



News/Media

Facets Magazine features a special topic on our DOD Project



New Training Promises a Stronger, Faster Soldier

The Eagle Tactical Athlete Training Program is featured on CNN.com



The Eagle Tactical Athlete Program was also featured in the Pittsburgh Post-Gazette and The Pittsburgh Tribune Review

DEPARTMENT OF DEFENSE RESEARCH



Neuromuscular Research Laboratory University of Pittsburgh



Department of Sports Medicine and Nutrition
School of Health and Rehabilitation Sciences



Department of Defense Injury Prevention and Performance Optimization Research

Unintentional musculoskeletal injuries limit the physical capabilities of the Warfighter to train efficiently and will impact tactical readiness. Many of these injuries are preventable with physical training based on tactical performance. Physical training is the cornerstone of the

weapons platform as a Warfighter and significant costs are associated with training and maintaining the Warfighter for deployment.

The objective of our Department of Defense research is to maximize human capital by reducing the rate of unin-

tentional musculoskeletal injury, sharpening battlefield performance, optimize physical readiness, extending the tactical lifecycle of the Warfighter, and enhancing quality of life after service.

Naval Special Warfare Group 4—Special Boat Team 22

Stennis Space Center, MS—

The Special Warfare Combatant-craft Crewmen (SWCC) is one of the elite combat units of Naval Special Warfare and specialize in the operation of rapid mobility in shallow water where larger ships cannot operate.

Modeled after our research with Naval Special Warfare Group 2, this project will identify injury risk factors that are culturally-specific to the SWCC.



The purpose of this multi-phase research study is to create an injury prevention and human performance initiative for Naval Special Warfare Group 4 SWCC that is systematically developed based on task and demand analyses of training and tactical simulation, identification of risk factors for injury, and improvement of suboptimal physical, physiological, and nutritional parameters.

Installed in December 2010, the Human Performance Research Laboratory at Special Boat Team 22 is currently performing task and demand analyses. The task analysis will identify SWCC-specific tasks during which injuries occur and the mechanisms of injury. The demand analysis will



identify the physiological and metabolic requirements of SWCC training.

The second phase of research will test for suboptimal biomechanical, musculoskeletal, physiological, and nutritional characteristics which necessitate targeted training to decrease the risk of unintentional musculoskeletal injury and improved physical readiness.

This work was supported by the Office of Naval Research, Grant #N00014-10-1-0912

101st Airborne (Air Assault)



LTG Eric Schoomaker, Surgeon General of the Army, toured the Neuro-muscular Research Laboratory and was briefed on the current research activities with the 101st Airborne Division (Air Assault) including implementation of the Eagle Tactical Athlete Program and similar projects with Naval Special Warfare Group 2 and Naval Special Warfare Group 4/ Special Boat Team 22.

Fort Campbell, KY—

ETAP Development

The Eagle Tactical Athlete Program (ETAP) was developed following a four phase model which includes Injury Surveillance and Task/Demand Analyses, Predictors of Injury and Optimal Performance, ETAP Design and Validation, and ETAP Division Implementation and Surveillance.

The first two years of research identified the scope of injury and suboptimal biomechanical, musculoskeletal, physiological, and nutritional characteristics of the 101st Airborne Division (Air Assault) Soldier.

ETAP was validated in an 8 week trial to induce favorable adaptations to the suboptimal characteristics previously identified.

The Instructor Certification School (ICS) was designed to educate and train PT leaders on principles of exercise prescription and ETAP implementation at the unit level. ICS was based on the Army concept of “train the trainer”.

ETAP was integrated into Division PT to replace individual PT at Fort Campbell and is currently being evaluated to mitigate injuries and improve performance. To date, over

1000 NCOs have completed ICS and 20,000 Soldiers have been exposed to ETAP.

CURRENT RESEARCH

ETAP Injury Mitigation Efficacy

The data from this aim will validate the efficacy of ETAP to mitigate unintentional musculoskeletal injuries in garrison and theater. This study employs an experimental/control group design to evaluate injuries 12 months prior to ETAP or non-ETAP control physical training intervention and 18 months post intervention. To date, monitoring of unintentional musculoskeletal injuries is being performed on 1478 Soldiers.



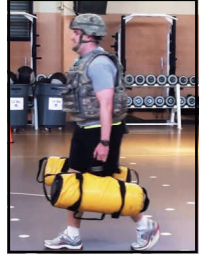
ETAP Performance Efficacy

The data from this aim will confirm knowledge transfer from the research investigators to the ICS certified NCOs, and establish long-term effects of ETAP on performance. The data will also identify training gaps between garrison and deployment environments. To date 51 Soldiers have been enrolled and performed baseline and post-ETAP laboratory, performance, and APFT testing following ICS implementation.

