



# Long-Term Follow-Up of Patients with Ocular Trauma: Visual and Anatomical Outcomes

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## KEYWORDS

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## ABSTRACT:

Ocular Trauma is one of the major causes of permanent blindness in a number of patients. The main purpose of this research is to explore the long-term follow-up of patients with ocular trauma. It can be seen with the help of this research that the Ocular Trauma Scoring System (OTS) is anticipated as one of the better approaches for the prediction of the final visual results. It can also be seen that patients who receive proper treatment on time have better chances to recover and can have better optical and surgical results. The Secondary Qualitative Data has been gathered for this research due to the flexibility and cost-effectiveness of the data. Furthermore, gathered secondary data has been analysed with the help of the Thematic Data Analysis Method. It can be seen by analysing the secondary data that long-term follow-up of ocular trauma patients shows major issues that can affect the well-being of the patients and can decrease recovery retention rates.

## 1. Introduction

### 1.1 Background of the study

Trauma that affects the eye and optical adnexa is among the most common emergency room visits all over the world. Numerous studies display the results of these injuries. Ocular trauma can be defined as an injury to the eye or its outer tissues, including “the eyelids, their orbits, and visual nerve” [1]. These injuries may happen due to various reasons and differ in severity, resulting in significant impairment of the vision or complete blindness. Ocular trauma is one of the major causes of blindness and impairment worldwide and an in-depth understanding is required to understand its long-run implications to elevate treatment for patients as well as management [2]. Various problems related to ocular trauma such as “detachment of the retina, accurate vision loss, glaucoma, and scarring of the cornea” are often observed in patients who are affected by ocular trauma.

This type of medical condition rapidly reduces visual quality as well as eye health. Several patients who suffer from ocular trauma, are often observed to be suffering from additional problems because of the ocular trauma. In this research complete details of ocular trauma and its effects are discussed briefly. An absence of uniformity in the ocular trauma documentation required the establishment of a trustworthy sorting methodology. “The

International Society of ocular trauma” has established “The Birmingham Eye trauma terminology (BETT) method”. The ocular trauma classification group was developed in 1997 to increase the identification of ocular injuries around the eye. A better approach has been anticipated for the prediction of the final visual results with the help of the Ocular Trauma Scoring System (OTS) which was established later on.

### 1.2 Problem Statement

Ocular trauma is a major cause of vision loss and impairment that is affecting people every year all over the world [3]. Moreover, the long-term structural as well as optical diagnostic of patients with ocular trauma remains uncertain and varies despite developments in medical as well as surgical treatments. The primary issue is the complex features of optical injuries which differ from minimal skin irritation to life-threatening diseases that affect major components of the eye. There are various types of injuries, information about the patient's background, and different treatment methods that affect the prognosis and the administration of long-term results. To determine the most effective method for preserving structural integrity as well as vision results from different types of methods are combined for the treatment of various types of ocular injury [4]. The order and duration of these treatments are mostly based on the seriousness of the initial injury, and details about the patient are all



evaluated to find out their impact on the long-term results of the injury from the trauma. Additionally, the initial treatment and ongoing evaluation are important as they are based on the significant results that are based on continuous follow-up studies. Patients who receive proper treatment on time are most likely to achieve better optical as well as structural results.

Furthermore, personalized treatments are provided to the patients based on their injury information which results in better patient care and recovers significantly from the trauma. Moreover, a complete evaluation of the patients with ocular trauma needs to be conducted to identify the elements that have an impact on eyesight and physical recovery and to determine treatment methods that can enhance patient care as well as its outcome. One of the most important advantages of continuous monitoring is the capacity to monitor the development of visual as well as structural changes over time. Although it is a long and complex method, it helps to identify late-onset issues including “secondary glaucoma, detachment of the retina, or proliferation of vitreoretinopathy” which are not observed in the earliest stages of the injury [5]. Furthermore, it also helps in the identification of stability as well as effectiveness of various types of treatment methods. Moreover, evaluating results from different treatment methods, helps doctors to identify the treatment that will enhance long-term patient care, contributing to the development of standard patient treatment methods.

