BULLSEYE SHOOTERS' GUIDE

FOR THE EYECARE PROFESSIONAL

Dear Colleague:

My name is Norman H. Wong, O.D. and I am a member of the California Optometric Association and the American Optometric Association. I am also a veteran, a life-member of the NRA and a competitive shooter in the sport of Conventional Pistol, known to its adherents as “bullseye shooting.” In bullseye shooting, competitors fire one-handed at paper targets from distances of 25 and 50 yards (50 feet during the indoor season) under exacting time constraints: In the most extreme instance, five shots must be placed on the paper within 10 seconds, while the slow-fire phase allows shooters as much as 10 minutes in which to make 10 shots. At the upper levels of competition, a millimeter or two of accuracy can make the difference between winning and simply placing in the top twenty. Like golf, bullseye shooting is a sport in which incremental improvements in equipment, technique and consistency can result in vastly improved scores.

My reason for writing is that many bullseye shooters have told me that, while their day-to-day eyewear is often fine for conventional use, shooting glasses prescribed by the same eyewear professional often leave something to be desired. I believe this situation can be alleviated with a bit of guidance from someone familiar with the shooting discipline, so I hope you will not mind if I pass along some advice in the form of this document.

Bullseye shooters are a wonderful and convivial group of individuals with critical visual needs. I urge you to set aside any political views against firearms and treat the bullseye shooter as you would any other patient.

The patient will ask, or has asked, for permission to bring his/her pistol(s) and/or revolver(s) to the office for the eye examination and will demonstrate that the firearm is unloaded and safe to handle. If permission was denied, sighting parts of the equipment were brought instead. Please take a moment to review the following important steps before and during your eye examination. Besides your routine health tests of the eyes, I have emphasized a few areas of concern. Your kind attention to these details would be most appreciated.

EYE EXAMINATION

1. CASE HISTORY: A thorough case history revealing any medical problems relating to eye health and vision stability is essential. Note all medications taken, including over-the-counter medications, and advise of possible visual side-effects.

2. DOMINANCE: Review and confirm eye- and hand-dominance.

3. REFRACTION: Your best effort is needed to obtain the most accurate results. After you obtain your best distance Rx, see if the patient is sensitive to 0.12 diopter steps. Please double-check vertex distances especially for higher powers. Check to see if the patient's line of sight is "continually" centered through the phoropter lenses. Do not reduce the full strength of the prescription even if there was a large change from the previous examination results. Small prescriptions such as +0.25, -0.25 diopter sphere and +0.25, -0.25 diopter cylinder, even if obliquely orientated, may be significant to the bullseye shooter.

4. RED DOT SCOPES: For decades, the sport of bullseye shooting was conducted almost exclusively with conventional, open sights (also known as “iron sights”). An issue with iron sights is the impossibility of keeping the front sight of the pistol and the bull of the target (the black center portion) in focus at the same time. Because of this, shooters in recent years have adopted the use of 1X “red dot” scopes, which superimpose an illuminated dot on the image of the target and allow simultaneous focus. Normally, the best lens for the red-dot scope viewing will be the best distance prescription. Demonstrate this lens while the patient looks at the red dot while holding out the scope. Because the red dot in the scope is not focused at "optical infinity" (it is closer), try a +0.12 or a +0.25 diopter lens over the best distance prescription to see if the dot becomes even clearer. If possible, judgment would be best if the patient can view at a distance greater than the standard 20 feet and with outdoor lighting. If the dot is distorted, use the phoropter once again to verify cylindrical power and axis as the patient holds the pistol (or scope only) in front of the phoropter. Final results should be demonstrated with trial lenses. If the red dot never becomes clear and round after all lens possibilities have been demonstrated, then a careful determination of ocular health involvement needs to be assessed.

