**Presenter Notes for Dakotas AER Conference,**

**Grand Forks, ND, October 11th-13th, 2023**

**Slide 1)** Introductory slide saying the source of the request for this virtual webinar (namely the ***Dakotas AER Conference, October 11-13, 2023***), along with presenter’s name and contact information: Chuck Huss, COMS, Driver Rehabilitation Specialist, chuck\_huss@hotmail.com, TEL: (304) 767-1497 ©.

**Slide 2)** Title slide for presentation. – “**Bioptic Driving: Overview, Update, and Basic Readiness.”**

**Slide 3)** Objectives of presentation. Presenter will provide an overview of the concept or definition of bioptics and bioptic driving; basic types and characteristics of bioptic telescopic lens systems (BTLS); basic bioptic usage technique and benefit during the driving task; candidacy and status of bioptic driving; role of COMS – basic pre-driver readiness; time for questions and answers; and mobility challenges faced by persons with vision impairment.

**Slide 4)** Slide depicting (using a frontal view photo of a Designs for Vision, Inc. 2.2X BIO II Galilean binocular mock-up bioptic telescopic lens system, BTLS) what a bioptic telescopic lens system is, how correction for refractive errors if present can be ground into both the carrier lenses and ocular lens end of the miniature telescope(s), and which type of professionals (namely optometrists and ophthalmologists with established clinical low vision practices) are responsible for prescribing such devices for driving.

**Slide 5)** Illustration of that part of a patient’s retina (namely the central 3-5 degrees (narrow white cone, representative of good central acuity and color vision). A person presenting mild to moderate visual acuity loss in this region might receive help from telescopic magnification, offered by a prescription bioptic telescopic lens system. Illustration also points out that part of the retina (blue gray peripheral matter – representative of the peri-central and peripheral vision of a patient’s retina) which is usually intact in one or both eyes of a typical bioptic driving candidate, and responsible for use by bioptic user for approximately 90-97 % of the total driving time.

**Slide 6)** provides a functional definition of “***bioptic driving***” and how select visually challenged patients with central vision impairment might receive help from a prescription bioptic telescopic lens system for visual aid in the driving task.

**Slide 7)** Photos illustrate the two (2) types of telescopic lens units that form part of a typical prescription bioptic telescopic lens system. The photos to the left are examples of Galilean (primarily fixed focused) type of systems, while those on the right are examples of Keplerian (variable focus) systems. Specifically, those units photographed on the left (top to bottom) include: a Designs for Vision Inc. (DVI) 2.2X BIO II Galilean system; a Conforma 2.2X BITA; and an Ocutech, Inc. 2.2X Sight Scope Flip system. Those photographed to the right include: a DVI 3.0X Expanded Field Prism Unit (far left); an Ocutech, Inc. 3.0X Visual Enhancing System (VES) Mini (top, center); an Ocutech, Inc. 4X VES Sport II (far right); and a 3.0X Spitzberg Optical Behind-The-Lens (BTL) System (lower right).

**Slide 8)** Slide provides a list of the distinguishing features of Galilean vs. Keplerian bioptic telescopic lens systems. For example, Galilean lens systems are usually: fixed focus, smaller in size, lighter in weight, smaller field of view, brighter image due to only four (4) lens surfaces, and made up to 4X; whereas Keplerian lens systems are variable-focus in nature, longer in size, heavier in weight, larger field of view, less bright image due to 8-10 lens surfaces and made up to 14X.

**Slide 9)** Slide provides a photographic frontal view of several Galilean-type binocular mock-up bioptic lens systems of the same or similar dioptric power; but allowing greater magnified fields of view pending type selected and vertex distance upon final fitting and facial structure of user. Those devices pictured include: 2.2X DVI WA BIO I with tan colored housing (top left), 2.2X BITA (middle left), 2.2X BIO II (bottom left), 2.2X DVI WA BIO I with black colored housing (top right), 2.2X BIO I (middle right), and 2.2X Ocutech, Inc. Sight Scope Flip (Lower Right)

**Slide 10)** Slide provides a sample listing of various types of commonly prescribed bioptic telescopic lens systems by manufacturer and the respective monocular field of view (in degrees, °) per telescope listed.

