

DEPARTMENT OF DEFENSE RESEARCH PROJECTS



Neuromuscular Research Laboratory University of Pittsburgh



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



News/Media

Facets Magazine features a special topic on our DOD Project



Department of Defense Injury Prevention and Performance Optimization Research

The Department of Defense Injury Prevention and Performance Optimization Research Initiative will expand its efforts in FY10. Continued research with the 101st Airborne (Air Assault) at Fort Campbell will include further ETAP implementation and injury surveillance, monitor-

ing longitudinal effects of ETAP, and redeployment testing. Other projects at Fort Campbell will include human performance testing of USASOC's 5th Special Forces Group and a weight management and performance optimization intervention for the 101st Airborne. Funding has

also been awarded to validate Naval Special Warfare Group 2's (Little Creek, VA) Tactical Athlete Program and to begin to work with Naval Special Warfare Combatant-Craft Crewman (SWCC) of Special Boat Team 22 at Stennis Space Center, MS.

Eagle Tactical Athlete Program—101st Airborne (Air Assault)

Division-wide implementation of the Eagle Tactical Athlete Program (ETAP) officially began in May 2009. The "Train the Trainer" strategy for implementation was adapted from similar Army schools designed to train a large number of Soldiers quickly and effectively. The Instructor Certification School (ICS) is a 4-day school designed to teach Non-Commissioned Officers (NCOs) how to implement ETAP with their unit. The course includes: ETAP workouts, lectures, practical sessions and materials/resources helpful for physical training implementation. Upon completion of ICS, certified NCOs will implement ETAP and train fellow Soldiers with the provided materials. To

date, ICS has graduated 48 classes and certified 880 Soldiers. In addition to the 4-day course, unit commanders and senior NCOs attend two-hour VIP sessions to learn the basics of ETAP. Over 1600 Soldiers have attended 47 VIP sessions. Approximately 3500 subjects are enrolled in the research aspect of ETAP. The experimental subjects underwent ETAP training by ICS graduates and will continue to perform ETAP physical training. Soldiers in the control group will continue with their traditional Army Physical



Training and enroll in ETAP upon completion of the research aim. A systematic approach has been implemented to monitor daily training exposure, track injuries, and monitor performance adaptations with the research objective to evaluate the effects of ETAP on reducing unintentional musculoskeletal injuries.

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



Year 2010 Research Activities

“The 101st Airborne Division (Air Assault) Injury Prevention and Performance Enhancement Research Initiative, administered by the University of Pittsburgh, continues to positively impact the physical readiness of our Soldiers...Soldiers across the Army deserve, now more than ever, the health benefits afforded by state of the art medical research. Proving the Army's investment in the early phases of this project was an insightful success and the 101st Airborne Division (Air Assault) and Fort Campbell remain firmly committed to participation in this Injury Prevention and Performance Enhancement Research Initiative.”

*~John F. Campbell
Major General, US Army
Commanding General*

Special Forces (USASOC) Fort Campbell, KY

The 5th Special Forces Group (SFG) performs missions in varied locations that span the scope of operations. This research will identify task-and-demand specific needs and injury risk factors for the 5th SFG. The data from this research aim will be used to drive human performance program development.



Weight Management/ Performance Optimization Intervention Fort Campbell, KY

Based on the data collected during the first two years with the 101st Airborne (Air Assault), 27% of Soldiers did not meet the Army Weight Screening Table and Maximal Allowable Body Fat Standards for gender and age. This project will address the specific nutritional needs of the overweight 101st Soldier with a comprehensive weight managements

and performance optimization intervention. The intervention will include innovative feeding strategies that merge weight management techniques including motivational interviewing/counseling, and nutrition and dietary supplement education for the Soldier and their family. The objective of this intervention is to reduce overall body fat in the Soldiers who do not meet Army's maximal allowable body fat standards without sacrificing physical readiness.

UPitt-Med

The University of Pittsburgh Military Epidemiological Database is a custom relational software program designed to collect and process demographic, medical, physiological, musculoskeletal, biomechanical, and nutritional data. UPitt-Med facilitates the analysis of factors associated with performance, injury, disability, factors affecting injury recovery progression, and will develop models predicting injury performance and tactical readiness.

