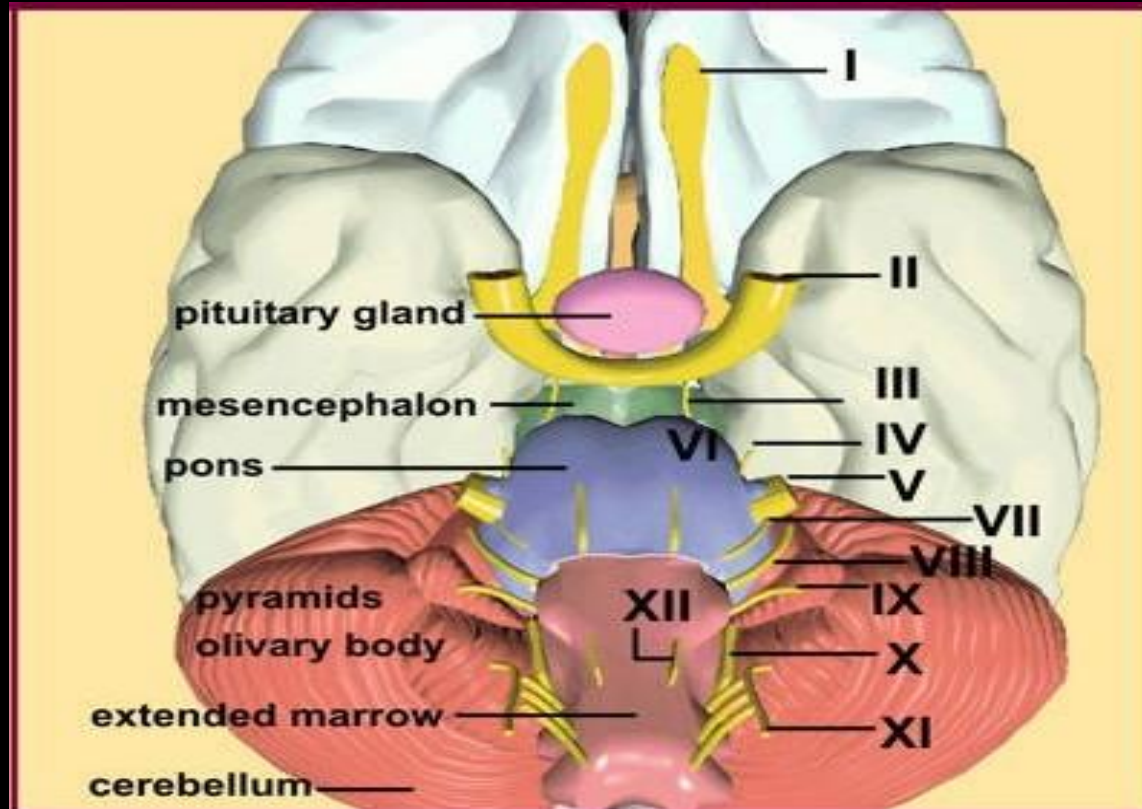

Examination of cranial nerves 1-6
Dr Ajaz Qadir, Sr Medicine

Cranial nerve examination



Cranial nerves

- | | |
|-------|------------------|
| I. | Olfactory |
| II. | Optic |
| III. | Oculomotor |
| IV. | Trochlear |
| V. | Trigeminal |
| VI. | Abducent |
| VII. | Facial |
| VIII. | Auditory |
| IX. | Glossopharyngeal |
| X. | Vagus |
| XI. | Spinal accessory |
| XII. | Hypoglosseal |

Summary of funCtion of Cranial nerveS

Cranial nerves I - VI	Sensory function	Motor function	PS* fibers	Cranial nerves VII - XII	Sensory function	Motor function	PS* fibers
I Olfactory	Yes (smell)	No	No	VII Facial	Yes (taste)	Yes	Yes
II Optic	Yes (vision)	No	No	VIII Vestibulocochlear	Yes (hearing and balance)	No	No
III Oculomotor	No	Yes	Yes	IX Glossopharyngeal	Yes (taste)	Yes	Yes
IV Trochlear	No	Yes	No	X Vagus	Yes (taste)	Yes	Yes
V Trigeminal	Yes (general sensation)	Yes	No	XI Accessory	No	Yes	No
VI Abducens	No	Yes	No	XII Hypoglossal	No	Yes	No

(b) *PS = parasympathetic

FUNCTIONAL TYPES

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graph TD; A[FUNCTIONAL TYPES] --> B[Pure sensory]; A --> C[Pure motor]; A --> D[Mixed nerves]; B --> B1[? Olfactory]; B --> B2[? Optic]; B --> B3[? Auditory]; C --> C1[? Trochlear]; C --> C2[? Abducent]; C --> C3[? Accessory]; C --> C4[? Hypoglosseal]; D --> D1[? Trigeminal]; D --> D2[? Facial]; D --> D3[? Glossopharyngeal]; D --> D4[? Vagus]; D --> D5[? Oculomotor];
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Pure sensory

