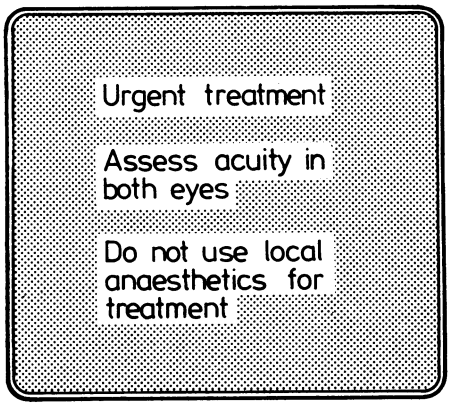
ABC of Ophthalmology

P A GARDINER

ACCIDENTS AND FIRST AID

Assess acuity in both eyes

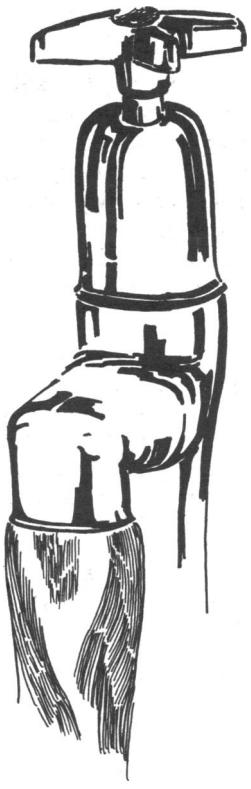


Trauma to the eye clearly needs urgent treatment. Equally important is the fact that even a trivial injury to the only good eye of a pair is potentially far more serious than it would be if both eyes have good equal acuity.

The acuity of the uninjured eye is far more important at the outset than that of the injured eye because it indicates the level of care that is needed, perhaps making all the difference between admission or outpatient treatment. The acuity should be recorded in all cases, for both clinical and medicolegal reasons.

As a general principle local anaesthetics should not be used more than once, though general sedation is often sensible. Atropine drops 1% or mydrilate, which dilate the pupil, often give great relief from pain.

Chemical and thermal burns: immediate first aid



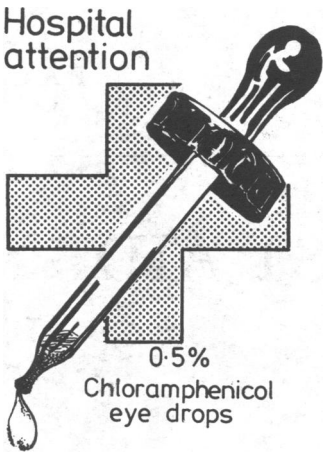
Immediate first aid is needed in all forms of chemical burns. Speed is essential, and the eyes should be washed out with copious amounts of any clean water. This may be difficult because pain causes spasm of the lids, but it must be attempted, and within seconds if possible.

Many chemical burns have late complications, notably lime burns because of retained particles. Therefore all burns that affect the globe require early hospital attention. Late complications include adhesions of the globe to the lid, so that liberal and frequent applications of chloramphenicol ointment or drops are desirable.

It is difficult to know whether to cover the eye, but the retention of toxic substances and danger of adhesions will be less if the eye remains uncovered or only loosely covered.

In many corneal conditions extremely painful iris spasm may often occur. This is indicated by constriction of the pupil, but even without this sign the patient is likely to be much more comfortable if mydrilate 1% or atropine 1% is instilled. Dark glasses are helpful.

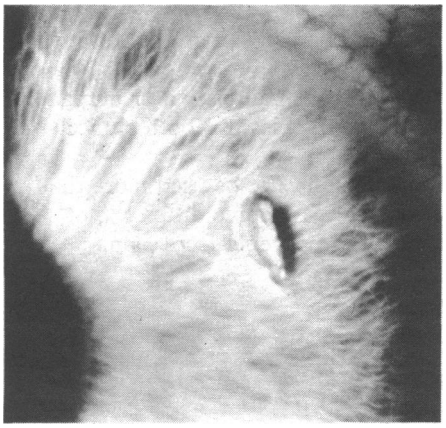
Many chemicals have specific antidotes, but searching for these may cause delay. A supply of antidotes is clearly necessary in industrial practice, where there may be particular risks from specific toxic agents. The antidote to lime, for example, is a saturated solution of glucose.



