

Perceived health and readiness for duty following return to duty from a musculoskeletal injury in U.S. Army soldiers

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DISCLOSURE

The opinions and assertions expressed herein are those of the author(s) and do not reflect the official policy or position of the Uniformed Services University or the Department of War.

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Data from the Military Power, Performance and Prevention – Return to Duty Study (MP3-RD)

LEARNING OBJECTIVES

- 1** Describe the perceptions of Soldiers about their **ability to pass a physical fitness test** upon being cleared for full duty following a musculoskeletal injury.
- 2** Discuss the perceptions of Soldiers' **ability to perform their wartime mission** right after being cleared for full duty following a musculoskeletal injury.
- 3** Describe Soldiers' perception about their **holistic health** (e.g., sleep, nutrition, mental health) right after being cleared for full duty following a musculoskeletal injury, and how these findings should influence future RTD decisions.

BACKGROUND

Musculoskeletal injury is the #1 threat to U.S. Army readiness

~49%

of soldiers sustain a new musculoskeletal injury every year

#1

leading cause of medical encounters and lost duty time in the military

\$100s M

in direct medical costs and lost productivity each year

Most are overuse injuries of the spine and lower extremities, and the demand on the force has not substantially changed in a decade.

BACKGROUND

Clearing a soldier for duty does not mean recovery is complete

The injury → recovery → re-injury cycle

1 Injured & placed on profile

2 Rehabilitation & recovery

3 Cleared & returned to duty

4 Re-injury within 1 year

~1 in 2

soldiers cleared to return to duty sustain a new or recurrent injury within the following year

No universal guidance exists for returning soldiers to duty.

Decisions rest on a single clinician's judgment; and soldiers are often not ready for the full spectrum of occupational demands when cleared.

BACKGROUND

Recovery is multidimensional — but RTD decisions rarely reflect it

Current clearance is largely a binary administrative gate (profile on / profile off). Dimensions that shape true readiness are seldom assessed:

Perceived health & confidence

Self-rated readiness predicts return to function

Psychological readiness

Kinesiophobia, fear-avoidance, catastrophizing

Sleep

Impairs healing, neuromuscular & cognitive performance

Nutrition & behaviors

Hydration, caffeine, supplement use, recovery fuel

These gaps may explain the high re-injury rate and are the focus of this study.

PURPOSE

Characterize the perceived health and readiness of soldiers after being cleared to return to full duty following a musculoskeletal injury.

And to compare perceptions between:

Spine vs. lower-extremity injuries

Combat vs. combat-service vs. combat-service-support units

METHODS

Prospective cohort: soldiers cleared for unrestricted duty

Design

Prospective cohort (MP3-RD study); STROBE-compliant

Setting

3 military hospitals: Fort Bliss & Fort Sam Houston (TX), Fort Bragg (NC)

Enrolled

Feb 2016 – Sept 2017, after a thoracic/lumbar spine or lower-extremity injury

Cleared

No active profile and no plans for further medical care

Excluded

Separating within 10 months • pending medical board • pregnant • on limited duty for other reasons

480
enrolled

469
analyzed

Soldiers completed a mean of 9.9 physical therapy visits before being cleared.

METHODS

Questionnaires spanning four domains of readiness

Perceived readiness

Need for further care • ability to pass fitness test • deployability with gear & weapon • % mission-capable

Function & recovery

Global Rating of Change (GRC) • LEFS (lower extremity) • ODI (spine)

Psychological health

PHQ-9 • Tampa Scale of Kinesiophobia • Fear-Avoidance Beliefs • Pain Catastrophizing • job & life satisfaction

Holistic health

Perceived health • sleep (ESS, PSQI) • physical activity & exercise enjoyment • hydration, caffeine, supplements

RESULTS — COHORT

469 soldiers cleared for full duty

27.1

mean age (years)

13.9%

female

88.3%

enlisted

38.2%

less than 1 year in service

Injury location

Lower extremity

72.9%

Spine (thoracic/lumbar)

