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Journal of Special Operations Medicine

A Peer Reviewed Journal for SOF Medical Professionals

Winter Training

Dedicated to the Indomitable Spirit & Sacrifices of the SOF Medic

From the Surgeon

Greetings again from HQ USSOCOM!

This Journal remains a viable tool for us to spread the word and share medical information between each level of medical support. Our forces have been deployed into Operation Enduring Freedom for several months now. We here in this headquarters are beaming with pride at the professionalism demonstrated by our SOF forces, and in the quality of the medical care rendered to our forces by the Medics, Corpsmen and PJs in the field. We get daily status reports from the hospitals in Europe caring for casualties of this deployment, and the medical personnel charged with their care have performed superbly from the point of injury/illness through evacuation to CONUS Medical Centers.

As this campaign unfolded, we "chopped" as much of our staff to help CENTCOM as needed for this effort. Our guys, in concert with the CENTCOM/SG staff, put together a medical annex to the "big" plan that was awesome given the tyranny of distances involved. We even sent one of our medical planners as the JSOCC-SG forward. Bottom line is that all is working well.

So, why do I bring it up? Early in the operation I began to get a little nervous that we had this big plan and we medics hadn't shared the details with the Line leadership here. I had a meeting with the CINC on another matter, and finally said that we here were supporting CINC CENTCOM and SOCCENT and that we were very happy with the plan. I offered to bring him a briefing on the "nuts and bolts" of the medical annex hoping that his approval would give us all a "warm fuzzy". He simply told me that he didn't need a briefing, "but we had better be happy with the plan; those are our people over there!".

So, he trusts us with the plan and we trust the operators to pull it off. As folks come back and redeploy, pick their brains, get their experiences on paper, find the shortfalls and let us know what they need to continue their successes. The forces we deploy are so highly skilled and trained they are national treasures. Bust your butt to find new and better ways to support them in their attack on the terrorists. Pass the word, let us know, keep on keepin on!

God Bless America

dhammer

Dave Hammer (center) 1st Marines, Fleet Marine Force Pacific, Winter 1959

COVER



Third Battalion, 10th Special Forces out of Fort Carson near Colorado Springs, CO train at Crested Butte.
Sgt. First Class Gabe Maillet, Master Ski Instructor, instructs an advanced class.
Photographs by: Joseph Rehana


The Journal of Special Operations Medicine is an authorized official quarterly publication of the United States Special Operations Command, MacDill Air Force Base, Florida. It is in no way associated with the civilian Special Operations Medical Association (SOMA). Our mission is to promote the professional development of Special Operations medical personnel by providing a forum for the examination of the latest advancements in medicine.

The views contained herein are those of the authors and do not necessarily reflect official Department of Defense position. This publication does not supercede any information presented in other Department of Defense publications.

Articles, photos, artwork, and letters are invited, as are comments and criticism, and should be addressed to Editor, Journal of Special Operations Medicine, USSOCOM, SOC-SG, 7701 Tampa Point Blvd., MacDill AFB, FL 33621-5323. Telephone: DSN 968-5442, commercial: (813) 828-5442, fax: -2568; e-mail JSOM@socom.mil.

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From The Staff

As we continue to involve you, our readers, in the production of this journal, your submissions and photos are what are needed to make this journal unique. It is a sharing of your missions and your lives as you go forth as instruments of national foreign policy. We can't do it without your input. You are what the journal is all about.

This journal is one of the most excellent and righteous tools we have to span all the SOF services, to share medical information and experience unique to this community. The JSOM survives because of generous but time-consuming contributions sent by clinicians, researchers and former medics from all the services who were SOF qualified and/or who served with SOF units. We need your help. We are always looking for SOF-related articles from current and/or former SOF medical veterans.

If you have contributions great or small… fire 'em our way. Our E-mail is: JSOM@socom.mil.

A recent addition to the JSOM is the offering of CMEs. We are currently working with USUHS, our sponsor for CMEs for the physicians, PAs and nurses, starting with this edition. In this edition, you will find CMEs offered on "Part 1- Dive Medical Brief " (Part 2 will be in our Spring Edition) and "Prehospital Treatment of Hypothermia" articles.

In this edition of the JSOM, we honor our fallen brother, MSG Jefferson D. Davis, killed in support of Operation ENDURING FREEDOM .

Word from the "field", our readers, is that they would like to see the following types of articles in future JSOMs. Articles that entail and involve the following: Tricks of the Trade…anything from simple more effective bandaging to doing more with less (supplies, meds), keeping IVs warm, treatment of hotspots and blisters, Colloids vs. Crystalloid fluid replacement, IV infusion in extremities vs. intraosseous fluid infusion; Poor-mans Gatorade recipe, improvised laxatives or antidiarrheals or anything improvised for that matter; herbal medicine…any relevance or uses that are legitimate; articles dealing with trauma, infectious disease processes and/or environment and wilderness medicine type articles; more photos accompanying the articles or alone to be included in the photo gallery associated with medical guys and/or training.

The fact is most everybody that has read an article on a technique or concept knows of another way of doing the same thing that's perhaps faster, easier, or dare I say...better. Just like any patrol or observation of a target…the more eyes the better. If you, the readers, have knowledge of such things as listed above or at least know where to find info on a particular subject…let us know here. We'll hunt down where you think you saw that information and see if we can't either re-print it for the rest of the readers or at the very least pass along where information of interest can be found. OK enough said…keep your eyes open and let us know. Thanks.

Lastly, our distribution list continues to expand daily. Requests for the journal have come from all services: from medics to physicians, from clinical to operational units as well as from the retired and civilian communities. We are doing our best to see that all who will benefit from the journal receive it.

Enjoy this edition of the journal, send us your feedback, and get those article submissions in to us: JSOM@socom.mil.

sea/mdd

Meet Your JSOM Staff

EXECUTIVE EDITOR
David L. Hammer, MD
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Colonel Hammer's military and medical career began in 1958 when he served as a U.S. Navy Combat Medical Corpsman attached to U.S. Marine Corps infantry, artillery, and communication/reconnaissance units. Following discharge, he completed his BS and MD degrees at the University of Michigan in 1967 and 1970 respectively. Following nine years of civilian medical practice in a multi-specialty group in Grand Rapids, Michigan, he reentered military service as a Flight Surgeon at Beale AFB. In 1984, he completed the Air Force Residency in Aerospace Medicine at Brooks AFB, Texas, during which period he earned a Masters in Public Health Degree from Harvard University. Colonel Hammer has spent the majority of his career in aerospace medicine and direct line support assignments, has commanded three medical groups, and has been assigned to the ARRS/SG, the AFSOC/SG and the USAFA/SG. He is a chief flight surgeon and a master parachutist.

MANAGING EDITOR
Steve E. Anderson, PA-C
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CPT Anderson enlisted in the Army in 1980. Upon completion of the Combat Medic course, he volunteered for Airborne and Special Forces training. Assignments encompassing 13 years as a SF medic include: Team medic-C/3/10th SFG(A), Instructor at Med Lab-Ft Bragg and Medic-1st SFOD-D. CPT Anderson was accepted to the Military Physician Assistant program and subsequently commissioned in 1995. Assignments from that time to present include: 1/9th INF Regiment, 2/504th PIR, 82d Abn DIV, 2/7th SFG(A), and currently assigned to the USSOCOM Surgeons Office as the Command PA. Education and qualifications include: B.S. Southern Illinois University 1979, B.S. University of Oklahoma 1995, and MPAS University of Nebraska-1997, Jump Master, SERE, HALO, Combat Diver, Dive Medical Technician, Flight Surgeon, Dive Medical Officer.

PRODUCTION EDITOR
Michelle D. DuGuay, RN
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Maj DuGuay joined the Army Reserve in 1987 and served as a nurse in a Combat Support Hospital unit for three years before switching services in 1990 to become an Air Force C-130 Flight Nurse. She is currently a reservist attached to the USSOCOM/SG office. Maj DuGuay has a BSN and is currently obtaining her MBA with a concentration in management. Her skills include being a flight nurse (both military and civilian), 15 years of critical care and emergency room nursing experience, an EMT and a legal nurse consultant. She has also served as the military liaison to her FL 3 Disaster Medical Assistance Team (DMAT). Prior to the SG office, Maj DuGuay's experience at USSOCOM included an assignment in the Center for Force Structure, Resources, Requirements, and Strategic Assessments.

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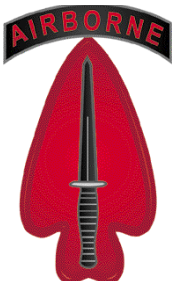

Rocky Farr, MD
COL, USA
Command Surgeon

Editors Note: After several months of coercion, COL Farr has provided the JSOM an updated photograph. The previous photo was CIRCA 1969 in the Republic of Vietnam. This new photo was recently taken in Afghanistan.

Below is an accounting of the USASOC Surgeon's Conference this December in Tampa. After concentrating on Guerrilla Warfare (GW) for the weekend and for a week of the Special Operation Medical Association (SOMA) conference, I was fortunate enough to make it forward to the war. GW is alive and well & our guys are doing it great. Robin Sage in action. Thanks, Rocky

2001 USASOC COMMAND SURGEON'S CONFERENCE
AFTER ACTION REPORT (AAR)
by LTC Michael Mouri

The 2001 USASOC Command Surgeon's Conference was held 8-10 December 2001 at the Hyatt Regency Hotel, Tampa, FL.
Hosts: COL Farr, USASOC Command Surgeon, COL Diamond, USASOC IMA Command Surgeon, COL Keenan, JSOMTC Dean & USAJFKSWCS Surgeon, COL Anderson, USASOC Surgeon's Staff
Attendees: HHC--CPT Schob, MSG Capuzzo, LTC Mouri; GSC--CPT Settle; 1st Bn--CPT Hamada, MSG Long; 3rd Bn--MAJ Butler, CPT Garrett; 350 CA--COL Jenkins, LTC Ward, LTC Weaver, LTC Adams, LTC Milligan, LTC Cunningham, MAJ Allen; other CA and SF units minus 5th Group, 75th Ranger Regiment, 160th SOAR

Presentation Topics:
Medical Training: There are now six 61N Flight Surgeon individual mobilization augmentee (IMA) slots at the JSOMTC with curriculum responsibility for 30 days of the 18D training calendar. Volunteer tours are available from 90 to 179 days. Special forces medical sergeant (SFMS) consists of special operations combat medic (SOCM) and advanced special operations combat medic *(*ADSOCM). For the SEALs, ADSOCM is special operations independent duty corpsman (SOIDC). Sick Call is now incorporated in SOCM using the Navy Sick Call Screener Curriculum. The DOT 2000 update of EMT-P certification recommends 1200 hours of training excluding the EMT-B and A&P prerequisites. SOCM provides 948 hours and now awards the 91WW1. ADSOCM/SOIDC provides 1032 hours and re-establishes medical acumen, reinforces anesthesia including inhalational, and provides unconventional warfare/guerrilla warfare (UW/GW) nursing skills. One day of dental training is lost. The medical sustainment requirements for 18Ds remain the same: Special Operations Forces Medical Skills Sustainment Program (SOFMSSP), Medical Proficency Training (MPT) and Non-trauma modules (NTM) every two years. All SF groups except the 19th now have local MPT training sites.

Our site is the Birmingham VA Hospital, which requires a minimum 30-day advanced notice before a rotation is established. Our memorandum of understanding (MOU) must be renewed every two years. **All MPT rotations require that the 18D maintain a patient contact journal with age, gender, diagnosis and procedures performed. A case study is mandatory and will be sent to USASOC Surgeon for entry into an 18D archive.** The two primary unassigned sites remain Shock Trauma in Baltimore, MD and the Navaho Indian Hospital in Shiprock, NM. Pending sites include a two-week anesthesia rotation at Charlotte Hospital and a four-week surgical rotation at the University of Cincinnati. Continuing medical education (CME) hours may be possible through the JSOMTC but it will not be easy and it remains at the bottom of the priority list at this time. **CME is available for paramedics in the JSOM**.

Physical Examination: Approval for all Special Warfare Center and School (SWCS) physicals now resides at the Bn level with the Surgeon and PA and all stamps have been distributed. **Waivering authority for any disqualifying condition remains with the SWCS Surgeon, COL Keenan.** Profiling for any heat or cold casualties now requires a Medical Evaluation Board (MEB). Temporary profiles cannot exceed 90 days and no one should be on profile in excess of one year.

Live Animals: Several approved exportable animal use protocols exist. All physicians and veterinary surgeons require an 8-hour training block on animal use. It is exportable, however, the Group Surgeon and all veterinarians should attend the course at Ft Bragg. A new protocol to recover animals from anesthesia is due in July 02 and will allow for a UW/GW training focus for teaching other 18 series and indigent soldiers. **For all animal use outside of Ft Bragg, you must have an approved protocol; inform the PI and the CG via USASOC Surgeon; use trained instructors; have students sign a letter of nondisclosure; and maintain records**.

Reports: Both Command Health Report (CHR) & 18D Quarterly Training Report (QTR) are due by the 15th to MSG Capuzzo. Accuracy and promptness are paramount. Deployment Health Surveillance **(DHS) is required for all OCONUS missions regardless of length of stay**. Complete DD2795 during the predeployment medical threat brief with the original in the medical record and a copy to USSOCOM. TB skin testing should be within one year and all females must have a UPT 48 hours before deploying. CHRs continue while deployed. Complete the weekly DNBI report while deployed as well as those on the reportable medical event list. Within 5 days of redeploying, present redeployment medical briefing, complete DD2796 and consider drawing serum to be stored in the DOD Serum repository on everyone with a possible exposure. TB skin testing should be done 3 months postdeployment.

Med Intel: Dave Passaro, who is also an 18D with 19th SFG (A), works with CSM Betty Rice as an S-2 officer. Information sources include Travax from Department of State, Disease and Environmental Alert Reports (DEARS) now know as Armed Forces Medical Intelligence Center Medical Environmental Disease Intelligence and Counter-measures (AFMIC MEDIC CD-ROM), environment, climate, water, blood, hyperbaric chambers, waste, plants & animals, health service assessment, foreign medical facilities handbook, evacuation capability, reports (special operations debriefing and retrieval system [SODARS], AARs, Intellink), and special studies. If you have a military or government e-mail address, contact directly http://mic.afmic.detrick.army.mil especially for infectious diseases and environmental injuries. Suggested resources would be AFMIC, phone: 910-432-9264. Other resources include TRAVAX.COM and PROMED, e-mail Majordomo@promedmail.org. After logging on, type "SUBSCRIBE PROMED". **He stressed the importance of sending copies of OCONUS AARs to him**. You can contact him at 910-432-9652/9264/2491 Fax 4292 DSN 239-xxxx STU III 9652.

Med Log: SFC Ramirez, 91S, reminded us that our **med chem kits of the Mark I injector, CANA and PB tabs are centrally managed by the MEDCOM and the request for release should go through USASOC Surgeon to the OTSG**. There is a catalog of all available medical supplies at the special operations forces support activity (SOFSA).

Retention: AD 18Ds over 18 years will be given an opportunity to test for PA certification with a four-year commitment if successful at the JSOMTC. Nothing will be funded centrally and no additional time will be provided for preparation or testing.

Opthalmic Surgery: MAJ Barnes, Deputy Command Surgeon and Chief SOF Ophthalmologist, reviewed keratorefractive surgery. Radial Kera-

otomy (RK) is never indicated and permanently disqualifying and nonwaiverable, due to permanent residual weakness to the corneal structure because the incision depths are over 90% of the thickness of the cornea. Photo Refractive Keratectomy (PRK) is approved after vision has stabilized as early as 3 months post-surgery. **Laser Assisted In-Situ Keratomileusis (LASIK) is not approved for SWCS schools but can be waived for SF duty retention only after examined by a SOF ophthalmologist**. PRK and LASIK are similar in success rates: 90-95% will see 20/40 or better but 1-2% will have permanent vision loss of 2 lines on the Snellen chart. LASIK is better in that the hazing and pain common to PRK is minimal to none. However, complications associated with the corneal flap may become extremely serious although rare. Most complications involve fungal infections and epithelial cell creep below the flap. Laser Assisted In-Situ Epithelial Keratomileusis (LASEK), a new modification of the LASIK whereby a small epithelial corneal layer is rolled back, is promising and may greatly reduce some of these complications. COL Enzenauer, 5/19th SFG (A) Bn Surgeon and paediatric ophthalmologist, recommends that PRK is best for nearsightedness or myopia less than 4 diopters. LASIK is better for myopes greater than 4 diopters. Dr. Enzenauer also recommends that a corneal specialist who does both procedures perform your surgery. My professional colleague and Army Reserve Oculoplastic Surgeon, Dr. Nevarez, concurs.

Chemical Bacteriological Radiological (CBR): PT Sean Phelps, 1/1 SFG (A) Battalion Surgeon, discussed a training exercise involving unknown CBR threats. He stressed the need to plan for a hasty recon before exfil and contamination containment plan. Two decon lanes are recommended whenever possible. Isolation for up to 17 days may be required for any potential biological agent exposure. There is no substitute for field-testing all equipment and practice. Med Log, Med Opns and NBC Officers have to coordinate both training and response especially with medevac to higher echelons with the Air Force. NAVSPECWAR is the leading authority in CBR for Special Operations and SOCOM Manual 3-11 should be added to all SOF libraries. Biofoam by MODEC is the recommended decon agent. A field expedient respirator can be made with three folded layers of cotton over the nose and mouth, which will filter out 80% of all airborne particles.

Blood Substitutes: MAJ John Mullen, 1st SFG (A) Group Surgeon, presented a special talk on blood substitutes, Hemoglobin Based Oxygen Carriers (HBOC), which should be considered a drug that carries oxygen. Hemorrhage accounts for the majority (60%) of preventable combat deaths and blood is difficult to transport and to store. Even in major disasters, all blood supplies will be depleted within 10 days. Hemopure has the advantage over Polyheme in that it does not require refrigeration. Hemopure has excellent oxygen exchange, low viscosity and colloidal properties. Several studies were reviewed. Clinical use is similar to Hespan.

Live Tissue Protocols: MAJ Drew Kosmowski, 7th SFG (A) Group Surgeon, presented live tissue protocols on Combat Trauma Management and Surgery. All participants sign non-disclosure statements and Battalion Commanders cosign as adjunct principal investigators (PIs). There is an online training requirement for all investigators including group and battalion surgeons and the commanders. They treated chest, abdominal and extremity wounds using a goat model and exported live tissue training OCONUS. As a side note, Dr. Kosmowski delivered a baby precipitously at a traffic checkpoint at Fort Bragg recently.

10th SFG: MAJ Craig Durck, 10th SFG (A) Group Surgeon, reviewed their activities and the importance of Medical Humanitarian Civic Actions (Med HCAs) in making inroads with the Serbians, especially the need for optometry and dentistry. In the event of a life-ending injury to a military member, a current leave earning statement (LES), commanding officer's (CO's) letter stating no judicial actions pending, and MD's letter of possible imminent death are all that is needed for medical retirement. These should be included in the servicemembers retirement packet (SRP). This type of medical retirement can be reversed. Live tissue training is now incorporated in the Special Forces Advanced Urban Combat (SFAUC) course. He also went over cold weather training opportunities and short discussion on cold injury. He discussed a mine injury occurring on post. A team medic was new from school and spent considerable time discussing team roles during a trauma incident which was very helpful. It took approximately 45 minutes for the casualty to be picked up by helicopter. He was a multiple trauma, including traumatic amputations and

pneumothorax. Preparation on the scene by the paramedic was credited with saving his life. Several important items were brought up. Training between civilian MEDEVAC will be important at Camp Williams.

19th SFG: LTC David Ludlow, 19th SFG (A) Group Surgeon, introduced National Guard (NG) SF to the mixed SOF audience. He discussed the importance of UW/GW medicine and its application to Balance Magic 01 and the medical training Joint Combined Exercise Training (JCET) mission to Mongolia. Dr. Ludlow applied these principles in discussing the clinical experiences and lack of tertiary care equipment and facilities in Mongolia. There are plans to continue using this mission as an annual training site for NG 18Ds. He also reviewed the NG SF experience and addressed the types of problems we face that are unique to NG SF Groups.

20th SFG: LTC Mike Mouri, 20th SFG (A) Group Surgeon, reinforced points raised by Dr. Ludlow and identified continuing problems among the NG SF Groups with training, funding and materiel. He reviewed the novel NTM field training exercise and Medic Stakes provided to our 18Ds this past March and the Guerrilla hospital template used in Trinidad during Tradewinds 01 along with the Guerrilla Hospital scenario adapted for the next NTM class that has been postponed until FY03. FY02 objectives outlined include Med HCA missions, CD ROM for NTM procedures, IRT proposal for MPT site surveys, additional animal use protocols and expanded medical practicums for all 18 series personnel.

Rangers: SFC H.R. Montgomery, Ranger Regimental Senior Medic, went over the Ranger First Responder course. Curriculum for this course should soon be available on CD-ROM. For non-medically trained individuals this is a 2 day course. However, senior individuals with some training go through it in 4 hours. They use a human patient simulator to train their medics. One was demonstrated at the meeting. He introduced **the four main training subjects: Physical Fitness, Medical Response, Marksmanship and Small Unit Tactics**. He reviewed the introduction of the Ranger Sked, the locking tourniquet, redesigned Israeli trauma dressing, standard Pelican cases for air and ground resupply, adapting the Thermal Angel IV warming system, Ranger Rescue wrap (Dr Down sleeping wrap with Velcro attachments and space blanket), and Ranger First Responder aid pack. They are updating SOPs and resupplying their Anniston Air Drop Medical bundle. Ranger MAG-1 glasses are now authorized for all Rangers and SF units. They are developing a Casualty Estimation Planning Tool and converting all Ranger medical officers to Flight Surgeons.

91W Enhancement: MAJ Fletcher, 96th CA Bn Vet Surgeon, discussed the **enhancement of teams from 30 to 48 with 91W replacing 18Ds** on the augmented teams. Medical activities focus on maintaining medical readiness of the deploying teams; only one is CONUS at this time. Since March, 18Ds have performed 58 deployments in 42 countries.

JSOM & R&D: Mr. Bob Clayton and Maj. Michelle DuGuay introduced the Journal of Special Operations Medicine (JSOM), its importance and legacy to the SOF medical community. **It is important to share information and to build a library of articles for the Journal with a focus on operational medicine.** Maj DuGuay is happy to report the JSOM will now be offering CME credits for physicians, PAs and nurses beginning with the Winter Edition. Enlisted medics and corpsmen have been able to receive CME through the journal since its Spring Edition. This is a great forum to communicate from 18D to 18D. COL Anderson urges Bn medical officers to mentor potential 18D authors and to encourage them to write even if they have a negative observation or complaint.

Mr. Bob Clayton, USSOCOM R&D, summarized the SOF research on different battlefield dressings as compared to tying off the bleeders. **The fibrin impregnated American Red Cross bandage did very well in trials but cost $300 for a 10-cm bandage.** The current Army dressing was 50% effective and did much better than the Marine Corps polymer dressing which proved totally ineffective at stopping hemorrhage. A chitosan dressing consisting of seashell substrate was only $50 and as efficacious as the fibrin dressing but was not involved in all the studies. He also introduced the SOF Medical Handbook in print with a CD ROM version due out soon.

MSG McMillan surveyed the recent research developments in SOF medicine. The highlights include the Special Forces Electronic Medical Handbook and the SF Tac Set enhancements: finger pulse oximeters, laptop EKGs, lightweight x-ray machines with digital imaging, one-hand tourniquets, IV solution warmers, lightweight laryngoscopes/diagnostic sets and card diagnostic sets.

Other News: MAJ Ferris, USASOC Med Opns Officer, discussed the process of modified table

of equipment (MTOE) changes. DA Form 2028 is for personnel changes and 4610-R for equipment changes. Levels of Care were defined as: Level 1--first responder; Level 2--physician supervision with a holding capability; Level 3--postoperative recovery; Level 4--rehabilitation; and Level 5--convalescence. The 528 Special Operations Support Battalion (SOSB) will no longer have the medical assets to provide Level 2 care so all medical assets and supports will have to be formally requested. Hugs, Bugs, Drugs & Specs are available at Level 2. **The forward surgical team (FST) team can only function at a Level 2 facility and performs stabilizing surgery only**. Any deployment over 15 days requires potable water and food approved by a vet. The Combat Support Hospital (CSH) will be the only deployable hospital facility. Travelers Emergency Network System (TENS), a subsidiary of Global Assist, will no longer contract medevac from foreign countries with SOF, based on patient evacuations with 3rd SFG (A) but they did provide excellent timely service when the Air Force was not available to assist. Each medevac costs TENS $50,000 per flight. Capt Gravely, AF critical care flight nurse, briefed aeromedical evacuation capabilities as fixed wing with costs of $8000/hr, which is managed by Tri-Care. First question to ask: Is local care available? Second question: Is illness or injury life threatening? No dedicated aeromedical evacuation currently exists but one may be designated. However the minimum arrival time from call to wheels down for a location within 90 minutes by air is 5 hours! The AF has committed to fly from Level 3 to Level 5, NOT into Level 2 although we would like them to fly into Level 2. Army Medical Department (AMEDD) has not provided medevac support for SOF. 160th will assist but needs advanced request.

CPT Van Steenwort, Special Operations Support Command (SOSCOM) Med Opns Officer, provided an overview of the SOSCOM and the medical support element. He stressed the need and importance for appropriate planning and devising a viable medical annex. His checklist highlighted the country survey and chemoprophylaxis during predeployment. Coordination with airflow is critical for timely movement. **During deployment, concentrate on what you have in theater, establish contacts and utilize them properly**. Postdeployment, perform medical surveillance. He presented the medical support of Cabanas 2000 and Operation Enduring Freedom as an example of providing medical support in theatre. Articulate the medical needs of SOF to the conventional AMEDD and to our partners to integrate joint assets. **At the Joint level, identify the Joint Special Operations Task Force (JSOTF) Surgeon and staff, establish logistics, provide for blood products, address all mission requirements, consider transportation costs, integrate with the CINC's objectives, obtain med Intel continuously, and make up shortages ASAP**. Remain flexible. Medical capabilities will shift to USAR. Be specific with your helo requests, establish rapport with the air planners, and sell joint medical package as an entity and insure you have a way to recapture your medical support personnel. Your med support cell needs to precede the FST team.

