



EFFICACY OF PSYCHOLOGICALLY-INFORMED PHYSICAL THERAPY FOR TREATING ACTIVE- DUTY SERVICE MEMBERS WITH MUSCULOSKELETAL INJURIES

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Authors have no conflicts to report.

Learning Objectives

- 1) Describe the importance of PiPT in recovery from MSI.
- 2) Identify two psychological risk factors that can be modified by PiPT.
- 3) Describe one potential impact of implementing PiPT in the Navy.

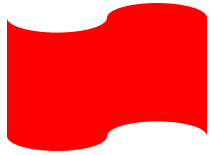
INTRODUCTION and BACKGROUND

- Musculoskeletal injuries (MSI) are a primary cause for separation and long-term disability in active-duty service members (ADSM)
 - The Navy and Marines have the highest level of attrition from MSI in the military
- Psychosocial factors increase the risk of disability from MSI
 - Fear of activity
 - High levels of work stress
 - Poor social support at work

INTRODUCTION and BACKGROUND

- Biopsychosocial model shows interplay among physiological, psychological, and social factors determine the experience of pain and disability
 - Cortical changes affect function through altered muscle response patterns (e.g., abnormal dynamic muscle control)
 - Pain transmission heightened by stress hormones released after injury
 - Psychological impacts involve cognitive appraisals of pain as unremitting, leading to feelings of anxiety and hopelessness
 - Fear of movement may restrict activities and social interaction
 - This pattern becomes self-sustaining and reduces the likelihood of recovery
- Biopsychosocial model is applied to clinical practice by identifying various risk factor categories, or “flags” that are associated with delayed recovery

The Flag System



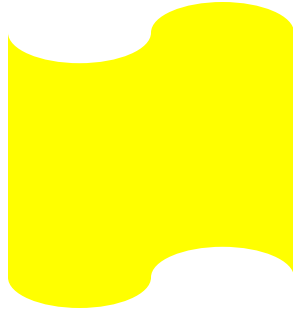
Red Flags

Immediate
medical
attention



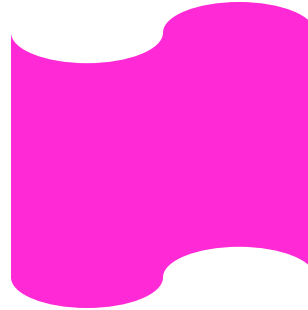
Orange Flags

Psychiatric
pathology



Yellow Flags

Beliefs,
Emotions,
Behaviors



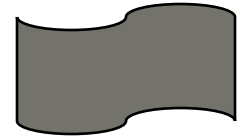
Pink Flags

Coping
Resources



Blue Flags

Perceptions
about work
and social
environment



Black Flags

Contextual
obstacles

Psychologically-informed Physical Therapy (PiPT)

- Psychologically-informed physical therapy (PiPT) is designed to identify and address modifiable psychological risk factors early in MSI episodes
- PiPT provider is trained to identify psychological risk factors and modify them through targeted pain neuropsychology education and develop a plan of care that includes reassurance, relaxation strategies, cognitive pain management skills, and psycho-behavioral reactivation
- PiPT emphasizes the role of the therapeutic alliance and communication
- PiPT has been proven effective in preventing chronicity in civilian populations
- Our team developed a course to train military physical therapy (PT) staff in PiPT for treating ADSM with MSI
- This study tests the effectiveness of our training

METHODS

- Observational prospective comparative cohort study
- First, we observed clinical outcomes in a cohort of ADSM with MSI receiving usual PT care at a military outpatient PT clinic
- Next, we trained all PT staff in PiPT
- Finally, PiPT was implemented in a second cohort of ADSM
- Data was collected from each cohort at pre-treatment, 4th PT visit, 6 months and 12 months post-enrollment
- Primary outcome was pain interference and secondary outcomes were psychological risk factors for chronicity, including fear avoidance, pain catastrophizing, and emotional distress

Study Outcomes

Primary and Secondary Outcomes

- Pain interference measured by Pain Disability Index (PDI)
- Secondary outcomes:
 - Pain catastrophizing (PCS)
 - Fear-avoidance beliefs (FABQ)
 - Psychological distress (HADS)
 - Self-efficacy (PSEQ)
 - Positive outcome expectations (POE)
 - Satisfaction with process of care and outcome satisfaction (MRPS and COMI)

