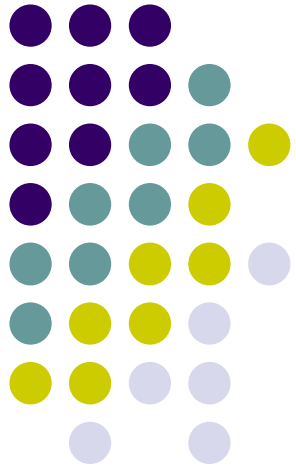
Presbyopia and Its Correction

Basic Optics, Chapter 24



Presbyopia

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  - Due to decreased elasticity of the lens

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- We think of it as afflicting of middle-aged adults, but loss of accommodation begins in childhood
  - It goes unnoticed until middle age, when the cumulative loss is enough to impact vision at reading distances

Presbyopia

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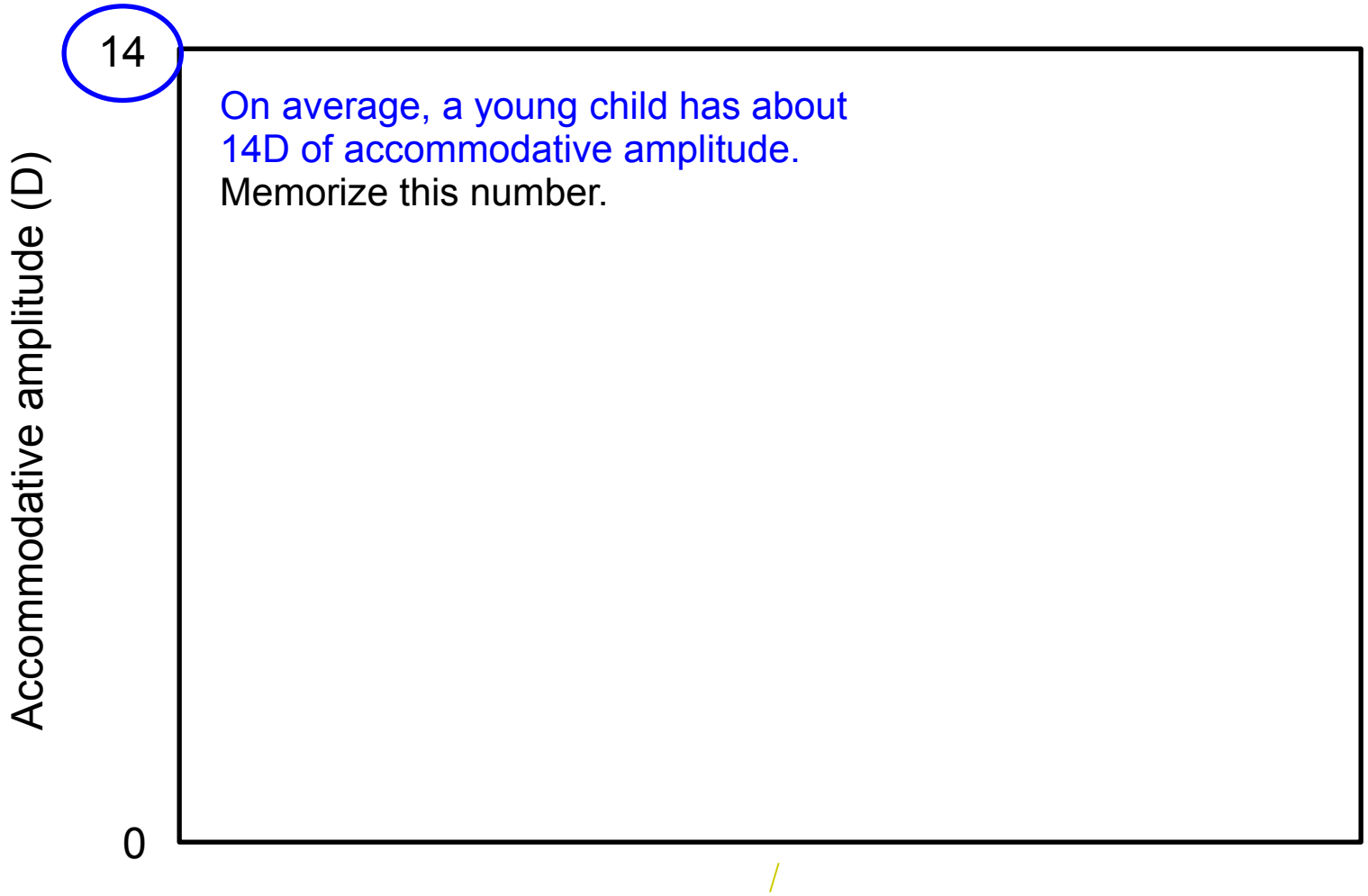
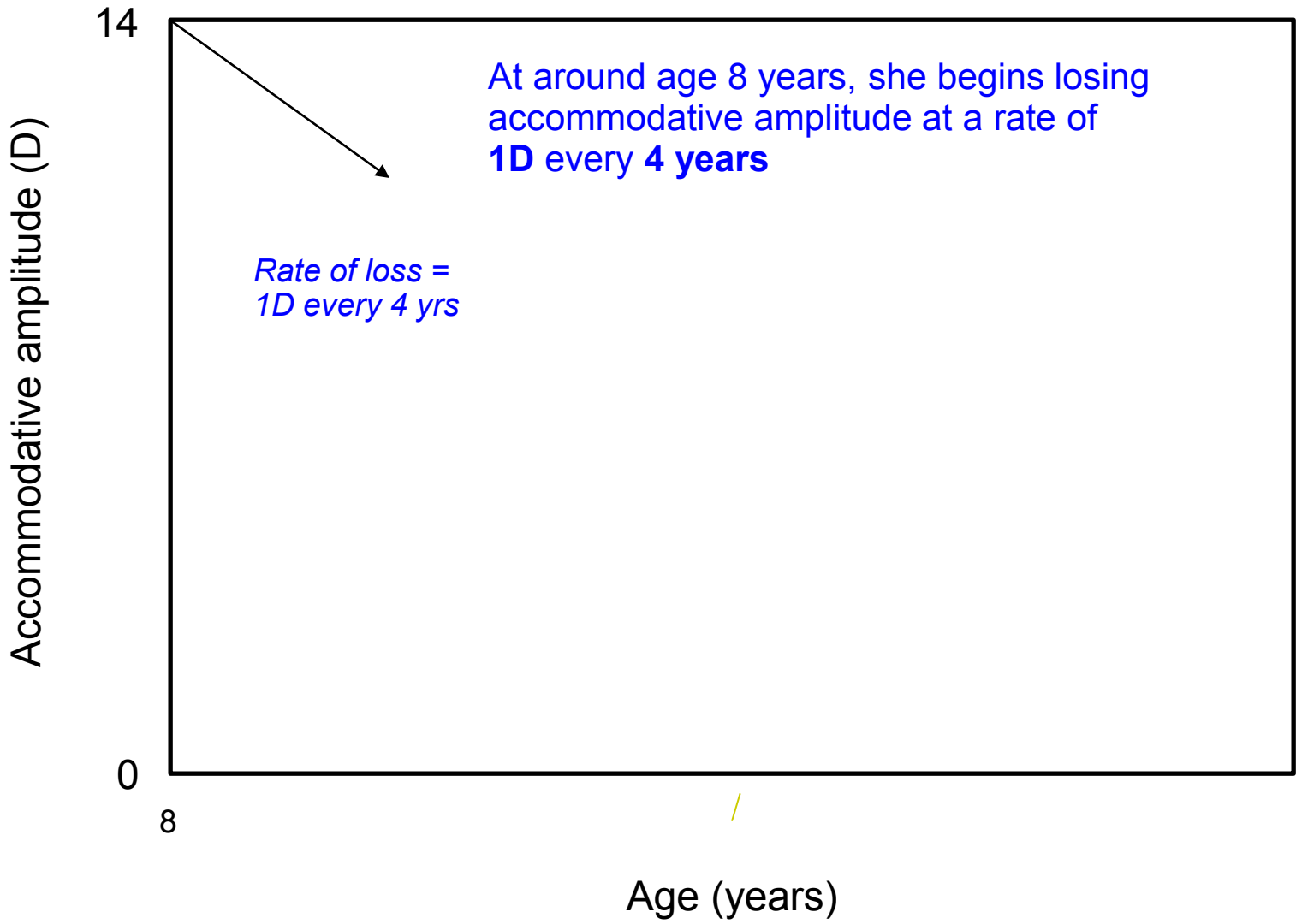
  - Due to decreased elasticity of the lens
- We think of it as afflicting of middle-aged adults, but loss of accommodation begins in childhood
  - It goes unnoticed until middle age, when the cumulative loss is enough to impact vision at reading distances
- The relationship between *age* and *accommodative amplitude* has a characteristic pattern, as shown on the following slides

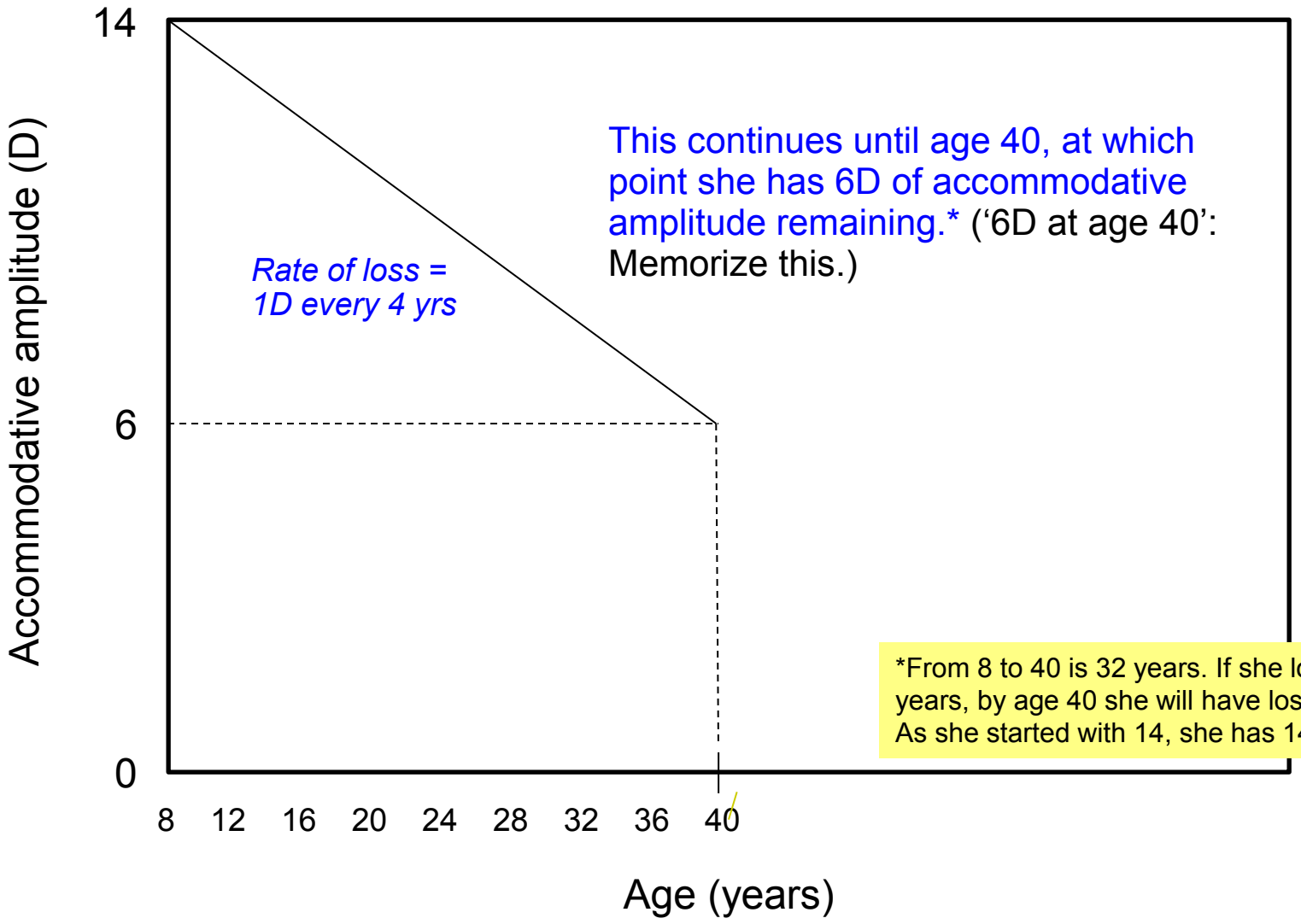
Presbyopia


14
On average, a young child has about
14D of accommodative amplitude.
Memorize this number.
Accommodative amplitude (D)
0

Presbyopia


14
0
8
Accommodative amplitude (D)
Age (years)
At around age 8 years, she begins losing accommodative amplitude at a rate of **1D** every **4 years**
Rate of loss = 1D every 4 yrs

Presbyopia

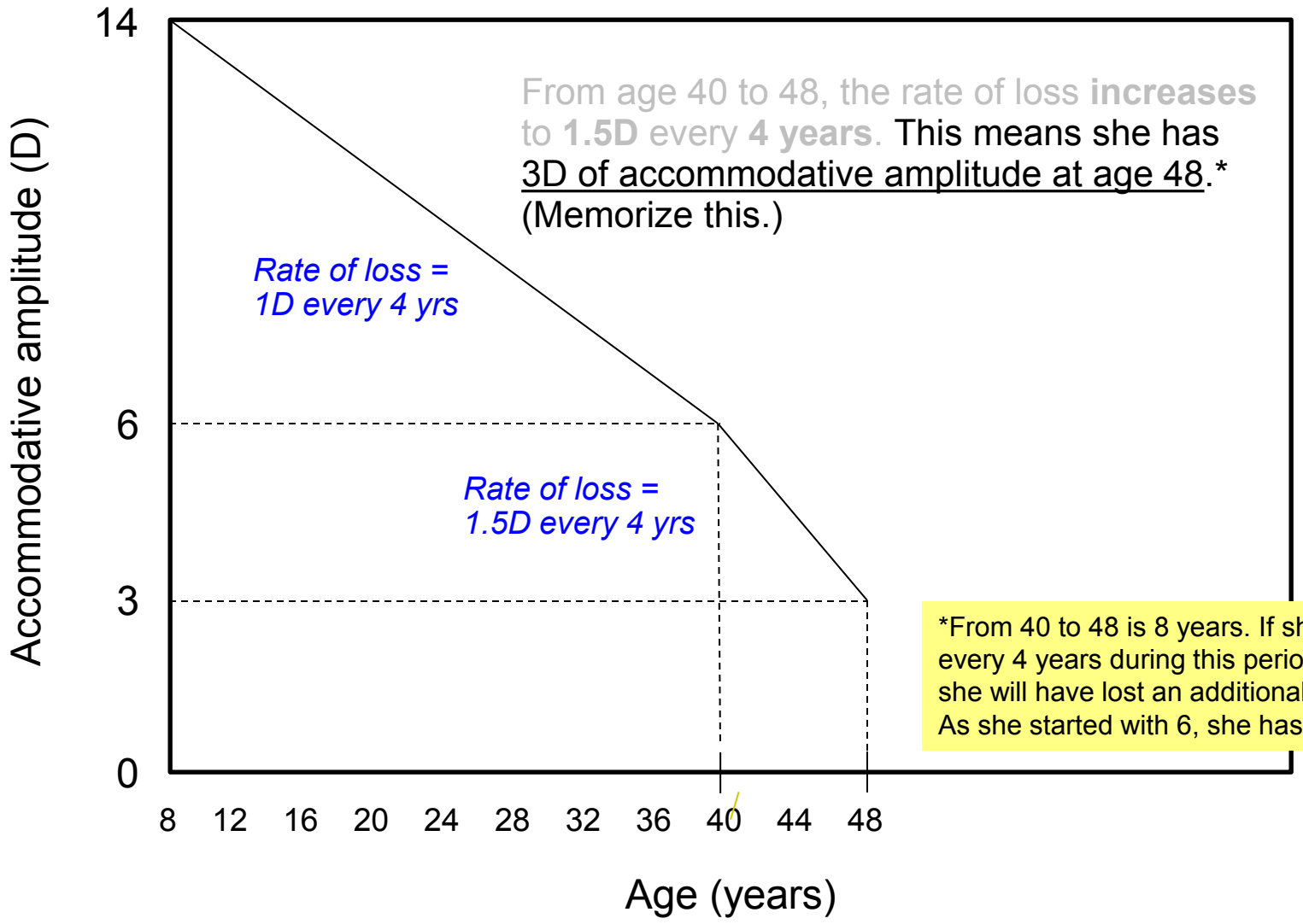


*From 8 to 40 is 32 years. If she loses 1D every 4 years, by age 40 she will have lost 32/4 x 1D = 8D. As she started with 14, she has 14 - 8 = 6D left.