COL Farr introduced his entire staff and stressed that any animal use or performance enhancing drug protocols be forwarded to his office. If there is any need for blood down range, arrange to take a FST team. USASOC Drugs of Abuse Potential remain the same with ketamine and stadol. He submitted a **directive to allow 18Ds and SOCMs to prescribe drugs OCONUS to the OTSG and is awaiting approval**. SOFMSSP is open to SF medical officers but slots will not be available until Apr 02. MPT rotations for a one-month trauma rotation for SF medical officers is also highly recommended and he is looking for a highly motivated, high speed, low drag test subject/poster child. A biomed NCO MTOE slot has been recommended for FY06. Combat Authorized Stockage List (ASL) lists should be compiled by the Group Surgeon and forwarded to US Army Medical Materiel Agency (USAMMA) for funding and distribution. SF medical officers now have an extra alternative to obtain HMO status via the USAF School of Aerospace Medicine Hyperbaric Officers Course (USAFSAM HBOC). **Finally he stressed OPSEC, OPSEC, OPSEC!**

NAVSPECWARCOM

Larry Garsha, MD
CAPT, USN
Command Surgeon

SProphylactic Antibiotic Therapy for Combat Trauma

Mark Donald, PA-C

Although controversial, the question of the role of prophylactic antibiotics for war wounds has been continually raised in attempts to reduce the infection rates among combat causalities.[1, 2, 3, 4, 5] This question in turn, requires that medical choices be made as to which antibiotic or group of antibiotics and which route of administration would best be suited for adequate treatment of battlefield microbial contaminants. These choices feed the antibiotic debate and may even eclipse the question whether to treat prophylactically or empirically at all. The issue is further complicated by the lack of a defined and implemented standard of data collection or the continuity of specimen collection within the past research that is available. Specifically, many of the studies done to date cite cultures gathered after surgery at the echelon IV level.[1, 6, 7] This adds the question of when these pathogens were truly encountered. Were these pathogens introduced at the time of injury on the battlefield, nosocomially or somewhere along the evacuation and treatment route of the causality?[7, 8] Matsumoto's data suggests that the initial cultures were gathered at the echelon II and III level, clearly closer to area of battle. Unfortunately, this article does not answer which pathogens were consistently the culprit of infectivity. A historical review of available studies and data demonstrate a continuous shift of the most prevalent microbial flora encountered on the battlefield for not only each decade of warfare but also during the same year of a prolonged conflict.[7, 8, 9] Therefore, these questions should also be addressed when choosing a treatment modality for prophylactic therapy.

Research performed during the early 1970s provides evidence of a significant rise in Gram-negative bacteria most notably Pseudomonas and Proteus. This is believed to be due to the effective use of penicillin and sulfonamides from earlier conflicts. United States Marine casualties involved in the Vietnam conflict were noted to have Bacillus, Staphylococcus, Enterobacter and Alcaligenes upon admission with increases in Gram-negative flora Escherichia coli, Pseudomonas and Proteus with continued hospitalization. Little changed with the Gram-positive group during this period of review as Staphylococcus and Bacillus remained predominate throughout.[7] More recent studies of the late 1980s cite Pseudomonas and Staphylococcus to be nearly seventy percent of the bacteria encountered during the management of orthopedic war wounds.[1] Foreign data collected during the mid 1990s from the Bosnian conflict further re-enforced the presence of the two aforementioned pathogens, Pseudomonas and Staphylococcus, but differed as to which other microbacteria followed in descending prevalence.[10] Regardless which study an individual chooses to rely on, the underlying agreement that appears amongst most of the investigators is that the trauma surgeon will be faced with complications from multiple combinations of the infectious bacteria along with the possible sequela of orthopedic injuries and / or organ failure.[6] Therefore, the administration of prophylactic antibiotics, perhaps administered empirically by the battlefield medic as some have

suggested[4] could prove to be a great benefit in reducing the casualty morbidity and mortality rate in these instances.[1, 2]

Years of controlled studies and substantial clinical experience by the surgeon has led to the general acceptance for use of surgical antibiotic prophylaxis when the potential benefits transcend the expected risks.[11, 12] This practice is especially favored in contaminated or delayed surgery[5] or procedures that involve the implantation of foreign material, grafts or prosthetic devices. Mini, Nobili and Periti cite in their study regarding clean surgical procedures that an antibiotic treatment regime must be based upon the expected pathogens, appropriate pharmacokinetic properties as with tissue penetration and half-life and must also obtain adequate concentration levels pre and post operatively in order to be effective.[13] In this setting, some have suggested the use of a first or second-generation cephalosporin in combination with one or two glycopeptides in order to combat the increasing amount of methicillin-resistant Staphylococci aureus along with providing adequate Gram-negative coverage. Yet battlefield trauma is clearly not going to meet the standards for clean surgery as outlined in the United States National Research Council's wound classification criteria. Nor will there be any complete certainty as to what pathogens would be expected as discussed earlier, so the patient's condition upon arrival, along with organ involvement, gains even greater importance for the trauma surgeon's selection as to which antibiotic regime would be best suited for surgical prophylaxis on the modern day battlefield. Fortunately, the emergence of newer agents, treatment options and possible modifications to current doctrine may prove to be a considerable aid in the quest for an answer to all of these questions.

The fluoroquinolones, which have demonstrated an excellent coverage of Gram-negative microorganisms, have shown strong results in the treatment of resistant strains of Streptococcus but this is primarily in relation to oral therapy for respiratory tract and community acquired pathogenic infections.[14, 15] Although their use in combination with other agents providing a greater Gram-positive coverage in the treatment of osteomyelitis is promising,[16, 17] presently there is little data to support their individual use for treatment of anything beyond uncomplicated infections of the skin and soft tissue.[18] Some of these newer agents are available for parental administration, an important feature given the emphasis toward intravenous dosing as the preferred route of administration with the critically ill and shock patients[19] and supports their possible use in combat prophylaxis. However, more studies would be beneficial to evaluate their effectiveness in contaminated or dirty surgical procedures that would be generally associated with combat injuries.

The reemergence of the antimicrobial silver dressing and other topical antibiotics also warrants strong consideration[1] This adds uncertainty on the need or benefit derived from differentiating between prevention of systemic infectivity by topical means verses the systemic prophylactic treatment that has been discussed in the past. Perhaps there is a need to consider whether a combination of the two should be utilized. A brief look at the material released by the creators of the newer topical silver dressings shows much promise in providing a topical barrier to contamination and inhibition of bacterial growth. However, upon further review of the materials many questions remain. No company has compiled any significant in vivo data. The method of administration for protection beyond the site of application relies completely on the patient's cardiovascular perfusion to the area of application in order to achieve systemic benefit. A comprehensive literature search yielded no recent data from an independent source on silver dressings other than their traditional use with burn injuries, and neither of the newer silver dressings have been tested or used in a field or amphibious environment. There is a claim by at least one of these product's manufacturers that a patient's hygienic bathing will not compromise the dressing's effectiveness[20] but this does not adequately address the dressing's performance during a prolonged submersion within a salt or fresh water environment. How would the environmental extremes encountered during amphibious operations affect the moisture activated antimicrobial release of this dressing?[20]

Perhaps most intriguing is the arrival of a new class of antibiotics, oxazolidinones, which provide an additional treatment option that was unavailable in prior years.[21] The first agent in this new class of medications demonstrates an unmatched coverage and effectiveness against Gram-positive organisms along with a moderate effect in the treatment of Gram-negative pathogens

comparable to some of the presently utilized broad-spectrum antibiotics.[22] This agent has already been proven in human studies to be effective in the treatment of both complicated soft tissue infections and osteomyelitis.[23] This antibiotic has also demonstrated the highest rate of tissue perfusion despite the cardiovascular compromise of the patient.[24] Because oxazolidinones are primarily metabolized through oxidation within the cell membrane and not by the cytochrome P450 system, it allows for it to be utilized in patients with renal failure and hepatic insufficiency without dose adjustment.[25] This causes no reduction in antimicrobial effect and allows for non-organ dependent metabolism to occur within any tissue in the body. However, it is expensive and currently unfamiliar to many medical professionals.

Clearly, the role of empiric antibiotic therapy on the battlefield is far beyond anything that can be completely addressed or answered here by this author. What this article does hope to accomplish is to raise the awareness of the reader as to the complexity of the decision to use empiric antibiotic treatment or the more traditional prophylaxis therapy for war wounds. Much can be gained with formal, independent, controlled research to study the topical silver dressings and their effectiveness with the wounds generally encountered on the modern day battlefield. Live tissue studies utilizing these dressings within the field environment and their ability to withstand field operations to include phase replacement should be addressed. The data demonstrating the extremely effective oxazolidinone antibiotics and their use as either an independent agent or in conjunction with other antibiotics such as the fluoroquinolones also needs to be investigated. This investigation would perhaps include implementation in a field test environment as well as formal study within a surgical trauma center that would closely mimic those injuries believed to be encountered in the urban warfare setting. Finally, the need for some basis of standardization to provide continuity for future studies conducted on combat or field operations has to be set. In such an instance, much can be learned from the medical care provided to conventional forces and the humanitarian care given to the indigenous population of the region. If the research is conducted with some sort of similar guidelines, be it shipboard or within the Battalion Aid Station, the effects of these therapeutic treatment options currently being discussed would be invaluable.

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AFSOC

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Command Surgeon

CURRENT OPERATIONS: THE SPRINGBOARD FOR FUTURE SUCCESS

While the world has watched a unique war-winning effort unfold, several operational concepts in the medical business have been validated for the first time. The preparation of the last few years in Organizing, Training, and Equipping our medics has paid us back ten-fold. The dedication of those medics in the front lines, have saved lives again and again. All the credit goes to them for doing the job right. But, it took our predecessors' foresight to make the decisions that gave our dedicated professionals the tools and know-how to be successful.

The process of looking at what we have, who we have, and how to do better never stops. So, you might want to know what us Rear Echelon you-know-what's have been doing as current operations have unfolded. There has been an opportunity to evolve new doctrine, assess what works and what doesn't, and look toward the future as we pursue new plans for the war against terrorism.

We saw at least three opportunities in that future: (1) modernization of equipment, (2) enhancement of diagnostic capability, and (3) further efforts to modularize and tailor medical equipment to mission requirements.

The first of these, modernizing equipment, is an ongoing process, not only for the Air Force Medical Service, but also for the entire DOD. It's enough to say that the medics need to advocate for improvement in lifesaving, with an emphasis on the operational support piece of healthcare, along with modernization needed throughout the Force. And Special Operations must be a partner. The Biomedical Initiatives Steering Committee, mentioned above, has a charter that considers only war fighter physiological enhancement, and not medical care, as such. Modernization of SOF medical capability, as a treatment and prevention activity in operations, must proceed along service lines. Items such as the Dry Fibrin Bandage and other hemostatic devices and applications have been available and awaiting funding for some time. The USSOCOM Surgeon has taken on advocacy for ASAP development of these strategies-every life lost that we can save through the use of a "nearly fieldable" medical item is a priceless investment.

The second opportunity for the future, diagnostic sensory input, comes from personal field experience of managing severe trauma. While we've made great strides in putting the medical equipment to intervene into the hands of the surgeon, flight doc, or paramedic, we haven't followed up that capability with the technology for advanced diagnosis in the field. Most of the technology available in civilian medical centers that does highly accurate diagnostic testing is large, bulky, and heavy-in a word, unfieldable. But that doesn't mean that there are not alternative technological solutions that allow our teams to stay "lean and lightweight It would dramatically improve our skills if basic techniques of observation, inspection, palpation, and percussion (not to mention probing, injecting and the like) could be done reliably under extreme adversity, and without requiring multiple pallets for airlift. For instance, a glove-mounted scanner transmitting an image to a heads up display, using "noise" (vibration) canceling technolo-

gy, would fit part of the bill. Star Trek's Dr. McCoy would be envious, but there is no theoretical impediment to devices like these that I am aware of. To accurately assess and stabilize a life threatening, intra-abdominal injury without waiting for arrival back at a secure area could be a boon. Our technology has out-run our ability to use it under the conditions of immediacy, austerity, and hazard that the situation sometimes requires. In AFSOC we are assembling a "portable ICU" that will add oxymetry, EKG, spirometry, and ultrasound to the kitbag that our field teams carry. Total weight: 2 pounds (including sensors, software and hardware). This package should be available to the field for use by SOF by next month.

Lastly, as mentioned earlier, a key success in becoming "lighter and leaner" has been the capacity to modularize the medical support "package" for any given mission. But this success is currently limited to back packs and nesting boxes. Also, a weakness of being very light and lean, is….little depth. How do we accomplish just-in-time resupply of IV fluids and irrigation for teams that carry little of this in order to keep their equipment man-portable? With computer systems and automated inventory management it is not hard to imagine forging clinical guidelines for mission scenarios that would be linked to the types of casualties expected and the medical supplies needed for those types. It should be possible to configure one-off medical equipment package in minutes, focused on the scenario and wasting nothing. Or, it may be possible with telemetry to monitor an inbound casualty in enough detail to configure a real-time treatment kit, ready to take the appropriate treatment action immediately upon arrival. Lastly, it should be possible to bring in re-supply for the far-forward teams in modules on opportune airlift. Some of this is already being done, on an ad hoc basis. But we need a system that keeps our medical teams fully capable without impact to the casualty. In SOF, the need is acute: we should continue to look for opportunities to carry all that we need but only what we need to do the job.

Education & Training

Medical Risk Assessments: Expanded Mission for SOF Medical Personnel

William M. Darby, MPH, MEPM, REHS

Situation: You, as the team leader/senior team NCO of a small unit, are told to conduct a series of raids on caves within your AOR. Would you have your personnel perform the mission without prior reconnaissance or intelligence? NO! Would you deploy to those same caves without knowing all of the potential medical threats in the region? How do you determine what the medical risks to SOF assets are? The answer is medical risk assessments.

Risk management in the military is not a new concept. Military leaders have been using FM 100-14,[1] AFPAM 90-902[2] and OPNAVINST 3500.39[3] to determine risks associated with safety issues for years. These documents describe the 5-step continuous application process of risk management: identify the threats, assess the threats, develop controls and make risk decisions, implement controls, and supervise and review. FM 3-100.12[4] (MCRP 5-12.1C, NTTP 5-03.5, AFTTP(I) 3-2.34) takes the process a step further connecting force protection with the risk management process by identifying three areas of primary intervention:

Planning - conduct risk assessment & develop controls.
Operations - update risk assessment & implement controls.
Sustainment - update assessment & adjust controls.

However, none of these documents specifically address how to use risk assessments within the medical arena.

Historically, SOF medical assets are proficient when assessing and treating common medical threats (the big 6): Heat, Cold, Food, Water, Insects, and Disease. Operation Desert Shield/ Desert Storm and the search for answers to the Gulf War Syndrome demonstrated that medical hazards on the battlefield are not limited to just these six. As a result, DOD issued DODD 6490.2[5] and DODI 6490.3[6] requiring the identification and documentation of all potential health threats to service members before, during and after deployment. Further, HQ, Department of the Army Letter 1-01-1,[7] dated 27 June 2001, states:

"Under current DOD policy, every commander, leader, and manager is responsible to protect personnel from harmful Occupational and Environmental Health (OEH) hazards during peacetime, during Stability and Support Operations (SASO) deployments, and during war."

OEH hazards are defined as:

1) Accidental or deliberate release of non-weaponized Toxic Industrial Materials (TIMs), hazardous physical agents, ionizing and non-ionizing radiological hazards, and the residue from the use of nuclear or chemical weapons.
2) Environmental contaminants to include vector and arthropod-borne threats, residues, or agents, naturally occurring or resulting from previous activities of U.S. forces or other concerns, such as non-U.S. military forces, local national governments, or local national agricultural, industrial, or commercial activities.
3) The TIMs or hazardous physical agents currently being generated as a by-product of the activities of U.S. forces or other concerns, such as non-U.S. military forces, local national governments, or local national agricultural, industrial or commercial activities.

In order to monitor potential OEH hazards, USSOCOM Directive 40-4,[8] Medical Surveillance, outlines OEH surveillance requirements for SOF units. It also requires that subordinate command surgeons:

1) Ensure that force health protection begins at the inception of planning and initial deployment.
2) Identify/monitor/evaluate environmental, health, occupational and epidemiological threats.

This requires the SOF medical asset to include OEH hazards in the medical risk assessment process (i.e., compare risk to SOF forces due to EOH hazards to risks associated with the "big 6"). So how do you compare the risk of being bitten by a mosquito carrying dengue hemorrhagic fever, the risk of becoming sick from buried hazardous waste, and the risk of heat injuries? One would first turn to the traditional venues (Navy Environmental and Preventive Medicine Unit (NEPMU) Force Health

Protection (FHP) plans, the Armed Forces Medical Intelligence Center (AFMIC) MEDIC CD-ROM, AFMIC Environmental Assessments, etc.) of medical intelligence. They do not, however, adequately address OEH threats in enough detail to be useful in developing a medical risk assessment.

Better guidance is found in U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) Technical Guide (TG) 248,[9] which outlines the processes and the tools that can be used to make appropriate decisions based on the medical threat. TG 248 is the first place that all of the potential health hazards (OEH and the "big 6") are lumped together. Health hazards are placed into four categories:

1) No health threat - a hazard only when there is no evidence to indicate its presence in the environment or if there is enough data to know that the concentration and extent of its presence would not pose a credible health threat.

2) Health threats - all identified hazards which, under the right circumstances, could result in adverse health effects to certain individuals but are not expected to have immediate medical impacts on overall mission effectiveness.

3) Health threats of concern to the command - health threats that are of immediate importance to the commander based on the nature of the operation and/or related considerations.

4) Medical threats - a subset of health threats that has the potential to render a field unit combat or mission ineffective.

This leads to the question "How do you know if a hazard is present or not?" Prior to deployment, the answer can be found through an industrial hazard assessment (IHA). IHAs are a coordinated effort between USACHPPM and AFMIC. The primary chemical hazards are identified for the area of interest. These hazards represent the most toxic, flammable, and explosive of the chemicals potentially located in the area, and thus represent the chemicals most likely to pose acute health risks to deployed U.S. personnel from exposure to TIMs. Additionally, IHAs should be the first step (Figure 1) in determining what environmental samples need to be collected and what control measures need to be implemented during the deployment. IHAs can be requested by using a secure server to go online to: http://usachppm1.army.smil.mil/. USACHPPM TGs and previous IHAs can also be accessed from this site.

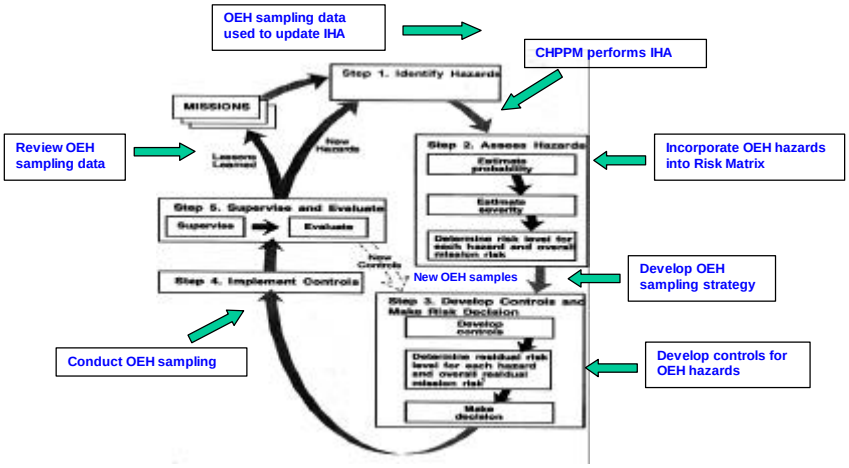


Figure 1. IHA Role in Risk Assessment Process

After the threat has been identified, the next step is to assess the threat. USACHPPM TG 230[10] describes the process of determining the severity, probability, and the risk associated with the presence of OEH hazards based on quantities. Concentrations of chemicals (based on sampling data collected by following USACHPPM TG 251)[11]

Instruction for Use: Starting at the top row, read each row from left to right.

IF THE CONCENTRATION IN _____IS...						
Water	<MEG	≥ MEG that is not based on TB MED 577 (see Water Note)		≥ MEG that is based on TB MED (see Water Note)	see Water Note	see Water Note
Soil	<MEG	≥ MEG (see Soil Note)		see Soil Note	see Soil Note	see Soil Note
Air	<1-yr MEG or <14-d MEG	≥1-yr MEG or ≥ 14-d MEG but < 1 to 24-hr Min-MEGs	≥1-yr MEG or ≥ 14-d MEG but ≥ 1 to 24-hr Min-MEGs	≥1-hr Min MEG but ≤ 1-hr Sig MEG	≥1-hr Sig-MEG but ≤ 1-hr Sev MEG	> 1 hr Sev-MEG
In general, the associated health outcome attributable to the exposure is...percentages are very uncertain and will vary by chemical and other confounding factors	No cases of illness or non-cancer disease and less than 1 cancer case in 10,000 occuring after the mission	0-10% of personnel may develop illness or chronic disease after the mission	0-10% of personnel may develop mild illness or temporary irritation during the mission	> 10% of personnel may experience mild illness, irritation and 0-10% of personnel may develop severe illness that befgins to impair functional abilities during the mission	10-25% of personnel mayexperience severe illness, irritation and more noticeable degradation of performance capabilities and other personnel will suffer some mild effects during the mission	> 25% of personnel may experience severe incapacitating effects and fatalities will begin to occur just above the Sev Air-MEG with increasing number of fatalities as concentrations increase during the mission
	?	?		?	?	?
Then the suggested severity rank is...	NONE	NEGLIGIBLE		MARGINAL	CRITICAL	CATASTROPHIC
and the hazard poses...	NO HEALTH THREAT	A HEALTH THREAT		A MEDICAL THREAT		

WATER NOTE: Concentrations greater than the MEG may result in Hazard Severity from Marginal to Catastrophic if certain chemicals are present in high enough quantities and there is sufficient consumption. Additional information in the Notes column of the MEG Tables should be evaluated regarding impacts of higher levels of exposure.

SOIL NOTE: Soil is unlikely to represent a hazard that would yield a Medical Threat. Additional information in the Notes column of the MEG Tables should be evaluated regarding impacts of higher levels of exposure.

PERCENT OF PERSONNEL THAT WILL EXPERIENCE CONCENTRATIONS EQUAL TO OR GREATER THAN MEG*

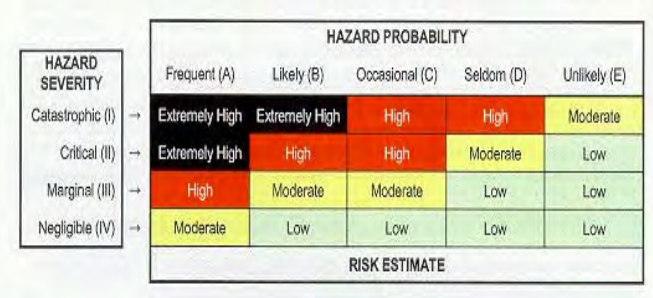
< 10% **Unlikely**	10 <25% **Seldom**	25 <50% **Occasional**	50 <75% **Likely**	>75% **Frequent**

*Determination of the percent of personnel exposed to a chemical or mixture specifically above a guideline level can be based on modeling, gridding, or generalized assumptions.

Figure 2. USACHPPM TG 230 Severity/Probability Tables (Specific guidelines and definitions of acronyms are found in TG 230.)

correlate to severity rankings (Figure 2). Percent of personnel that are likely to be exposed to those concentrations determines the probability.

These properties are then plugged into the risk



HAZARD SEVERITY	HAZARD PROBABILITY				
	Frequent (A)	Likely (B)	Occasional (C)	Seldom (D)	Unlikely (E)
Catastrophic (I) →	Extremely High	Extremely High	High	High	Moderate
Critical (II) →	Extremely High	High	High	Moderate	Low
Marginal (III) →	High	Moderate	Moderate	Low	Low
Negligible (IV) →	Moderate	Low	Low	Low	Low
	RISK ESTIMATE				

Figure 3. Risk Assessment Matrix

assessment matrix (Figure 3) to determine the initial risk. By going through this process you can compare the risk of the mosquito to the pool of "goo" on the ground.

Medical risk assessments are valuable tools for SOF medical assets. By performing these activities, SOF medical assets significantly improve their ability to identify potential risks to deployed personnel. Greater identification accuracy allows for the development of better control measures and determining the initial sampling requirements for the location. Better controls equate to lower residual risk to SOF assests. By using all of these tools, SOF medical assets can ensure that their commanders make fully informed decisions based on all of the medical threats.

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Functions of the Biomedical Initiatives Steering Committee

Robert Clayton, SVERDRUP

In the inaugural issue of the Journal of Special Operations Medicine (JSOM), the functions of the USSOCOM Biomedical Initiatives Steering Committee (BISC) were discussed. The BISC is chartered and functions in accordance USSCOM Directive 40-1. Over the past year, the JSOM has been used to relay some of the research that the BISC has supported. As each SOF Component functions differently in relating the BISC project to the SOF community, the JSOM will be used to augment this capability. In future editions of the JSOM the results of the research and publish articles will be included.

As stated before, the BISC receives input through the Component Surgeons Offices. The Special Operational Acquisition and Logistics Center (SOAL) manages the MEDTECH programs and announces research topics in the Commerce Business Daily with a Broad Agency Announcement (BAA). Research topics are published to canvas industry, academe and the DOD Laboratory System to submit proposals for consideration by the BISC. The BISC ranks the proposal using several criteria. Unsolicited proposals are given equal consideration to solicited proposals, but the significant factor is the relevance to SOF missions/requirements.

Each member of SOF is encouraged to participate in the thought process that provides the BISC with topics. If you have an idea, a problem, a suggestion, an operational shortcoming, or an area which requires improvement, pass it to your Component Surgeon. Over the past several years the BISC has established a good rapport with the Services, which in turn have begun to incorporate SOF requirements into their own. The BISC has made headway in getting the Services to support and fund those non-SOF peculiar needs. One of the strong points of the BISC is the ability to leverage program dollars with the Services R&D capabilities.

