Efficacy of Kinesio Taping and Pilate Exercises on Pain and Range of Motion in Lumbar Spondylosis

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Abstract: Low back pain is one of the most common health problems in different communities of the world. The objective of this study was to investigate the effect of the pilate exercise and kinesio taping on pain and range of motion in the lumber spondylotic patient. For this purpose, 60 female subjects with lumbar spondylosis, with age range from 45 - 65 years, and the body mass index should be less than 35 participated in this study, they were randomly assigned in two equal groups. Group A: Received kinesio taping for four weeks and was changed once every week, Group B: Received pilate exercises program three times per week for four weeks. We used BROM instrument to measure the range of motion in lumbar spine and Visual Analogue Scale (VAS) to measure the intensity of the pain. The results of study indicated that there is significant effect of kinesio taping on pain and range of motion in lumber spondylotic patients.

Keywords: Kinesio taping, Pilate excercise, Lumber spondylosis.

Introduction

Lumbar spondylosis can be described as all degenerative conditions affecting the disks, vertebral bodies, and associated joints of the lumbar vertebrae. Within the literature, lumbar spondylosis encompasses numerous associated pathologies including spinal stenosis, degenerative spondylolisthesis, osteoarthritis and many others. It also captures effects of aging, effects secondary to trauma, “wear and tear,” degenerative disease that involve the intervertebral discs, vertebrae, and associated joints. The disease is said to be progressive and irreversible, mostly occurring in older patients. Exposure to mechanical stress, due to the loading of the spinal segments while standing and during spinal motion, causes the lumbar region to be the most affected region. When a patient suffers from lumbar spondylosis, osteophytes can form. These are bony overgrowths that occur due to the stripping of the periost from the vertebral body. The patient can also experience joint stiffness, which can limit motion.

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Experimental

Sixty patients diagnosed as lumbar spondylosis at the level of L3-L5 participated in this study. Their mean age was 45-65 years, and body mass index less than 35.

They were randomly distributed into two groups. Each group consisted of 30 patients and there was no significant difference between the two groups (age, height, weight). There are randomly selected and divided into equal group.

Group (A) : Received KT applied for four weeks and was changed once every week. Three times per week for four weeks as a home exercises program.

Group (B) : Received pilate exercises program three times per week for four weeks.

Evaluated Procedures

Patients were assessed just before and after 4 weeks of treatment. The assessment procedure included the following items.

- Pain assessment and range of motion assessment
  Pain was assessed by Visual Analogue Scale (VAS). It consisted of a horizontal line of 10 cm long, with anchors at either ends. The first anchor represents no pain while the last anchor represents pain as bad as it could possibly be. The patient was asked to place a mark through the line at the point that best describes how much pain was experienced. The measurement was taken as the distance from the zero end to the mark made by the patient. Visual analogue scale would give a valid data for chronic pain.

- Range of motion assessment:
  The BROM II (Back Range of Motion Instrument) measures range of motion of the lumbar and thoracic spine. The BROM II provides readings that can easily be produced by a second examiner. This procedure provides standardized protocol for four types of measurements: Flexion and Extension Measurements, Pelvic Tilt, Rotation Measurements, Lateral Flexion Measurements.

Treatment procedure:

- Taping procedure: Based on the work of Kase et al., H technique was used in the application of the Kinesiotaape. The patient was positioned in a flexed spinal position. The therapist applied 2 longitudinal Kinesio tape strips parallel to the spine from the base of the sacroiliac joint region, or a minimum 2 inches below the point of pain to the inferior angle of the scapula with tension of 20-25%. The third strip is a space correction technique, which is applied over the region of the greatest pain with 100% tension.

- Pilates based exercise
  Participants completed one hour of a supervised (1:4 ratio) Pilates exercise twice per week for 6-weeks. Each session included a 10-minute warm-up concentrating on movements of the trunk musculature. Participants were taught to find lumbar spine neutral (LSN) as the intermediate position between retroversion and anteversion. Activation and control of the TrA and MF muscles was established with expiration during diaphragmatic breathing in different positions (standing, sitting, supine, prone and four-point kneeling) based on the Pilates technique. The exercise intervention included the following Pilates movements, spine stretch forward, spine twist, single leg stretch, rolling, the hundred, diamond press, side kick and shoulder bridge. Exercise intensity and duration was progressed in accordance with the ACSM guidelines for chronic low back pain.
Result

Group A

A paired sample t test was applied to find the comparison of VAS no, VAS faces, Flexion, Extention, Lateral pending and Rotation before and after treatment of Group A. As shown, there was a significant increase in Flexion, Extention and Lateral pending RT and LT.

