BrienHoldenVisionInstitute

CLINICAL TECHNIQUES: ENTRANCE TESTS

THINK

A person comes to you complaining of double vision. What tests do you need to do?

WHAT YOU WILL LEARN

When you have worked through this unit you should know how to perform and interpret the results of the following tests or procedures:

- Ocular motility test
- Cover-uncover test
- Hirschberg test
- Pupil examination and pupil reactions (including the swinging flashlight test)
- Confrontation fields
- Oblique flashlight test.

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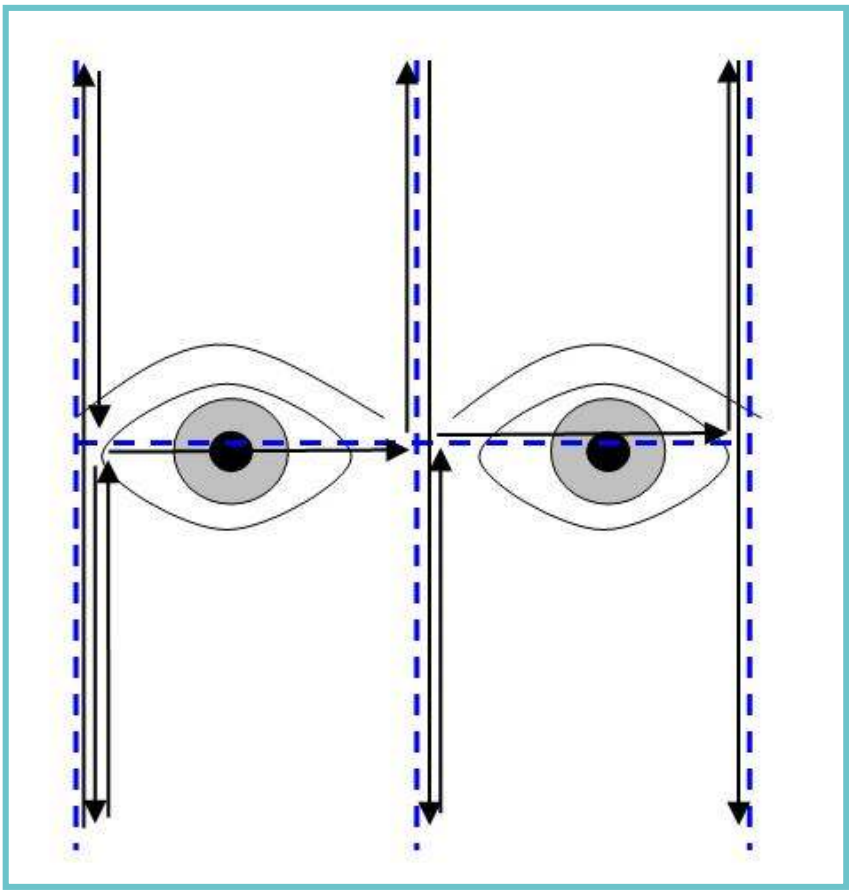
OCULAR MOTILITY TEST

WHAT IS IT AND WHY IS IT USED?	• The ocular motility test is used to assess the quality of eye movements, and how the two eyes move together as they follow a target • This test allows us to diagnose strabismus, extra-ocular muscle dysfunction and palsy of the cranial nerves which innervate the extra-ocular muscles • Ocular motility should always be assessed, especially when people complain of double vision.
HOW IS IT DONE?	• The person should not wear their spectacles for this test • Turn a penlight on, and hold it directly in front of the person's face, at about 50cm • Ask the person to hold their head still, and to follow the light only with their eyes • Ask them to tell you if it hurts when they move their eyes or if they have any double vision • Using smooth and regular movements, move the penlight in a large double H shaped pattern in front of the person's face (as shown in Figure 21-1).  ***Figure 21-1: Ocular motility test (double H pattern)*** • Look for: ○ Smooth movement of the eyes (not jerky) ○ The eyes moving together.

