



# INTERPUPILLARY DISTANCE

## THINK

Have you ever noticed that some people have eyes that are close together, and other people have eyes that are far apart?

You need to know how to measure the distance between a person's eyes before you begin a refraction examination. You also need to know the distance between a person's eyes if you need to order a new pair of spectacles for them.

## AIM

This unit will explain how to measure interpupillary distance (also called "PD").

## LEARNING OUTCOMES

When you have worked through this unit you should be able to:

- define interpupillary distance (PD)
- measure distance PD using the limbus method and the corneal reflex method
- measure and calculate the near PD
- measure distance and near PD using a pupillometer
- explain why PD is important.

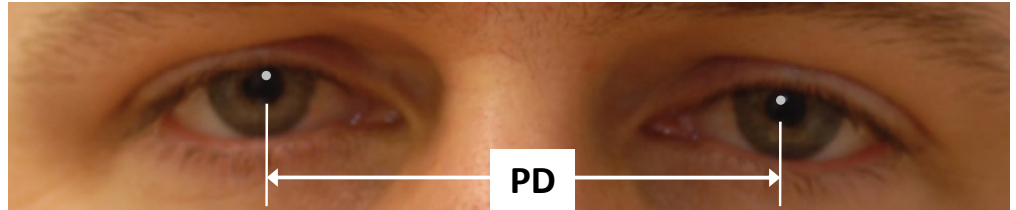
## REVIEW: INTERPUPILLARY DISTANCE

<b>ANATOMICAL TERMS OF LOCATION</b>	<ul style="list-style-type: none"> <li>• Anterior = In front of</li> <li>• Posterior = Behind</li> <li>• Superior = Above</li> <li>• Inferior = Below</li> <li>• Nasal = Closer to the nose; further away from the ear</li> <li>• Temporal = Further away from the nose; closer to the ear</li> </ul>
<b>PARTS OF THE ANTERIOR EYE</b>	<ul style="list-style-type: none"> <li>• Cornea → transparent window of the eye located anterior to the iris and the pupil</li> <li>• Sclera → white protective covering of the eyeball</li> <li>• Limbus → located where the cornea and the sclera meet</li> <li>• Iris → the round coloured part of the eye that is located posterior to the cornea</li> <li>• Pupil → the black round hole in the centre of the iris</li> </ul>
<b>SPHERICAL LENS SHAPE</b>	<ul style="list-style-type: none"> <li>• Plus lenses are thicker in the middle than at the edge.</li> <li>• Minus lenses are thinner in the middle than at the edge.</li> </ul>
<b>PRISM</b>	<ul style="list-style-type: none"> <li>• A prism bends light away from its apex.</li> <li>• A plus lens can be thought of as two prisms that are joined base to base.</li> <li>• A minus lens can be thought of as two prisms that are joined apex to apex.</li> </ul>
<b>OPTICAL CENTRE OF LENSES</b>	<ul style="list-style-type: none"> <li>• The optical centre is the only part of a lens that a light ray can travel through without being refracted (bent).</li> <li>• The optical centre of a plus lens is where the lens is thickest.</li> <li>• The optical centre of a minus lens is where the lens is thinnest.</li> <li>• The optical centre of a lens is not always in the centre of a lens.</li> </ul>

## INTERPUPILLARY DISTANCE (PD)

### DEFINITION

The interpupillary distance (PD) is the distance between a person's pupils. This distance is measured in millimetres (mm), and will be different for different people. Most people have a PD between 50 mm and 75 mm.



*Figure 7.1: Interpupillary distance (PD)*

There are two types of PD:

- **Distance PD**

This is the distance between the pupils when a person is looking at something far away.

This is often just called the "PD" instead of "distance PD".

- **Near PD**

This is the distance between the pupils when a person is looking at something that is close to them.

This will always be called "near PD".



When a person is looking far away, their eyes are further away from each other.

This is the resting position for the eyes.

When a person is looking at something close, their eyes turn in and are closer to each other. For this reason, near PD is less than distance PD.

When the eyes turn in we say that the eyes are converging.

### PD MEASUREMENT

The PD is the distance between the centre of one pupil and the centre of the other pupil.

PD can be measured in two ways:

- with a PD rule (a small rule) and a pen torch
- with a pupillometer (a piece of equipment designed especially for measuring PDs).



**The PD measurement needs to be accurate to within 0.5 mm.**

***If the PD measurement is not accurate, your refraction and the glasses that you make may be incorrect.***

## MEASURING DISTANCE PD WITH A PD RULE

If the PD is measured with a PD rule (a small ruler), it can be hard to see exactly where the centre of each pupil is. For this reason, special methods are used to measure PD.

These methods include:

- the limbus method
- the corneal reflex method.

To measure the PD you need to close each of your eyes, one at a time.

It is very important that you always:

- look at the person's right eye with your left eye (keeping your right eye closed)
- look at the person's left eye with your right eye (keeping your left eye closed).

If you do not do this your PD measurement will not be accurate.

It is also important that the person and the examiner are at the same eye level, and that both of you stay still while the measurement is taken.

### LIMBUS METHOD

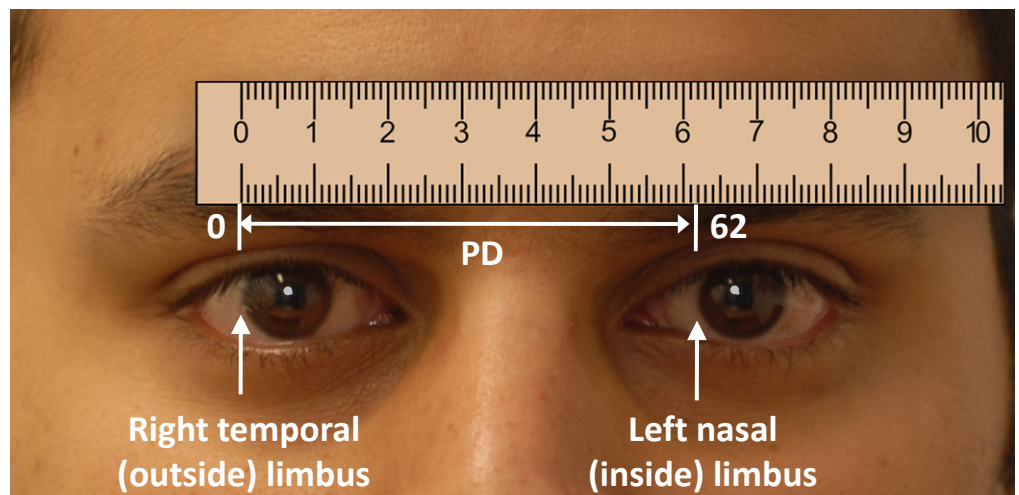


#### REMEMBER:

The limbus is the part of the eye where the clear cornea meets the white sclera.

