Koos knee survey

was used to assess the pain and quality of life. According to KOOS scoring 100 points indicate perfect condition while worst condition indicated by 0. The results of study were presented as frequency, percentages, mean $\pm$ SD and p-value. The intervention period for each patient was 6 weeks and data was collected on 1st day and at the end of every 2nd week. For between groups, cross-sectional comparison, Independent sample t-test was used and for within the groups repeated measures ANOVA was used. The p value was taken as Significant <0.05.

## RESULTS:

**TABLE NO.3 -QOF -LACK OF CONFIDENCE**

Descriptive Statistics between the group				
	Groups	Mean	Std. Deviation	P -value
QoF lack of confidence [0 week]	Group A	3.45	.759	0.00
	Group B	3.90	.308	
QoF lack of confidence [After 2nd week]	Group A	2.55	.605	0.00
	Group B	3.65	.489	
QoF lack of confidence [After 4th week]	Group A	1.95	.394	0.00
	Group B	3.00	.000	
QoF lack of confidence [After 6th week]	Group A	1.20	.616	0.00
	Group B	2.90	.308	

Statistical analysis shows that between the two group experimental group shows more improvement than the control one as the p value = <0.05. Which is further justified by the mean score of the question being asked from all patients about the QoF lack of confidence. Mean score of symptom of QoF lack of confidence during zero week of experimental group was 3.55 $\pm$ .510 while the score amongst the control group was 4.00 $\pm$  0.00. After application of lateral wedges along with other rehabilitation protocols mean score after 2<sup>nd</sup>

week was 2.75  $\pm$  0.63 while the mean score of control group was 3.55  $\pm$  0.50. After 4<sup>th</sup> week the QoF lack of confidence score was recorded in experimental group was 1.95  $\pm$  0.68 while control group score was 3.50  $\pm$  0.51. After the 6<sup>th</sup> week or last week the mean score was 1.10  $\pm$  0.57 of experimental and 3.00 $\pm$  0.000 of control group. It clearly elaborates that lateral wedges reduced the score of the QoF lack of confidence more significantly than the normal physical therapy interventions. [Low score means perfect condition]

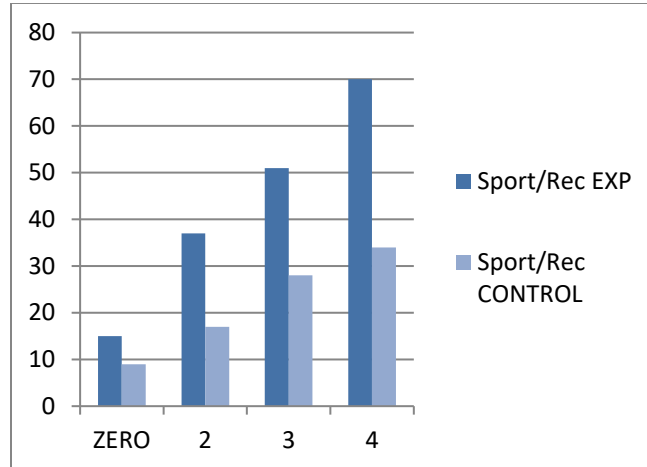
**TABLE NO. 4 QOF DIFFICULTY WITH KNEE**

Descriptive Statistics between the group				
	Groups	Mean	Std. Deviation	P -value
QoF difficulty with knee [0 week]	Group A	3.60	.598	0.00
	Group B	3.90	.308	
QoF difficulty with knee [After 2nd week]	Group A	2.50	.607	0.00
	Group B	3.65	.489	
QoF difficulty with knee [After 4th week]	Group A	1.90	.641	0.00
	Group B	3.15	.366	
QoF difficulty with knee [After 6th week]	Group A	1.05	.605	0.00
	Group B	2.60	.503	

