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## Pediatric lens trauma in Tanta University eye hospital

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### Abstract

**Background:** Lens trauma is commonly found among school- children (mainly boys) aged 5-15 years. The timing of surgery is important for visual rehabilitation, it is also important to consider in a child, in whom amblyopia is a concern. Ultrasound Biomicroscopy (UBM) can be used as an effective diagnostic tool. The biometry of the anterior segment can be measured by UBM systems that encompass the entire anterior segment. This allows preoperative evaluation of the position of the sulcus plane before cataract surgery, facilitating estimation of postoperative intraocular lens position.

**Aim of the Work:** The purpose of the current work is to investigate the causes, clinical aspects and outcome of pediatric lens trauma.

**Patients and Methods:** This prospective, randomized study included 40 eyes of 40 patients with eye trauma coming to Tanta University Eye Hospital. During the period from September 2018 to August 2019. Their age ranged between 2 to 18 years old. All patients in this study subjected to the following: Full history taking, general examinations and precautions if polytrauma, full ophthalmic examination. Investigation were done if indicated (Orbital imaging, Ultrasound Biomicroscopy) and examination of the contralateral eye.

**Results:** Our prospective study included 40 eyes of 40 patients with eye trauma (25 males and 15 females). The majority of our patients (67.5%) were more than 6 years. The most prevalent cause was blunt trauma which represented 62.5%. Ocular trauma in street was the most prevalent site (50%). Early detection and seeking medical advice for ocular trauma represented 62.5% of cases. Right eye was affected in 22 (55%) patients. 85% of our patients had rupture globe and 15% of patients had closed globe lesions. 70% of cases had 2 sessions of surgery. By using UBM to evaluate the cases, most of cases (42.5%) had cataract, followed by rupture of posterior capsule which was found in 8 cases. With slit lamp examination, the most prevalent status of the lens was cataract in 52% of patients, then free lens matter in anterior chamber and clear lens with the same percentage (12.5% of patients). There was a statistically significance difference between lens examination by slit lamp and UBM ( $P=0.032$ ) and there wasn't a statistically significance between AC examination by slit lamp and UBM. There wasn't a statistically significance association between the causative agents and both of the type of injury and the number of surgery sessions. Also there wasn't a statistically significance with place of trauma. While There was a statistically significance association between time of presentation and type of injury  $p = 0.001$ .

**Conclusion:** This study reported maximum incidence of paediatric ocular trauma at school age children with blunt objects as the most common cause of injury. UBM is a very helpful tool in assessment of lens status after trauma also in decision making for surgery.

**Keywords:** UMB, ocular trauma, pediatric

### Introduction

Ocular injury is a significant contributor to eye morbidity globally and is the primary reason of non-congenital unilateral blindness among children <sup>[1]</sup>.

School-aged youngsters (mostly males) between the ages of 5 and 15 often experience lens trauma. Rural locations are where it is more prevalent than urban regions <sup>[2]</sup>. Pediatric lens harm, in contrast to adult lens trauma, is often the consequence of play-related accidents brought on by the usage of iron wires, scissors, needles, spears, peashooters, or fireworks <sup>[3, 4]</sup>. The surgeries timing is crucial for vision rehabilitation, particularly in youngsters since media opacity increases the risk for amblyopia. According to many studies, individuals with traumatic cataract who underwent early cataract elimination and intraocular lens (IOL) implants have satisfactory vision <sup>[5]</sup>.

A complete eye exam is required in every instance of traumatic lens damage to evaluate if procedure is required and when it should be performed. If the lens dislocates within the anterior chamber and causes pupillary block glaucoma or if lens particle-induced or phacoantigenic glaucoma develops, immediate or urgent surgical excision of the lens might

be required [6]. When amblyopia in a youngster is a problem, surgical scheduling is especially vital to take into account [7]. Equatorial stretching and zonule rupture in forceful trauma lead to traumatic lens dislocation or subluxation. Traumatic equatorial stretching may also lead to vitreous protrusion into the anterior chamber and disintegration of the anterior hyaloid face. Lens capsule, cortical, and zonule injuries may be detected by anterior segment optical coherence tomography (OCT) [8].

In situations of ocular injuries, ultrasound biomicroscopy (UBM) may be utilized as a reliable diagnostic method. UBM may be carried out using topical anesthesia in situations of closed or open-globe injuries. The examination could sometimes be carried out with the lids closed. When working with an open globe, caution must be taken to avoid applying excessive pressure, and sterile medium should be utilized. When there is corneal scarring, UBM may show iridodialysis, lens displacement, anterior lens capsule rupture, cyclodialysis, zonular abnormalities, intraocular foreign objects, angle recession, cataract and lens subluxation, and ciliary body separation. UBM systems that cover the whole anterior segment may assess the biometry of the region. This enables assessment of the sulcus plane's location before to cataract surgery, making it easier to predict the position of the intraocular lens after surgery [9].