The SOF Medical Handbook has been in the field since late summer. If you have not received your copy, contact your senior medic. Based upon the feedback I have received, the handbook must be perfect. I say that because I have not received any comments or criticism on the content, size, etc. In this issue of the journal there are several excellent articles, one on cold weather injuries and another on the use of pack animals. Coincidentally there are sections in the handbook that focus on the treatment of cold weather injuries and on veterinary medicine. The plan is to revise the handbook in about a year. You, the user, play a key part in this revision. Without your input the revision will be difficult. The handbook, like all of the BISC products, is designed to support or provide the SOF medics with the tools to accomplish your tasks. The success of all research and development programs is dependent upon the needs of the user and user feedback.

Another ongoing project that impacts each of you is the Special Operations Computer Assisted Reference Medical System (SOCAMRS). This is a quick reference set that is embedded into a CD-ROM set which is currently 4 Compact Disc. The SOCAMR is designed to provide the medic with a compendium of various articles from some of the leading medical journals, and other publications, along with those hard to find military publications, regulations and other reference material. Again, you are the key to the content. If you want improvements or have suggestions contact your Component Surgeons.

In the last issue of the JSOM I mentioned that the Hemostatic Dressing, also know as the Fibrin Dressing, would soon be fielded. During the Special Operations Components Surgeon's Conference in December and at the quarterly BISC meeting on 14 December, I discussed the program and the anticipated fielding schedule. On 17 December I was notified that the Medical Research and Materiel Command (MRMC) had exhausted all FY02 funds. Currently there is an $8.2 million shortfall that is delaying all further development. USSOCOM and CENTCOM are working closely with MRMC in attempting to overcome this issue. Hopefully by the time this article is published this shortfall will be resolved.

Remember the BISC was designed to address the needs of the SOF medical community. Your input to this process is necessary. The BISC meets quarterly, and each Component Surgeon has a voice and a vote in the process.

A Layman's Guide to Complex Scientific Research Articles

Scientists and Principle Investigators (PIs) will usually articulate their findings in either a quasi-technical term or embellished data with minute symbols that either confuse or stimulate the thought processes. Normally the research is conducted on a subject that no matter how many previous research reports have been published, the "n" factors, "K" factors or some other factor was either overlooked or over used. Therefore, additional research will quantify the end point.

With this in mind, it is important that when reading these findings, statistical analysis, etc., a liberal interpretation must be in order. I have accumulated several translations of scientific findings to help understand the true meaning of the PI's research/report. I only lay claim to one of these which is listed last:

Scientific Jargon	**Translation**
"It is believed that…"	I think
"It is generally believed that…"	A couple of my friends think so too
"It has long been held that…"	I did not bother to look it up
"While I have not found definite answers to these questions…"	The data made no sense, but I am publishing it anyway
"It might be argued that…"	I can answer this objection so well that I now raise it
"Of great theoretical and practical importance…"	Somewhat interesting to me
"Of extreme purity, ultrapure…"	Composition unknown
"The W-1B system was chosen as especially suitable to show the predicted behavior..."	The fellow in the next lab had some already made up
"Although some detail has been lost in the reproduction, it is clear from the original micrograph..."	It is impossible to tell from the micrograph
"Presumably at longer times…"	I did not take time to find out
"Qualitatively correct...Correct within an order of magnitude..."	Wrong
"Three samples were chosen for detailed study…"	The others did not make sense
"Typical results are shown in Fig.2..."	The best results are shown in Fig.2
"The most reliable values are given by Jones…"	Jones is a friend of mine
"Subjected to controlled stress during the experiment…"	Accidentally dropped on the floor
"Handled with extreme care during the experiment…"	Not dropped on the floor
" A discussion of the remaining data will be forthcoming..."	Some of my results don't make sense
"A complete understanding clearly requires much more work..."	None of my results make sense
"I would be remiss not to thank Theodore Bumstead for assistance in the experimental aspects of this investigation, and Dr. Barbara Knowles for helpful comments during the analytical phase..."	Ted did all of the work and Barb explained it to me

If none of this makes sense, just remember what **food for thought** turns into once digested.

CE/CME ARTICLE

Dive Medical Brief: A Comprehensive Review for the Special Forces Dive Medical Technician

Part One

Eric D. Martin, DO

Abstract

This article provides an overview/review of dive medicine for the Special Forces dive medical technician with a body of information organized in a concise format that addresses the prevention and treatment of various diving medical injuries. Mechanisms, treatments, etc. are abbreviated with deference to the US Navy Dive Manual.

The dive medical brief focuses on five areas: 1) Dive physics and gas laws, 2) Barotrauma, 3) Pulmonary over inflation injuries, 4) Decompression sickness, and 5) Gas related injuries unique to closed circuit diving.

The positive response from combat divers and dive medical technicians who have been trained suggests that this medical brief could serve as a standard review and recertification program for all Special Forces dive medical technicians and would serve to benefit sister services as well as a review.

OBJECTIVES-

1. Describe how to recognize the signs and symptoms of in-water diving injuries.
2. Explain how to render the appropriate medical treatment, including recompression therapy.

Complete Test on Page 51--Answer sheet on Page 49

Completion of this article and test offers 1.75CME and 2.0 CNE/CEH for nurses.

Disclosure:

Dr. Eric D. Martin has indicated that his presentation will include discussion of commercial products or services. However, he has no significant financial relationship with a commercial entity whose products or services are related to the subject matter of the topic he will be addressing.

INTRODUCTION

Currently the U. S. military does not have a standardized medical brief for Diving Operations. This article is a retrospective review of the literature detailing the various dive injuries that can occur in an undersea environment. The brief serves two purposes. It provides the dive medical technician with refresher training to better understand the pathophysiology behind dive injuries, and how to diagnose and treat them. It also represents a comprehensive guide to teach combat divers the hazards of thermal stress, physiological stress, and environmental stress from changes in the hydrostatic ambient pressure acting upon their bodies. This pressure change can cause barotrauma to the ears and sinuses, predispose to over-inflation injuries of the lungs, or lead to decompression sickness from increasing nitrogen gas trapped in the body's tissues or vascular system.

Health care providers in the military are seen as force multipliers, and their job is to "preserve the human component of the combat weapon system." This preservation of the human component can best be achieved by preventive medicine. Through education, injury to the diver can be minimized.

The instructional program described in this article is based on the fundamentals of a diving pro-

file that consists of three phases: the descent, the bottom time, and the ascent. The dive brief addresses the various diving medical injuries unique to each of these phases.

OBSERVATIONS

Although the dive medical technicians receive excellent introductory training at Key West, Florida, a lapse of time between training and application is frequently problematic. In all the training requalification this author was involved in, several divers sustained injuries. The injuries occured as a result of inexperience and a lack of knowledge about anatomy, physiology, and the changes that occur when the body is exposed to a hyperbaric environment.

A very common injury among divers is barotrauma to the middle ear cavity and sinuses. An analysis of the dive profiles, histories, and chief complaints of injured divers indicated that, though divers are highly trained, disciplined soldiers, they lacked understanding of the medical implications of their actions in the water contributed to unnecessary risk.

The more information divers and medical technicians acquired about diving medicine, however, the less likely they were to ignore warning signs and symptoms and the more likely they were to respond appropriately in the water and on the surface. The need for standardized instruction in diving medicine review became evident.

RESULT

Based on my observations and interviews with divers and dive medical technicians, I developed the *Dive Medical Brief* by organizing and presenting the information they need to have in order to execute their mission successfully with a minimum of risk. The brief reviews the following topics: 1) dive physics and gas laws, 2) barotrauma, 3) pulmonary over-inflation injuries, 4) decompression sickness, and 5) gas-related injuries unique to closed-circuit diving. It can be used as a standard for all training sessions. This article is an elaboration of the content of the Dive Medical Brief.

DIVE PHYSICS

A review of diving physics will help dive medical technicians understand the causes of dysbaric injuries.

BOYLE'S LAW: THE PRESSURE/VOLUME LAW ($P_1 V_1 / P_2 V_2$)

Given a constant temperature, the absolute pressure and volume of a discrete quantity of gas are inversely related. The greater or higher the absolute pressure, the smaller the volume. The lower the absolute pressure, the greater the volume becomes.

CHARLES' LAW: THE TEMPERATURE/VOLUME LAW ($P_1 V_1 T_2 / P_2 V_2 T_1$)

If the pressure is kept constant, as in certain types of freely expanding containers, the volume of gas will increase as the temperature increases and the volume of gas will decrease as the temperature decreases.

GAY–LUSSAC'S LAW: THE PRESSURE/TEMPERATURE LAW ($P_1 T_2 / P_2 T_1$)

For any gas at a constant volume, the pressure of the gas will vary directly with the absolute temperature.

GENERAL GAS LAW: ($P_1 V_1 T_2 / P_2 V_2 T_1$)

A convenient combination of Boyle's law, Charles' Law, and Gay–Lussac's Law, the General Gas Law is used to predict the behavior of a given quantity of gas when changes may be expected in any or all of the variables. There can only be one unknown.

DALTON'S LAW: THE PARTIAL PRESSURE LAW: PP +(DEPTH X .445) + 14.7 = X% OF GAS

The total pressure exerted by all the gases within a container will be equal to the sum of the pressures exerted by each of the individual gases within that container.

ARCHIMEDES' PRINCIPLE/PROPERTIES OF WATER

Buoyancy: Any object wholly or partially immersed in a fluid is buoyed up by a force equal to the weight of the fluid displaced by the object. One cubic foot of salt water weighs 64 lbs. One cubic foot of fresh water weighs 62.4 lbs.

Light Absorption: As a diver descends, the dispersion of colors becomes imminent. Reds disappear at 15 ft., oranges disappear at 30 ft., yellows disappear at 60 ft., and greens disappear at 70 ft. Blues and violets will be predominant at greater depths.

Diffusion: Light rays are scattered and reflected. This reduces the total illumination, but at the same time aids the diver's vision by spreading the light evenly. Shadows are softened or eliminated.

Turbidity: Impurities can cut off light, thus blocking vision. If turbidity is severe, the diver's vision will be severely limited the minute he goes below the surface.

Sound: Sound travels four times faster in the water than in the air. The human ears cannot detect the difference in arrival times at each ear, thus making it very difficult to detect from which direction the sounds come.

Heat: Heat is transmitted by conduction and convec-

tion. The human body loses heat faster in the water than in the air, and an unprotected diver will become chilled in water at a temperature of 70^{o} F.

Formulas:

* One foot of seawater exerts 0.445 pounds per square inch
* $^{o}F + 460 = {}^{o}Rankin$, $^{o}C + 273 = {}^{o}Kelvin$
* To convert Celsius to Fahrenheit:

  $^{o}F = (^{o}C \times 1.8) + 32$
* To convert Fahrenheit to Celsius:

  $^{o}C = (^{o}F - 32) \times 0.55$

Barotrauma

Category	Description	Restriction from Diving
TEED 0	Normal	
TEED 1	Vascular congestion of pars. umbo	1 to 3 days
TEED 2	Vascular congestion of entire TM	1 to 3 days
TEED 3	Hemorrhage within TM	1 week
TEED 4	Hemorrhage into middle ear cavity	4 weeks
TEED 5	TM rupture	6-8 weeks

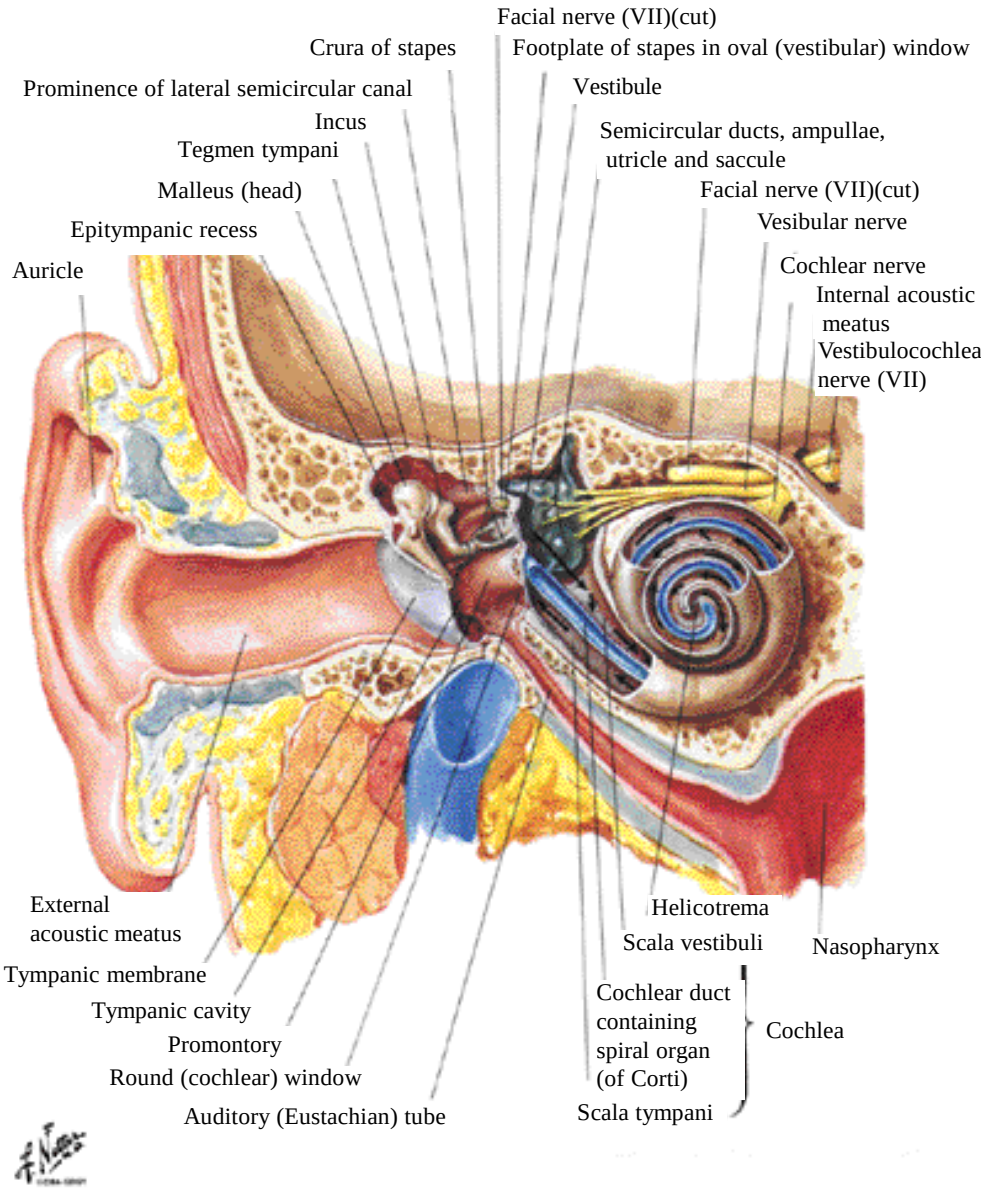


Diagram of ear

Note: arrows indicate course of sound waves

INJURIES THAT OCCUR DURING THE DESCENT: BAROTRAUMA

Dive medical technicians need to recognize signs and symptoms of barotrauma to the external, middle, and inner ear in order to apply the appropriate treatment.

EXTERNAL EAR SQUEEZE

External ear squeeze occurs when the tympanic membrane (TM) bulges outward if air cannot freely enter the ear canal. The mucosal lining of the external auditory canal becomes edematous, hemorrhagic, and hyperemic. Cause: Cerumen ear plugs, tight fitting dive hoods. The diver experiences pain not ameliorated by equalization. To treat this condition, the diver should slowly ascend in the water.[2]

MIDDLE EAR SQUEEZE

The middle ear cavity is a gas-filled structure surrounded by bone. The TM is distensible. The eustachian tube connecting to the nasal pharynx serves as an avenue for gas venting. Three bony auditory ossicles (malleous, incus, and stapes) serve as a conduction apparatus to

transmit sound energy through vibrations into the inner ear cavity.

During descent, the TM is forced inward by unbalanced pressures on each of its surfaces. A feeling of fullness occurs at a pressure of 60 mmHg (3 feet of sea water[fsw]). Equalization is nearly impossible at 90-120 mmHg (5 fsw). As the differential pressure increases, changes in the TM may include capillary dilation, edema of the mucosa, hemorrhage of the mucosa, hemorrhage into the middle ear cavity, and rupture.[3]

TM Rupture Signs and Symptoms

The following signs coincide with TM rupture: conductive hearing loss, vertigo, hemorrhage, and the disappearance of pain. The absence of pain should not lead a health care provider to think this is an innocuous injury, but rather it should serve as a warning sign that TM rupture has possibly occurred.

Prevention and Treatment

The diver should keep ahead of the pressure by performing gentle Valsalva maneuvers. He should clear his ears every two to three feet as he descends and descend in a head-up position. When a diver experiences pain in his ear, he is close to the differential pressure at which he will be unable to clear. He should stop his descent and ascend slowly until the pressure dissipates causing the pain in his ear to subside. The best remedy is for the diver to ascend to a depth of relief and gently try to clear his ear again. Consider ENT consult for rupture and avoid eardrops if ruptured. Do not dive with an upper respiratory infection (URI)

Pharmaceutical agents that may be used for treatment are:

* decongestants (Sudafed 60 mg: PO qid)
* antihistamines (Zyrtec 10 mg: PO qd)
* nasal steroids (Flonase two puffs each nostril: qd)
* antibiotics (Penicillin or Erythromycin 250 mg: PO qid for 10 days)

Editor's Note: Antibiotics are not needed for TM rupture *per se*, unless complications develop.

INNER EAR SQUEEZE

Serious manifestations of inner ear barotrauma is rupture of the round (cochlear) or, rarely, the oval (vestibular) window. A pressure differential between the inner and middle ear can cause either an implosive or explosive window rupture. This usually occurs during a difficult descent, close to the surface as the pressure differential is accentuated by a forceful Valsalva maneuver. This addition of pressure to the middle ear induces an increase in pressure on the inner-ear windows.

Implosion occurs when sudden equalization causes exaggerated movement of the ossicular chain (malleus, incus, stapes) through the oval (vestibular) window due to a forceful Valsalva. [5, 6]

Explosion results from an excessive pressure differential produced by excessive absorption of gases within the middle ear. Contributing to this phenomenon is the over-pressurization of cerebrospinal fluid (CSF), which generally occurs either as a result of excessive production or defective absorption of the CSF caused by inflammatory changes within the inner ear.[5, 6]

Signs and Symptoms

Barotrauma to the round or oval window that results in rupture is marked by the onset of severe vertigo not relieved with ascent, tinnitus, sensorineural hearing loss, nystagmus, and a feeling of fullness in the affected ear.[5]

Prevention and Treatment

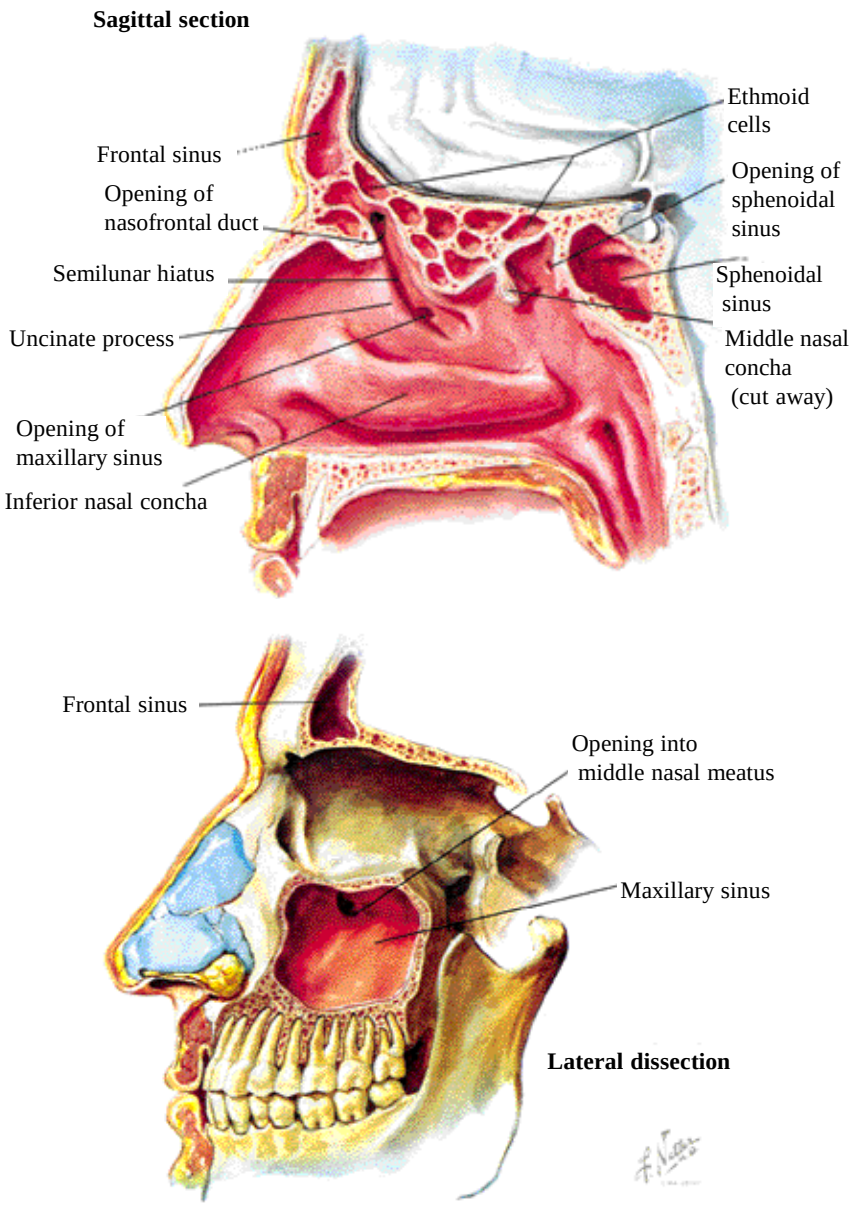
To prevent this condition, the diver should avoid forceful Valsalva maneuvers.

Pharmacotherapy for this condition includes:

* antivertiginous medication (Meclizine [Antivert] 25 mg: PO tid)
* antiemetic medication (Promethazine [Phenergan] 25 mg: PO tid)

The patient should be evaluated for possible early surgical repair by an ear, nose, and throat (E.N.T.) surgeon to determine if a perilymph fistula (abnormal communication between the scala vestibuli and scala tympani) exists. An audiogram and an electronystagmogram are helpful in locating and assessing the extent of the perilymph fistula if one exists. Patients whose audiogram shows a flattened curve over all frequency ranges seem to recover more completely than those patients whose initial deficit is confined to the higher frequencies. Round or oval window ruptures may heal spontaneously after five to seven days. [5, 7]

Note of Caution: Inner-ear barotrauma and inner-ear decompression sickness can be difficult to differentiate in terms of symptomatic presentation. The treatments are quite different. It is important, therefore, for divers to pay very close attention to the onset of any symptoms (i.e., did symptoms occur during descent after a forceful Valsalva or did they occur because of decompression



sickness [DCS]). DCS is still possible despite following the decompression tables. Inner ear DCS is rare and usually occurs in saturation divers.

ALTERNOBARIC VERTIGO

Alternobaric vertigo is a transient, sudden, and overwhelming feeling of spinning and disorientation, occurring more frequently on ascent rather than descent. It is caused by unilateral pressure differential greater than 50 cmH_20 between the middle and inner ear.

This condition is due to the diver's inability to equalize one or both ears and usually lasts less than one minute. The diver may feel a fullness preceding the onset of vertigo. Alternobaric vertigo on descent usually follows a difficult descent with many forceful Valsalva maneuvers and sudden equalization.

Very rarely, one of the complications of alternobaric vertigo is facial nerve palsy. If the facial nerve is exposed to prolonged middle-ear over-pressurization, its blood supply can be compromised with resulting facial palsy. Complete unilateral facial nerve palsy is the most extreme result, but is transient and resolves as soon as circulation is restored by equalizing middle-ear pressure.

Signs and Symptoms

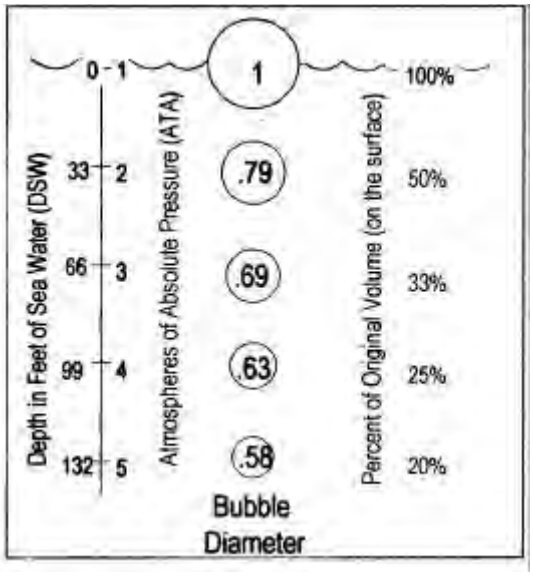
The signs and symptoms are in-water vertigo, nausea, vomiting, and nystagmus.

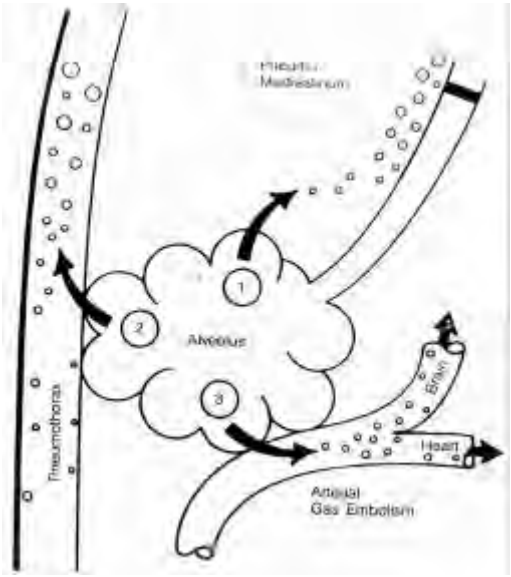
Prevention and Treatment

To treat the condition, the diver should slowly ascend in a controlled fashion. Decongestants hasten clearing once the diver is on the surface. A myringotomy should be performed only by an E.N.T. specialist if other modalities fail. [8]

SINUS SQUEEZE

Sinus squeeze occurs less frequently than does ear squeeze and is usually associated with a pre-existing upper respiratory infection that distorts the sinus ostia. Sinus squeeze is also associated with mucosal polyps and cysts. They most often involve the frontal and maxillary sinuses and





occur with reverse maxillary sinus squeeze. Epistaxis (nose bleed) may also occur. As the diver surfaces, blood and mucous may fill the bottom of the face mask. This blood normally comes from the nasal pharynx out through the nose because this is where the ostia are anatomically located to drain each of the respective sinuses.

