

THE FREQUENCY OF OCULAR TRAUMA MANAGEMENT IN STATES WITH  
THERAPEUTIC PRIVILEGES

by

Timothy J. Ellis

Ferris State University  
College of Optometry  
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## **ABSTRACT**

The frequency of ocular trauma and management was surveyed from optometric practitioners in states with therapeutic privileges. Of all the types of trauma surveyed, corneal abrasion was the most common diagnosis. Corneal foreign bodies and toxic keratitis were the next most common presentations. Overall, superficial eye trauma (i.e. corneal abrasion, superficial foreign body, etc.) accounted for 65 percent of all trauma cases presented to the optometrists, while intraocular anterior and posterior segment trauma accounted for 14 and 20 percent respectively. Of all the superficial eye trauma cases seen, over 90 percent were managed solely by the optometrists. Of the intraocular anterior segment trauma cases (i.e. traumatic iritis, etc.), over 60 percent were managed by the optometrists. This study may be of interest to educators, health care planners, and to legislatures contemplating expanding the scope of optometric practice.

## **INTRODUCTION**

As optometry continues to expand its scope of practice into the treatment of ocular disease and trauma, the optometrist will be increasingly concerned with eye problems of a more urgent nature. Eye injuries occur at an alarming rate each year and rank second only to cataracts as the single most common cause of vision impairment. With such a high prevalence of ocular trauma and optometry's increased involvement, a study was initiated that will help guide practitioners to the areas that represent the expanding scope of optometry in the treatment and management of ocular trauma. The main purpose of this study was to determine the frequency of ocular trauma and its subsequent treatment in states allowing the use of therapeutic pharmaceutical agents (TPA). Information on the frequency and type of ocular trauma encountered by the optometrist should be of interest to educators when planning academic course work and continuing education.

With the urgent issue of escalating health care costs and the ensuing development of a broad health care plan, issues of emergency care and who pays for it are highly important. It is likely that many patients with urgent eye problems go to emergency rooms for treatment. However, sources of treatment other than emergency rooms may be available, and they may be more cost effective when considering that the majority of eye conditions that are common to emergency rooms are superficial in nature such as conjunctivitis, abrasions and superficial corneal foreign bodies.<sup>1</sup> It would then be reasonable to suggest that most urgent eye conditions could be treated by optometrists whose scope of practice was expanded to include the use of therapeutic drugs. Identifying the types of ocular trauma that are being managed currently by optometrists with TPA privileges could be used to help formulate laws in states where therapeutic rights have not been granted and to highlight the areas in eyecare where optometry can significantly contribute in controlling costs. We



also sought to identify the optometrist's practice setting, how long they had a therapeutic license, trends noticed in treatment since therapeutic privileges, general pharmaceutical agents used, utilizing hospital privileges, and whether they treat glaucoma related to trauma.

## **METHODS**

The frequency and type of ocular trauma was evaluated by randomly distributing 306 surveys to optometric practitioners in 17 therapeutically licensed states from rosters provided by the state associations. One hundred fifty-two surveys were returned and were included in the study for almost a 50 percent return of the distributed questionnaires. Some therapeutic states were not included because rosters of their state association members could not be obtained, the state's therapeutic bill was not intended for ocular trauma treatment, or newly formulated bills were still unclear as to the specific pharmaceutical agents. Approximately eighteen questionnaires were sent to optometrists in each of the states listed in Table 1 with the exception Washington which could not be surveyed due to roster restrictions. The single response from Washington probably represents the relocation of a practitioner from one of the surveyed states. The numbers listed next to the states in Table 1 represent the number of surveys returned from the individual states. Of the 32 states with therapeutic privileges, 17 were used in the survey. Of the remaining 15 states with TPA privileges, four were excluded because the bill had just recently been passed or they were having difficulties determining the pharmaceutical agents to be used. One state was excluded because it was unable to treat ocular trauma, and the other ten states were excluded because rosters could not be obtained from their state association.

Optometric practitioners were asked to mark the approximate number of times, since January 1991, that a diagnosis, treatment, or referral was made of the listed types of eye trauma. Under the designated "diagnosed", "treated", and "referred" columns for each trauma listed, were blanks with "1-2", "3-5", "6-9", and "10+" for recording the appropriate frequency. If a listed trauma was not seen by the optometrist it was left blank and was not counted in the survey tally.

