

Physiotherapy in early phase of low back pain

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Abstract: Low back pain (LBP) is a substantial health problem and has subsequently attracted a considerable amount of research both in the early and chronic phases. Chronic, nonspecific LBP indicates limited effectiveness from most commonly applied interventions and approaches, but it seems to be opposite in the early phase. Intervention is more effective than advice on staying active in acute LBP, leading to more rapid improvement in function, mood, quality of life, and general health. We compared physiotherapy (PT) that involved 3–7 treatment sessions based on subclassification in early phase LBP (acute and subacute LBP lasting <3 months) to one session of PT that advised staying active, in 134 LBP patients. Low back and leg pain, disability, and days of sick-leave were evaluated. After 12 months, all groups had only minimal pain and disability. In the advice-only group, those patients who had radiating pain had less improvement compared with other groups, and increasing days of sick-leave because of LBP after 12 months. Compared with the advice-only group, orthopedic manual therapy and McKenzie methods seemed to be slightly more effective than one session of assessment in pain and disability.

Keywords: OMT, advice, low back pain

Introduction

Low back pain (LBP) is a substantial health problem and has subsequently attracted a considerable amount of research both in the early and chronic phase. Clinical trials evaluating the efficacy of a variety of interventions for chronic nonspecific LBP indicate limited effectiveness for most commonly applied interventions and approaches.¹ It seems to be opposite in the early phase. Gellhorn et al² have shown that there is a lower risk of subsequent medical service usage among patients who received physiotherapy (PT) early after an episode of acute LBP relative to those who received PT at later times. According to Wand et al³, intervention is more effective than advice on staying active in acute LBP, leading to more rapid improvement in function, mood, quality of life, and general health. The timing of intervention affects the development of psychosocial features.³ In a systematic review of randomized controlled trials (RCTs) on advice for the management of LBP, the authors concluded: “advice to stay active is sufficient for acute LBP”.⁴ No conclusions could be drawn as to the content and frequency of advice that is most effective for subacute LBP, due to the limited number and poor quality of RCTs. For chronic LBP, there is strong evidence to support the use of advice to remain active in addition to specific advice relating to the most appropriate exercise, and/or functional activities to promote active self-management.

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Classifying patients with nonspecific LBP into meaningful subgroups is thought to provide assistance for clinical management, and to increase the power of outcomes assessments, and has been targeted as an important research priority. The importance of classifying patients into homogeneous subgroups has been emphasized, and has been said to be one of the biggest challenges in physiotherapy.⁵ Use of homogeneous subgroups is considered by many experts to be essential for the improvement of clinical trials related to patient management and clinical outcomes.^{5–10}

We compared PT that involved 3–7 treatment sessions based on subclassification in early phase LBP (acute and subacute LBP lasting <3 months) to one session of PT that advised staying active.

Methods

Participants

Participants (N = 134) were selected according to the following inclusion criteria: working-aged, employed people with current nonspecific LBP with or without radiating pain to lower leg; patients who visited their occupational physicians 0–7 days after their last LBP episode and had started the first treatment on day 8 or later; and the back pain episode could be the first or recurrent. Exclusion criteria were: pregnancy, low back surgery less than 2 months previously, and ‘red flags’ that indicate serious spinal pathology.¹¹ Patients were randomized into three groups: 45 allocated to orthopedic manual therapy (OMT), 52 to McKenzie (or Mechanical Diagnosis and Therapy [MDT]), and 37 to the advice-only group¹² (Table 1).

In both treatment groups, the physical therapists treated their subjects independently by the method in which they

were certified. All treatments were provided to each individual participant by the same therapist. The OMT was carried out by a physical therapist with 20 years of clinical experience in this field. The McKenzie method was carried out by a physical therapist with 10 years of experience in this therapy method. The physical therapist who advised the subjects to stay active and continue normal daily living had 5 years of clinical experience in treating patients with LBP.

All the participants provided written informed consent before the study, and the study protocol was approved by the local ethics committee.

A power calculation determined that the study was slightly underpowered (needing 50 subjects/group).

PT

OMT group

In the OMT group, the participants were clinically assessed and classified into the five patho-anatomical and patho-mechanical subgroups.¹³ The group underwent pain treatment, specific mobilization or stabilization, spinal manipulation if indicated, and muscle-stretching techniques.^{14–16} Typically, between three and five individually selected home exercises were prescribed to actively stabilize or mobilize the lower back, and stretching exercises were to be performed once a day.