Presbyopia

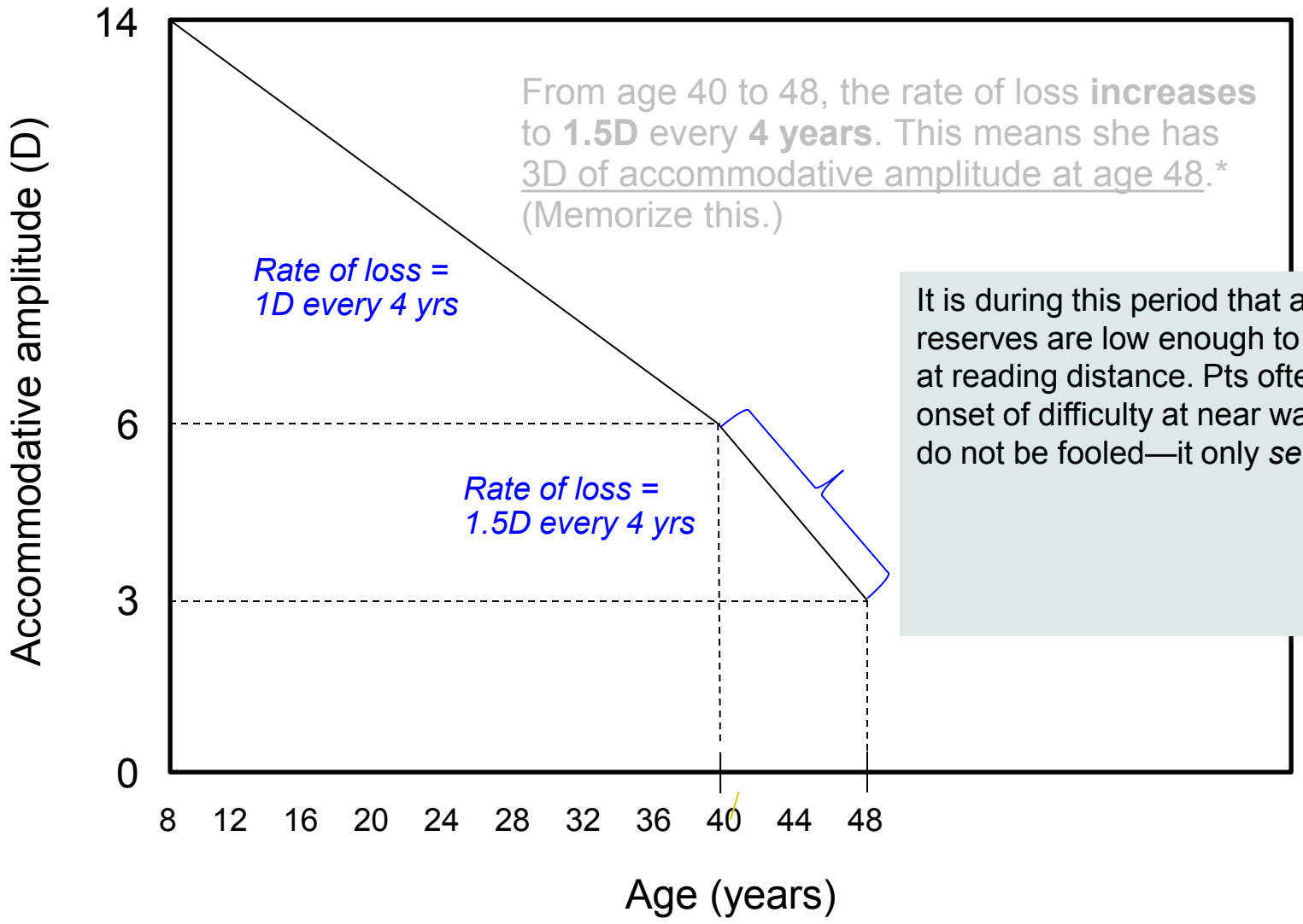

14
6
0
Accommodative amplitude (D)
From age 40 to 48, the rate of loss **increases** to **1.5D** every **4 years**.
Rate of loss = 1D every 4 yrs
Rate of loss = 1.5D every 4 yrs
8 12 16 20 24 28 32 36 40 44 48
Age (years)

Presbyopia



*From 40 to 48 is 8 years. If she loses 1.5D every 4 years during this period, by age 48 she will have lost an additional 8/4 x 1.5D = 3D. As she started with 6, she has 6 - 3 = 3D left.

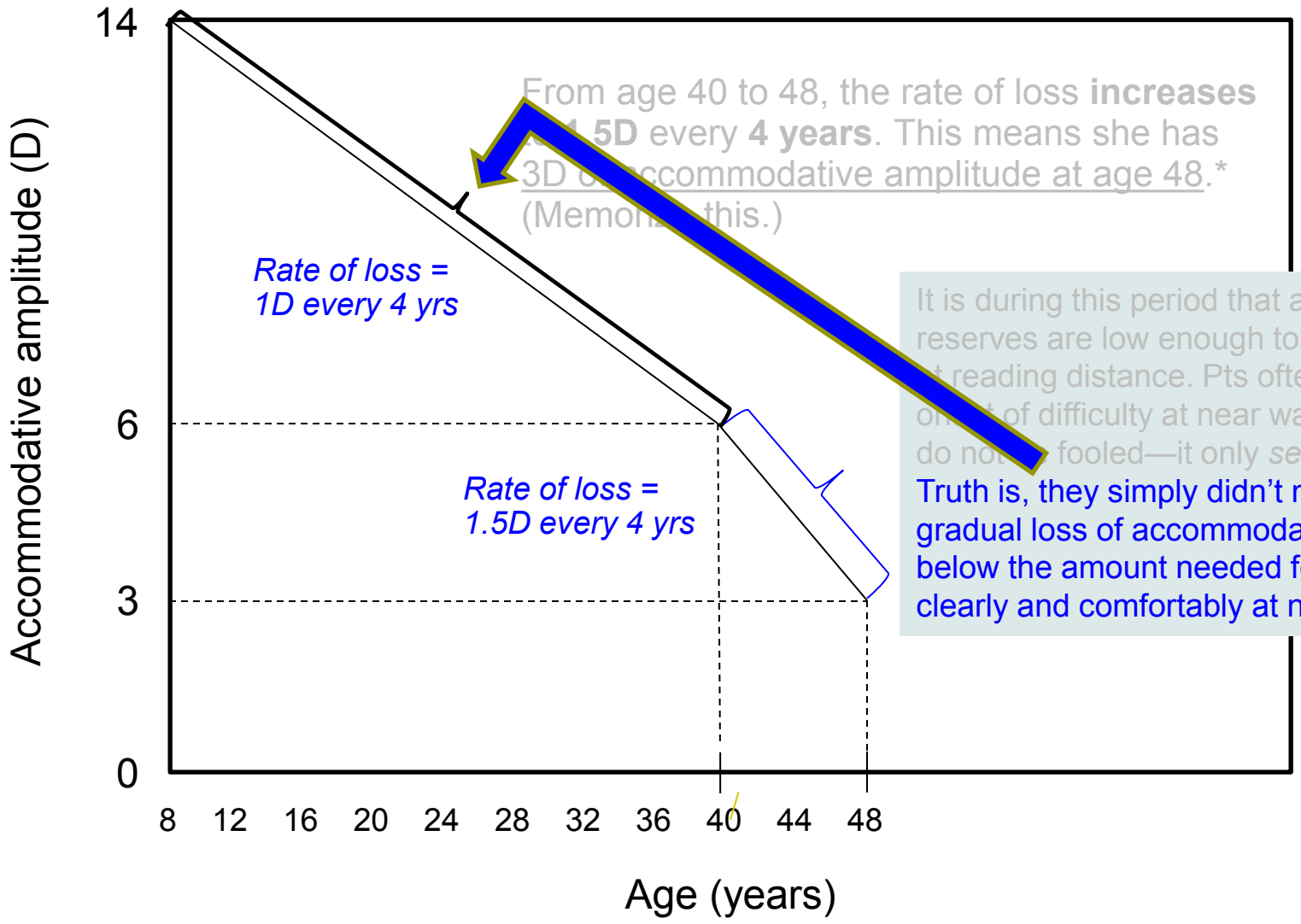
Presbyopia



From age 40 to 48, the rate of loss **increases** to **1.5D** every **4 years**. This means she has 3D of accommodative amplitude at age 48.* (Memorize this.)

It is during this period that accommodative reserves are low enough to impact vision at reading distance. Pts often c/o that the onset of difficulty at near was abrupt, but do not be fooled—it only *seemed* abrupt.

Presbyopia



From age 40 to 48, the rate of loss **increases** to **1.5D** every **4 years**. This means she has 3D of accommodative amplitude at age 48.* (Memorize this.)

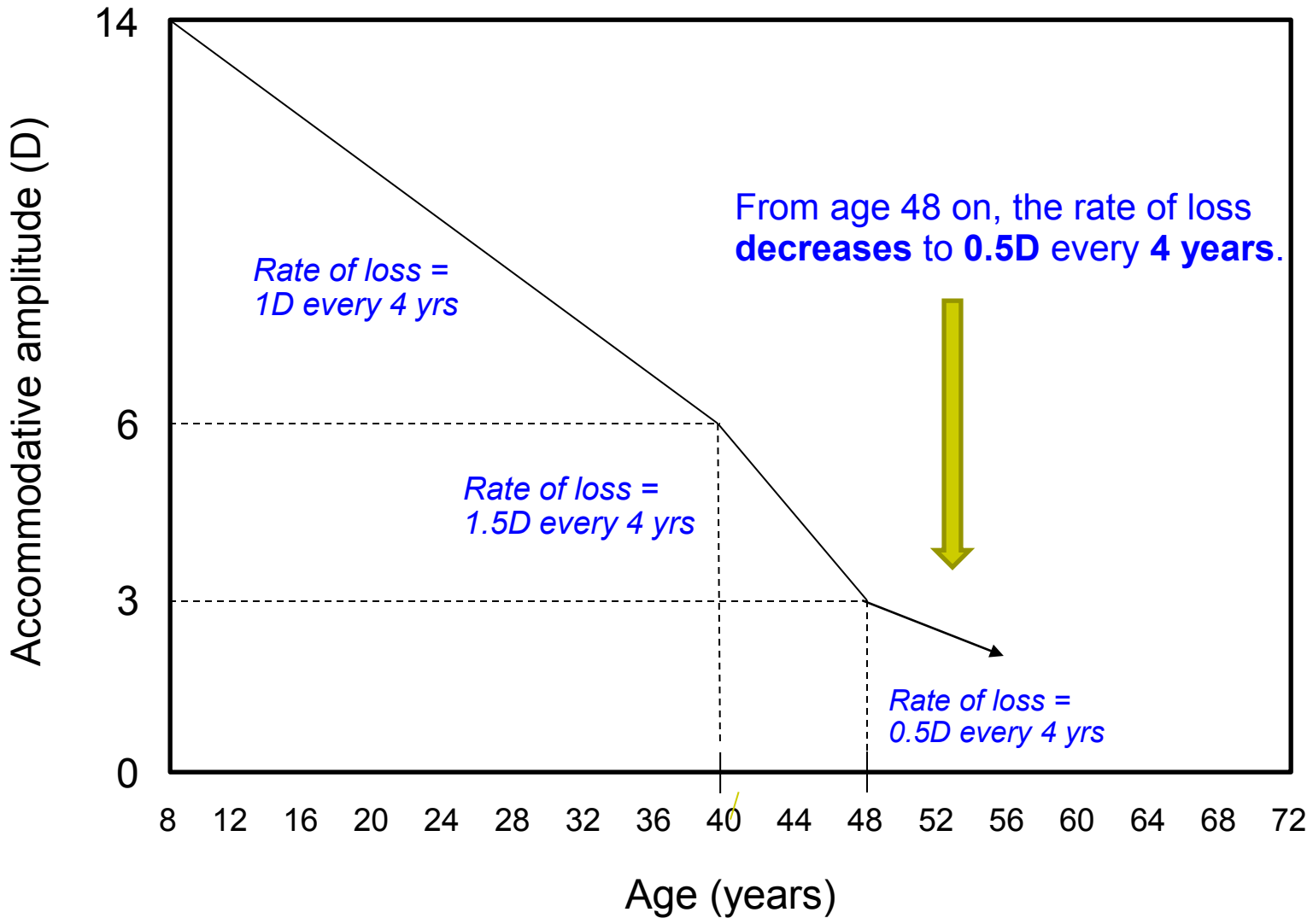
It is during this period that accommodative reserves are low enough to impact vision at reading distance. Pts often c/o that the onset of difficulty at near was abrupt, but do not feel fooled—it only *seemed* abrupt. Truth is, they simply didn't notice the gradual loss of accommodation until it fell below the amount needed for them to see clearly and comfortably at near.

