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Optic glioma	Meningioma
Ectodermal Tx	Mesodermal Tx
	Cap cells of Arachnoid around Intraorbital portion of ON
• Solitary • Von Recklinghausen NF	
Non Neoplastic Self limiting good Prognosis	
» Childhood Congenital 2-5yrs	Middle aged ♀
gradual DOV ↑ Axial proptosis	Early Visual loss Proptosis » OA (Exc. Extradural Tx at Apex of Orbit
RAPD Optic Atrophy » Disc Edema	Restriction of move^n Upward » (if ↑IOP) ⇔ Optociliary shunts Hyperostosis (lat portion of Sphenoid ridge)
Enlargement of Optic Canal	
MRI » Subtle diff of fat content / hydrat^n of N. tissues CT → ✗ Artifacts of bone	✓ Axial & Coronal Confirm Origin of Tx

Prechiasmal Compression by ONS Tx.

Dysthyroid ← | → Glioma → Meningioma

Glioma

2% of all glioma.
5% of childhood.
first 2 decades of life
Benign. Rare Malignancy

Intraorbital ON → M.C
Orbital & IC ON → 2nd M.C → Intracranial & chiasmal Involve

Meningioma

Epid

1-2%.
2nd M.C type of ON tumour
affect middle aged adults
usually women

Pathogenesis

Benign neoplasm 4m.
meningoepithelial cells of Meninges

Ocular Manifestation

Exophthalmos, ↓ Visual fxn.
Dyschromatopsia
RAPD

Slowly progressive, painless VL
acc by Proptosis & EOM
RAPD, dyschromatopsia

Normal swollen, Atrophy OD swollen or atrophic
CRVO +/-
Optociliary shunt, Retinal & Choroidal folds
Malignant — Bad Blindness to death

Investigation

On MRI — Intrinsic enlargement of ON.
confused ⊆ orbital Tx. on CT.

MRI → ON glioma & NF1
Double intensity tubular thickening caused by peripheral arachnoid gliomatosis & elongation & downward kinking of mid orbital ON.

Enlargement of Optic foramen ~~and~~ that arises 2° to Meningeal hyperplasia.

Neuroimaging confirms
CT — fusiform, tubular & irregular enlargement of ON.
Beaded enhance after admn of I.V contrast to leave a central linear lucency ⊆ in ON sheath (Train Track Sign) ✓
Segmental calcification + nt
MRI fat suppression & Gd-DTPA -to detect extension of ONS meningioma. MRI → Intracanalicular
Intracranial ext is rule even in small Tx.

Systemic Association

NF-1
If ✕ NF1 then — ↑ICP & ON & chiasmal involvement
Precocious puberty.

Pathology

Intrinsic Tx arise 4m Neuroglia usually astrocytes

Transitional area — Optic spaces ⊆ myxomatous material — Rosenthal fibres → astrocytes spindle formation

Meningothelial cells of Arachnoid villi
Histo — pattern of whorls & sheets.
fibroblastic pattern of Meningioma ⊆ psammoma bodies +

Malig Bx → Bizarre atypical astrocytes that seperate disrupted myelin sheaths

Treatment

Vision
- VF testing ↘ MRI to check intracranial extension
- poor → Exo excessive → remove lesion by craniotomy & superior orbitotomy
- Intracranial extension — remove by craniotomy

Chemo Rx

Radio Rx

Malignant — x successful Rx

Conservative

Slow to grow.

VF regular MRI ≤ 1yd. enh

documented intracranial spread Wallant Sx.

Types & Location

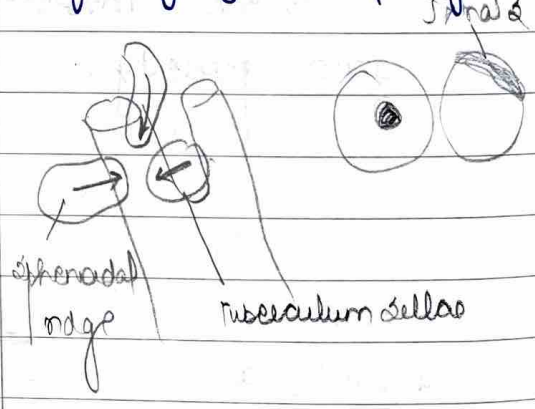
Cause & Outcome

True neoplasm — early growth followed by long periods of stability in many cases

Poor prognosis for vision if chiasm involve — NO Rx

Malig → Bad rapid blindness ≤ 6-8 wk followed by death ≤ in 6-9 months.

- Tuberculum Sellae — Jxn ↓
- Sphenoidal ridge
  - L fullness in temporal fossa due to hyperostosis
- Olfactory groove Meningioma.



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Intracranial and Intracanalicular Compressive lesions

- Inflammation
  - Neurosarcoidosis
- Infection
  - Tuberculous Meningitis
  - Syphilis Meningitis
- Aneurysm
  - Supraclinoidal Ophthalmic
- Tx
  - Glioma
  - Pituatary Adenoma
  - Meningioma
  - Craniopharyngioma
  - Mucocoele
  - Fibrous dysplasia

Ptosis

Abnormally low position of upper lid.

Types

- Neurogenic
  - 3N paresis
  - Horner syndrome
- Myogenic
  - L LPS mal.
  - myopathy
    - Congenital
      - simple
      - complicated
        - Ocular motor anomalies
        - Blepharophimosis ptosis
        - Marcus Gunn
    - Acquired
      - Myasthenia gravis
      - Myotonic dystrophy
      - Progs. Ext Ophthalmoplegia.
- Aponeurotic or Involution
  - defect in LPS aponeurosis
- Mechanical
  - gravitat" effect
  - of mass
    - Neurofibroma
    - Scar tissue
    - Severe edema
    - Ant orbital lesions

C/F

Age of Onset
Duration
Photographs of pt
Diplopia
Postural Variations
Excessive fatigue

Pseudoptosis

- Lack of support
  - Artificial eye
  - Micro-ophthalmos
  - Phthisis bulbi
  - Enophthalmos
- Contralateral lid retraction
- Ipsi hypotropia
- Dermatochalasis
- Brow ptosis

Measurements

- MRD1 – 4-5mm
- Palpebral fissure ht { Upper – 2mm, Lower – 1mm } Normal

♂ 7-10mm ♀ 8-12mm.

Grades – Diff in MRD in normal & ptotic lid

~~Diff in Palp fiss ht. MRD +~~

Callahan & Beard class

2mm → Mild

3mm → Moderate

4mm → Severe

- LPS fxn

normal >15mm. | good 12-14mm. | fair 5-11mm | Poor ≤4mm

- Upper lid crease

♂ 8mm ♀ 10mm

↓ lid crease – Poor Congenital

High – Aponeurotic

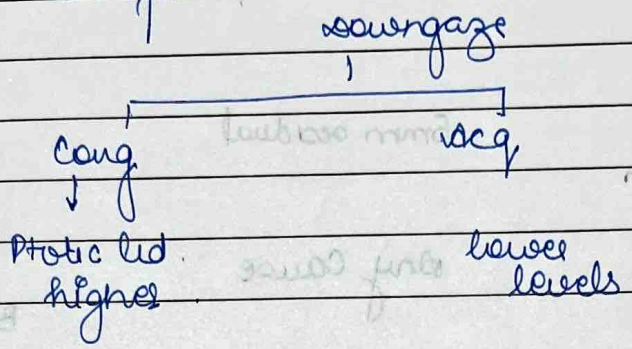
guide to Initial Incision

- Pretarsal show
- Associated Signs – Pupil – Horner Syndrome
  – Drooping of other lid – due to Increased Innervation → vice versa → other lid ↓
- Fatigability → Cogan twitch, hop on side gaze
- Ocular motility defects – Superior Rectus
- Jaw Winking

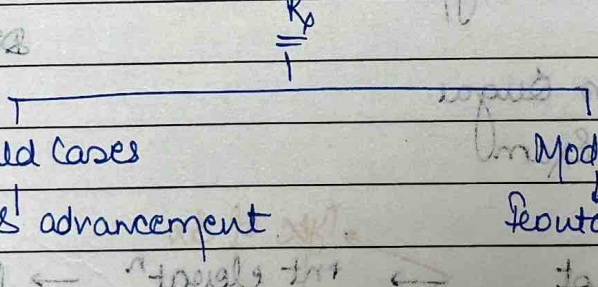
- 3rd N misdirect° Syndrome – Right gaze impaire Rt eye ptosis
- Tear film
- Bell phenomenon

Simple Congenital Ptosis

- Family H/O
- Absent Upper lid crease
- Poor LPS fxn
-



- Following Dx Correct° lid lag ↑.
- SR weakness
- Chin elevation
- Refractive Errors → Amblyopia



Levator is dystrophic → In dawngaze

Non Sx → Myoblast transfer therapy

Sx

Conjunctival Muller resection

LPS advancement

Beaver frontalis suspension

2-3mm elevat^{n} ✓

Mild ptosis

LPS actor good ✓✓

Phenylephrine test — elevat^{n}

Causes — Horner.
— Mild Cong. Ptosis

5mm residual

Any Cause

both in INP

Hair Anaesthesia

Severe >4mm

Poor <4mm

3N palsy
Blepharophimosis
Unsatisfactory

Double Δ Tech.
Base down.

Ix

°Vf testing — » in Adult pt

°Fascia lata

Tension test — 10mg/1ml 0.2ml 0.3ml Conservative elevat^{n}

EMG

Urine Exam for Sugar

Neurological Exam

Schimer test

Phenylephrine test → Type of Sx → +nt elevat^{n} → Muller Resection.

ACH receptor Ab → Latent ptosis

Single fibre EMG.

DEP — 3N palsy

× Exposure Keratitis

HVF → MRD<2mm — Sup field loss

MRD ≤ 1mm — Down gaze field loss

Insurance purpose

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Etio — Hypoplasia of dystrophy of LPS
PTOSI, PTOSZ ZFN-4

Anatomy — Elevation — LPS, fasrtalis, Mullee mol

Carotid Cavernous Fistula

Development of AV fistula b/t carotid artery and venous cavernous sinus.

↓

↑ Venous Pressure in sinus

Patho

Venous & arterial stasis around eye & orbit

↓

↑ episcleral venous pressure

↓

↓ Arterial blood flow to CN.

Types

- Direct Arterial
- Dural
  - ICA
  - ECA
    - High flow
    - Low flow
      - Traumatic
      - Spont.

Direct

↓

High flow shunts

CA → CS

↓

defect in wall of Intracavernous portion of ICA

- Trauma → Basal Skull # → Symptoms 1 week later
- Surgery → Symptoms 1 week later
- Spont rupture → aa
- Atherosclerotic artery → middle age HTN

Symptoms: C. chemosis, Pulsatile proptosis, Whooshing noise in the head.

↓

3rm Visual loss ← TON

Delayed — EK, 2° glaucoma, CRVO, Ant Seg Isch, Isch ON.

Ips | Bil | Contr Sign.

Indirect (Dural shunt)

↓

Low flow

Meningeal br → CS

Intact

C/F - subtle

Spont rupture

- Minor trauma
- Straining
- CTD, CVD.

Ass ⊆ Choroidal detachment

gradual onset of redness of both eyes

» Elderly pt due to deg changes in sinuses

Ehlers Danlos

Severe Ipsilateral headache

D I

Marked Episcleral Vascular dilatation
Hmrgic chemosis
Pulsatile prop + Bruit + Thrill
Progressive
Abolish on compr.
Carotid compr in neck.

Milder
Exaggerated Ocular pulsatn
L AT
Corkscrew Episcleral vessels
↑IOP > side of fistula
Mild Bruit & Thrill
dilated conj vessels produce red eye without pulsation

✓ ↑IOP. / ↑episc VP
L Eg

✓ Ant Seg Isch — Corneal Epi Edema.
Ag, cell & flare
Iris atrophy
Cataract
Rubeosis Iridis

Ptosis

✓ Ophthalmoplegia — 3,4,6 → Marked
fundus + OD swelling, Venous dilatn
Intraretinal Hmrg ✓

Mx Dx — Chr Conjunctivitis
Cellulitis
Pseudotumor
Thyroid Eye disease

Ix
CT, MRI — Prominence of SOV
diffuse enlargement of EOM
Orbital Doppler — Abn flow patterns
DSA — Bag of worms appearance

Rx
Neurological subsp opinion
L Cortical venous drainage fistula ↑ risk of stroke

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Direct

Eye at risk.
of x spont closure
↓
&x

Transaxterial approach to repair
aet (Coil)

- Occlude involved sinus (Coil, Balloon)

Indirect

Transvenous occlusion
of involved sinus
Embolisation ± detatchable
balloons – Isobutyl cyanoacrylate
Polyvinyl alcohol
particle
gel foams

Ectropion

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Anatomy

Def — Lid margin everts or turns away from eyeball

Lower lid » common

Classificat^n

- Cong
- Acq
  - Involutional
  - Cicatricial
  - Mech
  - Paralytic

Etiopath

Involutional/Senile »

Horizontal lid laxity
→ Lengthen^ of Med & Lat Canthal tendons
→ Mid facial hypoplasia
↓
Inf orbital rim located post to eyeball
↓
↓ LL support
↓
↑ propensity for LL retract^n

Cicatricial

↓

Shortening of Ant lamellae

- Trauma
- Burns
- Chemical inj
- Ulcers
- Post ops

Paralytic

VII N palsy
↓
Loss of tone of Orbicularis oculi mus

- Bells palsy
- Parotid Sx
- Trauma
- T x
- Acoustic Neuroma

Mech

↓

Eversion of LL by Tx or mass

Congenital

↓

Shortage of skin
↓

- Ichthyosis
- Blepharophimosis
- Down's Syndr

- Horizontal lid laxity
- LL Retractor Weakness
- Lamellar dissociation

Symptoms — Irritation
redness
Epiphora
dryness
Photophobia
F.B sensation.

History — Trauma.
Cicatricial skin disease.
Cancer
Actinic damage
Ichthyosis
Resolved Bell's palsy
Previous lid Sx.

Signs
Scar tissue
Lid mass
facial asymmetry.
Exposure keratitis

Pinch eyelid distraction test
laxity > 6mm

Snap Back test
grade 1 — 2-3s
2 — 4-5s
3 — >5s returns c blink.
4 — hang back

Canthal laxity

Medial

LL pulled laterally of punctum (N x > 2mm)

Limbus — Mild

Pupil — Moderate

Beyond pupil border — Severe

Lateral

∠ contour 1-2mm med to lat rim

↓

Rounded appearance

Position of L. puncta.

