The American Optometric Association acknowledges that driving is not a right but a privilege. Issues related to public safety are of primary concern. However, access to driving privileges should not categorically be denied to individuals with reduced visual acuity. Driving privileges should be allowed for individuals with adequate residual vision and cognition, who demonstrate the abilities to be a qualified, competent driver. This paper describes the bioptic driving population, the multifaceted aspects of vision, principles of bioptic telescopes, current vision criteria used for drivers’ licensure, and multidisciplinary adaptive driver education programming. It reviews current research and suggests areas of future research and interdisciplinary cooperation. The American Optometric Association calls for a rational approach to consideration of individuals adapted to bioptic telescopic spectacles who apply for driver’s licensure.

WHO ARE THE BIOPTIC DRIVING POPULATION?

Current figures vary significantly, based on the criteria used to define visual impairment, as to how many Americans are visually impaired. With this in mind, it has been estimated that there are between 3.4 and 16.5 million Americans who are visually impaired today. The majority of these individuals have distance visual acuity in the 20/50 to 20/200 range. According to Prevent Blindness America, twice as many people will be visually impaired in 2030 as there are today. Visual acuity alone may be a useful quantitative measure, but does not provide a qualitative measure of the multifaceted visual skills that impact driving. Abilities related to visual field, color perception, contrast discrimination, photosensitivity and glare recovery, oculomotor skills, etc., along with cognitive factors vary significantly amongst individuals with a visual impairment, suggesting the need for thorough evaluation and individual consideration.

For the purposes of this paper the segment of the “low vision” population referred to has undergone a current comprehensive vision rehabilitation evaluation, by an optometrist or ophthalmologist, to assess the status of ocular pathology and address the multiple visual factors described above. Access to independent mobility at any level is a primary goal in vision rehabilitation. Livelihoods may depend on independent mechanized mobility. Prescription of bioptic telescopic spectacles may be appropriate to assist with ambulatory mobility in addition to a variety of visual needs especially in relation to education and employment. The optometrist or ophthalmologist may have the opportunity to select candidates who may be able to master dynamic skills required for driving with the use of bioptic telescopes.

The eye care practitioner may work with associated professionals in blind rehabilitation, driver education, occupational and physical therapy and/or state driver improvement departments to assist appropriate individuals in gaining driver’s licenses. Figures vary concerning how many states permit driving with bioptic telescopic lenses. However, most reports indicate that around 2/3 of states permit driving with a bioptic telescope. Obtaining bioptic telescopic spectacles does not guarantee that an individual will be granted a driver’s license in those states. The effectiveness of an individual’s visual and functional performance with the bioptic telescopic system should be the determining factor for the licensing agency on a case-by-case basis.
WHAT ARE BIOPTIC TELESCOPES?

Bioptic telescopes are spectacle mounted devices that magnify distant objects. They are permanently fixed on a spectacle carrier lens fabricated to the patient’s conventional prescription (and tint, when appropriate). Bioptic telescopes are mounted off axis, usually in the superior position but, depending on the patient’s need, may be fixed in other positions. They may be monocular or binocular. Diversity in technology of telescopic design requires an individual approach to fitting, training and specific use while driving.\(^{(6, 8-18, 28, 29)}\)

HOW ARE BIOPTIC TELESCOPES USED FOR DRIVING?

Issues related to bioptic telescopes and driving are well documented.\(^{(7-13, 26, 29, 30)}\) Individuals using bioptic telescopes for driving view mainly through the prescriptive carrier lens thus maintaining visual field as though viewing through conventional spectacles. Persons eligible for licensure with bioptic telescopes are those select individuals who are able to see objects through their carrier lenses, but may not be able to discern details or read signage from great distances. When detailed vision is required, telescopic view is engaged with a head and/or eye movement – thus the term “bioptic”. One criticism of the use of bioptic telescopes for driving stems from the misconception that the telescope portion is used continually, thus limiting visual field.\(^{(30)}\) Actually, the telescopic portion of the bioptic system is in use only a small percentage of driving time.\(^{(6)}\) When the concept is understood and mastered, this misconception erodes.

WHAT ARE THE VISION CRITERIA USED FOR DRIVING?

Three types of driver’s licenses for persons with reduced visual acuity currently exist nationally, though specific criteria vary from state to state: \(^{(28)}\)

1. Restricted license – e.g. daytime only, limited distance, limited purpose or excluding freeway use, etc. A restricted license, depending on state regulations, may be granted to individuals with spectacle acuity of 20/40 to 20/200 in the better eye. Some states have a minimum monocular and/or binocular visual field requirement.

2. Bioptic Telescopic System License – specifications are not uniform in the 34 states that license bioptic drivers. The minimum acuity allowable through the telescopic system may be 20/70, however most states specify corrected acuity with the telescope to fall in the 20/30 to 20/50 range. Distance visual acuity through the carrier lens also varies from state to state, with 20/100 to 20/200 being most common.

3. License by individual review – in some states, individuals with visual acuity or visual field limitations can acquire restricted or unrestricted driving privileges based on their demonstrated ability to safely operate a motor vehicle. These states allow individualized privileges to a visual acuity level of 20/200.

Some individuals may obtain licenses that are a combination of these types. License renewal policies vary widely from state to state.
WHAT OTHER FACTORS SHOULD BE CONSIDERED?

Requirements for both distance visual acuity and visual field specifications do not necessarily provide a qualitative understanding of the individual’s visual performance and driving skill. Cognition and perceptual ability play important roles in addition to visual skills outlined previously. Multidisciplinary adaptive driver education programs can be very helpful in training potential candidates in efficient usage techniques and other compensatory and defensive driving techniques. (7-9, 24, 25, 27)

WHAT ISSUES ARE RELATED TO RESEARCH?

Data regarding driving with bioptic telescopes is insufficient to categorically deny driving privileges to bioptic users. Small samples to date generally show that bioptic drivers fare as well or better than groups of other licensed handicapped populations. (6, 12, 25, 27, 29)

Larger samples and formalized cooperative skills are necessary to reach conclusions that impact safety and access to independent mechanized mobility for bioptic users. Necessary studies could not be designed or administered if bioptic users are denied the opportunity to demonstrate their driving performance. Although funding for these studies should receive priority in the national research plan, this has yet to happen.

HOW CAN OPTOMETRISTS SERVE TO HELP CLARIFY ISSUES RELATED TO BIOPTIC DRIVERS?

1. Provide comprehensive vision rehabilitation evaluations to potential bioptic driving candidates encompassing multiple factors related to driving. Optometrists who do not practice vision rehabilitation should be aware of appropriate service providers for referral.

2. Be aware of the traditional and new bioptic telescopic design technology that meets the needs of appropriate candidates on an individual basis.

3. Participate in the development of adaptive driver education programs geared to bioptic drivers.

4. Contribute to national and state research studies related to bioptic driving.

5. Provide expertise to State Department of Motor Vehicles Medical Advisory Committees and national panels and symposia as policies related to driver improvement, vision function and use of bioptics for driving are developed and implemented.

Note: This paper deals with use of bioptic telescopes for driving only.
References

4. Vision Problems in the US. 2002 Prevent Blindness America