PRO TO PRO
CONTINUING EDUCATION

BORN ON THE BATTLEFIELD

Protecting Eyes in Youth and Beyond

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[1 CE CREDIT]

This course is about raising awareness of the importance of wearing protective eyewear to prevent sports-related eye injuries. You will learn about a company whose name has become synonymous with eye safety and protection. How does an eyewear brand become synonymous with safety and protection? In the case of Wiley X, their reputation and brand loyalty were built by engineering eyewear to withstand the extreme demands of the battlefield to protect the eyes of our brave soldiers.

The general lack of awareness regarding the need to protect the eyes from injury during sports activities will be discussed in this CE, particularly the lack of awareness of the dangers posed to children's eyes who participate in youth sports. The leading cause of blindness in children is sports injury related. In general, it is the physical injuries to the body that are championed in sport safety health and awareness campaigns and by sports leagues. Sports eye safety often goes unmentioned, and protective eyewear is rarely required by youth leagues, leading to injuries that could have been easily prevented.

PROTECTING EYES IN YOUTH AND BEYOND

Both Prevent Blindness America and the National Eye Institute have active consumer campaigns to alert us to sports eye injuries to children and adults alike. Wiley X has answered the call with their Youth Force line of sport eyewear. Their mission to protect the eyes of our children is a natural progression for a company renowned for producing eyewear tough enough to withstand the rigors of the battlefield.

To learn more about sports safety, I visited many websites, and although some included eye safety recommendations, many did not. I visited the Centers for Disease Control site and read the article titled "Protect the Ones You Love: Child Injuries Are Preventable,"

LEARNING OBJECTIVES:

Upon completion of this program, the participant should be able to:

1. Learn about the lack of awareness that prevails regarding the prevalence of sports-related eye injury.
2. Learn the complexities of making prescription eyewear in high-wrap frames.
3. Learn the story of eyewear engineered to withstand the extreme demands of the battlefield.

Credit: This course is approved for one (1) hour of CE credit by the American Board of Opticianry (ABO). Technical Level 2 Course STWJHI1009-2

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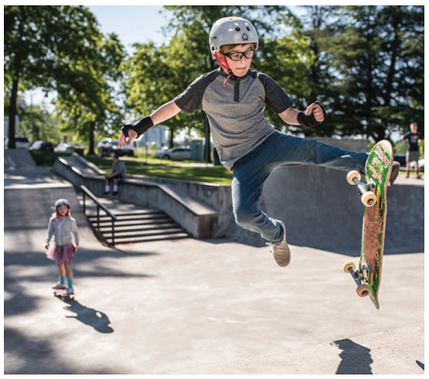
FIG. 2 Eye injuries are the leading cause of blindness in children in the United States



and sadly there's isn't one word about protecting eyes. The same is true for Safe Kids Worldwide and the National Center for Sports Safety. While local, regional and national sports injury awareness organizations have yet to recognize that sports eye safety is imperative, we thankfully have companies that make eye protection a priority, such as Wiley X. After developing protective eyewear for military personnel, law enforcement officers, outdoor enthusiasts, marksmen and adult athletes for over 25 years, Wiley X entered the youth athlete market, a key demographic for sport eyewear. To meet this market demand, they developed the Youth Force line, an affordable protective eyewear line that meets ASTM F803 Standard Specification for Eye Protectors for Selected Sports. This specification covers eye protectors, designed for use by players of racket sports, women's lacrosse, field hockey, basketball, baseball and soccer. To meet the requirements of the ASTM F803 standard, eyewear must undergo a variety of optical and mechanical tests. Optical testing of lenses includes but is not limited to: refractive tolerances, astigmatism, power imbalance, prism, luminous transmittance, etc. Mechanically the eyewear must withstand high velocity impacts from various sports balls (i.e., racquet ball, squash ball, tennis ball, etc.) at velocities ranging from 40 to 90 mph. The velocity is dependent on the eyewear's application of design. These tests focus on the strength of the frame, and the strength and quality of the lenses. Youth Force eyewear is available in both plano and prescription.

PROTECTING YOUNG EYES

Startling sports-related eye injury stats— data provided by the Coalition to Prevent Sports Injuries:

- Eye injuries are the leading cause of blindness in children in the United States, and most injuries that occur in school-aged children are sports-related. These injuries account for an estimated 100,000 physician visits per year at the cost of more than $175 million.
- Ninety percent of sports-related eye injuries are avoidable with the use of protective eyewear. Protective eyewear includes safety glasses and goggles, safety shields and eye guards designed for a particular sport. Ordinary prescription glasses, contact lenses and sunglasses do not protect against eye injuries. Safety goggles should be worn over them.

