Bioptic Telescopes for Driving: A Clinicians Perspective

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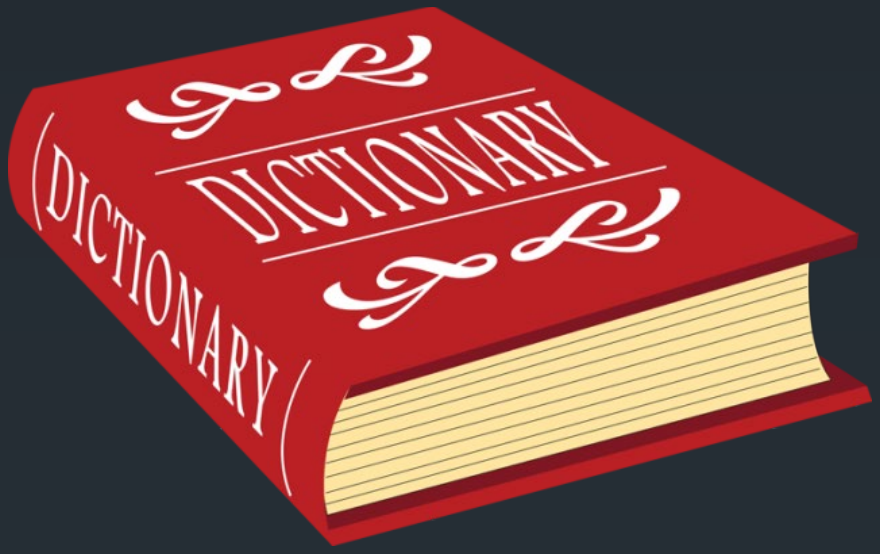
Blueprint for this afternoon

- Basics of the types of telescopes used in low vision applications
- Basics of fitting the bioptic telescope
- Things I consider when fitting
- Some of the things you the driver must consider
- Bits and pieces
- Feel free to ask questions as we go along



- Low vision is a reduced level of vision that cannot be fully corrected with conventional glasses, contact lenses or surgery.

- Bioptic telescopes for driving, are eyeglasses that contain miniature telescopes mounted toward the top of the eyeglass lens allowing the user to scan between a magnified and unmagnified image

Keep it simple

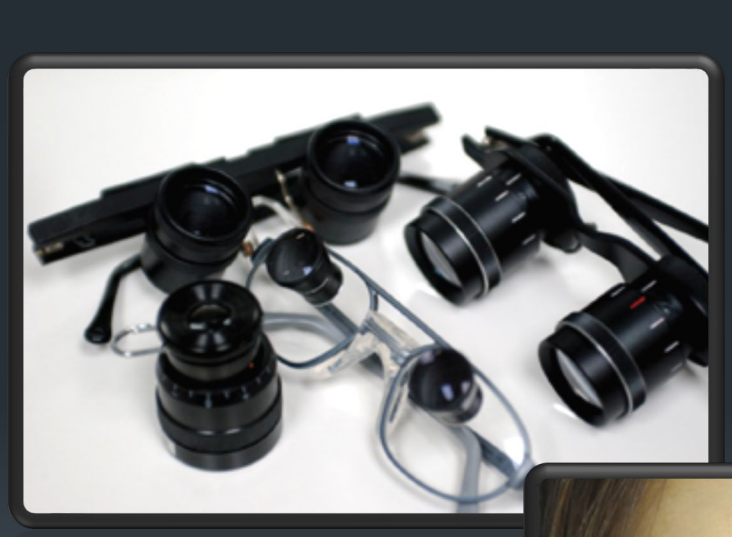
- In low vision care we are really only manipulating three variables
- Enhance contrast***/ control glare
- Make the image large enough (magnify)
- Help the patient learn to use their remaining vision more constructively

In the very simplest sense seeing, for all of us, can be compared to taking photographs……..

- Good camera……. Bad roll of film
- Focus all you want…….
- But… a stronger lens won't help?
- If you can't make it sharper what else can you do
- Right, make it appear bigger!