↓

x visible

Direction away from globe – earliest sign

Mild – P not apposed to globe on looking up

Moderate – " " even in 1° gaze

Severe – P. conj & fornix are exposed

1 — Medial side only P is everted

2
- a → ½ Ld eversion
- b → ✓ e visible lower sclera

3
- a — Conj hyperemia
- b — + thickening of conj

3+ Exp K. Keratinz

- Orbicularis tone

Mx

- Lateral tarsal strip operation
- Lat
  - Kuhnt Szymanowski procedure modified by Byron Smith
- Pentagonal Wedge resection
- Medial spindle procedure
- Byron Smith Lazy T procedure
  - Medial diamond excision + Horizontal lid shortening

- Cicatricial → Z plasty
- Mech → Excise mass
- Cong → lid taping → Lubricant → Skin graft
  - Wipe tear upward toward nose
- Paralytic → Tarsorrhaphy → gold wt in pretarsal

1° defect

- Horizontal laxity → Lid shortening (Tarsal or canthal tendon)
- Vertical laxity → Shortening, reatt of LL retractor

Punctoplasty
Dilis lee procedure

Edelstein Snyder procedure

If Punctal stenosis — Involutional — as c Mid facial Trauma / Post hoon of MCL tear

Mild punctal ectropion

× lid lax

↓

Excision of diamond of Tarsus & Conj

✓ Horizontal
× LL Weakness

✓

(Byron Smith)
- Lazy T operation
- Tarsal ectropion repair c redn of LL retractors

LC — MC — Generalized

LC: Mild → LCT suture plicat^n ; Severe → Lat tarsal strip

MC: Mild → MC suture plication ; Severe → MCT resection.

Generalized → Bick's procedure

↳ Kuhnt Szymanowski procedure

(Blepharoplasty)

Myasthenia gravis

AI disorder

Gen. | Ocular

Amt of Ach released is normal
↓ no. of Ach receptors available.

Anti Ach Recep Antibody

Gen → 90%
Ocular → 85-45%

Ach Recep Ab. → ↓

Pathogenesis — Ab recep block NM transmission.
destroy receptors

EOM are susceptible — retention of Embryonic Ach receptor isoform by epsilon subunit.

⇒ Multiply innervated EOM fibers are specifically targeted.
⇒ EOM has early involvement bcoz of high activation rate.

Diagnosis

- Icepack test — 5min.
- Tensilon test (AChesterase Inh) (0.15mg/kg) — Edrophonium i.v 1-2mg test dose → ↓ 60s. → 8-9mg → Improve Ptosis
- Atropine stand by
- Neostigmine. — 30min before. — 1.5mg IM (deltoid) — 0.04mg/kg ♀ — 30min (peak)
- Sleep test — 30min dark room rest
- Curare test — d tubocurarine — ↑ effect of paralysis
- EMG — Single fibre EMG — LDS, SR
- Anti AchR Ab.
- Mst biopsy — Radiolabelled Bungarotoxin.
- Mediastinal Xray & MRI — Thymoma (Chest)

Systemic Exam

Blocking Ab
- 60% generalised MG → If x detected - 40% Res → MuSK (Muscle specific Kinase) → rare
- 50% Ocular
- 1% → x Ab

Ptosis in MG

- Congenital
  - ♀
  - Predominance of Ocular Symptoms
  - Lack of immune related pathophysiology
  - Rule out thymoma, Thyroid disease, CTD.
- Pediatric
- Adult
  - Consider Transient MG in MG mothers
- Variable ptosis + double ptosis ± fatigue (Upgaze)

Electrophysiological test

- Repetitive Supramaximal Motor Nerve stimulation (1-3Hz)
  - Progressive decremental response of Compound Msl action potentials during 1st 4-5 stimuli
  - 40-90% pt
  - » in severe disease
- SFEMG
  - Jitter — Variability of propagation time to individual Msl fibre supplied by same motor neuron
  - 90% sensitivite

Systemic features → facial Weakness, Jaw Weakness
Limb Weakness
Inability for Erect posture

Kids to MG mothers.

Intro

disorder of NM Jxn

Ab mediated AI attack on Ach receptors at NMJ

Hallmark → fluctuating mal weakness that worsen ⊆ exersion & improves ⊆ rest

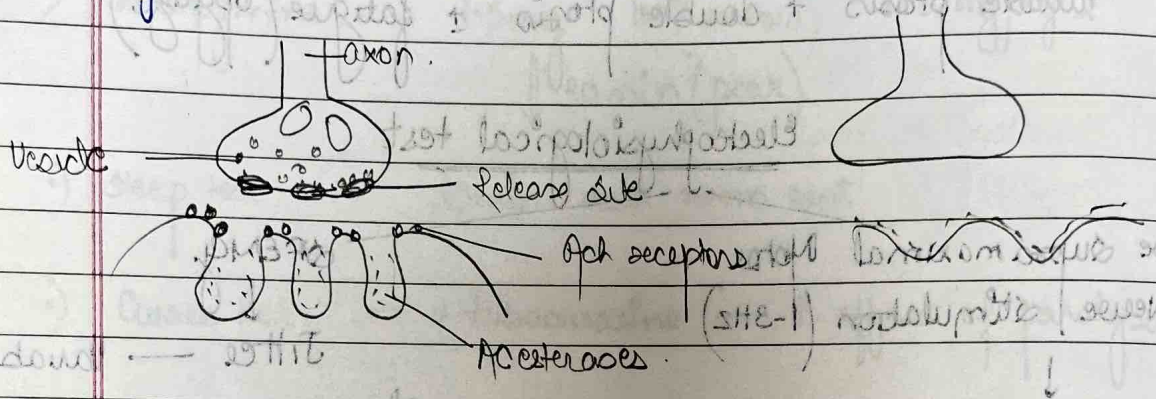
Epidemiology

Children >40

& HLA-B B7

3 HLA DR 2

Explain Normal NMJ conduction



MG → Post synaptic membrane changes

↓

Loss & simplification of Post Jxn folds

↓ no. of Ach receptors

Widened synaptic cleft

↓

New recep s synthesized bt not incorporated

∴ 1/3 receptors

Ab mediated proces — likely originates in thymus gland.

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Ab

Accelate rate of degradation of Ach recep

Block Ach binding sites

75%. MG

Thymic Abn

85%. Thymic hyperplasia

15%. Thymomas

Congenital MG — × Ab mediated
∴ ✗ — × Immuno✗ but.

- Quinine SO_4
- fluoxetine
- Salbutamol
- ACE Inh

Ocular Manifestation Ptosis, Diplopia
Quiver eye movt, Gaze Evoked Nystagmus
Normal pupil

Dx

See saw ptosis
fluctuating diplopia & ptosis
Cogan lid twitch.
Scinfang's signs — ↓s of forced lid closure
Icepack test

℞ Pyridostigmine 60mg. started ≤ 30mg TDS
180mg (Cholinergic Crises)
Diplopia no Improve

Cs → Immuno suppressive
Plasma pheresis → MG crisis Pre-Thymectomy
IVIG
Surgery.

- ACE inh
- IS — Rituximab — Musk Ab
- Symptomatic & of Ocular Abn
- Avoidance of agents that worsen NMJxn.
- Thymectomy — Transsternal approach

Quad drugs — Penicillamine
Aminoglycoside

Course

10-20% spont. remission

30-80% generalize disease ≤ in 2yrs of onset of disorder

Diff Table

Optic Neuritis

Inflammation of ON

- OD.
  - ✓ Visible
    - Papillitis
    - Neuroretinitis
  - Ophthalmoscopic
- Proximal to OD.
  - ×
  - Retrobulbar Neuritis.

Etiology

- Idiopathic.
  - Demyelinating disorders
    - Isolated.
    - MS.
    - NMO.
- Associated c Inf.
  - Local
    - Endoph.
    - O. Cellulitis
    - Sinusitis < Sphenoid / Eth
    - Contig. spread
  - Systemic
    - Viral
    - Bact
    - Fungal
    - Protozoal
    - Parasitic
- Metabolic — DM. Anaemia
- Immune mediated
  - Local
    - SO
    - Uveitis
  - Sys
    - Sarcoidosis
    - WG
    - ADEM

CNS / Local

- CNS
  - MS
  - NMO
  - ADEM
  - HZ.
  - Epidemic encephalitis
  - Polio.

ON ∈ × CNS ⇒ Lobar disease.

(a) Acc to Etio

- Demyelinating
- Infectious
- Parainfectious
- Non Infectious

(b) Acc to Disc apperance

- Retro.
- Neuro
- Papillitis

(c) Acc to Laterality DoD

- Unil.
  - NAION.
  - Infection
  - LHON
  - Compressive
  - Infiltrative.
  - Retinopathies
- Bilateral
  - LHON — ♀ Inheritance
  - Chiasmal Syndrome
  - Nutritional B_{12} def
  - Toxic — Ethambutol
    - TNFα
  - NMO — Amiodarone
  - Papilloedema.
  - Non Organic
  - Jamaican ON — Central scotoma

Atypical ON → Vision does not improves to 6/6 levels

- Out of typical age range
- No pain on Eye movements
- Poor vision beyond 2 wk of Onset
- Progressive DOV beyond 2 wk.
- Severe disk edema.
- Steroid dependent VA.

(*) due to stimulation of peripapillary retina.

Ipsi Eye pain. → visual loss → Psychophysia

Clinical features

Symptoms → Vision ↓ Improves by 4-5wk ⇒ Mono-Ocular

- Colour vision
- Contrast Sensitivity
- Visual fields

} Takes longer to recover

(*) Tiny white or coloured flashes (phosphenes) ← Movement / Sound induce

VA ↓ 1wk, Tough.

- Uni
- Bil

} of Retrobulbar Neuritis.

- Local tenderness
- Pupillary Rx
- Abn in VF

Age — 18-45yrs (20-50yr)

Retro-Ocular pain ↑ by Eyemove or Pressure. — Fracture or Inflammed ON sheath

Neuralgia

Headache

Loss of Colour Vision (Red desaturation)

↓ Perception of light Intensity

H/O Visual illness, Previous H/O CNS s/o demyelination, focal neurological Symptoms — Weakness, Numbness, tingling in extremities

Altered perception of moving objects — Pulfrich phenomenon

Worsening of Symptoms ≤ Exertion. ↑ Temp — Uhthoff sign ↓ Other ON

Signs

Tenderness on digital pressure ∝ SR tendon.

↓VA

↓ Colour Vision — Desaturation → Colour mixed ≤ White

Abn Contrast Sensitivity → Macular

↓ Stereo-acuity — Pulfrich effect — Stereo Illumination ON

VFD — Scotoma or non-specific depression in retinal sensitivity

Pupil — RAPD ∝ Lack of sustained Constriction of pupil to light

OD — Retro. but Temporal pallor

L Red free — NFL defect

To & fro movement & elliptical movement

ION

AION — Papillitis — Papillitis — Swollen. — Hyperaemia. — Children & Young Adults — ≤ or ≤ out — peripapillary — flame shaped — Hmg — blurred margin. — Tortous Veins — Exudates upon disc — fine Uiteous Opacities.

PION — Retrobulbar — Retrobulbar Neuritis — Normal — Children — Stellate pattern. — of Retinal Exudates in NFL (Macular star) — Adults — >50yr — Swollen disc — elderly

Disc — Neuroretinitis — Inflamed & neibouring retina.

Papillitis	Retrobulbar Neuritis	AION

Inflamed & neibouring retina. — Normal — Swollen disc

Children & Young Adults — ≤ or ≤ out — >50yr — Adults — elderly

Stellate pattern. of Retinal Exudates in NFL (Macular star)

peripapillary — flame shaped Hmg — blurred margin. — Tortous Veins — Exudates upon disc — fine Uiteous Opacities.

		× MS	Temporal pallor.
		Infection.	
		2° Etio.	
		Atypical	

Ix — VEPs → (Prolonged latency) — Normalizes

VA	✓	× Normalizes
Colour	✓	
CS	✓	
StereoAc.	✓	
VF	✓	Normalizes × Normalizes
RAPD	✓	

↓

Post Neuritis atrophy

DD — Papilloedema — Grade IV HTN — LHON — Toxic & Metabolic ON — Compressive eg. ICSOL

	ON	AION
Papilloedema	May or May not	✓ Swollen. 100%
>2-3D × Central vision affected	Normalizes [VA / VF] improvement ✗	
	s/o Demyelinat^n MRI	
	<	Mean Age >50 (66)
	> ♀	gender
	=>	Pain
	=>	Progression.
	Central scotoma, Field defect	→ NF Bundle enl. Altitudinal
	ger depression	
Not affected.		
	~~Child~~	Adult
	↓	↓
	Bilateral Simultaneous	Retrobulbar N.
	=> Viral infection	
	Good Prognosis	
	Papillitis	

CRMP-5 — Collapsing Response Mediator protein as Paraneoplastic

Ix

CBC — FTA-ABS
RPR — ANA test
CRP — MRI Brain & Orbits ⊆ gadolinium Enhancement & fat suppression
ESR.

Sarcoid — ACE, Chest CT, gallium scan
Cat Scratch.
TB — PPD.
Lupus — ANA
Lyme — Lyme Titre.
AI — ESR, Anti Cardiolipin Ab, CRMP-5, NMO IgG
LHON test —

Lumbar Px — Oligoclonal bandings
IgG synthesis rate
VDRL.
AFB, gram stain.
Bact & fungal culture
Cytology.

Multifocal & full field ERG — Pattern ERG
PERG.
ON dysfxn. (N) P100 latency
Maculopathy P50 amplitude ↓

VEP — Pattern VEP — Cortical & preforniceal areas 17, 18, 19
Triphasic
N75 P100 N145

Prolonged P100 latency Amplitude α. VA. >118 ms
Inter Ocular diff in P100 latency 9ms diff → JOND

Other Cause of P100 latency.

Anti AQP4
NMO

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℞ ONTT trial — i.v CH_3 bed × 3d

↓

Oral 1mg/kg/day × 11d (×alone as recurrence ↑)

↓

Tapered over Next 8d

↓ recurrence & ↑ recovery α Occupational requirement

Outcome same

(b) If established ON → observe.

Immunomodulatory ℞ → If Brain lesion

↓

Ifn β.
Teriflunomide
Glatiramer

2 characteristic white lesion. on MRI.
Single myelinating event. — CHAMPS.
↓
i.m inj

Refer to — Dr. C.

BENEFIT — Betaseron IFN β-1b.

Demyelinating ON

Myelinated NF lose insulating myelin layers
Myelin phagocytosed by ↓ microglia & macroglia.
↓
Astrocytes — fibrous tissue in plaques
∴ demyelination disrupts nerve conduction in white matter.

- Isolated ON
- MS
- Optic Disease
  - Neuromyelitis Optica.
  - Bil ON
  - ≤ days/wk.
  - Transverse Myelitis
  - NMO IgG — 70% sensitive, 100% specific
- Schilder Disease
  - <10yr.
  - death 1-2yr
  - Bil ON

× clinical evidence

Infectious ON

Sinus related — [illegible], sphenoiditis
Ab & drainage
» Uncl ≤ recurrent headache

Cat Scratch fever — Bartonella henselae
Cat Scratch/Bite
Neuroretinitis

Syphillis — Papillitis, NR.
Lyme — Borrelia burgdorferi — Tick Bite
Cryptococcal — AIDS, Acute ON, Bilateral
Varicella Zoster — Immunocompromised, HZO

Para Infectious ON

Viral inf — Measles, Mumps, Chicken Pox, Rubella.

Immunization.

» Children

H/o fever.

Bil papillitis

good prog

x Rx

o/f severe Loss, Bil, Only seeing eye then steroid

antiviral.