## 2. Research Aim and Objectives

### Aim

The study aims to identify the long-term visual and anatomical results of patients who are suffering from Ocular Trauma

### Objectives

- To understand the long-term eye conditions of people suffering from Ocular Trauma
- To recognize and evaluate the important elements that affect the recovery of the patients from the type of trauma
- To determine the treatments of the patients based on their injury information and personalized the treatment based on the information
- To provide optimal care to the patients so that they recover rapidly

## 3. Research Hypothesis

**Hypothesis 1:** Long-term follow-up of Ocular Trauma beneficial for patients

The long-term follow-up of ocular trauma is beneficial for the patients as it helps the patient for early diagnosis and administration of issues such as “glaucoma or detachment of the retina” that may occur after the original damage. Moreover, daily tracking helps in obtaining immediate treatment that enhances visual as well as physical results. This type of treatment can be personalized based on the nature of the injury thus, providing better care to the patients and improving their quality of life.

**Hypothesis 2:** delay in the follow-up of Ocular Trauma can result in loss of eyesight.

If there is a delay in treatment of the ocular trauma, it elevates the risk of complete or irreversible eyesight. Various types of issues such as “detachment of the retina, glaucoma, and eye infections” can happen if the injury is not monitored and treated properly. Along with the early detection and treatment can ensure more effective optical results thus, preserving eyes from damage and preserving eyesight.

## 4. Literature Review

### 4.1 Impacts of Ocular Trauma

The eyes are the most important part of our life and trauma from the eyes must be resolved on time before it results in complete blindness. Patients who suffer from ocular trauma not only face physical restrictions but also have a great impact on mental health as well as financial conditions. It not only disturbs the life of the patient but also every member of the family [6]. Complete blindness can be caused by very little harm to the delicate structure of the eyes, it may interfere with the person's ability to see clearly and result in significant physical deformities. Moreover, it not only reduces financial assets but also causes elevated mental strain.

Eye damage due to the work conditions of the individuals is very common if they are not handled properly. Additionally, individuals who work in industries, construction as well as sportspersons are most likely to be suffered from these injuries. According, to recent studies it is observed that one in 20 people requires eye therapy due to the damage caused in the eyes. These injuries can lead to complete blindness and it destroys the life of the



patient. Continuous damage from eye trauma may appear immediately or after months or years.

Moreover, these types of injuries are common in daily activities which include “sports, housework, travel, and aggression”. There are a lot of injuries that are specific due to the occupation of the patient or due to everyday activities [7]. Moreover, complete blindness can result from the latest injury or from previous injuries or infections whose consequences are observed after months or years of the accident.

Moreover, the seriousness of the outcomes can be worsened by self-medication without any consultation from the doctors, it may affect the vision of the patient and can cause complete blindness [8]. As a result, preventative

measures must be taken to protect the eyes during adverse events is important for reducing the impact on eye health and prevent it from permanent damage. Moreover, for successful recovery of the eye as well as minimizing the related outcome of visual distortion must be done by a qualified doctor to prevent complete blindness and proper recovery of the eyes.

#### 4.2 Impact of Open Globe Injuries

Ocular Trauma is divided into two parts: open globe and closed globe. In a closed globe, damage does not enter into the surroundings of the eyes which includes “cornea, limbus, and pupils”, on the other hand, open globe injury affects the entire surroundings of the eyes [9].

