

INCIDENCE AND TYPES OF OCULAR SURFACE FOREIGN BODIES: CORRELATION WITH LOCATION IN THE EYE AND OCCUPATION

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Abstract

Background: The objective is to find the incidence and types of ocular surface foreign bodies and correlation with their location in the eye. **Place and Duration of Study:** This cross sectional study was conducted at Dr. Y S Parmar Government Medical College, Nahan, Himachal Pradesh from May 2023 to November 2023. **Materials and Methods:** Patients presenting with foreign sensations were subjected to detailed slit lamp examination after assessing the visual status. The type and location of the foreign body was recorded. Superficial foreign bodies were removed with the help of buds and forceps after anaesthesia. The impacted ocular surface foreign bodies were removed with the help of sterile 26 gauge needle. **Result:** 316 eyes of 316 patients with ocular surface foreign bodies were enrolled in this study. Corneal injuries were most common. Most common location for different foreign bodies included metallic particle on cornea in 235 eyes (74.36%), insect wing in upper lid sub tarsal space in 17 eyes(5.37%), Mites on palpebral conjunctiva lower lid and on Caruncle in 11 eyes(3.48) and straw in layers of cornea and conjunctiva in 4 eyes(1.26%),. No statistically significant correlation was found between the type of ocular surface foreign body(OSFB) and their location in the eye. **Conclusion:** Most common type of ocular surface foreign body was metallic particle ,insect wing and mite followed by others in minor frequency. Most common location was cornea for metallic OSFB. The need to use protective Eye Wear (PEW) at work place is to be emphasized to protect cornea.

INTRODUCTION

The leading cause of unilateral loss of vision is Ocular trauma.^[1] Injury by superficial ocular surface foreign body (OSFB) is the commonest form of ocular trauma. It is one of the leading causes of ocular morbidity.^[2,3] It causes not only significant discomfort due to intractable foreign body sensations but if not properly managed can lead to permanent visual impairment. Usually ocular surface foreign bodies are small in size.^[4,5] They are particles of iron, dust, insect wings, straw of vegetable matter, animal or human hair and threads of cotton or plastic. In most of the cases ocular surface foreign bodies are found on cornea, sub tarsal space and palpebral conjunctival surfaces. They may also be found in fornices, bulber conjunctiva and caruncle. Patients experience pain,

foreign body sensation, redness and it incapacitates him to do any work. If left untreated and not properly managed they can lead to erosion of underlying surface, establishment and spread of infection leading to infective keratitis, conjunctivitis and endophthalmitis.^[4] A patient may encounter this type of injury in a variety of settings for example at home, while playing, at work or as a result of accident or assault.^[6] According to the Classification of Ocular Trauma based on severity of the trauma, the injuries caused by superficial foreign bodies are graded as mild.^[7,8] Thorough eye examination including upper lid eversion is necessary in patients with history of foreign body. Identification of the type of foreign bodies and their location of impaction into the eye and its effect will help in reducing ocular morbidity as well in creating

awareness and use of appropriate protective eye wears (PEW) to save eyes.

MATERIALS AND METHODS

This prospective study was done at Dr. Y S Parmar Government Medical college Nahan, Himachal Pradesh in 6 months duration from a period June 2023 to November 2023. During this study period 316 patients with OSFB in eye coming as outpatient door and in emergency department were included in this study after taking consent.

Age and gender were recorded for all patients. The patients presenting with foreign bodies were subjected to detailed slit lamp examination after assessing the visual status. Fluorescein dye was instilled in the eye to notice location of the foreign body as well as injury in form of abrasions caused by it. Superficial foreign bodies were removed with the help of cotton buds or forceps under topical anesthesia Proparacaine 0.5%/Lignocaine topical 4%. The location of foreign bodies recorded. The impacted ocular surface foreign bodies were removed with the help of sterile 26 gauge needle. Associated damage assessed in regards to size and area, and recorded. The topical antibiotic ointment was instilled into the eye after removal of OSFB. The topical antibiotic eye drops were prescribed for five days along with artificial tear drops. In case foreign body was deeply buried and patch given for 24 hours to 48 hours for healing of epithelium. Complete examination of the lids undersurface and fornices after double eversion was done in all cases. The dust and stone particles and other loose surface foreign bodies, were removed with irrigation with normal saline.

Statistical Analysis: It was performed using statistical programme for social sciences (SPSS version 21). No significant correlation was found for type and location of OSFB.

