

McKenzie method for low back pain

Método McKenzie na dor lombar

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ABSTRACT

BACKGROUND AND OBJECTIVES: Low back pain is a disorder affecting people of all ages, being among major diseases leading individuals to look for health professionals' help. Clinicians agree that back pain is a heterogeneous condition, however there is no uniformity in the choice of most effective methods to manage pain. This study aimed at evaluating the contribution of the McKenzie method to manage low back pain, in addition to checking whether there is comparison of McKenzie with other treatment modalities.

CONTENTS: Health Virtual Library and Pubmed portals were queried from November 2013 to March 2014. All studies were analyzed according to quality criteria established by the PEDro scale, in addition to inclusion and exclusion criteria established by the authors. Of 353 studies found, just six were considered eligible. McKenzie method compared to other therapeutic approaches was effective in functional performance and dysfunction indices, however there has been discrepancy of results due to heterogeneous samples of different clinical trials.

CONCLUSION: Although having contributed to manage low back pain patients, McKenzie method requires further studies to validate the technique in specific patient groups.

Keywords: Low back pain, McKenzie method, Physiotherapeutic modalities.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor lombar é um transtorno que afeta pessoas de todas as idades, estando entre as principais doenças que levam o indivíduo a buscar ajuda de profissionais da área da saúde. Clínicos concordam que a dor lombar é uma condição heterogênea, porém não há uniformidade na escolha dos métodos mais eficazes para o tratamento da dor. O objetivo deste

estudo foi avaliar a contribuição do método McKenzie para o tratamento da dor lombar, além de verificar se há comparação do McKenzie com outras abordagens de tratamento.

CONTEÚDO: Foram realizadas buscas nos portais da Biblioteca Virtual em Saúde e Pubmed no período de novembro de 2013 a março de 2014. Todos os estudos foram analisados de acordo com os critérios de qualidade estabelecidos pela escala de PEDro, além de critérios de inclusão e exclusão estabelecidos pelos autores. Foram encontrados 353 estudos, sendo que apenas 6 foram considerados elegíveis. O método McKenzie ao ser comparado com outras abordagens terapêuticas mostrou-se eficaz em índices desempenho funcional e disfunção, porém houve discrepância de resultados por conta de amostra heterogênea nos diversos ensaios clínicos.

CONCLUSÃO: Embora o método McKenzie tenha contribuído para o tratamento de pacientes com dor lombar, é necessária a realização de novos estudos que validem a técnica em grupos específicos de pacientes.

Descritores: Dor lombar, Modalidades de fisioterapia, Método McKenzie.

INTRODUCTION

Low back pain reaches epidemic levels worldwide¹. It is considered a heterogeneous clinical condition affecting a certain spinal region and is primarily related to the incorrect use of human biomechanics¹. Low back pain is also responsible for significant part of the demand for health services and is a multidimensional phenomenon involving psychosocial, behavioral and pathophysiological processes²⁻⁴. So, it represents an important global and socioeconomic problem, since it is a disabling condition with high costs both for individuals and the society^{5,6}. It affects primarily females aged between 40 and 80 years⁷.

In Brazil, approximately 10 million people have low back pain-associated incapacity⁸, primarily affecting individuals between 50 and 59 years of age⁹. Pathophysiology is complex¹⁰. In addition, there is still no "gold standard" for low back pain management, since diagnostic and management systems available in the literature are still undergoing validation and reliability processes.

McKenzie method (MDT) is a treatment system developed by New Zealander physiotherapist Robin McKenzie, which consists of evaluation, treatment and prophylaxis stages, with the following bases: 1) classification of disorders related to spine and extremities; 2) centralization phenomenon and its reverse (peripheralization); 3) classification of patients according to three mechanical or non-mechanical syndromes of derange-

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ment, dysfunction or postural; 4) emphasis on education and active patient involvement. MDT focuses on the spine and its peripheral joints and is based on solid principles aiming at an accurate evaluation to get the determining mechanical diagnosis to develop a specific treatment adequate for each patient¹¹. This study aimed at evaluating the contribution of the McKenzie method for low back pain management, in addition to checking whether there are comparisons between McKenzie and other treatment approaches.

CONTENTS

This study was developed in the Pontifícia Universidade Católica de Campinas, Campinas/SP by means of a survey of data published from 2004 to 2013 in Medline via Pubmed and Virtual Health Library (VHL) including LILACS, Scielo, IBICS and Cochrane Library quotations.

Descriptors were: low back pain, sciatica and lumbar spine associated to McKenzie, centralization, directional preference, derangement syndrome, extension exercises and McKenzie method, as well as their synonyms in Portuguese: *dor lombar, ciática e coluna lombar associados à McKenzie, Método McKenzie, exercícios de extensão, centralização, preferência direcional e síndrome do desarranjo*. A manual search of reference lists of previously published systematic reviews and clinical trials was performed by the authors and, after this, available data were submitted to descriptive analysis. McKenzie International Institute references list was also taken into consideration.

