Acta Scientific Ophthalmology (ISSN: 2582-3191)

Volume 6 Issue 6 June 2023

Review Article

Contact Lenses in Sports

Sushant Kumar Shah[1] and Kamal Thakur[2]*

[1]*Lecturer, Acharya Institute of Allied Health Sciences, India*

[2]*Lecturer, Nethradhama School of Optometry, India*

***Corresponding Author:** Sushant Kumar Shah, Lecturer, Acharya Institute of Allied Health Sciences, India.

DOI:10.31080/ASOP.2023.06.0640

Received: April 11, 2023

Published: May 25, 2023

Abstract

Introduction: Over the years, playing sports has evolved as a profession from being a fun activity. Athlete across all sports work very hard on their skill to improve their performance where vision plays a significant role. Different aspects of vision such as depth perception, hand-eye-body coordination, colour, contrast, visual memory, and visual reaction time must be functioning at the highest level for an athlete's better performance. Advancement in contact lenses has enabled many athletes with significant refractive conditions the ability to maintain their vision at the optimal level. Contact lenses have become the ideal vision correction choice for virtually anyone involved in sporting activities. The use of contact lenses for vision correction in sports playing general population has been found four times higher than in the overall adult population and is the preferred choice when compared to spectacle correction or refractive surgery. Contact lenses offer several advantages over spectacle. The main objective of contact lens corrections is to provide an excellent vision which is stable in all conditions encountered during sports. Different sport offers different kind of challenge to the athlete which has to be taken into consideration before advising the contact lens.

Keywords: Sports Contact Lens; Sports and Eye; Contact Lenses for Athletes; Occupational Contact Lenses

Key Messages

Contact lens offers several advantages over spectacles and may help in better performance of athletes. Vision correction in athletes always should be based on the refractive condition of the athlete and the nature of the sport played by the athlete.

Introduction

Over the years, playing sports has evolved as a profession from being a fun activity. Athletes and their supporting staff, across all areas of sports, work to improve the performance of the athlete. Vision correction is recognized as one of the important aspects which have a significant role in improving an athlete's performance. Famous football coach Blanton Collier had said that "the eyes lead the body" [1]. as vision provides the information regarding spatial localization, size, strength, and speed required for efficient processing of visual information. Several aspects of the visual system, such as Visual acuity and contrast sensitivity, Stereo vision and depth perception (binocular sensory processes), peripheral vision, and visual integration must be functioning at the highest level for an athlete's better performance [2].

Advancements in contact lenses have provided many athletes with significant refractive conditions and the ability to compete in their respective sports. Contact lenses have become the ideal vision correction choice for virtually anyone involved in sporting activities, whether it is cricket, football golf, tennis, or water sports [3]. Whereas spectacle correction has many disadvantages in sports which can become a limitation to the athlete. The use of contact

lenses for vision correction in sports playing general population has been found 4X higher than in the overall adult population and is the preferred choice compared to spectacle or refractive surgery [4].

Benefits of Contact lenses over spectacles in Sports

Contact lenses offer several advantages over spectacle such as:

- Contact lenses provide more sharper and natural vision (Object size is more consistent with real-world Size) than glasses. As contact lens conforms to the shape of the cornea there are fewer aberrations and also need not worry about unwanted reflection which can occur in glasses.
- Contact lenses provide a wider field of vision by about 15% [5] when compared to spectacles. Better peripheral vision better is eye-hand/body/foot coordination.
- The prismatic effect is induced with most spectacle lenses when the athlete views off the optical centres of the lenses which are eliminated by contact lenses.
- Contact lenses provide excellent visual stability and enhanced depth perception especially useful in dynamic sports as lenses do not dislodge and do not fog up.
- Athletes are at risk of ocular injury from broken frames or spectacle lenses during contact sports. This can be nullified by contact lens wear and also providing psychological advantages over spectacles.

Consideration for contact lens fitting

Not all athletes may be ideal for contact lens wear for a normal period. History and preliminary examination should be carried out to determine the same. Less than ideal candidates can be considered for short-term wear. Prescribing the appropriate type of lens is very important as different sport poses different kind of challenge which can be environmental, lens stability on impact and extreme eye-body position. Any special visual demand required must be considered. It is necessary to assess the visual skill of the athlete before fitting the contact lens and again after the adaptation. Usually, 2 weeks for the adaptation is sufficient after which if visual skill remains the same or doesn't improve the contact lens should be modified or removed.