Because the clear cornea covers the coloured part of the eye, when we look at a person's eye we see the limbus as the circle where the coloured part of the eye meets the white of the eye.

The limbus method measures PD by measuring the distance between the right eye's temporal (outer) limbus and the left eye's nasal (inner) limbus. It is easier to see the limbus than it is to know exactly where the centre of the pupil is – especially in people who have dark coloured eyes.



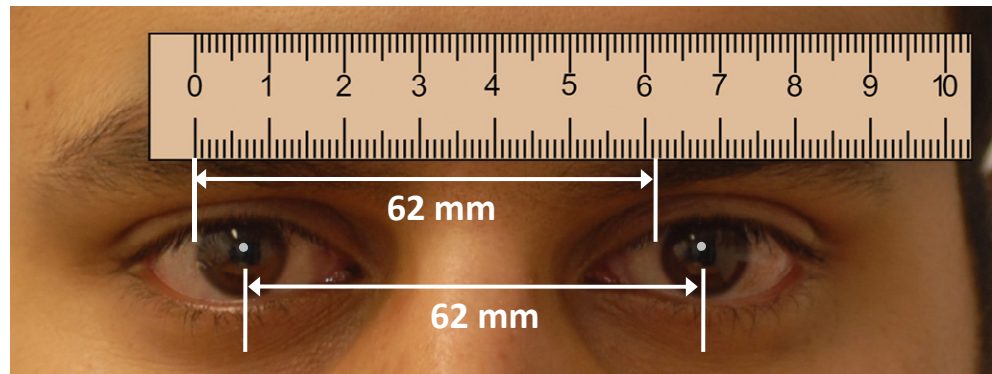
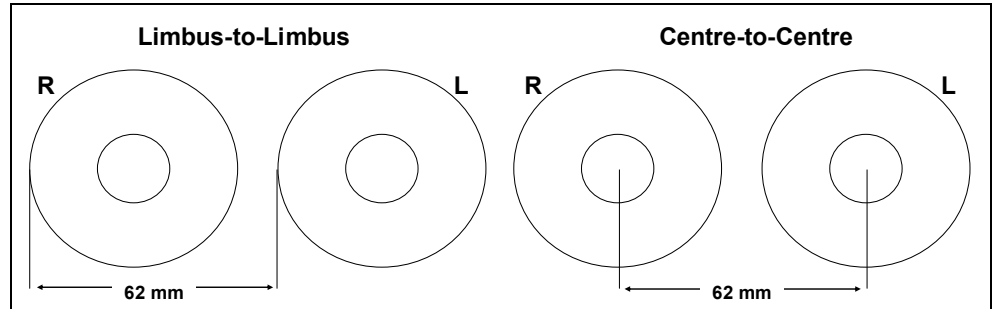
**Figure 7.2:** Measuring distance PD using the limbus method

The person shown in Figure 7.2 has a PD of 62 mm.

## MEASURING DISTANCE PD WITH A PD RULE (cont.)

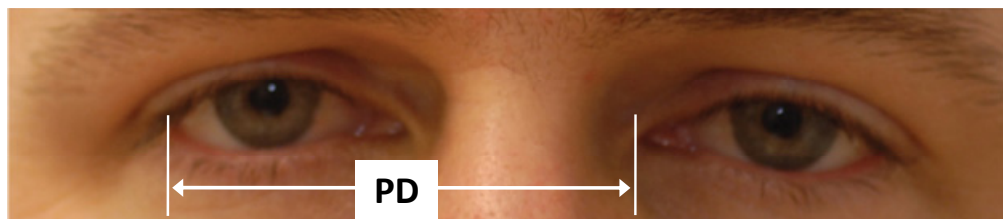
### LIMBUS METHOD (cont.)

This measurement will be approximately the same as if you measured from pupil centre to pupil centre, because the distance from the centre of the pupil to the limbus is usually the same in both eyes.



**Figure 7.3:** Limbus-to-limbus = centre-to-centre

For very young children or those with strabismus or nystagmus, the PD can be measured by measuring from the outer canthus of the right eye to the inner canthus of the left eye – but this method is not as accurate as the limbus method.



**Figure 7.4:** Outer canthus of right eye to inner canthus of left eye

## MEASURING DISTANCE PD WITH A PD RULE (cont.)

### METHOD

- **Step 1:**  
Make sure that you are in good lighting, so that you can clearly see the person's eyes and the markings on the PD rule.
- **Step 2:**  
Stand or sit facing the person – about 40 cm away from them.  
  
Make sure your eyes are at the same height as their eyes (you may need to make yourself higher or lower). If the person is taller than you, you may both need to sit down. You also need to be directly opposite the person (not to the left or to the right of them).
- **Step 3:**  
Tell the person: *"I am going to measure the distance between your eyes"*.
- **Step 4:**  
Gently place the PD rule on the person's nose or forehead.



Figure 7.5: Measuring PD



You can rest one or two of your fingers on the person's cheek or forehead to help keep the PD rule still.

- **Step 5:**  
Close your right eye and ask the person to look at your open (left) eye.  
Say: *"Look at my open eye"*.  
Sometimes, it helps if you use your finger or a pen to point to your open eye.
- **Step 6:**  
Look at the temporal (outside) limbus of the person's right eye. Move the PD rule so that the zero mark on the PD rule is lined up with the right temporal limbus.



Once you have lined up the zero mark, make sure you do not move the PD rule or your head. Your head and the PD rule (and the zero mark) must stay in the same position while you are measuring.



