

**Pain Management Special Interest Group  
May 2017 Research Update**

**Booth J, Moseley GL, Schiltenswolf M, Cashin A, Davies M, Hübscher M. Exercise for chronic musculoskeletal pain: A biopsychosocial approach. Musculoskeletal Care. 2017. doi: 10.1002/msc.1191. [Epub ahead of print]**

**Abstract**

Chronic musculoskeletal pain (CMP) refers to ongoing pain felt in the bones, joints and tissues of the body that persists longer than 3 months. For these conditions, it is widely accepted that secondary pathologies or the consequences of persistent pain, including fear of movement, pain catastrophizing, anxiety and nervous system sensitization appear to be the main contributors to pain and disability. While exercise is a primary treatment modality for CMP, the intent is often to improve physical function with less attention to secondary pathologies. Exercise interventions for CMP which address secondary pathologies align with contemporary pain rehabilitation practices and have greater potential to improve patient outcomes above exercise alone. Biopsychosocial treatment which acknowledges and addresses the biological, psychological and social contributions to pain and disability is currently seen as the most efficacious approach to chronic pain. This clinical update discusses key aspects of a biopsychosocial approach concerning exercise prescription for CMP and considers both patient needs and clinician competencies. There is consensus for individualized, supervised exercise based on patient presentation, goals and preference that is perceived as safe and non-threatening to avoid fostering unhelpful associations between physical activity and pain. The weight of evidence supporting exercise for CMP has been provided by aerobic and resistance exercise studies, although there is considerable uncertainty on how to best apply the findings to exercise prescription. In this clinical update, we also provide evidence-based guidance on exercise prescription for CMP through a synthesis of published work within the field of exercise and CMP rehabilitation.

**Lima, L. V., Abner, T. S. S. and Sluka, K. A. Does exercise increase or decrease pain? Central mechanisms underlying these two phenomena. J Physiol. 2017. doi: 10.1113/JP273355. [Epub ahead of print]**

**Abstract:**

Exercise is an integral part of the rehabilitation of patients suffering a variety of chronic musculoskeletal conditions, such as fibromyalgia, chronic low back pain and myofascial pain. Regular physical activity is recommended for treatment of chronic pain and its effectiveness has been established in clinical trials for people with a variety of pain conditions. However, exercise can also increase pain making participation in rehabilitation challenging for the person with pain. Animal models of exercise-induced pain have been developed and point to central

mechanisms underlying this phenomena, such as increased activation of NMDA receptors in pain-modulating areas. Meanwhile, a variety of basic science studies testing different exercise protocols, show exercise-induced analgesia involves activation of central inhibitory pathways. Opioid, serotonin and NMDA mechanisms acting in rostral ventromedial medulla (RVM) promote analgesia associated with exercise. This review explores and discusses current evidence on central mechanisms underlying exercised-induced pain and analgesia.

**Geneen LJ, Moore RA, Clarke C, Martin D, Colvin LA, Smith BH. Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. Cochrane Database of Systematic Reviews. 2017. doi: 10.1002/14651858.CD011279.pub3. [Epub ahead of print]**

### Background

Chronic pain is defined as pain lasting beyond normal tissue healing time, generally taken to be 12 weeks. It contributes to disability, anxiety, depression, sleep disturbances, poor quality of life, and healthcare costs. Chronic pain has a weighted mean prevalence in adults of 20%. For many years, the treatment choice for chronic pain included recommendations for rest and inactivity. However, exercise may have specific benefits in reducing the severity of chronic pain, as well as more general benefits associated with improved overall physical and mental health, and physical functioning. Physical activity and exercise programmes are increasingly being promoted and offered in various healthcare systems, and for a variety of chronic pain conditions. It is therefore important at this stage to establish the efficacy and safety of these programmes, and furthermore to address the critical factors that determine their success or failure.

### Objectives

To provide an overview of Cochrane Reviews of adults with chronic pain to determine (1) the effectiveness of different physical activity and exercise interventions in reducing pain severity and its impact on function, quality of life, and healthcare use; and (2) the evidence for any adverse effects or harm associated with physical activity and exercise interventions.

### Main results

We included 21 reviews with 381 included studies and 37,143 participants. Of these, 264 studies (19,642 participants) examined exercise versus no exercise/minimal intervention in adults with chronic pain and were used in the qualitative analysis. Pain conditions included rheumatoid arthritis, osteoarthritis, fibromyalgia, low back pain, intermittent claudication, dysmenorrhoea, mechanical neck disorder, spinal cord injury, postpolio syndrome, and patellofemoral pain. None of the reviews assessed 'chronic pain' or 'chronic widespread pain' as a general term or specific condition. Interventions included aerobic, strength, flexibility, range of motion, and core or balance training programmes, as well as yoga, Pilates, and tai chi.

Reviews were well performed and reported (based on AMSTAR), and included studies had acceptable risk of bias (with inadequate reporting of attrition and reporting biases). However the quality of evidence was low due to participant numbers (most included studies had fewer than 50 participants in total), length of intervention and follow-up (rarely assessed beyond three to six months). We pooled the results from relevant reviews where appropriate, though results should be interpreted with caution due to the low quality evidence.

**Pain severity:** several reviews noted favorable results from exercise: only three reviews that reported pain severity found no statistically significant changes in usual or mean pain from any intervention. However, results were inconsistent across interventions and follow-up, as exercise did not consistently bring about a change (positive or negative) in self-reported pain scores at any single point.

**Physical function:** was the most commonly reported outcome measure. Physical function was significantly improved as a result of the intervention in 14 reviews, though even these statistically significant results had only small-to-moderate effect sizes (only one review reported large effect sizes).

**Psychological function and quality of life:** had variable results: results were either favourable to exercise (generally small and moderate effect size, with two reviews reporting significant, large effect sizes for quality of life), or showed no difference between groups. There were no negative effects.

**Adherence to the prescribed intervention:** could not be assessed in any review. However, risk of withdrawal/dropout was slightly higher in the exercising group (82.8/1000 participants versus 81/1000 participants), though the group difference was non-significant.

**Healthcare use/attendance:** was not reported in any review.

**Adverse events, potential harm, and death:** only 25% of included studies (across 18 reviews) actively reported adverse events. Based on the available evidence, most adverse events were increased soreness or muscle pain, which reportedly subsided after a few weeks of the intervention. Only one review reported death separately to other adverse events: the intervention was protective against death (based on the available evidence), though did not reach statistical significance.

### Authors Conclusions

The quality of the evidence examining physical activity and exercise for chronic pain is low. This is largely due to small sample sizes and potentially underpowered studies. A number of studies had adequately long interventions, but planned follow-up was limited to less than one year in all but six reviews. There were some favorable effects in reduction in pain severity and improved physical function, though these were mostly of small-to-moderate effect, and were not consistent across the reviews. There were variable effects for psychological function and quality of life. The available evidence suggests physical activity and exercise is an intervention with few adverse events that may improve pain severity and physical function, and consequent quality of life. However, further research is required and should focus on increasing participant numbers, including participants with a broader spectrum of pain severity, and lengthening both the intervention itself, and the follow-up period.