Non. Infectious ON

Sarcoid

lumpy appearance s/o granulomatous infiltration.

c Vitritis & Retinal Vasculitis

x pain

Steroid Rx

Autoimmune

Retro AION

slow progressive

Compressive lesion

steroid

Multiple sclerosis

Idiopathic demyelinating disease involving white matter.

♀ > ♂

Acute MS — Marburg Variant. Rapid death

Presentation — 3-4 decade

Relapsing, remitting

Pathology — focal inflammation, demyelination, gliosis, scarring

Selective demyelination ± relative sparing of axon is hallmark

Medullary sheaths of NF affected

Systemic features

- Spinal cord
  - Weakness
  - Stiffness
  - Sphincter disturbance
- Brainstem
  - diplopia
  - Nystagmus
  - Dysarthria
  - Dysphagia
  - Intention tremor
- Cerebral
  - Hemiparesis
  - Hemianopia
  - Dysphasia
- Psychological
  - Intellectual decline
  - Depression
  - Euphoria
- Uhthoff phenomenon
- Lhermitte sign
  - electrical sensation on neck flexion

Ophthal features

- Common
  - Retrobulbar ON.
  - INO. ——— Young — MS
    Old — Vascular Occlusion
  - Nystagmus
    ± Intention Tremor
- Uncommon
  - Hemianopia
  - ON motor palsy
  - Retinal periphlebitis

Ix → Lumbar Px → Oligoclonal band on protein electrophoresis of CSF.

→ MRI → white matter lesions, Mc Donald Criteria.

Plaques – Multiple greyish, sclerotic lesion in white matter.

↓ Macroscopic

1mm - 3cm. (>3mm).

Dawson fingers

→ VEPs – Conduction delay & ↓ Amplitude.

Association b/t ON & MS → 15yr risk – 50%.

MRI lesion

→ 10% 2nd episode

70%

25%

↓ risk if → Male gender.

Visual syndrome

OD swelling, Hmrg

Vision ↓ PL.

Absence of Periocular pain.

MS – presenting ± ON – 30%.

± established MS – 50% any pt of time

Clinically definite MS – documentation of 2 or > episodes of symptoms – >24hrs

1mth apart

– 2 or > sign. (1 Neurological Exam
2 Paraclinical – MRI
VEP

that reflect involvement of anatomically non contiguous white matter.

Miller fisher syndrome

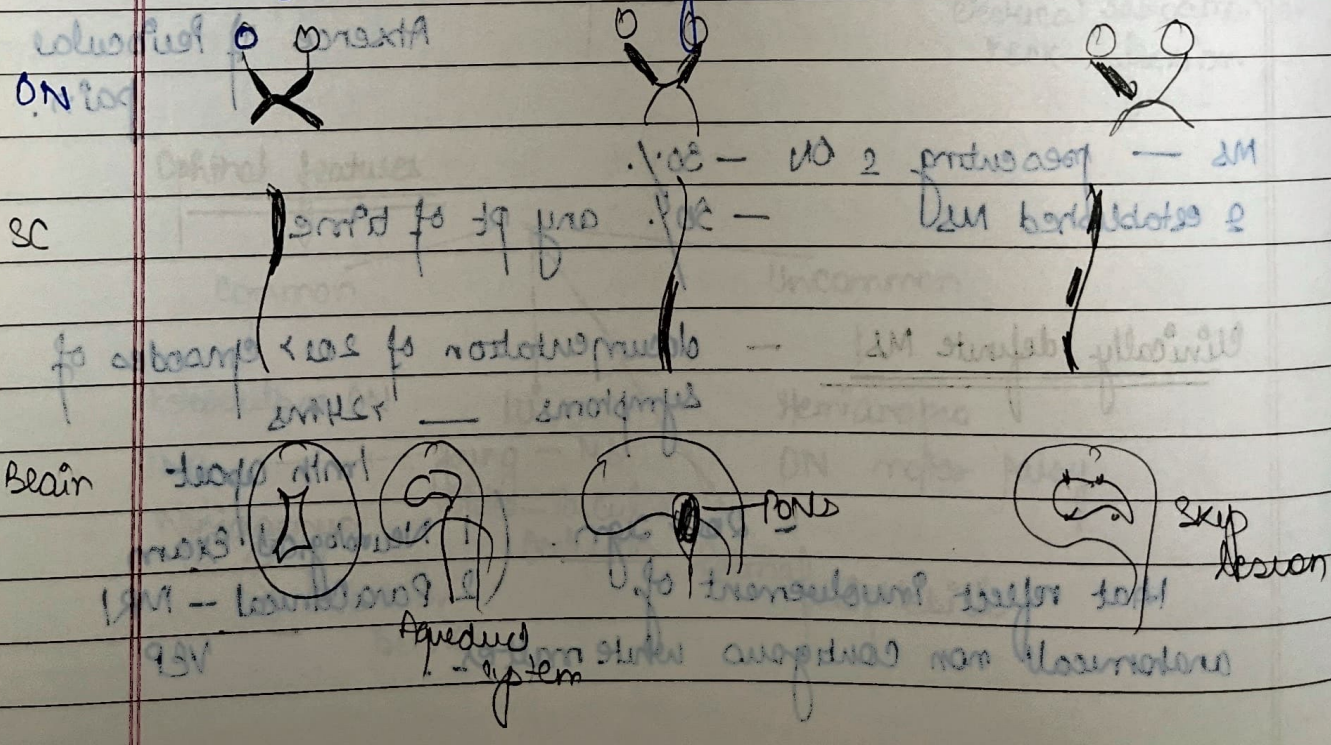
GB → Acute Ophthalmoplegia. ← Bickerstaff's

LHON plus — LHON + MS

Rx → Q10 — sodium Topical Brimonidine

NMO	MS
involve SC & ON	ON & white matter of brain
involve >3 vertebral seg	short seg of SC
CSF pleocytosis & PMN cells	CSF oligoclonal band

NMO — MOG — MS



Newer drugs for MS - Gilenya (Fingolimod)

Copaxone (Glatiramer Acetate)

Recurrence ←

Tysabri (Natalizumab)

↙ 1° & 2°

Congenital Optic Nerve Anomalies

governed by Laplace Law

↓ Deformities ∝ Size of disc

Larger Disk	Smaller Disks
Thinner lamina	Smaller pores → Impair axonal
Thinner Corneas	transport → ON dewsen
↑ IOP → glaucomatous	
Macrodisc / Megalopapillae >2.1 mm. >2.5 mm^2.	Disk at Risk → RP. NAION.

How to check disc size — 5° light beam from direct ophthalmoscope.

Congenital vs Aquired ON pathology = Preserved colour vision in former.

Various Anomalies

- ON hypoplasia
- Posterior / Neuronal Loss
- Peripheral Cavitary anomalies / OD pit ✓
- Papillorenal Syndrome
- Morning glory disc ✓
- Trisomy 21
- Disk Coloboma ✓
- Peripapillary Staphyloma
- Aicardi Syndrome ✓
- OD dysplasia
- Megalopapillae
- ON aplasia
- Bergmeister papillae ✓
- Myelinated NF ✓
- OD dewsen ✓
- Tilted disc ✓
- Torsional disc.

ON hypoplasia — Central Vascular Crowding ≤ Illusion of enlarged Central Vein. ↓ No. of NF

- Pale disc lamina.
- Hyperplasia of RPE at both lamina - scleral ⇒ double ring sign ✓✓ retinal neural jxn

Ocular association

→ Superior segmental OD hypoplasia → Topless disk ✓✓ ⇒ IDDM ♀

→ Midline abnormality, Corpus C. hypoplasia of Ant pituitary → Dc Morsier Syndrome ⇒ Phenytoin

foveola. disc center distance >3DD.

Symptoms

Signs — RAPD check.

Post Neuronal Loss — Bil hollowed disc

loss of Optic radiat 2° PVL.

Peripheral Cavitary Anomalies	Optic disc Pit

Thin laminar disc edge

⇓

defect in intermediate tissue of Kuhnt — Barrier b/t nerve parenchyma & Sensory retina

⇓ CSF tracking & Vitreous access

Retinal schisis & Serous detachment

Rx — fenestration of ON. sheath.

↑ IOP → Topical steroids

Enlarged Blind Spot ≤ Paracentral Scotoma

- O

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Lasers.

Vitrectomy + AFE + Prone position

Papillorenal syndrome – Bilateral multiplicity of evident ciliioretinal vessels >3 total

- Defective Angiogenesis
- Cx existing Renal dysplasia.
- for early Dx → screen family members.

Morning glory disk Anomaly – Unilateral Multiplicity of ciliioretinal vessel

- Enlarged disc
- funnel shaped excavation
- Containing anomalous central glial tissue.

If. Infrapapillary ass ⊆ transsphenoidal defects ⇒ panhypopit
hypertelorism.

Congenital Ipsilateral IC stenosis ⊆ Moyo, moyo collaterals

Trisomy 21 – Branching & spokewheeling of central retinal vessels
Endostatin protein.

Peripapillary Staphyloma
Normal disk & vessels ⊆ thinned out sclera. which is staphylomatous

Aicardi syndrome
Variable chorioretinal lacunae surrounding hypoplastic disc ass ⊆ Cataract, Colobomba
Only ♀.
CNS ⟶ Seizures.

Disk Coloboma
Ocular tissue defect due to incomplete closure of fetal optic fissure – the axis of which is ON.

» Inferonasal, AD – PAX6 mutation

ass ⊆ Charge Syndrome, Goldenhar.
Iridocorneal ophthalmos. C. of iris & lens
VA ⟶ ↓, Amblyopia
focal, glistening white, bowl shaped excavation decentered Inf. ⊆ NRR thinn.
ass OR coloboma.
disc pit Ida Nunn. ✓
HVF – Superior defect Lingham. ✓

Compl — Serous RD, Progressive NRR thinning

- Nerve itself being usually spread out as pink, horizontal, linear band at upper part.
floor of Colobama is white & measurably depressed & often ectatic.

	Glaucoma	NAION
Presenting H/O	Asymptomatic till end stage	Sudden rapid progressing vision loss headache
Visual acuity	Central vision preserved till the end	Vision loss relatively early.
VA ≤ OD cupping	Central vision often better despite advanced OD cupping	VA poor compared to amount of OD cupping.
OD	Vertical Cup, splinter shaped hmg	~~Area of~~ Pallid disc. Swollen initially then become pale.
Nature of NRR.	Residual rim pink.	Area of pallor larger than Cup. Residual disc pale.
Nature of visual field defects	Nasal step. Arcuate visual field defect	Central, CentroCaecal, altitudinal that respects vertical meridian

Tilted disc — Ratio of Longest/shortest.
Ovality index >1.3
Inferonasally directed ∴ ST defects
OCT → RNFL — thinning
GCC — Normal

Torsional disc — long axis inclined >15°

OD drusen — Calcified deposits within substance of ON
focal collection of axonal metabolic products.

- Symptoms — Episodic blurring — clouding effect

Buried — Drusen — Exposed

Pseudopapill.
lumpy disc
Absent cup
Anomalous Vasculature
↑ No. of vessels & tortuosity

close to disc surface
appear as whitish pearl like lesion

RNFL thinning
VF defect —
Ass c — RP., Angoid streak, Alagille syndrome
Complication — CNV, VH, Vasc Occ, AION.
Ix — FAF.
(A) USG ⇒ Useful to delineate ↑ IOP cause
OCT — thinning
CT

Morning glory Syndrome

Glaucoma disc		~~Disc Colobama~~
No tuft		Central tuft of glial tissue +nt
+nt (Present) >> Temporal Quadrant	Peripapillary pig changes	~~Present~~ Present 360° degrees
Normal.	Retinal Vasculature	Abnormal retinal vasculature

Glaucoma disc		Disc Colobama
		Defect >> Inferior Quad Assymetric looking disc.
Present	Peripapillary changes	Minimal or absent
↑ Vertical CDR with NRR all around		ON itself spread out as pink linear band. In Upper part flat - white, depressed & ectatic.

Ptosis

Pseudoptosis.

Classification

Myogenic
- Simple
- BPS
- SEP
- COFS.
- CPEO
- Oculopharangeal dystrophy
- Mol dystrophy
- Traumatic (Orbital fat is exposed)

Neurologic
- 3N palsy
- Horner syndrome
- MG
- MG JWP

Aponeurotic
- Involutional (Aponeurosis dehiscence)
- Post traumatic
- Blepharochalasis
- Chr. Lec. Edema
- Cicatricial ptosis
  - Trauma
  - Conj shrinkage Syndrome (SJS, OCP)

Mech
- Dermato chalasis
- Eyelid mass
- Orbital mass
- Scarring.

Bell test — On everting eyelid:

Normal pt → Comes back to Normal position

Ptotic pt → Remains everted

- Unil / Bil
- Complete / Incomplete
  - ↓ LPS action
- Symmetrical / Asymmetrical

♀ → BPS — Infertility
Amenorrhoea

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Herings law of Page
MG.

Case sheet format

History

Uni/Bil → Drooping of upper lid → ↑ Evening / After Exs (Upgaze — MG) / Sleep.
Progressive — CPEO
Recurrent — DM, HTN

Narrowing of IPA
Inability to lift upper lid
Raised Eyebrow.
Prominent forehead furrow
Elevation of chin
Jaw Winking
Diminished Vision
(MG) Diplopia + EOM
− On raising UL ↓ LL + other EOM +

Onset → Cong / Acq
Cong → Simple / Complicated
Simple → Acute / Gradual

HOPI — ↓ Sweating
Difficulty in deglutition
Associated Recurrent Allergic Conjunctivitis

Past H/O — Contact Lens Wear — Aponeurotic Acq
Drug Intake — Steroid, Neostigmine
Recurrent attack
Trauma
Medical Condition — Thyroid ↓
Spectacle use.
Amblyopia Rx

Treatment H/O → Peribulbar block, Cataract Sx
Squint Sx
Previous Ptosis Sx.

Birth H/O — Forceps Inj — Aponeurotic Ptosis

— Explain pt

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family H/O → BPS.

Jaw Winking — Levator resection + suspension

↳ Ex Manipulation — Cardiac Arrythmia : Main Anaesthesiologist

> It Unilateral sucking in infants

To diff frm pseudoptosis — Ask pt to fixate

Gen — Neurological
Muscular.] Mod Dystrophy
Resp
CVS — Heart abn.

Exam
VA — Amblyopia > BPS pt — WTR.
Head Posture — Chin elevation — Ix for Sx
good motivation of child

Lids & Adnexa — Telecanthus, Epicanthal folds, PFH, Frontalis Overaction] BPS

MRD1
MRD2
MRD3
] Rel to Exs
Cold test
Sleep test

diff b/t MRD3 of 2 lid ⇒ BPS cause
MRD3 — Cornea reflex & UL in upgaze

PFH, PFHidth
LPS. — Frontalis suppress < Puttermann — MLD 9mm
Bell's Method.
upgaze
decides Sx to be done
In children — Cliff test.
limbus at 6 O'clock

Iris — Heterochromia
Pupil
Signs of Cornea Exposure
Corneal Sensations.
Conj
Dry Eye Basic tests, Status of tarsus & Sup fornix — Cicatrix, Masses — Blepharoplasty
- Lagophthalmos » Cong. Ptosis, ↑ after correction
- Bell's phenomenon Ix for Strabismus surgery ↓ Absent — SR paralysis
Fundus Exam.
Jaw winking Ph. — 3N to LPS ⟺ 5N → Mastication MS
Cogan twitch
Saccadic Velocity
Saccadic Intrusions
Saccadic Dysmetria
Saccadic Latency
Saccadic Duration
Saccadic Accuracy
Saccadic Amplitude

Traction test – To check adhesion of lid & ~~SKIN~~ globe

Material Used

Natural
↓
Fascia Lata
Palmaris Longus tendon (<3yr)

Synthetic / Non Autologous.
PTFE
Prolene
Polyfil Nylon (Supramid Extra)
Silicone.
↓
High failure Rate.