## MEASURING DISTANCE PD WITH A PD RULE (cont.)

### METHOD (cont.)

- **Step 7:**  
Now open your right eye and close your left eye. Ask the person to look at the eye that is open now (your right eye).  
Say: *"Look at my open eye"*.
- **Step 8:**  
Look at the nasal (inside) limbus of the person's left eye. Look at the number on the PD rule that is lined up with the left nasal limbus.  
This number is the person's distance PD measurement.
- **Step 9:**  
Repeat steps 4 to 8 to check the PD measurement.  
If your second measurement is not the same as your first measurement, repeat steps 4 to 8 again, until you get two readings that are the same.

### CORNEAL REFLEX METHOD

If we shine a light in front of a person's eyes, the light will reflect from the centre of each of their pupils. These reflections are called corneal reflexes. The distance between each of these corneal reflexes is the person's PD.

#### Method:

- **Step 1:**  
You need to take this measurement in normal or low lighting. Be careful that there are no extra light sources (e.g. windows, ceiling lights) in front of the person – otherwise you might see extra reflections in the person's eyes. If you cannot avoid extra light sources, it helps if the person sits with their back towards any extra light sources.
- **Step 2:**  
Stand or sit facing the person – about 40 cm away from them. Make sure your eyes are at the same height as their eyes (you may need to make yourself higher or lower). If the person is taller than you, you may both need to sit down. You also need to be directly opposite the person (not to the left or to the right of them).
- **Step 3:**  
Tell the person: *"I am going to measure the distance between your eyes"*.
- **Step 4:**  
Gently place the PD rule on the person's nose or forehead.
- **Step 5:**  
Close your right eye and ask the person to look at your open (left) eye.  
Say: *"Look at my open eye"*.
- **Step 6:**  
Hold a pen torch below your left eye. Shine the pen torch into the person's right eye.
- **Step 7:**  
Look at the corneal reflex in the person's right eye. Move the PD rule so that the zero mark on the PD rule is lined up with this corneal reflex.



Once you have lined up the zero mark, make sure you do not move the PD rule and do not move your head. Your head and the PD rule (and the zero mark) must stay in the same position while you are measuring.

**MEASURING DISTANCE PD WITH A PD RULE (cont.)****CORNEAL REFLEX  
METHOD (cont.)**

- **Step 8:**  
Now hold the pen torch below your right eye.  
Shine the pen torch into the person's left eye.
- **Step 9:**  
Open your right eye and close your left eye.  
Ask the person to look at the eye that is open now (your right eye).  
Say: *"Look at my open eye"*.
- **Step 10:**  
Look at the corneal reflex in the person's left eye.  
Look at the number on the PD rule that is lined up with this corneal reflex.  
This number is the person's distance PD measurement.
- **Step 11:**  
Repeat steps 4 to 10 to check the PD measurement.  
If your second measurement is not the same as your first measurement,  
repeat steps 4 to 10 again, until you get two readings that are the same.



## MEASURING NEAR PD WITH A PD RULE

The near PD is the distance between the pupils when a person is looking at something close to their eyes. When a person looks at something that is close to them, their eyes converge (move closer together). This means that the near PD will always be less than the distance PD.

There are two ways to find the near PD with a PD rule:

- corneal reflex method
- calculation method.

It is more accurate to measure near PD using the corneal reflex method (using a PD rule and a pen torch). The calculation method is less accurate.

### CORNEAL REFLEX METHOD

#### Method:

- **Step 1:**  
You need to take this measurement in normal or low lighting. Be careful that there are no extra light sources (e.g. windows, ceiling lights) in front of the person – otherwise you might see extra reflections in the person's eyes. If you cannot avoid extra light sources, it helps if the person sits with their back towards any extra light sources.
- **Step 2:**  
Stand or sit facing the person – 40 cm away from them.  
  
Make sure your eyes are at the same height as their eyes (you may need to make yourself higher or lower). If the person is taller than you, you may both need to sit down. You also need to be directly opposite the person (not to the left or to the right of them).
- **Step 3:**  
Tell the person: *"I am going to measure the distance between your eyes"*.
- **Step 4:**  
Gently place the PD rule on the person's nose or forehead.
- **Step 5:**  
Hold a pen torch below your dominant eye.  
Shine the pen torch on the bridge (top) of the person's nose.



#### Your dominant eye:


Everybody has an eye that they prefer to use – this is called their dominant eye.

There are several ways to find out which of your eyes is dominant. An easy way is to:

- Point to an object in the distance. Keep both of your eyes open.
- Close your right eye.  
Are you still pointing to the object?  
Yes → you are left eye dominant  
No → you are probably right eye dominant.

Close your left eye.  
Are you still pointing to the object?  
Yes → you are right eye dominant  
No → you are probably left eye dominant.

## MEASURING NEAR PD WITH A PD RULE (cont.)

<b>CORNEAL REFLEX METHOD (cont.)</b>	<ul style="list-style-type: none"> <li>• <b>Step 6:</b> Keep your dominant eye open, and close your other eye. Ask the person to look at your nose. Say: "Look at my nose".</li> <li>• <b>Step 7:</b> Look at the corneal reflex in the person's right eye. Move the PD rule so that the zero mark on the PD rule is lined up with this corneal reflex.</li> <li>• <b>Step 8:</b> Look at the corneal reflex in the person's left eye. Look at the number on the PD rule that is lined up with this corneal reflex. This number is the person's near PD measurement.</li> <li>• <b>Step 9:</b> Repeat steps 5 to 8 to check the PD measurement. If your second measurement is not the same as your first measurement, repeat steps 5 to 8 again until you get two readings that are the same.</li> </ul>
<b>CALCULATION METHOD</b>	<p>Sometimes it is not possible to measure the near PD using the corneal reflex method. If this is the case you can calculate the near PD instead of measuring it .– but remember, calculating near PD is not as accurate as measuring it using the corneal reflex method.</p> <p><b>Method:</b></p> <ul style="list-style-type: none"> <li>• <b>Step 1:</b> Measure the distance PD using the: <ul style="list-style-type: none"> <li>- limbus method, or</li> <li>- corneal reflex method.</li> </ul> </li> <li>• <b>Step 2:</b> Calculate the near PD: <ul style="list-style-type: none"> <li>- If the distance PD is more than 64 mm, we subtract 4 mm from distance PD to find the near PD.</li> <li>- If the distance PD is less than (or equal to) 64 mm, we subtract 3 mm from the distance PD to find the near PD.</li> </ul> </li> </ul> <div data-bbox="454 1527 614 1659">  </div> <div data-bbox="678 1563 1433 1637"> <p>If the distance PD is &gt; 64 mm: Near PD = Distance PD – 4 mm If the distance PD is ≤ 64 mm: Near PD = Distance PD – 3 mm</p> </div>
<b>EXAMPLE 1</b>	<p>You measure the distance PD of a man and find that it is 67 mm. What is his near PD?</p> <ul style="list-style-type: none"> <li>• Distance PD = 67 mm</li> <li>• 67 mm &gt; 64 mm</li> </ul> <p>So, Near PD = Distance PD – 4 mm = 67 mm – 4 mm = <b>63 mm</b></p>
<b>EXAMPLE 2</b>	<p>You measure the distance PD of a girl and find that it is 57 mm. What is her near PD?</p> <ul style="list-style-type: none"> <li>• Distance PD = 57 mm</li> <li>• 57 mm &lt; 64 mm</li> </ul> <p>So, Near PD = Distance PD – 3 mm = 57 mm – 3 mm = <b>54 mm</b></p>