**Aim of the Work**

The aim of the current work is to evaluate the causes, clinical aspects and outcome of lens trauma among paediatrics.

**Patients and Methods**

This prospective, randomized study included 40 eyes of 40 individuals with eye trauma coming to Tanta University Eye Hospital. During the period from September 2018 to August 2019. Their age ranged between 2 to 18 years old. The Tanta University Faculty of Medicine's ethical review board gave the research its approval.

**The criteria for inclusion:** Age: below 18 years, both sexes enrolled, children exposed to blunt or penetrating trauma.

**The exclusion criteria:** Pre-existing ocular condition such as (Microcornea, microphthalmos, glaucoma, uveitis, optic nerve disease, congenital colobomas, corneal opacities, scars) and history of previous ocular operation.

**All patients in this study subjected to the following**

**Full history taking including** (Age, sex, time of injury, etiology, prior history related to systemic and ocular illnesses, drug allergies, and familial history).

**General Exams and Polytrauma Precautions:** prior to beginning any ophthalmic treatment for children who have had ocular trauma and were brought to the emergency room, their systemic health was evaluated to look for any indications of shock, infections, trauma to the brain, or damage to important organs. Following a quick treatment for the damaged eye, a consultation or referral is promptly considered, if required.

**Full ophthalmic examination:** Visual Acuity Test (Measurement of uncorrected and best corrected visual acuity). Slitlamp examination (Slitlamp biomicroscopy for anterior segment assessment and direct and indirect ophthalmoscopy for posterior segment assessment). **IOP Measurement** in cases with closed eye injury was evaluated

by Goldman tonometer in cooperative children and by hand-held tonometer in younger children.

**Investigation:** Orbital imaging (Those who may have an intraocular foreign substance or an orbital fracture). Ultrasound Biomicroscopy (It was done at least one month after rupture globe and immediate after close globe rupture). An adequate evaluation of the anterior section may be impossible because of media opaqueness and distorted structure. UBM employs radio-frequency signal generators connected to piezoelectric transducers to transform electric signals into high-frequency (35–100 MHz) sound waves. Those sound waves are sent to the eye and move across it at various speeds. They strike tissues with various levels of acoustic resistance, reflect back at various times, and produce a 2-dimensional cross-sectional high-resolution picture as a result. The individual is in the supine posture. An ocular cup with a unique shape and size that was filled with saline as a coupling solution was employed while under topical anesthetic. Ultrasound bio-microscopic examination was performed using Vu Max sonomed model, with 35 MHz transducer probe.

**Examination of the contralateral eye Results**

**Table 1:** Distribution of children according to UBM data

Lens status	N	%
Clear	4	10
Cataractous	17	42.5
Swollen and cataractous	2	5
Ruptured anterior capsule	7	17.5
Rupture posterior capsule	8	20
Partial rupture in posterior capsule	1	2.5
Anterior chamber changes	4	10

**Table 2:** Distribution of children according to slit lamp findings

Lens status	N	%
Clear	5	12.5
Cataractous	21	52.5
Cataractous lens with ruptured anterior capsule	3	7.5
Free lens matter	5	12.5
Cataractous lens with irregular AC	1	2.5
Deep and irregular AC	1	2.5
Aphakia	4	10

**Table 3:** Correlation between causative agents of pediatric ocular trauma and (type of injury, number of surgery sessions)

Causative agents	Open globe		Closed globe		MC	P
	n	%	N	%		
Blunt	21	61.7	4	50.0	2.486	0.400
Sharp	12	35.3	1	25.0		
Unknown	1	3.0	1	25.0		

Causative agents	One session surgery		Two session surgery		MC	P
	n	%	n	%		
Blunt	6	50.0	19	67.8	1.253	0.625
Sharp	5	41.7	8	28.5		
Unknown	1	8.3	1	3.6		

**Table 4:** Correlation between place of pediatric ocular trauma and (injury' type, number of surgery sessions)

Place	Open globe		Closed globe		MC	P
	N	%	n	%		
Home	16	48.4	2	28.6	6.057	0.200
Street	17	51.6	3	42.8		
School	0	0.0	1	14.3		
Unknown	0	0.0	1	14.3		

