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Literature review

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Effect of the Pilates method in multiple sclerosis patients: a systematic review

Efeito do método de Pilates em pacientes com esclerose múltipla: uma revisão sistemática

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RESUMO | INTRODUÇÃO: A esclerose múltipla (EM) é uma doença autoimune degenerativa, com incidência desigualmente distribuída em todo o mundo. O método Pilates tem grande relevância no tratamento de pacientes com EM aumentando a capacidade funcional e contribuindo para uma melhoria significativa na qualidade de vida. **OBJETIVO:** Revisar sistematicamente o efeito do Pilates em pacientes com esclerose múltipla. **MÉTODOS:** Revisão sistemática de ensaios clínicos randomizados, analisados por dois revisores independentes, conforme recomendado pela plataforma Prisma nas bases de dados PubMed e Cochrane Library. Foram incluídos estudos originais utilizando o método Pilates sobre a força muscular, fadiga e equilíbrio em pacientes com EM. A escala de Cochane foi usada para analisar a qualidade metodológica e a análise de risco de viés. **RESULTADOS:** Foram incluídos cinco estudos publicados entre 2014 e 2017. O Método Pilates interveio na melhora da fadiga, equilíbrio e força muscular, quando comparado a outros grupos onde exercícios físicos e fisioterapia padrão foram aplicados em pacientes com EM. **CONCLUSÃO:** Conclui-se que o método Pilates é uma opção eficaz para o tratamento da funcionalidade em pacientes com esclerose múltipla.

PALAVRAS-CHAVE: Técnicas de movimentação do exercício. Esclerose Múltipla. Qualidade de vida.

ABSTRACT | INTRODUCTION: Multiple sclerosis (MS) is a degenerative autoimmune disease with an unevenly distributed incidence worldwide. The Pilates method has great relevance in treating MS patients, increasing functional capacity and contributing to a significant improvement in quality of life. **OBJECTIVE:** To systematically review the effect of Pilates in Multiple Sclerosis patients. **METHODS:** Systematic review of randomized controlled trials, reviewed by two independent reviewers, as recommended by the Prisma platform in the PubMed and Cochrane Library databases. Provision of original studies using the Pilates method, muscle strength, fatigue and balance in MS patients. The Cochane scale was used to analyze methodological quality and bias risk analysis. **RESULTS:** Five studies were included, published between 2014 and 2017. The Pilates Method intervened in the improvement of fatigue, balance and muscle strength, when compared to other groups where standard exercise and physical therapy were applied in MS patients. **CONCLUSION:** It is concluded that the Pilates Method is an effective option for the treatment of functionality in patients with Multiple Sclerosis.

KEYWORDS: Exercise movement techniques. Multiple Sclerosis. Quality of life.

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Introduction

Multiple sclerosis (MS) is a chronic and progressive disease, with genetic predisposition related to an environmental factor and presumed autoimmune origin, resulting from an inflammatory process[1]. It is a disease that is present worldwide and its incidence varies according to some factors, such as geography, age, ethnicity and gender[2]. About 80% of people with the disease improve in the days or months after the initial symptomatology, acquiring a certain degree of improvement, ranging from mild to virtual disappearance of neurological dysfunction[1].

Regardless of the clinical type presented by MS, patients are usually referred for physical therapy at a stage where they have already lost their ability to perform functional activities, or part of them, when the disease has already caused irreversible damage to the central nervous system. Although the rehabilitation process does not eliminate the neurological damage caused, it can effectively act in the treatment of specific symptoms, favoring functionality[3].

Although pharmacological options are available for the treatment of MS, there is still debate about its long-term efficacy and concern with safety profiles. The lack of effective surveillance of younger agents is another problem, as not all patients are eligible for these drugs, leading many people to seek non-pharmacological methods, including exercise, in an attempt to improve and control the disease[4].

Given an effort to lessen the impacts of MS, many researchers and scholars are currently discussing points about its improvement. In non-pharmacological treatment, there is the regular practice of physical activity (aerobic, anaerobic or cognitive), aiming to restore the individual's functional abilities and, consequently, improve their quality of life[5]. In this sense, the Pilates method obtains space through the principles involving concentration, balance, activation of deep muscles, stabilization of trunk muscles, center of force and improvement of breathing capacity[5].