## MEASURING THE PD USING A PUPILLOMETER

### PUPILLOMETER

A corneal reflex pupillometer (or simply, "pupillometer") is a piece of equipment that measures the distance between the visual axes of the eyes instead of the distance between the pupil centres.

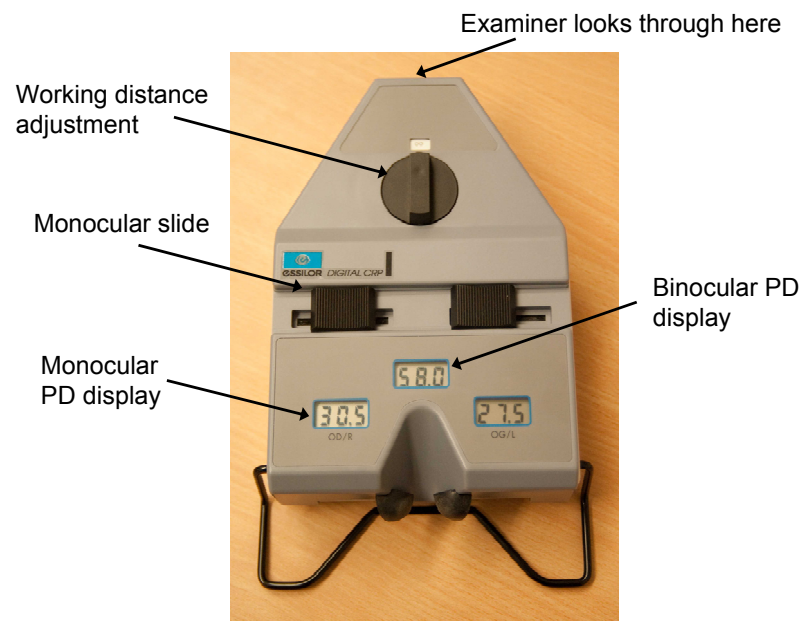
A more accurate PD measurement can be achieved using a pupillometer compared to using a PD rule. A pupillometer can be used to measure both distance and near PD accurately.

- **Advantages** A pupillometer:

- provides a more accurate measurement than a PD rule
- provides a more consistent (repeatable) measurement than a PD rule
- allows you to occlude (cover) each of the person's eyes  
*This is useful for measuring the PDs of people with strabismus (eye turns)*
- allows you to measure monocular PDs (*this can also be done using a special PD rule, but using a pupillometer is faster and more accurate*)
  - A monocular PD measurement is the distance from one eye to the mid-line of a person's face.  
The right and the left eyes may have different monocular PDs.
  - Monocular PD measurements are necessary when prescribing special spectacle lenses (such as progressive addition lenses)
- allows you to measure the near PD for several different working distances
- can be used by people with minimal training
- is handheld and portable.

- **Disadvantages:** A pupillometer:

- is much more expensive than a PD rule and a pen torch
- is less portable than a PD rule and a pen torch
- can be more difficult to use on young children.



**Figure 7.6:** A corneal reflex pupillometer

## MEASURING THE PD USING A PUPILLOMETER (cont.)

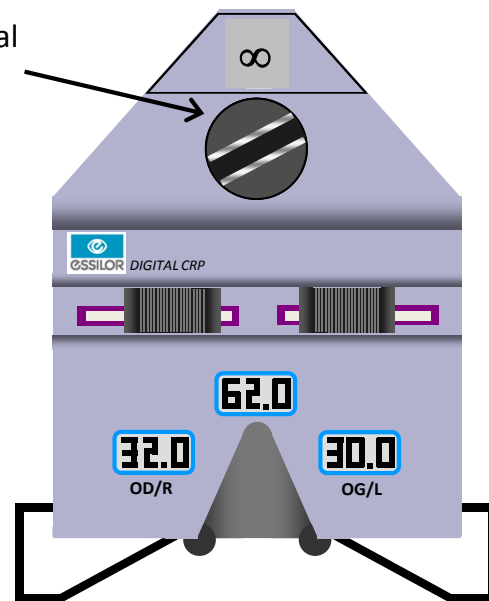
### MEASURING DISTANCE PD WITH A PUPILLOMETER

#### Method:

- Step 1:**

Set the working distance adjustment button to infinity ( $\infty$ ).  
This makes the circle target inside the pupillometer look like it is very far away.

Working distance dial  
is set to infinity



**Figure 7.7:** Setting the working distance dial to infinity

- Step 2:**

Tell the person: *"I am going to measure the distance between your eyes".*

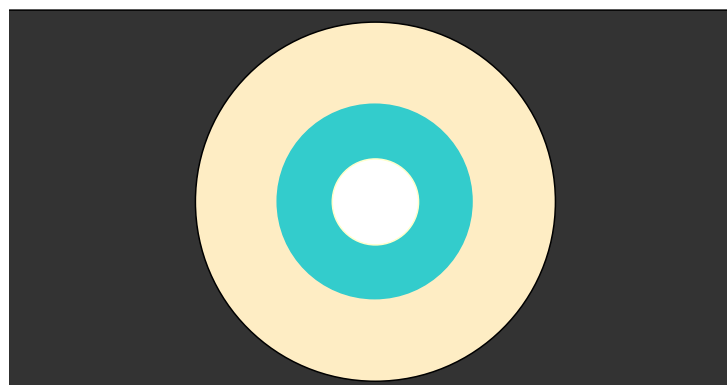
- Step 3:**

Ask the person to hold the pupillometer as though it was a pair of binoculars.

