



# NSW's Tactical Athlete Program



UNIVERSITY OF PITTSBURGH  
HUMAN PERFORMANCE RESEARCH LABORATORY



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**N**avy SEAL training and missions are legendary arduous. To even become a SEAL, members must prove they are psychologically and physically tough. Every NSW operator performs physically demanding jobs that require him to maintain fitness levels equivalent to an elite athlete. SEALs, like Olympians or professional athletes, are always looking for ways to improve physical performance and gain a competitive edge to enhance success in missions or competition. NSW's triumph in that effort can be traced to its Tactical Athlete Program (TAP) and support from the University of Pittsburgh's (UPitt) Human Performance Research Laboratories.

NSW took another step forward in the area of human performance and sports medicine research in late February, when the UPitt Department of Sports Medicine and Nutrition, School of Health and Rehabilitation Sciences opened a third NSW human performance/sports medicine research lab at Naval Amphibious Base Coronado, in San Diego. The new facility is a welcomed addition to the two strategically located at Joint Expeditionary Base (JEB) Little Creek, Va. and at the John C. Stennis Space Center in Mississippi.

Since 2007, UPitt has supported NSW's TAP by studying injury prevention and the physical readiness of NSW operators. UPitt's efforts align with the primary objective of the TAP, which is to facilitate preservation of the force and families by minimizing the number and severity of operator injuries, maximizing performance and combat readiness, and enhancing career longevity, and quality of life following service.

"Ultimately, UPitt will help us improve our human performance and sports medicine testing, training, rehabilitation, and nutrition protocols," said Capt. Scott Jonson, NSW command's deputy force medical officer and sports medicine director for the TAP. "They will help us discover where our operators have opportunities for improvement, and assist us

A SWCC performs a neck strength test with a hand held dynamometer.



# RESEARCH LABS TESTING

in implementing scientifically-based strategies to facilitate resilience and rapid recovery.”

UPitt’s staff, led by Dr. Scott M. Lephart, professor and chairman of UPitt’s Department of Sports Medicine and Nutrition, is using an approach that the university has developed 25 years. It is a four-phase method that will span the next three years.

“Our first phase is to study the responsibilities of and operational demands placed on the operators,” Lephart said. “We go out in the field with our instrumentation and technology to study the prevalence and mechanisms of injury. We study the metabolic and physiological demands of various training activities and establish scientifically-based strategies to help prepare the operators for these demands.”

The second phase moves into the laboratory. This is our opportunity to take the information from the field and replicate what we can in the lab; replicate the mechanisms of injury and conduct testing to determine what is contributing to the injuries and what strategies need to be employed to help mitigate the injuries. The second phase is also designed to study the nutritional characteristics and needs of the operators.

The third phase is the most important, and is driven by phases one and two. It’s the development of intervention programs, which are very specific to the operators’ needs. Our primary role is to evaluate scientifically the TAP and help improve its effectiveness. Many human performance programs are not

validated in terms of demonstrating their ability to alter injury risk characteristics and optimize performance – that’s our role with NSW’s program in phase three of our research,” said Lephart.

The final phase is to facilitate longitudinal analyses. Operator injuries will be tracked over the course of one’s career with treatment and prevention recommendations made through TAP. The end goal is to minimize the insidious effects of multiple injuries among operators.

Currently, each of UPitt’s three research laboratories is in a different phase of testing.

## The Laboratories

The Naval Special Warfare Group 2 (NSWG 2) lab at JEB Little Creek was the first to be established. Since that time, 302 operators have been tested in phases one and two. Each Sailor underwent a comprehensive human performance assessment to determine opportunities for improvement.

“We will conduct two clinical trials beginning in April to demonstrate the effectiveness of the human performance/sports medicine program that NSWG 2 has employed. We will continue to conduct other long-term research over the course of the project,” said Lephart.

The research conducted at the NSWG 2 lab has already begun to bear



A SEAL participates in a VO2 max test that measures aerobic capacity.

fruit. One issue the testing has identified is the correlation between body fat percentage and injuries.

“There seems to be a threshold right around 15 percent body fat. Individuals with body fat higher than 15 percent appear to sustain significantly more injuries than individuals whose body fat is at or below 15 percent,” said Matthew Darnell, project coordinator at the NAB lab. “The general body fat recommendation for the male athletic population is between five and 15 percent.”

