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Disability and depression after orthopaedic trauma

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ABSTRACT

Introduction: Musculoskeletal injury is a common cause of impairment (pathophysiology), but the correlation of impairment with pain intensity and magnitude of disability is limited. Psychosocial factors explain a large proportion of the variance in disability for various orthopaedic pathologies.

The aim of this study is to prospectively assess the relationship between psychological factors and magnitude of disability in a sample of orthopaedic trauma patients in The Netherlands.

Material and methods: One hundred and one adult patients between 1 and 2 months after one or more fractures, tendon or ligament injuries were enrolled. Four eligible patients refused to participate. Thirty-five women and 30 men with an average age of 50 years (range, 22–92 years) completed the follow-up evaluation between 5 and 8 months after their injury and their data was analyzed. The patients completed a measure of disability (the Short Musculoskeletal Function Assessment-Netherlands, SMFA-NL), the Dutch Centre for Epidemiologic Study of Depression-scale (CES-D), the Dutch Impact of Event Scale (SVL), and the Dutch Pain Catastrophizing Scale (PCS) at the time of enrollment and again 5–8 months after injury.

Results: There were moderate correlations between symptoms of depression (CES-D, $r = 0.48$, $p < 0.001$) and symptoms of PTSD (SVL, $r = 0.35$, $p = 0.004$) at enrollment and magnitude of disability 5–8 months after trauma. Catastrophic thinking (PCS) at enrollment and magnitude of disability 5–8 months after trauma showed a small correlation (PCS, $r = 0.26$, $p = 0.034$). The Pain Catastrophizing Scale (Beta = 0.29; $p = 0.049$), surgery (Beta = 0.26; $p = 0.034$), additional surgery (Beta = 0.26; $p = 0.019$) and other pain conditions (Beta = 0.31; $p = 0.009$) were the significant predictors in the final model (adjusted R-squared = 0.35; $p < 0.001$) for greater disability 5–8 months after trauma.

Discussion and conclusions: In The Netherlands, symptoms of depression measured 1–2 months after musculoskeletal trauma correlate with disability 5–8 months after this trauma. The psychological aspects of recovery from musculoskeletal injury merit greater attention.

Level of evidence: Level II, Prognostic study.

Introduction

Musculoskeletal injury is a common cause of impairment (pathophysiology), but the correlation of impairment with pain intensity and magnitude of disability is limited [1]. Psychosocial factors explain a large proportion of the variance in disability for various orthopaedic pathologies [2]. For instance, catastrophic thinking (the tendency to magnify pain, feel helpless when faced with pain, and ruminate on the pain experience), pain anxiety (cognitive and physiological anxiety when experiencing pain, as well as avoidance of activities that cause pain), and symptoms of depression tend to account for more of the variation in magnitude of disability and pain intensity than measure of musculoskeletal pathology and impairment for many conditions [3].

Given the moderate to strong correlation between psychological factors and musculoskeletal disability [4,5], it is surprising that they are not routinely addressed in the care of patients recovering from orthopaedic trauma. To date, we know that depressive symptoms are common after trauma, and they correlate with disability [6]; Post Traumatic Stress Disorder (PTSD) is common after orthopaedic trauma [7,8]; and patients who develop PTSD after trauma have more depressive symptoms within days of the injury [9]. A previous study in the United States found that symptoms of depression 1–2

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months after 1 or more fractures correlate with magnitude of disability 5–8 months after injury [23]. Since psychosocial factors are culturally mediated [10] we were curious if the conclusions drawn from that study would also apply in a cohort of orthopaedic trauma patients in The Netherlands. If prospective studies consistently demonstrate longitudinal relationships between psychological factors measured early on in recovery and greater pain intensity and magnitude of disability during the late stage of recovery, the next step would be an intervention to try to ameliorate this.

The aim of this study is to prospectively assess the relationship between psychological factors (depression and PTSD), coping strategies (pain catastrophizing and pain anxiety), pain intensity (measured on an ordinal scale), and magnitude of disability in a sample of orthopaedic trauma patients in The Netherlands. Our primary null-hypothesis is that symptoms of depression, PTSD, and catastrophic thinking measured 1–2 months after musculoskeletal trauma do not correlate with disability 5–8 months after injury. In addition we addressed the prevalence of an estimated diagnosis of major depression and PTSD, at enrollment and final evaluation, and changes in magnitude of disability, symptoms of depression, and symptoms of PTSD between enrollment and final evaluation.

