Miss JS

LIVE Case

Shivanand Sheth

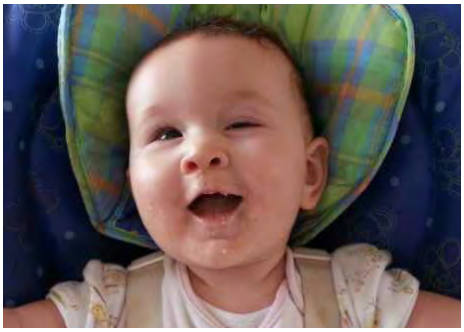
1

Miss JS

- Presented at 9 month old

1. BE ptosis (L>R) with chin up head position
2. Abberent eyelid movements
3. No elevation BE
4. LE mild amblyopia

- VA R 3.2 cyc/cm L 2.4 cyc/cm (L first) TAC @ 55cm
- Normal Anterior and Posterior Segment
- Normal developmental milestones



2

Photos before ptosis surgery (age < 2)



3

Co-management with Oculoplasty for ptosis – Multiple surgeries for PTOSIS

- 24/4/18 (2 yrs 5 mo) : L silicone brow suspension ptosis surgery
- 15/5/18 (2 yrs 6 mo) : L redo Frontalis silicone sling
- 21/1020 (4 yrs 11 mo) : R fascia lata brow suspension + disinsertion of R levator
- 03/03/21 (5 yrs 3 mo) : L fascia lata brow suspension (Crawford triangle)
- 31/01/24 (8 yrs 2 mo) : L redo brow suspension with fascia lata from right thigh

4

2022 – Strabismus assessment

- VA (Sloan) RE 6/12-3, LE 6/9-2
- Glasses:

OD +2.75/-4.00x 60
OS + 1.75/-0.50x 2

<u>Head posture:</u>

- Chin up, left tilt and left face turn
- Poor elevation OU
- Levoversion: simultaneous R abduction and L Adduction

5

9 gaze – Synergistic divergence in left gaze

6

EOM clip 1

Video

7

Clip 2 : with near target and ductions

Video

8

MRI brain and orbit (2017)

CONCLUSION:

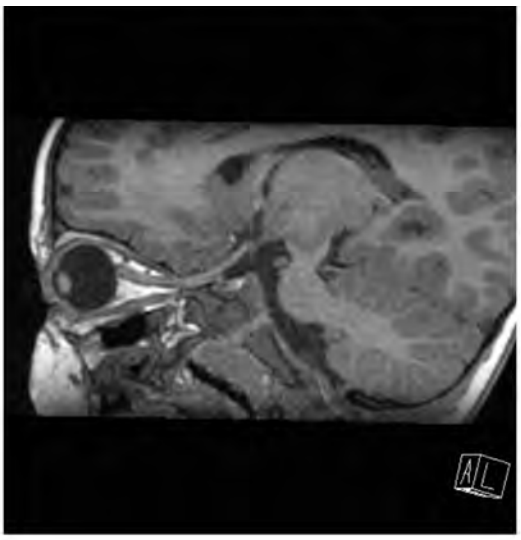
1. Near symmetrical tiny focal bulge along the posterior aspect of the
globes at the insertion of optic nerves with mild effacement of surrounding
CSF at this level, it is uncertain whether this represent morning glory disc
anomaly (MGDA)or tiny colobomas.

2. Abnormal extraocular muscles bilaterally with significantly smaller
medial rectus and superior oblique muscle belly on the right. Reduced bulk
of the superior rectus muscles bilaterally. Significantly smaller inferior
oblique muscle on the right. Appearances could be in keeping with congenital
fibrosis of extraocular muscles.