26.0%

Both

1.1%

Unit type

Combat service support

53.1%

Combat

36.9%

Combat service

10.0%

RESULTS — PERCEIVED READINESS

Many cleared soldiers did not feel fully ready

16.4%

still felt they needed more medical care
before returning to duty

11.9%

did not believe they could pass their Army
fitness test

15.1%

did not feel able to wear full body armor or
handle their weapon if deployed

27.3%

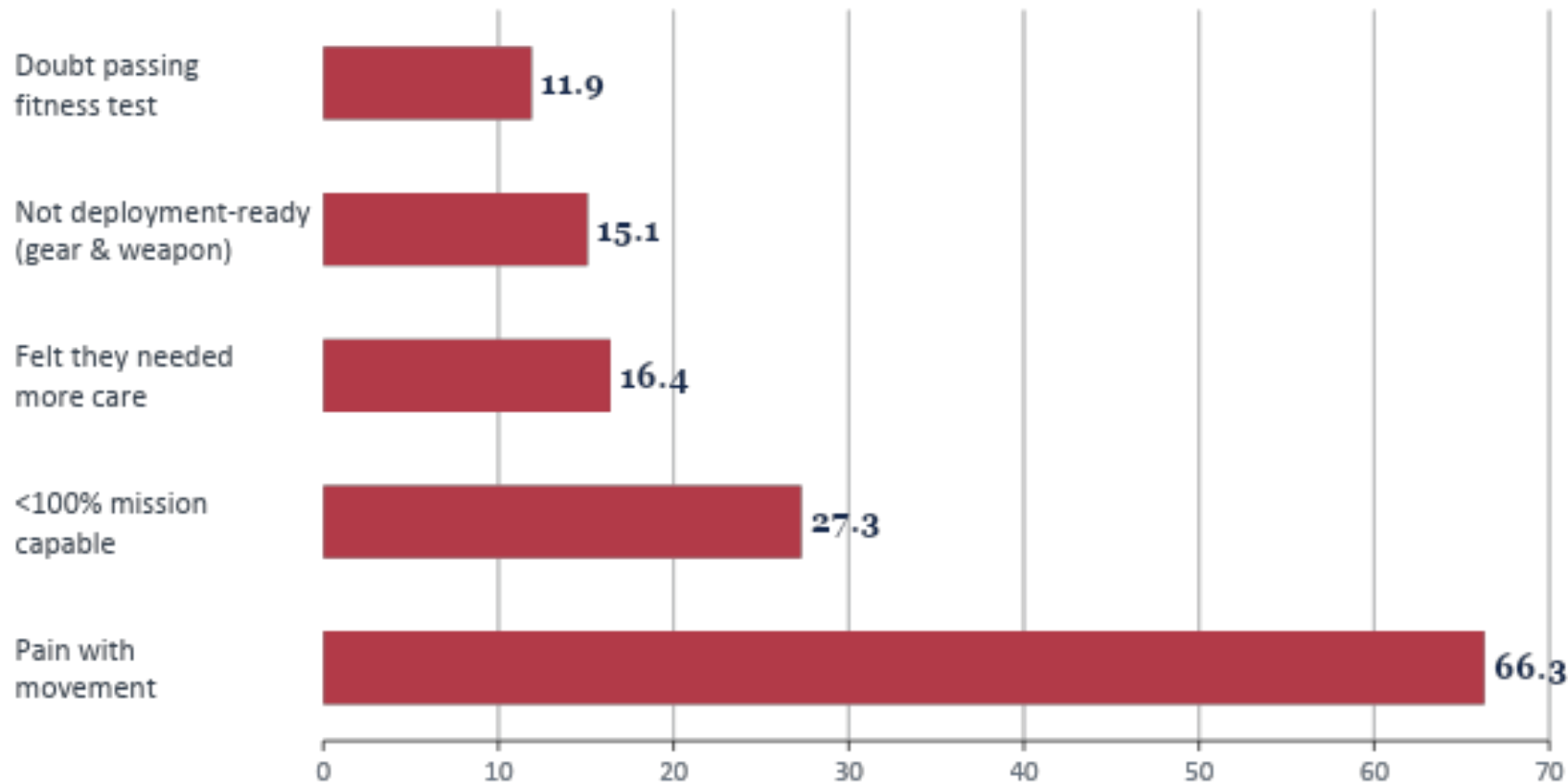
felt less than 100% mission-capable for their
job

66.3%

had pain during their movement
assessments

RESULTS — PERCEIVED READINESS

Self-perceived deficits at the moment of clearance



Validated function scores were high

LEFS 71.7 / 80

(lower extremity)

ODI 10.2 / 100

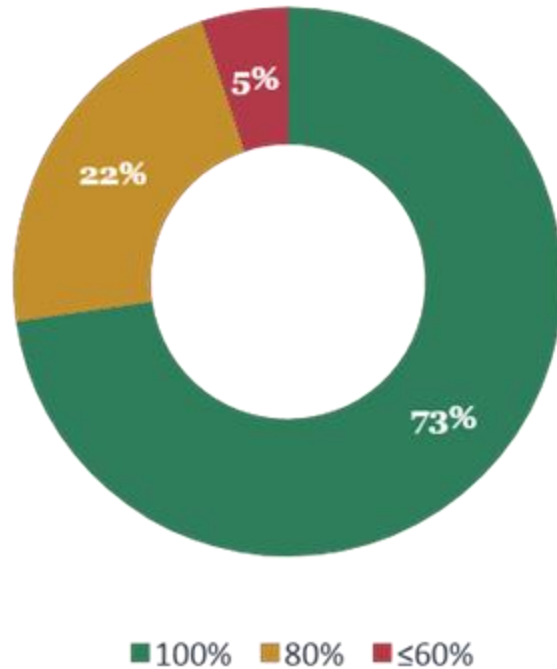
(spine disability)

Objective function looked good, yet perceived readiness lagged.