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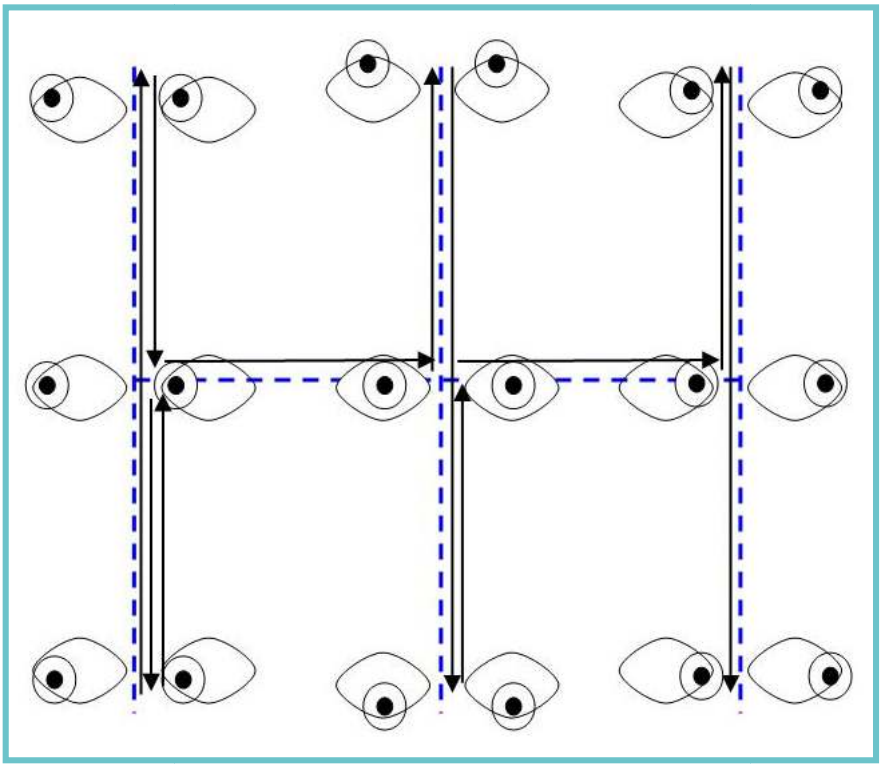

Figure 21-2: Ocular motility, showing the position of the eyes in each position of gaze

HOW DO I RECORD THIS?

- If the eyes move smoothly, together, and unrestricted in all positions of gaze, record this as:
  - Ocular motility: full and unrestricted
- If the eyes do not move together, you need to record:
  - Which eye is not moving
  - The direction(s) in which the abnormal movement(s) are observed (e.g. nasal, temporal, up, down).

REFERRAL CRITERIA

- Refer if:
  - The person complains of double vision
  - The person experiences any pain on eye movement
  - The person's eye movements are jerky
  - The person cannot follow the light (no movement of the eyes)
  - The person's eyes do not move together (if one of the eyes cannot move in a certain direction)

Refer URGENTLY if the double vision has occurred recently or suddenly.

- If the motility problem is longstanding (if the person knows that they have had it for a long time), and there is no double vision, you do not need to refer.

COVER TEST

WHAT IS IT AND WHY IS IT USED?	• The cover test is a simple test in which we use an occluder to assess the presence and direction of an eye turn or tropia • If one eye turns in, out, up or down, we say that the person has a tropia or a squint • The cover test is performed at both distance and near in the same manner, and with the person wearing their appropriate spectacle correction (distance and/or near spectacles).
HOW IS IT DONE?	• To perform the test at distance, ask the person to look at the biggest letter on the acuity chart at 6 metres while wearing their distance spectacles (if they have any) • To perform the test at near, ask the person to look at a target at 40 cms (such as a pen or near acuity chart) while wearing their near spectacles (if they have any) • Use an occluder (or a PD rule or your hand) to cover the left eye, while carefully watching the right eye for any movement ***Figure 21-3: Cover the left eye while watching the right eye for movement*** • The right eye should stay still as the left eye is covered – it should not move inwards, outwards, up or down • If the right eye moves when the left eye is covered, it means there is a tropia (eye turn) present • Uncover the left eye after about 2 seconds

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Figure 21-4: Uncover the left eye after about 2 seconds

- Allow about another 2 seconds for the eyes to realign, and then cover the right while carefully watching the left eye for movement

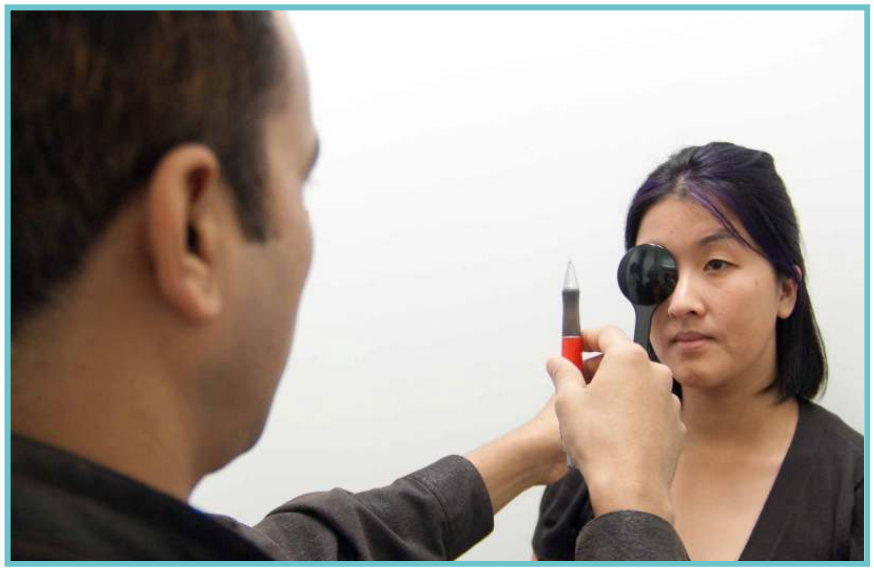

Figure 21-5: Cover the right eye while watching the left eye for movement

- The left eye should stay still as the right eye is covered – it should not move inwards, outwards, up or down
- If the left eye moves when the right eye is covered, it means there is a tropia (eye turn) present
- Uncover the right eye after about 2 seconds

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Figure 21-6: Uncover the right eye after about 2 seconds

WHAT MIGHT IT LOOK LIKE?