- ? Olfactory
- ? Optic
- ? Auditory

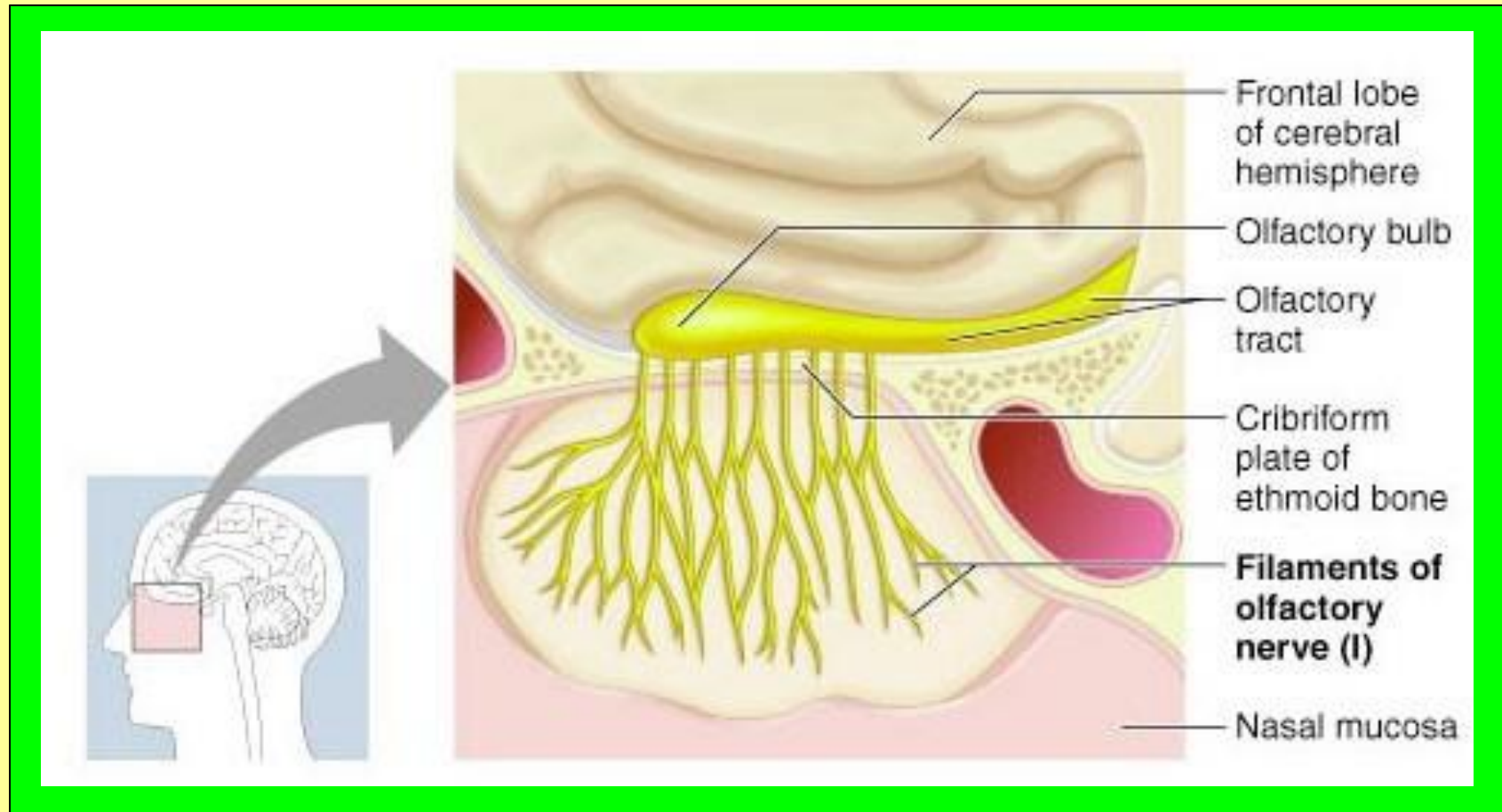
Pure motor

- ? Trochlear
- ? Abducent
- ? Accessory
- ? Hypoglosseal

Mixed nerves

- ? Trigeminal
- ? Facial
- ? Glossopharyngeal
- ? Vagus
- ? Oculomotor

Cranial Nerve I: Olfactory



Function

- Carries the sensation of smell from nasal mucosa to olfactory bulb

Purpose of the test

- To determine any impairment of smell is unilateral or bilateral.
- Whether impairment is due to any local nasal disease or neural lesion.

Method of testing

- Small bottles containing essences of very familiar odour are required
 - Coffee
 - Lemon
 - Chocolate
 - Asafetida etc



PROCEDURE

A woman with brown hair is shown from the chest up, looking towards the camera. She is holding a small white strip of paper near her nose with her right hand. A person wearing a blue nitrile glove is holding the strip of paper near her left nostril. The background is slightly blurred, showing what appears to be a laboratory or clinical setting.

Compress 1 nostril & sniff the taste odour twice

Ask whether he can smell or identify odour

Repeat test on other nostril & ask if smell is similar in both nostril

Allow odour to disperse & repeat test with other 2 test odour, ask he can distinguish smell

