EFFECTIVENESS OF THE MCKENZIE METHOD IN THE TREATMENT OF LOW BACK PAIN IN SUBACUTE AND CHRONIC STAGE

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(Original scientific paper)

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Abstract

Introduction: Low back pain is a highly prevalent condition worldwide. Physiotherapists commonly use a system of diagnosis and exercise prescription called the McKenzie Method to manage patients with low back pain. Objective: The main aim of this study was to evaluate the effectiveness of the McKenzie method treatment, in sub-acute and chronic low back pain. Material and methods: Our study was conducted between years 2009-2010, in General Hospital “Rezonanca”, in physical therapy care. We did a short-term, prospective study in duration of 15 days. The total number of patients enrolled in the study was 100, aged above 23 years, of both sexes. Patients were treated with McKenzie Method, the assessment was done before and after the treatment. We used the Numeric Rating Scale to assess the pain, and Modified Schober’s test for mobility. Results: McKenzie method increases the mobility and reduces the pain in the lumbar region more on sub-acute stage. Short-term treatment of patients, (on sub-acute and chronic stage) with the McKenzie method is more effective in reducing pain. McKenzie method is most effective in patients in sub-acute stage. Conclusions: Chronic low back pain patients need to be treated for longer periods, with the McKenzie Method. Our recommendation is to further research the efficacy of McKenzie method for longer periods, larger sample size, with randomized, crossed –over, double-blind, placebo-controlled treatment groups, in order to avoid bias.

Key words: Numeric rating scale, Schober, exercise program, extension, flexion

Introduction

Low back pain (LBP) is one of the most prevalent health conditions and the most expensive which affect the developed world (2,3,4,5). It is also one of the most common muscular-skeletal conditions treated by physical therapists (6). The aim of the research is to demonstrate the efficiency of the McKenzie method in treating pain in the lower back in sub-acute and chronic stage. The primary goal is to set the frequency of patients in sub-acute and chronic phase and compare the degree of pain according to Numerical Assessment Scale (Numeric Rating Scale), before and after treatment (15days). Secondary goal is to assess and compare the lumbar mobility, flexion and extension, according to Modified Shober's test in chronic and sub-acute phase.

Material & Methods

The research was conducted at the General Hospital "Rezonanca", in Pristina, in the period 2009-2010. The total number of patients included in the research was 100, aged about 23 years, of both sexes, with pain in the lower back for more than four weeks (sub-acute and chronic phases). The survey was short-term, lasting 15 days and prospective. The patients were underwent physical therapy by Reumatologist, orthopedist and neurosurgeon.

According to clinical evaluation, all patients were classified with Disorder Syndrome. The patients were treated with exercise program of McKenzie method, which represents the program of exercises of extension and flexion. The patients did exercises every day in the clinic, under the supervision of physiotherapist and continued the exercises at home. Repetition of exercises was performed for five times during the day, 5-10 repetitions of each exercise.

In the first visit and the second visit, after 15 days, the assessment of the degree of pain according Numerical Assessment Scale of pain (NRS) was conducted, range of active motion in the lumbar region was measured with Modified Shober's Test and Lasegue’s.
Statistical Analysis and presentation of data is done through tables. Data processing was done with the statistical package InStat. Of statistical parameters were calculated: arithmetic mean, standard deviation, and minimum and maximum values. For testing nonparametric data it is used the x2-test and Fisher's test, while for parametric data, the t-test was used. Verification of tests for the degree of reliability was 95% and 99%, respectively p <0.05 and p <0.01

Results

Table 1. Patients included in the study by age and sex

<table>
<thead>
<tr>
<th>Age</th>
<th>F</th>
<th>M</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>20-29</td>
<td>11 19</td>
<td>9 21.4</td>
<td>20 20</td>
</tr>
<tr>
<td>30-39</td>
<td>18 31</td>
<td>13 31</td>
<td>31 31</td>
</tr>
<tr>
<td>40-49</td>
<td>12 21</td>
<td>13 31</td>
<td>25 25</td>
</tr>
<tr>
<td>50-59</td>
<td>11 19</td>
<td>7 16.7</td>
<td>18 18</td>
</tr>
<tr>
<td>60-69</td>
<td>6 10</td>
<td>- -</td>
<td>6 6</td>
</tr>
<tr>
<td>Totally</td>
<td>58 100</td>
<td>42 100</td>
<td>100 100</td>
</tr>
</tbody>
</table>

The total number of patients enrolled in the study was 100 with low back pain, 43 or 43% of them where in sub-acute stage and 57 or 57% where in chronic stage. Higher frequency of age belonged to the age group 30-39 years 31%.

Regarding gender, the large number of female patients at greater frequency belonged to the age group 30-39 years, in contrast to the male patients who were slightly older, 30-49 years. (Table 1.)

