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Manual Therapy and Exercise Therapy in Patients With Chronic Low Back Pain

A Randomized, Controlled Trial With 1-Year Follow-up

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Study Design. A multicenter, randomized, controlled trial with 1-year follow-up.

Objectives. To compare the effect of manual therapy to exercise therapy in sick-listed patients with chronic low back pain (>8 wks).

Summary and Background Data. The effect of exercise therapy and manual therapy on chronic low back pain with respect to pain, function, and sick leave have been investigated in a number of studies. The results are, however, conflicting.

Methods. Patients with chronic low back pain or radicular pain sick-listed for more than 8 weeks and less than 6 months were included. A total of 49 patients were randomized to either manual therapy (n = 27) or to exercise therapy (n = 22). Sixteen treatments were given over the course of 2 months. Pain intensity, functional disability (Oswestry disability index), general health (Dartmouth COOP function charts), and return to work were recorded before, immediately after, at 4 weeks, 6 months, and 12 months after the treatment period. Spinal range of motion (Schober test) was measured before and immediately after the treatment period only.

Results. Although significant improvements were observed in both groups, the manual therapy group showed significantly larger improvements than the exercise therapy group on all outcome variables throughout the entire experimental period. Immediately after the 2-month treatment period, 67% in the manual therapy and 27% in the exercise therapy group had returned to work ($P < 0.01$), a relative difference that was maintained throughout the follow-up period.

Conclusions. Improvements were found in both intervention groups, but manual therapy showed significantly greater improvement than exercise therapy in patients with chronic low back pain. The effects were reflected on all outcome measures, both on short and long-term follow-up. [Key words: low back pain, chronic, manual therapy, exercise, clinical, sick leave, function] **Spine 2003;28:525–532**

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About 60% to 80% of the population in the western world will experience low back pain (LBP) at some stage in life.[4,9,17,24,34,37] Due to a favorable prognosis in the acute stages, 80% to 90% of the patients will improve considerably within 6 to 8 weeks.[10,26,46] The prognosis for chronic LBP is considerably less favorable,[8,42,45] causing potentially long-lasting suffering to the patient and significant socioeconomic costs.[7,35]

A number of different conservative treatment methods and methods for LBP have been studied, but controversy remains as to the preferred treatment.[1,14,20,21,36,44] It has been proclaimed that various national guidelines for LBP treatment in primary care are fairly consistent, but discrepancies were emphasized with regard to exercise and spinal manipulation.[23]

Several recent reviews claim a strong evidence of effectiveness for exercise therapy in chronic LBP and moderate evidence of ineffectiveness in acute LBP.[43] There is some evidence for a dose-response effect of exercises for chronic low back pain,[27] although the effect was dependent on persistent exercise activity.[28] However, a recent study of LBP patients found no significant difference between graded medical exercise therapy and conventional physiotherapy with lesser intense exercise regime.[41] In the recently published report by the International Paris Task Force on Back Pain, it was concluded that "there is sufficient scientific evidence to recommend that patients who have chronic low back pain perform physical, therapeutic, or recreational exercises, keeping in mind that no specific active technique or method is superior to another."[1] This conclusion is supported by an extensive report by The Swedish Council on Technology Assessment in Health Care.[34,38]

Most studies of manipulation in LBP focus on patients in the acute or subacute stages. Review studies presented over the past 13 years of randomized controlled trials conclude that the effect of spinal manipulation is promising but the results inconsistent.[20,36,44] In a review of clinical trials in manual therapy including patients with chronic LBP, van Tulder *et al* concluded that manual therapy clearly had a positive effect on chronic LBP and was better than medical treatment, bed rest, and instructional information.[44] However, Andersson *et al* recently published a study that compared osteopathic manipulation combined with medical treatment and injections to ordinary physiotherapy and standard medical care in subacute and chronic LBP patients.[3] The only significant difference found was a favorable outcome in medication con-

sumption in the group receiving spinal (osteopathic) manipulation at 12 weeks after the initiation of treatment.

