EFFECTIVENESS OF RETROWALKING IN CHRONIC OSTEOARTHRITIS OF KNEE JOINT

Pradeep Shankar*, Renukadevi M. Adithi Bhandiwad, Harish Pai

Faculty Of Department Of Physiotherapy, J.S.S. College Of Physiotherapy, Mysore, India.

ARTICLE INFO

Corresponding Author:
Pradeep Shankar
Associate Professor, Faculty Of Department Of Physiotherapy, J.S.S. College Of Physiotherapy, J.S.S. Hospital Campus, Ramanuja Road, Mysore 570004. Karnataka. India.

Keywords: Retro Walking, Backward Walking, Osteo Arthritis of Knee, Biomechanics of Knee

ABSTRACT

Background and need; Knee osteo arthritis (OA) is a metabolically active, dynamic disease that includes both destruction and repair mechanism that may be triggered by biomechanical and mechanical insults. Mechanical factor such as dynamic joint loading have been implicated in knee OA patho mechanics. Several Biomechanical studies shown OA knee patients walks with more secondary compensatory gait pattern of decreased knee excursion, increased adductor moment and joint stiffness to overcome greater ground joint reaction force. This prolonged usage of secondary compensatory gait ends with greater reduction in muscular endurance, strength, imbalance later ending up deformity. So it is important to overcome these physiological changes to avoid further degeneration in knee. Several author conducted study on Backward walking in normal subjects, their study shown backward waking has more advantageous effects compare to forward in reducing shear force, increasing extensor moment, and to gain flexibility around knee. Considering its advantageous effect, study was proposed to find the efficacy of retro walking in chronic osteoarthritis of knee patients.

Methods; 30 subjects clinically diagnosed as OA and having grade 3 OA changes on radiological evaluation using Kellgren and Lawrence system and fulfilling inclusion criteria were selected in the study. All subjects underwent retro walking on 15 degree angle inclined motorized treadmill with (self tolerated ) minimal pace and gradually increased depending on the patients comfort up to 10 minutes for 10 days. Parameter on VAS, WOMAC, EXTENSION Lag AND DYNAMIC BALANCE THROUGH STEP TEST taken prior and immediately after 10th day of intervention.

Result; result were statistically analyzed using T test, there was highly significant improvement in all parameters with p<0.0001.

Conclusion; retro walking is highly effective in reducing symptom and overcome disability in patient suffering from chronic OA

©2013, IJMHS, All Right Reserved

Considering the advantageous effect of B.W. with respect to F.W. in decreasing the compressive load on knee, and improvising the muscular strength in functional range, study was hypothesized to find effectiveness of Back ward Walking or Retro Walking [R.W]training to overcome pain and physical dysfunction in patients suffering from chronic O.A knee.

The Objective of the study was to find 1) Retrowalking is effective in alleviating pain of O.A. knee patients 2) Retrowalking is effective in improving physical function of chronic O.A. knee 3) Retrowalking is effective in improving Balance in O.A. knee

MATERIAL AND METHOD;

30 Subjects both male and female of Mean age group of 50.23 years who clinically diagnosed as O.A. by Orthopedician and having grade 3 OA changes on radiological evaluation using Kellgren and Lawrence system and fulfilling inclusion criteria were selected in the study. Details of the study were explained to each subject and got signed in written informed consent form prior to enrollment in the trial. The study was approved by J.S.S. Research Ethics Committee. Subjects suffering from pain in the peripheral joints, Lumbar disc lesion, Neurological disorder [motor and sensory loss], cardio vascular disease and suffering from grade 4 or 5 OA were excluded from study.

INTERVENTION;

Prior to undergoing intervention each subjects base line measurement of parameter of the study such as Visual Anolog scale, Western Ontario and McMaster universities (WOMAC) index, extension lag, dynamic balance through Step Test were taken for each subject prior to their intervention.

A motorized Tread Mill with 15 Degree inclination made from floor were used in this study.

Subjects initially underwent forward [F.W.] walking with minimal speed on a motorized treadmill with 15 degree inclination for duration one minute as a warm up and to get familiarized with equipment. Later speed was increased to their maximum tolerance and went Forward walking to extent of duration that stopped only when they report pain or discomfort. Time and distance covered in F.W. were recorded.

Same subject next day underwent retro walking [R.W] training on motorized treadmill to learn or to be familiar with R.W. Patients were instructed to hold the Rails of Tread mill for support while doing R.W. After taking rest for 20 min and being familiarized with R.W. Subjects underwent retro walking on 15 degree angle inclined motorized treadmill with (self tolerated) minimal pace and gradually increased depending on the patients comfort up to 10 minutes.

Subjects underwent 10 minutes retro walking, one session per day for 10 days. On 10th day parameter of VAS, WOMAC, extension lag were taken. Dynamic balance through step test was also recorded.

