The Neurological Examination

Special Senses

Assessing vision and hearing

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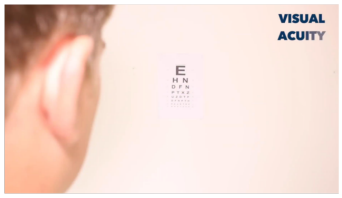
Visual Acuity (how clearly you see objects around you!)

- Visual acuity refers to the ability of the eye to appreciate two points 1.75 mm apart as two distinct points (indicates the sharpness or clarity of vision).
- Assessment of visual acuity is mandatory in all ophthalmic patients. Each eye must be tested separately. The most commonly used method of testing for distance vision is Snellen chart, which displays a random selection of letters at diminishing font size in successive lines.
- Each line is marked with a number (60,36,24,18,12,9 & 6). This represents the distance in meters at which a normally sighted person could read that line. (We test each eye alone because the visual acuity in each eye can be different)

Assessment of visual acuity (distance vision)

- Seat the patient 6 meters away from the chart
- Each eye needs to be tested separately
- Use an occluder to cover the eye that is not being tested , if we don't have an occlude we can use the palm of the hand, we ask the patient to cover his eye with the palm of the hand without applying pressure.
- Ask patient to read from the top letter
- Keep going until they can't read the line clearly or they make more than 2 mistakes in a line.
- The result is expressed as a ratio X / Y, where X is the testing distance and Y refers to the line containing the smallest letter that the patient identifies.



OKAY, sometimes when we are testing the patient and we see that the visual acuity is decreased the next step will be to assist the visual acuity through a pinhole. You can see in the picture that the occluder has a certain part that has pinholes in it so if the visual acuity is decreased you can reassist it after applying the pinhole and if it improves this strongly suggests --- the cause of decreased visual acuity is refractive error يعني في عنا مشكلة في الrefractive apparatus of the eye.

• You can have the patient read through a pinhole to see if this improves vision (if vision is improved with a pinhole, it suggests there is a refractive component to the patient's poor vision).

• If the patient cannot see the largest font letter, reduce the test distance to 3 meters, then to 1 meter if necessary.

• If they still cannot see the largest font letter, document instead whether they can count fingers, see hand movement or just perceive the difference between light and dark.

Assessment of near vision

Now this chart contains paragraphs that have different letter sizes, when we perform the test we ask the patient to hold this card\ chart 37cm away from his eyes, 37cm is the normal reading distance.

And again, here we test each eye alone.

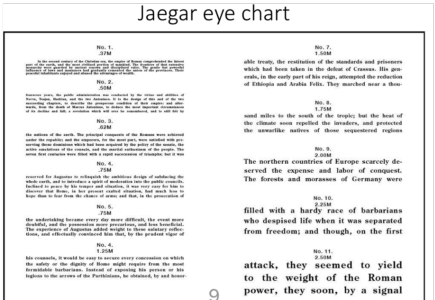
• The Jaeger eye chart (or Jaeger card) is used to test and document near visual acuity at a normal reading distance. It has print samples of different sizes (No. 1-No.11). Anyone with normal vision should be able to read the smallest print in good lighting, at a comfortable reading distance.

1. Ask the patient to hold the test card 37 cm away from the eyes.

2. Test each eye alone.

3. Ask the patient to go to the smallest block/paragraph of text they feel can see without squinting, and read that passage aloud.

Jaegar eye chart



4. Record the "J" value of the smallest block of text he can read.

So, this is how we Assis for near vision, and maybe it's not always tested unlike the Snellen chart which is always used, any patient who comes for ophthalmological examination must have his vision tested for distant visual acuity.

color vision

- The retina contains two types of photoreceptors; the rods and cones.

- Cones are responsible for color vision. (so, we can see colors because of cone).

The retina contains 3 different types of cones, each one contains a certain type of photo pigment called opsin which is sensitive to a particular wavelength of light. We have a cone that's sensitive to the blue light, and then another one for the green, a 3rd one for the red.

In real life we can see more than 3 colors, its because every color stimulates 2 or 3 of these cones to various degrees and the brain combines the input from all these 3 types of cones to identify the color we are viewing.

- There are three types of cones, each containing a specific photopigment called an opsin that is most sensitive to particular wavelengths of light (blue, green and red).

- The brain combines input from all three types of cones to produce normal color vision

Color Vision Deficiency

• Color vision deficiency (color blindness) represents a group of conditions that affect the perception of color.

• Usually, color deficiency is an inherited condition.

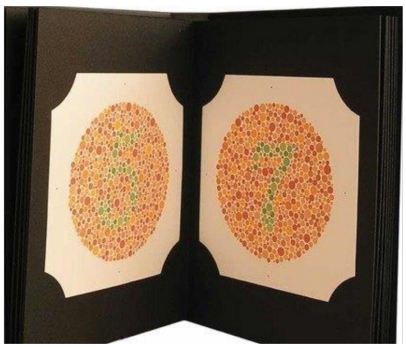
• Disease or injury that damages the **optic nerve** or **retina** can also cause loss of color recognition in such case the condition might affect one eye only.