The only “tool” that can be used to magnify distance objects is a telescope….

Helps you identify detail further away



What is a telescope?

A telescope is a multiple element optical device that magnifies the image of a distant object

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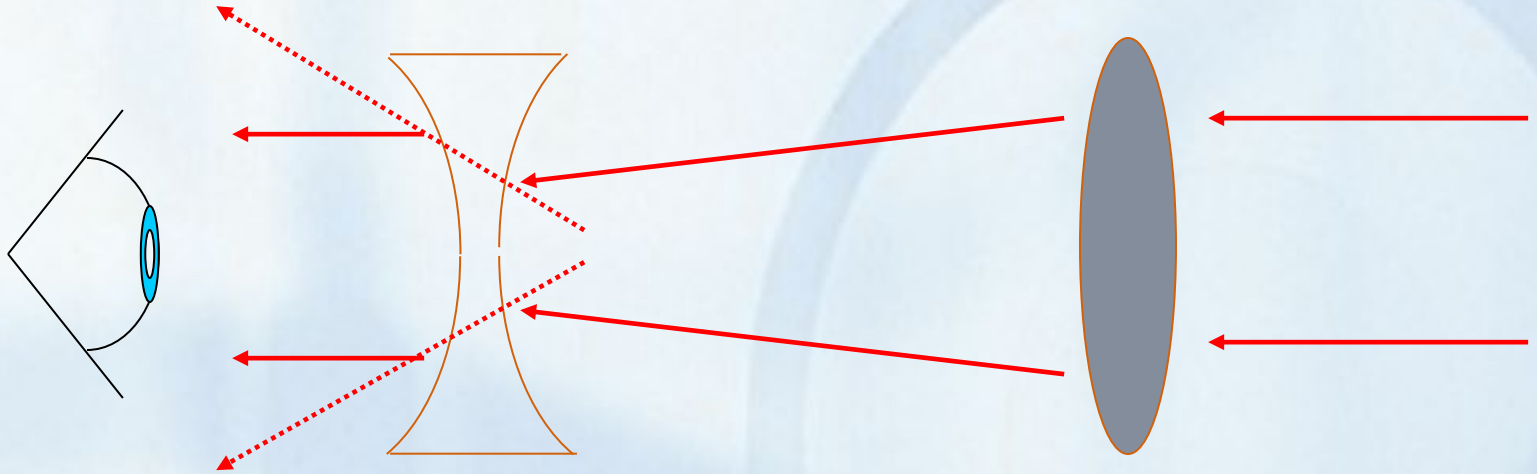
- As a hand-held telescope
- As a mounted telescope