3. Normal intracranial contents.

9

Small atrophic SR OU



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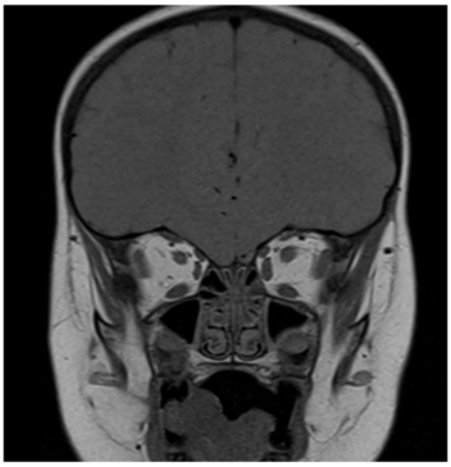
Thinner RMR, smaller RSO



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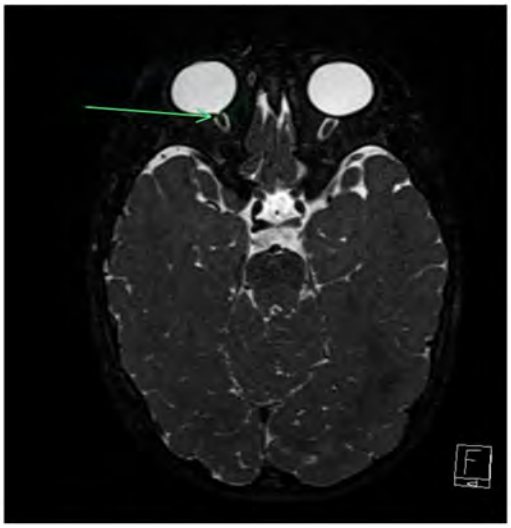
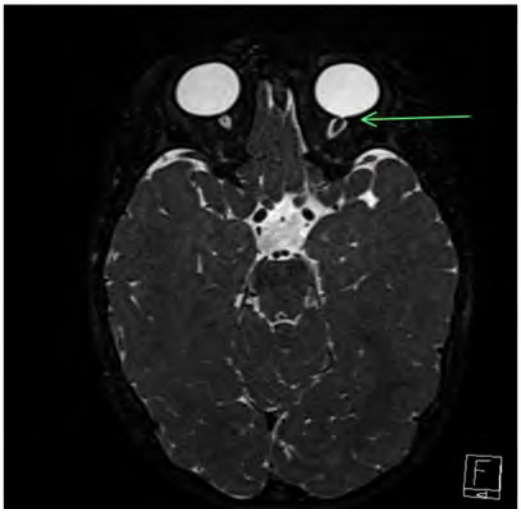
Tiny focal bulge @ post globe, clinically no coloboma





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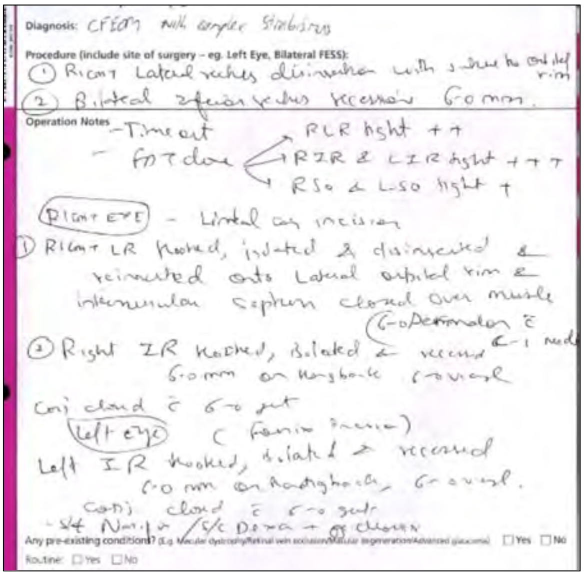
1st Surgery Feb 2023:


Diagnosis: CFEOM with complex strabismus
Procedure (include site of surgery – eg. Left Eye, Bilateral FESS):
1. Right Lateral rectus disinsertion with suture to orbital rim
2. Bilateral inferior rectus recession 6.0 mm.

Operation Notes
- Time out
- FDT done: RLR tight ++; RIR & LIR tight +++; RSO & LSO tight +

Right eye – Limbal conj incision
1. Right LR hooked, isolated & disinserted & reinserted onto lateral orbital rim & intermuscular septum closed over muscle
2. Right IR hooked, isolated & recessed 6.0 mm on hang back

Conj closed c̄ 6-0 gut

Left eye
Left IR hooked, isolated & recessed 6.0 mm on hang back

Conj closed c̄ 6-0 gut

Any pre-existing conditions? (E.g. Macular dystrophy/Retinal vein occlusion/Macular degeneration/Advanced glaucoma) ☐ Yes ☐ No
Routine: ☐ Yes ☐ No

