EVIDENCE-BASED EVALUATION AND CURRENT PRACTICE OF NON-OPERATIVE TREATMENT STRATEGIES FOR LUMBAR STENOSIS

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ABSTRACT
Objective: A number of non-operative treatment protocols have been proposed in the literature for lumbar stenosis. However, the available primary research describes inadequately the employed protocol. This causes difficulties in distinguishing which interventions are more effective in reducing symptoms.

Methods: We reviewed existing studies in order to promote the construction of an evidence-based strategy for non-operative treatment rehabilitation of lumbar stenosis patients. Randomized controlled trials describing insufficiently the non-operative treatment rehabilitation protocols were excluded since the results may not direct this review towards a favorable treatment plan.

Results: A protocol has been outlined to inform the clinician and to elucidate the effectiveness of non-operative treatment through randomized controlled trials. The results of this study indicate that a comprehensive exercise and manual therapy protocol is more effective in reducing symptoms than a less intensive exercise program.

Conclusions: A comprehensive non-operative treatment comprising of flexion exercises, manual therapy and treadmill exercises appears to be more beneficial in reducing symptoms than a less vigorous program comprising of flexion exercises, treadmill training and home exercise.

Key words: spinal stenosis, rehabilitation, physical therapy

INTRODUCTION
Spinal stenosis is characterized by narrowing of the spinal canal, nerve root canal and/or intervertebral foramina which may result in neural tissue compression.1 Symptoms of lumbar stenosis may include pain in the lower back, groin and leg (unilaterally or bilaterally), weakness or numbness. Neurogenic claudication is a symptom that is not reported by all patients.2,3 When present, it is experienced as pain, paresthesia or cramping of one or both legs. Standing and walking aggravates symptoms while sitting relieves symptoms.2-4 The impact of symptoms is variable depending on the individual and may potentially guide treatment to operative or non-operative intervention.

The selection of treatment grossly depends on patients’ symptoms due to the fact that there is still insufficient evidence to compare non-surgical and surgical treatments.5,6 The goals of treatment are pain relief and improvement in daily activities.4 Non-operative treatment is generally accepted to be the first step for the treatment of lumbar stenosis.7-9 Still, recommendations in non-operative treatment are based on expert opinion rather than primary research.4 It could be assumed that there is insufficient research to support an evidence-based rehabilitation strategy. In addition, the available studies do not describe adequately the employed protocols. According to Atlas and Delitto the reason for that is not lack of research, but the unclear therapeutic protocols in the available studies.4 Furthermore, methodological weaknesses prevent research studies
from being considered to create an evidence-based practice outline, such as lack of randomization, small sample sizes, non-validated outcome criteria and short-term follow-up.

**AIM**

The purpose of this review was to critically appraise randomized controlled trials with a clear outline of the non-operative treatment rehabilitation approach, and to promote the formation of evidence-based strategy.

**METHODS**

The inclusion criteria were randomized controlled trials (RCTs) outlining or describing a rehabilitation protocol. Exclusion criteria were: non randomized clinical studies, no mention or vague rehabilitation protocols, and studies employing different regimens in a single non-operative treatment group, thus prohibiting any conclusions on the efficacy of a specific rehabilitation program. The required level of precision for the rehabilitation protocol was a description of type of exercises (e.g. flexion exercises) and modalities or other forms of intervention such as treadmill training and patient education.

**SEARCH STRATEGY**

MEDLINE electronic database was searched for Medical Subject Headings (MeSH) related to lumbar stenosis. The MeSH term “spinal stenosis” was retrieved. The search was restricted to “rehabilitation” and “therapy” subheadings, and was further limited to RCTs and English language. Search results yielded 35 RCTs; only four of these met the inclusion criteria set for the purpose of the present study. The data were abstracted using methods from the Cochrane Collaboration Back Review Group, and study quality was assessed with the assistance of the Consolidated Standards of Reporting Trials (CONSORT) Checklist by the authors and an independent blinded reviewer. The described search strategy was also conducted for CINAHL, EMBASE and PEDro databases.

