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An evaluation of two types of exercise classes, containing shoulder exercises or a combination of shoulder and thoracic exercises, for the treatment of nonspecific shoulder pain: A case series

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ABSTRACT

Study Design: A case series was carried out.

Introduction: There is a lack of evidence exploring the effectiveness of group exercise classes for people with nonspecific shoulder pain (NSSP). Also, there is a lack of research that measures potential reductions in thoracic kyphosis after exercise interventions in people with NSSP.

Purpose of the Study: To observe changes in shoulder pain, disability, and thoracic kyphosis in 2 groups of people with NSSP, after 2 different types of group exercise classes.

Methods: People with NSSP received a 6-week block of exercises classes containing either shoulder exercises alone (shoulder group, $n = 20$) or a mixture of shoulder and thoracic extension exercises (thoracic group, $n = 19$). The Disabilities of the Arm, Shoulder and Hand questionnaire for disability and the Numeric Rating Scale for pain were measured at baseline, 6 weeks, and 6 months. Thoracic kyphosis was measured at baseline and 6 weeks using the manual inclinometer.

Results: Significant and clinically meaningful improvements in Numeric Rating Scale and Disabilities of the Arm, Shoulder and Hand were demonstrated in both groups at 6-week and 6-month follow-up ($P < .001$). Effect sizes ranged from 0.78–1.16 in the shoulder group and 0.85–1.88 in the thoracic group. Thoracic kyphosis did not change beyond measurement error in either group.

Discussion/Conclusion: Group exercise classes can improve shoulder pain and disability in people with NSSP. Resting thoracic kyphosis did not change after either exercise intervention, which suggests that the treatment effect was not due to a change in static thoracic spine posture.

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Introduction

Shoulder pain is the third most common musculoskeletal complaint presenting to physiotherapy,¹ and its incidence rises with age.² Furthermore, only 40%–50% of shoulder pain cases in primary care completely recover within 2 years.^{3,4} The resulting economic burden has been recognized.⁵ As life expectancy is

increasing, the costs associated with shoulder pain are also likely to escalate.⁶ This highlights the need for effective strategies for managing people with shoulder pain.

Numerous special tests have been described, which aim to identify the specific structure responsible for the shoulder symptoms. These special tests are often combined with imaging, subjective questioning, and further objective examination (eg, range of motion [ROM] and strength) to guide treatment planning. However, structural pathology cannot be assumed as the cause of shoulder pain as studies have demonstrated that the extent of tissue damage observed on clinical imaging does not correlate with shoulder pain intensity.^{7,8} Furthermore, several systematic reviews have reported that most special tests advocated in shoulder assessment have

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limited diagnostic accuracy⁹⁻¹¹ and poor reliability,¹² suggesting their unsuitability for guiding treatment.¹⁰

Patients who do not appear to have a specific structural diagnosis may be classified as having nonspecific shoulder pain (NSSP).^{13,14} NSSP has been described as pain without clearly defined pathology,¹⁵ on the exclusion of specific causes of shoulder pain, including infection, trauma, dislocation, neoplasm, systemic inflammatory disorders, and referred pain.^{15,16} Although there has been some previous literature targeting people without defined structural diagnoses,¹³⁻¹⁶ including people classified as having NSSP, this research is limited to a small number of studies. Furthermore, these studies^{15,16} delivered predominantly passive treatments, rather than an exercise-based intervention. It is therefore unclear if people with NSSP can be treated effectively with an exercise program.

Individual physiotherapy is the most widely adopted approach for musculoskeletal conditions.¹⁷ However, treatment delivered in a group may be as effective, with the potential benefits of providing peer support, reducing costs, and the opportunity to treat patients sooner, thereby reducing their risk of chronic pain. Two recent systematic reviews compared the effectiveness of group exercise classes vs individually delivered treatment for people with a range of musculoskeletal pain conditions.^{18,19} They concluded no significant differences in outcomes between group and individual treatments.^{18,19} If small differences existed, they were in favor of the group intervention.¹⁹ Therefore, physiotherapy delivered through an exercise class may be an effective means of treatment.²⁰ The effectiveness of group exercise classes in people with NSSP is not known.

