

Fear of Movement in the Early Aftermath of a Motor Vehicle Collision is an Independent Predictor of Pain Interference at Six Weeks

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INTRODUCTION

Motor vehicle collisions (MVCs) are a common cause of civilian trauma and emergency department (ED) visits.¹ While 90% of ED-evaluated patients do not require admission,¹ persistent pain and pain-related disability after MVC are common and costly problems.² Two cognitive processes which might contribute to the development of persistent pain after injury are fear of movement (FOM), the unreasonable or irrational fear of pain and painful reinjury from physical movement,³ and pain catastrophizing (PC), perceiving oneself as vulnerable to being overwhelmed by pain and helpless to deal with it.⁴ In this study, we asked whether fear of movement and pain catastrophizing mediate the relationship between acute neck pain (assessed in the ED) and a) neck pain six weeks after MVC and b) pain interference six weeks after MVC.

MATERIALS AND METHODS

129 European Americans age 18-65 (Table 1) presenting to one of eight study sites (Figure 1) within 24 hours of MVC who did not have a fracture or other injury requiring hospital admission were enrolled. Baseline ED measurements included evaluations of FOM (Tampa Scale for Kinesiophobia), PC (Pain Catastrophizing Scale), neck pain intensity, overall pain intensity, as well as psychological symptoms and traits. Telephone/internet follow-up assessments of neck pain intensity, overall pain intensity, and pain interference were performed six weeks later. A multivariable linear regression model adjusting for age and sex analyzed the relationship between ED neck pain, FOM, and PC. Standardized regression coefficients were examined to analyze the mediating effects of FOM and PC on the relationship between six-week neck pain and six-week pain interference.

Table 1. Participant characteristics (n=129).

Characteristics	% ^a
Age	
18-34	53
35-49	29
50-65	18
Female	57
Education	
8-11 years	9
High school	20
Post-high school ^b	40
College graduate	22
Post graduate	9
Overall pain in ED^c	
None	2
Mild	19
Moderate	35
Severe	43
Missing	2
Neck pain in ED^c	
None	33
Mild	17
Moderate	23
Severe	26
Vehicle damage	
Minor	16
Moderate	26
Severe ^d	55
Missing	3
Driver	86

^aSum of numbers may not equal 100% due to rounding.
^bEither technical school or some college.
^cPain in emergency department rated on a 0-10 scale. 1-3 is mild, 4-6 is moderate, 7-10 is severe.
^dSevere damage defined as vehicle undrivable post-collision.

Figure 1. CRASH network study sites.



Figure 2. Causal diagram of the relationship between ED neck pain and 6-week neck pain as partially mediated by pain catastrophizing and fear of movement, both measured in the ED. Values on paths are standardized β's. * P value <.05; ** P value <.01.