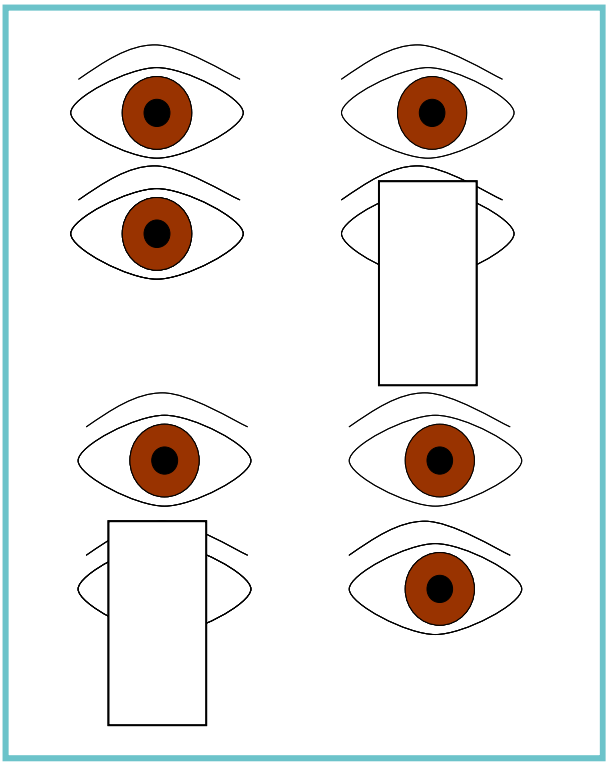

Figure 21-7: Cover test on a person with no tropia – there is no eye movement present when an eye is covered

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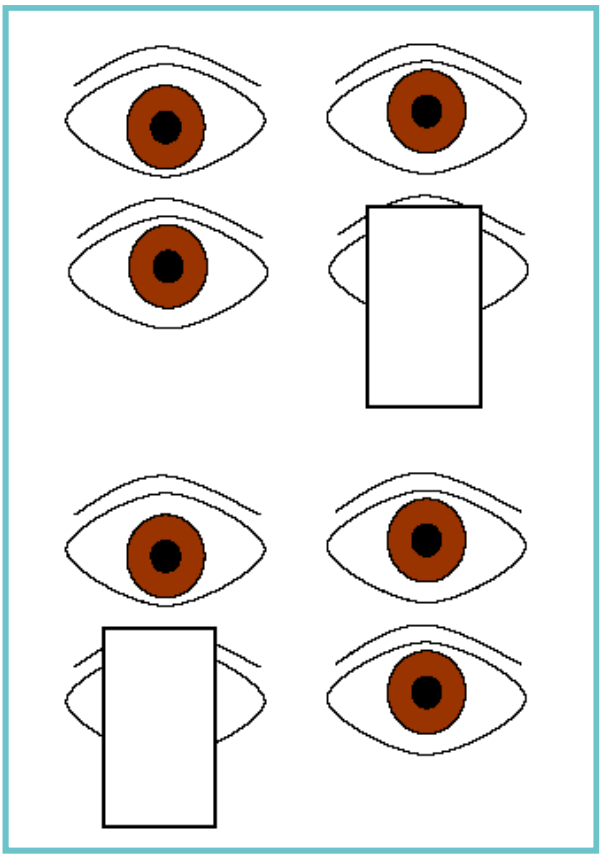
<table>
<tr><td></td><td> 

Figure 21-8: Cover test on a person with right hypotropia – the right eye moves upwards when the left eye is covered; there is no movement of the left eye when the right eye is covered</td></tr>
<tr><td>HOW DO I RECORD THIS?</td><td>If there is no movement when you cover each eye, you record this as:
○ Cover test (distance): No movement detected
○ Cover test (near): No movement detected
• If there is eye movement on the cover test, you need to record:
○ Which eye moved
○ The direction of the eye movement
• If there is movement on the cover test, there are four ways to record this:
○ Exotropia – means that the eye moved in when you covered the other eye
○ Esotropia – means that the eye moved out when you covered the other eye
○ Hypotropia – means that the eye moved up when you covered the other eye
○ Hypertropia – means that the eye moved down when you covered the other eye
• For example, if the left eye moves outwards when the right eye is covered, this means the left eye is usually turned inwards and not looking straight at the target. We record this as: Left Esotropia.</td></tr>
<tr><td>REFERRAL CRITERIA</td><td>• Refer if you detect the presence of a tropia and:
○ The person is a child
○ It is a new problem (sudden onset)
○ The person complains of double vision.</td></tr>
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HIRSCHBERG TEST

