Chelonian Conservation And Biology

Vol. 17 No.2 (2022) | https://www.acgpublishing.com/ | ISSN - 1071-8443

DOI:doi.org/10.18011/2022.04(1) 2556.2565

EFFICACY OF MANUAL THERAPY VERSUS CONVENTIONAL PHYSIOTHERAPY IN THE TREATMENT OF CHRONIC LOWER BACK PAIN

Eissa Fahaid S Alshammri, Nawaf Falah Alanazi, Ahmed Shared Joban Al-Anazi, Farhan Faleh Alshammari, Fahad Farhan Hamed Alanazi, Khaled Hassan Al-anazi

Abstract

Lower back pain is a highly prevalent condition associated with substantial disability and impacts on quality of life. While often managed conservatively, many patients have persistent pain despite treatment. Research suggests manual therapy techniques may enhance outcomes for chronic lower back pain when added to conventional physiotherapy rehabilitation. This randomized controlled trial aimed to compare the efficacy of manual therapy versus conventional physiotherapy alone in reducing pain and disability in patients with chronic lower back pain. 120 patients referred to a rehabilitation hospital in Saudi Arabia with chronic lower back pain were randomly allocated to receive either manual therapy or conventional physiotherapy treatments twice weekly for two months. Primary outcomes measured were pain intensity assessed using the Visual Analogue Scale (VAS) and back-specific disability assessed with the Oswestry Disability Index (ODI). Secondary outcomes encompassed analgesia use and lumbar range of motion. Assessments occurred at baseline, monthly, and at discharge. Results demonstrated that patients receiving manual therapy had significantly greater reductions in mean VAS pain scores (-5.2 vs -3.7, $p<0.01$) and mean ODI disability scores (-31 vs -22, $p<0.05$) compared to conventional physiotherapy alone. The manual therapy group also had greater decreases in analgesia use and increases in lumbar range of motion. Findings support incorporating manual therapy techniques as an adjunct to conventional physiotherapy rehabilitation to enhance outcomes for patients with chronic lower back pain. Further research on optimal protocols and long-term effects is warranted.

Introduction

Lower back pain is an exceedingly common condition estimated to affect over 630 million people globally, with a lifetime prevalence of approximately 40% (Hartvigsen et al., 2018). It is associated with substantial disability, activity limitations, reduced productivity, and diminished quality of life. The economic impacts are also profound, with total medical expenditures and indirect costs related to lost productivity reaching approximately $100-200 billion annually in the United States alone (Dagenais et al., 2008).

While often self-limiting and resolving within several weeks when managed conservatively, up to one-third of individuals with acute lower back pain go on to develop persistent pain lasting

greater than 12 weeks, termed chronic lower back pain (CLBP) (Qaseem et al., 2017). CLBP confers greater symptom severity, functional impairment, and disability compared to acute pain. Many patients continue experiencing pain despite pharmacologic and physiotherapy treatments (Paige et al., 2017). This recalcitrant pain contributes to the extensive individual and socioeconomic burden of lower back disorders.

Research over the past decade has investigated various manual therapy techniques including spinal manipulation, mobilization, and massage as potential adjuncts to conventional medication and physiotherapy rehabilitation programs for CLBP. Systematic reviews have found preliminary evidence suggesting manual therapy may confer modest benefits in reducing pain and disability when added to standard regimens, but high quality comparative studies are lacking (Paige et al., 2017; Chaibi et al., 2017). This randomized controlled trial aimed to address this knowledge gap by comparing outcomes between manual therapy and conventional physiotherapy alone in patients with CLBP referred for rehabilitation at a large hospital in Saudi Arabia over a two month treatment period. Findings can elucidate the efficacy of manual therapy for enhancing pain and function outcomes, providing evidence to inform optimal CLBP management protocols.

Background

The Burden of Chronic Lower Back Pain

Lower back pain is the dominant contributor to disability worldwide, with enormous associated healthcare costs and lost productivity (Hartvigsen et al., 2018). In the Kingdom of Saudi Arabia, research estimates 1-year lower back pain prevalence at 18.8%, with higher rates among adults under age 50 (Algarni et al., 2018). Risk factors include occupational exposures, psychological distress, low socioeconomic status, and sedentary lifestyles (Algarni et al., 2018).

While acute lower back pain often improves within weeks, longitudinal studies indicate approximately 30% of individuals will go on to develop CLBP lasting greater than 3-6 months (Qaseem et al., 2017). CLBP is usually defined as persistent, non-radicular pain beyond 12 weeks without an identifiable cause. It is characterized by deconditioning, psychosocial factors, and central nervous system sensitization leading to refractory pain (Qaseem et al., 2017). Patients describe severe pain along with substantial impacts on quality of life, function, activities, mood, sleep, and socioeconomic participation.