⇒ IBS collection

Cong Ptosis → BPS
DEP
Oculomotor Nerve Palsy
MG
CPEOM — Non Progressive < CPEO → Prog. / Kearns Sayre
MGJWP.

6 Oclock

plasty

Ptosis + Strabismus + ~~Bell pool~~

Pupil
↓
N

Other CN → else ON palsy
↓
N.

DEP + Bell's pool

(-1) Ptosis

Syndrome

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Horner

Horner → Unilateral Mx of Neuroblastoma.

Inverse ptosis 1-2mm

Cong → Iris Colour

Acq → Rule out Tx of sympathetic pathways

↓

Do PE test

✓ elevatn → Internal Carotid Muller Muscle resection

✗ → LPS adv via. Ext. Crease Incision

3N palsy

Ptosis + Squint + Pupil

Cong

Thrombo Emb. Vasc disease

Both Trauma

Direct trauma 4m Amnio

Acq

Trauma

Inflammatn

Viral Inf

Migraine

Tumour.

Acute → Neuro-Eval

Chr → Aberrant Reg

Blepharophimosis Syndrome

- Horizontal shortening of Palpebral fissure
- Ptosis
- Epicanthal folds.
  - » Inversus.
- Telecanthus
  - Isolated
  - associated ⊆ other Craniofacial

- Malar hypoplasia
- hypertelorism
- fusion of eyebrows
- Poorly developed Nasal Bridge.

AD trait

FOXL2 mutation gene — forkhead transcription factor

Sq, chromosome

Ass ⊆ Neurological development defects

♀ → Amenorrhoea. ♀ infertility

Amblyopia »

℞ → Staged Sx Correction

- Epicanthal fold.
  - → Modified Mustard Tech
  - → V-Y Advancement
  - → Anderson Nowinski S flap tech
- Ptosis
  - Poor LPS
    - Sling »

Ptosis Dx

Cutch glasses

- Internal (Post)
  - Cory Mullerectomy Tarso
    - Fasanella Servat
      - Leave 4mm tarsus
  - Cory Mull (8mm Resect)
    - Putterman
      - Sparing tarsus 5-0 Nylon sutures
- Whitnall sling procedure
- Levator plication
  - good LPS action
  - Müller Levator Resection
    - ~~Hebes~~ Webb's
- External (Ant)
  - L. Advancement
  - L. Resection
    - Frontalis suspension
      - Double ∆ Tech
      - Single Rhomboid

\+ Phenylephrine elevation test −

» Predictability in GA ↓

↓ difficult » easy.

Lagophthalmos Anatomy identificat" Syntitic Exclusion

Spl Cases | MGJWP

- < 2mm
  - ≈ Myogenic ptosis
- 2mm
  - Recently
    - a) ✓
    - b) x as child made to learn
- >
  - a) Frontalis sling +
  - b) Extirpation of Levator

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Double Δ Tech of Crawford

Single Rhomboid Tech

Dx

α PE test

LPS action.

Response to PE		Dx
Good	MRD 4-5	Putterman Modified Fasanella
Moderate	3	Graded Modified Fasanella Heed procedure
Poor	<2	Levator Dx or Frontalis Suspension

Levator fxn → Procedure

Levator fxn		Procedure
Excellent	>13mm	Aponeurotic Adv
Good	8-12mm	" or Mod. Resection (14-17mm)
Fair	5-7 mm	Large L. Resection 18-22mm
Poor	<4mm	• Frontalis sling • Superaxinal Levator Resection

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Aponeurotic/Acq

Levator Resection (A) | MMCR

MMCR → 2 marking - 2 at ½ dist of desired correction.

Op Tech

Mark lid crease Incision
Infiltrate LA.
Incise skin / Excise for Blepharoplasty
÷ O. septum → Expose LPS below fat
Expose Ant Tarsal Surf,
Dissect Aponeurosis frm Tarsus
Advance levator forward/downward.
to reattach to tarsus ⊆ horizontal
mattress suture
Adjust lid Ht by repositioning sutures.
Reform lid crease.
Close skin.

Complication of Sx

Over Correction
Under "
lid Contour Abn.
lid lag
Lagophthalmos
lid Crease Asymmetry
Keratopathy
Infection
Hmrg.

Levator Resection

Conj approach → Blaskovics

Ext → Everbusch tech

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Ptosis

- Pseudo
- True
  - Neurogenic
    - 3N involve
      - Only 3N
        - Upper division
      - 3N + other CN
        - Both division
          - Examine pupil
            - + → Intracranial lesion
            - Sparing → Diabetis
          - Squint Sx → Ptosis
            - ↓
            - It may correct ptosis
  - Congenital
  - Myogenic
    - Exs
      - ↑ diplopia
        - Tensilon test
          - +ve
            - Myasthenia
              - Medical Rx
      - ✗ change
        - Progressive
          - ENG
            - Cosmetic correction
    - Horner
    - Cervical symp

Papilledema

Def : OD edema usually bil resulting from ↑ ICT.

Anatomy 1.2 million axon converge at OD.
50mm long.

- Orthograde
- Retrograde

Because of compromise of axonal integrity at lamina Cribrosa.

Etiology

a) Tumours
Large hemispheric masses

b) If Imaging -ve for { Mass Lesion / Obstruction of Ventricular System } # IIH
LP → ↑ opening pressure & (N) fluid Composition
last page.

Pathophysiology Blockage of Axoplasmic flow — to move of materials responsible for maintaining the axon, primarily proteins & organelle formed in neural soma & transported along axon
↳ Microtubules act as Railroad tracks

Orthograde flow

Slow	RAPID
0.5-3mm/day	200-1000 mm/day

flow obstructed by ← Mech causes
↑ Vascular.

Blockage at level of Lamina Choroidalis & Lamina Scleralis

Intrinsic Rx → Extrinsic Orbital Masses ← CRVO (Abn in bld flow)

Hydrostatic, non inflammatory phenomenon.

Physiological cup gets filled in → ILM raised

degenerate ← NFL swollen

show numerous cytoid bodies in front of Lamina Cribrosa

Ophthalmoscopy → engorgement of axons in lamina portion of ON

↳ filled w/ mitochondria

Choroidal lamina Cribrosa (LC) ↑ ← U

Subpial edema distal to site of entry of vessels

OPL is edematous × cystic spaces seen in HTN retinopathy

(*) Also in Astigmatism.

Ocular Manifestations

Ophthalmoscope

20D → 90D

Std (white) | Red free (NFL)

Clinical Signs

Mech.

- Blurring of OD margins (*)
- Filling in OD cup
- Ant extension of ONH (3D = 1mm)
- Edema of NFL
- Retinal / choroidal folds (Kestenbaum > 12)

Vascular

- Venous Congestion of peripapillary vessels
- Papillary & Retinal peripapillary Hmrg
- NFL Infarct
- Hyperaemia of ONH
- Hard exudates of OD.

Classification

Early	Fully developed	Chronic	Late.
↑ Hyperaemia	• gross swelling of ONH	→ ↓	→ 2° OA
↑ Swelling	• Engorged & dilsky veins	→ Hard Exudates ⊆ in Nerve Head	→ Disc Su ↓
Blurring of disc margins	• Peripapillary splinter Hmrg	→ few	→ RA nasso
" " NFL	• Choroidal fold & Retinal striae	→ OD completely obliterated. ↓ Champagne cork appearance DC shunts	→ OD dute gay. 2° to gliosis

Modified Frisen Scale

1. Min deg of edema → C shaped Halo that is subtle & gradient ≤ temp gap
   - ↳ Obscures underlying Retinal details
2. Low deg of edema →
   - Circumferential Halo
   - Elevation (Nasal border)
   - No May vessel obscuration
3. Mod deg of Edema →
   - Obscuration of >1 deg of may vessel leaving disc
   - Circumferential Halo
   - Elevation all borders
   - Halo (irregular outer fringe & finger like extension)
4. Marked deg of edema →
   - Total obscuration
   - Elevation
   - Border obscuration (Complete)
   - Halo
5. Severe deg of edema → Obscuration of all vessels on the disc & leaving disc

c/f

Headache — ↓ Nausea, Vomiting
Sense of pressure around ears
Worse in recumbent position
in early morning. → wakes up
during the day

Transient obscuration of vision
└ Mono/Bino blackout
↳ 3-4s
↳ Pt arises 4m recumbent position

Blurring of vision — ⇌ HH
Enlargement of Blind Spot
Adj. retinal folds & Edema.

Injury to ON → OA (2°) → Permanent
→ Poor colour vision
- Constricted visual fields

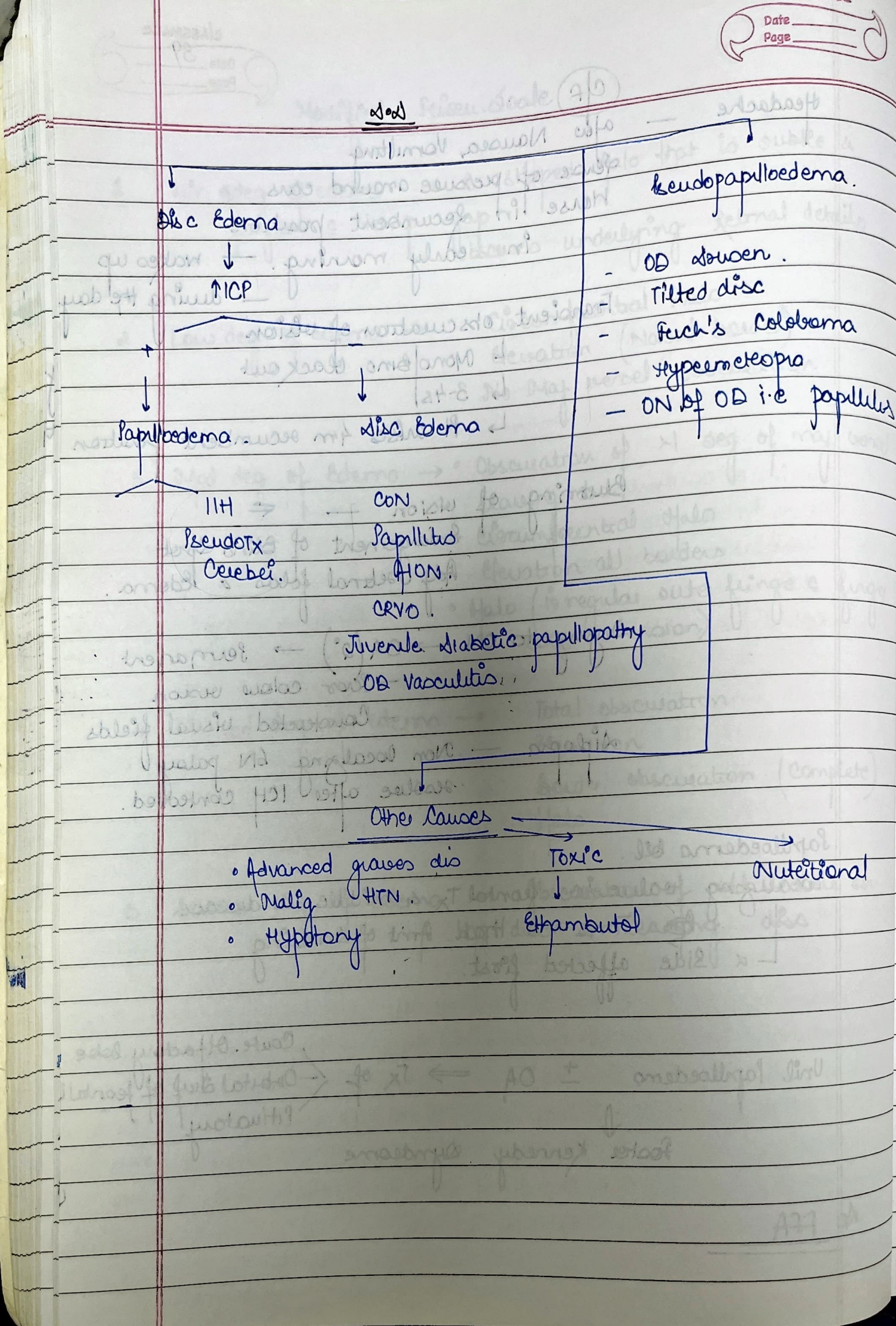
Diplopia — Non localizing 6N palsy
resolve after ICH controlled.

Papilloedema Bil.
Localizing value in frontal Tx & middle ear disease
└ ⇒ Time » than. Amt of swelling.
└ ∝ Side affected first.

Unil Papilloedema ± OA ⇒ Tx of ← Contr. Olfactory lobe
← Orbital surf of frontal
← Pituitary

↓
Foster Kennedy Syndrome

No FFA


Disc Edema
↑ICP
Papilloedema
IIH
Pseudotx
Cerebi.
Disc Edema
CON
Papillitis
AION.
CRVO.
Juvenile diabetic papillopathy
OD vasculitis.
Pseudopapilloedema.
- OD drusen.
- Tilted disc
- Feuch's Coloboma
- Hypermetropia
- ON of OD i.e papillitis
Other Causes
• Advanced graves dis
• Malig HTN.
• Hypotony
Toxic
Ethambutol
Nutritional

CON

» Ant Orbit to produce S. Edema
- glioma
- Meningioma
- Mases of Orbital & PNS
- Inflammatory & infiltrative lesions
- Mets/Secos of distal malignancies

Papillitis

follows prodromal viral illness
↓
Neuro-retinitis

Cells in vitreous
M. Star +

Marked symptoms
- ↓ vision
- RAPD
- ✕ / CSOL.

AION

Sectoral (pallid) Edema
Peripapillary Hmrg

Acute vision loss
Altitudinal shape

50-75 yrs.
HTN/DM ✓.

AION — NAION

DM.
Short post ciliary artery.
↓
ON swell" → Atroph
↓
OD Vasculitis Cupp

CRVO

Congestion in ONH

Ext Hmrg all over

» Middle age
Older individual
Hyperviscosity syndrome

Juvenile Diabetic Papillopathy

Unil/Bil D. Edema

VL — minimal

Peripheral constrict
Central Scotoma

Fundus - dilated telangiectatic vessels over disc
- OD NeoVasc

OD uveitis
Papillophlebitis
Big Blind spot Syndr.

Min ↓ VA.