Place	One session surgery		Two session surgery		MC	P
	n	%	n	%		
Home	4	33.3	14	50.0	3.519	0.318
Street	7	58.3	13	46.4		
School	0	0.0	1	3.6		
Unknown	1	8.4	0	0.0		

**Table 5:** Correlation between time of presentation and (injury type, number of surgery sessions)

Time	Open globe		Closed globe		FE	P
	N	%	n	%		
Early	25	73.5	0	0.0	11.765	0.001*
Delayed	9	26.5	6	100.0		

Time	One session surgery		Two session surgery		FE	P
	n	%	n	%		
Early	6	50.0	19	67.8	1.143	0.285
Delayed	6	50.0	9	32.2		

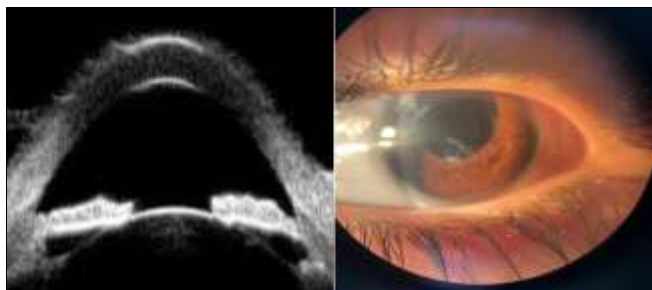
**Cases**

**Case (1):** Male patient aged 7 years old with history of trauma with nail affecting the right eye

**Time of presentation:** delayed after 48 hours

**Type of injury:** rupture globe

**Photo slitlamp:** clear lens, anterior chamber formed UBM clear lens in place with normal parameters intact anterior and posterior capsule, regular anterior chamber. He needed only one session surgery for repair of wound

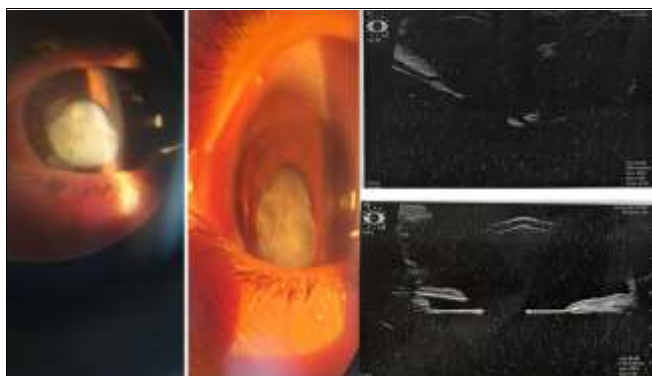


**Case 2:** Female patient aged 8 years old with history of trauma with wire affecting right eye

Time of presentation delayed after 48 hours

Type of injury penetrating rupture globe

Photo slitlamp cataractous swollen lens, moderate retrorenal floaters indicating rupture posterior capsule. UBM the anterior chamber is deep, the angle is opened and posterior capsule is preserved in all quadrants. She needed first session surgery for wound repair and irrigation aspiration, and second session for secondary IOL implantation and anterior vitrectomy.



**Discussion**

Eye trauma is a group of pathological lesions on the eyeball brought on by outside aggression. One estimate puts the number of instances of unilateral blindness at 19 million. among the main factors contributing to monocular blindness and poor visual acuity in children is ocular trauma [10].

Our prospective study to evaluate pediatric lens trauma, consists of 40 eyes of 40 individuals with eye trauma with male predominance (25 males and 15 female). Their aged between 2 to 18 yrs with mean ± SD 7.08 ± 3.16. 67.5% of our patients were more than six years.

Despite the number of study subjects was higher in other studies as that conducted by Lama PL *et al.* 2022 [11] that included 205 cases of eye trauma, Patients' ages ranged from one to sixteen years in extremes, with an average of 7.87 years. Having a sex ratio of 1.59, there were 126 (61%) more men than women.

Rohr JT, 2016 [12] assessed 103 instances of ocular trauma in a cross-sectional study. Children from zero to 15 yrs were involved. The individuals that were examined were 7.5 years old on average. All age groups are dominated by boys (68%). In the 103 instances that were assessed, 68% of the patients were men and 32% were women, or 2.12 males for each girl.

Moreover, Podbielski DW *et al.* 2009, [13] in their study which comprised 149 people who visited the emergency room in 2002 with ocular injuries. The median patient's age was 8 years and eight months (interquartile range, 4–11 years), with patient ages ranging from 3 months to eighteen years of age. 73.2 percent of the patients were boys.

Madan AH, *et al.* 2020 [14] in their study found that At presentation, the average age was 8.33 ±4.03 years. The majority of afflicted children were those between the ages of 6 and 10 (39.3%), then those between 11 and 15 (36.1%).