**ASSIGNMENT TO TREATMENT GROUPS**

Subjects in all studies were randomly assigned to treatment groups. Whitman et al. and Malmivaara et al. used a computer generated randomization scheme in blocks. Subjects in the study of Malmivaara et al. on the event of an exacerbation during non-operative treatment, reserved the option of selecting surgical intervention. Amundsen et al. and Pua et al. used blocked randomization (tables of random numbers); Amundsen et al. performed randomization in part of the sample (31/100). The remaining 69 subjects were assigned to either surgery (n = 19) or non-operative treatment (n = 50) based on the intensity of pain. Physicians used to choose surgical over non-operative treatment when the symptoms experienced were severe; otherwise non-operative treatment was preferred.

**INCLUSION CRITERIA FOR SYMPTOMS AND SAMPLE CHARACTERISTICS**

Common inclusion criteria for symptoms across all studies were low back and leg pain aggravated by walking and relieved by sitting. Exclusion criteria were previous spinal surgery, herniated disc, spondylosis or spondylolisthesis. Table 1 summarizes inclusion/exclusion criteria and sample/group characteristics of these studies.

Amundsen et al. included patients with leg pain, with or without back pain but not patients with disc herniation. Patients with spondylosis were not included, nor was it mentioned whether spondylolisthesis was found in the subjects of their study. Malmivaara et al. included patients with back and leg pain aggravated by walking. Patients with disc herniation diagnosed over the last 12 months and spondylosis or spondylolisthesis were excluded. Whitman et al. included patients with low back and leg pain improved by sitting or standing and aggravated by walking, degenerative disc disease and spondylosis/spondylolisthesis; and four and eight patients in their study demonstrated lumbar retrolisthesis in the Flexion and manual therapy and exercise group respectively, and nine and 15 patients in the same groups presented with anterolisthesis. Pua et al. included patients with low back or leg pain that was relieved in a sitting position compared to walking and standing, and spondylolisthesis of less than 5 mm. Regarding the spinal stenosis levels that were surgically decompressed, Amundsen et al. stated that 8% of the patients underwent a single spinal level operation, 52% of the patients 2 levels, 29% of the patients 3 levels, and 11% of the patients 4 levels. Malmivaara et al. reported operation only in one or two levels, while Pua et al. and Whitman et al. did not report the levels of spinal stenosis.

Although, the mean age of the patients was similar in all three studies, the age range in the study of Amundsen et al. was significantly higher; the mean age was 59 years and age range was 16-77 years. In addition, in their study, ten patients of...
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Malmivaara et al.\textsuperscript{13} utilized standard radiographs, computed tomography scans (CT), magnetic resonance imaging (MRI), and myelography; in their study, diagnosis was established upon spinal canal narrowing of the sagittal diameter of the dural sac of less than 10 mm\textsuperscript{2}, or planimetrically assessed cross-sectional dural area of less than 75 mm\textsuperscript{2}. Whitman et al.\textsuperscript{12} utilized MRI, and Pua et al.\textsuperscript{15} used either MRI scans or radiographs. Diagnostic imaging modalities selected by Amundsen et al.\textsuperscript{14} is unclear. In their study, diagnostic imaging criteria included imaging findings of stenosis through compression of clinically affected nerve roots.

**TREATMENT COMPARISON ACROSS STUDIES**

There are significant differences across studies regarding non-operative treatment protocols for spinal stenosis (Table 2). The exercise group in the study by Whitman et al.\textsuperscript{12} followed a program of flexion exercises and a progressive treadmill training and home exercise program for 6 weeks, while the manual therapy exercise group followed a program of manual therapy in addition to a comprehensive exercise regimen and a treadmill training and home exercise program for 6 weeks. Pua et al.\textsuperscript{15} compared the outcomes of two 6-week non-operative treatment protocols consisting of heat, lumbar traction, flexion exercises in a daily home exercise program, and treadmill walking program with body weight support or cycling. Malmivaara et al.\textsuperscript{13} reported that non-operative treatment groups received only 1-3 sessions of physical therapy including trunk muscle stretching and endurance training along with non-steroid anti-inflammatory medications, training pain relieving postures, ergonomics and a printed brochure. The second group underwent surgery.