Idiopathic Intracranial HTN

Pseudotumour Cerebri

→ Neg imaging for Mass lesions & Obstruction of ventricular System
→ ↑ opening pressure
→ Normal fluid composition

Headache → worst when recumbent
Absence of Any neurological sign other than visual loss
Neurological exam — (N)

Usually idiopathic may be associated with → VPLA

Tetracycline
Nalidixic Acid
Steroids (» steroid withdrawal)

Trauma → IIH ⇔ Intracranial Venous thrombosis ← OM, Mastoiditis

CTD
HyperCoagulable States

↓ PTH & Adrenal adenomas → IIH.

Associated Syndrome → Chronic Resp Insufficiency
Renal Syndrome
IDA
Obstructive sleep Apnoea
obese young ♀

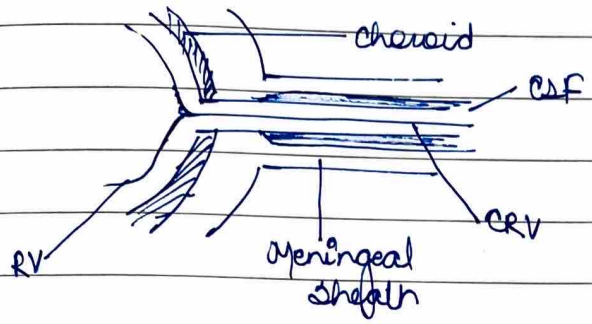
6N palsy Non Specific sign

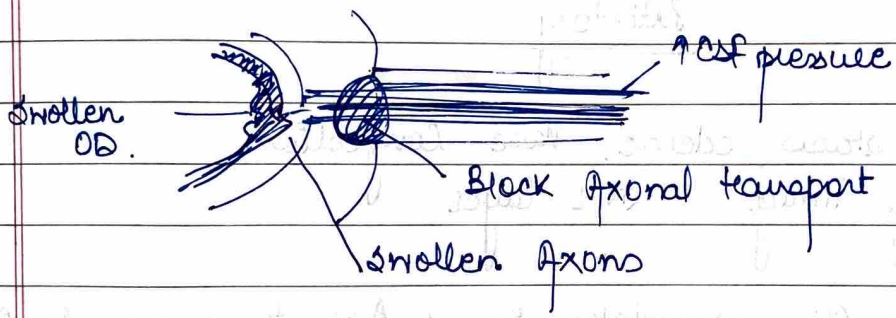
↑ resistance to CSF drainage

↓VA, Transient obscuration of vision, Enlarged Blind spot diplopia

Transient obscuration of vision + Optociliary shunt ⇒ Bad prognosis

Other R/F → Anaemia, ↑ Myopia.





℞ — Lumbar peritoneal shunt
local decompression by making multiple slits
Cutting window in ONS in orbit.

Systemic Ass

Visual +

6CN, Hearing loss, VII N palsies

↓

Self limiting after ↓ of pressure.

Pathology

Axoplasmic stasis, edema, Vasc Congestion

Peripapillary Hmeg — RNFL layer

- Vacoules of ECF accumulates in & Ant to Retrol lamina Cribrosa
- Engorgement of axons in laminar portion of ON.

classmate
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Rx ∝ Ophthal decision ∝ VLoss.

Address reason

Diuretics
CA inhibitor.

IIH

↓

Wt reduction.
Serial lumbar puncture
ONS decompression
LP shunt

Course & Outcome

& promptly the caused

Multispl approach.

OD Drusen

occurs in families

Bil, Inherited as dominant trait.

evolve slowly over many yrs

x > 2D

Papilloedema ass ⊆ Visual defects

Small ONH

Concentrically laminated globular aggregates

Altered axoplasmic flow at OD

OD drusen ass ⊆ Angioid streaks, SR. NVM, VH, RP

FFA → Normal

Pseudo Disc Edema / Pseudo Neuritis / Pseudopapilloedema

Hypermetropic eyes

appearance due to Ophthalmoscopic reflexes

x > 2D

FFA → no leakage

BMO (BM opening)

OCT — +ve ∠ b/t RPE & Bruch. → ↑ICT ⊆ papilloedema

x in Pseudopapilloedema

30° tilt test

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Disc Edema

Unil		Bil
• Papillitis	DOV + Improve"	• Papilloedema
• AION	✓ -	• HTN
• Orbital Tx	Slow	• D. papillopathy.
• OA vasculitis	Rapid -	• Adv graves
• CRVO	+/-	• CST
• Ocular hypotony	Rapid -	• CCF
• Foster Kennedy		• LHON
• Pseudo " "		• An/Hypoxia.

USG B Scan findings →

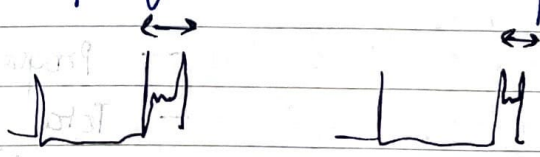
Avg ONSD = 5·5 ± 1 mm.

Of papilloedema — at 3mm behind globe 5-5·7mm

1.) → Spont. Venous Pulsation normalizes ≤ short term ICP fluctuation. ONSD does not

2) Crescent sign + → echolucent area in anterior Intraorbital optic & its sheath.

3) Lat gaze @ 30° test → 10% ↓ in diameter on A Scan in presence of fluid but not if due to infiltration.



ONSD

Ix — Rapidly progressive field & acuity loss
Established & progressive VA loss that is reproducible
Progressive loss ⊆ failed VP shunt
shunt c/I by ↓ Cerebellar tonsils / IC pathology
Not first line
Need Transconjunctival approach
MR hooked & Disinserted!!
Baseball sutures passed.
Put retractor & follow Long Posterior Ciliary Artery
Once you see short PCA.
Use keratome to put nick, the ballooned Optic nerve.
↓ CSF come
↓ Put back MR / reinsert.

Document / SAE on USG Scan prior to Sx
Crescent sign
Rough Nutt sign
Transverse Scan probe Mark up temporally at limbus

Sx ? Spontaneous Venous Pulsation present → surely IOT is not raised

Endoscopic → Ix → Failure to improve vision after 72 hrs of IV MP &
Progressive VL during steroid &
Total Blindness ⊆ CT evidence of ON decompression

ION

Ant
ONH.

Post.
Intra Orbital part of ON
x Visible disc Edema.

Arteritic

Non Arteritic.

	AION	NAION
	Epidemiology	
	↓ incidence	>50yrs NO gender
Mean Age	70	60
Sex Ratio	♀ > ♂	=

Pathogenesis

SPCA vasculitis → ONH infarct
OD edema ⊆ ischaemic Necrosis of peclaminar/laminar/Post portion of N & infiltration of SPCAs by chronic inflammatory cells

Insufficiency of OD circulat" at disk at risk. Inadequat O_2. produces isch & swelling of disc

isch → Axonal swell" → Vascular compression

delayed filling of OD & choroid 30-69s

5-13s

Rapid onset, stable course

Contributing factors -:
- Periodic Nocturnal systemic hypo
- Locat" of OD in watershed zone b/t distribut" of Lat & medial SPCAs.

AION	NAION
	FFA → segmental delay in disc filling ↳ and peripapillary choroidal filling ∴ level at parapapillic branches that supply ONH directly

Ocular Manifestation

Rapid onset, painless, unilateral loss of vision, ~~NOPL~~,
Altitudinal defect . RAPD . disk edema precedes Vision loss . Pallid disk edema → hallmark.
Also seen . Hyperemic swelling, focal or diffuse surface telengiectasia . peripapillary retinal ~~hemg~~.

- Headache, jaw claudication temporal artery tenderness » Occult temporal arteritis	VL reported on awakening » to Nocturnal systemic hypotension
Pallor +nt (chalky white » in AAION)	↓ pallor
	Luxury perfusion at ONH diffuse / focal telengiectasia
fellow eye disc normal →	disk at risk.

AION NAION

Diagnosis

↑ (70-120 mm/hr) ESR, CRP

Hayreh ESR >47 CRP >2.45 mg/dL 97% specificity of AION

↓

Temporal artery Biopsy.

false neg

Intimal thickening, ILM fragmental, Chronic Inflamm infiltrate

Skip lesions

Temporal arteritis

Systemic Associations

Systemic HTN, Migraine, Diabetes, OD drusen, OD drusen, Idiopathic VO disease

Treatment

i.v CH_3 Bed

Oral CS

↓

If No CS respond think of other Dx

Rx

✓ — X

13% better 54-90%

Oral CS

ONS Decompression

No recurrence + nt after 2mth → Think other cause

PION

- Ischaemia of ON not involving ONH.

Acute Visual loss + RAPD
Normal OD —— subsequent atrophy

2 settings

Vasculitis → GCA

Syst Hypotension + Anaemia → Bld loss 4m Sx. GI bleed & trauma.

DDD Compressive, Inflammatory, Infiltrative ON

Advise MRI

	ON	PION
Age grp		Older
+	Ophthalmoplegia	-

DDD of AION

Idiopathic ON < 50yrs
ON / Inflammat° — Syphilis, Sarcoidosis
Infiltrative ON
Ant Orbital lesion → Ant ON compression
Diabetic papillopathy

Optic Atrophy

Hereditary	Nutritional	Toxic
LHON	B12	Tobacco
Kjer's AD. OA	folic Acid	Methyl Alcohol
		Amiodarone Indu

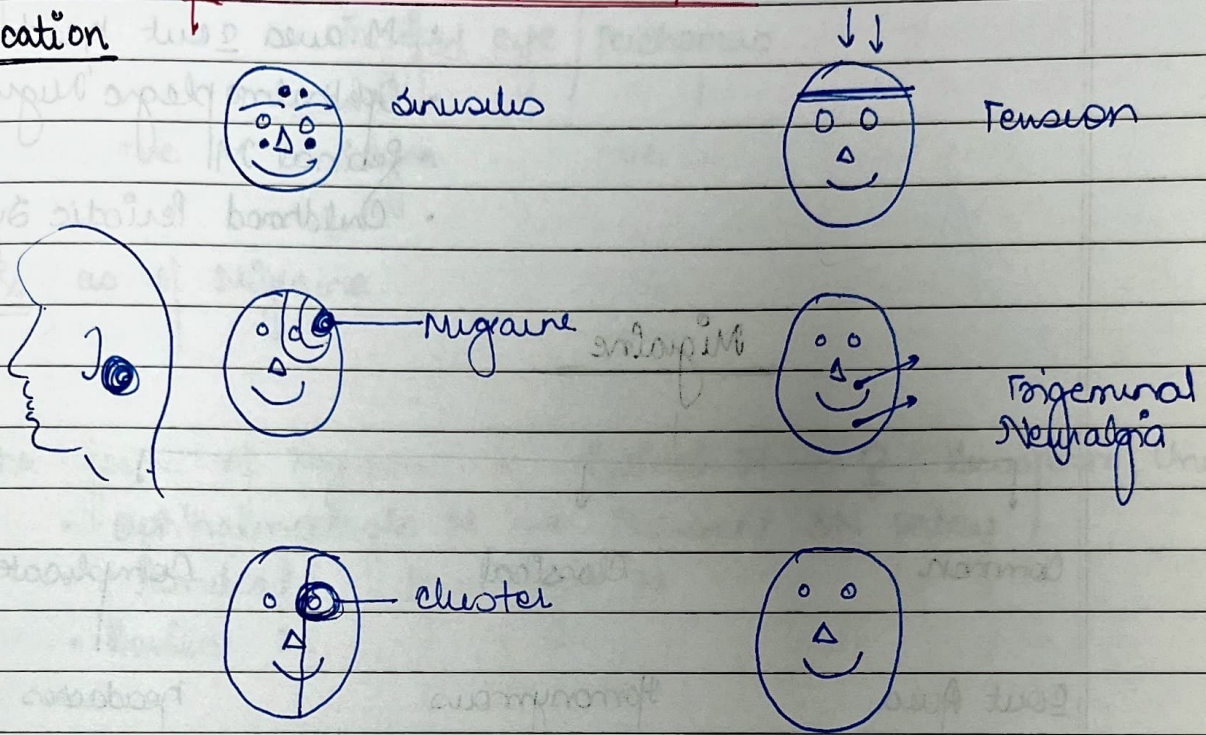
& of LHON — Idebenone — Quinol Analog — Ameliorate Net ATP synthesis by providing alternate pathway

→ Sechiasmal pathways – Compression by ON & Sheath Tumours

Dysthyroid Ophthalmopathy | Glioma | Meningioma.

Headache & facial Pain.

Location



IHS Classification of Headache

- Migraine
  - A
- Tension
  - Episodic
  - Chronic
- Cluster
  - Typical cluster
  - Chronic paroxysmal hemicrania
  - Atypical cluster

Myofascial Syndrome
Tension headache count
disorder of pericranial msl.

Migraine

- Without aura
- With aura
  - Typical aura
  - prolonged "
  - familial Hemiplegic M.
  - Basilar M
  - M. aura ± out headache
  - Ophthalmoplegic Migraine
  - Retinal M
  - Childhood Periodic Syndrome.

Migraine

- Common
- Classical
- Complicated

± out Aura

Homonymous Hemianopia visual aura

headaches ± Nau visual Neuro symptoms that occur during/after headache phase

± out Aura → Headache unil → Think of ICSOL
Throbbing, over 1-2hrs
last for 24hrs
exacerbated by routine physical activity
Nausea +
Like Quet room

c area → Prodrome — homonymous scintillating scotoma
Hemisensory disturbance

Visual area — perception of multicoloured shimmering lights beginning in paracentral area & expanding in crescent shaped fashion to obscure hemifield of eye

Jagged eye / Teichopsia

+ve edges -ve

Rx as of Migraine.

Other forms of Migraine
- Retinal M — ♀, Vasospasm, Unil
- Ophthalmoplegic M → Transient 3N palsy
- Familial Hemiplegic M.
- Basilar M.

Neuralgia
- Cluster Headache
  - SUNCT (Short lasting, unilateral, Neuralgiform headache attacks & Conj injection & tearing) Syndrome
    - ↓ Severe
    - ↔ >
    - » Autonomic features
- Trigeminal Neuralgia → × Autonomic features
- Paroxysmal hemicrania (Sjaastad Syndrome)
- 1° Stabbing headache
- Raeder Paratrigeminal Syndrome
- HZO.

AVM of Occipital lobe vs c aura

Intermittent — Visual phenomenon. 15-20 min episode complete before

) Occipital apoplexy ass c Hmg

Ophthalmoplegic Migraine → 3N.

- A prior H/O typical common/classic M headache
- Ophthalmoplegia during an established M. attack.
- Exclusion of other reasonable causes by clinical & radiological studies

Recurrent demyelinating inflammatory cranial Neuropathy

Retinal Migraine → Hemianopic & cortical in origin

Transient Monocular Vision loss +

Amaurosis fugax —

Well established migraine

+/- aura

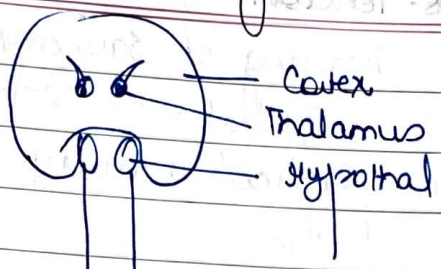
x.

