

# An Illustrated Guide For Cranial Nerve Examination

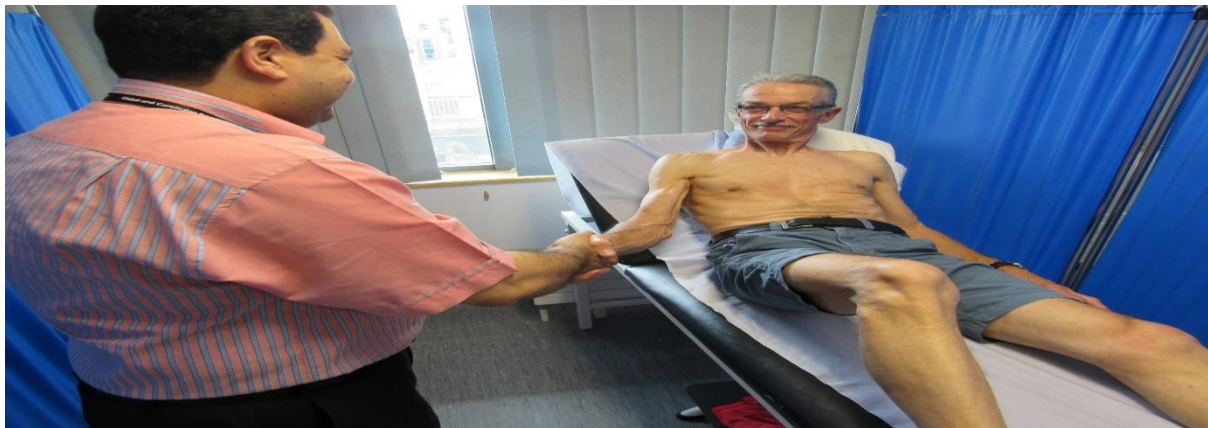
Bedside Teaching for 2<sup>nd</sup> year medical Students



**Prepared by:**  
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**Clinical Teacher (Hon)**  
**November 2016**

**Before Examination :**

- Wash hands
- Introduce yourself
- Confirm patient details – *name / DOB*
- Explain the examination
- Gain consent
- Ask patient if they have pain anywhere before you begin!



**Cranial Nerves**

Number	S/M/B	Name	Location	Function
CN-I	S	<b>Olfactory</b>	Telencephalon	Smell - Special Sense
CN-II	S	<b>Optic</b>	Diencephalon	Vision - Special Sense
CN-III	M	<b>Oculomotor</b>	Midbrain	Most eye movement (up/down/pupil)
CN-IV	M	<b>Trochlear</b>	Midbrain	Some eye movement (superior/oblique)
CN-V	B	<b>Trigeminal</b>	Pons	Facial Sensory and muscles of mastication
CN-VI	M	<b>Abducent</b>	Pons/Medulla junction	Some eye muscle movement (outward)
CN-VII	B	<b>Facial</b>	Pons/Medulla junction	Motor and Intermediate nerve
CN-VIII	S	<b>Vestibulocochlear</b>	Pons/Medulla junction	Hearing - Special Sense
CN-IX	B	<b>Glossopharyngeal</b>	Medulla	Mixed- M, S and Special Sense
CN-X	B	<b>Vagus</b>	Medulla	Mixed - M, S and Special Sense
CN-XI	M	<b>Spinal Accessory</b>	Superior Spinal Cord	Neck muscles movement
CN-XII	M	<b>Hypoglossal</b>	Brainstem/Medulla	Tongue muscles movement

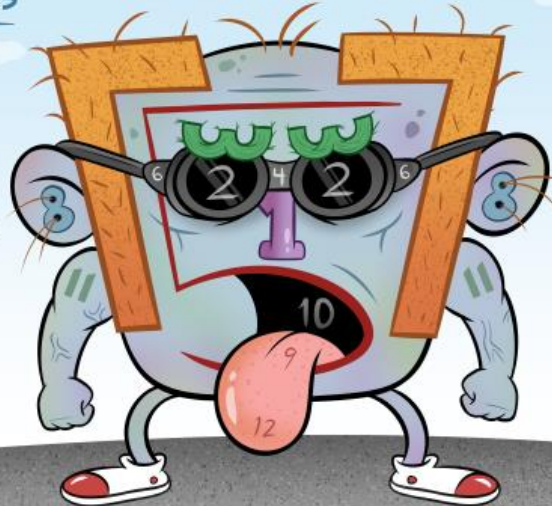
**S= sensory**

**M= Motor**

**B= Both**

## CRANIAL NERVES

1. OLFACTORY
2. OPTIC
3. OCULOMOTOR
4. TROCHLEAR
5. TRIGEMINAL
6. ABDUCENS

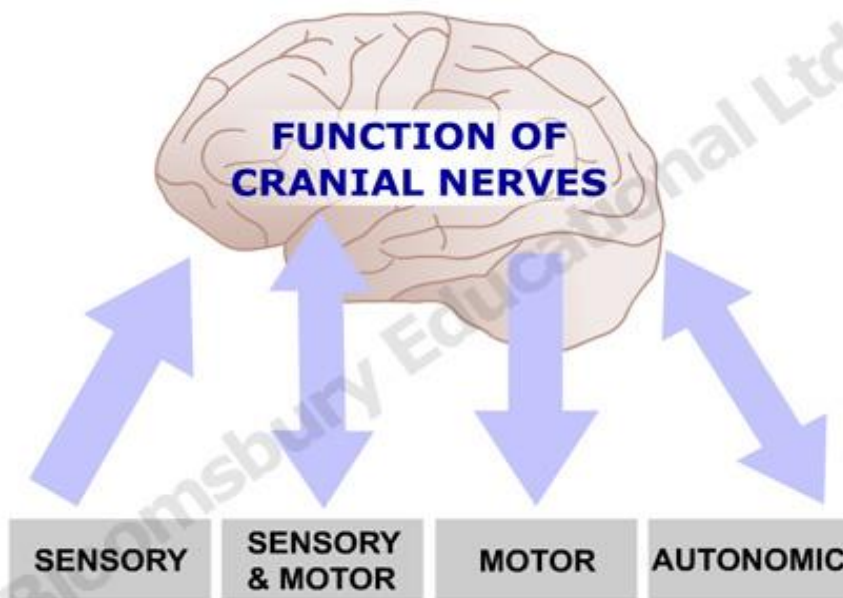


7. FACIAL
8. ACOUSTIC
9. GLOSSOPHARYNGEAL
10. VAGUS
11. ACCESSORY
12. HYPOGLOSSAL

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## FUNCTION OF CRANIAL NERVES