- Step 4:**

Tell the person to look into the centre of the circle that they see inside the pupillometer.

Say: *"Look at the centre of the circle".*

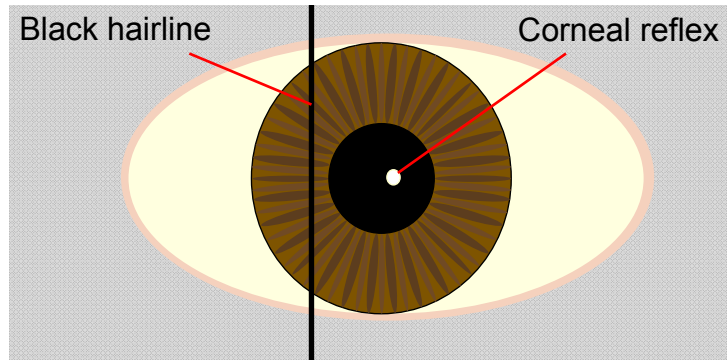


**Figure 7.8:** What the person sees when they look inside a pupillometer

## MEASURING THE PD USING A PUPILLOMETER (cont.)

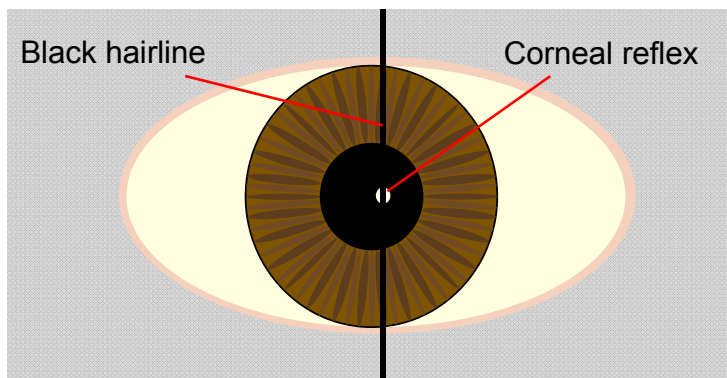
### MEASURING DISTANCE PD WITH A PUPILLOMETER (cont.)

- **Step 5:**  
Look into the pupillometer with both of your eyes open.



*Figure 7.9: What the examiner sees when they look inside a pupillometer*

- **Step 6:**  
Use the occluder switch to cover the person's left eye, to measure the distance PD of the right eye.
- **Step 7:**  
Move the monocular slide in front of the person's right eye until you see the black hairline lined up with the corneal reflex.



*Figure 7.10: The black hairline and the corneal reflex are aligned*

- **Step 8:**  
Uncover the person's left eye and occlude the person's right eye.
- **Step 9:**  
Move the monocular slide in front of the person's left eye until you see the black hairline lined up with the corneal reflex.
- **Step 10:**  
Look at the pupillometer PD displays to read the binocular (or monocular) PD.

## MEASURING THE PD USING A PUPILLOMETER (cont.)

### MEASURING NEAR PD WITH A PUPILLOMETER

#### Method:

- **Step 1:**  
Set the working distance adjustment dial to the person's preferred near working distance (normally 40 cm).  
This makes the circle target inside the pupillometer look like it is at this distance.
- **Step 2:**  
Tell the person: *"I am going to measure the distance between your eyes"*.
- **Step 3:**  
Ask the patient to hold the pupillometer as though it were a pair of binoculars.
- **Step 4:**  
Tell the person to look into the centre of the circle that they see inside the pupillometer.  
Say: *"Look at the centre of the circle"*

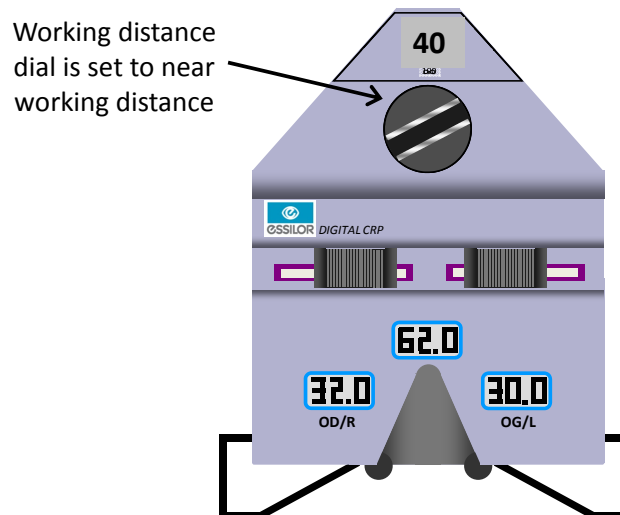

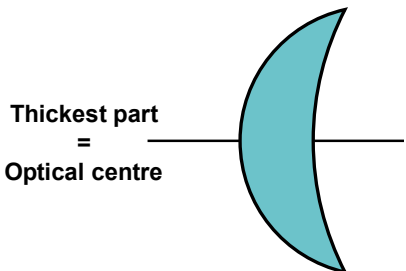
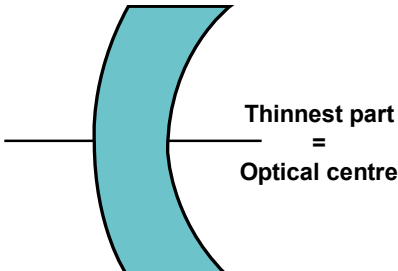


Figure 7.11: The pupillometer working distance is set at 40 cm

- **Step 5:**  
Look into the pupillometer with both of your eyes open.
- **Step 6:**  
Use the occluder switch to cover the person's left eye, to measure the near PD of the right eye.
- **Step 7:**  
Move the monocular slide in front of the person's right eye until you see the black hairline lined up with the corneal reflex.
- **Step 8:**  
Uncover the person's left eye and occlude the person's right eye.
- **Step 9:**  
Move the monocular slide in front of the person's left eye until you see the black hairline lined up with the corneal reflex.
- **Step 10:**  
Look at the pupillometer PD displays to read the binocular (or monocular) PD.