The McKenzie group

In the McKenzie group, the participants were clinically assessed and classified into the three mechanical syndromes.¹⁷ If a syndrome was present, then one of the treatment principles of mechanical therapy was selected as the management strategy. This consisted of an educational component,

Table 1 Baseline demographics of 134 patients allocated to receive OMT or McKenzie therapy or advice-only

| | OMT (n = 45) | McK (n = 52) | Advice-only (n = 37) |
|--|--------------|--------------|----------------------|
| Age | | | |
| Mean (SD) | 44 (10) | 44 (9) | 44 (15) |
| Gender | | | |
| Females/males (%) | 41/59 | 31/69 | 35/55 |
| History of present LBP episode | | | |
| Acute: 0–6 weeks (%) | 48 | 56 | 50 |
| Subacute: from 7 weeks to 3 months (%) | 52 | 44 | 50 |
| On sick-leave because of LBP (%) | 16 | 17 | 8 |
| History of LBP | | | |
| 0–5 episodes (%) | 54 | 52 | 54 |
| >6 episodes (%) | 46 | 48 | 46 |
| Symptom localization | | | |
| LBP only (%) | 29 | 19 | 31 |
| Radiating pain (%) | 71 | 81 | 69 |

Abbreviations: LBP, low back pain; McK, McKenzie method; OMT, orthopedic manual therapy; SD, standard deviation.

supported with the book, and an active therapy component that provided instructions on exercises repeated several times a day according to the principles of the approach.^{18–20}

Advice-only group

Participants in the advice-only group received 45–60 minutes counseling from a physiotherapist concerning good prognosis for LBP, pain tolerance, medication, and early return to work. For support, a two-page educational back booklet was also supplied.²¹ The patients in this group were told to avoid bed rest and advised to continue their routine as actively as possible, including exercise activities, within the limits permitted by their back pain.

Measurements

Low back and radiating pain

A visual analog scale (VAS) allowed the participant to rate current intensity of radiating leg and LBP from 0 to 100.²²

Disability

A 0–24-point scale Roland-Morris Disability Questionnaire allowed measurement of disability in daily activities in relation to LBP in the previous 3 months.²³

Sick-leave because of LBP

During the 3-, 6-, and 12-month follow-up points, participants were asked whether they had taken sick-leave for current LBP, and the number of sick-leave days after the last follow-up.

Effect sizes

Comparison of treatment effects between all groups was analyzed, calculating effect sizes according to the following categories: effect size of 0.2–0.3 to be a “small” effect, around 0.5 a “medium” effect, and >0.8, a “large” effect.²³

Data analysis

The means and differences between LBP patients in three different groups were calculated. For the significance in the difference between the groups, Student's *t*-tests for parametric distribution, and Mann–Whitney *U* test for nonparametric distribution were used.²⁵

Results

Treatment effects were compared between two PT approaches (OMT and McKenzie) and one counseling approach (advice). The absolute values of pain and disability indices and percentages of patients in sick-leave because of LBP at the 3-, 6-, or 12-month follow-up are shown in Table 2.

LBP (VAS)

At the 3-month follow-up point, back pain (VAS) decreased in all groups 12–21 mm from baseline, but there was no treatment effect when comparing therapy groups to the advice-only group. A small effect size (ES) of 0.3 was seen in the McKenzie compared with the advice-only group. After the

Table 2 Outcome measures at baseline, 3-, 6-, and 12-month follow-up visits

| | OMT (n = 45) | McK (n = 52) | Advice-only (n = 37) |
|-----------------------------------|--------------|--------------|----------------------|
| Baseline values | | | |
| Leg pain (VAS, mm) ^a | 20 (26.2) | 16 (25.4) | 16 (21.6) |
| LBP (VAS, mm) ^a | 35 (19.5) | 32 (19.7) | 37 (2.8) |
| Roland–Morris (0–24) ^b | 9 (5.7) | 9 (4.6) | 8 (4.1) |
| Sick-leave because of LBP (%) | 16 | 17 | 8 |
| Outcome measures at 3 mo | | | |
| Leg pain (VAS, mm) ^a | 6 (18.2) | 1 (8.4) | 4 (12.9) |
| LBP (VAS, mm) ^a | 18 (16.6) | 10 (15.4) | 17 (17.9) |
| Roland–Morris (0–24) ^b | 2 (4.9) | 1 (4.0) | 0 (4.2) |
| Sick-leave because of LBP (%) | 5 | 26 | 11 |
| Outcome measures at 6 mo | | | |
| Leg pain (VAS, mm) ^a | 4 (15.1) | 1 (7.1) | 8 (18.5) |
| LBP (VAS, mm) ^a | 14 (17.8) | 10 (10.3) | 22 (20.2) |
| Roland–Morris (0–24) ^b | 1 (3.8) | 0 (1.8) | 1 (4.9) |
| Sick-leave because of LBP (%) | 6 | 7 | 19 |
| Outcome measures at 12 mo | | | |
| Leg pain (VAS, mm) ^a | 2 (17.6) | 0 (10.5) | 8 (16.7) |
| LBP (VAS, mm) ^a | 11 (17.3) | 8 (19.4) | 16 (16.1) |
| Roland–Morris (0–24) ^b | 0 (3.7) | 1 (2.1) | 0 (4.5) |
| Sick-leave because of LBP (%) | 3 | 4 | 23 |