APLA & other AI disorders

Amaurosis fugax study group – 5 categories

- Embolic
- Hemodynamic
- Ocular
- Neurologic
- Idiopathic

Pathogenesis of Migraine



NRD LC.

BV

- Dilation of Extracranial Vasc
  ↓
  Sterile Perivasc Inflamm
  ↓
  Release of Vasoactive peptide
  ↓
  Activation of perivascular pain recep
  ↓
  Stimulat^n of pain centre in Spinal Nucleus of Trigeminal
  ↓
  Cortical perception of pain

Adrenal Stimulation
↓
Release of NE into circulat^n
↓
Platelet release of 5HT into circulation

React^n of Cortical circula blood vessel
↓
Cortical ischaemia
↓
Spreading neuronal depression
↓
Focal Neurolog Signs

Stress - Tension Headache

Mild to moderate pressing or squeezing sensation
Non pulsatile, Bil. radiation to post- neck
↑ by routine physical activity
1/yr last ½ hr

→ Headache free intervals diff 4m path processes

Pericranial Not involved.
Myofascial pain syndrome — reproducible pain on palpation of trigger points
↳ fibromyalgia

Cluster Headache

Most painful. Suicide — Unil/Peri Orbital
Horner Syndrome +
Nocturnal occurrence
Sumatriptan
Li

Temporal Arteritis

> 50yrs
Dr of Sup temp artery. + tenderness of scalp
Pain ∂ chewing
Diplopia
Transient Visual loss

ESR
CS given.

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Headache due to Intracranial pathologies

New Onset Headache
New pattern
The Worst headache ever
Change in personality / mental status
Focal Neurological deficit
Signs of Meningeal Irritation
Unexplained fever
Recent head trauma

Sinus disease

↓ to moderate. Daily + frontal / maxillary area
Bending forward, blowing Nose
Nasal decongestant

Sphenoid Mucoceles

Orbital Pain & Nausea

classmate
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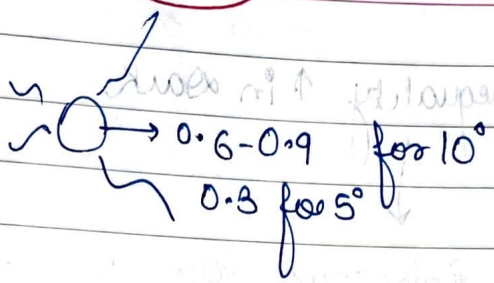
DD of facial pain

Trigeminal Neuralgia (Tic douloureux)
Raeder's Paratrigeminal syndrome
Chronic Para-oxysmal hemicrania
Ice Pick Headache (Jabs & Jolt's syndrome)

RAPD



0.3 for each Quad

Causes

Neutral Density filter
Tilting test (To aff hippus) → 0.3 → >> apparent
At least 3 times
Inverse RAPD

Dx – Infrared Videography
Computerized pupillometry
Pupil Perimetry

Inequality ↑ in dark

↓

Anisocoria reverses in Bright light → Tonic pupil →

↓ ⊕ ⊖

Dilatation lag in smaller pupil when lights off

+ −

Horner's → Physiologic Anisocoria (0.4mm)

↓

Drug test

Cocaine HCl 5% / 10% | 60min

↓

Aniso ↑. Smaller pupil dilate poorly → <0.8mm → Equivocal

↓

Phenylephrine 1%

↓

>0.8mm in light

↓

Small pupil.

↓

Horner's ? level

↓

dilates well become larger

poorly

↓

Hydroxyamphetamine 1%

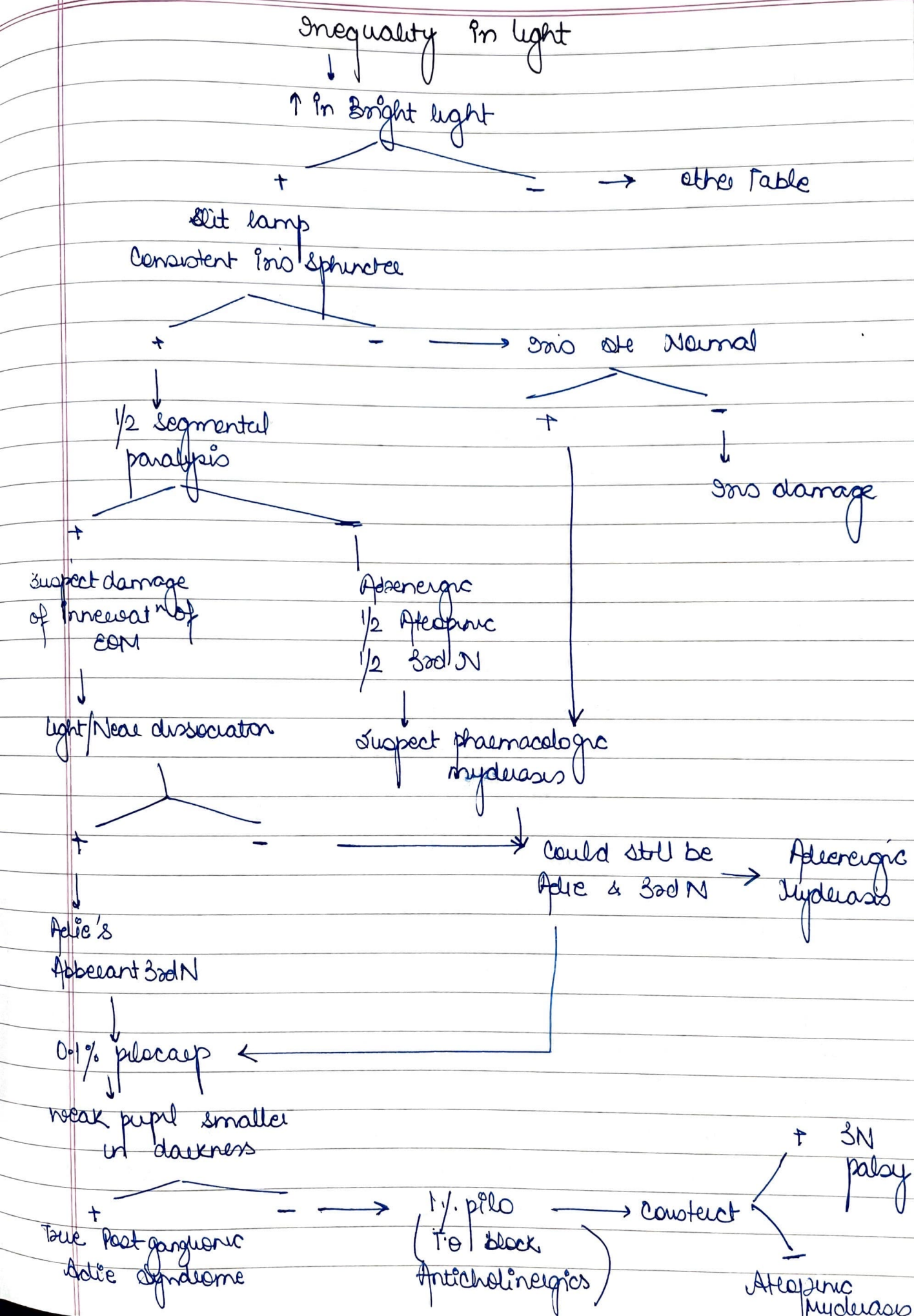
↓

Structural Aniso.

Both dilate → CNS Horner's

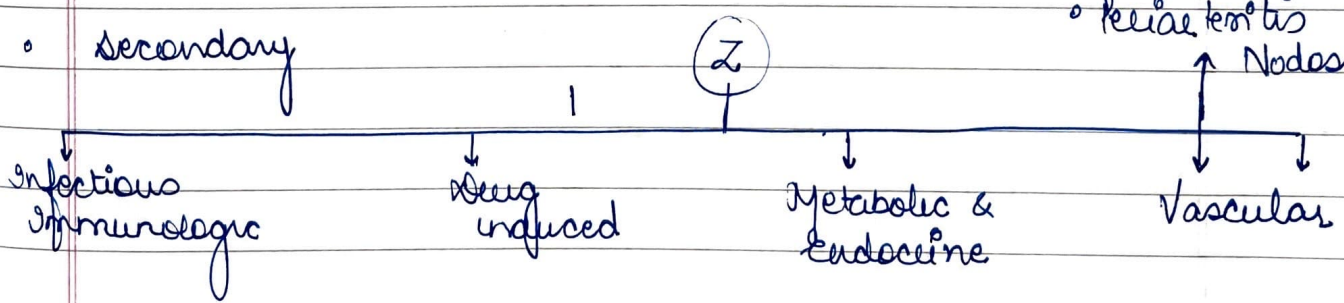
Both dilate. Horner's – larger → Pre

Horner's x dilate → Postganglionic


Inequality in light
↑ in Bright light
+
−
other Table
Slit lamp
Consistent iris Sphincter
+
−
Iris ste Normal
+
−
1/2 Segmental paralysis
Iris damage
+
Suspect damage of Innervat" of EOM
Adrenergic 1/2 Atropine 1/2 3rd N
Light/Near dissociation
Suspect pharmacologic mydriasis
+
−
Could still be Adie & 3rd N
Adrenergic Mydriasis
Adie's Aberrant 3rd N
0.1% pilocarp
weak pupil smaller in darkness
+
−
True Post ganglionic Adie Syndrome
1% pilo (to block Anticholinergics)
Constrict
+ 3N palsy
Atropine Mydriasis

Neurodegeneration

- Dystonia
- Cerebellar
  - Friedreich Ataxia
  - Marinesco Sjogren Syndrome
  - Ramsay Hunt
  - X linked Inherited Ataxia
  - Charcot Marie Tooth disease.
- Parkinson
  - Progressive Supranuclear Palsy
  - Shy Drager Syndrome
  - Hallervorden Spatz disease
- Chorea
  - Hereditary
  - Huntington's disease
  - Hereditary Non progressive
  - Neuroacanthocytosis
  - Wilson
  - Ataxia telengiectasia
  - Leach Nyhan Syndrome
- Secondary
  - Hemichorea
  - Retinal tortis
  - Nodosa



- Sydenham Chorea
- Encephalitis
- SLE
- L dopa
- Ant Convulsant
- Cholinergic psychotic
- Chorea gravidarum
- Hyper T
- Birth Control pills

(x)

Dementia
Alzheimer.
Pick's
Creutzfeldt Jacob
Charles Bonnet

Mito rel dis
- LHON
- Muto dis ⊆ Mutat^{n} of nuclear DNA.

Urgent NO emergencies

- Giant cell Arteritis
- Aneurysm
- Cavernous Sinus Thrombosis
- Orbital Apex Syndrome ++
- Pituitary Apoplexy ++

	Giant cell Arteritis	Aneurysm	Cavernous Sinus Thrombosis
Visual loss	+	−	+
Ophthalmoplegia	−	+	+

(a) Giant Cell Arteritis

Epid — 7th decade

Patho — affects primarily small to medium sized arteries
└ Ophthalmic, temporal, PCA
↓
Segments occluded
↓
Choroidal Ischaemia / ION.

Arterial thrombosis — demonstrated by delayed choroidal & disc filling on FA.

Ocular Manifestation → Sudden vision loss in 50% of these patients. → Dcos of AAION
Amaurosis fugax ⟶ Permanent Vision loss

CRAO, Choroidal ischaemia, PION

elderly + CRAO + Non Valvular lesion ⟹ GCA.

- Diplopia — Infarction of EOM, CN, BS nuclei
- Greater Stroke Syndrome

Diagnosis ∝ clinical signs & symptoms
Lab findings
Temporal artery Biopsy — gold std
2 cm.

Headache (Unil) + Scalp tenderness
Myalgia, fatigue, Wt loss, ↓ appetite

ESR	↑↑	∝ Age & gender
CRP	↑↑	
CBC	Normo An,	Thrombocytosis

Upper limit of Normal → ♂ → Age/2.
→ ♀ → (Age+20)/2

Dx NAION — younger
- ↓ vision loss
- neg review of system
- (N) Lab test

Inflammatory ON
- ON swell^n pain eye Move^n.
- neg. review of system

Compressive Tx
- slow progression loss
- →

Diabetic Papillophlebitis
- young
- ON sw ± Hmg
- →
- mild ↑ ESR.

CRAO
CRVO

Pathology Overwhelming Inflamm cell destruct^n of int elastic lamina & necrosis of media. Occluded vessel lumen
Multinucleate giant cell

Rx — Systemic CS
80-100mg
i.v Ctg Pred.

Outcome — Avert vision loss in fellow eye
Unx — 90% suffer vision loss.

Aneurysm

Epidemiology — Intracranial saccular Aneurysm – 9/1 lac
↑ with Age, Peak 6-7 decade ♀>♂

Pathogenesis

- Carotid Artery main trunk → 40%
- At level of PCOM
  - Most freq. to cause 3rd N palsy before rupture
  - Pupil involving ← probe to rupture
  - Sub Arachnoid Hmrg
- Ophthalmic artery
- Cavernous Sinus

Ocular Manifestation

↳ ∝ position of Aneurysm
Cortical blindness — Basil A.
Vision loss
O.plegia — A. of Circle of Willis & CS
Complete Unil ptosis
1-2mm ptosis — laxity of palsied mal
Abducted Eye (Down & Out)
Anisocoria — destruction of PNS fibres on surf of Nerve
↳ ↑ Bright light

DM + 3rd N + Pupillary involve ⇒ Aneurysm

Diagnosis — frontal head pain

Unruptured
↓
Pain 2m. Adj tentorium

MR Angio, Spiral CT, DSCA — gold std

A Saccular Aneurysm. 4mm or > seen at jxn of ICA & post communicating artery.

D.D

Angio neg

- Microvasc or Ischaemic lesion
  - ↓
  - DM
  - Pupil – ⊖
- Epidural or Subdural hematoma
  - Trauma H/O
  - Mental status changes
- Meningitis
  - fever +
- Migraine
  - relapsing/remitt" aura

Pathology → Marked thinned media & adventitia
Area of thinning, fragmentat", absence

Rx ∝ size & position ∝ Age ∝ health

Unruptured — Direct/Open Sx
Endovascular

Direct
↓
Apply metal clips at base of Aneurysm
Damage to adj str.

EndoVascular
↓
Catheter to introduce balloon, coil

Cx — Incomplete closure
Displacement
Rupture.

Cause & Outcome → Result of Sx – Excellent
Mortality 1-5%. Morbidity 10-15%.

Cavernous Sinus Thrombosis

Epid

Pathogenesis

- Septic
  - ↓
  - 100% Mortality
  - Sphenoidal & Ethmoidal Sinus
  - Acute / Chronic (gram +ve bact) -ve / fungi
- Aseptic
  - ↓
  - Venous thrombosis
    - Polycythemia
    - Vasculidites (Sickle cell)
    - Trauma
    - Neuros x
    - Preg
    - OCP

Ocular Manifestation → Eyepain, Orbital Congestion Proptosis, Adenexal edema, Ptosis, O. plegia (3,4,6) $V_1 V_2$

Uni ↘ Bil as infection spread to Contralateral side through Circular Sinus.

