





The American Society of Ophthalmic Trauma Newsletter Allison Rizzuti, MD

Ophthalmic Trauma at AAO 2023

American Academy of Ophthalmology's annual meeting is just around the corner. Here are the trauma related sessions you won't want to miss in San Francisco!

Saturday 11/4/2023

- 8:00AM 9:15AM PST: Open Globe Trauma Surgical Management for the On-Call Ophthalmologist
- 11:30AM 12:45PM PST: Sports Related Ocular Trauma

Sunday 11/5/2023

- 9:45AM 11:00AM PST: Multifaceted Presentation of Orbital Trauma A Video-Based Course With Complex Case Discussion
- 10:30AM 11:30AM PST: Poster Theater Trauma

On Demand:

- On Demand: Demographic & Socioeconomic Disparities in Receipt of Ophthalmology Consultation for Facial Trauma
- On Demand: Post-Traumatic Ophthalmic Artery Pseudoaneurysms
 From Blunt Orbital Trauma

ASOT IS ON SOCIAL MEDIA







HOT OFF THE PRESS

Recent Publications in Ophthalmic Trauma

Incidence of Eye Trauma in Children Associated With Foam Bullets or Foam Darts From Nonpowder Guns

https://jamanetwork.com/journals/jamaophthalmology/article-abstract/2804747

Ocular trauma accounts for most pediatric visits to ophthalmic emergency departments (EDs).<u>1</u> Several articles<u>2-5</u> have drawn attention to pediatric eye injuries associated with the recreational use of nonpowder guns: paintball guns, air guns, BB or airsoft guns, and foam bullets and/or foam dart blasters. To our knowledge, much of the literature on such nonpowder gun-associated ocular trauma consists of case reports or small case series. We conducted this case series to estimate the annual incidence and severity of these toy-related injuries seen in our center.

Epidemiologic Pattern and Injury Mechanism of Intimate Partner Violence-Related Ocular Trauma in the US

https://jamanetwork.com/journals/jamaophthalmology/article-abstract/2803106

Question: What is the epidemiological pattern of intimate partner violence (IPV)related ocular injury in the adult population of the US? Findings: This cross-sectional analysis of 2589 IPV-related ocular traumas recorded in the National Trauma Data Bank from 2017 to 2019 illustrated that almost two-thirds of ocular trauma survivors were female, roughly one-third had Medicaid insurance, and approximately one-half were White. Meaning: Study findings suggest that important identifiable risk factors for adult IPV-related ocular trauma include sex, race and ethnicity, and socioeconomic level.

ASOT FEATURED ARTICLE: Badminton-Related Eye Injuries: A Systematic Review

Annette K Hoskin, Stephanie Watson, Tengku A Kamalden

Introduction

Sports-related eve injuries are an increasing proportion of all eye injuries.¹² Badminton injuries represent between 1% and 5% of all sports injuries and rank sixth after soccer, basketball, volleyball, long-distance running and cycling.³ Previous case series and reports have identified eve injuries from badminton to be related to the shuttlecock and racket during both singles and doubles matches.3-5 Badminton is widely played in countries including Britain, Denmark, Sweden, China, Indonesia. Malaysia and Korea with an estimated 220 million players worldwide.⁶ Britain alone has 4 million badminton players, about 6% of their population, and is ranked as the second most popular sport in the world.⁷ Badminton is a racket game played either in singles or doubles format with the size of the court 13.4 m by 6.1 m. The racket is similar in size to a squash racket, but lighter. The shuttlecock is cone shaped with a cork base (diameter 25-28 mm) and feathers (58-68 mm wide at the widest point and 62-70 mm long) weighing 4.75 to 5.5 g in total (figure 1). During play, the shuttlecock travels at an average speed of 168-217 km/hour producing an energy transfer of 6-9 J. A badminton court is small relative to a squash court, with 3.9 m between the server and their partner at the net, or slightly more for the opponent at the net, players are close to a projectile at speed. When a player offers a smash hit, combined with an opponent's rush to the net the increased terminal velocity of the shuttlecock, this may increase the risk of retinal detachment from the associated blunt trauma if it impacts the eye.⁸Globe and adnexal injuries associated with badminton include hyphaema, commotion retinae, glaucoma, traumatic cataract and angle recession. Such injuries carry the risk of permanent vision impairment and long-term complications.9 Indeed up to 55% of badminton-related eve injuries result in a permanent decrease in vision, with 11% having a final visual acuity (VA) of 6/60.9 Despite the reporting of badminton-related eve injuries in case series and reports, they still occur.