Statistical analysis shows that between the two group experimental group shows more improvement then the control one as the p value = <0.05. Which is further justified by the mean score of the question being asked from all patients about the QoF difficulty with knee? Mean score of QoF difficulty with knee during zero week of experimental group was  $3.60 \pm .598$  while the score amongst the control group was  $3.90 \pm 0.30$ . After application of lateral wedges along with other rehabilitation protocols mean score after 2<sup>nd</sup> week was

$2.50 \pm 0.60$  while the mean score of control group was  $3.65 \pm 0.50$ . After 4<sup>th</sup> week the symptom of swelling score was recorded in experimental group was  $1.90 \pm 0.64$  while control group score was  $3.15 \pm 0.33$ . After the 6<sup>th</sup> week or last week the mean score was  $1.05 \pm 0.60$  of experimental and  $2.60 \pm 0.50$  of control group ,it elaborates that lateral wedges reduced score of QoF difficulty with knee significantly then the normal physical therapy interventions used

**GRAPH NO.1 SPORTS AND RECREATIONAL ACTIVITIES**



**TABLE NO. 5 REPEATED MEASURE ANOVA OF TOTAL SYMPTOM**

REPEATED MEASURE ANOVA		Experimental group [N=20]			Control group [N=20]		
		Mean	SD	p-value	Mean	SD	p-value
TOTAL SYMPTOM	At zero week	10.9	10.29	0.00	2.3	2.2	0.00
	After 2 weeks	31.4	10.17	0.00	18	10.02	0.00
	After 4 weeks	47.8	11.44		18	10.02	
	At 6 <sup>TH</sup> week	65.8	11.27		26	1.77	

**TABLE 6 REPEATED MEASURE ANOVA OF QOF DIFFICULTY WITH KNEE**

KNEE FUNCTIONING		Experimental group [n=20]			Control group [n=20]		
		Mean	SD	p-value	Mean	SD	p-value
QoF difficulty with knee	At zero week	3.60	.598	0.00	3.90	.308	0.00
	After 2 weeks	2.50	.607		3.65	.489	
	After 4 weeks	1.90	.641		3.15	.366	
	At 6 <sup>TH</sup> week	1.05	.605		2.60	.503	

According to the table above experimental group shows significant improvement then control group suggested by mean score improvement and P value <0.05. According to the table above experimental group shows significant improvement then control group suggested by mean score improvement and P value <0.05.

According to the table above experimental group shows significant improvement then control group suggested by mean score improvement and P value <0.

#### DISCUSSION:

Knee taping includes the use of glue inflexible strapping tape to the patella and additionally related delicate tissue structures. It may be normal that the torment mitigating impacts of tape are kept to when the tape is worn, one review found that advantages were as yet present 3 weeks taking after tape removal[[13]

This study brings about a lessening in medial compartment stack.[14]. The two most regular traditional treatment for patient with OA are utilizing different sorts of knee support and lateral wedge insoles, which have been utilized to lessen knee torment or pain, to enhance the arrangement and to build the knee joint scope of movement [ROM] when walking. The fundamental reason for pain in medial compartment might be its disintegration that builds load and subsequently pain. For its cure, a parallel wedge insole that disseminates the load along the lateral side, decreasing it from medial compartment that lessens pain [15]. There is some confirmation that physiotherapy in blend with other administration systems, for example, weight reduction and regard for mental components may give more huge results than any of these in isolation An individual way to deal with patient administration is expected to figure out which medicines are most proper for every patient. Biomechanical thinks about demonstrate that parallel wedges lessen the adduction minute amid strolling by 4–12% contrasted and unshod or shoes alone in average knee OA. This thus brings about a decrease in average compartment load[16].