FDT: RLR tight++
RIR and LIR: Tight +++
RSO and LSO Tight +

Surgery:

Right LR disinserted and attached to Lateral orbital rim

Right IR recessed 6.0 mm

Left IR recession 6.0 mm

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After 1st Surgery: Better head position

1 month post surgery

3 month post surgery

14

Before and after 1st Surgery: Head position

15

Video of head position post surgery

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Video

17

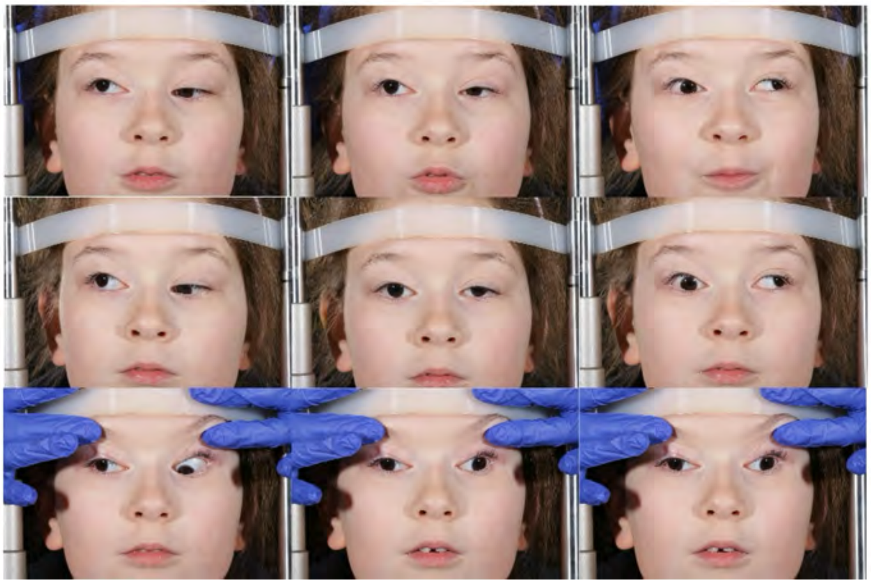
Photos 3 months post surgery: June 2023

RE fixing

LE fixing

18

6 months post surgery: August 2023



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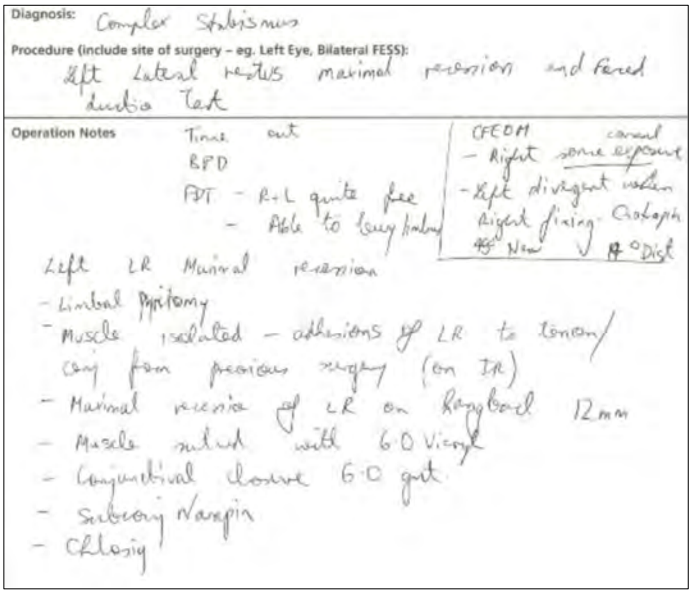
2nd Surgery Dec 2023:



Diagnosis: Complex Strabismus

Procedure (include site of surgery – eg. Left Eye, Bilateral FESS):
Left Lateral rectus maximal recession and Forced duction Test

Operation Notes
Time out
BPD
FDT – R+L quite free
– Able to bring limbus

CFEOM
– Right some exposure
– Left divergent when Right fixing. Orthoptic
45 Near ✓ [illegible] °Dist