Presbyopia

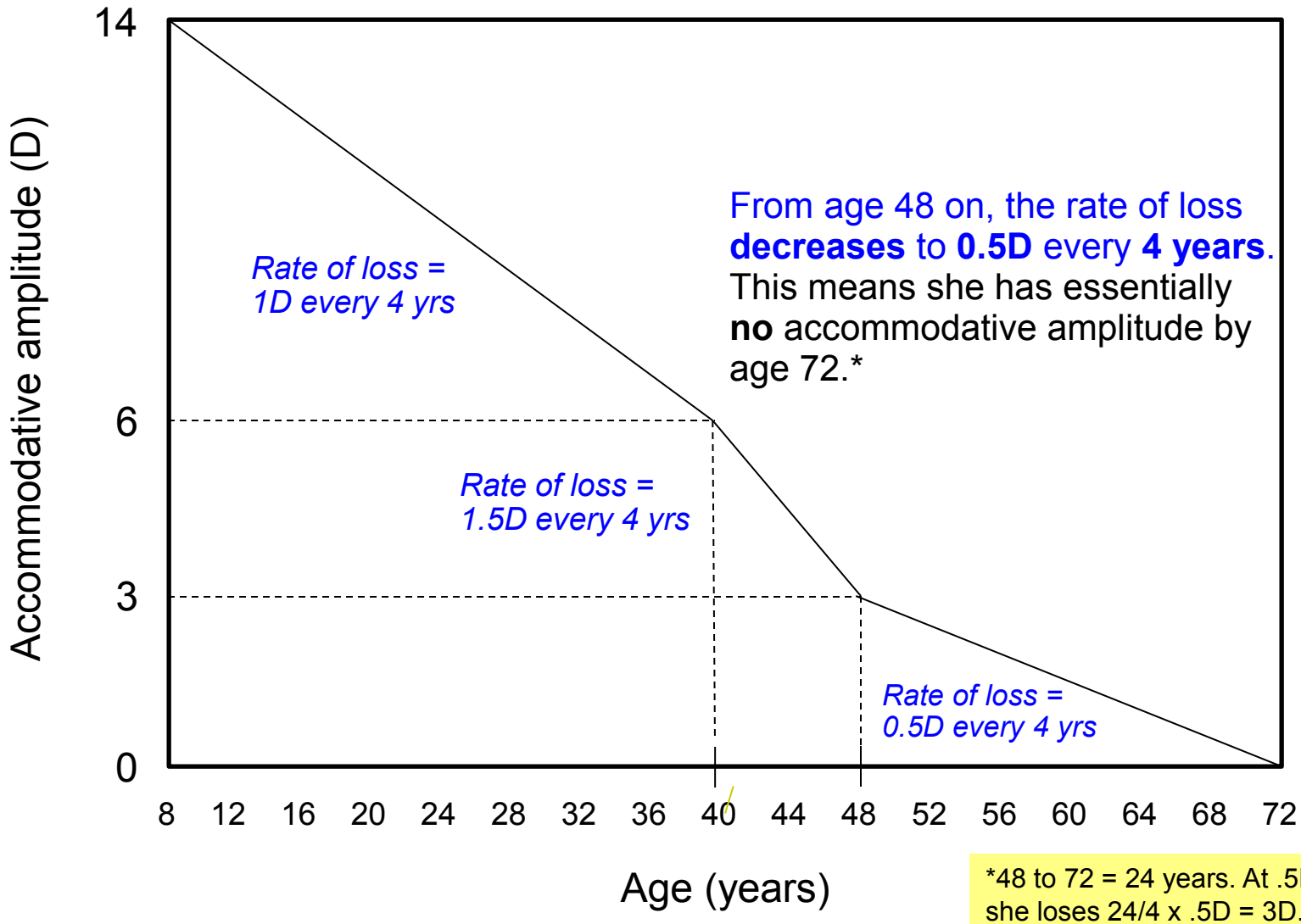
From age 40 to 48, the rate of loss **increases** to **1.5D** every **4 years**. This means she has 3D of accor
(Memorize t

Because some of their accommodative reserve must be spent to see clearly at distance, **hyperopes** often experience the onset of presbyopia-induced near difficulty at a younger age (*how* young depends on the degree of their hyperopia)

Presbyopia

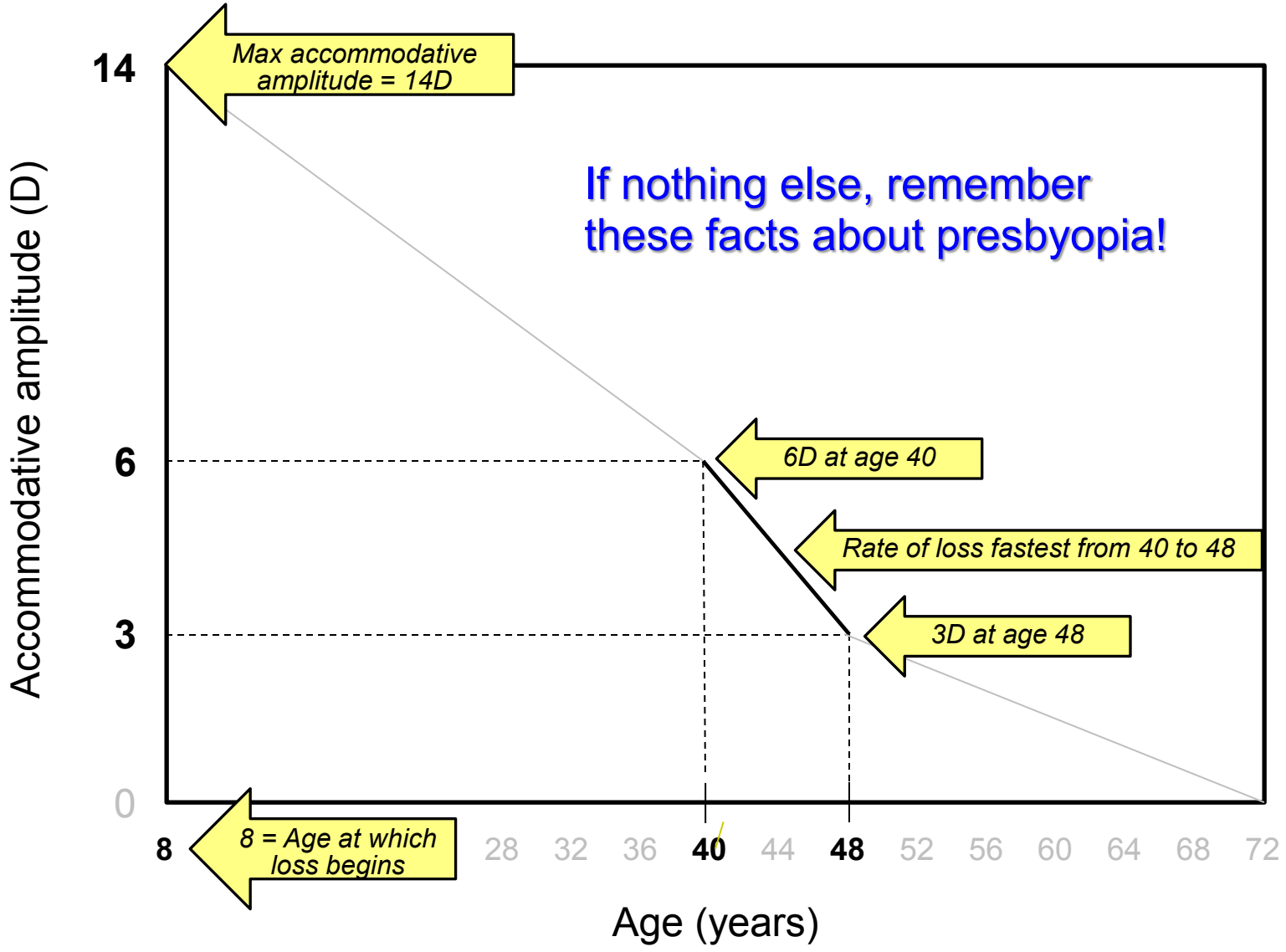

14
6
3
0
Accommodative amplitude (D)
8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72
Age (years)
Rate of loss = 1D every 4 yrs
Rate of loss = 1.5D every 4 yrs
From age 48 on, the rate of loss **decreases** to **0.5D** every **4 years**.
Rate of loss = 0.5D every 4 yrs

Presbyopia



*48 to 72 = 24 years. At .5D every 4 years, she loses 24/4 x .5D = 3D. As she started with 3, she has 3 - 3 = bupkis.

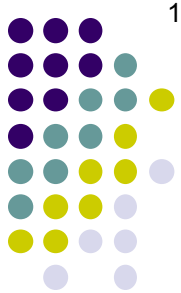
Presbyopia


Max accommodative amplitude = 14D
If nothing else, remember these facts about presbyopia!
6D at age 40
Rate of loss fastest from 40 to 48
3D at age 48
8 = Age at which loss begins
14
6
3
0
Accommodative amplitude (D)
8
28
32
36
40
44
48
52
56
60
64
68
72
Age (years)

Presbyopia

- *Presbyopia* is the loss of accommodation associated with increasing age
  - Spectacle correction of presbyopia is performed with single-vision readers *or* by specs with a near-vision component

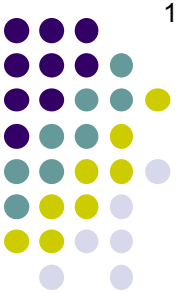
Presbyopia



- *Presbyopia* is the loss of accommodation associated with increasing age
  - **Spectacle correction of presbyopia** is performed

Next we will review some high-yield pearls regarding the spectacle correction of presbyopia

Presbyopia Correction: Pearls



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Presbyopia Correction: Pearls

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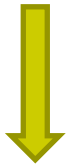
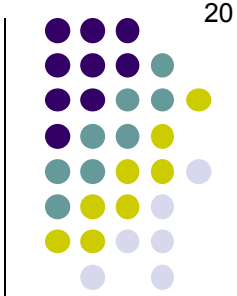
  - Note: It takes +2.5D to get from infinity to 40 cm



(100cm/40cm = 2.5D)

Presbyopia Correction: Pearls



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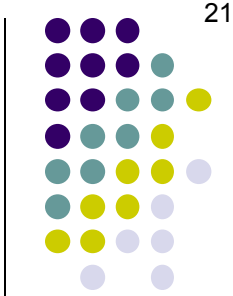

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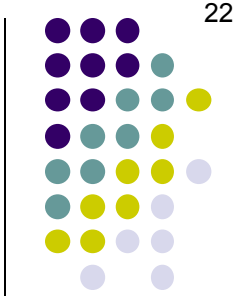
  - *Can* because this amount of accommodative effort is, per the book, 'the most that is comfortably sustainable for an extended amount of time'

Presbyopia Correction: Pearls



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  - *Can* because this amount of accommodative effort is, per the book, 'the most that is comfortably sustainable for an extended amount of time'
  - *Should* because using some accommodation allows the reader to move the book a little nearer or farther without causing the image to blur

Presbyopia Correction: Pearls

- *40 cm* as a default reading distance
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- Again as a default, the *Optics* book assumes readers can (and should) use half of their accommodative reserve while reading
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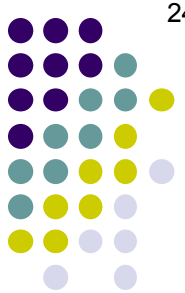
Memorize these factoids! In addition to being clinically useful rules of thumb, they bring into play a host of OKAP/WQE questions that are impossible to answer without knowing them. **For example**…

allows the reader to move the book a little nearer or farther without causing the image to blur

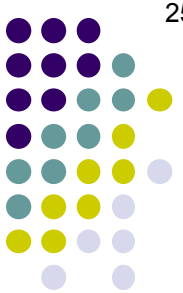
Presbyopia Correction: Pearls



- *What Rx should be given to a 4D hyperope with 3D accommodative reserve?*

Bifocal Rx: *?*

Presbyopia Correction: Pearls

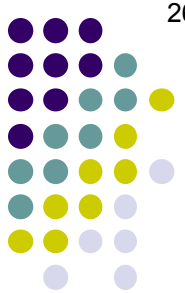


- *What Rx should be given to a 4D hyperope with 3D accommodative reserve?*
  - He needs +4 sph to see clearly at distance, and another +2.5D to see clearly at near

Bifocal Rx: *+4 sph add 2.50*

(IMPORTANT! This is not the final/correct answer—keep going)

Presbyopia Correction: Pearls



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  - Allowing him to use half of his accommodative reserve for near means he needs an add of 2.5 – 1.5 = 1D

Bifocal Rx: ***+4 sph add 1***

(**This** is)

Presbyopia Correction: Pearls

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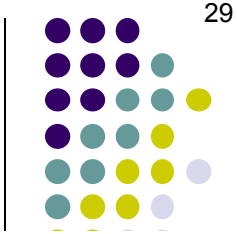
Bifocal Rx: ***+4 sph add 1***

- *What Rx should be given to a 4D myope with 4D accommodative reserve?*
  - She needs -4 sph to see clearly at distance, and another +2.5D to see clearly at near

Bifocal Rx: *-4 sph add 2.5*

(Not final/correct—keep going)

Presbyopia Correction: Pearls



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Bifocal Rx: ***+4 sph add 1***

- *What Rx should be given to a 4D myope with 4D accommodative reserve?*
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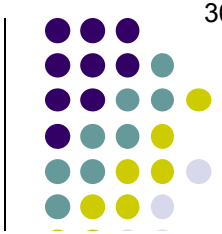
  - Allowing her to use half of her accommodative reserve for near means she needs an add of 2.5 – 2 = 0.5D

Bifocal Rx: ***-4 sph add 0.5***

(Final/correct)

Presbyopia Correction: Pearls



single-vision near

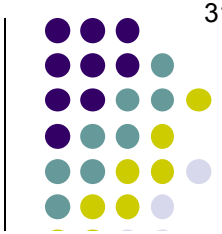
- *What Rx should be given to a 4D hyperope with 3D accommodative reserve?*

single-vision near

- *What Rx should be given to a 4D myope with 4D accommodative reserve?*

What if the pt wanted specs only for near?

Presbyopia Correction: Pearls



single-vision near

- *What Rx should be given to a 4D hyperope with 3D accommodative reserve?*
  - To see clearly at near he needs +4 + (+)2.50 = 6.5D

single-vision near

- *What Rx should be given to a 4D myope with 4D accommodative reserve?*

Single-vision readers Rx: ***+6.5 sph***

(Not final/correct—keep going)

Presbyopia Correction: Pearls

single-vision near

- *What Rx should be given to a 4D hyperope with 3D accommodative reserve?*
  - To see clearly at near he needs +4 + (+)2.50 = 6.5D
  - Allowing the use of half his accommodative reserve, he needs 6.5 – 1.5 = 5D

single-vision near

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Single-vision readers Rx: ***+5 sph***

(Final/correct)

Presbyopia Correction: Pearls

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Single-vision readers Rx: ***+5 sph***

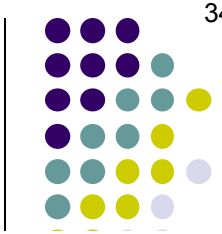
single-vision near

- *What Rx should be given to a 4D myope with 4D accommodative reserve?*
  - She has a +4 error lens—but needs only +2.5D for near. So she has a *surplus* add of +1.5. Thus, **full** near correction would require -1.5D.

Single-vision readers Rx: ***-1.5 sph***

(Not final/correct—keep going)

Presbyopia Correction: Pearls



single-vision near

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Single-vision readers Rx: ***+5 sph***

single-vision near

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  - Allowing the use of half her accommodative reserve, she needs -1.5 – 2 = -3.5D

Single-vision readers Rx: ***-3.5 sph***

(Final/correct)

Presbyopia Correction: Pearls

single-vision near

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  - To see clearly at near he needs +4 + (+)2.50 = 6.5D

Another way of thinking about this one

needs 6.5 – 1.5 = 5D

Single-vision readers Rx: *+5 sph*

single-vision near

- *What Rx should be given to a 4D myope with 4D accommodative reserve?*
  - She has a +4 error lens. When she kicks in half her reserve, she has +4+2 = +6D of 'add'—but only *needs* +2.5.

Single-vision readers Rx: ***?***

Presbyopia Correction: Pearls

single-vision near

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Single-vision readers Rx: *+5 sph*

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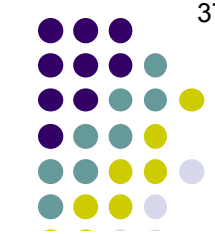

single-vision near

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Single-vision readers Rx: ***+5 sph***

single-vision near

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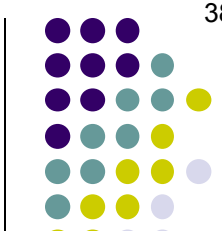
  - To get from 6D to 2.5D, we must **offset** the excess +3.5; ie, she needs an Rx of -3.5D.

