Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

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Abstract

Background: Manual therapy (MT) and exercise (Ex's) have proven to be effective for CLBP patients. Both modalities are recommended by NICE guidelines in the UK. At present, no Systematic Review (SR) has been carried out to investigate the effectiveness MT and Ex's combined, in comparison to sole use of Ex's for those patients.

Objective: To evaluate the effectiveness of MT combined with Ex's, versus Ex's for patients with CLBP.

Methods: Systematic searches were conducted on seven bibliographic databases: CINAHL, CENTRAL, MEDLINE, Ovid, PubMed, Science Direct and Google Scholar, from 2000 to 2015. The SR included studies such as RCTs that investigated MT combined with Ex's versus Ex's for treating CLBP.

Results: This SR consisted of seven RCT's (N = 1053). four studies concluded that there were no significant differences between combination of MT with Ex's versus Ex's (P = 0.46 for disability) (P = 0.470, for pain) (P = 0.150 for pain - P = 0374 for disability) (P = 0.0283 for pain, P = 0.226 for disability). However, the remaining three studies did demonstrate that there was a significant difference between the combinations of MT with Ex's compared with exercise only in favour of combination treatment (P < 0.05) (P < 0.001, P = 0.002) (P < 0.001).

Conclusion: The results debated the effectiveness of using MT and Ex's together, as opposed to using exercise alone. Approximately, more than half of the aforementioned studies concluded that the combination of MT and Ex's has the same effect of Ex's alone. Conversely, less than half of these studies presented the combination treatment as more effective than Ex's alone. It should be noted that all included studies boast different levels of quality. Furthermore, different types of Ex's and MT techniques were implemented, which may have affected the results.

Keywords: Chronic Low Back Pain (CLBP); Recurrence Low Back Pain; Manual Therapy Combined with Exercise; Pain; Disability; Multimodal Intervention; Randomized Control Trails (RCT)

Abbreviations

LBP: Low Back Pain; CLBP: Chronic Low Back Pain; UK: United Kingdom; MT: Manual Therapy; Ex's: Exercises; SR: Systematic Review; RCTs: Randomized Control Trails; VAS: Visual Analogue Scale; NRS: Numerical Rating Scale; ODI: Oswestry Disability Index; RMDQ: Roland Morris Disability Questionnaire; PEDro: Physiotherapy Evidence Database

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Introduction

Low Back Pain (LBP) is ubiquitous, and can arise at any given moment [1]. Recent research suggested that LBP, more than any other ailment, leads to numerous years living with a disability [2]. The aetiology of LBP is multifactorial, encompassing individual traits, as well as both psychosocial variables and occupational variables [4,5] psychosocial aspects play a fundamental role in guiding the treatment of CLBP patients [20]. Physical findings must be carefully scrutinised by clinicians as they can indicate whether or not the patient has improved [21]. Primarily, patients with CLBP were treated initially with the intent to cure the condition [26]. However, treatment of CLBP is difficult, and many established interventions have limited efficiency [27], MT is commonly used to treat symptoms as part of a multimodal treatment package and is endorsed by Chou and Huffman; National institute for health and care excellence [NICE] [28-30]. A recent literature review of current national and international guidelines for CLBP consistently recommend Ex’s therapy as a treatment for CLBP [31]. Furthermore, Ex’s is considered to be highly beneficial for CLBP, as it facilitates improvements in back strength, flexibility, range of motion and fitness [3,36,37]. Nevertheless, researchers observed that, when these alternative exercise treatments were applied on their own, their influence on pain and disability was limited [38,39]. As the recent literature has highlighted several studies that have applied MT along with Ex’s to determine whether this combination of two modalities provide better results, as opposed to using each method in isolation when treating CLBP patients. These studies can be differentiated through their individual design and goals. Therefore, only RCT’s studies included for the purposes of this SR. Conducting a contemporary SR can enable clinicians and patients to avoid unnecessary cost and time on non-effective intensive programs. At present, current literature would suggest that no SR has been undertaken on MT and Ex’s as a combination in comparison to Ex’s alone for the treatment of CLBP, though some studies in the literature did support the combined use of MT and Ex’s. Recently, the UK Beam Trial Team (2004) conducted RCT study with 12 months follow-up. The findings indicated that, spinal manipulation when combined with Ex’s, improved functional status in both the short-term and long-term. However, the authors have not mentioned sufficient information regarding the follow up, which may incite attrition bias [40]. In terms of LBP management, Ex’s therapy frequently applied on CLBP patients, the benefits of which have been confirmed by a number of systematic reviews [41-44]. Non-pharmacologic therapies integrated in interdisciplinary CLBP programmes encompass physical modalities, Ex’s, education and MT [45]. As their name implies, such therapies are typically employed to supplement rather than replace pharmacotherapy, although no consensus has been reached as to which is the most productive [46]. Nonetheless, Ex’s therapy can be undertaken alongside other non-pharmacologic modalities such as MT as individually, it is not sufficient to successfully treat CLBP. The selection of MT was based on the fact that it is frequently applied in a clinical context for the treatment of LBP, recommended by NICE guidelines as adjacent intervention for CLBP, and several RCT’s have been conducted with regard to this [28,29]. As a result, this SR aims to investigate the effectiveness of MT combined with Ex’s versus Ex’s amongst CLBP patients. That being said, CLBP has a multifactorial aetiology and such might require multimodal programs [7]. Furthermore, this SR will employ a robust rating criterion. In particular, the methodology quality of each study reviewed will be analysed using the Physiotherapy Evidence Database (PEDro) scale.

