

Summary table 100 — squint and amblyopia

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Quality	Results	Other notes
2714	Webber and Wood 2005	General review (previous reviews and cross-sectional studies)	Mostly the UK and USA	Strabismus (squint)	NA	NA	NA	Strabismus (squint) is one of the common predisposing conditions for amblyopia, due to its effects on the development in visual acuity after birth. Strabismus may not be cosmetically obvious, meaning that screening is important.	
2686	Adams and Sloper 2003	General review (population studies and intervention studies)	Mostly UK	Strabismus	NA	NA	NA	A squint is one of the most common causes of amblyopia, causing strabismic amblyopia. Some studies recommend very early squint surgery to give the best chance of stereopsis while others recommend waiting to see if the problem will resolve itself. This often depends on the severity of the squint.	
3392	Tong 1997	General review (laboratory studies)	NA	Strabismus	NA	NA	NA	The various kinds of amblyopia are not only disturbances of the development of the visual system at different points but also different pathologic processes. It is hypothesised that strabismic amblyopia is the result of earlier disturbance than other forms of amblyopia.	

Summary	Group
Although there is debate about different intervention and screening programs, strabismus is clearly a cause of amblyopia.	<p>Group 1 — Clear association/causality</p> <p>Group 2 — Possible association/causality (more research needed)</p> <p>Group 3 — Lack of association/causality</p> <p>Group 4 — Possible lack of association/causality (more research needed)</p> <p>Group 5 — Conflicting results</p> <p>Group 6 — Possible protection</p> <p>Group 7 — No studies</p>

Summary table 106 — anisometropia and cataract

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
2128	Guzowski et al 2003	Cross-sectional	Blue Mountains Eye Study	Anisometropia	NA	3654	IV	Refractive asymmetry was associated with age and cataract. Refractive asymmetry is associated with unilateral cataract (OR 1.9; 95%CI 1.3 to 2.7) and bilateral cataract (OR 2.4; 95%CI 1.8 to 3.2). Unilateral mixed cataract was associated with higher refractive asymmetry than each type separately.	Frequency/rate study

Summary	Group
This study shows that anisometropia is associated with the presence of cataract. Further research would be required, however, to confirm causality.	<p><i>Group 1</i> — Clear association/causality</p> <p><i>Group 2</i> — Possible association/causality (more research needed)</p> <p><i>Group 3</i> — Lack of association/causality</p> <p><i>Group 4</i> — Possible lack of association/causality (more research needed)</p> <p><i>Group 5</i> — Conflicting results</p> <p><i>Group 6</i> — Possible protection</p> <p><i>Group 7</i> — No studies</p>

Summary table 107 — anisometropia and amblyopia

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
2463	Attebo et al 1998	Cross-sectional	People 49 years of age or older from an area west of Sydney	Anisometropia	NA	3654	IV	Amblyopia was diagnosed in 3.2% of the population and anisometropia was the underlying cause of amblyopia in 50% of the observed cases. The most frequent refractive error in amblyopic eyes was hyperopia.	
1805	Huynh et al 2006	Cross-sectional	The Sydney Myopia Study (mostly 6-year-old children from 34 randomly selected Sydney schools)	Anisometropia	NA	1765	IV	Anisometropia was significantly associated with amblyopia (OR 29; 95%CI 8.7 to 99). The overall prevalence of anisometropia was 1.6%.	
2465	Brown et al 2000	Cross-sectional	The Visual Impairment Project (residents of Victoria aged 40–92)	Anisometropia	NA	4721	IV	This study demonstrated that amblyopia was a significant cause of unilateral reduced visual acuity in a population aged 40 years and older. The population-weighted prevalence of amblyopia was 3.06%. Anisometropia was more prevalent and the degree of anisometropia was greater in the amblyopic group compared with the normal population.	