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**Table 1. Characteristics of the studies: inclusion criteria, samples and groups**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Amundsen et al.\textsuperscript{14}</th>
<th>Whitman et al.\textsuperscript{12}</th>
<th>Malmivaara et al.\textsuperscript{13}</th>
<th>Pua et al.\textsuperscript{15}</th>
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<tr>
<td><strong>Inclusion criteria:</strong></td>
<td>Leg pain with or without low back pain; imaging signs of stenosis and compression of the clinically affected nerve roots.</td>
<td>More than 50 years of age; low back and leg pain; lumbar spine nerve root(s) compression; relief of symptoms during sitting position compared to standing or walking.</td>
<td>Back and leg pain; fatigue and loss of sensation in lower limbs aggravated by walking; persistent pain without neurological deterioration; spinal canal narrowing: &lt; 10 mm\textsuperscript{2} sagittal diameter of the dural sac, or &lt; 75 mm\textsuperscript{2} planimetrically assessed cross-sectional dural area; more than 6 months duration of symptoms and signs.</td>
<td>More than 50 years of age; history of back pain; body mass index less than 38 kg/m; lumbar spinal stenosis on MRI or x-ray; back or leg pain during walking or pain while sustaining spinal extension in the quadruped position for 30 seconds, relief in sitting compared to walking or standing.</td>
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<tr>
<td><strong>Exclusion criteria:</strong></td>
<td>Bulging or disc herniation; spondylolysis; coxarthrosis; gonar-throsis; arterial insufficiency in legs; polyneuropathy; deteriorated general health status; previous back surgery.</td>
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<table>
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<th>Sample and groups</th>
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<tbody>
<tr>
<td>n = 69</td>
<td>Surgical (n = 19, 13 randomly allocated). Non-operative treatment group (n = 50, 18 randomly allocated) based on pain intensity. Intense or intolerable pain led to allocation to surgery group.</td>
<td>n = 58</td>
<td>Two non-operative treatment groups (n=29 each group).</td>
<td>n = 94</td>
</tr>
</tbody>
</table>
A thoracolumbar orthosis was applied in the patients of the non-operative and surgical treatment groups of Amundsen et al.\textsuperscript{14} in order to stabilize the spine and facilitate wound healing. After one week, all patients were assigned to rehabilitation for 1 month. Patient education and “back school” was provided and sitting was not permitted; still, patients were encouraged to walk normally and avoid pain. Patients of both groups remained in hospital for a total of one month. The thoracolumbar orthosis was worn for another month, and at the third month it was gradually removed. At the end of the fourth month, all patients of both groups began physical therapy including ambulation - physical training and stabilizing exercises.

Generally, anti-inflammatory and analgesic medications are prescribed to patients for pain relief but they may influence the results of non-operative treatment. Whitman et al.\textsuperscript{12} attempted to reduce the confounding influence of medication on results and requested patients to avoid changes in dose during treatment and follow up. Furthermore, an inclusion criterion was that epidural steroid injections should have taken place over 6 months before initiation of treatment. Amundsen et al.\textsuperscript{14} noted differences in reports of use of analgesics which were later considered to be unreliable.

**Follow-up**

The largest follow-up was that of Amundsen et al.\textsuperscript{14} (10 years) followed by the study by Malmivaara et al.\textsuperscript{13} (2 years) and Whitman et al.\textsuperscript{12} (1 year). The study by Pua et al.\textsuperscript{15} employed no follow-up measurements.

**Outcome Criteria**

Outcome criteria used by Amundsen et al.\textsuperscript{14} included pain as evaluated by a visual analogue scale (0-10 scale), level of daily activities, claudication distance, socioeconomic status, and self-assessment of patients in a scale of excellent, fair, unchanged,
or worse (Table 3). Malmivaara et al. used the Oswestry Disability Index to measure functional disability, and a visual analogue scale (0-10 scale) for leg and back pain. Self reported and measured walking capacity test was performed at 2.5 km/h for a maximum of 30 minutes and a total of 1.25 km. The global rating of change (GRC) scale was used in the study by Whitman et al. The GRC scale is a 15-point scale (range from -7 to +7); positive values indicate perceived amount of improvement in symptoms and vice versa, and zero indicates no change. Secondary measures were the Modified Oswestry Disability Index, the Satisfaction Subscale of spinal stenosis scale (SSS), the Numerical Pain Rating Scale (NPRS), a measure of satisfaction, and a treadmill-walking tolerance test that included 15 min walking and 10 minute of rest followed by 15 min of walking in 15% inclination. Pua et al. employed the modified Oswestry Disability Index, the Roland Morris Disability Questionnaire, a visual analogue scale for pain (100 mm), and a self-assessment of patients’ benefit from treatment in a 6 point scale of completely better, much better, better, same, worse, much worse.