FIG. 3 Over 600,000 sports-related eye injuries happen each year with over 200,000 of them involving children

- Currently, most youth sports leagues do not require the use of protective eyewear. Parents and coaches must advocate for the child and insist that they wear safety glasses or goggles whenever they play.

THE WILEY X DIFFERENCE

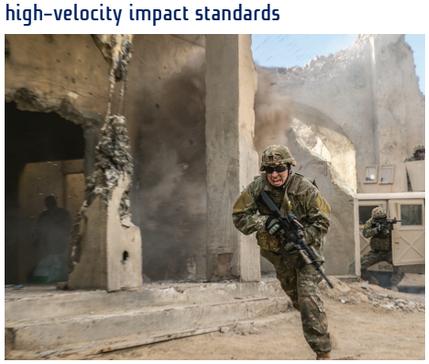
A family that's protecting families—Myles Sr. passed on his commitment to eye protection to his sons Myles and Dan, the current owners of Wiley X. Together, they proudly carry on the family's dedication to eye safety. As a world leader in the research, development and marketing of protective eyewear and gloves for the military, law enforcement and civilian markets, all of Wiley X's products endure the most extensive product testing in the industry. Every pair of eyewear that they produce meets the highest national and international standards for safety and optical quality. Wiley X's tactical eyewear models meet the highest military ballistics and high-velocity impact standards. Extreme conditions require extreme protection! Select models are equipped with a Facial Cavity Seal, ensuring that even the finest dust and dirt will stay out of your eyes.

ABOUT WILEY X

Wiley X was founded by Army veteran Myles Freeman Sr., who recognized that a soldier's eyes are exposed to risk from impact injury, sun damage, as well as extreme discomfort from wind, sand and debris. It is said that Wiley X was born on the battlefield. The goal was to make lenses and frames that are virtually indestructible. Mission accomplished—all of the Wiley X tactical eyewear models meet the highest military ballistics and high-velocity impact standards.

Although the initial mission was to protect the eyes of soldiers by providing protective eyewear, Wiley X has since expanded to law enforcement, outdoor and sports enthusiasts, and adventure seekers. I was introduced to Wiley X by a motorcyclist and soon learned that the brand has a very loyal following among the biker community. As established

FIG. 4 Wiley X tactical eyewear models meet the highest military ballistics and high-velocity impact standards



leaders in protective sunglasses, it was time to turn their attention to prescription sunglasses and dress eyewear. The challenge was to produce the same Wiley X experience with prescription lenses in full coverage wrap frames as the loyal followers of Wiley X plano sunglasses have come to expect. Although high-wrap frames provide the most coverage and protection to keep the sun, wind and sand from entering the eye from oblique directions, they present optical and cosmetic challenges for prescription sunglasses. The high-wrap angle of Wiley X frames relative to the wearer's visual axis results in loss of central acuity, prism and oblique astigmatism. Often a patient picks up their high-wrap sunglasses with their new prescription to only be disappointed with the aesthetics as well as the poor optics and limited clear field of vision. Understandably, the customer is dismayed when they see thick edged lenses that are no longer the same as the plano sunglasses they previously tried on. By investing in a state-of-the-art proprietary lab, Wiley X has become experts in creating lenses for high-wrap frames. By using digital surfacing equipment, advanced design and five axes MEI edging machines, Wiley X produces an equivalent experience in high-wrap sunglasses for ametropes as that experienced by emmetropes. All lenses are stamped and certified for safety before leaving the lab to ensure that every customer receives the highest quality eyewear.

THE COMPLEXITIES OF PRODUCING RX EYEWEAR IN HIGH-WRAP FRAMES

The optical and cosmetic challenge of wrap frames for prescription eyewear:

Problem 1. Optical lens performance starts with having the correct lens base curve (within a narrow range) to match the power of the lens. In high-wrap frames (Fig. 5), the frame curve is typically 8-base. This steep base curve creates an obstacle for labs because they are unequipped with the knowledge and tools to compensate for the high-wrap design. Incorrect base curve increases

FIG. 5 High-wrap frames typically have a base curve of base 8

oblique astigmatism that compromises peripheral acuity. The further the base curve deviates from the ideal range, the more oblique astigmatism induced.