## **RESULTS**

### **Location, Setting, Trauma Management**

Respondents came from a variety of practice settings with the majority from solo practice, comprising 79 of the respondents (51.6 percent), partnerships with 29 respondents (19 percent), group practice with 20 respondents (13.1 percent), MD/OD with 18 respondents (11.8 percent), multidisciplinary with 4 respondents (2.6 percent), and HMO with 2 respondents (1.3 percent). The majority of the surveyed optometrists had their therapeutic license for more than 5 years, comprising 98 of the respondents (64.9 percent), those between one and four years comprising 45 of



the respondents (29.4 percent), and less than one year, comprising 8 of the respondents (5.2 percent).

The incidence of eye trauma cases seen within their practice since the passage of the therapeutic bill increased in 105 of our respondents (78.4 percent), no increase or the same incidence comprised 29 respondents (21.7 percent), and 19 respondents abstained from answering. The use of pharmaceutical agents for treating eye trauma after the passage of therapeutic legislation increased in 123 of the respondents (89.8 percent), no increase in use or no change comprised 14 respondents (10.2 percent), and 16 abstained from answering.

When asked about the use of antibiotic agents, 153 of the respondents (100 percent) reported prescribing topical ophthalmic antibiotics, 85 respondents (55.9 percent) prescribe fortified antibiotics, and 45 respondents (30.2 percent) prescribe oral antibiotics, with some requiring co-management. Radiologic tests such as x-ray or CT scans are directly ordered by 48 of the optometrists (38.1 percent) with a few respondents requiring a co-referral. Eighteen of the respondents (12.2 percent) reported that they can admit patients into the hospital for such conditions as hyphemas, with a few respondents requiring a co-referral.

#### **Trauma Frequency and Distribution**

During the 1.5 year survey period, a total of 9,790 patients with ocular trauma visited the offices of the optometric practitioners in the survey. Superficial eye trauma accounted for 6,371 cases (65 percent) of the total, with anterior and posterior segment trauma contributing 1,374 cases (14 percent) and 1,987 cases (20.3 percent) respectively. As shown in Table 2, the two most common eye problems presented to the optometrists were corneal abrasion, comprising 1,411 cases (14.41 percent) and corneal foreign bodies, comprising 1,401 cases (14.3 percent) of all eye trauma seen. The third most common ocular problem was toxic keratitis, comprising 769 cases (7.86 percent) of all eye trauma seen. Together these three problems accounted for more than one-half (56.21 percent) of all superficial eye problems in the survey.

The fourth most commonly presented eye problem was traumatic iritis, comprising 662 cases (6.76 percent) which accounted for nearly 50 percent of the anterior segment trauma. The fifth and sixth most commonly presented eye problems were retinal tears and retinal detachments, comprising 556 cases (5.68 percent) and 477 cases (4.87 percent) respectively, and accounted for over 50 percent of the posterior segment trauma.

Of the 9,790 eye trauma cases, 7,452 were treated or managed solely by the optometric practitioners. Nearly all of the treatments were superficial in nature and accounted for 6,062 cases (81.33 percent) of all the eye trauma treated. The most



common treatments were of corneal abrasion and corneal foreign body, comprising 1,365 cases (18.31 percent) and 1,342 cases (18.01 percent) respectively, and together accounted for nearly 50 percent of the superficial treatments. Traumatic iritis was the most common anterior segment treatment, comprising 580 cases (7.78 percent) and accounting for 60 percent of the anterior segment treatments. Of the 9,790 eye trauma cases, 2,371 were referred by the optometric practitioner to a physician for treatment. Referrals for posterior segment trauma were the most common, comprising 1,553 cases (62.99 percent) of all referrals in the survey. The two most common referrals were retinal tear and retinal detachment, comprising 511 cases (21.55 percent) and 456 cases (19.23 percent) respectively, and accounted for over 60 percent of posterior segment referrals. The most common anterior segment referral was for hyphema, comprising 118 cases (4.98 percent) of all cases referred and accounted for over 25 percent of anterior segment referrals.

## **DISCUSSION**

When determining the frequency for the different types of trauma, the lowest number in the numerical range was used to represent the total for each type of trauma. For example, if a respondent marks the 3-5 column of a particular eye trauma, the number 3 would be used to compute the total, giving a conservative representation since not all of the respondents needed to mark just the first number. Furthermore, we wanted a conservative total because we realized that estimating the types of ocular trauma and how it was managed in the last year and a half is not an easy task and that estimating errors undoubtedly occurred.

A broad range of eye trauma types were listed, ranging from the most benign to only surgically managed trauma which falls outside the scope of treatment by optometrists. This made the treatments impossible by the optometrist in surgically managed trauma, and a treatment indicated on the survey in this area probably represents a monitoring role. In some of the anterior and posterior trauma listed in the survey, no treatment exists for the primary traumatic injury. Treatment of the secondary ailments and monitoring the primary disorder may be the appropriate protocol and thus may have been indicated as a treatment. Also some optometrists may be involved in pre- or post-operative treatment of trauma in conjunction with a physician, allowing some treatment capabilities not ordinarily performed by optometrists.