### OUTCOMES

The Oswestry Disability Index was reduced in both groups ($p=0.01$) in the study of Malmivaara et al., thus functional ability was improved in both groups. Leg and back pain levels were reduced at 6 months and at the later follow-up ($p=0.02$ and $p=0.0003$, respectively). Measured walking ability was comparable.

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**Table 3. Outcome measures, criteria and results**

<table>
<thead>
<tr>
<th>Outcome measures and criteria</th>
<th>Amundsen et al.</th>
<th>Whitman et al.</th>
<th>Malmivaara et al.</th>
<th>Pua et al.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual analogue scale for pain intensity in daily activities, claudication, effect of bending forwards or backwards.</td>
<td>Global rating of change (30% difference in success rate termed as “perceived recovery”), Modified Oswestry Disability Index, Satisfaction Subscale of spinal stenosis scale (SSS), Numerical Pain Rating Scale (NPRS), measure of satisfaction, treadmill-walking tolerance (2 x 15 min walk with 10 min rest, 15% inclination).</td>
<td>Oswestry Disability Index, back/leg pain, measured walking ability.</td>
<td>Modified Oswestry Disability Index, Roland Morris Disability Questionnaire, pain severity, patient perceived benefit.</td>
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</table>

**Results**

- The surgery group showed better results than the non-operative treatment group, comparable to the randomized surgery group.
- The non-operative treatment group showed better results than the randomized group but decreased over time.
- More patients from manual therapy group than the exercise group ($p = 0.0015$) recovered at 6 weeks. At 1 year, threshold of perceived recovery decreased in manual therapy group but demonstrated better results. Disability and satisfaction scores, and treadmill walk test favored manual therapy group.
- Functional ability improved in both groups ($p = 0.01$) at all follow-up examinations (6-12-24 months). Back and leg pain improved in both groups at 6 months. At the latest examination, scores leveled off, and back and leg pain was less in the surgery group. Measured walking ability was comparable.
- Body weight supported treadmill walking is comparable to cycling.
ability at 6, 12 and 24 months was comparable in both groups; no statistically significant difference between groups was demonstrated.

In the study by Pua et al.\textsuperscript{15} the difference between groups in the modified Oswestry Disability Index (MODI) during the first 3 weeks was -3.6 (95% confidence interval [CI]) and -6.6 (95% CI), and at 6 weeks was -7.1 (95% CI) for the treadmill group and -8.8 (95% CI) for the cycling group. The difference between the treadmill and the cycling groups was 3.2 (95% CI) and 2.1 (95% CI) for weeks 0-3 and 3-6, respectively. Small differences were observed in the Roland Morris questionnaire. At 6 weeks, the between-group difference in pain severity increased to 2 mm on a 100 visual analogue scale (95% CI, -5 to 10) from 1 mm on week 3 (95% CI, -6 to 8). The authors concluded that both interventions may be comparably effective, but improvement could be due to the natural course of recovery of spinal stenosis and treatment.

Whitman et al.\textsuperscript{12} reported that more patients of the manual therapy and exercise group than the exercise group (p = 0.0015) recovered at 6 weeks. At 6 weeks, 79% of the patients of the manual therapy and exercise group met the threshold of perceived recovery compared to 41% of the exercise group, while at one year, the respective percentages for both groups were 62% and 41%. At the latest follow-up, although the manual therapy and exercise group demonstrated better results, no statistically significant difference was observed between the groups. Disability scores, Satisfaction scores and Treadmill walking tests were higher for the manual therapy and exercise group. Secondary outcomes favored manual therapy group except NPRS for lower extremity symptoms up to 1 year (not statistically significant difference).