Research Methods

Research aim

1. To investigate effectiveness of Ex’s when combined with MT versus Ex’s alone on CLBP patients.

Research objectives

1. To review the literature using the available range of databases.

2. To utilise rigorous criteria.

3. To use the PEDro scale to assess the methodology quality of included studies.

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**Research question**

Does the addition of manual therapy combined with exercise versus exercise alone improve pain and reduce functional disability for chronic low back pain patients?

**Research strategy**

This research employs a robust literature review to collect data, using a comprehensive digital search of physiotherapy journals. The search strategy was based on the PICO search framework as shown in table 1. The search was restricted to studies that included MT with Ex’s versus Ex’s, whilst further search was limited to the studies that were published from 2000 to 2015.

<table>
<thead>
<tr>
<th>PICO Definition</th>
<th>Key words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population of the patients</td>
<td>Chronic Low Back Pain</td>
</tr>
<tr>
<td>Intervention</td>
<td>Manual Therapy Combined with Exercise versus Exercise</td>
</tr>
<tr>
<td>Comparisons</td>
<td>Exercise only</td>
</tr>
<tr>
<td>Outcome</td>
<td>Pain and Disability</td>
</tr>
<tr>
<td>Study Design</td>
<td>Randomized Control Trails</td>
</tr>
</tbody>
</table>

*Table 1: PICO search framework [47].*

**Databases**

- The cumulative index of nursing and allied health (CINAHL)
- The cochrane central register of control trails (CENTRAL)
- Medline database
- Ovid database
- PubMed database
- Science direct database
- Google scholar.

**Hand search**

This process was conducted within the most common journals in LBP and Manual therapy literature. To identify the manuscripts that were not presented in the databases (Appendix 4).

**Citation search**

The citation search was undertaken when the articles were founded and key texts identified by the reviewer. As to further search for and identify any titles that related to the combination of MT with Ex’s for CLBP patients. This process was utilised to avoid missed key-words.

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Text mining approach

The reviewer used a variety tools in text mining to ensure that all relevant studies were included in this review. This process was carried out by using the following website (www.nactem.ac.uk/), which provide an advanced search strategy by concepts using text analysis.

Research design

The search design was a systematic review of randomized control trials. The SR collected and summarised all relevant aspects to the particular research question using an explicit, transparent and systematic method to combined the results of theses studies [48]. As well as it helps clinicians to remain up to date and consider the starting point for developing clinical practice guidelines [49,50].

Strengths of SR

1. Prioritize the hierarchy of evidence [51].
2. Lower in cost than alternative methods [52].

Limitations of SR.

1. Time consuming.
2. Inadequate knowledge of research design might provide irregular findings.
3. Publication of studies in different languages might restrict the collection of relevant article that can be reviewed [52].

Inclusion/Exclusion criteria

Types of study

• This SR included only RCTs.
• Included only studies wrote in English to minimise bias [53,54].
• Included only studies that were conducted in the period of 2000 - 2015.

Types of participants

Included

• Enrolled adult males and females (≥ 18 years) with CLBP for more than three months with or without radiating pain.
• The number of participants was restricted to at a minimum of 20 patients in each group. It is difficult to ascertain the true differences when the groups have a limited sample size [55].

Excluded

• CLBP patients were excluded due to a specific pathology or “red flag”.
• Patient who have previously undergone spine surgery.

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The literature provides guidance that enable the narrative synthesis to be conducted using a more systematic and transparent method, whilst focusing on synthesis of evidence on efficacy of specific interventions in addition to elements determining the implementation of that interventions [58]. However, the narrative synthesis method has some limitations. For instance it depends on subjective judgment, preference and biases of the reviewer [59]. In this SR, rigorous criteria were used to select the best available evidence. The methodological quality of each study will be assessed using a valid scale (PEDro Scale).

**Assessment of methodological quality**

This SR used the PEDro scale for the assessment of methodological quality of the included studies. This scale is a valid and reliable tool to assess the methodological quality of RCT’s in the physiotherapy field [60]. It uses a simple strategy, not time consuming and minimizes the chance of individual error in assessment of study quality. In addition, included studies will be categorised by PEDro scale, the studies that score 9 - 10 are of “excellent” methodological quality. Those scoring between 6 - 8 are good, 4 - 5 are “fair” and anything scoring below 4 was considered “poor” [61].

**Results**

**Search process**

Search processes were undertaken during the aforementioned database yielding (235) studies. In addition, 15 studies were identified through other sources (See appendix 4) and Search Trails Registers (See appendix 5). In order to disregard irrelevant studies, the authors examined the title of all founded studies to identify relevant and duplicate studies. For further investigation of studies, the main
author screen (200) then excluded 130 studies, as they were irrelevant. Full-text of the remaining 70 studies were examined and 63 were excluded as these studies were not RCT’s or included sub-acute CLBP patients or were used co-intervention different of author target.

