

Contact Lens Update

CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

Sports vision in practice?

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In principle, sports vision sounds simple – just “manage the vision care needs of athletes”. In practice though, it doesn’t always seem to be quite so clear-cut. Who are our athletes? What are their visual needs? Are they really any different than the rest of our patients? Can athletes’ vision be trained? These are all very good questions, some with simpler answers than others.

Our athletes

First of all, who are our athletes? Professional sportsmen, Olympians, junior hockey players, college and varsity teams? Yes, in some cases we have all of these athletes in our practices. But there are others too: weekend warriors, youth in the community, the runner who passes your house every morning, players on your recreational baseball team. All of these people are our athletes too, but we will never realize it unless we take the time to ask our patients if they play sports.

Vision care for athletes

What are the vision care needs of athletes? This in part depends on their sport(s) of choice, as well as their level of competition and their motivation to improve. At least 80% of the information athletes use to play sport is visual, and a 2007 survey of Olympic level athletes determined that 87% of athletes felt that vision was important to their performance in their chosen sport.¹

Yet, despite the recognized role of vision in sports performance, approximately 50% of athletes have out-of-date eye exams and up to 25% of them have never had an eye exam.²⁻⁴ Perhaps the greatest reason athletes don’t access vision care resources is because they assume that success in sport means their vision must be good. Generally, athletes don’t realize that routine eye care may improve their ‘good vision’ in addition to improving their performance. As in many other areas, more education is needed to get this message across loud and clear.

Are athletes different?

Are the vision needs of athletes really different? We think so, but the evidence is scarce at this time. For the time being, the best answer to this question is yes, we think athlete’s vision is different from non-athletes—at least for tasks that represent the visual demands of their particular sport, such as dynamic visual acuity, but not for standard clinical measures, such as static visual acuity.^{5, 6}

Past research has tried to expand on this understanding, but much of this work suffers from a number of flaws, the most significant being that testing equipment and methods were different for every study.^{5, 6} To date, there are no standardized assessment methods for sports-related visual functions. Furthermore, these studies suffered

because they lacked consistent definitions of “athletes”, “non-athletes” and “elite athletes”, which means that none of them compared similar populations.

While the population issue may be difficult to work around, research groups across North America are beginning the long process of developing and validating sports vision tests, such as dynamic acuity charts, multiple object tracking programs, and visuomotor reaction time protocols. Much more work is needed in this area, but for the first time sports vision research is moving ahead with science in mind, and the outcome looks promising.

The question of visual training

We think athletes’ vision can be trained or modified in some way, such that it impacts their performance, but we are not entirely sure how. To begin to answer this question, researchers must first define what they mean by vision: does vision refer to perceptual processes such as the ability to see and resolve detail (i.e. visual acuity) or does vision refer to how we use visual perception in the real world (i.e. where and when do we look at a pitch in order to decide when to swing?). Historically, sports vision literature and clinical practice have not distinguished between these two types of ‘vision’ very clearly.

With regards to enhancing perception, or perceptual learning, studies have shown it is possible to improve visual functions such as static visual acuity,⁷ but training often takes thousands of hours and the effect may not be clinically significant. Enhancing our ability to use our vision however falls into the realm of motor learning research. Motor learning also appears to be possible and seems to take less time to achieve results,⁸⁻¹² but the outcomes of this research are much harder to measure because improvements in sport performance can be difficult to quantify.

How to begin

Despite controversy in the research literature and the current lack of commercially available standardized equipment, there are simple things we can all do in practice to start providing sports vision services.

- Simply asking, “Do you play any sports?” as part of your case history, and taking a minute or two to ask follow up questions goes a long way to getting established as a sports vision practitioner. You may identify a number of unmet needs and untapped markets just waiting for you in your chair.^{13, 14}
- If you don’t understand a particular sport, ask your patients to tell you more about it. Athletes love talking about what they do!
- Prescribe spectacles or contact lenses that are meant to be used for sport only, so that they become part of the athlete’s “equipment”.
- Be proactive about education and injury prevention. Ninety percent of all sports-related eye injuries are preventable.¹⁵
- Examine the tear film and the ocular surface while considering factors in the athlete’s competitive environment, such as temperature, wind exposure and the presence or absence of water. In this way, you can work to prevent issues such as chronic dry eye, UV exposure and contact lens infections.
- If an athlete has experienced an eye or head injury during sport, conduct a dilated eye exam and measure their visual field to ensure the eye is healthy from front to back.