At 6 months, 1 and 4 years, Amundsen et al.\textsuperscript{14} reported good results in 70%, 64% and 57% of the patients in the non-operative treatment group (n= 50), 79%, 89% and 84% of the patients in the surgery group (n= 19), 39%, 33% and 47% of the patients in the Randomized non-operative treatment group, and 92%, 69% and 92% of the patients in the Randomized surgery group, respectively. Up to 4 years, the surgery group reported more back pain than the non-operative treatment group; however, at 10 years there was no difference.\textsuperscript{14} Homogeneity in baseline characteristics between the treatment groups such as age or gender was observed, rendering the groups comparable. Furthermore, assigning the sample or part of the sample to a treatment that is more suitable according to researchers, also known as clinical equipoise, is an important ethical consideration often overlooked in practice.\textsuperscript{17} Since researchers in the study found one of two treatments appropriate, the most suitable should be provided. This method of sample selection is also closer to real life practice rather than random allocation.

The eligibility of patients for non-operative

1/5 of patients reported claudication. The number of patients employed was reduced in both groups during the period of their study, which was largely due to the retirement of patients (40 out of 100), and was not related to spinal stenosis.\textsuperscript{14}

Only the studies of Whitman et al.\textsuperscript{12} and Pua et al.\textsuperscript{15} reported their study power and their sample size was large enough to demonstrate treatment effect. Therefore, the significance of their results on the effect of physical therapy is outlined. A weakness of the study of Amundsen et al.\textsuperscript{14} is that although there is a detailed account of their results, the p-values, the confidence intervals or other parameters signifying a statistical significant result were not reported. Therefore it is not known whether their results were statistically significant.

A high dropout rate was observed in the study by Pua et al.\textsuperscript{15}; 37% of their patients missed at least one measurement appointment. Amundsen et al.\textsuperscript{14} report the death of 3 patients in the first 4 years, and 11 in the remaining 6 years; still, no death was due to spinal stenosis. Patients who experienced unsatisfactory pain relief underwent surgery. In the study of Whitman et al.\textsuperscript{12} three dropouts took place after 6 weeks, and 9 patients did not take the treadmill test at 12 months, although they underwent training, because of associated general health problems.

DISCUSSION

The clinical study of Amundsen et al.\textsuperscript{14} was considered in this review, although it was partly an RCT. Results were reported independently for the randomized and non-randomized groups, a fact which enables individual consideration of the results of the randomized sample. The authors assigned their patients to either surgery or non-operative treatment based on the intensity of pain. Up to 4 years, the surgery group reported more back pain than the non-operative treatment group; however, at 10 years there was no difference.\textsuperscript{14} Homogeneity in baseline characteristics between the treatment groups such as age or gender was observed, rendering the groups comparable. Furthermore, assigning the sample or part of the sample to a treatment that is more suitable according to researchers, also known as clinical equipoise, is an important ethical consideration often overlooked in practice.\textsuperscript{17} Since researchers in the study found one of two treatments appropriate, the most suitable should be provided. This method of sample selection is also closer to real life practice rather than random allocation.
treatment in the study of Whitman et al.\textsuperscript{12} is unclear. The authors included patients with low back and leg pain improved by sitting or standing and aggravated by walking, degenerative disc disease and spondylolysis / spondylolisthesis. The authors concluded that more patients of the manual therapy and exercise group than the exercise group (p = 0.0015) recovered at 6 weeks, without, however, a significant difference at the latest follow-up. However, the trial included patients that were probably not fit for surgery based on the fact that physicians did not appear to propose surgical treatment nor was there a part of the patients disqualified from the study in order to follow surgical treatment. Their patients might have been candidates for surgery.\textsuperscript{12} In that case the results would not apply to real life spinal stenosis patients undergoing non-operative treatment.

In the study of Malmivaara et al.\textsuperscript{13} myelography was performed instead of MRI; both imaging modalities appear to be of comparable diagnostic value and accuracy.\textsuperscript{7,18} In the study of Pua et al.\textsuperscript{15} the diagnostic imaging criteria for spinal stenosis were unclear and consisted of imaging signs of stenosis compression of clinically affected roots. The imaging assessment therefore raises doubt on the appropriateness of the selection of patients for the study.