Pascalis Spyrou



## Reminders



### Remember

Cranial Nerves formed of sensory fibres only are CN 1 (Olfactory), 2 (Optic), & 8 (Vestibulo-cochlear) (remember FIAT 128)

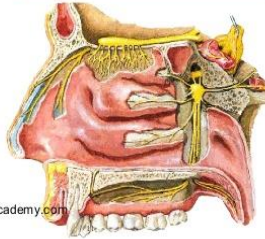
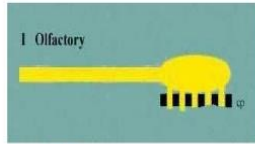


Remember : Cranial nerves which contains parasympathetic fibres are : 3 (Oculomotor), 7 (Facial), 9 (Glossopharyngeal) & 10 (Vagus) (Remember 1973)

**(I) Olfactory = smelling**

**OLFACTORY NERVE**

- It is the first cranial nerve and nerve of smell and form first order neuron of olfactory pathway.
- **Type** → Special Sensory type.
- **Origin** → From olfactory epithelium in the olfactory region of nasal cavity (superior nasal concha and opposed part of nasal septum).



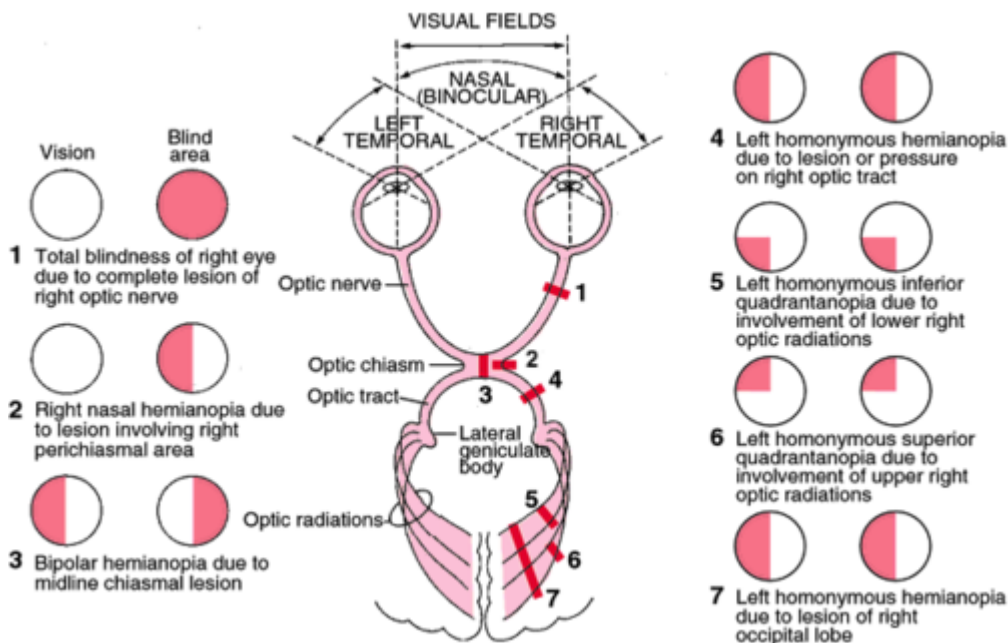
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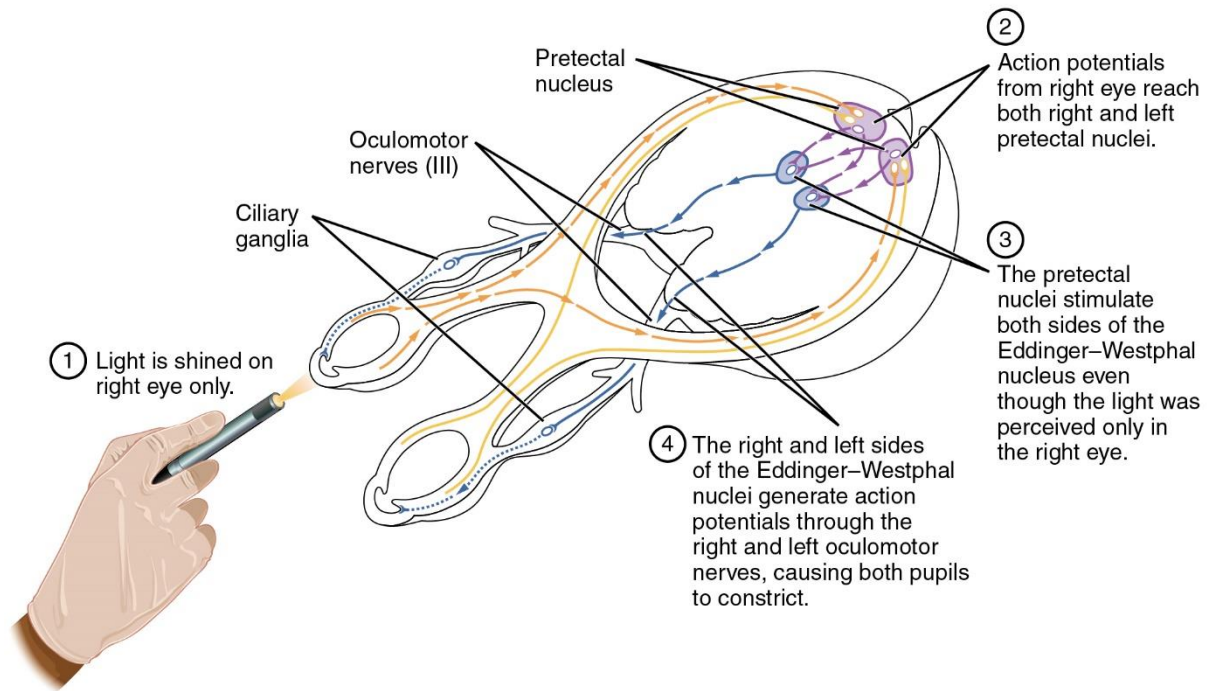
Use familial, non irritant substance (e.g. coffee ground) and test each nostril alone

**PS : Irritant substance will test pain fibres= Trigeminal not olfactory**

**(II) Optic Nerve:**



## Light Reflex



Test:

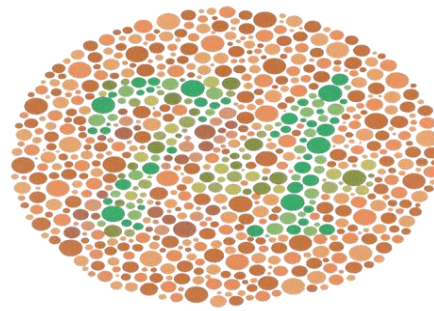
### A) Visual Acuity :