WHAT IS IT AND WHY IS IT USED?	• The Hirschberg test is a screening test to determine whether a person's eye are in alignment, or whether they have an eye turn (also called a tropia or strabismus) • It is especially useful for examining babies or young children, when it may be difficult to do the cover test • In the Hirschberg test, we shine a light into the person's eyes and look at where the light reflex is located on the cornea in reference to the pupil • In a person with no squint, light will be reflected from the centre of both corneas • In a person with a misalignment of the eyes, the location of the corneal reflex will help us to determine the direction of the strabismus.
HOW IS IT DONE?	• Shine a light in the person's face from a distance of about 40 cm, holding the light just below your own eye • Ask the person to keep both eyes open and to look at the light • Look at the location of the light reflections in the person's eyes • If there is no squint, the light reflections will be equal for the two eyes, typically close to the centre of the pupil, or displaced about 0.5 mm nasally • If the person has a squint, the reflection from the light will not be in the same position in each eye ***Figure 21-9: The corneal reflexes are in the centre of each pupil, indicating no misalignment of the eyes*** • The type of displacement of the corneal reflex tells us the type of tropia that is present ○ If the reflex is nasally displaced → the person's eye is turned outwards (exotropia) ○ If the reflex is temporally displaced → the person's eye is turned inwards (esotropia) ○ If the reflex is displaced upwards → the person's eye is turned downwards (hypotropia) ○ If the reflex is displaced downwards → the person's eye is turned upwards (hypertropia).

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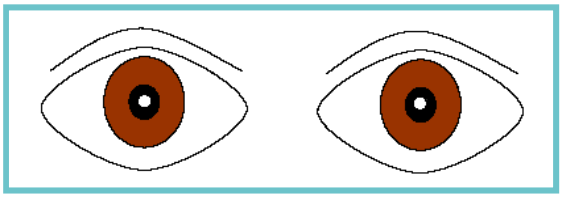
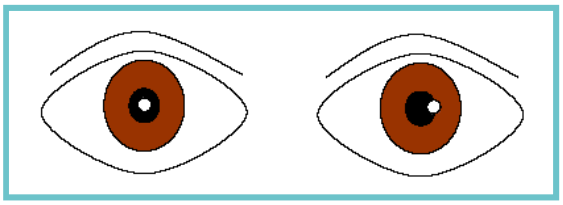
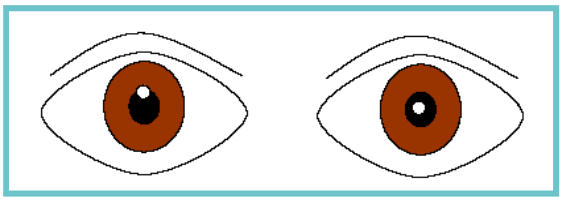
WHAT MIGHT IT LOOK LIKE?	 ***Figure 21-10: No misalignment of the eyes***  ***Figure 21-11: Left esotropia***  ***Figure 21-12: Right hypotropia***

HOW DO I RECORD THIS?	• If the corneal reflexes are close to the centre of each pupil, or displaced about 0.5 mm nasally in each pupil, you record this as:
	  ○ Hirschberg test: No Squint
	• If a corneal reflex is not in the centre of the pupil, you need to record:
	  ○ In which eye the reflex is not central
	  ○ The direction of the reflex (nasal, up, down, lateral).

REFERRAL CRITERIA	• If you see a baby or a small child with a squint, you should refer them.

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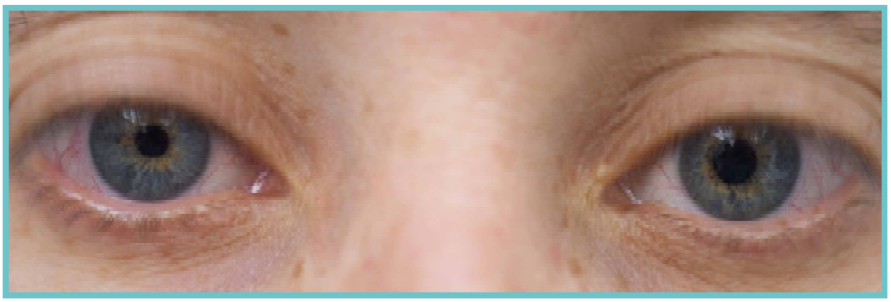
PUPIL EXAMINATION AND PUPIL REACTIONS