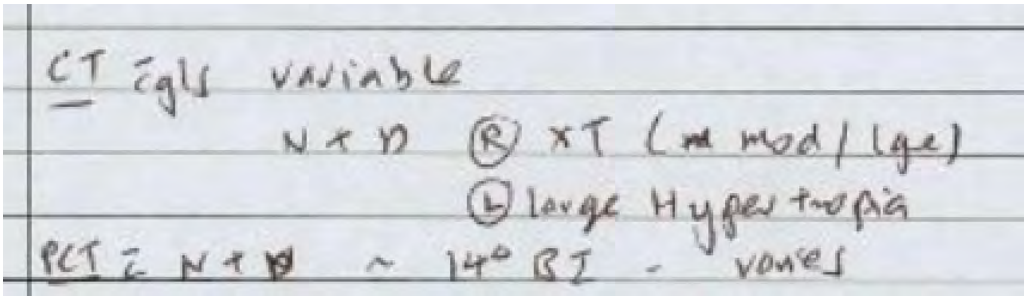
Left LR Maximal recession
– Limbal peritomy
– Muscle isolated – adhesions of LR to tenon/conj from previous surgery (on IR)
– Maximal recession of LR on Hangback 12 mm
– Muscle sutured with 6.0 Vicryl
– Conjunctival closure 6.0 gut
– Subconj Naropin
– Chlorsig

Surgery:

Left LR recession 12 mm

20

2 months post 2nd surgery



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Genetics result: Negative genetics in 2020

Test Requested	Exome 15
Reason for Referral	Undiagnosed condition
Results	**A cause for this patient's condition has not been identified.**
Interpretation	No variants causative of this patient's phenotype have been identified with this test. This result does not preclude the presence of causative genetic variants in this patient (refer to method and limitations for details). Future re-analysis is available on request (additional charges may apply).
Method	*Whole exome sequencing was performed using massively parallel sequencing (Agilent Sureselect QXT CREv2 kit, Illumina Sequencers) with a targeted mean coverage of 100x and a minimum of 90% of bases sequenced to at least 15x. Data was processed, including read alignment to the reference genome (GRCh38) and variant calling, using Cpipe (Sadedin, SP. et al. (2015) Genome Medicine 7:68). Variant analysis and interpretation, within the target region (coding exons +/- 8bp) was performed using Agilent Alissa Interpret. Variants were annotated against relevant RefSeq gene transcripts, curated utilising the transcript predicted to be the most deleterious to the protein and reported in accordance with HGVS nomenclature. Genomic coordinates were generated by Cpipe and do not comply with HGVS guidelines.* *Curation of variants was phenotype-driven with pre-curated or custom gene lists used for variant prioritisation (see below). If a likely cause of the disease was identified, other candidate variants may not have been classified. Where no causative variants were identified within the prioritised genes, analysis was expanded to truncating and very rare/conserved missense variants identified in the mendeliome that could potentially be associated with the reported phenotype (this applied only to cases where appropriate request and consent were supplied). Classification of variants was based on ACMG guidelines (Richards, S. et al. (2015) Genetics in Medicine 5:405-424). Reported high confidence variants are generally not confirmed by an orthogonal method. Refer to www.vcgs.org.au/tests/clinical-exomes for gene list details.* *Annotation Sources: ClinVar, OMIM, gnomAD, gene constraint scores (gnomAD), NCBI, PDB, UCSC Genome Browser, DECIPHER, PolyPhen2, PROVEAN, MutationAssessor, FATHMM, PhyloP, NetGene2, BDGP NNSPLICE, Human Splicing Finder.* *Genes/gene lists prioritised based on phenotypic information (refer to vcgs.org.au for gene list details):* *Custom gene panel: CHN1, ECEL1, HOXA1, HOXB1, KIF21A, PHOX2A, ROBO3, SALL4, TUBB2B, TUBB3*

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Genetics re-analysed: New Diagnosis in 2024

Clinical Genomics Laboratory

Test Requested	Clinical Exome Singleton Reanalysis
Reason for Referral	Congenital fibrosis of the extraocular muscles
Gene list(s) applied	*Gene of interest: TUBA1A*
Results	**Consistent with a genetic diagnosis of congenital fibrosis of the extraocular muscles (MONDO:0007614), TUBA1A-related.**
Interpretation	This individual is heterozygous for a **LIKELY PATHOGENIC** variant in the *TUBA1A* gene. Pathogenic variants in *TUBA1A* are associated with autosomal dominant congenital fibrosis of the extraocular muscles (MONDO:0007614), TUBA1A-related. Testing for this variant is available for other family members. Future reanalysis is available on request (additional charges apply). Genetic counselling is being provided by Victorian Clinical Genetics Services.