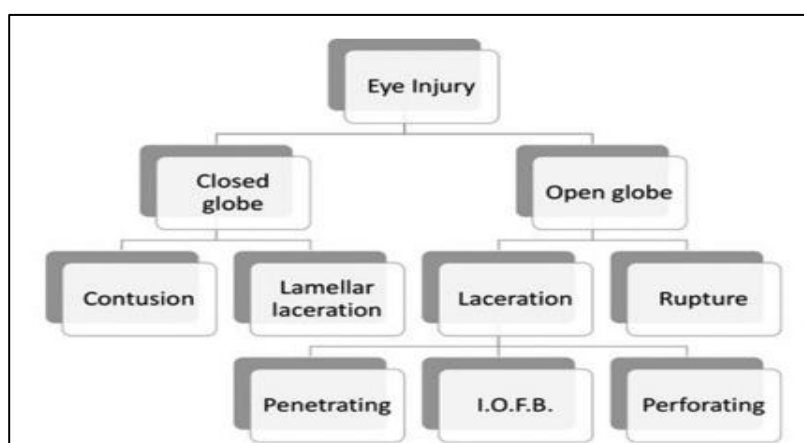
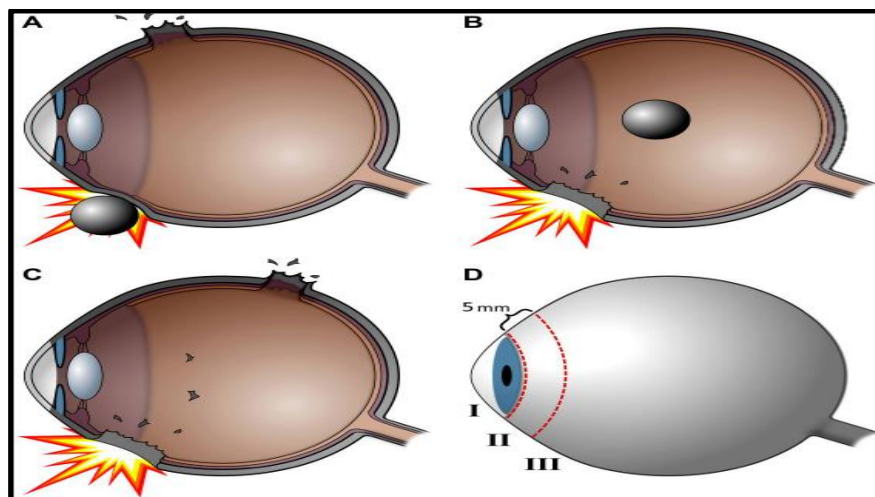


Figure 4.2.1: Classification of Eye Trauma Terminology System

(Source: Shukla *et al.* 2017)

The classification of eye trauma terminology system can be understood in a more clearer way with the help of the above classification. The outer layer of the eyes supports the structure and symmetry of visual alignment thus, establishing an actual defence against environmental problems [11]. Open Globe injuries are defined as the complete thickness of the eyeball defects that are identified by the process of injury that caused them. These injuries can be blunt or acute. These ocular trauma issues have a significant impact on visual impairment [12].

However, eye damage can be permanent if proper treatment is done. Different types of surgical methods are employed for the treatment of open globe injury. The open globe injury has a primary feature which is based on the identification of rough or acute methods of injuries. Blunt trauma is identified by the damaged globes which happens when weak points around the eyeballs are destroyed due to “high intraocular pressure (IOP)” with the help of inward processes.



**Figure 4.2.2: Classification of Open Globe Injury**

(Source: Influenced by the Study of Fujikawa *et al.* 2018)

Figure 4.2.1 shows various classifications of open globe injury. A) In ruptured globes damage takes place at a distance from the impact. B) the injury has a try point but no exit point which results in the sustainability of the foreign object into the eye. C) An open injury has both entry and exit points from the same object. D) in point 1 the injury is limited to the cornea as well as the limbus, in point 2 injuries have moved up to 5 mm behind the edge of the limbus, and in point 3 injuries have moved up to the limbus.