Finally, consider offering some vision training in your office. Start simple, with one or two small pieces of equipment or one or two sports and build over time, investing further in your equipment as your practice grows.

Examples of commercially available sports vision training equipment include:

- Sports Vision Trainer™, Australia (<http://www.sportsvision.com.au/home/>)
- FitLight Trainer™, Canada (<http://www.fitlighttraining.com>)
- D2™ Vision Training System, Dynavision, United States of America (<https://dynavisioninternational.com>)
- Batak Pro, United Kingdom (<http://www.batak.com>)
- tWall, Germany
- Bassin Anticipation Timer, Lafayette Instrument Company, USA (<http://www.lafayettelifesciences.com>)
- NeuroTracker, CogniSens Athletics Incorporated, Canada (<http://neurotracker.net>)
- Nike SPARQ Sensory Station, Nike, USA

At the end of the day, sports vision can be a very rewarding and enjoyable part of clinical practice. With some hard work and perhaps a little bit of good luck, you will no doubt achieve success. Therein lies the beauty of sport – anything is possible.

REFERENCES

1. Falcetti C, Esterow G. The Vision Care Institute™, LLC Helps 2008 U.S. Olympic Hopefuls and Athletes See Gold Through its New AchieveVision™ Program: New State-Of-The-Art Vision Program to Optimize Vision of U.S. Athletes. In press release - Jacksonville, FL: The Vision Care Institute™, LLC, a Johnson + Johnson company, 2007.
2. Dalton K, Willms A, Cinelli M, et al. Visual characteristics of varsity athletes. *Optom Vis Sci* 2014;91: E-abstract 145134.
3. Dalton K, Hutchings N. Visual characteristics of precision air pistol and air rifle shooters. *Optom Vis Sci* 2014;91: E-abstract 145135.
4. Beckerman SA, Hitzeman S. The ocular and visual characteristics of an athletic population. *Optometry* 2001;72: 498-509.
5. Hitzeman SA, Beckerman SA. What the literature says about sports vision. *Optom Clin* 1993;3: 145-69.
6. Stine CD, Arterburn MR, Stern NS. Vision and sports: a review of the literature. *J Am Optom Assoc* 1982;53: 627-33.
7. Ciuffreda KJ, Wang B. *Vision training and sports*. In: Hung GK, JMP, ed. Biomedical engineering principles in sports. New York: Kluwer Academic, 2004: 407-33.
8. Vickers JN, Livingston LF, Umeris-Bohnert S, et al. Decision training: the effects of complex instruction, variable practice and reduced delayed feedback on the acquisition and transfer of a motor skill. *J Sports Sci* 1999;17: 357-67.
9. Vine SJ, Wilson MR. Quiet eye training: Effects on learning and performance under pressure. *Journal of Applied Sport Psychology* 2010;22: 361-76.
10. Vine SJ, Moore LJ, Wilson MR. Quiet eye training: The acquisition, refinement and resilient performance of targeting skills. *European Journal of Sport Science* 2012: 1-8.
11. Vine SJ, Moore LJ, Wilson MR. Quiet eye training facilitates competitive putting performance in elite golfers. *Front Psychol* 2011;2: 8.
12. Vine SJ, Wilson MR. The influence of quiet eye training and pressure on attention and visuo-motor control. *Acta Psychol (Amst)*;136: 340-6.
13. Erickson GB. *Sports Vision: Vision care for the enhancement of sports performance*. St. Louis: Butterworth-Heinemann Elsevier; 2007.
14. Kirschen D, Laby D. The role of sports vision in eye care today. *Eye Contact Lens* 2011;37: 127-30.
15. Rodriguez J, Lavina A, Agarwal A. Prevention and treatment of common eye injuries in sports. *Am Fam Physician* 2003;67: 1481-8.