Findings related to phenotype

Gene	Genomic Location	Variant	Zygosity	Classification	Inheritance
TUBA1A	chr12:49185899	c.467G>A; p.(Arg156His)	Heterozygous	Class 4	Unknown

Variant Descriptions

NM_006009.3(TUBA1A):c.467G>A; p.(Arg156His)

This variant is classified as Likely pathogenic.
Evidence in support of pathogenic classification:
- Variant is absent from gnomAD (both v2 and v3).
- Missense variant in a region that is highly intolerant to missense variation (high constraint region in DECIPHER).
- Another missense variant comparable to the one identified in this case has limited previous evidence for pathogenicity. The p.(Arg156Gly) variant has been observed in an individual with epilepsy and malformations of cortical development (PMID: 31269740).
- This variant has moderate previous evidence of pathogenicity in unrelated individuals. This variant has been shown to be *de novo* in an individual with congenital fibrosis of the extraocular

TUBA1A associated CFEOM

Eur J Hum Genet. 2021 May; 29(5): 816–826. PMCID: PMC8110841
Published online 2021 Mar 1. doi: 10.1038/s41431-020-00804-7 PMID: 33649541

Novel variants in *TUBA1A* cause congenital fibrosis of the extraocular muscles with or without malformations of cortical brain development

Julia A. Jurgens,[1,2,3,4] Brenda J. Barry,[2,5] Gabrielle Lemire,[6] Wai-Man Chan,[1,2,3,4,5] Mary C. Whitman,[1,7,8] Sherin Sheabar,[1,2,3,9] Caroline D. Robson,[10,11] Sarah MacKinnon,[7,8] Elena M. England,[12,13,14] Hugh J. McMillan,[15] Christopher Kelly,[16] Brandon M. Pratt,[1,2,3] Care4Rare Canada Consortium, Anne O'Donnell-Luria,[12,13,14] Daniel G. MacArthur,[12,13,17,18] Kym M. Boycott,[6,19] David G. Hunter,[7,8] and Elizabeth C. Engle[21,2,3,4,5,7,8]

First published in 2021

23

Now is 5 months post second surgery

- Can we make her better?

- PANEL

24

Ms. LD

LIVE CASE

Dr. Shivanand Sheth

1

History – 60y F

- Asthma
- Atrial Fibrillation
- Breast Cancer 2008
- History of Smoking

Meds:

Sotalol

Tests:

HbA1C mildly high

High LDL Cholesterol and high triglycerides

Myaesthenia Bloods – Normal

High TPO Ab: 147

T3, T4, TSH: Normal

TgAB: Normal

TRAb: Not done

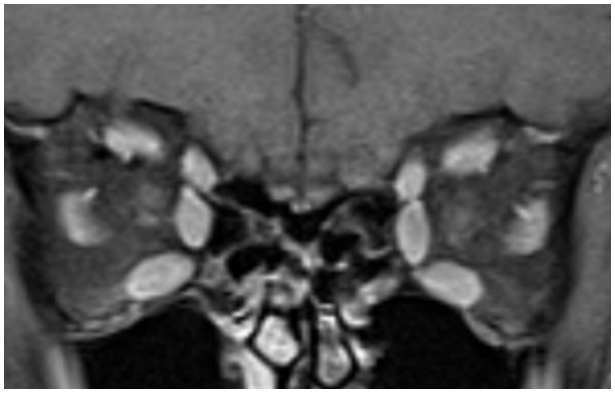
2

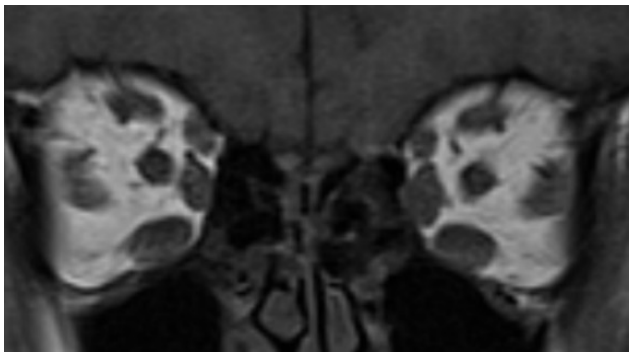
History

- Diplopia Since 2012 – horizontal, vertical and torsional
- Seen first in Feb 2021
- Uses right head tilt to make images single.
- Finding it harder and uncomfortable with head position
- VA 6/6 OD and 6/6 OS

