



Research Article

## EFFECTIVENESS OF RETRO WALKING IN OSTEOARTHRITIS KNEE

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### ABSTRACT

**Background:** Osteoarthritis is a progressive disorder of the joints caused by gradual loss of cartilage resulting in the development of bony spurs and cysts at the margin of the joints. It is also known as osteoarthritis or degenerative joint disease. The major pathological changes are seen in the articular cartilage. Retro-walking is defined as walking backwards. In this initial contact occurs in the forefoot, then the heel strike and propulsion occurs relatively passive shortly after heel lift. **Objective:** To evaluate the effectiveness of retro walking in patients with chronic osteoarthritis knee and also to compare the effectiveness of Retro walking and strengthening exercise programme in patients with chronic osteoarthritis knee. **Study Design:** Experimental study (Pre test and post test design). **Procedure:** 20 subjects are selected and are randomly divided into two groups, group A undergo progressive resisted strengthening and group B undergo retrograde walking. The subjects are given duration of 10 mins to retro walk at their maximum phase. The pain is measured prior to the intervention using VAS scale and disability is measured using WOMAC index for both the groups. **Results:** The P value of group A is 0.0025 and group B is <0.001 for VAS, therefore the result is significant. **Conclusion:** The study concluded that there is a reduction in VAS after performing Retro-walking for Osteoarthritis knee.

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### INTRODUCTION

Osteoarthritis is a progressive disorder of the joints caused by gradual loss of cartilage resulting in the development of bony spurs and cysts at the margin of the joints. It is also known as osteoarthritis or degenerative joint disease. There are two forms of, Primary Osteoarthritis and Secondary Osteoarthritis. The major symptoms present in Osteoarthritis are pain and stiffness of knee joint<sup>1</sup>. Osteoarthritis is an extremely common condition occurring after 40 years of age. It is widespread in adults older than 65 and affects men more than women before the age of 50, but reverses after the age of 50<sup>2</sup>.

The major pathological changes are seen in the articular cartilage. The first osteoarthritis change in articular cartilage is increased water content. This increase suggest that proteoglycons have been allowed to swell with water far beyond normal (mechanism is unknown). There are changes in the composition of newly synthesized proteoglycons. As disease progresses, proteoglycons are lost, which diminishes the water content of cartilage resulting in destruction of cartilage and narrowing of joint space. This causes to lose its compressive stiffness and elasticity. The cartilage may degenerate to the point that subchondral bone is exposed.

Sub chondral bone in turn can then become sclerotic and stiffer than normal bone. These changes in cartilage results in increased friction, decreased shock absorption and greater impact loading of the joint<sup>2</sup>.

In Osteoarthritis the quadriceps and hamstrings muscles lean body mass decreases, leading to loss of muscle tissue. Lipofescin and fat are deposited in muscle tissue. Because of these changes the muscle fiber shrinks and is gradually replaced by tough fibrous tissue. These changes combined with normal ageing process in the nervous system cause muscles to have reduced tone and contractility<sup>2</sup>.

Therapeutic intervention for the management of Osteoarthritis includes conservative and surgical approach. Physiotherapy treatment includes electro therapy (IFT, ultrasound) and exercise therapy- supervised strengthening exercise<sup>1,3,4</sup> and manual therapy<sup>5</sup> and taping<sup>6,7</sup>.

Retro-walking is defined as walking backwards<sup>8</sup>. In this initial contact occurs in the forefoot, then the heel strike and propulsion occurs relatively passive shortly after heel lift<sup>9</sup>.

Strengthening exercise programme consists of isometrics to quadriceps, mini squats, and step ups. These exercises help to promote muscle strength, improve range of motion, increase mobility and ease pain<sup>4</sup>.

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**Need of the Study**

Patients with OA knee tends to maintain an extended knee position at heel strike, thereby experiencing a rapid increase in ground reaction force and vertical loading rates. They make more rapid shift of the body weight from the contra lateral limb to the support limb which reduces medial and lateral distance between center of mass and knee joint center<sup>10</sup>.

Since in chronic OA there is lack of hip abductor muscle strength, the contra lateral limb drops throughout the swing phase, leading to the movement of the trunk away from the support limb, similar to trendelenberg gait which results in increased medial lateral distance between the center of mass and knee joint center and greater varus alignment results in peak knee adduction movement<sup>10</sup>.