WHAT IS IT AND WHY IS IT USED?	• The pupil controls the amount of light entering the eye • Examining the pupils of a person's eyes can provide important information about the health of the eyes and the functioning of the visual system.
HOW IS IT DONE?	• Pupil examination typically includes an assessment of pupil size and shape in each eye, as well as pupil reactions to light and accommodation. **Pupil size and shape:** • Examine both pupils in dim room illumination • The pupils of a person's eye should equal in size, or no more than 1 mm different • Differences in pupil sizes may indicate a neurological abnormality, or may be the side effects of certain drugs or medications • Both pupils should also be round in shape • Pupil shape may be altered through trauma to the eye, or due to anatomical abnormalities.  ***Figure 21-13: Unequal pupil sizes – the pupil of the left eye is larger than that of the right eye*** **Direct and consensual pupil reflexes:** • Ask the person to look into the distance, or at a large letter on the distance visual acuity chart • Shine a pen torch into the person's right eye while looking at the right pupil • The right pupil should constrict (get smaller) when light is shone in it • Now take the light away from the right eye, while looking at the right pupil • The right pupil should dilate (get bigger) when the penlight is moved away • Normally, the pupil will get smaller when a light is shone into either eye and get bigger when the light is taken away → this is called the *direct reflex* • Next, you should shine the light into the person's right eye again, but this time look at the pupil of the person's left eye • The left pupil should constrict (get smaller) when light is shone into the right eye • Now take the light away from the right eye, while still looking at the left pupil • The left pupil should dilate (get bigger) when the light is taken away from the right eye • This reaction of the left pupil to light shone into or taken away from the right eye is called the *consensual reflex* • Repeat the entire procedure for direct and consensual reflex by shining light into the person's left eye

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- If the pupils do not react normally to light, this could mean that the person has a serious eye disease or neurological condition.

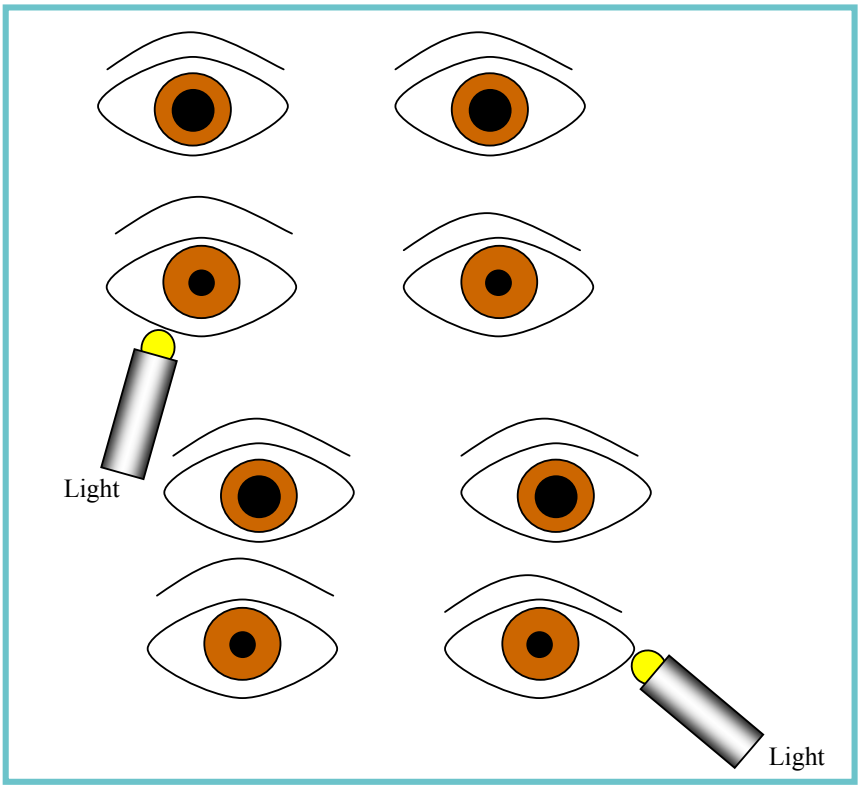

Figure 21-14: Normal direct and consensual reflex

Swinging flashlight test:

- In dim room illumination, note the size of the pupils
- Ask the person to look far away
- Now swing the light of the pen torch back and forth from one pupil to the other, while carefully looking at the pupil size and reaction of each
- When you shine the light into the person's right eye, both pupils should constrict
- When you swing the light over to the left eye, the left pupil should stay small → it should NOT get bigger!
- Now swing the light back over to the right eye again → the right pupil should stay small
- If either pupil gets larger when we swing the light to point at it, we call this a relative afferent pupil defect (RAPD), or sometimes it is also called a Marcus Gunn Pupil
- An RAPD usually indicates a problem with the optic nerve, or some kind of retinal disease.