3

MRI – Suggestive of Thyroid eye disease

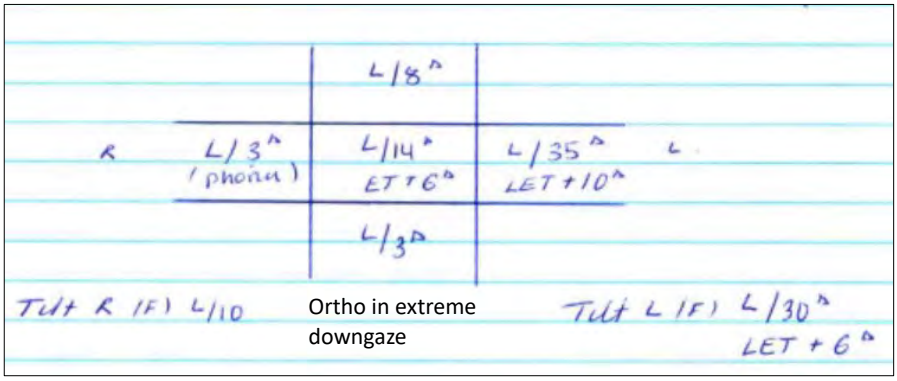




Bulky EOMs
RSO > LSO

4

Feb 2021



Right Gaze

Left Gaze- worse Left hypertropia

5

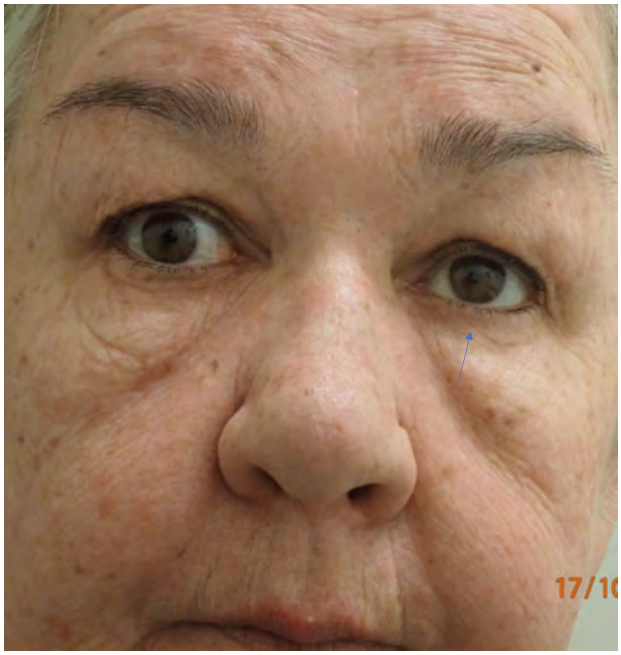
9 gaze

6

Can make images single with right head tilt

Can also make images single with chin up in extreme downgaze

7



Left hyper more prominent in left tilt

8

2023 - October

- Had recent bilateral cataract surgery
- Still ongoing horizontal, vertical and torsional diplopia

9

Measurements from OCT 2023

Ortho in extreme downgaze and on significant right head tilt with orthophoria in those positions.
Also has torsional diplopia from excyclotorsion

10

Surgery notes

Force duction testing done.
Right inferior rectus very tight +++
Right medial rectus tight +
Right superior rectus not tight
Right superior oblique tight ++
Left inferior rectus tight ++
Left superior rectus tight++
Left medial rectus not tight
Left superior obqliue not tight

11

Surgery notes

Right eye:
Fornix conjunctival incision
Right inferior rectus recessed 4 mm with 5-0 vicryl, direct to sclera, after recession force duction free
Right medial rectus recession: 3 mm with 6-0 vicryl (adjustable technique). FDT free
Conjunctiva closed with 6-0 gut