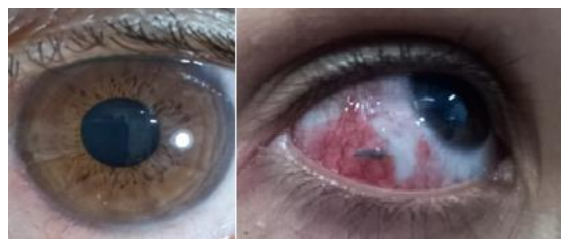
RESULTS

In our study we found 316 eyes from 18744 eyes of 9372 patients (1.68%) some kind of Ocular Surface Foreign Body (OSFB). The Right eye was involved in 59.81% patients and Left eye in 40.19% patients. We found OSFB in 86% male patients and in 14% female patients.



Mite

OSFB on peripheral part of cornea

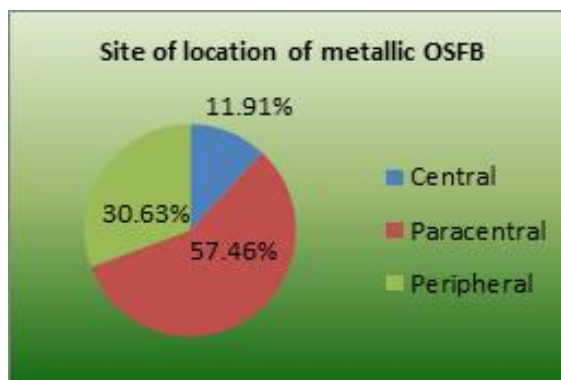
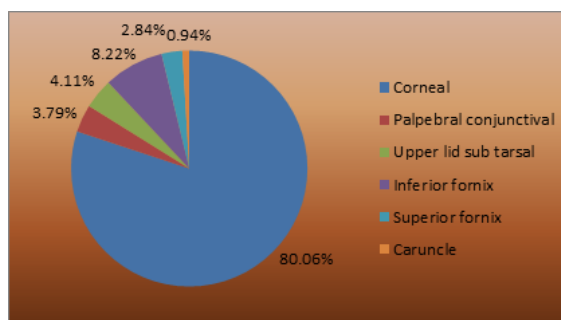


Glass -OSFB

Straw OSFB

The age commonly affected by OSFB injury in our study, ranged from between 10 to 60 years in which there was predominance of this injury during 31–40 years (26.58%) followed by 41-50 years (21.51%). Mean age of presentation in our study group was 34 years.

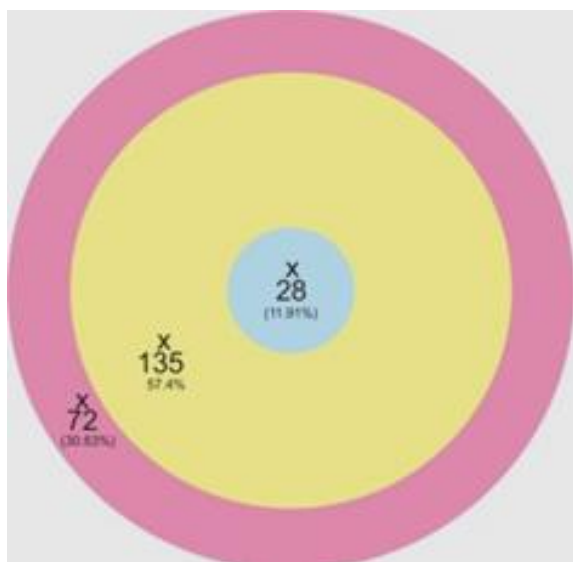
Most common location of OSFB was corneal (80.06%) followed by Inferior fornix (8.22%), Upperlid subtarsal area (4.11%), inferior and superior fornix and caruncle. we noticed mite adhered to caruncle, lower lid and lower palpebral conjunctiva as depicted in [Table4].



Metallic OSFB



OSFB undersurface upper Lid



CORNEA

We noticed Metal particles on cornea in 235 eyes (74.36%) insect wing in upper lid sub tarsal space in 24 eyes(7.59 %),Mites on palparal conjunctiva lowerlid and on Caruncle in 11 eyes(3.48%) and straw in layers of cornea and conjunctiva in 4 eyes(1.26%). Adhesive glue over cornea and Conjunctiva in 9 eyes (2.84%), Dust & stone particles in 8 eyes(2.53%), piece of thread seen in 7 eyes(2.21%), Plastic piece in 6 eyes (1.89%), Caterpillar hair in 5 eyes(1.58%), Straw piece in 4 eyes (1.58%), Eye lash in 3 eyes (0.94%) ,Contact lens in the superior fornix in 2 eyes (0.63 %)and Cigarette bud in 9 eyes (0.3 %).

