

Eyeglasses for Presbyopes

Distance vision correction

Everyone's eyes are somewhat different.

Some people are blessed with near perfect distance vision.

All of the others are nearsighted or farsighted. Some have astigmatism.

These people need vision correction. They get an eye exam. They have their distance vision tested, and they get a prescription for lenses that will correct their distance vision.

They may get glasses. They may get contacts. They may have lasik surgery (which attempts to achieve the required corrections by re-shaping the corneas of their eyes).

If the correction is done right, their distance vision will be good.

And, since the lens in their eyes can change shape to focus from far to near, they can focus sharply on objects at any distance.

Problem solved.

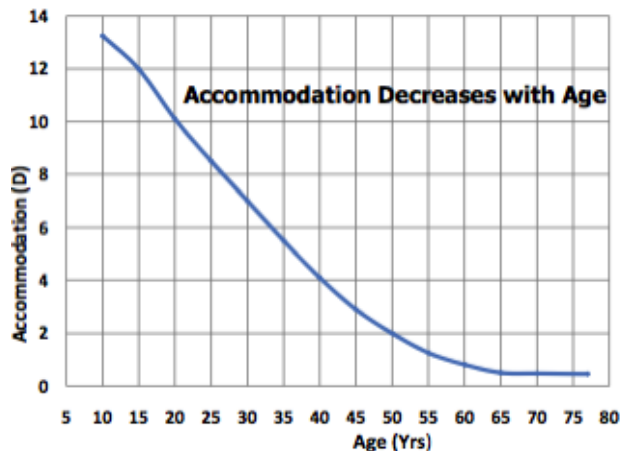
Then, people get into their 40's, and they start to become aware that all is not well.

Presbyopia

As we age, our eyes progressively lose the ability to focus over the full range of distance from far to near.

This happens to everyone, regardless of how good your distance vision.

It takes place gradually over time.



The lens in your eye must change shape (increase its curvature) in order to change focus from distant to close. The ability to do this is known as "Accommodation". Accommodation is measured in diopters (D).

By the time you are 65, you have lost virtually all of your accommodation.

The average person will have about .5 diopters of residual accommodation left. But, it takes a lot of effort to access this, so it is very tiring for sustained reading.

You need about 2.5 diopters (2.5 D) to focus to a normal reading distance.

As you can see from the graph, once you get into your 40's focusing to a reading distance gets increasingly difficult. Soon, it becomes impossible.

To learn more see:

[Nearsightedness, Farsightedness, Astigmatism & Presbyopia](#)

Compensating for Presbyopia

Most people find that their eyes are having to work harder and harder to focus on normal printed text as they progress through their 40's. After a few years, they realize that they are going to need help.

"Help" comes in the form of a lens that adds extra curvature (ADD) to your distance prescription. This ADD compensates for the curvature that the lens in your eye is no longer providing when you want to look at something close.

You will start out needing less than 1 diopter (1 D) of ADD. But, as the years progress, you will need more: 1.5, 1.75, 2, 2.25 etc. By the time most people are 65, they will typically need about 2.5 D of ADD to read comfortably.

Multiple pairs of glasses

When they first start having trouble reading printed text, many people start with a pair of "reading glasses" with a mild amount of ADD.

People who do not need to wear glasses for distance vision will probably start out with simple drug store reading glasses that provide ADD, but no other correction.

People who wear glasses to correct their distance vision will need prescription reading glasses — glasses in which their distance prescription has been modified to include the extra ADD they now need to read comfortably.

They put on their reading glasses to read, then take them off and put on their distance glasses when they want to look at something further away.

This works for a while. Then they have to move to reading glasses with more correction (more ADD), then still more.

As they move to stronger and stronger reading glasses, they start to find that they need multiple pairs of glasses to deal with things at different distances. They typically read a computer screen from a greater distance than they do a book or a menu. The ADD that works for one no longer works for the other.