## WHY IS PD IMPORTANT?

<b>IMPORTANCE OF PD</b>	<p>The PD measurement must be accurate so that the:</p> <ul style="list-style-type: none"> <li>• refraction examination is accurate, and</li> <li>• spectacles are made correctly.</li> </ul>
<b>REFRACTION EXAMINATION AND PD</b>	<p>During a refraction examination, lenses of different powers are put in front of a person's eyes. The optical centres of these lenses must be aligned with the person's eyes otherwise the refraction will be incorrect.</p> <p>Knowing the person's PD measurement allows you to align the optical centres of the lenses with the person's eyes.</p>
<b>SPECTACLES AND PD</b>	<p>When lenses are put into a spectacle frame, the distance between the optical centres of the two lenses should be the same as the person's PD – this will align the optical centres of the lenses with the person's eyes.</p> <p>If a pair of spectacles is made incorrectly – if the optical centres are not aligned with the person's eyes – we say that there is unwanted "prism" in the spectacles.</p> <p>If a person has unwanted prism in their spectacles, they may have the following symptoms:</p> <ul style="list-style-type: none"> <li>→ asthenopia (eye strain or headaches)</li> <li>→ dizziness</li> <li>→ nausea (stomach discomfort)</li> <li>→ double vision</li> <li>→ blurred vision.</li> </ul> <p>If these symptoms are very bad, the person may not be able to wear their spectacles.</p> <div data-bbox="454 1086 1513 1552">  <p>If a person has prism in their spectacles, they may feel uncomfortable. Their symptoms may be so severe that the person will be unable to wear their spectacles.</p> <p>This can happen if:</p> <ul style="list-style-type: none"> <li>- the PD is measured incorrectly → examiner's error</li> <li>- the distance between the optical centres of the lenses is not the same as the PD → spectacle technician's error.</li> </ul> <p>A person is more likely to have problems with prism in their spectacles if they require high-powered lenses.</p> </div>
<b>OPTICAL CENTRES OF LENSES</b>	<p>The optical centre of a lens is usually the:</p> <ul style="list-style-type: none"> <li>• <b>thickest part of a plus lens, or</b></li> <li>• <b>thinnest part of a minus lens.</b></li> </ul> <div data-bbox="502 1657 1452 1993"> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><b>Plus lens</b></p>  </div> <div style="text-align: center;"> <p><b>Minus lens</b></p>  </div> </div> </div>

**Figure 7.12:** Optical centres of lenses



## WHY IS PD IMPORTANT? (cont.)

### OPTICAL CENTRES OF LENSES (cont.)

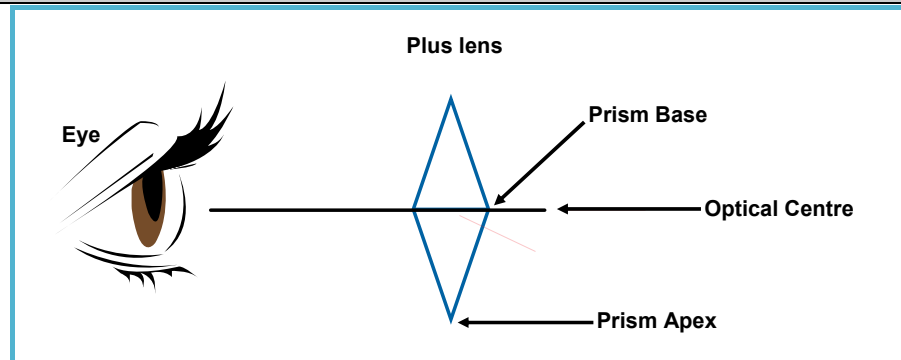


#### Remember:

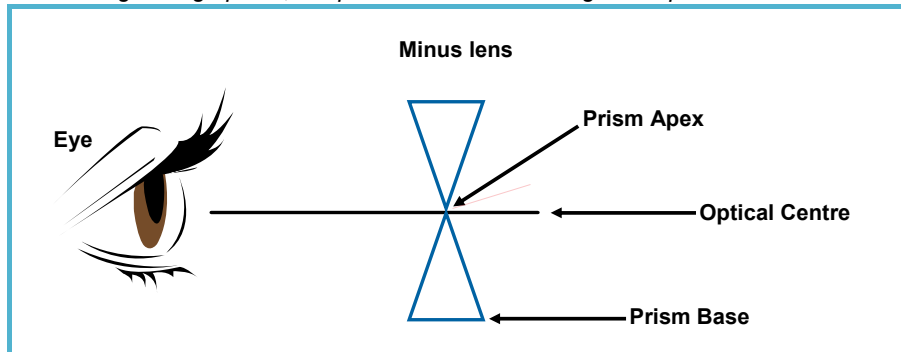
A lens can be thought of as being made of two prisms.

→ The point where these two prisms touch is the optical centre of the lens.

If the person does not look through the optical centre of a lens, they will be looking through one of these prisms.



**Figure 7.13:** A spherical plus lens can be thought of as being like two prisms with their bases together. The part of the lens where the two prism bases meet is the optical centre of the lens. To avoid looking through prism, the person must look through the optical centre of the lens.



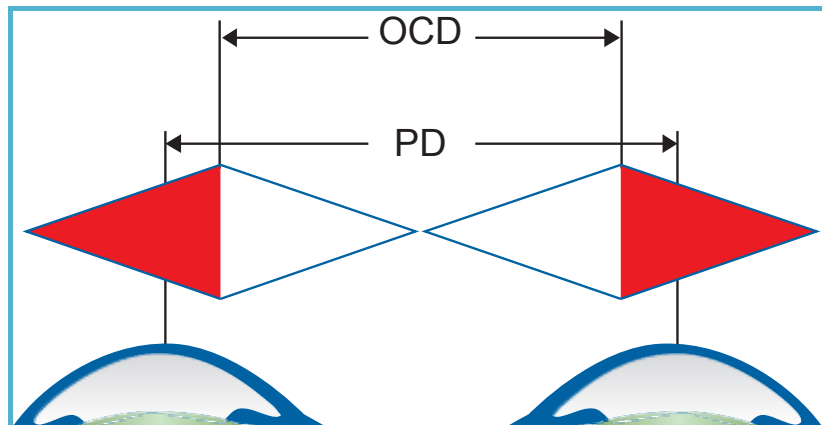
**Figure 7.14:** A spherical minus lens can be thought of as being like two prisms with their apexes together. The part of the lens where the two prism apexes meet is the optical centre of the lens. To avoid looking through prism, the person must look through the optical centre of the lens.