RESULTS — RECOVERY

Only half felt 'a great deal' better since seeking care

Self-rated mission capability



50.1%

reported feeling 'a great deal' or 'a very great deal' better (GRC +6 / +7)

10.7%

reported no change, or felt worse, despite being cleared for duty

RESULTS — MENTAL HEALTH

Psychological distress was low across the cohort

Mean Scores

2.3

PHQ-9 depression
(none / minimal; 0–27)

17.0

Kinesiophobia, TSK-11
(low; 11–44)

3.5

Pain catastrophizing
(low; 0–52)

7.8 / 9.1

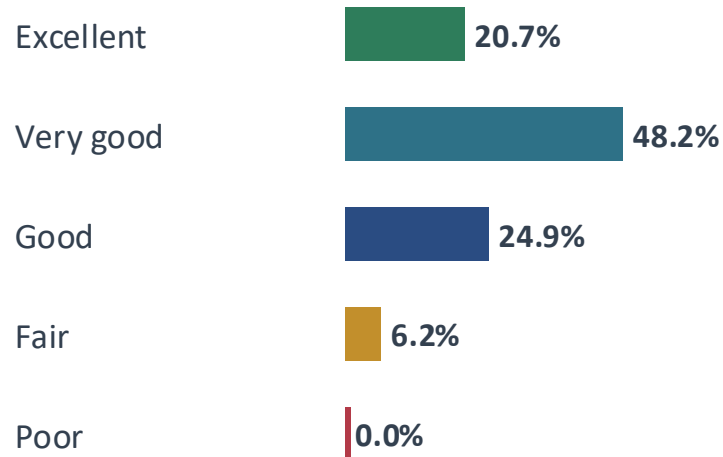
Fear-avoidance beliefs
(physical activity / work)

Satisfaction remained high: job 69.9 · military service 78.1 · life 87.3 (0–100). All fear and distress scores fell below thresholds for clinically relevant maladaptive coping.