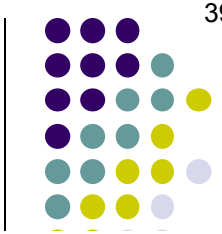
Single-vision readers Rx: ***-3.5 sph***

Presbyopia Correction: Pearls



- Correcting presbyopia with bifocals may leave the wearer with a clinically significant ‘gap’ in their clear vision at the arm’s length distance

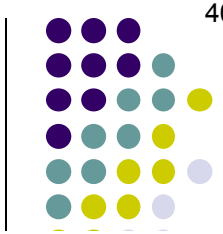
Presbyopia Correction: Pearls



- Correcting presbyopia with bifocals may leave the wearer with a clinically significant ‘gap’ in their clear vision at the arm’s length distance

Consider: A pseudophakic pt corrected for distance with monofocal IOLs is slightly hyperopic (oops), needing +0.5 at distance. Because she has no accommodative reserve (duh), a full near add (+2.50) is given; ie, her Rx is +0.50 add 2.5. At a followup appt she c/o blurriness. At what distance, and why?

Presbyopia Correction: Pearls



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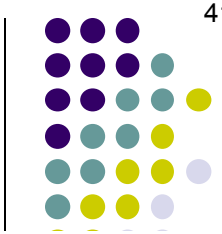
From 40cm to ~1m. The *why* is pretty straightforward: The distance portion of her correction gives her good vision from infinity (= 20 ft/6m) to ~1m.[1]

[1]Technically, seeing clearly at <6m requires an additional plus power; however, most individuals aren’t bothered by the blur of objects nearer than 6m until somewhere around 1m.

Presbyopia Correction: Pearls



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Consider: A pseudophakic pt corrected for distance with monofocal IOLs is slightly hyperopic (oops), needing +0.5 at distance. Because she has no accommodative reserve (duh), a full near add (+2.50) is given; ie, her Rx is +0.50 add 2.5. At a followup appt she c/o blurriness. At what distance, and why? From 40cm to ~1m. The *why* is pretty straightforward: The distance portion of her correction gives her good vision from infinity (= 20 ft/6m) to ~1m.[1] The near portion of her correction affords good vision at and around 40cm.

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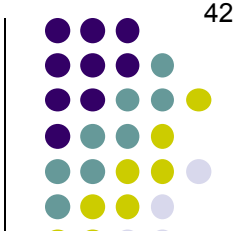
Presbyopia Correction: Pearls



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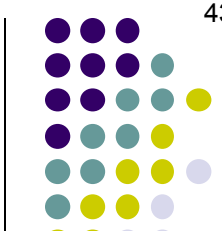
[1]Technically, seeing clearly at <6m requires an additional plus power; however, most individuals aren't bothered by the blur of objects nearer than 6m until somewhere around 1m.

[2]Also technically, there is an additional gap from 40cm on in; however, adults rarely try to see at such distances, and thus this gap goes unnoticed.

Presbyopia Correction: Pearls



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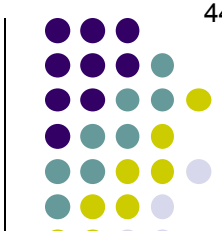

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  - **Classic c/o**: Difficulty when on the computer—blurriness and/or neck pain (from tilting their head back and leaning in to use their reading add to see the screen)
- This intermediate-distance gap can be corrected via a trifocal or PALs

Presbyopia Correction: Pearls

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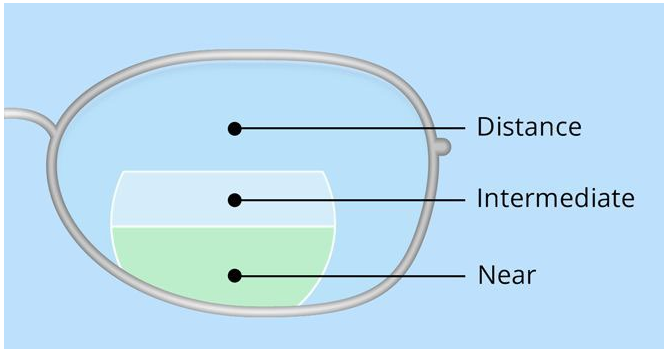
  - Consist of a ‘stripe’ of intermediate power sitting atop the add seg



Presbyopia Correction: Pearls

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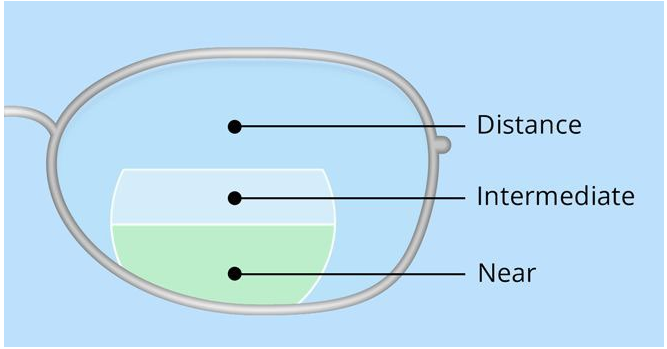
Remember this!



Presbyopia Correction: Pearls

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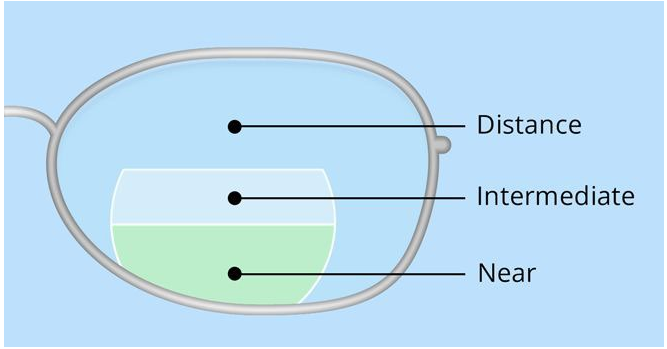

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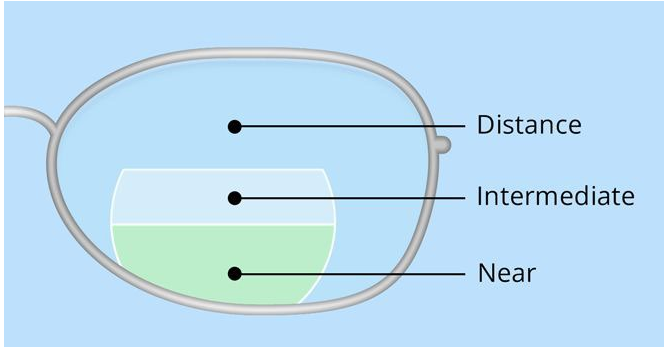

*If this means nothing to you: No worries, we will unpack it in detail later shortly

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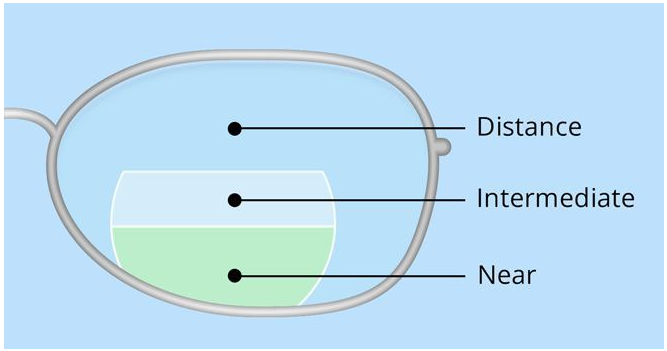

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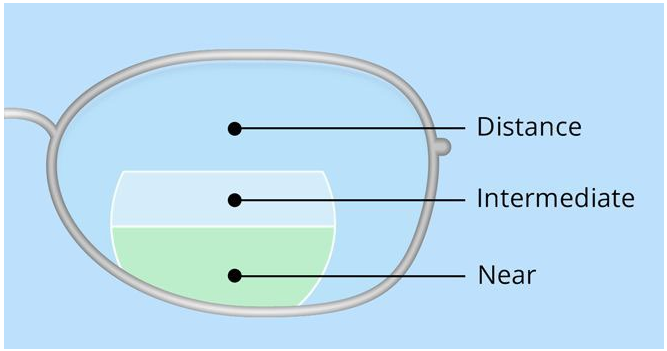
Next let's work an OKAP-style question on this…



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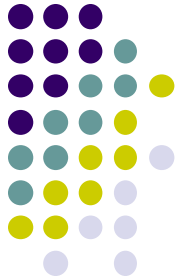
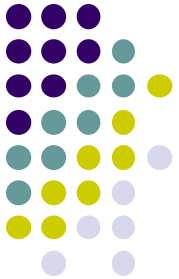


- A 51 y.o. engineer has specs, -2.50 +0.25 x 161 OD and -2.25 +0.75 x 016 OS and an accommodative amplitude of 1D. He has bifocals, but c/o difficulty at intermediate distances. You Rx trifocals with +3D near and +1.50 intermediate. He returns a week later c/o ‘gaps’ in his otherwise clear vision between:
  - 67 and 100 cm, 25 and 40 cm
  - Infinity and 67 cm, 40 and 33 cm
  - Infinity and 40 cm, 33 and 25 cm
  - 67 and 100 cm, 40 and 33 cm

Presbyopia Correction: Pearls



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…through the distance segment:	infinity	*to*	100cm

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…through the intermediate:	67cm	*to*	40cm

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…through the near:	33cm	*to*	25cm

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…through the intermediate:	67cm	*to*	40cm
…through the near:	33cm	*to*	25cm

Thus the **gaps** are between 67 and 100 cm, and between 40 and 33 cm.

Presbyopia Correction: Pearls

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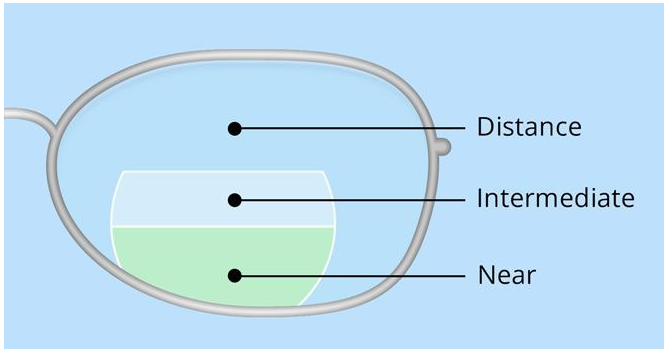
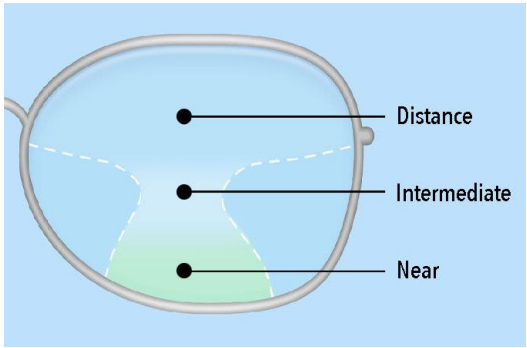
  - Consist of distance Rx above, full near add at the bottom, and a ‘corridor’ of increasing power in-between





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- PALs
  - Consist of distance Rx above, full near add at the bottom, and a ‘corridor’ of increasing power in-between
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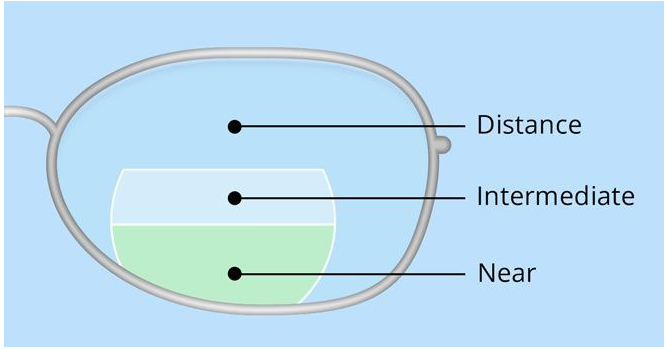

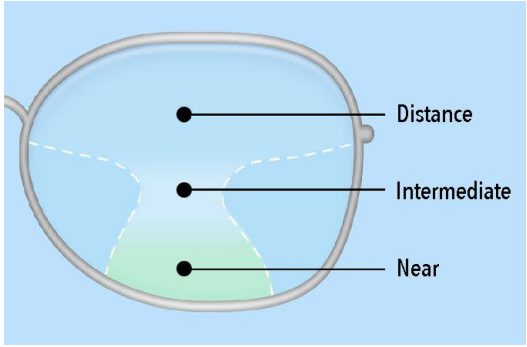

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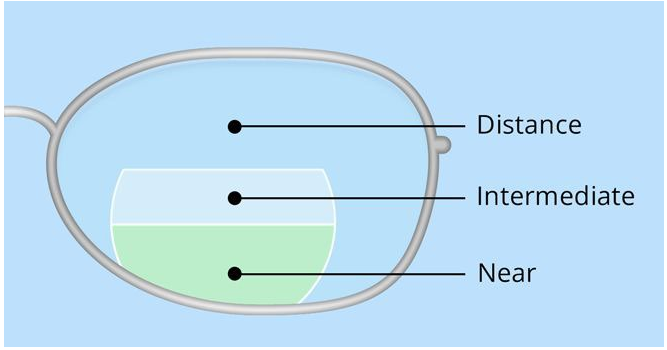

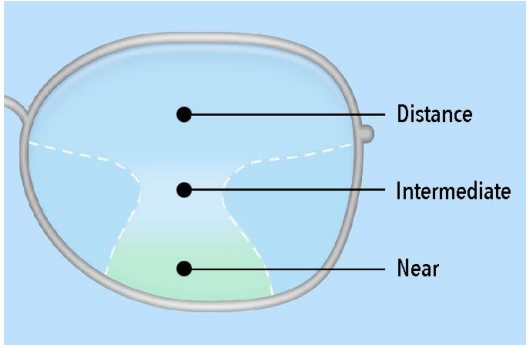

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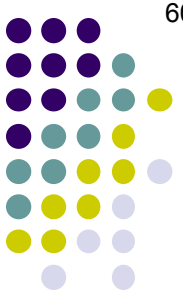
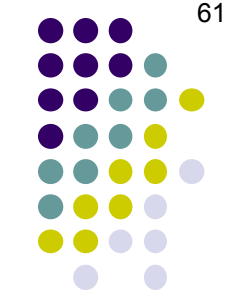


- Start new presbyopes with PALs
  - Forewarn them about the ‘swim’!*

*Remember: If you tell a pt about something in advance, it’s an expectation. If you tell them about it *after* it happens, it’s a complication.