Nausea
Vomiting

Dx Neuroimaging
NC CT , MRI c fat suppression

DD
Orbital apex Syndrome
Tolosa Hunt " (Exclusion)
AV fistula
Thyroid Eye disease

Pathology
Sinus specimen — Infection
Gram Stain
India Ink stain
Non septate large branching hyphae

Rx
AmB + Anti coagulation
CS
Debridement of sinuses
Mucor — Ampho B.
Correct underlying Metabolic Acidosis

Course & Outcome
30% Mortality Morbidity ↑.
↓ in Aseptic

Orbital Apex Syndrome	Pituitary Apoplexy
Epidemiology	Rare condition
1% of O. cellulitis	0.6 - 9 % of P. adenoma
50% ← DM	1-9 decade
Rhinocerebral Mucormycosis	♀ = 0 →
M C.	
Pathogenesis	Sudden enlargement of Tx PG Adenoma
Ketoacidosis is R/F	Sudden enlargement damage
↳ lack of inhibitory	surrounding str → Optic chiasm
activity against Rhizopus	Hypothalamus
↓	→ Rapid expansion into CS.
Restored upon correction	ppt factor → ↓ Bld flow in pitu
of acidosis	stimulatn of gland in ↑ Esteo stat
	↳ Beg, AntiCoag, ↑ Bld flw.
Ocular Manifestations	
O. plegia	Painful O. plegia
Ptosis, ↓ Corneal sensatn	Vision loss
Vision loss early than OAS	VF ↓.
RAPD +	RAPD +/-
Later → Adenexal edema &	Variable ⇒ O. plegia &
Orbital congestion +	asymmetrical
Proptosis	
Eschars + if Unx disease.	

Orbital apex Syndrome

↳ as CST.

OAS occurs ⊆ Ethmoid Sinusitis

Order Coronal & Axial views

↳ CST

Pituitary Apoplexy

Diagnosis

Meningeal irritation

Hypofxn of gland

Irregular Menses, Libido, ↓ Na⁺

Hypoth, ↑ Cortisolism

MRI — gold std.

DDx

Intracranial Aneurysm — both expanding & ruptured

↳ if Dx unclear

MR Angio ↓

Pathology

P. Hmeg, Necrosis, Thrombosis

↑ deg of Necrosis

Null Cell — Most freq.

↓

Somato → Cortico — Lacto

↓

Gonado.

Rx

Decompression of Sella transsphenoidally

Bromocriptine — in cases ⊆ no. Neuro-Ophthal deficit

- Supplementation of Pit hormone

Course & Outcome

Mortality 46% – 52% despite Ampo B & Rx

↑ Morbidity

Permanent Neuro deficits

Rx decompr — good outcomes

high Improvement

Transient Visual Loss (TVL)

Due to fatal / benign conditions

TVL

- Binocular
  - Visual obscuration — sec-min — OD swelling & Abn
  - Amaurosis fugax — sec-min — Often altitudinal
  - Prolonged transient — 15-60 min — HTN, Retinal migraine, Hematopoietic VL
- Monocular
  - Homonymous attacks 10-30 min, No other Symptom
    - Isolated visual Migraine
    - Acephalic Migraine
    - Migraine accompaniment

Abn of vision, Pupillary abn — Colour Vision loss, Amsler chart defects

Monocular TVL — Impacted embolus

- Localized hard white → Ca^{2+} → Damaged AV & MV
- Thromboplatelet emboli → Bx of Retinal Bx Arteriole → white/gray
- Hollenhorst or Cholesterol → yellow, golden

∴ generally missed, pressure on eye

Retinal emboli — Main cause of Amaurosis fugax
└ Carotid artery likely source

- Auscultation of Bruit in Neck — No. MRA or Carotid Dopplers

Dx

Nature of episodes
- When, where, how
- Did it appear or disappear gradually
- Did field loss occur

Certain effect of Altitudinal MVL.

Type of Visual loss
Mon/Bin
easily told by pt

Length of episodes
1-5 min

Freq of Episodes

Isolated.
Sufficient to warrant Tx
Carotid doppler study

Recurrent over short interval
full workup.

Associated Symptoms
CL Weakness — Severe Carotid stenosis
Cerebral TIA — Embolic to Brain, HTN
Transient Binocular Blindness — PCA Ischaemia

Underlying risk factors
HTN
DM.
Hematopoetic disorders
OCP

young pt — HyperCoagulable States

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Sx, Cause & Outcome → Ix & Rx

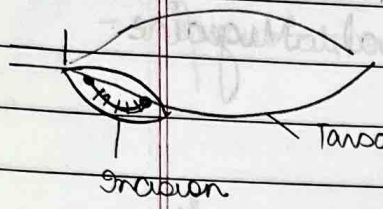
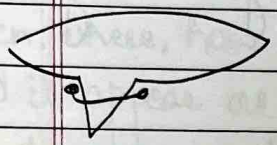
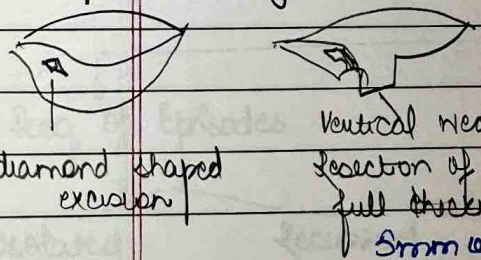
Transient Bilateral loss of Vision →
Isolated Visual Migraine

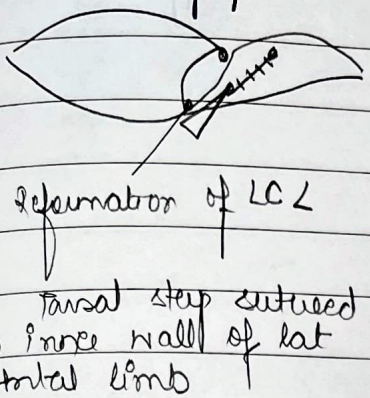
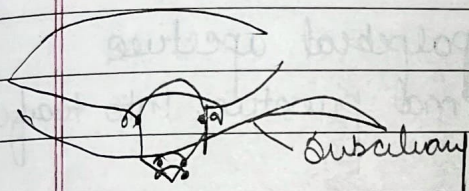
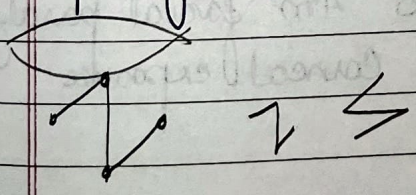
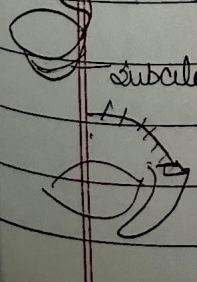
Scephalic M
M accompaniments
Kaleidoscopic light ×10-20 min
Miller — No Migraine Dx until Embolic event rule out

Complicated — Prolonged Neurological deficit
VF testing

Say a word abt Pediatric, Ophthalmoplegic. Migraine too.

Ectropion

a) Plication of Ant limb of Medial Canthal tendon	Involutional E + facial palsy Mild MCL. No Canthal ∠ displacement at rest
Ant limb of Medial Canthal tendon  	(+) lat horizontal lid shortening procedure Arm to support MCT x overtight — Ant displacement of lid margin + Wrinkling of skin
b) Medial Canthal Resection 	MCLaxity +, dystopia of MC∠ Involutional Resection of MC structure + horizontal lid shortening
c) Excision of diamond of Tarsa Conjunctiva  	Punctal eversion + x Horizontal lid laxity MCT normal Vertical shortening of post lamella ⇒ Media shortening of Medial lid retractors — Mild Involutional ectropion " Cicatricial changes
d) Medial diamond excision + Horizontal lid shortening (Jaggy T) ↑ Byron Smith	Medial Ectropion ± punctal eversion + Medial horizontal lid laxity

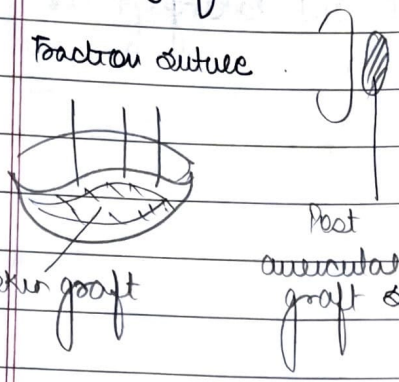
Lateral Tarsal strip procedure 	lateral & Canthal tendon laxity & gen horizontal lid laxity
Horizontal lid shortening by full thickness wedge excision 	Horizontal lid laxity + x LC or MC laxity
Horizontal lid shortening + Blepharoplasty (↑) Kushner Symanowski Procedure	Excess of LL skin + gen Horizontal lid laxity, Involutional
Z plasty 	lid shortening due to focal linear Scar
Pedicle transposition flap 	Mild Cicatricial changes

a

Skin graft

Diffuse skin shortage

Traction sutures



b

Medial Canthoplasty

Support to medial LL
& vertical palpebral aperture
bring lacrimal punctum into tear film

Mild paralytic ectropion + LL eversion

c

Lateral Tarsorrhaphy

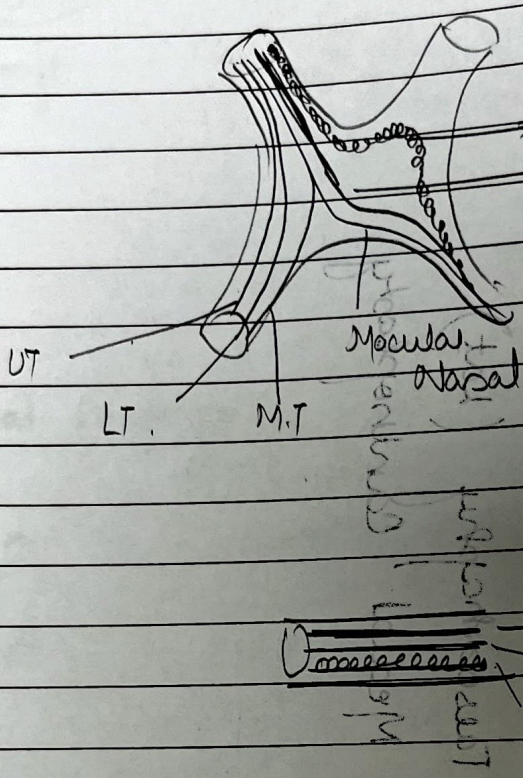
Lagophthalmos 4m facial paralysis causing. Corneal exposure

Pillar T.

Temp

Permanent

- Cicatricial
  - Anti Scar Cream
  - Silicon gel sheet
  - V-Y operation
  - Z plasty / Elschnig's operation
  - Skin grafting
  - Pedicle transposition flap.
- Paralytic
  - Self Resolution
  - Temp Measures
    - frequent lubricatn
    - Lid taping at Night
  - Tarsorrhaphy (Lat)
  - Medial Canthoplasty
- Mechanical
  - ↓
  - Cause


LN
UN
Macula
UT
LT
M.T
UN
Macular
LN

Optic Chiasma / Parasellar Region / Pituitary fossa.

X → Chiasma

nasal fibres crossing.

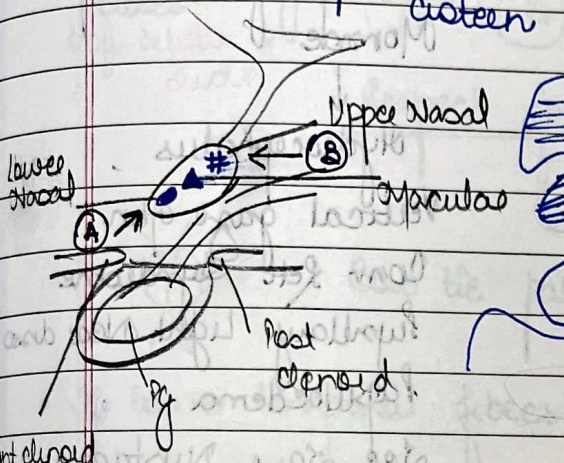
Anatomy

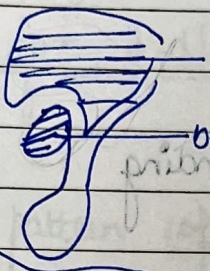
10mm abv PG

Supersellar

Dorsa of sphenoid bone

Inf Chiasmatic cistern





Sphenoid sinus

Prefixed

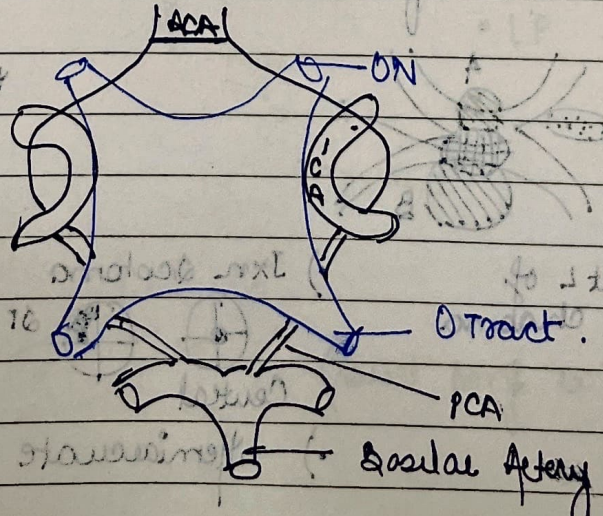
Post fixed

Tuberculum Sellae

Overlies

Dorsum Sellae

- Willibrand Knee
- Arrangement of fibres
- Rel ⊆ B.S



Colour Desaturat^n – Red test

Signs & Symptoms

Chiasmal

Unaware of deficit

↓

Loss of depth

Double vision

Hemifield slide

↓

Acute NOV ± ON.

fluctuation of vision.

OD pallor – late finding

Parachiasmal

Ocular Motility

Pupil

Facial Sensation

Optic foramen of Monroe

↓

Hydrocephalus

Vertical gaze Pal.

Conv Ret Syndrome

Pupillary Light Near dissoc

Papilloedema

See Saw Nystagmus

→ x Sleep

→ x Blind

Cause Oscillopsia

Preexisting phoria

+

Bitemporal hemianopia.

↓

Exo — Hyper — Eso

→ Post fixation blindness

A

C

B

good

Ant ∠ of chiasma (Post fixed lesion)

•) Ixn Scotoma

Central

•) Hemianuate

ST.

V on

Sphenoid Meningioma

IN fibres looping into Non Uninvolved Knee

Overlapping Blind field

H/O difficulty in near task binocularly

→

B compression from below (Prefixed) — Bitemp Hemi / Bitemp Sup Quad — Pit Adenoma

V from apex up & post (Post fixed) — Bitemp Inf Quad — Craniopharyngioma

C Post chiasma & decussating fibres from below & side — Binasal (Upper) hemianopic — B from image 1

Respect for Midline + Vertical

Bow tie pattern of Atrophy (+)

- If lower temporal fibres involved — for sure its not Pituitary adenoma.

Dx

Neuro Imaging ⟷ Vf test — Other Dx testing

VA
Anat location

MRI >>
CT – Tx lesion
Calcification
Hyperostoses.