Left eye:
Fornix conjunctival incision
Left Inferior rectus recessed 2 mm with 5-0 vicryl, direct to sclera. After recession forced duction free
Left Superior rectus recession 5 mm with 6-0 vicryl, (Adjustable technique) FDT free
Conjunctiva closed with 6-0 gut

Adjustment 2 hours post surgery: Ortho in PP with only a Flick Left Hyper and single with reasonable ROSV around PP – Tied off

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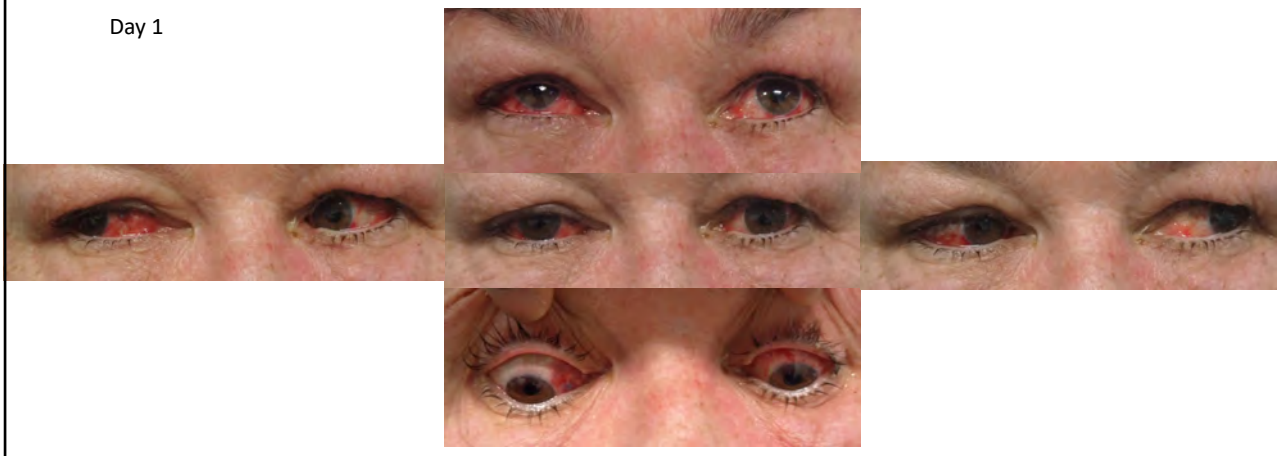
Day 1



Intermittently single in PP with overlapping images but tilted. Diplopia worse in upgaze- R/L (Overcorrection) in upgaze

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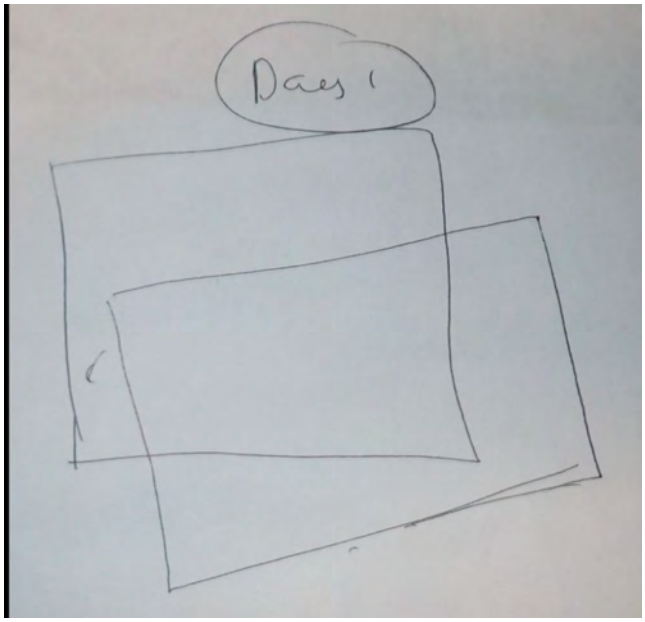
Subjective Torsional Diplopia on Day 1 – Drawn by LD