**Figure 1: PRISMA flow diagram.**

<table>
<thead>
<tr>
<th>Studies Identifier</th>
<th>Participants</th>
<th>Intervention</th>
<th>Outcome</th>
<th>Measures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authors</strong></td>
<td><strong>Design</strong></td>
<td><strong>(N) Patients characteristics</strong></td>
<td><strong>Exercise</strong></td>
<td><strong>Exercise pulse manual therapy</strong></td>
<td><strong>Pain and Disability and Follow up</strong></td>
</tr>
<tr>
<td>Aure, et al. 2003</td>
<td>RCT’s PEDro Score = 7/10 EL = 1b</td>
<td>49 patients with CLBP, Age 20 -60 years old</td>
<td>General exercise (N = 22), Mean age = 41.4 (36.9-45.9)</td>
<td>Spinal manipulation plus exercise for spine, abdominal and lower limb (N = 27), Mean age = 38.9 (34.1-43.8)</td>
<td>VAS, ODI</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Study</th>
<th>PEDro Score</th>
<th>EL</th>
<th>Patient Characteristics</th>
<th>Intervention Details</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critchely, et al. 2007</td>
<td>7/10</td>
<td>1b</td>
<td>212 patients with CLBP</td>
<td>8 sessions of 90 minutes</td>
<td>No significant different between interventions (P = 0.46 for disability)</td>
</tr>
<tr>
<td>Szulc, et al. 2015</td>
<td>4/10</td>
<td>1b</td>
<td>60 patients with CLBP</td>
<td>10 daily sessions within 5 weeks</td>
<td>McKenzie alone and McKenzie plus MET shows significant improvement in both disability and pain (P &lt; 0.001) for pain and disability</td>
</tr>
<tr>
<td>Cecchi, et al. 2010</td>
<td>6/10</td>
<td>1b</td>
<td>210 patients with CLBP</td>
<td>15 one-hour sessions, 5 day a week for 3 weeks</td>
<td>No statistically significant were found between two groups (P = 0.150)</td>
</tr>
<tr>
<td>Rasmussen, et al. 2008</td>
<td>6/10</td>
<td>1b</td>
<td>72 patients with CLBP</td>
<td>3-5 times with gradual increase of extension, at least once per hour For 4 weeks.</td>
<td>No statistically significant were found between two groups (P = 0.150)</td>
</tr>
</tbody>
</table>

**Critical Information:**
- ** PEDro Score:** Indicates the methodological quality of the study.
- **EL:** Effect size level, ranging from 1a to 1b, with 1a being the highest.
- **CLBP:** Chronic Low Back Pain
- **VAS:** Visual Analog Scale
- **RMDQ:** Roland-Morris Disability Questionnaire
- **ODI:** Oswestry Disability Index
- **PRS:** Patient Rated Score

**References:**
Quality assessment of included studies

All clinical trials were evaluated and analysed using PEDro scale. This included studies that had a score ranging between 4 and 8 out of 10 score.

The average scores derived for all of studies was (6.28). The ten criteria for the PEDro scale and assessment of all included studies are shown in table 3.

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**Table 2: Characteristics of included studies.**


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Summary of results

The reviewer outlined how the search process was conducted, as well as describing the included studies. Overall, approximately 45% (3 of 7; authors) were demonstrated effectiveness of combination treatment. On the other hand, the remaining (4 of 7; authors), with 55% were conflicted.

Discussion

The use of evidence-based treatment for CLBP patients produced a variation of results. As well as appropriate and gold standard for the treatment of patients with CLBP have not issued yet [62]. Proper treatment play a crucial role in reducing the experience of long term lower back pain and significant disability [63]. Therefore, different guidelines were issued across the globe for the management of lower back pain, though they provided similar recommendations such as exercise for CLBP patients. Nevertheless majority of these guidelines do not recommend a specific type of exercise [31]. In addition, the manual therapy has been investigated widely, and it was recommended for CLBP [36]. This systematic review has investigated the effectiveness of the combination of manual therapy with exercise versus exercise on CLBP patients. Seven studies were included as these studies fulfilled the inclusion and exclusion criteria. All the included trials were RCTs and investigated different types of MT combined with different Ex’s versus Ex’s. For the purpose of this SR, the researcher found that the findings of all included studies were conflicting. Two RCT’s studies with good methodological quality [64,65] (7;10 - 8;10, n = 253 patients) investigated manipulation combined with Ex’s versus Ex’s, along one year follow up. The authors gave patients treatment via general exercises, stabilizing exercise, exercise for trunk stability and spinal mobility. Both the PEDro was used scale to determine the methodological quality. Both studies reported that manipulation with exercises was more effective in reducing

Table 3

<table>
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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Eligibility criteria were specified (non account to total score)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2. Random allocation</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. Allocation was concealed</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4. Similarity between group at baseline</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. Blinding of subjects</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>6. Blinding of therapists</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>7. Blinding of assessors</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>8. Measure at least one key outcome was obtained from more than 85% of the subjects</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>9. Intention to treat analysis</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>10. Between group statistical comparisons reported for at least one key outcome</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>11. Point and variable measures for at least one key outcome measure</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Total score from (10)</td>
<td>7/10</td>
<td>8/10</td>
<td>7/10</td>
<td>6/10</td>
<td>6/10</td>
<td>4/10</td>
<td>6/10</td>
</tr>
</tbody>
</table>