ETAP Risk Factor Identification

The data from this aim will identify risk factors for unintentional musculoskeletal injury in Soldiers. Screening recommendations will be made for injury risk and early identification of individuals who may require targeted intervention. The data will also allow

for ETAP refinement recommendations as predictors are identified. To date, 460 Soldiers have been enrolled in this aim



FUTURE RESEARCH

ETAP/PRT Trial

This aim will evaluate the ability of ETAP to improve laboratory, performance, Warrior Tasks, and APFT testing compared to TC 3-22.20 Physical Readiness Training (PRT). A 12-week randomized controlled trial will examine the relationship between ETAP and PRT on variables including laboratory performance, tactical tasks, and APFT testing.



Nutrition Performance Optimization

This aim will address specific nutrition strategies to optimize fueling and to expedite muscle healing and recovery from daily physical training. A comprehensive dietary supplement education program will address physiological rationale for use, potential risks and benefits and safe and effective dietary alternatives.

This work was supported by the US Army Medical Research and Materiel Command (Research grant USAMRMC/TATRC #W81XWH-06-2-0070/W81XWH-09-2-0095/W81XWH-11-2-0097). Opinions, interpretations, conclusions, and recommendations are those of the author and not necessarily endorsed by the US Army.



Naval Special Warfare Group 2

Little Little Creek, VA—

Naval Special Warfare Group 2, a maritime Special Force, is a tactical force with strategic impact that is able to conduct multiple missions against targets that larger forces cannot approach undetected.

Established in January 2008, the Human Performance Research Laboratory at Little Creek, VA has performed testing for phases 1 and 2 of this research project. The



aim of the first two years of research was to evaluate suboptimal biomechanical, musculoskeletal, physiological, and nutritional characteristics that contribute to injury and inhibit optimal performance in the Operators. At the completion of phase 2, specific recommendations were provided to the NSWG2 human performance personnel for considerations to augment their physical training protocol, provide Operator review of laboratory data and nutritional habits for consultation, and establish laboratory testing cycle to demonstrate training adaptations.

In conjunction with NSWG2 human performance personnel, our phase 3 research will develop and vali-



date an “augmented” human performance training program to modify the suboptimal characteristics previously identified during phases 1 and 2. Phase 3 research will also prospectively identify risk factors for injury which are culturally-specific to the tactical demands of the SEAL.

This work was supported by the Office of Naval Research, #N00014-07-1-1190/ #N00014-08-1-0412 .

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.”

~ General Peter W. Chiarelli, Vice Chief of Staff of the U.S. Army March 11, 2009 Committee on Appropriations – Subcommittee on Defense

United States Army Special Operations Command (USASOC)

Fort Bragg, NC—

The mission of the US Army Special Operations Command is to organize, train, educate, man, equip, fund, administer, mobilize, deploy and sustain Army special operations forces to successfully conduct worldwide special operations, across the range of military operations, in support of regional combatant commanders, American ambassadors and other agencies as directed.



Human Optimization, Rapid Rehabilitation, and Reconditioning (THOR3) program to identify the priorities necessary for improvement and change in the current physical training program. The data from this study will be used to develop a predictive model to identify Special Forces Soldiers who are predisposed to musculoskeletal injury based on task and demand analyses, biomechanical, musculoskeletal, physiological, and injury prevalence data.

Modeled after our work with Naval Special Warfare Group 2 and Group 4, the USASOC project will support development of USASOC's Tactical

The Human Performance Research Laboratory at Fort Bragg is scheduled for installation summer 2011.

This work was supported by the US Army Medical Research and Materiel Command (Research grant USAMRMC/TATRC #W81XWH-11-2-0020). Opinions, interpretations, conclusions, and recommendations are those of the author and not necessarily endorsed by the US Army.



Presentations and Publications

Sell TC, Abt JP, Lovalekar M, Crawford K, Nagai T, Deluzio JB, Smalley BW, McGrail MA, Rowe RS, Lephart SM. Warrior Model for Injury Prevention and Human Performance- Eagle Tactical Athlete Program (ETAP) Part 1. *Journal Special Operations Medicine*. 10(4): 2-21, 2010.

Abt JP, Sell TC, Lovalekar M, Crawford K, Nagai T, Deluzio JB, Smalley BW, McGrail MA, Rowe RS, Lephart SM. Warrior Model for Injury Prevention and Human Performance- Eagle Tactical Athlete Program (ETAP) Part 2. *Journal Special Operations Medicine*. 10(4): 22-33, 2010.