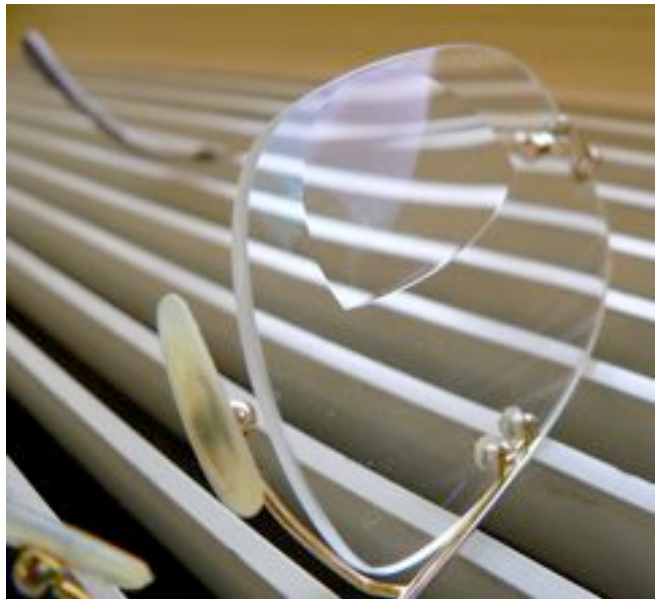
Bifocals

Many people who need glasses to correct their distance vision don't want to have to take off one pair of glasses and put on another every time they want to look at something close, then reverse the process when they want to look at something further away.

Clever Ben Franklin found a way to combine two different pairs of glasses in one. He cut the lenses of his distance glasses and his reading glasses in two and mounted the top part of his distance lens in the top of his eyeglass frames, and the bottom part of the reading glasses in the bottom. Two different half lenses -- each with a different curvature -- married together.

Today, we do the same thing by making a single lens that contains two different sections with different correction curvatures.

The base lens contains the distance prescription. The "near focus" section of the lens contains extra curvature that adds the requisite amount of ADD to the distance prescription.



Of course, having lenses that are only focused for two specific distances will only cover the full range of distances for a couple of years.

As their presbyopia progresses, many bifocal wearers move to trifocals that have a third, narrow intermediate distance zone in between the distance and reading portions of the lens.

Limitations:

1. Bifocals and trifocals only provide sharp focus at two (or three) specific distances. As you lose more accommodation, you find that there are increasing numbers of things you want to look at that fall in between these distances.

2. You have to look through a specific portion of the lens to see clearly at a specific distance. So, you have to point and tilt your head to line up the thing you want to look at with the appropriate portion of the lens.
3. The transition between the two or three different sections of the lens is abrupt and disconcerting.
4. Because the reading portion is almost always placed at the bottom of the lens, when you look down (as to look at the stairs on a stairway), what you see is badly out of focus.

And, of course, as your eyes continue to lose accommodation, you are going to have to keep getting new lenses with increasing amounts of ADD in order to keep up with the progression of your presbyopia.

Progressives

“Progressive” lenses attempt to address some of the limitations of bifocals and trifocals. But, they introduce their own set of problems in the process.

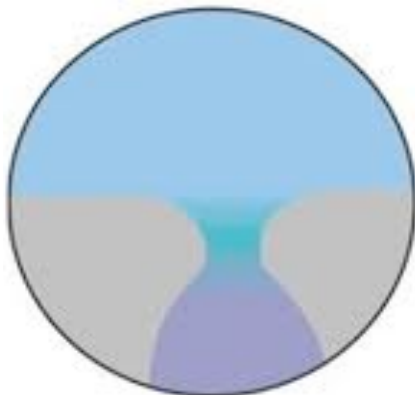


Diagram showing the visual zones of a multipurpose PAL

- distance zone
- progressive zone
- near zone
- peripheral zones

Progressive Addition Lenses = “PALs” or “Progressives”