Problem 2. The other problem posed for high-wrap frames with prescription lenses is that the effective lens power changes when the frame tilts the lens either around the horizontal 180-degree axis or the vertical 90-degree axis. Prescription lenses mounted in a wrap-around frame must be digitally compensated to correct the power errors.

Problem 3. The high-wrap angle causes a tilt change in the optical axis location relative to the wearer's visual axis creating unwanted prism. High-wrap frames can tilt lenses more than 20 degrees. Extreme wrap angles of 8-base frames induce central power error and increase oblique astigmatism for off-axis gaze directions.

Problem 4. The power of the lens also changes when the lens vertex distance is further from or closer to the eye than the distance of the phoropter at the time of refraction. Wrap frames typically sit closer. This will increase minus power and weaken plus power. The problem with non-compensated lenses for wrap frames is therefore: 1. Incorrect effective power at the optical axis of the lens. 2. Increased oblique astigmatism resulting in poor peripheral vision and reduced fields of view. 3. Induced prism in the horizontal meridian that negatively affects binocular vision, and 4. Power change resulting from shorter vertex distance in wrap frames can induce discernible power error in higher prescription powers.

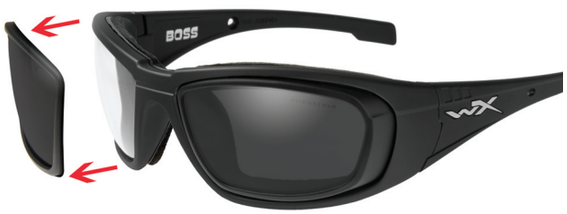
The solution for optical and cosmetic challenges in wrap frames with prescription lenses:

New DIGIFORCE digital Rx lenses are designed specifically for Wiley X's 8-base wrap frames. These lenses are digitally optimized for increased field of vision in all directions.

DIGIFORCE PAL lenses provide a more significant reading zone with high-performance optical quality. Standard Rx lens designs in Wiley X 8-base wrap frames can cause peripheral distortion, referred to as the "fishbowl effect." Utilizing point by point digital lens mapping, DIGIFORCE delivers enhanced visual clarity and color contrast while minimizing distortion. Matching this digital lens technology with Wiley X frames allows the wearer's personalized vision needs to be met while providing essential protection from impact and UV. The design personalizes the lens for the way the frame fits the face by accounting for pantoscopic tilt, wrap angle, vertex distance and more, or in the final design parameters.

DIGIFORCE gives Wiley X prescription wearers personalized eyewear for their unique viewing angles and frame measurements, improving the perceived prescription results as the wearer gaze direction changes. The result—the broadest possible vision zones, smoother transition through the corridor and minimized oblique astigmatism.

Combining this level of prescription lens performance with the advanced vision protection for which Wiley X is recognized provides the indispensable visual experience for the way people work, play and live.



Digital Edge Thinning is a lens technology that uses aspherization in wrap-around frames to enhance vision in higher prescriptions. This process allows for the production of lighter and thinner lenses when compared to standard lenses. High-wrap frames with thin plano lenses can follow the 8-base curve

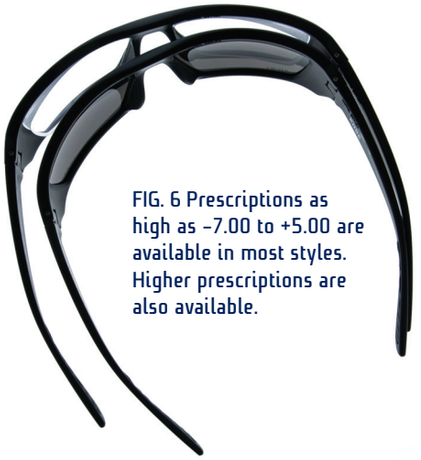


FIG. 6 Prescriptions as high as –7.00 to +5.00 are available in most styles. Higher prescriptions are also available.

of the frame without a problem. But once a prescription lens enters the equation, a plus lens can bulge too much, while the edges of minus lenses are too thick, creating lens retention and cosmetic issues. The same digital aspherization and digital optimization of the lens surface that improves optics also enhance the lens thinning technology used by Wiley X to produce aesthetically pleasing finished eyewear. Wiley X's SEL (Smart Edge Lens) Technology de-centers and tapers the lenses to ensure that they meet ANSI optical quality standards and provide a true spatial relationship of objects in the field of view.