Thermal burns seldom affect only the globe, but general sedation and an antibiotic drop or ointment into the eye is sensible treatment.

When only the lids are injured externally the ultimate dangers are less and less immediate. Burnt lids should be treated like any other burn of the skin, though eventually scarring in more severe cases may lead to complications affecting the globe.

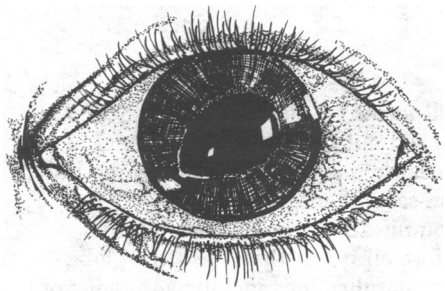
Sharp wounds: general management



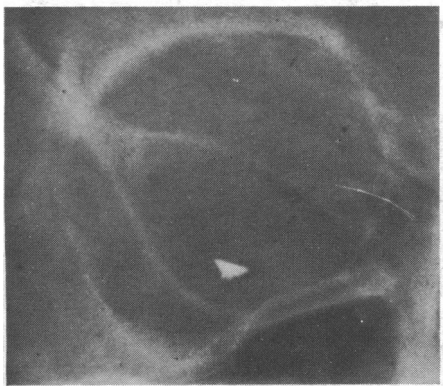
When serious damage of the eye is feared the less examination of the eye that is carried out the better. If the globe is likely to have been damaged attempts to determine the extent of the wound may extend the damage. The patient should be immobilised, given a general analgesic if he is in severe pain, and transferred rapidly to the casualty department of a hospital that has facilities for eye surgery. No pressure should be put on the eye, so any covering should be light.

Penetrating wounds, which are often surprisingly painless, need urgent attention because the longer repair is delayed the more danger there is of the intraocular contents being disturbed or extruded and the greater the chance of infection.

Penetrating wounds: state of pupil an important sign

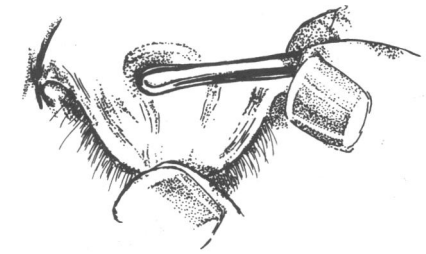


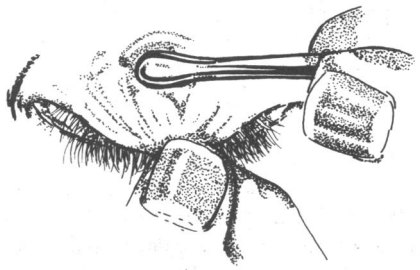
An important sign of penetration is the state of the pupil. Instillation of a local anaesthetic, such as amethocaine, may be necessary to make this examination, which is harmless in a co-operative patient. The use of such an anaesthetic should not be continued to relieve pain, however, as it may delay healing or promote further damage. A penetrating wound is usually indicated by a deformed (oval) and sluggish pupil. If the pupil is deformed, however slight other signs may be, penetration must be assumed until it has been definitely excluded. Nevertheless, a round pupil does not indicate that penetration has not occurred.