**Paired Sample t-test**

<table>
<thead>
<tr>
<th></th>
<th>Mean difference</th>
<th>d.f</th>
<th>t-value</th>
<th>p-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS No. before treatment-VAS No. after treatment</td>
<td>1.00</td>
<td>4</td>
<td>1.118</td>
<td>0.326</td>
<td>Not significant</td>
</tr>
<tr>
<td>VAS Faces before treatment-VAS Faces after treatment</td>
<td>0.60</td>
<td>4</td>
<td>2.449</td>
<td>0.070</td>
<td>Not significant</td>
</tr>
<tr>
<td>Flexion before treatment-Flexion after treatment</td>
<td>-1.20</td>
<td>4</td>
<td>-6.532</td>
<td>0.003</td>
<td>Significant increase</td>
</tr>
<tr>
<td>Extention before treatment- Extention after treatment</td>
<td>-1.70</td>
<td>4</td>
<td>-6.668</td>
<td>0.003</td>
<td>Significant increase</td>
</tr>
<tr>
<td>Lateral Pending RT before treatment-Lateral pending RT after treatment</td>
<td>-2.0</td>
<td>4</td>
<td>-3.65</td>
<td>0.022</td>
<td>Significant increase</td>
</tr>
<tr>
<td>Lateral Pending LT before treatment-Lateral pending LT after treatment</td>
<td>-1.8</td>
<td>4</td>
<td>-3.087</td>
<td>0.037</td>
<td>Significant increase</td>
</tr>
<tr>
<td>Rotation RT before treatment-Rotation RT after treatment</td>
<td>-0.40</td>
<td>4</td>
<td>-1.633</td>
<td>0.178</td>
<td>Not significant</td>
</tr>
<tr>
<td>Rotation LT before treatment-Rotation LT after treatment</td>
<td>-0.20</td>
<td>4</td>
<td>-1.00</td>
<td>0.374</td>
<td>Not significant</td>
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</tbody>
</table>

Group B

RESULT: A paired sample t test was applied to find the comparison of VAS no, VAS faces, Flexion, Extention, Lateral pending and Rotation before and after treatment of Group B. As shown, there was a slight significant increase in Flexion, Extention and rotation RT.

**Paired Sample t-test**

<table>
<thead>
<tr>
<th></th>
<th>Mean difference</th>
<th>d.f</th>
<th>t-value</th>
<th>p-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS No. before treatment-VAS No. after treatment</td>
<td>1.20</td>
<td>4</td>
<td>6.000</td>
<td>0.004</td>
<td>Significant decrease</td>
</tr>
<tr>
<td>VAS Faces before treatment-VAS Faces after treatment</td>
<td>0.40</td>
<td>4</td>
<td>1.633</td>
<td>0.178</td>
<td>Not significant</td>
</tr>
<tr>
<td>Flexion before treatment-Flexion after treatment</td>
<td>-0.65</td>
<td>4</td>
<td>-5.099</td>
<td>0.007</td>
<td>Significant slightly increase</td>
</tr>
<tr>
<td>Extention before treatment- Extention after treatment</td>
<td>-0.50</td>
<td>4</td>
<td>-3.162</td>
<td>0.034</td>
<td>Significant slightly increase</td>
</tr>
<tr>
<td>Lateral Pending RT before treatment-Lateral pending RT after treatment</td>
<td>-1.2</td>
<td>4</td>
<td>-1.500</td>
<td>0.208</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Lateral Pending LT before treatment-Lateral pending LT after treatment</td>
<td>-0.50</td>
<td>4</td>
<td>-2.236</td>
<td>0.089</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Rotation RT before treatment-Rotation RT after treatment</td>
<td>-0.80</td>
<td>4</td>
<td>-4.000</td>
<td>0.016</td>
<td>Significant slightly increase</td>
</tr>
<tr>
<td>Rotation LT before treatment-Rotation LT after treatment</td>
<td>-0.60</td>
<td>4</td>
<td>-2.449</td>
<td>0.070</td>
<td>Not significant</td>
</tr>
</tbody>
</table>
Comparison Of Group A and Group B

UnPaired T TEST

1. Comparison of Vas No. and Faces (Before and After Treatment) Between Group A and Group B
Fig 1 and Fig 2 are the graphs of comparison of VAS No. and Faces Between Group A and Group B.

