THE INCIDENCE AND PREVENTION OF EYE INJURIES IN H.M. FORCES.

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Royal Army Medical Corps.
Command Specialist in Ophthalmology.

The purpose of this survey is to assess the incidence and effect of eye injuries in H.M. Forces and to determine conclusions which may help to prevent them. It is based on an analysis of 10,000 cases from all branches of the Services under static conditions of warfare.

All these cases were examined at a Military Ophthalmic Centre; subsequent in-patient treatment was continued in a General Hospital so that there was continuous supervision and facilities for observation. The Centre was fully equipped with all modern apparatus, such as a slit lamp, etc., and possessed its own optical department, staffed by Serjeant Opticians, where spectacles were assembled and dispensed. The Ophthalmic Department of the General Hospital had a full range of all modern surgical instruments of the highest quality together with two magnets and a diathermy set. During the period under investigation there was little enemy activity so that ophthalmic work continued with the minimum of interference and under conditions approximately those of civilian practice with differences which will be dealt with later.

The object of our work was to increase the efficiency of the Forces by optical assistance and to limit the loss of man power occasioned by eye disease and accident.

Increasing mechanization of the Army, with the need for workshops, has proved a frequent source of serious eye injuries; it seemed profitable to review these eye cases as a whole and to determine what proportion were preventable and by what means.

OUT-PATIENT ANALYSIS.

This analysis is compiled from cases attending the Military Ophthalmic Centre; it does not include errors of refraction or severe cases admitted to hospital.

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<tbody>
<tr>
<td>Blepharitis ... ... ...</td>
<td>Ulcers ... ... ...</td>
<td>Iritis ... ... ...</td>
<td>Infection or inflammation of socket ...</td>
<td>Investigations and minor operations ...</td>
</tr>
<tr>
<td>Styes ... ... ...</td>
<td>Foreign bodies ... ...</td>
<td></td>
<td>Provision of artificial eyes ...</td>
<td></td>
</tr>
<tr>
<td>Meibomian cysts ...</td>
<td>Abrasions ... ...</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Abscess of Meibomian glands ... ...</td>
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<tr>
<td>Trichiasis ... ...</td>
<td></td>
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<tr>
<td>Total ... ...</td>
<td>170</td>
<td>12</td>
<td>48</td>
<td>241</td>
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</table>

<table>
<thead>
<tr>
<th>Diseases of the Conjunctiva.</th>
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</thead>
<tbody>
<tr>
<td>Conjunctivitis ... ... ...</td>
<td>Ulcers ... ...</td>
<td>Iritis ... ...</td>
<td>Infection or inflammation of socket ... ...</td>
<td>Investigations and minor operations ... ...</td>
</tr>
<tr>
<td>Burns (petrol, lime, acid)</td>
<td>Foreign bodies ... ...</td>
<td></td>
<td>Provision of artificial eyes ... ...</td>
<td></td>
</tr>
<tr>
<td>Subconjunctival ecchymosis</td>
<td>Abrasions ... ...</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lacerations ... ... ...</td>
<td></td>
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<tr>
<td>Trachoma ... ... ...</td>
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<tr>
<td>Pterygium ... ... ...</td>
<td></td>
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</tr>
<tr>
<td>Total ... ...</td>
<td>470</td>
<td>6</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

| | | | | |
| | 1,466 | | | |
Thus, of 10,000 cases, 1,466 required minor treatment of a type usually carried out in the casualty department of an Ophthalmic Hospital.

Conjunctivitis caused the largest number and many were due undoubtedly to the practice of bandaging a discharging eye, either by the patient or unit medical officer. Cases of obstructive lacrimation are also frequent and are of great importance in military practice since they impair accurate shooting, outdoor manœuvres and driving. Chronic blepharitis of the seborrhœic type was given the routine treatment by triple dye, shampoos, etc., but if relapses occurred the patient was discharged from the Forces. Superficial corneal foreign bodies were not unduly numerous, most being removed by the unit medical officer. Discharging sockets resulting from irritating artificial eyes account for much loss of man-hours, especially in low grade units. The provision of a comfortable artificial eye for a soldier is of great importance and is well recognized by the authorities. Of these minor treatment cases, 9 per cent were definitely due to trauma; probably preventable in most cases.