Table 2. Statistical data of parameters of age by sex

<table>
<thead>
<tr>
<th>Age</th>
<th>F</th>
<th>M</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Average</td>
<td>41.6</td>
<td>38.6</td>
<td>40.3</td>
</tr>
<tr>
<td>SD</td>
<td>12.6</td>
<td>9.8</td>
<td>11.6</td>
</tr>
<tr>
<td>Min</td>
<td>24</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Max</td>
<td>69</td>
<td>58</td>
<td>69</td>
</tr>
<tr>
<td>T-test, P-value</td>
<td>T=1.286, P&gt;0.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The average age of the patients involved in the research was 40.3 years (SD ±11.6 years). The average age of female patients was 41.6 (SD ± 12.6 years), whereas male patients 38.6 years (SD ± 9.8 years). With T-test, we found no statistically important significance by gender (t = 1.286, P > 0.05) (Table 2).

Table 3. Values of Lasegue’s test before and after treatment (15 days)

<table>
<thead>
<tr>
<th>Lasegue’s test</th>
<th>Day 1</th>
<th>Day 15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Positive</td>
<td>57</td>
<td>57</td>
</tr>
<tr>
<td>Negative</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Totally</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>X2-testi</td>
<td></td>
<td>P&lt;0.01</td>
</tr>
</tbody>
</table>
On the first day of treatment, the Laseg’s test was positive in 57% of the patients, and 15 days after treatment, the Laseg test was positive only in 23% of patients. In all of our patients, with x²-test, we found statistically significant difference regarding the presence of a positive Lasegue test (P <0.001) (Table 3).

Table 4. Evaluation of pain before and after treatment (15 days) with the McKenzie method

<table>
<thead>
<tr>
<th>Pain rate</th>
<th>*NRS Day 1</th>
<th>*NRS Day 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Average</td>
<td>9.2</td>
<td>2.5</td>
</tr>
<tr>
<td>SD</td>
<td>0.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Min</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Max</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>T-test, P-value</td>
<td>T=37.87, P&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

The average pain, on the first day of evaluation, was 9.2 (SD ± 0.8) in the interval of 8-10 according to Numerical Rating Scale of pain. After treatment, this value is reduced, 2.5 (SD ± 1.5), the interval of 0-6. In the treatment of patients with McKenzie method, with the t-test we found statistical significance assessing the degree of pain before and after treatment (t = 37.87, P <0.001) (Table 4).

Table 5. Statistical data of Shober’s test in flexion, before and after treatment (15 days)

<table>
<thead>
<tr>
<th>Shober's test in flexion (cm)</th>
<th>Day 1</th>
<th>Day 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Average</td>
<td>4.2</td>
<td>6.8</td>
</tr>
<tr>
<td>SD</td>
<td>0.7</td>
<td>1</td>
</tr>
<tr>
<td>Min</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Max</td>
<td>6.0</td>
<td>8.3</td>
</tr>
<tr>
<td>T-test, P-value</td>
<td>T=38.85, P&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

Of all the patients included in the study, the average of flexion on the first day of evaluation was 4.2 cm (SD ± 0.7 cm), while on day 15 after treatment it was 6.8 cm (SD ± 1.0cm). With the T-test we found statistical significance measuring the flexion of the lumbar spine before and after treatment (1-15 days) (t-test = 38.85, P <0.001) (Table 5).

Table 6. Statistical data of Shober's test in extension, before and after treatment (15 days)

<table>
<thead>
<tr>
<th>Shober's test in extension (cm)</th>
<th>Day 1</th>
<th>Day 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Average</td>
<td>1.4</td>
<td>3.7</td>
</tr>
<tr>
<td>SD</td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Min</td>
<td>0.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Max</td>
<td>2.8</td>
<td>6.5</td>
</tr>
<tr>
<td>T-test, P-value</td>
<td>T=26.96, P&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

On the first day of the assessment, the average of extension of our patients was 1.4 cm (SD ± 0.6 cm), while on day 15 after treatment was 3.7 cm (SD ± 1.2 cm).

The interval of minimum and maximum value of the extension, on the first day of assessment was from 0.4cm-2.8cm and in day 15 from 1.3cm-6.5cm.

With T-test we found statistical significance measuring extension of the lumbar spine before and after treatment (15 days) (t-test = 26.96, P <0.001) (Table 6).
Table 7. Lasegue’s test results on the 15th day of treatment in relation to the stage of disease

<table>
<thead>
<tr>
<th>Lasegue’s test</th>
<th>Stage of disease</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chronic</td>
<td>Sub-acute</td>
</tr>
<tr>
<td>Positive</td>
<td>20</td>
<td>35.1</td>
</tr>
<tr>
<td>Negative</td>
<td>37</td>
<td>64.9</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100</td>
</tr>
<tr>
<td>Fisher’s test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the examination of our patients, on the 15th day after treatment with the McKenzie method, the Lasegue’s test has been more common in the chronic phase of the disease (35.1%) compared with those sub-acute (7%), which is expressed with high statistical significance (P <0.001) (Table 7).