Physical vulnerability, diminished coordination, and limited capacity to avoid or flee from danger are all characteristics of young children. Additionally, they exhibit curiosity and a drive to explore, which might put them in danger [15].

The majority of patients (67.5%) were more than six years while Jinagal J, *et al.* 2019 [16] found Maximum Patients were between the ages of 6 and 10.

In our research, there were more men than women, suggesting that males are more impulsive and often involved in dangerous behaviors than young girls. The ratio of ocular trauma occurrence was 1.66: 1 male: female, the ratio in pre-school subjects was 1.6: 1 while the school age subjects were 1.7: 1.

Our study's male predominance was in line with evidence from the literature regarding Lama PL *et al.* 2022 [11], Mayouego Kouam, *et al.* 2015 [17], Mensah, A *et al.* 2004 [18]. El-Sebaity DM, *et al.* 2011 [15], Takvans, J.A. *et al.* 1993 [19]. We noticed that Ocular trauma in street was the most prevalent site (50%) followed by home (45%). blunt trauma represented 62.5% while sharp trauma represented 32.5%. Open globe trauma was the most significant kind of injury (85% of the participants had ruptured globes and 15% had closed globe lesions).

Our findings were the same as El-Sebaity DM *et al.* 2011 [15] study who revealed that The majority of the injuries (54.7%) happened on the street, then within the household (32.7%), within schools (6.7%), as well as at workplace (6%).

In contrary, Sharifzadeh M, *et al.* 2012 [20] who reported in a study that Home was the location of most injuries (57.7%), afterwards the street (20.3%). The most frequent factor (35.8%) was projectile traumas, afterwards blunt traumas (33.3%). 86.3% of traumatic situations had a closed-globe aspect.

Other previous studies were agreed with our results, such as Ghafoor A. *Et al.* 2016<sup>[21]</sup>, Hosseini H 2011<sup>[22]</sup> and Aghadoost D 2012<sup>[23]</sup>. They revealed that Home was the most frequent site of eye damage.

Our results in line with the results of Singh S, *et al.* 2017<sup>[24]</sup> who found that 67.79% of open-globe lesions resulted from penetrating wounds, Madan AH *et al.* 2020<sup>[14]</sup> who reported that 24.6% of patients suffered from closed globe incidents of injury, whereas 63.9% of instances suffered from open-globe lesions and Bozali, E *et al.* 2022,<sup>[25]</sup> Sharp things, that include wood or metal splinters, were among the top causes for injuries. 29 incidents (56.9%) of all injuries happened outside. In contrary to our results, Mayouego Kouam *et al.* 2015<sup>[17]</sup> who reported that the clinical examination found most of cases (66.3%) was closed globe trauma (23.9% open globe trauma), but it was more in line with our findings that the admission time was 49% during the initial 24 hours, 35% within a period of 24 hours to 48 hours, and 16% after 48 hours. With ranges of 1 to 32 days, the average time was 3.47 days. In addition, Jinagal J, *et al.* 2019<sup>[16]</sup> noticed that Penetrating injuries was the predominant insult in 100 individuals (68%) and blunt traumas in 47 individuals. (32%).

Blunt trauma in Rohr JT, 2016<sup>[12]</sup> study represented (55.3%), and open injury was 20%. The majority of incidents happened at homes.

Numerous investigations have shown similar patterns as Katiyar V, *et al.* 2016<sup>[26]</sup> Cao H. *et al.* 2012<sup>[27]</sup>. A few investigations, nevertheless, have shown that closed-globe injuries is more frequent than open-globe injuries as Al-Mahdi HS, 2011<sup>[28]</sup> Maurya RP 2019<sup>[29]</sup>, Armstrong GW 2013<sup>[30]</sup> and Chakraborti C 2014<sup>[31]</sup>.

34 of our cases had rupture globe caused by blunt object, sharp objects and unknown causes (21 cases, 12 cases, 1 case, respectively).

Unlike Günaydın NT *et al.* 2022<sup>[32]</sup> study which revealed that Penetrating damage from a sharp item was the most frequent reason for trauma (27.6%).

Poor visual outcomes are often the result of delayed medical and surgical care in juvenile ocular trauma situations. The most efficient methods to avoid vision loss may be determined by understanding the causes of such injuries in youngsters<sup>[33]</sup>.

62.5% of our cases had early detection of ocular trauma presented in but late detection was in 37% of cases

This finding was comparable to the outcomes mentioned by Rohr JT, *et al.* 2016<sup>[12]</sup>, The majority of these individuals were treated in hospitals the same day.