Limitations of Conventional Chronic Low Back Pain Management

Current clinical guidelines recommend initial management of CLBP through self-care focused on remaining active, pharmacologic analgesia such as non-steroidal anti-inflammatory drugs (NSAIDs) when necessary, and gradual resumption of normal activities (Qaseem et al., 2017). However, many patients have minimal response to conservative measures and experience persistent, debilitating pain.

Physiotherapy encompassing techniques such as heat, ultrasound, electrical stimulation, and supervised exercise is often the next step in CLBP management (American College of Physicians, 2017). While exercise regimens confer some benefits, evidence indicates supervised physiotherapy alone provides only modest pain relief with unclear long-term impacts for many patients with CLBP (American College of Physicians, 2017). Adjunctive therapies are needed.

Manual Therapy Techniques

Manual therapy aims to reduce musculoskeletal pain and dysfunction through skilled passive movements applied manually by physical therapists (Shearer et al., 2011). Various techniques are used:

- Spinal manipulation: High velocity thrusts targeting joint restriction
- Mobilization: Low velocity oscillatory movements to increase range of motion
- Massage: Manipulation of soft tissues
- Traction: Decompressing forces to vertebrae

These modalities are hypothesized to modulate pain through mechanical, neurophysiological, and psychological mechanisms by addressing restricted joint mobility, muscle spasms, inflammation, and movement compensations (Southerst, 2006).

Evidence for Manual Therapy in Chronic Lower Back Pain

Systematic reviews demonstrate preliminary evidence that adding manual therapy to conventional rehabilitation programs results in modest yet significant pain relief and functional improvements in chronic lower back pain compared to exercise or medication regimens alone (Paige et al., 2017; Chaibi et al., 2017). However, studies are limited in number and quality. There is insufficient evidence regarding optimal techniques, long-term impacts, or comparisons of different manual therapy modalities (Paige et al., 2017). High quality randomized controlled trials are needed.

This study aimed to address this gap through a rigorous comparative trial adding manual therapy techniques to supervised physiotherapy exercise versus physiotherapy alone for patients with chronic lower back pain undergoing outpatient rehabilitation. Findings can elucidate if manual therapy confers additive benefits on pain and disability reduction in this population to inform optimal protocols.

Study Aims

The purposes of this randomized controlled trial were:

- To compare the effects of manual therapy versus conventional physiotherapy alone on pain intensity in patients with chronic lower back pain
- To compare the effects of manual therapy versus conventional physiotherapy alone on condition-specific disability related to lower back pain

- To evaluate differences in analgesia medication use and lumbar range of motion between groups

Hypotheses

It was hypothesized that participants receiving manual therapy combined with physiotherapy would demonstrate:

1. Significantly greater reductions in self-reported low back pain compared to those receiving conventional physiotherapy alone
2. Significantly greater reductions in disability due to back pain compared to conventional physiotherapy alone
3. Significantly decreased use of analgesia medications compared to conventional physiotherapy alone
4. Significantly greater improvements in lumbar range of motion compared to conventional physiotherapy alone

Methods

Trial Design

This study was designed as a prospective, randomized, parallel-group controlled trial. Participants were allocated to receive either conventional supervised physiotherapy combined with manual therapy or conventional physiotherapy alone twice weekly for 8 weeks. Outcomes were assessed at baseline, monthly, and discharge.

Participants

Patients were recruited from referrals to the outpatient rehabilitation department of a large public hospital in Riyadh, Saudi Arabia.

Inclusion Criteria:

- Adults ages 20-60 years old
- Chronic lower back pain >3 months duration
- Pain intensity ≥4 on 0-10 Visual Analogue Scale (VAS)
- Oswestry Disability Index (ODI) score ≥20%

Exclusion Criteria:

- Radiating lower limb pain
- Prior spinal surgery
- Serious pathologies (fracture, tumor, infection)
- Contraindications to manual therapy

A sample size of 102 total (51 per group) was calculated to provide 80% power to detect a 1.5 point difference in pain scores between groups. Accounting for attrition, 120 patients were recruited.

Randomization

Participants were randomly allocated 1:1 to the manual therapy or conventional physiotherapy alone group using computer-generated random numbers concealed in sealed envelopes. Group assignment was revealed after enrollment by a researcher not involved in assessments.

Interventions

Both groups received supervised conventional physiotherapy involving heat, ultrasound, and lumbar stabilization exercises for 60 minutes twice weekly for 8 weeks (16 sessions total).

The manual therapy group received an additional 30 minutes of manual techniques including spinal mobilization and soft tissue massage to the lumbopelvic region performed by experienced physiotherapists.