Statistical analysis in experimental group shows more improvement then the control one as the p value = <0.05, Which justified by Mean total symptom score during zero week of experimental group was  $10.95 \pm 10.29$  while the score amongst the control group was  $2.35 \pm 2.27$ , after application of lateral wedges with rehabilitation protocols mean score after 2nd week was  $31.45 \pm 10.14$  while the mean score of control group was  $10.02 \pm 5.97$ . After 4th week the symptom score was recorded in experimental group was  $47.00 \pm 11.4$  while control group score was  $18.00 \pm 10.02$ . After the 6th week or last week the mean score was  $65.85 \pm 11.5$  of experimental and  $26.0 \pm 1.775$  of control group. This elaborates that lateral wedges reduces the symptoms more significantly then the normal physical therapy interventions.

Studies by Kristin Baker with double blinding to detect effects of intervention with 50 years participants Kristin had medial joint space narrowing and scores indicating moderate pain for 2 of the 5 items on the Western Ontario and McMaster Universities Osteoarthritis Index [WOMAC] pain scale. The subjects had received Lateral wedge of 5 0or with neutral insole for 6 weeks. The knee pain was measured by Numeric Pain Rating Scale and Functions of knee with WOMAC .Knee was reduced more in experimental group than other. Another study of Toda et al report GC Campos conclude that decrease in pain among patients who used a lateral-wedge insole in non randomized study.[17]

These results of insole Wedges also correlated with a lateral shift in the location of the COP during stance phase. With respect to the OApaitents who had an increase in the knee joint Varus moment with insole Wedges suggests that the indication and limitations of laterally wedged insoles in general should be analyzed in more detail, possibly leading to new guidelines for the use of such wedged insoles.

In studies by Gustavo Constantino de Campos prospectively enrolled 58 patients with medial knee osteoarthritis, used a lateral wedge insole. All the patients were instructed to use the insole for five to ten hours per day. The outcome tool was Visual Analogue Scale and WOMAC [18] and the Lequesne questionnaire were applied at baseline and at weeks 2, 8 and 24. At weeks 8 and 24, both groups showed lower scores for WOMAC [P = 0.023 and P = 0.012 respectively]. Pain was significantly reduced in both the group.[19] In our study mean age of all patients were  $55.05 \pm 6.7$  years while sensation of pain at knee joint due to osteoarthritis were reduced as suggested by pain score of KOOS questionnaire used an assessment tool. As in zero week within experimental group the total pain score mean was  $79.9 \pm 2.2$  while on final session the total pain score mean was  $91.4 \pm 4.2$  as discussed earlier that 100 shows perfect condition while 0 means worst condition further suggested by P value =0.01.

#### CONCLUSION:

As the result of the study suggested that the within experimental group the knee osteoarthritis condition was significantly improved. Meanwhile the total pain score was significantly improved quality of life was enhanced patients activity level, become easy for the patients and sports and functional abilities were reinforced in patients utilizing lateral wedges which



manage the excessive knee joint load in osteoarthritis patients.

### RECOMMENDATIONS:

In Pakistan biomechanical analytical equipments are not easily available. This intervention can avoid the need of expensive surgery as it is less cost effective and more accurate. It does not require any bed rest or expensive antibiotics drugs that may lead to liver and kidney damage. So such interventions should be used which as an easy method.

### LIMITATIONS OF STUDY:

This study was carried out on small sample as well in specific population. Such intervention should be used so that conservative interventions can be used for improving in health and betterment of the subjects with Degenerative diseases

