

Driving and Low Vision in California

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You will be asked to leave the room if request is not followed.

DMV across the States

- 37 states have peripheral field requirements
 - Usually horizontal specs
 - Usually binocular
 - Varies from 30-140 with most requiring greater than 100 degrees
 - Most states do not address hemianopsia but they would fail in 22 states
- Bioptic driving permitted in 28 states

Eli Peli VISUAL FIELD REQUIREMENTS IN THE USA

DMV's Vision screening Standards

If 20/40 is still not seen on the Optec 1000, the person is referred to his or her vision specialist for complete vision examination. In California, the person is given a Report of Vision Examination form to be completed by the doctor

What is the requirement in your state?

Measurement of visual acuity



CA DL62

DMV's Visual Acuity Screening Standard

• 20/40 with both eyes tested together and
• 20/40 in one eye and
• 20/70 in the other eye

Pass Fail

PERFORMANCE ON THIS TEST COMPLETES THOSE SECTIONS THAT APPLY — INFORMATION FROM THIS FORM MUST BE REPORTED

1. REFRACTION — Complete only those sections that apply.

Refractive correction used for refraction: None Contact Contact + Spectacle Contact + Spectacle + Contact

By central vision: Yes No Not tested

By peripheral vision: Yes No Not tested

Binocular: Yes No Not tested

Monocular: Right eye only Left eye only Not tested

Binocular: Yes No Not tested

Monocular: Right eye only Left eye only Not tested

2. VISUAL ACUITY — Complete Central Vision and Peripheral Vision sections unless noted otherwise.

Visual Acuity	Binocular	Right Eye	Left Eye	Visual Acuity	Binocular	Right Eye	Left Eye
20/20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/40	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/40	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/60	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/50	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/60	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/80	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/100	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/80	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/120	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/90	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/150	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/100	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/200	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/120	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/300	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/150	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/200	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/500	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/300	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/800	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20/500	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20/1000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. DISCREPANCY — If there is a discrepancy between the results appearing above, indicate the reason(s) for the discrepancy in the space below.

4. VISUAL ABNORMALITIES — The following information will help the examiner evaluate your patient's ability to safely operate a motor vehicle. Record your testing, clinical impression, or knowledge of the disorder. Please indicate the severity of any of the following visual abnormalities which your patient may be experiencing. Indicate severity of condition by placing a 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

5. VISUAL FIELDS — If vision is not adequate to drive, indicate the visual field abnormality. A full visual field examination (perimetry) must be performed. Show the appropriate peripheral extent and any weakness in the diagram below.

6. VISUAL ABNORMALITIES — The following information will help the examiner evaluate your patient's ability to safely operate a motor vehicle. Record your testing, clinical impression, or knowledge of the disorder. Please indicate the severity of any of the following visual abnormalities which your patient may be experiencing. Indicate severity of condition by placing a 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

4. PRESCRIPTION:

Diagnosis: _____ None Anisometropia Contact wear _____ (000)

Diagnosis: _____ None Myopia Contact wear _____ (000)

Diagnosis: _____ None Myopia Contact wear _____ (000)

5. VISUAL FIELDS — If vision is not adequate to drive, indicate the visual field abnormality. A full visual field examination (perimetry) must be performed. Show the appropriate peripheral extent and any weakness in the diagram below.

LEFT EYE **RIGHT EYE**

Upper: _____ Left: _____

Lower: _____ Right: _____

Far: _____ Near: _____

6. VISUAL ABNORMALITIES — The following information will help the examiner evaluate your patient's ability to safely operate a motor vehicle. Record your testing, clinical impression, or knowledge of the disorder. Please indicate the severity of any of the following visual abnormalities which your patient may be experiencing. Indicate severity of condition by placing a 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Abnormality: None Mild Moderate Severe Very Severe Unknown

Diagnosis: None Myopia Hyperopia Astigmatism Presbyopia Contact wear None Contact wear None

7. ADVISE — Have you been told about any safety about driving? Yes No If yes, please explain in 400 letters.

8. ADDITIONAL COMMENTS — Please use additional information or comments you feel DMV should know concerning your patient's visual and perceptual capabilities relating to driving performance. You may use an additional sheet of paper to provide this information as well as information about any existing conditions which contribute to your patient's visual or perceptual capabilities, etc. Any recommendations about the patient's general safety should also be stated. DMV will make the final licensing decision based on a combination of factors, including your professional expertise.

