

# Clinical Diagnoses in a Special Forces Group: The Musculoskeletal Burden

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## ABSTRACT

The published literature contains little epidemiologic information concerning the spectrum of morbidity in Special Operations units. This study defines the burden of illness and injury seen in a Special Forces Group by quantifying the distribution of diagnoses. Excluding administrative categories, musculoskeletal conditions comprised 40% of all clinical diagnoses, raising the question of what more can be done to address the preventable causes of lost time due to injuries. We conclude there is need for increased training in the diagnosis and treatment of musculoskeletal injuries among all healthcare professionals assigned to Special Forces Groups as well as a need for increased education and resources to achieve better strength, conditioning, rehabilitation, and injury prevention for our units.

## INTRODUCTION

From the collective anecdotal experience of 5th Special Forces Group providers who treated numerous middle-aged team sergeants with shoulder, back, and knee overuse injuries, the authors believed some leverage point existed address this issue systemically. First; however, we needed objective data to quantify the extent of this perceived problem.

Our study's aim was to define the spectrum of illness as well as injury seen in a Special Forces Group. This select group consisted primarily of healthy, very fit Soldiers. However, the study found a preponderance of overuse injuries in these patients. This manuscript quantifies the distribution of diagnoses and examines the question of what more can be done to address the preventable causes of lost time due to injuries and illnesses. Very little epidemiologic information is published in the literature concerning the spectrum of morbidity in Special Operations units. Certainly a wealth of information exists concerning *injuries* in diverse populations within the military — only a small fraction of which include Special Operations units. The following highlights some of the background evidence most applicable to our study.

In 1996, the Armed Forces Epidemiological Board (AFEB) Injury Prevention and Control Work Group coined the term “Hidden Epidemic” to refer to injuries as the leading cause of morbidity and mortality in the military.<sup>1</sup> Since then, the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM), among others, conducted considerable

work to identify, measure, and improve injury outcomes in the military. We know from these studies that the most important causes of morbidity are: training-related injuries, sports, falls, and motor vehicle accidents. Studies from 1994 revealed that accidents during *sports* are the second leading cause of injuries in the Army and Air Force and are the number one cause of hospitalizations.<sup>2</sup> Similar findings were revealed in a study of 10,000 Navy Physical Evaluation Board (PEB) cases from 1998 to 2000. Musculoskeletal conditions were the number one cause and accounted for 41.6% of all PEBs. For perspective, the second leading cause was mental disorders, which accounted for only 12% of Navy PEBs.<sup>3</sup>

Jones and Knapik have extensively studied the impact of physical training on injuries in the military.<sup>4</sup> Their study of exercise-related injuries in 1999 showed that unintentional injuries cause half of all disabilities and account for about half of all outpatient visits. Musculoskeletal conditions and injuries accounted for 28% of hospitalizations in U.S. Army personnel, with the next most common category being digestive diseases at 12%. These authors identified potentially modifiable risk factors which included high volumes of running, low levels of fitness, high and low flexibility, sedentary lifestyle, and tobacco use. Low cardiorespiratory endurance is the most consistently documented risk factor for injuries in the U.S. Army. From other studies we know the rate of injury for different subsets of the military. Incidence rates for operational infantry,

Special Forces, and Ranger units are about 10 to 12 injuries per 100 Soldier-months, which is comparable to collegiate endurance athletes. Of all the types of units studied, Special Forces has the highest incidence of injury rate at 12.1 per 100 Soldier-months.<sup>4</sup>

This pattern is consistent across jobs and branches of the Service. In a one-year injury study of Army mechanics at Fort Bragg, Knapik and colleagues showed 61% of injuries involved the lower back, knee, ankle, foot, and shoulder.<sup>5</sup> While occupation was hypothesized to contribute to injury patterns, injuries in mechanics were most likely the result of physical training, mechanical work, and sports. Notably, airborne operations only caused 9% of injuries. Based on a study of all active duty enlisted Marines in 1997 and 1998, Huang and associates determined that back and upper extremity disorders were among the top four sources of outpatient visits and duty limitations among enlisted Marines.<sup>6</sup> Of interest for military providers with relatively older patients, the study found that injury rates increased with age for 11 of the 15 diagnoses for the back and upper extremity. This is not surprising but has been overlooked in the literature since most military injury data has been obtained from studies on young, healthy basic trainees. In an effort to study seasoned, operational Soldiers versus new recruits, Smith and Cashman evaluated 3,000 active duty light infantry Soldiers, all males between 17 and 48 years old.<sup>7</sup> While not the exact same demographics, this population more closely resembles a Special Forces Group than the numerous new recruit studies. This study revealed that physical training caused 50% of all injuries, and 30% were linked to running. Injuries resulted in 10-times the number of profile days (lost work days) as illnesses. In an attempt to quantify this loss, the investigators determined the average loss of duty time per injured Soldier from physical profiles (light duty). For shoulder injuries, this was 30 days, and for ankle and knee injuries the average profile was about 20 days.