<b>E</b>	1	20/200
<b>F P</b>	2	20/100
<b>T O Z</b>	3	20/70
<b>L P E D</b>	4	20/50
<b>P E C F D</b>	5	20/40
<b>E D F C Z P</b>	6	20/30
<b>F E L O P Z D</b>	7	20/25
<b>D E F P O T E C</b>	8	20/20
<b>L E F O D P C T</b>	9	
<b>F D P L T C H O</b>	10	
<b>P E Z O L O P T D</b>	11	

**Snellen chart to assess visual acuity**

## B) Colour Vision:

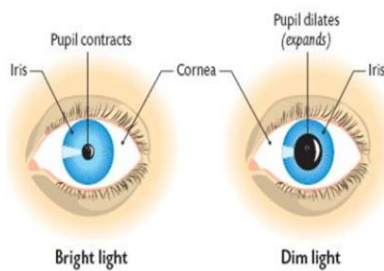
Ishihara plate to test vision



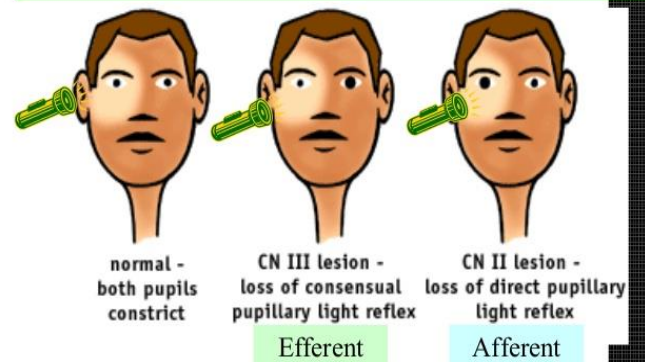
colour

## C) Light reflex:

### Pupillary Light Reflex

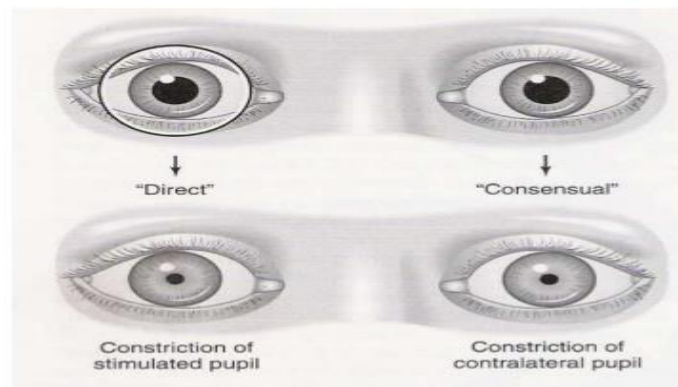


### Pupillary Reflex



Consensual reflex

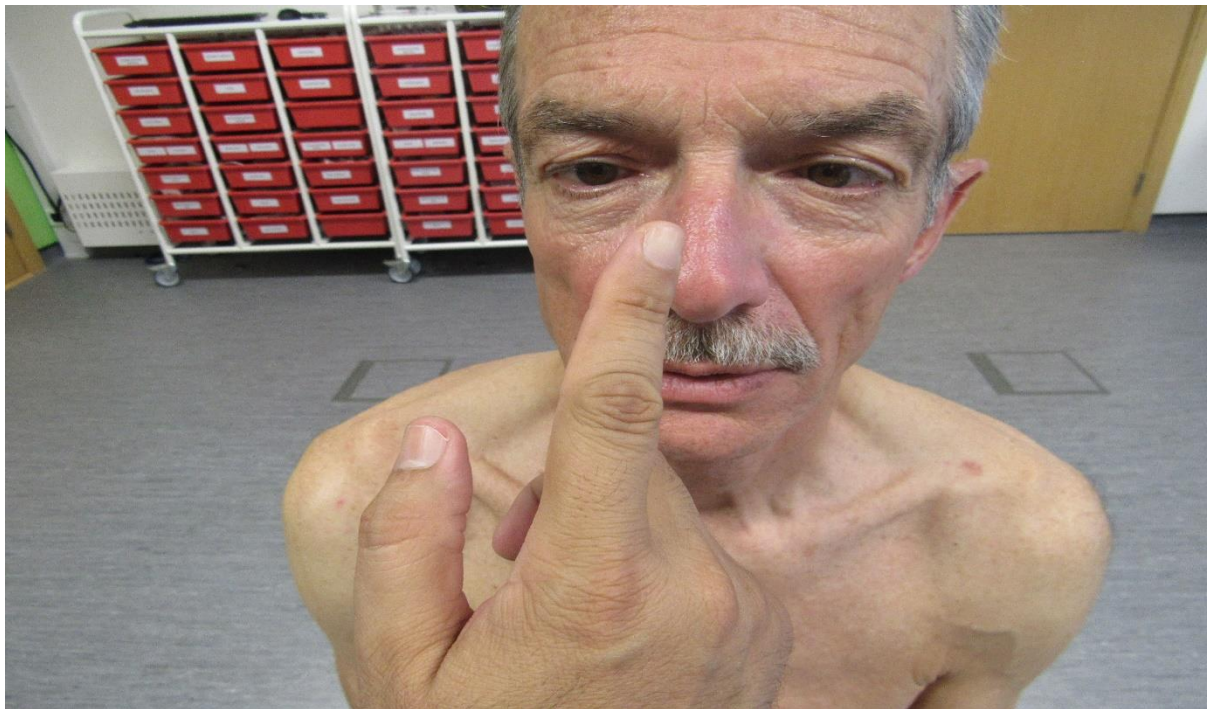