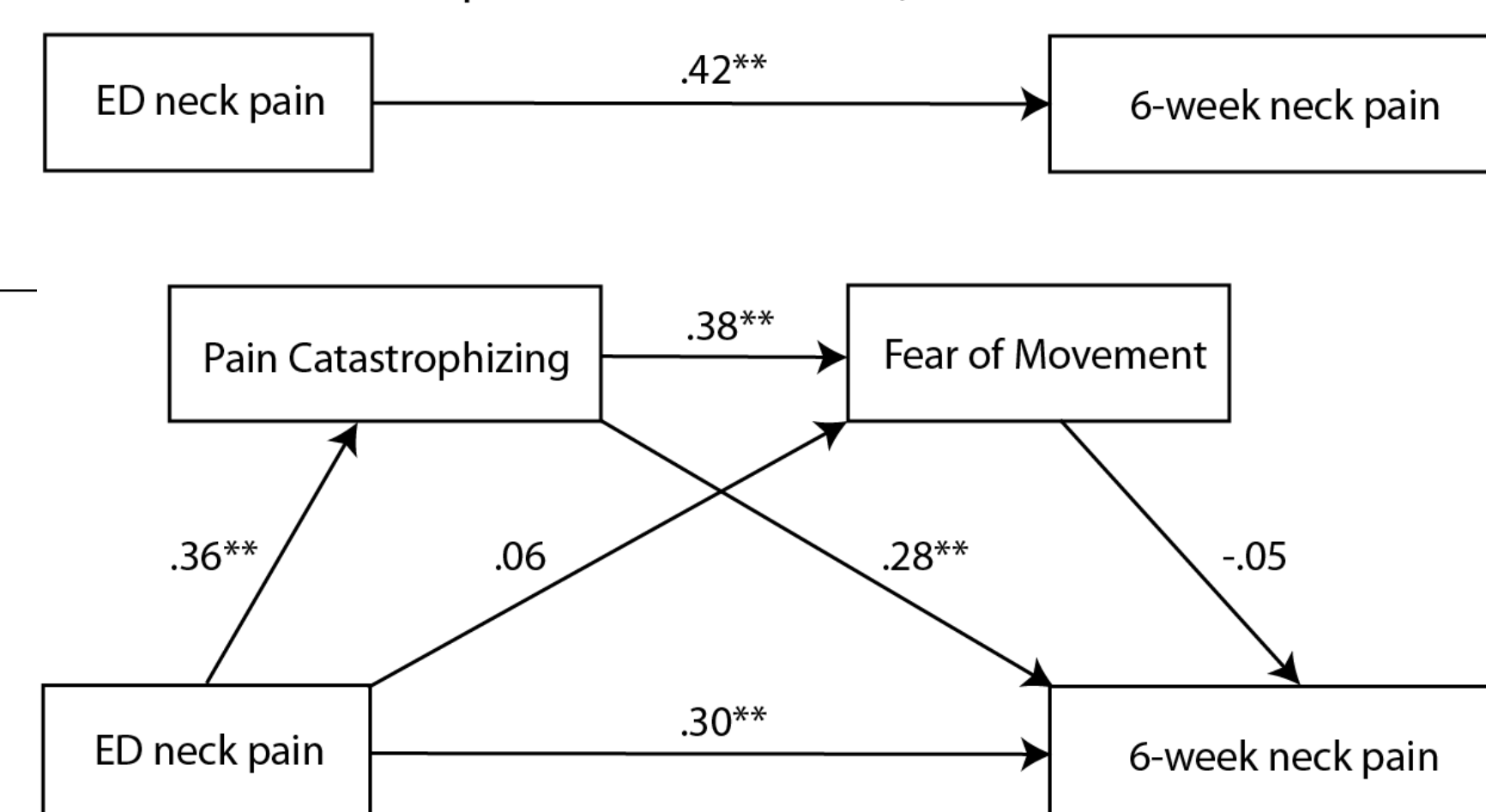
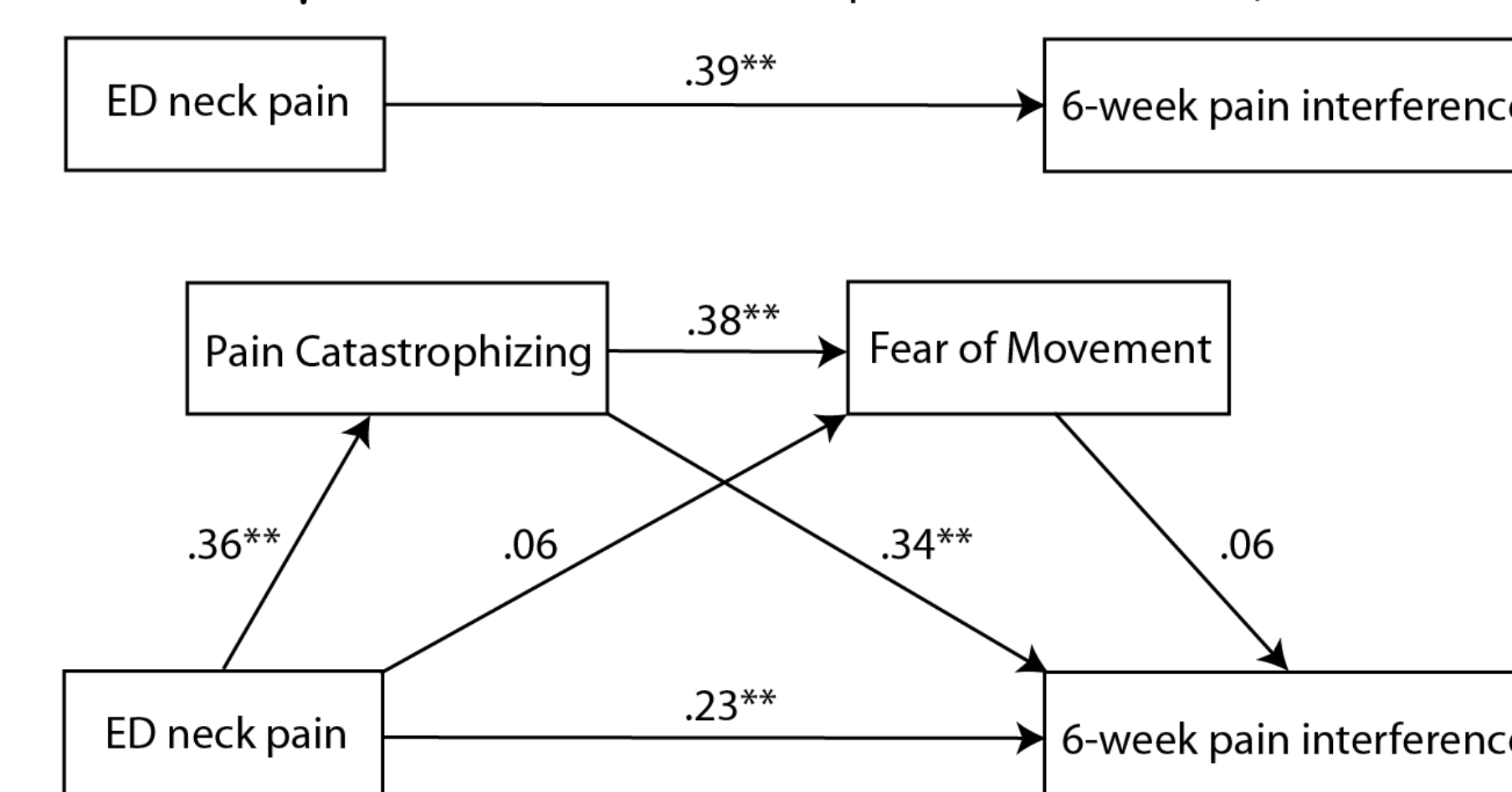