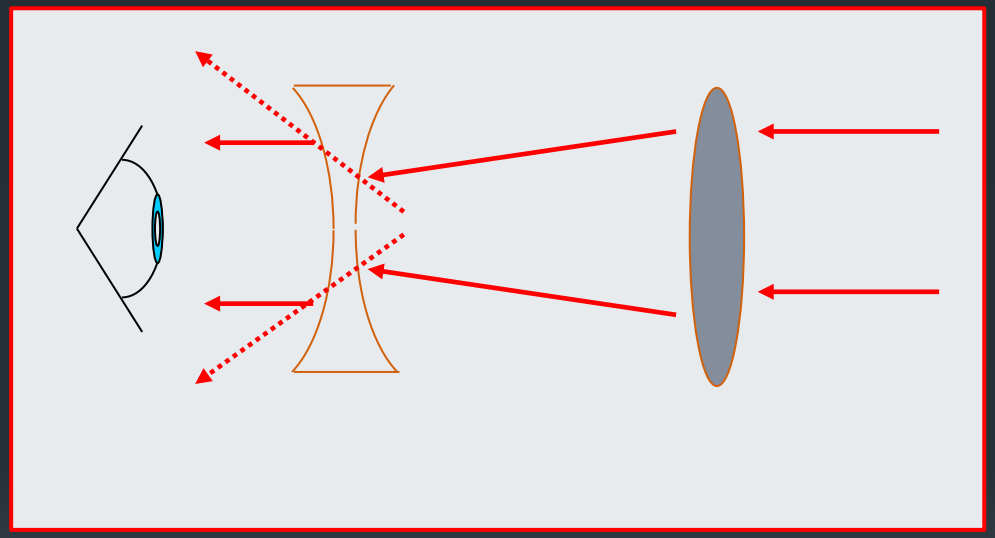
Telescopic Vision Aids

Galilean Telescopes



Galilean Telescopes:

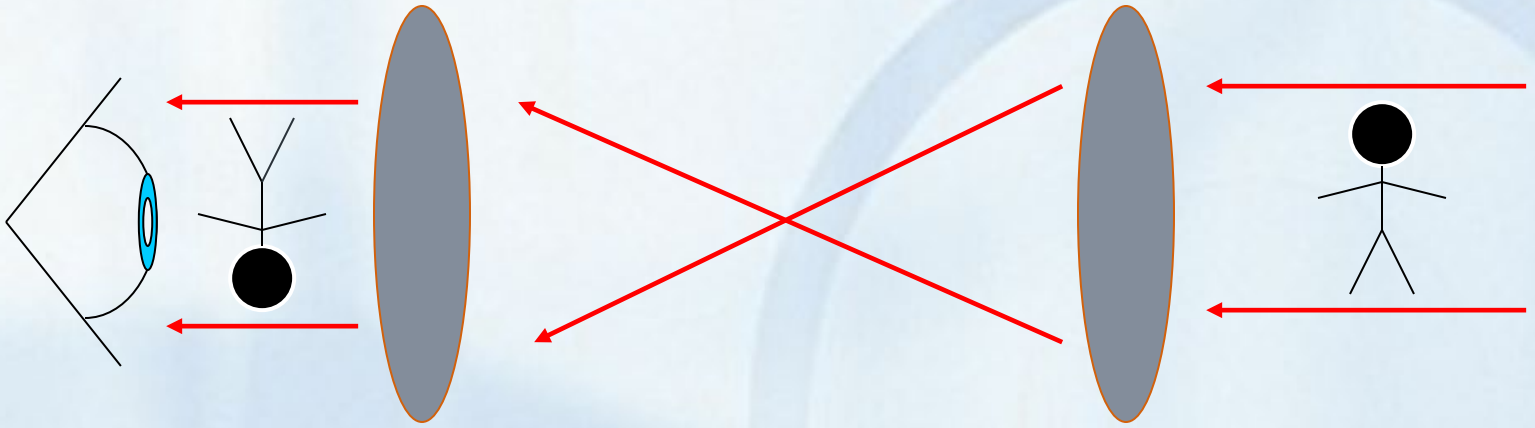
- Simple 2-lens design
- Bright
- Shorter barrel (smaller physical dimensions)
- Lighter weight
- Easiest to fit
- Typically afocal



- Limited power range (< 5X)