Research specifically designed for Special Warfare Combatant-craft Crewmen (SWCC) is being conducted at Special Boat Team 22 at Stennis. The research is modeled after the initial studies conducted at NSWG 2 and is working to identify injury risk factors that are culturally specific to the SWCC



A SWCC performs one of the lab tests that measures internal and external rotation shoulder strength using a isokinetic strength dynamometer.



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-Scott Conger,  
NAB laboratory coordinator

community. The lab, which has been operating less than two years, is conducting research phases one and two and has evaluated nearly 100 SWCC.

The lab will complete phase two and move onto phase three within the next year. Lephart explained that during phase three, he and his research team will make recommendations on TAP development and then validate the recommendations over the next couple of years.

The newest lab, located in San Diego, will focus on SEAL Qualification Training (SQT) and Crewman Qualification Training (CQT) graduates.

According to Lephart, the work being done at NAB Coronado is the most meaningful of all activities the university has been involved with during its seven-year partnership with NSW. The data captured at the NAB lab will provide a physical and physiological baseline for SEAL and SWCC operators as they first enter the NSW Force.

“It’s going to allow for initial benchmarking of NSW’s operators as they go through SQT and CQT,” said Lephart. “They will then be tested periodically over their careers to give leadership feedback on the combat readiness of their operators.”

Laboratory and tactical testing will be performed on 300 SEAL and SWCC operators upon completion of SQT or CQT. Phase one is currently underway.

## The Testing

Lab assessments include two days worth of 50 tests, taking approximately two hours per day to complete. The assessment battery consists of a body composition analysis, various strength and endurance tests, range of motion and balance tests, a nutritional survey and more.

Upon completion of the testing, the lab provides each SEAL and SWCC volunteer with a detailed report, plotting each Sailor’s profile against college and professional athletes.

“The one thing that I would say about [NSW operators] is they are really motivated, very intelligent and they are really excited about the tests,” said Scott Conger, NAB laboratory coordinator. “They really try to do the best they can at every task, which makes it fun for us.”

“Our experience at both labs (Little Creek and Stennis) is that the guys are anxious to volunteer for testing and come back willingly for a follow-up after a time, to see if they have made improvements. We now have waiting lists. It’s been quite remarkable,” said Lephart.

Many of the SQT and CQT graduates believe there is more to completing this testing than individual tracking and feedback. They also feel a deep sense of responsibility to give an all-in effort while supporting important force-wide research.

“I wanted to come in for testing to see where I’m at, but it’s more than

that,” said an SQT student. “This research could ultimately change the future of our community and the way we train in years to come.”

Having motivated test subjects has helped keep research tracking on a productive course and makes the research team’s work that much more enjoyable.

“They are very appreciative of what we’re doing, which is not always the case when dealing with high-level athletes,” said Darnell. “At the end of the day, when working with some civilian athletes, they may run a little faster or jump a little higher so they can score an extra point or another touchdown. With these guys (operators), this is their life and livelihood. They realize injury prevention and performance improvements can save their life, someone else’s life and make their careers healthier and longer. So, working with them is more meaningful in that aspect.”

## The Future

The UPitt staff will continue to move forward with studies until all four phases of the research have been completed. At that point, the labs will be turned over to NSW.

“We’ll complete the research at all three of the sites and then there will be a hand off,” said Lephart. “It will be a handoff of the skills, knowledge, and data we have to the NSW Force, so it will have the ability to continue a solid scientifically-based program. Upon completion of the research, all of UPitt’s lab assets will be “gifted” to NSW.”

Until that time, NSW and UPitt will continue to work together in the spirit of maximizing the effectiveness of the NSW TAP, which will ultimately lead to a stronger and more resilient NSW Force. 

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(Above) Darcie Yount, NAB research associate, and Scott Conger, NAB lab coordinator conduct a cervical range of motion test on a SWCC.

(Left) Scott Conger (left) and Matthew Darnell (far right) motivate a SEAL as he performs a windgate bicycle test of anaerobic power at the Naval Amphibious Base Human Performance Lab. This 30 second test measures the maximum amount of power a subject can produce and the ability to maintain that power over the course of the 30 seconds.