

Authors' opinion

Effect of mental imagery and physical exercise on musculoskeletal pain and quality of life among office workers: a commentary

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Abstract: *Background* — Musculoskeletal pain is one of the most common problem among office workers. The main reason is related to the long time spent sitting and the associated lack of physical activity. Musculoskeletal pain can affect not only their work-related performance, but also their personal performance and quality of life. Research has mainly focused on the effects of physical activity in managing musculoskeletal pain in office workers, while research is sparse pertaining to the possible role of mental imagery on reducing musculoskeletal pain in office workers. While mental imagery has only a minor effect on pain modulation in healthy individuals, its effect appears to be more pronounced in those with chronic pain.

Aim — This commentary attempts to present beneficial mental imagery techniques that can be used solely or in combination with physical exercise in an office-based setting to improve musculoskeletal pain to enhance work performance and quality of life among office workers.

Keywords: Mental, pain, imagery, quality of life.

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Introduction

Musculoskeletal pain as a result of long periods of sitting and lack of physical activity is common among office workers [1, 2]. Problematically, this pain varies and significantly affects work, personal and social life of people. Work stress, when combined with prolonged periods of sitting and inactivity, not only affects psychological health but also results in physical manifestations, such as further musculoskeletal pain [2]. The wealth of information available suggests that musculoskeletal pain in office workers mainly affects the shoulder, neck and lower back, with the pain being considered chronic [3-5]. In many cases, the lack of management and treatment of the pain ultimately affects mood, sleeping and social behavior of individuals and thus also quality of life and work performance [6].

While many guidelines and prescriptions exist for the management of musculoskeletal pain in office workers, many of these recommendations are not feasible and/or cost-effective in low-resource settings or in an office environment [7]. Also, the new pattern of lifestyle or work, that has emerged as a result of the COVID-19 pandemic, requires appropriate, cost-effective, simple exercises and mental training protocols for use by office workers in their homes and/or offices [8,9]. While it is unequivocal that certain forms of exercise can improve pain symptomatology, research is sparse pertaining to the effect of mental imagery on pain management [8, 9].

Research showed that exercise can effectively treat pain symptomatology in the long-term manner, while mental imagery does so in the short-term perspective. Thus, combining the two modalities may not only provide a rapid reduction in pain, but an enhanced response to the long-term overcoming of such pain. Mental imagery can reduce pain symptomatology in the short-term, since mirror neurons in regions, such as primary motor cortex, supplementary motor area, anterior cingulate cortex, inferior and superior parietal lobules and cerebellum may affect the role of perception and action of movement outcomes [8,9]. Exercise was shown to potentially have some effect on short-term pain symptomatology, but has been found to be most effective over the long-term in pain modulation. Importantly, different modes of exercise have been shown to impact pain in diverse ways. In this regard, high-intensity exercise has been shown to decrease pain significantly via exercise-induced hypoalgesia (EIH), or runner's high. However, for office workers and at-risk patients, high-intensity workouts may not be a realistic or safe option, given the associated risk. Research indicates that low-intensity aerobic exercise can have a marked acute EIH benefit, while research is unambiguous that resistance training is most beneficial for long-term or chronic pain reduction. While the mechanisms responsible for EIH are not entirely understood, the opioid hypothesis has received the most attention. This hypothesis states that activation of the endogenous opioid system during exercise may be responsible for EIH. In addition, it has been suggested that the endocannabinoid system may be affected by exercise since

increased levels of endocannabinoids have been found in long-term exercisers, in addition to the presence of cannabinoid receptors in nociceptive-processing areas of the brain and spinal cord. Further, in the short-term, an increased pain sensitivity after exercise (i.e., exercise-induced hyperalgesia) may result in a major barrier to adherence, precipitating a cycle of physical inactivity that may lead to long-term worsening of both pain and disability. Thus, mental imagery may provide a short-term solution to overcoming this initial increased pain sensitivity following exercise. An important question that remains largely unexplored is whether combining exercise with other interventions, such as mental imagery, might help to restore impaired EI. This combination training may prove especially useful in the home/office, which tend to be a low-resource setting. Thus, this commentary will attempt to introduce guidelines for combining exercise and mental imagery techniques that are cost-effective and feasible in low-resource settings [8, 9].

Mental imagery

Mental imagery, also known as visualization, is a mind-body technique that could be considered as seeing and/or hearing in the mind using a quasi-perceptual feeling [10]. Mental imagery takes place in the mind in the absence of a real situation in the external environment [11]. There are different techniques of mental imagery which include *inter alia* deep breathing, performing yoga, meditation, positive thinking, and mindfulness. While mental imagery is a cognitive process, it is proposed to reduce pain of unknown pathology [12]. To support this supposition, several studies have demonstrated the positive effects of mental imagery for the relief of a variety of chronic pain [13, 14].

While it is clear that attention (or distraction) can modulate pain, the exact cognitive and somatic mechanisms for this are not understood. It is thought that mental imagery can modulate pain-related neuronal networks and the perception of pain. However, given the lack of standardized mental imagery protocols and existing research in office workers, it may require the implementation of variety of trial-and-error applications in office workers until optimal pain management is achieved. In addition, since the treatment effects of mental imagery tend to be short-lived, this treatment option should be combined with other longer acting forms of treatment (especially, those that work via alternate and complementary mechanisms), such as physical exercise.

Physical exercises

While it is well known that physical exercise has a pain-modulating effect [16], there is a lack of information regarding the implementation of the optimal program design for such pain management, especially in office workers [17]. This is problematic in that the rate of musculoskeletal pain among office workers is continuously increasing due to the lack of pain management by the office workers themselves and their employers [15].

It is, however, critical for health professionals to design and introduce simple, cost-effective and feasible exercise programs that can be performed in a home- or office-based setting for the management of musculoskeletal pain. In this regard, a suitable pattern of exercise training should improve the muscular fitness (i.e., strength and muscular endurance) and cardiorespiratory endurance of office workers and should take place three or more days weekly [16]. It is interesting to note that such programs have

also been demonstrated to increase quality of life and sleep quality of employees, resulting in an enhanced productivity [17, 18]. Muscular fitness/resistance training components should focus extensively on the neck, shoulder, and lower back with a focus to improve the strength of the body core, which could be defined as a four-sided muscular frame with the abdominal muscles anteriorly, paraspinals and glutes posteriorly, diaphragm superiorly, and the pelvic floor and hip girdle inferiorly. Resistance training should be performed for two to three sets of 10-15 repetitions and 10-15 seconds lifting duration [19]. Physical exercise programs for the management of musculoskeletal pain in office workers should also focus on improving flexibility in identified shortened musculature for sets sets 30 seconds.

Authors' opinion

While it is clear that both mental imagery and physical exercise have pain-modulating mechanisms, it may prove prudent to incorporate both treatment modalities due to their unique and complementary mechanisms and ease of use in the home or office setting. However, the success of such programs relies on the quality of the initial explanation and instruction, the continual reminders, especially via email and social media to engage in such treatment, and the availability of suitably qualified health professionals to answer any questions arising from the office workers regarding their treatment [20].

Conflict of Interest

The authors declare that they have no conflict of interest.

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