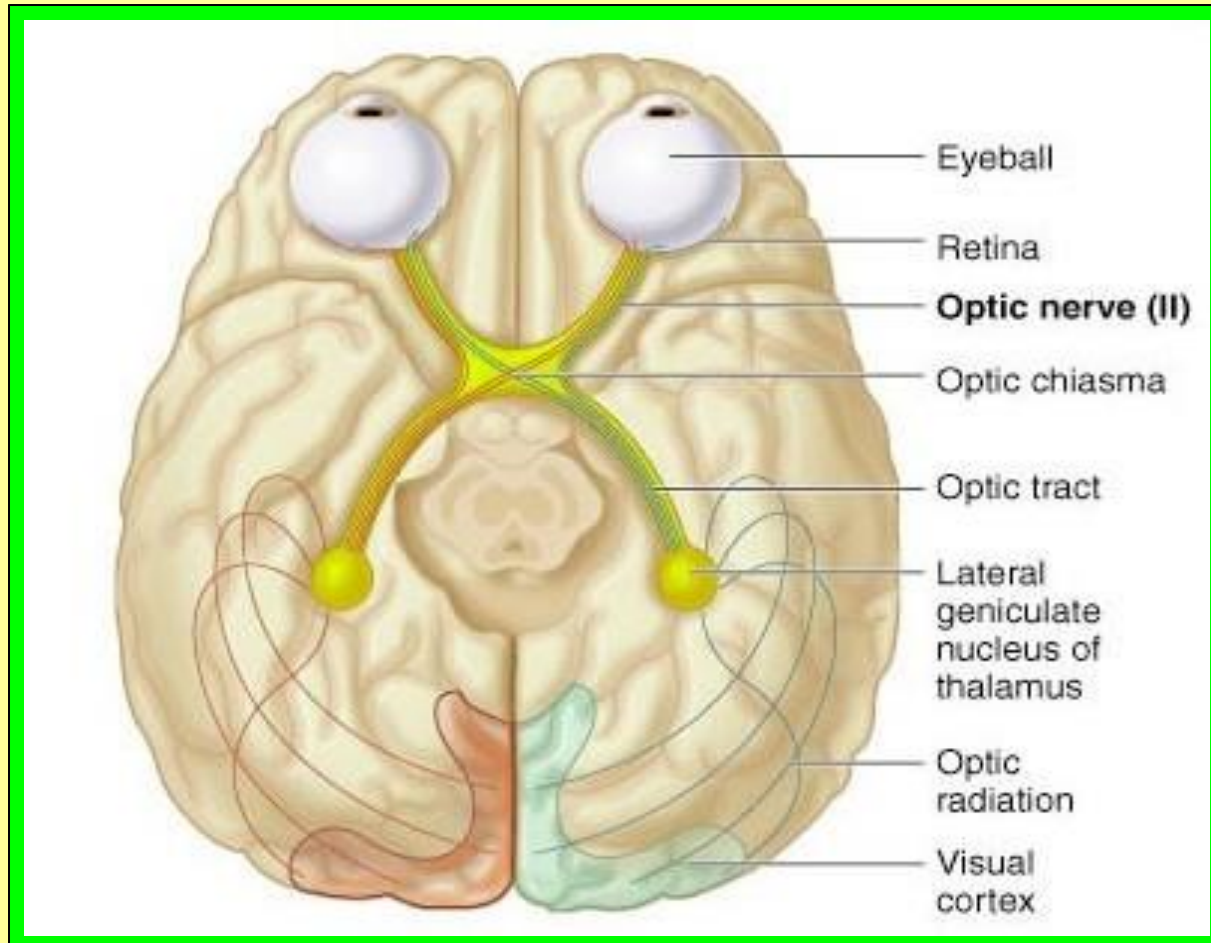
Interpretation of result

- Who can recognize & name odours quickly (females)
- Who can recognize but difficult in naming (males)
- Who can smell & know difference but neither recognize nor naming
 - The above 3 should be accepted as normal
- Who feel each odour is similar but is distorted & unpleasant (parosmia)
- Those who cant smell anything or is much reduced compared to the other (anosmia)
- Those whose responses are vague & variable

Common causes of anosmia

- Acute/chronic inflammatory nasal disease
- Heavy smoking
- **Head injury**
- **Intra cranial tumour compressing the olfactory bulb**
- **Atrophy of olfactory bulb**
- **Chronic meningeal inflammation**
- **Parkinson's disease**

Cranial Nerve II: Optic



Function

- Carries the visual impulses from the retina to the optic chiasma & in the optic tract to the lateral geniculate body
- The impulse acts as an afferent pathway for the pupillary light reflex

Purpose of the test

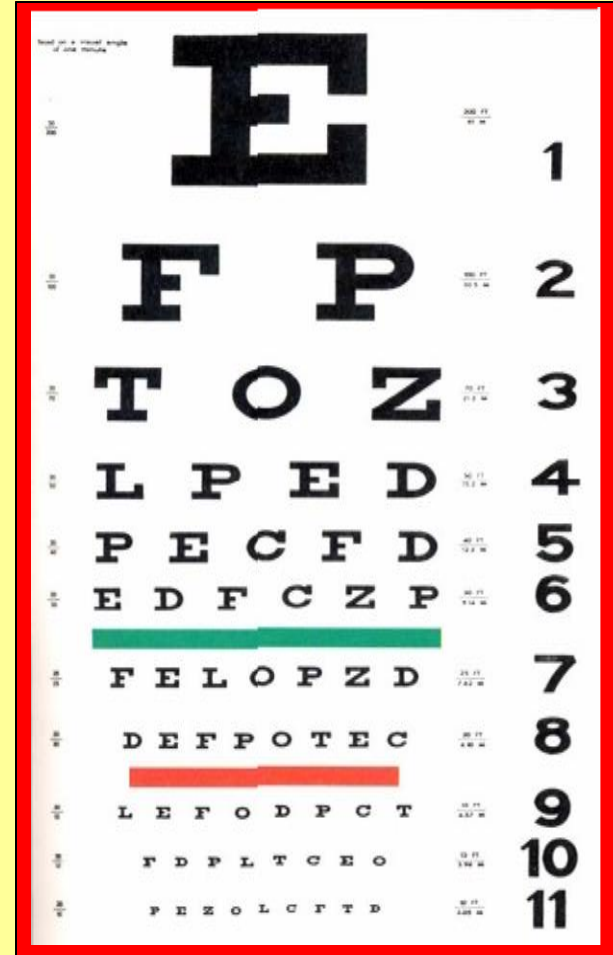
- To measure acuity of vision & determine if any disease is due to local ocular disease or neural impairment
- To chart the visual field

Method of testing

Visual acuity

- The standard snellen's chart can be used for vision & the Jaeger type card can be used for near vision