Potential Confounders

- Demographic and clinical information (gender, age, marital status, race, education, branch of service, length of military service, duty status, MSI/pain characteristics, and MSI comorbidities)
- Psychological and psychosocial variables (depression, anxiety, PTSD, job satisfaction, work stress, organizational commitment, and job social support)

Statistical Analyses

- Baseline characteristics compared between Cohorts using independent-samples *t*-tests for continuous variables (reported as mean $\pm$ SD) and Pearson's χ^2 tests for categorical variables (reported as n, %)
- To assess change over time and differences in change between cohorts, fitted linear mixed-effects models with a random intercept for each participant and fixed effects for time (baseline vs. follow-up 1), cohort, their interaction, age, and gender were used
- Mean change from baseline to follow-up within each cohort (along with SD) the model-based between-cohort difference in change with its 95% confidence interval (CI), and the corresponding two-tailed p-value for the time-by-cohort interaction are reported
- Covariates associated with the outcome at $P < 0.10$, and prespecified clinical factors, were included in multivariable models to control for confounding

Sample Demographics

Characteristic (N)	Overall Sample (N=396) ¹	Cohort 1 (N=196) ¹	Cohort 2 (N=200) ¹	p-value ²
GENDER (396)				0.951
Female	158 (40%)	79 (40%)	79 (40%)	
Male	238 (60%)	117 (60%)	121 (61%)	
AGE (396)	32 ± 8	32 ± 8	32 ± 8	0.795
BRANCH (396)				0.251
Navy	385 (97%)	189 (96%)	196 (98%)	
Army	7 (2%)	5 (3%)	2 (1%)	
Marines	1 (0%)	1 (1%)	0 (0%)	
Air Force	2 (1%)	0 (0%)	2 (1%)	
Other	1 (0%)	1 (1%)	0 (0%)	
LENGTH OF SERVICE (396)	11 ± 8	10 ± 8	11 ± 8	0.543
DUTY STATUS (262)				0.483
Full duty	217 (83%)	118 (84%)	99 (82%)	
Limited duty	38 (15%)	20 (14%)	18 (15%)	
Medical Board	2 (1%)	0 (0%)	2 (2%)	
Other	5 (2%)	3 (2%)	2 (2%)	
¹ n (%); Mean ± SD				
² Pearson's Chi-squared test; Welch Two Sample t-test				

Baseline clinical characteristics by cohort

Characteristic	Overall Sample (N=396) ¹	Cohort 1 (N=196) ¹	Cohort 2 (N=200) ¹	p-value ²
PRIMARY MSI Complaint (275)				
Low back	76 (28%)	36 (25%)	40 (31%)	0.298
Knee	59 (21%)	28 (19%)	31 (24%)	0.406
Shoulder	49 (18%)	34 (23%)	15 (12%)	0.018
Ankle or foot	34 (12%)	18 (12%)	16 (12%)	>0.999
Hip	18 (7%)	11 (8%)	7 (5%)	0.645
Mid-back	13 (5%)	6 (4%)	7 (5%)	0.819
Other	12 (4%)	4 (3%)	8 (6%)	0.268
Neck	9 (3%)	7 (5%)	2 (2%)	0.242
Arm or hand	5 (2%)	2 (1%)	3 (2%)	0.889
Duration of Pain (275)				0.682
Acute (Less than 12 weeks)	62 (23%)	31 (21%)	31 (24%)	
Chronic (More than 12 weeks)	213 (77%)	115 (79%)	98 (76%)	
Frequency of Pain (275)				0.242
Never/On some days/On most days	94 (34%)	55 (38%)	39 (30%)	
Mid-Every day	181 (66%)	91 (62%)	90 (70%)	
Previous Care for Primary MSI (275)				0.399
Recurrence (275)	166 (60%)	88 (60%)	78 (60%)	>0.999
Intensity of Pain (275)				0.408
MSI comorbidities, 1 or more (275)	223 (81%)	112 (76%)	111 (86%)	0.055