Only controlled, randomized studies published in English and meeting the following criteria were selected: scores above

5 in the PEDro scale¹², randomized clinical trials (RCT) defining low back pain as going from the last rib to gluteal folds, with or without irradiation, where MDT or synonyms in the corresponding language were used to give name to one intervention performed; RCT where MDT was not mentioned, however interventions reflected one or more principles of the method, such as repeated passive spinal movements or sustained positions in specific directions, and RCT where other techniques were performed together with MDT, since this approach reflects current physiotherapy clinical practice.

Excluded from this review were RCT in duplicate, those obtained regardless of keywords, those performed with restricted populations, RCT focused on specific diseases (spondylolisthesis, infection or inflammatory processes) and RCT where the experimental group would perform dynamic strengthening exercises because this intervention does not represent MDT itself or the classification proposed by it.

In VHL and Pubmed databases, 146 and 208 studies, respectively, were found, in a total of 353 studies. Most studies were excluded by duplicate (148), other studies were excluded according to exclusion criteria (197): studies with restricted populations, clinical trials focusing on specific diseases, studies with scores below 5 in the PEDro scale and non-randomized studies. So, six RCT were selected for meeting inclusion and exclusion criteria (Table 1).

Among six evaluated RCT, one has addressed low back pain in its acute phase¹⁶, none in sub-acute phase, two have addressed low back pain in its chronic phase^{14,18} and three have not specified low back pain symptoms duration along their articles^{13,15,17}.

Table 1. Summary of selected articles

Study [PEDro score/10]	Participants	Interventions	Results
Browder et al. ¹³ [6/10]	48 patients (15 females), aged 18-60 years; symptoms distal to gluteus which centralized with extension movements.	(G1) eight physiotherapy sessions for lumbar spine extension (exercises + mobilizations) associated to home exercises program (n=26) (G2) eight physiotherapy sessions for strengthening (isolated contractions of abdominal and spine stabilizing muscles) associated to home exercises program (n=22).	G1 compared to G2: G1 had more significant evolution in dysfunction measurement (ODQ) after one week and six month of follow up and has also improved pain (NPRS) just after one week follow up.
Garcia et al. ¹⁴ [8/10]	148 patients (109 females), aged 18-80 years; nonspecific low back pain symptoms for at least three months	(G1) four individual sessions lasting 45 minutes to one hour, 1x/week with MDT, based on directional movements preference (n=74). (G2) four sessions being the first individual and remaining in groups, lasting 45 minutes to one hour, 1x/week made up of theoretical and practical orientations according to the Back School method (n=74)	G1 compared to G2: better functional performance index (RMDQ) after one month of treatment, however with no differences in pain measurement.
Long, Donelson & Fung ¹⁵ [8/10]	312 patients (146 females), aged 18-65 years; low back pain and sciatic pain. Those with directional preference (n=230) were included and 201 participants have concluded the study.	(G1) exercises compatible with directional preference presented during evaluation for two weeks (n=80) (G2) exercises compatible with directional preference opposed to that presented during evaluation for two weeks (n=70). (G3) exercises without directional approach for two weeks (n=80).	1/3 of G2 and G3 participants have abandoned treatment two weeks later due to worsening or lack of improvement of symptoms; no G1 member has quit. There were significant improvements in G1 as compared to G2 and G3 in all measurements (RMDQ, VAS, BDI) and decreased drug use.

Continued...

Table 1. Summary of selected articles – continuation

Study [PEDro score/10]	Participants	Interventions	Results
Machado et al. ¹⁶ [8/10]	148 patients (73 females), aged 18-80 years; nonspecific acute low back pain symptoms. 138 participants have concluded the study and 2 were excluded soon after randomization.	(G1) general orientations on how to keep active and avoid remaining for long periods in bed, confirmation of favorable acute low back pain prognosis and administration of paracetamol in specific hours (n=73). (G2) G1 + MDT-based protocol (n=73).	G2: Differences ($p>0.05$) in pain perception (NRS) and looked for less additional health care.
Paatelma et al. ¹⁷ [7/10]	134 patients, aged 18-65 years; symptoms of nonspecific low back pain with or without irradiation to one or both legs.	(G1) manual orthopedic therapy, with maximum of seven sessions lasting from 30 to 45 minutes each (n=45). (G2) Treatment according to MDT, with maximum of seven sessions lasting 30 to 45 minutes each (n=52). (G3) Just orientations in one-hour session (n=37).	After three months, six months and one year follow up there were no significant differences between G1 and G2; as compared to G3, interventions carried out by G1 and G2 were more effective, however without statistical significance.
Petersen et al. ¹⁸ [7/10]	350 patients (265 females), aged 18-60 years; low back pain symptoms for more than six weeks with centralization of peripheralization, with or without irradiation.	(G1) Treatment according to MMK, individually planned for each patient. For G1, approaches involving vertebral mobilization techniques, including high velocity maneuvers were prohibited (n=175). (G2) All types of manual techniques, including vertebral mobilizations, high velocity maneuvers and trigger-points therapy. For G2 specific exercises in preference directions were prohibited (n=175).	G1: higher success rate of treatment according to RMDQ scores, reaching statistical significance in the follow up of 2 and 1.