## Pupillary Light reflex



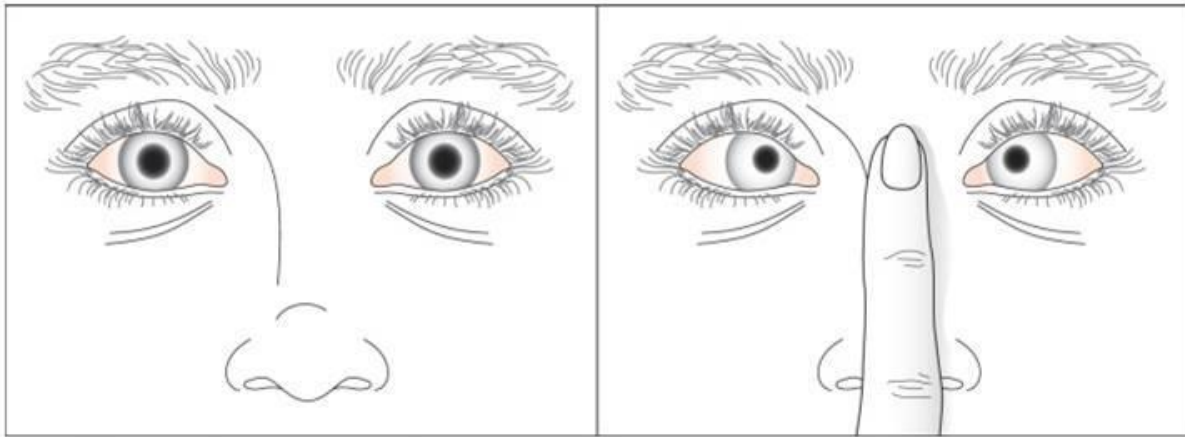




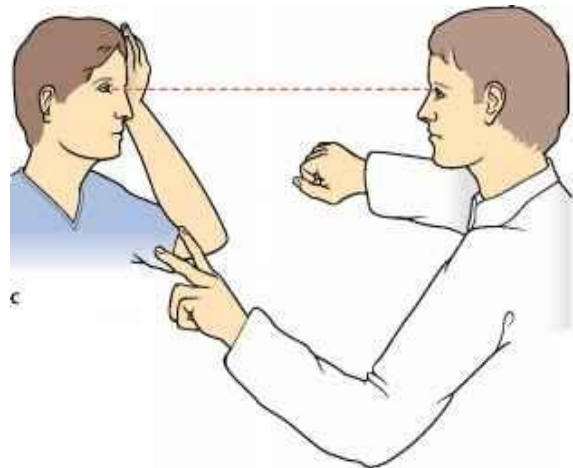
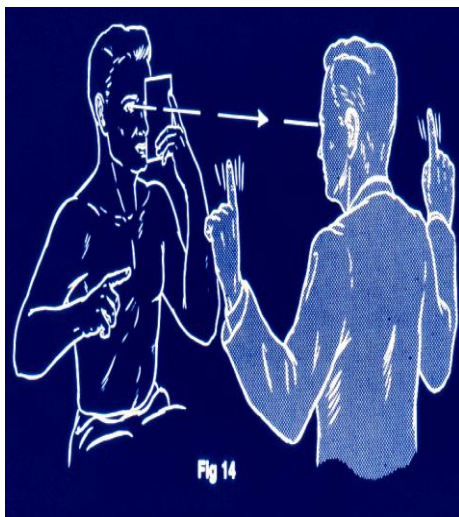
**D)Accomodation Reflex:**







### E) Visual Field: Confrontation Test

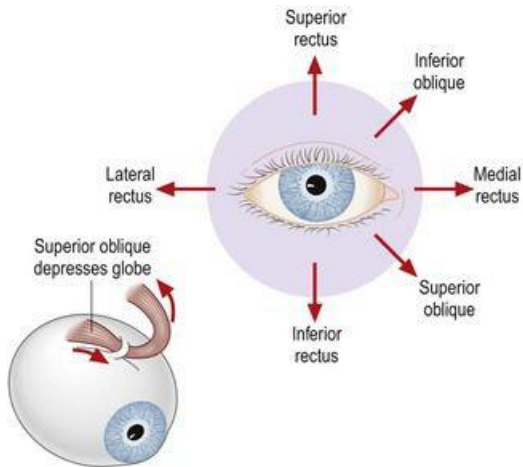




**F) Fundus Examination:**

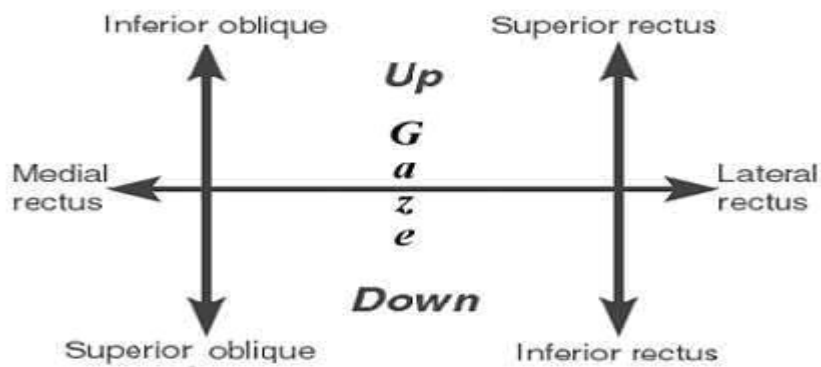


### (III,IV&VI) Oculomotor, Trochlear and Abducent



**FIGURE** Actions of the muscles controlling eye movements (insert: action of superior oblique)

**Assess eye movement in different directions :test each eye alone and both eyes together**









**Right third-nerve palsy – neutral gaze.**



**Left third nerve palsy**



Right sixth-nerve palsy:

(A) primary position



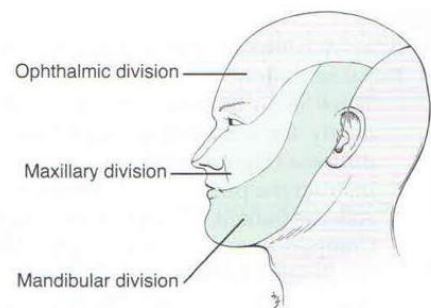
(B) looking left



(C) looking right

## (V)Trigeminal

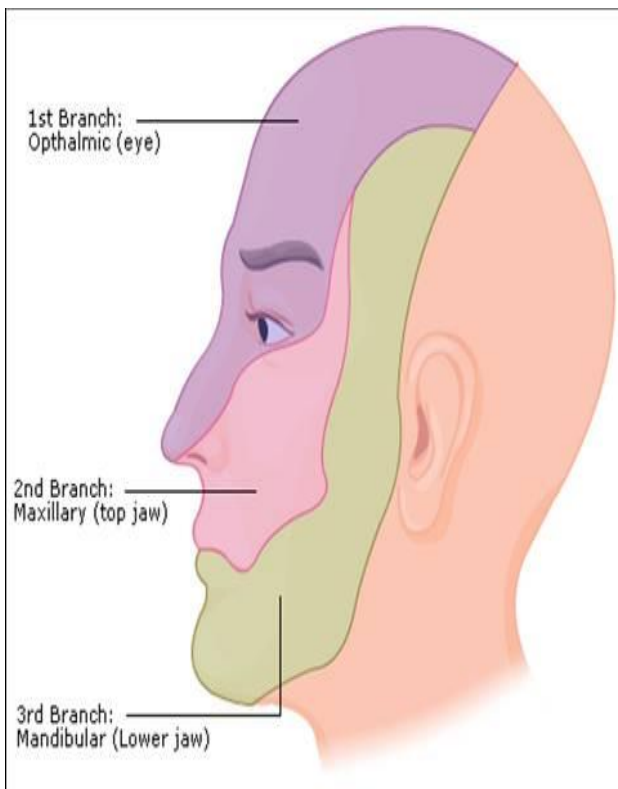
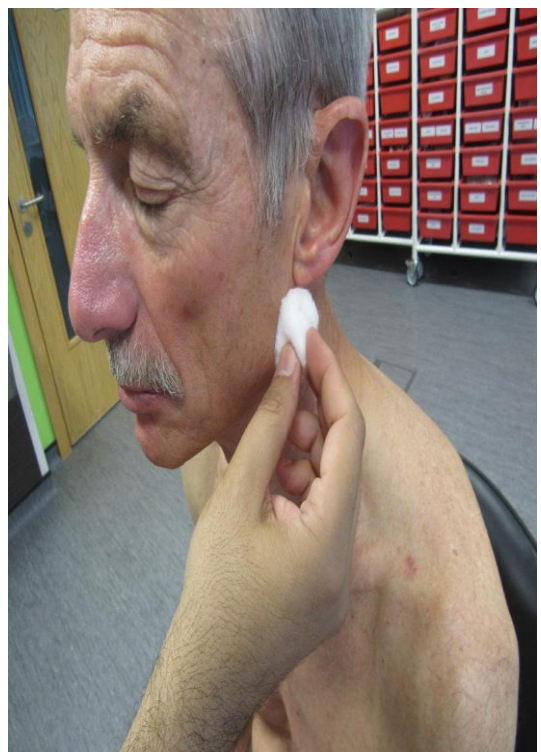
**Figure** Divisions of trigeminal nerve sensory branches: ophthalmic division (V1), maxillary division (V2), and mandibular division (V3). (From Swartz MH. *Textbook of Physical Diagnosis: History and Examination*. 6th ed. Philadelphia: Elsevier; 2010 [p. 656, Figure 22-10].)



**PS: Sensation over angle of mandible is supplied by C2 not Trigeminal nerve**



## I. Sensory part



### Compare

- Both Sides**
- Inner & outer face**
- Each division**

**Method : Cotton wool touch sensation (using cotton piece) & pain sensation (using a pin) over 3 divisions – ask patient to close eyes, check for symmetry , check both centre and periphery of the face.**



## II. Motor part

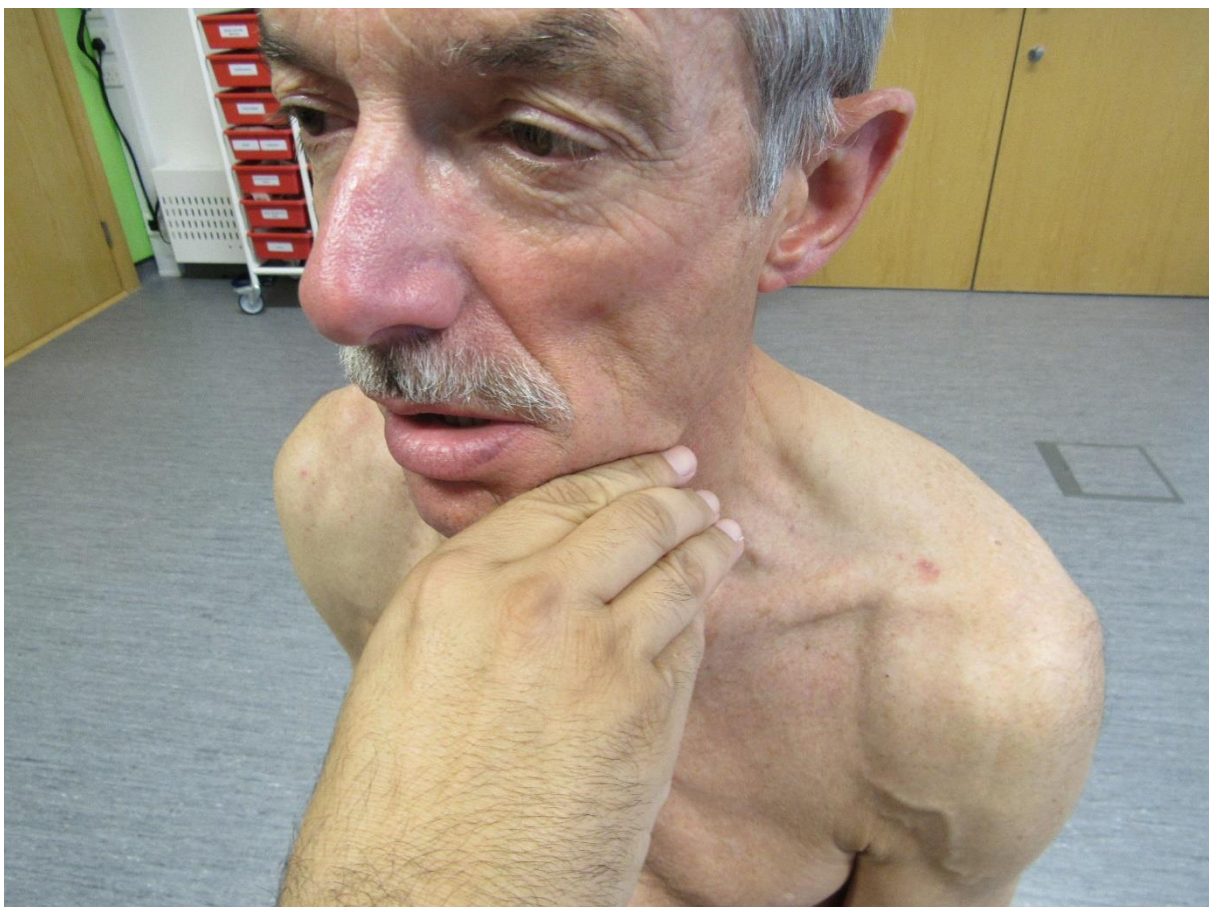
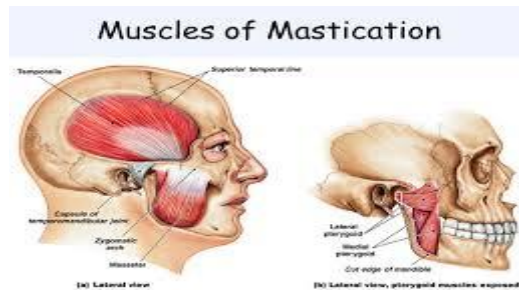
**Figure** Technique for examination of the trigeminal nerve motor function. (From Seidel HM, Ball JW, Dains JE, et al. *Mosby's Guide to Physical Examination*. 6th ed. St. Louis: Mosby; 2006 [p. 777, Figure 22-12].)