The types of eye injuries associated with badminton are known; however, the associated risk factors are not well understood. A literature review will provide a comprehensive overview of the nature and risk factors for such injuries. The aim of this paper was to review the literature relating to badminton-related eye injuries to find common themes in terms of outcomes and risk factors. Data from our study may inform preventative strategies and assist patient counselling.

Methods

A review of the literature was registered in PROSPERO and performed with abstracts identified by searching the following databases on 26 September 2020 (and repeated in February 2022): CENTRAL (The Cochrane Library. www.thecochranelibrary.com) MEDLINE, EMBASE and Informit Health Collection. Search terms used for identifying the articles were key word and MeSH terms for: Eye injury', 'Ocular trauma', 'Badminton' and Shuttlecock'. The exact search strings used were MEDLINE (MeSH terms 'badminton' OR 'shuttlecock' AND 'Eye Injuries' with keywords 'eye injur*' OR 'ocular trauma' OR 'eve inj*adj (penetrating or perforating)'), CENTRAL ('eye injury') and EMBASE (Appendix 3), Informit ((eye injur*) OR (ocular trauma) OR (eve injur* adj3penetrating) AND (badminton)). To find relevant unpublished articles and theses, clinicaltrials. gov, Trip, MedNar and Google Scholar were searched using the key words 'eve injury' OR 'ocular trauma' AND 'badminton'. No language or date restrictions were applied. Our review was conducted in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.¹⁰



Figure 1 Comparison of size of shuttlecock size relative to bony orbit.

ASOT Featured Article: Badminton-Related Eye Injuries: A Systematic Review (continued)

TAK and AKH agreed on the manuscripts for inclusion. The bibliographies of included studies were screened by AKH to identify additional relevant publications. Studies included were retrospective epidemiological studies, case reports and case series reporting badminton-related eye injuries. Studies reporting data on sports injuries without specific information on badminton-related eye injuries were excluded.

Duplicates were identified and removed with EndNote software V.X7.7.1 (Thomson Reuters, New York, USA). The titles, abstracts and, where appropriate, full text were screened independently by two authors (AKH and TAK) to identify eligible studies. AKH and TAK assessed the articles according to the inclusion criteria for this review. Disagreements were resolved by discussion. AKH extracted data on included studies using an electronic form developed and agreed by the authors and piloted on three representative studies. The form was designed to capture study design as well as epidemiological and clinical information from study.¹¹ Studies were each assessed for methodological quality with regard to data collection against the Strengthening the Reporting of Observational Studies Epidemiology in recommendations. Patient and public involvement. The research question was developed to specifically understand the impact on visual outcomes of badminton-related eye injuries, to help determine appropriate prevention measures. Patients and the public were not involved in the design of the study or recruitment but will be involved in the dissemination of the study results with support for the development and communication of standards and policies relating to the use of eye protection.

Results

Features of included studies

The electronic search retrieved abstracts of 48 distinct published articles; 16 articles were eligible for full-text review. Of the 16 articles, 14 were eligible to be included in the literature review, with cross-referencing identifying a further 5 articles (figure 2).

The studies were published between 1974 and 2020, with the largest number from the period 2017-2020 (table 1). A total of 378 badminton-related eye injuries in 378 patients were identified across 19 included studies with 3 from the UK and China, 2 from each Australia. India and Canada and 1 each from Malaysia, Philippines, Scotland, South Korea, Taiwan, Finland and the USA. Study types included retrospective case reports and series, 1 prospective cross-sectional reviews 4 case series⁹ and prospective and retrospective⁴ reviews. All sportsrelated ocular injuries were included in six of the studies and the remainder only reported badmintonrelated ocular injuries.

Studies ranged in size, from 1 to 85 included patients, with median of 5.5 patients. Gender was reported in 13/19 (68.4% of studies), with the proportion of male-to- female patients 2.5:1. The age of the patients was reported in 8/14 articles and average age across these studies was 20.9 years and ranged from 9 to 42 years old. All injuries reported were monocular. The object responsible for the injury was the shuttlecock in 85% (228/269) of cases with the racket being responsible for the remainder of cases. The opponent was responsible for the injury in 55% (120/221) and the player's partner in 45% injuries, with 2 bystanders injured. The injuries occurred during a doubles match in 154/194 (79%) cases and singles match in 40/194 (11%) cases. The majority of injuries (95%) were closed globe injuries (CGIs) and 6 open globe injuries (OGIs) were reported. The most common clinical findings were hyphaema, angle recession, traumatic mydriasis and commotio retinae. Chronic sequelae included alaucoma, angle recession, chronic uveitis and retinal detachment. A final visual outcome of 6/60 or worse was reported for 20 patients (12.0%). The use of eye protection was not recorded in nine studies. Where the use of eye protection was recorded (11/19 studies), no patients wore eye protection. Spectacles were reported as being worn by 19 patients, with 5 OGIs associated with the spectacles breaking at the time of injury.

