

DISPOSABLE CONTACTS

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What's New In Disposable Contact Lenses?

In this issue of The Eye Newsletter, I will discuss seven new and exciting disposable contact lenses.

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These seven contact lenses are the latest in our continuing efforts to solve the problems of comfort, bifocal need, disposability for all corrections, advanced oxygen permeability, and the need for water retention in dry eyes.

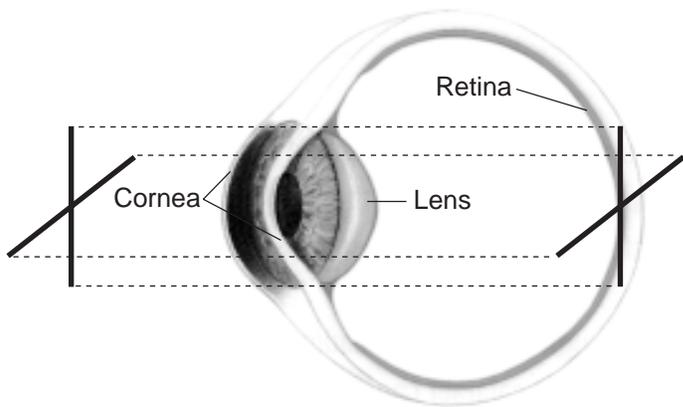


Fig. 1. Emmetropia

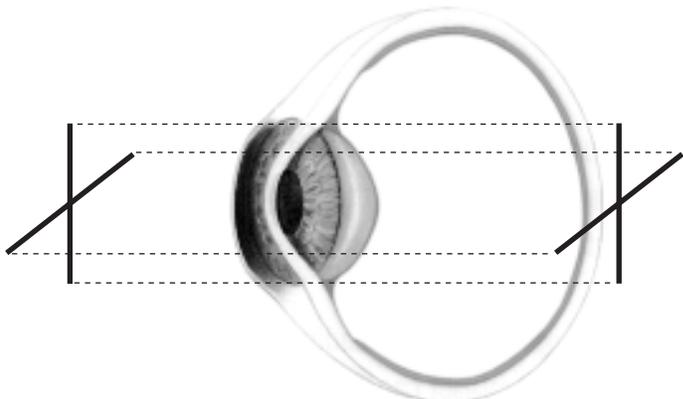


Fig. 2. Hyperopia

I will just briefly explain a little anatomy of the eye for those who are not familiar with the subject.

Cornea. As most of you know, the front layer of the eye is called the cornea and this layer optically functions to help bend (refract) light rays into the eye. The cornea is about one millimeter thick and requires oxygen from the air for its health, as it has no blood supply of its own.

Lens. The lens is behind the iris and adds to the corneal refractive abilities to help focus light rays on the retina.

Retina. The retina receives the light; its cells become activated and send the information to the visual center of the brain where it is seen.

What causes the eye to be farsighted, nearsighted, astigmatic, or need reading glasses? In this discussion, normal means emmetropia - a correction is not required to focus distant rays of light on the retina (Fig. 1).

Farsightedness (hyperopia). Hyperopia is present when the normal distant rays of light focus behind the eye. This occurs when the eye is either shorter than normal or when the cornea is flatter than normal (Fig. 2).

Nearsightedness (myopia). Myopia is present for just the opposite reasons and the distant rays of light focus in front of the back of the eye. This occurs when either the eye is longer than normal or when the cornea is steeper than normal (Fig. 3).

