College of Health Sciences

Epidemiological Analysis of Injuries Occurring in Marine Corps Forces Special Operations Personnel

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ABSTRACT

Special Operation Forces have been shown to sustain greater rates of musculoskeletal injuries than conventional forces. These injuries result in loss in deployable operators, which negatively impacts force readiness. In addition to Operators (OPs), Marine Corps Forces Special Operations Command (MARSOC) also utilizes Combat Support Personnel (CSP) to support OP missions. These CSP may also be at risk for sustaining similar injuries and mechanisms as OPs. **PURPOSE**: Describe injury epidemiology in MARSOC personnel and compare injury patterns between OPs and CSP. **METHODS**: A total of 141 MARSOC personnel (81 OPs, 55 CSP) completed an injury history questionnaire and described musculoskeletal injuries that occurred in the previous 12 months. Injury proportions were calculated for OPs and CSP. Proportions of injured subjects were compared between OPs and CSP using Fisher's exact tests. **RESULTS**: A total of 43 injuries were reported within the previous 12 months, 25 of which were classified as preventable (15 in OPs, 10 in CSP). There were no statistically significant differences in the proportion of injured subjects between OPs and CSP. Preventable injuries were sustained by 14% of OPs and 16% of CSP. Both OPs and CSP sustained the majority of preventable injuries while performing lifting and running activities (27% and 40% for OPs and 40% and 50% for CSP, respectively). Also, the knee and lumbopelvic region were the most commonly reported location of preventable injuries for OPs (20% each) and CSP (30% each). The top three most common injury types were muscle strain, tendinopathy, and pain/spasm. **CONCLUSION**: Approximately 15% of MARSOC personnel experienced preventable injuries within 12 months prior to the questionnaire. Therefore, the force would significantly benefit from performance and injury prevention programs to mitigate preventable injuries and optimize force readiness. Because the majority of injuries were sustained during physical training there is a need to monitor training readiness to avoid overtraining and fatigue. Additionally, OPs and CSP seem to sustain similar injury patterns with similar mechanisms, suggesting CSP should also be included in injury prevention initiatives to optimize force readiness.

INTRODUCTION

- **Unintentional musculoskeletal injuries inflict a large burden on military forces**
- **Special operation forces operators sustain greater rates of musculoskeletal injuries than conventional forces counterparts**
- **Each special Operations command under the United States Special Operations Command umbrella has it's own culture and way of operating – requiring culturally specific injury characteristics to be identified before effective injury prevention and performance optimization strategies can be enacted**
- **Special operations commands, such as Marine Corps Forces Special Operations Command (MARSOC), select personnel from the conventional Marine Corps to support the needs of their Operators in theater, called Combat Support Personnel (CSP)**
- **These CSP may be exposed to higher level demands and thus may have more similar injury characteristics to Operators and require similar injury prevention interventions**

PURPOSE AND HYPOTHESES

- **The purpose of this study was to describe injury characteristics in MARSOC personnel and compare injury patterns between Operators and combat support personnel**
- **We hypothesized:**
  - **CSP will report similar injury proportions and mechanisms compared to operations**
  - **The majority of preventable injuries would be sustained during physical training**

SUBJECTS

- **A total of 141 MARSOC personnel participated in this study**
  - **81 Operators (OP, Age: 29.7 ± 5.8 years; Height: 1.80 ± 0.06 m; Mass: 86.8 ± 8.72 kg)**
  - **55 Combat Support Personnel (CSP, Age: 28.0 ± 6.3 years; Height: 1.79 ± 0.06 m; Mass: 83.5 ± 11.1 kg)**

EXPERIMENTAL DESIGN AND METHODS

PROCEDURES

- **Each participant completed an injury history questionnaire in consultation with an experienced clinician to describe injuries that occurred within the previous 12 months**

DATA ANALYSIS

- **Proportions of subjects with a preventable musculoskeletal injury were compared between OP and CSP by total injuries, mechanisms, activity during injury, location, and type**

STATISTICAL ANALYSIS

- **Between group injury proportions were compared using Fisher's Exact Test ($\alpha<0.05$)**

RESULTS

Figure 1a. Injury Mechanism - OP

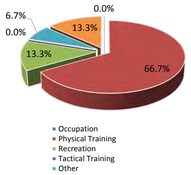


Figure 1b. Injury Mechanism - CSP

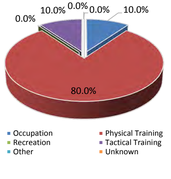


Figure 2a. Injury Activity - OP

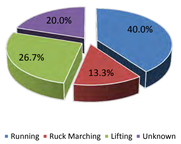


Figure 2b. Injury Activity - CSP

Figure 3a. Injury Sub-Location OP

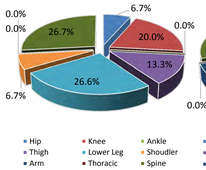
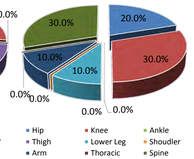


Figure 3b. Injury Sub-Location CSP



- **Overall, 15% of MARSOC personnel sustained a preventable musculoskeletal injury over one year**
- **The most common cause of preventable injuries were running (OP = 40.0% and CSP = 50.0%) and lifting (OP = 26.7% and CSP = 40.0%)**
- **The most common activity being performed when preventable injury occurred was physical training (OP = 66.7% and CSP = 80.0%)**
- **The knee(OP = 20%, CSP = 30%), lower leg (OP = 26.6%, CSP = 10.0%), and spine (OP = 26.7%, CSP = 30%) are the most common locations for preventable injury**

Table 1. Injury Counts and Proportions

	OP		CSP		Fishers Exact Test p-value
Number of Subjects	81	%	55	%	
Total Injuries	23	27.1%	12	21.4%	0.551
Preventable Injuries	12	14.1%	9	16.1%	0.811
Overuse Injuries	10	12.9%	5	8.9%	0.591
Running Injuries	6	7.1%	6	10.7%	0.541
Lifting Injuries	5	5.9%	4	7.1%	0.741
Physical Training Injuries	10	11.8%	8	14.3%	0.797
Tactical Training Injuries	4	4.7%	2	3.6%	1.000

SUMMARY AND CONCLUSIONS

- **MARSOC Operators and combat support personnel sustain similar injuries with similar mechanisms**
- **This data demonstrates the need to include combat support personnel in injury prevention initiative within the special operations community**
- **This data also stresses the importance of monitored training as the majority of preventable injuries were sustained during physical training vs organized military physical training**

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Opinions, interpretations, conclusions, and recommendations are those of the author/presenter and not necessarily endorsed Department of Defense, Office of Naval Research, or the United States Marine Corps