Data quality measures for the included studies were completeness of data.

ASOT Featured Article: Badminton-Related Eye Injuries: A Systematic Review (continued)

An absence of initial or final VA occurred in five studies (26% of studies) and information about the presence or absence of eye protection not reported in nine studies (47%). No data precision measures were reported in any of the included studies.



Discussion

A total of 19 studies, including 378 eye injuries, were identified in our review from 12 countries. Males were most-commonly affected during doubles play and most injuries associated with impact from the shuttlecock. Our review provides an overview of badminton-related eye injuries and the common functional outcomes, identifying permanent visual impairment associated with angle recession and retinal changes. Despite most commonly causing CGIs, which are more likely to have better visual outcomes than OGIs, badminton has been shown to be an important cause of vision impairment. Vision impairment from OGI has been identified to result in a final VA of <6/60 in 47%12 to 48%13 cases. Imaging may help to document damage to the retinal pigment epithelium

in sports-related eye injuries, including badminton, where blunt force trauma to the globe is experienced. A clearer understanding of outcomes associated with badminton-related injuries will help in prognostication and treatment of these injuries in a clinical setting.

Hazards associated with badminton:

Despite the low weight of a shuttlecock, the high speed achieved during play may result in significant impact energy relative to other projectiles in sport (online supplemental figure 1).¹⁴ The size of the shuttlecock allows it to fit within the bony orbit, which may lead to maximal impact with the eveball. In severe cases, the shuttlecock may cause globe rupture with a high risk of blindness. For CGIs, visual impairment may result from traumatic optic neuropathy, choroidal rupture, traumatic glaucoma and/or in traumatic maculopathy. A published case highlighted that issues with manufacture of the shuttlecock, with the nails used during construction protruding and penetrating the sclera, can also increase the risk of injury.¹⁵ Doubles play was more often associated with injury, with the injuries reported to have occurred when the player at the net turns to look at their partner⁵, however, without a more comprehensive audit of badminton players (both singles and double), conclusions about relative risk of doubles versus singles play. Prevention Eye protection use is known to reduce eye injuries in sport.¹⁶ The rising rate of myopia in many parts of the world, in particular Asia, has been widely reported.^{17 18}Sports Medicine Australia has classified badminton as a high-risk sport and the Ontario Badminton Association mandated protective eye protection for all players in 2005. However, such rules are not applied in many other countries where badminton is a popular sport. In addition, there are no known international standards for eye protection in badminton. As vision is critical to play, ordinary spectacles may often be worn during play but may increase the risk of eye injury as a result of lenses fracturing.¹⁹ For this reason, it was reported in one study that many players remove their spectacles and play with uncorrected vision, which may slow reflexes and therefore increase risk of injury.³

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Badminton-Related Eye Injuries: A Systematic Review (continued)

It is important that in the development of standards for eye protection, the needs of prescription spectacle wearers are specified. The poor usage of protective eyewear in badminton may result from unsuitable lens material and design which causes fogging, discomfort during extended period of play and restricted field of view.

and clinical outcomes were missing for many of the patients reported. Information about the use of eye protection was missing from many of the papers reviewed. As eye injuries are relatively rare, a larger prospective data set, using an international registry such as International globe and adnexal trauma epidemiology study^{22 23} could be used for future studies to better