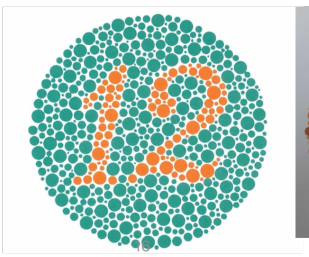
- Red-green color vision defects are the most common form of color vision deficiency. Affected individuals have trouble distinguishing between some shades of red, yellow, and green. It is an X-linked genetic disorder
- (More common in males)
  - A person with loss of red cones is called a protanope
  - A person who lacks green cones is called a deuteranope
- Blue color vision defects (tritanopia) less common type , which are rarer, cause problems with differentiating shades of blue and green. Defect in Chromosome 7.

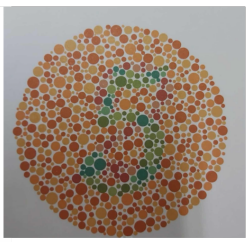
Assessment of color vision

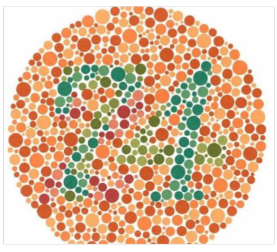
• The patient is shown a series of specially designed pictures composed of colored dots, called pseudoisochromatic plates. Most commonly used is **Ishihara plates.**

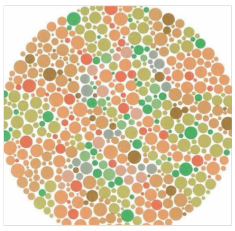
• Ishihara plates, each of which contains a coloured circle of dots. Within the pattern of each circle are dots which form a number that is clearly visible to those with normal colour vision and difficult or impossible to see for those with colour vision defect.











How to use Ishihara plates

First of all we have to make sure that the light in the room, اضاءة الغرفة تكون جيّدة normal sunlight،يُفضّل انها تكون

- If the patient normally wears glasses for reading, ensure these are worn for the assessment. let him wear it because we are not testing visual acuity here.
- Test each eye individually and ensure there is enough sunlight in the room.
- The patient is asked to look at the plates and report the number they see.
- The first page is usually the 'test plate' which does not test colour vision and instead assesses contrast sensitivity.
- On the test plate, individuals with normal color vision see the correct number, while those with a deficiency see a different number or see nothing at all.

Assessing hearing

• Types of hearing loss :

1. **Conductive hearing loss**: occurs when there is an obstruction or damage to the outer or middle ear that prevents sound from being conducted to the inner ear.

✓ Causes include excessive ear wax, otitis externa, otitis media, and perforated tympanic membrane, anything that impairs the sound waves from reaching the inner ear.

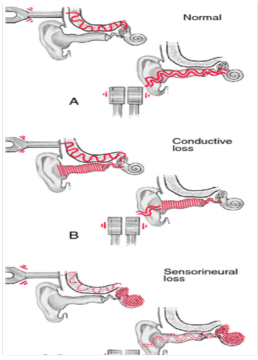
2.**Sensorineural hearing loss**: impairment of the cochlea or the vestibulocochlear (VIII) nerve.

✓ Causes include aging, excessive noise exposure, genetic mutations, viral infections and ototoxic agents.

- Hearing can be assessed by subjective methods such as Rinne and Weber tests, or by objective methods such as an audiometry test

Rinne and Weber tests

- These tests are designed to evaluate hearing
- Useful, quick, and simple screening test for evaluating hearing loss.
- They are screening tests and do not replace formal audiometry.
- We use a 512 Hz tuning fork



Rinne Test – (we test each ear alone/ separately).

- Strike the tuning fork against a firm but the elastic object (e.g., the clinician's knee or elbow).
- Place the vibrating tuning fork firmly on the mastoid process.
- Confirm the patient can hear the sound of the tuning fork and then ask them to tell you when they can no longer hear it.
- When the patient can no longer hear the sound, move the tuning fork in front of the external auditory meatus to test air conduction.
- Ask the patient if they can now hear the sound again.

Results interpretation

- Normal : air conduction is better than bone conduction
- Sensorineural deafness: air conduction is better than bone conduction (both air and bone conduction are reduced equally).
- Conductive deafness: bone conduction is better than air conduction

Weber Test

- The vibrating tuning fork is placed on the vertex of the skull or the forehead in the midline , and the patient is asked to report the side where the tone sounds louder.
- Normally, the tone sounds equal on both sides/ears.
- In conductive hearing loss, the tone is louder on the affected side.
- In sensorineural hearing loss, the tone is louder on the normal side