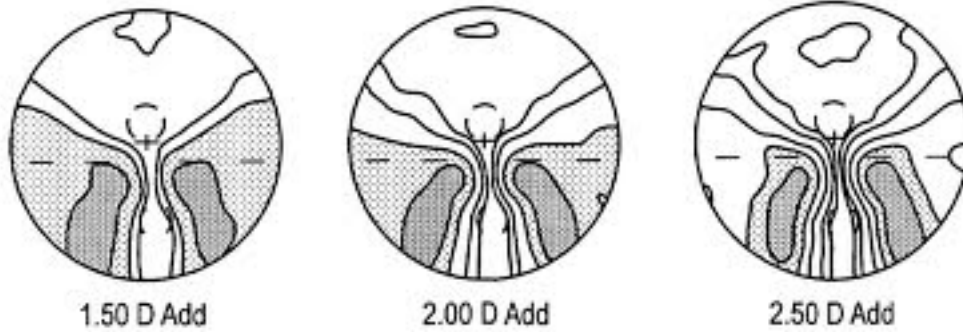
Like bifocals and trifocals, progressive lenses have a top area that contains your distance prescription and a small area at the bottom with the extra curvature required to provide the amount of ADD you currently need for reading.

In between these two, there is a narrow corridor in which the correction “progresses” from your distance prescription to your reading prescription.

The problem is that you pay a heavy price to achieve this added flexibility:

The areas of the lens that provide clear focus are distressingly small, and they are surrounded by areas of very substantial distortion.

The greater the reading ADD, the greater the distortion:



The consequences are:

1. A relatively small portion of the total lens area is actually useful and the field of view is very limited — especially for intermediate and close distances.
2. You have to move your head so that you are looking through the specific “sweet spot” you need at any given moment.
3. As with bifocals and trifocals, anything further away than reading distance is badly out of focus when you look through the bottom portion of the lens.
4. There are very large areas of substantial distortion. Many people can never adjust to this.

Electrically Switchable Progressives

Pixel Optics emPower! glasses have a new variety of progressive lens. Sandwiched into the (relatively small) reading area of the lens is a pocket that contains a liquid crystal substance.

When an electric field is applied across the liquid crystal its molecules align themselves with the field and provide an extra $\frac{3}{4}$ D of ADD. When the power is turned off, the extra ADD goes away.

So, these are basically progressive lenses in which you can switch the near vision reading zone on and off.

The version of the lens that Pixel Optics uses for demonstration has $1\frac{1}{4}$ D of ADD in the unpowered reading area. When the power is turned on, the extra $\frac{3}{4}$ D of ADD provides a total of 2 D (about what is appropriate for a typical person in their early 50's).

If you wanted to get the 2.5 D of reading ADD more appropriate for someone in their 60's, the base lens would need to have to have $1\frac{3}{4}$ D of ADD. The reading portion of such a lens would be focused to 16" with the power on, and to 23" with the power off.



The benefits:

Like all progressive lenses, these lenses have specific areas of focus (you still have to tilt your head just so), and significant areas of distortion.

But, because the base progressive lens can have $\frac{3}{4}$ D less reading ADD than a standard progressive, the lens can have less distortion than a standard progressive lens with the same total ADD.

In addition, if you look down at the ground with the power switched off, the ground will still be out of focus. But, it will be less badly out of focus than it would be if you looked down with the extra reading ADD turned on.

This benefit will be more useful with emPower! lenses that have a total reading ADD of 2 D or less. The higher the total ADD, the blurrier the ground is going to look even with the power switched off.

The trade-offs:

1. Compromised optical quality in the switchable reading area.
2. When the power is on, there is an abrupt $\frac{3}{4}$ D jump when you move from the powered reading area into the progressive area of the lens.
So, when the power is on, the progressive lens isn't really progressive any more.
3. Having a battery (to provide the electric power) and electric circuits in your glasses means that the temples have to be fat and somewhat heavy – and that you have to recharge the battery at night.
4. Because they contain electronics, you must not get these glasses wet.
5. As with conventional progressives, bifocals, and trifocals, you must aim your head differently to focus on objects at different distances.

6. The glasses are very expensive. (The starting price is over \$1250.)
And, although your optician and/or optical lab may provide one or more of these things on their own initiative (and at their own expense), unlike Superfocus, Pixel Optics itself provides:

- No re-do's
- No exchanges
- No returns
- No refunds

7. As with any progressive, bifocal, or trifocal, you will need to buy new glasses with ever-stronger prescriptions as your presbyopia progresses.

