

The NATO Special Operations Surgical Team Development Course

A Program Overview

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ABSTRACT

The Special Operations Surgical Team Development Course (SOSTDC) is a 5-day course held two or three times a year at the North Atlantic Treaty Organization (NATO) training facility within the Special Operations Medical Branch (SOMB) of the Allied Centre for Medical Education (ACME). Its aim is to teach, train, develop, and encourage NATO partner nations to provide robust, hardened, and clinically able surgical resuscitation teams that are capable of providing close support to Special Operations Forces (SOF).

KEYWORDS: *Special Operations Surgical Team; resuscitation; in-flight surgery; blood*

Executive Summary

The SOSTDC is a 5-day course held two or three times a year at the NATO training facility within the SOMB of ACME in Mons, Belgium.¹ Its aim is to teach, train, develop, and encourage NATO partner nations to provide robust, hardened, and clinically able *surgical* resuscitation teams that are capable of providing close support to SOF taskings, operations, and missions. University College Cork, Ireland, as part of its SOF development initiative, provides academic oversight to the course. The SOSTDC contains only 1 full day of lectures and briefings. The rest of the course is taken up with hyperimmersive training scenarios using the validated crawl, walk, run training method.²

The Course

Over 5 days, the course teaches NATO medical personnel how to create and refine Special Operations Surgical Teams (SOSTs). The SOF operational environment, characterized by extended medical evacuation timelines and the high-risk nature of SOF operations, increases SOF personnel's chances of requiring urgent surgical intervention in remote environments. National SOF elements now also more frequently participate in military assistance (MA) and humanitarian response operations (HRO) by deploying specialized, highly mobile, flexible surgical teams. Medical engagement, host nation partnering, and limited disaster medical care at reach are also necessary.

The course thus discusses and covers foundation and emerging concepts in damage control surgery, far forward resuscitation,

medical planning, equipment, and employment of SOSTs. Students use modern medical simulators, 3G manikins, and appropriate military medical equipment to practice team concepts and surgical skills. The simulation environment includes the use of noise, heat, light, and smell. Course graduates are likely to be better prepared to create, maintain, train, and employ SOSTs, thereby increasing NATO SOF medical interoperability. Course enrolment priority is normally given to teams currently in direct support of NATO SOF elements.

The ACME also provides a range of other complementary courses: the NATO Special Operations Combat Medic Course (NSOCOM), the Basic and Advanced Special Operations Medical Leaders Course (SOMLC and ASOMLC), a Special Operations Medical Planning and Support Course (SOMP), a Combat Medical Simulation Course, as well as numerous research workshops and study days. These courses are free to NATO member nations and are bid for through NATO. The ACME now also offers the first Diploma in Military Special Operations Forces Medical Care.³

Educational Objectives

Clear and specific educational and learning objectives for the course are set out and monitored by its educational partner, University College, Cork.

- Students will understand that the resuscitative and surgical capabilities required within a SOST are different from those of conventional forces.
- Students will understand that operating in the remote austere environment, at logistic reach, requires an updated team mind-set: This includes the almost mandatory use of protocolled checklists.
- Students will demonstrate that the skills required to evaluate and improve their own nation's SOST at the tactical and operational level can have strategic level effect.

Individual course schedules are tailored to each country before arrival with prior completion of a questionnaire and a planning meeting (face to face if possible) to determine what level of progress (nascent, developing, developed) that country or team has achieved. Courses can be and are modified for those countries that have just assembled and are refining protocols, equipment and team composition.

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Equipment

Shared equipment updates are an important part of the course, looking at items such as oxygen concentrators and generators, fluid warmers, in-flight noise-cancelling headphones linked to 3G networks via voice-activated hands-free microphones, and magnetic chest mats to hold instruments secure yet close. One idea in particular has been the concept and development of a damage control surgery (DCS) set.⁴ Most SOF surgical teams early in their development, and particularly when transitioning from the conventional environment, carry two basic sets, one chest set, one vascular set, two abdominal sets, and two orthopedic sets, for a total of eight sets. Sixty kilograms of equipment is then required for the treatment of just two casualties who can clearly be injured in multiple anatomical locations.

The recognition of a generic skill and mind set for SOF DCS has changed this. There should be available a single appropriate, agreed, and familiar surgical set that, when opened, could equally service a (damage control) laparotomy, a thoracotomy, a vascular shunt or repair, a pelvic packing and stabilization, a wound debridement, and a limb fasciotomy. As an example, the current UK DCS set measures 36 × 22 × 11 cm, weighs 6kg, and is capable of performing all current damage control and resuscitation procedures (Figure 1). Each set is paired with a Hoffman®-3 magnetic resonance imaging-compatible field pack. Only one DCS set is needed per casualty for planning purposes, and it now has its own NSN: 6545-99-959-1062.

