

DISCOVERY

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Through the Many Facets of Aerospace Medicine

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Portable Brooks-tested hyperbaric device saves lives

By Rudy Purificato
311th Human Systems Wing

A portable hyperbaric device that Brooks scientists tested and developed a training program for is having a positive impact on Air Force aeromedical evacuation operations as well as bolstering Defense and Homeland Security Departments' capability to rapidly and safely transport victims of decompression sickness.

Called the Emergency Evacuation Hyperbaric Stretcher, this portable, single-patient hyperbaric chamber is being used by the aeromedical evacuation community from all branches of America's Armed Services. In a recent case, U.S. Air Force School of Aerospace Medicine-trained EEHS operators helped save the life of a 66-year-old civilian diver victimized by decompression sickness during a Pacific Ocean incident.

"It was developed in response to needs expressed in 1997 by the U.S. Navy, U.S. Coast Guard, NASA, the U-2 community and Special Forces," said Col. (Dr.) James Wright, former Clinical Investigation Branch chief for USAFSAM's Davis Hyperbaric Laboratory. He explained that their need was primarily based on finding a transitional treatment protocol while transporting victims of decompression sickness to fixed hyperbaric facilities.

"The sooner a victim is treated for decompression sickness, the less severe the (medical) condition will become and the more likely the patient will have favorable results," Dr. Wright said.

Decompression sickness is potentially fatal. It can lead to a host of debilitating injuries that can

require prolonged treatment. For aviators, this can result in a significant loss of flying time.

While decompression sickness is not pervasive within the Armed Forces, it claims dozens of victims annually.

"We average 45 cases a year," said Dr. Wright, referring to those that are reported. Historically, aviators have been reluctant to report suspected cases of decompression sickness.

"In past studies, 80 percent of decompression sickness in U-2 pilots went unreported. They didn't want to be grounded," said Dr. Wright.

During World War II, 17 victims of decompression sickness died out of approximately 17,000 cases that were reported. Since WWII, an estimated 3,000 cases of decompression sickness worldwide have been reported in the Air Force.

In a joint initiative by the Air Force and Navy, the development and fielding of the EEHS has had an effect on the flying and diving communities. "We've developed a treatment protocol (through EEHS) that encourages them to report cases of decompression sickness," Dr. Wright noted.

The device that federal organizations have been using since 2000 is the Hyperlite, commercially developed by the London, England-based SOS Limited. Selected through a foreign comparative testing program, the Hyperlite was tested for air worthiness by USAFSAM that led to the device's certification in 2000.

Costing \$70,000 per unit, the collapsible and pressurized EEHS is ideally suited for use aboard C-17 aircraft. Its C-17 use has allowed aircrews to fly at normal altitudes, saving time and fuel.

Before the advent of the EEHS, C-17s transporting decompression sickness patients had to fly at much lower altitudes to prevent these victims from suffering medical complications, explained Dr. Wright.

The EEHS uses oxygen generated by the same molecular sieve technology employed by military aircraft's On Board Oxygen Generating Systems, commonly known as OBOGS. A minimum of two trained professionals can operate an EEHS, usually a flight surgeon and physiologist/physiology technician.

"We've trained about 50 people in EEHS operations," said Dr. Wright, referring to USAFSAM training that has been conducted at Air Force and Navy installations where EEHS units are in operation, including Fairchild Air Force Base, Wash.; Beale AFB, Calif.; Hickam Field, Hawaii and Johnston Atoll in the Pacific Ocean.

The Navy owns the bulk of EEHS units, with Air Combat Command having the majority of Air Force units. USAFSAM, Air Force Special Operations Command and Pacific Air Force Command are among other Air Force organizations that have EEHS units. "The Coast Guard was the first (military organization) to get the EEHS five years ago," said Dr. Wright, noting that even the U.S. Army has one.

Besides decompression sickness, EEHS units also can be used to treat arterial gas embolism, acute blood loss, crush injuries, burns and bacterial infection. The Air Force can use the EEHS to support a variety of missions including high altitude operations, mass casualty response, special operations and chemical, biological and nuclear warfare response.