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pain intensity and disability level in CLBP than exercises alone. Finding the difference to be statically significant (P < 0.05) (P < 0.001, P = 0.002) for pain and disability. The results of these two studies were consistent in reducing pain and disability level for short-term period. However, effectiveness in reducing pain and disability for long term was conflicted. These results were similar to the RCTs study by UK Beam Trail Team. However, this study was not included in this SR as it is not predominantly for CLBP [34]. In addition, the study with fair methodological quality (rated by Pedro 4; 10) conducted by Szulc., et al. investigated extension Ex's combined with muscles energy technique versus extension Ex's on CLBP [66]. The finding of this study reported a clinically significant reduction in pain and disability level in short term period (P < 0.001, P < 0.001). In contrast, three studies were found with good methodological quality (N = 530 patients) (rated by PEDro-scale as 7, 6, 6 out of 10) [67-69]. They reported that there was no significant difference between groups and suggested that the combination of MT with Ex's treatment has the same effect as Ex's alone (P = 0.46 for disability) (P = 0.470, for pain) (P = 0.150 for pain· P = 0.374 for disability respectively). All authors of these three studies provided patients with manipulation techniques with Ex's versus Ex's. When observing the quality of these trials, some bias resources threaten the results. Rasmussen., et al. For example, did not provide information about the method used for randomisation of patients in groups. On the other hand, Critchley., et al. and Hurley, et al. utilised a computer generator for the randomisation process. In terms of intervention sessions given to patients, Critchley., et al. gave a 30 minute- 12 treatment sessions with 18 months follow up [67]. In Rasmussen., et al. study only three manipulation sessions were given to the combination group -with follow up of one year- which is considered an inadequate number of treatment sessions to reflected noticeable effect of interventions. This may then lead to bias [68,70]. However, in the study by Hurley, et al. there was no restriction in the number of visits and it was subjected to the therapist decision during the one-year follow up. Giving all participants the same number of treatment sessions is very important when conducting such a study otherwise the results will be underestimated and may lead to time biased of treatment [69-71]. The majority of included studies (five studies) utilised manipulation techniques for the combination therapy group. However, Cecchi., et al. provided in his study mobilisation techniques combined with Ex's for the combination treatment group. The results reported that there is no significant difference between groups (P = 0.0283 for pain, P = 0.226 for disability). The use of different MT techniques can affect the results. In this study, the randomisation process was clearly defined. The patients were given one hour-15 treatment sessions for three weeks with a one-year follow up. The potential limitation of this systematic review could fall with reviewer bias [72]. In addition, it includes studies utilised different types of Ex's combined with different techniques of MT, which might lead to inaccurate results. In contrast, the strength of this SR is that the authors consider studies design, population, and valid and reliable outcome measures for CLBP patients. Although there are direct, pre-existing reviews about the combination of modalities for LBP. There is not existed systematic review for combination of MT with Ex's versus Ex's on CLBP. Evidence is increasing in the literature in support of multimodal interventions. Nevertheless, this evidence remains inconsistent. Geisser., et al. (2005) propose that collaborative treatment is most effective for those with low-level pain and minimal disability. For those with higher-level ailments, a multidisciplinary treatment plan may prove more successful [73]. Though these findings may prove valuable for both clinicians and CLBP patients, practitioners should be mindful of individual patient requirements and the financial implications of certain treatment plans. NICE’s guidelines recommended MT as an additional intervention alongside Ex’s for CLBP [30]. In addition, the exercises were recommended according to the preference and capabilities of patients. The recent SR argued that there is no exercise superior to others [74]. As well as Shamus., et al. recommended that the manual therapy have the greatest benefit when combined with additional physical therapy intervention [75].

**Conclusion**

To sum up, the results outlined that less than half of the studies under analysis believed combination therapy to be more effective than exercise alone. Clinicians should understand how this might cause conflict within the literature, with regards to the effectiveness of MT and Ex’s when treating CLBP patients. This study concluded that, the combination of the exercise with manual therapy versus exercise alone was debated in term of its ability to reduce the pain and disability level of CLBP patients. Likewise, using a mixture of exercise with different types of manual therapy techniques on CLBP patients will lead to inaccurate results. The future research should concentrate on the investigation of the specific techniques of manual therapy combined with specific exercise versus specific exercise on CLBP.

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Appendixes

Appendix 1: Data extraction form

<table>
<thead>
<tr>
<th>Data characteristics</th>
<th>Study contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic information</td>
<td></td>
</tr>
<tr>
<td>Date of data extraction</td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td></td>
</tr>
<tr>
<td>Journal and publication details</td>
<td></td>
</tr>
<tr>
<td>Identification of the reviewer</td>
<td></td>
</tr>
<tr>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>Specific information</td>
<td></td>
</tr>
<tr>
<td>Care setting</td>
<td></td>
</tr>
<tr>
<td>Population - describe target population (age, gender, diagnosis)</td>
<td></td>
</tr>
<tr>
<td>Inclusion criteria,</td>
<td></td>
</tr>
<tr>
<td>Exclusion criteria,</td>
<td></td>
</tr>
<tr>
<td>Recruitment procedure,</td>
<td></td>
</tr>
<tr>
<td>Subject characteristics (age, etc.) and Numbers</td>
<td></td>
</tr>
<tr>
<td>Outcomes- content,</td>
<td></td>
</tr>
<tr>
<td>What was measured (domains)</td>
<td></td>
</tr>
<tr>
<td>Answer options</td>
<td></td>
</tr>
<tr>
<td>Baseline,</td>
<td></td>
</tr>
<tr>
<td>After intervention,</td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td></td>
</tr>
<tr>
<td>Methodological quality-design</td>
<td></td>
</tr>
<tr>
<td>Psychometric properties</td>
<td></td>
</tr>
<tr>
<td>Reliability (types)</td>
<td></td>
</tr>
<tr>
<td>Who conducted the measurement?</td>
<td></td>
</tr>
<tr>
<td>How was validity assessed?</td>
<td></td>
</tr>
<tr>
<td>Sensitivity - does the technique adjust for confounding variables?</td>
<td></td>
</tr>
<tr>
<td>Responsiveness</td>
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<tr>
<td>Applicability</td>
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<tr>
<td>Individual options</td>
<td></td>
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<tr>
<td>Is subjective evaluation included?</td>
<td></td>
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<tr>
<td>Outcome measures and results</td>
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<td>Length of follow up</td>
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<td>Dropouts</td>
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<td>Missing data</td>
<td></td>
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<tr>
<td>Discrete data (p value)</td>
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<td>Comparison to other tools</td>
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<td>Reviewer check for multiple publications</td>
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<tr>
<td>Second reviewer</td>
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<tr>
<td>Discrepancies with first reviewer</td>
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Appendix 2: Red flag