There were other studies which reported Lama *et al.* 2022<sup>[11]</sup> report that just ten percent of their respondents had consulted during the first 6 hours, indicating a delay in the consultation time. 49.3% of the participants were assessed on the day of the event. Additionally, Mayouego Kouam *et al.* (2015)<sup>[17]</sup> discovered that the series-wide average time for consultation was 3.47 days.

El-Sebaity DM *et al.* 2011<sup>[15]</sup> revealed in their study Most often, (31.3%), following a minimum of three days following trauma (24.7%), and during the same day of trauma (31.3%), people sought medical attention after being injured.

34% of the kids in research by Saxena *et al.* 2002<sup>[34]</sup> exhibited 24 hours following the injury. A pediatric Egyptian ocular trauma research by Wadei *et al.* in 2016<sup>[35]</sup> revealed that fifty percent of children attended within 24 hours of the injury.

We correlated the relation between place of trauma and type of injury, we found that 18 cases of ocular trauma occurred

at home (16 cases were open globe), 20 cases occurred in street (17 cases with open globe) just one case report at school and was closed globe injury and one case was unknown place with closed globe lesion. No statistically significant relationship existed among the site of the trauma and the kind of damage.

El-Sebaity DM *et al.* 2011<sup>[15]</sup> Open injuries made up 65.9% of all street injuries, while closed injuries made up 34.1%. The most frequent interval between injury and seeking medical attention was on the same day of the trauma (31.3%), followed by three days or more after the trauma (24.7%).

A considerable fraction of juvenile cataracts, which are a prevalent cause of young blindness, are caused by trauma. Traumatic cataracts may develop as a result of eye injuries, either as the lone damage or in combination with others such vitreous hemorrhage, retinal detachment, hyphema, and corneal lacerations. Such cataracts develop as a result of wounds from a variety of items<sup>[36]</sup>.

Penetrating or blunt ocular damage is avoidable, as is traumatized cataract. The level of damage to other ocular components must also be taken into consideration before lens extraction may increase visual acuity<sup>[37]</sup>.

The most affected side was Right eye in our patients. By using UBM, we evaluated the cases, most of cases (42.5%) had cataract, followed by rupture of posterior capsule in 8 cases. With slit lamp examination, the most prevalent status of the lens was cataract in 52% of patients.

Oiticica-Barbosa MM 2015<sup>[38]</sup> noted that in 46 (48%) instances, the right eye was hurt. The majority of patients (61.6%) saw the treating doctor within 24 hours, and 40.6% did so during the initial 12 hours following the injury.

Unlike Singh S, *et al.* 2016<sup>[39]</sup> and Ugalahi MO *et al.* 2021<sup>[40]</sup> who found the left eye was affected in most of patients (59%, 53.2% respectively). Fifty-two (67.09%) eyes of Ugalahi MO *et al.* 2021<sup>[40]</sup> cases had other ocular injuries apart from cataracts. Jinagal J, *et al.* 2019<sup>[16]</sup> reported that In 122 individuals (83%), complete cataract was the most often seen variation.

El-Sebaity DM *et al.* 2011<sup>[15]</sup> results were similar to ours; they noticed that In both closed and open injuries, traumatic cataract predominated.

There were other studies had low numbers of patients who had cataract after ocular trauma such as Mehul S *et al.* 2021<sup>[41]</sup> study who reported 25.4% of cases had traumatic cataract and AlMahmoud, T. *et al.*, 2020.<sup>[42]</sup> Found traumatic cataract in 15.3% of case.

UBM is a useful method for assessing injured eyes since it may identify anatomical abnormalities and foreign bodies in the anterior region<sup>[43]</sup>.

By using UBM we evaluated the cases, most of our cases (42.5%) had cataract, followed by rupture of posterior capsule in 8 cases and 7 cases had rupture of anterior capsule.

While Ceylan OM, *et al.* 2011<sup>[44]</sup> noticed that recession of angles (8 eyes, 34.7%), hyphema (8 eyes, 34.7%), zonular deficiencies (4 eyes, 17.3%), subluxation of the lens (2 eyes, 8.6%), irido-dialysis (4 eyes, 17.3%), peripheral anterior synechiae (PAS) (2 eyes, 8.6%), and displacement of the intraocular lens (1 eye, 4.3%) had been the most frequent findings found on UBM.