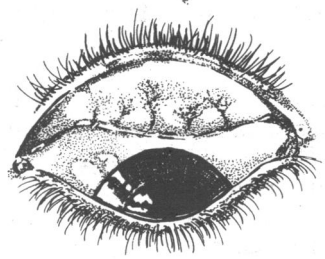


Injuries from flying particles, during operations such as grinding or chipping with hammer and chisel, are particularly misleading. In grinding, high-velocity metal particles may penetrate the eye and eventually lead to blindness with little or no apparent external injury or pain. In chipping it is often falsely assumed that a fragment from the object being chiselled has entered the eye, whereas it is just as common for a particle from one of the tools to have done so. It is important to find a foreign body in these cases and essential to take an *x*-ray picture. Retained intraocular foreign bodies may cause blindness many years later.

Removing foreign bodies: harder than it looks

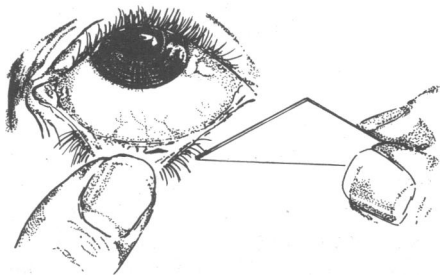






The pain in superficial wounds may be much greater than with penetrating wounds, especially if the cornea is affected. Superficial foreign bodies are most often found either inside the upper or lower lid or on the cornea. The sensation of a foreign body under the lid, scraping the cornea with each blink, is identical with that of a scratch on the cornea without a foreign body. A good search for a foreign body and its removal in the surgery will spare the patient a visit to hospital. A local anaesthetic is usually needed.

Most foreign bodies look black against the lid or sclera but are often difficult to identify against the background of the iris or the pupil. A drop of fluorescein dye will help to identify the lesion through washing round a corneal foreign body or staining a corneal abrasion. It is difficult to find quite large foreign bodies under the upper lid without exposing the inner surface of the lid, which is often impossible, even under local anaesthesia. If it proves impossible the patient should be referred to an ophthalmologist if the symptoms or history of a foreign body are present.

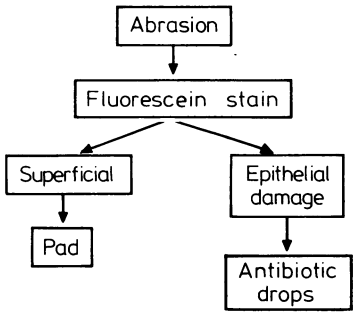


Removing a foreign body from the lower lid is comparatively easy if the patient is co-operative. The patient's head should be firmly supported, and a local anaesthetic (amethocaine 1%) should be given if the foreign body is on the cornea. It may also be helpful if the foreign body is under the lids.

A good instrument to use in removing a foreign body is a piece of white postcard cut into a triangular shape. Gripped by one angle of the triangle the opposing sharp point will remove all superficial foreign bodies with far less trauma than a metallic instrument, especially if the particle has to be pursued across the eye after it is loosened.

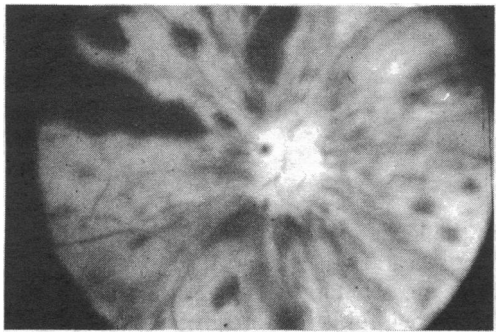
Any foreign bodies that resist this technique need more expert removal with more dangerous instruments. Removal should be followed by immediate instillation of an antibiotic (chloramphenicol), as the procedure is not sterile. If the cornea has been affected it is wise to pad the eye for about two hours or longer if the pain returns. A bright light, self-retaining lid speculum, and magnification are all aids. Follow-up is advisable if the affected eye is the only useful one, and whenever possible acuity should be recorded in both eyes before treatment and in the injured eye after healing.