Telescopic Vision Aids

Keplerian Telescopes

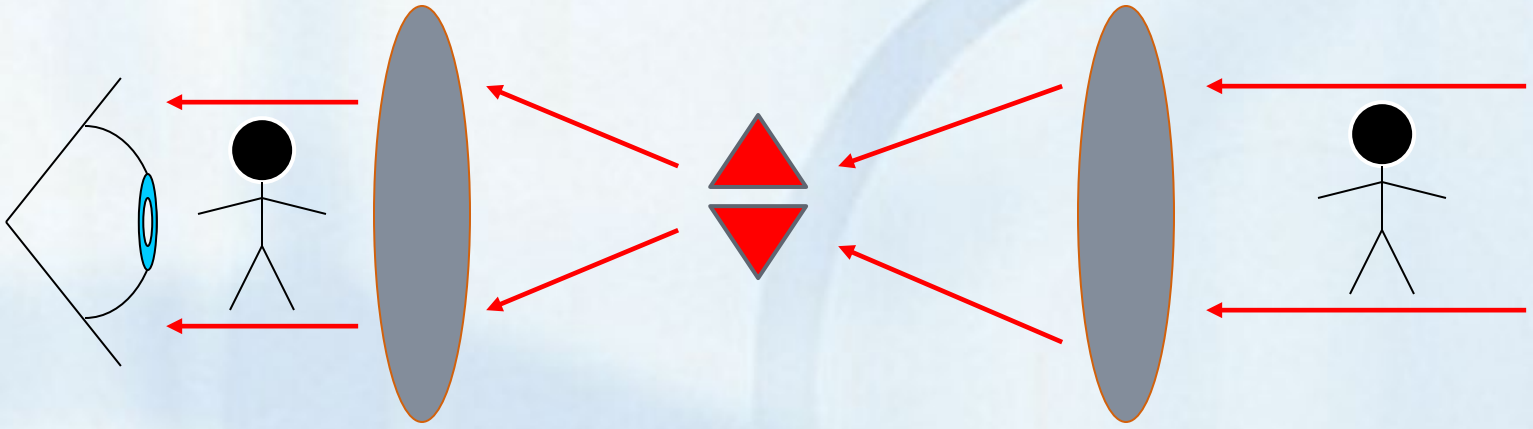


Plus eyepiece

Plus objective

Telescopic Vision Aids

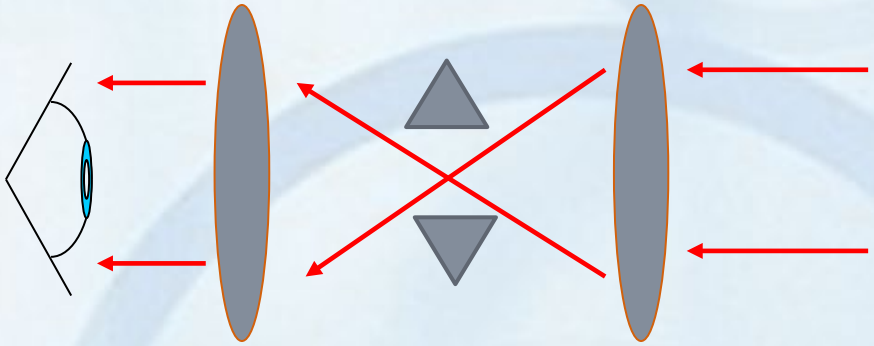
Keplerian Telescopes



Plus eyepiece

Plus objective

Keplerian Telescopes:



Multi-element design

- Not as bright as Galilean
- Longer barrel
- Heavier (more lenses)
- Challenging to fit
- Typically focusable

- Broad power range – up to 10X

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Telescopic Vision Aids

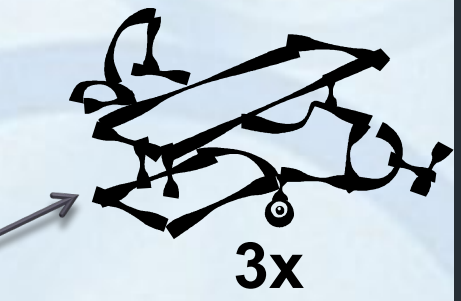
What is a bioptic telescope?

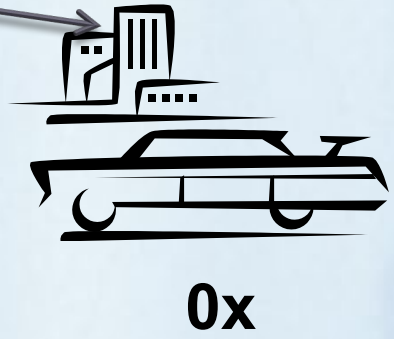
A bioptic telescope is a custom-mounted telescope that allows for two lines of sight, one through the telescope and the other through the carrier lens.

Telescopic Vision Aids

Why use a custom-mounted telescope?