ODI = Oswestry Disability Index; ODQ = Modified Oswestry; NPRS = Numeric Pain Rating Scale; RMDQ = Roland Morris Disability Questionnaire; NRS = Numeric Rating Scale; BDI = Beck Depression Index; VAS = visual analog scale. Developed by the authors.

Symptoms irradiation, on the other hand, was inclusion criteria just for one study¹³, being also exclusion factor in two reviewed RCT^{14,16} and in the others^{15,17,18} patients could or not present this symptom associated to low back pain.

Excluded RCT were also different in sessions' characteristics, being that the number of sessions has varied between eight¹³, seven¹⁷, four¹⁴ and two¹⁵. RCT where patients have received orientations were also different, being performed in four sessions once a week lasting 45 to 60 minutes¹⁴, or single 60-minute session¹⁷. Two authors have not specified number or duration of sessions^{16,18}.

Another aspect with regard to studies characteristics was the way how sessions were performed. For some studies, patients were divided in groups (G1, G2 and up to G3), but sessions were carried out individually¹⁷ or in groups¹⁸. It is worth stressing that in some cases such information was not available in the study^{13,15,16} and in one RCT, MDT was performed individually and Back School Method in groups, being individual just the first session¹⁴.

DISCUSSION

This review could identify that current scientific evidences do not supply health professionals with enough information to guide the decision-making process during the choice of interventions for low back pain management, resulting in outcomes below expectations and wide variations between techniques employed by different therapists.

Studies have been carried out¹⁹⁻²¹ aiming at classifying patients in specific subgroups, with interventions and protocols which

could be more beneficial and compatible with their symptoms. However, current scenario is that most people suffering from low back pain use muscle relaxants, traction, transcutaneous electrical nerve stimulation (TENS) and orthoses. On the other hand, other approaches such as kinesiotherapy, are seldom used due to low adherence of patients to active treatment, since just 3% of patients suffering from low back pain are included in continuous physiotherapy programs²³.

MDT, for example, has scientific evidences proving that its exercises induce immune system activation and at the same time increase IL-4 cytokines concentrations which contribute for pain relief²⁴. The evaluation process was also better than MRI to distinguish painful from painless discs²⁵.

A different technique used to treat low back pain and that, similar to MDT, requires active involvement of patients is the Back School method, the basis of which is an exercise program aiming at improving mobility, flexibility and stretching of symptomatic individuals²⁶. In comparing the techniques, there has been no statistical difference in pain between groups, but with regard to functional performance improvement, authors have reported that the group treated with MDT has shown statistically significant difference as compared to the Back School group¹⁴.

On the other hand, studies evaluating directional preference of participants have suggested significant low back pain improvement, including less use of drugs¹⁵. Another group performing mobilization exercises aimed at lumbar spine extension had significant evolution in dysfunction measurements after one week and six months follow up and also pain just after one week of follow up¹³, confirming published results

which have shown that low back pain treatment based on directional preferences is highly reliable and valid²⁷.

As to manual therapy, which is a musculoskeletal physiotherapy option being widely used as treatment for low back pain patients¹⁰, although different with regard to specific techniques^{17,18}, both those treated with manual therapy and with MDT had positive results in pain and dysfunction improvement measurements. Notwithstanding, there are few scientific papers and review studies addressing this intervention with methodological quality²⁸.

From reviewed RCT including home orientations as part of the treatment¹⁶⁻¹⁸, all were conflicting among them, since they have also given different types of orientations. However, their results were always worse than other techniques used with other intervention groups.

With regard to strengthening exercises, one RCT has addressed this type of treatment¹³ for chronic low back pain, using exercises aiming at abdominal and spine stabilizing muscles, promoting isolated contractions of some muscles such as transverse muscle of abdomen, abdominal oblique muscles, lumbar quadratus muscle, multifidus and erector muscle of spine. Participants have engaged in a program of exercises encouraged by verbal commands and tactile stimuli given by therapists and were oriented to perform them at home only in case of missing a session. As result, the group being treated with extension exercises had better evolution in the item dysfunction as compared to the group performing strengthening exercises, in one and four weeks and six months follow up. In addition, the extension group has also shown higher change in pain scale, however just one week after treatment completion.

However, reviewed clinical trials had limitations, such as: 1) not having how to monitor home exercises performed by patients; 2) the fact that therapists and patients were not blind; 3) progressive decrease in number of participants in long term follow up, with reasons varying from impossibility of contact, symptoms relief or dissatisfaction with treatment, among others; 4) the fact that authors have not divided patients according to duration of symptoms nor have taken into consideration low back pain biopsychosocial factor.

An additional limitation of one reviewed RCT¹³ was the fact that it had a small number of participants, not enough to state that strengthening exercises had not produced favorable results to improve low back pain. However, most reviewed studies had a good sample size, totaling 1140 participants in six RCT, with mean of 190 participants per study, which has provided, together with high PEDro scale scores, reliability to the interpretation of results.

CONCLUSION

Our review has shown that MDT is beneficial and should be considered alternative to manage low back pain patients, since patients submitted to this intervention after physiotherapeutic evaluation have improved dysfunction, quality of life and daily life activities.

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