Naval Special Warfare Group 2 Little Creek, VA

Two years of data collection have identified several areas for refinement related to unintentional musculoskeletal injury and suboptimal performance. Based on the data obtained through Operator-specific task and demand analysis, injury history, nutritional behavior, and laboratory testing, recommendations were provided to the Human Performance personnel to refine their program based on the testing results. This aim will be designed to validate the implemented training program to improve previously determined suboptimal physical and physiological charac-



teristics. A six month clinical trial will be utilized to measure the effects of a non-linear periodized training program. Coupled with the physical component will be a titrated nutritional program designed to meet the physical demands of the Operators.

SWCC- Special Boat Team 22 Stennis Space Center, MS

This project will establish an injury prevention and human performance research laboratory at Stennis Space Center



to support Special Warfare's Combatant-Craft Crewman (SWCC) Special Boat Team 22. This project will adopt the model previously utilized with Naval Special Warfare Group 2 and the 101st Airborne (Air Assault) to identify the unique injury risk factors of the SWCC. The aims will include testing the specific tasks and demands of the SWCC, and identify the biomechanical, musculoskeletal, physiological, and nutritional characteristics which contribute to injury and inhibit optimal performance of the SWCC. This project is intended to begin summer 2010.



Presentations and Publications

- 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*. 175:41-7, 2010.
- Crawford K, Fleishman K, Abt JP, Sell TC, Nagai T, Deluzio J, Rowe R, McGrail M, Lephart SM. Lower Body Fat Improves Physical and Physiological Performance in Army Soldiers. *Military Medicine*. (In review)
- 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. *Presented at: 57th Annual Meeting of the American College of Sports Medicine*. Baltimore, MD (June 2-5, 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. *Presented at: 57th Annual Meeting of the American College of Sports Medicine*. Baltimore, MD (June 2-5, 2010).
- Nagai T, Sell TC, House AJ, Deluzio JB, Abt JP, Lovalekar MT, Smalley BW, Lephart SM. Shoulder Flexibility and Strength Predict Dynamic Pushup Ratio in the 101st Airborne Division Soldiers. *Presented at: 57th Annual Meeting of the American College of Sports Medicine*. Baltimore, MD (June 2-5, 2010).
- Nagai T, Sell TC, House AJ, Deluzio JB, Abt JP, Lovalekar MT, Smalley BW, Lephart SM. Measurement of Spinal Active Range of Motion among Different Military Occupations in Combat Aviation Brigade. *Presented at: National Athletic Trainers Association Annual Meeting*. Philadelphia, PA (June 22-25, 2010).
- Sell TC, House AJ, Akins JS, Opp AR, Lephart SM. Significant Correlation between Tibial Acceleration and Proximal Anterior Tibia Shear Force Across Increasing Jump Distance. *Presented at: 57th Annual Meeting of the American College of Sports Medicine*. Baltimore, MD (June 2-5, 2010).
- Lovalekar M, Abt JP, Sell TC, Lephart SM, Keenan K, House AJ, Zimmer AC, Hovey GD. Assessing the Validity of Self-reported Injury History Among U.S. Military Personnel. *Presented at: 137th Annual Meeting & Exposition of the American Public Health Association*. Philadelphia, PA (November 7, 2010).

Research Center for Injury Prevention and Human Performance

Initial research began by developing and validating the Eagle Tactical Athlete Program (ETAP) using scientifically driven, soldier-specific activities to prevent injuries and improve tactical physical readiness based on our four phase model of injury prevention and performance optimization. The injury prevention and performance optimization research will continue as part of the Research Center for Injury Prevention and Human Performance with development of enhanced screening models for injury and performance predictors and development of nutritional programs focused on soldier wellness and education. Research will expand to other populations at Fort Campbell including Special Forces. The Research Center for Injury Prevention and Human Performance is dynamic and responsive to the needs of the US Army through ongoing and future research to improve injury resiliency and enhance force readiness. The Research Center for Injury Prevention and Human Per-

formance at Fort Campbell, KY is staffed by Takashi Nagai, PhD, ATC—ETAP Manager, Jennifer Deluzio, MS, CSCS—Center Coordinator, Anthony House, MS, ATC—Laboratory Director, Daryl Lawrence, MS, CSCS—Strength and Conditioning Director, Brandon Sullivan—Research Associate; and Dale Williams, MS, CSCS—Strength and Conditioning Coach. The expanded scope and personnel have made it possible to conduct laboratory/field testing and ETAP ICS concurrently, while also expanding the capacity of the Research Center for Injury Prevention and Human Performance.