Summary	Group
It is well-established that anisometropia can lead to amblyopia, although it is not the only cause of this condition. Australian studies have shown that amblyopia is a significant cause of reduced visual acuity in the adult population.	<p>Group 1 — Clear association/causality</p> <p>Group 2 — Possible association/causality (more research needed)</p> <p>Group 3 — Lack of association/causality</p> <p>Group 4 — Possible lack of association/causality (more research needed)</p> <p>Group 5 — Conflicting results</p> <p>Group 6 — Possible protection</p> <p>Group 7 — No studies</p>

Summary table 114 — cataract and amblyopia

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
3063	Birch et al 1998	Comparative study (compared the visual acuity of patients who had received early or later treatment for unilateral or bilateral cataract — not randomised)	Comparison of children with unilateral and bilateral cataracts treated at different stages (1–8 weeks or 12–30 weeks)	Early treatment	Late treatment	29	III-2 (small study)	Dense congenital bilateral cataracts can compromise visual development and cause amblyopia, through visual deprivation. Dense congenital unilateral cataracts can also compromise visual development through visual deprivation, but if treatment is delayed to 12–30 weeks, biased intraocular competition also plays a role in amblyogenesis.	
3396	Wheeler et al 1999	Case series (retrospective)	Patients presenting to a pediatric ophthalmology clinic		NA	15	–	Patients with pyramidal anterior polar cataracts, which are present from birth, are likely to require cataract surgery to treat or prevent amblyopia. Amblyopia can result from unilateral occurrence or asymmetry of bilateral opacities and can be worsened by surrounding cortical opacification.	
2722	Zetterström et al 2005	General review (accepted surgical practice)	NA		NA	NA	NA	Surgery must be performed promptly in cases with dense congenital cataract to prevent irreversible amblyopia. The development of amblyopia can also depend on the size, location and density of the cataract. Partial cataract may not require surgery but should be carefully monitored to prevent amblyopia. Even mild unilateral cataract can cause amblyopia in the affected eye if not treated.	

Summary	Group
<p>It is well known that congenital cataracts cause abnormal or reduced visual stimulation during the sensitive period of visual development, which can result in amblyopia.</p>	<p>Group 1 — Clear association/causality <i>Group 2 — Possible association/causality (more research needed)</i> <i>Group 3 — Lack of association/causality</i> <i>Group 4 — Possible lack of association/causality (more research needed)</i> <i>Group 5 — Conflicting results</i> <i>Group 6 — Possible protection</i> <i>Group 7 — No studies</i></p>

Summary table 117 — cataract and age-related macular degeneration

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Quality	Results	Other notes
2645	Klein et al 2004	General review (prospective cohort)	Beaver Dam Eye Study and Blue Mountains Eye Study	Cataract	NA	NA	II (LPS)	In the Beaver Dam Eye Study, cataract surgery before the baseline examination was associated with a fourfold increase in the incidence of neovascular AMD. However, the Blue Mountains Eye Study did not report similar findings. Surgical trauma and inflammation due to cataract surgery may cause AMD.	
2735	Velez and Weiter 2002	General review (prospective cohort)	Beaver Dam Eye Study, Chesapeake Bay Watermen Eye Study, Age-Related Eye Disease Study	Cataract	NA	NA	II (LPS)	The association between lens opacities and AMD have not been consistent. Both, however, are recognised as diseases of the ageing eye. Several studies have suggested an association between cataract extraction and increased severity of AMD, although other studies have not found the same relationship. Given the role of inflammation in the pathogenesis of AMD, cataract extraction could be expected to affect the course of the disease. There is difficulty confirming this, however, as patients with AMD may have unrecognised symptoms due to the presence of cataract.	

Summary	Group
It is not clear whether incidence of cataracts or cataract surgery is linked to age-related macular degeneration.	<p><i>Group 1</i> — Clear association/causality</p> <p><i>Group 2</i> — Possible association/causality (more research needed)</p> <p><i>Group 3</i> — Lack of association/causality</p> <p><i>Group 4</i> — Possible lack of association/causality (more research needed)</p> <p><i>Group 5</i> — Conflicting results</p> <p><i>Group 6</i> — Possible protection</p> <p><i>Group 7</i> — No studies</p>

Summary table 120 — physical activity and cataract

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
1530	Paunksnis et al 2006	Case-control	Patients admitted to an eye clinic for cataract surgery	Physical activity	Controls, admitted to a skin clinic	110 cataracts; 50 controls	III-3	The study found that less active patients were significantly more likely to develop cataract than physically active patients. This held true for both right eyes (OR 7.00; 95%CI 2.93 to 16.74) and left eyes (OR 4.43; 95%CI 1.97 to 9.98).	

