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Clinical Study

Relationship between different measures of pain-related fear and physical capacity of the spine in patients with chronic low back pain

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Abstract

BACKGROUND CONTEXT: It has been controversially stated that pain-related fear is a more important determining factor for disability in chronic low back pain (CLBP) than pain or physical impairment in itself. So far, the relationship between psychological and physiological determinants of chronic pain, that is, pain-related fear and physiological abilities, remains unclear.

PURPOSE: To evaluate whether pain-related fear assessed by different tools (both task specific and non task specific) is related to physical capacity measured by specific spine tests and, secondarily, to explore the relationship between different pain-related fear assessment tools.

STUDY DESIGN/SETTING: Cross-sectional study.

PATIENT SAMPLE: Fifty patients with CLBP (50% women; mean_{age} [$\text{standard deviation}_{\text{age}}$]: 44.2 [9.5 years]).

OUTCOME MEASURES: Physical capacity by means of three specific spine tests, that is, the finger-floor distance test (flexibility), a maximal isometric strength test of trunk extensor muscles (strength), and the Sorensen test (endurance). Pain-related fear by means of self-report measures, that is, the Tampa Scale for Kinesiophobia (TSK), the Photograph Series of Daily Activities (PHODA), and a fear visual analog scale (FVAS) tailored to the spine tests.

METHODS: Participants were asked to complete the TSK and PHODA and to perform the three spine tests. Right before performing each of the spine tests, an FVAS was filled out. Linear regression analyses controlling for gender and age were performed to study the association between the pain-related fear measurements and the results of the spine tests. To investigate the relationship between the pain-related fear measurements, correlation tests were performed.

RESULTS: The linear regression analyses revealed that neither the TSK and PHODA scores nor the FVAS scores were significantly related to the physical capacity measurements. The correlational tests showed no significant correlation between the PHODA, TSK, and FVAS scores.

CONCLUSIONS: The present study shows that neither the task-specific tool (FVAS) nor the non task-specific questionnaires (TSK and PHODA) were significantly correlated to the spine tests in patients with CLBP. This is contrary to earlier evidence according to which physical capacity is inversely related to the level of pain-related fear, and it suggests that one should not draw conclusions about physical capacity based on pain-related fear scores. Furthermore, the different assessment tools for pain-related fear were surprisingly not correlated with each other.

Keywords: Chronic low back pain; Pain-related fear; Physical capacity

FDA device/drug status: Not applicable.

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EVIDENCE & METHODS

Context
It is commonly accepted in spine care that pain-related fear can impact expected physical capacity. The authors assessed this.

Contribution
They found that measures of pain-related fear did not correlate with measures of physical capacity. They also found that measures of pain-related fear did not correlate with each other.

Implications
Given that the findings are contradictory to expectations and the current base of knowledge, further exploration is needed. Whether the surprising findings are about *patients* or about the tools chosen in this study to assess them is unclear.

—*The Editors*

Introduction

According to the ''fear-avoidance model'' [1] of chronic musculoskeletal pain (eg, low back pain), acute pain can be catastrophically (mis)interpreted leading to excessive pain-related fear and associated defensive behavior such as avoidance/escape (eg, daily activities). In the long run, this may lead to limitations in daily functioning (disability) and in negative psychological and physiological effects (disuse) [2,3]. Although the presence of the latter in patients with chronic low back pain (CLBP) remains controversial [4], long-term disuse could, according to the model, result in physical deconditioning characterized by a reduced level of physical capacity (ie, ''the highest probable level of functioning that a person may reach in a given domain at a given moment'' as defined by the International Classification of Functioning, Disability and Health [5]), e.g. altered muscle quality (strength, endurance, etc.) and altered muscle coordination [2].

Many studies have looked into the relationship between pain-related fear and actual physical capacity in patients with CLBP: in contrast to some studies reporting no significant correlation [6–8], a negative effect of pain-related fear on physical tests was shown in others [9–13]. Perhaps these different findings might be influenced by the type of tests used to quantify physical capacity: although the studies reporting no significant relationship used a submaximal test [6–8], other studies have included tests requiring a maximal voluntary effort [9,10,13,14], which can be influenced by individual confounding factors such as pain-related fear (as a result, they are sometimes called ''behavioral test''). The studies related to the relationship between pain-related fear and physical capacity also differ regarding the measures used (eg, walking velocity [13], quadriceps muscle strength [15], spine flexibility [10,14], trunk extensor static [9,10] or dynamic [16,17] strength); one could assume that some tests are more feared than others, especially the spine tests because they specifically involve the painful region.

The different tools used to assess pain-related fear may further complicate the interpretation of these different findings, and in particular, how specifically they measure fear for a movement or situation. ''Pain-related fear'' is a broad term encompassing fear of pain, movement, physical activity, (re)injury, work-related activity, or rehabilitation-based exercises, as well as perceived harmfulness of activities [18,19]. Therefore, different tools (mostly self-report tools) not only measure different underlying constructs but also assess several specific fears. The extent to which pain-related fear is related to actual physical spine capacity may also be dependent on the ability of the fear tool to assess fear for that specific test. One of the most widely used tools is the Tampa Scale for Kinesiophobia (TSK) [20,21], which is a questionnaire made up of 17 statements regarding fear of movement or (re)injury. Although this provides a rough estimate of the level of the patient's fear, it does not provide any information regarding the specific movement or activity the patient actually fears, in contrast with tools using photographs depicting several daily activities, such as the Photograph Series of Daily Activities (PHODA) [22,23]. By rating each daily activity on its perceived level of harmfulness, a personalized fear hierarchy is set up that can be used to tailor fear-reducing treatment strategies, such as a graded exposure in vivo therapy. In contrast to the TSK and PHODA (non task-specific), which cannot be tailored to a specific physical test, a fear visual analog scale (FVAS) does provide this opportunity (task specific). An FVAS consists of a 10-cm horizontal line ranging from no fear (left end) to maximal fear (right end), on which patients have to indicate how fearful they feel. FVASs have been used in the Fear of Daily Activities Questionnaire developed by George et al. [24] and can be used in association to any task/test, for example, spine-specific tests.

In the present study, the main aim was to investigate the relationship between three measures of pain-related fear (ie, TSK, PHODA, and FVAS) and three specific tests of physical spine capacity in patients with CLBP. The finger-floor distance (FFD) test, an isometric strength test of the trunk extensor muscles (maximal voluntary contraction [MVC] test), and the Sorensen test were selected for the present study because they are commonly included in physical test batteries designed for patients with CLBP [25,26]. Additionally, they each capture different components of muscle quality (ie, flexibility, strength, and endurance, respectively). Significant negative correlations (low to moderate) were expected between these spine tests and the three fear measures. Furthermore, we expected that these spine tests might be particularly feared because they specifically involve the painful