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Systematic review

Effects of orthopaedic manual therapy in knee osteoarthritis: a systematic review and meta-analysis

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Abstract

Objective This systematic review to aimed to evaluate the effects of orthopaedic manual therapy (OMT) on pain, improving function, and physical performance in patients with knee osteoarthritis (OA).

Data sources Four databases (PubMed, Web of Science, CENTRAL, and CINAHL) were searched.

Study selection Trials were required to compare OMT alone or OMT in combination with exercise therapy, with exercise therapy alone or control.

Data extraction Data extraction and risk assessment were done by two independent reviewers. Outcome measures were visual analogue scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain score, WOMAC function score, WOMAC global score, and stairs ascending-descending time.

Results Eleven randomized controlled trials were included (494 subjects), four of which had a PEDro score of 6 or higher, indicating adequate quality. The results of the meta-analysis indicated that reduction of VAS score in OMT compared with the control group was statistically insignificant (SDM: −0.59; 95% CI: −1.54 to −0.36; $P = 0.224$). The reduction of VAS score in OMT compared with exercise therapy group was statistically significant (SDM: −0.78; 95% CI: −1.42 to −0.17; $P = 0.013$). The reduction of WOMAC pain score in OMT compared with the exercise therapy group was statistically significant (SDM: −0.79; 95% CI: −1.14 to −0.43; $P = 0.001$). Similarly, the reduction of WOMAC function score in OMT compared with the exercise therapy group was statistically significant (SDM: −0.85; 95% CI: −1.20 to −0.50; $P = 0.001$). However, the reduction of WOMAC global score in OMT compared with the exercise therapy group was statistically insignificant (SDM: −0.23; 95% CI: −0.54 to −0.09; $P = 0.164$). The reduction of stairs ascending-descending time in OMT compared with the exercise therapy group was statistically significant (SDM: −0.88; 95% CI: −1.48 to −0.29; $P = 0.004$).

Conclusions This review indicated OMT compared with exercise therapy alone provides short-term benefits in reducing pain, improving function, and physical performance in patients with knee OA.

Review registration PROSPERO 2016:CRD42016032799.

Keywords: Knee; Osteoarthritis; Orthopaedic manual therapy; Pain; Function; Exercise

Abbreviations: OA, osteoarthritis; OMT, orthopaedics manual therapy; RCT, randomized controlled trials; VAS, visual analogue scale; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index; ROM, range of motion; SDM, standard difference in mean; CI, confidence intervals; GRADE, Grading of Recommendations Assessment, Development, and Evaluation System; MWM, mobilization with movement.

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Introduction

The prevalence of knee osteoarthritis (OA) is gradually increasing worldwide and is the commonest cause of disability in older adults [1,2]. Approximately 9% of people aged 60 years and older are diagnosed with symptomatic knee OA in the United States [3]. Due to its chronic nature and high treatment costs, knee OA becomes a significant burden to society [4]. The major symptoms of knee OA include pain, stiffness in the affected joint and functional disability, which can affect the quality of life [5].

Orthopaedic manual therapy (OMT) is defined as "any hands-on therapy given by the physical therapist. Intervention may include moving joints in various and specific directions and at various speeds to regain movement (joint mobilization and manipulation), stretching, passive range of motion (ROM) exercise of the affected body part, or having the patient move the body part against the therapist's resistance to improve muscle activation and timing. Selected certain soft tissue techniques may also be used to improve the mobility and function of tissue and muscles [6]." Abbott *et al.* [7] reported long term beneficial effects (up to 1 year) of OMT compared with usual care in patients with hip or knee OA. However, the authors did not show any additional benefits of OMT in combination with exercise therapy in patients with hip or knee OA [7]. Similarly, Kappetijn *et al.* [8] reported a beneficial effect of passive mobilisation in combination with exercise therapy in reducing pain, functional limitation and improving extension ROM of knee joint in patients with knee OA. In addition, Jansen *et al.* [9] reported a moderate effect size on pain reduction following exercise therapy plus manual mobilisation compared to small effect sizes for strength training or exercise therapy alone in patients with knee OA. Moreover, Pinto *et al.* [10] reported that the exercise therapy and OMT in isolation was more cost effective compared to usual care in patients with hip or knee OA.

Over the last 10 years, several studies assessing the effects of OMT published that seems to indicate that OMT is an effective treatment approach for musculoskeletal disorders [11–18]. However, there is inconclusive evidence on the overall effects of OMT treatment [19]. Previous studies have demonstrated promising effects of OMT in reducing pain and improving physical function in patients with knee OA [7,8,10,20,21], but isolated effectiveness of OMT has not been well-established [22,23]. In addition, only two systematic reviews and meta-analyses have been published indicating effectiveness of OMT and exercise for managing pain and functional limitations in individuals with knee OA [9,23]. However, French *et al.* [23] study included only 4 trials out of which 3 had a high risk of bias, whereas, Jansen *et al.* [9] study did not assess risk of bias in their included trials. Therefore, this systematic review and meta-analysis aimed to evaluate the effects of OMT on pain, functional disability, ROM, and physical performance in patients with knee OA.

Methods

The current systematic review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for conducting search and reporting the trials [24]. This systematic review was prospectively registered in PROSPERO (CRD42016032799) and available at http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42016032799.

Database and search strategies

Four databases (PubMed, Web of Science, CENTRAL, and CINAHL) were searched by two independent reviewers from the time of their inception to February 6, 2017. The language of the articles was restricted to English. The literature search was conducted using the major key words knee OA and OMT; which were adapted for each database as required (as shown in supplementary Table A in the online version at DOI:10.1016/j.physio.2018.05.003). Additional potential articles were searched manually from the reference lists of identified articles.

Inclusion and exclusion criteria for selection of studies

The current systematic review included all the published articles that qualified the following PICOS criteria:

Participants: adults over 30 years of age diagnosed with knee OA (unilateral or bilateral) as per criteria given by the American College of Rheumatology [25,26] or had a radiographic or symptomatic knee OA diagnosed by a physician.

Interventions: OMT alone or OMT in combination with exercise therapy

Comparators: exercise therapy alone or electrotherapy or control

Outcomes: pain, functional disability, ROM, and physical performance

Study design: randomised controlled trials (RCTs)

Studies were excluded if they were not published in the English. In addition, due to risk of high potential bias, non-randomised and cross-sectional studies, case reports and case series were also excluded. Furthermore, Studies that did not include OMT in their interventions were excluded.

Study selection

Only randomised controlled trials (RCTs) were included in this meta-analysis. The outcome measures of interest were pain, functional disability, ROM, and physical performance in individuals with knee OA. Pain, functional disability, ROM, and physical performance were measured using a visual analog scale (VAS), the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scale, goniometry, and stairs ascending-descending time, respectively.

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