

Eye injuries in children

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SUMMARY We report a retrospective study of children's eye injuries treated during 1977 at Helsinki University Eye Hospital. There were 110 cases representing 34.5% of all eye injuries and 3% of all patients treated in 1977; 81.8% were boys and 18.2% girls. Half of the injuries were caused by another child, one-third were self-inflicted, and the rest were other accidents. The risk of eye injury in girls was low and stable at all ages, but in boys the risk grew markedly at the age of 8 years. The commonest cause of injury was a thrown missile. Other important causes were shots, hits, and sports accidents. Two-thirds of the injuries were concussions. The proportion of perforations was 8.9%, which is a much lower figure than in earlier reports, suggesting that the injuries have become milder. Some kind of complication was seen in 16% of concussions. No secondary bleeding was found among them. Permanent impairment of vision was seen in 2 cases: one had a visual acuity of 0.1 because of traumatic cataract and the other 0.6 because of corneal scars. Although the number of perforations was too low for statistical analysis, the final result in this group suggests that the prognosis of perforating eye injury is still as bad as it was during the 1950s.

The frequency of eye injuries among children is remarkably high and the damage often serious.¹⁻⁸ Ocular trauma caused by accidents is theoretically preventable. In actual fact prevention is not easy. Before discussing methods of preventing injuries to the eyes one must know the causes of accidents and then decide on the most effective methods of eliminating or preventing them. The purpose of this study was to analyse the causes and prognosis of all eye injuries in children who required admission to Helsinki University Eye Hospital for at least 48 hours during the calendar year 1977.

Materials and methods

The hospital records of children aged 0-15 years and treated for eye injuries at Helsinki University Eye Hospital in 1977 were reviewed. The following information was recorded for every patient: age and sex, activity at the moment of accident, cause of accident, diagnoses, possible complications, status on the last examination, and treatment time.

Results

The total number of patients with ocular injuries in 1977 was 319 and the number of diagnoses 321. 110

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Table 1 Age and sex distribution of children with eye injuries

Age (years)	Boys	Girls	Both sexes
<1	—	—	—
1	2	1	3
2	1	1	2
3	3	2	5
4	3	1	4
5	5	1	6
6	5	2	7
7	2	1	3
8	13	1	14
9	8	4	12
10	9	1	10
11	9	—	9
12	5	3	8
13	12	—	12
14	10	2	12
15	3	—	3
Total	90	20	110

(34.5%) patients were children, representing 3.0% of all patients admitted to hospital (3700). Of those 110 children 20 (18.2%) were girls and 90 (81.8%) boys. Table 1 shows the age and sex distribution. 8.1% of accidents happened at school and 91.9% during leisure hours. The distribution of accidents during leisure hours was as follows: 68% in play,

14% in sport, 11% at home, 5% road traffic accidents, 1% assaults, and 1% at nursery school. 32% of the injuries were self-inflicted, another child caused 49.5% of them, and 18.6% were pure accidents.

The causes of injuries are shown in Table 2. The commonest cause was snowball (12 cases). Among shots there were 6 arrows shot from a bow, 6 shots with a catapult, and 3 with an airgun. A stick or branch was the causative agent in 7 cases among the hits. Of sports accidents 5 occurred at ice-hockey, 4 of these when boys were playing without their normal protective equipment. Among the pointed objects were 2 knives and 2 pairs of scissors.

The diagnoses are classified in Table 3 by age into 3 groups and by sex. The complications and prognosis in various diagnosis groups were as follows. Among 73 concussions there were 12 patients (16%) with 1 or 2 complications; temporary hypertension was seen in 6 eyes, traumatic cataract in 3 eyes, traumatic mydriasis in 3 eyes, macular degeneration of retina in 1 eye, and corneal scars in 3 eyes. At the last examination the vision was normal in all but 2 cases in the concussion group: one had a visual acuity of 0.6 because of corneal scars and the other 0.1 because of traumatic cataract. The follow

Table 2 Causes of injuries

Cause	No. (%)
Missile	23 (21%)
Shot	18 (16%)
Hit	16 (14.5%)
Sports accident	14 (13%)
Falling, bump	8 (7%)
Flying object	8 (7%)
Prick of pointed object	5 (4.5%)
Dog's bite or kick	3 (3%)
Road traffic accident	3 (3%)
Explosion	2 (2%)
Cause not known	10 (9%)
Total	110 (100%)

Table 3 Diagnoses of injuries distributed into 3 age groups and by sex

Diagnosis	0-6 years		7-11 years		12-15 years		0-15 years		Total
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	
Concussion	8	4	29	2	25	5	62	11	73 (65.2%)
Wound of lid(s)	6	2	4	—	1	—	11	2	13 (11.6%)
Perforating wound	1	—	4	3	2	—	7	3	10 (8.9%)
Nonperfor. wound	1	1	3	2	2	—	6	3	9 (8.0%)
Superficial foreign body	4	2	1	—	—	—	5	2	7 (6.3%)
Total	22	7	41	7	30	5	91	21	112 (100%)

Table 4 Total and mean treatment times in various diagnosis groups

Diagnosis	Treatment days, total	Treatment days, average
Concussion	622	8.6
Wound of lid(s)	141	10.8
Perforating wound	256	25.6
Nonperforating wound	57	7.1
Superficial foreign body	19	2.7
Total	1095	9.9

up period in the latter case was 16 months, and cataract operation was planned.