[the commonest causes of visual error lies in the eye only]



Visual field

➤ Purpose:

- To chart periphery of visual field
- To detect position, size & shape of the blind spot

Confrontation test

Pt & examiner sit face to face



Pt covers left eye & examiner right



PT moves the test object from outside the visual field towards midline



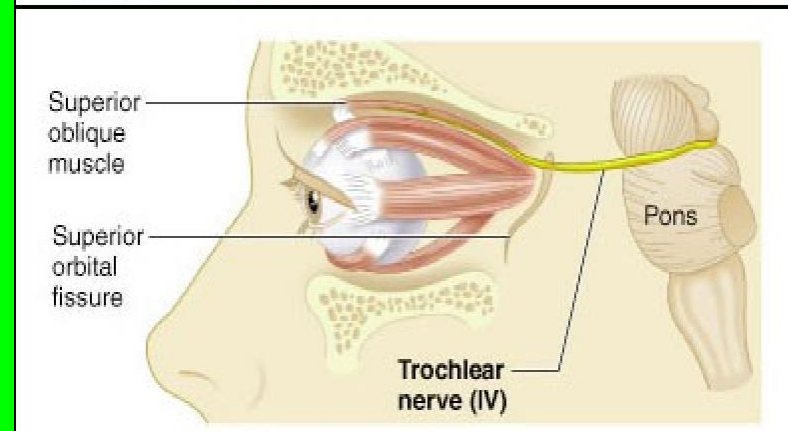
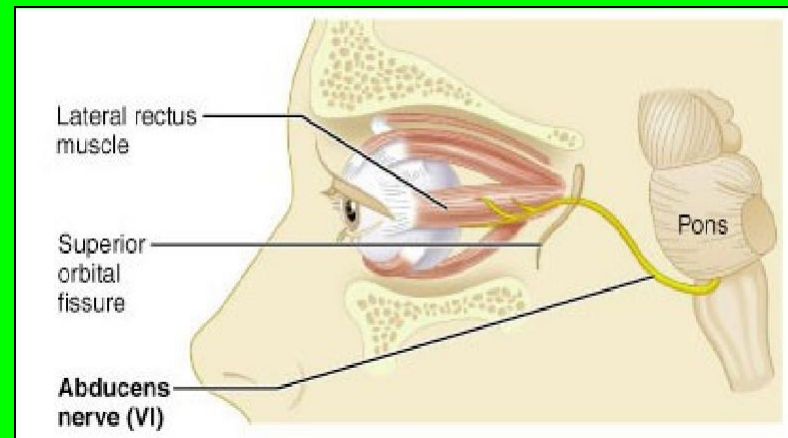
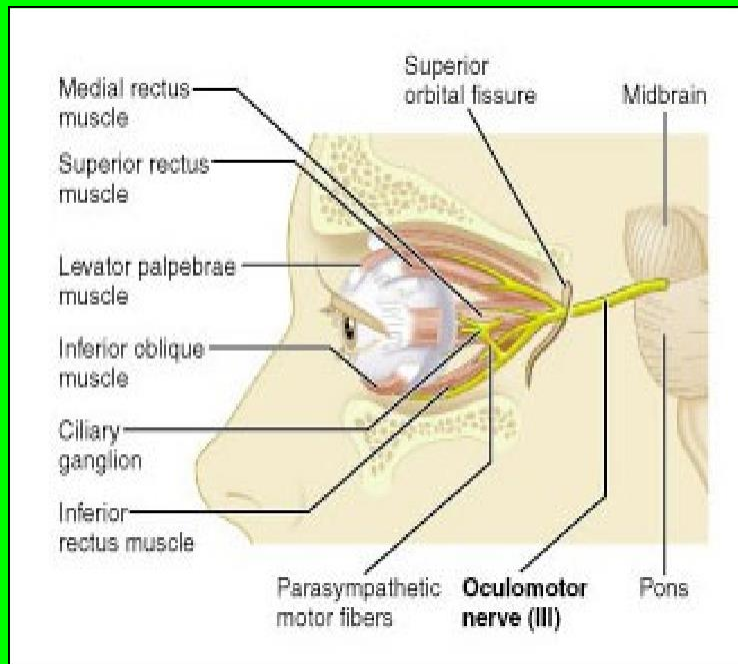
Instruct Pt to indicate appearance of the object



Common causes

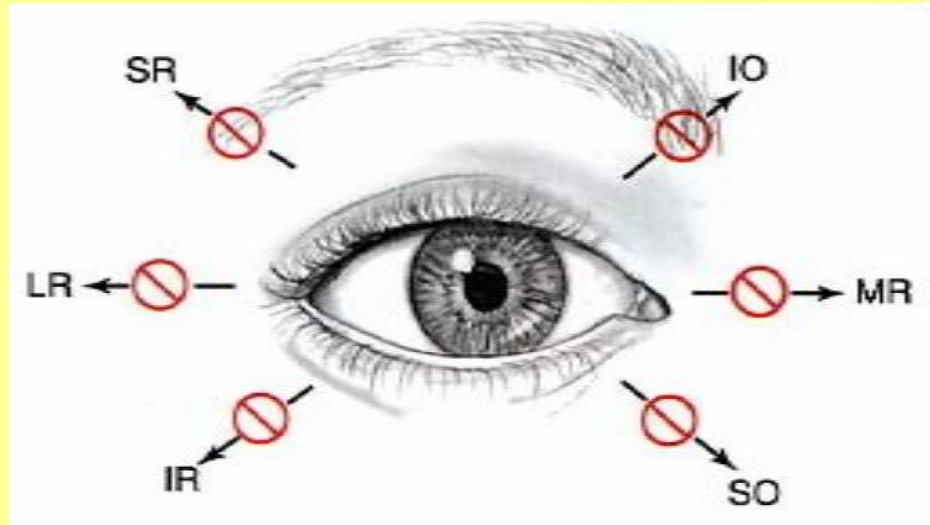
- Total unilateral loss of vision: optic nerve lesion
- Homonymous hemianopia: lesion between optic tract to occipital cortex
- Bitemporal hemianopia: lesion of optic chiasma

