

# CRANIAL NERVE VII



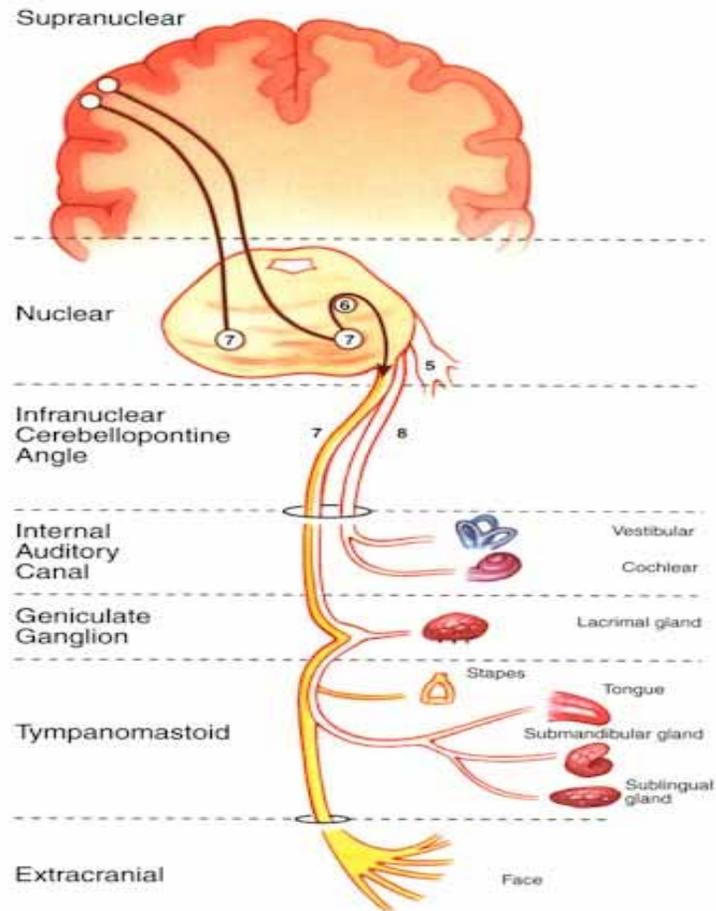
THE FACIAL NERVE

# ANATOMY

## # Long complicated course:

- Cerebral cortex
- Internal capsule
- Brainstem : nucleus in the lower Pons
- Leaves brainstem at cerebello-pontine angle
- Internal auditory meatus – Canal
  - CN VII
  - CN VIII
  - Nervus intermedius
  - Internal auditory artery and vein

# ANATOMY (cont)



# ANATOMY (cont)

## # Temporal bone

- Labyrinthine segment

- Horizontal segment

  - Medial wall of middle ear

- Vertical segment

  - mastoid

## # Exits at stylomastoid foramen

# ANATOMY (cont)

- ✦ Turns to run through parotid gland
  - Divides into branches

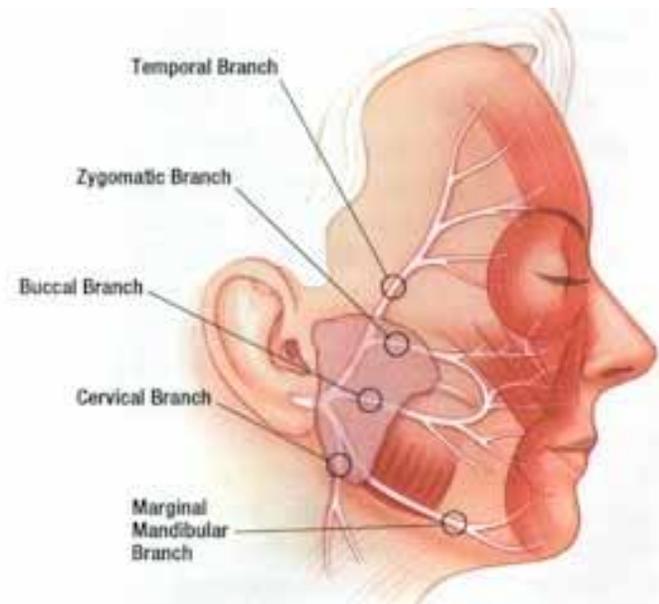


Figure 2b: Branching patterns of the facial nerve in the upper and lower face.

