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FIRE-CRACKER INJURY TO THE EYES IN HONG KONG*

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THE colony of Hong Kong occupies a land area of 398¼ square miles. The total population at end of 1964 was estimated to be 3,739,900, 85 per cent. being concentrated in the urban areas of Hong Kong Island and Kowloon. On the basis of language and place of origin about 98 per cent. could be described as Chinese. Thus Chinese custom and traditions predominate in Hong Kong. One such custom is to discharge fire-crackers during the Chinese New Year. From 1960 to 1965, a period of 6 years, 262 cases of fire-cracker injury to the eyes were recorded at Government Clinics.

Analysis of Cases

Age and Sex (Table I and Figure, opposite).—Most of the victims belonged to the 5 to 20-year age group, and injury in males far exceeded that in females (207 males to 55 females). The injuries were nearly all uniocular.

TABLE I

AGE, SEX, AND NUMBERS OF PATIENTS

Age Group (yrs)		1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59	60 to 64	65 to 69	70 to 74	75 to 79	Total Cases
Sex	Male	14	71	49	19	9	10	4	10	14	3	1	–	1	–	1	1	207
	Female	9	12	13	5	–	2	3	2	1	5	1	1	–	–	1	–	55

Mode of Injury.—During the Chinese New Year celebrations, lighted fire-crackers are thrown about aimlessly from all places and in all directions. Most of the patients stated that they had been injured by the carelessness of others. Only a very small group admitted injuring themselves while discharging fire-crackers.

Clinical Findings.—These are given in detail in Table II (opposite).

Investigation and Treatment

The orbit was *x*-rayed in all cases of penetrating injury, hyphaema, and cataract to exclude radio-opaque intra-ocular foreign body. The result was negative in all cases.

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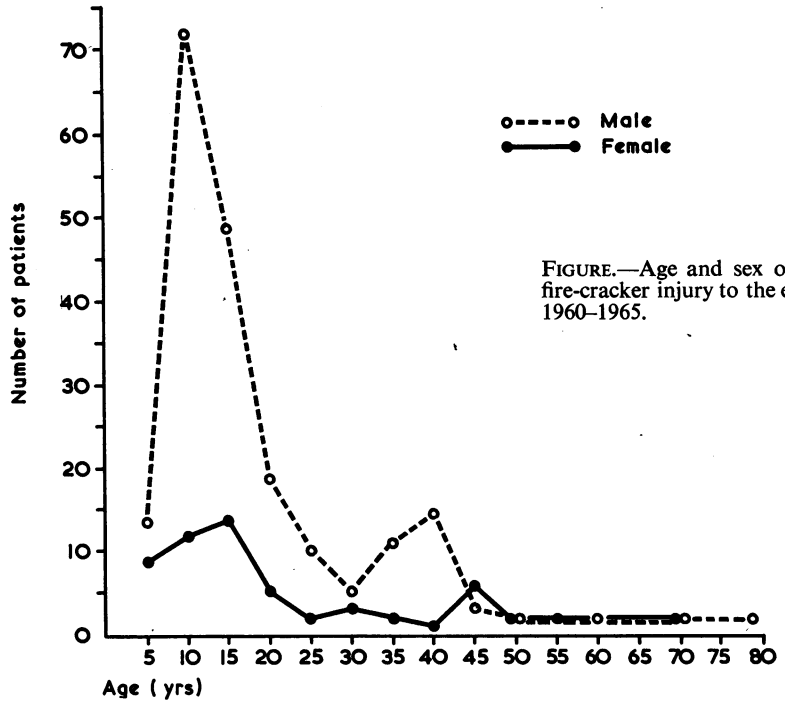

FIGURE.—Age and sex of 262 cases of fire-cracker injury to the eyes in 6 years, 1960–1965.