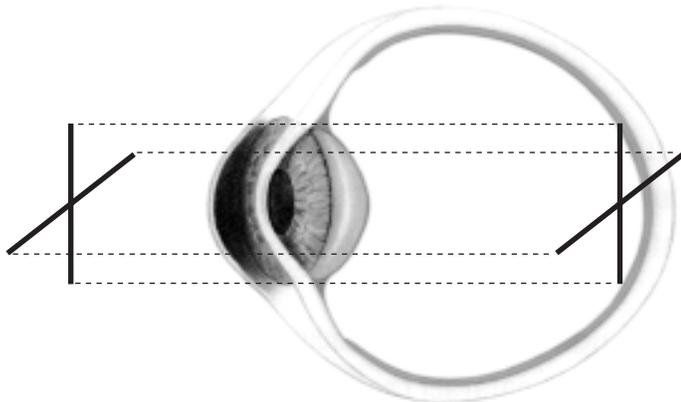


Fig. 3. Myopia

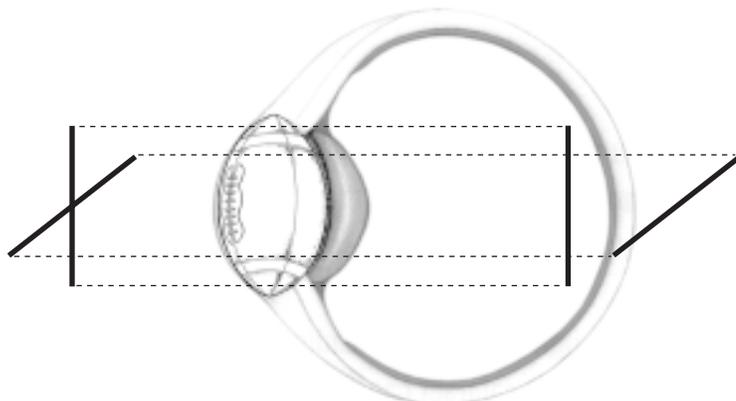


Fig. 4. Astigmatism

Astigmatism. Astigmatism occurs when the cornea (or another portion of the eye) is shaped like a football. The optically steeper stronger curve of the football focuses the vertical line of the image closer to itself, while the optically flatter weaker curve of the football focuses the horizontal line further away from itself (Fig. 4).

Presbyopia. Presbyopia is an age-related condition in which the lens in the eye becomes stiffer and the muscles that control lens shape cannot change the thickness of the lens. When the lens cannot change shape (become thicker), we need extra focusing help to see images that are close to us as occurs in reading.

Contacts and glasses correct these optical conditions by:

- 1) Helping to converge the light rays in hyperopia
- 2) Helping to diverge the light rays in myopia
- 3) Using different lens powers at two different positions in astigmatism, and
- 4) Helping to bend just the light rays from near objects in presbyopia.

That's it for anatomy except for one more thing – oxygen. The ability of oxygen to pass through a contact lens (oxygen permeability) is directly related to how long one can safely wear a contact lens and to the degree that contact lens wear causes corneal swelling. Corneal swelling does not normally occur with your eyes open. When the eyes are closed during sleep, the normal cornea swells 1.9%. Previously,

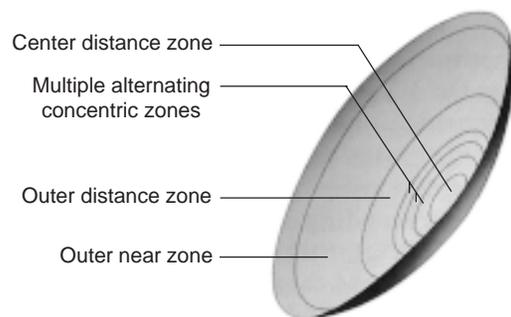
even the best of the extended wear contacts caused a 9.1% corneal swelling rate during sleep. This is why most of us who fit contacts strongly discourage sleeping even in contacts intended for extended wear. Corneal swelling and oxygen deprivation can cause corneal scars, new blood vessels growing into the cornea to supply more oxygen, and a complication rate of infections and ulcers that is ten times more than if you just wore the extended wear lens as a daily wear lens. Now, on to the new stuff.

With the regimen our office uses, you may wear each of these disposable lenses for one month. It is a simple routine that only requires you to clean your lenses on a weekly basis with a standard soft lens cleaner.

Acuvue Bifocal Lens. The Acuvue Bifocal contact lens is a new bifocal design in a 58% water polymer. It incorporates an inside/outside marker with the use of a number “123,” an ultraviolet blocker, and a visibility tint. The lens utilizes a concentric ring design of five alternating near and far refractive zones, with the center zone as the distance prescription.

During bright light conditions, the pupil constricts and the center zone provides distance correction. The three middle zones, along with the center zone, deliver equal amounts of near and distance vision under intermediate light conditions. The outer distance zone provides added distance correction to improve vision during night driving (the pupil is larger) and other low vision situations. The outer near zone is especially helpful for normal reading positions when looking down at reading material (the eye moves down and looks through the outer portion of the contact lens).

This bifocal contact lens has worked the best of all the bifocal lenses we have tried over the last several years.



PureVision. This silicone hydrogel contact lens is designed purely for extended wear use and for those cases where the highest oxygen level must be maintained for normal corneal health. With this lens, corneal swelling while asleep has been documented at 3.0%. The chart below shows a corneal swelling comparison between the PureVision lens and a regular hydrogel soft lens. A unique surface finish results in a wettable surface that reduces deposits. This level of oxygen permeability should allow you to wear your lenses for six nights each week. The lenses should be cleaned, rinsed and then disinfected during the seventh night.

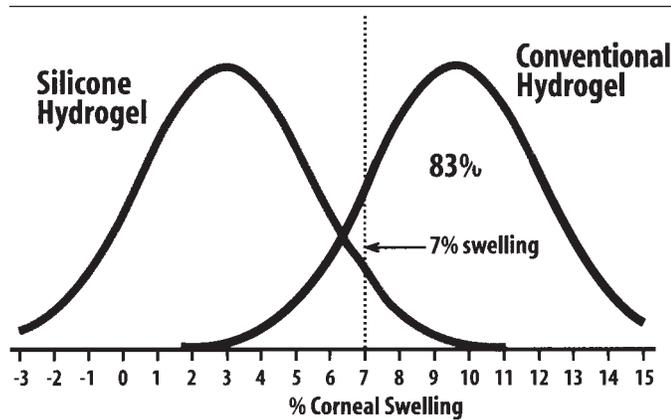


Chart 1 Overnight corneal swelling with a silicone hydrogel compared to a conventional hydrogel lens. Note that with overnight wear of a conventional hydrogel lens 83% of wearers experience 7% or greater swelling.