According to Özdal MP, *et al.* 2003<sup>[43]</sup> zonular deficit (64.2%), iridodialysis (17.9%), angle recession (43.3%), and displaced lens (16.4%) were the most prevalent UBM results in a closed-globe lesion. Zonular deficit (54.8%), PAS (26.2%), irido-dialysis (26.2%), and iridocorneal adhesions (19%) constituted the most typical UBM results

in an open-globe injuries.

letaP RB *et al.* 2014<sup>[45]</sup> discovered UBM made a greater number of diagnoses in instances with posterior capsular rupture, angle recession, zonular dialysis, and PAS.

Furthermore, according to the study by Zeng J. *et al.* 1993<sup>[46]</sup>, UBM results revealed that 27 eyes experienced hyphema, 16 eyes experienced iridodialysis, 22 eyes experienced anterior chamber angle recession, 19 eyes experienced localized lens luxation, 5 eyes experienced vitreous hena in the anterior chamber, 19 eyes had cyclodialysis, 23 eyes experienced anterior choroidal detachment, and 9 eyes experienced anterior vitreous haemorrhage.

The key to a better clinical result is timely, suitable intervention. Open-globe injuries that is postponed in presentation may result in endophthalmitis and postoperative wound leak. Open-globe injuries wound treatment that is prompt and thorough may lessen these consequences<sup>[42]</sup>.

We noted that most of cases (70%) need two surgical sessions.

Espinosa, *et al.*, 2021,<sup>[47]</sup> found that surgical management was required in 64% of the cases, but Ugalahi *et al.* 2021<sup>[40]</sup> had a result not agreed with our finding, they noticed that 7.6% of children underwent a second procedure to address additional morbidities in the same eye.

While the rate of second surgery in Shah MA, *et al.* 2013<sup>[48]</sup> study was 30%.

While Liu, X *et al.* 2022<sup>[49]</sup> reported that traumatic cataract was found in 29 (60.4%). 8.3% had one operation (vitrectomy to remove IOFB with self-sealing wound), 14.2% underwent two operations, 22.8% underwent three operations, and 16.7% underwent four or more.

In 699 instances (65%) of the research by Shah MA, *et al.* (2018)<sup>[50]</sup>, cataract surgery was the main procedure. One procedure was used in 821 instances (76.3%), while three surgeries were required in 32 cases (3.2%).

## Conclusion

The main cause of vision loss in youngsters is eye injuries. Boys are more likely to suffer from ocular injuries, which is common on the streets. This research identified blunt items as the most frequent source of pediatric eye injuries among school-age children. UBM is a very helpful tool in assessment of lens status after trauma also in decision making for surgery.