Summary	Group
Physically active people may be less likely to develop cataract than those who are inactive, although more research is needed.	<p>Group 1 — Clear association/causality</p> <p>Group 2 — Possible association/causality (more research needed)</p> <p>Group 3 — Lack of association/causality</p> <p>Group 4 — Possible lack of association/causality (more research needed)</p> <p>Group 5 — Conflicting results</p> <p>Group 6 — Possible protection</p> <p>Group 6 — Possible protection</p> <p>Group 7 — No studies</p>

Summary table 124 — physical activity and age-related macular degeneration (AMD)

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
1537	Knudtson et al 2006	Prospective cohort	Beaver Dam Eye Study (residents aged 43–84 years)	Physical activity	Less active	4926	II (LPS)	People with an active lifestyle (regular activity more than 3 times per week) were less likely to develop exudative AMD (OR 0.3; 95%CI 0.1 to 0.7) than less active people. Increased categories of numbers of blocks walked per day also decreased the risk of exudative AMD (OR 0.7; 95%CI 0.6 to 0.97). This study controlled for factors such as age, systolic blood pressure, body mass index, smoking and education. The incidence of early AMD and pure geographic atrophy were not related to physical activity.	

Summary	Group
Physical inactivity may be associated with exudative AMD, independent of body mass index and other confounders.	<i>Group 1</i> — Clear association/causality <i>Group 2</i> — Possible association/causality (more research needed) <i>Group 3</i> — Lack of association/causality <i>Group 4</i> — Possible lack of association/causality (more research needed) <i>Group 5</i> — Conflicting results <i>Group 6</i> — Possible protection <i>Group 7</i> — No studies

Summary table 127 — eye protection and eye injuries (impact, blunt force, foreign bodies)

Paper no.	Reference	Type of study	Population/ study information	Risk factor/ intervention	Comparator	N	Level (quality)	Results	Other notes
1569	Lipscomb 2000	Systematic review with: 6 'before and after' (BA) studies 1 case– control study	Workers in various industries (chemical plant, shipfitters, aerospace, shipyard, light engineering, grinding, electrical) who received safety intervention with respect to eye protection (BA studies). Patients from grinding injuries — use of different types of eye protection.	Interventions to prevent eye injuries Eye injury	No safety intervention Other diseases	NA 120 cases/120 controls	III (Adequate) III-3	No controlled studies found. BA studies: Outcomes were number/severity/rate of eye injuries, use of safety glasses, hours of work lost. Results showed increases in use of eye protection; decreases in number of eye injuries (50–92%); decreased lost work time due to eye injury. Case–control study: Injured Among eye injuries, OR for correct grinding goggles = 0.38; for std spectacle use with some side protection = 3.8; for custom fit std spectacle = 1.2; for face shield = 1.1.	

Paper no.	Reference	Type of study	Population/ study information	Risk factor/ intervention	Comparator	N	Level (quality)	Results	Other notes
1559	Voon et al 2001	Case series	Patients seen at ophthalmic unit, Singapore General Hospital's emergency department	Eye protection		870 patients out of 1631	IV	Trauma cases were more likely to be male (OR 4.2; 95%CI 3.2 to 5.4), nonresident (OR 6.2; 95%CI 3.7 to 10.5) and younger than 40 years (OR 3.2; 95%CI 2.7 to 4.1). Work-related injuries accounted for 590 (74.1%) of all injuries. More than 90% of work-related injuries resulted from grinding, cutting metal or drilling. Of the work-related injuries, only 21.7% used eye protection, 43.7% were offered it and had refused and 34.6% reported that they had not been offered eye protection. Use of eye protection resulted in fewer cases requiring hospital admission or follow up (11% compared to 20% who did not use eye protection).	
2118	Yu et al 2004	Case-control	Patients with work-related eye injuries in Hong Kong	Eye protection	Controls selected from the general population	239 cases, 253 controls	IV	Most of the patients (85.4%) did not wear any protective devices at the time of eye injury. Subjects who wore safety glasses regularly were less likely to have eye injuries (OR 0.29; 95%CI 0.14 to 0.62). Requirement for safety glasses was negatively associated with eye injuries (OR 0.31; 95%CI 0.15 to 0.62).	
2095	Farrier et al 2006	Cross-sectional	Survey of general dental practitioners and their staff	Eye protection	NA	200	IV	87% of general dental practitioners wore eye protection regularly, but it was not always adequate for the task. 48% had experienced ocular trauma or infection and 75% of these injuries resulted from not wearing eye protection. Almost all dental hygienists (96%) wore protection when doing procedures with patients.	