- Temporalis muscle : clench teeth + palpate muscle
- Masseters : clench teeth + palpate muscle, holding its ant. & post. Borers.



- Pterygoids: Fixed head ; open mouth + open mouth against resistance to test tone

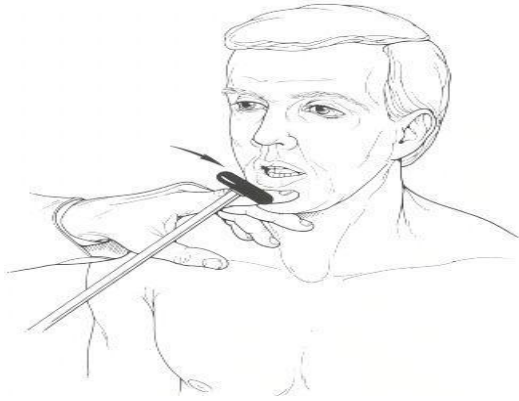


**In Unilateral pterygoid paralysis :** The jaw is deviated to the diseased side

**In Bilateral pterygoid paralysis :** inability to open mouth



### III. REFLEXES : Jaw reflex and Corneal reflex



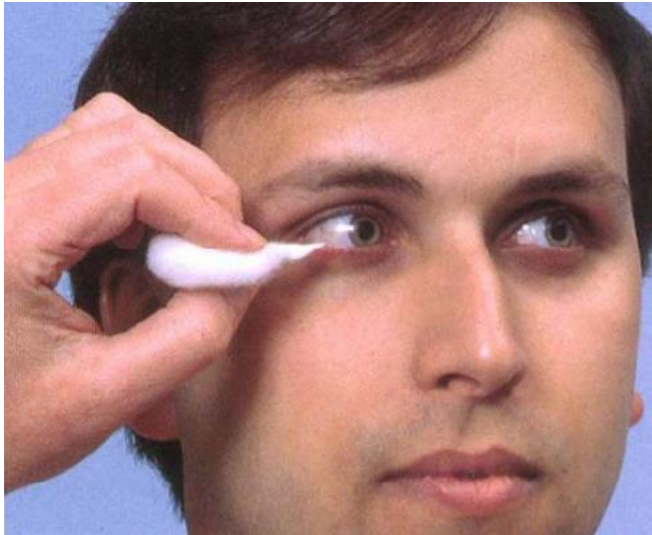
#### Jaw Reflex

Exaggerated in bilateral Upper Motor Neurone Lesion (UMNL) above level of pons

Afferent: Trigeminal nerve

Efferent : Trigeminal nerve

#### Corneal Reflex



Afferent: Trigeminal nerve

Efferent : Facial Nerve

Remember:

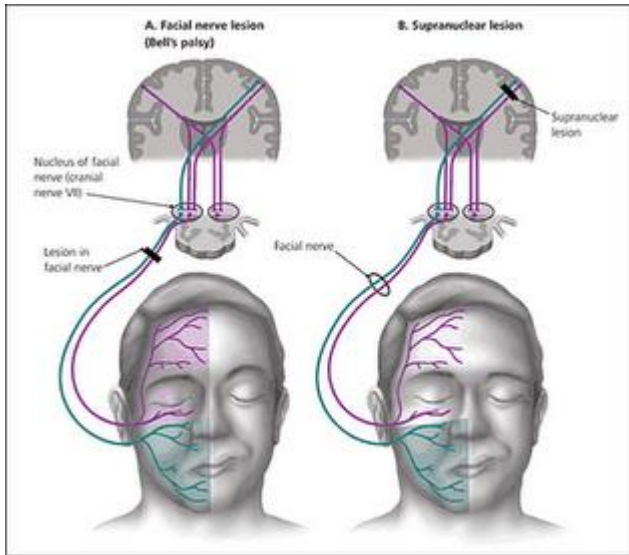
Jaw reflex(5/5)

Corneal Reflex (5/7)

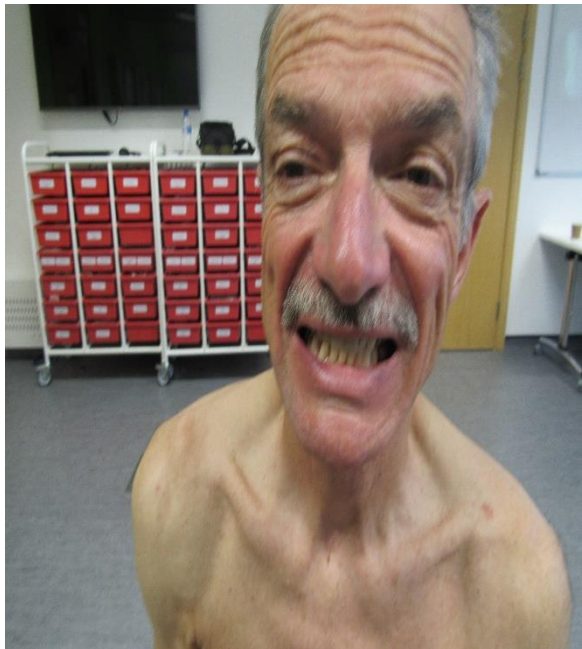
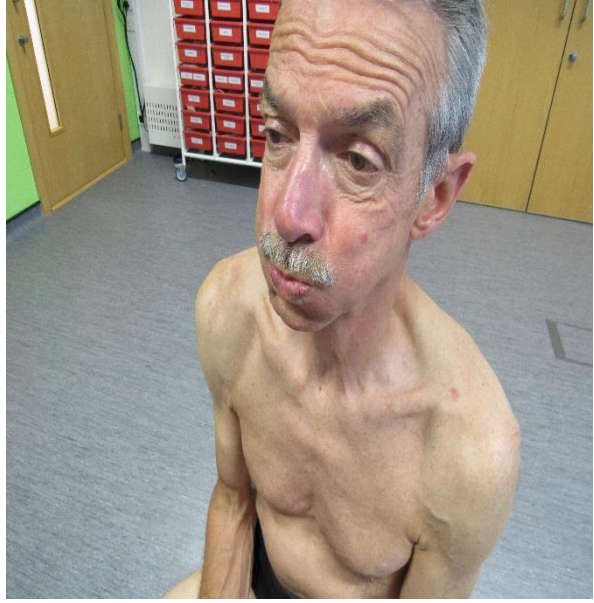
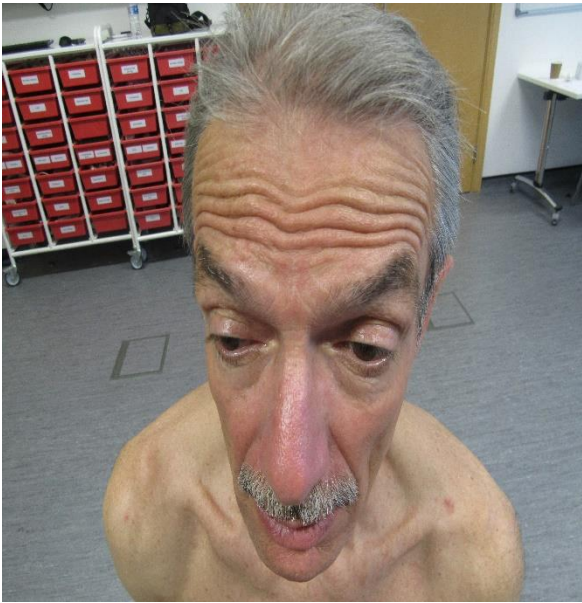
#### (VII )Facial Nerve:

