

3rd
Edition



Contact Lens Fitting Guide

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Sports and Contact Lenses

INTRODUCTION

Contact lenses are one of the most important modes of vision correction in sports. While fitting contact lenses to athletes, it is to be remembered that contact lenses are not fitted to athletes but the athletes are fitted to contact lenses. The following considerations are important before fitting contact lenses to athletes and players:

- Sports and the position of athlete in the sports.
- Risk of trauma which may be very common in dynamic sports, e.g., soccer or hockey.
- Environment, for example, indoor environment usually is characterized by no air flow and low humidity.
- Relative risk of nonionizing radiations.
- Comfort issues which may be worst in non-dynamic sports when the eyes are static.

All these conditions must be considered in relation to the athlete's own physiology. In sports like swimming or sailing, the choice of correction may be combination of contact lenses and spectacle on top. **Flowchart 9.1** shows the advantages of fitting contact lenses to athletes.

Peripheral Awareness

Nearly all sports demand good peripheral awareness. Possessing a relatively large field of vision is obviously asset in terms of sports

Flowchart 9.1: Advantages of fitting contact lenses for athletes.



performance. There are two simple reasons. Nature and evolution have made us more sensitive to movements in the periphery area of field of vision. Typically, lots of conflicting movements are often present in our peripheral field of vision. It implies, therefore, in addition to seeing the peripheral area of field of vision, an awareness of the objects in the periphery is equally important. Since contact lenses move with eyes, they provide an excellent macular field of vision. On the contrary, glasses are paired with the frame where lens edge and the frame rim also limit the field of vision. In basketball and football, both offensive and defensive players must have awareness of where the ball is, where his teammates are, and where the opponents is at all time, suggesting that the larger range of field is a factor that greatly contributes to good sporting performance in these events.

No Prismatic Effect

Observing through an eccentric zone of the lens creates a prismatic effect. A prismatic effect leads to deviation similar to heterophoria that the individual tries to compensate with his own binocular fusion. It may cause:

- Strain, if the deviation is moderate.
- Asthenopia or diplopia, if the deviation is greater. The result is observed as increase in fixation disparity or unstable fixation disparity which ultimately affects stereopsis adversely.

Since contact lens does not significantly decentralize with respect to the individual's visual axis, no undesirable prismatic effects occur. This is particularly important in case of anisometropia.

Reduced Magnifications and Minifications

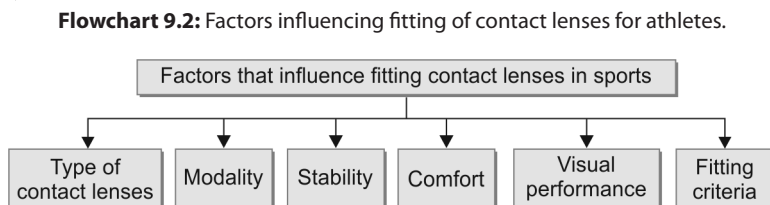
A minus spectacle lens makes objects in the field of view appear smaller; whereas, a plus prescription makes objects look larger in the field of view. These changes are further aggravated when the refractive error is significantly higher. This is due to the vertex distance. Sometimes, it may create difficulties for an individual to move about in his environment without considering a short period of adaptation. With contact lenses, however, the objects are not so much magnified or minified as they lie on pupillary plane. So, this is an important criterion to select a vision correction mode for an athlete. However, an athlete

who is habituated to use spectacle may find it difficult to adjust to contact lenses when fine judgment of depth is required. As it can be seen in table tennis where timing of a top spin smash relies critically on the distance of the bat from the ball and half of a millimeter can have drastic effect on the timing.

Safety and Cosmesis

Cosmesis is all about appearance and look. How an individual looks to him and others is important; this is natural and cannot be ignored. There is no right and wrong when it comes to cosmetics. Some people feel that they look good in spectacles, while others take spectacles as the stealer of their personality. If an athlete does not wear a correction modality just because he feels that he does not look good, it would defeat the whole purpose of dispensing. This seems true also as playing sport is a social activity as much as an expression of competitive needs. The mode of correction which is cosmetically not appealing will detract the pleasure of the game. Another perception that has been seen to dominate the people's mind is that a product that looks good also performs better. It is coincidence that sports frames have part of their appeal routed in their fashion appeal. Contact lenses have the intrinsic advantage of not affecting the natural appearance of the athlete. When soft lenses are used for swimming, they also give a degree of protection from chemicals in the water. As long as lenses are disposed off after swimming, chemicals absorbed by the lenses do not remain in contact with cornea any longer. Hence, it could be argued that this is an advantage of wearing clean daily disposable contact lenses for swimming.