A definite conclusion reached in the study of Whitman et al.\textsuperscript{12} was the beneficial effect of physical therapy for lumbar stenosis patients. The flexion exercise group included only a few exercises in the protocol, whereas the manual therapy and exercise group received comprehensive manual therapy treatment plus a much more extensive exercise program (in addition to a treadmill training program in both groups). Based on the results of this study it is suggested that a specialized physical therapy including a number of comprehensive exercises and manual therapy is more beneficial than a limited number of flexion exercises. This fact underlines the need for comprehensive physical therapy services in clinical practice and the incorporation of comprehensive physical therapy protocols in research.

Malmivaara et al.\textsuperscript{13} included patients with back and leg pain aggravated by walking to evaluate functional ability with and without surgery. In their study, the Oswestry Disability Index was reduced in both groups, thus functional ability was improved; leg and back pain levels were reduced at 6 months and at the latest follow-up, and no significant difference was observed between the two groups at the measured walking ability.\textsuperscript{13} Although the surgical treatment group demonstrating greater improvement, it should be emphasized that non-operative treatment group patients was restricted to only 1-3 sessions. Therefore, the poorer results in this group of patients could also be attributed to the lesser number of sessions. In addition, in their study, it cannot be estimated whether results in the non-operative treatment group would be improved if physical therapy was more comprehensive. It is also not clear whether all patients in the non-operative group received physical therapy. It is thus possible that a significant part of the non-operative treatment patients did not receive physical therapy services. The results in that case would reflect effectiveness of both non-operative treatment and non treatment, constituting a heterogeneous group in terms of treatment.

In the study of Amundsen et al.\textsuperscript{14} it is emphasized that in the non-operative treatment group physical therapy did not start until 4 months after the application of the thoracolumbar orthosis and “back school”. Therefore, this study does not provide evidence on the relief offered by a comprehensive rehabilitation protocol. Another significant element of this study is that the patients of the surgical treatment group followed the same postoperative treatment protocol as the non-operative treatment group patients. Therefore, this study did not compare the outcomes of non-operative versus surgical alone treatment, rather than non-operative versus surgical treatment plus post-surgical rehabilitation.

The use of medications in addition to physical therapy may influence outcomes and lead to greater improvements compared to treatment without medications. Although a change in dosage during treatment is likely in all studies and their confounding effect is possible, Whitman et al.\textsuperscript{12} recommended patients to avoid changes in doses if already using medications, to avoid altering symptoms.

Dropout rates were high in the study by Pua et al.\textsuperscript{15}; therefore it cannot be excluded that improvement might be due to the natural course of lumbar stenosis. Dropout bias was not observed in the other studies.

The outcome measures used in these studies are mainly subjective. Therefore, psychological and social factors interfere with scores; this may be a confounding factor, since other psychological or social issues might mask treatment effect either positively or negatively. If these subjective outcome measures were used in the present studies, it is speculated that the same confounding factors or
errors might be common in all these studies to a variable extent; thus if errors are common they may be ignored. On the other hand, objective measures would exclude such errors. However, this would not have taken into consideration the patients’ satisfaction that would be a significant weakness since the ultimate goal of treatment is improving quality of life which is by definition subjective.

The Oswestry Disability Index (ODI) is a valid and vigorous outcome measure, therefore it is widely used in research. The modified ODI used by Pua et al. is considered reliable and sensitive to change. The validity and reliability of the GRC scale used in the study of Whitman et al. is still unclear. However, it has to be underlined that the Oswestry Disability Index was also used and provided similar results.

Lumbar stenosis is a heterogeneous condition that should be approached multi-dimensionally, since treatment effects depend on patients’ clinical characteristics such as intermittent claudication, back and/or leg pain. Clinical examination and findings appear to lead to distinct subgroups of patients. It is evident through the present study that exercise is focused on the flexor muscles of the spine. Still it has to be highlighted that paraspinal muscle denervation and trunk extensor muscle function have been observed in patients with spinal stenosis. This fact underlines the need to include exercises for the spinal extensors in the exercise program.