The majority of the participating optometrists surveyed were from a solo practice. The number of respondents from partnerships, group practice, and MD/OD settings were similar, but much less common than the solo practice. Because the majority were from the solo setting, the results primarily reflect the types of trauma that would be expected from such a setting. This should be of interest to students and educators since the solo practice



is the most common mode of practice and, based on the survey, has a high frequency of superficial and anterior segment eye disorders that should be familiar to a recent graduate. Laboratory testing, which may consist of gram stains, glucose, and culture testing, was performed at least once a month by 41 respondents, every six months by 34 respondents, once a year by 11 respondents, every two years by 9 respondents, and 56 abstained from answering. The frequency of laboratory testing may not be directly applicable to trauma treatment but is indicative of conditions that may warrant the need of pharmaceutical agents for treatment. One hundred percent of the surveyed optometrists are prescribing topical antibiotics, which parallels the frequent treatment of superficial eye trauma indicated by the survey. Furthermore, a surprising number of optometrists are treating and managing eye conditions with topically fortified antibiotics (56 percent), oral antibiotics (30 percent), by directly ordering x-rays/CT scans (30 percent), admitting patients into hospitals (12 percent), and medically managing glaucoma related to trauma (45 percent). Historically, optometrists involved with advanced treatment of eye conditions are in settings other than solo practice. However, only a small number of the optometrists surveyed are in specialized settings based on the mode of practice data and are not numerous enough to significantly interfere with the large number of surveys obtained from the solo practitioner.

By far the most common types of eye trauma presented to optometrists surveyed are those that involve the superficial eye and adnexa. Of the 6,371 superficial cases of eye trauma presented to optometrists, only 358 cases (5.6 percent) needed to be referred to a physician for treatment or consultation. This represents a significant number of patients (94 percent) with superficial eye trauma that were treated by optometrists with therapeutic privileges. This indicates that optometrists clearly need to know about superficial eye problems, since they are generally treated by the optometrist.<sup>1</sup> However, this is not meant to diminish the need for knowledge about open wounds, as well as for other serious diseases of the eye or adnexa.<sup>1</sup> The survey indicates occurrences of a variety of intraocular trauma that requires the optometrists to make crucial differential diagnoses utilizing advanced clinical techniques. Penetration and perforations accounted for 86 cases and orbital fractures accounted for 91 cases. Although the treatment of severe eye trauma is generally surgical in nature and falls outside the scope of optometrists and general physicians, the optometrist is responsible to diagnose and refer to appropriate sources of care. All optometrists surveyed were using pharmaceutical agents for treatment of superficial eye trauma, although not all to the same extent. The results strongly suggest that treatment of superficial eye trauma by optometrists is common in those states with therapeutic privileges. Furthermore, the most common anterior segment trauma was traumatic iritis with only 89 of the 662 cases needing to be referred, which again demonstrates that optometrists in therapeutic states manage the majority of

anterior segment disorders.

With the ability to treat anterior segment and superficial conditions of the eye and adnexa with pharmaceutical agents, optometrists are able to function as primary care providers for which they have been trained. Presently, patients are often managed by secondary care level providers which is not cost effective or efficient health care. Since the scope of optometric practice has expanded in many states to include the treatment of superficial eye problems and select anterior segment disorders the access and quality of care has most likely improved in those states.



TABLE 1

Number of Optometrists Participating in Survey by State.

Georgia	-----19	respondents
North Carolina	-----16	respondents
Iowa	-----15	respondents
Oklahoma	-----10	respondents
Kansas	-----10	respondents
North Dakota	-----9	respondents
Wyoming	-----9	respondents
Arkansas	-----9	respondents
New Mexico	-----8	respondents
Nebraska	-----8	respondents
Texas	-----8	respondents
Kentucky	-----7	respondents
Florida	-----6	respondents
Rhode Island	-----6	respondents
South Dakota	-----6	respondents
Idaho	-----5	respondents
Montana	-----1	respondent
Washington	-----1	respondent
Total	153	respondents

Practice Setting of Participating Optometrists

Solo	-----79	respondents
Partnership	-----29	respondents
Group	-----20	respondents
MD/OD	-----18	respondents
Multidisciplinary	-----4	respondents
HMO	-----2	respondents