For years others have examined this “hidden epidemic” across the military. We believed that Special Operations Forces ought to be evaluated for similar patterns in the context of all diagnoses to obtain a true picture of the burden of musculoskeletal injuries.<sup>8</sup> This was the aim of our study. We hypothesized that the leading reason for outpatient visits in our Group was for musculoskeletal disorders.

## METHODS

We gathered data using the Composite Health Care System (CHCS) electronic medical record by mining the records for all Soldiers assigned to 5th Special Forces Group (Airborne) at Fort Campbell, Kentucky

who sought care during fiscal year 2007 (FY07). To do this we identified every encounter for all 5th Group primary care physicians and physician assistants during FY07. We included in the study every clinic encounter during this time that was documented in the Armed Forces Health Longitudinal Technology Application (AHLTA) database. Since some encounters had more than one diagnosis, we included in the data the top three diagnoses for each encounter. This totaled 3,180 diagnoses. Each diagnosis was categorized using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). We did not use any form of unique patient identifiers to preserve protected health information. This study was given institutional review board approval by Southeast Regional Medical Command (SERMC).

## RESULTS

Total diagnoses categorized by system are portrayed in Figure 1. The majority of patients seen were for musculoskeletal conditions and education/exams. This second category consists mostly of physical exams and also a small number of other visits for counseling and patient education. If we excluded this “administrative” category from our total clinical diagnoses, then musculoskeletal conditions would make up 1005/2511 or 40% of all clinical diagnoses.

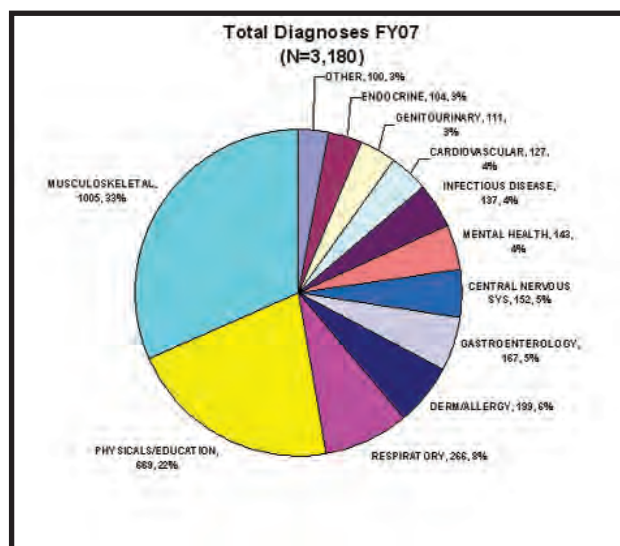


Figure 1. Total Diagnoses by System

From the 1,005 musculoskeletal diagnoses, we then evaluated anatomic location. The locations of affected musculoskeletal conditions in descending order include: back/neck (31%), ankle (10%), shoulder (10%), and knee (10%). Due to the imprecision of some diag-

noses assigned, some conditions existed for which a location was not available (unspecified 14%). Also, the categories of *upper extremity* and *lower extremity* include diagnoses for a limb without a more precise location. These two categories probably resulted in underestimates of shoulder, knee, and ankle conditions.

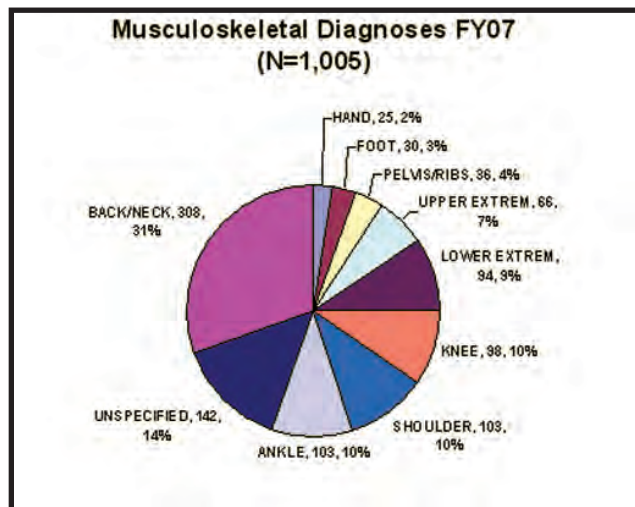


Figure 2. Musculoskeletal Diagnoses by Location

## DISCUSSION

This study helps to quantify the burden of musculoskeletal injuries in an Army Special Forces Group. We found that over 40% of all clinical diagnoses in the 5<sup>th</sup> Group Clinic were for musculoskeletal problems. This finding is comparable to previously published studies of Army populations.<sup>4,7</sup> With the average time spent on profile (light duty) of 20 to 30 days<sup>7</sup> and over one thousand clinic visits for musculoskeletal conditions, the operational impact on the unit is significant.

