eye chart 20 ft (6 m) away. If this test cannot be done, acuity can be measured by using a chart held about 36 .cm (14 in) from the eye

Normal and abnormal vision is quantified by Snellen notation. A Snellen notation of 20/40 (6/12) indicates that the smallest letter that can be read by someone with normal vision at 40 ft (12 m) has to be brought to 20 ft (6 m) before it is recognized by the patient. Vision is recorded as the smallest line in which the patient can read half of the letters, even if the patient feels that the letters are blurry or they have to guess. If the patient cannot .read the top line of the Snellen chart at 20 ft (6 m), acuity is tested at 10 ft (3 m)

If nothing can be read from a chart even at the closest distance, the examiner holds up different numbers of fingers to see whether the patient can accurately count them. If not, the examiner tests whether the patient can .perceive hand motion

.If not, a light is shined into the eye to see whether light is perceived

Near vision is checked by asking patients to read a standard near card or newsprint at 14 in (36 cm);

.patients > 40 yr who require corrective lenses (reading glasses) should wear them during near vision testing

Refractive error can be estimated roughly with a handheld ophthalmoscope by noting the lens necessary for the examiner to focus on the retina; this procedure requires examiners to use their own corrective lenses and is .never a substitute for a comprehensive assessment of refraction

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More commonly, refractive error is measured with a standard phoropter or an **automated refractor** (a device that measures changes in light projected and reflected by the patient's eye). These devices also measure .astigmatism

?How to take visual acuity for children

Children might be quite challenging. Some might be shy, others might have developmental delay or they might .not up to the adequate age to cooperate with the examiner

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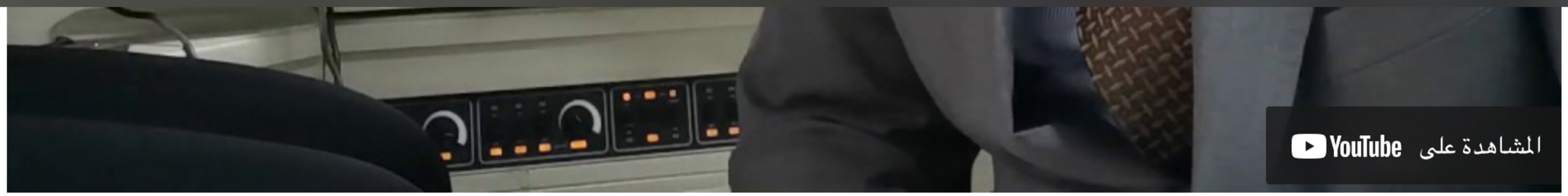
Another important way of assessment is the use of cyclo-refration in children. the examiner rely on the clinical judgment to make adequate eye glasses for the child. it is very common to find a +2 to +3 refraction in those .children

Eyelid and conjunctival examination

Eyelid margins and periocular cutaneous tissues are examined under a focal light and magnification (eg, .provided by loupe, slit lamp, or ophthalmoscope)



Corneal examination

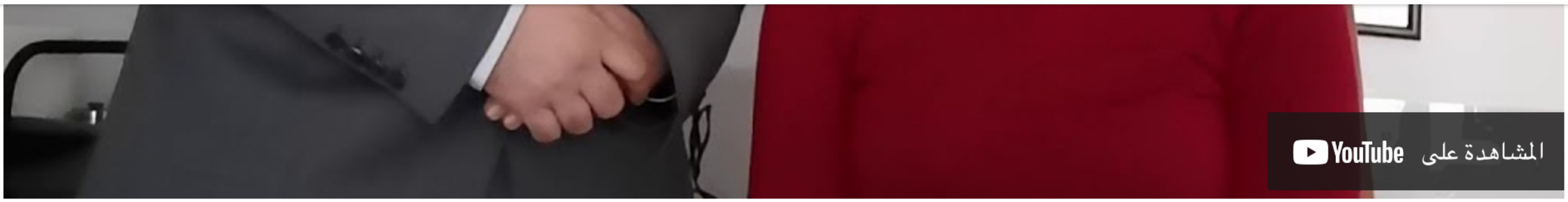
Indistinct or blurred edges of the corneal light reflex (a reflection of light from the cornea when illuminated) .suggest the corneal surface is not intact or is roughened, as occurs with a corneal abrasion or keratitis

Fluorescein staining reveals abrasions and ulcers. Before staining, a drop of topical anesthetic (eg, proparacaine 0.5%, tetracaine 0.5%) may be added to facilitate examination if the patient is in pain or if it .is necessary to touch the cornea or conjunctiva (eg, to remove a foreign body or measure intraocular pressure)