Paper no.	Reference	Type of study	Population/ study information	Risk factor/ intervention	Comparator	N	Level (quality)	Results	Other notes
1917	Jain et al 2007	Case report	Single case of 16-year-old boy injured playing sport	Eye protection	NA	1	–	The wearing of spectacles with polycarbonate lenses is not necessarily an adequate protection against eye injuries, and further eye protection is still required for spectacle wearers.	

Summary	Group
Eye injury is associated with lack of eye protection, often occurs at work and is particularly prominent in young men. The use of eye protection leads to a marked decrease in eye injuries.	<p>Group 1 — Clear association/causality</p> <p>Group 2 — Possible association/causality (more research needed)</p> <p>Group 3 — Lack of association/causality</p> <p>Group 4 — Possible lack of association/causality (more research needed)</p> <p>Group 5 — Conflicting results</p> <p>Group 6 — Possible protection</p> <p>Group 7 — No studies</p>

Summary table 135 — work and eye injuries (impact, blunt force, foreign bodies)

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results
1568	Catalano and Maus 2004	Case series (registry)	Reported cases of eye injury in Alabama	Work	NA	6847 cases	–	18% of injuries occurred at work and 38% at home. The incidence of work-related injuries increased as more people entered the workforce.
1547	Baker et al 1999	Case series (registry)	All admissions of ocular trauma to acute care hospitals in California in 1988.	Work	NA	455 cases	–	59.1% of work-related admissions were due to ocular trauma. Open globe injury accounted for 45.9% of all work-related ocular traumas. The next most common were traumatic hyphema (16%) and open wound adnexa (14.1%). The major causes of work-related ocular trauma were associated with foreign body intrusion (19%), transport vehicles (18%), cutting or piercing tools (17%), assaults (9%), falls (8.6%) and caustic/corrosive substances (8.6%).
2095	Farrier et al 2006	Cross-sectional	Survey of general dental practitioners and their staff	Work	NA	200	IV	87% of general dental practitioners wore eye protection regularly, but it was not always adequate for the task. 48% had experienced ocular trauma or infection and 75% of these injuries resulted from not wearing eye protection. Almost all dental hygienists (96%) wore protection when doing procedures with patients.
1563	Andreotti et al 2001	Cross-sectional	Survey of USA active duty military personnel in 1998.	Work	NA	1.6 million	IV	The rate of walk-in eye injury cases was 58 times higher than the rate of hospitalisations (983/100,000 person years compared to 17/100,000 person years). Contusions and open wounds accounted for 85% of injuries resulting in hospitalisation and 80% of walk-in injuries were due to superficial wounds and foreign bodies. Younger men (17 – 24) were more likely to be hospitalised and tradespeople (eg welders, metalworkers) were 3–4 times more likely to present walk-in cases than any other group.