Spine and upper extremity-related diagnoses accounted for 50% of the musculoskeletal diagnoses. This differs from other studies of Army populations, where lower extremity diagnoses predominate.<sup>4,5,7</sup> This may be due to the slightly older average age of our Soldiers versus conventional units, in addition to the cumulative effect of repetitive micro trauma from airborne operations, combatives training, wearing heavy body armor, and carrying heavy loads.

This study has certain limitations. First, the total number of patients seen in the Troop Medical Clinic may not accurately reflect the true number of Soldiers who sustained a musculoskeletal injury. Many Special Forces Soldiers seek treatment from their Special Forces Medical Sergeants (18Ds) and never report to the clinic. In fact, it is only after several weeks of treatment by the medic that many Soldiers even report

to the physicians or therapist. Additionally, the encounter data used in this study does not include the Soldiers that the Group Surgeon evaluated and treated in the Orthopaedic Surgery Clinic, nor does it include Soldiers initially evaluated and treated by the Group Physical Therapist. The actual number of musculoskeletal injuries would certainly be much higher had we included this data.

Second, this study relied on the ICD-9 diagnostic code entered by the treatment provider. There is considerable variability among providers as to the diagnostic codes used for certain injuries. Further, it is not known whether the recorded diagnoses reflected the actual conditions that were treated. Greater consistency among diagnoses would have allowed for more precise interpretation.

Despite these limitations, this study highlights the need for increased training in the diagnosis and treatment of musculoskeletal injuries among primary care physicians and physician assistants assigned to Special Forces Groups. The typical family medicine resident, for example, spends one to three months out of three years of training in orthopaedics while other specialties spend considerably less. Physicians and PAs assigned to Special Forces Groups should undergo refresher training prior to or immediately upon assignment to Special Forces. This could easily be done by spending several weeks in an orthopaedic clinic, or through a specific program of instruction given by the Group Physical Therapist. Our population is decidedly different from what is typically seen in adult medicine clinics both in and outside of the military system, therefore our training should be modified to match.<sup>9</sup>

Military medical providers including those in SOF units should receive additional training in coding properly. The importance of accurately coding for a diagnosis is often minimized in the rush to get through a busy clinic. Other times, uncertainty of the exact diagnosis results in a vague ICD-9 code. This is a disservice to both the patient and the unit. Accurate diagnostic codes with appropriate E codes (cause/place of injury) allow unit surgeons to collect better epidemiologic data on non-battle injuries and to provide commanders with objective data with which to make sound decisions. Accurate coding enables a more complete assessment of the potential threats to unit readiness and the development of more effective measures to combat these threats.

The Special Forces Medical Sergeants should also receive more training in the diagnosis, treatment, and prevention of musculoskeletal injuries, both in their initial training and subsequent centralized sustainment

training. The 18D training is mainly focused on trauma management (with good reason), yet they serve as the primary caregiver for the members of their Operational Detachments both in garrison and while deployed. Currently, musculoskeletal training in the 46-week Special Forces Medical Sergeant Course consists of 50 hours of didactics and a 1-week orthopaedic clinical rotation. In an effort to improve their musculoskeletal diagnostic and treatment skills, the 5th Special Forces Group has incorporated orthopaedic clinic rotations in all medical proficiency training and has added orthopaedic/physical therapy lectures and hands-on training to all non-trauma module training.

Finally to focus more on prevention, Special Forces Groups should modify unit physical training programs to incorporate the fitness and performance fundamentals used in today's top athletic programs. Military researchers have shown that modified physical training programs can result in lower injury rates with improvements in physical fitness.<sup>10,11</sup> Training regimens that emphasize core strength and cross-training would likely increase physical readiness while decreasing the incidence of spine and lower extremity injuries. Other SOF units have demonstrated the value of additional expertise and resources dedicated to functional fitness principles. Specifically, Special Forces Groups should hire Certified Strength and Conditioning Specialists (CSCS) as coaches to oversee physical training and to consult with the Group Physical Therapist. An invaluable asset, the Group Physical Therapist must have a Physical Therapy Technician to assist with clinical duties, which have to this point precluded him from focusing on Group physical training and injury prevention. By making these changes to training and resourcing, Special Forces Groups will be investing in our most lethal weapon—the individual Special Forces Soldier.

## CONCLUSION

This study quantifies the extent of the musculoskeletal burden of illness in a Special Forces Group. The data defines a somewhat different injury pattern than has been previously published in other military injury studies. These results underscore the need for increased training in the diagnosis and treatment of musculoskeletal injuries among all healthcare professionals assigned to Special Forces Groups as well as

the need for increased education and resources to achieve better strength, conditioning, rehabilitation, and injury prevention for our units. Future studies should be aimed at further evaluating the extent of musculoskeletal injuries across Special Operations Forces and should address the effectiveness of available interventions.

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