Studies show that the Pilates Method can be a very effective tool for the Physiotherapist in the rehabilitation process, presenting varied benefits and few contraindications, showing that Pilates can be used by the Physiotherapist in the rehabilitation of different populations and dysfunctions, always following the principles of the method and respecting the individual conditions of each patient[6]. However, a more in-depth approach and more research with more significant samples and addressing other variables is still needed[6,7].

Although the benefits generated by physical exercise in the treatment of MS are well described in the specialized literature, most of them are studies focused on aerobic, strengthening or combined exercises. However, much of the available evidence has shown the positive effects of using the method on the rehabilitation of MS patients. For example, improvements in balance, mobility, muscle strength, cognition, quality of life and physical performance can be measured[7]. Thus, the aim of this study was to systematically review the effects of the Pilates Method in patients with Multiple Sclerosis.

Material and methods

It consists of a systematic review study, developed through searches in the PubMed, Scientific Electronic Library Online (SciELO) and Virtual Health Library (LILACS) databases, published in the last ten years, using the following Boolean descriptors and operators “Pilates” AND “Multiple Sclerosis”.

Inclusion and exclusion criteria

We selected randomized controlled trials that addressed the Pilates Method applied to patients with Multiple Sclerosis, and excluded studies that addressed other pathologies or that did not bring the Pilates Method as a form of intervention.

Methodological quality assessment

The methodological quality of these articles was analyzed using the Cochrane Collaboration tool. The articles were evaluated with the following criteria: high risk of bias, low risk of bias and uncertain risk of bias. The studies included in this systemic review discuss the effects of the Pilates Method in multiple sclerosis patients.

Data extraction

The reading of the title and abstract were the starting point used for the selection of articles, followed by the evaluation of the inclusion and exclusion criteria

in each study, aiming to obtain more accurate results for the construction of the systematic review.

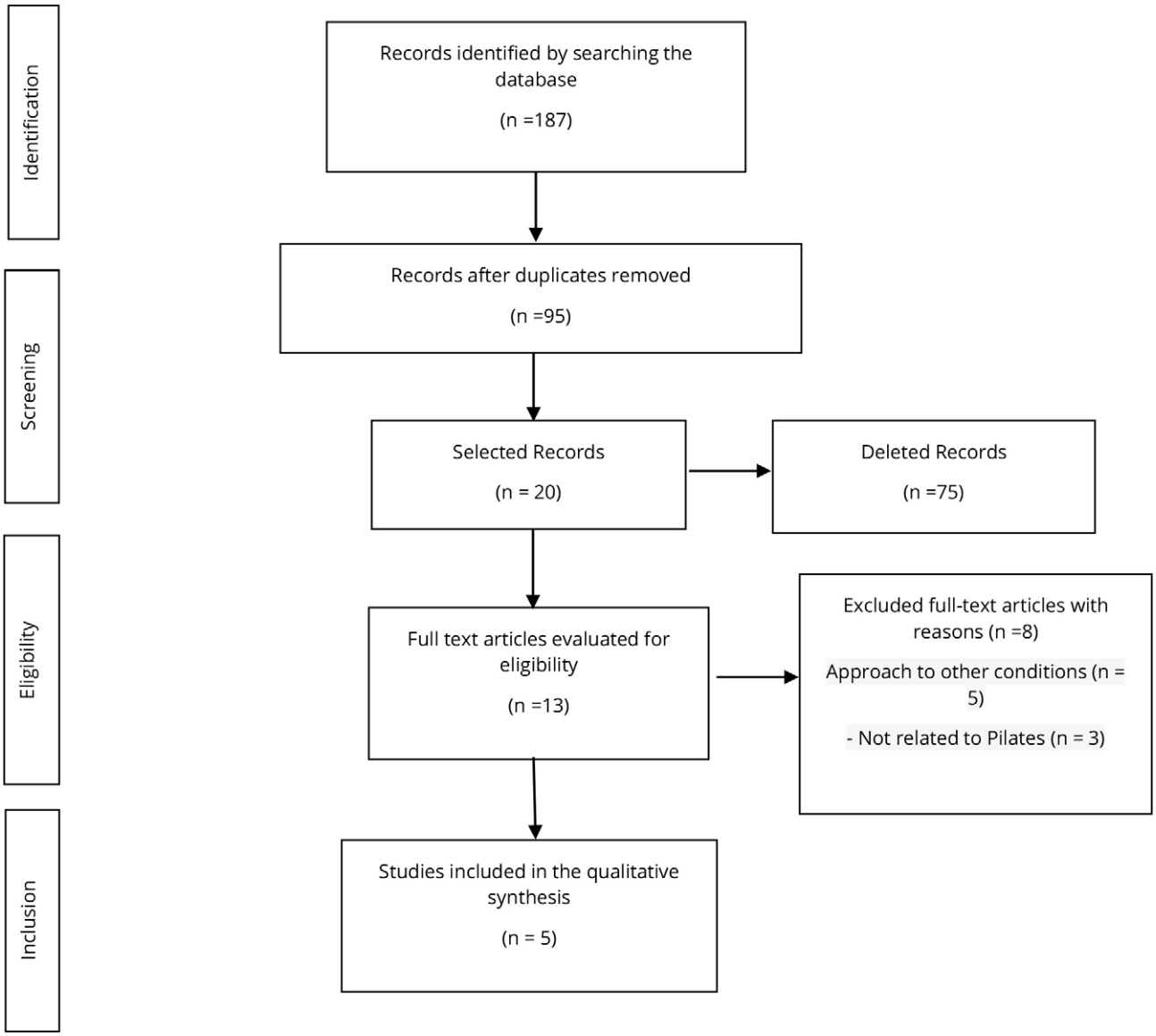
The results of the articles were separated and cataloged so that they could be compared and discussed among the researchers, so that the objective of this study could be achieved.

