ISSN 0103-5150
Fisioter. Mov., Curitiba, v. 28, n. 4, p. 759-765, Oct./Dec. 2015

DOI: http://dx.doi.org.10.1590/0103-5150.028.004.AO13

Effects of Pilates and Classical Kinesiotherapy on chronic low back pain: a case study

Efeitos do método Pilates e Cinesioterapia Clássica na lombalgia: um estudo de caso

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Abstract

Introduction: Chronic low back pain (LBP) is characterized by daily lower back pain lasting more than three consecutive months. It may lead to functional disability and can be treated by several physical therapy techniques, including therapeutic exercise. The aim of this study was to investigate the effects of pilates and classical kinesiotherapy on the treatment of pain and functional disability in patients with chronic low back pain. **Materials and methods**: The study sample consisted of five patients with a diagnosis of chronic low back pain and a mean age of 32.4 ± 15.6 years. A Visual Analogue Scale (VAS) was used for pain assessment, and the Oswestry Disability Index was used to assess functional disability at the beginning and at the end of the intervention. Patients were divided into two groups and received 20 individual sessions of therapeutic exercise at a frequency of two sessions per week. Group A was treated with classical kinesiotherapy and group B was treated with pilates exercises. Statistical analysis was performed using Wilcoxon's test. The significance level was set at 5%. **Results**: There was a significant reduction in pain (p = 043) and functional disability (p = 042) in both groups. We found no significant differences between the effects of pilates and classical kinesiotherapy on pain and functional disability. **Conclusions**: We conclude that, in the population

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studied here, both pilates and classical kinesiotherapy were effective in treating chronic low back pain symptoms, with no significant difference between them.

Keywords: Low Back Pain. Exercise therapy. Physical therapy.

Resumo

Introdução*: A lombalgia crônica é caracterizada por dor na região lombar por mais de três meses, que pode levar a incapacidade funcional, tratado por várias técnicas fisioterapêuticas, incluindo exercícios terapêuticos. O objetivo deste estudo foi verificar os efeitos da aplicação do Método Pilates e da Cinesioterapia Clássica no tratamento dos sintomas de pacientes com lombalgia crônica.* ***Materiais e métodos****: A amostra foi composta por cinco pacientes com diagnóstico de lombalgia crônica e idade média de 32,4 ± 15,6 anos. Para avaliação da dor foi utilizada a Escala Visual Analógica (EVA) e para quantificação da incapacidade funcional foi utilizado o Índice de Incapacidade de Oswestry no início e fim do protocolo de intervenção. Os pacientes foram divididos em dois grupos e submetidos a 20 sessões de tratamento, duas vezes por semana. O grupo A realizou o protocolo de Cinesioterapia Clássica e o grupo B exercícios do Método Pilates. A análise estatística foi realizada por meio de testes de Wilcoxon, com significância de 5%.* ***Resultados****: Houve redução significativa da dor (p = 0,043) e do Índice de Incapacidade Funcional (p = 0,042) com a aplicação de ambos os protocolos. Não houve diferença significativa na comparação entre os efeitos do Método Pilates e a Cinesioterapia Clássica com relação à dor e incapacidade funcional.* ***Conclusão****: Conclui-se que, na população estudada, tanto o Método Pilates quanto a Cinesioterapia Clássica foram eficazes no tratamento dos sintomas da lombalgia crônica sem haver diferença significativa na comparação entre os grupos.*

Palavras-chave*: Dor lombar. Terapia por exercício. Fisioterapia.*

Introduction

Chronic low back pain (LBP) is characterized as a clinical condition of moderate to severe pain in the lower part of the spine, persisting for a period longer than twelve weeks. It causes disability, has an indeterminate onset and oscillates between brief periods of clinical improvement and the emergence of new pain (1-4). LBP is classified as a symptom of multifactorial etiology. It affects both sexes equally and shows a high incidence among economically active people of working age. Moreover, LBP may cause temporary or permanent work disability (1-5).