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results
1559	Voon et al 2001	Cross-sectional	Patients seen at ophthalmic unit, Singapore General Hospital's emergency department	Work	NA	870 patients out of 1631	IV	Trauma cases were more likely to be male (OR 4.2; 95%CI 3.2 to 5.4), non resident (OR 6.2; 95%CI 3.7 to 10.5) and younger than 40 years (OR 3.2; 95%CI 2.7 to 4.1). Work-related injuries accounted for 590 (74.1%) of all injuries. More than 90% of work-related injuries resulted from grinding, cutting metal or drilling. Of the work-related injuries, only 21.7% used eye protection, 43.7% were offered it and had refused and 34.6% reported that they had not been offered eye protection. Use of eye protection resulted in fewer cases requiring hospital admission or follow up (11% compared to 20% who did not use eye protection). Foreign bodies accounted for 80% of trauma cases.
1542	Karaman et al 2004	Case series (registry)	Patients with eye injuries admitted to Split University Hospital between 1998 and 2002	Work	NA	383 cases	–	27.7% of injuries occurred at work. 67.3% of injuries were due to foreign body intrusion. Injuries resulting in monocular blindness made up 17.9% of cases. Of those cases, 16.9% were due to foreign body lacerations.
1554	Lombardi et al 2005	Cross-sectional (survey)	Worker's compensation claims in 2000 from welders to a large US insurance provider	Work	822 nonwelders	1353 welders	IV	Eye injuries as the main claim accounted for 5% of all compensation claims. Eye injuries accounted for 25% of all claims by welders. The majority of injuries were due to foreign bodies in the eye (71.7%).
1544	Xiang et al 2005	Case series (registry)	Work-related eye injuries reported in emergency departments in USA in 1999	Work	NA	280,000	–	Individuals aged 20 to 34 years were most at risk for work-related eye injuries (51.0%). Work-related eye injury was significantly greater for males (31+8/10,000) than females (9+2/10,000). Males 20–24 had the highest eye injury rate (60+21/10,000). Foreign bodies in the eye accounted for 37.6% of injuries and were the most common cause.

Summary	Group
<p>Eye injury is a common hazard in certain jobs, and is particularly prominent in males between 20 and 34 years. Foreign bodies in the eye are the most common work-related injury</p> <p>Regular wearing of appropriate eye protection can reduce the incidence of eye injury (see summary table 135).</p>	<p>Group 1 – Clear association/causality</p> <p>Group 2 – Possible association/causality (more research needed)</p> <p>Group 3 – Lack of association/causality</p> <p>Group 4 – Possible lack of association/causality (more research needed)</p> <p>Group 5 – Conflicting results</p> <p>Group 6 – Possible protection</p> <p>Group 7 – No studies</p>

Summary table 137 — work and chemical injury

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
1540	Islam et al 2000	Cross-sectional (survey)	Workers compensation claims, Virginia USA in the year July 1997 to June 1998.	Work	NA	60,718	IV	The rate of ocular injuries was 567/100,000 employees. Burns and conjunctivitis were the second most common injuries, behind foreign body penetration.	
1541	Islam et al 2000	Cross-sectional (survey)	Workers compensation claims, Virginia USA in the year July 1994 to June 1995.	Work	NA	64,646	IV	65% of lost-time burn cases were to the face and/or eye. Most burns to the eye were due to chemicals. Burns to the eye were the third-most common injury in female workers and the most common in male workers.	
1544	Xiang et al 2005	Cross-sectional (survey)	Work related eye injuries reported in emergency departments in USA in 1999	Work	NA	280,000	IV	Individuals aged 20 to 34 were most at risk for work-related eye injuries (51.0%). Work-related eye injury was significantly greater for males (31±8/10,000) than females (9±2/10,000). Males 20–24 had the highest eye injury rate (60±21/10,000). Foreign bodies in the eye accounted for 37.6% of injuries and were the most common cause. Burns accounted for 11.7% and dermatitis/conjunctivitis for 10.6% of eye injuries.	Injury rates are per 10,000 full-time equivalent (FTE) workers

Summary	Group
Chemical injury to the eye is the second most common cause of eye trauma, after foreign bodies. Males are more at risk from this type of injury than females.	<p>Group 1 — Clear association/causality</p> <p>Group 2 — Possible association/causality (more research needed)</p> <p>Group 3 — Lack of association/causality</p> <p>Group 4 — Possible lack of association/causality (more research needed)</p> <p>Group 5 — Conflicting results</p> <p>Group 6 — Possible protection</p> <p>Group 7 — No studies</p>