Prevention and Treatment

The diver should ascend and equalize if he experiences pain over the affected sinus area during descent. Adjunctive pharmaceutical treatments include decongestants and nasal steroids. Antibiotics may also be administered:

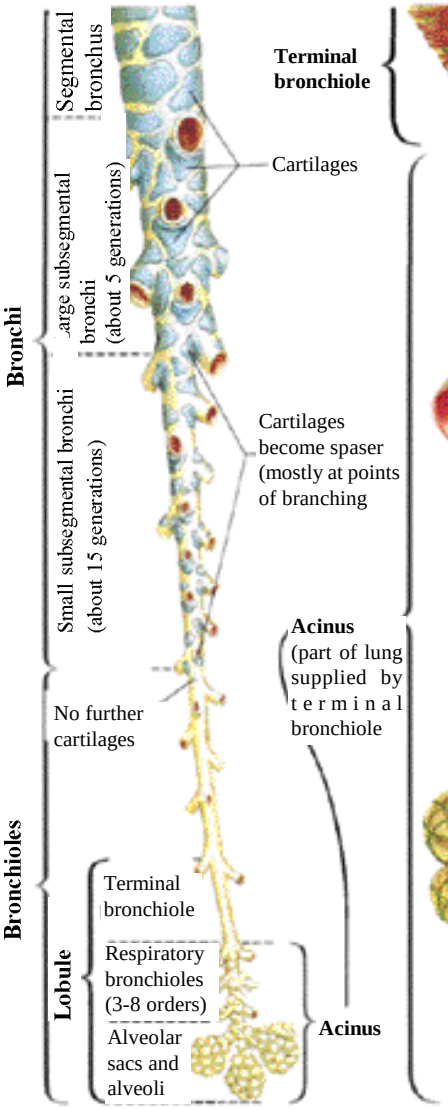
* amoxicillin-clavulanate 250 mg: PO tid
* azithromycin 250 mg: two tabs PO on day 1 then one tab PO qd times 5 days) [9]

usually occur on descen ›s the pressure differential increases between the sinuses and the ambient pressure.

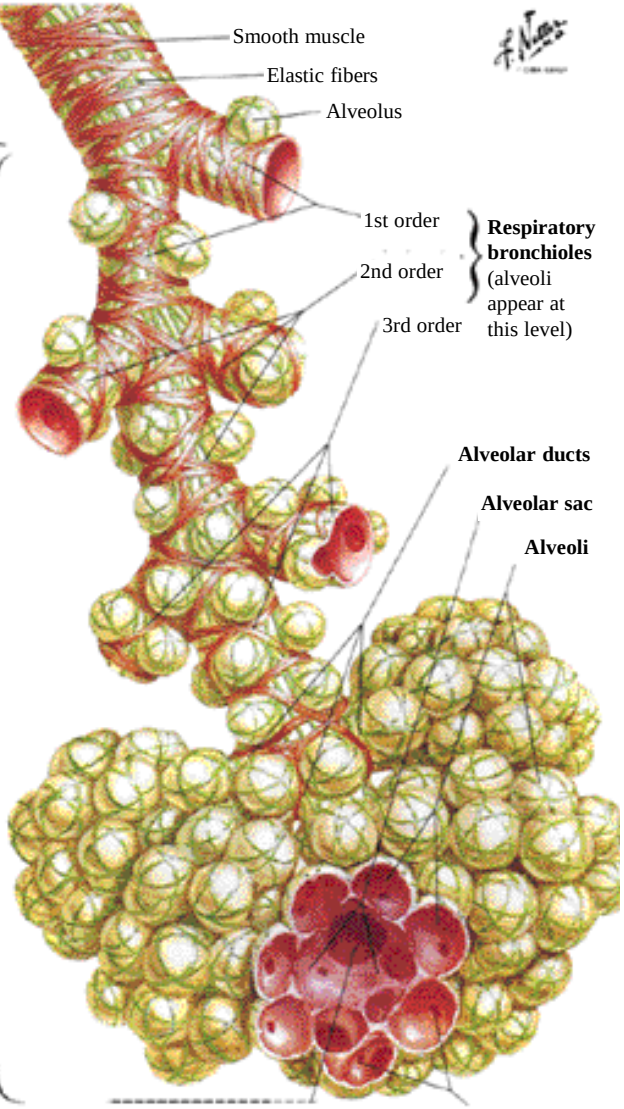
Sinus squeeze may occur on ascent as well. This is called reverse sinus squeeze and usually results when the ostium is obstructed by redundant mucosa, polyps, or a mucous plug. As gas expands following Boyle's Law due to a reduction in ambient hydrostatic pressure associated with ascent, the mucosa lining the sinuses becomes edematous, hyperemic, and possibly hemorrhagic.

Signs and Symptoms

When this condition exists, pain occurs over the affected sinus area. Occasionally, paresthesias or numbness occur in the distribution of the infraorbital nerve and may



Subdivision of intrapulmonary Airways



Structure of intrapulmonary Airways

INJURIES THAT OCCUR DURING THE ASCENT: PULMONARY OVER-INFLATION SYNDROMES (POIS)

Dive medical technicians need to recognize signs and symptoms of pulmonary over-inflation syndromes and understand the mechanism of injury leading to over-inflation of the lungs in order to provide the diver with definitive treatment and basic life support measures.

OVERVIEW OF POIS

Air in the lungs follows Boyle's Law. At a depth of 33 fsw, the lung volume of a diver who inhaled to total lung capacity at the surface will be almost half.

Constant exhalation is required to vent air from a diver's lungs during ascent, so that the increasing volume change associated with the decreasing hydrostatic pressure won't over-pressurize the alveoli. The cause of POIS is inadvertent breath-holding during an ascent or trapping of free flow regulation. Over-pressurization of only 90cm H_20 (6 fsw) is necessary for alveolar rupture to occur and more likely to occur near the surface.
Types of pulmonary over-inflation injuries include: 1) pneumomediastinum and pulmonary pseudocysts, 2) Subcutaneous emphysema, 3) pneumothorax, and 4) arterial gas embolism (AGE).[2, 11, 12]

PNEUMOMEDIASTINUM / PULMONARY PSEUDOCYSTS

Escape of air from alveoli into the substance of the lung tissue creates pseudocysts similar to interstitial blebs seen on radiographs of patients with emphysema. If this air dissects into the hilum of the lung, pneumomediastinum can result.

Signs and Symptoms

Signs and symptoms of pneumomediastinum include supraclavicular crepitus, change in voice timber, compromised venous return from the head causing vascular engorgement of the neck veins and dyspnea.

Prevention and Treatment

To prevent this condition the diver should avoid breath holding during the ascent. The dive medical technician should administer O_2. This condition usually resolves in 3-5 days. [12]

Include also a good neurological exam to rule out an arterial gas embolism (AGE) & a chest X-Ray to rule out pneumothorax. This rarely requires decompression treatment. If severe, follow the algorhythm in the USN Dive Manual.

SUBCUTANEOUS EMPHYSEMA

Subcutaneous emphysema is a condition that results from an extravasation of bubbles that form in the subcutaneous tissues in the supraclavicular and thoracic region. This extra-pulmonic air escapes causing a relatively benign condition that will resolve spontaneously. The condition presents clinically with crepitation of the soft tissues with direct palpation.

Treatment- see above

PNEUMOTHORAX

A pneumothorax is sequela of air extravasation from damaged alveoli between the visceral and parietal pleura. These trapped air bubbles compress the lung parenchyma, exacerbating a ventilation-perfusion mismatch.

Signs and Symptoms

The signs and symptoms are dyspnea and decreased breath sounds on the affected side, along with possible chest pain, splinting and hyperresonance.

Treatment

Mild cases can be treated with intermittent 100% O_2. Needle decompression is required for any evidence of shock indicating the possible presence of an immediately life-threatening tension pneumothorax.[10, 12, 13]

ARTERIAL GAS EMBOLISM (AGE)

AGE is the most commonly fatal of all diving and ascent injuries. Air escapes from the alveoli into the pulmonary venous system to be carried back to the left heart and ejected into the systemic arterial system. One of the complications resulting from this embolic phenomenon is decreased local blood flow distal to any obstruction caused by bubbles carried to the site by arterial blood flow. An ischemic region results from intravascular obstruction caused by bubble coalescence. Intravascularly, the embolus causes accelerated coagulation and thrombus by damaging the endothelial layer of the blood vessel, causing release of tissue factor, collagen, and cytokines. It also stimulates platelet aggregation, causes protein denaturation, and increases capillary permeability due to kinin activation. This cascade of inflammatory events leads to thrombus formation, inflammatory changes, and edema of the interstitial space due to

vasogenic and cytotoxic changes. Moreover, complement activation is enhanced and, combined with activation of the arachadonic acid metabolism pathway, yields an increase in prostaglandins, thromboxane A-2, and leukotrienes. These by-products of the inflammatory process further increase vasospasm and vascular permeability in the surrounding tissues.

This condition occurs during ascent due to over-pressurization of the alveoli leading to rupture caused by breath holding, trapped air or free flow regulator. Manifestation of symptoms usually occurs in 10 minutes or less, once the diver is on the surface.[14]

Signs and Symptoms

The signs and symptoms of the most important syndromes are:

Cardiac: chest pain, shortness of breath, nausea, diaphoresis, and radiating pain in the arm or jaw.[15, 16]

Central nervous system: altered mental status, seizures, various neurological deficits, symptoms similar to a stroke, and increased intracranial pressure.[17]

Treatment

Due to the fact that there may be life-threatening consequences as a result of AGE, initial evaluation should begin with a primary survey which includes evaluating the airway, checking for breathing, and assessing the circulatory status-- the (ABCs) including level of consciousness.

The health care provider should:

*start immediate decompression;

*administer the maximum of oxygen and start an intravenous (IV) line;

*not place the casualty on positive-pressure ventilation unless absolutely necessary, as more air can be forced out of the alveoli into the pulmonary venous system;

*treat any dysrhythmias with Advanced Cardiac Life Support (ACLS) protocols;[16]

*treat inadequate perfusion with small, repeated boluses of IV crystalloid fluids, in order to maintain pulmonary venous pressure and prevent secondary injury to the brain and other organs from shock;

*use with caution any vasopressor infusions that may be needed in cases of neurogenic shock or the Systemic Inflammatory Response Syndrome, because agents such as dopamine and norepinephrine can cause serious deterioration in casualties suffing from cardiogenic shock after an AGE-induced myocardial infarction;

*administer diazepam [Valium] 5 mg intravenously for seizure prophylaxis, if central nervous system involvement is suspected;

*administer morphine to the patient in order to decrease the preload on the heart through venodilitation;

*begin anti-platelet therapy with either aspirin or Plavix;

*transport the injured diver in a position where his head is at the same level as his heart (to prevent bubbles from rising to his brain), and possibly in a semi-left lateral decubitus position halfway toward prone (to place his coronary arteries at their lowest position).

The definitive treatment for this condition is hyperbaric oxygen (HBO), which is the GOLD STANDARD. The casualty must be transported to a recompression facility where HBO is used to improve tissue oxygenation, reduce intracranial pressure, and provide a large diffusion gradient to aid in bubble reabsorption.[18] This also mechanically reduces the size of offending bubbles to enhance passage through the capillary circulation.

Divers who suffer an air embolism should be advised not to return to diving.

To be continued in Part Two of Dive Medical Brief in the Spring 2002 Edition of the JSOM.

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Medical care being given to a
diver by a SOF healthcare provider

The Lost Art of Mule Packing in the U.S. Army

Michael B. Lennon VMD, PhD

Abstract

Army Special Operations Forces (ARSOF) often operate in austere and covert environments far removed from normal logistical and transportation systems. In many of these environments, operations must be adapted to that of the indigenous population. The use of pack animals often becomes a critical component of the mission as demonstrated by recent events in support of Operation Enduring Freedom in Afghanistan.

INTRODUCTION

When I first became the Group Veterinarian of the 10th Special Forces Group (ABN) in 1982, I came across a manual and a training tape called *The Care and Use of Pack Animals in Unconventional Warfare* (Fig. 1). They were authored by then CPT (Dr) David Franz, the Group Veterinarian in 1975. COL Franz just retired as the Commander of the United States Army Medical Research Institute for Infectious Diseases (USAMRIID), and is a bonafide expert in biological warfare. I found that except for some passed-down knowledge within the Special Forces Groups and the JFK Special Warfare Center and School (SWC), mule packing was indeed a largely lost art in the United States Army.

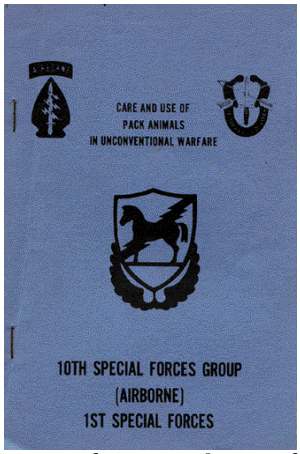

Figure 1. The cover of Care and Use of Pack Animals manual, 10th Special Forces Group (ABN), 1975

HISTORY

Beginning in 1775, the Army Quartermaster Department was responsible for the procurement and training of animals for military use. During WWI, the Remount Service used over 571,000 horses and mules, of which more than 68,000 were killed during operations. At one point during the war, horses and mules were the victims of the first organized biological attack in modern warfare, when the Germans used a bacterial disease, *glanders*, in order to disrupt Allied procurement. A breeding program to supply mules and horses to the War Department was originated in 1919 when the Remount Board was created, and produced over 39,000 foals until 1949, when the program was discontinued.

WWII saw the mechanization of the Army and the horse lost its prominence as a mode of transportation. The transportation of supplies, equipment, and personnel was relegated to motor vehicles. However, mules continued to have great value due to their ability to negotiate rugged terrain inaccessible by vehicles. This fact was proven in the mountains of Italy and the jungles of Burma. During 1944-45, the 10th Mountain Division employed over 14,000 mules in the rugged terrain of northern Italy during its drive through the North Apennines Mountains and the Po Valley. Unconventional forces in Burma, including Merrill's Marauders, used mules quite effectively. During the operations against Myitkyina, the 475th Infantry Regiment, 124th Cavalry, two bat-

talions of pack artillery and a variety of QM Pack Troops became a long-range penetration outfit, known as the Mars Task Force. Along with the mules someone at Regimental HQ added "those two damned elephants." While the mules were critical to the success of the operation, they were not without their headaches. BG Merrill has been quoted as saying, "Next time give me muleskinners instead of doughboys, for it is easier to make doughboys out of muleskinners than muleskinners out of doughboys."

During 1948-49, General Van Fleet, in Greece, used more than 10,000 animals against the communist insurgency. The general was convinced that the American pack mule played a major role in bringing about a successful conclusion to the fighting. Mules were also used sparingly during the Korean War. However, the conflict proved beyond a doubt that there was no substitute for pack animal transportation in the terrain that was encountered. Nevertheless, the Remount Service was deactivated after the Korean war. A small cadre of pack animal experts was maintained in two units, the 4th Field Artillery Battalion and the 35th QM Pack Company, both at Fort Carson Colorado. These were subsequently deactivated in 1957. In ceremonies befitting and honoring the long service of the sometimes cantankerous animal, mules were officially mustered out of the Army, to be replaced by helicopters.

Until last year, when FM 31-27, *Pack Animals in Support of Army Special Forces* was published, the only official Army publication on pack animals, FM 25-7, *Pack Transport,* had been out of print for over 50 years. *Animal Transport*, a draft FM 25-5 written in 1961, was never published. During the 1980s and 1990s, missions in many parts of the third world and recent Enduring Freedom operations in Afghanistan, have created a renewed interest in using pack animals.

TRAINING

While the 10th SFG(A) maintained a small core of pack-animal trained individuals and did some training during the 1980s, some of the other groups did extensive training, attending foreign schools and in many cases incorporating pack animals into real world missions. I was a participant on a couple of these missions with the 7th SFG(A) in Central America in the late 1980s (Fig. 2). The 7th SFG(A) maintained mule packing ODAs as did the 5th SFG(A) and both have run courses on the use of pack animals. One such course was the Special Operations Animal Packing Course (SOAP-C) run by 2nd Bn, 5th SFGA in 1996. The Special Warfare Center and School reestablished pack animal training in addition to providing the new manual in 2000. On an unofficial but recent map of Ft. Bragg, the old SF area of Riley road is listed as "The Artillery Mule Packing Training Area and Stables."

Figure 2. Author with the "horse ambulance," Special Forces M-5 medical bag mounted on a horse, during operations in Central America in the 1980s with 7th SFG (A)

PACK ANIMAL OPERATIONS

Army Special Operations Forces often find themselves involved in operations in remote or rural environments that are not accessible by wheeled transport. During sensitive or covert operations or where hostile elements are active, the use of helicopters, the other mode of movement and resupply in remote areas, may not be available or feasible. In many cases, especially working with indigenous forces, the SOF soldiers may have to adopt the mode of transportation of the local population.

Pack animals can transport large quantities of cargo and weapons over a variety of terrain and under virtually any condition. The pack animal detachment can traverse steep grades and rugged terrain in heavily wooded areas where well-defined trails are nonexistent. Everything from beans to bullets, to include large weapons systems (like pack 75mm howitzers and large mortars) and light suspension bridges, can be transferred to the front. (Fig. 3).

The selection of animals is extremely important. The species will often depend on the weight and volumes of equipment to be carried, terrain, distance, enemy situation, and probably most important, the available species. The disposition of animals is very important given the heavy, awkward, and sometimes

Figure 3. 7th SFG(A) soldiers packing a 60mm mortar on a horse during operations in Honduras.

noisy loads that pack animals will be asked to carry. The selection of healthy animals is critical and must include prepurchase or soundness exams (Fig. 4) whenever possible. Conformation of animals is also very important to ensure the animal has the build, muscle, and weight to carry the loads. Mules and horses should be muscular and stocky with short backs and good withers and pasterns. "Horse Traders" will often pawn off the worst animals on unsuspecting Americans with deep pockets.

Figure 4. SGT Murphy and SFC "Bones" Hamilton of 7th SFG(A) conduct a soundness exam on a horse in Honduras.

Whenever possible, animals should be acquired locally. These animals are usually familiar with the terrain and immune to many of the endemic diseases. Introduction of non-native species can result in disaster, as the first explorers to East Africa discovered when all their horses died of nagana (tryponosome protozoa that cause sleeping sickness). Besides equines (horses, mules, and donkeys), oxen, camels, llamas, elephants, and dogs have been used as pack animals. However, the mule or horse is probably the best suited for almost every type of climate and terrain. Mules and horses can travel 15-20 miles a day in mountainous terrain and can carry 150-300 pounds of equipment (approximately 20% of their body weight).

Animal husbandry of pack animals to include care and feeding, grooming, veterinary care, exercise and conditioning, and foot care are extremely important and can only be learned by training and experience, although common "horse sense" can go a long way. Equipment such as packsaddles and rigging come in various shapes, sizes, and configurations but basically serve the same purpose. The two major saddle systems are the crossbuck (or sawbuck) and the Decker, even in foreign countries. The U.S. Army saddle that was used for almost 100 years was the McClellan, although the 10th Mountain Division used a Phillips saddle (which had an integral heavy fiber pad) up until the 1950s. Proper padding is critical. Field expedient packsaddles may be made by using a normal saddle and materials used for personal and equipment airborne operations. Cargoing (wrapping items to be carried in bundles) and packing must be done carefully to ensure proper weight distribution and prevent injury to the animals. Special knot tying is a critical requirement. Details can be found in FM 31-27.

AFGHAN OPERATIONS

Pack animals have been used in military operations in Afghanistan since 300 BC, when it was conquered by Alexander the Great. For the last 20 years, they have been the main mode of transportation to the front lines of the remote guerrilla war, first against the Soviets, and then against the Taliban. Men and boys traverse careful paths worn to familiarity by the ferrying of weapons and warriors to the fluid and rugged battlefront. A continuous caravan of over 300 horses supplies the Northern Alliance in northeastern Afghanistan with everything to include food, clothing, radios, car batteries, assault rifles, artillery shells, rockets, and bullets. When Special Forces advisors join the Northern Alliance, it is often on horseback. Anti-Taliban forces on horseback attacked tanks in November 2001 in northern Afghanistan as U.S.

airstrikes hit caves and vehicles. Secretary of Defense Rumsfield proudly showed a photograph during a press conference of Special Forces soldiers going into battle on horseback with pack animals in tow (Fig. 5).

Figure 5. U.S. special forces troops ride horseback as they work with members of the Northern Alliance in Afghanistan during Operation Enduring Freedom on Nov. 12, 2001. he last cavalry charge in the US Army has always been the subject of much dispute.(DoD photo)

CONCLUSIONS

With the advent of ecotourism and adventure outings, remote trips using pack animals have become very popular with the general public, as any internet search will attest to. Unconventional military operations, even with advances in modern warfare, may require SOF personnel to operate in austere and covert environments employing warfare as the indigenous population has for centuries. Utilizing pack animals may often be a component of such operations.

U.S. special forces troops are using pack animals to carry equipment as they work with members of the Northern Alliance in Afghanistan during Operation Enduring Freedom on Nov. 12, 2001. (DoD photo)

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LTC Michael Lennon is a graduate of Pennsylvania Military College and received his doctorate in medicine from University of Pennsylvania School of Veterinary Medicine and a PhD in biochemistry from Temple Medical School. He served on active duty with the 82nd ABN division and graduated from the Special Forces Qualification Course in 1982, subsequently serving 4 years with the 10th Special Forces Group (ABN). As a reserve officer he served 8 years with the 11th SFG(A) as the Preventive Medicine Officer and Group Surgeon, including missions with the 7th SFG(A) to Central America. He was the XO of the 450th Civil Affairs Bn (ABN) with the 82nd Airborne Division during Desert Storm. He also served several years with the 404th CA Bn (FID/UW) going on JCETs with the 10th SFG(A) to Eastern Europe and to Africa with the 96th CA and 3rd SFG(A). He is presently assigned to United States Special Operation Command on loan to the 5th SFG(A) for Operation Enduring Freedom. In civilian life, he practices equine medicine and surgery in New England.

CE/CME ARTICLE

Prehospital Treatment of Hypothermia

Gordon G. Giesbrecht, Ph.D.

Abstract

This article considers several issues regarding cold stress, development of hypothermia, and prehospital care of the hypothermia patient. Advice is given on the use of clinical impressions and functional characteristics to determine the level of hypothermia. Response to cold water immersion is characterized as short-term (cold shock response), midterm (loss of performance), and long-term (development of hypothermia). Circum-rescue collapse is the dramatic worsening condition of the patient just before, during, or after rescue from cold stress. After rescue, the treatment priorities are to arrest the fall in core temperature, establish a steady, safe rewarming rate while maintaining the stability of the cardiorespiratory system, and provide sufficient physiological support.

OBJECTIVES

1. Discuss thermophysiology as it relates to cold stressed humans.
2. Identify level of hypothermia from functional characteristics, signs and symptoms.
3. Discuss proper treatment of the hypothermic victim during prehospital transport.

Complete Test Page 53--Answer sheet on Page 50

Completion of this article and test offers 1.25CME and 1.5 CNE/CEH for nurses.

Disclosure:

Dr. Gordon G. Giesbecht has indicated that his presentation will include discussion of commercial products or services. However, he has no significant financial relationship with a commercial entity whose products or services are related to the subject matter of the topic he will be addressing.

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INTRODUCTION

Wartime casualties during the first part of the 20th century stimulated a great deal of hypothermia research. This was followed by the heyday of research from the 1960s to 1980s. Despite all of this work, many controversies remained open for debate today. This article will attempt to address some of these issues.

There are several systems for describing the level of hypothermia.[1-3] A common approach to classification includes core temperature (T_{co})and functional characteristics (figure 1). Briefly, in the mild hypothermia range (T_{co} = 35 - 32 ° C), there are thermoregulatory mechanisms (i.e. shivering) that operate fully, with development of ataxia, dysarthria, apathy, and even amnesia.[4] In moderate hypothermia (T_{co} = 32 - 28 ° C) the effectiveness of the thermoregulatory system diminishes until it fails, the primary effect of body cooling becomes evident, there is a progressive decrease in level of consciousness, and atrial fibrillation and other dysrhythmias occur. In severe hypothermia (T_{co} < 28 ° C), consciousness is lost, shivering is absent, acid-based

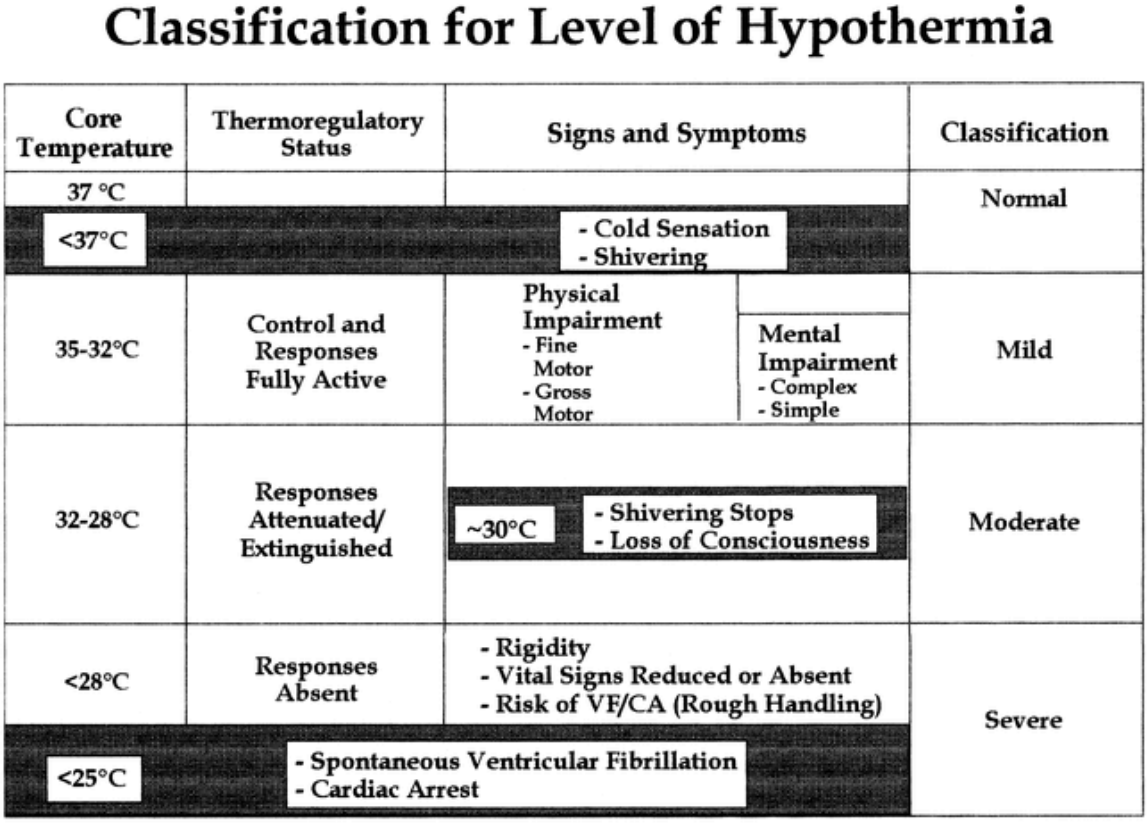

Figure 1. Criteria for classification of hypothermia.

disturbances develop, and the heart is susceptible to ventricular fibrillation (either spontaneous or caused by mechanical stimuli) or asystole. Death from hypothermia is generally from cardiorespiratory failure.