Front Row (left to right): Jennifer Deluzio, Tony House, Brandon Sullivan

Back Row (left to right): Daryl Lawrence, Takashi Nagai, Dale Williams

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Department of Defense Laboratory Personnel

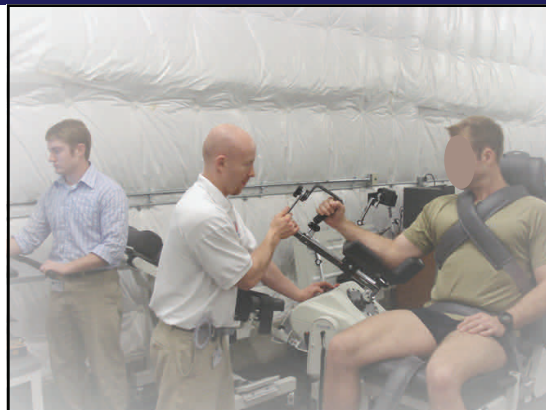
“The soldier is a unique tactical athlete requiring maximal development of athletic and skill-related performance...We can develop specific training models to address the identified deficits and maximize athletic and skill-related performance of the tactical athlete”

*~Dr. John Abt, PhD,
ATC
Co-Investigator
University of Pittsburgh*

Human Performance Research Center

Little Creek, VA: Staff and Scope

The Human Performance Research Laboratory at Little Creek, VA has been operating at Little Creek Naval Amphibious Base since January 2008. The laboratory is staffed by Greg Hovey, MS, CSCS, and Anthony Zimmer, ATC. Prior to joining the NMRL staff, Greg completed his Masters degree in Exercise Physiology from Central Washington University. Anthony Zimmer completed his Bachelors degree in Athletic Training from the University of Pittsburgh and worked as an certified athletic trainer for UPMC prior to joining the NMRL staff. The University of Pittsburgh staff works collectively with the Human Performance Staff at Naval Special Warfare Group 2 at the Human Performance Research Center. The Human Performance Research Center is a 2,200 sq/ft facility which serves as the remote data collection facility for the Performance Optimization and Injury Prevention Research Project with the US Naval Special Warfare special operation units (SEALs). The program evaluates the functional fitness of the Operators based on our sports medicine model, in attempt to reduce their rate of injury and optimize their combat performance. To date, nearly 300 Operators have been tested for the Naval Special Warfare Group TWO Research project.



Anthony Zimmer (left) and Greg Hovey (right) perform Biodex strength testing on a Navy SEAL

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Neuromuscular Research Laboratory: New Location



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Neuromuscular Research Laboratory (NMRL) University of Pittsburgh, Pittsburgh, PA

The Neuromuscular Research Laboratory (NMRL) is a 5,200 sq/ft applied research facility of the University of Pittsburgh's Department of Sports Medicine and Nutrition within the School of Health and Rehabilitation Sciences. The NMRL collaborates with the Department of Orthopaedic Surgery and the University of Pittsburgh Medical Center. The laboratory houses three separate motion analysis systems for specific task and sport analyses. The laboratory also features defined areas for sports physiology, proprioception, postural stability, and strength assessments. Additional space has been designed for offices for all of the NMRL's faculty as well as a conference and classroom for instruction of the Department of Sports Medicine and Nutrition's sports medicine classes (MS and PhD).



Above: Outside view of new laboratory

Right: Inside view of new laboratory, equipped with motion analysis, force plates, EMG, physiology, strength, metabolic, and body composition analysis