2. Comparison of Flexion (Before and After Treatment) Between Group A and Group B:

Fig 3 and Fig 4 are the graphs of comparison of Flexion Between Group A and Group B.

3. Comparison of Extention (Before and After Treatment) Between Group A and Group B:

Fig 5 and Fig 6 are the graphs of comparison of Flexion Between Group A and Group B.
4. Comparison of Lateral Pending Rt, Lt (Before and After Treatment) Between Group A and Group B

![Bar Graph of comparison of lateral pending RT, Lt between Group A and Group B]

![Line Graph of comparison of lateral pending RT, Lt of Group A and Group B]

Fig 7 and Fig 8 are the graphs of comparison of Lateral pending RT, Lt Between Group A and Group B.

5. Comparison of Rotation Rt, Lt (Before and After Treatment) Between Group A and Group B

![Bar Graph of comparison of rotation RT, Lt between Group A and Group B]

![Line graph of comparison of rotation RT, Lt between Group A and Group B]

Fig 9 and Fig 10 are the graphs of comparison of rotation RT, Lt Between Group A and Group B.

Discussion

It was found that mean of Visual Analog scale for pain-number and faces decreased after treatment of Group A. Before treatment the mean of VAS No was 6 and it decreased to 5. Flexion and Extention increased after treatment of Group A. Before treatment the mean of Flexion was 7 and it increased to 8.20. And the mean of Extention was 5.80 before treatment which increased to 7.50, Lateral pending RT increased after treatment of Group A. Before treatment the mean of Lateral pending RT was 17 and it increased to 19. And the mean of Lateral pending LT was 18 before treatment which increased to 19.80, Rotation RT increased after treatment of Group A. Before treatment the mean of rotation RT was 9.60 and it increased to 10. And the mean of rotation LT was 9.80 before treatment which was increased to 10. Found that mean of Visual Analog scale for pain-number and faces decreased after treatment of Group B. Before treatment the mean of VAS No was 5 and it decreased to 3.80, Flexion and Extention increased after treatment of Group B. Before treatment the mean of Flexion was 6.30 and it was increased to 6.95. And the mean of Extention was 7.70 before treatment which...
increased to 8.20, Lateral pending RT increased after treatment of Group B. Before treatment the mean of Lateral pending RT was 19.60 and it increased to 20.80. And the mean of Lateral pending LT was 19.70 before treatment which increased to 20.20. Of Rotation RT increased after treatment of Group B. Before treatment the mean of Rotation RT was 9.20 and it increased to 10.00. And the mean of Rotation LT was 9.40 before treatment which increased to 10.00.

Recently Pilates based exercises have been increasingly incorporated into physiotherapy rehabilitation programmes. The Pilates technique focuses on the principles of centring, postural alignment, co-ordination, concentration, breathing, precision and movement sequencing. These principles aim to allow dysfunctional movement to be isolated perfected then integrated back into functional movement and teach control of spinal movement during activities of daily living.

The results of the present investigation are in accordance with Taylor et al. and Natour et al. who observed improvements in pain and self-reported disability after 6 and 12-week Pilates interventions respectively. However in contrast to our study Natour et al. measured functional disability using the Roland-Morris Disability Questionnaire which unlike the ODQ requires a response to all questions regardless of patient relevance.

Improvements in the perception of functional disability and pain as a result of the Pilates exercise may contribute to improvements in core muscle endurance and range of motion. CE improved post-intervention which is in accordance with the work of Natour et al. who purported that Pilates improved core strength because of higher levels of TrA contraction. In addition Kamioka et al. reported that there was strong evidence that in a healthy population Pilates exercise improved flexibility and enhanced muscular endurance in the short term.

**Conclusion**

From tables of group A: A paired sample t test is applied to find the comparison of VAS no, VAS faces, Flexion, Extention, Lateral pending and Rotation before and after treatment of Group A. There was a significant increase in Flexion, Extention and Lateral pending RT and LT.

From tables of group B: A paired sample t test is applied to find the comparison of VAS no, VAS faces, Flexion, Extention, Lateral pending and Rotation before and after treatment of Group B. There was a slight significant increase in Flexion, Extention and rotation RT.

**References:**

5. ACSM. Exercise management for persons with chronic diseases and disabilities. 3rd ed. Champaign, USA: IL Human Kinetics; 2009

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