### EXAMPLES

In the diagrams below, you need to imagine that you are looking at a person from above – you are looking down at their eyes and their spectacle lenses.

### EXAMPLE 1

The distance between the optical centres (OCD) of two plus lenses is less than the person's PD.



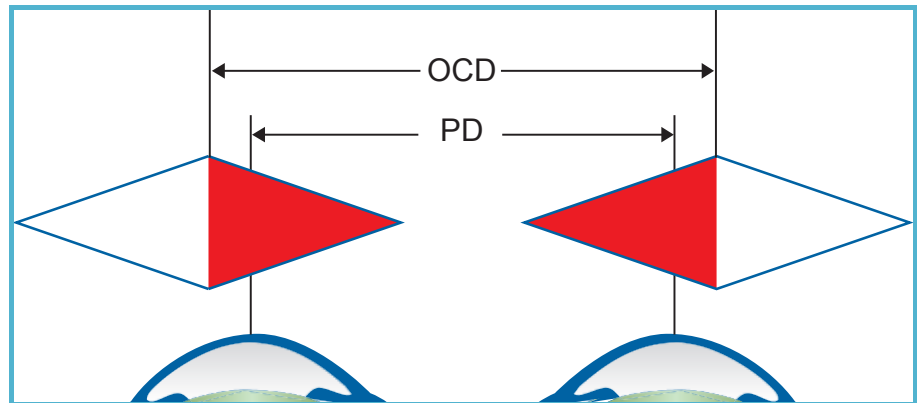
**Figure 7.15:** Plus spectacle lenses where  $OCD < PD$

In this case, the person is looking through prisms with the bases facing each other. This is called "base-in prism".

## WHY IS PD IMPORTANT? (cont.)

### EXAMPLE 2

The OCD of two plus lenses is greater than the person's PD.

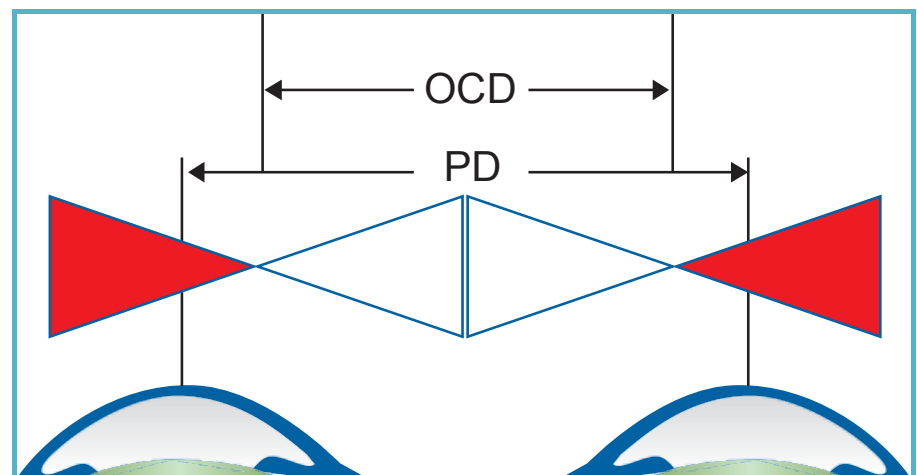


**Figure 7.16:** Plus spectacle lenses where  $OCD > PD$

In this case, the person is looking through prism with the bases facing away from each other. This is called "base-out prism".

### EXAMPLE 3

The OCD of two minus lenses is less than the person's PD.

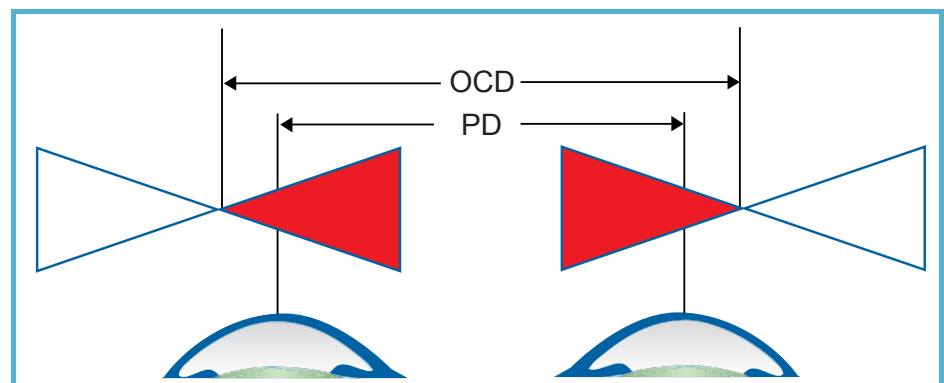


**Figure 7.17:** Minus spectacle lenses where  $OCD < PD$

In this case, the person is looking through prism with the bases facing away from each other. This is called "base-out prism".

### EXAMPLE 4

The OCD of two minus lenses is greater than the person's PD.