Notes: Values are mean and standard deviation. ^aSelf-reported measures included a VAS; ^b0–24 point scale on Roland–Morris Disability questionnaire.

Abbreviations: LBP, low back pain; McK, McKenzie method; mo, months; OMT, orthopedic manual therapy; VAS, visual analog scale.

6-month follow-up, back pain (VAS) decreased 20–24 mm in the therapy groups, and 4 mm in the advice-only group from baseline. There was a medium ES between the OMT and the advice-only group (0.42), and the McKenzie and advice-only group (0.76). At the 12-month follow-up, back pain (VAS) decreased in all groups 14–22 mm from baseline. Small ESs were found in the OMT (0.23) and in the McKenzie (0.17) groups compared with the advice-only group. Decrease of LBP at the 12-month follow-up was as follows: OMT 60%, McKenzie 59%, and advice-only 45% (Figure 1, Table 3).

Leg pain (VAS)

At the 3-month follow-up point, leg pain (VAS) decreased in all groups 12–15 mm from baseline. A small ES of 0.3 was seen in the McKenzie compared with the advice-only group. At the 6-month follow-up, leg pain decreased 15–16 mm in the therapy groups and 8 mm in the advice-only group from baseline. A medium ES was seen in the McKenzie (0.6) and in the OMT group (0.5) compared with the advice-only group. At the 12-month follow-up, leg pain was decreased 16–18 mm in the therapy groups and 8 mm in the advice-only group from baseline. A small ES was seen in the McKenzie (0.4) and in the OMT (0.3) groups compared with the advice-only group. Decrease of radiating leg pain at 12-month follow up was as follows: OMT 74%, McKenzie 75%, and advice-only 26% (Figure 1, Table 3).

Roland–Morris (R-M) disability

At the 3-month follow-up point, R-M disability was decreased in all groups 7–8 points. A small ES of 0.2 was seen in the McKenzie and in the OMT group compared with the advice-only group. At the 6-month follow-up, disability decreased in the therapy groups 8–9 points and 7 points in the advice-only group from baseline. A medium ES of 0.5 was seen in the OMT group compared with the advice-only group, and also in the McKenzie group compared with the advice-only group (ES: 0.7). At 12-month follow-up, disability was decreased in all groups 5–8 points from baseline. A medium ES of 0.8 was seen in the McKenzie group and in the OMT group (0.6) compared with the advice-only group. Decrease of disability index was at 12-month follow-up as follows: OMT 80%, McKenzie 85%, and advice-only 64% (Figure 1, Table 3).

Sick-leave (days)

At the 3-month follow-up point, days of sick-leave were decreased in the OMT group by 3 days, there was no change in the advice-only group, but there was an increase of 8 days in the McKenzie group from baseline. A medium ES of 0.6 was seen in the OMT group compared with the advice-only group, and an ES of 0.5 in the advice-only group compared with the McKenzie group. Change in days of sick-leave from baseline in the OMT group was –3 days and in the McKenzie group +8 days compared with the advice-only group. At the 6-month follow-up, days of sick-leave were