Among the metal particles on cornea in 235 eyes (74.36%), 11.91 % were found in central area (papillary area) and patient has some visual impairment which recovered after removal of foreign body and patching. 57.46 % foreign bodies were paracentral in location and 30.63 % in peripheral location without any visual impairment. Complete history from these patients revealed that 275 were (87.02%) affected at work place i.e industry where mostly patients involved in grinding, cutting and welding. At work place painters got injury from dust, paint or lime. Among other patients 21 eyes of farmers (6.65 %),12 eyes (3.80 %) at home while working and 8 eyes involved had no clear history. Those working at workplace only 44.62% were using Protective Eye Wear (PEW), 31.32% were not using at all PEW, while 24.05% did not remember exactly and were unable to tell. Rust ring was seen in 36.36 %, epithelial defect of varying degree was seen in 53.75 %, corneal ulceration in 3 patients (1.18 %). These 3 patients had reported 3-4 days after injury.

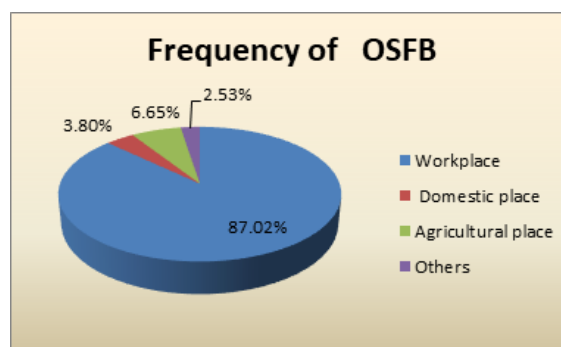


Table 1: Distribution of OSFB gender wise

Male	273	86 %
Female	43	14 %

Table 2: Distribution of OSFB on basis of eye involved

Right Eye	189	59.81 %
Left Eye	127	40.19 %

Table 3: Distribution of OSFB age wise

10 -20 years	52	17.40%
21 – 30 years	57	18.03 %
31 – 40 years	84	26.58 %
41 – 50 years	68	21.51 %
51- 60 years	55	17.40%

Table 4: Site of location of OSFB

Location of Foreign Body	Frequency out of 316	Percentage
Corneal	253	80.06 %
Palpebral conjunctival	12	3.79 %
Upper lid sub tarsal	13	4.11%
Inferior fornix	26	8.22 %
Superior fornix	9	2.84 %
Caruncle	3	0.94 %
Total	316	100 %

Table 5: Types of OSFB with frequency

Metalic particle on cornea	235	74.36%
Insect wing	24	7.59%
Mites	11	3.48%

Adhesive glue over cornea and Conjunctiva	9	2.84%
Dust & stone particles	8	2.53%
Thread	7	2.21%
Plastic piece	6	1.89%
Caterpillar hair in 5 eyes(1.58%),	5	1.58%
Straw piece	4	1.26%
Eye lash	3	0.94%
Contact lens in the superior fornix	2	0.63%
Cigarette bud	1	0.3%

Table6: Location of metallic OSFB on cornea with frequency

Central	28	11.91 %
Paracentral	135	57.46 %
Peripheral	72	30.63 %

Table 7: Frequency of OSFB in relation to occupation place.

Occupation	Frequency	Percentage
Workplace	275	87.02 %
Domestic place	12	3.80 %
Agricultural place	21	6.65 %
Others	8	2.53 %

Table 8: Distribution of Patients in relation to use of PEW at workplace.

Using PEW	141	44.62%
Not using PEW	99	31.32%
Not clear	76	24.05%

Table 9: Effect of Corneal foreign body n=253

Effect of corneal foreign body	Frequency	Percentage
Rust ring	92	36.36 %
Epithelial defect on removal	126	53.75 %
Corneal ulceration	3	1.18 %
No effect	32	12.64%

DISCUSSION

Corneal foreign bodies (CFBs) among OSFBs are one of the most common ocular injuries.^[9-11] The discomfort and pain associated these injuries is estimated to be the most common reason for attending the ophthalmic clinics and departments.^[9] In our study male patients(86%) outnumbered the female patients (14%) with male to female ratio 6.14: 1, which is similar to study conducted by Ajay Shankar Kar.^[9] The male to female ratio ranged in other studies from 3:1 as per Jahangir Tehmina et al,^[12] 3.1 to 14:1 in study of Guerra Garcia RA.^[13] We found OSFB in 316 eyes(1.68%) from 18744 eyes of 9372 patients(1.68%). And per day case seen was 1.72.

