

# A review of the psychological response to ocular trauma

**Dr Doina Gherghel** discusses the nature of ocular trauma, the possible psychological consequences, and the importance of both recognising the possible warning signs and in working with an appropriate multidisciplinary team for the benefit of the patient

**N**early six million people worldwide die every year from various injuries, with projected figures of 8.4 million deaths in 2020.<sup>1</sup> In the UK, 'for every injury-related death there are 45 hospital episodes, 630 doctor consultations and 5000 to 6000 minor injuries.'<sup>2</sup> It is very difficult, however, to get up-to-date statistics on overall injuries and most of the above numbers are already out of date.

Worldwide, there are 55 million eye injuries that leave approximately 1.6 million people blind, 2.3 million with bilateral visual impairment and 19 million with unilateral vision loss.<sup>3</sup> Some older UK data suggest a cumulative incidence of ocular trauma of over 8% per 100,000 population annually,<sup>4</sup> with trauma commonly accounting for between 10 to 27% of cases presenting in outpatient settings, 38 to 65% of presentations in emergency departments, and 5 to 16% of cases in specialist eye units.<sup>5</sup> Most cases occurring in young, male population.<sup>6</sup>

Over the last century, the causes and patterns of ocular injury have markedly changed with changes in lifestyle, work and effective preventative strategies. Shifts from employment in heavy industry, introduction of national standards for eye protection and increased time for sport and leisure have meant that damage to the eye from penetrating trauma and intra-ocular foreign bodies has been supplanted by blunt injury as the primary cause of hospitalisation. Introduction of compulsory seatbelt wear and laminated windscreens in motor vehicles have almost eradicated the penetrating injuries previously caused by shattering glass, and currently the majority of injuries requiring hospital admission, approximately 30% of the total, occur in the home environment.<sup>7</sup>

While trauma and injury to the eye can be experienced by all age groups some sectors of the population appear more vulnerable. The incidence of eye trauma appears to have a bimodal trend with peaks in the people aged 15 to 29 years and those over 70 years.<sup>8</sup> This is striking, considering that children under the age of five years may be more susceptible anatomically because of their flatter features, rendering eyes vulnerable at the front of the face and thus more exposed, and because their exploration of unfamiliar

environments is not matched by maturity of motor skills. Yet, it is young adults and the elderly who are most likely to present for treatment. Indeed, ocular trauma is the primary cause of vision loss in adults under 25 years of age.<sup>9</sup> In the younger cohort, this may reflect accidents while unsupervised, participation in higher-risk activities (such as sports), disinhibited behaviour after alcohol and/or drug use, and is also likely to relate to involvement in road traffic accidents (RTAs) which still account for over 50% of eye injuries. Indeed, worldwide around six million children sustain some form of ocular trauma every year and a quarter of a million of these cases require hospitalisation for a serious ocular injury.<sup>10</sup>

Ageing increases vulnerability to accidents more generally hence frequency of presentation in older adults. It has been suggested that the relationship between age and certain mechanical characteristics of the eye, in particular, those relating to the lens, lens capsule, and cornea, may play an important role.<sup>11</sup>

## OCULAR TRAUMA

The College of Optometrists have published guidelines for dealing with ocular trauma.<sup>12</sup> A range of symptoms are associated with traumatic injury. These include:

- Pain (from mild to severe)
- Epiphora
- Visual loss (variable)
- Photophobia
- Diplopia

Signs vary depending upon the severity of the injury. Milder cases, where vision is typically unaffected, may show:

- Eyelid swelling (oedema)
- Ecchymosis (bruising)
- Conjunctival chemosis
- Subconjunctival haemorrhage
- Corneal abrasion

In more severe cases, where an associated loss of vision is likely, there are a whole host of possible signs, the nature and number of which are related to the extent, severity, location, duration and actual cause of the trauma. Signs listed in the College guidelines include the following:

- Infraorbital nerve anaesthesia (lower lid, cheek, side of nose, upper lip, teeth) may indicate orbital floor fracture
- Disturbance of ocular motility, either by muscle restriction due to oedema or compression, as in a blow-out fracture
- Enophthalmos (a possible indication of orbital fracture)
- Nose bleeding (direct trauma, or could indicate skull fracture)
- Corneal oedema or laceration
- Anterior chamber activity
- Fixed dilated pupil
- Iridodialysis (tearing of iris from its attachment to ciliary body)
- Crystalline lens damage. This may include subluxation, opacification, or capsule damage
- Intraocular pressure changes. IOP may rise in cases of angle blockage due to blood, inflammatory cells or pigment. IOP may drop if the globe is perforated
- Vitreous haemorrhage (figure 1)
- Commotio retinae
- Retinal detachment or dialysis (figure 2)
- Traumatic macular hole (figure 3)
- Relative afferent pupillary defect

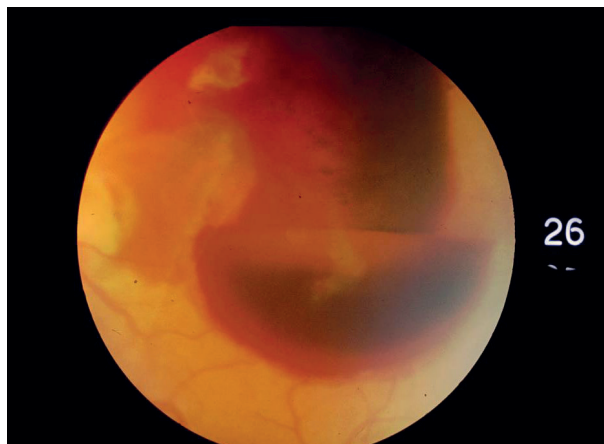
### PSYCHOLOGICAL RESPONSE TO OCULAR TRAUMA

Although causes of ocular trauma have shifted and those incurred tend to be less severe than in previous decades, eye trauma remains both common and potentially disastrous, with millions of people rendered blind in one or both eyes by their injuries. This has a significant personal, social and economic impact. An overwhelming focus on the physical consequences of eye trauma and, in some instances, a justifiable focus on emergency treatments, has meant that the emotional consequences have been, somewhat, neglected. Nevertheless, there is clear evidence that those who experience ocular trauma can experience substantial and enduring distress and for a lengthy period after the injury itself.<sup>13</sup>

Post-traumatic stress disorders (PTSD) can occur after various types of traumatic events, including eye injuries. Indeed, following the introduction of PTSD into the Diagnostic and Statistical Manual of Mental Disorders in 1980,<sup>14</sup> it has also been recognised that the traumas of daily life are also potent sources of psychopathology and problems of adjustment.<sup>15</sup> PTSD usually occurs in individuals that have experienced or witnessed an event that involved actual or threatened death or serious injury, or a threat to the physical integrity of the self or others. The individuals should also have experienced an immediate response involving intense fear, helplessness or horror. Damage to the eye is also likely to cause significant distress, leading to symptoms of agitation, intense feelings of fear, a numbing of emotional reactions, mood change and even impaired cognition.

Optometrists will not be able to assess if their patients suffer of PTSD due to ocular traumas. In addition, distinctions will need to be made between psychological issues that might have existed for the patient prior to the eye trauma and those that have been caused by or magnified by the trauma itself and this is beyond the current optometric practice. It is of note that patients more vulnerable to developing PTSD after an ocular injury are those with