The focus in the present study was on chronic LBP patients, a group with traditionally less favorable prognosis both in physical and psychological terms compared to acute LBP patients.[8,40,42,45] The intention was to investigate a manual therapy approach in tune with how this regime is carried out in clinical settings, consisting of spinal manipulation and mobilization techniques, specific stretching, localized exercises, and information. Based on the clinical examination, the treatment methods are aimed to normalize function by means of spinal or peripheral joint manipulation and mobilization techniques, specific muscle stretching, and exercises to the affected spinal segment or peripheral joints area.[11–13]

The aim of this study was to compare the effect of manual therapy, consisting of specific exercises and segmental techniques, to general exercise therapy in chronic LBP patients.

■ Methods

Patients. A letter with general information about the study was mailed by the local Social Security Office (SSO) to all patients in the area on sick leave for more than 8 weeks and less than 6 months under ICPC codes L84 (back syndrome without radiating pain) and L86 (back syndrome with radiating pain).[47] This was done once for each patient and successively as patients were registered by the SSO and took place in the period from 1994 to 1997. Unfortunately, we do not know the exact number of patients who were mailed the letter and thus do not know the number of patients that refused to participate. Patients willing to participate in the study on receiving the letter from the SSO responded by phone to the physiotherapist in charge of the study, who asked the patient to make contact with their primary physician for referral. All responding patients were then evaluated by the physiotherapist in charge of the study according to the selection criteria, resulting in 49 included and 11 excluded patients, who were excluded for various reasons based on the exclusion criteria given below. Patients were then referred to the study's collaborating physician for the Schober test. Thereafter, the physician referred the patients in consecutive order to the three participating clinics (clinic 1, 2, 3, 1, 2, 3, *etc.*), where the randomization was performed (see *Design*).

Inclusion criteria were men and women age 20 to 60 years that had been sick-listed between 8 weeks and 6 months due to LBP with or without leg pain. Exclusion criteria were unemployment or early retirement because of LBP; prolapse with neurologic signs and symptoms requiring surgery; pregnancy; spondylolisthesis; spondylolysis; degenerative olisthesis; fractures; suspicion of malignancy; osteoporosis; previous back surgery; known rheumatic, neurologic, or mental disease; or absence of pain aggravation on active, functional movement tests (*i.e.*, indicating nonorganic symptoms). Of the 49 patients included in the study, 27 were randomized to manual therapy (MT) and 22 to exercise therapy (ET). Fifteen patients (8 MT and 7 ET) were treated at one clinic and 17 each at the other two clinics (10 MT and 7 ET at one clinic and 9 MT and 8 ET at the other). The three physiotherapy clinics were situated in a town of 40,000 inhabitants. All patients were on 100% sick leave at the start of the study. Two patients, 1 in each group, who had recently received physiotherapeutic treatments for LBP, were asked to wait 3 weeks before starting treatment. The previous treatment was without effect and both were still on 100% sick leave.

Given the likely variability in the way treatment for LBP patients is conducted in the physiotherapy clinic, the interest was on detecting relatively large group differences, with an effect size of 0.8 or larger. With the preselected α-level of 0.05 and the β-level of 0.20 (power: $1 - \beta = 0.8$), power analysis returned an estimate of 26 patients in each group.[2] As it turned out, the actual results were 27 MT and 22 ET patients in the two groups. A small imbalance in sample sizes is of little influence on the power.[2] With the other premises unchanged, the resulting sample sizes reduced the power from the planned 0.8 to 0.78.

The study protocol was approved by the local ethics committee. Eligible patients were given written information about the study before giving their written consent to participate. The information stated that the purpose of the study was to evaluate two common physiotherapy treatment regimes, without emphasizing the specific differences between the two regimes.

Design. The study was carried out as a multicenter, controlled, randomized trial with 1-year follow-up. A blocking design with sex (male and female) and age (below and above 40 years of age) as blocking factors was used with separate randomization within each stratum. The randomization took place at each clinic by presealed envelopes provided by an external research corporation (Medstat Research AS, Lillestroem, Norway) and was administered by one participating therapist at each clinic.

