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Changes in Depression, Health Anxiety, and Pain Catastrophizing Between Enrollment and 1 Month After a Radius Fracture

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Objectives: To test the difference in symptoms of (1) depression, (2) health anxiety, and (3) catastrophic thinking between 1 and 6 weeks after injury to the radius. **Patients and Methods:** In total, 69 adult patients with a minimally displaced radial head or distal radius fracture were prospectively enrolled. After diagnosis, we recorded demographic variables, 11-point ordinal numerical pain score, and agreement with “no pain, no gain”; Disabilities of the Arms, Shoulder, and Hand (DASH) questionnaire; Center for Epidemiologic Studies Depression Scale; the Whiteley Index; and the Pain Catastrophizing Scale. In total, 55 patients (80%) returned after 1 month to reevaluate pain, Disabilities of the Arms, Shoulder, and Hand, Center for Epidemiologic Studies Depression, Whiteley Index, and Pain Catastrophizing Scale scores. **Results:** Center for Epidemiologic Studies Depression scores decreased by an average of 5 ± 9 points ($p < 0.001$), and Pain Catastrophizing Scale

scores decreased by 2 ± 6 points ($p = 0.0041$). In multivariable analysis, decrease in Center for Epidemiologic Studies Depression was associated with not having an additional pain condition, more days elapsed between injury and final evaluation, and stronger agreement with “no pain, no gain” (adjusted $R^2 = 0.26$, $p = 0.0006$). An increase in Whiteley scores was associated with fewer years of education ($R = -0.34$, $p = 0.012$). Changes in Pain Catastrophizing Scale scores were associated with marital status (single -1.7 ± 4.3 vs married -4.6 ± 6.0 vs separated 0.55 ± 6.2 , $p = 0.040$). **Conclusions:** Symptoms of depression and catastrophic thinking, but not health anxiety, improved during recovery after injury. If psychologic measures are used as a screening tool to predict outcome after treatment, one should account for a patient's disease phase.

Level of Evidence: Prognostic level I

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INTRODUCTION

Psychologic factors (such as symptoms of depression, health anxiety, and catastrophic thinking) are associated with increased magnitude of disability and pain intensity in patients with musculoskeletal illness.¹ Those constructs can be quantified using validated questionnaires that have good test-retest reliability in stable individuals.^{2–4} However, the performance of these questionnaires during recovery is unknown. Symptoms of depression might be in part reactive

and may change over time as patients recover. For example, a previous study showed that symptoms of

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depression decreased from 51% to 20% 1 year after hip fracture surgery.⁵ But health anxiety and catastrophic thinking may be more stable constructs that are less affected by recovery.

This study aimed to assess the magnitude of change from baseline to 1 month for 3 important constructs associated with pain and disability in orthopedic patients. Specifically, this study tested the primary null hypothesis that there is no difference in symptoms of (1) depression, (2) health anxiety, and (3) catastrophic thinking between approximately 1 and 6 weeks after injury among patients with nonoperatively-treated radial head and distal radius fractures. Secondly, we assessed the association of demographic variables with change in questionnaire scores for depression, health anxiety, and pain catastrophizing.

MATERIALS AND METHODS

Study Design and Patient Population

Following institutional review board approval, we prospectively enrolled 69 adult patients with a minimally-displaced radial head or distal radius fracture between December 2009 and May 2014. Inclusion criterion included a stable, isolated, nonoperatively-treated fracture of the radial head or distal radius, occurring no later than 14 days before enrollment. We excluded patients cognitively and physically unable to perform the required exercises, pregnant women, and patients unable to provide informed consent.

After the senior investigator diagnosed the isolated radial head or distal radius fracture, informed consent was obtained and the visit was paused to record: demographic variables (sex, age, smoking status, pre-existing pain conditions, marital status, employment status, years of education, and the type of immobilization), 11-point ordinal numerical pain score, and agreement with “no pain, no gain”; Disabilities of the Arms, Shoulder, and Hand (DASH) questionnaire⁶; Center for Epidemiologic Studies Depression (CESD) Scale⁷; the Whiteley Index⁸; and the Pain Catastrophizing Scale (PCS).³ The visit was then resumed, and as part of standard care, the surgeon coached the patient for 10 minutes on the importance of stretching and how to stretch effectively. During the follow-up appointment, we again measured pain, DASH questionnaire, symptoms of depression, Whiteley Index, and PCS.

Outcome Measures

The CESD Scale consists of 20 questions answered on a 4-point Likert scale (0 indicating “rarely” and 3 “most of the time”), resulting in a score from 0–60 with a higher score indicating more depressive symptoms.⁷

Symptoms of hypochondriasis were measured using the Whiteley Index, a 14-question survey using a 5-point Likert scale ranging from 1, “not at all,” to 5, “a great deal,” resulting in a score from 14–70. A higher score indicates a more heightened illness concern.⁸

The PCS measures catastrophic thinking: an exaggerated negative attitude toward or an over-interpretation of pain. PCS uses 13 questions answered with a 5-point Likert scale (0 meaning “not at all” and 4 “all the time”) for an overall score between 0 and 52, with a higher score indicating higher levels of pain catastrophizing.³

The DASH questionnaire is used to assess symptoms and disability of the upper extremity. The questionnaire involves 30 questions regarding the use of the arm on a 5-point Likert scale response (1 indicates “no problems/pain” and 5 indicates “impossible”). The final score ranges from 0–100, with a higher score indicating higher levels of pain and disability in the arm.⁶

Two 11-point ordinal scales were used to assess the patients' general pain levels, ranging from 0, “no pain,” to 10, “the worst pain ever,” as well as the patients' agreement with “no pain, no gain” regarding the importance of stretching to discomfort so as to recover.

Patient Demographics

In total, 69 patients were enrolled (mean = 5 ± 2 d, range 1–12 d) after injury. Of the 55 patients (80%) returning after 1 month (mean 36 d after the first visit, range: 20–84 d), 38 had proximal radius fractures and 17 had distal radius fractures. Average age was 47 ± 16 years (range: 20–80 y), and 39 were women (Table 1).

Statistical Analysis

Continuous variables are presented as mean (± standard deviation) and discrete variables as number and percentage. Histograms showed that the data were normally distributed, allowing the use of parametric testing. The enrollment and follow-up patient survey

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