Superfocus

Superfocus glasses are based on a completely different principle than any other glasses. Rather than containing several regions, each pre-focused to a different distance, Superfocus glasses dynamically focus the *entire* lens to *any* distance from far to close-focus reading.

In essence, Superfocus mimic the function of the youthful human eye.

A prescription front lens contains the distance correction. Behind this is a second, focusing lens. The focusing lens changes curvature (increases ADD) to allow you to focus to any distance far to near – *exactly as the focusing lens in your eye changed shape to focus when you were younger.*

Focusing: Focusing is as quick and easy as reaching up to touch the bridge of the Superframe. After a very short time, the same “autofocus” circuitry in your brain that works to focus the lens in your eye, seems to take over focusing the Superfocus glasses as well.

You don't even think about the act of focusing. You simply move your finger and whatever you want to see simply pops into focus.

Crystal clear, distortion-free focus across the entire lens.

Pick any distance: It is this ability to focus the entire lens to any distance that makes Superfocus glasses seem almost magical. It is usually easy to dial in the exact focus setting that allows you to see everything you need to see to perform any particular task without the need to re-focus:

One setting that allows you to see everyone around a conference table or dinner table. Another setting that allows you to have both the road signs far down the road and the instruments in your car in sharp focus at the same time. Yet another setting allows you to see your entire computer screen in tack sharp focus – and also the document you have on your desk next to the computer.

When you get up to walk around – or walk down a stairway -- you flick the focus lever to focus on objects further away. When you sit back down at your computer, you slide the focus to a closer setting to bring the screen back into sharp focus.

After a while, this will all become so natural that you are no longer thinking about it.

*For a more detailed explanation of how Superfocus glasses work see:
<http://www.superfocus.com/the-superfocus-technology>*

Adjusting to vision fluctuations: Everyone’s eyesight fluctuates from day to day — and over the course of a day. The same focus setting will not be quite right from one time to the next.

Superfocus are the only glasses that accommodate this. Because your brain’s built-in “autofocus” circuitry automatically helps you focus on what you are looking at, it does not matter if this focus is different from one hour to the next.

Adapting with you: Similarly, as your presbyopia progresses (as it will), you will find yourself simply dialing in increasing amounts of ADD without even thinking about it. No need for new glasses. You are simply pushing the slider a little further over as you need additional ADD.

Interchangeable front lenses: Because the prescription front lens is separate from the rear focusing lens, we have made the front lenses removable.

The front lenses are held in place with tiny (but strong) magnets. You can snap off a clear pair of prescription front lenses and replace them with another — a pair of prescription sunglass lenses, for example.

If your distance prescription changes, you can order new front lenses with your new prescription.

The trade-offs:

Of course, there are a couple of trade-offs:

1. To provide sharp, distortion-free focus across the entire lens, a focusing lens needs to be round. The lens in your eye is round. A camera lens is round. Superfocus focusing lenses are round.

2. And, at the moment, there are two frame styles.

Fortunately, both of these are iconic “designer” styles, created by the internationally-known design firm M-Design. And, both are designed to complement a wide variety of faces, rather than being a “look at me” statement.

In fact, Superfocus won the coveted 2011 iF International Forum Design Award.



21st Century glasses: Many wearers start out by thinking that they are only going to wear their Superfocus glasses when they are at home or work, and keep their old “fashion” glasses for dress-up occasions.

But, most find that Superfocus are so much better than any glasses they have previously worn that they don't want to give them up.

They end up wearing their Superfocus glasses almost all the time.

They tell us that Superfocus glasses are very addictive.

After you have had them for a while, they say, it just seems natural and logical that your glasses *should* be able to focus.

Glasses that don't focus suddenly seem very limiting — and very old fashioned.

30 day free trial/friendly & helpful customer service: Try Superfocus for yourself. If you don't like them for any reason, return them! It's that simple.

See unsolicited YouTube videos posted by Superfocus wearers at:

<http://www.superfocus.com/user-videos>