



# METALLIC CORNEAL FOREIGN BODY; A PREVENTABLE WORK RELATED CAUSE OF OCULAR MORBIDITY.

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**ABSTRACT... Objectives:** To evaluate demographic characteristics, morbidity and attitude of the patients in cases presenting with metallic corneal foreign bodies. **Study Design:** Descriptive, observational study. **Setting:** Department of Ophthalmology, Pak Red Crescent Medical and Dental College Dina Nath District Kasur. **Period:** April 2017 to January 2018. **Methods:** 100 consecutive patients with metallic corneal foreign bodies and had not received any treatment were enrolled. Data regarding patient's age, gender, education, occupation and number of working years was collected. Patient was further inquired about the mechanism of injury, past history, availability and use of protective eye wear, availability of physician at work place, use of unprescribed drugs, self-removal attempt and self-removal method, pain intensity and leaves taken from job. Time interval between injury and presentation in the hospital was also noted. Location, depth of foreign body and ocular complications after removal were also examined. **Results:** All the patients were male and age ranged between 14-43 years. Patients were working in different industries from 6 months to 20 years. 43% got foreign body during metal grinding, 32% injuries occur during metal cutting, 20% during welding and 5% did not remember how they got foreign body. Only 7% used the protective eyewear during work, although protective eyewear was available to 59%. Physician was available to only 12% of patients at work place. 46% tried self-removal of the FB and 28% used unprescribed drugs before visiting to hospital. Pain intensity of the patient was measured on VAS from 0 (no pain) to 10 (worst pain ever experienced) mean 5.5. Patients were absent from work up to 4 days (mean 1.1). Rust ring was the most common complication developed in 38% patients. **Conclusion:** Corneal foreign bodies are preventable work related eye injuries common among young industrial workers. There should be educational and safety programs about eye protection at work place.

**Key words:** Metallic corneal foreign bodies, Rust ring, Protective eyewear.

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## INTRODUCTION

A superficial metallic corneal foreign body is the most common and preventable work related eye injury.<sup>1</sup> Besides its economical impact of making the subject be absent from work for a period of few hours to few days, corneal foreign body is one of the leading cause of monocular blindness in the industrial workers. Once foreign body is in the cornea, it is potentially sight threatening as it can cause corneal scarring, infectious keratitis and endophthalmitis.<sup>2</sup> Self-medication and self-removal of foreign body is a common practice which is related to nonavailability of eye physician at work place. Treating corneal foreign bodies with unprescribed medicine and removing with currency note, thread, tooth pick and magnet can

lead to severe ocular complications.

Prevention of corneal foreign body accidents and their potentially serious consequences are certainly possible. Wearing appropriate protective goggles prevents about two-thirds of these accidents.<sup>3</sup> The current study was conducted to evaluate demographic characteristics, morbidity and attitude of the patients in cases presenting with metallic corneal foreign bodies.

## MATERIALS AND METHODS

This study was conducted at Department of Ophthalmology, Pak Red Crescent Medical and Dental College Dina Nath District Kasur between April 2017 and January 2018. 100 consecutive

patients who presented with metallic corneal foreign bodies and had not received any treatment were enrolled. Informed consent was taken from each patient. Before instilling topical anesthetic, the patient was requested to assess intensity of ocular pain on visual analogue scale. The scale was graded between 0 and 10 with zero indicating no pain and ten indicating maximum pain ever experienced by the patient. We obtained demographic data from each patient including age, gender, education and occupation. We also recorded information regarding number of years of work at present place, time between incidence and first visit to eye department, history of similar eye injury in past, availability of protective measures like safety goggles and shields, use of protective measures, presence of physician at workplace, attempted self removal of foreign body, method of attempted corneal foreign body removal, and leaves taken by the patient from job. Slit lamp examination was done to examine associated corneal complications like rust ring and corneal abscess. Patients with non-metallic corneal foreign bodies, penetrating injuries and patients who had received prior treatment from some other hospital were excluded from study.

## RESULTS

All the patients were male and the age ranged between 14 to 43 years (mean 24.7 years). Mean education of patients was  $6.25 \pm 3.55$  years (range 0-14 years). 15% patient did not receive any formal education, 38% patient had primary education and 32% patient went to school up to middle class. While 10% patient went to high school and only 5% patient were college graduate. All of the patients were industry workers. Working years of these patients in industry range from 6 months to 20 years (Mean 6.8 years) (Table-I). 40% patients were electrician, 20% were welder, 10% were mechanics and further 10% were masons, While 20% patients were working in different sectors.

	Range	Mean	Std. Deviation
Age (Years)	14-43	24.7	6.63
Years of education	0-14	6.25	3.55
Working years in industry	0.50-20	6.8	6.31

**Table-I. Patient profile**

Most of the patients (43%) got foreign bodies during metal grinding, 32% got injuries during metal cutting and welding was the cause of 20% of FB. 5% of patient did not know how they got FB.