Communication

Communication both within and without any resuscitation surgical team is deemed to be vital for positive medical outcomes. In a noisy environment, it becomes much more difficult. In an in-flight scenario in particular, emphasis is placed on closed-loop communication, voice discipline, and formatted information passage. Experts on this subject often compare resuscitative surgery to the airline industry: In an in-flight emergency the keys are to, aviate, navigate and communicate using the nature of emergency, intentions, time remaining, and special instructions (NITS) algorithm. Medically, we teach communicate, resuscitate, and operate using an initial “command huddle” followed by use of the TBCs algorithm (TBC = Time since start of procedure, Temperature of patient, Blood given and Blood remaining [Blood gases including lactate], Coagulation, Surgical plan [including bail-out options]), with the information closed-loop distributed every 10 to 15 minutes.⁵

Blood

Checklists may be the best way to remember information in crisis or high-stress situations. These may also include reminders of blood adjuncts such as calcium, futility decisions to be made early (often at the 6 red cell and 6 plasma point), and appropriate drug administration. An example of the UK massive transfusion checklist is shown at Figure 2. A true SOST cannot perform DCS without blood. Currently, this is delivered by most teams using red cells and plasma administered concurrently. Storage options such as Cryocube® and Duracube® Golden Hour Boxes are discussed on the course. The novel Norwegian THOR approach using fresh (or cold-stored) whole blood, which can deliver active platelets out to 10 days, is covered. Many SOSTs now prescreen their members for type

Standard Course Schedule

Monday

0830 – Welcome Brief NSHQ Staff
0900 – Course Overview
0915 – Care under Fire
0945 – Why SF Soldiers Die
1000 – The SF Medical Emergency Response Team (SF-MERT)
1020 – Coffee
1030 – Basic SOF (McRaven) Operational Principles
1130 – Austere DCR: Blood Transfusion
1200 – Austere DCS: Principles and Physiology
1230 – Lunch
1400 – SOF Surgery – Lessons from War
1430 – The Role of the Team Leader
1500 – The Role of the Clinical Leader
1530 – Tea
1600 – Tour of SOMB Complex and Simulation Facility
1700 – End of Training Day for Team

Tuesday

0830 – Basics of SOF Operational Medical Planning
0930 – Clinical Governance on SF Operations
0945 – Crew Resource Management (CRM) 1 – Situational Awareness
1000 – Coffee
1015 – Scenario One Brief and Facilitated Whiteboard Planning Exercise
1100 – Team Set-Up (Desert Safe House)
1130 – Team Equipment and Internal Casualty Reception Drills
1230 – Lunch
1330 – Scenario 1*
1600 – Tea and Video Debrief
1630 – Mission Brief for Scenario 2
1700 – Team Depart

Wednesday

0830 – CRM 2 – Human Factors and Evaluation
0900 – Equipment – Oxygen, Blood, and the DCS Set
0930 – TCCC R1 Update
1000 – Coffee
1030 – Scenario 2†
1400 – Late Lunch
1500 – Debrief Internal then External
1600 – Mission Brief for Scenario 3
1700 – Team departs

Thursday

0830 – CRM 3 – Communication and Feedback
0930 – SOST C-130 Set Up
1030 – Scenario 3‡ (Figure 3)
1400 – Late Lunch
1500 – Debrief – Internal Initially then External
1600 – Team Departs

Friday

0830 – Hasty Mission Brief Scenario 4
0900 – Set up C130 (Dark, Head Torches Only)
1000 – Scenario 4
1300 – Hot Debrief and Course Overview Inval
1400 – Endex! Final Instructor Meeting to 1430

*Individually tailored to team. Eg, GSW Abdomen, moulaged using a cut-suit on a 3G Sim-man. Slow time initial R1 care, then MERT transfer to the SOST. Reception and resuscitation, with minimal transfusion. A slow transition from resuscitation to surgery, slow time decision to operate, ICU hold 1 hour, transfer to R3.

†SOST set up on ship: Two casualties. GSW groin requiring initial basic first aid. (Moulaged on responsive high-flow pumping Sim with blood reservoir.) CUF/TFC for R1 care on flight deck of ship. MERT arrival to resuscitate and transfer on a rotary platform back to SOST. <C> on MERT and transfusion. Rapid transfusion, decision to surgery on groin for a minimum of 60 minutes. Second casualty (second Soldier from assault) arrives 30 minutes into surgery, GSW chest requiring chest tube or more – if team is doing well, this patient also requires surgery; both casualties held for 90 minutes awaiting transfer with fluctuating vital signs and resuscitation requirements.