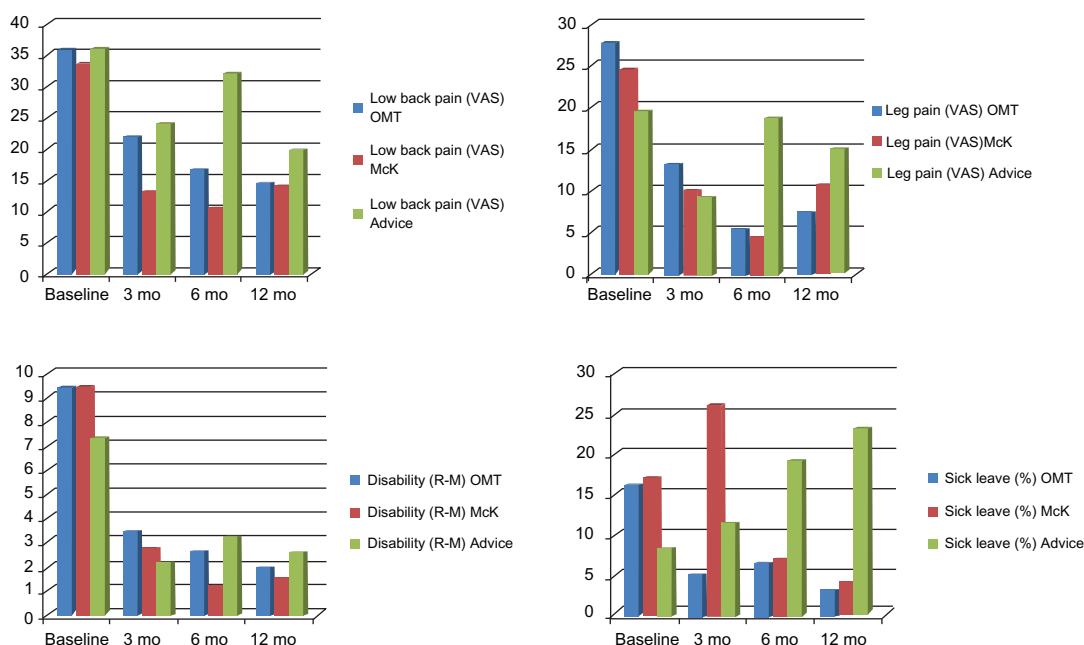


Figure 1 Low back pain (VAS), leg pain (VAS), disability (R-M), and sick leave (%).

Abbreviations: McK, McKenzie method; mo, months; OMT, orthopedic manual therapy; R-M, Roland–Morris; VAS, visual analog scale.

Table 3 The effect sizes between therapy groups (OMT and McK) compared with the advice-only group

| Low back pain | Effect size | Leg pain | Effect size |
|---------------------|-------------|---------------------|-------------|
| OMT vs Advice 3 mo | 0.04 | OMT vs Advice 3 mo | 0.15 |
| OMT vs Advice 6 mo | 0.42 | OMT vs Advice 6 mo | 0.52 |
| OMT vs Advice 12 mo | 0.23 | OMT vs Advice 12 mo | 0.35 |
| McK vs Advice 3 mo | 0.30 | McK vs Advice 3 mo | 0.34 |
| McK vs Advice 6 mo | 0.76 | McK vs Advice 6 mo | 0.61 |
| McK vs Advice 12 mo | 0.17 | McK vs Advice 12 mo | 0.41 |
| Disability | | Disability | |
| OMT vs Advice 3 mo | 0.17 | OMT vs Advice 3 mo | 0.50 |
| OMT vs Advice 6 mo | 0.54 | OMT vs Advice 6 mo | 0.53 |
| OMT vs Advice 12 mo | 0.59 | OMT vs Advice 12 mo | 0.35 |
| McK vs Advice 3 mo | 0.17 | McK vs Advice 3 mo | -0.62 |
| McK vs Advice 6 mo | 0.73 | McK vs Advice 6 mo | 0.52 |
| McK vs Advice 12 mo | 0.79 | McK vs Advice 12 mo | 0.11 |

Note: Effect size of 0.2–0.3 is a “small” effect, around 0.5 a “medium” effect, and ≥ 0.8 , a “large” effect.²⁴

Abbreviations: McK, McKenzie method; mo, months; OMT, orthopedic manual therapy.

decreased in the OMT group by 3 days, and 2 days in the McKenzie, and increased 1 day in advice-only group, from baseline. A medium ES (0.6) was seen in the OMT group and in McKenzie group compared with the advice-only group. Change in days of sick-leave from baseline in the OMT group was -4 days and in the McKenzie group -3 days compared with the advice-only group. At the 12-month follow-up, days of sick-leave were decreased in the OMT group by 3 days, but there was an increase of 1 day in the McKenzie and 4 days in the advice-only group, from baseline. A small ES (0.4) was seen in the OMT group compared with the advice-only group. Change in days of sick-leave from baseline in the OMT group was -7 days and in the McKenzie group -3 days compared with the advice-only group (Figure 1, Table 3).