TABLE II
CLINICAL FINDINGS, BY YEAR

Type of Injury	Clinical Findings	Year						Total	
		1960	1961	1962	1963	1964	1965	No.	Per cent.
Penetrating	Laceration of Cornea and Sclera	3	3	–	–	1	4	11	4·21
Non-Penetrating	Burn and Abrasion of Lid	8	6	5	4	8	7	38	14·56
	Traumatic Conjunctivitis	8	1	5	5	4	5	28	10·73
	Laceration of Conjunctiva	–	–	2	1	–	4	7	2·68
	Subconjunctival Ecchymosis	–	3	2	3	4	2	14	5·37
	Corneal Abrasion and Ulcer	8	12	12	12	9	10	63	24·14
	Corneal Foreign Bodies	2	5	2	2	4	1	16	6·13
	Hyphaema	9	6	4	6	7	5	37	14·17
	Traumatic Mydriasis	–	–	2	1	3	–	6	2·30
	Iridodialysis	1	2	1	–	–	–	4	1·53
	Traumatic Cataract	1	1	5	5	4	8	24	8·82
	Vitreous Haemorrhage	1	–	2	–	2	1	6	2·30
	Retinal Oedema	–	1	1	1	1	4	8	3·06
Total		41	40	43	40	47	51	262	100

Surgery.—This consisted of repair of laceration of conjunctiva, cornea, and sclera, and removal of corneal foreign body.

Topical Therapy.—This consisted of prevention of infection with antibiotic eye-drops and ointment, mydriatics for corneal lesions, and enzymes for haemorrhage. Topical steroids were used in some cases to prevent symblepharon formation.

Systemic Therapy.—This consisted of vitamins, antibiotics for controlling infection, and carbonic anhydrase inhibitor (Diamox) to lower the intra-ocular pressure where necessary.

Results

The lesions involving lids, conjunctiva, and cornea (63·61 per cent.) healed well and left no visual impairment after treatment. Two cases of mild symblepharon occurred involving the lower lid. These were in the groups for which follow-up was poor: presumably the patients were cured after the first treatment.

Eight patients with hyphaema had permanent damage to one eye. The results are shown in Table III.

TABLE III
RESULTS AFTER HYPHAEMA

Results	No Follow-up	Well	Iridodialysis	Traumatic Cataract	Optic Atrophy and Retinal Degeneration
No. of Cases	16 (assumed well)	9	4	5	3

Traumatic mydriasis, iridodialysis, vitreous haemorrhage, and retinal oedema (9·19 per cent.) quietened uneventfully after treatment without damage to the sight.

Among the cases of non-penetrating injury were 24 cases of traumatic cataract (8·82 per cent.), in which vision was severely impaired.

Of eleven patients (4·21 per cent.) with penetrating injury, only four regained a reasonable degree of visual acuity; the rest ended in traumatic cataract (4 cases), and atrophy of the globe (3 cases). No case of sympathetic ophthalmitis was observed.

In the end 39 out of 262 cases had permanent damage to sight (14·88 per cent.).

Prevention

Despite the ever-increasing population, the incidence of fire-cracker injury has remained more or less the same (Table IV), a fact that must be credited to the

TABLE IV
INCIDENCE OF EYE INJURY, BY YEAR

Year	Estimated Mid-year Population	No. of Injuries	Incidence per 10,000
1960	2,981,000	41	1·40
1961	3,177,700	40	1·26
1962	3,400,000	43	1·26
1963	3,592,100	40	1·12
1964	3,692,200	47	1·30
1965	3,739,900 (end of 1964)	51	1·33

Secretary for Chinese Affairs, who has taken the following preventive measures:

1. Posters,
2. Broadcast talks in Chinese and English,
3. Newspaper articles,
4. Police action prosecuting the offenders,
5. Shortening the permitted hours of discharging fire-crackers: 41 hours in 1960, 1961, 1962, and 1963; 15 hours in 1964; and 17 hours in 1965.

Summary

262 cases of fire-cracker injury to the eyes are reported and analysed. The injuries are usually uniocular. About one-sixth of them caused blindness due to traumatic cataract, atrophia bulbi, optic atrophy, and retinopathy.

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BIBLIOGRAPHY

DUKE-ELDER, S. (1954). "Text-book of Ophthalmology", vol. 6, pp. 5751–6123. Kimpton, London.
——— (1959). "Parsons' Diseases of The Eye", 13th ed., p. 384. Churchill, London.
HONG KONG (1965). "Hong Kong Report for The Year 1964", p. 241. Government Office, Hong Kong (H.M.S.O., London).
TREVOR-ROPER, P. D. (1962). "Ophthalmology", 2nd ed., p. 403. Lloyd–Luke (Medical Books), London.
VAUGHAN, D., COOK, R., and ASBURY, T. (1962). "General Ophthalmology", 3rd ed., p. 253. Lange, Los Altos, California.