RESPONSES TO COOLING

The rate at which one becomes hypothermic depends mainly on the imbalance between increased heat loss and decreased heat production and inflow. First, the rate of heat loss is attenuated by insulation, either from endogenous body fat or protective garments. Heat loss can be greatly increased by the combination of cold air with wetness and wind, which can be a debilitating[5] and lethal combination. Wet-wind conditions decrease effective clothing insulation[6] by as much as 90%. On the other hand, increased heat production from shivering, exercise, or both can prevent or attenuate a decrease in body temperature during cold stress. At low workloads, metabolism may be 50% higher in the wet-wind conditions vs dry, calm conditions. These differences are minimized or eliminated at higher workloads. Shivering is an extremely effective source of heat production, which can reach five to six times the resting metabolic rate.[7] It has recently been demonstrated that shivering endurance in otherwise healthy individuals exceeds previous expectations. A high level of shivering heat production can continue for four to six hours before it starts to decline (assuming shivering is not centrally inhibited by reaching a moderate to severe level of hypothermia).[8]

When long-term exposure to cold induces a reduction in shivering rate or ability to exercise, overall heat production decreases, and the rate of core cooling increases.[9] The deaths of four students in the United States Army Ranger School in 1995 spawned a study by Young et al,[10] which demonstrated that exertional fatigue and chronic negative energy balance greatly interfere with the ability to withstand a significant cold stress.

A great deal of misunderstanding surrounds the issue of cold water immersion. It is commonly reported that death caused by hypothermia can occur within minutes. In fact, it requires a significant length of immersion (at least 30 minutes) for hypothermia to develop. The cold shock response occurs within the first three to four minutes of cold water (head-out) immersion and will initiate peripheral vasoconstriction, the gasp reflex, hyperventilation, and tachycardia; these may lead to drowning or cause vagal arrest of the heart.

For those surviving the cold shock

response, significant cooling of peripheral tissues, especially in the extremities, continues to occur for the first 30 minutes of immersion. This cooling has a direct deleterious effects on neuromuscular activity.[5] The resultant loss of motor control makes it difficult, if not impossible, to execute survival procedures such as grasping a rescue line or hoist, signaling, etc. Thus, the ultimate cause of death is drowning, either through a failure to initiate or maintain survival performance or excessive inhalation of water under turbulent conditions.

The individual who survives the immediate and short-term phases of cold water immersion faces the possible onset of hypothermia as continuous heat loss from the body eventually decreases core temperature. Many predictive models have been developed to determine the core temperature response to cooling[11-15] that are based on relationships between body composition, thermoregulatory response (i.e. shivering heat production), clothing and insulation, and water temperature and sea conditions. All of these factors have been taken into account in a recent survival-time prediction model that is now used to assist in search-time decisions by various search and rescue teams.[15]

Behavioral variables also affect core cooling rate. Hayward et al[16] demonstrated that minimizing both voluntary activity and the exposure of major heat loss areas of the skin to the cold water (i.e., the HELP position) is the best way to minimize the drop in core temperature. They showed that treading water and drownproofing significantly increased the cooling rate. Despite increased metabolic heat production during exercise, the increased surface heat loss resulted in faster core cooling during exercise in cold water. It should be noted that this research mainly relates to *lightly* clothed individuals. Recent work has determined that there may be some benefit to intermittent exercise if one is wearing a *well-insulated* survival suit.[17] Under these conditions, the insulation retains the heat produced during exercise, and the rate of core cooling is significantly attenuated.

CIRCUM-RESCUE COLLAPSE

There are many clinical examples of victims being rescued from cold stress (usually from cold water immersion) in an apparently stable and conscious condition, only to experience a rewarming shock or post-rescue collapse, with symptoms ranging from syncope to ventricular fibrillation and cardiac arrest. Golden et al[18] have noted that deaths can occur shortly before, during, or after rescue and have used the term *circum-rescue collapse*. Deaths have been described just before, during, or soon after rescue, as well as up to 24 hours after rescue.[18-21]

Golden et al[18] propose that removal from cold water results in a precipitous fall in blood pressure, inadequate coronary blood flow, and myocardial ischemia that possibly precipitates ventricular fibrillation. These authors demonstrated decreases in aortic blood pressure and central venous pressure during vertical lifting by helicopter strop from cold water. This has led to a widespread practice of using a double sling (under the arms and knees), which can raise a victim in a more horizontal position.

The importance of further cooling from the heart cannot be discounted. Fibrillation of a cold heart can be initiated by mechanical stimuli,[22] hypoxia and acidosis,[23] and the rapid changes in pH.[24] A recent review[25] presents data from several sources documenting afterdrop values of up to 5°C. Regardless of the etiology, it is important to note that in severely hypothermic patients, there is a significant risk of further deterioration. A summary of 21 cases of severe hypothermia indicated four with variable cardiac function upon rescue, with subsequent deterioration to ventricular fibrillation or asystole.[25]

Prehospital Patient Care

TO WARM OR NOT TO WARM?

There are several views regarding methods for resuscitation of hypothermia victims. An even more fundamental question is whether or not to initiate prehospital warming at all. Some believe that such warming may be dangerous, and the advice to "prevent uncontrolled superficial rewarming"[26] forms part of the Swedish military medical doctrine. This advice has come mainly from two concepts. First, there is the interpretation that the "metabolic icebox" (decreased but stable cardiorespiratory activity at very low core temperature's) is a stable, safe condition and that rewarming the heart may bring it to a warmer range (28 - 32 °C) where the heart is more susceptible to ventricular fibrillation. This premise seems unfounded, because the threshold for fibrillation decreases as the heart becomes cooler.[27] It has been demonstrated that when shivering is pharmacologically inhibited (providing a human model for severe hypothermia) and active warming is withheld, core temperature continues to decrease by up to 2°C and remains at the lower values for several hours.[28,29] Second, there is a fear of massive vasodilation and hypotension caused by surface warming. Treatment decisions are most impor-

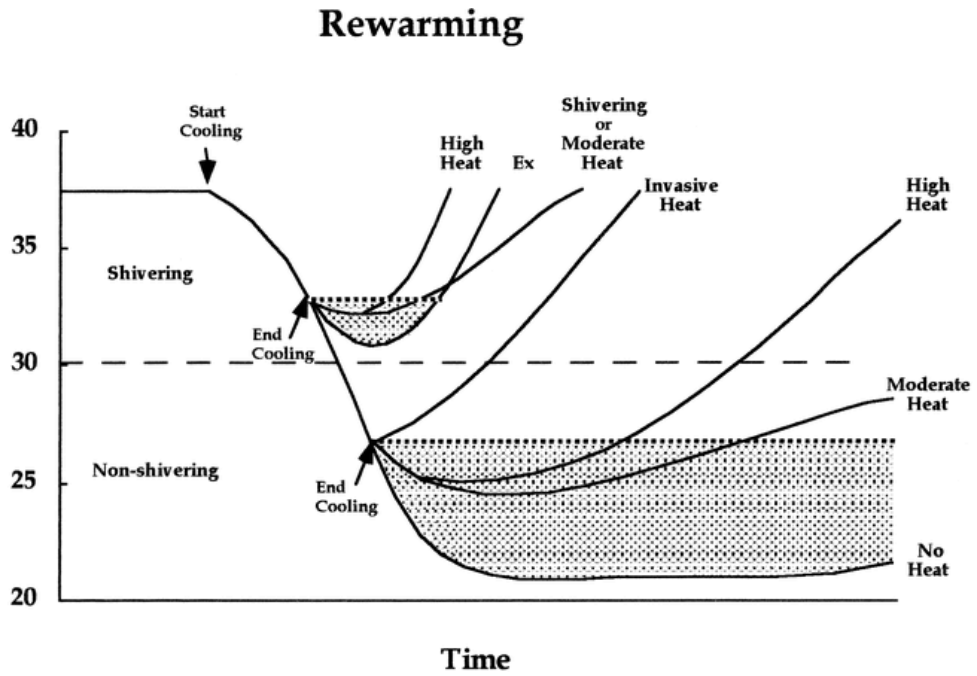

Figure 2. Schematic representation of relative effectiveness of various types of rewarming protocols for shivering and non-shivering patients.

tant at moderate (28 - 32°C) to severe (< 28°C) hypothermia. This author is unaware of any clinical or laboratory evidence that moderate surface warming could cause such vasodilation (although whole body immersion in hot water may, and is therefore contraindicated). Even immersion of the lower arms and legs in warm water has not cause hypotension.[30-32]

On the basis of the above work, it seems that active warming can be conducted on severely hypothermia victims as long as care is taken not to jostle the patient in any way and core rewarming proceeds at a conservative rate to prevent rapid uncontrolled physiological changes.

REWARMING METHODS

The following rewarming classifications will be used in this article. The term *spontaneous/endogenous rewarming* includes shivering and exercise and emphasizes that active endogenous heat production is occurring. *Exogenous external rewarming* differentiates between moderate and high sources of heat that are applied to the body surface, and *exogenous internal rewarming* includes noninvasive and invasive methods for application of heat directly to the core.

The main priorities for treatment are to arrest the fall in core temperature and establish a steady, safe rewarming rate while maintaining the stability of the cardiovascular system and providing sufficient physiological support (i.e., oxygenation, correction of metabolic and electrolyte imbalances, and intravenous volume replenishment). Although rewarming studies generally focus on the rate of warming, it is important to note that a rapid rate of rewarming does not necessarily correlate with an increase survival rate. In fact, during prehospital transport, when ability to monitor and control physiologic parameters may be limited, a safe strategy would be to promote steady but moderate warming (~2 °C/hr^{-1}).

Hamilton and Paton[33] summarized survey responses from 41 Mountain Rescue Association teams to determine common rescue and treatment practices. They reported the use (by number of teams) of the following rewarming methods: chemical pads (19); sleeping bag, spontaneous warming (16); hot water bottle (13); warm intravenous fluids (7); warm oxygen or air inhalation (3); charcoal Heatpac (Standard Telefon og Kabelfabrik, Oslo, Norway) (3); and water-perfused sarong (1). Some of these methods have been extensively researched, whereas others have not.

Figure 2 summarizes the effectiveness of various types of warming protocols (see Keatinge[24] and Rogers[34] for review). When shivering is present (i.e., T_{co} above ~30 °C), moderate exogenous external rewarming is not any more effective than shivering (if the patient is dry and insulated) because surface warming inhibits shivering heat production. This has been documented that with body-to-body contact,[35,36] heating pads,[35,37,38] and forced-air warming.[39] Exercise causes a significant increase in post-

cooling afterdrop before a rapid increase in core temperature is seen.[38,40] Only a high source of heat (i.e., warm water immersion of the arms and legs [32] or the total body,[41,42] or a high-heat forced-air warming device[44]) will warm the core faster without an initial increase in afterdrop.

When shivering is absent in moderate to severe hypothermia, some form of exogenous external rewarming (i.e., high or moderate heat) or exogenous internal rewarming (i.e., invasive heat) is required; otherwise, little or no warming will occur. The charcoal-burning Heatpac (Standard) provides a thermal advantage when metabolic heat production is minimal,[44] and forced-air warming also provides a warming advantage in laboratory[29,39] and clinical[45] studies. Further work has been done with a forced-air warming prototype designed to take advantage of pre-existing commercial heating units to provide heat to a collapsible, rigid cover. [46] This cover has been used in nonshivering hypothermic volunteers and has attenuated the afterdrop and resulted in effective warming, compared with a continued and extended decrease in T_{co} in spontaneous conditions.[44]

Inhalation warming with humidified air or oxygen has the core-warming effectiveness of "moderate heat" in a shivering patient[42] and "no heat" in a nonshivering patient (see figure 2). Inhalation rewarming reduces the metabolic heat production of mildly hypothermic shivering subjects, and the increased respiratory heat provided by inhalation rewarming did not compensate for this reduction. Studies have demonstrated a reduction of 1.4 kJ and 1.95 k.J of metabolic heat[42,47] for every kilojoule of respiratory heat added. In shivering subjects, no rewarming advantages were found when rewarming trials were conducted in 2 °C[48] or -20°C [49,50] air.

When using a human model for severe hypothermia (shivering inhibited by meperidine in hypothermic subjects)[28], inhalation rewarming still did not provide any core rewarming advantage over spontaneous warming during 150 minutes of recovery.[29] Therefore, although inhalation warming is often presented as an effective strategy for body warming or at least prevention of further body cooling,[51] the advantage regarding thermal balance is likely minimal.

Hayward and Steinman[52] have suggested other benefits of inhalation warming, including rehydration, stimulation of mucociliary activity in the respiratory tract, and direct heat transfer from the upper airways to the hypothalamus, brain stem, and other brain structures. Any resultant warming of the respiratory and cardiovascular centers could help stabilize cardiorespiratory parameters even if total body heat content were not increased significantly. There are a few anecdotal reports in which application of inhalation warming to hypothermic victims in the field significantly improved the patient's pulse rate and mental state within 20 to 40 minutes. Although this is consistent with inhalation therapy warming the brain stem or other brain structures without significantly increasing core body heat content, the improvement could also have been caused by improved oxygenation. In summary, there is no reason to preclude the use of inhalation warming, either by itself or in combination with other invasive and noninvasive measures.

The past decade has seen research on two new warming methods that use the principal of warming via the patient's appendages. Vanggaard and Gjerloff[53] proposed a simple rewarming technique that supplies exogenous heat by immersing hands, forearms, feet, and lower legs in 44 to 45°C water. The proposed advantages of this method are threefold. First, rewarming of the distal extremities opens the arteriovenous anastomoses in the fingers and toes. Second, this greatly increases the venous return to the heart via the superficial venous rete in the forearms and lower legs. Third, the warmed venous blood returns to the heart with minimal countercurrent heat exchange (loss), because the superficial veins are not in close proximity to the arteries.

Two previous studies warming either the hands and forearms only[31] or hands and feet only[30] concluded that this method is ineffective. However, when arms, forearms, lower legs, and feet were immersed in 42 or 45°C water, very impressive warming rates were seen (6.1 and 9.9°C / hr^{-1}, respectively).[32] Because of technical limitations, this method may not be practical for field use or in small transport vehicles; however, it was adopted by the Royal Danish Navy in 1970 for use on ships.[54] As a precaution against burns, the safest application of this method may be to start with 42°C water and gradually increase it to only 44°C .

In a related procedure, Grahn et al[55] applied negative pressure to enhance arteriovenous anastomoses warming in hypothermic (T_{co}= 34.8°C) postoperative patients recovering from general anesthet-

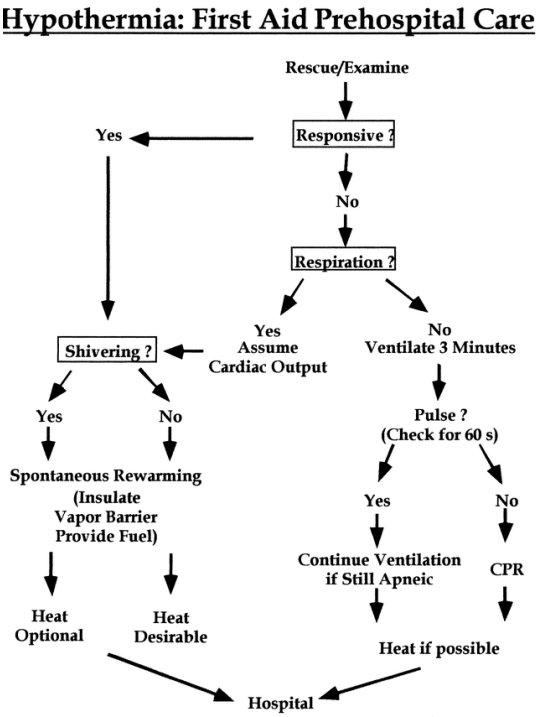

Figure 3. First aid prehospital care of the hypothermic victim.

ics. They applied a water-perfused blanket (45 - 46 °C) to a single forearm and hand that had been placed in a subatmospheric pressure environment (-30 to -40 mm Hg). This method resulted in a tenfold increase in rewarming rate (13.6°C hr^{-1} over 5-15 minutes) compared with external warming only (1.4°C hr^{-1}). This promising methodology has been applied to four hypothermic Norwegians soldiers (tympanic temperature [T_{ty}] = 35 - 36.2°C measured by infrared thermometer) reporting to a field hospital after prolonged exposure to a cold environment. Negative pressure heating caused rapid cessation of shivering, increased thermal comfort, and abruptly increased T_{co} to normal values within 15 minutes. There were no comparisons with control treatments conducted in other patients, but the results seem promising for victims rendered mildly hypothermic because of environmental exposure. Not all results from the use of this technique have been positive. Smith et al[57] showed no difference in warming efficacy between negative pressure warming and standard surface warming in postanesthesia care unit patients. We have applied this methodology to hypothermic subjects (T_{co} = 35°C) after cold-water immersion and found no rewarming benefits compared with spontaneous warming, both in shivering subjects and those in whom shivering was inhibited by meperidine. The discrepancy in results may be caused by the much greater overall cooling of the water-immersed subjects compared with the post-operative patients and cold-air-exposed soldiers. The greater cooling, and thus greater integrated cold thermal signal to the thermoregulatory center, might make it more difficult to overcome the cold-induced closing of the arteriovenous anastomoses.

General Care

In conclusion, Figure 3 provides an algorithm for first aid prehospital care of the hypothermic patient. In all cases, patients should be treated gently, removed from the cold stress, and have wet clothing removed; if the patient is moderately to severely hypothermic, clothes should be cut off to minimize movement. Care should then be taken to insulate and provide a vapor barrier, if possible, to minimize conductive/convective and evaporative heat loss, respectively. If responsive and shivering vigorously, the patient should rewarm spontaneously; however, exogenous external heating could be instituted in any condition.

One of the most difficult decisions in the field is whether or not to start cardiopulmonary resuscitation (CPR).[58] At very low core temperatures, it may be difficult to confirm ventilation or cardiac activity, and initiation of CPR on someone with diminished but viable cardiac function will likely trigger ventricular fibrillation. If respiration cannot be detected, a short period of ventilation should be initiated with care not to cause hyperventilation. This increased oxygenation may improve cardiac function to the point where it can be detected. At this point, a concerted effort should be made to feel a carotid pulse (i.e., 60 seconds). If pulse or breathing still cannot be detected, it may be assumed that there is no cardiac function, and CPR should be initiated with standard procedures.

Finally, the balance of factors (time of transport vs. more advanced medical facilities) is something that should be considered when transport decisions are made. It may be advantageous to transport the more severely hypothermic cases to more advanced care facilities, even though transport time may be greater.

Dr.Gordon Giesbrecht

Gordon Giesbrecht is a professor of thermophysiology at the University of Manitoba in Winnipeg, Canada. He holds the rank of professor both in the Dept. of Anesthesia, and the Faculty of Physical Education and Recreation Studies. Dr. Giesbrecht runs the Laboratory for Exercise and Environmental Medicine where he studies human responses to exercise/work in extreme environments. He has conducted hundreds of cold water immersion studies that have provided valuable information about physiology and pre-hospital care for human hypothermia. He is a member of the board of directors for the Wilderness Medical Society and has lectured and advised several military groups. He is an avid mountaineer and has just led a winter research expedition on Lake Winnipeg, Canada. The "One Million Steps Expedition" tested clothing, food and physiology in arctic-like conditions.

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NVG Injuries in U.S. Army Aviation

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Abstract

Night vision goggles give an immense tactical advantage on the modern battlefield but at the same time there is a potential risk of injury to the face. Thirty-five injuries in over twenty years of experience have confirmed this. Despite the reassuringly few injuries in this study, serious injury remains a possibility due to the proximity of the NVGs to the face. Other nations' armies have used devices to protect the face from injury and although these may be effective they can also add hazards of their own. If a piece of equipment could be devised that prevented the NVGs hitting the face but did not have the adverse features of the Face Protection Visor, injury rates could be reduced and flight safety maintained.

Introduction

Night Vision Goggles (NVGs) and other helmet-mounted displays (HMDs) have become an essential part of military flying since the introduction of AN/PVS-5 in the early 1970s. Not surprisingly the Special Operations community were amongst the first to embrace their use. Originally available only in a full-face configuration (Figure 1), allowing no peripheral vision, they were later replaced for aviation use by the "cutaway" version.

Figure 1

Since then, third generation image intensification devices with a breakaway mount, the AN/AVS-6 Aviator's Night Vision Imaging System (ANVIS) (Figure 2), have replaced the AN/PVS-5.

Figure 2

Other HMDs include the helmet display unit (HDU) worn by Apache pilots, which provides a monocular image based on temperature contrast in the environment. For future aircraft, such as the Comanche, increasingly complex HMDs are likely to be fielded.

Immense tactical advantage can be gained using these devices but the degraded visual environment also presents the aviator with new challenges. These factors have been extensively reviewed,[1, 2] but crash safety has received less attention in the aeromedical literature. Shannon and Mason[3] found

an increased risk of head and neck injury in NVG accidents, and although neck injury is a significant concern, head injuries account for 22.9 percent of all injuries in survivable U.S. Army helicopter crashes. The most common injury mechanism is contact with objects within the cockpit.[4] In 37.5 percent of cases the helmet is struck around the visor or visor cover[5] and with HMDs worn extremely close to the aviator's eyes and face, the potential for harm is evident. Despite this, HMD use in the AH-64 Apache accounts for only 4 injuries out of 50 accidents; none of these injuries was severe or had any lasting sequelae.[6]

Even so British Army helicopter pilots using NVG without a breakaway mount are advised to use a polycarbonate face-protective visor (FPV)[7] that is worn between the NVG tubes and the eyes (Figure 3). However, pilots have reported that the FPV is uncomfortable and distracting, and visor fogging or scratching can be a problem, possibly increasing the chance of an accident.

Figure 3

In the U.S. Army, facial protection is not provided, although a prototype protective visor, similar to the FPV, has been designed for the HGU-55 series helmets for use in fixed wing aircraft. NVG-users needing spectacles use polycarbonate lenses, as NVG tubes have been shown to easily shatter glass lenses; these may provide a limited amount of protection.[8]

The objectives of this study were to determine the frequency and nature of NVG-related facial injury and to assess the potential benefit of facial protection.

METHOD

The U.S. Army Safety Management Information System database was searched for injuries related to NVGs in survivable or partially survivable (hereafter combined as survivable) Class A-C helicopter accidents from 1980 to 2000. Class A-C accidents include all accidents in which work time was lost, or the property loss was >$10,000. To estimate the potential effect of FPV use, the injuries were classified based on injury location (Table 2).

Effect of FPV on Injury	Injury Location
Probably would have been reduced or prevented	Eye, forehead, zygoma
Possibly would have been reduced or prevented	Face, nose, cheek, maxilla
Probably would not have been reduced or prevented	Lip, chin, mandible

Table 2. Effect of FPV by injury location.

RESULTS

During the study period, 3179 Class A-C helicopter accidents occurred, and of these, 347 survivable and 35 non-survivable accidents involved the use of NVGs. Although Class A accidents with NVGs were less likely to be survivable than non-NVG Class A accidents (72/107 vs 391/477, $Ç^2 = 11.47$, p [0.001]), the majority (67.3 percent) were still survivable. Overall, 96.2 percent of Class A-C helicopter accidents and 89.9 percent of NVG accidents were survivable.

In the survivable crashes, 28 people in 21 aircraft sustained 35 NVG-related injuries. Most injuries were classed,[9] as "minimal" or "minor" and only 7 were "major". The seven major injuries consisted of one forehead and one orbital laceration, one eye hemorrhage and four facial fractures in three victims. The commonest injury type was a laceration.

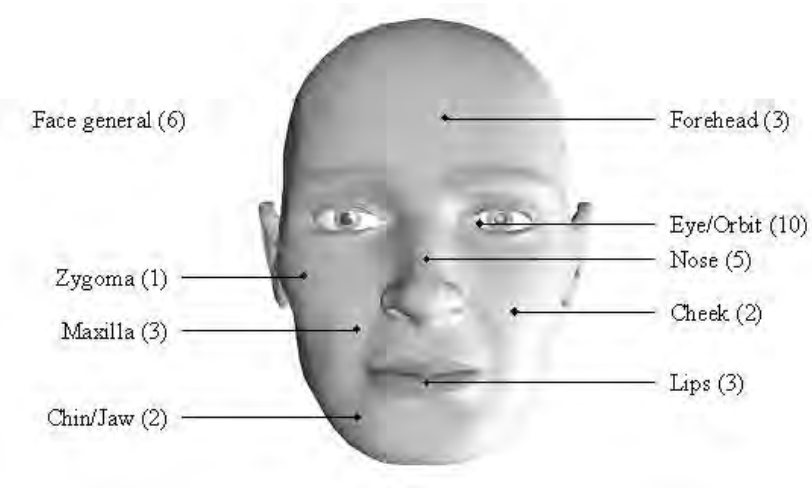

Figure 4 shows the distribution of injury sites.