**In-Patient Analysis.**

This analysis is compiled from records of the Ophthalmic Wards in the General Hospital. Compared with civil practice the figure is high but it must be remembered that it is frequently not possible or economical to have soldiers attending an out-patient department daily, either because units are too far away or frequent transport is costly. A higher proportion of cases therefore is admitted to hospital.

<table>
<thead>
<tr>
<th>Diseases of the Lids.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Blepharitis</td>
<td>34</td>
</tr>
<tr>
<td>Delayed plastic repair</td>
<td>4</td>
</tr>
<tr>
<td>Trichiasis</td>
<td>2</td>
</tr>
<tr>
<td>Primary suture after injury</td>
<td>3</td>
</tr>
<tr>
<td>Multiple Meibomian cysts</td>
<td>6</td>
</tr>
<tr>
<td>Abscess of Meibomian glands</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diseases of the Conjunctiva.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjunctivitis</td>
<td>49</td>
</tr>
<tr>
<td>Conjunctivitis due to malingering</td>
<td>1</td>
</tr>
<tr>
<td>Burns</td>
<td>5</td>
</tr>
<tr>
<td>Trachoma</td>
<td>1</td>
</tr>
<tr>
<td>Vernal catarrh</td>
<td>2</td>
</tr>
<tr>
<td>Ulcer (trauma)</td>
<td>1</td>
</tr>
<tr>
<td>Pterygium</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diseases of the Cornea.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Ulcer (all types)</td>
<td>52</td>
</tr>
<tr>
<td>Wounds (non penetrating)</td>
<td>4</td>
</tr>
</tbody>
</table>

**Foreign bodies:**

- (a) Multiple (incendiary bombs)        | 6   |
- (b) Thorn                               | 5   |
- (c) Rust                                | 3   |
- (d) Emery                               | 3   |
- (e) Glass                               | 2   |

<table>
<thead>
<tr>
<th>Diseases of the Iris.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Iritis:</td>
<td></td>
</tr>
<tr>
<td>(a) Focal</td>
<td>11</td>
</tr>
<tr>
<td>(b) Gonorrhœal</td>
<td>5</td>
</tr>
<tr>
<td>Iridodialysis (cricket ball)</td>
<td>2</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Diseases of the Ciliary Body.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Cyclitis (without iritis)</td>
<td>2</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Diseases of the Lens.</th>
<th></th>
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<tbody>
<tr>
<td>Cataract:</td>
<td></td>
</tr>
<tr>
<td>(a) Senile</td>
<td>1</td>
</tr>
<tr>
<td>(b) Traumatic</td>
<td>11</td>
</tr>
<tr>
<td>(c) Congenital</td>
<td>1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Diseases of the Vitreous.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Traumatic haemorrhage</td>
<td>1</td>
</tr>
<tr>
<td>Eales' disease</td>
<td>3</td>
</tr>
</tbody>
</table>
The Incidence and Prevention of Eye Injuries

Diseases of the Choroid
- Rupture ........................................... 1
- Choroiditis ........................................ 5
- Myopic hemorrhage .............................. 1
- Neoplasm (sarcoma) ............................. 1

Diseases of the Retina
- Commotio retinae (football) .................. 2
- Detachment (two trauma) ...................... 4
- Degeneration (investigation) ................. 8

Diseases of the Optic Nerve
- Atrophy (investigation) ....................... 4
- Retrobulbar neuritis ........................... 1

Diseases of the Orbit
- Cellulitis ......................................... 1
- Haemorrhage ...................................... 1

Total ........................................... 345

These figures show that 345 cases required in-patient treatment, i.e. in this series one case in every thirty and, apart from errors of refraction, one-sixth of all treatment cases were admitted to hospital.

Trauma accounted for 125 cases of the 345 in-patients. It may therefore be stated that in minor out-patient cases trauma accounts for one-twelfth and, in serious eye conditions, the proportion is one-third.

Operation Analysis.

The following figures indicate the types of operation carried out in the treatment of 345 in-patients.

Major Operations Analysis.