**Slide 11)** Slide shows photos of persons wearing an Ocutech, Inc. 5X Visual Enhancing System (VES) Sport II Model BTLS (upper left), a Beecher Optical 5.5X Mirage BTLS (lower left) and a Designs For Vision, Inc. (DVI) 5.0 X Expanded Field Prism (EFP) BTLS (upper right), along with stating the respective fields of view of each type of monocular BTLS (10.5°- Ocutech VES 5.0X Sport model BTLS ); 12.0° - Beecher Mirage 5.5X BTLS; and 8° - Designs For Vision, Inc. (DV)) 5.0X Expanded Field Prism BTLS)

**Slide 12)** Slide that describes and lists the impact of increasing power on extent of monocular fields of view of telescopic lens systems (5.5X or greater magnification)

**Slide 13)** Slide highlights the concerns of using higher power BTLS for visual aid in the driving task. The concerns listed include sudden and unexpected appearance of objects or forms in magnified field of view when vertical spotting technique is engaged briefly on straight stretches of roadway, the resultant greater nearness illusion which user could experience, non-trained users staying in the telescope portion of the device too long of periods of time, with potentially sudden and unexpected braking taking place and resultant potential rear-end accidents occurring. Also, it is more of a challenge to visually locate smaller in-size targets with scopes presenting smaller fields of view as the user gets closer to intersection.

**Slide 14)** List of the major USA bioptic telescopic lens system manufacturers and vendors (including Designs For Vision, Inc. (DVI), Ocutech, Inc., and Conforma Contact Lens), and respective contact persons, e-mail addresses and telephone numbers for each respective manufacturer. Those individuals include ***Jody Klager*** (with Designs for Vision, Inc.), [jody@dvimail.com](mailto:jody@dvimail.com), 1-800-345-4009; ***Dawn Jarvis*** (with Ocutech, Inc.), d.jarvis[@ocutech.com](mailto:clinical@ocutech.com), 1-800-326-6460, [info@ocutech.com](mailto:info@ocutech.com); and ***Teri S. Mackley*** (with Conforma Contact Lens (manufacturer of the Bi Telescopic Apparatus, or so called “BITA”), tmackley@conforma.com, 1-757-321-0186.

**Slide 15)** These photos illustrate the position of the head and neck of a typical bioptic lens user during both carrier lens viewing, which constitutes approximately 97% of the total driving time (photo on the left), as well as telescopic lens viewing, which constitutes approximately the other 3% of the total driving time (photo on the right). The only technique that is currently suggested for the bioptic lens user during driving is an intermittent (1-2 second) per fixation ***vertical spotting technique.*** During carrier lens viewing, the user tilts his/her head back ever so slightly to view directly below and parallel to the ocular lens piece of the miniature telescopic unit(s). This offers the best viewing position horizontally through the carrier lens(es). When or if a more defined view of whatever the user is looking at is desired, the user simply dips his/her head downward into the telescope for 1-2 seconds. The latter intermittent task is only undertaken on straight or relatively straight stretches of roadway, with good sight distance ahead, and in the absence of other road users in the user’s surrounding space cushion.

**Slide 16)** Slide alludes to a common area of discussion amongst proponents vs. those opposed to the mandatory use of bioptics for driving, which is still debated in private and public conversation circles. And the laws or rules made by several states requiring persons with mild to moderate levels of several vision loss to use such bioptic lens systems to meet arbitrarily set static distance visual acuity levels for restrictive driving purposes. The question is “w**hat benefit does a person with low vision derive from using a bioptic telescopic lens system while driving?”**

**Slide 17)** Slide provides an answer to question raised in slide 16, namely that a bioptic lens system allows the user to increase their “***margin of safety***”; that is the time or linear distance equivalent to detect, identify, mentally predict, and decide whether an adjustment in speed or lane position is needed (then execute such decision) in response to a critical object or critical condition approached during the driving task.

**Slide 18)** Slide provides an example of the ***margin of safety*** alluded to in slide 17, namely that correct use of a BTLS during the driving task allows the user to detect, identify and react to if needed tocritical objects/forms or conditions in the dynamic driving scene presented (i.e. the jay walker, persons crossing street in crosswalk, traffic light and traffic light color/color change, deciphering the regulatory sign positioned over the outside right lane (a turn right lane) for emergency vehicles or buses only, or the lone pedestrian on the right sidewalk who may suddenly and unexpectedly turn, step down into the street, and cross street).

**Slide 19)** Slide is another example of the “***margin of safety***” re to correct use of BTLS, namely in deciphering what driving maneuver cannot be undertaken legally at the approaching traffic-light controlled intersection from the inside lane and why? (Clue - get the big picture …. No separate turn left lane)

**Slide 20)** Slide provides yet another example of the **“*margin of safety*”** re to correct use of BTLS, namely that user can use a brief (1-2 second in length) vertical spotting technique to detect the signal ahead warning sign, then traffic light, then respective color of traffic light to address question being asked.

**Slide 21)** Slide provides yet another example of the **“*margin of safety*”** re to correct use of BTLS, namely as to what two (2) basic functions of the driver are called upon in this driving scenario (i.e., adjustments in speed and lane position) to follow the instructed hand and arm signals and avoid a potential collision with the first responders positioned in lane ahead.