NVG-related injuries were seen in 6.1 percent of Class A-C accidents and 26.4 percent of Class A accidents. There were 7.2 injured cockpit occupants per 100 Class A-C accidents, and 31.9 injured per 100 Class A accidents. The NVG type had no significant effect on injury rate in cockpit occupants; 14.3 percent of AN/PVS-5 users and 15.6 percent of ANVIS users suffered injury in Class A mishaps. Analysis of the 35 injuries revealed that 14 probably would have been prevented or reduced by the FP; 16 might have been prevented or reduced.

SURVIVABILITY

NVG accidents tend to be less survivable, and some think that there is little point in protecting against NVG injuries if there is a high risk of death from other injuries. However, the vast majority are at least partially survivable. It is important, therefore, to ensure that the NVGs are not responsible for a severe injury that might be the sole cause of death or disability in an otherwise survivable accident.

INJURIES

As expected, the face in general, eyes and nose received the most damage with laceration, abrasion and contusion being the most common injury types. Although less common, fractures accounted for most major injuries. Whilst the risk of an injury related to NVGs might appear high, particularly in Class A accidents, this includes all 35 injuries no matter how severe. The risk of major injury is much lower. In fact, over the whole period of the study, there were only seven major injuries, one every three years.

Given the proximity of the eyepiece lens to the face it is surprising that so few NVG-injuries were found and certain design features may account for this. The older AN/PVS-5 design distributes any force across the brow and keeps the tubes clear of the eyes although the tubes of the cutaway AN/PVS-5 are more exposed and similar to ANVIS. ANVIS, however, has the breakaway feature that may prevent the tubes impacting the face.

NVGs might be expected to cause more injury than the Apache HDU for several reasons. First, NVGs cover more of the face, presenting a greater chance of being caught between the face and cockpit structure. Second, NVGs in the "stowed" position above the helmet can rotate down toward the face. The stowed position for the HDU, in contrast, allows rotation away from the face. Finally, although the HDU places a potentially dangerous transparency close to the aviator's eye, the HDU shaft usually rests on the maxilla minimizing dynamic overshoot in the event of an impact. Notwithstanding these differences, NVGs and the Apache HDU appear to present a similar risk of facial injury. An AH-64A crewmember had a 4 percent chance of an HDU-related injury in a Class A-C survivable accident and a 13.8 percent chance in a Class A accident[6] compared with a 3.6 percent chance of NVG-related injury in a Class A-C survivable accident and a 16.0 percent chance in a Class A accident.

PREVENTION

Although an FPV has been worn in an NVG accident, there was no evidence that the faceplate was struck[10] and so, its operational performance is unknown. Nonetheless, this analysis suggested that if the FPV functioned as designed, 85.3 percent of the NVG-related injuries could have been prevented or reduced in severity. The potential benefit of an FPV must be weighed against the liabilities and, if the device does not gain aircrew acceptance, it may not be fully utilized; this might prove to be the case in the British Army. Indeed, a visor may not be the only, or best method of preventing the NVGs striking the face. Several methods of detaching NVGs from the helmet of fast jet aircrew have been examined for the U.S. Navy.[11] Although primarily aimed at reducing neck loads during ejection, some of

these systems could remove the NVGs from in front of the face and reduce the risk of injury.

CONCLUSION

In the 347 survivable Class A-C U.S. Army helicopter accidents involving the use of NVGs between 1980 and 2000, 28 aviators in 21 aircraft suffered 35 facial injuries that were ascribed to NVG. Most injuries were "minimal" or "minor," and none were life threatening. In survivable NVG accidents, there were 7.2 injured cockpit occupants per 100 Class A-C accidents and 31.9 injured per 100 Class A accidents, similar numbers to those seen with the AH-64A HDU.

If an FPV functioned as designed, as much as 85.3 percent of the NVG-related injuries might have been prevented but its safety has been questioned. Future developments to rotary-wing aircraft may modify or increase the risk of injury and, despite the reassuringly few injuries in this study, serious injury remains a possibility due to the proximity of the NVGs to the face. If a piece of equipment could be devised that prevented the NVGs hitting the face but did not have the adverse features of the FPV, injury rates would be reduced and flight safety maintained.

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Article 1 Dive Medical Brief Page 22

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1. a b c d	5. a b c d	9. T F	13. a b c d e
2. a b c d	6. a b c d	10. a b c d e	14. T F
3. a b c d	7. T F	11. a b c d	
4. a b c d	8. a b c d	12. a b c d e	

Article 2 **Prehospital Treatment of Hypothermia Page 35**

Please circle the letter that corresponds to the correct answer:

1. T F
2. T F
3. a b c
4. T F
5. T F
6. a b c d e f
7. T F
8. a b c d e
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1. Which of the following correctly explains the relationship between Boyle's Law and the cause of sinus squeeze?
   a. The sinus cavities are lined by mucosa, which become edematous when injured during the descent due to an increasing volume and a decreasing hydrostatic pressure.
   b. The sinus cavity is a gas-filled structure surrounded by a bony framework, which is subject to changes in pressure and volume during the descent and ascent. Gas expands with decreasing ambient hydrostatic pressure.
   c. The two sinuses most commonly affected are the frontal and maxillary sinuses and are subject to barotrauma from obstruction of the osteameatal openings such that gas expands during the descent.
   d. None of the above.

2. Which of the following pathological directions are associated with air escape from an alveolar rupture?
   a. Pneumoperitoneum, Sub Q emphysema, and pneumocephaly
   b. Pneumothorax, AGE, and retroperitoneal free air
   c. Pneumothorax, AGE, and pneumomediastinum
   d. AGE, Sub Q emphysema, and pneumocephaly

3. Which of the following signs all coincide with a tympanic membrane rupture?
   a. Pain, vertigo, and hemorrhage
   b. Conductive hearing loss, hemorrhage, and pain
   c. No pain, conductive hearing loss, and vertigo
   d. Sensory hearing loss, no pain, and vertigo

4. When a diver experiences pain in his ear while diving, he is close to the pressure differential at which he will be unable to clear. What is the most appropriate step for the diver to take at this time?
   a. Continue his descent slowly
   b. Perform a forceful Valsalva in an attempt to clear his ears
   c. Use in-water decongestants like Pseudophed
   d. Stop the descent and ascend slowly to a depth of relief

5. Justification for the use of the GOLD STANDARD (decompression chamber) in treating arterial gas embolism (AGE) include all the following except:
   a. Reduces the size of the bubble, which diminishes vascular obstruction and tissue distortion.
   b. Allows diver quick return to diving.
   c. Promotes bubble reabsorption due to the increase of ambient pressure creating a large diffusion gradient.
   d. Prevents further bubble evolution enhancing tissue oxygenation.

6. The symptomatic presentation of inner ear barotrauma and inner ear decompression sickness is similar. Which of the following are signs common to both injuries?
   a. Vertigo, tinnitus, sensorineural hearing loss, nystagmus
   b. Conductive hearing loss, tinnitus, dizziness
   c. Vertigo, tinnitus, nystagmus, conductive hearing loss
   d. Pain, hemorrhage, disequalibrium, nausea

7. True ___ False ___ Inner ear barotrauma and inner ear decompression sickness are distinguished based on the onset of their symptoms correlating with the diver's profile.

8. Mechanisms by which inner ear barotraumas may occur from a forceful Valsalva include.

1. Difficult descent
2. Implosion
3. Explosion
4. Pressure differential

a. 1) and 2)
b. 2) and 3)
c. 1), 2) and 3)
d. All of the above

9. True __ False __ The definitive treatment for a pneumothorax associated with an overinflation injury is a tube thoracostomy.

10. Of all the diving injuries which one is considered the most potentially fatal?
a. Pulmonary oxygen toxicity
b. Type II DCS
c. Caustic cocktail
d. TM rupture
e. AGE

11. The General Gas Law is composed of which of the following laws?
a. Boyle's Law, Gay-Lussac's Law, and Dalton's Law
b. Henry's Law, Boyle's Law, and Charles' Law
c. Gay-Lussac's Law, Charles' Law, and Henry's Law
d. None of the above.

12. Overinflation injuries involving the alveoli of the lungs are reflected in which of the following gas laws?
a. Boyle's Law
b. Dalton's Law
c. Henry's Law
d. Gay-Lussac's Law
e. Charles' Law

13. Which structure in the middle ear cavity connecting to the nasal pharynx serves as an avenue for gas venting?
a. 3 bony auditory ossicles
b. Tympanic membrane
c. Eustachian tube
d. Nose
e. All of the above

14. True___ False____ Implosion occurs when sudden equalization causes exaggerated movement of the ossicular chain (malleus, incus, stapes) through the round (cochlear) window due to a forceful Valsalva.

CONTINUING MEDICAL EDUCATION TEST

NO.2

Prehospital Treatment of Hypothermia

JSOM

1. Death from hypothermia is generally from cardiorespiratory failure.
   T or F

2. Coldwater immersion death is ultimately caused by drowning as opposed to hypothermia.
   T or F

3. A safe strategy used in steady rewarming would be:
   a. Total body immersion
   b. Partial rewarming at ~ 2° C/hr
   c. Partial rewarming at ~ 5° C/hr

4. In mildly hypothermic subjects in which shivering was observed, major rewarming advantages were found when rewarming trials were conducted in 2° C or in -20° C air.
   T or F

5. It has been noted that exercise can actually cause a significant increase in post-cooling afterdrop before an increase in core temperature is seen.
   T or F

6. Exogenous external rewarming may be required is some circumstances. Examples would be:
   a. Hot baths of 42-45º C
   b. Warm IV fluid
   c. Hot water bottles
   d. Warm air/oxygen inhalation
   e. A&C
   f. B&D

7. Proposed simple warming techniques supplying exogenous heat to portions of the body extremities have a 3-fold advantage.
   T or F

8. In all cases of hypothermia the patient should be:
   a. Handled quickly without regard to excessive patient movement
   b. Remove from offending environment
   c. Remove wet clothing and then insulate
   d. B&C
   e. All the above

9. Initiating CPR runs the risk of triggering ventricular fibrillation in a hypothermic patient.
   T or F

10. The decision to initiate CPR on the hypothermic patient is made after establishing carotid pulselessness of:
    a. 1 minute
    b. 2 minute
    c 1½ minutse
    d ½ of a minute

SOMA Update

In December, the SOF medics met at the Special Operations Medical Association (SOMA) Conference, and again it was an opportunity to meet old friends and colleagues. We gained new insights, saw new technologies and shared experiences. It was a great success and will continue into the future.

One of the highlights of the conference was the address by 1Lt (ret) James DeVoss from Grand Rapids, Michigan entitled "Thanks For My Everything." He is an old friend from my undergraduate college days who went off to "fly jets" when I went off to Medical School. He joined the USAF and ultimately was assigned to Vietnam as an F-105 pilot (an aircraft affectionately called The Thud). In June 1969, while flying over North Vietnam his aircraft was hit by ground fire and disabled. Lt DeVoss had to "punch out" at a speed in excess of 600 mph. His injuries at this speed were multiple and significant as you can imagine. His left arm was severely fractured and dislocated behind his torso such that he wasn't sure he retained it through the ejection sequence. The windblast broke and severely dislocated his knees and lower legs rendering them useless. His parachute carried him into a bamboo patch and his torso and extremities were impaled by it. Once conscious, he found his right hand and arm to be functional and all the training he had was recalled, allowing him to key his survival radio and summon help.

In those days, America dedicated a task-force capability to the recovery of our pilots. The pilots flew close to the "edge of the envelope" knowing that this dedicated force was there to bring them home. On this day, the "King-Bird", the "Sandies", the "FACs" and the "Jolly Green Giants" showed up for him like they had for so many others. The team cleared the area, the helicopter found him and the PJs deployed down the hoist to get him. They recovered him, rendered necessary aid, put him in the recovery basket, hoisted him aboard the helicopter and took him to the care he required. Once back at the base he was handed over to the hospital folks. The rescue folks then went to ready themselves for the next "Save".

After months of medical care, multiple operations, numerous hospitals from Vietnam, through Clark AFB to CONUS and ultimately back home, Lt DeVoss' focus was to try walking again and to learn how to use his injured arm with a goal to return to flying and his USAF career. Within the next 5 years he was successful in getting on his feet and out of the leg braces and back to a reasonably normal life. It became apparent though, that his medical retirement would be permanent and so he went about readjusting to civilian life. He completed his Masters Degree and has enjoyed a very successful career.

In the past 30 years he also was a motivational speaker to literally thousands of folks. He told them his story of flying, his rescue, and all the folks along that chain of events who dedicated themselves to his preservation and life—from the flying instructors, the SERE instructors, the aircraft and crews of his rescue, the PJs who hoisted him out of the jungle, the medical technicians, the doctors, the nurses, the VA folks and all those along the way that brought him back and gave him back his life. On this day at SOMA he was able, for the first time, to address folks that are descendents of the rescue tradition and his thanks were sincere, from the heart and touching. He thanked us for his marriage of over 30 years, for his two children and for all his successes. His oldest child is a Ph.D. Professor at Michigan State University and his youngest is finishing his Ph.D. in Immunology at Stanford University.

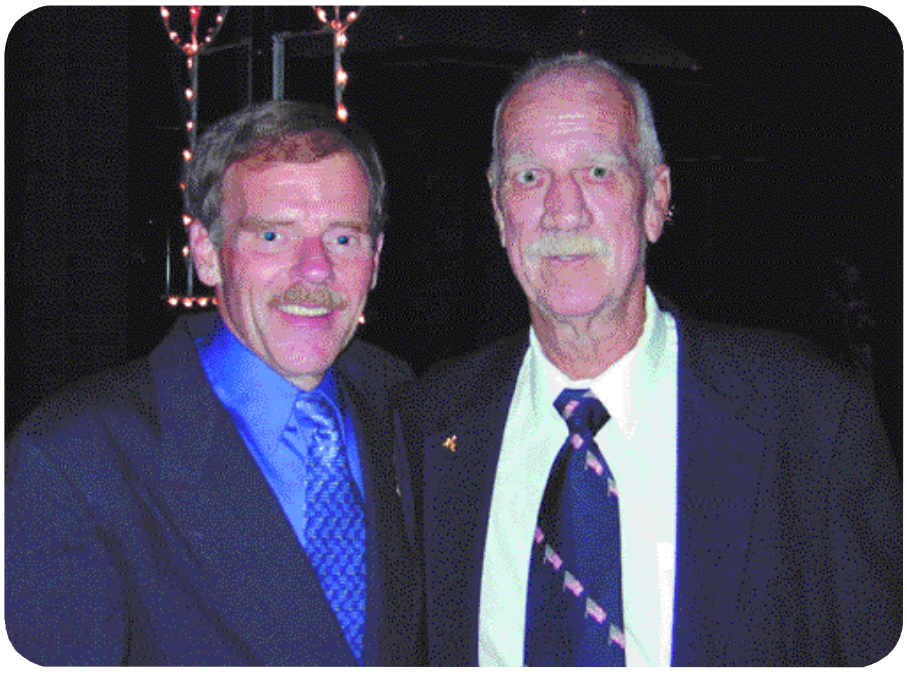
His one regret was that he had tried in vain to find any of the crewmembers who engineered that save in 1969. He tried for years without success. So, he relished the idea of thanking us in the audience in their place, for we too were dedicated to the motto "That Others May Live." Little known to him, we had checked with the "PJ Mafia" and asked if we could find anyone from that rescue. They responded with success and we smuggled into the meeting TSgt (ret) Lorenzo Willis from Satellite Beach, Florida. After Mr. DeVoss finished, we

pointed out the real issues of rescues, for the true rewards of a rescue are often lost in the preparation and reconstitution for the next rescue. The ramifications from each rescue are far-reaching and significant. This family and all their accomplishments to date, and in the future with these children, is the legacy of the rescue—it is much more than a "Save".

We then asked if TSgt Willis was in the room, and he stood to be recognized. When asked if he was the guy who came down the hoist and got this pilot out of the bamboo he replied, "Yes sir, I am". These two men immediately recognized each other even though they hadn't looked into each other's face since June 1969. The reunion was magnificent! TSgt Willis retired in 1973 from the USAF and had settled here in Florida. He remembered the rescue well as it was one of his last, and he described in detail the state of the injured pilot and his concerns for his rescue.

So, the meeting is over, the emotion of the moment is calmed, and we have all scattered back to our lives and our jobs. However, we are all better for the efforts of our colleagues and predecessors—the pilots and the rescuers. The successes of the DeVoss children that we will benefit from come from the efforts of SOF operators well before us. And just to put "frosting on the cake", we just got a note from TSgt Willis, THE RESCUER—it says "Thanks for the best day of my life"—go figure! God Bless America!

David L. Hammer



"Isn't it wonderful that I can grow old thanks to the gentleman next to me! And to so many others!!"
Jim DeVoss with Lorenzo Willis
Photo courtesy of MSG Samuel R. Rodriguez

THE "DOC" IS IN

Leonard D. Blessing Jr.

ABSTRACT

The Special Forces medic is a unique breed among a group of unique individuals. He embodies what the American soldier represents. He is a highly trained professional soldier who is compassionate and caring to those he is asked to help. *Doc* is an expression of respect and trust that is displayed by his team and the people he treats. Doc, spoken in any language, conveys the immense capabilities and responsibilities that the medic possesses, and the love that is felt for him by all those with whom he comes into contact. There is no greater love than that which exists between the men of the Special Forces and their *Doc*. His role with the team is that of soldier first, healer second. At times, both roles are performed simultaneously. The weapons and medicine have changed but the practice of the medic as a combat arms soldier first, remains the same to this day. Each team member knows their *Doc* will come to their aid during the chaos of combat and its aftermath. Most importantly, he is always ready to provide reassurance, comfort and laughter at just the right moment, whether it is through his skills, a smile or a prank, but always providing physical and mental healing.

***

This article, derived through research for an upcoming book detailing the history of the Special Forces medic, was inspired by the unbreakable bond that exists between a father and his daughter, and the camaraderie between the men of SF and their team *Doc*. I would be remiss to not credit CSM Larry Dickinson's daughter, Debbie, and Dom Campos, long time friend and former team mate, for sharing their memories and experiences with a man who was born to be an SF medic and embodied the spirit of this unique and special soldier.

Dickinson or *Dick*, as Campos calls him, joined Special Forces in 1959 as a medic from the 82nd Airborne Division and remained in that capacity throughout his entire Special Forces career. During that time, he touched the lives of many people, providing a constant source of laughter, reassurance and stability to those around him.

Dickinson's smiling, youthful face exuded confidence, yet balanced with a carefree demeanor. This disposition is an intangible character trait among medics; it provides them the ability to appeal not only to patients' ills and wounds, but also their mind. It provides an extra dimension that instills confidence among the people he cares for. It does not matter what the problem is; *Doc* can take care of it. This is perhaps the strongest medicine he can dispense, the ability to care for his charges in spite of anything encountered, whether in an Area of Operations (AO) or a night on the town, inspiring those around him.

Dickinson had a reputation for his ability to survey a situation and react accordingly, to make the best of the moment. It was all in a day's work. Dick's solutions most often manifested itself in a prank with a subtle coolness that left those who knew him laughing. For the unsuspecting recipient of one of his task resolutions, little more than a shake and scratching of the head was the only thing to do in its aftermath. The propensity for any SF'er to solve and overcome an obstacle by utilizing humor is not uncommon; however, the curative results, when employed by the *Doc*, provide a physical and mental healing that is unparalleled.

Dom Campos recalls that Dickinson never seemed to get old and that he was always smiling. Often, this elicited people to ask, "What in the hell is he happy about?" The simple answer to this question: Larry Dickinson loved life and what he was doing. This attitude is incredibly infectious and provided that "extra dimension", as Campos called it, to a team, giving them a "much needed calming effect, especially when the stuff was hitting the fan." Campos provided another explanation for Dickinson's affability and ever-present smile. "I never once saw him angry, and only once or twice witnessed someone angry at him. Probably because they were stressed out and envied his nonchalant charismatic demeanor."

Now, what kind of SF story would this be without a few, *This is a no BS story* stories? Campos provides a few instances that help describe Dickinson's character. To compliment his humor,

Larry had a rep for being a prankster. He must have enjoyed doing it; we did! We would try to figure out what he would do next to *oppose the rules.*

Campos recalls a time that he and Dick decided to visit the Pope Air Force Base NCO Club, where the ladies were plentiful, the music was great and the libations were cheap. The dress code for any such establishment, where two carefree incredibly handsome SF'ers sought a good time on a Saturday evening, typically consisted of a sport shirt and dress slacks. Dick was confident his choice of appropriate attire and immaculately polished *jungle boots* presented a debonair appearance for any self respecting SF'er. Apparently, the doorman at the club was not equally impressed with his choice of footgear. He was also apparently unaware of an SF'ers ability to have an answer for everything.

A conversation ensued between Dick and the doorman concerning the club rules about boots not being permitted on the dance floor. Even after Dick exerted his best effort to convince the keeper of the gate that he had *no intentions of dancing*, the doorman stood his ground and reiterated, "Sorry, can't let you in with the boots on." This new and unexpected development in the evening festivities threatened the successful accomplishment of the mission they had set out upon. Campos found himself standing in front of the club awaiting Dick's return from his car to obtain a pair of low quarters.

Campos was convinced a scene was inevitable when Dick reappeared moments later, still wearing the boots. The doorman, astonished by Dickinson's persistence, angrily informed Dick that "No boots are allowed in here!" Dickinson then raised his pants leg to reveal that the boots were no more – Larry had cut them down with his handy dandy demo knife! A field expedient surgical procedure had provided the means to *Charlie Mike* (Continue Mission) according to plan, as the speechless doorman waved his hand to indicate entry to the club had been granted.

Dickinson carried the same approach to perceived problems into the field. Campos recalls during a tour with Delta Project, "Dick and I were sent out as the advance party to establish a Forward Operating Base (FOB) in III Corps (RVN). This included setting up temporary quarters, showers/latrine facilities, necessary transportation, refueling areas, briefing areas, helicopter pads, etc. Among the initial priorities were the latrines. After three or four days, Dick notified the FOB OIC (Officer in Charge) that the area was ready for inspection. The OIC seemed impressed with our work. However, during his critique, he pointed out to Dick that we needed some signage on the outhouses so that everyone could distinguish between the officers' latrines and the enlisted latrines. I turned to Dick, he smiled and said, "Of course, Sir, how could I have overlooked such a need!" The OIC responded, "Other than that, the place looks good. The recon teams will start arriving this afternoon.

That afternoon, the teams flew in, and we began walk through orientations of the respective areas. When we showed them the latrines, everyone started laughing like hell. Unbeknownst to me, over the doorway of one latrine, there was a nicely printed wooden sign reading, *Officers Restroom.* On the other, Dick had placed a brown cardboard, hand scratched sign reading, *EM Shithouse*."

While the joking prankster was always present in Dickinson's actions, he also exhibited an unending love and compassion for the men he was trained to provide care for. Thanks to his daughter, it is possible to relay the heroic actions undertaken by her father during an attack on Detachment A-217 located at Plei Me, South Vietnam. The following extract, directly from the Silver Star Award Citation, best details the actions he took while making "house calls" to provide aid for his patients.

"For gallantry in action: Staff Sergeant Dickinson distinguished himself by exceptionally valorous action on 25 October 1965 as a member of a task force reinforcing the besieged U.S. Special Forces camp at Plei Me, Republic of Vietnam. As a reinforcement squad moved out of the camp to assault a Viet Cong machine gun position, enemy fire was placed on the squad and one Vietnamese soldier was wounded. Staff Sergeant Dickinson observing this action from a covered position within the camp, immediately seized a litter and aid kit, and ran forward through the protective wire of the camp to assist and recover the wounded Vietnamese soldier. As he reached the assaulting forces, he came under extremely heavy enemy fire. He provided medical aid to the soldier and continued to move back and forth through the assaulting forces to locate other wounded soldiers. Sergeant Dickinson then came upon a U.S. Special Forces advisor, who was wounded severely in the arm. He applied medical treatment and assisted in moving him into the camp to safety. Later on the same day, as helicopters

were evacuating the seriously wounded from the camp, the Viet Cong directed a heavy volume of automatic fire on the camp, forcing everyone to take cover. Sergeant Dickinson left his covered position and ran approximately 15 meters to the helipad, loaded the wounded on a helicopter and returned to his position while under continuous automatic weapons fire. He repeated this performance three times to load additional evacuation helicopters. His heroic and timely actions saved many lives at the risk of losing his own."

It is interesting to note, but not at all surprising, that CSM Larry Dickinson spent his last few years nursing and caring for a dear SF friend that had suffered injuries resulting in becoming quadriplegic. Larry's daughter never sold her father's home in which another friend of theirs resides in the unchanged environs, including an old rustic sign that simply reads, "THE DOC IS IN."

SSG Larry Dickinson receiving Silver Star; January 1966
Photo courtesy of Debbie Powell

CSM Dickinson (Ret) chilling in the hammock during his time with B-52 Project Delta, 1965
Photo courtesy of Mal McHoul

Len Blessing has been involved with research and writing the book about The History of the Special Forces Medic (Project BacSi) for over a year and a half.

Antibiotic Use In The Austere Environment Part One: Upper Respiratory

Warner Anderson, MD

THE PROBLEM

Special operations forces (SOF) field medical care is a composite of several mission-derived applications. For instance, direct action (DA) medical care is almost entirely trauma-related, while foreign internal defense lies at the other end of the spectrum, with illness care for both soldiers and indigenous personnel. Of course, there is a lot of overlap, and the uncertainty of supply and resupply provides much of the challenge: how much is just enough?

A fresh look at a long-neglected component of unconventional warfare, the guerrilla hospital ("G hospital"), offers a valuable opportunity to refine and redefine medical skills and appropriate applications of care. Standards of care must, insofar as possible, uphold top-quality practice regardless of location and circumstances.

At the 2001 Special Operations Medical Association meeting, Colonel Warner (Rocky) Farr and the USASOC staff presented an overview of several historical examples of guerrilla medical care, with discussion of how they could be used to develop doctrine for future operational needs. However, while the historical data yield valuable lessons on centralization versus decentralization, organization, security, and even logistics, little is available to guide clinical protocols and practices. What does the medic do in the field, by kerosene lamp, with a pressure cooker for an autoclave?

If we start with the premise that quality health care is essentially the same regardless of setting, it follows that an evidence-based review of certain clinical practices can offer 1) valuable improvements in therapy, 2) decreased adverse effects, and 3) efficient use of scarce resources.

