

AN ANALYSIS OF SPINAL MANIPULATION TREATMENT VERSUS PILATES EXERCISE, VERSUS A COMBINED APPROACH ON FLEXIBILITY AND PAIN PERCEPTION OF PATIENTS WITH CHRONIC NON-SPECIFIC LOW BACK PAIN

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INTRODUCTION

ACROSS THE GLOBE, LOW BACK PAIN IS REPORTED TO BE ONE OF THE MOST COMMON BURDENS ON MEDICAL RESOURCES, AFFECTING UP TO 84% OF PEOPLE IN THEIR LIFETIME

(Hoy *ET AL.*, 2014; Jackson, 2007)

In many cases, the reported musculoskeletal pain cannot be clinically diagnosed or associated to a specific pathology or nerve condition, therefore without a definitive diagnosis these cases are classed as non-specific low back pain (NSLBP) (Hartvigsen *et al.*, 2018; Mesner *et al.*, 2016). The National Institute for Health and Care Excellence guidelines (NICE, 2016) state that it is usual for pain and disability from NSLBP to last a couple of weeks to a few months, however, up to one third of people experience recurring pain 12 months after an acute period (NICE, 2016).

Unsurprisingly, NSLBP causes a significant economic impact on employers due to reduced productivity and high rates of absence (Hoy *et al.*, 2014). The UK Government statistics highlighted an estimated **3.2 million working days were lost in 2016/17 as a result of work-related back disorders**, averaging a loss of 16.5 days per case (Health and Safety Executive, 2017). The number of complaints was higher in construction, transportation and storage industries, as well as human health and social work activities. Statistics further reported a **higher rate in men (720 cases per 100,000 workers) compared to women (580 cases per 100,000 workers)** over the period 2014/15 to 2016/17 (Health and Safety Executive, 2017).

Over the past thirty years, clinical guidelines for treating NSLBP have moved away from recommending pharmacological and surgical treatments in the first instance and now recommend self-management, physical and psychological therapies (Foster *et al.*, 2018). However, guidelines throughout the world are contradictory in terms of what therapies are most effective for treatment, with unpredictable outcomes and little research available for prevention strategies (Balthazard *et al.*, 2012; Foster *et al.*, 2018).

RATIONALE

The NICE guidelines for low back pain and sciatica (2016) recommends non-invasive non-pharmacological primary care interventions such as exercise and manual therapies, including spinal manipulations. However, the guidelines offer little in the way of direction as to the type, frequency or success of such interventions in order to treat patients most effectively.

THE AIM

The aim of this study is to analyse the effectiveness of spinal manipulations versus Pilates exercise, versus a combination of both interventions on chronic NSLBP.

THE OBJECTIVE

The objective is to evaluate which course of action is the most beneficial for reducing chronic NSLBP and increasing lumbar flexion within a 6-week time frame.

SUMMARY OF LITERATURE

Literature around NSLBP and its management recognises that occurrences can be short lived and influenced by lifestyle, such as being sedentary, smoking and obesity (Hartvigsen *et al.*, 2018). That said, recurring pain is common, leading to longer term chronic discomfort and so patients' expectations of recovery must be managed during rehabilitation (Hartvigsen *et al.*, 2018). Evidence also shows that patients who do not make early improvements are most likely to experience a slower, prolonged recovery due to the impact of psychological factors, which is an important consideration when selecting the most suitable method of treatment for rehabilitation (Foster *et al.*, 2018).

A popular manual therapy treatment modality for NSLBP is spinal manipulations, administered by a Chiropractor. This involves the Chiropractor passively taking the vertebral joints to the end of range and then administering a rapid thrust action, with a high velocity and low amplitude, going beyond the physiological range of motion of the joint, often causing a crack-like noise and sensation

(Millan *et al.*, 2012a). Research indicates that spinal manipulations can have an immediate positive effect on pain, yet the duration of this pain relief is unknown (Millan *et al.*, 2012b). Axén and Leboeuf-Yde (2017) were unable to find a 'typical' recovery pattern in patients following chiropractic treatment, with fluctuating outcomes and future relapses occurring over a 6-month period. Alongside the lack of evidence to support long term effectiveness and often high cost of treatment plans, patient preconceptions and fears regarding the use of a Chiropractor can result in them seeking alternative options of treatment (Dagenais, 2013).

Active exercise is an alternative treatment intervention recommended by guidelines to improve functional movement (NICE, 2016). Although proven to be effective, there is still a lot of debate in the literature as to the most suitable type of exercise for NSLBP rehabilitation – Pilates being one form that is becoming more widely used (Llewellyn *et al.*, 2017). Defined by Wells *et al.* (2013) as a mind-body exercise, Pilates combines core stability, strength, flexibility, posture, breathing and muscle control to improve the stability of the lumbar spine. Several studies in recent years have focused on the effectiveness of Pilates for reducing NSLBP and disability, which found conflicting outcomes (Wells *et al.*, 2013). Research by Rydeard *et al.* (2006) confirmed that participants doing a 4-week course of Pilates based exercise reported a significant improvement in LBP and disability, which continued over the 12-month follow up period compared to the control group. Yet, a systematic review carried out by Wells *et al.* (2013) identified 5 research studies, of which they concluded that there was inconclusive evidence supporting its efficacy due to primary studies being too small in sample size, baseline differences across groups and high drop-out rates.