Consideration for prescription

The main objective of contact lens corrections is to provide an excellent vision which is stable in all conditions encountered during sports performance. All myopic and significant hyperopic refractive errors (≥0.25 D) should be corrected. If not corrected may lead to eye fatigue and athlete's performance deterioration over time. In sports depth perception and dynamic visual acuity are very important so any anisometropia ≥0.50 D should be corrected. Astigmatism >0.50D should be corrected with a toric soft contact lens or RGP lens because they offer better visual acuity and contrast sensitivity than a spherical soft contact lens. If athletes have dehydration problems thick – low water content lenses or silicone hydrogels lenses should be prescribed. This can be noticed in sports requiring intense concentration where the blink rate is reduced. Re-wetting drops can also be suggested in such cases. Disposables and frequent replacement plans are usually suited for the athlete as they require minimal care and maintenance. Also contact lenses that have been worn for some time become soiled which affects vision, comfort, and contrast. A fresh lens enhances vision, comfort and starting a competition with new pair of the lens may give psychological advantages to the athlete. Another good option for athletes where the use of glasses is prohibited is orthokeratology. Athletes can have good vision without fear of injury from spectacle or contact lens loss or dislocation [6]. The greatest disadvantages of ortho-k lenses are they can correct only limited power range, decreased contrast sensitivity [7] and risk of complication. Scleral and mini scleral lenses are the ideal choice for an athlete with irregular cornea, keratoconus as scleral lenses doesn't dislodge from the eye easily and can provide the best vision in such cases [8]. But one has to be careful while prescribing in risk or contact sports like boxing, and karate as an impact on the lens may cause ocular damage. Fortunately, there have not been many cases with the negative impact of scleral lenses in sports activities [9].

Sports-specific fitting consideration

Different sport offers different kind of challenge to the athlete which has to be taken into consideration before advising the contact lens. Some of the sports-specific considerations are hereby mentioned.

Contact lens in water sports

Water sports include sports like swimming, scuba, kayaking, water polo etc. Generally, contact lenses are contraindicated in water activities due to the increased risk of infection from the water source. Also, there is the possibility that the lens may get lost in the water. Some cases may be fitted with contact lenses considering the athlete is highly motivated for the same. A few extra steps in the fitting may reduce the risk like irrigating the eye with fresh saline or rewetting drops as soon as possible after leaving the water, using daily disposable contact lenses which can be discarded after a single use. RGP lens should be avoided. The use of thick loose fitted soft contact lenses can prevent lens loss. Swimming goggles are must during water sports.

Contact lens in winter sports

Sports like skiing, ice hockey, luge, and skating that are played in snow or ice come under the winter sports [10]. Winter sports possess an extreme environmental challenge to the athlete when the temperature can fall to -40°C [11]. Not only temperature but other factors such as UV radiation and contact lens dryness are the challenges for prescribing the contact lens in winter sports. Athletes usually do not prefer spectacle as it fogs easily in such conditions. Contact lenses are a better choice keeping a few things in consideration as prescribing rewetting drops to the athlete, UV absorbing CL, daily disposable or frequent replacement plan, low water content and high DK/t material lenses [3].

Contact lens in dynamic sports

Sports like cycling, tennis, and basketball, which require extreme body movement and speed come under dynamic sports. Athletes who play dynamic sports require very clear stable vision and a wide peripheral field of view [12]. For these reasons, soft contact lenses with precise fitting are recommended in such sports [3]. Also, some of these sports spectacles and sunglasses are contraindicated so a UV-absorbing CL can be a good option.

Contact lens in risk sports

Sports like football, hockey, karate, and boxing where athlete are at risk of getting a blow on the head or body comes under risk sports or contact sports [13]. Athletes may have to avoid small fast-moving objects which can cause injury to the eye. Spectacle glasses are contraindicated in such sports as it may cause injury if broken. RGP lenses are also contraindicated as they may easily get dislodged. Soft contact lenses are advised for any refractive error correction but they do not provide protection against injury [3]. If permitted athletes should wear protective safety glasses or shields/helmets [11]. Fitting consideration for SOFT CL is the same as in dynamic sports that lens should be precisely fit for stable vision [3]. An athlete has to be taught how to find dislodged lenses if any.

