How Much Do Coping Skills Affect the Physical Function of Tibial Plateau and Ankle Fracture Patients?

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Purpose

To examine the effect of patient “coping skills” measured by PROMIS pain interference (PI) on Physical Function (PF).

Our hypothesis was that PI adversely affects PF scores after operative fixation (ORIF) of orthopaedic injuries and that this association decreases with time.

Background

Variation in patient outcome after orthopaedic trauma is often attributed to “coping skills”. Pain interference, the degree to which pain limits an individuals’ physical, mental, and social abilities, has been used as a surrogate for one’s coping skill¹. PROMIS PI has been shown to adversely effect PF in the elective orthopaedic surgery patients^{2,3} however, its effect has not been examined in trauma patients.

Methods

Patients undergoing ORIF of an isolated tibial plateau or ankle fracture from 2014 – 2018 at a tertiary referral center with routine healing were included. The plateau cohort was divided into medial unicondylar (41B1 - 3.2), lateral unicondylar (41B1-3.1), and bicondylar (41C) groups. Similarly, the ankle cohort was divided into isolated fibula (44A1,B1,C1), bi/trimalleolar (44A2-3, B2-3, C2-3), and pilon (43C) fracture groups. Patients with follow-up < 6 months, polytrauma, malunion, nonunion, and infection were excluded from analysis. The PI and PF scores at 2 weeks, 6 weeks, 3-, 6-, and 12-months were collected. Linear regression was used to compare the PI and PF association at these time points.

PROMIS Physical function versus Pain interference comparing all tibial plateau fracture patients with ankle fracture patients

Table 1: Linear regression of PROMIS Physical function versus Pain Interference in tibial plateau fractures

Follow-up	Sample Size			Slope		P-value ¹
	(Lateral / Medial / Bicondylar)	Unicondylar		Medial	Bicondylar	
2 Week	63 (37 / 9 / 17)	-0.17		-0.79	0.12	0.02
6 Week	58 (36 / 5 / 17)	-0.11		-0.04	-0.29	0.69
3 Month	73 (44 / 12 / 17)	-0.22		-0.64	-0.43	0.43
6 Month	71 (46 / 8 / 17)	-0.47		-1.23	-0.69	0.04
1 Year	36 (22 / 4 / 10)	-0.43		-1.37	-0.79	0.01
P-value ²		p = 0.07		p = 0.05	p = 0.03	

Table 2: Linear regression of PROMIS Physical function versus Pain Interference in ankle fractures

Follow-up	Sample Size			Slope		P-value ¹
	(Fibula / Bi- or trimalleolar / Pilon)	Fibula		Bi- or trimalleolar	Pilon	
2 Week	113 (29 / 57 / 7)	-0.10		-0.07	-0.67	0.01
6 Week	97 (19 / 56 / 22)	-0.57		-0.27	-0.11	0.35
3 Month	125 (29 / 71 / 25)	-0.24		-0.42	-0.03	0.07
6 Month	116 (29 / 59 / 28)	-1.04		-0.49	-0.60	0.01
1 Year	83 (9 / 49 / 25)	-0.88		-0.92	-0.27	<0.01
P-value ²		p < 0.01		p < 0.01	p = 0.04	

1: P-value of difference between slopes of tibial plateau groups at a particular follow-up time point.
2: P-value of difference between slopes for a particular tibial plateau group at different follow-up time points.

Results

70 tibial plateau and 134 ankle fractures were included in the study. There was no difference in the ankle or tibial subgroups with respect to age, BMI, ASA class, Charlson Comorbidity Index, tobacco use, or follow-up. There was no difference in PF scores between subgroups of the ankle or plateau cohort at any time point.

PI adversely affected PF scores for each subgroup of the tibial plateau and ankle cohorts and this association increased with time as seen by increasing slopes at 3, 6 and 12 months.

PI had a significantly negative effect on PF scores of medial tibial plateau and isolated fibula fractures compared to the other subgroups in their cohort (p < 0.05 at 6, and 12 months).

Conclusion

Contrary to our initial hypothesis, PI adversely affects physical function, but this adverse interaction increases with time.

Isolated fibula fractures and medial tibial plateaus PF scores were disproportionately affected by PI at 6 months and 1 year.

Psychosocial interventions directed towards these at-risk groups may optimize their perceived PF.

References:

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