Balthazard *et al.* (2012) also identified that a patients' willingness and ability to participate in exercise may be determined by their level and tolerance of pain, with fear of doing more harm than good. This leads to the purpose of the study: **to evaluate the effectiveness of the individual intervention strategy, as well as a combined approach to treatment, to investigate whether participants respond more positively to Pilates exercise after the pain reducing effects of spinal manipulations.**

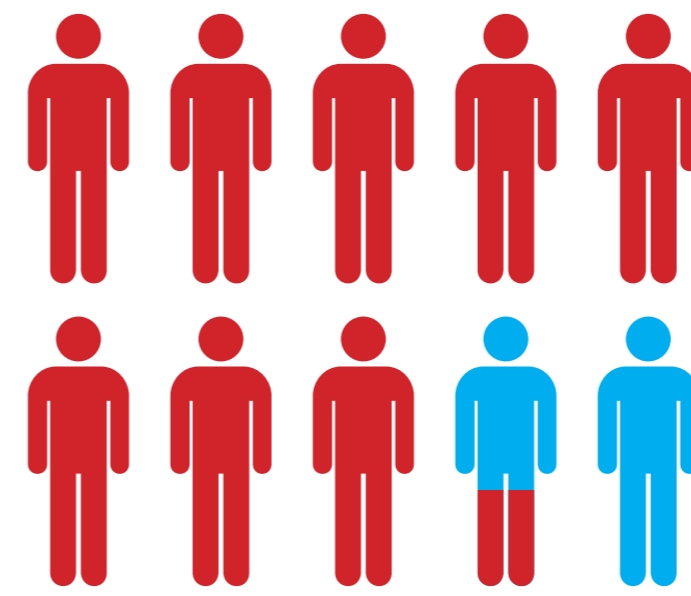
METHOD

6-week quantitative study involving 30 participants with chronic NSLBP

A between subject design:



- Questionnaire to measure level of perceived pain to be completed at the start and end of the study, and also in week 2 and week 4.
- V-sit and reach test conducted at the start and end of the study to measure any improvements in flexibility.
- The Bournemouth Questionnaire (BQ) and STarT Back Screening Tool (SBST) will be used, which are validated outcome measures for use in routine practice settings, recommended by the Royal College of Chiropractors (Bolton and Hurst, 2011).
- The study will take place at MSK Healthcare & Performance Clinic and participants will be recruited via convenience sampling when coming to the Clinic for treatment.
- Gatekeeper permission has been granted from Gary Hall, the owner of the Clinic.
- Gary Hall is a highly qualified and experienced Chiropractor and will be carrying out the spinal manipulation treatment.
- The number of spinal manipulation treatments for **Group A** is based on the patient's individual reported perceived level of pain. A reduction of 47% or more is stated by Bolton and Breen (1999) to be a clinically significant change for low back pain, when using the Bournemouth Questionnaire (BQ).
- **Group B** will be introduced and guided through a Pilates exercise plan at the Clinic by a Sports Therapist, which is then to be completed at home 3 times per week. A detailed plan and video will be supplied for each participant to follow.
- **Group C** will undertake both treatments in the same way as **Group A** and **B**.
- SPSS Statistics software will be used to analyse the quantitative data collected, using a paired t-test and MANOVA test.



84% SUFFER WITH LOW BACK PAIN IN THEIR LIFETIME

INCLUSION CRITERIA

All participants must be over the age of 18 and had symptoms of NSLBP for the last 3 months or more, which is clinically classed as chronic pain (Grotle *et al.*, 2010).

EXCLUSION CRITERIA

- Anyone who is pregnant.
- Anyone who has a serious pathology or has had spinal surgery or treatment for spinal conditions.
- Anyone that is currently seeing another Chiropractor, Sports Therapist, Physiotherapist or any other practitioner for chronic NSLBP treatment.
- Anyone who has had spinal manipulation treatment or taken part in Pilates based exercise for chronic NSLBP in the last 3 months.

EXPECTED FINDINGS

The expected findings are that spinal manipulation treatment will provide greater short-term improvements in pain, supporting the research by Millan *et al.* (2012b), and that some recurrence of pain may be present at the end of the study. The Pilates intervention may not have such an immediate positive impact on pain or flexibility but may have a greater long-term success rate by the end of the study, supporting the findings by Rydeard *et al.* (2006). The expectation is that the combined intervention will see the greatest overall improvements in pain levels and flexibility.

LIMITATIONS

Due to tight timescales, the maximum time available to run this study is 6-weeks, which could be deemed too short. Evidence highlights that most occurrences of NSLBP will improve significantly within 6-weeks (Hartvigsen *et al.*, 2018), however, a study by Kongsted and Leboeuf-Yde (2010) found that patients receiving chiropractic LBP treatment had some recurrence of pain after 12-weeks. Therefore, if this was a longitudinal study, participants could be monitored over a longer time span to look at long-term effects, potentially allowing for different outcomes and conclusions to be made.

The relatively small sample size will also provide generalised conclusions which may not be reproduced if the same study was repeated with a larger sample group.

The Pilates intervention could be made more reliable by participants attending weekly sessions with an instructor guiding them. By doing so, it would ensure correct technique when doing the exercises, give participants motivation and confirm that they are complying to the required number of sessions per week, however, lack of resources will prohibit this. The findings of this study rely on the participants being honest and adhering to the exercise plan supplied.

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