The user wants one device allowing them to view two different distances with different magnifications





Some of the considerations in choosing a telescope that I plan on custom-mounting:

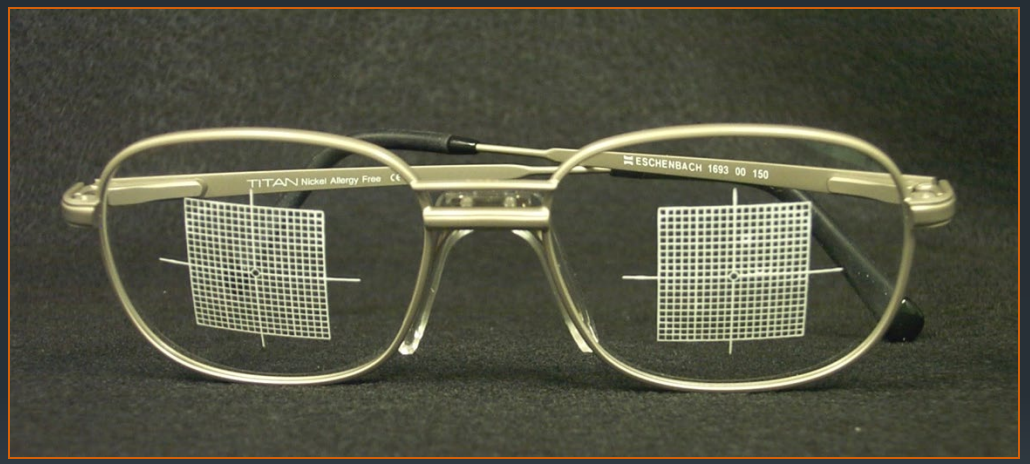
- Application
- Telescopic power required
  - Trade off or power vs. field of view
- Cosmesis
- Ergonomics

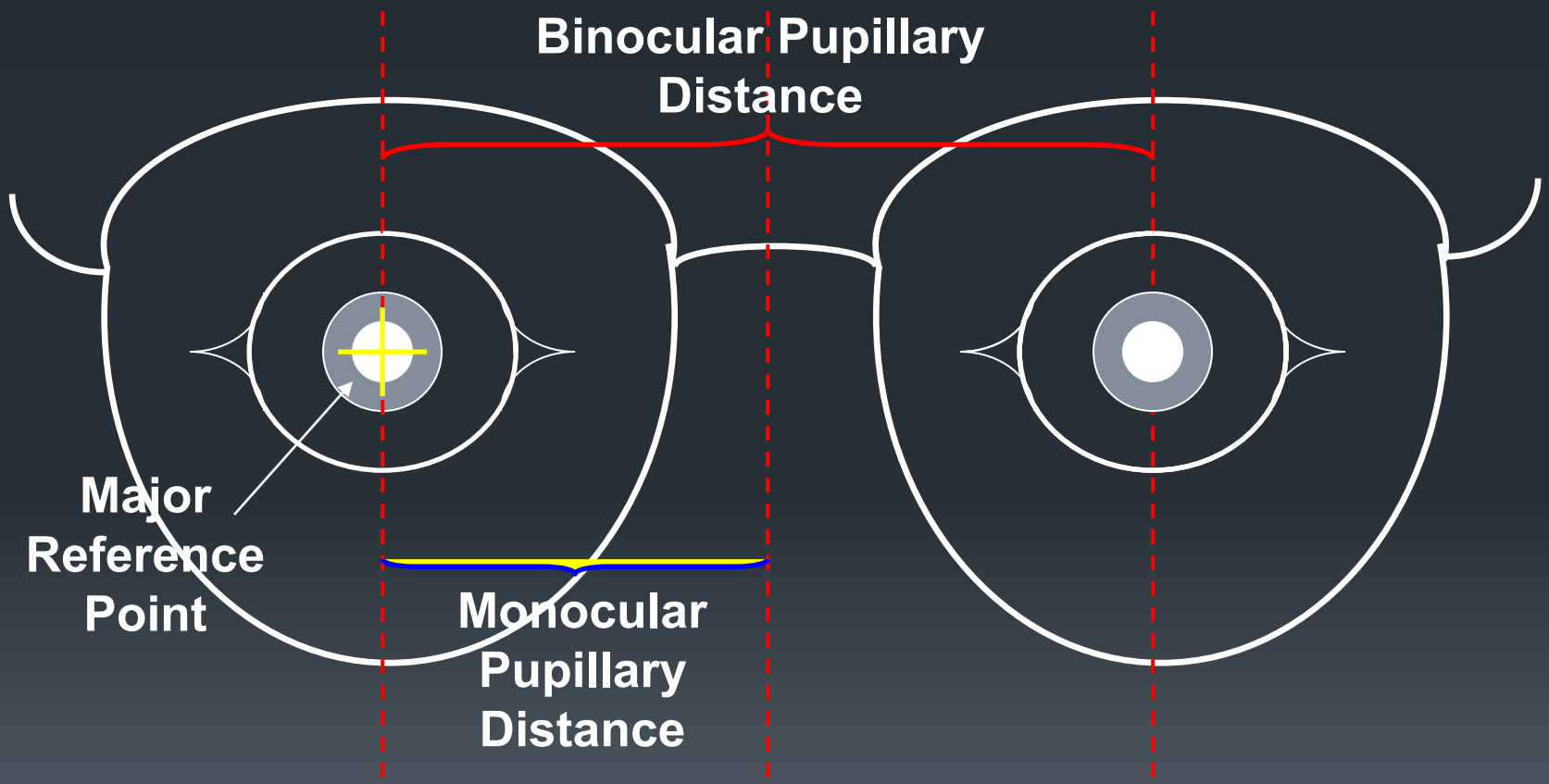
Cosmesis and ergonomic considerations for custom-mounted telescopes:

