Eye Trauma

Information Sheet 2007

It is estimated that 500,000 blinding ocular injuries occur worldwide each year and that ocular trauma is a leading cause of monocular vision loss (Thylefors 1992).

The age distribution of ocular trauma is bimodal, with the greatest risk occurring among the young and people over 70 years of age. Most ocular trauma occurs in young people (Fong 1995) and could be prevented by proper use of safety eyewear. Alcohol is often a major contributing factor.

Prevalence

A 1995 prospective survey of eye injuries treated in Victorian hospitals (Imberger, Altmann and Watson 1998) found that:

- the workplace accounted for 44% of all injuries and 19% of severe trauma, including ruptured globes and internal bleeding;
- sports injuries accounted for 5% of all injuries, but 19% of severe injuries;
- the incidence estimate for penetrating eye injuries was 3.6 per 100,000 population; and
- the incidence of eye injuries requiring hospitalisation was 15.2 per 100,000.

Causes

Agents of eye damage may be broadly classified into the following four categories:

- impact or blunt force;
- foreign bodies;
- chemicals injurious to the eye; and
- radiation.

In a study of eye injuries presenting to emergency departments of hospitals, the National Injury Surveillance Unit (NISU) of the Australian Institute of Health and Welfare found a pattern of injury similar to that in the United States. Of the 1000 eye injuries estimated to occur in US workplaces each day, 70% are caused by flying particles smaller than a pin head and one fifth are caused by exposure to chemicals. Many of these injuries occurred when workers were not wearing appropriate eye protection, but more than 50% of workers injured while wearing eye protection felt that another type of eye protection could have better prevented or reduced the injury suffered (Research Centre for Injury Studies 1997).

Risk factors

There are many occupations where eyes are at risk. Workers at risk include those who work with:

- mechanical equipment;
- chemicals; and

- sources of radiation, mainly ultraviolet radiation from welding and infra-red radiation from furnaces.

Construction, automotive repair and manufacturing occupations have the highest rate of workplace eye injuries in the United States. Military personnel are also at risk in conflict settings, with injuries much more likely to be bilateral than in peacetime. The rate of penetrating eye injuries appears to be on the increase due to changing weaponry.

Sports are a common cause of severe ocular injuries in the developed world. Injuries range from abrasions of the cornea and bruises of the eyelids to internal eye injuries, such as retinal detachments and internal bleeding. Many of these injuries lead to vision loss and permanent blindness. Sports presenting particular risks include basketball, baseball, football, soccer, hockey, tennis, golf, water sports and gun sports. Assault may also lead to ocular trauma, and often with a particularly poor outcome.

Prevention

Nearly all cases of eye damage that occur in Australia each year are preventable. Damage to the eye can be avoided by suitable design and engineering controls, following well-established safe working and playing procedures and, where necessary, wearing suitable eye protection.

Australia has an Australian Standard for eye protectors for racquet sports (AS/NZS 4066:1992, amended 1994). This Standard specifies requirements for eye protectors designed for use by players of racquet sports; requirements for eye protectors for indoor and outdoor cricket are not included. AS4066 deals with materials, construction, attachment, optical properties, testing, labelling and marking, and optical, field of view, area of coverage and impact resistance requirements.

The Standards for eye protection in industrial applications are given in AS/NZS 1336 (1997) and AS/NZS 1337 (1992), and eye protectors for motor cyclists and racing car drivers are specified in AS 1609 (1981, amended 1982). Safety of laser products is given in AS/NZS 2211 (1997-2004) and AS 2397 (1993) sets standards for safe use of lasers in the building and construction industry.

AS1337 aims to assist in the provision of safe, efficient and comfortable vision in the industrial situation, including consideration of the need for protection against sunglare and optical radiation in the natural environment. The Standard specifies minimum requirements for eye protectors and associated lenses designed to protect eyes against common industrial hazards such as flying particles and fragments, dusts, splashing materials and molten metals, harmful gases, vapours and aerosols. Requirements for optical qualities and low, medium and high impact resistance are given and appendices describing appropriate test methods are included.

AS1336 sets recommended practices for protecting eyes against the same range of hazards as well as high-intensity radiation generated during welding operations and furnace work. It also gives guidance on selecting eye protectors appropriate to the use of particular lasers.

Reference

(Fong 1995)
Fong LP 1995 Eye Injuries in Victoria, Australia *Med J Aust* 162(2): 64-8

(Imberger, Altmann and Watson 1998)
Imberger AL, Altmann AE and Watson W 1998 *Unintentional Adult Eye Injuries in Victoria* Monash University Accident Research Centre Report No. 137 ISBN 0 7326 1435 X. 36pp

(Research Centre for Injury Studies 1997)
Research Centre for Injury Studies. 1997. Keeping an eye on eye protection. *Injury Issues Monitor*. No. 10, March 1997

(Thyefors 1992)
Thlyefors B Epidemiologic patterns of ocular trauma 1992 *Aust NZ J Ophthalmol 20:95-98*