In regards to age, patients affected by OSFB injury in our study, ranged from between 10 to 60 years of age in which there was predominance of this injury(26.58%) in age group of 31–40 years followed by 41-50 years(21.51%). The mean age reported by Muhammad Luqman Ali Bahoo et al was 38.58 ± 21.49 years.^[14] Ajay Shankar Kar^[9] also reported that the age commonly affected by OSFB injury in their study, ranged from between 10 to 60 years in which there was predominance of this injury during 31–40 years.^[9] In most reports, injuries occurred in men under 50 with higher incidences in the 3rd and 4th decades of life which is in consistent to our findings.^[15]

The study of Ajay Shankar Kar,^[9]Yiğit Özlem et al^[10] and Radha I Dass et al,^[15] showed majority of FB to be metal fragments. Most of them were metallic iron foreign bodies. Our study also revealed similar results where corneal OSFB were found to be 80.06%, metallic being 74.36%.

In our study right eye was more involved as compared to left eye (Right eye 59.81%. and Left eye 40.19%). Ajay Shankar Kar^[9] and Reddy P et al,^[16] also reported similar findings but it is in contrast to study by Muhammad Luqman Ali Bahoo et al,^[14] where Left eye was more involved.

In our study majority of CFBs were found in paracentral (57.46%) area followed by peripheral (30.43%) and central area of cornea(11.91%). paracentral area being most involved. This finding of ours is consistent with finding seen in other studies were seen by Ajay Shankar Kar, Reddy P et al.^[9,16]

OSFB are superficial FBs lodged in the outer coats of the eye. Radha I Dass et al,^[15] showed that in 73.5% cases cornea was more frequently involved, rest 26.5% showed involvement of conjunctiva, fornices etc. The study of Yiğit Özlem et al,^[10] showed comparable results with involvement of cornea to be 72.6%, the same study found the majority of FB to be metal fragments followed by dust particle. The cases most prone to assaults by the metal FBs were industrial workers. We also found the similar results 80.06 % being corneal involvement and rest at other locations.

Ajay Shankar Kar,^[9] in his study revealed that majority of injury occurred as the workers were not using protective eye wear even though this was available in their work place and 65.55% patients could have been prevented by PEW. In the study of Jahangir Tehmina et al,^[12] over 3/4 of the injuries were preventable by protective devices.^[16,17] Tak Sun Ignatius Yu et al^[18] reported that Most of the patients (85.4%) did not wear any protective devices at the time of injury. These similar reasons were given by patients in their study by Ajay Shankar Kar.^[9] In our study only 44.62% were using PEW. Reasons given by the patients for not wearing the PEWs were ignorance, discomfort and forgot wearing.

Subjects who wore safety glasses regularly were less likely to have eye injuries steel industry, factory and construction workers and those exposed to multiple hazards may get eye injuries at work. They should be provided with protective devices which are effective in preventing such exposures. Health education and safety training are important in preventing eye injuries.^[18] Ballal SG reported that the incident rate for ocular injuries was 111.8 per 1,000 men exposed. The age group 33-42 had the highest prevalence rate (55.8%) and 67.5% of the eye injuries involved employee. More than a third of the injured were not wearing eye protection. Avoidable factors, such as negligence, were major contributory factors. A training programme concerning safety has much to commend it, Welders should be given health education on the potential ocular hazards of the different aspects of their occupation from time to time. The need for regular eye check and utilization of ophthalmic eye care services should be emphasized to all welders.^[19]

CONCLUSION

The industrial work and agricultural work are the occupations wherein workers are more prone to OSFB injury. The OSFB injury is most common type of ocular trauma. In steel work the workers are exposed to grinding, cutting and drilling so the metal chip is the source of injury to eye commonly to the cornea, most accessible front part of eye painters are exposed to lime, dust and other paint material whereas farmers are exposed to dust, cowdung, straw and vegetable material. Proper precautions at work place, home place and outdoor work including farming to be taken seriously and importance of PEW should be emphasized. There is need to generate public awareness programmes to educate people on how to protect eyes from injuries especially at work places.

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