Presbyopia Correction: Pearls



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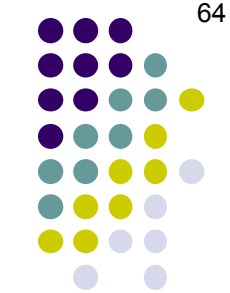

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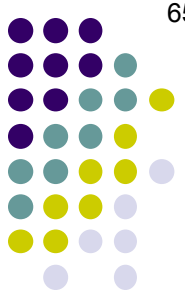
*Next (and as promised), let's drill down on the highly OKAPable issues of image **jump** and image **displacement***

Jump and Displacement



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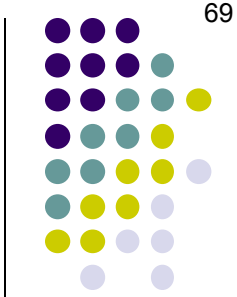
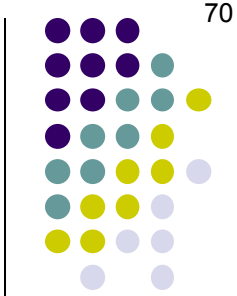


- Image jump and image displacement are phenomena associated with bifocal additions
- **Not** an issue with PALs (progressive addition lenses; i.e., no-line bifocals*)
- Before delving into jump and displacement, let's talk about some background info:
  - Lenses as prisms
  - Types of bifocal add segments
  - Optical centers
  - Prentice's rule of induced prism

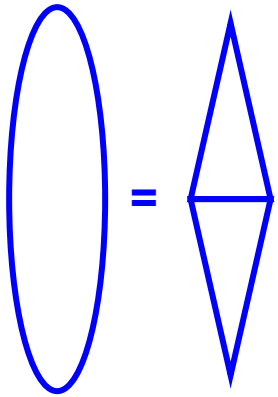
Lenses as Prisms



Spherical lenses come in two basic flavors: *Plus* and *minus*

Lenses as Prisms

Recall that a *plus* lens can be thought of as two prisms **base-to-base**



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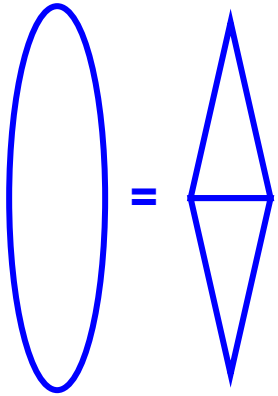

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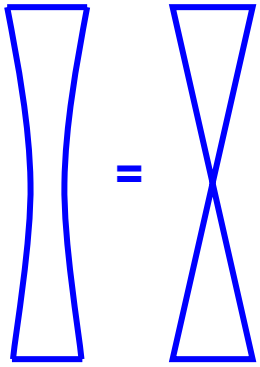
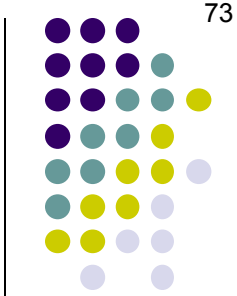
Likewise, a *minus* lens can be thought of as two prisms **apex-to-apex**



Types of Add Segments



Bifocal adds come in two basic flavors: *Round top* and *flat top*

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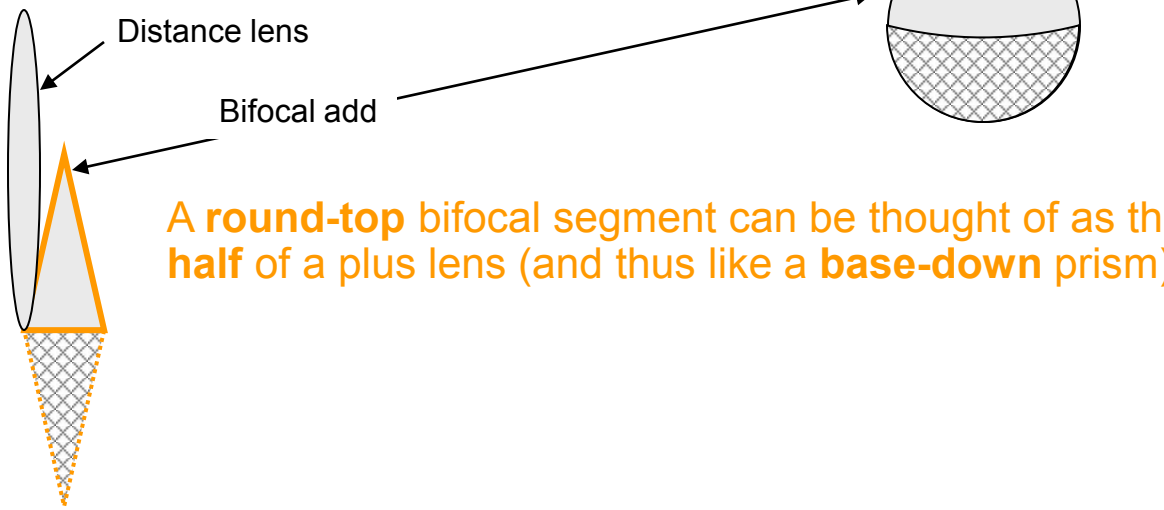

A **round-top** bifocal segment can be thought of as the **top half** of a plus lens (and thus like a **base-down** prism)

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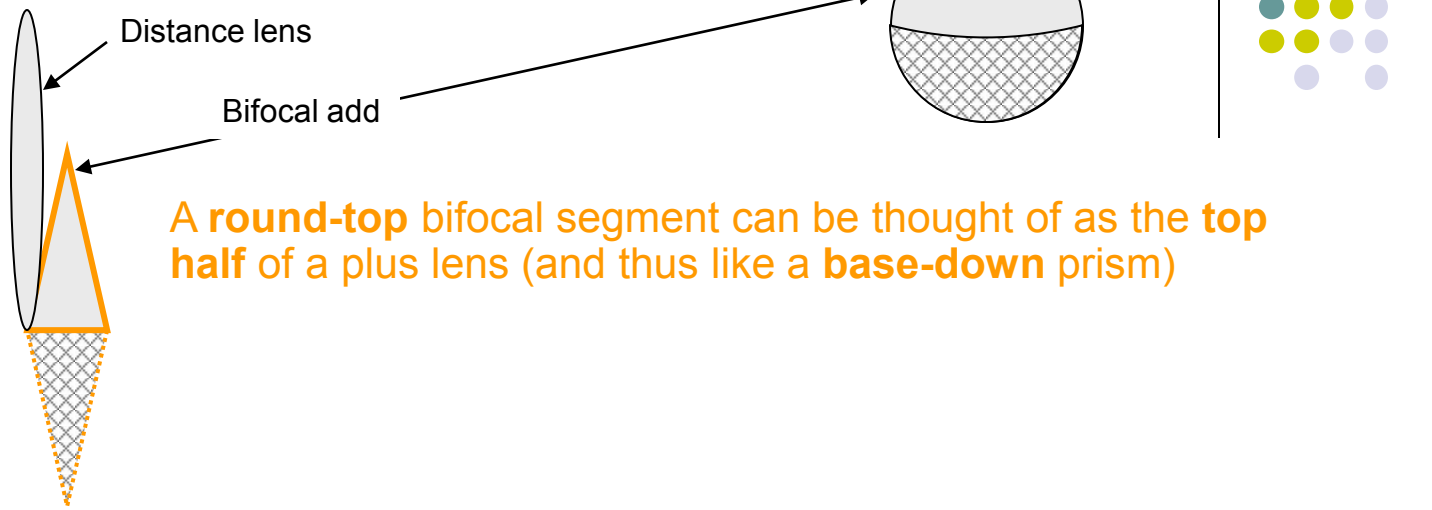

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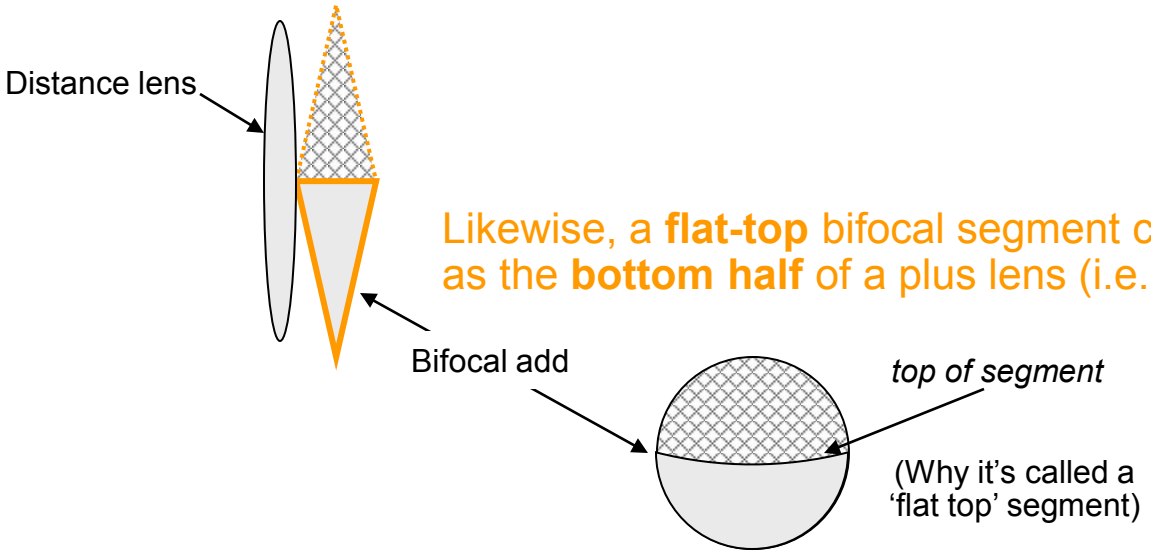
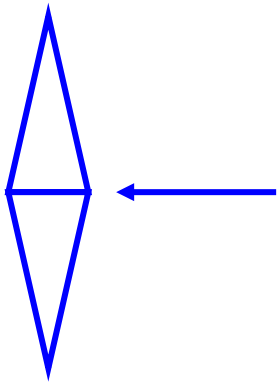
Bifocal adds come in two basic flavors: *Round top* and ***flat top***



Likewise, a **flat-top** bifocal segment can be thought of as the **bottom half** of a plus lens (i.e., a **base-up** prism)

Lenses: Optical Centers

The optical center of the **plus** lens is right here, in the center



Spherical lenses come in two basic flavors: ***Plus*** and *minus*

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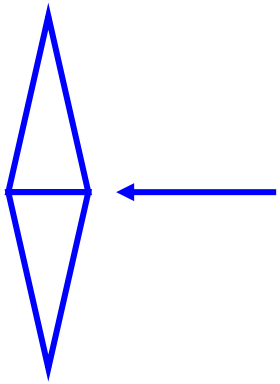
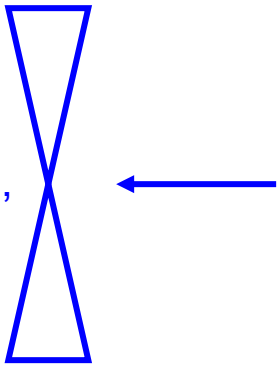


Spherical lenses come in two basic flavors: *Plus* and ***minus***

The optical center of the **minus** lens is right here, in the center



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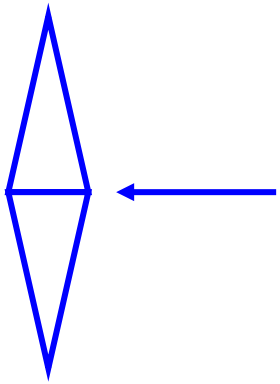

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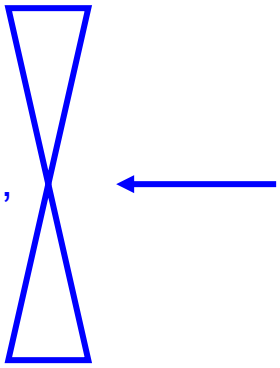

The optical center of the add is near its base; i.e., near where it would be if the add were a 'whole' plus lens instead of half of one

Lenses: Optical Centers

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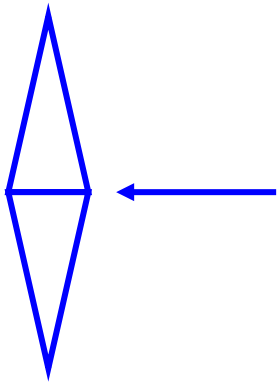

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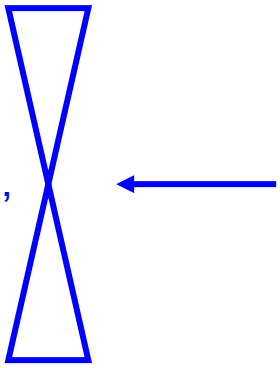

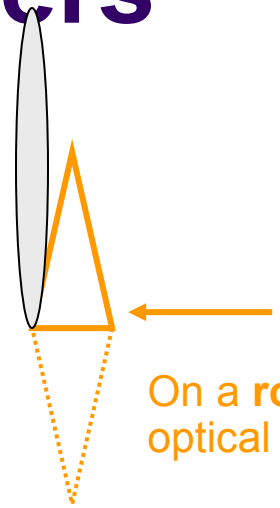

On a **round-top** add, the optical center of the add is **low**

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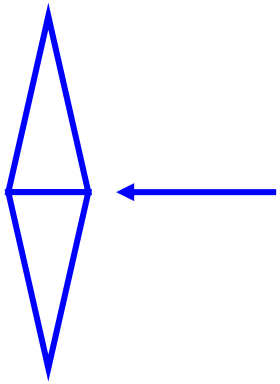

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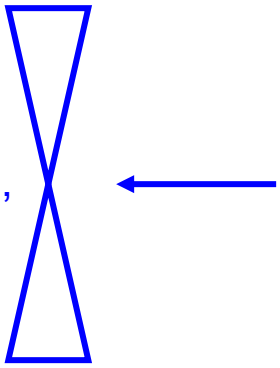

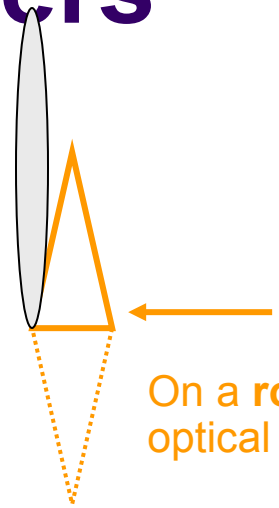

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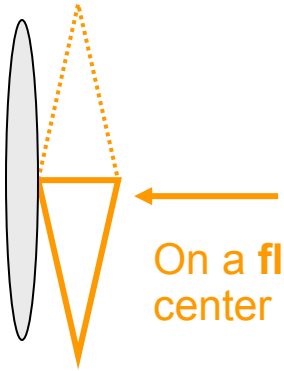
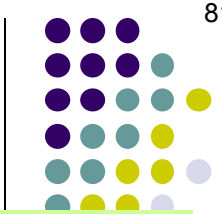


On a **flat-top** add, the optical center of the add is **high**

Prentice's Rule of Induced Prism



Because lenses are fundamentally prisms, it is not surprising that lenses can have prismatic effects. **Prentice's Rule** *states that the amount of prism (in prism diopters,* **PD***) induced by a lens is a function of the distance from the optical center through which one is looking, and the dioptric power of the lens:*

$$PD = hD$$

where **h** *is the distance from the optical center in cm and* **D** *is the dioptric power of the lens.*

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Make sure you take note of this!