# ANATOMY (cont)



- # Motor supply to face and a few sensory fibres to ear
- # Secretomotor component - parasympathetic

# ANATOMY (cont)

- ⚙️ Fibres from contralateral hemisphere supply the nucleus in pons
- ⚙️ Motor fibres from ipsilateral hemisphere supplies the portion of nucleus that innervates the forehead
  - UMN innervation of forehead - bilateral

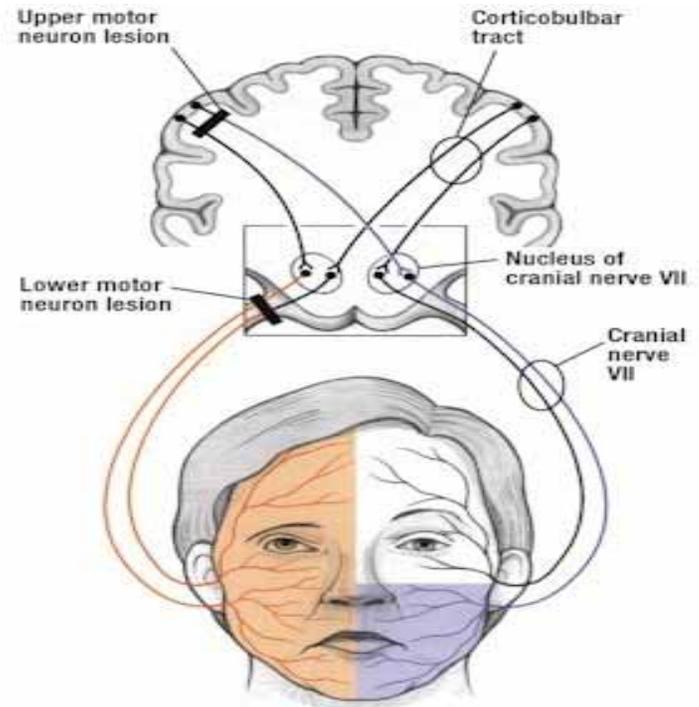


Figure 2a: The color lines show the distribution of facial muscles paralyzed after a supranuclear lesion of the corticobulbar tract and after a lower motor neuron lesion of the facial nerve.

# GENERAL

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- # Damage = facial weakness + cosmetic deformity
- # Level of damage is determined by clinical picture
  - UMN vs LMN
- # Degree of recovery dependent on extent of damage

# AETIOLOGY

- # UMN lesions = neurosurgeon/  
neurologist
- # LMN lesion = ENT surgeon
  - damage along pathway of nerve

# CAUSES: NON TRAUMATIC

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- # Bell's palsy - most common
- # Herpes Zoster oticus
- # Tumors
  - Acoustic neuroma
  - Parotid tumors
- # Ramsey Hunt Syndrome

# CAUSES: NON TRAUMATIC

## # Infections

- TB

- Mastoiditis

- Viral infections

## # CSOM

## # AOM

# CAUSES: CONGENITAL



## # TRAUMATIC

- Difficult delivery
- Forceps
- Large infant

# CAUSES: CONGENITAL

## # INHERITED

- Myotonic Dystrophy
  - Autosomal dominant
  - Muscle wasting + mental impairment
  - CNVI I palsy = early sign
- Albers-Schoenberg disease
  - Autosomal recessive
  - Affects bone metabolism
  - Osteoperosis of bony canals

# CAUSES: CONGENITAL

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## # DEVELOPMENTAL

- Moebius syndrome
- Charge syndrome
- Oculo-auriculo-vertebral syndrome
- Congenital unilateral lower lip palsy

# CAUSES: ACQUIRED

## # INFECTIONS

- Ramsey Hunt Syndrome
- Herpes Zoster oticus
- OME
- TB
- Mastoiditis
- Syphillis
- AIDS

# CAUSES: ACQUIRED

## # NEOPLASTIC

- Schwannomas
- Acoustic neuroma
  - CNVIII
- Parotid gland tumors

# CAUSES: ACQUIRED

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## # METABOLIC

- DM
- HT
- Pregnancy
- Autoimmune diseases
- hypothyroidism

# CAUSES: ACQUIRED



# NEURO

■ GBS

■ MS

# CAUSES: ACQUIRED

## # TRAUMATIC

- Skull base #'s
- Iatrogenic
  - Surgical injuries
- Sharp injuries

# APPROACH:



TRAUMATIC AND NON-  
TRAUMATIC LMN  
FACIAL NERVE PALSY

# TRAUMATIC:

## # Post surgical

- Requires urgent attention
- ? urgent surgery

## # Laceration to extra-temporal course

### ■ Assess:

- Branches involved, how distal lesion is and degree of damage (paralysis, paresis and palsy)
- Urgent referral to ENT/ plastic surgeon

# TRAUMATIC (cont):

## ✦ Petrous temporal bone #'s:

### ■ Characteristics:

- Hx of significant head trauma
- Haemotympanum / laceration of EAM

### ■ #'s:

#### ■ Longitudinal (90%)

- ✦ Side blow; 20% facial nerve injury

#### ■ Transverse (10%)

- ✦ Frontal/occipital blow; 40% facial nerve injury
- ✦ May be bilateral, ass. with hearing loss

