

Open Reduction and Internal Fixation of the Distal Radius: Catastrophic Thinking Leads to Stiff Fingers

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Background/Purpose: There is debate whether patients who have greater pain and disability than expected after musculoskeletal injury have a distinct pathophysiological process (eg, increased sympathetic nerve activity) or ineffective coping strategies such as excessive catastrophic thinking. This study aims to establish predictors of finger stiffness after distal radius fracture surgery. We hypothesize that there are no physical or psychological factors associated with finger stiffness measured by (1) range of motion and (2) distance to palmar crease at 8 weeks after surgical treatment.

Methods: After IRB approval, we prospectively enrolled 116 patients at the time of suture removal after volar plate fixation of a distal radius fracture. At inclusion we recorded patients' demographics, pain intensity, catastrophic thinking (Pain Catastrophizing Scale), symptoms of depression (Patient Health Questionnaire), health anxiety (Whiteley Index), and index through small finger's motion and distance to palmar crease. Motion and distance to palmar crease were evaluated in 96 patients 5 weeks after enrollment (approximately 8 weeks after fracture). 17% (20/116) of the patients did not have a second evaluation: 8 sought follow-up care closer to home and 12 were missed by the research assistant when an appointment was rescheduled.

Results: Age ($r = -0.45$, $P < 0.001$), having another pain condition (pain condition $938^\circ \pm 168^\circ$ versus no pain condition $999^\circ \pm 99^\circ$, $P = 0.044$), years of education ($r = 0.32$, $P = 0.0017$), catastrophic thinking ($r = -0.42$, $P < 0.001$), health anxiety ($r = -0.22$, $P = 0.033$) and pain score ($r = -0.26$, $P = 0.010$) at enrollment were associated with range of motion 8 weeks after surgery. Age (beta = -3.2 , 95% confidence interval [CI] -4.6 to -1.8 , $P < 0.001$), years of education (beta = 10 , 95% CI 3.1 to 18 ; $P = 0.006$), and catastrophic thinking (beta = -6.3 , 95% CI -9.8 to -2.8 , $P = 0.001$) were retained in the final model for range of motion (adjusted R^2 0.35 , $P < 0.001$). The same variables were associated with increased distance to palmar crease 8 weeks after surgery: age ($r = -0.28$, $P < 0.0053$), having another pain condition (pain condition 3.9 ± 7.3 cm vs. no pain condition 1.3 ± 3.5 cm, $P = 0.031$), years of education ($r = -0.29$, $P = 0.0042$), catastrophic thinking ($r = 0.59$, $P < 0.001$), health anxiety ($r = 0.38$, $P < 0.001$), and pain score ($r = 0.25$, $P = 0.013$). Years of education (beta = -0.32 , 95% CI -0.61 to -0.040 ; $P = 0.026$), and catastrophic thinking (beta = 0.45 , 95% CI 0.32 to 0.58 , $P < 0.001$) were retained in the final model for increased distance to palmar crease (adjusted R^2 0.37 , $P < 0.001$).

Conclusion: A maladaptive coping response to pain (catastrophic thinking) leads to stiff fingers. Surgeons and therapists should acknowledge the counterintuitive aspects of recovery and help patients change their mindset so that they feel healthy about using their sore arm and doing uncomfortable stretching exercises.