Among palpebral wounds were 7 cases with damage to the lacrimal canaliculi, i.e., in 54% of all lid injuries. In every case the function was normal after treatment.

The 10 perforating injuries of the eye included 3 ruptures of the globe. When these 3 cases are included the following complications were seen in this group: uveal prolapse in 8 eyes, traumatic cataract in 3, haemophthalmus in 3, vitreous prolapse in 1, and choroidal detachment in 1. The fate of the eyes with perforations was as follows: 3 eyes were enucleated during the first hospital stay (those 3 with rupture of the globe); in 1 eye the vision was counting fingers at 1.5 metres, and there was a corneal leucoma because of an earlier injury with acetic acid; in 1 eye the vision was 0.2 and in the other 0.5 p because of corneal scar; in 1 eye the vision was 0.15 because of traumatic cataract; and in 3 eyes the final vision was 1.0.

In cases with nonperforating wounds or superficial foreign bodies no complications were found, and the prognosis was good.

Table 4 shows the treatment times in various diagnosis groups.

Discussion

The proportion of children with eye injuries among all eye patients admitted to hospital seems to be

quite stable at 3 to 4%.¹³ The ratio of boys to girls, about 4:1, is typical, too.^{13,6} The distribution by age was also similar to that in other series. Among girls the accidents occurred equally at all ages, while among boys the risk of injury clearly increased from the age of 8. It seems that the first school years calm the boys, because the frequency of injuries was very low at the age of 7.

According to this series the accidents had become milder during the 1970s than in earlier decades. In Werner's series¹ from this same clinic the percentage of perforating eye injuries was as high as 72% of 215 patients, while the percentage in this series was only 9%. On the other hand we know that during the 1930s 25 children were admitted to hospital every year because of perforating injuries, and during the 1950s the corresponding number was 33 on average.⁹ Söllner⁶ in his large series of 8547 children from 21 clinics in Europe had 48% perforations and Kobor⁵ 40%, Lambah³ 27%, and Holland¹⁰ 39%. Because the difference was so great between this and the other series, the distribution of various diagnoses at Helsinki University Eye Hospital from the previous year 1976 was checked. The result was exactly the same. So we can say that the most dangerous injuries have diminished both relatively and absolutely.

The explanation for this fortunate development can be found when the causes of injuries in different series are compared. It is well known that the commonest causes of perforating eye injuries in children are pricks of various pointed objects. Shots, hits, and bumps are also common.^{1-3,5,6,8,9} In some European countries explosions were common causes of perforations after the second world war.¹¹ Finland is one of these countries.^{1,9} In the present series the proportion of pricks of pointed objects was only 4.5%. Werner had 33%, Kobor 11%, and Söllner 16%. A great difference was also seen in the group of explosions. In the present series they constituted only 2%, but in Werner's series up to 20%, in Kobor's 7%, and in Söllner's series 6%. These observations suggest that dangerous tools and explosives are nowadays not so easily available to children as formerly. However, better parental supervision is still needed when children are handling guns, if they must handle them at all. The commonest single cause of eye injury was thrown snowball. Nearly all these accidents happened at school and could have been prevented with better supervision by teachers.

Table 3 shows that the commonest injury in every age group was concussion. However, there are some differences in various groups. Before school age wounds of the lids were the second commonest diagnosis. During the first school years perforating

and nonperforating bulbar wounds were typical as well as concussions, but in the oldest group other diagnoses besides concussions were rare.

Although there were 16% of complications among concussions, only 2 (2.7%) of them led to reduced vision. No secondary bleeding was seen. The only serious complication was traumatic cataract.

The lacrimal canaliculi were very often injured in cases with palpebral wounds. This is understandable, because the uncomplicated wounds are often sutured by other than ophthalmic surgeons.

The number of perforating injuries was too low for statistical analysis, but the final result in this group suggests that the prognosis of perforation is as bad as it was during the 1950s and only a little better than during the 1930s at this clinic.⁹

The treatment days of children's eye injuries took 2.8% of all treatment days at the clinic. The mean treatment time, 9.9 days, was a little shorter than the mean treatment time of all patients, 10.7 days. While the mean treatment time of all patients has become shorter since the 1950s (18.1 days), the treatment time of perforating eye injuries is about the same as during the 1950s at this clinic (Niiranen, unpublished data).

In 1977 the costs of 1 bed at Helsinki University Central Hospital were 532 Finnish marks a day. When we take only this sum into account we can calculate that children's eye injuries cost over half a million marks to the community. The human suffering and the effects of permanent invalidity to the child's development and education cannot be calculated. Consequently preventive work cannot be stressed too often.

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