Furthermore, analyzing the widespread nature as well as its effects on eye damage helps doctors, as well as lawmakers, understand the importance of sufficient resources for the training of ocular therapy [14]. Although, accurate information on these types of injuries helps in the development, any of scientific standards for normal therapy, making sure that the patients are receiving proper care despite the surroundings

## 5. Methods

In this study conducted between march 2018 to feb 2019 at IGIMS Patna, secondary quantitative data was collected from peer-reviewed journals and papers that have been published since 2020. The pieces of information for the study were carefully chosen to offer one of the greatest updated and appropriate details. Moreover, conceptual data analysis was done to evaluate the connections in the data thus, offering an excellent understanding of the topic. The research was then followed by an interpretation of the approach to the research, aiming to enquire into the

individual significance as well as experiences. Moreover, an inductive technique is employed in which different types of theories and patterns were developed from the data instead of undergoing evaluation for previously present beliefs. With the help of the technique, a thorough investigation of complicated issues was implemented that helps in the treatment of ocular trauma patients.

In this study, a cross-sectional design was implemented to provide an understanding of current procedures and standards for ocular trauma care and its results. Additionally, it can collect and analyze information at a particular moment was made possible because of this design, which provided researchers with crucial pieces of information about the pros and cons of the long-term follow-up of patients suffering from ocular trauma. Although, by the incorporation of different types of methods of analyses, the study provides a complete, defied picture of the effects as well as outcomes of ocular trauma that is based on recent and reliable pieces of information. These methods were implemented in this study for the understanding of the outcome of the trauma in the patients.

## 6. Data Analysis and Discussion

### 6.1 Thematic Data Analysis

#### 6.1.1 Challenges Affecting the Ongoing Follow-Up of Ocular Trauma Patients

A major significant drawback of this trauma is the lack of patient retention. Sometimes people remove themselves



from the research due to a variety of reasons such as “losing interest, relocation, or death” which is not common during this length of time. Because of the widespread differences among the patients that remain in the study are very important in determining the results of the study. Additionally, there is another problem that needs to be taken care of investment [15]. Conducting continuous studies on ocular trauma patients is expensive, time-consuming as well, and laborious. Moreover, keeping patients involved along participating as time passes poses obstacles that result in insufficient information along with its related errors. Moreover, it is tough to manage as it requires accurate tools to analyze and measure large amounts of data. These challenges display the difficulties in carrying out studies for a longer period

### 6.1.2 Monitoring of Ocular Trauma Patients

The ongoing monitoring of patients with ocular trauma is important for understanding the visual as well as physical outcomes of these injuries. These types of studies can discover the methods that can improve patient care and provide them with the best treatments [16]. Long-term research provides important pieces of information that can enhance health care treatments, and patient awareness as well as the distribution of resources that lead to improved eye health and its surrounding tissues and improve the quality of life of patients suffering from ocular trauma.

### 6.2 Discussion

Long-term follow-up of ocular trauma patients displays major problems, which are related mostly to patient retention issues and the resource-intensive nature of the study. Moreover, patients often stepdown from the research may cause a loss of interest, shifting, or death which results because of the variation in the remaining participants. Furthermore, these studies are expensive, labour-intensive as well and time-consuming, demanding important investments in inaccurate data analysis software and participation from the patients. Despite these issues, the importance of constant monitoring cannot be observed. Regular monitoring of ocular trauma is important for understanding every aspect of these injuries, both physically as well as visually. Prolonged research helps to develop better treatment processes, improves the care of the patient, and increases knowledge as well as maximizes the distribution of resources.

### 7. Conclusion

Long-term follow-up of ocular trauma patients shows major problems, owing mostly to their patient retention issues and significant issues that are important for this research. Patients leave the research for numerous reasons that majorly affect the research outcomes. Moreover, the research is very costly as well as time-consuming. This type of trauma may cause permanent damage to the eyes and can cause complete blindness if it is not treated properly. Different types of methods are implemented for patients who are suffering from ocular trauma. Customized treatments are given to the patients based on their injury information. Because of personalized treatments, patients are treated on time as compared to the old methods in which detection of the was time-consuming. With this proper care given to the patients, their quality of life improved.

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