Table 8. Statistical data on the degree of pain on the 15th day according to disease stage

<table>
<thead>
<tr>
<th>*NRS day 15</th>
<th>Stage of disease</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chronic</td>
<td>Sub-acute</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>43</td>
</tr>
</tbody>
</table>

During the examination of our patients, on day 15 after treatment, the average pain level was 2.5 (SD ± 1.5), in the interval of 0-6.

Regarding the stage of the disease, the average rate of pain in chronic phase was slightly higher 2.9 (SD ± 1.3), compared with sub-acute phase 2 (SD ± 1.6).

In treating patients with the McKenzie method, the degree of pain and 15 days after treatment was higher in patients in the chronic phase, which is also featured with statistical significance (t-test = 3.10, P <0:01) (Table 8).

Table 9. Statistical data of Shober’s test in flexion (cm) on the 15th day, according to the stage of disease

<table>
<thead>
<tr>
<th>Shober’s test in flexion (cm)</th>
<th>Stage of disease</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chronic</td>
<td>Sub-acute</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>43</td>
</tr>
</tbody>
</table>

Of all our patients, on day 15 after treatment, the average of flexion was 6.8 cm (SD ± 1cm), interval from 4.2cm-8.3cm.

Regarding the stage of the disease, the average of flexion was higher 7.2 cm (SD ± 0.8 cm) in sub-acute stage, compared with chronic 6.4 cm (SD ± 1.0cm).

With T-test we found statistical significance in degree of flexion by stage of disease 15 days after treatment (t-test = 4.31, P <0.001) (Table 9).
Table 10. Statistical data of Shober's test in extension (cm) on the 15th day, according to the stage of disease

<table>
<thead>
<tr>
<th>Shober's test in extension (cm)</th>
<th>Stage of disease</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chronic</td>
<td>Sub-acute</td>
</tr>
<tr>
<td>N</td>
<td>57</td>
<td>43</td>
</tr>
<tr>
<td>Average</td>
<td>3.2</td>
<td>4.4</td>
</tr>
<tr>
<td>SD</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Min</td>
<td>1.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Max</td>
<td>6</td>
<td>6.5</td>
</tr>
<tr>
<td>T-test, P-value</td>
<td>(T=5.40, P&lt;0.001)</td>
<td></td>
</tr>
</tbody>
</table>

In the 15th day after treatment, the average of extension in our patients in the chronic phase of the disease was 3.7 cm (SD ± 1.2 cm), interval from 1.3 cm-6.5 cm.

Regarding the stage of the disease, the average values for patients who have chronic phase have been met lower 3.2 cm (SD ± 1.1 cm), compared with sub-acute phase, 4.4 cm (SD ± 1.1 cm).

T-test found statistical significance degree of extension by stage of disease, 15 days after treatment (t-test = 5.40, P <0.001) (Table 10).

Discussion

Pain in low back is the most frequent cause of disability. Epidemiological studies have generally considered that the risk factors for the onset of back pain are interconnected in three dimensions: individual factors and lifestyle, physical or biomechanical factors, and psychosocial factors.

Brian et al. (83), in reviewing the literature, they concluded that the McKenzie method is a highly effective program for patients with non-specific back pain. McKenzie method appears to be an effective technique in reducing the pain in the spin, compared with other forms of conservative treatment.

Skikiç et al. (84) came to the conclusion that, according to McKenzie, exercises for low back pain are useful treatment in increasing flexibility and improving back pain. These data are similar to our paper records in terms of increasing flexibility and reducing pain.

Helen et al. (85) supported the extension measurement with the modified Schober’s test for patients treated with McKenzie method.

Clare et al. (86) through a review of literature on DARE, CINAHL, CENTRAL, EMBASE, MEDLINE and Pedro have come to the conclusion that the McKenzie method in treating short-term (<3 months) of patients with low back pain presents the greatest results in reduction of pain and disability, despite other standard therapies. Related data has been found by Brian et al. (83).

In our research, the duration of treatment, with the McKenzie method was 15 days, with approximate Skikiç et al. (84). The same authors have confirmed that the average time of treatment of patients with McKenzie method is 15.5 days.

Petersen et al. (87), in 2002, in their paper lasts 8 months, have compared the effectiveness of the McKenzie method of addressing the intensive dynamic strengthening of patients in chronic phase and sub-acute. They, at first assessment, found a difference in reducing disability in favor of McKenzie group, after 2 months of treatment, but no significant difference in the degree of pain. According to them, after 8 months of treatment, both forms of treatment have the same effect in patients with low back pain in chronic phase and sub-acute.

Conclusion

Short-term treatment of patients with low back pain in sub-acute and chronic stage with the McKenzie method is more effective in reducing pain, and is more effective in sub-acute stage, increasing mobility and reducing pain.

Chronic low back pain patients need to be treated for longer periods, with the McKenzie Method. Our recommendation is to further research the efficacy of the Mckenzie method for longer periods, larger sample size, with randomized, crossed –over, double-blind, placebo-controlled treatment groups, in order to avoid bias.

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