Observe face for asymmetry/ involuntary movements

Wrinkle forehead/Bare teeth/screw eyes shut tight/blow out cheeks

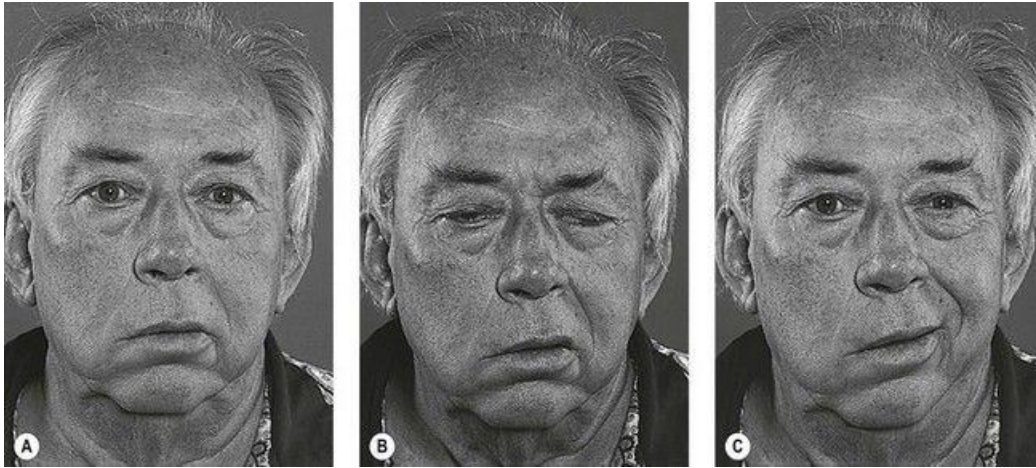


Remember upper half of face innervated by both cerebral hemispheres so if upper motor neurone lesion can still wrinkle forehead



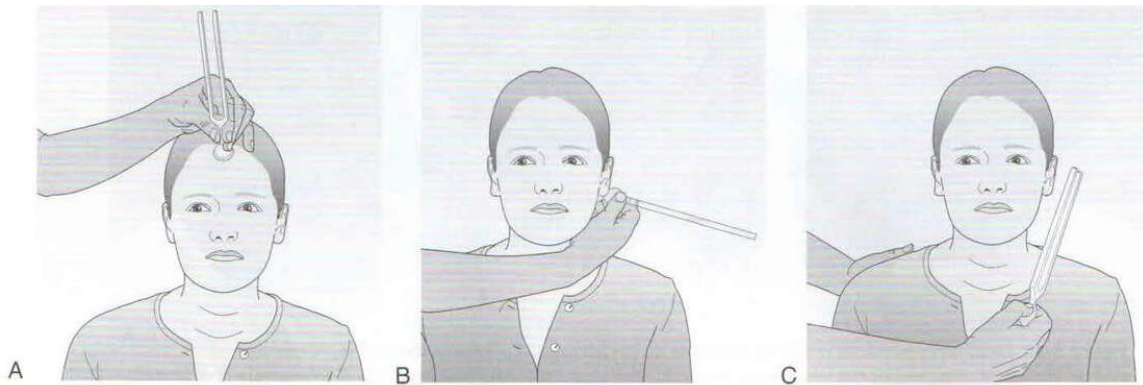
**Facial Nerve Examination :** **Upper left :** Raise your eye brow (you will see frontal corrugation due to action of frontalis muscle). **Upper right :** Puff out your cheeks and do not let me push the air out. **Lower left :** Smile and show me your teeth. **Lower right :** Close your eyes as tight as you can, and do not let me open them.



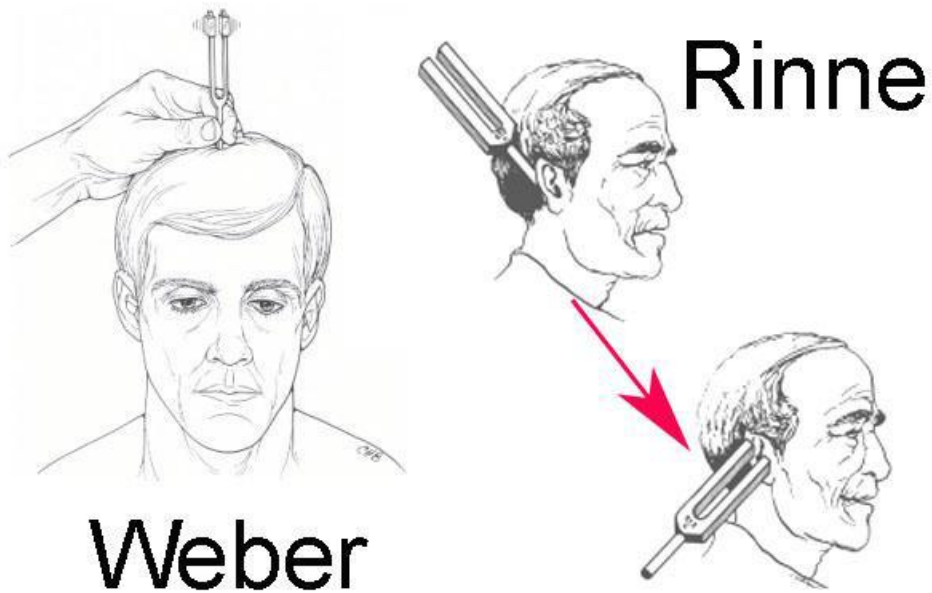


Facial nerve palsy: (A) at rest (B) closing eyes (C) smiling.

