CRANIAL NERVE VII

THE FACIAL NERVE
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.
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

- 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
  - CNVII palsy = early sign
- **Albers-Schoenber disease**
  - Autosomal recessive
  - Affects bone metabolism
  - Osteoporosis of bony canals
CAUSES: CONGENITAL

DEVELOPMENTAL
- Moebius syndrome
- Charge syndrome
- Oculo-auriculovertebral syndrome
- Congenital unilateral lower lip palsy
CAUSES: ACQUIRED

- INFECTIONS
  - Ramsey Hunt Syndrome
  - Herpes Zoster oticus
  - OME
  - TB
  - Mastoiditis
  - Syphilis
  - AIDS
CAUSES: ACQUIRED

NEOPLASTIC

- Schwannomas
- Acoustic neuroma
- CNVIII
- Parotid gland tumors
CAUSES: ACQUIRED

* 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
  - Haemotypanum / 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:

- 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:

- 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:

- 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:

- Palsy occurs in 2-3 days
- Rx: myringotomy and IV antibiotics
- If acute mastoiditis: do mastoidectomy
- Do not decompress nerve
CHRONIS OTITIS MEDIA:

- Acute infectious exacerbations of CSOM
  - IVI antibiotics and surgery
- Cholesteatoma
  - Surgery
SPECIAL INVESTIGATIONS:
RADIOLOGICAL TESTS:

- Not indicated for every pt
- High resolution CT
- MRI
ELECTROPHYSIOLOGIC TESTS:

- 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):

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
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):

- **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:

Score each of the following of 20:
- Forehead
- Eyes
- Nose
- Mouth

Total score out of 80
Useful guide for follow-up and monitoring
THANK YOU!!