Occulomotor, Trochlear, Abducent



Function

- Controls the external ocular muscles & elevators of the lids
- Also regulates the pupillary muscles



Purpose of the test

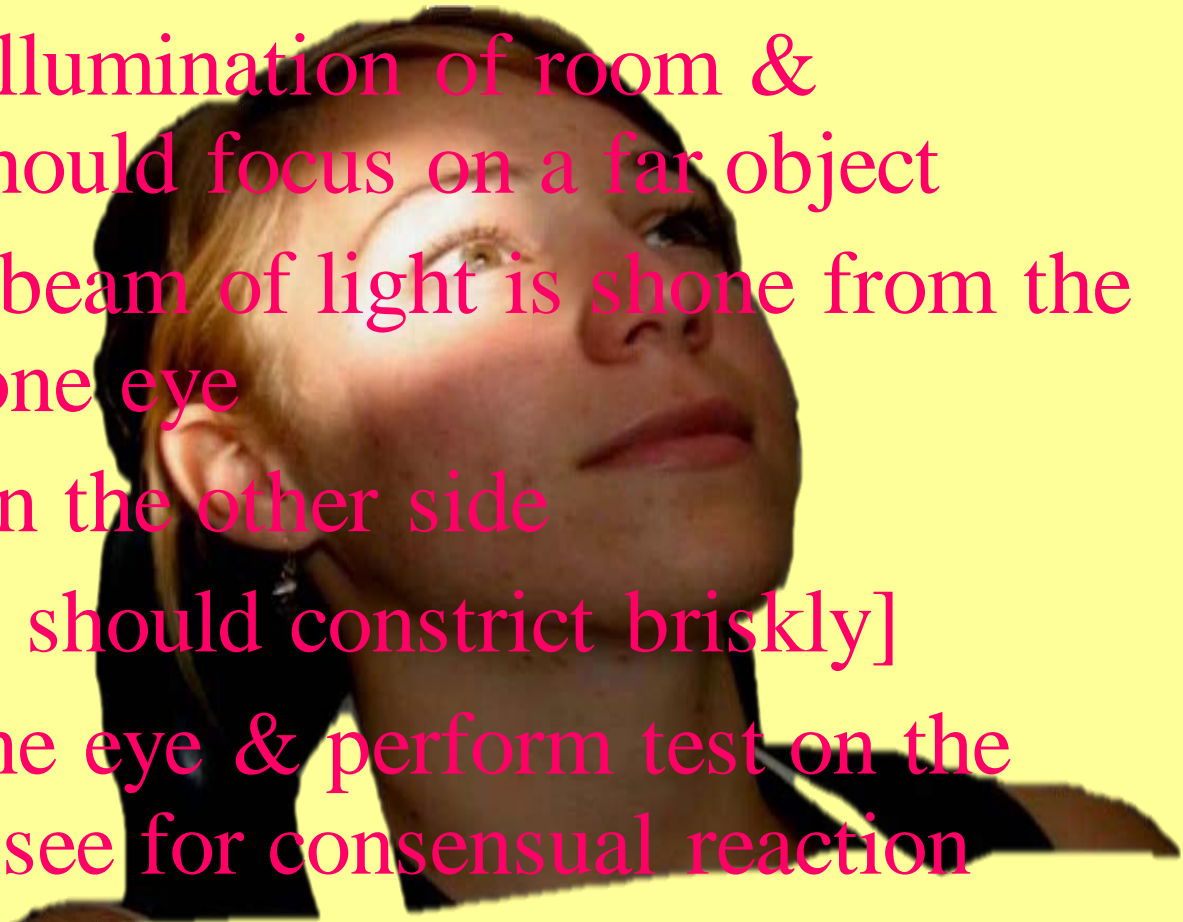
- Inspect pupils to rule out a local disease, peripheral lesion or a nuclear involvement
- Examine eye movement & determine if defects is muscular origin or neural involvement
- To detect nystagmus

Method of testing

- Observation
 - Presence & absence of ptosis & squint
 - Whether unilateral or bilateral
 - Constant or variable
 - Size, shape, equality & regularity of the pupils