### CONFLICT OF INTEREST:

No potential conflicts of interest found Between Authors

### FUNDING DISCLOSURE:

None

### REFERENCES:

1. Srikanth VK, Fryer JL, Zhai G, Winzenberg TM, Hosmer D, Jones G. A meta-analysis of sex differences prevalence, incidence and severity of osteoarthritis. *Osteoarthritis and cartilage*. 2005;13[9]:769-81.
2. Muraki S, Oka H, Akune T, Mabuchi A, En-Yo Y, Yoshida M, et al. Prevalence of radiographic knee osteoarthritis and its association with knee pain in the elderly of Japanese population-based cohorts: the ROAD study. *Osteoarthritis and cartilage*. 2009;17[9]:1137-43.
3. Losina E, Walensky RP, Reichmann WM, Holt HL, Gerlovin H, Solomon DH, et al. Impact of obesity and knee osteoarthritis on morbidity and mortality in older Americans. *Annals of internal medicine*. 2011;154[4]:217-26.
4. Nelson AE, Braga L, Renner JB, Atashili J, Woodard J, Hochberg MC, et al. Characterization of individual radiographic features of hip osteoarthritis in African American and White women and men: the Johnston County Osteoarthritis Project. *Arthritis care & research*. 2010;62[2]:190-7.
5. Zhang W, Doherty M, Peat G, Bierma-Zeinstra SM, Arden N, Bresnihan B, et al. EULAR evidence based recommendations for the diagnosis of knee osteoarthritis. *Annals of the rheumatic diseases*. 2009.
6. Mujahid MA, Azam MJ, Salam A, Mahmood T, Arif AB. Impact on quality of life in patients with knee osteoarthritis in faisalabad.
7. Muraki S, Akune T, Oka H, Ishimoto Y, Nagata K, Yoshida M, et al. Incidence and risk factors for radiographic knee osteoarthritis and knee pain in Japanese men and women: A longitudinal population-based cohort study. *Arthritis & Rheumatism*. 2012;64[5]:1447-56.
8. Malemud CJ. Cytokines as therapeutic targets for osteoarthritis. *BioDrugs*. 2004;18[1]:23-35.
9. Bennell KL, Bowles K-A, Payne C, Cicuttini F, Williamson E, Forbes A, et al. Lateral wedge insoles for medial knee osteoarthritis: 12 month randomised controlled trial. *Bmj*. 2011;342:d2912.
10. Andrianakos AA, Kontelis LK, Karamitsos DG, Aslanidis SI, Georgountzos AI, Kaziolas GO, et al. Prevalence of symptomatic knee, hand, and hip osteoarthritis in Greece. The ESORDIG study. *The Journal of rheumatology*. 2006;33[12]:2507-13.
11. Magee DJ. *Orthopedic physical assessment*: Elsevier Health Sciences; 2014.
12. Figueiredo ECQd, Figueiredo GC, Dantas RT. Influence of meteorological elements on osteoarthritis pain: a review of the literature. *Revista brasileira de reumatologia*. 2011;51[6]:622-8.
13. Hinman RS, Crossley KM, McConnell J, Bennell KL. Efficacy of knee tape in the management of osteoarthritis of the knee: blinded randomised controlled trial. *Bmj*. 2003;327[7407]:135.
14. Shelburne KB, Torry MR, Steadman JR, Pandy MG. Effects of foot orthoses and valgus bracing on the knee adduction moment and medial joint load during gait. *Clinical Biomechanics*. 2008;23[6]:814-21.
15. Ahmad A, Munawar A, Hanif MK, Ahmed I. Study of the lateral raise in foot wear for the management of medial compartment degenerative joint disease of knee. *Annals of King Edward Medical University*. 2014;20[2]:104.
16. Page CJ, Hinman RS, Bennell KL. Physiotherapy management of knee osteoarthritis. *International journal of rheumatic diseases*. 2011;14[2]:145-51.
17. Campos GCd, Rezende MU, Pasqualin T, Frucchi R, Bolliger Neto RJSPMJ. Lateral wedge insole for knee osteoarthritis: randomized clinical trial. 2015;133[1]:13-9.
18. Salam A, Awan MW, Mahmood T, Rukh MS, Seffat NJJoLUoM, Sciences H. Application of

Lateral Wedge in Knee Osteoarthritis for Improving Pain and Quality of Life. 2019;18[02]:146-51.

19. Rezende MUd, Campos GCd, Pailo AFJAob. Current concepts in osteoarthritis. 2013;21[2]:120-2.