<table>
<thead>
<tr>
<th>Age</th>
<th>History</th>
<th>Symptoms</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Presentation under 20 years</td>
<td>Violent trauma</td>
<td>Constant, progressive, non-mechanical pain</td>
<td>Persisting severe restriction of lumbar flexion</td>
</tr>
<tr>
<td>Onset over 55 years</td>
<td>Past history of cancer</td>
<td>Neurological symptoms</td>
<td>Neurological signs</td>
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<tr>
<td></td>
<td>Systemic steroids</td>
<td>Systematically unwell</td>
<td></td>
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<tr>
<td></td>
<td>Drug abuse</td>
<td>Weight loss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HIV</td>
<td>Thoracic pain</td>
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Appendix 3: Yellow flags

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<th>Individual factors</th>
<th>Occurrence</th>
<th>Chronicity</th>
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<tr>
<td>Age</td>
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<td>Obesity</td>
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<tr>
<td>Physical fitness</td>
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<td>Low educational level</td>
</tr>
<tr>
<td>Strength of back and abdominal muscles</td>
<td></td>
<td>High levels of pain and disability</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
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<tr>
<td>Psychosocial factors</td>
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<td>Distress</td>
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<td>Stress</td>
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<td>Depressive mood</td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td>Somatisation</td>
</tr>
<tr>
<td>Mood/emootions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive functioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain behaviour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational factors</td>
<td></td>
<td>Job dissatisfaction</td>
</tr>
<tr>
<td>Manual handling of materials</td>
<td></td>
<td>Unavailability of light duty on return to work</td>
</tr>
<tr>
<td>Bending and twisting</td>
<td></td>
<td></td>
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<tr>
<td>Whole-body vibration</td>
<td></td>
<td>Job requirement of lifting for 3/4 of the day</td>
</tr>
<tr>
<td>Job dissatisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monotonous tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work relations/social support</td>
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<td></td>
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<td>Control</td>
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</table>

Appendix 4: Other resources were used for search process

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<td>The spine journal</td>
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<tr>
<td>European spine journal</td>
<td>3</td>
</tr>
<tr>
<td>Manual therapy journal</td>
<td>7</td>
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<td>Total</td>
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### Appendix 5: Search strategies

#### CINHAL Databases

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<th>Interface</th>
<th>Database</th>
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<td>S12</td>
<td>manual therapy and exercise and multimodal</td>
<td>Search modes - Boolean/Phrase</td>
<td>Interface - EBSCOhost Research Databases</td>
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<tr>
<td>S11</td>
<td>“manual therapy with exercise”</td>
<td>Search modes - Boolean/Phrase</td>
<td>Interface - EBSCOhost Research Databases</td>
<td>Search Screen - Basic Search Database - CINAHL</td>
<td>67</td>
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<tr>
<td>S10</td>
<td>10. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9</td>
<td>Search modes - Boolean/Phrase</td>
<td>Interface - EBSCOhost Research Databases</td>
<td>Search Screen - Basic Search Database - CINAHL</td>
<td>20,053</td>
</tr>
<tr>
<td>S9</td>
<td>recurrence back pain</td>
<td>Search modes - Boolean/Phrase</td>
<td>Interface - EBSCOhost Research Databases</td>
<td>Search Screen - Basic Search Database - CINAHL</td>
<td>60</td>
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<tr>
<td>S8</td>
<td>8. (“lumbopelvic pain”)</td>
<td>Search modes - Boolean/Phrase</td>
<td>Interface - EBSCOhost Research Databases</td>
<td>Search Screen - Basic Search Database - CINAHL</td>
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<td>Search modes - Boolean/Phrase</td>
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<td>Search Screen - Basic Search Database - CINAHL</td>
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<tr>
<td>S4</td>
<td>(“back pain”)</td>
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<td>control clinical trail</td>
<td>Search modes - Boolean/Phrase</td>
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Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

**CENTRAL database**

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Date Run: 15/11/16 21:09:33.993

Description:

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<td>MeSH descriptor: [Back Pain] explode all trees 3378</td>
<td>3378</td>
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<td>#2</td>
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</tr>
<tr>
<td>#4</td>
<td>(lumbopelvic pain) 63</td>
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<td>#5</td>
<td>(low next back next pain) 5761</td>
<td>5761</td>
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<td>#6</td>
<td>(Ibp) 853</td>
<td>853</td>
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<tr>
<td>#7</td>
<td>(#1 or #2 or #3 or #4 or #5 or #6) 18286</td>
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<tr>
<td>#8</td>
<td>manual therapy with exercise versus exercise 678</td>
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<td>#9</td>
<td>manual therapy with aerobic exercise versus exercise 149</td>
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<tr>
<td>#10</td>
<td>manual therapy and exercise and multimodal intervention 77</td>
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</tr>
<tr>
<td>#11</td>
<td>manipulation enriched exercise versus exercise only 11</td>
<td>11</td>
</tr>
<tr>
<td>#12</td>
<td>(manual therapy and exercise) 1257</td>
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<td>#13</td>
<td>(#6 or #9 or #10 or #11 or #12) 1263</td>
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<tr>
<td>#14</td>
<td>(#7 and #13) 525 studies</td>
<td></td>
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</tbody>
</table>

*Figure A*

**Medline database**

S1. randomized controlled trial.pt.