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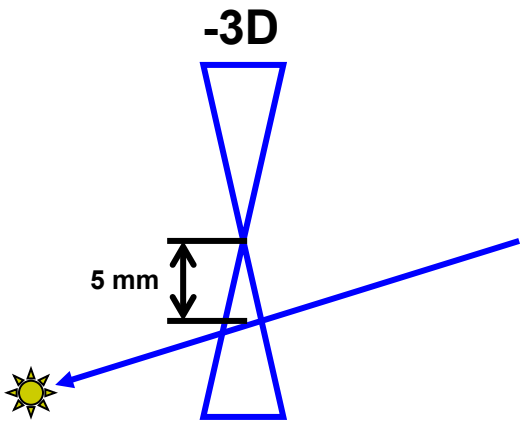

Looking 5 mm below the optical center of a -3D lens induces 0.5 x (-3) = 1.5D of base-**down** prism

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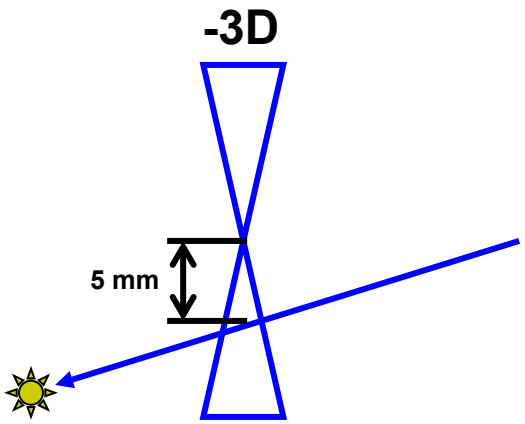
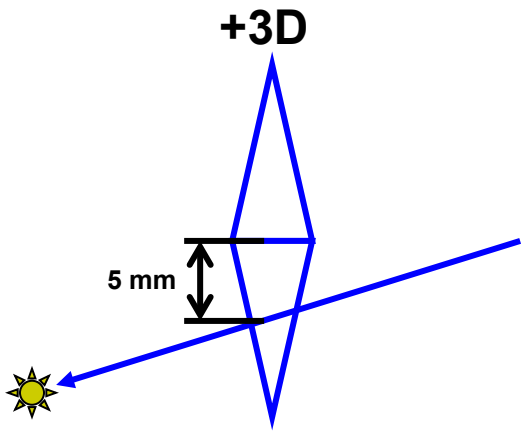


Looking 5 mm below the optical center of a -3D lens induces 0.5 x (-3) = 1.5D of base-**down** prism



Looking 5 mm below the optical center of a +3D lens induces 0.5 x (3) = 1.5D of base-**up** prism

Prentice's Rule of Induced Prism

*Because lens … rismatic effects. **Prent** … ced by a lens is a func… , and the dioptric powe…*

*where **h** is th… he lens.*

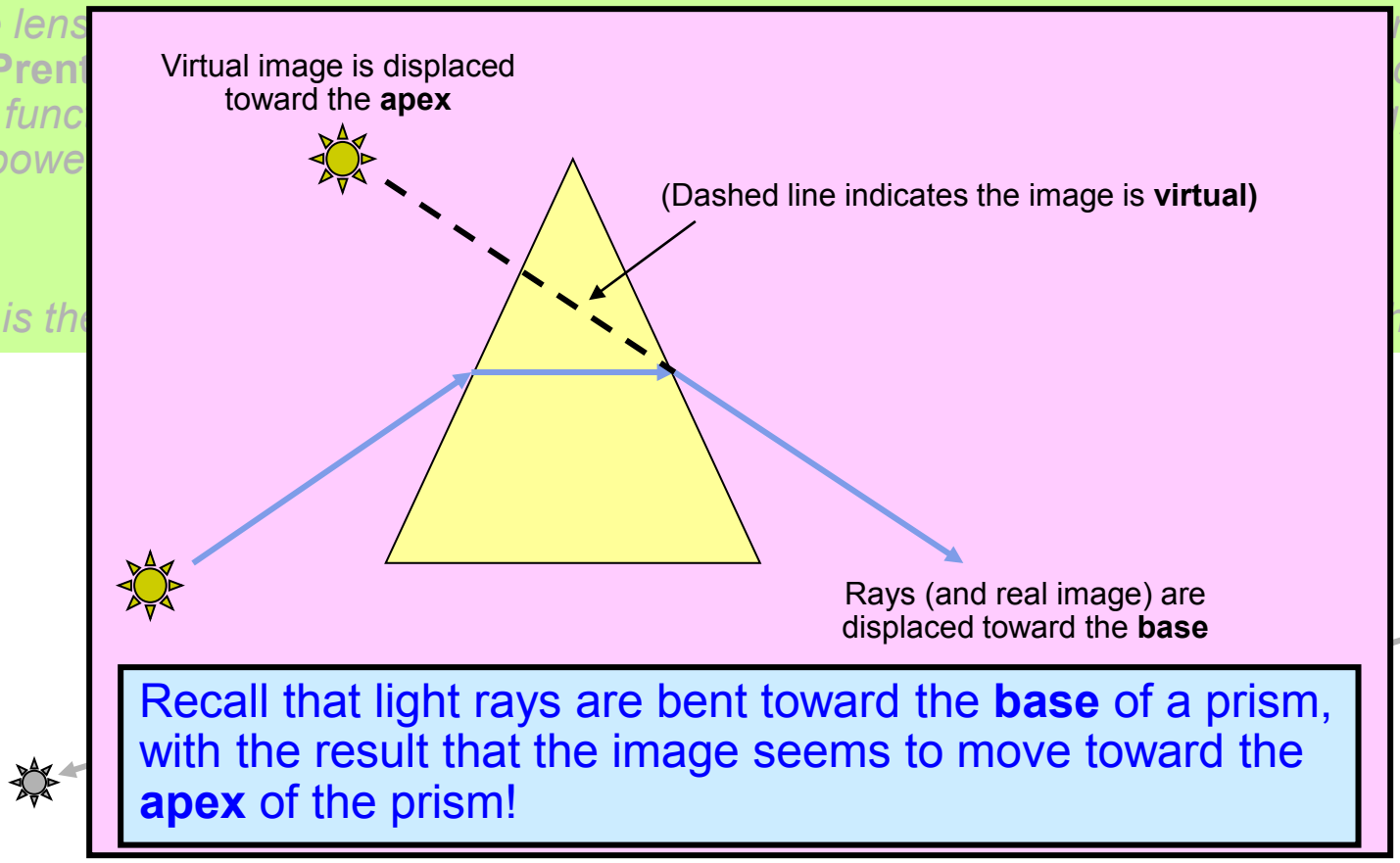


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Image *Jump*

- *Image jump* refers to a **sudden** change in image location that occurs when gaze shifts from the distance lens to the add segment

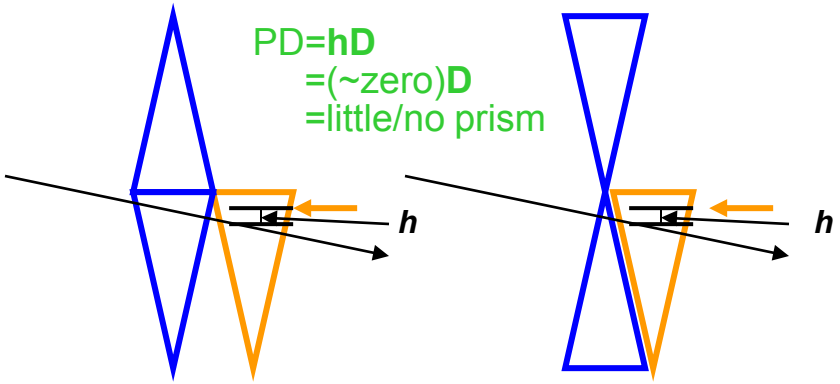
Image *Jump*

- *Image jump* refers to a **sudden** change in image location that occurs when gaze shifts from the distance lens to the add segment
  - Think of it as a **Prentice's Rule** issue owing to the location of the **optical center** of the add segment

Image Jump

Image jump: *A sudden change in image location occurring when gaze shifts into the bifocal add segment*

Bifocal add:
Flat-Top segment



The optical center of a **flat-top** segment is high*.

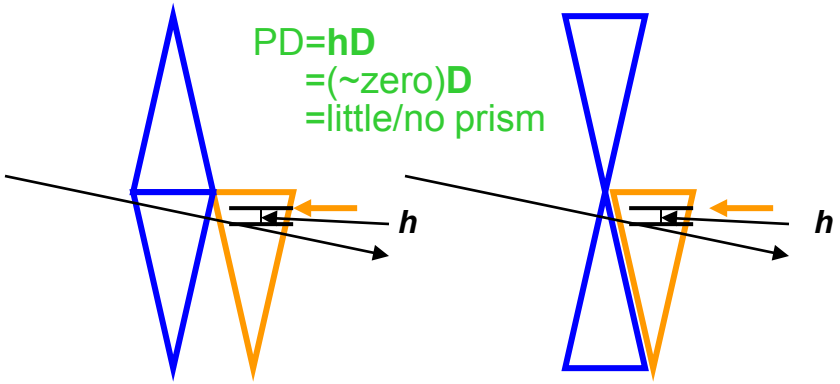
*Per the BCSC *Optics* book, the optical center of a typical flat-top is 3 mm from the top of the segment. However, *don't factor this into any Prentice-rule calcs you do on the OKAP or WQE* (unless the Q itself supplies this info)!

Image Jump

Image jump: *A sudden change in image location occurring when gaze shifts into the bifocal add segment*

Bifocal add:

Flat-Top segment

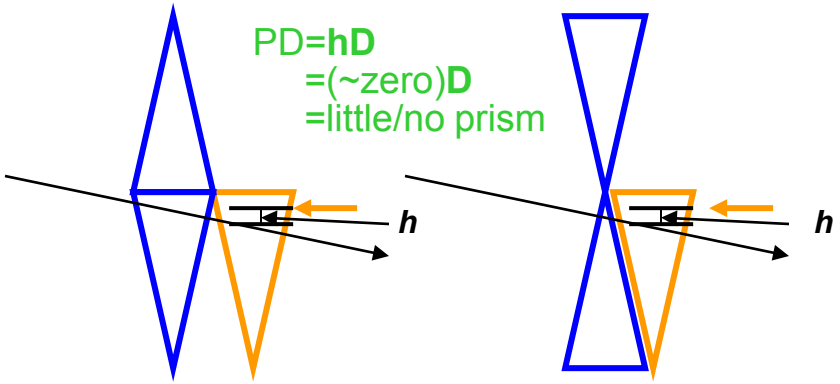


The optical center of a **flat-top** segment is high. When gaze shifts downward into the add, one is looking very near its optical center. Because there is little induced prism (i.e., ***h*** is small), images do not seem to jump.

Image Jump

Image jump: *A sudden change in image location occurring when gaze shifts into the bifocal add segment*

Bifocal add: ***Flat-Top*** segment



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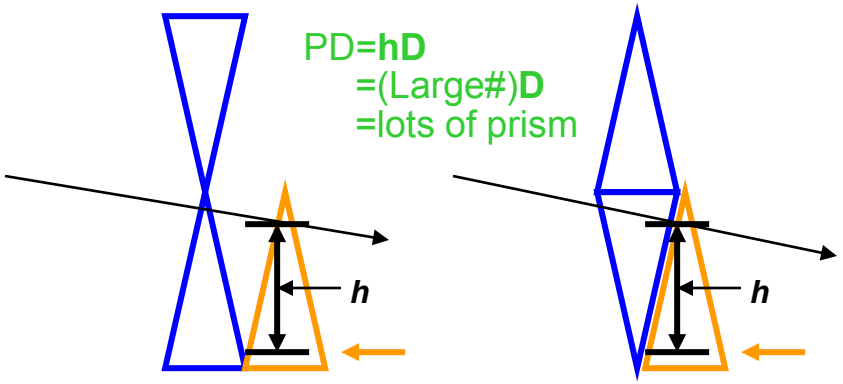
Bifocal add: ***Round-Top*** segment



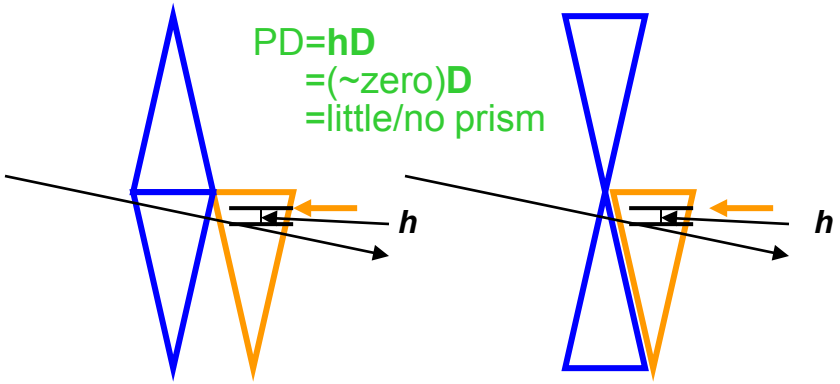
However, the optical center of a **round-top** segment is low*.

*The *Optics* book does not offer a specific value for the typical segment-top-to-optical-center distance on a round-top.

Image Jump

Image jump: *A sudden change in image location occurring when gaze shifts into the bifocal add segment*

Bifocal add: ***Flat-Top*** segment



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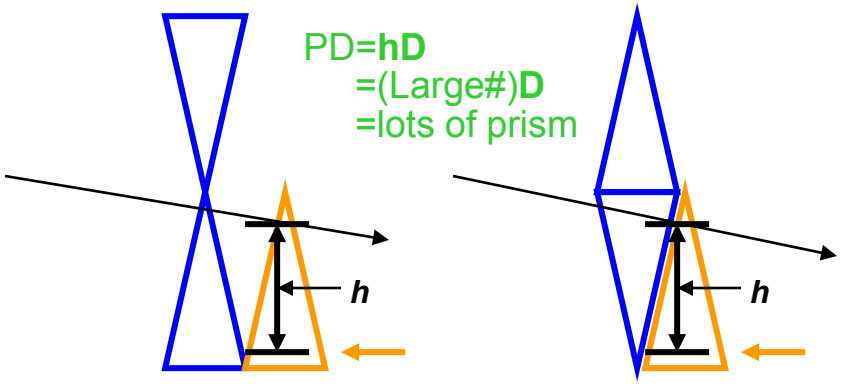
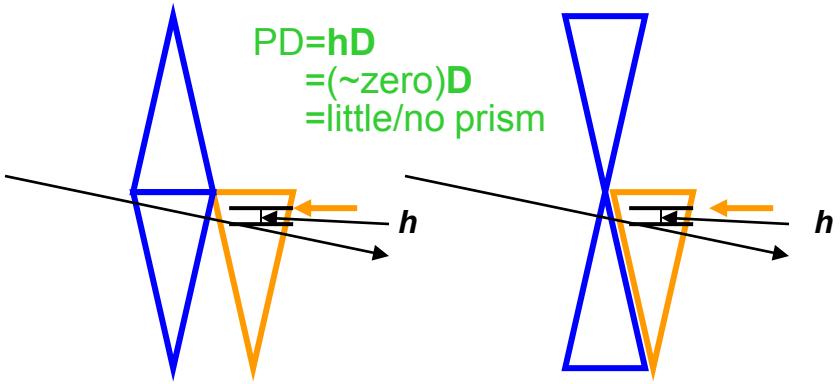


However, the optical center of a **round-top** segment is low. Therefore, when gaze shifts downward into the add, one is suddenly looking through a lens at considerable distance from its optical center (i.e., ***h*** is large). This abruptly induces a significant amount of prism, and images will seem to jump (*upwards*, toward the apex of the add segment 'prism').