9. SIGNATURE — This section must be completed to submit this report.

Restrictions

- Wear corrective lenses
- Geographic Area
- Hours (No night driving)
- Specific Roads (No freeway)
- Special Vehicle & Equipment
- Driving to specific destinations
- No Restrictions

Field Restrictions

- What about acuity better than 20/40 but field loss?
- Homonymous Hemianopsia
- Depends on State Licensure requirements
 - California has no field restriction whatsoever!!

Bioptic discussion



Designs for Vision Bioptics



Ocutech Bioptics



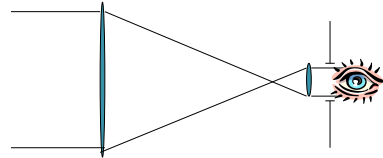


Optics of Bioptics - brief

- Review brief basics of Keplerian vs Galilean
- Monocular vs. binocular
- Expense
- Cosmesis
- Field of view

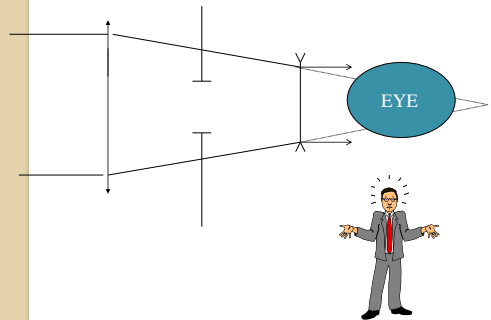
Biopic Telescopes

- Keplerian (Ocutech):
 - Two positive lenses
 - long tube length (objective to ocular)
 - image inverted unless extra element to upright image
 - exit pupil is real (outside, behind ocular)
 - Largest field of view



Telescopes

- Galilean
 - positive objective, negative ocular lens power
 - short length
 - final image is upright
 - virtual exit pupil (inside TS)
 - smaller field of view



Galilean Telescopes

- The field of view is directly proportional to the diameter of the objective lens.
 - In order to expand the FOV, manufacturers produce telescopes called
 - wide angle telescopes (WATS)



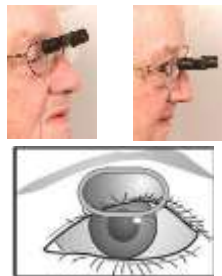
Telescopic Prescribing: Considerations

- Cosmesis
- Need for refractive error correction in the ocular (or as a cap)
- Availability
- Cost
- Binocularity
- Uses/goals

BiOptic Driving Network

<http://www.biopticdriving.org/index.htm>

- *This patient is using an Ocutech VES Mini 3x (Keplerian optics)*



When is a Bioptic Telescope Recommended for Driving (Kammer opinion)

- Visual Acuity 20/100 or better
- Near normal peripheral visual fields
- Near normal contrast sensitivity
- Primary visual goals of seeing street signs
- What do you think?

