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Development of chronic pain following severe accidental injury. Results of a 3-year follow-up study

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Abstract: **OBJECTIVE:** Motor vehicle accidents (MVA) and work-related injuries are two of the more common causes of chronic pain. Nevertheless, there is little evidence on predicting factors regarding the development of chronic pain following physical injury. **METHODS:** The present study investigated temporal associations between accident-related factors, psychological factors [symptoms of posttraumatic stress disorder (PTSD), anxiety, depression, coping], and the development of chronic pain in a sample of individuals who had sustained severe accidental injuries (N=90). Assessments were performed within 1 month of the accident, and at 6, 12, and 36 months post trauma. **RESULTS:** A total of 40 individuals (44%) reported accident-related pain 3 years after the accident. Individuals with chronic pain showed significantly more symptoms of PTSD, depression, and anxiety, more disability, and more days off work. Analysis of temporal associations between psychological variables and the development of chronic pain indicated that the separation of the pain from the nonpain group mostly occurred between 6 (T2) and 12 months (T3). Differences were much less pronounced at T1. **CONCLUSION:** The prevalence of chronic pain in severely injured patients 3 years after the accident is considerably high. The development of chronic pain is more related to psychological factors, particularly PTSD symptoms, in the aftermath of the accident, as compared to sociodemographic and accident-related variables at the time of the accident. These findings may be helpful to elucidate the problems in predicting chronic pain conditions in injured subjects and to recognize the onset of a chronic pain condition more reliably.

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Table 1: Sociodemographic and accident related characteristics of severely injured accident victims: total sample (N=90); subjects with chronic pain (n=40) and without pain (n=50) 3 years after the accident.

<i>Variable</i>	Total (N=90)		Pain (n=40)		No-Pain (n=50)		p^a
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
<i>Age: ^b Mean years ± SD</i>	41.9 ± 13.2		43.2 ± 10.6		40.8 ± 14.9		n.s. ^c
<i>Sex:</i>							
Male	69	(76.7%)	29	(72.5%)	40	(80.0%)	n.s.
Female	21	(23.3%)	11	(27.5%)	10	(20.0%)	
<i>Marital status: ^b</i>							
Single	30	(37.8%)	11	(27.5%)	19	(38.0%)	n.s.
Married	45	(47.8%)	22	(55.0%)	23	(46.0%)	
Divorced	15	(14.4%)	7	(17.5%)	8	(16.0%)	
<i>Living arrangements: ^b</i>							
Alone	19	(18.9%)	6	(15.0%)	13	(26.0%)	n.s.
With others (family, partner, friends)	71	(81.1%)	34	(85.0%)	37	(74.0%)	
<i>Physical disability:</i>							
No	54	(60.0%)	15	(37.5%)	39	(78.0%)	<.001
Yes	36	(40.0%)	25	(62.5%)	11	(22.0%)	
<i>Occupational invalidity: ^d</i>							
No	59	(65.6%)	16	(40.0%)	43	(86.0%)	<.001
Yes (complete or partial)	31	(34.4%)	24	(60.0%)	7	(14.0%)	
<i>Medical treatment (any):</i>							
No	53	(58.9%)	15	(37.5%)	38	(76.0%)	<.001
Yes	37	(39.1%)	25	(62.5%)	12	(24.0%)	
<i>Medication: Analgetics:</i>							
No	79	(87.8%)	29	(72.5%)	50	(100%)	<.001
Yes	11	(12.2%)	11	(27.5%)	0	(0.0%)	
<i>Medication: Psychotropics:</i>							
No	83	(94.3%)	33	(86.8%)	50	(100%)	<.05
Yes	5	(5.7%)	5	(13.2%)	0	(0.0%)	

^aChi-square or Fisher's exact test when appropriate

^bData from T1

^cIndependent samples t-test

^dCompensation by the accident insurance

Table 2: Accident survivors with chronic pain compared to accident survivors without pain: Multivariate analysis of variance (GLM multivariate) at four assessment time points with regard to psychological symptoms, Sense of Coherence, inpatient days and time off work.

Assessment*	No. of variables**	F	df	p	η^2 (%)
T1	6	2.95	6, 79	.012	18.3
T2	7	5.20	7, 74	<.001	33.0
T3	9	4.20	9, 70	<.001	35.1
T4	6	5.31	6, 75	<.001	29.8

* Assessments at two weeks (T1), 6 months (T2), 12 months (T3), and 36 months (T4) post accident

** Variables as presented in Figure 1 (CAPS, HADS-anxiety and -depression, Sense of Coherence, SCL-90-R-Somatization, SCL-90-R-GSI, Impact of Event Scale, inpatient days, days off work).

Table 3: Psychological symptoms, Sense of Coherence, inpatient days, and days off work of severely injured accident victims with (n=40) and without chronic pain (n=50) 3 years after the accident.

Variable	Chronic Pain (n=40)		No Pain (n=50)		<i>t</i>	<i>df</i>	<i>p</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>			
CAPS total score	17.7	19.4	5.0	6.7	-3.95	46.5	<.001
CAPS re-experiencing	5.4	7.2	1.1	2.2	-3.58	44.8	<.001
CAPS avoidance	4.3	6.9	1.2	2.5	-2.69	47.1	<.01
CAPS hyperarousal	8.0	7.7	2.7	4.1	-3.96	56.9	<.001
HADS depression	4.6	4.3	2.0	2.3	-3.31	53.7	<.01
HADS anxiety	5.4	4.7	3.1	2.7	-2.63	55.1	<.05
Sense of Coherence	147.9	32.2	161.9	19.8	2.34	58.4	<.05
Inpatient days	100.1	80.9	51.6	67.7	-3.10	88.0	<.01
Days off work	579.7	398.0	215.0	223.8	-5.05	55.1	<.001

Unequal variances in all variables, except inpatient days.

CAPS=Clinician-administered PTSD Scale, HADS=Hospital Anxiety and Depression Scale.