Also due to reduction of abductor moment in chronic OA, maintenance of pelvic level will alter. These changes contribute to increase in load on the medial compartment and thereby increase the risk of progression of disease. In OA since greater moment in abduction or adduction direction to a bi-condylar joint will merely shift the net contact point toward one compartment, thus always increase the load on one compartment which leads to more destruction of cartilage<sup>10</sup>.

In Retro-walking the percentage of stance phase during backward walking are the same and measured to be approximately 62%, when compared to forward walking. There is decrease in duration of support, with retro walking when compared to forward. There is less range of hip motion, shorter step lengths, slower speeds, higher energy requirements and less fluid motions in retro walking<sup>9,11,12</sup>.

According to a study by Neptune and Kautz (2000), backward walking allows increased hamstrings activation which generates reduced patello femoral and lower tibio femoral compression load stress and ACL strain, and therefore BW reverses the shear forces in the knee joint<sup>13</sup>.

**METHODOLOGY**

**Study Design:** Experimental study (Pre test and post test design),

**Sampling Technique:** Simple random sampling,

**Study Population:** both male and female,

**Study Sample:** 20 subjects

**Study Duration:** Training duration – five days per week Total Study duration – two weeks,

**Study Setting:** Madha Medical College & hospital Ravikumarortho clinic.

**Inclusioncriteria:** The Subjects aged between 40- 65 years both male and female, Subjects with clinical diagnosis and radiographic evidence of Osteoarthritis and Subjects who can walk 10 steps backward without any discomfort,

**Exclusioncriteria:** The Soft tissue injuries around the knee joint , Recent surgeries around knee joint, Elderly subjects with balance deficits, Fixed flexion deformity, Subjects with cardiac problems,

**Materials Used In The Study:** Visual analogscale, WOMAC index, Data collection sheet.

**METHOD**

Subjects included in the study after the initial assessment and who fulfills the inclusion criteria. The consent form is obtained after explaining the interventions. 20 subjects are selected and are randomly divided into two groups, group A and group B. The pain is measured prior to the intervention using VAS scale and disability is measured using WOMAC index for both the groups.

Group A subjects undergo progressive resisted strengthening exercise program which includes static quadriceps, seated leg press, mini squats and step ups.

Group B subjects undergo retrograde walking. The subjects are given duration of 10 mints to retro walk at their maximum phase.

The home program which includes static quadriceps and step ups are given to both the groups, one session in a day. The subjects therefore will have 2 sessions per day, one under the supervision of the investigator and one session as a home program for up to 2 weeks. At the end of 2<sup>nd</sup> week, pain and disability is evaluated using VAS and VOMAC scale respectively.

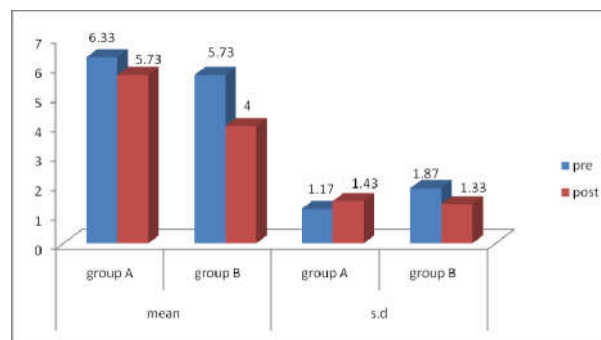
**Data Analysis**

Data analysis was done by using the software graphprism

**Table 1** Comparison of VAS Within Group Done By Using Paired t Test

Comparison of Vas In Group A And B (Within Group)							
variable	Mean		SD		t value	P value	Result
VAS	Pre	post	Pre	post	3.67	0.0025	Significant
group A	6.33	5.73	1.17	1.43			
group B	5.73	4	1.87	1.33	9.53	<0.0001	Significant

- The VAS comparison within group A and B with pre mean of group A being 6.333 and post mean being 5.733, whereas of group B pre mean being 5.733 and post mean being 4.
- The SD pre and post value for group A is 1.175 and 1.437 respectively and The SD pre and post value for group B is 1.877 and 1.3389 respectively.
- The P value of group A is 0.0025 and group B is <0.001 therefore the result is significant.

