

More Than a Pickle: Fastest-Growing U.S. Sport May Pose Ocular Injury Risks

Pickleball is growing faster than any other sport in the United States, and along with its rising popularity comes the risk of ocular injuries, ophthalmologists warn. Participation in pickleball—a sport often described as a cross between table tennis, tennis, and badminton—has skyrocketed, with 2022 participation climbing by 158.6% over three years.¹

Pickleball Basics

The sport is played on a 44 ft x 20 ft court—approximately half the size of a tennis court—where players hit a perforated plastic ball back and forth over a net with a paddle, a short-handled racquet typically made of some combination of graphite, carbon fiber, fiberglass, and wood. It can be played as either a singles or doubles game officially, but some players flout the rules and play triples.²

Eye Injury Risk

Ball-related trauma. A pickleball is about the size of a tennis ball, but about half the weight. During a game, pickleballs can clock in at speeds of 25 miles per hour or more, according to various player sites. It's small enough to fit into the orbital socket and impact the globe, said Amy Coburn, MD, at Houston Methodist Blanton Eye Institute.

Marisa Tieger, MD, at Tufts Medicine, said, “Players might not realize

that the use of perforated plastic balls during the course of the game can transform into high-speed projectiles when hit between players.” Ball velocity coupled with the small court size ups the risk for injury.³

Paddle problems. The paddle “can smash into the eye or adnexa,” Dr. Coburn said, adding that teams of doubles or triples crowd the court further, increasing the risk of accidental collisions, falls, and ricocheted balls.

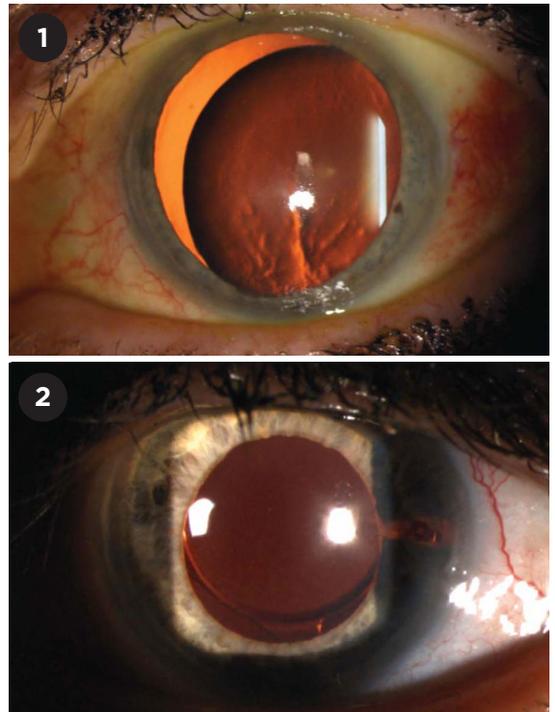
Celebrity attention. Actor Michelle Pfeiffer and Today Show journalist Savannah Guthrie have shared their pickleball injuries on social media, bringing more attention to the risk of eye trauma involved in the sport. Ms. Pfeiffer posted an image of the black eye she received during a pickleball match, while Ms. Guthrie shared a selfie displaying a lump just above her eye, which resulted from accidentally hitting herself with a pickleball paddle.⁴

While the two poked fun at their injuries, the contusions may be indicative of a larger trend. “I think these cases really show the sport’s potential for significant damage,” said Fasika A. Woreta,

MD, MPH, at the Wilmer Eye Trauma Center at Johns Hopkins Medicine.

The Medical Literature

So far, little data in the medical literature quantify pickleball ocular injuries. One study looked at pickleball and tennis players aged 60 and older, and the authors found that overall, pickleball injuries are on the rise in this age group, with strains and sprains the most common issue. The study notes that eye injuries among players are rare



PICKLEBALL INJURY. (1) Traumatic iritis, iris sphincter tear, and lens subluxation with 180-degree zonular dialysis from a pickleball injury. (2) Patient underwent pars plana vitrectomy and lensectomy, and a scleral fixated lens was placed.

