

**TATRC Highlighted Research News Article:
101st Army Airborne Injury Prevention and Performance Enhancement Program**

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Elite Training Program Makes Soldiers Faster and Fitter

Sports medicine clinicians and researchers who spent their careers getting top athletes into top shape have moved to the much higher stakes of getting top soldiers into top shape.



In clinical trials, a new evidence-based injury prevention/performance optimization program improved elite soldiers' physical fitness test scores and ability to complete tasks in the field.

[Photos titled "ETAP_climb" and "ETAP_pull up_electrodes" included]
((caption))

Sports medicine researchers analyzed what soldiers were being asked to do in training and combat in order to develop a specifically tailored fitness program.

From NFL linebackers to Olympic medalists, elite athletes receive highly specialized, research-based training to optimize their performance and prevent injuries. Why not the same for elite soldiers, where being fitter and faster could mean the difference between life and death?

Following that line of thinking, Maj. Gen. Jeffrey J. Schloesser, U.S. Army Commanding General of the 101st Airborne Division (Air Assault) based in Fort Campbell, Ky., requested proposals for a program to optimize performance and reduce injury in the division's soldiers. As within the rest of the military, unintentional stress fractures, torn ligaments and other orthopedic injuries from tactical training and combat were sidelining a steady stream of warriors at any given time.

Dr. Scott Lephart, director of the University of Pittsburgh's Neuromuscular Research Laboratory (NMRL), says his team jumped at the chance to work with the 101st because the request exactly matched what the lab had been doing for 20 years with sports teams such as the Pittsburgh Steelers and Penguins.

Lephart recruited an additional lab member from the NFL. Strength and conditioning specialist Darryl Lawrence, who's worked with the Minnesota Vikings and St. Louis Cardinals, wanted to help because he is former military.

Beginning in 2006, the physiologists, biomechanists, athletic trainers, and strength and conditioning specialists from Pittsburgh first studied soldiers in the field to see exactly what they were being asked to do in training and combat. Then in a sophisticated lab they set up at Fort Campbell in 2007, they worked with more than 400 Army Airborne soldiers to analyze what kind of stress was put on joints, tendons and muscles during these tasks and to gather data on the soldiers' strength, coordination, agility, endurance, body fat and other measures.

Soldiers donned electrodes to analyze muscle activation patterns as they dodged and darted ... sat in a pod that measured air displacement for an accurate reading of lean body mass and body fat ... and jumped onto force plates that calculated ground force reaction within a high-speed, 3D infrared motion analysis system.

The team then created the eight-week Eagle Tactical Athlete Injury Prevention/Performance Optimization Program (ETAP), tailored to address specifically the musculoskeletal injury risk factors, physiological improvement areas, weight management and nutritional needs revealed in their earlier analyses.

Lephart's team recently finished two clinical trials to test the ETAP. In both, participants' scores on the Army physical fitness test improved significantly, as did their ability to complete tasks in the field and in the lab. Says Lephart, "They reduced their body weight, increased their endurance, and became faster and more flexible and powerful."

Vice Chief of Staff of the U.S. Army Gen. Peter W. Chiarelli commented on the study in his March 11, 2009, testimony to the Committee on Appropriations—Subcommittee on Defense. As they were discussing injuries from the heavy equipment loads soldiers must carry, he noted, "I'm excited about what the University of Pittsburgh is doing for us. They're in the second year of a long-term study to collect just that kind of injury and performance data we need, both before the rotation and once the soldier returns, and providing the soldier the tools he needs to work on when he is deployed."

According to Schloesser, “The effects of this early data have been immediate and profound as unit and medical leaders have an increased awareness of shortfalls in physical training and injury patterns. Soldiers across the Army deserve the health benefits afforded by state-of-the-art medical research. The development of innovative physical training programs will yield long-term positive results that will enhance the medical readiness and combat effectiveness of all soldiers.”

Lephart remembers asking one young clinical trial volunteer why he was willing to spend hours being monitored and tested. “He said, ‘The better you allow me to do my job, the greater the chances that I’ll come back safely.’ Putting our knowledge and expertise to work for those who are putting their lives on the line for us truly energizes me.”

The laboratory at Fort Campbell is supported by a Department of Defense grant managed by Dr. Sylvain Cardin for the U.S. Army Medical Research and Materiel Command’s (USAMRMC) Telemedicine and Advanced Technology Research Center (TATRC).

Cardin says, "The command's goal is to have the entire division trained through the ETAP before they begin deploying to Afghanistan in early 2010. Once ETAP is implemented into the entire division, the researchers will gather pre- and post-deployment data to validate the effectiveness of the program to reduce injuries and enhance readiness for tactical operations."

Notes Lephart, “This evidence-based approach represents a cultural change in the way an entire division is preparing their war fighters for deployment.”

He adds, “Dr. Cardin and TATRC Director Col. Friedl have helped us refine our research methodology and goals so our work is truly valuable to the Army and not redundant with current military research. They’ve created a bridge between civilian academic researchers and military needs.”

Lephart explains that needs have changed dramatically since they began work at Fort Campbell; for instance, the military is seeing a significant increase in ankle injuries because soldiers are patrolling the mountainsides in Afghanistan. He says, “Our research questions are always changing so we can most effectively prepare our soldiers for deployment, extend their useful time in the military and improve their quality of life in later years.”

The infrastructure is in place for ongoing research: the team has replicated their lab on base (the first such lab at an Army post), complete with four full-time professionals on-site and six in Pittsburgh, \$1 million of advanced testing and training equipment, and 10,000 square feet of research space. Because of their promising results, they were asked to create the same type of center for Navy SEAL operators.

Says Lt. Col. Rusty Rowe, Command Surgeon of Special Operations Command Europe and former Division Surgeon of the Army 101st Airborne, “We’re all excited about

making better soldiers through science. Our soldiers want to be better, stronger, faster, able to endure more ... this helps them to do that.”