- Is a miniaturized telescope desirable?
  (However in driving applications miniature telescopes are contra-indicated)*
- Exit pupil size and brightness of image
- Weight of monocular systems
- Comfort of extended wear and carrier frame

Characteristics of a good carrier frame:

1. Rigid but flexible
2. Strong bridge
3. Long temples*
4. Nose pads appropriate for weight of system
5. “B” measure sufficient
6. This is a tool…not a fashion statement




Binocular Pupillary Distance
Major Reference Point
Monocular Pupillary Distance

Mark the pupils and desired position of telescopes for each task.

Be sure to mark the pupils at the patients normal viewing position

Marking near pupils
while viewing through hole in target*

Lessons I've learned!

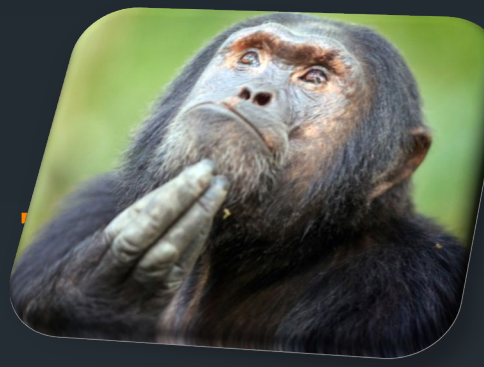
Use of adhesive rings to mark telescope position allows for functional testing of:

1. Centration
2. Binocularity
3. Footprint to TS

Tips for custom-mounting telescopes:

1. Carrier *eyewear* must be fully fitted and adjusted to the wearer before the telescope measurements are taken
2. CR-39 is preferred carrier lens material*
3. If Rx is used in carrier, it should almost always be incorporated in telescope
4. Tinting of the carrier lens can improve cosmesis
5. Beware of accommodative demands when using fixed focus telescopes
6. Tinted "caps" and specially drilled slip over sunglasses can be used to help with glare and contrast issues