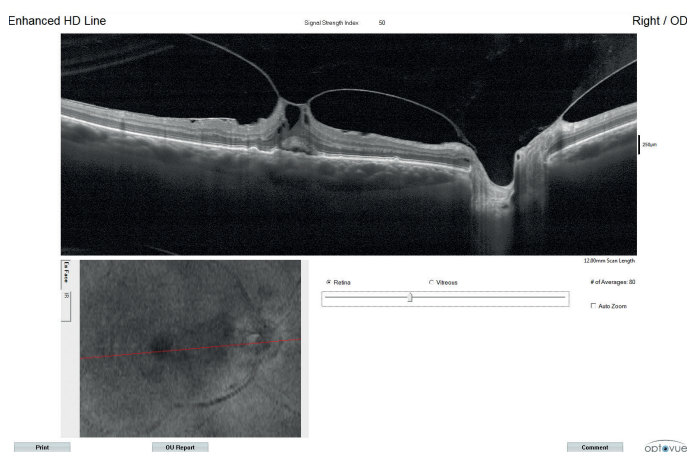
**FIGURE 1** Vitreous haemorrhage



**FIGURE 2** Retinal dialysis after trauma



**FIGURE 3** Traumatic macular hole



previous psychiatric history, predisposition to labile mood or having difficulty making sense of events around the trauma.<sup>13</sup>

Full diagnostic criteria for PTSD, identified by the American Psychiatric Association in their diagnostic manual, are shown in table 1.<sup>16</sup>

Although the optometrists are not involved in the diagnosis of PTSD after ocular trauma, the below case study will help to understand the psychological effects that a major incident can have on our patients. →

**TABLE 1 DSM-IV-R criteria for the diagnosis of post-traumatic stress disorder (PTSD)<sup>16</sup>**

A. The person has been exposed to a traumatic event in which both of the following have been present:

1. The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others.
2. The person's response involved intense fear, helplessness, or horror. Note: in children this may be expressed instead by disorganized or agitated behaviour.

B. The traumatic event is persistently re-experienced in one (or more) of the following ways:

1. Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
2. Recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognisable content.
3. Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur upon awakening or when intoxicated). Note: In young children, trauma-specific re-enactment may occur.
4. Intense psychological distress at exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event.
5. Physiological reactivity on exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event.

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:

1. Efforts to avoid thoughts, feelings, or conversations associated with the trauma.
2. Efforts to avoid activities, places, or people that arouse recollections of the trauma.
3. Inability to recall an important aspect of the trauma.
4. Markedly diminished interest or participation in significant activities.
5. Feeling of detachment or estrangement from others.
6. Restricted range of affect (eg unable to have loving feelings).
7. Sense of a foreshortened future (eg does not expect to have a career, marriage, children, or a normal life span).

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:

1. Difficulty falling or staying asleep.
2. Irritability or outbursts of anger.
3. Difficulty concentrating.
4. Hypervigilance.
5. Exaggerated startle response.

E. Duration of the disturbance (symptoms in criteria B, C, and D) is more than one month.

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

## CASE STUDY

Dan is a 42-year-old man who worked as a lorry driver. On an early afternoon, he was forced to pull his lorry on to the hard shoulder. Having stopped the vehicle, he moved over to the passenger seat, opened the door and sat on the edge of the seat dialling the recovery services on his mobile phone. As he made the call, he noticed movement reflected in the wing mirror of the open door and realised a lorry was moving at some speed towards him. He remembered thinking to himself that 'this lorry's not going to pull up in time – it's going to hit me'. He disclosed his mounting horror as the lorry continued on its path, looming darkness and the sound of metal crumpling and a smell of burning tyres.

Dan had little detailed memory of the subsequent events, believes he was knocked out and, on regaining consciousness, was aware of a searing pain across his forehead, eye and jaw and wetness, which he later realised was blood. He was in partial darkness and was pinioned between the cab of his vehicle and the embankment at the side of the road. Dan's story (which he managed to recall over a number of therapy sessions and with considerable initial distress) follows: 'I was terrified. I couldn't see very well. I was in agony and I was trapped. I was frightened that the cab would roll further or that the fuel tank would go up. The worst bit was waiting for help. I could hear voices that sounded a bit panicky and someone saying they thought I must be dead. All I could imagine was that I'd die without seeing my children again and I couldn't see anything. I felt so frightened.'

