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Class 58

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26 November 2007

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As more Soldiers survive injuries sustained in combat, the U.S. Army is focusing its resources on preventing them and reducing the health risks Soldiers face. One of the top risks Soldiers encounter involves injuries to the areas of the head and neck, particularly with the extensive use of improvised explosive devices (IED) by enemy combatants. These high-velocity explosives have caused wide-ranging damage to troops exposed to the blasts. A myriad of shrapnel wounds, hearing loss and other head injuries have become common. Even though ear, nose and throat (ENT) disorders are among the top issues facing troops in combat, improvements in personal protective equipment have significantly reduced the risk of injuries. I'll examine the levels of risk for ENT injuries and how the Army is working to prevent them.

The risk of suffering ENT injuries in combat

With so much of the news focusing on the horrific wounds that result in Soldiers losing limbs and damage to brain functions that result in mental disorders, you may be surprised to learn that ENT disorders remains among the top injuries troops suffer in combat. It is no secret that the Army has made efforts to provide better protective gear, but there is no single solution for the exposed parts of the body, particularly the head and neck area. According to a study presented by the American Academy of Otolaryngology Head and Neck Surgery, one out of every six troops wounded in combat required treatment by an ENT physician (Casler, Fravell, Nasser, & Xydakis, 2004). That means that more than 4,700 Soldiers out of the total 28,451 troops wounded in action in Iraq as of November 7, 2007 fit this description ("Department of Defense," 2007). Those numbers reflect the great risk Soldiers encounter in operations conducted in Afghanistan and Iraq where the IED has become the main weapon used by insurgents. Wounds caused by these explosions, along with other conventional weapons such as mortars and

automatic rifles, range in type and severity. Doctors are seeing everything from traumatic head and neck injuries, a loss of vision and hearing, and burns, particularly to those exposed areas of the body. Researchers cite IEDs as the most common cause of these injuries, accounting for 70 percent, followed by shrapnel at 26 percent, mortar rounds at 22 percent, and then gunshot wounds at six percent (Bair, Buckenmaier, Clark, Gironda, & Walker, 2007). Otolaryngologists at Landstuhl Regional Medical Center (LRMC) in Southwest Germany conducted a 14-month study to examine the pattern of wounds suffered by military members evacuated from combat in Iraq and Afghanistan. LRMC is the only Level IV medical facility outside the United States. During the study, held from January 2003 to March 2004, ENT doctors and surgeons at LRMC would be the first to treat them because no head and neck specialists were forward deployed at that time. Doctors used a computer tracking system to create a database of those patients. Not only did they record the percentage of air-evacuated patients seen by ENT doctors but also captured the number of those who were evaluated by other specialists because their ENT disorders related with other conditions, such as Traumatic Brain Injury (TBI). In all, LRMC admitted approximately 11,287 patients during the study with most coming from the Iraq theatre of operations. The study showed that the ENT department treated 8.7 percent of all patients, and other medical departments evaluated an additional 7.3 percent. They concluded that together those two factors meant that the picture showing the true extent of ENT disorders looked more like 16 percent of all injuries. In addition, they reported that 21 percent of all patients with what was termed as “battlefield injuries” had at least one ailment that was considered a type of head and neck trauma (Casler et al., 2004). However, when you compare these results with data from past wars, you find similar trends. A report published in the *British Journal of Oral & Maxillofacial Surgery* reviewed injuries from wars in places like Vietnam, Croatia, Somalia,

Afghanistan and Iraq. It concluded that troops involved in all conflicts shared a high occurrence of injuries to the head and neck – up to 40 percent of all wounded (Bremerich, Kranz, & Rustemeyer, 2007). The big difference today is that more Soldiers survive their wounds, and many return to duty as a result of improvements in protective gear.