S2. controlled clinical trial.pt.

S3. (MM “muscle, Skeletal”)

S4. manual therapy with exercise versus exercise only

S5. (Manual therapy with exercise)

S6. (Manual therapy AND exercise AND interdisciplinary)

*Citation:* Lynne Gaskell and Saeid Al Matif. "Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review". *EC Orthopaedics* 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

S7. Manual therapy combined or adjacent exercise AND multimodal

S8. Or /1-8

00. S1-S8 = (69,505)

S10. low back pain

S11. experience Back Pain

S12. backache

S13. lumbopelvic pain

S14. recurrence back pain

S15. (Manual therapy combined exercise versus exercise AND chronic low back pain)


S17. exercise and manual therapy

S18. exercise and manual therapy and multimodal

S19. exercise and interdisciplinary

S20. manual therapy and interdisciplinary

S21. (exercise and manual therapy and interdisciplinary and low back pain)

S22. OR/10-21

S23. AND S10, S21 = (1090 studies).

Ovid database

1 Randomized Controlled Trail/ 0 Advanced

2 Single blinded study/ 0 Advanced

3 Double blinded procedure.mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 34 Advanced.

4 Low back pain.mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 75905 Advanced.

5 experience back pain.mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 511 Advanced.

Citation: Lynne Gaskell and Saeid Al Matif. “Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review”. EC Orthopaedics 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

6 chronic back pain.mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 8643 Advanced.

7 Backache.mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 10105 Advanced

8 1 or 2 or 3 or 4 or 5 or 6 or 7 89052 Advanced

9 manual therapy with exercise versus exercise.mp.

[mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 0 Advanced

10 (chronic low back pain and multimodal intervention).mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 14 Advanced

11 (back pain and interdisciplinary).mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 2538 Advanced

12 "manual therapy and exercise and disability and pain and low back pain ".mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 0 Advanced

13 (manual therapy and exercise and low back pain).mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 907 Advanced

14 (disability and low back pain).mp. [mp = ti, ab, tx, ct, sh, bt, hw, ot, id, tc, tm, nm, kf, px, rx, an, ui] 22486 Advanced

15 9 or 10 or 11 or 12 or 13 or 14 24380 Advanced

16 8 and 15 23587 Advanced

17 remove duplicates from 11 1967 Advanced

18 remove duplicates from 13 713 Advanced

19 remove duplicates from 5376 Advanced.

PubMed databases

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Search,Query,Items found,Time

#20,"Search (((recurrence or experience back pain))) AND ((chronic low back pain and

Citation: Lynne Gaskell and Saeid Al Matif. “Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review”. EC Orthopaedics 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

Citation: Lynne Gaskell and Saeid Al Matif. “Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review”. EC Orthopaedics 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

Fields AND ""pain""[All Fields] OR ""back pain""[All Fields]) AND ((""musculoskeletal manipulations""[MeSH Terms] OR (""musculoskeletal""[All Fields] AND ""manipulations""[All Fields]) OR ""musculoskeletal manipulations""[All Fields]) OR (""manual""[All Fields] AND ""therapy""[All Fields]) OR (""man therapy""[All Fields]) AND enriched [All Fields] AND (""exercise""[MeSH Terms] OR ""exercise""[All Fields]) AND (chronic [All Fields] AND (""low back pain""[MeSH Terms] OR (""low""[All Fields] AND ""back""[All Fields]) AND ""pain""[All Fields]) OR (""low back pain""[All Fields]) AND (""musculoskeletal manipulations""[MeSH Terms] OR (""musculoskeletal""[All Fields] AND ""manipulations""[All Fields]) OR ""musculoskeletal manipulations""[All Fields]) OR (""manual""[All Fields] AND ""therapy""[All Fields]) OR (""man therapy""[All Fields]) AND (""exercise""[MeSH Terms] OR ""exercise""[All Fields]) AND (multimodal [All Fields] AND (""Intervention (Amstelveen)""[Journal] OR ""intervention""[All Fields] OR ""Interv Sch Clin""[Journal] OR ""intervention""[All Fields]) AND (""recurrence""[MeSH Terms] OR ""recurrence""[All Fields]) AND (""low back pain""[MeSH Terms] OR (""low""[All Fields] AND ""back""[All Fields]) AND ""pain""[All Fields]) OR (""low back pain""[All Fields]) AND #14) AND #15) AND (""back pain""[MeSH Terms] OR (""back""[All Fields] AND ""pain""[All Fields]) OR ""back pain""[All Fields]) AND #7) AND (B. [All Fields] AND (""musculoskeletal manipulations""[MeSH Terms] OR (""musculoskeletal""[All Fields] AND ""manipulations""[All Fields]) OR ""musculoskeletal manipulations""[All Fields]) OR (""manual""[All Fields] AND ""therapy""[All Fields]) OR (""man therapy""[All Fields]) AND (""exercise""[MeSH Terms] OR ""exercise""[All Fields]) AND multimodal [All Fields]) AND #14) AND #15) AND back pain) AND #7) AND B. manual