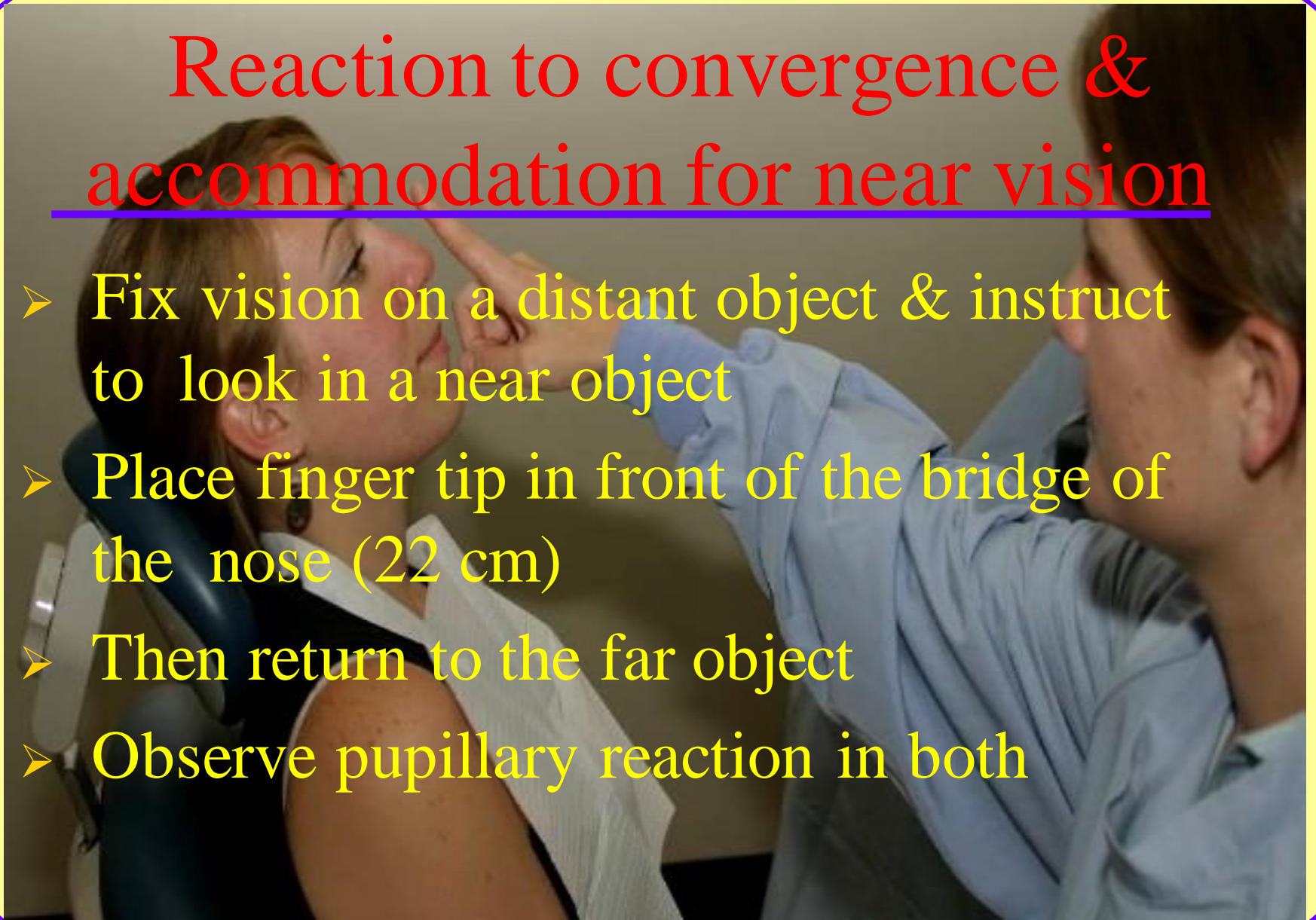
Reaction to light

- Reduce illumination of room & vision should focus on a far object
- A bright beam of light is shone from the side of one eye
- Repeat on the other side
[the pupil should constrict briskly]
- Shield one eye & perform test on the other & see for consensual reaction



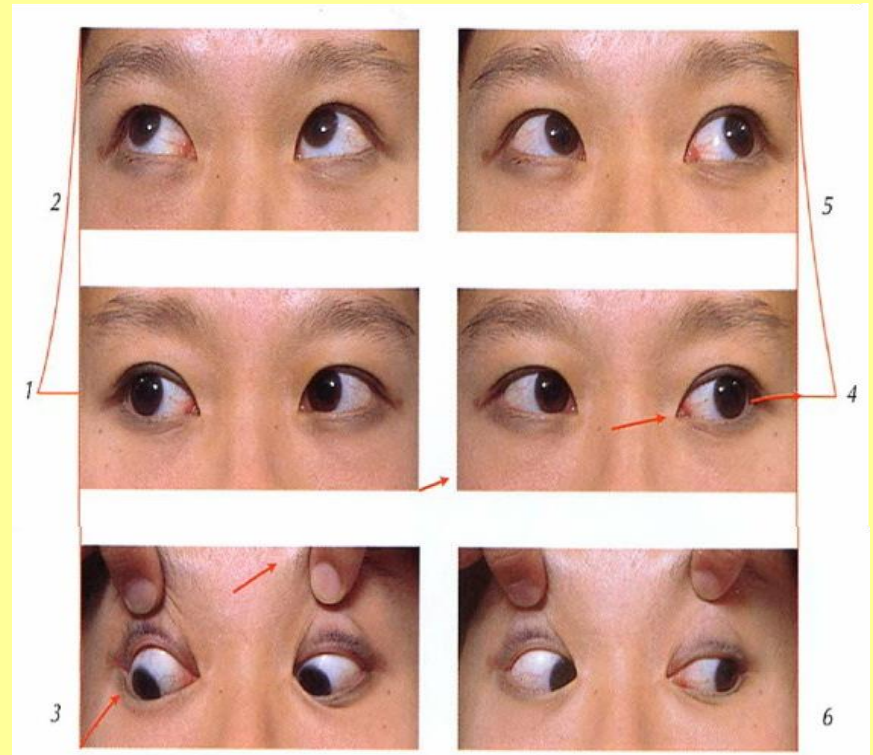
Reaction to convergence & accommodation for near vision

- Fix vision on a distant object & instruct to look in a near object
- Place finger tip in front of the bridge of the nose (22 cm)
- Then return to the far object
- Observe pupillary reaction in both



