



The Somatic Pre-Occupation and Coping Questionnaire

CARWH 2010 Conference

Worker Health in a Changing World of Work

Toronto, May 28-29, 2010

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Measuring Recovery

- Berger evaluated a consecutive sample of 1000 workers' compensation patients in Quebec who had undergone lumbar spinal surgery; 600 patients with single operations and 400 with multiple
- Surgery was successful according to radiographic and neurological outcomes.
- **BUT** - 71% percent of the single operation group had not returned to work more than 4 years after the operation, nor had 95% of the multiple operations group.

Berger E. Late postoperative results in 1000 work related lumbar spine conditions. Surg Neurol. 2000; 54(2): 101-6.



Measuring Recovery

- Orthopedic surgeons tend to treat imaging studies, and not patients.
- The association between imaging studies and functional recovery may be limited.



ELSEVIER

Journal of Clinical Epidemiology ■ (2009) ■

**Journal of
Clinical
Epidemiology**

ORIGINAL ARTICLE

Use of both short musculoskeletal function assessment questionnaire and short form-36 among tibial-fracture patients was redundant

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Measuring Recovery

- Between July 2000 to September 2005, we enrolled 1339 skeletally mature patients with open (Gustilo Types I-IIIB) or closed fractures (Tscherne Types 0-3) of the tibial shaft that were managed with intramedullary nailing
- Patients were asked to complete the SF-36 and SMFA at 3, 6, and 12 months post surgical fixation.

Table 3
SF-36 PCS and SMFA DI scores by patient's healing status

Follow-up time	Fracture status	n	SF-36 PCS score ^a		SMFA DI ^a	
			Mean	SD	Mean	SD
3 Months postsurgery	Healed	144	37.1	9.2	25.4	16.5
	Not healed	577	33.5	9.2	32.9	17.5
6 Months postsurgery	Healed	348	41.6	10.5	19.0	15.7
	Not healed	309	36.9	10.6	26.5	19.3
12 Months postsurgery	Healed	533	44.6	10.7	15.6	15.8
	Not healed	79	35.1	11.4	29.9	20.1

^a All comparisons of mean scores for healed vs. nonhealed fractures were statistically significant at $P \leq 0.001$.



Measuring Recovery

- Some authors have suggested that patients' expectations of recovery and illness perceptions may influence their outcome, and a systematic review has provided support for this hypothesis.

Mondloch MV, et al. CMAJ 2001; 165: 174-179.

- A subsequent prospective study found that injured workers' recovery beliefs, elicited through telephone interview, were independent predictors of clinical outcome.

Cole DC, et al. CMAJ 2002; 166: 749-754.



Measuring Recovery

- Prior studies exploring the association between patient beliefs and outcomes have primarily focussed on subjective complaints (e.g. LBP)
- Could patient beliefs predict recovery from severe orthopedic trauma?
- We developed the somatic pre-occupation and coping (SPOC) questionnaire to explore this hypothesis.



The SPOC Questionnaire

- Through a literature search and consultation with content experts we identified the following instruments:
 - i. The General Health Questionnaire
 - ii. The Somatization Subscale of the Symptom Check List-90
 - iii. The Chalder Fatigue Questionnaire, and
 - iv. The Illness Attitude Scales
- After including relevant items from these instruments, with modifications for the target population, the resulting SPOC questionnaire consisted of 60 items, with seven response options ranging from 0 to 6 for each item.



The SPOC Questionnaire

- We administered our instrument to a consecutive sample of 359 adult patients with tibial fractures, 316 of whom provided complete data.
- Items with a mean score of <1 were excluded, as they were assumed to capture no meaningful distress feature.
- Items showing a $SD < 1$ were also excluded, as this limited variation suggested that the item was rated homogeneously for the majority of patients.



The SPOC Questionnaire

- Factor analysis suggested retaining 4 domains, comprising 27 items:
 - somatic complaints – 10 items
 - coping – 6 items
 - energy – 7 items, and
 - optimism – 4 items
- The mean SPOC score in our population was 57.1 (SD = 28.5), values ranged from 0 to 147, and the distribution was normal.
- An important change in continuous outcome measures can be estimated as $\frac{1}{2}$ a SD of the aggregate score for a given population, and by this standard a 14-point difference on the SPOC would be considered meaningful.