BY ASHLEY WELCH INTERVIEWING AMY COBURN, MD, ANNETTE HOSKIN, PHD, BSC(OPTOM), MBA, LISA D. KELLY, MD, MED, ZEB A. SYED, MD, MARISA TIEGER, MD, AND FASIKA A. WORETA, MD, MPH

(making up 0.5% of pickleball injuries) and most often result from being hit with the ball.⁵

Several case studies document pickleball eye injuries, including corneal abrasions, retinal detachment, and vitreous hemorrhage. One case involves a 39-year-old male whose pickleball ricocheted off his own paddle and struck his left eye at high speed. Upon impact, he experienced blurred vision, worsening pain, and photophobia. An hour later, he presented to an emergency clinic and was diagnosed with a large corneal abrasion. The report describes debridement with an autoclaved Visitec PRK spatula and treatment with steroid eye drops and an amniotic membrane. Within a week, the patient's cornea had completely healed.⁶

However, Lisa D. Kelly, MD, MEd, at the University of Cincinnati College of Medicine, said that “topical antibiotics are ordinarily used in this context.” She added, “Large corneal abrasions are typically treated with a bandage contact lens and topical antibiotics.”

Another case report highlights injuries in two patients. The first, a 77-year-old male, had a history of hemorrhagic posterior vitreous detachment, ocular hypertension, and cataract surgery prior to his pickleball accident. He reported blurred vision, floaters, and photopsias after being hit in the right eye with a pickleball that had ricocheted off his partner's paddle. Ten days after the injury, he presented

with 20/300 visual acuity and an IOP of 26 mm Hg in the right eye. The exam revealed mild vitreous hemorrhage and displacement of the IOL and capsular bag complex into the vitreous cavity. The patient underwent IOL exchange with scleral fixation. Three months later, visual acuity was 20/25 and IOP was 17 mm Hg in the affected eye.⁷

The second patient, a 76-year-old woman with a history of nonexudative age-related macular degeneration, was hit with a pickleball in the left eye. The accident caused traumatic iritis, a temporal iris sphincter tear, lens subluxation, iris transillumination defects, and 180-degree nasal zonular dialysis (Fig. 1). The traumatic iritis was treated with topical difluprednate, and the ocular hypertension was treated with dorzolamide–timolol. She also underwent a pars plana vitrectomy and pars plana lensectomy but developed cystoid macular edema postoperatively (Fig. 2). Further complications included mixed-mechanism glaucoma due to angle recession and steroid response.⁷

Another case report details two instances of retinal tears due to pickleball injuries. A 66-year-old man presented with a symptomatic retinal tear, localized retinal detachment, and mild vitreous hemorrhage nine days after being hit in the left eye while playing pickleball. Cryotherapy treatment resolved the vitreous hemorrhage and retinal detachment within three weeks. The second patient, a 60-year-old wom-

an, reported vision distortion, flashes, and floaters one month after being struck in the eye with a pickleball. She was diagnosed with a posterior vitreous detachment and a symptomatic retinal tear. The patient underwent successful laser retinopexy treatment.⁸

Such cases “demonstrate the severe blunt trauma these injuries can cause,” Dr. Woreta said, “because the ball is traveling with so much force in such close range.” In all instances, patients were not wearing protective eyewear. (See “Injury Prevention.”)

Injury Outlook

Dr. Tieger said that while there have yet to be reports of hyphema, traumatic iritis, commotio retinae, choroidal rupture, and open globe injuries from pickleball, “these types of injuries are all theoretically possible given the heightened risk of blunt eye trauma.” Orbital floor fractures are more common in baseball, basketball, football, and other racquet sports in the United States, but pickleball could theoretically result in such an injury, too, she said.

Dr. Coburn said that online forums, such as Facebook and Reddit, are littered with posts about pickleball injuries and that, in the future, “all ophthalmologists should expect to see and be prepared to treat pickleball injuries.”

Who's most at risk? Pickleball is particularly popular with older adults, who are also more likely to have pre-existing eye conditions. More than half

Injury Prevention

There is no current requirement for eye protection in pickleball. “Yet, eye injury can be prevented by adopting rules that mandate use of sport safety glasses,” Dr. Coburn said.