Table 2. Relationship between fear of movement and pain catastrophizing in the emergency department and pain interference summary scores 6 weeks after motor vehicle collision adjusting for model covariates using linear regression. * P value <.05.

		6-week pain interference		
		Adj. model R ²	B _{Std}	p
Model 1	Intercept	0.06	-	0.79
	Fear of movement		0.24	<0.01
Model 2	Intercept	0.05	-	0.48
	Age		0.03	0.74
	Sex		0.10	0.24
Model 3	Fear of movement		0.26	<0.01*
	Intercept	0.17	-	0.37
	Age		0.06	0.47
Model 4	Sex		0.06	0.44
	ED neck pain		0.35	<0.01*
	Fear of movement		0.19	0.03*
Model 5	Intercept	0.24	-	0.57
	Age		0.07	0.39
	Sex		0.09	0.27
	ED neck pain		0.23	<0.01*
	Pain Catastrophizing		0.06	0.48
			0.35	<0.01*

Figure 3. Causal diagram of the relationship between ED neck pain and 6-week pain interference as partially mediated by pain catastrophizing and fear of movement, both measured in the ED. Values on paths are standardized β's. * P value <.05; ** P value <.01.



RESULTS

After adjustment for age, sex, and ED neck pain, FOM remained a significant predictor of pain interference six weeks post-MVC (Table 2). Adjusted for age, sex, ED neck pain, and FOM, PC was also a significant predictor of pain interference six weeks post-MVC (Figure 2). FOM in the ED was not a significant mediator between ED neck pain and six-week neck pain nor six-week pain interference. In contrast, PC was a significant mediator of both six-week neck pain and six-week pain interference (Figure 3).

CONCLUSIONS

In our sample of adults experiencing MVC, both ED FOM and PC were associated with persistent pain symptoms, but PC was a more important causal mediator of the relationship between ED neck pain and persistent pain symptoms. Interventions that reduce PC in the early aftermath of MVC may help to reduce the development of persistent post-MVC pain.

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