On 10th day Subject under went forward walking on motorized treadmill with their tolerated speed, they were stopped immediately once they report pain or discomfort. Time and distance covered on 10th day was noted.

Findings; Pre and post intervention Data were statistically analyzed using "paired T-test"

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.</th>
<th>Mean Difference</th>
<th>T- Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>91.16</td>
<td>164.5</td>
<td>30</td>
<td>89</td>
<td>5.6</td>
<td>1.03</td>
<td>82.2</td>
<td>2.7</td>
<td>0.001</td>
</tr>
<tr>
<td>Pain</td>
<td>15.2</td>
<td>2.5</td>
<td>0.46</td>
<td>21</td>
<td>1.8</td>
<td>0.33</td>
<td>13.1</td>
<td>22.9</td>
<td>0.001</td>
</tr>
<tr>
<td>Stiffness</td>
<td>4.3</td>
<td>2.29</td>
<td>0.41</td>
<td>0.53</td>
<td>0.73</td>
<td>0.13</td>
<td>3.8</td>
<td>3.91</td>
<td>0.001</td>
</tr>
<tr>
<td>Physical function</td>
<td>41.3</td>
<td>7.0</td>
<td>1.27</td>
<td>6.26</td>
<td>3.8</td>
<td>1.27</td>
<td>35.1</td>
<td>35.7</td>
<td>0.001</td>
</tr>
</tbody>
</table>
The result of the study had shown highly significant improvement in all parameters of WOMAC index, and also on other parameter Extension lag, VAS and Dynamic Balance. Result also showed significant improvement on time, speed, and distance of forward walking following 10 days of B.W. intervention.

DISCUSSION
Knee O.A is a prevalent condition contributing significantly to functional limitation and disability. Numerous studies show secondary gait change pattern of O.A is due to pain, decreased muscle strength, instability and stiffness. Numerous studies revealed pain in O.A KNEE is due to increased abnormal ground reaction force loading on joint and decreased extensor moment. According to Mundermann et al [2005] decreased knee extension momentum is due to compensatory strategy to unload knee joint. Kinetic and kinematic variable in knee joint of O.A include, decreased knee flexion angle, decreased knee extension moment, increased hip extension moment at the beginning of single leg stance and decreased flexion momentum at the end of single leg stance. There will be increased in leg stiffness adaption at the end of single leg stance to gain stability while accepting body weight. This adaptation gradually increases stiffness of knee joint, increases extension lag and reduces their balance. The results showed significant improvement in all parameter following Retro walking intervention, shows normalizing kinetic and kinematic variable.

According to Arata[1999], Batta[1980] from research work stated numerous performance differences between B.W against F.W, they are as follows.

<table>
<thead>
<tr>
<th></th>
<th>PRE MEAN</th>
<th>S.D</th>
<th>S.E</th>
<th>POST MEAN</th>
<th>S.D</th>
<th>S.E</th>
<th>MEAN DIFFERENCE</th>
<th>T-VALUE</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension lag</td>
<td>13.6</td>
<td>9.5</td>
<td>1.7</td>
<td>2.23</td>
<td>2.7</td>
<td>0.50</td>
<td>11.3</td>
<td>6.44</td>
<td>0.001</td>
</tr>
<tr>
<td>VAS</td>
<td>8.0</td>
<td>0.80</td>
<td>0.14</td>
<td>1.8</td>
<td>1.2</td>
<td>0.23</td>
<td>6.23</td>
<td>27.9</td>
<td>0.001</td>
</tr>
<tr>
<td>Step Test</td>
<td>4.91</td>
<td>1.08</td>
<td>0.197</td>
<td>12.7</td>
<td>1.68</td>
<td>0.197</td>
<td>-7.8</td>
<td>31.0</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 2 Other parameter between pre and post Retro walking intervention

The result of the study had shown highly significant improvement in all parameters of WOMAC index, and also on other parameter Extension lag, VAS and Dynamic Balance. Result also showed significant improvement on time, speed, and distance of forward walking following 10 days of B.W. intervention.

CONCLUSION
The study concludes retro walking is effective in reducing symptom and overcoming physical dysfunction in Osteo Arthritis of knee.

ACKNOWLEDGEMENTS
I Acknowledge to His Holiness Sri Shivarathri Deshikendra Swamiji his valuable support to conduct this experiment. I Acknowledge my Principal A.V. Sunish, all Staff, P.G students and Interns of J.S.S. College of Physiotherapy. Mysore. Interest of conflict; Study was conducted on Grade 3 Osteoarthritis where Degenerative changes and deformities were minimal might have resulted in significant improvement. Long term effect and kinematic changes of retro walking in osteoarthritis yet to know. Further study required on these limitation. Acknowledge to all of my subjects, students of J.S.S. College of physiotherapy. Mysore

REFERENCES