Citation: Lynne Gaskell and Saeid Al Matif. “Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review”. EC Orthopaedics 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

therapy) AND (((exercise and multimodal))) Schema: all

#16,"Search (((((((((lower back pain) AND back pain) AND randomized control trail) AND
((recurrence or experience back pain)))) AND manual therapy enriched with exercise) AND
((chronic low back pain and manual therapy with exercise))) AND (((multimodal intervention
and recurrence low back pain))) AND #14) AND #15) AND back pain) AND #7) AND 8. manual
therapy) AND (((exercise and multimodal)))",0,18:18:42

#15,"Search (#7and (#8or#9or#10 or #11or #12 or #13).)",0,18:17:53

#14,"Search (14. (#8 or #9 or#10 or #11or #12 or #13).)",0,18:16:14

#13,"Search ((multimodal intervention and recurrence low back pain))",0,18:14:50

#12,"Search (chronic low back pain and manual therapy with exercise)",178,18:14:36

#11,"Search exercise adjacent with manual therapy versus exercise",0,18:14:14

#10,"Search ((exercise and multimodal)))",586,18:13:57

#9,"Search manual therapy enriched with exercise",1,18:13:38

#8,"Search 8. manual therapy",6078,18:13:01

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#6,"Search ((recurrence or experience back pain))",396927,18:12:00

#5,"Search ((back pain and disability))",7806,18:11:45

#4,"Search randomized control trail",396,18:11:31

#3,"Search ((back pain and multimodal))",303,18:11:07

#2,"Search back pain",56734,18:10:35

#1,"Search lower back pain",33802,18:10:02

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Science direct database

1. Recurrence back pain AND manual therapy adjacent with exercise

2. experience back pain AND interdisciplinary intervention

Citation: Lynne Gaskell and Saeid Al Matif. “Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review”. EC Orthopaedics 12.7 (2021): 105-135.
3. “back pain AND multimodal treatment”


**Google Scholar**

1. “manual therapy with exercise” “randomized clinical trial” chronic back pain


**Appendix 6**

**Pain and disability questionnaires**

**Visual analogue scale (VAS) and numerical rating scale (NRS)**

![Figure 2. A: Example of a numerical rating scale. B: Example of a visual analogue scale.](image)

**Oswestry disability index**

Please complete this questionnaire. It is designed to tell us how your back pain affects your ability to function in everyday life.

I have “Chronic Pain” or pain that has bothered me for 3 months or more: □ Yes □ No

Check one of the following:

□ Prior to Surgery □ After Surgery 3 Months □ After Surgery 1 year □ After Surgery 6 weeks □ After Surgery 6 Months □ After Surgery 2 years

Please answer each section below by checking the One Choice that applies the most to you at this time. (You may feel that more than one of the statements relates to you at this time, but it is very important that you Please check only one choice that best describes your problem at this time.)

---

**Citation:** Lynne Gaskell and Saeid Al Matif. “Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review”. *EC Orthopaedics* 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

Section 1: Pain Intensity

☐ I can tolerate the pain I have without having to use pain killers. [0 points]

☐ The pain is bad, but I manage without taking pain killers. [1 point]

☐ Pain killers give complete relief from pain. [2 points]

☐ Pain killers give moderate relief from pain. [3 points]

☐ Pain killers give very little relief from pain. [4 points]

☐ Pain killers have no effect on the pain, and I do not use them. [5 points]

Section 2: Personal Care

☐ I can look after myself normally without causing extra pain. [0 points]

☐ I can look after myself normally, but it causes extra pain. [1 point]

☐ It is painful to look after myself and I am slow and careful. [2 points]

☐ I need some help but manage most of my personal care. [3 points]

☐ I need help every day in most aspects of self-care. [4 points]

☐ I do not get dressed wash with difficulty and stay in bed. [5 points]

Section 3: Lifting

☐ I can lift heavy weights without extra pain. [0 points]

☐ I can lift heavy weights, but it gives extra pain. [1 point]

Oswestry Low Back Pain Disability Questionnaire

Oswestry Disability Index

Section 3: Lifting (Cont.)

☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned for example on a table. [2 points]

☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned. [3 points]

☐ I can lift only very light weights. [4 points]

☐ I cannot lift or carry anything at all. [5 points]
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

Section 4: Walking

- Pain does not prevent me walking any distance. [0 points]
- Pain prevents me walking more than 1 mile. [1 point]
- Pain prevents me walking more than 0.5 miles. [2 points]
- Pain prevents me walking more than 0.25 miles. [3 points]
- I can only walk using a stick or crutches. [4 points]
- I am in bed most of the time and have to crawl to the toilet. [5 points]

Section 5: Sitting

- I can sit in any chair as long as I like. [0 points]
- I can only sit in my favorite chair as long as I like. [1 point]
- Pain prevents me sitting more than 1 hour. [2 points]
- Pain prevents me from sitting more than 0.5 hours. [3 points]
- Pain prevents me from sitting more than 10 minutes. [4 points]
- Pain prevents me from sitting at all. [5 points]

Section 6: Standing

- I can stand as long as I want without extra pain. [0 points]
- I can stand as long as I want but it gives me extra pain. [1 point]
- Pain prevents me from standing for more than 1 hour. [2 points]
- Pain prevents me from standing for more than 30 minutes. [3 points]
- Pain prevents me from standing for more than 10 minutes. [4 points]
- Pain prevents me from standing at all. [5 points]