Summary table 139 — sport and injury

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
1924	Drolsum 1999	Case series (registry)	Casualty records for a hospital in Norway from 1988–1998	Sport	NA	553	–	Young men were predominant recipients of sports-related eye injuries. Sports involving small balls or clubs caused the most injuries, and the most common injury was bulb contusion. Injuries tend to occur in unorganised activities, as many organised sports required the use of eye protection.	General sports
1929	Barr et al 2000	Case series (registry)	Patients in Scotland requiring hospital admission for ocular injuries during a 1-year period	Sport	NA	416	–	During the year, 12.5% of all cases of ocular trauma requiring hospital admission were sports related. Racquet sports such as squash accounted for most injuries, although soccer was the single most common sport associated with injury. The most common clinical finding was macroscopic hyphema. Most of the patients were male and most achieved good visual recovery.	General sports
1926	Filipe et al 2003	Case series	Athletes with ‘modern’ sports related ocular injuries presenting to a Portuguese hospital over a 10-year period	Sport	NA	24	–	This study examined the severity of ocular injuries from sports that are relatively new to Portugal, including health clubs, war games and new forms of soccer. Injuries from these ‘modern’ sports accounted for 8.3% of total eye injuries. Squash, paintball and motocross were common sources of injury. The most common diagnosis was retinal breaks.	General sports

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
795	Fineman et al 2000	Case series	Analysis of the records for patients admitted with ocular injuries from paintball in Philadelphia, USA.	Sport	NA	35	–	The most common injuries sustained during paintball were choroidal rupture, traumatic hyphema and commotio retinae. On follow-up, 46% of the patients had visual acuity of 20/200 or worse in the affected eye. Of the 35 patients, 27 required hospital admission and 14 required surgery. Some of the injuries were sustained during commercial war games while others were using paintball weapons in informal games. Although a few of the patients were wearing eye protection devices at the time of injury it was found that these did not meet industry standards. Other patients had removed their eye protection due to fogging or paint preventing clear vision.	Paintball
1927	Filipe et al 2003	Case series (registry)	Patients attending a sports ophthalmology unit over an 8-year period		NA	163	–	Most eye injuries incurred by soccer players were severe, and injury severity was independent of level of athletic expertise, age, sex and player position on the field. Hyphema and peripheral vitreoretinal lesions (most commonly in the superotemporal quadrant) were the most frequent injuries.	Soccer
1931	Alfaro et al 2005	Case series (registry)	Information on patients from the United States Eye Registry with fishing-related ocular injuries		NA	143	–	Fishing accounted for almost 20% of sport-related ocular injuries in the United States. Most common diagnoses were corneal penetration, hyphema and globe rupture caused by fishing hooks, lures and weights. Several of the patients were injured bystanders.	Fishing
1916	Jayasundera et al 2003	Case series	Information on patients with golf-related ocular injuries at the Auckland and Waikato hospitals during a 5-year period		NA	11	–	Golfing injuries were uncommon but were associated with severe ocular trauma and poor visual outcome. Most injuries were from golf balls, although injury from swinging clubs also occurred in children. Five patients incurred globe rupture and the other 6 had complications of blunt ocular trauma.	Golf

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
851	Flynn et al 2004	Case series (registry)	Patients who attended Cork University Hospital or Waterford Regional Hospital in Ireland for hurling-related injuries between 1994 and 2002		NA	310	–	Hurling related injury is a significant and preventable cause of ocular injury in Ireland, which could be prevented with the use of appropriate headgear and faceguards. At the time of the study the regulatory body for hurling did not have any required standards for protective equipment. Hyphema accounted for most hospital admissions. Spectators and referees were also among the injured.	
1928	Bianco 2005	Case–control	Professional and amateur boxers in Italy, examined over a 16-year period	Boxing	Nonboxers	956 boxers; 80 controls	III-3	There was no significant difference in the prevalence of serious ocular findings between boxers and controls. However, the presence of minor lesions (such as conjunctival and corneal alterations) was more prevalent in boxers ($P \leq 0.0001$).	Boxing
2114	Waicus and Smith 2002	Cross-sectional	Survey of participants in a intercollegiate lacrosse tournament			667	IV	Of the 667 players surveyed, 125 eye injuries were reported, 53 requiring medical attention. Injuries occurred during both games and practice. Eye protection is not compulsory in women's lacrosse in the United States, although in men's lacrosse helmets and faceguards are mandatory.	Lacrosse

