

# Challenges Faced by British Military Ophthalmic Services During the First World War

JKH Whitaker

General Duties Medical Officer, 1 Med Regt, York Bks, Munster, Germany, BFPO 17

### Abstract

**The First World War was a time of great change for many areas of military medicine. This article reviews some of the particular challenges faced by British Ophthalmic Services during 1914-18.**

### Introduction

Although ophthalmic officers stationed in Egypt and India were used to performing intra and extra ocular operations, those based in the UK before WWI, had limited surgical experience. The ophthalmic officer at home was limited to sight testing recruits, correcting presbyopia and treating minor ailments. The onset of WWI brought a plethora of challenging ophthalmic cases. These taxed the skill and ingenuity of the military ophthalmologist to the full, as they attempted to ensure the best possible vision for injured servicemen [1].

### Organisation of Ophthalmic Services

From the humble beginnings of tented ophthalmic outpatient departments in 1914, an effective pathway for the evacuation of the ophthalmic sick was eventually established [1]. Ophthalmic battle casualties were initially sent to the nearest casualty clearing station, before being evacuated by train to a Base Ophthalmic Centre or to the UK [1]. Base Ophthalmic Centres were usually deployed as part of a general hospital. Red ophthalmic labels were attached to patients at clearing stations so that they could be promptly identified and directed straight to the ophthalmic department on arrival at the base station. If the patient was too ill to be moved, an ophthalmic specialist could be sent to see patients at the clearing station [1].

The Base Ophthalmic Centres treated cases requiring operation. They would consist of an outpatient and inpatient department, wards and operating theatre. At times, the number of ophthalmic operations was so great that it obstructed the general surgical cases. As a consequence, some of the larger centres had a special operating theatre, in which was placed a large electromagnet. These centres were at Boulogne, Rouen and Etaples and became known as the “magnet centres”. The number of ophthalmic beds varied according to need but at Boulogne and Rouen were between 120 and 170 [1]. From here, cases would either be evacuated to the UK or to a convalescent depot, situated in close proximity to the base hospitals, enabling close monitoring of patients post-discharge [1].

A portion of cases evacuated to England were labelled for certain specific hospitals. Those blinded in both eyes were sent

to No 2 London General Hospital, Chelsea. They stayed until no further surgical treatment was required and then sent onto the special training centre for blinded soldiers, St Dunstan's [2]. It was a general instruction that any soldier who had lost an eye should have an artificial eye fitted, preferably before being discharged from hospital [3].

### Required Standards of Vision

Before WWI, Army recruits had to be independent of glasses. However, with the large numbers needed, this restriction was lifted and glasses were in fact issued to those who needed them. Due to recruitment pressures, tests were scanty or deliberately avoided by men to ensure being enlisted [4]. The gap between standards aspired to and those present was emphasised by Lt Wirgman RAMC: “*In many...it was a matter of surprise that they had ever passed fit for service, as the defects of vision were so gross that the most casual examination could not have missed them.*” [5]

In 1918 the Ophthalmological Society published suggestions as to the visual standards that should be required of a British soldier. They made distinction between different service arms with rifleman requiring at least 6/12 corrected vision in his right eye. A soldier for garrison duty required 6/18 whereas only 6/60 was needed for a man employed in auxiliary services [6].

### Chemical Warfare

Pulmonary irritants such as chlorine and phosgene, although causing significant damage to the lung, caused little ocular trouble beyond a slight and transient conjunctivitis [1].

Lachrymatory gas, though uncomfortable, led to no permanent damage. This gas caused an immediate intense burning pain, associated with profuse lachrymation and inability to keep the eyes open. Some ophthalmologists actually experimented on themselves, exposing their eyes to the vapour for five minutes, without finding any evidence of damage to the cornea, with the symptoms lasting no more than half an hour [1].