She recommends the American Society for Testing and Materials (ASTM) F3164 protective eyewear, which is the standard eye protection for racquet sports.¹ “These lenses and frames are designed to mitigate the risk of eye injury from impact in sports and are suitable for pickleball,” Dr. Coburn said. The lenses are also rated to resist shattering from high velocity impact.

ASTM F3164 lenses are inserted from the front of the frame rather than the back to keep the lens from dislodging with impact, and the frame is constructed to prevent breakage and can be secured with a strap, she said.

Prescription lenses can be fitted for best-corrected visual acuity and tinted for UV and glare protection.

April 2024 is Sports Eye Safety Month, and offers an opportunity to talk with patients about eye safety while playing pickleball and other sports. The Academy has resource pages where ophthalmologists can read about the topic and download and print information and infographics for their patients and offices.^{2,3}

1 ASTM International. www.astm.org/f3164-19.html. Accessed Jan. 12, 2024.

2 American Academy of Ophthalmology. aao.org/eye-health/tips-prevention/injuries-sports. Accessed Jan. 17, 2024.

3 American Academy of Ophthalmology. aao.org/eye-health/resources/articles. Accessed Jan. 17, 2024.

of “core” players—those who play eight or more times a year—are 55 or older, and about a third are 65 or older.⁹ Some research also indicates this age group is particularly susceptible to overall pickleball injuries due to slips, trips, and falls, and they may be at increased risk of eye injury from the sport, as well. But more research is needed to understand the rates of injury from pickleball. “Falls are a well-documented risk factor for older people, and this should be considered” because it puts them at greater risk for eye and other types of injuries, said Annette Hoskin, PhD, BSc(Optom), MBA, at the Save Sight Institute, University of Sydney and the Lions Eye Institute, University of Western Australia in Perth. Dr. Hoskin advises players to wear eye protection while on the court to reduce injury.

But exercise and staying social in later life can be beneficial for health, too, and ophthalmologists can direct their patients to resources for sports eye safety.^{10,11}

Existing conditions may increase injury risk. Certain ophthalmic issues may put individuals at a higher risk of more severe complications from pickleball injuries. “Players with pre-existing retinal pathology such as lattice degeneration, recent ocular surgery, or thin scleras due to anatomical features of connective tissue disorders would be at higher risk of more severe injuries,” said Zeba A. Syed, MD, at Wills Eye Hospital, Thomas Jefferson University, in Philadelphia.

Similarly, individuals who are on blood thinners may be more likely to have significant intraocular bleeding if they experience any ocular trauma during the game, Dr. Tieger said.

1 Sports & Fitness Industry Association. <https://sfia.org/resources/sfias-topline-report-shows-physical-activity-rates-increased-for-a-fifth-consecutive-year/>. Accessed Feb 7, 2024.

2 USA Pickleball. <https://usapickleball.org/what-is-pickleball/court-diagram/>. Accessed Jan. 12, 2024.

3 Waisberg E et al. *Eye*. 2023. <https://www.nature.com/articles/s41433-023-02870-9>. Accessed Feb. 13, 2024.

4 People. <https://people.com/michelle-pfeiffer-pickleball-mishap-black-eye-8409929>. Accessed

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5 Weiss H et al. *Inj Epidemiol*. 2021;8(1):34.

6 Dang V et al. *Clin Optom*. 2021;32(2).

7 Huang H, Greven MA. *Retin Cases Brief Rep*. 2024;18(1):15-17.

8 Atkinson CF et al. *Retin Cases Brief Rep*. 2022;16(3):312-313.

9 USA Pickleball. <https://usapickleball.org/wp-content/uploads/2021/08/2022-Pickleball-Fact-Sheet-updated-5.5.22.pdf>. Accessed Jan. 12, 2024.

10 American Academy of Ophthalmology. aao.org/eye-health/tips-prevention/injuries-sports. Accessed Jan. 17, 2024.

11 American Academy of Ophthalmology. aao.org/eye-health/resources/articles. Accessed Jan. 17, 2024.

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See disclosure key, page 10. For full disclosures, view this article at aao.org/eyenet.

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