According to the World Health Organization (WHO), about 80% of adults will experience at least one episode of low back pain at some point in their lives, and in 40% of cases, the initial pain will become chronic (6). LBP is the second major cause of functional disability, being surpassed only by headache. It is a leading cause of work absenteeism in developed countries. For this reason, besides being a health problem, it also leads to a considerable economic loss (3-7).

The clinical picture of low back pain consists of pain and inability to move or work, bringing about limitations in the lifestyles and activities of individuals Several conditions may trigger low back pain, such as degenerative or traumatic injury to the intervertebral disc or vertebral body, high work overload, excessive body movement, psychological factors, physical inactivity, obesity, and reduced flexibility and strength (8, 9).

In view of the magnitude of the impact of LBP on health, therapeutic alternatives for the treatment of this condition have been extensively investigated Several studies have found that exercise is an effective therapeutic option for treating low back pain symptoms, as it produces a lasting and satisfactory result (10-13). One of the treatments commonly used to treat LBP is kinesiotherapy. This method uses conventional stretching exercises as well as muscle strengthening exercises. On the other hand, the Pilates method is emerging as an alternative therapy in patients with LBP, as it fight somatic pain by using the principles of contrology. Through contrology a patient acquires complete control of his/

her own body and through the proper repetion of its exercises he/she strengthens stabilizing muscles of the trunk (14-16).

Thus, the aim of this study was to compare the effects of Pilates and Classical Kinesiotherapy on the treatment of pain and functional disability in patients with chronic low back pain.

Materials and methods

This study used convenience sampling. The final sample was composed of five patients (three females and two males; mean age 32.4 ± 15.6 years). The patients were referred by the doctor in charge of the Department of Orthopedics and Traumatology of the HUSFP, after clinical diagnosis of chronic low back pain.

The study was conducted from July through October, 2013, at the Physical Therapy Outpatient Clinic of the São Francisco de Paula University Hospital (HUSFP), which belongs to the Catholic University of Pelotas (UCPel).

Trial participants were adults aged 20-55 years, who had had low back pain for more than 12 weeks, and who accepted to participate in the study. Patients with herniated disc, neurological disorders, ankylosing spondylitis, rheumatoid arthritis, root compression, spinal stenosis or fibromyalgia, as well as regular exercise practitioners were excluded from the study.

The study project was approved by the Research Ethics Committee of the UCPel, opinion number 400 814/13. All patients who agreed to participate signed an informed consent form.

Pain scores were collected before and after the intervention through a Visual Analogue Scale (VAS). The VAS consists of a 10cm horizontal line with an anchor, such as 0 "no pain" and 10 "worst pain ever" at each end. The patient was asked to mark the point on the scale that represented the intensity of his/her pain. Next, the physical therapist uses a ruler to measure the mark drawn by the patient on the horizontal line and thus yield a numerical score of pain intensity (17).

Patient's functional disability was measured by means of the Oswestry low back pain disability questionnaire, also known as the Oswestry Disability Index (18). The Oswestry Disability Index consists of 10 questions relating to activities of daily living that must be interrupted due to or are affected by low back pain. Each question is followed by six statements, which progressively depict a higher degree of difficulty in performing the corresponding activity. These statements are scored from zero to five, giving maximum score of 50 points. The total score is multiplied by two and expressed by a percentage. The degree of disability as measured by the Oswestry Disability Index is rated as "no dysfunction" (0%), "minimum dysfunction" (1-20%), "moderate dysfunction" (21 - 40%), "severe dysfunction" (41- 60%) and "disability" (over 60%) (19, 20).

After sample selection, the patients were divided by lot into two treatment groups. Both groups attended 50 minutes sessions (of either Pilates or Classical Kinesiotherapy) twice weekly for 1 weeks (from July through October 2013). Group A was composed by two patients (mean age 35 ± 21.2 years). They performed an exercise protocol consisting of ten Classical Kinesiotherapy exercises for strengthening the abdominal, trunk extensor, and gluteal muscles, and exercises for stretching the hamstring, psoas and paraspinal muscles (21). The patients performed three sets of exercises, with 12 repetitions of each exercise per set.