**(VIII )Vestibulocochlear**



**Figure** Weber test for lateralization (A) and Rinne test for bone conduction (B) versus air conduction (C). (From Hall T. *PACES for the MRCP with 250 Clinical Cases*. 2nd ed. Philadelphia: Elsevier; 2008 [p. 386, Figure 3.23].)

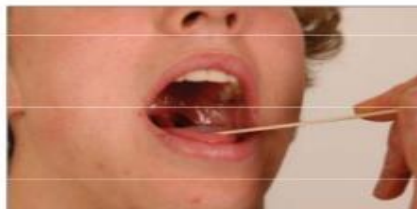




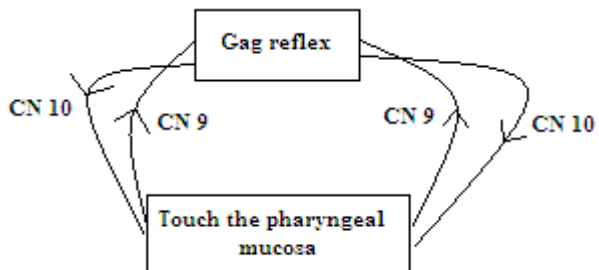
**(IX & X ) Glossopharyngeal & Vagus Nerves**

## **Cranial Nerve IX and X**

- Glossopharyngeal nerve:
  - Inspect mouth: “Aaaaaaaaaaaaaaaaaaaaaah”
    - uvula displacement
    - Asymmetrical rise of velum
- Gag reflex
  - Sensory component: glossopharyngeal nerve
  - Motor component: vagal nerve







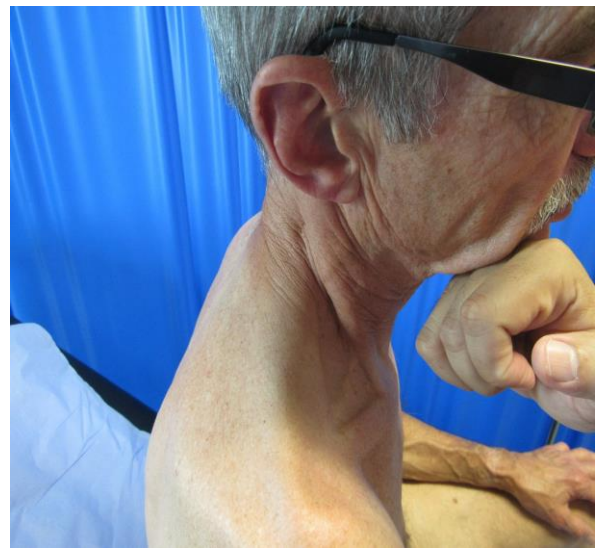


**XI Spinal accessory :**

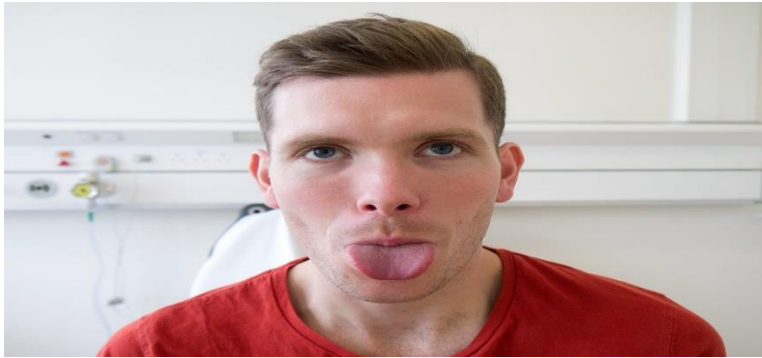


**Test Trapezius = Shrug shoulders**

**Test Sternomastoid = Turn head against resistance**



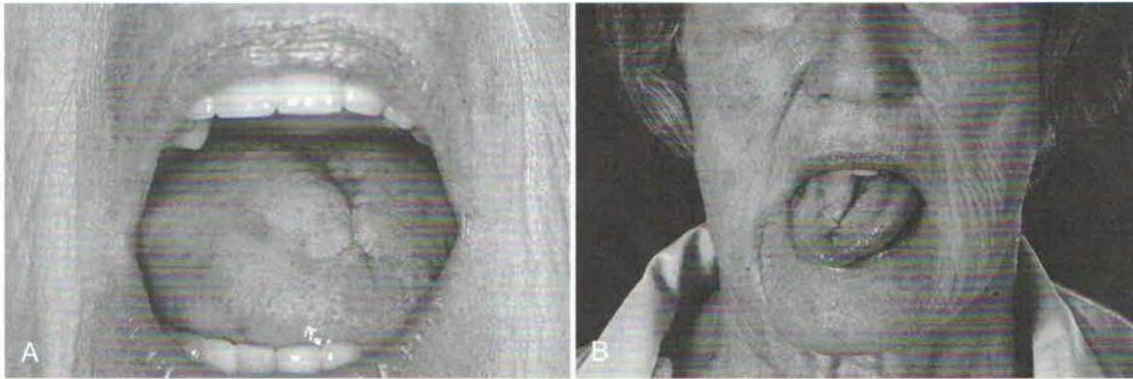
## VII Hypoglossal



Examine tongue for wasting/fasciculation (flickering movements)

Ask patient to stick out tongue – if deviates suggests lesion on that

side



**Figure** Hypoglossal nerve palsy. Note tongue asymmetry at rest (**A**) and deviation with protrusion (**B**). (From Hall T. *PACES for the MRCP with 250 Clinical Cases*. 2nd ed. Philadelphia: Elsevier; 2008 [p. 421, Figure 3.62].)

### Remember

#### In Cranial Nerve Lesions:

Lesions in CN 5 & 12 ----- Deviation is towards the diseased side

Lesions in CN 7 & 9 ----- Deviation is towards the diseased side

## References :

- 1- OSCE And Clinical skills handbook: Hurley KF, second edition.Elsevier Canada 2011
- 2- Online osceskills website. [www.osceskills.com](http://www.osceskills.com)
- 3- <http://geekymedics.com/eye-examination-osce-guide/>
- 4- Tim Hall: PACES for the MRCP with 250 cases .Third edition.
- 5- Google images