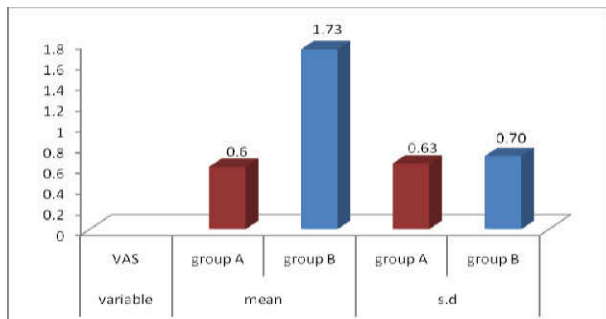


**Graph 1** Comparison of Vas IN Group A and B (Within Group)

**Table 2** Comparison of VAS between Group Done By Using Unpaired t Test

Comparison of Vas Between Group A And B							
variable	Mean		SD		t value	Pvalue	Result
VAS	group A	group B	group A	group B	4.29	0.0002	Significant
	6.33	5.73	1.17	1.43			

- The VAS comparison between group A and B with mean of group A being 0.6 and mean of group B being 1.73.
- The SD value for group A is 0.6324 and The SD value for group B is 0.7037.
- The t value is 4.298 and P value is 0.002 therefore result is significant.

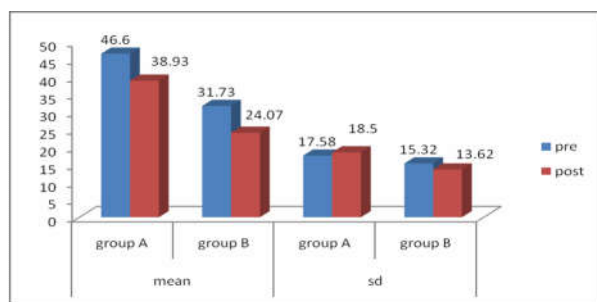


Graph 2 Comparison of vas between group A and B

Table 3 Comparison of WOMAC within group done by using wilcoxsigned ranktest

Comparison of Womac In Group A And B(Witin Group)							
Variable	Mean		SD		W value	P value	Result
WOMAC	PRE	POST	PRE	POST			
Group A	46.6	38.93	17.58	18.5	120	0.0007	Significant
Group B	31.73	24.07	15.32	13.62	120	0.0007	Significant

- The WOMAC comparison within group A and B with pre mean of group A being 46.6 post mean being 38.93, whereas of group B pre mean being 31.73 and post mean being 24.07.
- The SD pre and post value for group A is 17.58 and 18.5 respectively and The SD pre and post value for group B is 15.32 and 13.62 respectively.
- The W and P value of group A and group B is 120 and 0.007 respectively therefore the result is significant.

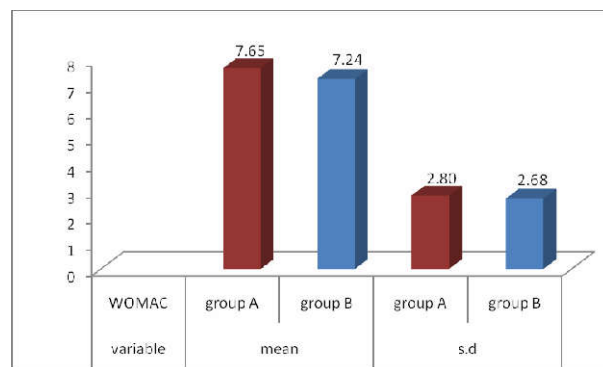


Graph 3 Comparison of Womac in Group A and B (Witin Group)

Table 4

Comparison of Womac Between group A and B							
Variable	Mean		SD		U value	P value	Result
WOMAC	Group A	Group B	Group A	Group B			
	7.65	7.24	2.80	2.68	105	0.77	Not significant

- The WOMAC comparison between group A and B with mean of group A being 7.6534 and mean of group B being 7.2453.
- The SD value for group A is 2.8010 and The SD value for group B is 2.6808.
- The U value is 105 and P value is 0.7701 therefore result is not significant.



Graph 4 Comparison of Womac between Group A and B

## RESULTS

- According to table:1 The VAS comparison within group A and B with pre mean of group A being 6.333 and post mean being 5.733, whereas of group B pre mean being 5.733 and post mean being 4.
- According to table: 2 The t value is 4.298 and P value is 0.002 therefore result is significant.

## CONCLUSION

The retro-walking is much needed activity along with exercises for the osteoarthritis patients

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