Baseline clinical characteristics by cohort

Characteristic	Overall Sample (N=396) ¹	Cohort 1 (N=196) ¹	Cohort 2 (N=200) ¹	p-value ²
CES-D (265) - Depression				0.496
Yes	103 (39%)	52 (37%)	51 (41%)	
GAD-7 (265) - Anxiety				0.222
Yes	69 (26%)	32 (23%)	37 (30%)	
PCL-M (265) - PTSD				0.925
Yes	65 (25%)	34 (24%)	31 (25%)	

Baseline primary & secondary outcome measures

Variable	Overall (N=396) ¹	Cohort 1 (N=196) ¹	Cohort 2 (N=200) ¹	p-value ²
PDI (273)	26 ± 14	24 ± 14	27 ± 14	0.119
PCS (271)	15 ± 12	16 ± 12	15 ± 11	0.490
FABQ-Total (269)	45 ± 19	45 ± 19	46 ± 20	0.716
FABQ-physical activity (269)	20 ± 6	20 ± 6	20 ± 6	>0.999
FABQ-work (269)	25 ± 16	25 ± 16	25 ± 16	0.660
HADS-anxiety (269)	8 ± 5	8 ± 4	8 ± 5	0.537
HADS-dep (269)	6 ± 4	6 ± 4	6 ± 4	0.661
POE (274)	3 (2, 3)	3 (2, 4)	3 (2, 3)	0.520
PSEQ (272)	39 ± 12	40 ± 12	39 ± 13	0.500

¹ Values are mean ± SD (POE: median [interquartile range])

² Welch two-sample t-test; Wilcoxon rank-sum for POE

No differences
between Cohorts
at baseline

Between-cohort differences in change (Baseline to Follow-up 1)

Outcome	Cohort 1 Change (SD) ¹	Cohort 2 Change (SD) ¹	Change (95% CI) ²	p-value ³
PDI total	-0.31 (±10.46)	-3.21 (±10.5)	4.10 (0.64, 7.57)	0.021
PSEQ total	0.38 (±9.54)	-0.26 (±12.88)	-0.76 (-4.45, 2.94)	0.687
Positive outcome expectations	-0.44 (±1.5)	-0.09 (±1.49)	-0.33 (-0.80, 0.13)	0.162
PCS total	0.09 (±7.95)	-1.06 (±7.27)	1.24 (-1.33, 3.81)	0.342
FABQ activity total	1.38 (±5.05)	-0.53 (±5.02)	2.00 (0.34, 3.65)	0.018
FABQ work total	1.8 (±8.31)	-0.76 (±9.62)	2.74 (-0.32, 5.80)	0.079
FABQ grand total	3.17 (±10.81)	-1.29 (±12.37)	4.72 (0.78, 8.65)	0.019
HADS total	1.42 (±4.57)	-0.06 (±4.77)	1.62 (0.04, 3.20)	0.044
HADS-anxiety	0.72 (±3.07)	-0.05 (±2.98)	0.81 (-0.21, 1.83)	0.121
HADS-depression	0.7 (±2.38)	-0.02 (±2.88)	0.86 (-0.03, 1.74)	0.059

¹ Mean change from baseline to follow-up for each Cohort, with standard deviation

² Estimated mean difference (Cohort 1 – Cohort 2) from baseline to follow-up 1, with 95% confidence interval, from linear mixed-effects model.

³ p-value from cohort × time interaction contrast in mixed-effects model.

In Summary:

Study participants who received PiPT showed significant improvement in:

- Pain interference
- Fear avoidance beliefs, especially r/t physical activity
- Pain related distress

CONCLUSIONS

- Results corroborate body of literature that supports the efficacy of PiPT for MSI
- Support rationale for ongoing implementation in a shore-based military setting AND for disseminating this treatment at other military treatment facilities
- PiPT has the potential to prevent chronification from MSI, thereby reducing lost man-hours, early medical separation and enhancing military readiness
- Enhance efficiency of health care delivery through optimal allocation of PT resources resulting in significant costs savings for the military
- Further research with other ADSM cohorts and long-term follow-up is needed to confirm these findings

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THANK YOU



Q&A

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