Decrease in back pain (VAS) in 1-year follow-up was more than 20 mm in all groups. Decrease in leg pain (VAS) was in the OMT group 18 mm and 16 mm in the McKenzie groups, and 8 mm in the advice-only group. The minimally clinically important change (MCIC) for pain on VAS should be close to 20 mm.^{26,27}

Decrease in R-M disability was 9 points in the OMT group, 8 points in the McKenzie group, and 8 points in the advice-only group. The MCIC for functional disability measured with R-M should be at least 3.5 points.^{26,27}

At baseline, there were fewer days of sick-leave because of LBP in the advice-only group. But during treatment periods and 12-months follow-up there were more days of sick-leave in the McKenzie group compared with the OMT group, especially at the 3-month follow-up point ($P = 0.004$). Despite the increasing percentage of patients in sick-leave at 6- and 12-months follow-up in the advice-only group, the difference compared with other groups was not statistically significant ($P = 0.03$).

Discussion

At baseline, subjects in three subgroups did not differ from each other in disability or in low back or leg pain. Despite, half the patients having had more than six LBP episodes (Table 1), recurrences were few in the treatment groups during the 1-year of follow-up. Our results are in line with similar pragmatic studies.^{28–32} We showed the effectiveness of OMT and McKenzie type of PT during at least one year follow-up.

When comparing the effects of OMT and McKenzie with one counseling session with a physiotherapist (advice-only) on low back pain/leg pain, disability, and sick-leave, no significant differences emerged between the OMT and McKenzie groups in pain and disability scores at any follow-up point, except in sick-leave. Compared with the advice-only group, OMT and McKenzie methods seemed to be slightly more effective than was one session of assessment in pain and disability. This difference was seen usually at the 6-month follow-up point.

After 12 months, all groups had only minimal pain and disability. In the advice-only group, those patients who had radiating pain (leg VAS) had less improvement compared with other groups, and increasing days of sick-leave because of LBP after 12 months.

Advice to stay active has for a long time been recommended as best practice in international evidence-based guidelines for the management of acute LBP, despite there being some conflicting evidence.³³ Malmivaara et al³⁴ concluded that among patients with acute LBP, continuing ordinary activities within the limits permitted by the pain leads to more rapid recovery than either bed rest or back-mobilizing exercises. The McKenzie method and chiropractic manipulation had shown similar effects

and costs, and patients receiving these treatments had only marginally better outcomes than those receiving the minimal intervention of advice on acute LBP.²⁸ Our results confirm that advice-only treatment seems to be effective in the first 3 months for back and leg pain, and in disability. The other two groups showed the effectiveness up to 12 months in these parameters. We did not evaluate cost-effectiveness of treatments. But increase of sick-leave days in the 3-months follow-up in the McKenzie group, which was statistically significant and increasing days of sick-leave from 3-months to 12-months follow-up in the advice-only group, should be considered when planning new studies.

Pengel et al³⁵ reported that for participants with subacute LBP, physiotherapist-directed exercise and advice were each slightly more effective than placebo. The effect was greatest when the interventions were combined. Storheim and Grotle³⁶ made the same conclusion, that a combination of exercise and advice was slightly better than placebo for subacute LBP. In our study, exercises and advice were part of the treatment strategy in every group.

Given that the effectiveness of treatment for subacute symptoms will directly influence the development of chronicity, these results would suggest that education and awareness of the causes and consequences of back pain may be a valuable treatment component for this patient subgroup.⁴ Education and cognitive components were also included in our therapies.

Conclusion

All groups in our study improved in back and radiating leg pain, and in dysfunction, in a way which is clinically significant. Improvement was seen during the first 3 months in all groups, and improvement increased in the therapy groups also in the 6- and 12-months follow-up, which could not be seen in the advice-only group. Despite there being no statistically significant differences between the advice-only group and the other two groups, the differences could be regarded as clinically significant. An interesting factor was the lower adherence of the advice-only group to self-treatment or unwillingness to participate in follow-up visits, so in future, the adherence to self-treatment should be studied.

Small but maybe important differences between the therapy groups and the advice-only group in radiating pain and disability favor the OMT or McKenzie-type approach in the early phase of LBP. These results can also be an encouragement to study further how the inexpensive advice-only method could be developed in the early phase of LBP. A small number of days of sick-leave will reflect the low risk

of the OMT-type approach, not only during the treatment sessions, but also during the 1-year follow-up, with a patient self-care program.

Disclosure

The author reports no conflicts of interest in this work.

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