Image Jump

Image jump: *A sudden change in image location occurring when gaze shifts into the bifocal add segment*

Bifocal add: ***Flat-Top*** segment



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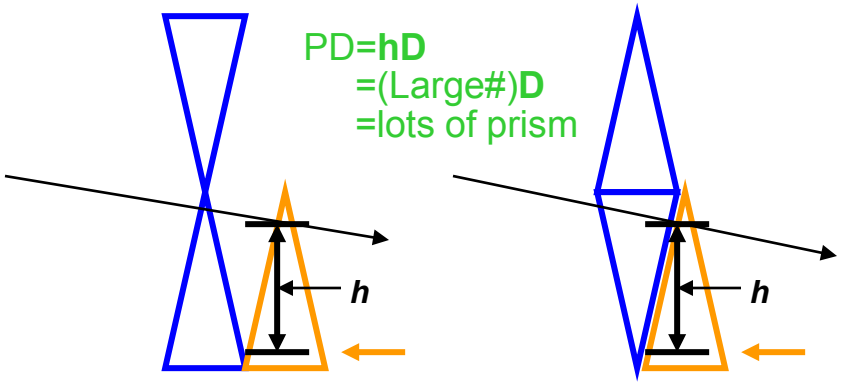

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*Therefore, for both plus and minus lenses, image jump is minimized with a **flat-top** segment*

Image Jump

A final note related to image jump…

There is a third, rarely dispensed bifocal flavor:

The *Executive* or *Franklin** type

*Yes, *that* Franklin

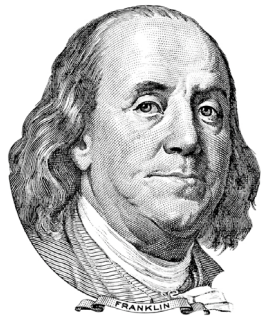
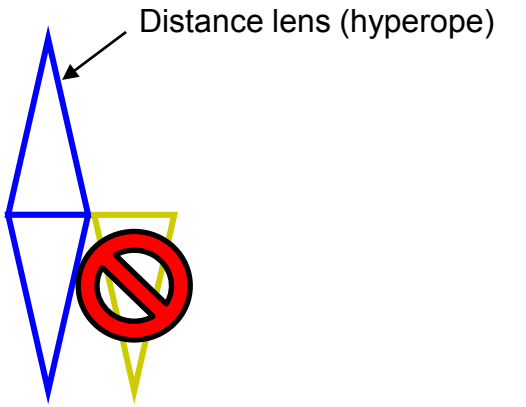
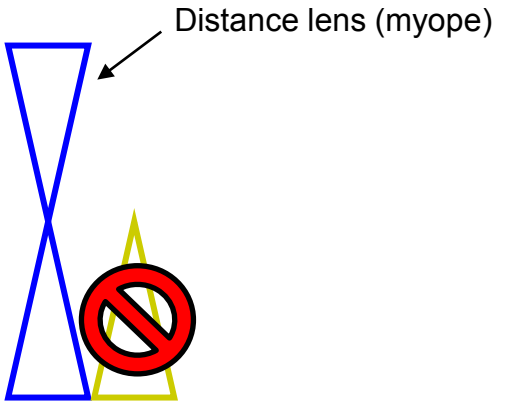


Image Jump



Executive/Franklin bifocals are not created by affixing a flat- or round-top seg to a base distance lens



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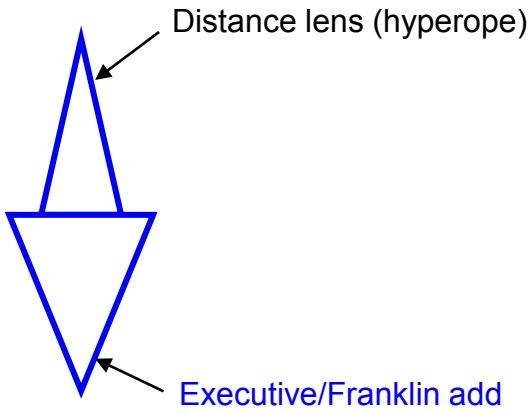
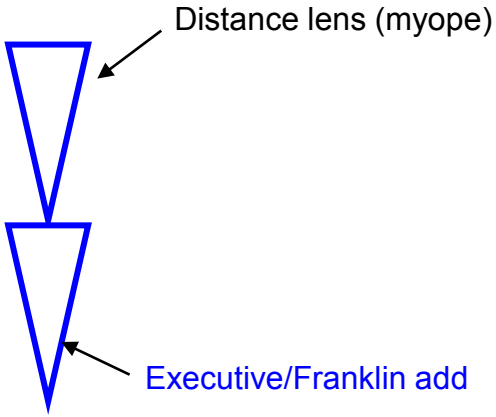


Instead, they are created by **replacing** the entire bottom half of the distance lens with the entire bottom half of an ‘add’ lens



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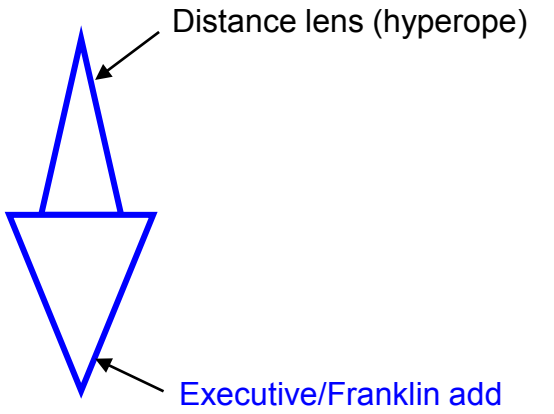

This construction makes Executive/Franklin bifocals recognizable by the line extending across the entire lens

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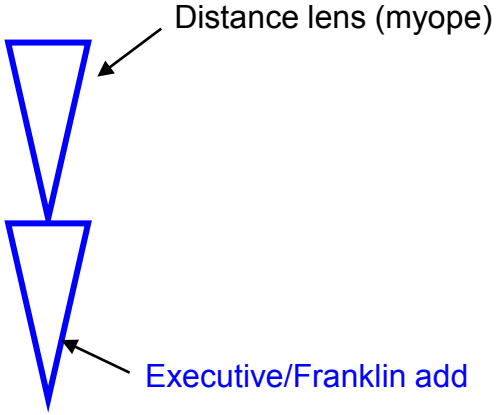

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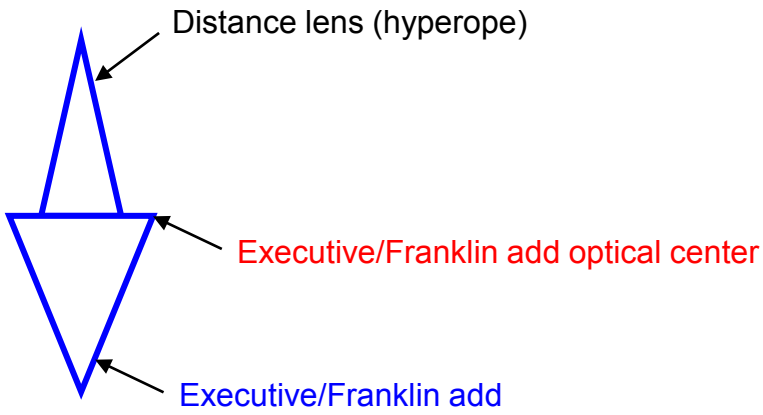
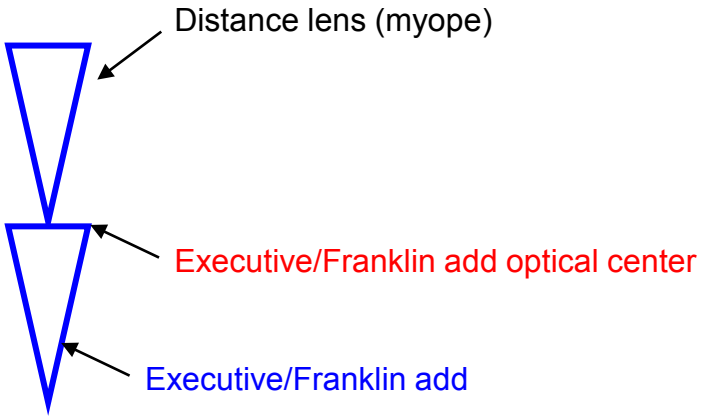


This construction also means the optical center of the add is at the very top of the near segment. Put another way: For the Executive/Franklin bifocal, *h* = 0.



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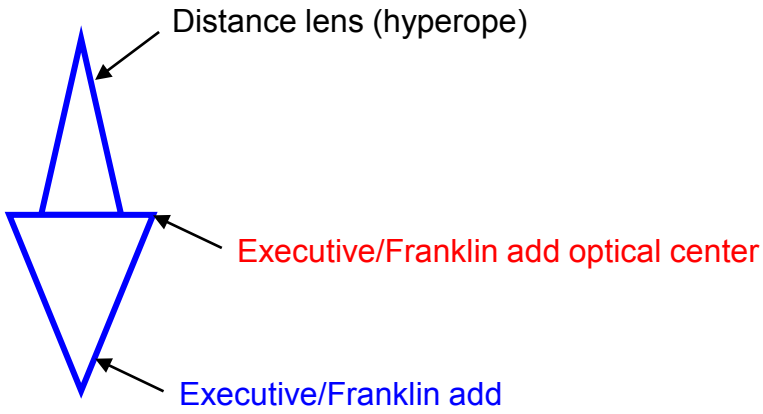

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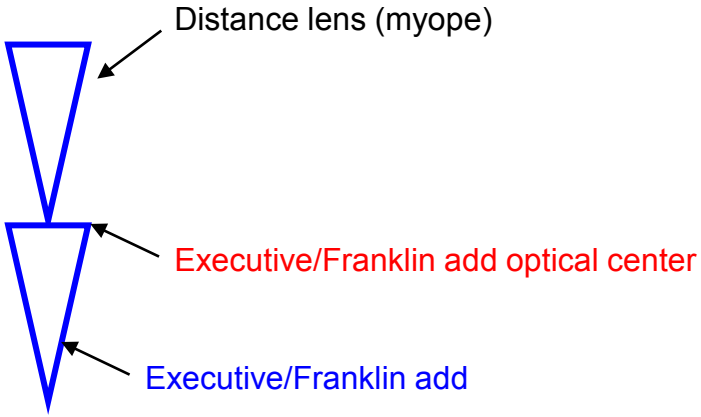

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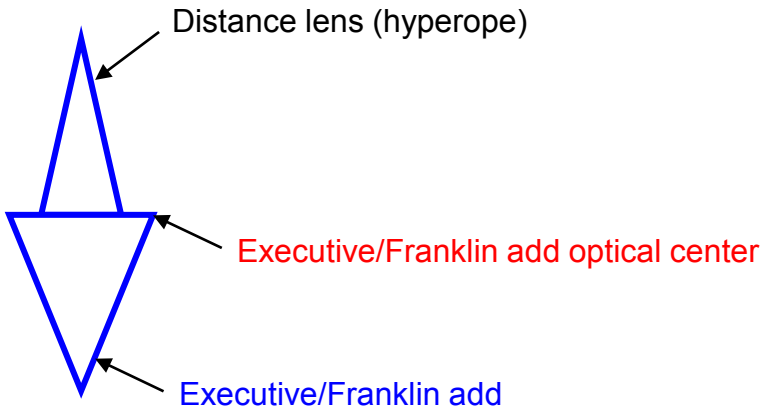

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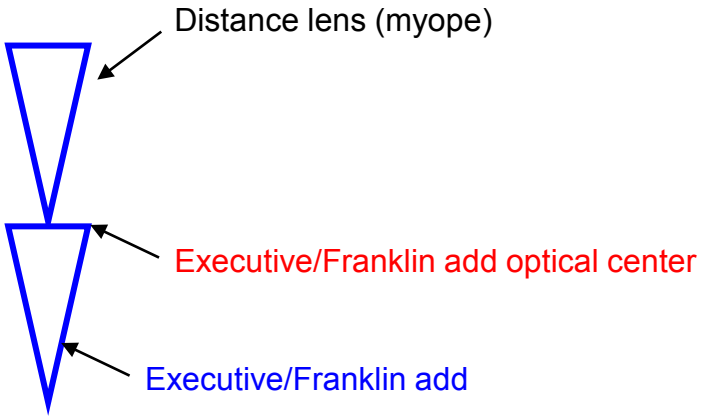
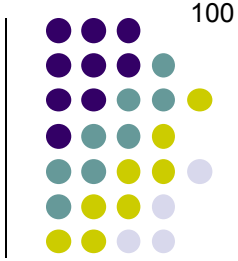


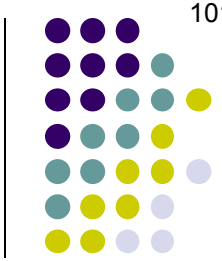
The takeaway point: *Executive/Franklin bifocals produce **no** image jump.*

Image *Displacement*



- *Image displacement* refers to the total apparent distance between an image viewed through the distance lens versus through the add segment

Image *Displacement*



- *Image displacement* refers to the total apparent distance between an image viewed through the distance lens versus through the add segment
  - Think of it as owing to **net prismatic effects**
    - The magnitude of image displacement is a function of the **total net prism** acting on the image through the bifocal segment

Image Displacement

The magnitude of image displacement is a function of the **total net prism** *acting on the image through the bifocal segment*

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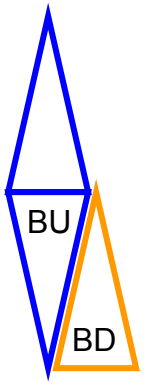
The magnitude of image displacement is a function of the **total net prism** *acting on the image through the bifocal segment*

Bifocal adds: ***Plus*** lenses

When a **round-top** segment is placed on a plus lens, note how the prismatic effects work to cancel each other



BU+BD=Little net prism→
little image displacement

Image Displacement

The magnitude of image displacement is a function of the **total net prism** *acting on the image through the bifocal segment*

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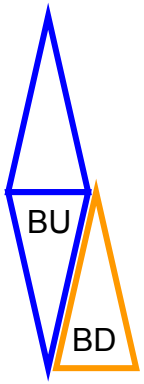

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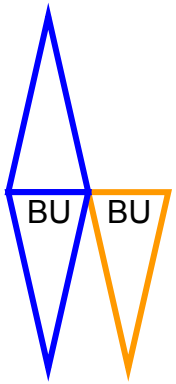

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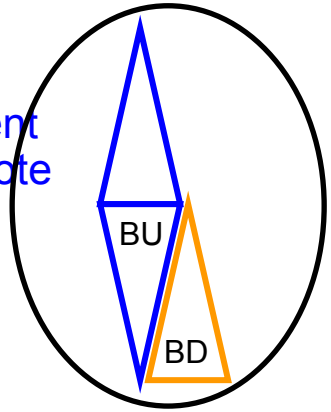

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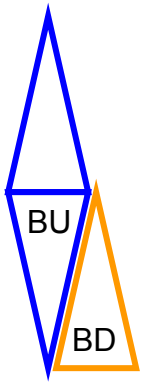

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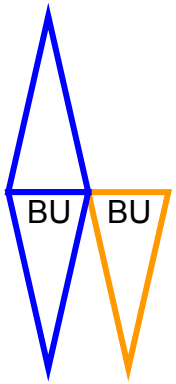

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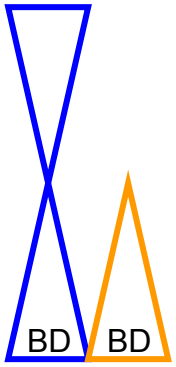

When a **round-top** segment is placed on a minus lens, note how the prismatic effects amplify one another

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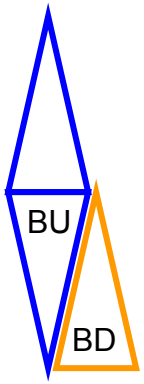

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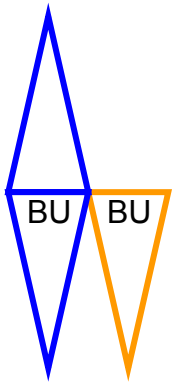

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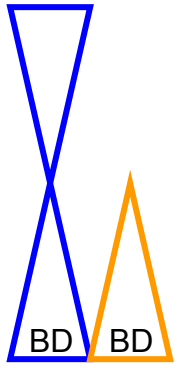

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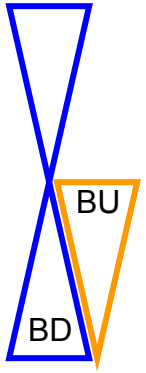

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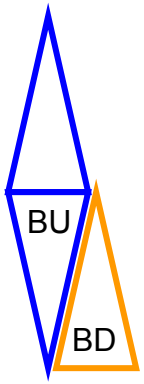

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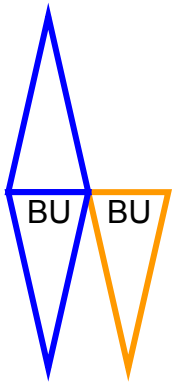

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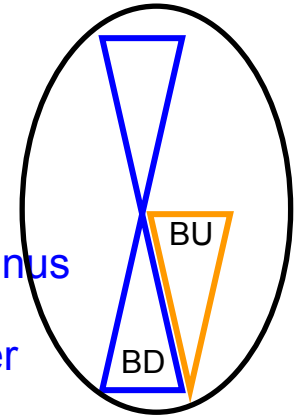

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Jump v *Displacement*: Which Add Is Best?