Although exercise is generally accepted as an effective treatment for shoulder pain,²¹ studies commonly measure outcomes to exercise interventions in terms of shoulder pain and function only. Research is required to determine the specific mechanisms that facilitate these symptomatic improvements, for example, changes in physical and/or psychological outcomes. Increased thoracic kyphosis is one postural variable that has been implicated in the development of shoulder pain.^{22,23} Exercises to reduce thoracic kyphosis are often included in rehabilitation programs.^{13,24,25} However, there is a lack of research that measures thoracic kyphosis before and after exercise-based interventions in people with shoulder pain, such that it is not possible to establish if a reduction in thoracic kyphosis is the mechanism through which exercise is effective in improving symptoms in people with shoulder pain. The aim of this case series was to observe within-group changes in shoulder pain, disability, and thoracic kyphosis in 2 groups of people with NSSP, after 2 different types of group exercise classes.

Methods

Design

A case series was conducted in 2 urban hospital sites in Ireland, which were running outpatient physiotherapy exercise classes for people with shoulder pain. The classes conducted between September 2014 and January 2016 were included in the study. Participants received 1 of 2 variations in exercise classes; a 6-week block of classes containing only shoulder exercises (shoulder group) or a 6-week block of classes containing a mixture of shoulder and thoracic extension exercises (thoracic group). The physiotherapists maintained the number of blocks relatively even between both types of class as the study progressed to balance the numbers in both groups. Ethical approval was obtained from the appropriate institutional ethics committees. Participants signed an informed consent form before participation.

Participants

The primary source of shoulder referrals to these physiotherapy departments was from local general practitioners and the pain consultants associated with the hospitals. As the population of interest for this study was people with NSSP, the following specific causes of shoulder pain were excluded during screening: referred cervical pain, systemic inflammatory disorders, frozen shoulder, recent shoulder trauma, or shoulder surgery, as described in the previous research.^{15,16} Full inclusion and exclusion criteria are listed in Table 1.

The physiotherapist at each site (CC and MC) carried out a basic screening with the individuals taken from the referral list to ensure their suitability and willingness to participate in a class. Alternatively, participants who had previously received individual physiotherapy at the sites and who were deemed suitable for an exercise class ceased individual physiotherapy and commenced the class. When the exercise classes commenced, participants did not receive any individual physiotherapy during the intervention period. When a sufficient number of participants were registered (4-6), a 6-week course of exercise classes commenced.

Intervention

To facilitate replication in future studies, the intervention is described as per the Template for Intervention Description and Replication checklist.²⁶ All participants received a 45-minute group exercise class, delivered by the physiotherapist, and scheduled once a week for 6 weeks. The physiotherapist at each site had experience in treating musculoskeletal pain for 25 and 10 years, respectively. Each class consisted of a 5-minute warm-up, followed by 10 exercises (2 minutes per exercise and 1-minute rest in between) and a warm-down. Each participant carried out an individual number of repetitions and sets in the 2-minute interval, which they aimed to progress throughout the 6 weeks. Progress was verbally reported by the participant to the physiotherapist each week. The participants were permitted to experience pain up to 5 of 10 during exercise,²¹ as long as the pain settled after the completion of the exercises and was not worse the next day.²⁷ Participants were encouraged to carry out the exercises at home every other day; however, adherence was not recorded. Although the 2 types of classes had the same physiotherapist, structure, and duration, they differed in the types of exercise, that is, number of shoulder resisted, scapular resisted, shoulder ROM, and thoracic extension exercises.

In the shoulder group, the 10 exercises consisted of 4 shoulder-resisted exercises, 3 scapular-resisted exercises, 2 shoulder ROM exercises, and 1 general body exercise. Shoulder and scapular

Table 1
Eligibility criteria for inclusion in the study

Inclusion criteria	Exclusion criteria
Older than 18 y	Cervical repeated movement testing affects shoulder pain and/or range of movement
Willing and able to participate	Equal restriction of active and passive shoulder flexion, abduction, or external rotation (restriction was defined as 30% less than the nonpainful side)
Minimum 6-wk history of shoulder pain	Systemic inflammatory disorders
Shoulder pain is aggravated by resisted shoulder flexion, abduction, or external rotation	Shoulder surgery or fracture within the previous 12 wk

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