Materials and methods

Patients

Adult patients visiting the outpatient office of the orthopaedic trauma service within 1 or 2 months after 1 or more fractures, tendon or ligament injuries were invited to participate in this prospective IRB-approved study. The timeframe of 1–2 months was used in prior studies and based on our experience that recovery is well established (e.g. taking little or no pain medication, bearing weight, making progress with exercises) in most patients by this time. The patients were enrolled by an independent researcher not involved in the patients' care after providing written informed consent.

We excluded patients with major medical comorbidity expected to worsen in the next 6 months, comorbid chronic pain condition, use of pain medication or antidepressant medication with a change in regimen after trauma, psychosis, bipolar disorder, or active substance dependence or other factors that could interfere with informed consent processes and treatment and we excluded comorbid brain injury, spinal cord injury, and mental retardation.

Among 118 screened patients 104 were enrolled, 4 patients declined and 10 did not meet inclusion criteria (3 with cognitive

Table 1
Patient demographics.

Parameter	Cohort ($n=101$)	Responders ($n=65$)	Non-responders ($n=36$)	p-value*
Age, median (IQR), range, *y*	45 (28–62), 18–92	48 (39–63), 22–92	36 (23–49), 18–78	0.003+
Injury Severity Score, median (IQR), Range	4.0 (4–9), 1–13	8.0 (4–9), 1–9	4.0 (4–9), 1–13	0.06+
Gender				
Male, No. (%)	51 (51)	30 (46)	21 (58)	
Female, No. (%)	50 (50)	35 (54)	15 (42)	0.24o
Surgery				
Yes, No. (%)	56 (56)	32 (49)	13 (36)	
No, No. (%)	45 (45)	33 (51)	23 (64)	0.20o
Additional surgery				
Yes, No. (%)	1 (1.0)	1 (1.5)	0 (0)	
No, No. (%)	100 (99)	64 (98)	36 (100)	1.0^
Other pain conditions				
Yes, No. (%)	13 (13)	8 (12)	5 (14)	
No, No. (%)	87 (86)	56 (86)	31 (86)	1.0^
Missing, No. (%)	1 (1.0)	1 (1.5)	0 (0)	
Marital status				
Single, No. (%)	34 (34)	17 (26)	17 (47)	
Living with partner, No. (%)	15 (15)	8 (12)	7 (19)	
Married, No. (%)	44 (44)	34 (52)	10 (28)	0.06^
Separated/Divorced, No. (%)	5 (5.0)	3 (4.6)	2 (5.6)	
Widowed, No. (%)	3 (3.0)	3 (4.6)	0 (0)	
Education				
Educated beyond high school, No. (%)	82 (81)	52 (80)	30 (83)	
Not educated beyond high school, No. (%)	18 (18)	12 (18)	6 (17)	1.0^
Missing, No. (%)	1 (1.0)	1 (1.5)	0 (0)	
Working status				
Full-time, No. (%)	43 (43)	26 (40)	17 (47)	
Part-time, No. (%)	28 (28)	19 (29)	9 (25)	
Homemaker, No. (%)	6 (5.9)	4 (6.2)	2 (5.6)	
Retired, No. (%)	14 (14)	10 (15)	4 (11)	0.99^
Unemployed not possible to work, No. (%)	3 (3.0)	2 (3.1)	1 (2.8)	
Unemployed possible to work, No. (%)	5 (5.0)	3 (4.6)	2 (5.6)	
Currently on sick leave, No. (%)	2 (2.0)	1 (1.5)	1 (2.8)	
Health outcomes				
SMFA-FI, median (IQR), Range	35 (22–49), 2.9–86	38 (26–49), 2.9–86	33 (19–48), 4.4–63	0.44+
SMFA-BI, median (IQR), Range	40 (25–52), 0–98	42 (27–52), 4.2–98	34 (15–49), 0–92	0.14+
SMFA-Total, median (IQR), Range	37 (22–49), 3.3–89	38 (27–49), 3.3–89	32 (21–48), 3.3–71	0.35+
SVL, median (IQR), range	8.0 (2.0–21), 0–106	10 (4.0–21), 0–106	6.0 (1.0–22), 0–62	0.67+
PCS, median (IQR), range	8.0 (2.0–12), 0–38	9.0 (4.0–13), 0–38	4.5 (0.5–9), 0–27	0.009+
CES-D, median (IQR), range	8.0 (3.0–13), 0–33	8.0 (3.0–13), 0–29	7.0 (3.0–10), 0–33	0.23+
Pain, median (IQR), range	3.0 (2.0–6.0), 0–9	3.0 (2.0–5.0), 0–9	2.0 (0.5–6), 0–8	0.22+

* Comparing, responders vs. non-responders.
\+ Mann–Whitney *U*-test.
o Chi-square test.
^ Fisher's exact test.