**Slide 22)** Slide provides a list of recommended candidacy requirements for driving with the aid of a prescription bioptic telescopic lens system. The latter include stable, long standing eye condition; best corrected visual acuity (BCVA) between 20/70-20/200 inclusive; field of view of 120° H, 80° V; enhanced acuity to 20/60 or better through scope; color awareness to differentiate color change on traffic lights, lane markings, road signs, brake lights, turn signals and emergency vehicles, and participation & satisfactory completion of an adaptive bioptic driver’s training program of instruction.

**Slide 23)** Provides a listing of the first set of vision standards for a ***limited driver’s license*** (including:best corrected visual acuity (BCVA) of 20/65 in the better eye, field of view extending to 125° horizontally in one eye, and an absence of diplopia (double vision) as proposed by the American Medical Association’s (AMA) Committee on Vision Standards for Drivers of Motor Vehicles, October 1937.

**Slide 24)** Slide provides information: who and when the first prototype prescription bioptic telescopic lens system was constructed, fitted, and prescribed for a low vision patient in the USA. That professional’s name and personal photos (at younger and older stages of his life) was William A. Feinbloom, OD, FAAO, 1959, (1/10/04-1/21/85). During an interview (1980’s) Dr. Feinbloom was quoted as saying “***Each failure taught me a new need …. until somehow it gave birth to a new development****” referring to how some of his invention attempts did not materialize, while others did (for example numerous low powered Galilean as well as Keplerian bioptic telescopic lens systems and the hard contact lens development were just some of his achievements over his illustrious optometric career).*

**Slide 25)** - Map indicating former status of bioptic driving in the United States (i. e. states highlighted in bright yellow color, n=13) as a result of a 1983 CA DMV Survey of States, set out to determine number and names of states that allowed bioptic driving at that time).

**Slide 26)** Slide provides a sample listing of the names of states and approximate year that legislation was passed in respective states listed, allowing the use of bioptics for visual aid in the driving task. The states of Ohio, Kentucky and west Virginia are highlighted IN RED and will be used by presenter to share unique story of the interrelationship amongst those states which became known over the years, influencing the type and origin of bioptic driving legislation passed in those respective states.

**Slide 27)** - Map showing current (2021) status of licensing jurisdictions allowing bioptic driving in the United States (i. e., states highlighted in bright blue color, n=48). The only states that this instructor is aware that currently ***does not*** recognize the use of bioptics for driving include UT and IA; yet those 2 states do allow driving with mild to moderate levels of central vision loss down to and including 20/100 and 20/199 visual acuity level respectively on a very select case-by-case basis. Note the state of CT did not recognize the use of bioptics until May 2022 when applicable bioptic driving related legislation did pass. That state is now working internally on deciding what standards they will use to allow for candidacy, training, and licensure.

**Slide 28)** Slide refers to the fact that driver licensure in the United States is a stated regulated function. It goes on to state that: some states are very conservative in nature when it comes to required level of acuity to drive restrictively, others are more liberal; some allow for the use of the miniature telescope to meet the visual acuity standards for restrictive driving privileges; some do not have carrier lens cut-off limits but impose limits re the X strength of attached miniature telescopes; or what level of improved acuity a low vision driver must be able to obtain through the miniature telescope. However, all states must abide by allowing their drivers licensed in one state to travel into and out of other states (employment, recreation, visitation, or general travel purposes, etc.) unless restricted by their home state of residence. The latter protection is offered by the US. Constitution, Article IV, Sec.1 “***full faith and credit clause***”. Reference to the latter can be found in the article written by Mary R. Marta and Duane Geruschat, titled Equal Protection, the ADA, And Driving with Low Vision: A Legal Analysis, JVIB, October 2004, Volume 98, Number 10, Page 3 of article.

**Slide 29)** An updated listing of states (see state initials) with current carrier lens acuity level needed for restrictive driving privileges per state. Note, states highlighted in red**,** between 20/40 and 20/70 inclusive allow bioptic driving candidates to use the telescopic part of their respective bioptic lens system to meet arbitrarily set acuity cut-off limits. In addition, States highlighted in red (including those at the 20/200) do not have an arbitrarily set carrier lens cut-of limits.

**Slide 30)** An updated listing of states (see state initials) with current carrier lens acuity level needed for restrictive driving privileges per state. States highlighted in **bold red in this slide** represent states which might have AER members attending this conference. Each of these states listed (blue & red alike ) have different rules re how bioptic driver candidates undergo driver’s training; for example, **AZ (**optional training, individualized competency based, sequentially arranged), **PA** (required training, sequentially arranged, set minimum hrs. of passenger-in-car (PIC) and behind-the-wheel training BTW), and **WV** (required training, concurrently arranged and minimum set number of classroom, PIC and BTW training for novice and experienced driver candidates).