## Conflict of Interest

Not available

## Financial Support

Not available

## References

1. Acar U, Tok OY, Acar DE, Burcu A, Ornek F. A new ocular trauma score in pediatric penetrating eye injuries. *Eye (Lond)*. 2011;25(3):370-4.
2. Johar SR, Savalia NK, Vasavada AR, Gupta PD. Epidemiology based etiological study of pediatric cataract in western India. *Indian J Med Sci*. 2004;58(3):115-21.
3. Xu YN, Huang YS and Xie LX. Pediatric traumatic cataract and surgery outcomes in eastern China: A hospital-based study. *Int. J Ophthalmol*. 2013;6(2):160-4.
4. Gogate P, Sahasrabudhe M, Shah M, Patil S, Kulkarni A. Causes, epidemiology, and long-term outcome of traumatic cataracts in children in rural India. *Indian J Ophthalmol*. 2012;60(5):481-6.
5. Bhandari AJ, Jorvekar SA, Singh P, Bangal SV. Outcome after cataract surgery in patients with traumatic cataract. *Delta Journal of Ophthalmology*. 2016;17(2):56.
6. Choi DY, Kim JG, Song BJ. Surgical management of crystalline lens dislocation into the anterior chamber with corneal touch and secondary glaucoma. *J Cataract Refract Surg*. 2004;30(3):71821.
7. Magli A, Iovine A, Bruzzese D, Giani U, Fimiani F. Strabismus in developmental cataract. *Eur J Ophthalmol*. 2008;18(4):540-3.
8. Kuriyan AE, Flynn HW Jr., Yoo SH. Subluxed traumatic cataract: optical coherence tomography findings and clinical management. *Clin Ophthalmol*. 2012;6:1997-9.
9. Silverman RH. High-resolution ultrasound imaging of the eye: A review. *Clin Exp Ophthalmol*. 2009;37(1):54-67.
10. Chaudhary A, Singh R, Singh SP. Prognostic value of Ocular Trauma Score and pediatric Penetrating Ocular Trauma Score in predicting the visual prognosis following ocular injury. *Rom J Ophthalmol*. 2022;66(2):146-52.
11. Lama PL, Sagno C, Fofana I, Sylla A, Camara S, Sovogui B, *et al.* Pediatric Eye Trauma: Epidemiological, Clinical and Therapeutic Aspects at CADESSO in Donka, Guinea. *Open Journal of Ophthalmology*. 2022;12(3):284-93.
12. Rohr JT, Santos PM, Santos RC, Vieira CV, Fé LM, Solano RL, *et al.* Profile of pediatric eye trauma at Hospital de Base do Distrito Federal (HBDf), Brasília, Brazil. *Rev Assoc Med Bras* (1992). 2016;62(4):324-9.
13. Podbielski DW, Surkont M, Tehrani NN, Ratnapalan S. Pediatric eye injuries in a Canadian emergency department. *Can J Ophthalmol*. 2009;44(5):519-22.
14. Madan AH, Joshi RS, Wadekar PD. Ocular Trauma in Pediatric Age Group at a Tertiary Eye Care Center in Central Maharashtra, India. *Clin Ophthalmol*. 2020;14:1003-9.
15. El-Sebaity DM, Soliman W, Soliman AM, Fathalla AM. Pediatric eye injuries in upper Egypt. *Clin Ophthalmol*. 2011;5:141723.
16. Jinagal J, Gupta G, Gupta PC, Yangzes S, Singh R, Gupta R, *et al.* Visual outcomes of pediatric traumatic cataracts. *Eur J Ophthalmol*. 2019;29(1):23-7.
17. Mayouego Kouam J, Epée E, Azria S, Enyama D, Ombwa Eballe A, Ebana Mvogo C, *et al.* [Epidemiological, clinical and therapeutic features of pediatric ocular injuries in an eye emergency unit in Île-de-France]. *J Fr Ophtalmol*. 2015;38(8): 743-51.
18. Mensah A, Fany A, Adjorlolo C, Touré ML, Kasieue Gbe M, Mhluedo KA, *et al.* [Epidemiology of eye injuries in Abidjanian children]. *Sante*. 2004;14(4):239-43.
19. Takvam JA, Midelfart A. Survey of eye injuries in Norwegian children. *Acta Ophthalmol (Copenh)*. 1993;71(4):500-5.
20. Sharifzadeh M, Rahmanikhah E, Nakhaee N. Pattern of pediatric eye injuries in Tehran, Iran. *Int Ophthalmol*. 2013;33(3):2559.
21. Ghafoor A, Waseem M, Khan SA. Frequency of Type of Ocular Trauma in Children. *Pakistan Journal Of Medical & Health Sciences*. 2016;10(1):222-3.
22. Hosseini H, Masoumpour M, Keshavarz-Fazl F, Razeghinejad MR, Salouti R, Nowroozadeh MH.