Group B was composed of three patients (mean age 30.1 ± 15.8 years). They performed an exercise protocol based on the Pilates method, which included exercises focusing on the "power house" (in Pilates, this includes the abdominal, transversus abdominis, multifidus and pelvic floor muscles), which is responsible for static stabilization and body dynamics. The protocol also consisted of exercises for stretching the posterior and lateral chain muscles, as well as exercises for strengthening the abdominal muscles. The patients performed ten repetitions of each exercise (1).

Baseline and post-treatment VAS pain intensity scores and Oswestry Disability Index scores were compared using the statistical software STATA 12.1, the Wilcoxon signed-rank test for paired data and the Wilcoxon rank-sum test for independent data. The level of significance was set at 5% ($p < 0.05$).

Results

In total, five patients met the inclusion criteria to participate in this comparative study. Of these, three (60%) were female and two (40%) were male. With

regard to the position adopted for the longest time during the day, one subject (20%) remained seated and four subjects (80%) had to stand most of the time. The mean time spent in these positions was 6.2 ± 2 hours.

The participants were divided into two groups of treatment for chronic low back pain: group A and group B. For group A, the mean VAS scores found were: 4.5 ± 0.7 at baseline and zero ± 0 at the end of the treatment. For group B, the mean VAS scores found were: 5 ± 2.6 at baseline and zero ± 0 at post-treatment.

When comparing baseline and post-treatment pain levels using stratified analysis for each group, we found that the use of both therapeutic exercises resulted in reduced levels of pain. The combined analysis of the two groups showed a statistically significant association for reduced pain after treatment (p = 0.043), as shown in Table 1.

When comparing the scores obtained in the Oswestry Functional Disability Index at baseline and after the last exercise session, the stratified analysis by intervention group showed that group A had a mean score of 18% ± 14.1 at baseline and a mean score of 2% ± 2.8 at the end of the study; and that group B had a mean score of 16 ± 5.3% at baseline and a score of 3% ± 2.7 after treatment. The combined analysis of both methods revealed a statistically significant reduction in functional disability (p = 0.042), as shown in Table 2.

The comparison of pain levels and functional disability scores between groups A and B at baseline and after treatment revealed that both treatment protocols were effective in reducing pain and functional disability (according to the Oswestry Functional Disability Index), as shown in Table 3.

Table 1 - Comparison of pain levels at baseline and after the last session of Classical Kinesiotherapy and Pilates, according to the Visual Analogue Scale (VAS)

		VAS at baseline	VAS post-treatment		
	N	Mean (±)	Mean (±)	Difference	p-value*
All	5	4.8 (1.9)	0 (0)	4.8	0.043
Group A	2	4.5 (0.7)	0 (0)	4.5	0.179
Group B	3	5 (2.6)	0 (0)	5	0.109

Note: *Wilcoxon signed-rank test

Table 2 - Comparison of functional disability at baseline and after the last session of Classical Kinesiotherapy and Pilates, as assessed by the Oswestry Functional Disability Index

		Oswestry at baseline	Oswestry post-treatment		
	N	Mean (±)	Mean (±)	Difference	p-value*
All	5	18.8 (8.0)	2.4 (2.6)	16.4	0.042
Group A	2	18 (14.1)	2 (2.8)	16	0.162
Group B	3	16 (5.3)	3 (2.7)	13	0.120

Note: *Wilcoxon signed-rank test

Table 3 - Comparison of pain levels (VAS) and functional disability (Oswestry) between groups A and B

	Group A	Group B	
	Mean (±)	Mean (±)	p-value*
VAS at baseline (0-10)	4.5 (0.7)	5 (2.6)	0.563
VAS post-treatment (0-10)	0 (0)	0 (0)	0.999
Oswestry at baseline (%)	18 (14.1)	16 (5.3)	0.978
Oswestry post-treatment (%)	2 (2.8)	3 (2.7)	0.767

Note: *Wilcoxon rank-sum test

Discussion

Low back pain is a very common condition in the general population. About 80% of adults are affected by it and suffer symptoms such as pain in the lower back. One of its consequences is the reduction of physical activity levels It is known that there is a relationship between pain and physical activity, and also that the lack of physical activity leads to chronicity of pain, creating a cycle that will result in functional impairment (22).