**Slide 31)** Slide illustrating the expansion of visual acuity standards for restrictive driving privileges at the legal blindness (visual acuity) level (n=12) or lower (n=11). Note, the states of Pennsylvania and Connecticut are the most recent states to adopt allowing in-state residents who meet the various visual protocol (including 20/200 carrier lens acuity), in-car training and testing requirements stated in PA HB 2296 (11/25/20) and CT SSB 333 (5/17/22) to apply for restrictive driving privileges with the use of prescription bioptic lens systems.

**Slide 32)** Question is delivered to audience as: **Given time and resources, how can we best prepare young novice candidates for entrance to “formalized programs of bioptic driver training”?**

**Slide 33)** Answer provided to question addressed in slide 32 is given and stated as: **assuring that such students are pre-driver ready!**

**Slide 34)** Slide denotes a functional definition of “***pre-driver readiness***”. Defined simply as the knowledge and travel skills needed to transition safely, confidently, and effectively from pedestrian to active passenger-in-car to motor vehicle operator.

**Slide 35)** Slide lists the two (2) basic types of pre-driver readiness skills: pedestrian related (basic, on-foot) travel skills; and active/advanced, passenger-in-car related travel skills.

**Slide 36)** Provides rationale as to what type of vision professional should be the service provider, when such type of preliminary pre-driver readiness training should start, and how the initial interview and screening should be conducted with novice bioptic driving candidates before application and participation in an actual program of formalized bioptic driver training.

**Slide 37)** Provides suggested travel settings and shapes of basic and advanced routes of travel to be undertaken as part of a basic survival, on-foot low vision orientation and mobility (O&M) program.

**Slide 38)** Provides a breakdown of other functional low vision O&M tasks, traffic control devices, road signs and pavement markings, visual and auditory aids, and basic travel related concepts that a child or student should gain exposure to on-foot before participation in formalized in-car bioptic driver training.

**Slide 39)** Provides a breakdown of prescription distance low vision devices ((optical and non-optical) and alternate means of transportation that a child or student should gain exposure to if possible before application and participation in formalized bioptic driver training.

**Slide 40)** Provides a list of the four (4) types of basic survival low vison O&M skills that a young novice low vison driver candidate should be able to execute with a reasonable degree of confidence, safety and effectiveness before application and enrollment in formalized bioptic driver training. The latter include: 1) take in, remember, and follow route instructions; 2) travel and reverse a route of travel; 3) detect, identify and react in time to critical objects; and 4) cross stop sign and traffic light-controlled intersections. These four (4) skills areas were a major finding of the WV Pilot Low Vision Driving Study, ‘85-’98 (those clients found to be pre-driver ready were able to perform these basic pre-driver readiness skills).

**Slide 41)** Slide refers to a ***Step-by Step Guide to Reinforcing Pre-Driver Readiness Skills with Novice Bioptic Driving Candidates***, available in standard and large print by contacting Chuck huss, COMS at: chuck\_huss@hotmail.com. Guide includes exposure to distance viewing skills, critical object awareness skills, basic bioptic usage skills, and hazard perception skills.

**Slide 42)** Slide raises the question: how can parents and teachers take the lead on helping their visually challenged student/child learn to use their distant vision? And at what age? The answer is provided in Slide 43.

**Slide 43)** Slide provides the name and front cover of a recently updated booklet titled ***Preparing Your visually Impaired Child for Their Future*** (including its respective sections). The emphasis is learning how to use their vision in a distant mode; first with hand-held Rx monocular devices, then hands-free Rx bioptic lens systems. Lead author for this document is Dr. Henry Greene, OD, FAAO. Other contributing authors and reviewers: Cindy Bachofer, PhD, CLVT, Carolyn Carman, OD, FAAO, Christi Closson, OD, FAAO, Anne Corn, EdD, Chuck Huss, COMS, and Laura Windsor, OD, FAAO.

**Slide 44)** Slides lists a variety of contact sources (including updated e-mail addresses) for more information, articles, etc. re pre-driver readiness, bioptic driving, bioptic driving research, bioptic driver screening and training, e-learning programs, etc.

**Slide 45)** Final slide re: For more information re bioptic driving, presenter’s name and contact information: Chuck Huss, COMS, Driver Rehabilitation Specialist, 1332 West Virginia Avenue, Dunbar, WV 25064, TEL: 304-767-1497, E-MAIL: chuck\_huss@hotmail.com.