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Driving with Bioptic Telescopes: *Information for individuals with low vision*

Bioptic Telescopes can help the visually impaired obtain or retain their driver's license,* increasing their independence and quality of life!



What the experts say:

"the vast majority of bioptic drivers find the bioptic telescope useful in a range of driving tasks."¹

"The majority (74%) rated the bioptic telescope as very helpful, and almost all (90%) would continue to use it for driving, even if it were not required for driving licensure."²

"This study failed to find any evidence suggesting that bioptic drivers were more prone to near-collision(s) than healthy drivers."⁶

What are bioptics and how do they help driving?

Bioptic telescopes are eyeglasses that contain miniature telescopes mounted toward the top of the eyeglass lens. They function in much the same way as binoculars by enlarging the image, allowing the visually impaired to see much further ahead. Drivers using bioptics look through their regular eyeglass lenses most of the time, and only sight through the telescope for short periods of time, similar to the use of rear and side-view mirrors in the car.

The Challenge of Driving with a Visual Impairment

Visually impaired drivers often find that they must get closer to a sign, signal or obstacle in order to see it well. As a result, there may be insufficient time to make the appropriate driving adjustments. The bioptic telescope allows the driver to see the target sooner, providing more time to respond.

In practice, the bioptic telescope increases the individual's ability to see further forward by a factor of the power of the device. For example, a 3x telescope will allow the user to see a sign at 60 feet through their bioptic, while they would only be able to see it at 20 feet with their normal vision-- a 3 times distance viewing gain.



Highway sign with normal vision



Highway sign with 20/100 (6/30) vision (simulated)



Highway sign using 3x Keplerian Bioptic (simulated)

What makes a driver safe on the road?

Driving instructors and DMV Examiners expect that capable drivers will exhibit the following safe driving behaviors:

- Maintaining appropriate speed and lane position,
- Making judicious and predictable driving adjustments,
- Avoiding obstacles, pedestrians and other traffic,
- Anticipating potential hazards so that proactive, defensive actions can be taken to avoid or minimize their risk.³



Do bioptics really help? *Studies show that they do!*

Studies show that experienced bioptic drivers only look through their bioptic telescope 2-3% of the time while they are driving^{4,6}. However, the intermittent use of the bioptic telescope should not outweigh its value. One study reported “that the vast majority of bioptic drivers find the bioptic telescope useful as an assistive device in a range of driving tasks.”¹ Another study found that “the majority (74%) rated the bioptic telescope as very helpful, and almost all (90%) would continue to use it for driving, even if it were not required for driving licensure.”²



Importantly, and perhaps not surprisingly, prior driving experience and on-road bioptic driver training are associated with better bioptic driving skills outcomes.⁵

Low Vision Specialists Recommend Ocutech Bioptic Telescopes

Ocutech telescopes are preferred by low vision prescribers for their advanced optics, appearance, ease of use, and their high quality. Ocutech low vision telescopes:

- Provide the widest fields of view available
- Are designed to be light weight, compact, and comfortable to wear
- Include specially designed optics to enhance image sharpness and clarity
- Include a full range of options to customize the system for one's individual needs
- Include industry-leading product warranties and user and prescriber support
- Developed originally with grant support from the National Eye Institute (NIH)

Popular Ocutech Bioptic Telescope Systems Prescribed for Driving



VES Sport-II: 4x, 5x, 6x Powers



SightScope: 1.7x, 2.2x Powers



VES Mini: 3x Power



VES Explorer: 3x, 4x Powers



Reveal: 2.2x Power

Bioptics can help visually impaired individuals to see better for a full range of activities.

Ocutech bioptic telescopes can help a visually impaired individual see better at any distance, but are especially helpful for use at distance for **viewing television, movies and theater, seeing faces, signs, the classroom, shopping, traveling, and mid-range distances** such as table-top activities including **card and game playing, reading music and the computer**. In addition to driving, Ocutech wearers have even used their systems to **hike, golf, bowl, paint, fish and mow the lawn**.

Visit the Ocutech bioptic driving page to learn more
and to watch the bioptic driving video.
<https://ocutech.com/driving-with-bioptics/>



References:

1. [Owsley C](#), [McGwin, Jr. G](#), [Elgin, J](#), [Wood, J](#). **Visually Impaired Drivers Who Use Bioptic Telescopes: Self-Assessed Driving Skills and Agreement With On-Road Driving Evaluation**, *Investigative Ophthalmology & Visual Science*, 2014, Vol.55, 330-336.
2. Bowers AR, Apfelbaum DH, Peli E. **Bioptic telescopes meet the needs of drivers with moderate visual acuity loss**. *Invest Ophthalmol Vis Sci*. 2005;46:66-74.
3. Marottoli RA, Cooney LM Jr, Wagner DR, Doucette J, Tinetti ME. **Predictors of automobile crashes and moving violations among elderly drivers**. *Ann Intern Med*. 1994; 121: 842-846.
4. Luo G, Peli E. **Recording and automated analysis of naturalistic bioptic driving**. *Ophthalmic Physiol Opt*. 2011; 31: 318-325.
5. [Dougherty BE](#), [Flom RE](#), [Bullimore MA](#), [Raasch TW](#). **Vision, training hours, and road testing results in bioptic drivers**. *Optom Vis Sci*. 2015; 92(4):395-403.
6. Mojtaba Moharrer, Shuhang Wang, Bradley E. Dougherty, Walter Cybis, Brian R. Ott, Jennifer D. Davis, and Gang Luo. **Evaluation of the Driving Safety of Visually Impaired Bioptic Drivers Based on Critical Events in Naturalistic Driving**, tvst.arvojournals.org 2020 | ISSN: 2164-2591

*You should consult your low vision specialist and your jurisdiction's Department of Motor Vehicles to determine your eligibility and the requirements and restrictions for using bioptics for driving in your community. Decisions regarding driving with bioptics rest solely with the licensing agency, the prescriber and the user. Ocutech makes no claims regarding the fitness of any of its devices or the fitness of any individual using bioptic telescope devices for driving.