The factors that influence fitting of contact lenses for athletes are given in **Flowchart 9.2**.



FACTORS TO CONSIDER FOR CONTACT LENS FITTING**Type of Contact Lenses**

Broadly there are two types of contact lenses:

1. Rigid gas permeable
2. Soft contact lenses

Rigid gas permeable lenses provide better visual acuity but the level of comfort is less as compared to soft contact lenses. There is an adaptation period of time which is quite significant and the wearer may feel the effect of glare and flare in dim light conditions. Soft contact lens improves peripheral vision and is more comfortable. Most wearer adapt to soft contact lenses very quickly. Soft contact lenses are the lenses of choice in sports.

Modality

The modality of contact lenses depends upon the duration of the sports and sporting environment. For example, in water sports like swimming or sailing, the first choice of modality is daily disposable lenses. Risk of *acanthamoeba* infection and chemical keratitis is unavoidable in swimming pool. The soft contact lenses absorb the contents of the water and if it is used for long, it could adversely affect, making daily disposable the lens of choice.

Stability

The need for stability affects the lens choice and fitting criteria. Soft contact lenses in fresh water (hypotonic) stick to cornea due to passage of water into the cornea and it floats away in salt water (hypertonic). This can be used to advantage in sports like canoeing, sailing, and water polo—as long as the lens sticks to right place. There are situations where contact lens may not be the correction of choice.

Comfort

Contact lens discomfort is a condition characterized by episodic or persistent adverse ocular sensations related to lens wear, either with or without visual disturbance, resulting from reduced compatibility between the contact lens and the ocular environment which may include eyes stinging, burning, itching, eye pain, abnormal feeling of

something in the eye, and excessive watering of the eyes. Low humidity and no air flow in indoor environment may reduce wearing comfort. Static eye may also lead to reduction in lens wearing comfort.

Visual Performance

Contact lenses can influence contrast sensitivity, but their impact is generally overshadowed by the effective correction they provide, especially when addressing minor refractive errors. Contact lenses are very effective solution for managing slight refractive issues. In cases of small cylindrical errors, individuals may often experience persistent efforts to achieve clarity and occasional spasms, issues that can be conveniently addressed with spherical contact lenses.

Contact lenses prove particularly advantageous for monocular refractive error correction, and athletes with a strong dominant eye may notice significant improvements in depth perception and anticipation. However, it's crucial to approach the fitting process with care. Transient instability of vision post-blink becomes critical, especially in sports where static visual acuity plays a pivotal role. Loose-fitting lenses can exacerbate visual decrement, emphasizing the importance of a precise and secure fit.

Fitting Criteria

Stability of contact lenses on the cornea is very important for accurate and undistorted vision. So, large diameter and steep fitting is advised for the duration of the game. Athlete may be informed that separate pair of contact lens needs to be used during sports which are not needed otherwise.

Contact lenses can be lost in many competitive contact sports especially some water sports where contact lenses can be contraindicated. Sport is not always clean and hands that get muddy or faces that get muddy make contact lens wear even more problematic. It is, therefore, important to consider the environment in which the athlete plays. Cold environments are often associated with low humidity, which in turn tends to induce lens dehydration. It suggests that low water content lenses will provide maximum resistance to lens dehydration. At high altitude, temperature falls and partial pressure of oxygen in the atmosphere decreases which suggests that High Dk/t lenses are essential for good ocular health. Rigid gas

permeable lenses are prone to trap debris beneath the lenses and are clearly contraindicated in dirty and dusty environment. Aquatic environment is not suitable for contact lenses. Contact lenses are likely to increase the rate of infection. In fresh water chlorinated pool, there is a risk of Acanthamoeba infection. High water content lenses are contraindicated in marine due to salt environment.

Multiple Choice Questions

- 1. Which of the following contact lens has been suggested for swimming?**
 - a. RGP lenses
 - b. Daily disposable soft contact lenses
 - c. Monthly disposable soft contact lenses
 - d. None of the above
- 2. Which of the following is not the reason for contact lens related discomfort?**
 - a. Low humidity
 - b. No air flow in indoor environment
 - c. Static eye
 - d. Low altitude
- 3. Which of the following is the most important criterion for fitting contact lenses to athletes and players?**
 - a. Stability of contact lens on cornea
 - b. Modality of contact lens
 - c. Type of lens material
 - d. Design of contact lens

Answer Key

1.	(b)	2.	(d)	3.	(a)
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Contact Lens Fitting Guide

Key Features

- Simple, concise yet comprehensive with problem-solving MCQ's.
- This new edition is more resourceful as an instant reference on the desk of both students as well as practitioners.
- A new chapter "Sports and Contact Lenses" is the unique addition to this edition, making it more befitting to contemporary practice.

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