At each clinic, one specialist in manual therapy treated the patients assigned to the MT group, and two physiotherapists without this specialty were assigned to treat the patients in the ET group. The patient's therapist at start of treatment performed a clinical evaluation in order to set up an individualized treatment plan, which was an important aspect given the design of this study. This evaluation was for the sole purpose of setting up the treatment plan and not for scientific purposes. All patients received 16 treatments, each lasting 45 minutes, with 2 treatments a week over a course of 8 weeks. The treatment dose in terms of duration and number of treatments both in the clinic and at home was equal in the two groups. However, about one third of the treatment time in the clinic was devoted to passive joint manipulation and mobilization techniques in the MT group, leaving two thirds of the time to exercise.

Both groups were assigned a maximum of six individually designed home exercises to be performed daily during the treatment period. All patients were firmly encouraged to perform walks, running, cycling, *etc.* at least 3 times a week. Brief information on relevant anatomic and ergonomic topics was handed out to all patients. The importance of self-responsibility and a positive attitude towards their LBP in order to minimize fear-avoidance reactions and chronic symptoms of the problem was emphasized to both groups. Patients were encouraged to return to work as soon as possible. There was no restriction on medication throughout the study. Other forms of treatment, such as acupuncture, chiropractic, or alternative medicine, were not allowed during the intervention period, but there were no restrictions in the follow-up period.

Forty-eight percent of the patients in the MT group and 46% of the patients in the ET group were women. No differences in baseline characteristics between the two treatment

Table 1. Baseline Characteristics of the Two Treatment Groups

Variable	Exercise Therapy (n = 22)	Manual Therapy (n = 27)	
Age (yrs)	41.4 (36.9–45.9)	38.9 (34.1–43.8)	NS
Duration of pain (wks)*	10 (9–18)	16 (11–24)	NS
Sick leave prior to inclusion (wks)*	9 (8–11)	10 (9–10)	NS
Pain (VAS; mm)	54 (46–64)	55 (48–62)	NS
Functional disability (Oswestry)	39 (33–44)	39 (34–43)	NS
General health (Dartmouth)	24 (22–25)	23 (21–24)	NS
Spinal range of motion (Schober; mm)*	26 (20–38)	26 (21–40)	NS

VAS = Visual Analogue Scale; NS = not significant.
* Median value with 95% confidence intervals are given for not normally distributed data.
Mean values with 95% confidence intervals are given for normally distributed data.

groups were observed (Table 1), nor was there any difference in the L86 and L84 ICPC diagnosis classifications.

Manual Therapy. Only spinal manipulation, specific mobilization, and stretching techniques described by Evjenth, Hamberg, and Kaltenborn were allowed.[11–13] The following mobilization or high-velocity, low-force manipulation techniques were allowed:

Traction thrust to the thoracic-lumbar junction with the patient sitting.[13]

Rotation-lateral flexion thrust to segments in the area from T10 to L5 with the patient lying on his/her side.[13]

The sacroiliac manipulation/mobilization technique used in the study was mainly a ventral or dorsal rotational technique with the patient either prone or lying on his/her side.[12,13]

The patients also performed a subset of five general exercises for the spine, abdomen, and lower limbs, and six specific and localized exercises for spinal segments and the pelvic girdle in each treatment session in order to normalize function (see Appendix). The purpose was mainly to mobilize hypomobile areas or to stretch paravertebral muscle tissue depending on the clinical findings. The exercises were performed by doing 2 or 3 sets of 20 to 30 repetitions for each exercise, with 30 seconds to 1-minute rest between each set. The patients were told not to provoke pain during the exercises. Each manual therapy treatment session lasted 45 minutes.

Exercise Therapy. Patients assigned to general exercise therapy were given 45 minutes of training. The first 10 minutes, they performed warm-up on an exercise bicycle. The exercise programs were individually designed based on the patient examination and the clinical findings, and the programs consisted of general training methods for LBP patients. Strengthening, stretching, mobilizing, coordination, and stabilizing exercises for the abdominal, back, pelvic, and lower limb muscles, suited to the clinical findings, were allowed. The therapist was free to choose type, number of repetitions, sets, and progression of exercises. The training took place with or without training equipment in the physiotherapy clinic. Group training, massage, and methods were not allowed during the treatment period. The patients were observed and guided closely by the therapist during each session.