Mustard gas was the only agent that gave serious lasting ocular trouble. Definite statistics are lacking though as many mild cases never reached an ophthalmologist. Mustard gas injury varied from mild to severe. Severe injury included definite corneal changes and represented only ten percent of cases, but could take a soldier out of action for several months. Out of one third of all mustard gas exposed eyes, 10 had vision impaired by permanent opacity in the cornea, and four eyes were lost due to pan-ophthalmitis [1].

**Corresponding Author: Capt John Whitaker RAMC, SHO in Emergency Medicine, General Duties Medical Officer, 1 Med Regt, York Bks, Munster, Germany, BFPO 17  
Tel: 004915 2515 93400 Email: johnwhitaker@doctors.net.uk**

Mustard exposure was not perceived by the soldier at the time, with symptoms commencing six to ten hours later. Pain, lachrymation and blepharospasm occurred, occasionally so pronounced that “for days entirely prevented the man from opening his eyes” [1].

Reassurance that sight was not lost played an important part of the treatment of most cases. The soldier’s eyes would be forcibly opened so as to convince the soldier of this and provide a good deal of relief [1].

### Non-Battle Injury

Functional disorders and malingerers were not infrequently encountered. A localised conjunctivitis due to the introduction of some irritant, such as cigarette ash, was a notable manifestation. Perhaps the most characteristic lesion was a symmetrical ulcer of adjacent portions of the ocular and palpebral conjunctiva, which was produced by putting the glowing end of a match between the lid and the eye itself [1].

A particularly interesting case that would pose ethical difficulty today, belonged to the French military ophthalmologist Lagrange. Apparent total loss of vision for over a year with normal ocular examination was treated by suggesting “tying the optic nerves to the brain by means of a silver wire” [7]. Thermocautery equipment was “brought close to the eye” of the anaesthetised patient. On coming to, he was told the operation had been perfectly successful and sight would be regained after about a fortnight, which, thankfully, it did.

### Ocular Injury

The eye represents 0.25% of body surface area. But, owing to the postures assumed in combat, is more frequently injured than its surface area would suggest [8]. Reports indicate the figure for WWI to be between 1.5-5% of admitted wounds [9,10].

During WWI the combination of ophthalmic, maxillofacial and head injuries was a common “trinity” of injuries. The collocating of ophthalmic centres with base hospitals enabled effective multidisciplinary treatment of these multiply injured patients [8].

Shell fragment was consistently noted to be the largest cause of ophthalmic injury on the Western Front, 50-70%, in contrast to the more common bullet injury of the Eastern Front [11-14]. Maxted, an ophthalmic surgeon at the 2<sup>nd</sup> London General Hospital, noted that over 60% of open globe injuries had an intra ocular foreign body, only a quarter of which regained any useful vision [11].

Without the modern day vitreo-retinal surgery, the use of high powered electromagnets to remove intraocular foreign bodies was standard practice. More than 30 different magnetic techniques were described and numerous patients provided ample practice [15]. Capt Whiting RAMC and Lt Goulden RAMC used the Haab magnet, on 30 cases in July 1916 alone, including five in one day [16]. “Magnet centres” were located at Boulogne, Rouen and Etaples. For patients unable to travel due to other injuries, an electromagnet was installed in a specially arranged ambulance car (Figure 1), complete with patient theatre table [1].

### Sympathetic Ophthalmia

Sympathetic Ophthalmia is an emotive disease causing loss of vision in a healthy eye following damage to its neighbour. It is a disease that caused considerable controversy as Lagrange summarised; “There are those who do not believe in it... there are