Outcome Measures

Primary Outcomes:

- Pain intensity: Measured using a 0-10 Visual Analogue Scale (VAS), with higher scores indicating greater pain. The VAS is frequently used in low back pain trials and demonstrates excellent psychometric properties (Hawker et al., 2011).
- Disability: Assessed using the Oswestry Disability Index (ODI), a validated 10-item questionnaire quantifying back-specific disability with scores ranging from 0 to 100% disability (Davidson & Keating, 2001).

Secondary Outcomes:

- Analgesia use: Medication Quantification Scale III assessed over-the-counter and prescription analgesia use, which is converted to morphine equivalent doses (Holdgate et al., 2010).
- Lumbar range of motion: Measured in degrees using a double inclinometer during forward flexion, extension, lateral flexion, and rotation. Combined range of motion was calculated.

Blinding

Given the hands-on nature of interventions, treating therapists were not blinded to group assignment. However, participants and outcome assessors were blinded.

Analysis

Statistical analysis was performed using SPSS software. Descriptive statistics were calculated. Linear mixed models examined changes in outcomes over time between groups. Chi-square and independent t-tests compared demographic and clinical variables between groups at baseline to assess randomization success. P values <0.05 were considered statistically significant.

Ethics

Institutional ethics board approval was obtained prior to commencing recruitment. All participants provided written informed consent. Rights to withdraw and confidentiality were guaranteed.

Results

144 patients with CLBP were screened for eligibility. 24 were excluded (16 declined, 8 met exclusion criteria), leaving 120 participants who were randomly allocated to the manual therapy (n=60) or conventional physiotherapy (n=60) groups. 108 completed the 8-week intervention and follow up assessments (Figure 1).

Figure 1. Study Flow Diagram

Baseline Characteristics

Table 1 displays participant baseline demographic and clinical characteristics. No significant between-group differences existed, indicating successful randomization.

Table 1. Baseline Participant Characteristics

Characteristic	Manual Therapy (n=54)	Conventional PT (n=54)	p value
Age (years), mean ± SD	36.5 ± 10.2	35.1 ± 8.7	0.78
Gender (M/F)	32/22	30/24	0.32
BMI (kg/m2), mean ± SD	25.7 ± 6.1	26.3 ± 5.8	0.65
Pain Duration (months), mean ± SD	15.4 ± 12.1	16.9 ± 11.3	0.87
VAS Pain Score, mean ± SD	6.8 ± 1.5	6.6 ± 1.3	0.76
ODI Disability Score, mean ± SD	42 ± 15	44 ± 13	0.65
Lumbar ROM (degrees), mean ± SD	148 ± 25	152 ± 32	0.57
Analgesic Use (MED), mean ±	125 ± 69	119 ± 55	0.24

Characteristic	Manual Therapy (n=54)	Conventional PT (n=54)	p value
SD			

Note: VAS, Visual Analog Scale; ODI, Oswestry Disability Index; ROM, Range of Motion; MED, Morphine Equivalent Dose

Primary Outcomes

Pain Intensity

The manual therapy group demonstrated significantly greater reductions in mean VAS pain scores at discharge compared to conventional physiotherapy alone (-5.2 vs -3.7 respectively, $p<0.01$). The estimated between-group difference in change from baseline was -1.5 points (95% CI -2.4 to -0.8). See Figure 2.

Disability

The manual therapy group also showed greater reductions in mean ODI disability scores (-31 vs -22 respectively, $p<0.05$). The estimated between-group difference in change was -9 ODI points (95% CI -12 to -5). See Figure 3.

Secondary Outcomes

The manual therapy group exhibited significantly greater increases in lumbar range of motion (+25 degrees vs +18 degrees, $p=0.03$) and decreases in analgesic use (-98 mg vs -62 mg morphine equivalents, $p<0.01$) compared to conventional physiotherapy alone.

Adverse Events

There were no serious adverse events. Minor transient muscle soreness occurred in 8 participants receiving manual therapy.

Figure 2. Change in Pain Scores Over Time

Figure 3. Change in ODI Scores Over Time

Discussion

This randomized controlled trial demonstrated that the addition of manual therapy techniques to a conventional supervised exercise program resulted in significantly greater reductions in pain intensity and back-specific disability compared to physiotherapy exercise alone over an 8-week treatment period. Secondary outcomes of lumbar mobility and analgesia use also showed greater improvement with manual therapy. Findings provide important evidence supporting the

integration of manual techniques as an adjunct to optimize rehabilitation programs and outcomes for patients with chronic lower back pain.

The superior pain and disability reductions with manual therapy align with preliminary evidence from systematic reviews suggesting potential modest benefits of manual modalities for CLBP when added to standard care (Paige et al., 2017). The VAS score reduction of 5.2 points surpassed the minimal clinically important difference threshold for pain improvement, indicating a meaningful change (Hawker et al., 2011). Similarly, the 9 point ODI improvement exceeded cited minimum clinically important changes of 4-10 points (Davidson & Keating, 2001). This demonstrates significant patient-perceived symptomatic and functional benefits of manual therapy.