Sell TC, Chu Y, Abt JP, Nagai T, Deluzio JB, McGrail M, Rowe R, Lephart SM. Additional Weight of Body Armor Alters Air Assault Soldiers' Landing Biomechanics. *Military Medicine*. 2010: 175, 41-7.

Crawford K, Fleishman K, Abt JP, Sell TC, Nagai T, Deluzio J, Rowe R, McGrail M, Lephart SM. Less Body Fat Improves Physical and Physiological Performance in Army Soldiers. *Military Medicine*. 176(1): 35-43, 2011.

Fleishman K, Crawford K, Abt J, Sell T, Lovalekar M, Nagai T, Deluzio J, Rowe R, McGrail M, Lephart S. Optimal Body Composition for Performance of 101st Airborne (Air Assault) Soldiers. *Medicine and Science in Sports and Exercise*. 42 (5) Suppl 1: 622, 2010.

House AJ, Nagai T, Deluzio JB, Sell TC, Abt JP, Lovalekar MT, Smalley BW, Lephart SM. Landing Impact, Hip Kinematics, and Hip Strength Predict Dynamic Postural Stability in Army 101st Airborne. *Medicine and Science in Sports and Exercise*. 42 (5) Suppl 1: 286, 2010.

Nagai T, Sell TC, House AJ, Deluzio JB, Abt JP, Lovalekar M,T, Smalley BW, Lephart SM. Shoulder Flexibility and Strength Predict Dynamic Pushup Ratio in the 10st Airborne Division Soldiers. *Medicine and Science in Sports and Exercise*. 42 (5) Suppl 1: 287, 2010.

Abt JP, Sell TC, Lovalekar M, Nagai T, Deluzio JB, Smalley BW, Lephart SM. Validation of the Army 101st Airborne Division (Air Assault) Eagle Tactical Athlete Program. *Journal of Athletic Training*. 45 (3) Suppl: S-120, 2010.

Abt JP, Sell TC, Nagai T, Deluzio JB, Keenan K, Rowe R, McGrail MA, Cardin S, Lephart SM. Relationship between the Army Physical Fitness Test and Laboratory-Based Physiological and Musculoskeletal Assessments. *Medicine and Science in Sport and Exercise*. 41(5) Suppl 1: 51, 2009.

Chu Y, Sell TC, Abt JP, Huang G, Nagai T, Deluzio J, McGrail MA, Rowe R, Lephart SM. Knee Biomechanics in Air Assault Soldiers Performing Two-Legged Drop Landings with and without Visual Input. *Medicine and Science in Sport and Exercise*. 41(5) Suppl 1: 457, 2009.

Abt JP, Sell TC, Nagai T, House AJ, Rowe R, McGrail M, Lephart SM. Field and Laboratory Testing Variance and Application to Daily Physical Training. *Journal of Athletic Training*. 44(3) Suppl: S-116, 2009.

Abt JP, Lephart SM, Sell TC, Nagai T, Rowe R, McGrail M. Kinematic Adaptations With Interceptor Body Armor in Soldiers of the Army 101st. *Journal of Athletic Training*. 43(4) Suppl: S-96, 2008.



Neuromuscular Research Laboratory

3830 South Water St.
Pittsburgh, PA 15203

Phone: 412-246-0460
Fax: 412-246-0461
<http://www.pitt.edu/~neurolab>
E-mail: neurolab@pitt.edu

Spring, 2011
Copyright, NMRL
University of Pittsburgh

Neuromuscular Research Laboratory

Pittsburgh, PA—

Established in 1990, The Neuromuscular Research Laboratory (NMRL) is the applied research facility of the University of Pittsburgh's Department of Sports Medicine and Nutrition within the School of Health and Rehabilitation Sciences.

The Neuromuscular Research Laboratory (NMRL) is the central core of our Department of Defense research and provides administrative and technical oversight. Technical responsibilities include data processing and management, database entry of laboratory, injury, and nutrition data, analysis of food records, development of testing protocols, piloting of testing protocols, and collection of athletic model data. Administrative requirements include budgetary management and processing with fiscal and administrative accountability, funding agency and command report preparation, and obtaining human subject approvals. The NMRL is staffed by multidisciplinary research faculty and graduate students including athletic trainers, physical therapists, exercise physiologists, bioengineers, biomechanists, registered dietitians, medical doctors, and epidemiologists.