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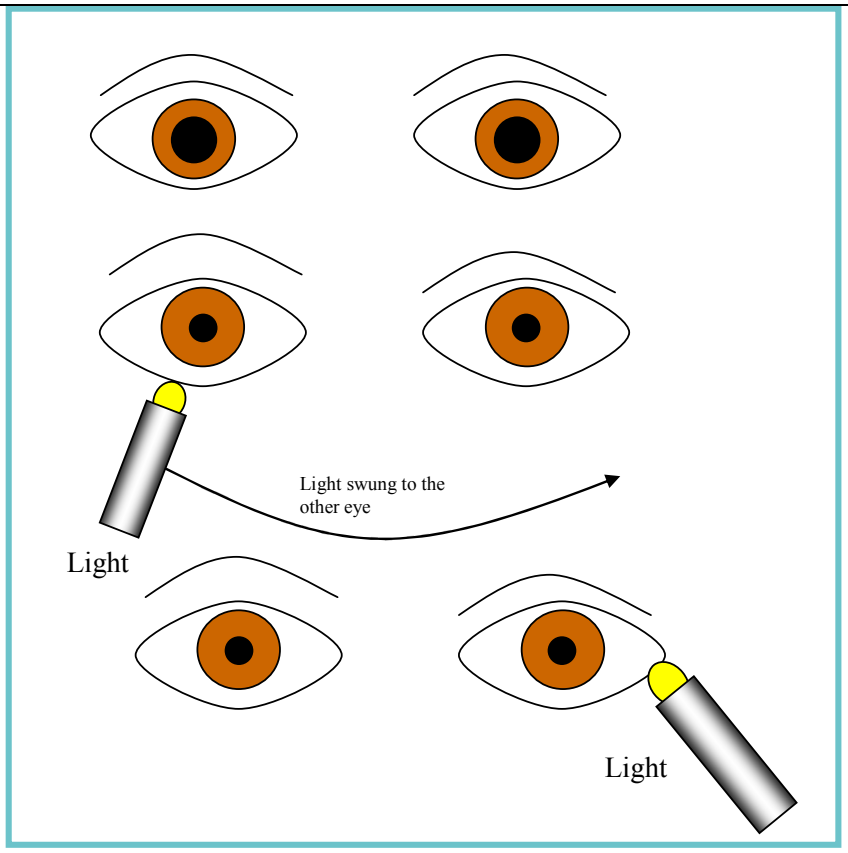

Figure 21-15: Normal swinging flashlight test

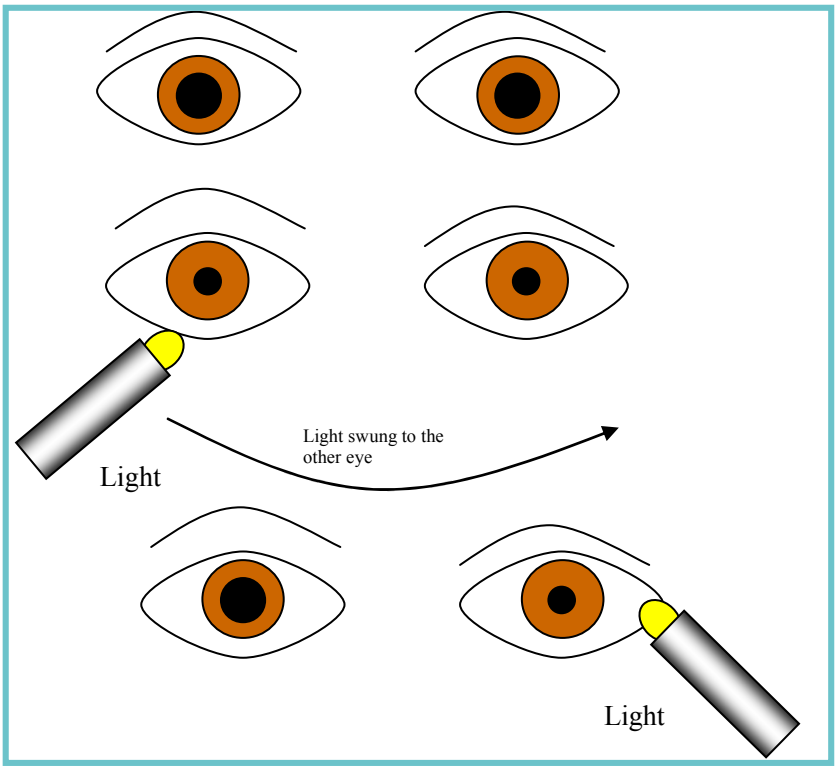

Figure 21-16: Swinging flashlight test indicating a right RAPD

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Near reflex:

- Ask the person to look into the distance or at a large letter on the distance visual acuity chart
- Hold a pen or a letter target 40 cm from the person's face
- Now get the person to look at the pen or letter target, while you carefully look at what happens to their pupils
- Both pupils should constrict when the person looks at the near target → this is called the *near reflex*.