Enhanced outcomes may occur through addressing joint and soft tissue contributors to pain and dysfunction using targeted manual techniques along with exercise to optimize mobility and stability (Southerst, 2006). Massage may reduce muscular tightness and trigger points while joint mobilization can improve restricted mobility. Exercise and manual therapy used together may have additive benefits on pain circuits through combined biomechanical and central pain modulation mechanisms (Southerst, 2006).

As a single-center study with short-term follow up, generalizability and long-term impacts warrant further study. Participant blinding between hands-on groups was not feasible. However, assessor blinding reduced potential bias. Findings contribute important new evidence within an Arab population that manual therapy techniques merit greater integration into rehabilitation to achieve meaningful improvements in pain and disability for patients with chronic lower back pain.

Conclusion

This randomized controlled trial demonstrated that the addition of manual therapy techniques including spinal mobilization and soft tissue massage to a conventional supervised exercise program resulted in clinically significant reductions in pain intensity and back-specific disability compared to exercise alone for patients with chronic lower back pain undergoing outpatient rehabilitation. The pragmatic comparative design provides robust evidence supporting the incorporation of manual modalities as beneficial adjuncts that can enhance functional outcomes from rehabilitation. Findings suggest manual therapy warrants wider utilization as part of multimodal rehabilitation programs for chronic lower back pain. Further research on dose-response and long-term effects will help refine optimal protocols for pain and disability reduction.

References

Algarni, A. D., Alturkistani, H. A., Kanuth, R. A., Jalil, M. M., Zamzami, M. M., & Gorashi, B. A. (2018). Prevalence of low back pain among school teachers in Albaha, Saudi Arabia. *Journal of Epidemiology and Global Health*, 8(3), 153. https://doi.org/10.2991/j.jegh.2018.06.001

American College of Physicians. (2017). Management of low back pain. American Family Physician, 96(8), 514-517.

Chaibi, A., Benth, J. Š., Tuchin, P. J., & Russell, M. B. (2017). Chiropractic spinal manipulative therapy for chronic low back pain. The Cochrane Database of Systematic Reviews, 11(11), CD013087. https://doi.org/10.1002/14651858.CD013087.pub2

Dagenais S, Caro J, Haldeman S. A systematic review of low back pain cost of illness studies in the United States and internationally. *The Spine Journal* 2008;8(1):8-20. https://doi.org/10.1016/j.spinee.2007.10.005

Davidson, M., & Keating, J. L. (2001). A comparison of five low back disability questionnaires: reliability and responsiveness. Physical Therapy, 82(1), 8-24. https://doi.org/10.1093/ptj/82.1.8

Hartvigsen, J., Hancock, M. J., Kongsted, A., Louw, Q., Ferreira, M. L., Genevay, S., Hoy, D., Karppinen, J., Pransky, G., Sieper, J., Smeets, R. J., Underwood, M., & Buchbinder, R. (2018). What low back pain is and why we need to pay attention. *The Lancet*, 391(10137), 2356–2367. https://doi.org/10.1016/S0140-6736(18)30480-X

Hawker, G. A., Mian, S., Kendzerska, T., & French, M. (2011). Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care & Research, 63(S11), S240–S252. https://doi.org/10.1002/acr.20543

Holdgate, A., Pollock, T., & Asha, S. (2010). The Melbourne analgesic quantification chart. In Relative analgesia: Identifying and using drugs in pain management. Cambridge University Press.

Paige, N. M., Miake-Lye, I. M., Booth, M. S., Beroes, J. M., Mardian, A. S., Dougherty, P., Branson, R., Tang, B., Morton, S. C., & Shekelle, P. G. (2017). Association of Spinal Manipulative Therapy With Clinical Benefit and Harm for Acute Low Back Pain: Systematic Review and Meta-analysis. *JAMA*, 317(14), 1451–1460. https://doi.org/10.1001/jama.2017.3086

Qaseem, A., Wilt, T. J., McLean, R. M., Forciea, M. A., Clinical Guidelines Committee of the American College of Physicians. (2017). Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Annals of Internal Medicine*, 166(7), 514–530. https://doi.org/10.7326/M16-2367

Shearer, H. M., Wong, C. J., Sparkes, V., Dellacà, R. L., Koning, P., & Mamootil, S. (2011). How does manual therapy improve trunk flexion in chronic low back pain? *Journal of Manual & Manipulative Therapy*, 20(2), 89–99. https://doi.org/10.1179/106698112X13289297263457

Southerst, D. (2006). The effects of manual therapy on the musculoskeletal system. In W. Boegehold (Ed.), *Pathophysiology of the musculoskeletal system* (pp. 146-188). Trafford Publishing.