

# Five months of surgery in the Multinational Field Hospital in Afghanistan with an emphasis on Oral and Maxillofacial injuries

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## Abstract

The aim of this review was to assess the workload of theatres in the role 3 Multinational Field Hospital in Kandahar, Afghanistan and to identify what period of day most emergency admissions arrived. During the period 05 August 2006 to 21 December 2006, 288 operations were performed on 259 patients and comprised 393 individually quantifiable procedures. 98% of these operations were to treat acute injuries. Oral and Maxillofacial surgeons were involved in 24% of operations. 63% of procedures done at these operations involved upper or lower limbs, 19% the head and neck and 18% involved the torso. An analysis of emergency admissions in November 2006 showed that most occurred between 18.00 and midnight. Although theatre timetabling made provision for this, whenever possible, elective surgery was scheduled for the following morning when emergency injury admissions were at their lowest.

## Introduction

In February 2006, over 160 military personnel from the Canadian Forces Health Services deployed to Kandahar in Afghanistan to take over the existing field hospital that had been established by the American military [1]. The Canadians increased the capability of the existing hospital to two operating theatres and an intensive care unit with three beds. The ward grew in size from an initial nine beds to 15 beds by August 2006. Support facilities include a blood bank, ultrasonography, digital radiography, laboratory services and a computed tomography scanner.

The initial medical staff consisted of a general surgeon, an orthopaedic surgeon, two anaesthetists, a physician, a radiologist, and an oral and maxillofacial surgeon [2]. Although led by the Canadian Armed forces, other NATO countries, including the UK, provided staff to support the Canadians as requested. In December 2006 Canadians occupied 72 of the 120 positions [3]. The remaining staff included those from Holland, the UK, Australia, the USA and later Denmark. During the period from March 2006 to June 2006 the hospital treated 612 patients, of which 250 were operated on for battlefield related injuries. There were on average two to three Medevac cases per day [3]. From Aug 2006 to July 2007 seven British oral and maxillofacial surgeons deployed to work with this hospital. These British surgeons replaced the existing contingent of Canadian oral and maxillofacial surgeons. As well as head and neck surgery, their work included

leading, and participating in, the resuscitation of patients on arrival to the hospital and supporting, and being supported by, orthopaedic and general surgeons in theatre.

This review aimed to assess the workload of the Kandahar Field Hospital operating theatres over a five-month period with an emphasis on maxillofacial surgery and investigate the timing of emergency admissions during November 2006.

## Method

During the period 05 August to 21 December 2006, four British military oral and maxillofacial surgeons worked at the Multinational Field Hospital in Kandahar. Theatre nurses collected prospective data on all operations performed within the two operating theatres. The information gathered was placed into an Excel spreadsheet and included the type of operation performed, the specialities of the surgeons and an anonymous patient identifying number.

Data from minor injuries treated in the emergency department was not included. Patients who were treated at other International and Security and Assistance Force (ISAF) hospitals in Afghanistan and then evacuated to a role 4 medical facility (Ramstein in Germany for the Canadian and US soldiers and most other ISAF personnel, Birmingham for British soldiers) without treatment at Kandahar hospital were also not included.

Data on patients admitted during November 2006 was collected from the logbook of the tactical operating cell (hospital administration and communications room). The timings of acute admissions were analysed to assess when emergency operations were most likely to be performed and hence what time of day elective operations should be done.

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## Results

259 patients were treated during the period 05 August to 21 December 2006. 288 operations were undertaken (Table 1), comprising 393 individually quantifiable procedures. Eight patients went to theatre twice, five patients went to theatre three times, three patients went four times and one patient was treated in theatre on six occasions. 264 of the 288 operations were performed for traumatic injuries and 14 electively.

General surgeons and orthopaedic surgeons treated the majority of the patients. Maxillofacial surgeons operated in 68/288 (24%) of all operations

Specialty	Operations
General Surgery Only	108
Orthopaedic Surgery Only	103
Oral and Maxillofacial Surgery Only	42
Orthopaedic + Oral and Maxillofacial	13
General + Oral and Maxillofacial	12
General + Orthopaedic	9
General + Orthopaedics + Oral and Maxillofacial	1
<b>Total</b>	<b>288</b>

**Table 1:** Speciality of surgeon involved in the operation

General surgeons performed 167 procedures. 155 were performed for trauma (Table 2) and 12 performed electively. The most common traumatic operations were wound debridement (48%) and dressing changes (10%). 13 procedures were done for reasons other than trauma. These included seven appendicectomies, a haemorrhoidectomy, a vasectomy, an incision and drainage of a scrotal cyst, excision of two lipomata on the back and excision of vulvular and rectal condylomata.