Endocrinal

- MRA – Vasc
- LP – Inflamm

VF

- Single Center isopter
- Static threshold sensitivity ≤ in Central 15-20° from fixation
- Changes in colour perception

classmate
Date
Page

D.D
- Retinal Conditions (Nasal RP)
- OD. Anomalies (Tilted disc)
- Artifacts

Systemic Association
- Headache
- Block CSF circulation
- Hydrocephal features
- Endocrinology changes

Etio

- Pit Adenoma
- Pit apoplexy
- glioma
- Meningioma
- Craniopharyngioma

Pit Adenoma

12-15 % IC neoplasm
↑ after 4th decade

Micro. <10mm
Macro =10mm

- Intrapituitary
- Intrasellar
- diffuse
- Invasive ↓ 35%

Type of cell involved.

spaces abv & below allow min. expansion ≤ out field loss
If VF loss + Trunk of adv. enlargement

Pit Adenoma
- Retrose ↓
- Endocrine ↑
- Systemic Sign ↓
- Visual pathway >>
- Inactive

Craniopharyngioma

Children & young adult
Embryonic vestigeal epithelial remnant of Rathke's pouch b/t Ant & post lobes of Pit → benign freq Cystic Tx

Bimodal Incidence
1st 2 decade 50-70 yrs
2-4% IC Neop.
Suprasellar, Intrasellar & Intracranial involvement
Extension Into 3rd Ventricle → Hydrocephalus
Post ext → Ventral BS compression & Cerebellar "

Pit Adenoma

Discrete Nodule 4m Ant part of gland – Adenohypophysis
↳ Necrosis occur

Lactotroph | Somato Cortico Thyro
Endocrine inactive cell (Null cell)

Prolactin — Bromocriptine
2.5mg OD — Shrink
in 6 wk, S.E CSF rhinorrhoea & Chiasmal herniation

- Growth hormone — Octreotide

Reg — × Bromocriptine better delay or transsphenoidal resection
↓
Post op Radiat^n Rx × > 200Gy
else Radionecrosis

Craniopharyngioma.

Solid & Cystic. Contain oily fluid
calcification +

Craniotomy ← → Subdiaphragm / Optic
↓
Trans Sphenoidally

Optic – difficult to Manage
Intracavitary placement of Radioactive & chemotherap
Recurrence ≤ in 2yr
Radiat^n > 5yrs age → bcos of visual impairment & growth retardation
60% visual recovery.

Supranuclear Control of Ocular Motility

Congenital — Acquired.

- COMA (Congenital Ocular Motor Apraxia)
- Vertical
- Horizontal

COMA

congenital saccadic palsy ♂ > ♀

- Rotate the child on table — No corrective horizontal fast phases seen
- Abn in Cerebellum / Post fossa
- Developmental delay (+)

S.S — Aicardi syndrome • dysgenesis of Corpus Callosum & Cerebellum, Ataxia telangiectasia, Cockayne's syndrome, Joubert's S, Succinic Semialdehyde dehydrogenase defi.

⇒ Congenital Vertical Ocular Motor Apraxia.

L.S.S — Neurovisceral lipidosis
Birth injury, ICA, Perinatal hypoxia

⇒ familial horizontal gaze palsy & Scoliosis (HGPS) → AR.
characterized by paralysis of horizontal gaze from birth, Scoliosis, OKR ×, VOR, fine pendular Nystagmus

Acquired gaze palsies

Stroke, Head injury, Tx, Seizure, Metab disorders

- Acute hemispheric stroke — transient gaze deviation
  - deviated toward side of lesion
  - resolve.

- Total Conjugate Ocular deviation - Destructive lesion
  - Part of Todd's paralysis

- PPRF Inj

Rostral	Caudal
Intact · VOR	×
- Ipsi Adduct weak	+
- Nystagmus	++

- Wrong way eyes — Toward hemiplegic side
  - Supratentorial lesion ∟ Thalamic Hmrg
  - Large perisylvian / lobar Hmrg

- PPRF
  - Partial → × maintain eccentric gaze ex. Nystagmus
  - Complete → Complete loss of Vol horizontal gaze
    - ↓
    - Quads pt ⇒ Locked in Syndrome
    - Diff fm Coma ⇒ Vertical eyelid movement

Disorder of Pursuit

- OKN goes
- Ass ⊆ Contralat homonymous hemianopia

Balint's Syndrome

- Apraxia of gaze
- Simultanagnosia
- Optic Ataxia

Disorder of Vertical gaze

- Midbrain lesion
- Supranuclear Upgaze palsy → Lid retraction
  - Upgaze
  - Light near dissociation
  - Impaired Convergence
  - Convergence Retraction Nystagmus

Parinaud Syndrome

Dorsal Midbrain lesion

- Downgaze palsy — Rostral nucleus of MLF.
  Percheron's artery — Post Thalamosubthalamic
- Steele Richardson Olszewski Syndrome — Postular instab. falls
- Wilson — Upgaze palsy
- Kernicterus/ Neonatal Jaundice — Upgaze palsy
- Huntington's disease — Vertical saccades » affected
- Forced upgaze
- Benign paroxysmal Tonic Upgaze → » Cystic fibrosis
- Forced downgaze — hydrocephalus.
- Skew deviation — Wallenberg Syndrome

- Ocular tilt rxn
- Ocular Counter Rolling
- SVS
- Congenital NES → Monocular
  Bi ..

Ocular Motility disorder.

Cerebellum

a) flocculus - stabilize image on fovea
b) Vermis & fastigial nuclei - Amplitude
c) Nodulus - Vestibular interaction
b) - dysmetric
a) - gaze evoked, downbeat Nystagmus
  Impaired smooth pursuit
c) - PAN

- Posterior fossa Tx → x regain fusion
- CONA after spectacle
- Chiari Malformation

Sign

Saccadic dysmetria
" pursuit
Sq Wave jerk.
Impaired VOR suppression
Gaze Evoked Nystagmus
Vertical Nystagmus

Vestibular system.

↓

Skew deviation

Vergence Disorder

- convergence Paralysis — Cerebellar deg
  Parkinsonism
  PSP
- C. Insuff
- ∆ ″
- ∆ · paralysis
- Spasm of Near reflex
- Post traumatic fusion deficiency
- Ocular Neuromyotonia

Painful Ophthalmoplegia

- Trauma
  - Tx
  - Ischaemia
- Aneurysm
  - Infection
    - Ophthalmoplegic Migraine
- CCF
  - Inflammation
    - Ophthalmoplegic Migraine
- CST
  - Giant cell arteritis

InterNuclear Ophthalmoplegia

3N
‖ MLF
↓
(6)

Injury to MLF
↓
a) ∴ x Adducting saccades of ipsi eye on lat gaze (away from side of lesion)
b) L Add eye overshoots & dissociate Nystagmus

BL INO
↓
Add saccade – slow
Upbeat & Torsional Nystagmus

→ Convergence preserved
Skew deviation
Defective Vertical Smooth pursuit
Impairment of Vertical VOR.
Impaired ability to suppress VOR

INO
disorder of BS
L Vascular
Demyelinating
Ayetostatic

Pseudo INO
L Myasthenia
L Long standing Exotropia

⇒ 1½ Syndrome → damage to caudal pons

↓

Ipsi MLF + { Ipsi PPRF / 6 Nucleus

Intact move is Abduction of contralateral eye

↓

Oculopalatal Myoclonus → 7N also +

1½ — MS, Brainstem stroke

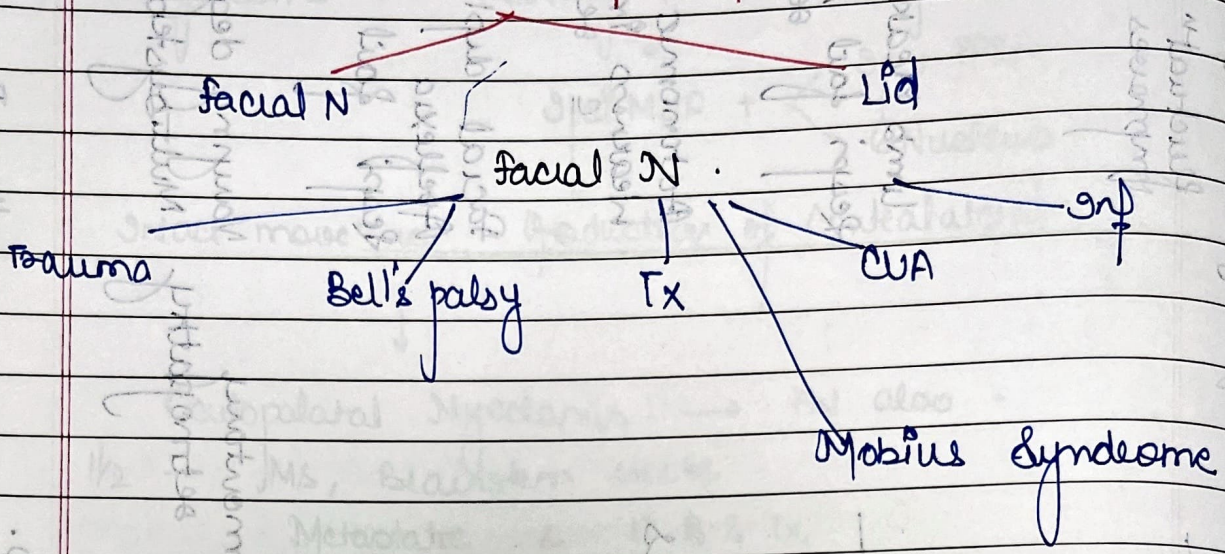
Metastatic & 1° B.S Tx

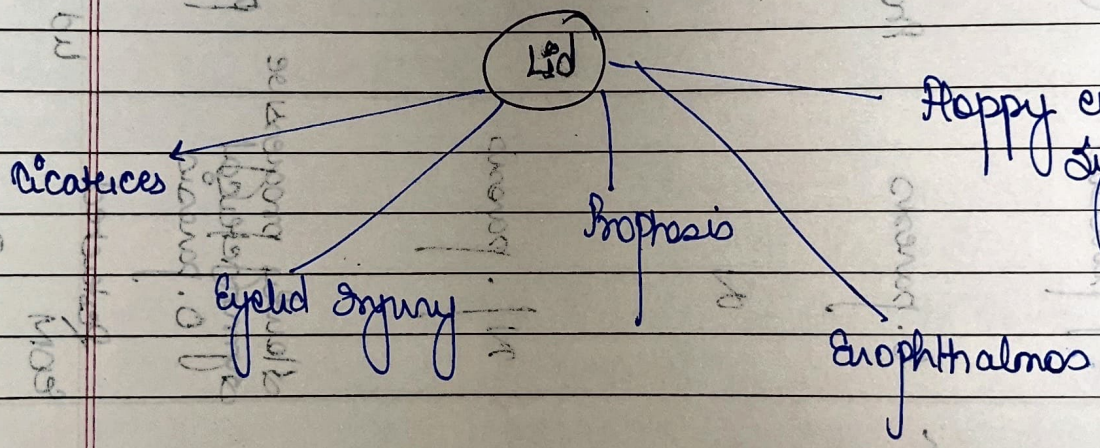
Pseudo 1½ → Ocular Myasthenia.

Disorder	Pupil	Ocular Motility	Lids	Other Ocular finding	Other systemic findings
MG	N	fluctuating Ophthalmo paresis	Ptosis Cogan twitch	–	fluctuat^{n} weakness Improves ± Rest
Botulinum	Dilated. Poor rxn LN dissociated	O. paresis	Ptosis	–	Limb Weak. Bulbar Sign Respi fail, Urinary retention
Lambert Eaton	N	N	N	KCS	Autonomic & limb. weakness Improves ± repetition
GB Syndrome	N	N/. paresis	Ptosis	–	Facial diplegia Areflexia Respl fail
CPEO	N	slowly progressive symmetrical O. paresis	slowly progressive ptosis	Pigmentary retinopathy	Varying deg of Multisystem involver
Thyroid	N	Restricted EOM +ve FDT	Ud retraction lag edema	exo. Conj ON	Hyper Thyroidism

Classmate Date Page

Causes of Lagophthalmos





Abn of Pupil / Pupillary Pathway

a) APD vs RAPD
↓
Amaurotic Pupil

b) Horner Syndrome (Oculosympathetic Syndrome)

c) Adie Pupil

d) Physiological Anisocoria.

e) Pharmacological Mydriasis

f) ARP.

e) Tectal Pupil — Light Near Dissociation.

f) BEUM — Benign Episodic Unilateral Mydriasis

APD vs RAPD

Amaurotic pupil — Marcus Gunn Pupil.

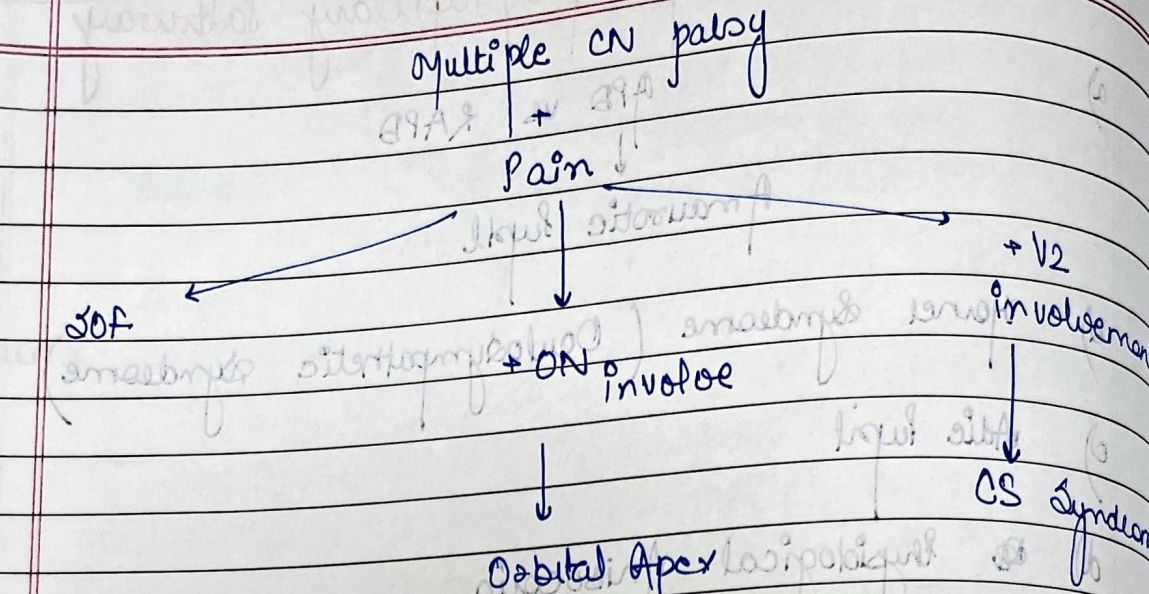
No PL. — VA. — ✓

Neither pupil Contract. — Affected eye. — Some Contract

Complete ON lesion — Lesion. — Incomplete.

APD (Sensory) vs EPD (Motor)

Equal in size — Anisocoria.


Multiple CN palsy
+
Pain
+ V2
involvement
CS Syndrom
Orbital Apex
Syndrome