A sterile, individually packaged fluorescein strip is moistened with 1 drop of sterile saline or topical anesthetic and, with the patient's eye looking upward, is touched momentarily to the inside of the lower eyelid. The patient blinks several times to spread the dye into the tear film, and then the eye is examined under magnification and cobalt blue illumination. Areas where the corneal or conjunctival epithelium is absent .(abraded or ulcerated) fluoresce green

Pupil examination

The size and shape of the pupils are noted, and pupillary reaction to light is tested in each eye, one at a time,



Extraocular muscles

The examiner guides the patient to look in 8 directions (up, up and right, right, down and right, down, down and left, left, left and up) with a moving finger, toy , or pen. It is very important not use a dazzling object it will be very uncomfortable for the patient.

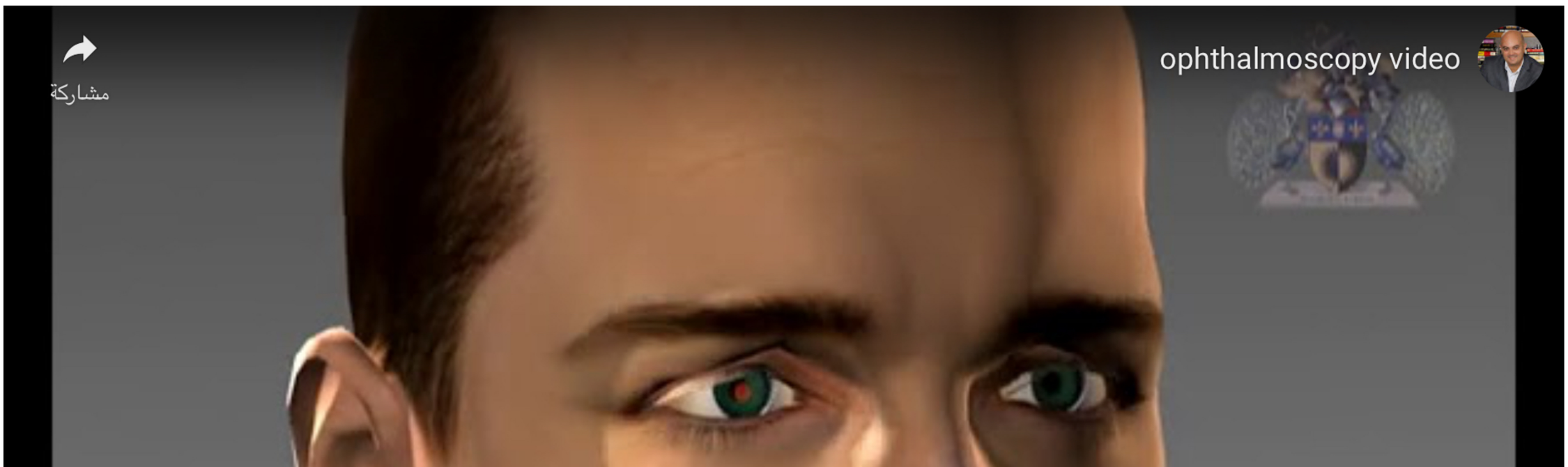
it is important to observe for gaze deviation, limitation of movement, disconjugate gaze, or a combination consistent with cranial nerve palsy, orbital disease, or other abnormalities that restrict movement.

Pupil examination

The size and shape of the pupils are noted, and pupillary reaction to light is tested in each eye, one at a time, while the patient looks in the distance. Then the swinging flashlight test is done with a penlight to compare direct and consensual pupillary response. There are 3 steps:

- One pupil is maximally constricted by being exposed to light from the penlight for 1 to 3 sec.
- The penlight is rapidly moved to the other eye for 1 to 3 sec.
- The light is moved back to the first eye.

The view of the retina is limited with a handheld ophthalmoscope, whereas indirect ophthalmoscopy gives a 3-dimensional view and is better for visualizing the peripheral retina, where retinal detachment most commonly occurs.