Procedure	Incidence
Debridement	75
Dressing Change (Burns)	16
Laparotomy	10
Abdominal Organ Resection/ Repair	9
Appendicectomy	2
Wound Debridement (Burns)	8
Dressing Change (Non- burns)	7
Escharotomy/ Fasciotomy	7
Suturing	6
Vascular Graft/ Repair	6
Skin Grafting	5
Removal of Drain	3
Oesophageal Repair	1
Sternotomy	1
Removal of Packing	1
Embolectomy	1
Epidural Bleed Burr hole + Debridement Brain	1
Gynaecological Examination under Anaesthesia	1
Bronchoscopy	1
Gastroscopy	1
<b>Total</b>	<b>155</b>

**Table 2:** Procedures performed by General surgeons for trauma

Orthopaedic surgeons performed 168 operations (Table 3), all of which were undertaken to treat trauma. The most commonly performed procedures were incision and drainage (19%), placement of external fixator (15%), wound debridement (12%) and intra-medullary nailing (12%).

Procedure	Incidence
Debridement	32
Placement of External Fixator	26
Wound Debridement	20
Intra Medullary Nailing	20
Closed Reduction of Fracture (No External Fixator)	7
Open Reduction and Internal Fixation of Fracture	7
Revision of Amputation	6
Dressing Change	6
Suturing of Lacerations	5
Limb Amputation	5
Revision of Below Knee or Above Knee Amputation	4
Iliac Crest Graft	4
Nail Removal/ Revision	4
Fasciotomy	4
Removal of External Fixator	4
DCS/ DHS	3
Vascular grafting	2
Adjustment of External Fixator	2
FDL Flap	2
Insertion of Antibiotic Beads	1
Screw Removal/ Revision	1
Neurolysis	1
Tendon Transfer	1
Exploration Under Anaesthetic	1
<b>Total</b>	<b>168</b>

**Table 3:** Procedures performed by Orthopaedic surgeons for trauma

Maxillofacial surgeons performed 63 procedures in total. 62 were to treat traumatic injuries (Table 4), and there was a single elective procedure (removal of a pigmented lesion).

Procedure	Incidence
Wound Debridement	31
Suturing	11
Tracheostomy	9
Open Reduction and Internal Fixation of Facial Fracture	7
Placement of External Fixator	1
Removal of External Fixator	1
Manipulation Under Anaesthetic of Nasal Fracture	1
Vascular Repair	1
<b>Total</b>	<b>62</b>

**Table 4:** Procedures performed by Oral and Maxillofacial surgeons for trauma

The majority of the patients operated on (Table 5) were Afghan Nationals (73%) with the remainder from Canada, USA, UK, Australia and Romania (representing the coalition soldiers and civilian contract workers).

Nationality	Incidence
Afghan National Army	78
Local Afghan National	60
Afghan National Police	40
Canadian	38
US	19
Detainee	11
UK	10
Australian	2
Romanian	1
<b>Total</b>	<b>259</b>

Table 5: Nationalities of patients operated on

The non trauma procedures have been excluded. Limb injuries were operated on in 63% of procedures, the head and neck in 19% of procedures, the torso in 18% of procedures and there was a single neurosurgical procedure performed (Table 6).

Area	Incidence
Lower Limbs	40%
Upper Limbs	23%
Head and Neck	19%
Torso	18%
Brain	0.3%

Table 6: Areas of the body operated on due to trauma

The majority (n=251) of patients were treated under general anaesthesia (Table 7), the remainder (n=37) being managed through local anaesthesia, regional blocks, sedation or combinations of these methods.

Type	Incidence
General Anaesthesia	244
Local Anaesthesia only	18
Regional Block only	10
General Anaesthesia + Regional Block	7
Local Anaesthesia + Sedation	5
Sedation only	4
<b>Total</b>	<b>288</b>

Table 7: Types of anaesthesia used

An analysis of the timings of 33 hospital admissions in November 2006 (Figure 1) showed that the majority of admissions (60%) occurred between 18.00hrs and midnight. Only 14% occurred between 06.00hrs and 12.00hrs.