5. IRON SIGHTS: Iron sights are still preferred by some competitors and are mandatory in certain forms of competition. With iron sights, we are concerned with three separate entities, the clarity of the front sight, the clarity of the rear sight and the relative blurriness of the bullseye. These three positions cannot be focused simultaneously with just a lens. The rear sight is separated from the front sight by about 6 3/4 inches in most standard model-1911, .45-caliber pistols. Measure the EXACT distance from the patient's shooting eye to the rear of the front sight while he/she is in the proper stance. Write this

down for the patient's record. Set this distance for the reading card on the rod of the phoropter. Find the best lens for this position and then try 0.12 diopter higher and 0.12 diopter lower and note if the patient responds to this small change. Presbyopic patients will give good responses. For the pre-presbyopes, low power lenses may allow for a more stable focus. Younger patients (those under 35 years of age) may benefit from a minimal plus power for a steadier focus, or perhaps none at all.

The patient needs to know the best plus lens because there are specialty type shooting glasses available with interchangeable lenses. The two popular ones are Knobloch Optik and Neostyle Champion systems which include lenses, occluders, apertures and side blinders. There are a number of lenses available with these systems (+0.50, +0.75, +1.00, +1.25, +1.50). The base lens (patient's distance prescription) can be custom made at the optical lab to incorporate into this system. A cylindrical lens must have an edge marking to coincide with an edge marking on the round lens holder. This would alert the shooter if the lens rotates within the holder and may cause blurriness and distortion.

Interchangeability allows for a quick change when different powers are needed for various shooting distances and lighting conditions. Personally, my best lens for the front iron sight stays the same under day and night lighting situations. In my case and in many other patients', we prefer a dedicated pair of shooting glasses for the iron sights, which may also be helpful as a computer Rx and for other hobbies at a similar working distance.

Next, have the patient view this best lens with the pistol in hand at a distance greater than 20 feet, and if possible, outdoors at 25 and 50 yards. It is understood that the majority of offices may have limitations in this regard. Depending upon a few factors such as arm length and pupil size, typical lenses that work best are +0.50, +0.75 and +1.00 diopter over the best distance prescription, but also try +0.37, +0.62 and +0.87 diopter lenses, even though these are uncommon powers. You may be surprised how sensitive some shooter's eyes are. In my case, +0.75 diopter is my ideal lens. A +0.62 diopter lens blurs the rear sight and a +0.87 diopter lens blurs the bullseye too much.

Experienced shooters would know that the distance bullseye will be out-of-focus. As different lenses are tried, this will allow the patient to compare the relative blurriness to the bull. Stress that front iron sight clarity is more important than bull clarity. Most shooters know that an adjustable aperture will then help clear the bull. When too much emphasis is given to the bull clarity, then rear-sight clarity will be compromised. The patient will always shoot better if the front and rear sights are perfectly clear and aligned while the bull is blurred, as opposed to a clear bull with sights that cannot be seen well enough for proper alignment. Always use the lowest plus-power lens to achieve this goal.

As a quick reference guide, here are the focal lengths of the powers discussed:

+0.37 diopter: 2.66 meters
+0.50 diopter: 2 meters
+0.62 diopter: 1.6 meter
+0.75 diopter: 1.33 meter
+0.87 diopter: 1.14 meter
+1.00 diopter: 1 meter

Lens determination by focal lengths alone may cause erroneous results. Use these only as a starting point.

6. BINOCULARITY: Advise the patient if there are any binocular problems which may affect focusing stability. Most shooters occlude one eye but some shoot with both eyes open and suppress the non-dominant eye. Hyperopic patients who are esophoric may have more of a difficult time if eyeglasses are not worn. Again, low power lenses need to be prescribed if the patient desires clear and stable focus.

7. CORNEA: Carefully inspect for any corneal defects including beginning signs of keratoconus. Note and advise the patient of any old scars and dystrophies along the visual axis that may compromise the focus of the red dot. Check corneal curvatures with the keratometer, or use corneal topography for irregularities. Check the tear film and advise of any possibility of dry eyes, which may cause unstable focus. Recommend dry-eye therapy as needed; use of ocular lubricants may be beneficial before and during shooting.

8. LASIK and RADIAL KERATOTOMY: Foreign matter introduced in the interface and other complications during LASIK procedure may or may not affect vision. Advise accordingly. Irregular astigmatism may result from radial keratotomy and distort the red dot. Frequently, we will have an undercorrection or an overcorrection after surgery and the full lens prescription needs to be given.