Outcome Measures. Outcome measures were spinal range of motion, pain, functional disability, general health, and return to work as follows:

A. Spinal range of motion was measured by the modified Schober test.[5]

B. Pain intensity due to LBP was recorded on a 100-mm Visual Analogue Scale (VAS), 0 indicating no pain and 100 the worst pain ever.[19] The scale was continuous without intermediate markings. Pain at the moment, worst pain the last 14 days, and mean pain during the last 14 days were scored. The final outcome measure used in the statistical analyses was the mean of these three recordings.

C. Functional disability was recorded using the Oswestry Low Back Pain Disability Questionnaire.[15,33] Each item is scored on a 0–5 scale, and the maximum score is 50. The maximum score in this study was 45, because one item was omitted (sex life). Relative values are reported (total score/total possible score × 100%).[33]

D. General health was measured by The Dartmouth COOP Function Charts.[30] Maximum score was 35.

E. Return to work was self-reported by the patients based on the status at each test session. Patients partly or fully sick-listed were contained in the "sick leave" group, whereas all those in the "returned to work" group had resumed full-time employment.

All outcome measures except for spinal range of motion were scored on questionnaires administered by the patients and carried out five times during the study: before and immediately after the treatment period (*i.e.*, within 3 days after the last treatment session), and then at 4 weeks, 6 months, and 12 months after end of treatment. A collaborating physician who was blinded to which group the patients were assigned recorded spinal range of motion. This was carried out at pre- and posttest only. All pretests were performed after randomization, except for spinal range of motion, which was performed before randomization.

Statistical Analyses. Intention-to-treat analysis was carried out for all included patients. Patients who dropped out for reasons other than the treatment to which they were randomized (dropout type A) were given the baseline registration score for missing data points during the follow-up period. Patients dropping out because of the treatment to which they were assigned (dropout type B) were given the worst score registered for any patient in their treatment group. During the treatment period, two patients dropped out in the MT group due to lack of effect and one in the ET group due to reasons unrelated to the treatment. They were all registered and statistically analyzed after the intention-to-treat principle.

All registration forms were entered into the database by two different persons. The two registrations were compared and discrepancies corrected. Mean was used as the measure of central tendency for normally distributed data and median for not normally distributed data, and 95% confidence interval (CI) was used to express the range estimated to contain the true population mean/median with a probability of 95%.[2]

Repeated measures ANOVA was used to test differences

Table 2. Pain, General Health (Dartmouth COOP), and Functional Disability (Oswestry Disability Index) for the Manual Therapy (n = 27) and Exercise Therapy (n = 22) Groups Throughout the Study

	Time					Within			Between		
Variable	Pre	Post	4 wks	6 mos	12 mos	DF	F Value	*P* Value	DF	F Value	*P* Value
Pain (VAS; mm) MT	55 (48–62)	22 (15–29)	22 (15–30)	22 (15–30)	21 (17–28)	4	37.1	<0.01	1	8.0	<0.01
Pain (VAS; mm) ET	54 (45–64)	37 (26–47)	39 (31–48)	42 (32–52)	35 (25–45)	4	5.1	0.04			
Dartmouth COOP MT	23 (21–24)	14 (12–16)	15 (13–17)	14 (12–16)	14 (12–15)	4	41.2	<0.01	1	13.0	<0.01
Dartmouth COOP ET	24 (22–25)	20 (17–22)	19 (16–21)	19 (16–21)	18 (15–21)	4	9.8	<0.01			
Oswestry MT	39 (34–43)	18 (13–23)	18 (13–22)	16 (12–21)	17 (12–22)	4	33.9	<0.01	1	11.6	<0.01
Oswestry ET	39 (33–44)	30 (26–35)	30 (24–36)	30 (24–36)	26 (20–32)	4	6.7	0.02			

VAS = Visual Analogue Scale; MT = manual therapy; ET = exercise therapy; DF = degrees of freedom.
Values are expressed as mean (95% confidence interval). Statistical test results of within (time) and between group differences are given.