IMPORTANT WILEY X FEATURES AND BENEFITS FOR YOUR PATIENT

1. **WorkSight** glasses offer a single eyewear solution for people who work both with their hands and in offices. All WorkSight eyewear meets ANSI Z87.1 with the side shields installed (removable and permanent side shields available).

2. Wiley X offers a large variety of Rx customization options (lens types, lens tints, coatings and mirrors) .

3. All Wiley X sunwear feature high-wrap frames to prevent unwanted stray light from obscuring your peripheral vision and provide 100 percent UV protection.

4. The **WX BLUE** blue-light filtering anti-reflective coating reduces high energy blue light from digital screens such as computer monitors, tablets and smartphones. Short-wavelength blue light is thought to contribute to Digital Eye Strain (DES) for two reasons: 1. Blue light scatters inside the eye as well as in the air and results in lower contrast impeding clear vision, and 2. Blue light refracts more upon entering a lens, including our compound lens systems that are made up of our cornea and crystalline lens. It focuses too soon and therefore never reaches the retina causing blue blur with up to -1.00 diopters defocus. By reducing the amount of blue light from screens that reach, we reduce the degree of blue defocus and scatter. This reduces eyestrain as the eye constantly struggles to bring the blue light from digital screens into focus.

5. **Removable Facial Cavity Seals** protect the face and eyes from dust, dirt and wind, as well as distracting vision and obstructing light that would enter from a peripheral angle.

6. The **Wiley X Black Ops** collection was created for elite-level military personnel, law enforcement and hard-core shooters. This collection features matte black frames, smoke grey lenses and an all-black Wiley X logo. The comfortable high-wrap frame design provides a secure fit as well as superior protection from stray peripheral light. Select models are also available with a Facial Cavity Seal that prevents dust and dirt from entering the eye.

7. **Ballistic tests** are only applicable to frames and lenses used in tactical and military environments. Spectacles must withstand the impact of 0.15 caliber, 5.85 (+/- 0.15) grain, T37 shaped projectile at 640 to 660 ft./s, where goggles must withstand three impacts of 0.22 caliber, 17 (+/- 0.5) grain, T37 shaped projectile at 550 to 560 ft./s.

8. **Scratch resistance**—Lenses are treated front and back with a clear coating that ensures added durability and resistance to scratching.

9. **ASTM F803**—Over 600,000 sports-related eye injuries happen each year with over 200,000 of them involving children. That's why all of Wiley X's Youth Force Sports Protective Eyewear meet the highest ASTM F803 safety standards. Wiley X puts their lenses and frames through a rigorous set of tests where projectiles at 90 mph are fired at the frame.

10. **ANSI Z87.1**—To meet the strictest ANSI optical and mechanical requirements, all lenses are verified as optically correct for refractive power, resolving power, astigmatism, prism and luminous transmittance. These optical tests ensure that Wiley X lenses do not distort the true size of objects and that objects do not appear off-center in the field of view. Frames and lenses are also tested to high-velocity and high mass mechanical impacts. High-velocity impacts require the frames and lenses to withstand the impact of 6.35 mm steel ball traveling at 150 ft/s. High mass impacts require that frames and lenses withstand the impact of a pointed projectile weighing a minimum of 500 g (17.6 oz.) dropped from a height of at least 127 cm (50.0 in.). Wiley X is the only premium eyewear company in the world whose entire adult line meets ANSI Z87.1 safety standards for optical quality and high mass/high-velocity impacts.

In summary, ECPs are on the lookout for independent companies that make exceptional products that can be dispensed with confidence. Wiley X is one of the most trusted brands for on the job safety eyewear, high-performance sunglasses and optical/protective sport eyewear for youth. Every Wiley X frame meets stringent ANSI Z87.1 High Velocity and High Mass Impact Safety standards, providing occupational grade protection for all wearers and a wide range of activities. Wiley X is the only premium performance sunglass brand with this level of vision protection in every pair of eyewear it makes. It is not surprising that Wiley X is a leading provider of protective eyewear systems to U.S. military, law enforcement and other tactical wearers around the world.

I love the premise upon which the brand was built—to withstand the rigors of the battlefield and to protect our brave soldier's eyes. Moreover, I appreciate the years of research that have gone into perfecting frames and lenses to protect our eyes in youth and beyond. Wiley X makes protecting our precious sight a priority just as we should make eye protection a priority when discussing eyewear needs with every patient. ■