Effects of personal protective equipment

The Army healthcare system has used knowledge gathered through studies like those mentioned above to improve its preventive medicine practices. These advances are true to form with past advances in the Army healthcare system spurred on by war. Even in the aftermath of the carnage of Pearl Harbor during the early stages of World War II the U.S. Army's medical response was considered groundbreaking as a significant number of wounded were able to return to duty with such a small amount of permanent incapacitating injuries after a relatively short time compared to past wars (Maisel, 1943). The accessibility of immediate care made the difference then as it does now, but developments in protective equipment like the Kevlar helmet and body armor have made the chances of survival even greater. U.S. Soldiers currently serving in Afghanistan and Iraq have a higher survival rate than ever before. In Vietnam, the U.S. Army experienced two or three injured Soldiers for every one killed while the ratio in Iraq and Afghanistan is more like seven to one (Blech, 2006). In Operations Enduring and Iraqi Freedom, more than 30,000 troops have been injured and more than 16,300 have returned to duty. In contrast, approximately 3,400 service members have died as a result of wounds suffered in action ("Department of Defense," 2007). It's no coincidence that these efforts include using the latest developments in personal protective equipment. Army leaders are responsible for implementing an aggressive preventive medicine program that uses personal protective measures along with protective clothing and equipment to ensure the health of its Soldiers is sustained during

peacetime operations and war (“Army Regulation,” 2005). The Army has ramped up its research and procurement efforts to field the best possible protective equipment for its troops through Project Executive Office (PEO) Soldier.

Project Executive Office Soldier

The Army created PEO Soldier in 2002 to upgrade its protective equipment and get it into the hands of its Soldiers in the field as quickly as possible. The program works on the full spectrum of development, from design to fielding, for all of the gear a Soldier wears or carries, including the Army Combat Uniform (ACU). PEO Soldier established a list of essential equipment items based on lessons learned in Afghanistan. Called a Rapid Fielding Initiative (RFI), the gear is intended to enhance a Soldier’s combat effectiveness and improve their general quality of life in the field. Since 2002, developers have refined and increased the RFI items to the current total of 58 individual and unit equipment items. The Army has equipped an average of 24,000 Soldiers a month since it began issuing the RFI kit to all troops deploying in 2004 (“U.S. Army,” 2007). The current RFI kit includes the Modular Lightweight Load-Carrying Equipment (MOLLE) and Interceptor Body Armor (IBA), Advanced Combat Helmet (ACH), ballistic eyewear, and combat ear protection. With the advent of body armor and its success, focus has shifted to protecting the head and exposed parts of the neck. The ACH, which is replacing the Kevlar helmet, is designed to ease blunt force trauma and provides ballistic and impact protection for the head and the neck when combined with a new light-armored nape pad that attaches to the back of the helmet to protect the neck. Some critics charge that the ACH offers less protection than the Kevlar helmet because of it exposes more of the neck. In response, the Army conducted a survey of combat troops wearing the ACH and determined that most improperly wore the helmet (“U.S. Army,” 2007). The Army concluded that the ACH does

provide the necessary protection if worn properly. Along with the ACH, ballistic eyewear has helped lessen the risk of injuries to the head and neck area. PEO Soldier estimates that 10 percent of injured Soldiers will have an eye injury. Because of that risk, Soldiers now wear ballistic eyewear when they are conducting tactical operations and any training that involves a risk of eye injury. The ballistic eyewear, which provides fragmentation protection, includes spectacles and goggles for prescription and non-prescription wearers with both clear and shaded lenses. Together, the RFI items give Soldiers the best protection against the unique challenges they now face in Iraq and Afghanistan. The Army recently issued its one-millionth RFI kit.

Conclusion

As the landscape of combat changed during the war on terrorism, the Army has responded with innovations in the gear it issues its Soldiers – gear that can withstand the harsh conditions of desert, mountain and urban combat. The modern Soldier is armed with more lethal weapons and superior personal protective equipment than any military has fielded before. Troops wear body armor, advanced helmet technology, ballistic eyewear and an assortment of uniform items to increase their chances of survival. Today, the Army spends about \$17,500 to outfit a Soldier for battle compared to the \$170 it did in World War II (Jelinek, 2007). Better equipment has meant that less Soldiers experience life-threatening injuries, although they still face risks, particularly to the head and neck. The Army is continuing its efforts to address the need for even greater protection as it strives to further diminish those risks.

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