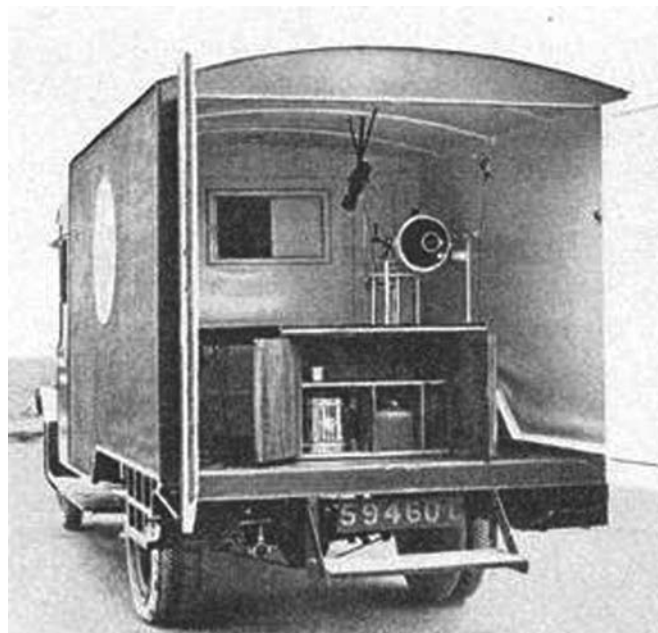


Fig.1 The mobile magnet. History of the Great War, Medical Services Surgery of the War Vol II. [1]

others who, without considering it frequent, think it is not so rare that we may put it out of our thoughts altogether” [17].

There were fears that the terrible rates of over 50% prevalence reported from the Franco-German War of 1870-71 might have recurred [18]. Fortunately very few cases were actually seen. Maxted noted that out of the thousands of casualties evacuated to the 2<sup>nd</sup> London General Hospital with eye injuries, he knew of only two cases [11.] Lagrange reported only 5 cases in over 2500 cases of eye trauma, confirming its low incidence [17]. The success in this regard was felt to be due to the antiseptic precautions, the delicacy of the surgeons and the prompt removal of “useless dangerous eyes” severely traumatically damaged [1].

### Rehabilitation for the Blind

A great legacy of WWI ophthalmic care was the founding of St Dunstan’s, a charity offering support to service personnel who live with visual impairment. It was set up originally by Sir Arthur Pearson in 1914 with the aim of returning blinded soldiers to as independent and as normal living as possible. Training was available in various subjects, Braille taught and sporting activities encouraged. By the end of 1918 more than six hundred men had been trained, with a further seven hundred in training. St Dunstan’s, as a charitable organisation, exists today, continuing to assist the visually impaired service community [2].

### Prevention of Combat Eye Injuries

Preventative eye wear was being devised during WWI. Capt RR Cruise RAMC, after working with patients from St Dunstan’s, devised a visor, which he hoped would parallel “the measure of protection against injuries to the head afforded by the steel helmet”. He believed at least 50% of eye injuries could have been prevented (Figure 2) [19].

### Final Thoughts

Much has changed within military ophthalmology since WWI. Magnets are no longer in use and fewer eyes are removed thanks to improvements in medical treatment of sympathetic ophthalmia.

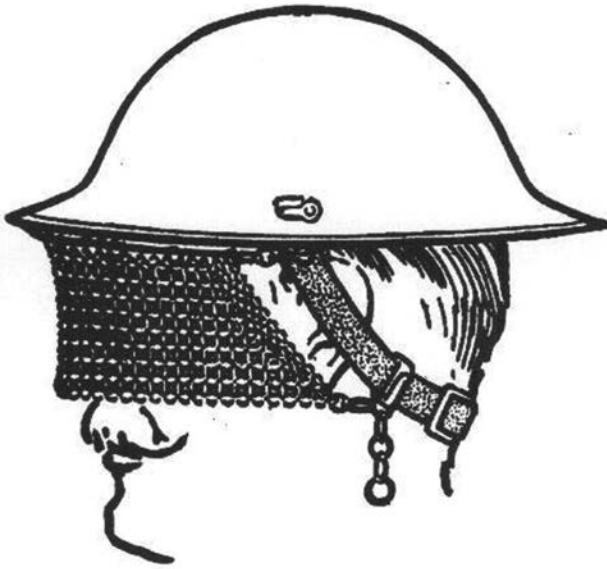


Fig 2. Capt Cruise's Visor. Protection of the Eye in Warfare. [19]

However the old challenges of preventing ocular injury and the rehabilitation of military personnel blinded in service of their country, remain important priorities.

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