Summary	Group
A high number of high injuries occur during sporting activity, with young men being most at risk. The sports resulting in the most number of injuries usually reflect their popularity in the country in question, rather than their inherent danger, although sports using hard, small balls warrant particular caution. Eye injury is less likely to occur in established sports with compulsory and well-designed eye protection.	<p>Group 1 — Clear association/causality</p> <p>Group 2 — Possible association/causality (more research needed)</p> <p>Group 3 — Lack of association/causality</p> <p>Group 4 — Possible lack of association/causality (more research needed)</p> <p>Group 5 — Conflicting results</p> <p>Group 6 — Possible protection</p> <p>Group 7 — No studies</p>

Summary table 140 — sport and foreign bodies in the eye

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
1905	Jaycock et al 2004	Case report	Patients presenting with eye injury	Sport	NA	3	–	Three patients who had been walking or running next to a road later required pars plana vitrectomy and removal of intraocular foreign bodies, most likely metallic debris projected from the road by passing cars.	

Summary	Group
Activities such as walking or running near roads may carry a small risk to eye health due to the potential for metallic foreign bodies to be projected from the road by passing cars.	<p><i>Group 1</i> — Clear association/causality</p> <p><i>Group 2</i> — Possible association/causality (more research needed)</p> <p><i>Group 3</i> — Lack of association/causality</p> <p><i>Group 4</i> — Possible lack of association/causality (more research needed)</p> <p><i>Group 5</i> — Conflicting results</p> <p><i>Group 6</i> — Possible protection</p> <p><i>Group 7</i> — No studies</p>

Summary table 143 — assault and eye injury

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
1941	Holland et al 2004	Case series	Airgun injuries to the head and neck presenting to Alder Hey Children's Hospital, Liverpool over a 5-year period	Assault	NA	16	–	The majority of injuries due to airguns were violent assaults.	
1938	Kuhn et al 2006	Case series (registry)	Analysis of information from the United States Eye Injury Registry database	Assault	NA	11,320 eyes	–	Injury by assault statistically significantly increased the chance of eye trauma resulting in blindness. Assaults were responsible for 19.5% of all injuries and the rate of blindness from assault was 41.2%. Many of the assault injuries were due to domestic violence.	
1937	Oum et al 2004	Case series (registry)	Patients with an ocular traumatic emergency presenting to a university hospital in Korea	Assault	NA	1809 (1183 male; 626 female)	–	The main sources of injury were work (35%), assault (22%), play (15%), traffic accidents (8%) and sports (7%). By gender, the largest cause for males was work-related events (27%), and the largest cause for females was assault (9%). The fist was the most common method of injury in assault. Blunt instruments and the foot were the second and third most common methods. Assault was the largest cause of ocular traumatic injury for females, although for males it was work-related injuries.	
1946	Scheufele and Blomquist 2004	Case series	Patients with ocular trauma presenting to a hospital or eye clinic in Dallas, Texas	Assault	NA	157	–	Assault was the most common setting for injury (31%). Blunt trauma was the usual method of assault injury. Alcohol was involved more often in assault than accidental injuries ($P < 0.001$).	Extracted from abstract

Paper no.	Reference	Type of study	Population/ study information	Risk factor	Comparator	N	Level (quality)	Results	Other notes
1933	Young et al 2002	Case series	Admissions to a regional burns unit in Hong Kong following chemical assault, over a 10-year period	Assault (chemical)	NA	19	–	All victims of chemical assault during the study period suffered burns to the head and neck. The victim's eyes were damaged in 47% of incidences, often leading to blindness, severe visual impairment and enucleation. The authors suggest that public awareness should be raised about the importance of immediate first aid after chemical injury.	

Summary	Group
The type of eye injury resulting from an assault depends on the method of assault. Blunt trauma was the most common type of injury. Most assaults, particularly chemical assaults, result in serious injury or blindness. Further studies would be required to evaluate the severity and incidence of eye trauma from assault in Australia.	<p>Group 1 — Clear association/causality</p> <p>Group 2 — Possible association/causality (more research needed)</p> <p>Group 3 — Lack of association/causality</p> <p>Group 4 — Possible lack of association/causality (more research needed)</p> <p>Group 5 — Conflicting results</p> <p>Group 6 — Possible protection</p> <p>Group 7 — No studies</p>