between groups (MT *vs.* ET) and within groups (within each treatment group over time) for the pain, Dartmouth, and Oswestry variables. The Tuckey-Kramer test was then used for pair-wise comparisons of means. Variables showing significant differences were retained for further *post hoc* analyses, and the student *t* test was used on the three above-mentioned outcome measures to test differences in improvement between the two treatment groups at all the posttreatment test sessions. Paired *t* test was used to investigate changes within groups, and the results from the posttreatment and follow-up test sessions were compared to the pretreatment result. Wilcoxon signed-ranks test (within groups) and Mann-Whitney U test (between groups) were used for the Schober test. The Fisher exact test was used to test group differences in sick-leave status and risk ratio (RR) used to estimate the risk of being sick-listed in the MT *versus* the ET group at all follow-up sessions. The level of significance was set to $P \leq 0.05$.[2]

The NCSS (Number Cruncher Statistical System; Utah, USA) was used for statistical analyses.

■ Results

Significant improvements in pain, general health, and functional disability were observed in both groups from before to after treatment ($P < 0.01$), and this improvement was maintained throughout the 1-year follow-up (Table 2). Significantly larger improvements ($P < 0.05$) were found in the MT group compared to the ET group at all posttreatment test sessions (Table 2). The mean reduction of pain from pre- to posttest in the MT group was twice that of the ET group (33 *vs.* 17 mm), correspondingly for general health (9 *vs.* 4 score point units) and functional disability (21% *vs.* 9%). The effects gained from the treatments were stable in the 1-year posttreatment period in both groups.

Spinal range of motion was measured only at the pre- and posttreatment sessions. Significant improvements were found both within ($P < 0.01$) and between groups, with the MT group showing significantly larger improvement. The mean improvement in the MT group was 31 mm (95% CI: 26–36) and in the ET group 9 mm (95% CI: 6–12; $P < 0.01$).

At each test session, the subjects were asked about their sick-leave status (Table 3). All patients in both groups were fully sick-listed at pretest. At posttest, 73% in the ET *versus* 33% in the MT group were partly or fully sick-listed ($P < 0.01$). The respective numbers at 4 weeks follow-up were 57% *versus* 30% ($P = 0.08$), at 6 months 62% *versus* 11% ($P < 0.01$), and at 12 months 59% *versus* 19% ($P < 0.01$).

■ Discussion

Although significant improvements were found in both intervention groups, the manual therapy group showed better results than the general exercise therapy group on all outcome measures, including pain, functional disability, general health, spinal range of motion, and return to work. The effects were largely gained during the 8-week treatment period, and the results remained stable throughout the 1-year follow-up period.

Table 3. Number and Proportions (%) of Sick-Listed Patients (*i.e.*, Total of Partly or Fully Sick-Listed) at Each Assessment Session in the Exercise Therapy and Manual Therapy Groups

	Pretest	Posttest	4 wks	6 mos	12 mos
ET (n = 22)					
n	22	16 *(4)*	12 *(2)**	13 *(3)**	13 *(3)*
%	100	73	57	62	59
MT (n = 27)					
n	27	9 *(4)*	8 *(4)*	3 *(1)*	5 *(3)*
%	100	33	30	11	19
RR (95% CI)		0.46 (0.26–0.87)	0.52 (0.24–1.12)	0.18 (0.04–0.55)	0.31 (0.11–0.78)

ET = exercise therapy; MT = manual therapy; RR = risk ratio; CI = confidence interval.
* One subject had missing scores.
Risk ratios with 95% confidence intervals are given to indicate the risk of being sick-listed with the MT regime as compared to the ET regime. The percentage and RR figures are based on the total number of sick-listed patients. Within parentheses in italics are the number of patients partly sick-listed.

To the authors' knowledge, this is the first controlled trial using a manual therapy approach including specific exercises, mobilization, and stretching techniques in addition to spinal manipulation on patients with chronic LBP.[20,22,36,44] Objections could be made to the flexibility and diversity of treatment items allowed in the intervention groups, as both groups received a package of interventions rather than a single regime. This design made us unable report on the factors within the regimes that contributed most significantly to the effects. The approach is, however, in line with how such programs are carried out in the physiotherapy clinic, which should raise the external validity of the results.