Cons to bioptic driving

- Restricted visual field through bioptic
- Ring scotoma causing blind spot
- Vibration and speed blur
- Telescopic parallax & depth perception
- Sensitive bioptic frame adjustments

Bioptic Training Sequence



- Locate stationary objects while still
- Locate moving objects while still
- Locate moving objects while moving
- Develop rapid, accurate perception
- Spatial awareness & memory
- Adjustments to various lighting conditions
- Use of tracking cues

Filters For Driving

- Color
- Transmission
- Transitions
- Polarization
- Selective Filtration



Fitover Filters

- Example: 2% Dark Amber, 40% yellow, 20% plum



Driving With Hemianopsia

- It may be possible in some states considering lack of field restriction criteria
- Always refer to Driver's Rehab program who have worked with field restricted patients
- Mirrors on car
- Scanning techniques
- Restrictions on license most likely

CASE I ST

- ST, 58 yo male
- Left HH
- 20/20 central acuities
- Plano refractive error

ST

- Initially enrolled in EP lens study with Dr. Peli and Dr. Bowers– Harvard, Chadwick Optical (Karen Keeney)
- 6 week fitting protocol
 - Fit upper
 - Fit lower
 - Wear both two weeks
 - Satisfaction surveys completed throughout trial



Summary comments

- Week 37 – ST added occasional night driving
- Some confusion from headlights on left approaching from behind
- Drove in the far left lane to reduce confusion
- Drove 1200 miles accident free at 50 weeks

CASE 2

SF

- 78 yo male with wet ARMD
- SF had primary goals of reading CT and keeping driver's license
- BVA's 10/80 OU Variable results
- Drives dependent wife to doctor's visits and grocery store

Issues

- CA requirement is better than 20/200 in the carrier lens
- Huge dilemma ethically
- Sole caregiver for sick wife

Issues

- History – patient at the clinic for many years, vision was stable at 20/120 for 5 years
- DMV form completed with no OD recommended restrictions, licensed with no restrictions

First visit with decreased vision

- 20/160 since previous visit one year ago
- No bioptic utilized
- Primarily local travel
- DMV form completed with no night driving and only local daytime driving
- Patient became upset!!!!

What would you have done?

End Result was

CASE 3 SS

- SS 16 yo male living in desert area
- First license attempt
- Great family support
- Entering VAs = 20/80 OU
- Already driving on dry desert lakebeds for practice

Several Visits

- Discussed bioptic telescopes
- Primary purpose for viewing street signs
- SS loved the idea and responded well to bioptic fitting and demonstration
- Licensure and driving discussed at length with SS and parents. All eager to proceed

SS

- Fit with 2.2X bioptic TS
- VA with TS = 20/30
- Training in office, outdoors, later referred for more extensive training behind the wheel



SS

- Would you do anything different?
- Result.....

Conclusions

- Driving with low vision = tough issues
- Don't run from the issue, explore the topic thoroughly and help your patients with resources and straight talk
- Questions?

Resources

Association for Driver Rehabilitation
Specialists
PO Box 49, Edgerton, WI 53534
608 884 8833
www.driver-ed.org



Resources

<http://www.eri.harvard.edu/faculty/peli/index.html>

Bioptic Driving Network

www.biopticdriving.org



DRIVING WITH CONFIDENCE

A Practical Guide to Driving with Low Vision

By Eli Peli (Principal Scientist, School, OCU) & Susan Peli

Millions of people in the US and other parts of the world face the grim prospect of losing their driving license. For many, and for a great many their spouses, this is a prospect that hangs in a shadowy near future.

Driving with Confidence is an outstanding book by message is simple: in many cases, people with low vision can get on roads, safer and safer, by using the driving strategies.

The book presents a single, comprehensive approach to the problem of low vision conditions, together with a specific program designed to help low-vision individuals maximize their already available visual resources and driving strategies. It also contains a related program of driving more effectively in any state in the US.

Customer Research History - Featured in the National Institute on Aging's Aging and Driving Initiative (http://www.aginganddriving.org) as the first book to be translated into Chinese, Spanish, Hindi, and Thai. Numerous chapters have been translated into other languages. The book has been translated into Chinese, Spanish, Hindi, and Thai. Numerous chapters have been translated into other languages. The book has been translated into Chinese, Spanish, Hindi, and Thai. Numerous chapters have been translated into other languages.

Readability - Reads like a novel and is the easiest, most readable, and most readable book on the subject of driving with low vision.

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