The pain may originate from several factors, with mechanical factors being the most common and occurring due to reduced activity of the stabilizing musculature of the lumbar spine (e.g.: paravertebral muscles and/or abdominal muscles) (23). It causes discomfort during the performance of functional activities and postural deficits due to the constant antalgic position that the individual will adopt with time.

Therapeutic exercise emerges as one of the few effective methods for treating chronic back pain. However, there is still no specification as to the most effective mode, duration, and intensity of exercised required to achieve these effects, which makes the choice of the method difficult. However, taking into account the causal factors of pain, it is possible to state that methods that strengthen the stabilizing muscles of the lumbar spine may have beneficial effects in treating the symptoms of low back pain (24, 25).

The use of classical kinesiotherapy during 20 sessions has shown important clinical effects on patients with chronic low back pain. The first variable evaluated was intensity of pain (at baseline and post-treatment), for which a significant result was obtained: there was a 100% reduction in pain levels. Another variable analyzed was functional disability. We found a reduction of 18.8% ± 8.0 to 2.4 ± 2.6% in the Oswestry Disability Index.

Several authors state that physical exercise has a positive effect on patients with chronic low back pain (10, 13, 26). Maher (27) has found that both long-term and short-term exercise are one of the most effective treatments for this dysfunction. For the treatment of patients with chronic low back pain, it is necessary to perform exercises to strengthen their lumbar, abdominal and gluteal muscles, as well as exercises to stretch the hamstring, psoas and paraspinal muscles (21, 28). We also stress the importance of implementing exercise programs to stabilize the lumbar spine (29). A study with 204 patients with chronic low back pain conducted by Riipinen et al has confirmed the positive effects of exercise in the treatment of pain and functional disability (30).

The use of a Pilates exercise protocol during 20 sessions has also shown satisfactory results in patients with chronic low back pain. Pain intensity was reduced by 100% after the intervention. It has been also observed that the Pilates method is beneficial for the restoration of functional capacity in patients with chronic low back pain. The use of this method was found to provide increased functionality and independence to patients.

According to Harrington and Davies (2005), exercises based on the Pilates method improve trunk control and stabilization by strengthening postural muscles, and may be considered an alternative therapeutic intervention for reducing the symptoms of low back pain (31, 32).

Both exercise protocols used in this study (Classical Kinesiotherapy and Pilates) have proven beneficial in reducing pain and disability in patients with LBP. The comparison between both groups with respect to pain and functional disability at baseline and after the interventions showed no significant difference. Both exercise protocols were effective in reducing the analyzed variables.

In the study by Rydeard et al. (32), patients with low back pain were divided into two groups. One group performed Pilates exercises and the other group performed conventional exercises. The authors assessed intensity of pain and dysfunction by means of a questionnaire. After treatment, the mean pain intensity was 18.3 and the mean disability score was 2.0 in the Pilates group, while in the "conventional exercise" group these means were 33.9 and 3.2, respectively. These findings led the authors to conclude that Pilates exercises are more effective in the treatment of low back pain than conventional exercises for LBP.

In the study by Wajswelner et al. (33), the study sample was also divided into two groups. Group A (n = 43) performed general exercises for low back pain and Group B (n = 44) performed Pilates exercises. The authors assessed level of pain and disability in these patients. The treatment was performed twice weekly and lasted six weeks. Both groups had reduced levels of pain and disability, and no statistical significance was found between groups (p = 0.07). The authors have concluded that both treatment protocols were effective in treating chronic low back pain.

The findings of the studies reported here and the data obtained in this study show that Classical Kinesiotherapy and Pilates exercises are effective in improving pain (VAS) and functional disability in individuals with low back pain.

Conclusion

We conclude that both Classical Kinesiotherapy and Pilates exercises have proven effective in reducing levels of pain and disability caused by low back pain, and no significant difference was found between these two exercise protocols for the treatment of chronic low back pain. We suggest that future studies be conducted with larger, representative samples to see if our results can be replicated.

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Received: 12/11/2013
Recebido: 11/12/2013

Approved: 05/28/2015
Aprovado: 28/05/2015