Plausible explanations for the group differences observed could be the impact of mobilization/manipulation in itself or a positive influence of the more specific approach used by the manual therapists in general. The importance of "specificity" in both diagnostics and conservative treatment deserves further attention in future studies of chronic low back pain patients. Perhaps the ET group could have reached results similar to the MT group had a more specific exercise regime been advocated in the ET group.[18,31,32]

The number of patients was low, and the strict inclusion criteria might reduce the generalizability of these results to other chronic LBP populations. Nor can the study address whether patients with nonorganic signs, *e.g.*, low back pain due to mental or psychological reasons, would behave differently. An added psychological impact on outcome measures of specific techniques and forceful manipulations as opposed to general exercise cannot be disregarded, nor can the fact that the study was initiated, planned, and partly conducted by physical therapists with a specialty in manual therapy. Lack of blinding in the study could also affect the outcome, particularly in a small community where word of mouth and the inhabitants' acquaintance with the physiotherapists could affect the outcome. However, the stable and persistent effects observed during the 1-year follow-up period weigh against such bias. The Schober test was conducted by a blinded physician not otherwise involved in the study. It adds further credibility to the trial that these results (Schober) were in conformity with the other outcome measures. The fact that all included patients had been sick-listed due to their LBP for at least 8 weeks before inclusion—*i.e.*, the patients experienced chronic pain—makes spontaneous remission unlikely.[8,42,45] This claim is further strengthened by the outcome pattern in the study, with clear improvements in both groups during the 8-week treatment period and a fairly stable situation thereafter. No additional treatments were given beyond the 8 weeks in the program. There was no control of whether the patients sought other treatments after the intervention period.

Baseline values in this study correspond to other studies both on the VAS for pain[3,25,41] and Oswestry Disability Index,[3,29,33] whereas the values on the modified Schober test were somewhat lower.[25] In the ET group, the relative change in Oswestry score was similar to another exercise study,[41] whereas the improvement in the MT group was slightly greater than reported in a study on manipulation.[3] Patients receiving both manual therapy and cortisone injection showed greater relative reduction on pain compared to the MT group in this study.[6]

A considerable reduction in sick leave was found in the MT group, as only 19% of patients were sick-listed at 1-year follow-up compared to 59% in the ET group. The results differ somewhat from other Norwegian studies of chronic LBP patients, which have indicated that 40% to 50% of the patients in control groups receiving minor interventions were still on sick leave at 1-year follow-up.[16,41] In groups receiving major intervention, the percentage of patients still sick-listed at 1-year follow-up was slightly in excess of 30%. The reason for these differences is uncertain. Variations in pre-baseline pain-period length and pain intensity might contribute to the discrepancies. "Returned to work" in this study demanded full-time (100%) employment, whereas the "sick leave" group contained both fully and partly sick-listed patients. This could be a reason for the larger number of patients on sick leave at 1-year follow-up in the ET group.

It is not possible to define a meaningful cut-off point for positive clinical outcome on the variables used in this study, making discussions on clinical relevance difficult. Conclusions are based on statistical significance. However, the sick leave data are quite clear and in agreement with the other outcome measures. Return to work has been related to physical function and pain in patients with back pain.[39] Getting people back to work may thus serve as a relevant clinical goal.

The effects in this study do call for trials in extended LBP populations, as well with alternative exercise therapy regimes. Particularly, there is a need to investigate the effect of specific exercise techniques, as was emphasized in the manual therapy regime in this study. Pragmatic treatment approaches in tune with how therapies are conducted in the clinic are encouraged also in future trials.

■ Key Points

- A randomized, controlled clinical trial was performed in patients with chronic low back pain.
- Two treatments, manual therapy and exercise therapy, were investigated.
- Both groups improved, but the manual therapy approach resulted in significantly greater improvements than exercise therapy on spinal range of motion, pain, function, general health, and sick leave.

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■ Appendix

Descriptions of the Five General Exercises

1. Patient lying prone: contract the gluteal, spinal, and interscapular muscles, then lift the upper trunk a few inches, hold the position for 5 seconds, and relax between each repetition.