Results

During the search, 187 articles were found, using the combined descriptors Pilates "AND" multiple sclerosis, and the filters with clinical trial criteria published after 2009, reducing at the end to 121 articles.

After reading the title and abstract, 13 articles were selected for systematic review, 5 of which[8,9,10,11,12] were used as the basis for analysis, showing them in Flowchart 1 and following the PRISMA platform.

Flowchart 1. Research and screening of studies for systematic review according to the PRISMA methodology



The PICO strategy for searching articles is expressed in chart 1. The methodological quality of these five articles was analyzed using the Cochrane Collaboration tool (Chart 2), with articles assessed by the following criteria: high risk of bias, low risk of bias and uncertain risk of bias.

Chart 1. PICO Search Strategy

Acrônimo	Definição	Descrição
P	Paciente	Pacientes com esclerose múltipla
I	Intervenção	Aplicação do Método Pilates
C	Controle	Grupo de pacientes que não receberam o método
O	Outcomes (Desfechos)	Capacidade functional, força muscular, fadiga e equilíbrio.

Chart 2. Analysis of the methodological quality of the studies: risk of bias of each study based on the Cochrane Collaboration tool

	Gunduz et al[8].	Kalron et al[9].	Fox et al[10].	Tomruk et al[11].	Bulgulogru et al[12].
Randomization Type	Low risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	Low risk of bias
Confidentiality of Allocations	Uncertain risk of bias	Uncertain risk of bias	High risk of bias	Uncertain risk of bias	Uncertain risk of bias
Blindness	Low risk of bias	High risk of bias	Low risk of bias	Low risk of bias	High risk of bias
Intent Analysis of Treat	Low risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	Low risk of bias
Early Stop by Benefit	Low risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	Low risk of bias
Selective Description of Outcome	Uncertain risk of bias	Low risk of bias	Uncertain risk of bias	High risk of bias	High risk of bias
Validated Scale	Uncertain risk of bias	Uncertain risk of bias	High risk of bias	High risk of bias	Uncertain risk of bias

Of the five studies found, two showed improvement in fatigue and balance in patients with MS[8,10]. Only one study showed improvements in pilates in the sensory interaction of individuals[11].

One article showed improvement in gait balance[9], while another article brought the effects of the method on strengthening CORE (abdominal muscles, spine erectors, pelvic floor and diaphragm)[12]. All articles showed improvements in the results obtained in muscle strength, fatigue and balance in the pilates groups when compared to the groups in which standard exercises and physiotherapy were applied (Table 1).