- Clinical and epidemiologic characteristics of severe childhood ocular injuries in southern Iran. *Middle East Afr J Ophthalmol.* 2011;18(2):136-40.
23. Aghadoost D, Fazel MR, Aghadoost HR. Pattern of pediatric ocular trauma in kashan. *Arch Trauma Res.* 2012;1(1):35-7.
  24. Singh S, Sharma B, Kumar K, Dubey A, Ahirwar K. Epidemiology, clinical profile and factors, predicting final visual outcome of pediatric ocular trauma in a tertiary eye care center of Central India. *Indian J Ophthalmol.* 2017;65(11):1192-7.
  25. Bozali E, YETER DY, Apa AS, ÖZEÇ AV, Erdoğan H. Pediatric Open Globe Injury in a University-Based Tertiary Hospital in the Anatolian Region. *Clinical and Experimental Health Sciences.* 2022;12(3):719-24.
  26. Katiyar V, Bangwal S, Gupta SK, Singh V, Mugdha K, Kishore P. Ocular trauma in Indian pediatric population. *Journal of Clinical Ophthalmology and Research.* 2016;4(1):19.
  27. Cao H, Li L, Zhang M. Epidemiology of patients hospitalized for ocular trauma in the Chaoshan region of China, 2001-2010. *PLoS One.* 2012;7(10):e48377.
  28. Al-Mahdi HS, Bener A, Hashim SP. Clinical pattern of pediatric ocular trauma in fast developing country. *Int Emerg Nurs.* 2011;19(4):186-91.
  29. Maurya RP, Srivastav T, Singh VP, Mishra CP, Al-Mujaini A. The epidemiology of ocular trauma in Northern India: A teaching hospital study. *Oman J Ophthalmol.* 2019;12(2):78-83.
  30. Armstrong GW, Kim JG, Linakis JG, Mello MJ, Greenberg PB. Pediatric eye injuries presenting to United States emergency departments: 2001-2007. *Graefes Arch Clin Exp Ophthalmol.* 2013;251(3):629-36.
  31. Chakraborti C, Giri D, Choudhury KP, Mondal M, Datta J. Paediatric ocular trauma in a tertiary eye care center in Eastern India. *Indian J Public Health.* 2014;58(4):278-80.
  32. Günaydın NT, Oral AYA. Pediatric traumatic cataracts: 10-year experience of a tertiary referral center. *BMC Ophthalmol.* 2022;22(1):199.
  33. MacEwen CJ, Baines PS, Desai P. Eye injuries in children: the current picture. *Br J Ophthalmol.* 1999;83(8):933-6.
  34. Saxena R, Sinha R, Purohit A, Dada T, Vajpayee RB, Azad RV. Pattern of pediatric ocular trauma in India. *Indian J Pediatr.* 2002;69(10):863-7.
  35. Al Wadei EA, Osman AA, Macky TA, Soliman MM. Epidemiological Features of Pediatric Ocular Trauma in Egypt. *J Ophthalmol.* 2016;2016:7874084.
  36. Zimmermann A, Magalhães IH, Tanaka HA, Zimmermann IT, Arieta CEL. Pediatric traumatic cataract review: origin of the trauma. *Revista Brasileira de Oftalmologia.* 2019;78:103-6.
  37. Memed FK, Mariska D, Wahyu MS, Irfani I, Oktarima P, Caesarya S. Pediatric Traumatic Cataracts at a Tertiary Eye Center in Indonesia. *Open Journal of Ophthalmology.* 2020;10(4):332-40.
  38. Oiticica-Barbosa MM, Kasahara N. Eye trauma in children and adolescents: Perspectives from a developing country and validation of the ocular trauma score. *J Trop Pediatr.* 2015;61(4):238-43.
  39. Singh S, Sah H, Keyal A. Visual Outcome of Unilateral Paediatric Traumatic Cataract at RM Kedia Eye Hospital, Birganj, Nepal. *Journal of College of Medical Sciences-Nepal.* 2016;12(2):40-3.
  40. Ugalahi MO, Olusanya BA, Aremu OO, Baiyeroro AM. Outcome of surgery for traumatic cataract in children in a child eye health tertiary facility, Ibadan, Nigeria. *Ther Adv Ophthalmol.* 2021;13:25158414211005308.
  41. Mehul S, Shreya S, Pradeep H, Ashvini K, Pediatric TD. Ocular trauma: A prospective cohort study on the globe rupture subgroup of open globe injuries. *W J Ophthalmol & Vision Res.* 2021;3(4):25-84.
  42. AlMahmoud T, Elhanan M, Alshamsi HN, Al Hadhrami SM, Almahmoud R, Abu-Zidan FM. Surgical management of pediatric eye injuries. *Oman J Ophthalmol.* 2020;13(2):84-8.
  43. Ozdal MP, Mansour M, Deschênes J. Ultrasound biomicroscopic evaluation of the traumatized eyes. *Eye (Lond).* 2003;17(4):467-72.
  44. Ceylan OM, Küçükevcilioğlu M, Erdurman FC, Durukan AH, Mumcuoğlu T. Ultrasound biomicroscopic findings of blunt eye traumas. *lhane Tip Dergisi.* 2011;53(1):31.
  45. Patel RB, Danayak PM. Ultrasound biomicroscopic evaluation of traumatized eyes. *Ophthalmology.* 2014;1(3).
  46. Zeng J, Chen J, Fang L. The clinical analysis of ultrasound biomicroscope scanning photography in anterior segment structure changes in blunt eye injury. *Chinese Journal of Ultrasonography.* 1993.
  47. Espinosa N, Montoya L, Gaviria A, Solano A. Visual outcome of pediatric ocular trauma in a Latin American population. *The Pan-American Journal of Ophthalmology.* 2021;3(1):2.
  48. Shah MA, Shah SM, Shah AH, Pandya JS. Visual outcome of cataract in pediatric age group: does etiology have a role. *Eur J Ophthalmol.* 2014;24(1):76-83.
  49. Liu X, Wang L, Yang F, Xie J, Zhao J, Liu Z, *et al.* Surgical management and outcomes of pediatric open globe injuries requiring vitrectomy. *Eur J Ophthalmol.* 2022;32(1):546-52.
  50. Shah MA, Shah SM, Gosai SR, Gupta SS, Khanna RR, Patel KB, *et al.* Comparative study of visual outcome between open- and closed-globe injuries following surgical treatment of traumatic cataract in children. *Eur J Ophthalmol.* 2018;28(4):406-11.

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