Ophthalmoscopy can detect lens or vitreous opacities, assess the optic cup-to-disk ratio, and identify retinal and vascular changes. The optic cup is the central depression, and the optic disk is the entire area of the optic nerve head. The normal ratio of the cup-to-nerve diameters is 0 to 0.4. A ratio of ≥ 0.5 may signify loss of ganglion .cells and may be a sign of glaucoma

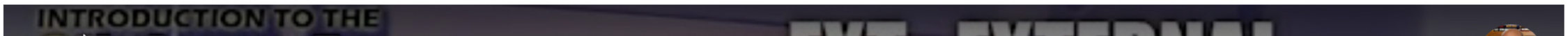
Retinal changes include

- Hemorrhage, manifested as small or large areas of blood
- (Drusen (small subretinal yellow-white spots that may signify dry age-related macular degeneration

Vascular changes include

- Arteriovenous nicking, a sign of chronic hypertension in which retinal veins are compressed by arteries where the two cross
- Silver wiring, a sign of hypertension in which thin, fibrotic arteriolar walls decrease the thickness of the light reflex
- Loss of venous pulsations, a sign of increased intracranial pressure in patients known to have had pulsations

Slit-lamp examination



A slit lamp focuses the height and width of a beam of light for a precise stereoscopic view of the eyelids, conjunctiva, cornea, anterior chamber, iris, lens, and anterior vitreous. With a handheld condensing lens, it can also be used for detailed examination of the retina and macula.

It is especially useful for the following:

- Identifying corneal foreign bodies and abrasions
- Measuring depth of the anterior chamber
- Detecting cells (RBCs or WBCs) and flare (evidence of protein) in the anterior chamber
- Identifying scleral edema, which is seen as a bowing forward of the slit beam when it is focused beneath the conjunctiva and which is usually a sign of scleritis.
- Identifying diseases such as macular degeneration, diabetic eye disease, preretinal membranes, macular (edema, and retinal tears (when using a condensing lens

Tonometry and gonioscopy, which quantifies the iridocorneal angle and requires the use of a special lens, may be done.

Visual field testing

Visual fields may be impaired by lesions anywhere in the neural visual pathways from the optic nerves to the

More detailed methods include the use of a tangent screen, Goldmann perimeter, or computerized automated perimetry (in which the visual field is mapped out in detail based on patient response to a series of flashing lights in different locations controlled by a standardized computer program). The Amsler grid is used to test the central vision.

Distortion of the grid (metamorphopsia) or a missing area (central scotoma) may indicate disease of the macula (eg, choroidal neovascularization), as occurs in age-related macular degeneration.

Visual Field changes an correlation with Eye disease.

Altitudinal field defect	Loss of all or part of the superior or inferior half of the visual field; does not cross the horizontal median	*More common:* Ischemic optic neuropathy, hemibranch retinal artery occlusion, retinal detachment *Less common:* Glaucoma, optic nerve or chiasmal lesion, optic nerve coloboma
Arcuate scotoma	A small, bow-shaped (arcuate) visual field defect	Damage to ganglion cells that feed into a particular part of the optic nerve head

Twelve to 24 Ishihara color plates, which have colored numbers or symbols hidden in a field of colored dots, .are commonly used to test color vision

Color-blind patients or patients with an acquired color deficiency (eg, in optic nerve diseases) cannot see some or all of the hidden numbers. Most congenital color blindness is red-green; most acquired (eg, caused by .glaucoma or optic nerve disease) is blue-yellow

Testing

Tonometry

Tonometry measures intraocular pressure by determining the amount of force needed to indent the cornea. .Handheld pen-type tonometers are used for screening

	Direct Ophthalmoscopy	Indirect ophthalmoscopy
Magnification	About 15 times	times when a +13D condensing lens is used 5
Diameter of the field of observationview	Smaller (about (10^{o} in diameter	(Wider (about 37^{o} in diameter
Brightness	There is relatively low brightness	There is relatively greater brightness
Structures seen	Central retina only	Peripheral retina seen *(by using a scleral depressor in addition to the indirect ophthalmoscopy itself)*
Image of the fundus that is seen	Virtual & erect image	Real & inverted image
Stereopsis	Image formed is not stereoscopic	Binocular indirect ophthalmoscopy provides better stereopsis
Retina anterior to the equator	Not well seen (seen with difficulty)	Seen better

Structures seen	Central retina only	Peripheral retina seen *(by using a scleral depressor in addition to the indirect ophthalmoscopy itself)*
Image of the fundus that is seen	Virtual & erect image	Real & inverted image
Stereopsis	Image formed is not stereoscopic	Binocular indirect ophthalmoscopy provides better stereopsis
Retina anterior to the equator	Not well seen (seen with difficulty)	Seen better
Scleral indentation	Difficult	Can be easily done in binocular indirect ophthalmoscopy
Visualization in hazy media	Poor	Better

good examples of seminars