2. "Four-foot" standing: lift the opposite leg and arm up while keeping the rest of the body as stable as possible. Relax and repeat with the other leg and arm.

3. "Four-foot" standing: change between flexing and extending the entire spinal column as far as pain allows.

4. Lying supine: with the knees flexed and heels on the floor, the patient uses his/her abdominal muscles to roll the upper trunk halfway upwards, making sure the lumbar spine is in contact with the floor. Hands on the chest or the belly.

5. Standing: upright position, lean forward by flexing the hips, keep this position while flexing the knees to 90°.

Description of the Six Specific Exercises

1. Side-lying with the knees flexed: in order to limit movements to the affected area of the spine, the trunk was rotated starting from the head and all the way down to the affected area or segments of the spine. In this position, the affected segments were flexed and extended alternatively and repeatedly.

2. Same position: using a firm pillow under the affected area, the patient tilted the pelvis in lateral flexion or rotation to the ipsilateral side, thereby creating an active mobilizing movement.

3. "Four-foot" standing: pushing the trunk backward towards the heels while simultaneously lowering the head towards the floor. This was done to stretch and flex the lower lumbar segments and muscles. More flexion could be achieved by placing a firm pillow under the knees.

4. Same position: leaning down on the elbows and, in this position, flexing and extending the spine. This position alters the area of lumbar movement in a cranial direction, *i.e.*, it creates a stronger stretching effect in the upper lumbar segments.

5. Lying supine: knees flexed, heels on the floor, and hands in the back on top of each other under the affected area of the spine and, in this position, flexing and extending the spine to create a localized movement.

6. Same position: both knees and the lower lumbar spine were rotated from side to side. The movement was limited to the first notion of movement in the affected segments, as noticed by the hands placed under the lower back.

Point of View

Ingalill Lindström, RPT, PhD

The scientific field needs clinicians that are doing research, which this study contributes to. This randomized controlled trial with 1-year follow-up found that both groups improved after manual therapy (MT) and general exercise therapy (ET). Respectively, the patients in the MT group improved significantly more than the patients in the ET group, especially in return to work. Schober and self-reported pain, on three visual analogue scales, Oswestry, COOP, and return to work, measured the improvements.

There are no international guidelines on how to choose and use outcome measurements. But to omit one item from an instrument and still name it Oswestry might be doubtful. There is no information on the patients' performed functional capacity, which would have been useful information in addition to self reports. Information on males and females, reported separately, would also have been useful.

The study sample is rather small. During 4 years, 49 patients appeared in the 3 clinics with 1 MT- and 1 ET-experienced physical therapist per clinic, *e.g.*, roughly 2 or 3 patients per therapist per year. Are these kind of patients rare in health care systems?

The authors studied more a "package of exercise therapy," including home exercises where specific manual therapy was added in the MT group. This study gives no guidance on how to choose the patients that should have this package of exercise therapy plus this specific manual therapy. It cannot be just all "sick-listed" patients with nonspecific low back pain with a duration of 2 to 6 months.

There is evidence-based knowledge that exercise therapy is helpful for patients with low back pain.[1,2] There is also evidence-based knowledge that manual therapy benefits patients with low back pain.[1] Would further research, comparing specific manual therapy with general exercise therapy or general manual therapy with specific exercise therapy be of interest? Is there a *general* exercise therapy and/or a *general* manual therapy available for scientific study?

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Finally, wouldn't it be more interesting to investigate different kinds of therapies for different kinds of patients and their implementations in clinical settings? Future researchers in this field ought to consider that different research designs need different outcome measurements. Should we use outcome measures that are related to the given treatments, or should we use the same outcome measures irrespective of the given treatments?

Is it the consequences of the patient's problems or is it the duration of the problems that should be in focus in further researching by using the International Classification of Functioning, Disability and Health (ICF) from the World Health Organization (WHO, 2001)? It would be useful if clinical research also focused on clinical relevance and clinical implementation and not only on statistical significance. An important question remains to be answered: which kind of treatment will decrease the consequences of the patient's problems?

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