Year	Country	Type of study	Period examined	Total patients	Mean age	Gender distribution (M/F)	Monocular/ binocular	Eye protection yes/none reported	Visual outcome<6/60	Shuttlecock	Racquet	Partner	Opponent	Doubles	Singles	Closed globe injury	Open globe injury
1974	Malaysia	Retrospective review ⁹	1968-1972	63	NA	NA	Monocular	None (4 spectacles)	7	54 (85.7%)	9 (14.3%)	8 (12.7%)	55 (87.3%)	44 (69.8%)	19 (30.2%)	63 (100%)	0
1979	USA	Survey ²⁴	1976-1977	16	30	1:1		NA	NA	13 (81.3%)	-	3 (18.8%)	13 (81.3%)	5 (31.3%)	9 (56.3%)		
1987	UK	Retrospective Case series ⁴	1979-1985	6	31	2:1	Monocular	None	2	5 (83.3%)	1 (16.7%)	2 (33.3%)	4 (66.7%)	6 (100%)	0	5 (83.3%)	0
1994	Aus tralia	Cross-sectional survey ²⁵	1989-1991	33	NA	NA		NA	NA	33 (100%)	0						
1995	UK	Retrospective review ²⁶	1992-1993	65	NA	All M		NA	NA								
2000	Scotland	Prospective review ²⁷	1991-1992	3	24	2:1		NA	NA								
2004	Taiwan	Prospective Case report ²⁸	2004	1	NA	NA		NA	0							1 (100%)	0
2006 1	Philippines	Cross-sectional survey ²⁹	2004	23	34.7	14:9	Monocular	None	NA	17 (73.9%)	5 (21.7%)	6 (26.1%)	15 (65.2%)	23 (100%)		23 (100%)	
2012	India	Retrospective Case reports ⁵	2011	2	38	1:1		None	1	2 (100%)	0	2 (100%)	0	2 (100%)	0	2 (100%)	0
2012	UK	Retrospective review ³⁰	2008	2	NA	1:1	Monocular	None, spectacles ¹	2	1	NA					NA	1
2014	China	Retrospective review ³¹	2008-2012	56	32	'Mostly men'	5 binocular	NA	NA	36 (64.3%)		25 (44.6%)				54 (96.4%)	7 (12.5%)
2015	South Korea	Prospective case report ¹²	2015	1	42	м	Monocular	NA	NA	1 (100%)							
2015	Finland	Retrospective review33	2011-2012	2	NA	3:2	Monocular	None	1								
2017	Canada	Prospective case report ^M	2017	1	9	м	Monocular	None	1		1 (8.3%)						
2017	Canada	Prospective case series ³⁵	2013-2014	5	36.8	4:1	Monocular	None	1	5 (100%)						5 (100%)	0
2017	Australia	Prospective case series ¹⁶	2015	12	44.5	2:1	Monocular	None	NA	na		1 (8.3%)	2 (16.7%)	1 (8.3%)	-	12 (100%)	0
2020	China	Prospective case report ³⁷	2020	1	46	NA	Monocular	NA	NA								
2020	China	Prospective case series ¹⁸	2011-2017	85	42.9	52:33	Monocular	None	10	60 (70.6%)	25 (29.4%)	52 (61.2%)	31 (36.5%)	73 (85.9%)	12 (14.1%)	80 (94.1%)	5 (5.9%)
2020	India	Prospective case report ¹⁵	2019	1	11	NA	Monocular	None	NA	1 (100%)							1 (100%)
Total				378					20	228 (84.8%)	41 (15.2%)	99 (45.2%)	120 (54.8%)	154 (40.7%)	40 (10.6%)	245 (94.6%)	14 (5.4%)

Another major contributing factor to the lack of eye protection among players maybe a severe lack of public awareness of the possibility of permanent visual impairment from related ocular injuries. Modifications to existing game rules to prohibit or discourage the front double player from looking backwards towards their partner during play may be difficult to implement considering the speed and fast reflexes required by the sport. Factors influencing the acceptance of using protective evewear by players is an area which warrants further investigation to improve compliance and prevent sports-related eve injuries and subsequent visual impairment. Nonetheless, advocacy initiatives for protective evewear by sport and health agencies maybe imperative in preventing visual impairment in badminton and other sports with projectiles²⁰²¹. Increased public awareness as well as availability of appropriate and affordable sports eyewear may encourage players to use them. This main limitation of the literature review was the retrospective study design of many included studies and therefore data on the circumstances

understand the risk factors as well as the impact of an intervention such as improved eye protection compliance.

Conclusion

Across 12 countries, published reports of badminton-related eye injuries found that serious injury can occur. Common risk factors were shuttlecock during doubles play. Future studies could focus on understanding why eye protection is not worn along with other risk factors to inform preventative strategies.

> Do you have an interesting trauma article or case to submit for our newsletter? Please send an email to info@theasot.com to have it featured!

Please join us in welcoming the new ASOT Student and Resident/Fellow Board Members:

The new additions to the ASOT Board of Directors will begin their term in January of 2024.

Student:



Sruti Rachapudi Wilmer Eye Institute



Jared Tuttle University of Texas



Jonah Blumenthal Harvard Medical School

Resident:



Melissa Yuan, MD Massachusetts Eye & Ear

Fellow:



Jennifer Hu, MD, MS Massachusetts Eye & Ear



Gabriella Schmuter, MD Weill Cornell



Sitara Hirji, MD Columbia University

The American Society of Ophthalmic Trauma is seeking nominations to fill multiple positions for the ASOT Board of Directors. Applications are now open!

Positions Available: Secretary, Treasurer, Education Chair, Policy Chair, Natural Disaster Chair, AAO Councilor, Member At Large

Submission and Deadline: Nomination submissions (self-nominations encouraged) must be sent to the ASOT Executive Office <u>info@theasot.com</u> no later than 6:00pm EST on October 15, 2023.

Upcoming Events: Save the Date

ASOT 2024 Annual Meeting May 17-18, 2024 Houston, Texas, USA





American Society of Ophthalmic Trauma

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