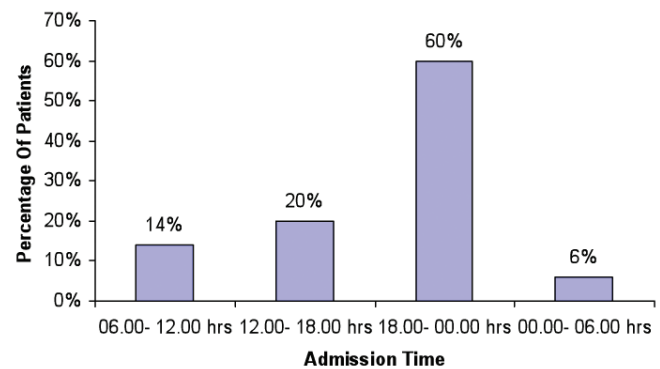


Figure 1: Timings of hospital admissions during November 2006

## Discussion

Trauma registries detailing the types of injuries treated have been reported from Afghanistan. All assessed the workload of small forward surgical teams and not a larger field hospital. They treated small numbers of patients at 50 over four months, 90 over seven months and 125 patients over three months respectively [4-6]. However, out of the 125 patients [6] only 54 (43%) were operated on. The extremities were the most commonly injured body area [4, 5] and also had the most operative procedures done on them in our study. Head and neck injuries rates were given as 17% [5] and 16% [4]. In our study oral and maxillofacial surgeons operated at 24% of operations and the head and neck accounted for 19% of the body areas injured.

Comparison between studies on military trauma must be made with care as the data presented is not standardised. Our study looked at the number of operations and number of procedures to analyse the surgical workload. This does not directly equate with the incidence of injuries. Data from larger field hospitals will not account for minor wounds treated locally or those soldiers treated at forward surgical facilities and evacuated directly to a Role 4 facility.

Similar percentages of Afghan nationals were treated at 67% of operations [5], and 68% of patients [6] in comparison to our study at 73% of patients. It is important to know the nationality of patients as this affects the treatment given. Injured ISAF personnel are frequently stabilised at Kandahar before evacuation to a Role 4 facility for definitive treatment. Stable patients with injuries that do not require urgent intervention are also evacuated to a Role 4 facility for later treatment. This strategy prevents blocking a theatre slot and a ward bed that might be required for an emergency; many fractures of the facial skeleton fall in this group. As a result, the number of treated facial fractures in ISAF personnel will be much less than the actual incidence. However, lack of surgical skills and medical resources within Afghanistan's health system, dictated that most injuries to Afghan nationals required definitive treatment within the field hospital. Although this strategy covered all surgical specialties, a disproportionate number probably occurred within head and neck trauma, as to our knowledge Afghanistan did not have an oral and maxillofacial surgeon.

A further reason for returning ISAF casualties back to the country of origin for definitive treatment rather than treating them in the operational environment is the unknown microbiological flora of the hospital and its potential impact on post operative infections. Four Canadian soldiers recently injured in Afghanistan developed *A. baumannii* infection, which was subsequently resistant to numerous classes of antimicrobials [7]. The report concluded that the source of the infection was the field hospital in Kandahar.

In November 2006 the majority of admissions were between the hours of 18.00 and midnight. Most combat occurs during daylight hours but there is often delay between injury and arrival at the field hospital. Therefore, in the evening hours surgeons and anaesthetists should be available to operate or assist emergency staff when casualties arrive, and the operating theatres should be free. The Kandahar Field Hospital had a policy of undertaking elective operations between 0800hrs and 1200hrs whenever possible. This was supported by our data that showed that only 14% of emergency admissions arrived between 06.00hrs and 12.00hrs.

The head and neck region accounts for 12% of the total body surface area. Data from military conflicts in the second half of the 20th century indicate that approximately 16% of battlefield injuries involve the head and neck [8, 9]. Reviews from Iraq and Afghanistan since 2003 have reported rates of 16% [10] to 20% [11] and 21% [12]. This is most likely due to improvement in body armour resulting in less thoraco- abdominal injuries [12] as well as the changing nature of weapons used. Nevertheless, in our study the majority of patients were Afghan Nationals and although some police and military would have worn body armour the majority would not.

Debridement of wounds was the most common operation done by all surgical specialities. A head and neck team deployed to Iraq for 4 months in 2004 [13] performed 257 operative procedures. They also found that the vast majority of operations involved soft tissue debridement, exploration and repair.

Twenty four percent of procedures were performed by dually qualified Oral and Maxillofacial surgeons. Extended competencies allowed them to work with the general and orthopaedic surgeons on ophthalmic, burns and neurosurgery cases. Developing a broad range of surgical skills is an important aspect of military Oral and Maxillofacial training [14].

Our study gives baseline retrospective data of the workload of theatres in a Role 3 hospital in Afghanistan. It is hoped that prospective data collection on future deployments will allow comparisons to be made and trends and changes to be identified.

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