**How do expectations, coping and depression impact on recovery after a musculoskeletal injury?**

**Executive Summary**

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**Introduction**

Musculoskeletal (MSK) pain and "soft-tissue" injuries are a major public health problem in Canada. Non-arthritic back conditions are the leading cause of activity limitations in the Canadian population.41 For example, eight out of every ten Canadian adults experience back or neck pain in any six-month period, and over 12% of all working aged adults experience significant activity and work limitations because of these conditions.4;8;11 Every year, almost one-fifth of adults visit health care providers for neck and low back pain - placing a significant burden on the Canadian health care system.12 In a study of the most expensive health conditions in the United States, back problems and motor vehicle trauma (most of which involve whiplash injuries) were the first and third most common causes of lost days of work respectively.18

 It was previously believed that MSK injuries to the back and neck are self-limiting conditions and that most of the acute MSK injuries recover well.2;3;39;40 It is now becoming clear that the course of neck and back disorders is usually marked by recurrences and exacerbations, rather than complete resolution of symptoms and limitations.9;13 Prior injuries increase the risk of subsequent injuries, and those who lose time at work because of such injuries are at greater risk for subsequent episodes of lost time and prolonged disability.15 Although most of the research examining the role of psychological factors in pain have focused on chronic pain, there is a growing focus on the need to understand how psychological factors influence recovery from acute musculoskeletal conditions

 *Why might beliefs, attitudes, mood and coping be important?* Beliefs can be thought of as personally-formed or culturally-shared cognitive understandings of events, while attitudes are generally thought of as the positive, negative or ambivalent feelings/emotions about events.24;48 Our beliefs about pain delineate the way we make sense of the experience of pain, and are thought to form part of the basis for our perceptions of pain and our attitudes toward pain.10 Expectations are a particular type of belief – a belief about the future, for example, the belief (expectation) of future recovery from a pain episode. It has been theorized that persons’ expectations are important in health outcomes after an injury, and may serve as a mechanism for the transition to recovery or chronic symptoms.1;21;22;26;34 Two recent studies (one in Sweden and one in Canada) have shown evidence that positive expectations for recovery in the first few weeks of traffic-related neck pain are associated with better actual *symptom recovery*.6;27 One systematic review examining prognostic factors in acute back pain suggested that better expectations predict faster return to work.28 However, another systematic review contended that no conclusions could yet be drawn about the influence of expectations on return to work because we do not fully understand the factors and processes influencing expectations.20 Thus, this is still an open question.

Fear-avoidance beliefs are another form of belief, that is, the belief that movement and activities will lead to re-injury or exacerbations of the current injury. Pain-related fears predict pain severity in chronic low back pain populations;15;31;43;46 and anxiety about pain has been shown to increase pain perception and decreases pain tolerance.14;33 Likewise, fear of pain is associated with greater concurrent disability and activity avoidance in acute back pain episodes.44 However, there are still questions about what role fear avoidance beliefs play in recovery and return to work.

Negative beliefs and attitudes have implications for psychological functioning, particularly depression19;45 There is little doubt that depressive symptoms are common features of chronic pain,4;23 and it has been reported that 56% of individuals with chronic disabling spinal disorders have major depression.17 However, there is conflicting evidence about how soon or how frequently symptoms of depression occur in the acute stage of recovery of MSK injuries, and whether such symptoms resolve over time or increase in those whose pain persists.25;32;36-38;42;47 A recent review suggested that depression was implicated in the transition between acute and chronic pain.35 However, the role of depression and other psychological factors have been understudied in occupational neck pain.5;7

Pain beliefs are also thought to be an important determinant of pain coping style. Pain *beliefs* are cognitive appraisals of the pain-related situation, while pain *coping* is a cognitive or behavioral response to pain. While beliefs about pain may predate the onset of pain; pain coping is a way of managing the pain once it is experienced. Coping is most often understood as a transactional process of managing a particular stressor,29;30 consisting of a fluid process of appraising the stressor (in this case, pain), responding, and re-appraising. It is generally accepted that both the appraisals and responses involved in coping are determined by beliefs and expectancies, as well as by personality, biological characteristics and social roles.16 It is clear that pain-related beliefs and expectancies, psychological status and coping are intrinsically linked. Attempting to understand one without understanding the inter-relationships among these factors is bound to yield an incomplete framework.

Our study aimed at assessing the associations among pain beliefs and fears, coping, depression, pain intensity and pain-related limitations among those seeking treatment for musculoskeletal injuries; whether these change over time; and how these factors at baseline influence recovery.

Participants were adult volunteers with a musculoskeletal condition, recruited from physical therapy clinics in Alberta. All participants provided written, informed consent for the study, and the study was approved by the University of Alberta Research Ethics Board. Questionnaires were given at baseline, and at 6 weeks, 3 months and 6 months after the initial contact. This questionnaire included demographic information and standardized questionnaires about pain, beliefs and psychological status.

We enrolled 216 participants, of whom fewer than half participated in the 6-week follow-up, one third in the 3-month follow-up and one quarter in the 6-month follow-up. The main factor distinguishing those who dropped out of the study was younger age. Mean age of participants was just over 40 years of age, and over half were female. The majority had at least some post-secondary education, and three-quarters had been employed full time at the time of the injury. Almost one-third reported that their injury was job-related, and almost half had already returned to their pre-injury job at the start of the study. Despite so many being back at work, the average pain intensity at the start of the study was well into the moderate range, suggesting that people were returning to work despite high pain levels. Interestingly, pre-injury job satisfaction was unrelated to whether participants were work absent after the injury.

There were strong associations among the psychological measures (depression, passive coping, fear avoidance) and pain intensity and pain disability). In particular, those who rated themselves as being highly disabled by their pain were also likely to be depressed, to be passive copers, and to have high levels of fear avoidance behavior, especially work-related fear avoidance. Those with poor expectations about their recovery had more depression, greater pain and greater pain-related self-rated disability. They also tended to cope more passively (but interestingly, not less actively). In those with complete data at all measurement points, there was little change in psychological variables across time. However, pain intensity decreased from moderate at baseline to mild at six weeks, and thereafter was relatively stable.

We assessed two indices of recovery: pain recovery and return to work. In the short term, those with better expectations for recovery and lower levels of initial self-rated disability at baseline had better *pain recovery*. In fact, all those who expected quickly at baseline had experienced pain recovery by the three month follow-up. However, neither expectations for returning to pre-injury work nor pre-injury job satisfaction predicted actual *return to work*. Likewise, actual return to work did not depend on whether the injury was work-related or not. Instead, early return to work was better in those with less baseline self-rated pain-disability and fewer work-related fear avoidance beliefs. However, baseline depression and passive coping were also important predictors of return to work in the longer term.

There are some strengths to this study. We included validated questionnaires assessing a number of relevant psychological factors. Our baseline sample size was over 200 participants, which allowed sufficient power to conduct baseline analyses. However, there are also some limitations to this study. This is a convenience sample of volunteers. However, there is no reason to belief that the associations among factors studied are different between participants and those who would have been eligible to participate. Recruitment was much more difficult and time consuming than was anticipated and there was substantial attrition. This attrition may have resulted in selection bias, although of the many factors tested for their association with attrition, only older age predicted greater participation. We do not believe that this biased our findings on pain recovery, since age was not associated with recovery at any point.

We believe that these findings are novel and useful for understanding the psychological and pain-related factors in recovery and in returning to work after a musculoskeletal injury.

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