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REVIEW: NARRATIVE REVIEW

Physical activity, fear avoidance, and chronic non-specific pain: A narrative review

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Summary *Background:* Chronic non-specific pain (CNSP) and physical inactivity have become increasingly prevalent in the United States; however, the associations between the two remain unclear. The lack of clarity may be due to the presence of a third variable, the individual's pain coping strategy.
Objectives: We had three specific aims. 1) To review the associations between fear-avoidance beliefs and behaviors, and levels of physical activity and disability. 2) To review the theoretical mechanisms behind chronic non-specific pain and the potential mediating role of physical activity. 3) Finally, to report the most commonly recommended interventions for fear-avoidant individuals suffering with chronic pain.
Conclusions: Further investigation is needed to fully understand the associations between physical activity, chronic non-specific pain, and fear avoidant beliefs and behaviors. Precise relationships notwithstanding, there is strong evidence to suggest that physical activity is an integral piece to the chronic non-specific pain puzzle. For this reason, it is incumbent upon clinicians to strongly recommend participation in regular, yet properly progressed, physical activity to chronic non-specific pain sufferers.

Introduction

The prevalence of chronic pain is increasing, imposing a financial burden that exceeds heart disease, cancer, and diabetes (Gaskin and Richard, 2012). The cost of chronic pain goes well beyond paying for treatment and work missed, as there are generally social and personal

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ramifications including reduced quality of life, reduced physical activity (PA) levels, negative impact on relationships, job loss, and depression (McBeth and Jones, 2007; Perquin et al., 2001). The symptom of pain accounts for over 80% of all physician visits (Gatchel et al., 2007). It is also estimated that, at any given point, 23% of the U.S. population has chronic (pain lasting longer than three months) or recurrent pain. In a small subset of these patients, the exact cause and diagnosis is still elusive and classified as chronic non-specific pain (CNSP) (Waddell, 2004).

Chronic non-specific pain

Chronic non-specific pain involves a lack of an identifiable patho-anatomical basis (i.e., infection, osteoporosis, fracture, radicular syndrome, and tumor) for symptoms. Moreover, psychosocial factors are thought to augment pain intensity and persistence (Gatchel et al., 2007). The most common reports of non-specific pain are of the low back (CNSLBP), but may also include widespread pain, pelvic girdle pain, knee pain, neck pain and headaches (Vleeming et al., 2008; Forsythe et al., 2008; Krismer and van Tulder, 2007). Chronic non-specific low back has been reported to be the second leading cause of physician's visits, the second leading cause of disability, and the most common cause of reduced PA in those younger than 45 years (Anderson, 1999). Chronic non-specific pain has a reported prevalence of 35—44% among children and adolescents, which is especially alarming as the presence of pain in youth is considered a risk factor for pain in adulthood (Brattberg, 2004). As the name would suggest, the mechanisms behind non-specific pain are not well understood; however, given the pervasive sedentary trends among Americans (youth and adult) (CDC, 2008), and the increased prevalence of CNSP, it stands to reason that these two issues may be linked. Logic notwithstanding, the data is conflicting. Some studies have shown that that those suffering from CNSLBP experience lower PA levels, PA avoidance and lower levels of fitness compared to healthy controls (Duque et al., 2009; Rudy et al., 2007). Conversely, two systematic reviews indicate that individuals with chronic low back pain engage in similar levels of PA compared with asymptomatic controls (Griffin et al., 2012; van Weering et al., 2007).

The fear avoidance model

It is acknowledged that pain is a multi-factorial, subjective experience, which is influenced by genetic, physical, psychological, environmental, cultural, and societal factors (Waddell, 2004; McCarthy et al., 2004). It is also recognized that people in pain cope in different ways, and these varying coping styles will likely influence treatment outcomes and PA levels (Waddell, 2004; Vlaeyen and Linton, 2000). As such, it may be useful to investigate PA and CNSP within the context of beliefs about PA causing harm. The fear avoidance model (FAM) postulates that the way an individual interprets pain leads to two different coping strategies, avoidance or confronting (Vlaeyen and Linton, 2000). The confronting path is characterized by the individual viewing the experience as a temporary setback rather than a life altering, catastrophic event. The confronting path echoes most pain management guidelines of early mobilization and the engagement in PA as soon as possible (Krismer and van Tulder, 2007; Koes, 2010). Alternatively, the avoidance path is characterized by a progressive, sequential spiral beginning with an acute pain experience which leads to pain catastrophizing (indicated by a tendency to focus on the pain sensation, helplessness, and magnification), pain related fear, avoidance of activity, hypervigilance about pain, and ultimately disuse, deconditioning and disability (Vlaeyen and Linton, 2000). Avoidance behaviors are considered adaptive during the acute stages of pain while tissue injury heals; however, long term-avoidance of PA is thought to impede functional recovery and result in increased chances of physical disability. The FAM also postulates that pain-related fear may be negatively reinforced by avoidance behaviors (i.e. guarded motions, exaggerated affect, wincing), which can further augment disability. According to a review by Leeuw et al. (2007), pain-related fear and anxiety is the fear that emerges when stimuli that are related to pain are perceived as a main threat. Kinesiophobia, an important construct of the FAM, has been defined as a condition in which an individual has "an excessive, irrational, and debilitating fear of physical movement and activity resulting from a feeling of vulnerability to painful injury or re-injury" (Lundberg et al., 2011).

Associations between fear avoidance and disability

According to the International Classification of Functioning, Disability and Health (ICF), disability is an impairment of an individual's physical functioning, mobility, dexterity or stamina (WHO, 2001). These impairments subsequently influence interactions within an individual's environment. There is evidence demonstrating that pain catastrophizing and fear beliefs are associated with disability in a certain subgroup of pain patients. Lentz et al. (2010) investigated 85 subjects with foot and ankle related disability. The researchers measured pain related variables including age, range of motion deficit, body mass index, chronicity of symptoms and kinesiophobia to determine which had the most impact on pain. The fear of movement was the single strongest contributor to ankle disability. A survey of acute low back pain patients showed that two thirds of them believed that a "wrong" movement would cause serious harm (Moore et al., 2000). Keefe et al. (2000) showed that osteoarthritis (OA) patients who catastrophize about pain have been shown to have high levels of physical disability. This study was further supported, when researchers examined if pain catastrophizing and pain-related fear accounted for variances in pain (Somers et al., 2009). The researchers took 106 individuals diagnosed with (OA) of at least one knee, and had them complete questionnaires measuring catastrophizing and pain-related fear. They found that pain catastrophizing and pain-related fear accounted for more overall variance in pain and disability than all other variables. Perhaps even more interesting, radiographic findings (i.e., MRI, X-Ray) indicating more advanced progression of OA were not predictive of