# TRAUMATIC (cont):

## # Petrous temporal bone #'s...

### ■ Mechanism of damage:

- Bony spicule
- Intraneural haematoma
- Neural contusion
- Nerve transection

### ■ Possible complications:

- Facial nerve palsy
- Deafness (sensorineural/conductive)
- Vertigo
- CSF leakage (otorrhoea)

# TRAUMATIC (cont):

- # Petrous temporal bone #'s:
  - Management: thorough neuro assessment
    - Immediate and complete palsy: refer to ENT
    - CSF leakage: neurosurgical opinion
    - Sensorineural deafness and vertigo (inner ear)
      - # Bedrest, labyrinthine sedatives and early mobilisation
  - Guidelines for elective ENT referral:
    - # Conductive deafness  $>1/12$
    - # Partial or delayed facial nerve palsy
    - # Any signs of inner ear damage

# NON-TRAUMATIC:

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- # Mostly idiopathic (Bell's)
- # 90% resolve spontaneously
- # Usually no significant sequelae

# NON-TRAUMATIC (cont):

## # EXCLUSION CRITERIA FOR BELL'S:

- Signs of a tumour
- Bilateral simultaneous palsy
- Vesicles
- Involvement of multiple motor CN's
- Hx or evidence of trauma
- Ear infection
- Signs of CNS lesion
- Facial palsy noted at birth
- Triad of IM (fever, sore throat, cervical LA)

# BELL'S PALSY:

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- # Unilateral facial palsy
- # Acute onset
- # Other sx: pain, hearing loss
- # 85% begin to recover in 3 weeks
  - Usually recover fully
- # 15% recover after 3/12
  - Poor clinical result

# BELL'S PALSY (cont):

## # Management:

- Prednisone 1mg/kg/day for 10 days
- Must start within 14 days of onset
- Acyclovir 400mg QID for 10 days
- Corneal protection:
  - Ointments
  - Eye drops
  - Eye coverage

# HERPES ZOSTER OTICUS:

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- # Ramsay-Hunt syndrome
- # Varicella zoster virus
- # Poor prognosis
- # Presents with severe otalgia
- # Vesicles appear in 3-7 days
- # Rx: steroids and acyclovir

# ACUTE OTITIS MEDIA:

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- # Palsy occurs in 2-3 days
- # Rx: myringotomy and I V antibiotics
- # If acute mastoiditis: do mastoidectomy
- # Do not decompress nerve

# CHRONIC OTITIS MEDIA:

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- # Acute infectious exacerbations of CSOM
  - I V I antibiotics and surgery
- # Cholesteatoma
  - surgery

# SPECIAL INVESTIGATIONS:



# RADIOLOGICAL TESTS:



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- # Not indicated for every pt
- # High resolution CT
- # MRI

# ELECTROPHYSIOLOGIC TESTS:

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- # Electroneuronography (EnoG):
  - 2 weeks of onset of sx
  - Measures and compares amplitudes of muscle summation potentials
  - Current applied over main trunk of facial nerve
  - Determines % degeneration

# ELECTROPHYSIOLOGIC TESTS

(cont):

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- # Nerve excitability test (NET):
  - Wave pulse applied to affected and unaffected facial nerve
  - Thresholds for min facial responses recorded and compared
  - 3-4mA difference abN

# ELECTROPHYSIOLOGIC TESTS

(cont):

- ✦ Maximal stimulation test (MST):
  - Stimulates ipsi- and contralateral facial muscles
  - Use max stimulation to evaluate muscular response
  - Subjective observation
- ✦ Electromyography (EMG):
  - Determines muscle activity rather than nerve

# ELECTROPHYSIOLOGIC TESTS

(cont):

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## # Audiometry:

- Evaluates conductive and SN hearing loss
- Co-existent in pt with CN VII palsies

## # Branches:

- Greater Superficial Petrosal Nerve:
  - Schirmer's test: assess parasym innervation to lacrimal gland
- Nerve to Stapedius: stapedius reflex (audiometry)
- Chorda tympani nerve: test for taste

# CLASSIFICATION:



# HOUSE-BRACKMANN SCALE:

- # I : N movement
- # II : slight weakness, N symm and tone
- # III : obvious weakness, no disfiguring weakness, N symm and tone, complete eye closure
- # IV : obvious weakness, possible disfiguring asymm, N symm and tone, incomplete eye closure
- # V : min movement and asymm
- # VI : total paralysis, no movement, obvious asymm at rest

# TBH PROF'S CLASSIFICATION:

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- # Score each of the following of of 20:
  - Forehead
  - Eyes
  - Nose
  - Mouth
- # Total score out of 80
- # Useful guide for follow-up and monitoring

THANK YOU!!