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<tr>
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</thead>
<tbody>
<tr>
<td>Trichiasis (diathermy)</td>
<td>Aspiration</td>
<td>Diathermy (Larsson, Safar.)</td>
<td>Exploration</td>
<td>Excision of lacrimal gland</td>
<td>Advancements and recessions</td>
<td>Curette evacuation</td>
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<tr>
<td>Delayed plastic repair</td>
<td></td>
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<tr>
<td>Primary suture</td>
<td>Fracture</td>
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<tr>
<td>Tarsorrhaphy</td>
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<tr>
<td>Multiple Meibomian cysts</td>
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<tr>
<td>Conjunctiva.</td>
<td>Conjunctional injections</td>
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<tr>
<td>Subconjunctival injections</td>
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<tr>
<td>Macervnoids operation</td>
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<tr>
<td>(pterygium)</td>
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<tr>
<td>Peritomy</td>
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<tr>
<td>Biopsy</td>
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<tr>
<td>Cornea.</td>
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<td>Cautery</td>
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<tr>
<td>Removal of foreign bodies (deep)</td>
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<tr>
<td>Trephine</td>
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<tr>
<td>Anterior Chamber.</td>
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<tr>
<td>Paracentesis</td>
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<tr>
<td>Iris.</td>
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<tr>
<td>Division of anterior synchiae</td>
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<tr>
<td>Optical iridectomy</td>
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<tr>
<td>Excision of prolapse</td>
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<tr>
<td>Ciliary Body.</td>
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<tr>
<td>Excision of prolapse</td>
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<tr>
<td>Lens.</td>
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<tr>
<td>Curette evacuation</td>
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<tr>
<td>Discussion</td>
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<tr>
<td>Extraction (Simple)</td>
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</tbody>
</table>

Total ........................................... 181

Vitreous.
- Aspiration ...................................... 3

Retina.
- Diathermy (Larsson, Safar.) ................. 4

Globe.
- Enucleation:
  - (a) Trauma .................................. 2
  - (b) Absolute Glaucoma ..................... 2
  - (c) Sarcoma of the choroid ............... 1

Orbit.
- Exploration .................................. 2
- Plastic repair (mucous membrane graft) ... 5

Lacrimal Apparatus.
- Excision of lacrimal gland .................. 2
- Incision of sac abscess ..................... 2
- Removal of sac ................................ 2
- Plastic dilation of canaliculi ............. 17
- External dachrocystostomy .................. 4
- Probing ..................................... 3

Extra ocular muscles.
- Advancements and recessions .............. 45

Magnet Extraction of Intra-ocular Foreign Bodies.
- Successful .................................. 8
- Unsuccessful ................................. 3
Thus 181 operations were necessary of which 58 were directly required for injuries.

The influence of trauma may therefore be regarded as follows:

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Total number of cases</td>
<td>10,000</td>
<td></td>
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<tr>
<td>under investigation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number requiring major in-patient treatment</td>
<td>345</td>
<td>36.4%</td>
</tr>
<tr>
<td>Total number requiring major operation</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td>Minor out-patient cases</td>
<td>1,466</td>
<td>8.7%</td>
</tr>
<tr>
<td>Major in-patient cases</td>
<td>345</td>
<td></td>
</tr>
<tr>
<td>Major operations</td>
<td>181</td>
<td></td>
</tr>
</tbody>
</table>

In this series two eyes were lost directly as a result of accident and in twenty-five eyes vision was seriously impaired.

**CONCLUSION.**

Prevention was investigated by careful inquiry of each patient: from these it was learnt that some simple form of protection would have been sufficient to prevent the injury.

An anti-gas eye shield would appear to be the handiest and most suitable protection.

Two measures would go far to preventing eye accident and disease in the Forces. The first recommendation is that the wearing of the anti-gas eye shield should be compulsory:

1. When hammering on metal or concrete, punching rivets and grinding.
2. In field operations in brushwood or thickets. The present type of forage cap and steel helmet afford no eye protection from swinging branches, etc.
3. When filling accumulators or using acids.
4. During enemy action, especially when dealing with incendiary bombs or charred material.
5. When lime spraying.

The second recommendation is the training of the unit medical officer in the treatment of eye disease. In this Command lectures and practical demonstrations have been held weekly for medical officers, sisters and nursing orderlies, the idea being to have someone in each unit familiar with ophthalmic treatment. Results have been very encouraging in diminishing severe conjunctivitis, obtaining early mydriasis in corneal ulcers and iritis and in the skilled removal of foreign bodies. An opportunity is thus given to young medical officers to fill in a gap so frequently left by under-graduate instruction and to increase their professional capital whilst with the Forces.