RESULTS — HOLISTIC HEALTH

Health behaviors revealed room for optimization

Self-rated physical health



1 in 4

reported poor sleep quality

31.8%

rated themselves very physically active

86%

consume caffeine; >half drink below recommended fluids

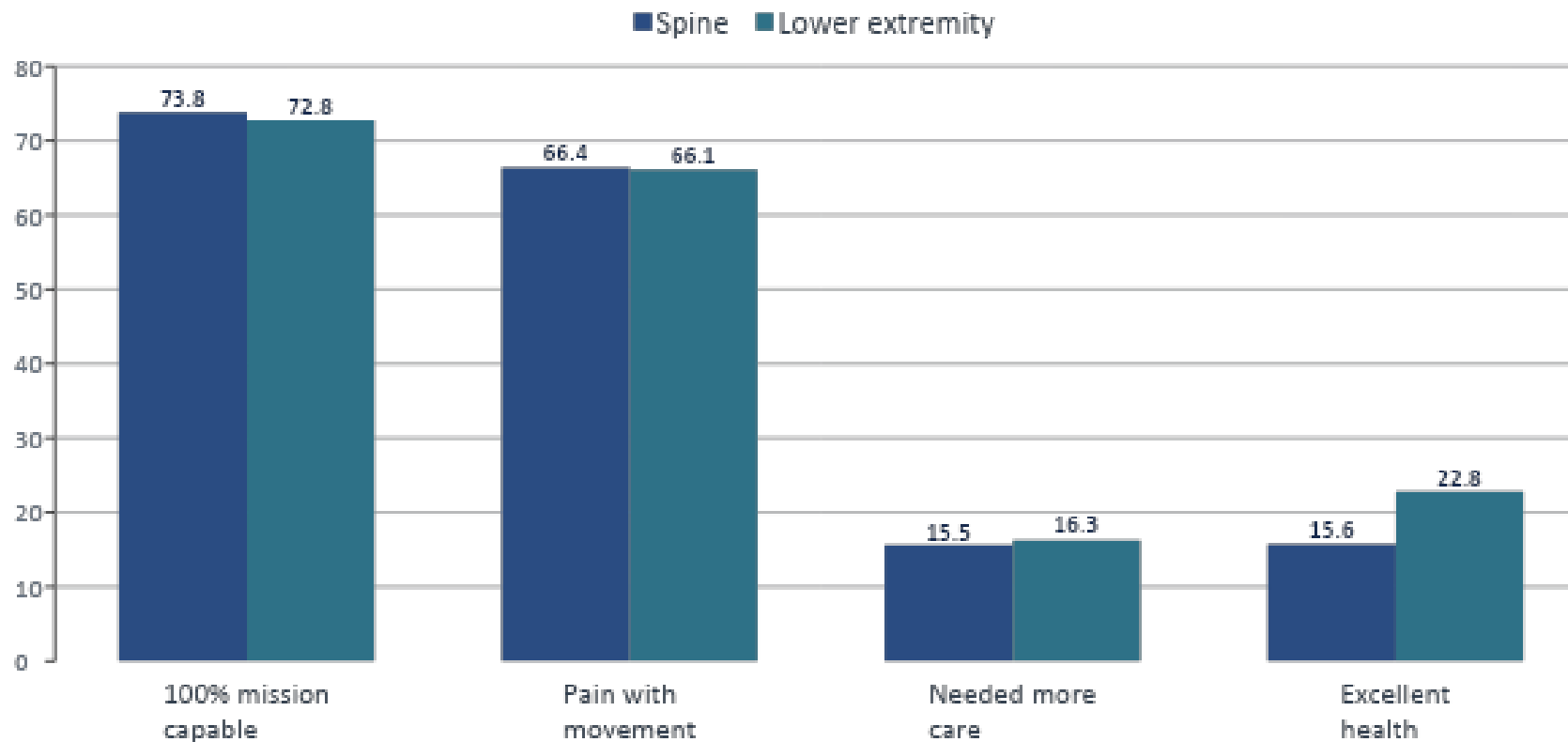
PSQI 5.7

mean sleep score, sits right at the poor-sleep threshold (>5)

Mean sleep and sleepiness scores stayed below clinical disorder thresholds, but a meaningful subgroup reported suboptimal sleep, hydration, and activity.

RESULTS — SUBGROUPS

Findings were largely comparable: spine vs. lower extremity



Shared burden

Perceptions were similar across injury location and across all three unit types (combat, combat service, combat service support).

The readiness gap is not specific to one injury or one kind of job.

DISCUSSION

A binary profile is a weak proxy for true readiness

The profile system

Profile [on or off] is a single administrative gate. Its removal does not capture gradations of recovery.

Soldiers cleared by profile removal often still show deficits in strength, neuromuscular control, movement quality, and psychological readiness, which were all linked to re-injury.

What our data add

A nontrivial share of administratively cleared soldiers perceived themselves as incompletely recovered or less than fully mission-capable.

Perception is subjective, but it is a patient-centered signal tied to successful return to sport and function.

Clearance ≠ optimal readiness.

DISCUSSION

Holistic domains interact — and the military undermines each

1

Sleep

Soldiers average < 7 h; impairs tissue repair, neuromuscular & cognitive performance

2

Nutrition

Inadequate intake delays bone remodeling; raises stress-fracture & overuse risk

3

Psychological

Modulates pain, rehab adherence, and the neuroendocrine drivers of healing

4

Physical activity

Shapes the anabolic response to nutrition and overall resilience

These domains are synergistic, not additive — poor sleep worsens undernutrition, distress disrupts sleep, inactivity blunts recovery. Soldiers cleared with these gaps are at elevated theoretical risk for re-injury.

DISCUSSION

Toward a holistic, criterion-based return to duty

- 1 Criterion-based battery** Add validated tests (MP3: movement screens, Y-Balance, hop, SANE) to supplement and NOT replace current pathways
- 2 Routine patient-reported outcomes** Systematically capture self-perceived readiness, confidence, fear-avoidance, pain interference
- 3 Brief holistic screens** Sleep, nutrition, psychological health, positive screens trigger referral to the Holistic Health & Fitness teams
- 4 Graded / conditional RTD** Allow functionally-capable but under-optimized soldiers to return with targeted support & reassessment
- 5 Multidisciplinary decisions** Readiness spans more domains than any single clinician can judge alone

CONCLUSION

A substantial proportion of soldiers cleared to return to duty after a musculoskeletal injury do not perceive themselves as fully recovered.

~1 in 4

did not feel fully
mission-capable

~1 in 10

doubted they could meet
minimum fitness standards

15.1%

felt unable to wear armor or
handle their weapon if deployed

These findings underscore the need for validated, clinically feasible, and holistic return-to-duty criteria.

MILITARY IMPLICATIONS

Why this matters for the force

Readiness is over-estimated

Profile removal alone can clear soldiers who feel under-recovered, while masking residual vulnerability across the force.

A shared, force-wide gap

Perceptions were comparable across injury type and unit type, suggesting the the burden is broad, not niche.

Actionable, low-burden fixes

Brief perceived-readiness and holistic-health screens slot into existing care and route soldiers to H2F resources.

Aligns with H2F & modernization

A graded, multidisciplinary RTD brings clinical practice in line with the DoW's holistic readiness strategy.

Thank you

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