In other words, more people will get better because of therapy, fewer will get sick because of it, and this can all happen in the austere health care setting.

A common misconception holds that the difference between a good clinician and a poor one is that a good clinician knows when to use a particular drug or intervention for the patient's problem. The reality is that a good clinician is one who knows when not to use a drug or intervention. For example, common practice prescribes antibiotics for a large number of conditions in which the antibiotics clearly are of no use, and may actually be harmful. The medic's challenge is to overcome the intellectual inertia that leads to this practice and protect the patient from bad medicine.

In special operations medicine, the corollary benefit will be a huge reduction in the resources used in the mission - thus, less tonnage and fewer cubic feet of supplies, and less demand on resupply.

So, the question is: what changes can SOF medicine make to provide more and better quality care in the austere environment? To find the answer, we can look to the literature on common problems encountered in SOF medicine.

THE ANSWER

A recent consensus paper sponsored by the American College of Physicians (internal medicine), the American Academy of Family Practice, the American College of Emergency Physicians and the Centers for Disease Control and Prevention warned that physicians and other clinicians are doing great harm to their patients by prescribing antibiotics for conditions in which they are not warranted.[1]

Sinusitis

Clinicians over-diagnose bacterial sinusitis by about 250%. In other words, for every five cases diagnosed, only two are really bacterial. The diagnosis is actually difficult, since no one wants to have a big needle poked into his sinus to have the pus sucked out for culture. Most clinicians are taught that sinus X-rays will show an air-fluid level, or at least mucosal thickening in sinusitis, but these are also common findings during the first week of the common cold. More recent teaching suggests that sinus films miss some sinusitis, and that a CT scan is necessary to rule it out. However, CT has been shown to be overly sensitive in screening for sinusitis, with a high false-positive rate. Certainly, diagnosing bacterial sinusitis on the basis of con-

gestion, sinus tenderness, purulent nasal discharge and fever will lead to a huge wasting of antibiotics.

In a SOF/UW situation, antibiotics are best considered for sinusitis only when the URI has been serious for more than seven days or takes a sudden turn for the worse late in its expected course, with documented fever, bloody-purulent nasal discharge, and exquisite (not mild-to-moderate) sinus percussion tenderness. Of course, erythema or swelling over a sinus should prompt antibiotics, and one should probably pull the antibiotic trigger on frontal sinusitis quicker than maxillary, simply because frontal sinuses can rarely rupture posteriorly into the brain.

Pseudoephedrine, nasal decongestant spray (not to exceed five days), and analgesia can go a long way to make the recovery process more tolerable.

Sore Throat

No clinician wants to miss a strep throat that might lead to rheumatic fever - and almost no one does. Clinicians who begin testing with rapid strep tests are usually surprised at how many apparent strep pharyngitis cases are negative, i.e. non-streptococcal. Since penicillin therapy shortens the duration of the strep infection by only about twelve hours, it's hardly worth it for suspected (but unconfirmed) cases.

Many clinicians use such clinical indicators as painful swallowing (as opposed to sore throat), tender cervical lymphadenopathy, fever and cryptic red swollen tonsils with purulent exudates to try to more accurately guess whether a sore throat is strep; however, they will be accurate only 10 - 30% of the time.

Furthermore, strep throat is almost unknown in children under two years old, and after about thirty years of age the chances of new rheumatic fever are about zero.

SOF/UW medics should administer penicillin (500 mg BID) for an adult-size patient with sore throat and history of rheumatic fever. Otherwise, antibiotics such as with good anaerobic coverage such as clindamycin should be given for peritonsillar abscess (plus surgical drainage), peritonsillar cellulitis, or sore throat that does not look like a viral URI or strep pharyngitis (Ludwig's angina, retropharyngeal abscess, etc.).

A sore throat, even with red and swollen tonsils, does not really merit antibiotic treatment, but it may merit lots of liquids, NSAIDs and codeine.

Bronchitis

When a patient presents with a bothersome cough - perhaps with musculoskeletal pain and no sleep from coughing all night, purulent sputum, fever and hoarseness - the temptation to reach for the antibiotics is great. However, patients who are under sixty years old, have competent immune systems and do not smoke can reliably be considered to have a viral condition. Of course, Moraxella and Chlamydia pneumoniae can cause bronchitis, but these seem to be self-limiting, anyway.

The SOF/UW medic should treat almost all bronchitis as the viral infection it is, and provide cough suppression and analgesia with codeine. Pseudoephedrine may help, but antihistamines will not.

In the field, rusty sputum, tachypnea greater that twenty/minute, heart rate greater than one hundred/minute, and/or rales (not wheezes) should prompt azithromycin or levofloxacin therapy, especially if pulse oximetry shows saturation less than ninety percent.

Otitis media

Most otitis media, whether in children or adults, will get better in seventy-two hours with, or without, antibiotics. First, the diagnosis of otitis media is hard to make, and has little to do with a red eardrum. Instead, the diagnosis is made with pneumatic otoscopy, reflectance tympanometry, or tympanogram (sure, the doctor looks in your kid's ear, but unless he pumps in air he's just fooling you).

The SOF medic may, by default, rely on an asymmetry of redness between the ear drums. Since any crying kid (and probably crying adults, I don't really know) have red ear drums, the medic will need to compare the two. After all, the reason humans are built symmetrically is so the medic can compare a paired structure to the other side for abnormality.

In the Netherlands, otitis media is treated with myringotomy. Easy to talk about but scary to do, myringotomy immediately relieves the pressure behind the TM and lets the pus drain.

Since the definition of an abscess is a collection of pus in a localized area, then it follows that otitis media is a type of abscess. And if the treatment for an abscess is drainage, not antibiotics, then judicious myringotomy makes good sense. In experienced hands, and in an antibiotic-poor environment, it can provide immediate relief for the both the suffering child and the frazzled parent. However, without antibiotics and without myringotomy, most all otitis media gets better and the pain responds to acetaminophen, ibuprofen or codeine.

Conclusions

Sometimes it takes a great deal of intelligence, courage and personal integrity to avoid, rather than reach for, the stock bottle of antibiotics. But SOF medics are chosen for intelligence, courage and integrity. Minimizing antibiotic use in an austere environment, just like in a rich one, is scientifically correct, judicious, morally right and inexpensive. And no one gets a rash, anaphylaxis, or resistance from the antibiotic that you didn't use. If the medic, PA and physician refrain from promiscuous use of antibiotics in the clinic and the field, they will be in good company: the ACP, AAFP, ACEP, CDC and the Infectious Diseases Society of America. Not bad at all.

See the Spring Edition for Part Two

Reference

1. *Annals of Internal Medicine.* 2001;134:479-517. (See also, *Annals of Emergency Medicine*. 2001; Vol. 37, No. 6. for identical articles)

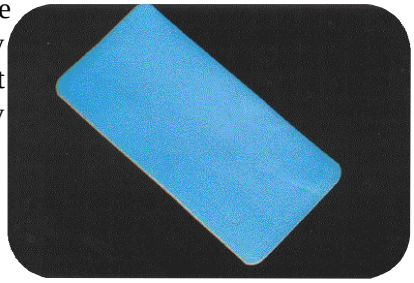
SAM® Splints for Special Ops Medicine

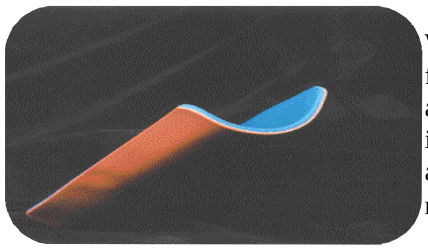
Sam Scheinberg

In 1984, a thin, foam covered "dead soft" strip of radiolucent aluminum created a paradigm shift in emergency fracture immobilization. This new product, known as the SAM® Splint, was clearly different from its predecessors. It was extremely lightweight and soft — seemingly far too weak and flimsy to function as a splinting device. On closer examination, however, its apparent weaknesses were actually strengths. Its light weight was appreciated by those carrying heavy backpacks, and the soft aluminum allowed the splint to be easily rolled or folded for storage. In addition, a single curve or bend placed in cross section along any longitudinal axis imparted remarkable rigidity. This strength along with the versatility permitted by malleability made the SAM® Splint suitable for splinting almost any body part.

This article reviews the general properties of the splint. It contains information regarding construction, principles of use, and environmental tolerance —- plus comments on cutting, cleaning and precautions. It describes the classic applications on the upper and lower extremities as well as three lesser-known techniques for use in the field.

The SAM® Splint is a long rectangle of zero temper, very thin aluminum alloy sandwiched between two layers of high quality dermatological safe ethylene vinyl acetate closed pore foam. In its virgin state (without any bends) the splint is completely malleable.

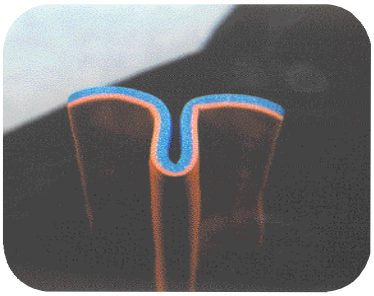




When a curve or fold is placed anywhere across its longitudinal axis it becomes rigid.

Secondary reverse curves placed along the edges dramatically increase the splint's strength.

A "T" bend produces exceptional rigidity.



The SAM® Splint is radiolucent, almost invisible on x-ray, and should not be removed for radiographs. It is designed to function through the extreme ranges of normal ambient temperatures. It is waterproof, but not fireproof. The closed pore EVA foam will not flash when exposed to flame, but will begin to melt and eventually ignite after approximately 8 seconds. The SAM® Splint is easily cut with ordinary scissors; trauma shears are not required. Cutting exposes the thin aluminum core. Unless a serrated scissor has been used, the aluminum is usually not sharp. To prevent any injury from the exposed edge, fold the edge on itself one or two times. Covering the edge with tape is also effective. The foam used on the SAM® Splint was selected for its "clean-ability." Whether cut or used intact, the splint can be cleaned with antiseptic soap and water or with almost any protocol cleaning solution. I prefer a half percent hypochlorite solution (9 parts water to 1 part common household bleach.) The closed pore foam, which promotes effective cleaning, does not absorb perspiration or allow the passage of air. This does not present a problem during short-term use. If, however, the splint is to be worn for prolonged periods (hours to days), some absorbent material, such as cotton cloth, cast padding or a double layer of tubular stockinet, should be placed over the splint to prevent skin maceration and odor. Although the EVA foam does provide some padding, additional soft

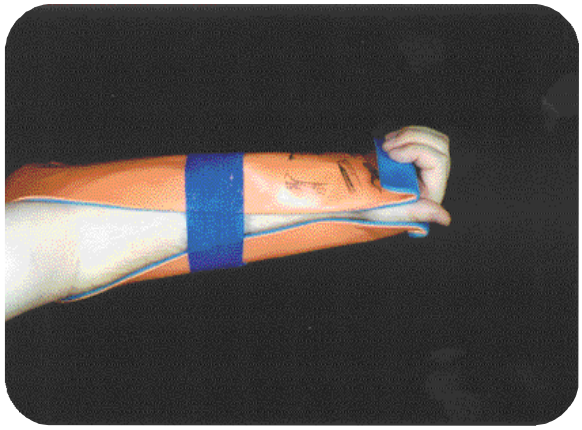
padding should be placed around all bone prominences when prolonged use is contemplated.

CLASSIC USES

UPPER EXTREMITY

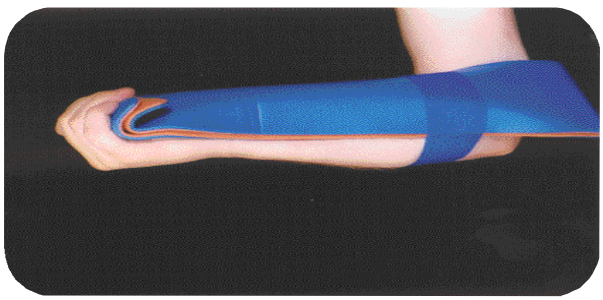
OPTION #1: The "Sugar-Tong"

The "sugar-tong" configuration provides support for the distal radius and ulna, and to some extent prevents rotation. First fold a 36 inch SAM® splint into two equal limbs. Then beginning at the end of one limb, use your thumbs to produce a gentle cross-sectional curve or half-circle. Squeezing can quickly deepen the curve. Do not extend the curve all the way down the limb, as this will limit your ability to fold the "sugar-tong" around the elbow. After completing the bends in the first limb, create a similar curve in the opposite limb. Fold the splint around the elbow and secure to the extremity with your wrap of choice. Excess splint should be folded back to allow good visualization of the fingers.



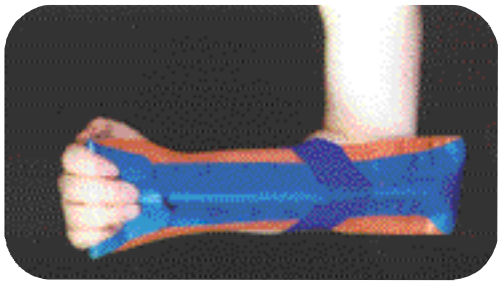
OPTION #2: The "Double Layer"

Folding a 36 inch splint in half upon itself creates the "double layer" configuration. This two-layered splint is then curved into a cross-sectional half curve and molded to your own extremity. Small adjustments are then made after applying the splint to the patient.



OPTION #3: THE "T"-Bend

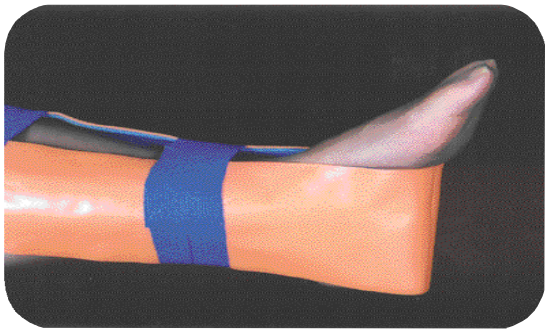
This configuration is exceptionally strong. The splint is first folded in half creating two limbs. One curve is folded onto itself along its longitudinal axis. The edges of that fold are then bent into a contrary direction to create a "T" shaped beam .The "T" beam is then placed as a support against the opposite limb of the splint which is curved to fit the extremity.



LOWER EXTREMITY

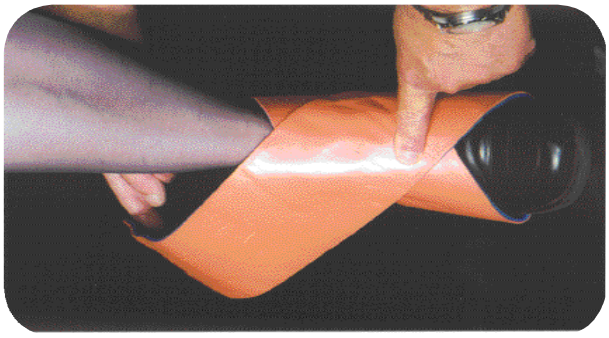
OPTION #3: The Ankle Stirrup

The same sugar-tong technique used on the upper extremity is used on the lower to create and ankle stirrup. Remember to apply padding just above and around the bony prominences (malleoli).



OPTION #4: The Figure "8"

The splint is folded into a figure "8" around the foot, boot or shoe. This can be quite useful when ambulation is required. Again, remember to pad the malleoli.



LESSER-KNOWN TECHNIQUES

OPTION #5: A Flexible Basin (the "SAM® PAN")*

To create a SAM® PAN, fold a 36 inch splint into a circle. The opposite ends of the splint may be left open or secured together with interlocking bends, paper clips or duct tape. Select a standard plastic kitchen garbage bag, sized to your desired use. Place the plastic bag within the splint circle and fold all excess bag over the splint edges. The folded portion of the bag can be left free, rolled over the splint or secured with paper clips. You now have a flexible container suitable for many uses including:

*For irrigation of scalp, trunk or extremity wounds. The pan can be molded to any one, and fits easily between the legs.
*For thawing frostbite.
*For personal hygiene - to collect body fluids (emesis basin, urinal or bedpan) or as a washbasin.
*For food preparation and cleaning.
*For general packing and storage.
*As a trashcan

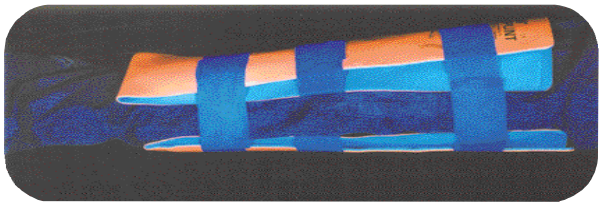
*My special thanks to Brian Horner (US Air Force Retired) who created the first SAM® PAN on the slopes of Mount Denali, and used it to re-warm a frostbitten foot.

OPTION #6: The "SAM® BAND"

Place 36 inch splint within a 5-6 foot section of 3 inch – 4 inch tubular stockinet. The length of the splint can be adjusted by folding. Center the splint in the stockinet so equal lengths of stockinet remains loose on each end. This device can then be wrapped around the body and used to apply compression. The "SAM® BAND" is useful in treating rib fractures and low back strains. It can also assist in closing "Open Book" Fractures of the pelvis.

"SAM® EXPAND"

A 36 inch splint is folded in the center to form two limbs. The outer edge of one limb is then placed adjacent to and slightly overlapping the inner edge of the opposing limb. This produces a fan shaped splint, wider at the top and narrower at the bottom. The splint is secured in this configuration by tape at the top, middle and bottom of the fan. It is then folded into a gentle cross sectional curve. This fan can be applied to both sides of the knee (wide end up) to create a knee immobilizer or used for extra large upper or lower extremities.



There are many other traditional and alternative uses for the SAM® Splint. Many of these will be described in a new instructional manual available in April 2002.

Members of the Special Operations medical community were among the first to recognize and utilize the unique qualities of the SAM® Splint. Their comments and suggestions have contributed enormously to the development of this product and no doubt will continue to do so. For a free instructional video, please contact The Seaberg Company, Inc., at 800-818-4726 or an send e-mail to seaberg@samsplint.com .

A Memorable Mission

Wayne Fisk

The following is an excerpt from a speech given by Wayne Fisk a number of years ago, and most recently at the 32nd Annual Jolly Green Giant Association Reunion in May.

The exploits of special tactics / operations forces medical warriors are legendary. They are handed down from generation-to-generation, from era-to-era to foster a sense of pride, camaraderie, and where-with-all so that when new generations find themselves confronted with seemingly inhuman challenges, they need only remember their predecessors.

But oftentimes in the telling and re-telling of the stories, the true facts of the incident are clouded, if not totally distorted. The following incident is absolutely true; no bravo-sierra.

In the early days of the quagmire that turned out to be the Vietnam War—say 1964 to 1968—the rescue forces of the famed Jolly Green Giants didn't have it too bad when it came to communist gunners being accurate, effective, and/or deadly. There were, indeed, some birds that got hit and shot down, but not too many considering their size, slowness, and lack of maneuverability.

The primary reason for this was the lack of marksmanship on the part of the bad-guys. They would see those huge, lumbering, slow-flying aircraft slogging across the sky, fixate on the pilots, and fire away. Well, as any duck hunter knows, unless one leads the target, all one will get is tail feathers. "Tail feathers" in this case, however, usually meant the aft half of the helicopter and the pararescueman (PJ) manning the ramp gun. Perhaps not as significant to the pilot as himself, his engines, and his rotor system, but nonetheless of great concern to the PJ.

Then, too, the bad-guys suffered an acute lack of fire discipline. Often times when a pilot was shot down, after surrounding him they would shoot at any passing aircraft, clearly denoting their positions and strengths. A-1 "Sandy" close-air support aircraft would roll in and have an exciting turkey-shoot, the end result being that Ho Chi Minh's ranks were thinning at a good (for us) rate. Bad for him/them.

Yes, life was pretty good in those early years.

But then in 1969 things began to change. Choppers began to get whacked on a regular basis regardless of the altitude and speed of the bird and/or the skills of the pilot. Chopper crews often found themselves surrounded by flak and chewed up before they could get up enough of a pucker-factor to be scared. Birds began to go down at an unprecedented rate.

Obviously the bad-guys had latched onto something new and spiffy, and their kill record reflected it. USAF combat air forces began to take note. Some even thought that perhaps the bad-guys had gotten hold of a copy of the USAF's Enlisted Force Career Progression Plan, the plan/program that trained enlisted men and women in the major skill levels of their careers. The joke was that the bad-guy gunners had all become 7-Level Proficient (that level of mid-NCO career proficiency wherein the saying, "The backbone of the [Air Force, Army, Marines, Navy]"… is most often directed).

Regardless of the type of training they were receiving, the bad-guys were good. (The real-world advent of this improved skill and capability was due to the Soviet Union's introduction of radar-controlled fire delivery systems.) And they were improving on their fire discipline, too. No longer would they open up in an undisciplined manner. Now they would hunker down, hold their fire, and wait for the chopper to insert the PJ before they opened up. Yep, things were a changin and the Jolly Greens and PJs were suffering.

On one particularly memorable mission in North Vietnam, the CSAR (combat search and rescue) force knew exactly where the pilot (survivor) was located in the dense jungle valley. It also knew that the bad-guys had set up a kill-trap down there and were just waiting for the Jolly Green to insert its PJ. The crew knew it; the PJ knew it; the Sandys knew it; the survivor knew it. And the bad-guys knew the CSAR force knew it.

Still the bad-guys remained absolutely silent. Not even the low and slow "trolling" of the Sandys—when those ballsy pilots rolled in at tree-

top level at a near-stall speed—would entice them to open up and reveal their concealed positions. Not even when the Sandys raked the area with .50 cal fire. Not even when the Jolly—one of the NVA's highest-prized, most sought after kills—would troll through the area. The bad-guys fire discipline was magnificent; they remained absolutely silent. They wanted a total guarantee of a complete kill mission: the Jolly and crew, the PJ, and the survivor.

Frustrations within the CSAR force began to run high. Daylight was waning, and if the survivor was not rescued by nightfall, the chances that he would be there the next day were very slim. Yet there appeared no way to make the bad-guys open up.

At length, the PJ at the rear gun position on the Jolly Green decided he had had enough, and took matters into his own hands. As the Jolly rolled in on final approach for yet another trolling pass over the survivor's position, he whipped off his ceramic vest, tore off his LBE (load-bearing equipment), let his gunner's belt all the way out, turned around, and backed to the very edge of the ramp. When the chopper was right over where he knew the bad-guys to be, he undid his belt, dropped his pants, and shook his pale, ghastly butt from side to side.

Ka-Wham! The whole valley opened up. The bad-guys were shooting everything: There were small arms; 12.7mms, B-40s, 23mms, and 37mms. All hell had broken loose.

The poor helicopter was ripped, shredded, sliced, and diced. It barely limped out of the valley in one piece. Suddenly being able to see the previously-concealed gun positions, flights of Sandy aircraft rolled in on attack passes. They were like maddened killer bees attacking a helpless victim. Tremendous kills were instantly realized. The FAC—call sign "Nail"—called orbiting F-4 "Phantom" fighter jets to join in. Multiple secondary explosions ripped through the jungle as bad-guy caches were destroyed, one after the other. The survivor was screaming on his emergency radio, "Keep it up, you magnificent bastards! More, more! Keep it up!"

Finally, the back-up Jolly Green rolled in through a deadly curtain of fire, snatched up the survivor from the enclosing bad-guys, flew like hell out of the area, and delivered him to the safety of American hands.

In debrief, the intelligence folks were utterly dumbfounded by the PJ's actions. The Jolly Green ops officer was called in, listened, then called in the commander. The commander sat dumbfounded in awe, then slammed down his fist, instantaneously declaring it an unprecedented tactical concept and recommended its fullest and most immediate implementation. Within hours it was staffed and approved at the highest level of 7/13th Air Force in Saigon for immediate use by all CSAR forces throughout Southeast Asia.

And that's why, to this day, you'll never find a PJ afraid to hang his ass out in the face of danger.

Wayne Fisk

OPERATION "JUNGLE JIM"

Hap Lutz

The foregoing is a brief historical account of the establishment of Air Commandos and the genesis of, and my subsequent association with United States Air Force Operation "Jungle Jim," with some of the attending hurdles I had to jump getting there. It was one of my most endearing Air Force assignments and commitments...and probably the last of its kind in US Air Force history. It is with dignity and great pride that I wore the Air Force Blue Badge of Honor as an Air Commando, any time, any place.

WORLD WAR II IN THE PACIFIC

In August of 1943, General Henry H. "Hap" Arnold met with British Admiral Lord Louis Mountbatten to discuss plans for American air support of British commando expeditions in the China-Burma-India theater of operations. General Arnold coined the term "air commando" to honor Lord Mountbatten who earlier commanded British commandos.

The general directed veteran fighter pilots Lieutenant Colonels Philip G. Cochran and John R. Alison to build a self-reliant composite fighting force to support British Brigadier General Orde C. Wingate and his "Chindits" on long-range penetrations into Burma against the Japanese. By March 1944, the unit was designated the 1st Air Commando Group.

COLD WAR ERA

General Curtis E. Lemay, Air Force Chief of Staff, established the 4400th Combat Crew Training Squadron in April 1961. Nicknamed "Jungle Jim," the CCTS was based at Hurlburt Field, Florida, and had a two-fold mission: counterinsurgency training and combat operations. Aircraft such as U-10s, C-46s, C-47s, B-26s, and T-28s soon showed up at the Hurlburt flight line.

OPERATION "JUNGLE JIM"

Following my return from a 13-month assignment to Dhahran Air Base, Saudi Arabia, I was reassigned to Holloman Air Force Base New Mexico in June of 1961. I resumed my duties as Non-Commissioned-Officer-In-Charge of the Flight Surgeon's Office, flying rescue, and as a volunteer sled-test subject at the Laboratory of the Human Tolerances Branch of the Air Force Missile Development Center. I had performed these duties prior to going to Saudi Arabia and had successfully requested reassignment.

It was probably around late July of 1961 that the Commander of Holloman Air Force Base was asked to seek volunteers for a top-secret project. In the medical field, they sought volunteers in the 901 and 902 specialty codes. As a 90170 (Aeromedical Technician), I was apprised of this assignment and was asked by my boss, Major Joe Gainey, the Hospital Commander, if I was interested. I gave him a definite, "Yes!"