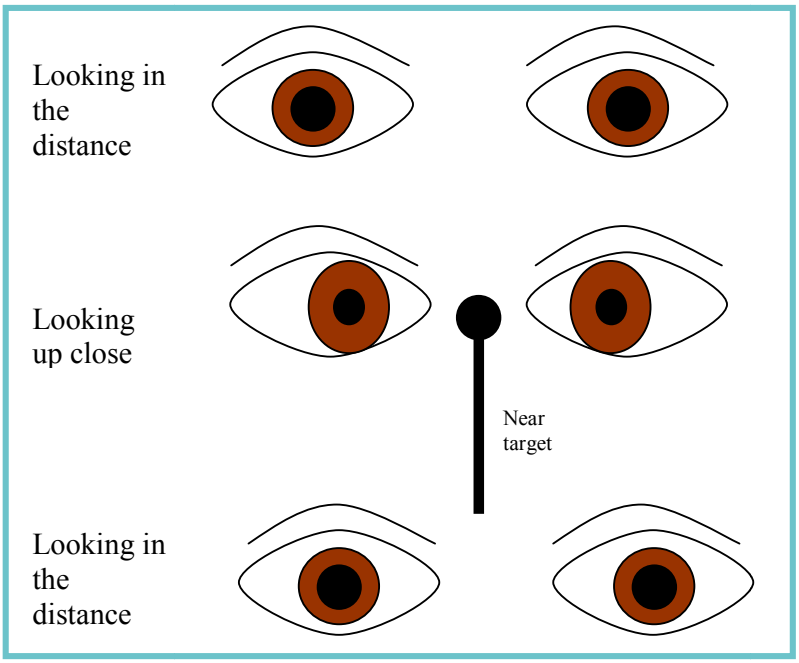

Figure 21-17: Normal near reflex

HOW DO I RECORD THIS?	• If all of the pupil reactions are normal, we record this as follows: ○ Pupil reactions: Normal reactions – direct, consensual and near, no RAPD (relative afferent pupil defect) • If any of the pupil reactions are not normal, it must be recorded: ○ For example: Right pupil does not react to light
REFERRAL CRITERIA	• Refer the person urgently if you notice any pupil reaction defect which is new or which happened suddenly.

Refer URGENTLY if the pupil reaction defect has occurred recently or happened suddenly, or if you are not sure whether what you are seeing is normal.

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CONFRONTATION FIELDS

WHAT IS IT AND WHY IS IT USED?	• When we ask someone to read an eye chart, we are testing their central vision • A confrontation field test is a way of finding out about someone's field of vision, which includes their peripheral vision or their side vision • If someone has a restricted (smaller than normal) field of vision, this could mean that they have an eye disease (like glaucoma), or a serious brain problem (like a brain tumour).
HOW IS IT DONE?	 ***Figure 21-18: Confrontation fields*** • This test is done in normal room illumination • If the person wears spectacles, ask them to take their spectacles off • Position yourself about 70 cm away from the person, facing them at eye level • Ask the person to cover their left eye, while you cover your own right eye • Ask the person to keep looking into your left eye • You should keep looking at the person's right eye • Explain to the person that you will bring some fingers in from the side, and they will have to tell you how many fingers you are holding up (without moving their eyes or their head sideways) • Hold up a number of fingers midway between you and the person outside their field of vision • Slowly bring the fingers in until the person says they can see them • Compare this to your own field of vision (i.e. when did you notice your own fingers in your side vision while you were looking at the person's right eye?) • Repeat this for the person's right eye in all eight directions of gaze (left, up and left, up, up and right, right, down and right, down and down and left) • Repeat the entire procedure for the left eye (get the person to cover their right eye and you cover your left eye).

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	Make sure that the person looks at your eye, not at your fingers.
HOW DO I RECORD THIS?	• If you and the person see the fingers at about the same time, write: ○ Fields to confrontation: Full • If you see your fingers before the person sees your fingers, record which eye and which direction was reduced.
REFERRAL CRITERIA	• Refer any person with a restricted field of vision compared to your own (i.e. when you can see your fingers before the person sees your fingers).

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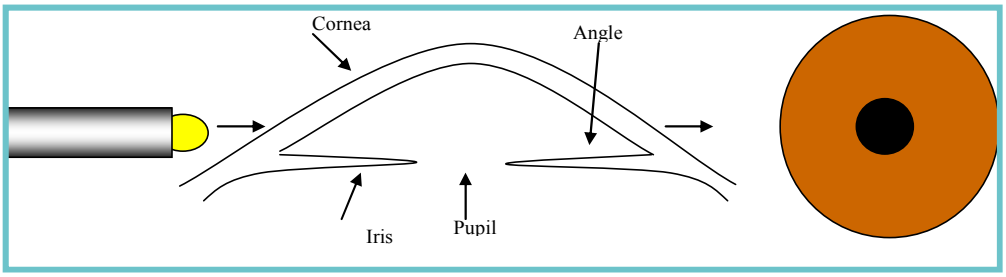
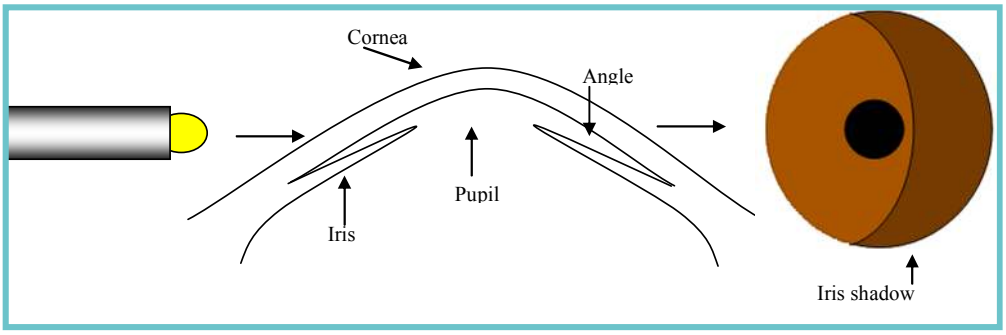
OBLIQUE FLASHLIGHT TEST