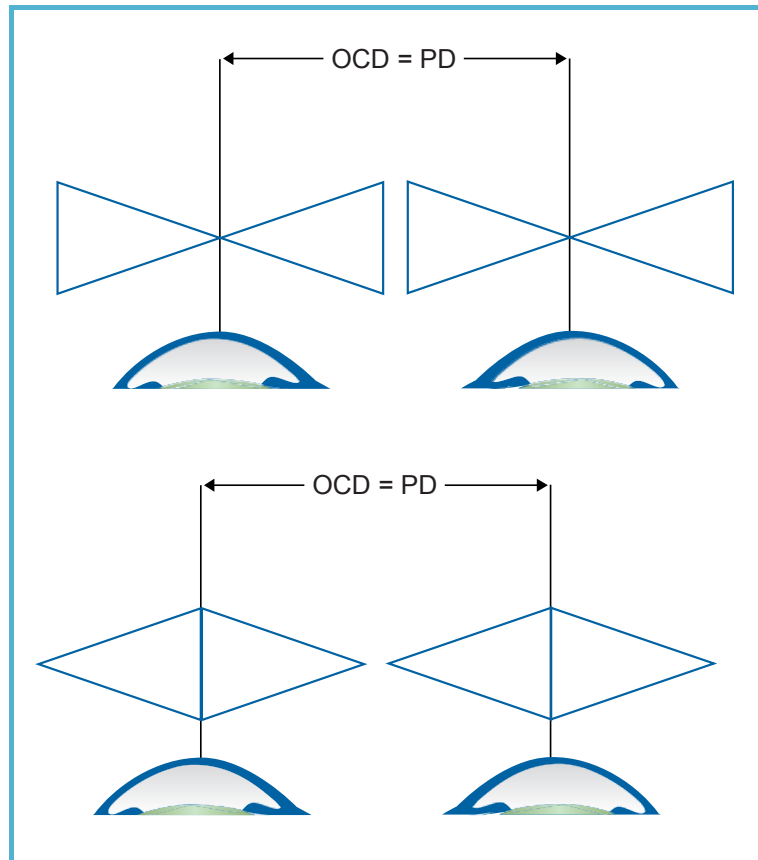
**Figure 7.18:** Minus spectacle lenses where  $OCD > PD$

In this case, the person is looking through prism with the bases facing each other. This is called "base-in prism".

## WHY IS PD IMPORTANT? (cont.)

### EXAMPLE 5

The OCD of the lenses and the person's PD is the same.



**Figure 7.19:** Minus spectacle lenses where  $OCD = PD$  and plus spectacle lenses where  $OCD = PD$ . There is no unwanted prism in these spectacles

In these cases the person is looking through the optical centres of the lenses, and not looking through prism in their spectacles. This is the same for both plus and minus lenses.

### INTENTIONAL PRISM

Very occasionally, an eye specialist will order spectacles with intentional prism.

In this case the distance between the optical centres will not be equal to the person's PD. This is because the eye specialist deliberately wants the person to look through prism as part of their treatment plan.

Unless you have received binocular vision training, you should never prescribe spectacles like these. If you do, you may cause problems for the person.



#### **Usually:**

Distance between optical centres of spectacle lenses = PD.

#### **Rarely:**

Distance between optical centres of spectacles lenses  $\neq$  PD.

Spectacles that have been made this way should only be prescribed by someone who is specially trained to treat binocular vision problems like strabismus (eye turn or squint).

## SUMMARY: INTERPUPILLARY DISTANCE

### INTERPUPILLARY DISTANCE (PD)

**Definition:**

- PD is the distance (in mm) between a person's pupils.
- Distance PD is the distance between a person's pupils when the person is looking at something far away.
- Near PD is the distance between a person's pupils when the person is looking at something that is close to them.
- Distance PD is always greater than near PD, because the eyes converge when they look at things that are close to them.

**PD measurement:**

- There are two ways to measure PD:
  - with a PD rule (and pen torch)
  - with a pupillometer.

### MEASURING DISTANCE PD WITH A PD RULE

- There are two ways to measure distance PD with a PD rule:
  - limbus method
  - corneal reflex method.
- The corneal reflex method is more accurate than the limbus method.

**Limbus method:**

- Measure the distance between the right temporal limbus and the left nasal limbus.

**Corneal reflex method:**

- Use a pen torch to reflect light from the centres of the person's pupils.
- Measure the distance between the corneal reflection of each eye.

### FINDING NEAR PD WITH A PD RULE

- There are two ways to measure near PD with a PD rule:
  - corneal reflex method
  - calculation method.
- The corneal reflex method is more accurate than the calculation method.

**Corneal reflex method:**

- Use a pen torch to reflect light from the centres of the person's pupils while the person looks at your nose.
- Measure the distance between the corneal reflection of each eye.

**Calculation method:**

- Calculate near PD by using the distance PD measurement:
- If distance PD > 64 mm → subtract 4 mm
- If distance PD ≤ 64 mm → subtract 3 mm

## SUMMARY: INTERPUPILLARY DISTANCE (cont.)

### MEASURING THE PD USING A PUPILLOMETER

- A pupillometer measures the distance between visual axes of the eyes instead of the pupil centres.
- Measuring PD with a pupillometer provides a more accurate measurement than using a PD rule.

### WHY IS PD IMPORTANT?

- The PD measurement must be accurate so that the:
  - refraction examination is accurate
  - spectacles are made correctly.

#### **Refraction examination and PD:**

- Optical centres of different lenses must be aligned with the person's eyes.

#### **Spectacles and PD:**

- The distance between the optical centres of the lenses in a spectacle frame should be the same as the person's PD.
- If this is not the case, prism will be created in the spectacles.
- Usually this is unwanted prism that will give symptoms including:
  - asthenopia
  - dizziness
  - nausea
  - double vision
  - blurred vision.
- Occasionally an eye specialist will put intentional prism into the spectacles.
  - **Unless you have received binocular vision training, you should never prescribe spectacles like these. If you do, you may cause problems for the person.**

**TEST YOURSELF QUESTIONS**

1. **What is interpupillary distance (PD)?**  
\_\_\_\_\_
2. **What are two methods for measuring distance PD with a PD rule? Which method is more accurate?**  
\_\_\_\_\_  
\_\_\_\_\_
3. **What are two methods for finding near PD with a PD rule? Which method is more accurate?**  
\_\_\_\_\_  
\_\_\_\_\_
4. **Why is near PD always less than distance PD?**  
\_\_\_\_\_  
\_\_\_\_\_
5. **A person's distance PD is 68 mm. Calculate their near PD.**  
\_\_\_\_\_

6. **Complete the following table:**

Advantages of Pupillometers	Disadvantages of Pupillometers

7. **Why must the PD measurement be accurate?**  
\_\_\_\_\_  
\_\_\_\_\_



## NOTES