Dan was eventually freed from his lorry and taken by air ambulance to hospital where he remained for almost two weeks, having fractured an arm and ribs, and with a penetrating injury to his left eye and severe lacerations to his face. He reported feeling: 'A bit spaced-out, detached-like. I couldn't talk to the wife and all my friends said I was lucky to have got off lightly. When I tried to think about it, I started to feel shaky and sick. I couldn't go back to work because I couldn't drive, and I couldn't go near a car, dreaded it, even as a passenger, never mind going near the accident. My head felt as if it would explode I was so tense and wound up.' Dan also reported nightmares, intrusive images and flashbacks over the next few weeks. He became frightened of falling asleep because the dreaming left him nauseous, sweating profusely and very alert. Dan also found that fractured sleep made him irritable and fatigued during the day, and without his usual routine he became depressed and began to increase his alcohol use to help him sleep. His changed and labile mood and behaviour began to sour his relationship with his wife and both withdrew from one another. At the time he was referred to the psychologist, Dan's symptoms had been present for almost seven months.

Dan's case illustrates three key clusters of symptoms that typify presentations of PTSD (as summarised in table 2).<sup>17</sup> These were:

- 1 Avoidance.** With Dan this was most obvious in his unwillingness to talk or think about what had occurred. It also characterised his behaviour, avoiding car travel wherever possible and complete avoidance of the crash site, to such an extent that he would insist on driving longer routes.
- 2 Arousal.** After this traumatic accident Dan presented with a hyper-aroused physiological state, always alert for something awful to occur, sleeping badly with erratic and irritable behaviour.
- 3 Re-experiencing.** For Dan, as with others with PTSD, re-experiencing included intrusions through dreams and nightmares, flashbacks (where he felt himself back in his lorry →

**TABLE 2 PTSD – symptom clusters<sup>17</sup>**

- **Re-experiencing** – Patients may experience intense distress when encountering stimuli that evoke or remind them of the trauma. These can be physiological (increased respiration, heart rate, pain etc) or external (for example smells such as fuel, blood or sounds such as loud bangs, screeching tyres, sirens). Patients feels real and present danger, intensity of fear akin to traumatic stressor episode, may report extreme panic and need to escape, disruption of mental activity, distressing visual images of event are more common than verbal thoughts but other sensory re-experiencing occur, eg sounds, feelings, smells and taste.
- **Avoidance** – In addition to the commonly express ‘I don’t want to talk or think about it’ patients’ presentation is marked by other behavioural and cognitive avoidance. The former may include avoiding places, people or activities associated with the trauma or a reduction in interest or participation in previously enjoyed activities. The latter includes mental defences such as impaired memory for part or whole of the trauma, emotional numbing (difficulty in being aware of or disclosing feelings or mood), and feelings of detachment an indifference to others.
- **Arousal** – Patients present with both physiological and behavioural hyper-activity, so that responses are greatly exaggerated in response to innocuous stimuli. Commonly reported/observed are exaggerated startle responses, irrational anger, irritability, impaired sleep, impaired concentration.

cab and in imminent danger), and intrusive thoughts. Intrusions can occur either spontaneously or as a consequence of deliberate rumination.

In addition to these three key clusters of PTSD symptoms, the eye care practitioner should be aware of other psychosocial consequences (table 3).

**CONCLUSION**

The main role of eye care professionals resides in preventing ocular injuries through appropriate education, which will increase people’s knowledge about avoiding and protecting themselves against risks. Nevertheless, it seems that the role of education on its own is limited.<sup>18-20</sup> In addition, it is also possible to deal with a recent eye injury, first hand. The College of Optometrists has published guidelines for dealing with ocular trauma.<sup>12</sup> When it comes to the psychological effects, however, recognising the possible warning signs and working with an appropriate multidisciplinary team for the benefit of the patient, might be the best approach. **Dr Doina Gherghel is an academic ophthalmologist with special interest in inter-professional learning for optometrists.**

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**TABLE 3 Other possible psychosocial consequences of ocular trauma**

- Increased substance use (including alcohol, tobacco, prescription medication and illicit drugs)
- Increased likelihood of chronic medical conditions
- Increased presentation with various physical symptoms, both explained and unexplained, particularly pain
- Compromised relationships

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**Post-Traumatic Stress Disorder (PTSD)**