We acknowledge that there is insufficient evidence to compare surgical and non-surgical treatments for lumbar stenosis; the selection of treatment grossly depends on patients’ symptoms. This should be attributed to insufficient research to support an evidence-based rehabilitation strategy and inadequately described treatment protocols from the available series. We performed this study aiming to clarify the results of previous studies and to provide evidence-based criteria for the treatment of patients with lumbar stenosis. In our practice, we evaluate the entire functional kinetic chain and the patients’ expectations and specific goal. In all patients, in the rehabilitation program in addition to passive modalities, manual therapy and patient education, we apply an active program consisting of flexion-based lumbar stabilization exercises, hip mobilization, proprioception training and general conditioning. The patients follow the program for 6 to 8 weeks, for 2-3 session per week. Pharmacologic treatment including analgesics such as acetaminophen and opioids, or non-steroidal anti-inflammatory medications are administered as necessary. Relative rest and activity modifications with specific instructions to avoid activities aggravating pain are routinely consulted in patients with pain. Bed rest is recommended rarely, if never. Delordosing spinal orthoses are also rarely prescribed, since we believe that they only aggravate the problem by causing further muscle atrophy and therefore spinal destabilization.

We evaluated the results of our practice using a pain analogue visual scale and the Oswestry Disability Index; based on the previously reported practice, most of our patients obtained a very good result in pain visual scales (more than 7-8 points) and the Oswestry Disability Index (minimal disability, less than 15%). However, since we used this rehabilitation program in all patients with lumbar spine disorders that are referred to our department from their treating orthopaedic surgeons and neurosurgeons, with or without surgical treatment, it is not possible to evaluate which primary treatment is more effective.

CONCLUSIONS

A comprehensive non-operative treatment protocol including flexion exercises, manual therapy and treadmill walking training appears to be more beneficial in reducing symptoms than a less vigorous protocol including flexion exercises, treadmill training and home exercise.

Non-operative treatment consisting of non-intensive exercises as described by Amundsen et al. and Malmivaara et al. has been observed to yield less encouraging results when compared to surgery. Therefore, the non-operative treatment protocol offered by Whitman et al. in the manual therapy and exercise group of patients might be considered as the most preferable non-operative treatment strategy, being the most comprehensive non-operative treatment group. Research has also shown that treadmill training could be replaced by cycling with comparable results.

Further research is necessary to establish the optimal rehabilitation treatment strategy for lumbar stenosis patients. Since the comprehensive non-operative treatment provides better results than less comprehensive treatment, it might be useful to compare the effects of comprehensive non-operative to surgical treatment.

REFERENCES

ДОКАЗАТЕЛЬСТВЕННО БАЗИРОВАННАЯ ОЦЕНКА И СОВРЕМЕННЫЕ ПОДХОДЫ К ЛЕЧЕНИЮ ЛЮМБАЛЬНОГО СТЕНОЗА

K. Balakatounis, K. Panagiotopoulou, E. Mitsiokapa, A. Mavrogenis, A. Angoules, J. Papathanasiou, P. Papageopoulos

РЕЗЮМЕ

Цель: В медицинской литературе сообщается о наличии нескольких протоколов относительно лечения люмбального стеноза. Первоначальные исследования, однако недостаточно хорошо описаны в литературе, что со своей стороны создает трудность при определении эффективности данного подхода для решения проблем заболевания.

Методы: С целью определить доказательственно базированную стратегию при консервативном лечении пациентов с люмбальным стенозом авторы ознакомились с имеющимися исследованиями в этом направлении. В работу не включены рандомизированные контролируемые исследования, которые подробно не описывают терапевтические протоколы реабилитации, так как их результаты не способствуют изготовлению хорошего плана лечения.

Протокол, определенный авторами в результате исследования, структурирован так, чтобы информировать клинициста и определить эффективность неоперабельного лечения посредством рандомизированных контролируемых исследований. Полученные результаты показывают, что протокол, при котором применяются целотелесная нагрузка и мануальная терапия более эффективен при лечении симптомов, чем программа физических упражнений с меньшей нагрузкой.

Выводы: Консервативное лечение, при котором включены флексионные физические упражнения, мануальная терапия и беговая дорожка, более эффективно справляется со симптомами заболевания, чем программа с меньшей нагрузкой, включающая флексионные упражнения, беговую дорожку и физическую нагрузку в домашних условиях.