WHAT IS IT AND WHY IS IT USED?	• When a slit lamp is not available, the oblique flashlight test is useful for the detection of narrow anterior chamber angle (the angle between the cornea and the iris, sometimes also called the "angle of the eye") • If the anterior chamber of the eye is very shallow and the angle of the eye becomes too narrow, the drainage canals in the eye become blocked or covered → causing closed angle glaucoma.
HOW IS IT DONE?	• Hold a pen torch at the side of the person's head so it shines across the anterior chamber towards the nose (perpendicular to the limbus) • If the anterior chamber is of normal depth and the angle of the eye is open, the entire iris will be illuminated  ***Figure 21-19: Oblique flashlight test for an open angle*** • In an eye with a narrow angle or shallow anterior chamber depth, a shadow will be seen on the nasal side of the iris.  ***Figure 21-20: Oblique flashlight test for a narrow angle***

HOW DO I RECORD THIS?	• If both angles are open, record this as:
	  ○ Oblique flashlight test: right and left angles open
	• If the angles seem narrow, record this as:
	  ○ Oblique flashlight test: right and left angles narrow.

REFERRAL CRITERIA	• Monitor any person with a shallow anterior chamber • Refer anyone with a very narrow anterior chamber angle.

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SUMMARY – CLINICAL TECHNIQUES: ENTRANCE TESTS

OCULAR MOTILITY

- Ocular motility is a way for us to assess eye movements
- The person follows a pen torch which is moved in a large double H pattern
- Anyone with double vision or pain on eye movement must be referred.

COVER TEST AND HIRSCHBERG TEST

- The cover test allows us to look for an eye turn (squint)
- It is done at both distance and near
- Ask the person to fix on a target, then cover and uncover each eye
- Look for movement in the open eye
- The Hirschberg test also allows us to look for turned eyes
- The Hirschberg test is especially useful in babies and young children
- Refer if you see movement on cover test and the person is a child
- Also refer if the person has double vision or the turned eye is a new condition.

PUPIL EXAMINATION AND PUPIL REACTIONS

- Testing pupils allows us to see how the eyes react to light
- Both pupils should be equal in size
- When you shine a light into one eye, both pupils should get smaller
- When you swing the flashlight over to the other eye, both pupils should stay small
- When the person looks from a distance object to a close object, the pupils should constrict
- Any pupil defect (unless it is a long-standing problem) must be referred urgently.

CONFRONTATIONAL FIELDS

- Confrontation allows us to test the peripheral vision (side vision)
- Bring your fingers from outside the person's field of vision into their field, and ask them to tell you when they can see your fingers
- Any restriction in visual field should be referred.

OBLIQUE FLASHLIGHT TEST

- The oblique flashlight test allows us to assess the angle of the eye if we don't have a slit lamp
- A narrow angle can be at risk of closing and causing closed-angle glaucoma
- Shine a bright light across the eye (from the temple towards the nose)
- The whole iris should glow if the angle is open
- Refer if you see a shadow on the nasal iris.

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TEST YOURSELF QUESTIONS

1. **If you shine a light into a person's right pupil, what should happen to the left pupil? What is this reflex called?**

_____
_____
_____

2. **A girl comes into your office complaining of double vision. When you cover her right eye, you notice that her left eye moves downwards. What does this girl have?**

_____
_____
_____

3. **What should be the referral criterion for the following tests?**

Test	*When should you refer?*
Pupil reactions	
Confrontation fields	
Ocular motility	

4. **A person has a history of narrow anterior chamber angles, but you do not have a slit lamp available to examine their eyes. What test can you perform that will help you assess the depth of the person's anterior chamber?**

_____
_____
_____

5. **When you shine a pen torch into a person's right eye, you notice that the right pupil constricts (gets smaller). When you take the penlight away from the right eye, the right pupil dilates (gets bigger). What is this called? What could cause this condition and what should you do?**

_____
_____
_____

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