TABLE 2

<u>Type of Trauma</u>	<u>Diagnosed</u>	<u>Treated</u>	<u>Referred</u>
<u>Superficial Eye Trauma</u>			
Corneal Abrasions	1411 cases	1365 cases	58 cases
Corneal Foreign Bodies	1401 cases	1342 cases	75 cases
Toxic Keratitis	769 cases	743 cases	66 case
Ecchymosis	764 cases	715 cases	35 cases
Chemical Burns	664 cases	610 cases	55 cases
Conjunctival Lacerations	559 cases	511 cases	42 cases
Ultraviolet Radiation	431 cases	419 cases	7 cases
Thermal Burns	372 cases	357 cases	20 cases
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<u>Anterior Segment Trauma</u>			
Traumatic Iritis	662 cases	580 cases	89 cases
Hyphema	310 cases	212 cases	118 cases
Angle Recession	151 cases	76 cases	74 cases
Iridodialysis	102 cases	48 cases	59 cases
Penetration/ Perforation	86 cases	11 cases	84 cases
Sphincter Tear	63 cases	33 cases	28 cases
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<u>Posterior Segment Trauma</u>			
Retinal Tears	556 cases	15 cases	511 cases
Retinal Detachment	477 cases	17 cases	456 cases
Traumatic Cataract	253 cases	73 cases	171 cases
Comotio Retinae	143 cases	84 cases	62 cases
Vossius Ring	137 cases	112 cases	17 cases
Orbital Fracture	91 cases	28 cases	71 cases
Retinal Dialysis	87 cases	14 cases	77 cases
Subluxated Lens	86 cases	17 cases	70 cases
Choroidal Ruptures	83 cases	15 cases	59 cases
Dislocated Lens	74 cases	12 cases	59 cases
Others	58 cases	43 cases	8 cases

## REFERENCES

1. Cohn MJ, Kurtz D. Frequency of Certain Urgent Eye Problems in an Emergency Room in Massachusetts. J Am Optom Assoc. Sept. 1992; 63: 628-33.



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# Ferris State University

College of Optometry

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Dear Optometric Practitioner:

It is estimated that over 2.4 million ocular injuries occur in the United States each year. Next to cataracts and glaucoma, eye injury is the single most common cause of visual impairment. With such a high prevalence of ocular trauma, a study that will help guide practitioners to the areas that represent the expanding scope of optometry in the treatment and management of ocular trauma is needed.

Your name and address was obtained from your state association which is recognized as having therapeutic rights. As an optometrist utilizing therapeutic agents, you have the unique opportunity to help guide other practitioners and students. Because you are in the position to observe ocular trauma and disease, your knowledge and experience in these areas represent the primary focus of my survey.

This survey is being conducted with Dr. Walt Betts as part of my senior project. Our goal is to better assess the areas of ocular trauma that are encountered by practitioners in those states allowing the use of therapeutic pharmaceutical agents. Thank you for your time and any information that you may have provided.

Sincerely,



Timothy Ellis  
Senior Intern



Walt Betts, O.D.  
Professor, FSU

**Please answer the enclosed survey to the best of your knowledge and return it in the enclosed stamped addressed envelope at your earliest convenience.  
THANK YOU !**

**OCULAR TRAUMA QUESTIONNAIRE**

*Please mark the approximate number of times, since January 1991, that you have diagnosed, treated, or referred to an ophthalmologist the following types of eye trauma. Please omit if your response is 'None' or 'Does not apply.'*

Type of Trauma	Diagnosed				Treated				Referred			
	1-2	3-5	6-9	10+	1-2	3-5	6-9	10+	1-2	3-5	6-9	10+
Subluxated lens	1	2	3	4	1	2	3	4	1	2	3	4
Dislocated lens	1	2	3	4	1	2	3	4	1	2	3	4
Retinal tears	1	2	3	4	1	2	3	4	1	2	3	4
Retinal dialysis	1	2	3	4	1	2	3	4	1	2	3	4
Orbital fracture	1	2	3	4	1	2	3	4	1	2	3	4
Retinal detachment	1	2	3	4	1	2	3	4	1	2	3	4
Penetration/perforation	1	2	3	4	1	2	3	4	1	2	3	4
Choroidal ruptures	1	2	3	4	1	2	3	4	1	2	3	4
Other: _____	1	2	3	4	1	2	3	4	1	2	3	4

**Thank you!**

**Please use the reply envelope to return your survey to: College of Optometry, Ferris State University, Big Rapids, MI 49307**

Would you like a copy of the final report?

Yes       No

If 'Yes' please provide the following information:

Doctor's Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_

Zip: \_\_\_\_\_ Phone: \_\_\_\_\_