Shortly thereafter, I was called for an interview with the Base Commander. (The interviewer had to be a full Colonel or above.) There were probably 10 others in the waiting room, of various Air Force specialties. I sat anxiously, excited, wondering what in the heck this was really all about. As individuals went in, some stayed only a few minutes and others stayed for what seemed like hours. This really added to my excitement and wonderment.

It finally came my turn. I was escorted into the Colonel's office and after reporting, I sat down directly across from him. (I do not remember his name.) First, he checked my ID card. He then asked about my health, family, and present job satisfaction. I responded that everything was well on all accounts.

The Colonel then shifted to the purpose of the visit. He said, with some hesitation and sincerity of purpose, "I'm going to ask you 5 questions. If you answer affirmatively to all 5 questions, I'll then precede with 10 other questions. If, however, you answer negatively to any of the first 5 questions, you will be dismissed without prejudice." He then cautioned that I was not to repeat any form of the 5 or 10 questions under any circumstance. He then asked if I fully understood the rules of the interview. I reported that I fully understood. The Colonel then proceeded with the interview.

Because I was told to forget the questions I was going to be asked, I only remember the crux of the 5 questions and they are as follows:

1. Would I be willing to be away for extended periods of time on a regular basis?
2. Would I be willing to perform under difficult and austere conditions for an extended period of time?
3. Would I be willing to fly into poorly constructed airfields to assist or extract others?
4. Would I be willing to attend parachute training school?

5. If accepted, would I be willing to accept any assignment my government or the Air Force asked of me?

I was excused, told to wait for further instructions and cautioned again not to discuss any aspect of the interview. I went away with a feeling of exhilaration. I knew I was into something big and exciting and found it very difficult to follow the Colonel's instructions. It became increasingly more difficult, as Holloman Air Force Base was a buzz with rumors about "the project."

Several weeks had passed before I had received definitive word that I had been accepted. My next move was to Lackland Air Force Base, TX for psychological testing.

TESTING

The number and list of psychological tests is as long as your arm that the Jungle Jim candidates had to successfully complete prior to acceptance into "the project." The degree of testing was modified as further volunteer selections were made. The test results were contained in report PRL-TR-64-24 dated October 1964 and entitled "Application of a Psychometric-Clinical Approach to Personnel Selection for Counterinsurgency Duty." These results were reviewed by George K. Contrell, Major, USAF, Fred E. Holdredge, Col. USAF, Roy A. DeGough, Lt. Col., USAF, and Cecil J. Mullins and conducted by the Personnel Research Laboratory, Aerospace Medical Division, Air Force Systems Command, Lackland AFB, TX.

One of the tests I remember quite well was the Modified Pressor Test. I recall standing in the tub of ice water, but I also recall also having to do so naked. If there was a rationale for me being naked, I didn't question it. My main purpose was to pass everything they had planned for me. Another test I remember well was the Success Motivation Test. I don't know how long my arms were extended, but when I was given the OK to drop them, I couldn't. The examiner had to assist me in getting my arms back to my sides. I guess I had frozen them in that position both mentally and physically, with total commitment toward not failing this procedure. Many interviews with the psychiatrists and psychologists filled the voids between the above-mentioned tests.

Following the mental examinations, I returned to Holloman AFB and resumed normal medical duties. Shortly thereafter, I received orders to report to Stead Air Force Base, Reno, NV for intensive survival training. It was during December...a very cold December. Let me add here that our particular training course, and those that followed us was specifically tailored for "Jungle Jim" selectees. By that I mean that the instructors and instructions were mandated to be particularly harsh and unrelenting in scope and performance.

After going through 2 weeks of classroom instructions on how to survive and escape and evade (several guest speakers were former POW's), coupled with 2 hours of daily combative training, we were broken up into elements of no more than 10 students, given a shoot down cover story, and turned loose in the Sierra Nevadas Mountains.

I was in an element of 10. We were provided with one live rabbit and 10 potatoes for the group. Also, each of us was given one pemmican bar. These were rations for a week for 10 of us. Anything else would be snared, trapped or caught in the mountain streams.

We were also given winter survival clothing, snowshoes, maps and compasses. Our survival route and check points were mapped out for us...and the day expected to arrive. (We were rewarded with an orange if we made them on time without capture.)

On our first day, and after building our tepee survival shelter, our element leader correctly suggested that we eat the rabbit and potatoes right away. His rationale was that if we got separated, the rabbit would surely perish in the treacherous weather we were experiencing and serve no useful purpose. He also suggested that lighting fires down the trail would surely attract attention from aggressors. We agreed to a man with his suggestion. As the only medical man and experienced cook in the group, the element leader tasked me to humanely slaughter and clean the rabbit, and make a stew. (We were provided with a much-used pot for that purpose, which we abandoned after eating.) The stew was so so, but eaten to the last drop.

After somewhat of a sleepless night (almost all of them were...from the bitter cold), and after thoroughly checking our gear, striking our tepee, and thoroughly dousing and covering our fireplace, we started our trek before dawn. We knew the going would be slow in snowshoes, so we let our slowest man set the pace. We had mapped our route the night before while eating rabbit stew.

To add to our misery and discomfort, it began

to snow unrelentlessly. It not only slowed our pace, it also hindered our navigational ability. In spite of it all, we plodded on, keeping off trails and going to the higher reaches to avoid detection. To say that the first day out was somewhat discouraging and depressing would be an understatement. Although we were still buoyed by the stew at start, the extra energy demanded by difficult walking through the day began to exact hunger pangs in all of us. And...we had missed our initial checkpoint, so no orange.

Grumbling, but glad that the day was over; we began building individual snow caves for the night. If you've ever slept in a snow cave, you know how miserable the night can be. Your breath alone causes a constant waterfall that soaks your clothing and then freezes. It also increases your desire to relieve yourself at the worst possible time.

We had reached a "safe" area (Wheeler's sheep camp) and could build fires without consequences, if desired. We built a communal fire, attempted to dry our boots and socks, and recounted the day's activities. Most of all, we pondered how we missed the first checkpoint. And would "they" be looking for us at some time? With those thoughts in mind, I gnawed on my pemmican bar and sauntered off to my snow cave for another restless night.

The next day the snow had subsided, we made our checkpoint, received a delicious orange, and generally rearranged our thoughts. And we didn't lose any of our element members in the process. In talking to the checkpoint guard, we were told that several students in other elements had quit due to the bitter cold and discomfort.

Our final trek day had finally arrived. We knew it would be a long one, so we started early. Towards what we thought would be the end, about 50 yards to my left, a brilliant light appeared! Two aggressors appeared from nowhere and grabbed one of our element students. Almost as suddenly, I hit a trip flare and was hustled to the ground by two burly guards. The same fate awaited all of us.

The simulated POW camp was as close to the real thing as they could possibly make it, both physically and mentally. I cannot adequately describe the techniques they utilized to "find a weakness and turn it into a strength."

On arrival in the camp, we were given a number, stripped and searched for any bounty we might have that would sustain us in any way. That included cigarettes, gum, toiletry items, medical items, lighters, knives, and all the issued survival items. We were then placed in metal lockers, in the horizontal position, deprived of light and sound. Talking was prohibited, to fellow inmates or the guards.

I could hear the guards take someone occasionally. Sometimes they came back, sometimes they didn't. Even in this metal locker, fatigue began to sweep over me as a result of the days in the mountains. I tried to drift off, but that was always precluded by the guard beating on the locker with a stick of some sort.

My turn came to be taken away. I was ushered into a small room and told to kneel. After the blindfold was removed, I could see a table before me and an individual sitting at the table in the same uniform the guards all wore. He then waived to his assistant to bring me a chair. He invited me to sit down. He then started a conversation about my family, my service, my circumstances, etc. He asked several questions, to which I didn't respond. (His job was to get me to talk in any way he could, about anything.) He assured me he was my friend and that he could make it much nicer for me if only I opened up to him. I continued to ignore him.

Despite their best efforts, I decided not to cooperate. Following that interrogation, I was placed in a black box. The same type of infamous "Black Box" that had been repeatedly reported. It was a very, very tight squeeze. I don't know the duration of my first stay, probably somewhere around 2 to 3 hours. I remember it was very difficult to stand up following the ordeal as I was placed in the crouched position.

Many more similar ordeals and interrogations followed. Those of us that were left were liberated after some 36 hours in the POW situation. We all headed for our rooms and basked in the shower. We were then fed in the mess hall and reminded to eat sparingly. After a night of restless sleep (takes a while to normalize), we headed for Reno. Harold's Club had given us a $5 "I Survived" plastic chip and a free steak dinner.

After successful selection we became a small component of Special Operation Forces. We were better known as "Air Commandos". As a general rule, Special Operations Forces are elite, specialized military units that can be inserted "behind the lines" through land, sea, or air to conduct a variety of operations, many of them clandestine. They have played a major role in most U.S. conflicts.

SOF personnel are carefully selected and undergo highly demanding training. Operations include everything from direct action to humanitarian missions.

Subsequent to my selection, I reported to the 4400th Combat Crew Training Squadron, Hurlburt Field, Florida on 10 January 1962 with assignment to the Flight Medical Section. We continued daily physical and combat training, 5-mile runs, knife and ax throwing, treating simulated wounds and injuries, flying duties, etc. We also held daily "sick call" for the other assigned personnel, along with giving them the required immunizations for the country they were being deployed to.

I departed for Bien Hoa Air Base, South Vietnam on 10 June 1962. My duties over there, and all other deployments, are a whole other story.

Hap Lutz originally entered the service in 1947 as a Navy Hospital Apprentice. His career lead to a eventual switch in service to USAF in 1958 as Staff Sergeant. Assigned to Holloman AFB, NM as NCOIC of the Flight Surgeon's Office. Posted to the USAF Hospital, Dahrhan, Saudi Arabia June 1960. Interviewed for Project "Jungle Jim" in September 1961. Assigned to Hurlburt Field, FL 10 January 1962. Served in Vietnam during 1962 and 1967. Served in Thailand and Laos with forays into Cambodia and Burma during 1964, 1965, 1966, 1970, 1971, and 1972.
Inducted into the Air Commando Hall of Fame in October 1969. Retired from active military service as a Chief Master Sergeant (E-9) on 1 January 1974.

Just received the new JSOM; looks like another winner! It's one pub that gets read cover-to-cover. Thanks for ensuring they get sent this way! Once in awhile a message comes along that should make us all stop and think about why we do what we do. “Note from the ER” is one of those messages.

When one considers the vast number of our EMT-Ps who perform their rotations in hospitals where they may encounter the final remnants of our "Greatest Generation", I think it's significant that we as special ops/special tactics medics understand--as the author of "Note from the ER" has--what these aging men and women gave to us: Citizenship--with no questions asked--to the greatest, most enlightened nation the world has yet seen. Of all the people who are the recipient of this great gift, we as military personnel, as SOF/ST medics, should be the most compassionate, the most grateful. And it should be our duty that as these men and women enter medical facilities, often as their Last Admissions, that they understand their efforts were not for naught, but rather preserved through us.

Best regards to you,
Wayne Fisk

Recently saw a copy of the Journal of Special Operations Medicine. Although I was not a Special Forces medic, I assisted the team medics when I was a detachment commander in an "A" Camp in Vietnam. Your publication brought back some good memories. Thanks!

Boyd F. Morris

We, in the 20th Special Forces Group Medical Section, have heard some grumblings within the SOF medical community about our USASOC Command Surgeon's, COL Warner D. "Rocky" Farr, photograph. We strongly believe his use of this photo when he was an operator and RT in Vietnam demonstrates many things about his character, personality and leadership including the courage and the ability to laugh at himself while wearing the birth control glasses.

We have enclosed a photograph of our section to show our solidarity and support in continuing to use his photos from Vietnam.

Thank you very much,
LTC Michael Mouri
m2

From left to right, SGT Darryl Brewer, 91WW1,Group MedLog NCO and Critical Care Paramedic, LTC Michael Mouri, Group Surgeon, and MSG John "Water Jump" Capuzzo, 18Z, Group Medical NCOIC.

Apologies & Corrections

Corrections to the Summer and Fall 01 editions: While attending SOMA this year, it was brought to my attention by SFC Bob Miller, that the picture on the cover the Summer Edition which was captioned "*SOF MEDICS PERFORMING NASAL INTUBATION...2001 VIEWED THROUGH NIGHT VISION GOGGLES* "should be captioned "RANGER MEDICS INSERT A NASO-AIRWAY DURING ASSESSMENT AND VALIDATION". The second picture was in the Photo Gallery of the Fall edition. It is captioned " *AN 18 DELTA TRAINING TO DO HIS JOB IN NBC MASK*" but should be captioned a "RANGER MEDIC RUNNING THE OBSTACLE COURSE IN PROTECTIVE MASK". These medics are all from the 3/75th Ranger Regiment. SFC Miller added "Thanks again for all you have done with respect to the journal. It really is a fantastic publication."

Apologies to COL Bill Davis for the error in Fall Ed Corresponence section. COL Davis brought to my attention " I was a Battalion Commander (Mike B in your office was one of our heroes), not a Group Commander. Could you please correct that very important point in the next issue. However, thanks for the "selection" anyway."

mdd

Editorials

GUERRILLA NBC WARFARE

Warner Anderson

By early September of 2001 the anthrax immunization program had become the most unpopular mass vaccination effort in the history of the U.S. military. Soldiers, marines, sailors and airmen (especially pilots) had refused the series and were punished or left the service as a result. One Air Force Reserve unit was rendered combat ineffective because of the resignations of pilots.

By mid-September 2001 it had become one of the most popular vaccinations, and now some civilians are angry they don't have access to the shots.

Since the Sverdlovsk cover-up in the Soviet Union, thinking people have known the anthrax risk is real. Since the Gulf War gave us a glimpse at Saddam's NBC capabilities, thinking people have known the risk of terrorist attack with that anthrax is also real.

Real but abstract. As an abstraction, NBC could be shunted off to the sidelines, and the success or failure of the anthrax immunization program was of little urgency to the soldier in the ranks. But the recent deaths have brought NBC into sharper focus, with the public facing the same - or greater - risks than the military.

At the time of this writing, the source of the attacks has yet to be determined, and although law enforcement is following some interesting leads, it is apparent that the source, magnitude, and politics of the attack may never be known. But the motive is clear - daily life has been disrupted in a serious way in the United States. Indeed, the NBC threat could become a bigger disaster than the Trade Center destruction, if pursued with any vigor.

A fine, blurry line separates the guerrilla from the terrorist. Indeed, while world bodies struggle with the concept of what separates a freedom fighter from a terrorist, we may offer the definition that a terrorist is a guerrilla who attacks civilian targets.

How does the guerrilla in the field relate to microorganisms other than as their unwilling host?

Lester Grau, in a recent paper entitled "Medical Support in a Counter-Guerrilla War: Epidemiological Lessons Learned in the Soviet-Afghan War" (available on the U.S. Army Command and General Staff School web site at http://call.army.mil/fmso) writes that Soviet hygiene and preventive medicine in Afghanistan were so poor that entire divisions were incapacitated as a result of hepatitis A. He attributes this hepatitis A epidemic to the lack of field hygiene discipline, in turn resulting from a weak NCO corps. Without experienced and empowered NCOs to enforce hygiene ("fieldcraft"), the conscript army defeated itself. The effect of enteric diseases on the Soviets was so great that, if one reads between Grau's lines, it seems the mujahideen played only a minor role in the Soviet defeat. Basically, the Soviets drove themselves out of Afghanistan.

So, pathogens can be force multipliers for the guerrilla force. But the other side of the coin, the disease threat to guerrillas, demands attention. If the Soviet Army was severely afflicted by disease due to poor hygiene, then how much more so the guerrilla in the field?

Consider you are one of two SOF medics on a team deployed into a denied area. Your team is tasked with providing advice and direct assistance to a fairly well-organized guerrilla force, a "front" in your operations area comprising perhaps 1,500 full-time guerrilla fighters. Your ad hoc medical system is necessarily decentralized, but you have established echelons of care. You have trained at least a few guerrillas along "combat life-saver" lines. Injured combatants who survive the first few hours are evacuated by litter, pack animal or vehicle to collection points where antibiotics, irrigation, analgesia (when available) and clean dressings are provided by indigenous medical personnel. When other activities permit, those requiring further care are then moved to your guerrilla hospital.

For the sake of the problem, assume that your base camp is in a fairly secure area. The camp includes a large number of non-combatants such as families of guerrillas, refugees awaiting evacuation to NGO resettlement facilities, and a few prisoners. On a daily basis, people arrive at and depart the camp. These may include the occasional reporter and film crew.

The camp and fighter population includes rural herdsmen and farmers as well as urban partisans who have answered the call. The educational level varies widely. Both men and women fight, and their ages range from fourteen to seventy-five years old. The urbanites are accustomed to modern sewage systems, electricity and immunizations,

while the rural folks come from a wide variety of subsistence existences and mistrust Western medicine.

What NBC threats would keep you awake at night?

Would the enemy infect one of their own with influenza A and send him to your base camp with an apparently legitimate purpose, covertly spreading influenza during the incubation period? Remember that in the US, 20,000 Americans died of influenza in the year 2000. What would be the effect on a heterogeneous unimmunized and perhaps antigenically naïve population?

Could the enemy dump giardia, hepatitis A, salmonella or cryptosporidium upstream? Assuming that boiling water is the most likely means of purification, how likely is it that a few undisciplined inhabitants would contract one of these diseases and pass it on through poor handwashing - perhaps as your cook?

Could an anthrax-infected beef carcass be sent intentionally to your camp through normal food supply chains and pass undetected through meat inspection? Even if the only people infected were the butchers, the impact on your resources would be enormous.

Could a stray dog be infected with rabies and immediately dropped off where the typical American soldier might be likely to adopt it and feed it? How fast would rabies spread in an environment where the pup licked a few children and other dogs before it became obviously ill?

Could the enemy allow an imprisoned guerrilla to become infested with lice (carrying typhus) and arrange for him to heroically escape and evade back to friendly lines before he became ill? Typhus defeated Napoleon before the Russians had their chance at Borodino - the impact on a guerrilla force could be disastrous.

Unlike the situation in America today, where NBC attack against civilians represents a serious vulnerability, NBC protection in a guerrilla area of operations may simply be a matter of enforcing basic principles of preventive medicine. Guarding against malicious threat is largely nested in guarding against natural threats.

A medic serving a guerrilla force will have to think through every facet of guerrilla life in order to anticipate the threats and pre-empt them. He will have to consider water and food supply, waste disposal (human, animal and garbage), quarantine measures, immunization programs targeted at specific needs, education, sexual hygiene, antibiotic use and rationing, vector control and so on.

For an unscrupulous enemy, the temptation to weaken and defeat the guerrilla through infection would be hard to detect and hard to resist.

Med Quiz

Two males present to your clinic for initial evaluation with a history of prolonged cold exposure to the hands approximately 4-6 weeks prior.

What's your diagnosis?

Frostbite occurs at temperatures below freezing (32° F). Although there are four basic degree categories of frostbite, it's important to differentiate between superficial from deep frostbite since they are managed differently. Superficial, as the name implies, involves just the surface without blister formation. Deep frostbite involves partial or full thickness skin injury, and causes blisters forming a line of demarcation over a period of days or weeks.

Frozen tissue is blanched white or pale yellow, completely ischemic and hard to the touch. The skin is immobile over joints. Upon rewarming the skin becomes red, swollen and may turn gray or deeply red to purple-blue. Large blisters containing either clear or hemorrhagic fluid form in severe frostbite. Deep frostbite will involve soft tissue and bone necrosis and the likelihood of an ensuing infection runs high.

Treatment of the frostbite ranges from simple superficial rewarming to a consult depending on the severity and sequel.

Answer:

Deep frostbite

Think this guy is a potential candidate to be a cold injury patient? Don't let this happen to you!

Cold Weather Training

Photo Gallery

SOF divers prepare for a mission.

A health care worker at a Jordianian field hospital in Mazar E Sharif, Afghanistan gives care to a boy in the pediatric ward.

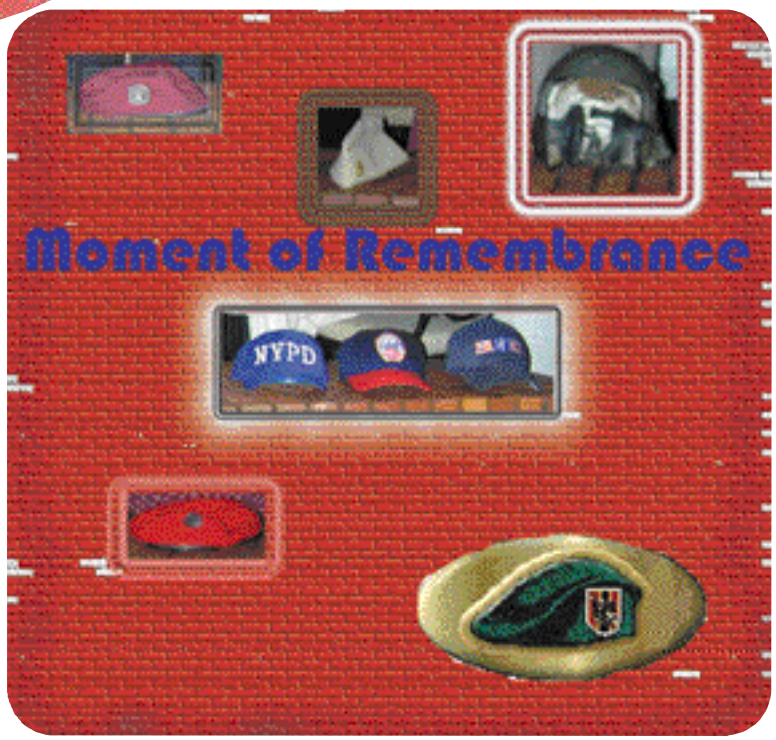
Tailgate Medicine. Village visit in Vietnam, circa 1963.

Afghanistan food drop
Photo Courtesy of AP

SOMA Mess Night 2001. SOMA President Robert Leitch, shaking hands with downed pilot Jim DeVoss
Photo courtesy of MSG Sam Rodriguez

Cold Weather Training

SOMA Mess Night 2001. SOMA President Robert Leitch and MSG Mike Brochu present the Army SOF Medic of the Year " Mike Hollingsworth" award to SFC Parrish from 10th group.
Photo courtesy of MSG Sam Rodriguez



Each year during the SOMA Mess Night a salute and moment of silence is devoted to our fallen comrades. Traditionally, a Beret has been displayed to represent those that have perished since the previous meeting. This year, because, several members of these organizations were members or former members of SOF Units and in appreciation of their support the SOF Paramedic program. The hats representing the New York EMT, FDNY and NYPD were included.
Photos of hats courtesy of MSG Sam Rodriguez

Dedication

MSG Davis (right) is reenlisted by MAJ Beech (left). Date unknown.
Photo courtsy of MSG Samuel R. Rodriguez and SFC Philip L.Melcher

MSG Davis (center) instructs students at the Joint Special Operations Medical Training Center (JSOMTC)

MSG Jefferson D. Davis, 39, was the Team Sergeant of ODA-574, Company A, 3rd Battalion, 5th Special Forces Group (Airborne). He was killed in action during Operation ENDURING FREEDOM.

JD, as he was known to his family and friends, was born in Tennessee on October 22, 1962. He graduated from Elizabeth High School in Tennessee in 1981. JD enlisted as a Medical Specialist in August of 1984 and served in Korea for three years. After graduating from the Special Forces Qualification Course, JD was assigned to 5th Special Forces Group (Airborne), Fort Campbell. Kentucky. He served as a Medical Sergeant on both ODA 562 and ODA 564. After completing a tour as Senior Instructor at the Special Warfare Center, Fort Bragg, North Carolina, he returned to 5th Group where he was selected to be the Team Sergeant for ODA- 574.

During his tenure in military service, JD participated in Operation DESERT STORM and numerous contingency operations throughout Southwest Asia.

His awards and decorations include the Silver Star Medal, Purple Heart Medal, two Meritorious Service Medals, two Army Commendation Medals, the Defense of Saudi Arabia Medal, the Liberation and Defense of Kuwait Medal, the Special Forces Tab, the Ranger Tab, the Combat Infantry's Badge, the Combat Medic Badge, the Master Parachutist Badge, and the Military Freefall Parachute Badge.

Ghosts
Watching on a hollowed day
Wearing Class A's and a Green Beret
Anticipation on his face
Fearing ghosts from another place
Remembering those who gave their all
Their names engraved in a granite wall
Hands caressing warm black rock
Tells of all that we have lost
Warmth exudes, their presence felt
He traced their names in hopes to help
erase those ghosts from years gone past
To us a name, but not to him
A lonesome memory for a long lost friend

SFC Stephen L. Young

GENERAL RULES FOR SUBMISSIONS

1. Use the active voice when possible.
2. Secure permission before including names of personnel mentioned in your piece. Do not violate copy right laws.
   If the work has been published before, include that information with your submission.
3. Articles should be double-spaced, twelve point font, aligned on the left and justified on the right.
4. Important: Include an abstract, biography, and photo of yourself as part of the article.
5. Use of acronyms should be held to a minimum and when used they must be spelled out the first time.
6. Remember that your audience is inter-service, civilian, and international.
7. Every article has a point to make, which is traditionally stated in the introductory paragraph and restated in the closing or summary. Subtlety is not usually a virtue in a medical publication.
8. All references MUST be cited in the text and in numerical order. The reference MUST be arranged in the order of appearance in the text. Give the full name of the journal. Use the following style of citation: author names, title of article, Journal name, year, volume number, inclusive page numbers. If unsure, please contact us at JSOM@socom.mil.
9. Photographs with your article are highly encouraged. Photos must be sent separately from document so they can be converted into a publishing format. Where possible, traditional ("hard copy") photos should be sent, however, scanned and digitized copies can be used but please make as large as possible, even if you have to send them one at a time. Every attempt to return your original pictures will be made, but the JSOM will not be held accountable for lost or damaged items.
10. Send submissions by e-mail, diskette, CD, or plain paper to the Editor. E-mail: JSOM@socom.mil or by mail to: USSOCOM Surgeon's Office. Submissions may also be sent to the above physical address. Retain a copy for yourself.
11. We reserve the right to edit all material for content and style. We will not change the author's original point or contention, but may edit clichés, abbreviations, vernacular etc. Whenever possible, we will give the author a chance to respond to and approve such changes.
12. Again, the JSOM is your journal. It is a unique chance for you to pass your legacy to the SOF medical community.

Take advantage of the opportunity.