‡C-130 Room: APU noise +, battle noise +. Embassy evacuation: 2 locations: Simulated short flight. Land 1 × casualty – “the Ambassador” ankle fracture (live casualty) with ongoing role-play of angina, myocardial infarction – en route to safety.

Land to take second casualty – abdominal wound “Embassy Guard” – GSW colon with bleeding (fecal smell generator), further 1 hour – 90-minute flight with two casualties. Land and transfer to CCAT/CCAST, reset equipment.

FIGURE 1 *The Massive Transfusion Checklist.*

Date:		Patient Details			
Bolus Number	Start Time	PRBCs ¹ (mL/Units)	FFP ¹ (mL/Units)	Notify Surgeons	Reminders
1	? MERT				TXA ² & Antibiotics ³
2	? MERT				
3				LSG DCS?	iSTAT pH/K/Ca/Gluc)
4				"4 + 4"	Ca ⁴
5					
6				"6 + 6"	?Futility ⁵ ?Donor Panel
7					iSTAT (pH/K/Ca/Gluc)
8				"8 + 8"	Ca+
9					
10				"10 + 10"	?Give FWB ⁶ ?FVIIa ⁷
11				Futility?	iSTAT (pH/K/Ca/Gluc)
12				"12 + 12"	Ca+
13					
14				"14 + 14"	
15					iSTAT (pH/K ³ /Ca/Gluc)
16				"16 + 16"	Ca+
17					
18					DCS Ended/Transfer?
19					
20					
21					
22					
23					
24					
25					
	Total mLs				
	Total Units				

Notes: 1. Note mL boluses in each box (e.g., 250) or circle "Units" and simply "tick" box for each unit given. 2. TXA 1g (~15mg/kg) as soon as transfusion indicated. 3. Antibiotics as per Operational Guidelines. Eg Co-Amoxiclav. 4. Calcium required approximately every 4+4 units (10mL 10% calcium chloride). 5. Futility may be influenced by blood/FFP availability. 6. Use of fresh whole blood is the only source of platelets. It requires a donor panel and takes time to collect, so decide early. 7. Use of factor VIIa should balance risk of thromboembolic complications with availability of blood/FFP. 8. 50mL 50% dextrose + 10 IU insulin IV over 15 min if K⁺ >5.5.

O low-titer blood before deployment as a way to provide an emergency donor panel forward. In a halfway step, the London HEMS Air Ambulance moved to use of single bags of premixed cells and plasma for trauma transfusion in October 2018. They cited not just its clinical effect but also the human performance simplicity of using a one-bag approach to austere environment resuscitation.⁶

Crew Resource Management

Admiral William H. McRaven noted in his classic work on SOF Operations the following six principles: purpose (a mission should have a clear purpose that everyone understands well, and towards which *all* action is directed) then simplicity, speed, security, repetition, and surprise.⁷ Medically, task repetition is key to success. In stressful resuscitations, we have noted a tendency for medical personnel to "*default to inaction.*" Task repetition and short lectures within the course on

the psychology of stress and crew resource management teach an awareness of the problem and the optimal solution of "*default to action*" instead. At a higher level, performance on the course in some countries is used as part of a psychological team selection process. Video feedback within the adult learning environment of the course is used for this.

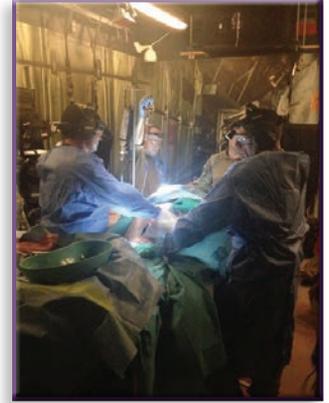
Conclusion

This paper has outlined the NATO SOSTDC approach to SOF Surgical Team Training. Individual course tailoring and an operationally experienced multi-disciplinary faculty allow for bespoke educational delivery. Advice on equipment and team composition is offered as well as examples of best practice. Sharing of this best practice can save much nugatory time and effort. Nations will often attend on three separate occasions over a two to three year period as their SOST capability develops and matures. The course has seen teams start with 20

FIGURE 2
The UK damage control surgery set.



FIGURE 3 *Simulated in-flight surgery.*



personnel on their first attendance (larger than their standard assault team) with 20 metric tons of equipment, before reducing this down to seven key personnel and a man-portable capability. We also view this course as sitting within a NATO-wide training continuum including attendance at Exercises Oden/Remedy in Sweden and Exercise “Surgical Training” in Denmark. We have also begun to integrate the course with Role 1 and medical emergency response teams to further develop an integrated SOF casualty care pathway.

Disclosure

The author has nothing to disclose.

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