



RANDOMISED, CONTROLLED TRIAL

Pilates versus general exercise effectiveness on pain and functionality in non-specific chronic low back pain subjects



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Summary Low back pain (LBP) is one of the most common causes of disability, and the Pilates method has been associated with improvements in symptoms. The purpose of this study was to assess the effectiveness of the Pilates method, when compared to general exercises, on pain and functionality after eight weeks (16 sessions, 2×/week) and a follow-up of three months, in subjects with non-specific chronic low back pain (NSCLBP). A randomised controlled trial composed of 22 subjects was proposed. Subjects were allocated into two groups: the Pilates group (PG) ($n = 11$) and the general exercise group (GEG) ($n = 11$). The PG protocol was

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based on the Pilates method and the GEG performed exercises to manage NSCLBP. There were no differences between the groups. When analysed over time, the GEG demonstrated improvements in functionality between baseline and the end of treatment ($P = .02$; Cohen's $d = 0.34$) and baseline and follow-up ($P = .04$; Cohen's $d = 0.31$). There were no differences between the Pilates and general exercises with regard to pain and functionality in NSCLBP subjects but general exercises were better than Pilates for increasing functionality and flexibility.

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Introduction

Low back pain (LBP) is one of the most common causes of disability and is the most common musculoskeletal condition found in the adult population, with a prevalence of up to 84%. Back pain may be the leading cause of absenteeism in North American countries and between 60% and 90% of the population is at risk of developing this condition during their life (Dagenais et al., 2010; Delitto et al., 2012; Philadelphia Panel, 2001; van Middelkoop et al., 2011). Low back pain has a significant impact on functional capacity, as the pain restricts occupational activities and is a major cause of absenteeism. Thus, the economic burden of low back pain is represented directly by the high costs of health care spending and indirectly by decreased productivity (Dagenais et al., 2010; Philadelphia Panel, 2001). The use of new technology in diagnosis and intervention contributes to the increased costs (Becker et al., 2011). Recent estimations show that the economic burden of back pain in the United States, including both direct and indirect, costs ranges from 84 to 624 billion dollars per year (Dagenais et al., 2010; Fairbank et al., 2011; Karayannis et al., 2012).

This condition can be classified as specific, in which the pain is caused by a specific pathology or condition, or non-specific, in which the cause of the pain cannot be determined (Manek and MacGregor, 2005). Back pain can be further classified into acute (less than six weeks), subacute (six to 12 weeks) or chronic (longer than 12 weeks) (Hayden et al., 2005).

Of the various treatment strategies for non-specific chronic low back pain (NSCLBP), studies have shown that the most effective treatments use exercise and cognitive/behavioural programs (Airaksinen et al., 2006; Bekkering et al., 2003; Philadelphia Panel, 2001; van Middelkoop et al., 2011). Systematic reviews have shown that exercise-based treatments, especially motor control exercises, present the best evidence in the management of NSCLBP and this type of intervention appears to be effective in reducing pain and improving functional status (Airaksinen et al., 2006; Bekkering et al., 2003; Delitto et al., 2012; Philadelphia Panel, 2001; van Middelkoop et al., 2011; van Middelkoop et al., 2010; van Tulder et al., 2000). This can be explained by the mechanical characteristics of CLBP, lumbo-pelvic instability, decreased joint mobility and neuromuscular mechanisms greatly impact trunk stability and movement efficiency (Mannion et al., 2001; Panjabi, 2003).

The trunk muscles can be divided into two groups: the global and local system. The muscles of the first group possess long levers and large moment arms, with emphasis

on speed, power, and larger arcs of multiplanar movement. The second group consists of short muscles with direct action on the vertebra, which generate power for segmental stability of the spine (transversus abdominis, multifidus, internal oblique, medial fibres of external oblique, quadratus lumborum, diaphragm, pelvic floor muscles, iliocostalis and longissimus (lumbar portions)) (Faries and Greenwood, 2007). Evidence regarding the role of trunk muscles, especially the transversus abdominis and multifidus, has been discussed in the literature and demonstrates that these muscles are the main providers of lumbo-pelvic stability (Barker et al., 2006, 2004; Hides et al., 2011; Hodges et al., 2005, 2003; Hodges and Richardson, 1996). Additionally, there is a consensus that these disorders arise from pain and inactivity associated with muscle disuse (Smeets et al., 2006).

Thus, Pilates could be an alternative treatment for these patients because it is based on strength and flexibility exercises, which are not exclusively static, but are also dynamic and focus on the muscles that are responsible for lumbo-pelvic stability (Gladwell et al., 2006). Pilates is known as a form of physical and mental conditioning characterised by a set of exercises performed on a mat or specific apparatus. It was created by Joseph Hubertus Pilates in the middle of the last century and is based on six principles: concentration, control, centring, flow, precision and breathing (Latey, 2001; Muscolino and Cipriani, 2004).

Several studies, both RCTs and systematic reviews, have evaluated the Pilates method for low back pain, but their results are conflicting (Aladro-Gonzalvo et al., 2012; Anderson, 2005; Cruz-Ferreira et al., 2013; Donzelli et al., 2006; Gagnon, 2005; La Touche et al., 2008; Lim et al., 2011; Marshall et al., 2013; Miyamoto et al., 2011; Natour et al., 2011; Pereira et al., 2012; Posadzki et al., 2011; Rydeard et al., 2006; Wajswelner and Metcalf, 2012). In addition, one study evaluated the methodological quality of systematic reviews on the effectiveness of Pilates to treat adults with CLBP (Wells et al., 2013). The authors included five systematic reviews that evaluated the outcomes of pain and functionality and determined that there was inconclusive evidence as to whether the Pilates method is effective in reducing pain and improving functionality in individuals with CLBP (Wells et al., 2013).

Thus, the aim of the present study was to assess the effectiveness of the Pilates method, when compared to general exercises (kinesiotherapy), on pain and functionality after 8 weeks intervention and again after a short-term follow-up period (three months) in subjects with non-specific chronic low back pain.

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