Association with 1-year SF-36 PCS Scores ($R^2 = 0.39$)

Variable	Univariable Analysis (unstandardized regression coefficients (95% CI))	p-value	R-square	Multivariable Analysis (unstandardized regression coefficients (95% CI))	p-value
Gender		0.58	<0.01		0.39
- male	reference category			reference category	
- female	-1.07 (-4.76 to 2.62)			-1.33 (-4.37 to 1.70)	
Age (for each 10-year increment)	-0.78 (-1.80 to 0.23)	0.13	0.01	-1.40 (-2.25 to -0.56)	<0.01
Smoking Status		<0.01	0.06		<0.01
- not currently smoking	reference category				
- current smoker	-5.96 (-9.32 to -2.60)			-4.28 (-7.09 to -1.48)	
Fracture type		<0.01	0.08		<0.01
- closed	reference category			reference category	
- open	-6.77 (-9.93 to -3.61)			-5.00 (-7.65 to -2.35)	
Multi-Trauma		0.08	0.02		0.14
- no multi-trauma	reference category			reference category	
- multi-trauma	-2.89 (-6.09 to 0.31)			-1.96 (-4.54 to 0.62)	
Total SPOC Score	-0.21 (-0.26 to -0.16)	<0.01	0.28	-0.19 (-0.24 to -0.15)	<0.01



Association with 1-year SF-36 MCS Scores ($R^2 = 0.30$)

Variable	Univariable Analysis (unstandardized regression coefficients (95% CI))	p-value	R-square	Multivariable Analysis (unstandardized regression coefficients (95% CI))	p-value
Gender		0.50	<0.01		0.51
- male	reference category			reference category	
- female	1.36 (-2.60 to 5.31)			1.17 (-2.33 to 4.66)	
Age (for each 10-year increment)	-0.21 (-1.30 to 0.89)	0.71	<0.01	-0.94 (-1.91 to 0.04)	0.06
Smoking Status		0.01	0.02		0.15
- not currently smoking	reference category			reference category	
- current smoker	-4.62 (-8.28 to -0.96)			-2.37 (-5.60 to 0.86)	
Fracture type		0.05	0.02		0.34
- closed	reference category			reference category	
- open	-3.58 (-7.09 to -0.07)			-1.47 (-4.52 to 1.59)	
Multi-Trauma		0.19	0.01		0.37
- no multi-trauma	reference category			reference category	
- multi-trauma	-2.29 (-5.74 to 1.16)			-1.34 (-4.32 to 1.63)	
Total SPOC Score	-0.22 (-0.27 to -0.17)	<0.01	0.27	-0.22 (-0.27 to -0.16)	<0.01



SPOC Validation

- The addition of pre-injury SF-36 scores to our models did not alter findings.
- The addition of SF-36 scores 2-weeks post-op to models did not alter findings.
- The SPOC questionnaire is not a pre-injury measure, or a surrogate for SF-36 scores.



SPOC score and Return to Work at 1-year

Odds of Return to Work at 12-Months according to 6-week SPOC scores (n=186)

SPOC quartile	Working at 1 year (%)	Not Working at 1 year (%)	Multivariable Analysis* odds ratio (95% CI)	Likelihood Ratio (95% CI)
1 st quartile (scores ≤ 35)	42 (89%)	5 (11%)	6.86 (2.48 to 18.97)	4.62 (1.92 to 11.11)
2 nd quartile (35.1 to 53.5)	37 (71%)	15 (29%)	1.37 (0.65 to 2.89)	1.36 (0.81 to 2.28)
3 rd quartile (53.6 to 76)	26 (59%)	18 (41%)	1.15 (0.53 to 2.49)	0.79 (0.47 to 1.34)
4 th quartile (scores > 76)	15 (35%)	28 (65%)	0.21 (0.10 to 0.47)	0.29 (0.17 to 0.51)

Key: Analysis is adjusted for age, gender, smoking status, fracture type (open or closed), and multi-trauma



Pre- and Post-Test Probability of RTW by SPOC quartile

- Assuming a pre-test probability of 0.64 (120 working at 1-year/186 total)
- Post-test probability for the 1st quartile (<35) is: 0.89
- Post-test probability for the 4th quartile (>76) is: 0.34



The SPOC Questionnaire

- SPOC scores at 6-weeks post-surgery accounted for 18% of the variation in patient-reported physical function and mental function, as measured by SF-36 PCS and MCS scores respectively at 1-year.
- SPOC scores at 6-weeks were a far more powerful predictor of functional recovery and RTW than age, gender, fracture type, smoking status, or the presence of multi-trauma.



The SPOC Questionnaire

- The SPOC questionnaire is the first validated instrument that captures illness beliefs among orthopaedic trauma patients, and is highly predictive of functional outcome at 1-year.
- This suggests the possibility that trauma patients with unhelpful illness beliefs could be identified early in the treatment process and targeted for concurrent therapy designed to modify such cognitions.



The SPOC Questionnaire: Next Steps

- Explore the addition of other potentially predictive variables, such as co-morbidity, compensation status and ongoing litigation.
- The generalizability of our results to other populations is uncertain and will require investigation.
- Establish if the illness beliefs captured by the SPOC questionnaire are amenable to modification, and if modifications lead to important improvement to functional outcome.
- If so, what range of SPOC scores would identify patients likely to benefit from intervention?



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