Corneal abrasions



Scratches on the cornea commonly accompany foreign bodies and attempts at their removal. At home a baby's fingernail, or in the garden stakes and twigs, are most to be feared. All abrasions stain with fluorescein. Superficial corneal abrasions heal quickly in about 48 hours with a firm pad to stop blinking and therefore reactivation of the damage; preventing blinking also has an analgesic effect. Local anaesthesia delays healing but dilating the pupil also relieves pain. In all cases when fluorescein staining indicates epithelial damage antibiotic drops twice a day should be used until healing has occurred. Persistence of an abrasion or pain beyond 48 hours may well indicate complications.

Blunt injuries: test acuity and exclude internal haemorrhage



Blunt injuries are characterised by the familiar black eye, which is caused by impact with objects larger than the orbit. The visual damage is unlikely to be as bad as external appearances suggest. The commonest complication of these injuries is double vision, which needs to be tested for at the full range of vision as soon as the eye is open.

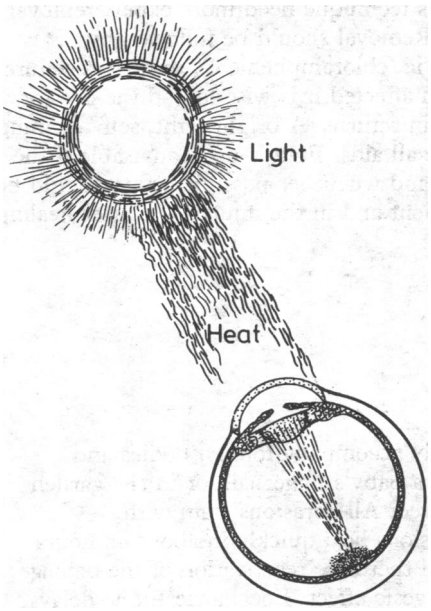
Recovery tends to be spontaneous except when the orbital wall is fractured. Then urgent treatment is needed to reconstitute the normal bony structure, which will prevent permanent limitation of movement caused by secondary adhesions or fibrosis of the extraocular muscles. Relief from diplopia may always be obtained by covering one eye, though at the expense of depth perception in patients with previously good binocular vision.

Ocular effects include haemorrhage into all parts of the globe: intraocular haemorrhages will obviously usually diminish visual acuity. Such haemorrhages need differentiation by an ophthalmologist, and physical rest is sensible until their nature and source has been established. Later complications include secondary retinal detachment. In most cases it is sensible to instil mydrilate two or three times a day until the absence of intraocular damage is proved.

The most dangerous injuries apart from those caused by traffic accidents are those caused by shotgun and airgun pellets, squash balls and champagne corks—projectiles that are small in relation to the orbit. Fireworks and all games with bows and arrows are dangerous to children. Such incidents are largely preventable by good discipline. Certain types of swimming goggles can cause dangerous injuries.

A dilated paralysed pupil is often the only sign of a blunt injury. This usually recovers in days or weeks but is often associated with haemorrhage into the vitreous, which must be excluded in every case.

Burns from sun and snow



Like its light rays the sun's heat rays are focused on the retina. Intense light initiates a defence mechanism to protect the retina by closing the eyes. Children who have competed with each other to see who could keep their eyes open longest while looking straight at the sun have often burnt their retinas and suffered a considerable permanent loss of vision. This is a variety of the eclipse blindness produced by watching the sun in eclipse with unprotected eyes, when focusing of the heat rays is not prevented by a response to the sun's light. In sleep the retina is protected by the globe rolling upwards into the orbit. Ambient sunlight is harmless in Britain.

Ultraviolet radiation in the so-called "arc eye" or in snow blindness may cause extremely distressing superficial effects some time after exposure and occurs if the eyes are not protected by tinted shields. Danger to sight is, however, minimal. Emergency treatment is of little avail, though bandaging with cold compresses gives partial relief of the pain, and adrenaline drops will reduce congestion temporarily. The use of amethocaine is justified, and its effects are sometimes dramatic. Atropine drops are useful if the pupils are painfully constricted as they reduce the element of spasm.

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