With regard to facilities at work place, protective eyewear was available to 59% of the patients while 41% were not provided with any protective eyewear (Table-II). However only 7% patients used protective eyewear and 93% did not use any protection despite the availability of protective shields (Table-III) and 30% of patient had previous history of FB. Physicians were available on only 12% of workplaces while 88% of industries did not provide any physician to their workers at workplace (Table-II).

	Available	Not Available
Protective eyewear	59%	41%
Physician	12%	88%

**Table-II. Facilities at workplace**

28% of patients used unprescribed drugs before visiting to ophthalmologist. Time interval between injury and presentation in hospital ranged from 1 hour to 144 hours (Mean  $43.9 \pm 43.72$  hours). On average 46% of patients tried to remove FB by them (Table-III). Self removal methods included currency note (23%), Tooth pick (8%), Thread (12%) and 3% used magnet to remove FB (Table-III).

	Yes	No
Use of Protective eye wears	7%	93%
Self removal	46%	54%
Use of Un-prescribed Drugs	28%	72%

**Table-III. Attitude of Patients**

Pain intensity of patient was measured on VAS score from 0 to 10 (Mean  $5.5 \pm 3.45$ ). Depending upon the pain intensity and discomfort patient took an average of 1.1 days of leave from work place, from no day off from work to maximum of 4 days of leaves (Table-IV).

	Range	Mean	Std. Deviation
Pain Intensity	1-10	5.5	3.45
Leaves availed by Patient	0-4	1.1	1.12

**Table-IV. Ocular morbidity**

There was no complication in 32% patients after

removal of foreign body. 38% patients developed rust ring, 27% has corneal abscess while there was corneal burn in further 3% patients.

## DISCUSSION

Although considered as minor ocular trauma, foreign bodies are associated with significant ocular morbidity. Thus the participants of our study were exclusively male belonging to younger age group as compared to previous studies. Mean age in our study was  $24.7 \pm 6.6$  years (range 14-43 years). Ramakrishnan T et al in their study reported 97% patients being males with mean age  $42 \pm 13$  years (range 19-73 years).<sup>4</sup> Macedo Filho et al in their study reported that 92% patients were male and their mean age was 35 years.<sup>5</sup> All the patients were industrial workers who received corneal foreign bodies at work place. The predominant mechanism of injury was metal grinding (43%) followed by metal cutting (32%), welding (20%). 5% of the patients were unaware of the mechanism of injury. In a study by Ozkurt GZ et al 65% of corneal foreign body injuries occurred during metal cutting 22% during welding whereas 13% had an unknown origin.<sup>6</sup> Samer I et al in their study noted that grinding was cause of corneal foreign body in 51% of cases, drilling in 21.9%, welding in 18.2% and nailing in 9.1% of cases.<sup>7</sup>

Only a small percentage of patients (5%) were using protective eyewear at the time of injury. Use of protective eyewear may be prevented by many factors like lack of comfort /fit, fogging scratching of eyewear etc.<sup>8</sup> However in our study the predominant factor was lack of knowledge and negligence on part of the patient as and protective eye wear was available at 59% of workplaces and 30% of the patients had already experienced a similar corneal foreign body injury in past. Ocular morbidity due to this problem was noted to be very high. The pain score in our study was high ( $5.5 \pm 3.5$  range 1-10). Some of the patients considered it as worst pain ever experienced by them in their life. Similar results were shown by Shah S et al who reported pain score ranging from 3.22 to 6.95 on visual analogue scale.<sup>9</sup> The number of leaves taken from work was also correspondingly high ( $1.1 \pm 1.12$  range 0-4).

Alexander MM et al. in their study noticed time lost from work ranging from – 80 hours.<sup>10</sup> Most common associated corneal complication was found to be the rust ring which appears due to disintegration, oxidation, and deposition of iron particle in surrounding corneal tissue.<sup>11-12</sup> Corneal abscess was noted in 27% of cases. The cause of high percentage of corneal abscess in patients was mainly due to long intervals between time of injury and patient's presentation in hospital. Our results agree with Chaikitmongkol V et al. who reminded that use of protective eyewear can prevent a magnitude of ocular morbidity and save significant cost to the community.<sup>13</sup>

## CONCLUSIONS

Corneal foreign bodies are preventable work related eye injuries common among young industrial workers. Lack of awareness and negligence on part of workers prevents the use of protective eye wears. Proper eye protection is essential and must be implemented at work places to prevent irreversible damage to the eye, loss of wages and work and save the cost of treatment. Self-removal of foreign body should be discouraged. Industrial workers must be educated and motivated to use protective eye wears at work places.

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It is not titles that **honor** men,  
but men that **honor** titles.



*“Niccolo Machiavelli”*

#### AUTHORSHIP AND CONTRIBUTION DECLARATION

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