Contact lens in Indoor sports

Indoor games such as table tennis, basketball, and chess all have artificial environments. These environments promote dryness and decreased contrast sensitivity. Indoor sports which require dynamic movement should be fitted with only a soft contact lens and if dynamic movement is not necessary then RGP can also be prescribed. Re-wetting drops should be prescribed if dryness. Disposable contact lenses are better at improving the contrast in indoor sports.

Contact lens in E-sports

E-sports has become very popular nowadays with a large number of audience. E-sports game which is played on a computer, PlayStation or mobile require player attention for longer hours on display. Most E-sports games are very task-demanding causing visual fatigue and reducing blink rate and musculoskeletal pain. E-sports players can be fitted with contact lenses keeping above mentioned things in mind. Fitting them with silicone hydrogel contact lenses would be a good choice because of fewer chances of lens pervaporation and gives a long wearing time. An option like blue cut contact lenses are also available. As prolonged near work can cause myopia progression in children which is associated with E-sport players as there is an in-game competitions or tournaments for gamers that pressurise players to play the game for long hours and master the art. Orthokeratology can be a great option for E-sports players controlling myopia progression and providing a spectacle and contact lens-free game experience during day time.

Conclusion

Vision has a very important role in a player's performance. Different aspects such as depth perception, hand-eye-body

coordination, colour, contrast, visual memory, and visual reaction time are required for better performance [14]. Several vision correction options are available but players often go with either contact lenses or refractive surgery [4]. Refractive surgeries have an advantage over contact lens as it eliminates the need of using prescription eyewear and have no risk of lens loss or damage from the lens. However refractive surgeries have a limited range for refractive correction, many may face problems with halos or decreases contrast, and athletes have to wait for their power to get stable and risk post-surgical complications [11]. Similarly, even contact lenses may also not always be the choice of correction. Therefore vision correction in athletes always should be based on the refractive condition of the athlete and the nature of the sport played by the athlete.

Bibliography

1. Collier B. "The eyes lead the body". *Optometric Management* 15 (1979): 73.
2. Kirschen DG and Laby DL. "The role of sports vision in eye care today". *Eye Contact Lens* 37.3 (2011): 127-130.
3. The International Association of Contact Lens Educators: Special topics. 1st ed. Contact Lens Course Module 9.
4. Zeri F., *et al*. "Refractive error and vision correction in a general sports-playing population". *Clinical and Experimental Optometry* 101.2 (2018): 225-236.
5. Benjamin WL. "Visual optics of contact lenses". In Bennett ES, Weissman BA, editors: Clinical contact lens practice, Philadelphia, JB Lippincott (1991).
6. Gary Heiting and Donald S Teig. "Orthokeratology for Athletes". All Abour Vision. February 27, (2019).
7. Chang CF and Cheng HC. "Effect of Orthokeratology Lens on Contrast Sensitivity Function and High-Order Aberrations in Children and Adults". *Eye Contact Lens* (2020).
8. Booras K. "Scleral Contact Lenses: Applications in Sports Vision". Poster presented at: American Academy of Optometry meeting. Nov.12-15, Denver, CO (2014).
9. Markus Ritzmann. "Blunt Trauma with Scleral Lens". *Global Insight*. March 31, (2020).
10. Nanna L Meyer., *et al*. "Nutrition for winter sports". *Journal of Sports Science* 29 (2011): S127-136.
11. Kristine Dalton and Gavin Rebello. "Prescribing Lenses for Athletic Patients". *Contact Lens Spectrum* 29 (2014): 30-32, 34.
12. John Dreyer. "Sports and Contact Lenses". *Eye Health Central*, 1 Jun (2016).
13. Avinash Mishra and Ashok K Verma. "Sports related ocular injuries". *Medical Journal Armed Forces India* 68.3 (2012): 260-266.
14. Erickson G. "Sports Vision: Vision Care for the Enhancement of Sports performance". St. Louis, MO. Butterworth-Heinemann Elsevier; (2007).