Table 1. General data about the articles selected to obtain the results

Author	Sample	Objective	Intervention	Results
Gunduz et al[8].	40	Investigate the effects of Pilates on balance, mobility and strength	Intervention – 8-weeks of supine, side lying, quadruped exercise, sitting on the exercise ball and standing exercises. Control - abdominal breathing and active extremity exercises at home.	Improvements were observed in balance, mobility, and upper and lower extremity muscle strength in the Pilates group ($p < 0.05$).
Kalron et al[9].	50	Evaluate Pilates x Physical Therapy in Gait Pattern	Intervention - 12 weeks of core stability exercises were selected from a basket of standardized exercises, each with three levels of difficulty appropriate for participants. Control - exercises aimed at improving trunk and pelvic stability, lower limb muscle length, strength, balance and control of movement, was used according to the Bobath concept.	Increased in the walking speed (p=0.021) and mean step length (p=0.023)
Fox et al[10].	99	Compare Pilates, Standard Exercise, and Relaxation	Intervention - Pragmatic trial and hence the exercises were selected by the treating therapist from 10 exercises chosen to be reflective of current clinical practice. Control - Exercises designed to improve pelvic and trunk stability, lower limb strength and balance.	There were no significant differences between Pilates and Relaxation for any secondary outcome (p>0.05).
Tomruk et al[11].	23	Qualify interaction, postural control and fatigue	Intervention - 10-week modified clinical Pilates Training. Control – Healthy people	Improvement of fatigue (0,033) and postural stability (0,001)
Bulgulogru et al[12].	59	Evaluate CORE stabilization in fatigue, quality of life and mobility	Intervention - The subjects in the Pilates groups did Mat or Reformer Pilates for 8 weeks, 2 days a week. Control - Breathing and relaxation exercises at home.	Balance, functional mobility, core stability, fatigue severity and quality of life improved after Pilates in Mat and Reformer Pilates groups ($p < 0.05$).

MS - Multiple Sclerosis; DAM - Auxiliary Gear Device; CORE - Body Gravity Center; Min – Minutes

Discussion

Five articles were found in the databases investigating the benefits of the Pilates Method in Multiple Sclerosis patients, aiming to evaluate its effectiveness as an intervention, comparing it to other methods, such as standard physiotherapy and relaxation and breathing techniques.

None of the articles studied used the Functional Determination of Quality of Life Scale or any other parameter for its evaluation in patients with MS. Among the articles evaluated, only Tomruk et al.[11]. use the Pilates method as an intervention, being the only one in this review to evaluate sensory interaction. The other articles associate different intervention techniques, including home exercise programs, relaxation exercises, breathing, and standard physical therapy.

The studies present the effects of the method on the core body stability (CORE) and body awareness of the patients studied, taking other authors as the basis for their study.

The tactile stimuli and postural correction during exercise help in the development of motor control and the strengthening of the erector and abdominal muscles, helping in the mobility of MS patients who manifest sensory and motor deficits[8]. In its turn, Fox et al.[10]. compare Pilates exercises with breathing exercises to measure the improvement in mobility and balance of individuals and their study showed no significant differences, as they used the Pilates Method only in the activation of the deep muscles that the method presents, not applying other common techniques to the method, such as resistance exercises, exercises with functional objectives or on unstable bases.

Kalron et al.[9], in their method, recognize that there is an evolution in balance and gait of patients with MS, with pilates as an intervention. The hypothesis of similarity between the results of the pilates group and the standard physiotherapy group in their research is due to the fact that, in both, the same health professionals were mediators in the applied techniques. Still, they concluded that pilates is a positive rehabilitation alternative for Multiple Sclerosis patients, especially regarding gait and balance improvement.

In addition to balance, improvement in fatigue and muscle strength, Bulguroglu et al.[12] compared two different pilates methods: mat pilates and reformer pilates. While in the intervention groups, strength performance and fatigue recovery were noted, stating that this is a competent option for treating patients with MS.

Overall, Gunduz et al.[8], Kalron et al.[9] Fox et al.[10], Tomruk et al.[11] and Bulgulogru et al.[12] agree that the Pilates Method, over the other applied techniques, is a truly effective option for treating Multiple Sclerosis patients.

Nevertheless, all studies included in this systematic review found improvements in the parameters evaluated in Multiple Sclerosis patients following intervention with the Pilates Method.

This review has as limitations the low number of selected articles and the heterogeneity between them.

Conclusion

This study shows that the Pilates Method has positive results in the improvement of functional standards, muscle strength, fatigue and balance, being a concrete and efficient option for the treatment of people with Multiple Sclerosis.

Author contributions

Cordeiro ALL was responsible for the conception and design of the research, analysis and interpretation of data, writing of the manuscript and critical review. Lima ES and Mota L were responsible for the conception and design of the research and writing of the manuscripts. Barros R was responsible for writing and critical review of the manuscript.

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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