Oswestry Low Back Pain Disability Questionnaire

Oswestry Disability Index

Section 7: Sleeping

- Pain does not prevent me from sleeping well. [0 points]
- I can sleep well only by using tablets. [1 point]

Citation: Lynne Gaskell and Saeid Al Matif. "Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review". EC Orthopaedics 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

- Even when I take tablets I have less than 6 hours sleep. [2 points]
- Even when I take tablets I have less than 4 hours sleep. [3 points]
- Even when I take tablets I have less than 2 hours of sleep. [4 points]
- Pain prevents me from sleeping at all. [5 points]

Section 8: Sex life

- My sex life is normal and causes no extra pain. [0 points]
- My sex life is normal but causes some extra pain. [1 point]
- My sex life is nearly normal but is very painful. [2 points]
- My sex life is severely restricted by pain. [3 points]
- My sex life is nearly absent because of pain. [4 points]
- Pain prevents any sex life at all. [5 points]

Section 9: Social life

- My social life is normal and gives me no extra pain. [0 points]
- My social life is normal but increases the degree of pain. [1 point]
- Pain has no significant effect on my social life apart from limiting energetic interests such as dancing. [2 points]
- Pain has restricted my social life and I do not go out as often. [3 points]
- Pain has restricted my social life to my home. [4 points]
- I have no social life because of pain. [5 points]

Oswestry Low Back Pain Disability Questionnaire

Oswestry Disability Index

Section 10: Traveling

- I can travel anywhere without extra pain. [0 points]
- I can travel anywhere but it gives me extra pain. [1 point]
- Pain is bad but I manage journeys over 2 hours. [2 points]
- Pain restricts me to journeys of less than 1 hour [3 points]

Citation: Lynne Gaskell and Saeid Al Matif. “Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review”. EC Orthopaedics 12.7 (2021): 105-135.
Effectiveness of Manual Therapy Combined with Exercise Versus Exercise on Pain Intensity and Disability on Chronic Low Back Pain Patients-A Systematic Review

- Pain restricts me to short necessary journeys under 30 minutes. [4 points]
- Pain prevents me from traveling except to the doctor or hospital. [5 points]

Interpretation

Simply add up your points for each section and plug it in to the following formula in order to calculate your level of disability: point total / 50 X 100 = % disability (aka: ‘point total’ divided by ‘50’ multiply by ‘100 = percent disability).

Example: On my last ODI I scored a 18. So, 18/50 x 100 = 36% disability:

ODI scoring:

- 0% to 20% (minimal disability): Patients can cope with most activities of daily living. No treatment may be indicated except for suggestions on lifting, posture, physical fitness and diet. Patients with sedentary occupations (ex. secretaries) may experience more problems than others.
- 21% - 40% (moderate disability): Patients may experience more pain and problems with sitting, lifting and standing. Travel and social life are more difficult. Patients may be off work. Personal care, sleeping and sexual activity may not be grossly affected. Conservative treatment may be sufficient.
- 41% - 60% (severe disability): Pain is a primary problem for these patients, but they may also be experiencing significant problems in travel, personal care, social life, sexual activity and sleep. A detailed evaluation is appropriate.
- 61% - 80% (crippled): Back pain has an impact on all aspects of daily living and work. Active treatment is required.
- 81% - 100%: These patients may be bed bound or exaggerating their symptoms. Careful evaluation is recommended.

The Roland-Morris disability questionnaire

When your back hurts, you may find it difficult to do some of the things you normally do.

This list contains sentences that people have used to describe themselves when they have back pain. When you read them, you may find that some stand out because they describe you today.

As you read the list, think of yourself today. When you read a sentence that describes you today, put a tick against it. If the sentence does not describe you, then leave the space blank and go on to the next one. Remember, only tick the sentence if you are sure it describes you today.

1. I stay at home most of the time because of my back.
2. I change position frequently to try and get my back comfortable.
3. I walk more slowly than usual because of my back.
4. Because of my back I am not doing any of the jobs that I usually do around the house.

5. Because of my back, I use a handrail to get upstairs.

6. Because of my back, I lie down to rest more often.

7. Because of my back, I have to hold on to something to get out of an easy chair.

8. Because of my back, I try to get other people to do things for me.

9. I get dressed more slowly than usual because of my back.

10. I only stand for short periods of time because of my back.

11. Because of my back, I try not to bend or kneel down.

12. I find it difficult to get out of a chair because of my back.

13. My back is painful almost all the time.

14. I find it difficult to turn over in bed because of my back.

15. My appetite is not very good because of my back pain.

16. I have trouble putting on my socks (or stockings) because of the pain in my back.

17. I only walk short distances because of my back.

18. I sleep less well because of my back.


20. I sit down for most of the day because of my back.

21. I avoid heavy jobs around the house because of my back.

22. Because of my back pain, I am more irritable and bad tempered with people than usual.

23. Because of my back, I go upstairs more slowly than usual.

24. I stay in bed most of the time because of my back.

Note to users:


- The score of the RDQ is the total number of items checked - i.e., from a minimum of 0 to a maximum of 24.

- It is acceptable to add boxes to indicate where patients should tick each item.

- The questionnaire may be adapted for use on-line or by telephone.

Disclosure

“I declare that part of this systematic review has been taken from existing published or unpublished material without due acknowledgement and that all secondary material used herein has been fully referenced”.

Sign: Saeid Al Matif.

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