Examination of ocular movement

- Observe lagging of one or both eye
 - Observe nystagmus



Analysis of diplopia

- Shield one eye with a transparent red shield
- Object is moved from left to right, up & down
- Ask if -
 - He sees 1 or 2 object
 - Object lies one above the other or side by side

Rules governing analysis of diplopia

- Separation of image is greatest in the direction in which the weak muscle has its purest action
- False image is displaced farthest in the direction in which the weak muscle should move the eye

Analyzing nystagmus

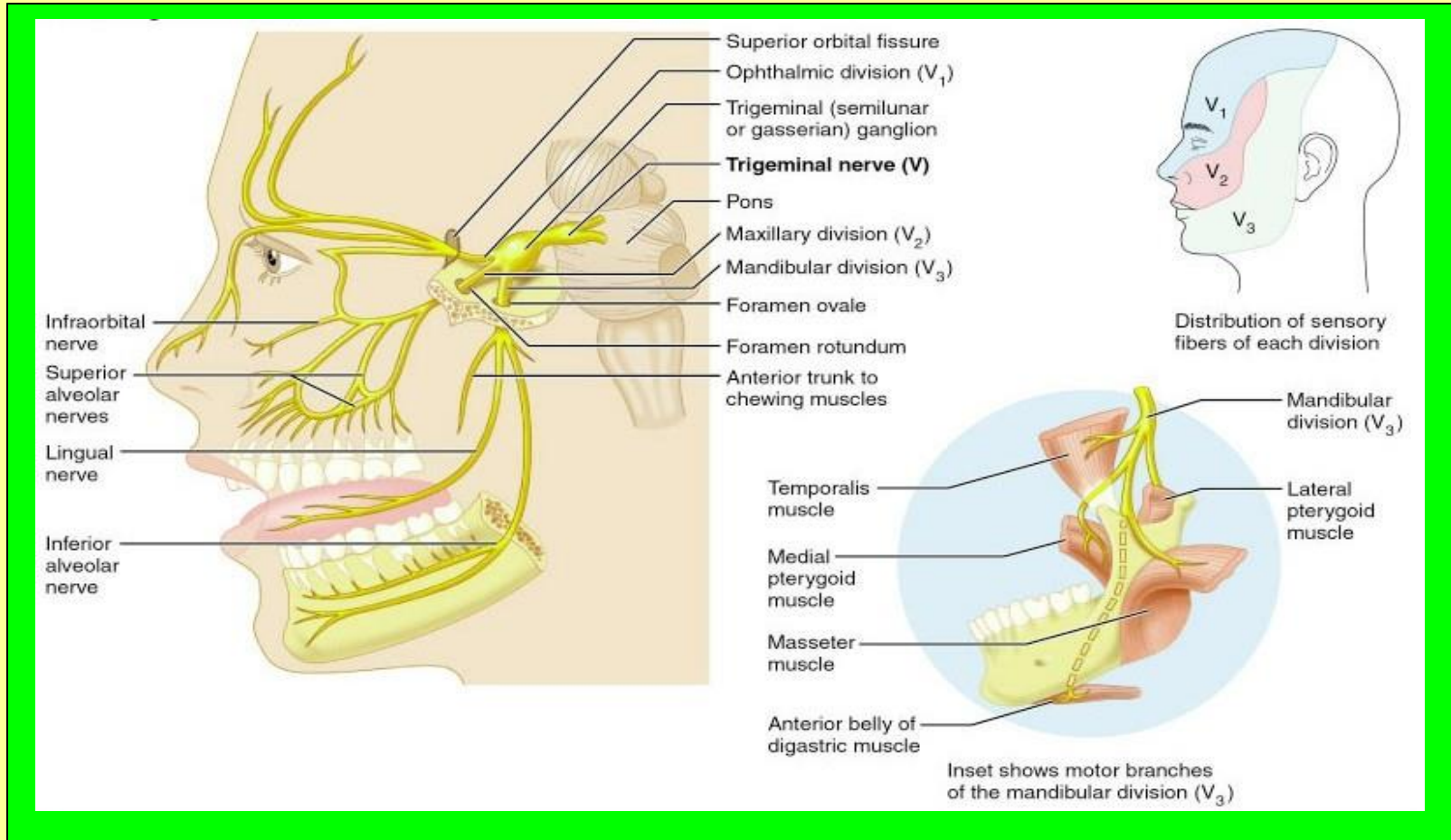
- Watch the patients eye while talking
- Ask to look at a definite point & move the point from left to right & up to down
- Hold each end position for 5 sec & assess nystagmus (direction, rate amplitude)

Common causes of paralysis

- Pontine lesions
- Neoplasms
- Vascular accidents
- Demyelinating disease
- Meningeal inflammation
- Tumour of base of skull
- Increased intra cranial pressure
- Head injury

[Total paralysis of III, IV & VI nerve indicates a lesion in cavernous sinus (carotid aneurism)]

Cranial Nerve V: Trigeminal



Function

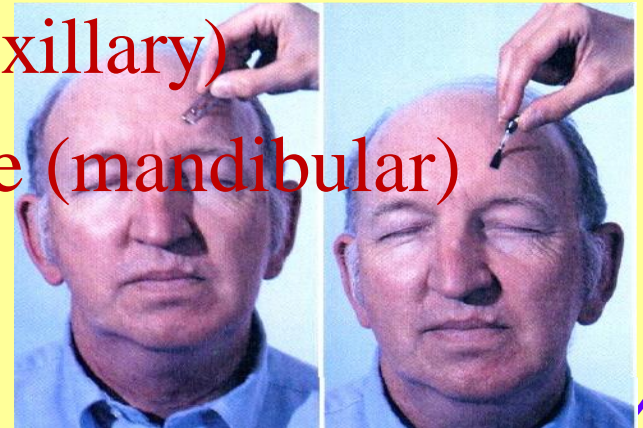
- Carries all forms of sensation from the face, anterior scalp, eye & the anterior 3rd of the tongue
- Also supplies the muscles of mastication