Things I have to consider…



- Best corrected visual acuity will dictate the required magnification of the telescope
- Which is the patient's dominant eye
- Am I fitting a monocular or binocular system
- Nystagmus
  - The direction
  - Amplitude of movements
- Null point…how does that effect telescopes position
- Your state's law may dictate the power and type of telescope that can be used

Examples of differing state laws

Missouri

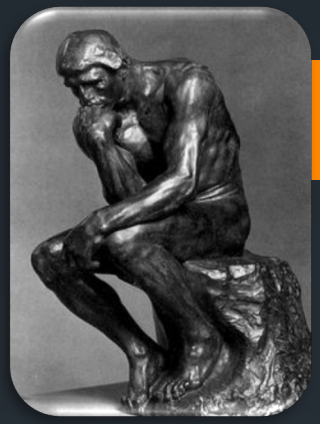
Illinois

Examples of differing state laws

- Missouri has a “progressive restriction law
- 20/20-20/40 unrestricted
- 20/41-20/60 daylight only
- 20/61-20/120 daylight & 45 mph*
- 20/121-20/160 daylight only /45* mph/ 10 mile radius
- No mention of bioptics!

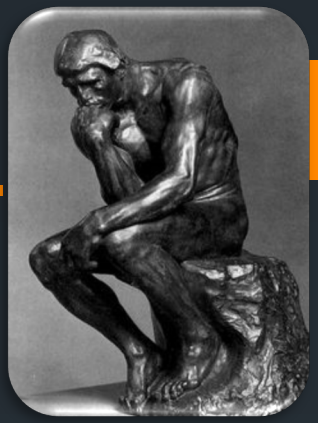
- Illinois is a true “bioptic state”
- 20/20-20/40 unrestricted
- 20/41-20/70 daylight only
- 20/71-20/100 “may be fit with a bioptic provided the VA through the bioptic provides 20/40 or better VA”
- Bioptic drivers are restricted to daylight only

Things for you to consider…
(and research on your own)



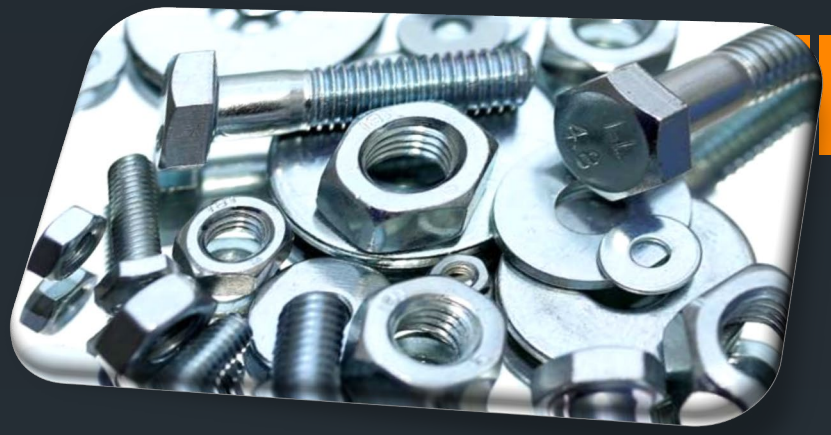
- What are your state's visual requirements for driving?
- Do your homework……very often your eye doctor won't have all that information.
- Be prepared for some frustration and "bumps in the road" when seeking information
- In almost every case you will have restrictions on when and where you can drive.
- In many states your license renewal may require a road test and/ or more frequent renewals than normally sighted drivers.

Things for you to consider…..



- If my state doesn't specifically mention bioptics for driving why should I consider getting one?
- Will getting a bioptic reduce the "restrictions" on my license? (such as daylight only)
- Getting fitted for the bioptic glasses is only part of the process.

Bits and pieces



- Probably not covered by your insurance
- Estimated cost of a bioptic can range from 2K to 5K
- The bioptic is only part of the cost
- For safe use a bioptic driver needs specific training with an experienced instructor!
- Unfortunately there is no registry of eye care professionals or driving instructors that have expertise in working with bioptics

Questions

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