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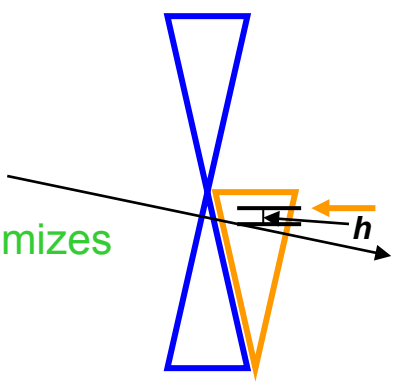
Minus lenses

A **flat-top** segment minimizes image jump



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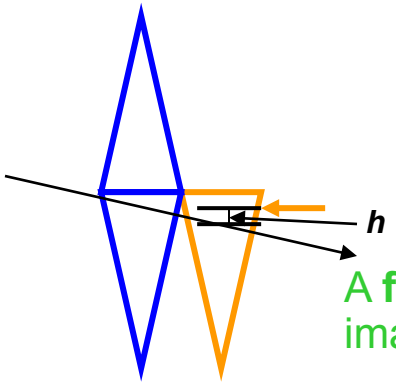

A **flat-top** segment minimizes image jump

As stated previously, a flat-top segment minimizes image jump for both plus and minus lenses

Jump v *Displacement*: Which Add Is Best?

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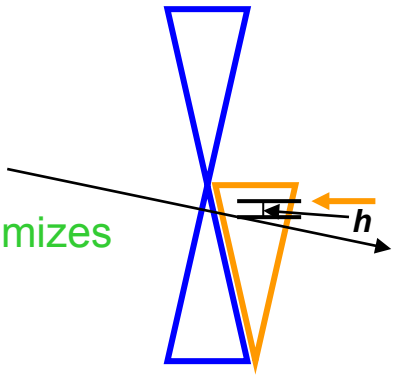

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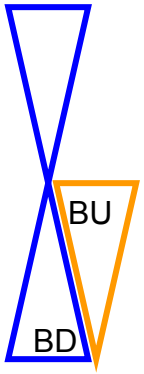

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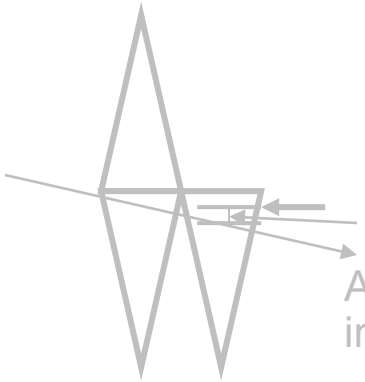

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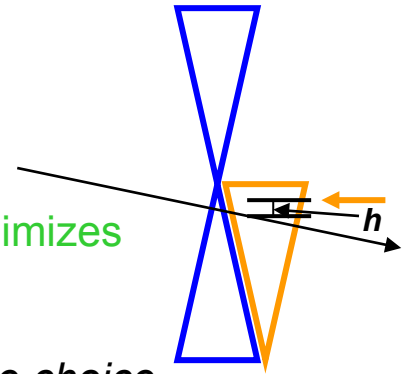

So, for minus lenses the choice of add type is easy: A flat-top minimizes both image jump **and** *displacement*

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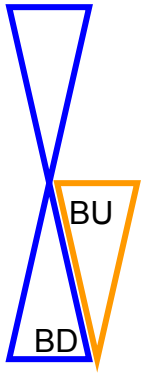

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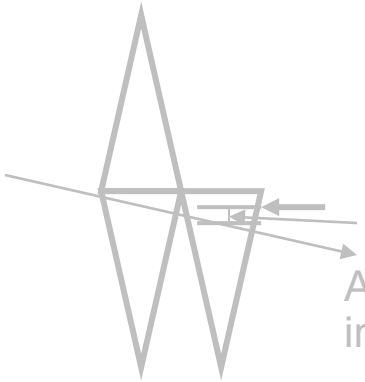

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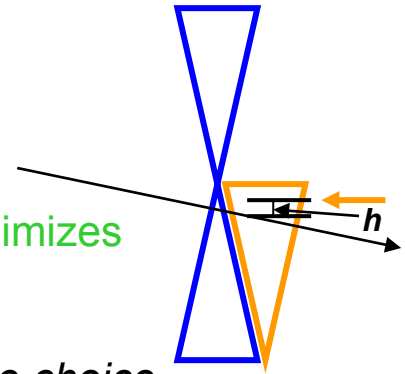

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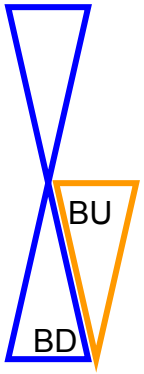

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For a **minus** *lens, always select a* ***flat-top*** *segment*

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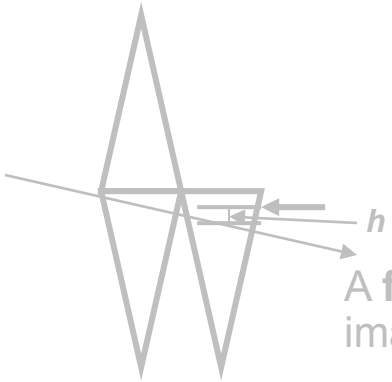

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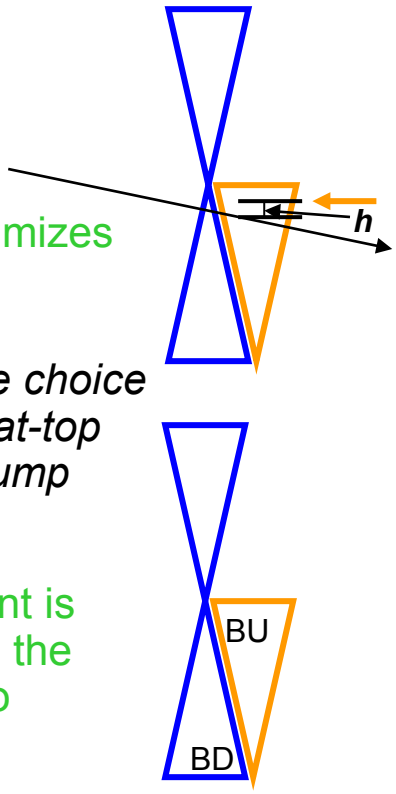

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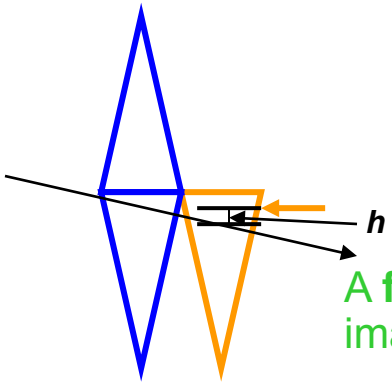

A **flat-top** segment minimizes image jump

For plus lenses, the choice is not as easy: A flat-top will minimize jump…

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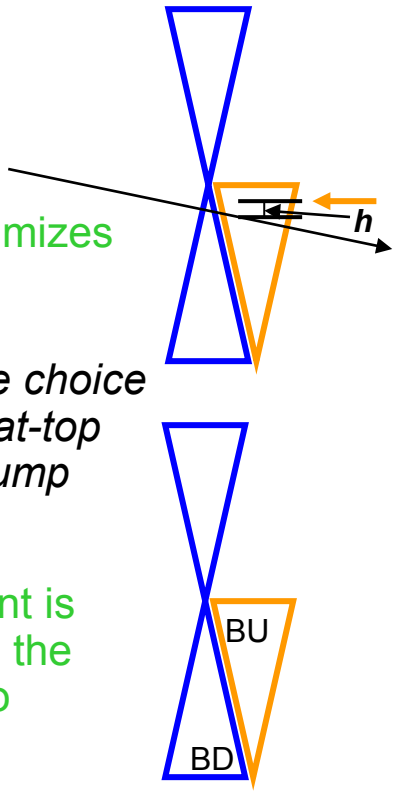

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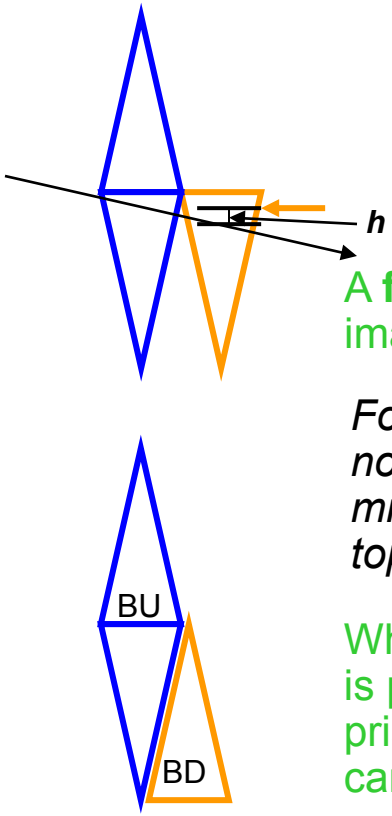

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For plus lenses, the choice is not as easy: A flat-top will minimize jump…but a round-top minimizes displacement

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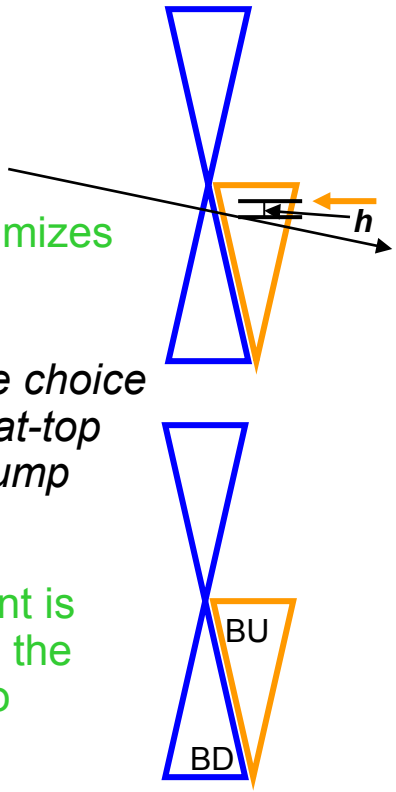

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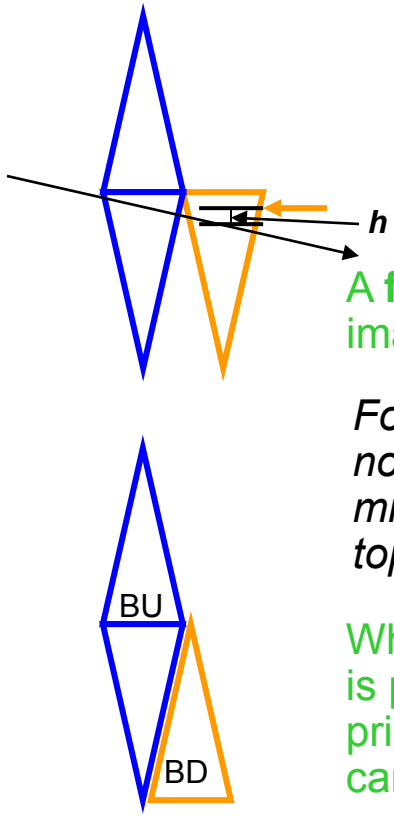

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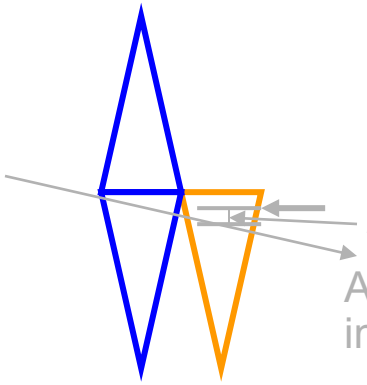
So which is the best add segment for a **plus** *lens?*

Jump v *Displacement*: Which Add Is Best?

- The choice of segment type for hyperopic adds depends on whether one needs to minimize jump *vs* displacement

Bifocal adds: ***Plus*** lenses



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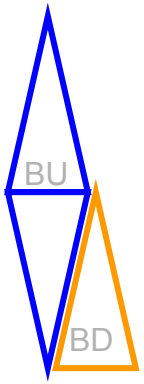

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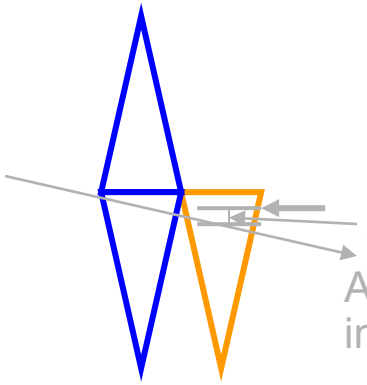
Jump v *Displacement*: Which Add Is Best?

- The choice of segment type for hyperopic adds depends on whether one needs to minimize jump *vs* displacement
  - *Jump* might bother waiters
  - *Displacement* might bother desk workers

Bifocal adds: ***Plus*** lenses



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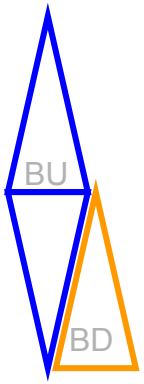

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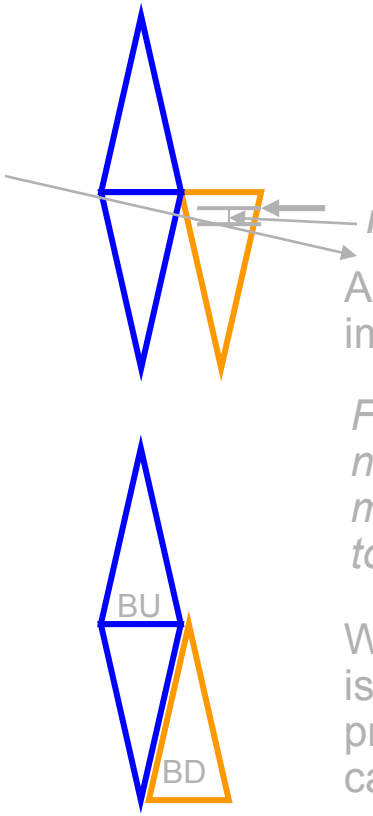
Jump v *Displacement*: Which Add Is Best?

- The choice of segment type for hyperopic adds depends on whether one needs to minimize jump *vs* displacement
  - *Jump* might bother waiters
  - *Displacement* might bother desk workers
- In practice, most specs are made with flat-top segs
  - Easier and cheaper to make

Bifocal adds: ***Plus*** lenses



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