Purpose of the test

- To determine any sensory impairment
- To determine unilateral or bilateral motor weakness & determine UMN from LMN

Method of examination

- Superficial sensory asst from mainly 6 areas (mainly light touch & pain)
 - Forehead & upper part of the side of nose (ophthalmic)
 - Malar & upper lip region (maxillary)
 - Chin & anterior part of tongue (mandibular)



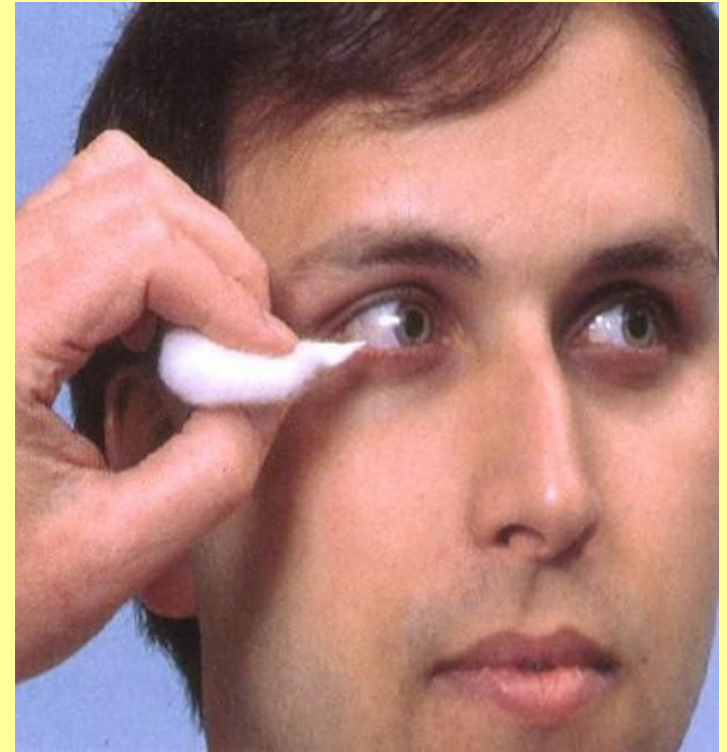
Interpretation

- Total loss of sensation: lesion of ganglion or sensory root
- Total sensory loss over 1 division: partial lesion of ganglion or root
- Touch only lost: pontine lesion affecting sensory nucleus
- Pain & temp lost: dissociate anesthesia (seringobulbia)

Corneal reflex

- Using a cotton piece the cornea is teased
- Normal response is a bilateral blink

(facial nerve forms the efferent loop of the reflex arc)

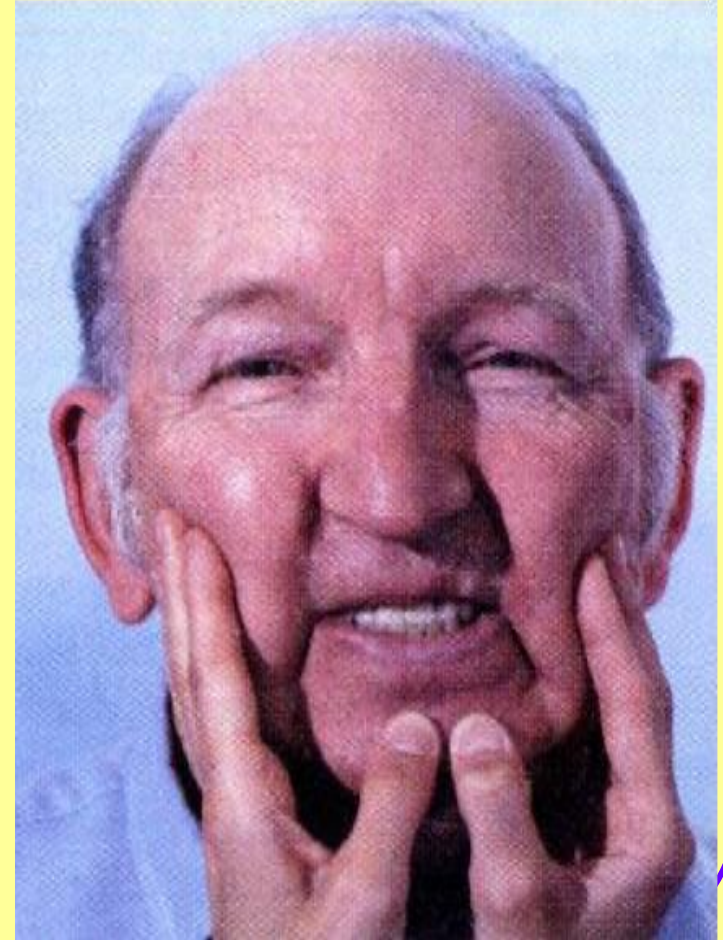


Interpretation

- No closure: ophthalmic division of the facial nerve
- No response in either lid when abn. is tested & bilateral blink when normal is tested: V nerve lesion
- No response of the affected side whichever side is tested: VII nerve lesion

Motor assessment

- Muscles of mastication
- Have Pt bite against resistance
- Have Pt protrude mandible against resistance
- Have Pt go into lateral excursive movts against resistance
- Jaw jerk



Common causes

- Tumours of base of skull
- Chronic meningeal lesion
- Trigeminal sensory neuropathy
- Acoustic neuroma
- Syringomyelia
- Multiple sclerosis