

Prescribing Bioptic Telescopes for Driving:

Considerations and Suggestions for the Low Vision Specialist

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What makes a driver safe?

What concerns us when a visually impaired individual drives? What makes any driver safe on the road? Since the frequency of accidents is greatest among normally sighted drivers, how relevant is the influence of sharp vision to safe driving?

We expect drivers to not expose themselves or others to unreasonable risks. Safe driving behavior includes maintaining appropriate speed and lane position, making judicious and predictable driving adjustments, avoiding obstacles, pedestrians and other traffic, and anticipating potential threats so that proactive, defensive actions can be taken to avoid or minimize their risk.¹

The value of sharp distance vision as a requirement for safe driving has been difficult to prove.² Interviews of normally sighted drivers after an accident frequently indicate that they didn't see the other vehicle, suggesting an attentional rather than visual cause. Nor can accidents experienced by visually impaired drivers be clearly associated with visual acuity factors.³ Certainly, severe visual acuity loss poses unacceptable driving risks; however these individuals would not be licensable candidates in any event.

Do bioptics really help?

Nevertheless, situations do exist where sharp distance vision will be of value to the visually impaired driver. While these instances might be encountered only occasionally, the visual benefit offered by a bioptic telescope may contribute to a safer outcome than might otherwise occur. Toward that end, the infrequent use of a bioptic telescope should not outweigh its potential value. Despite the evidence that bioptic drivers may only look through their bioptic 2-3% of the time⁴ 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."⁵ 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."⁶



Importantly, prior driving experience and on-road bioptic driver training are associated with better driving skills outcomes.^{7,8} However, since the telescope is used for such brief periods of time, if the individual cannot demonstrate competent driving skills without a bioptic telescope, the bioptic telescope cannot be expected to improve their performance. Nevertheless, there is clear evidence that a competent driver can become a safer driver when using a bioptic telescope if they can learn to use it effectively.^{6,7,9} As a result, proper and effective training in the use of the bioptic while driving is essential.⁸

If maximizing on-road safety is to be the primary goal of a bioptic telescope prescription (as compared to improving sign and signal identification), we suggest that a lower power, wider field of view device might be more beneficial than the narrower fields of view of higher power versions which will constrain road awareness. In addition, the higher the power, the more the magnified image will move due to head, vehicle and target motion, potentially making the object of regard more challenging for the driver to find, discern and derive relevant information from.



Bioptic prescribing suggestions

Based upon these considerations, we propose the following:

1. **Be certain to know your state's requirements for bioptic driving:**
 - a. Limits of visual acuity of a bioptic driver both through the carrier lenses and through the telescope.
 - b. Required telescope characteristics (monocular vs. binocular, maximum powers, focusable or fixed focus, etc.) allowed (if mandated).
 - c. Websites where such information is available include:
 - i. <https://ocutech.com/wp-content/uploads/2020/09/Bioptic-Driving-Regulations.9-2020.v2.pdf>
 - ii. <http://www.biopticdrivingusa.com/state-laws>
2. **Consider prescribing a telescope power that provides visual acuity no better than 20/30 to 20/40** and that provides the widest field of view possible. This implies prescribing Keplerian telescope optical designs for powers of 3x and higher.
3. **When prescribing for one eye**, the preference is to prescribe to the dominant eye, since it is usually more natural for the bioptic wearer to sight and localize using that eye.
 - a. **If the dominant eye is the poorer-seeing eye**, consider prescribing a monocular telescope to that eye, so long as you can achieve the desired visual acuity through the telescope.
 - b. **If you must prescribe to the non-dominant eye**, consider a binocular prescription if possible and permissible in the driver's jurisdiction.
4. Since the vast majority of driving will be conducted using the carrier lenses, it might be desirable to confirm that the individual has the potential to become a competent driver before prescribing a bioptic, especially if the sole purpose of the bioptic would be for driving purposes.

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



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