Soflens 66 Toric and Frequency 55 Toric. Astigmatism correction is one of the fastest growing segments of our contact lens practice. As can be seen with the astigmatism model (Fig.4, page 2), you have to grind two different optical curvatures into the lens so that you can correct one axis with one power and the opposite axis with a different power. This requires that the lens does not rotate. Fig. 5 shows the general construction of a toric contact lens. This provides for an overall power for the entire lens and a different power for the toroidal curve. The lens is also thinner in the periphery and thicker in the center (the area that lies between the eyelids). This design allows for a lens that moves up and down, but does not rotate. Because of this, we can now offer stable, reproducible vision with these one-month disposable lenses. Note the demarcation lines that appear on the lower portion of the contact lens (Fig. 6). These lenses are especially tear resistant and are easy to handle.

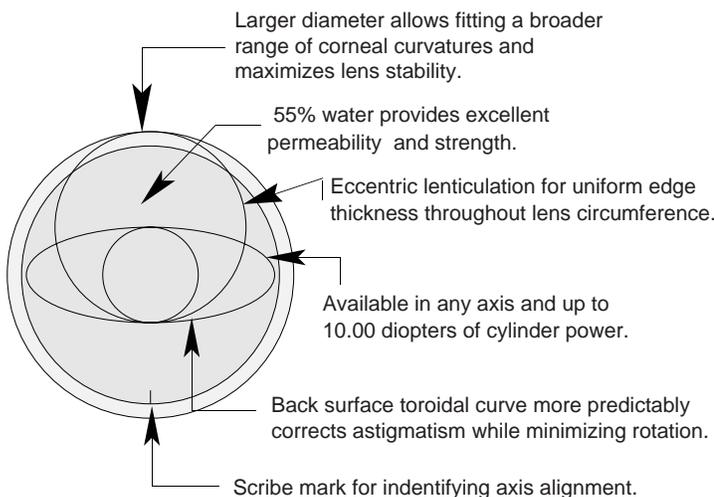


Fig. 5. Schematic of astigmatism correcting soft contact lens

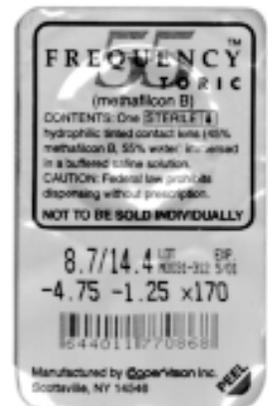
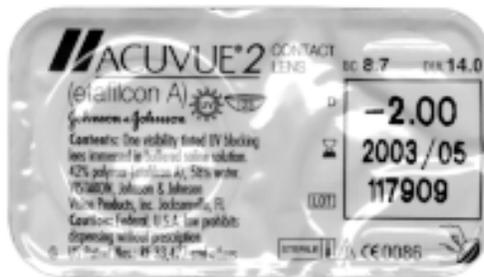


Fig. 6. Toric contact lens

Proclear. The U.S. Food and Drug Administration has recently permitted the product labeling for Omafilcon A to say that the material may provide improved comfort for contact lens wearers who experience mild discomfort or who have dry eye symptoms during contact lens wear. The lens material incorporates the water-retaining polymer phosphorylcholine and is available with the Proclear line of contact lenses. This material is beneficial for dry eye symptoms caused by an evaporative type of dry eye or from an aqueous tear deficiency. These lenses may not help every dry eye patient, but they add a new and strong tool for our dry eye management program. We have several patients who have had significant relief of their dry eye symptoms with these special lenses.



Acuvue2. This is a new version of the regular Acuvue contact lens. It maintains the high oxygen transmission and the sharp vision of the regular Acuvue lens; and it is easier to handle and to determine when it is inside out. There is a number “123” that is embedded in the surface. If it shows “321,” it is inside out.



1-Day Acuvues. The patient benefits of single-use daily wear lenses include the comfort and good vision one gets from a fresh lens and the elimination of lens care. Discomfort from lens deposits or chemical sensitivity is no longer a problem. The 1-Day Acuvue is available in two base curves and allows us to fit a greater variety of corneal shapes than before. Many patients like this lens because they can wear it as an occasional wear contact lens, such as for weekend sports or social occasions.



The choices have become so great that almost anyone can wear contacts that are safe, hassle-free, comfortable, provide good vision, and are disposable. There is almost no refractive condition that cannot be satisfied with a disposable contact lens.