9. CONTACT LENSES: Patients correctable to 20/20 or better frequently see only 20/25, 20/30, or worse with contact lenses. This may be due to small uncorrected astigmatism, contact lens surface deposits, or desiccation of the soft lens material. Contact-lens lubricants may help when used before and during a match. A shift in vision may be noted when toric contact lenses rotate. These minor problems may be acceptable to the patient.

10. PUPILS: Note if the patient's pupil is unusually small or large. A small pupil will allow for a longer depth-of-focus but may cause more symptoms with lenticular opacities. A wide pupil will cause a short depth-of-focus and will make it a little more

challenging to find the best lens possible. As the amount of ambient light changes throughout the day, the pupil size will also change and may give different sighting appearances. Inspect the iris for colobomas and for trans-illumination defects that can cause diplopia and glare.

11. CRYSTALLINE LENS: Note and advise the patient of any lenticular opacities which may affect the viewing of the sights. Commonly seen opacities that may not affect non-shooters will affect the shooters' clarity of the red dot or iron sights. Senior patients who have had intra-ocular implants need to be closely inspected for signs of posterior capsular opacities.

12. MACULA: Closely inspect the macular area for any signs of defects including ARMD. Use of Amsler Grid may be helpful.

EYEGLASS SELECTION

1. LENSES: Review past lens types and materials used. Discuss what has worked and what has not. Review ABBE VALUE of various lens materials and possible distortions especially in higher powers. Polycarbonate is the only FDA approved safety material that is widely used today and is always recommended as the first choice. Other materials may be used ONLY with the patient's understanding that they are not approved safety materials. If needed, the patient may be required to sign a waiver of responsibility. Many patients choose to have a dedicated pair of shooting glasses, which should be polycarbonate, and employ other materials for their dress eyeglasses. Note that Knobloch Optik and Neostyle Champion lenses come only in CR-39 plastic. When writing up the lab order, request for "exact power required" and reject lenses that are not .

2. EYEGLASS FRAMES: Frames should not be too small and flimsy (such as rimless). Safety frames following ANSI standards would be best. Wrap-around style frames may require steeper base curve lenses, which may cause distortions. Some sports frames with a one-piece curved front shield may have inserts, which will allow for the patient's prescription lenses. These goggle-type frames have no adjustability, important with moderate to high prescriptions. Being that there are four surfaces in such eyewear, fogging and cleaning may be a problem.

3. MULTI-FOCAL HEIGHT MEASUREMENTS: Have the patient demonstrate their head posture while at their "shooting stance" as you take the proper height measurements. Extreme diligence needs to taken so that the line of sight is not impeded by the near or intermediate portion of the lens. When measured correctly, there should be no restrictions

with bifocal, trifocal and progressive lenses. Verify that the measurement taken with the shooting stance is also compatible with the patient's normal daily use.

4. ANTI-REFLECTION COATINGS and ULTRAVIOLET COATINGS: Discuss the advantages of AR coatings which will reduce glare as well as reflections and UV coatings for blocking harmful UV rays of the sun.

5. TINTS: Kalichrome (yellow) enhances contrast but offers very little shading and may be helpful in low light settings. PLS 530 (orange) and PLS 540 (orange-brown) are tints that block all wavelengths above their stated levels. I have found that it is best for the patients to view tint samples and have them report what they find most comfortable. Transitions photochromic lenses lighten and darken with the amount of direct sunlight and their use is very convenient. Avoid "fashion tints" with no protective qualities. If possible, loaning samples for the patient to view at the range would be most helpful.

I am constantly learning more of the bullseye shooter's needs as I continue to participate in this rewarding sport, and have been revising and adding onto this list. I will, from time to time, update this list as needed, so successive patients may come in with guidelines that differ slightly from these. A check of the version date (under my name, below) will tell you which are the most recent guidelines.

Bullseye shooters are intelligent, honest, law-abiding citizens with great depth of character. You will now have a very happy patient and should you care to see the product of your work in action, we invite you, your family and friends to join us and see what BULLSEYE SHOOTING is all about.

Regards,
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10/05