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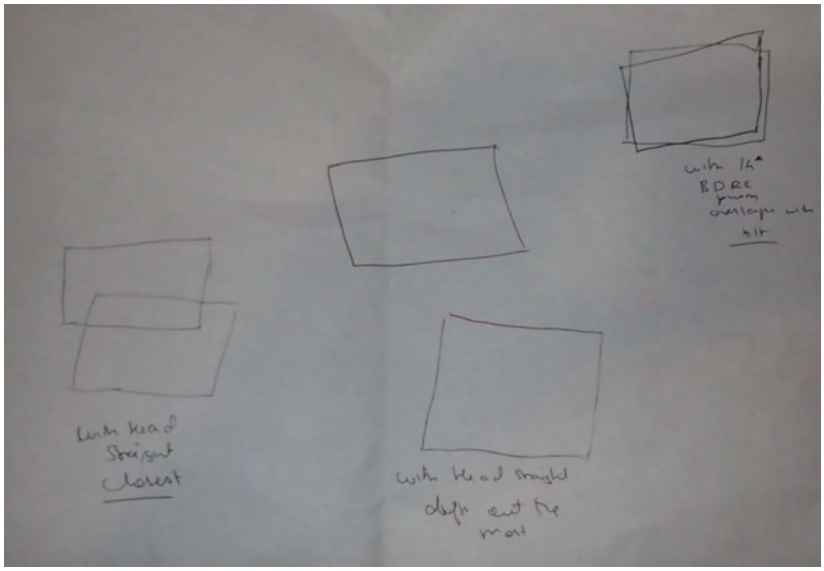
1 month post op – Diplopia worse, further away and still torsion



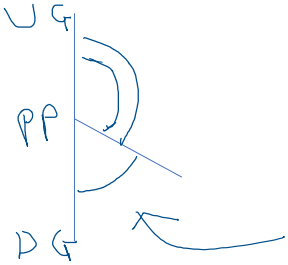
Left hyper in PP 14 PD with excyclo

Good range of single vision in down gaze

15

10 weeks post surgery

- Has developed overcorrection in primary position.
- Has ROSV Starting 10 degree below primary and large zone of SV in downgaze. Adopts a chin up.



Single vision in down gaze

16

R/L < 20	R/L > 25	R/L > 25
R/L 20+	R/L 20 with Excyclo	R/L 10
	R/L 5	

Right hyperphoria in down gaze and can see single with chin up

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Photos 12 weeks post surgery

18

Discussed case at Local Strab online meeting

- Issues overcorrection in primary, but range of single vision in Downgaze
- Still gets excyclotorsion
- Would Left IR re-recession alone help - correct Left hypo as well as excyclo?
- Is this a slipped LSR - Explore and advance LSR Adjustables?
- Currently Useful range of single vision in downgaze, will she lose this if aim to improve left hypo in primary?

Recommendation from Meeting: Likely Slipped LSR. Explore and advance Left SR +/- Recess Left IR

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2nd Surgery – Feb 2024

Force duction test:
Left IR tight+
Left SR not tight

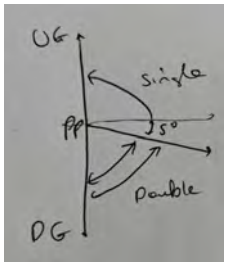
Superior conjunctival limbal incision
Left superior rectus explored - found slipped at 11 mm from limbus. Advanced to 8 mm from limbus with 6-0 Polyester sutures
Left inferior rectus explored - re-recessed further 2 mm with 5-0 Vicryl
Conjunctiva closed with 6-0 gut

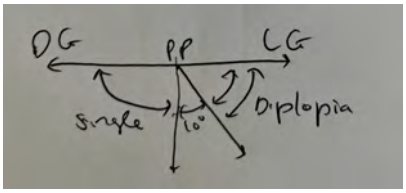
20

1 Month Post surgery – March 2024

- Orthophoric in Primary position with single vision!
- However poor range of Single vision in downgaze and left gaze- Diplopia starts 5 degrees into Downgaze and 10 degrees in left gaze
- Left hyper in dongaze
- Bothered by Diplopia downgaze and left Gaze
- How to make Better/expand range of single vision?

PANEL





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FACE TURN DUE TO INCOMITANT EXOTROPIA

DR LIONEL KOWAL

HEAD OCULAR MOTILITY CLINIC RVEEH

DR SHILPA KULKARNI

FELLOW OCULAR MOTILITY RVEEH

History

- *A 6-year-old boy presents in 2021 with a 3y history of face turn to R*
- *Vision RE 6/8 LE 6/6 with +0.25DS*
- *Systemically well*
- *Parents are **first cousins***

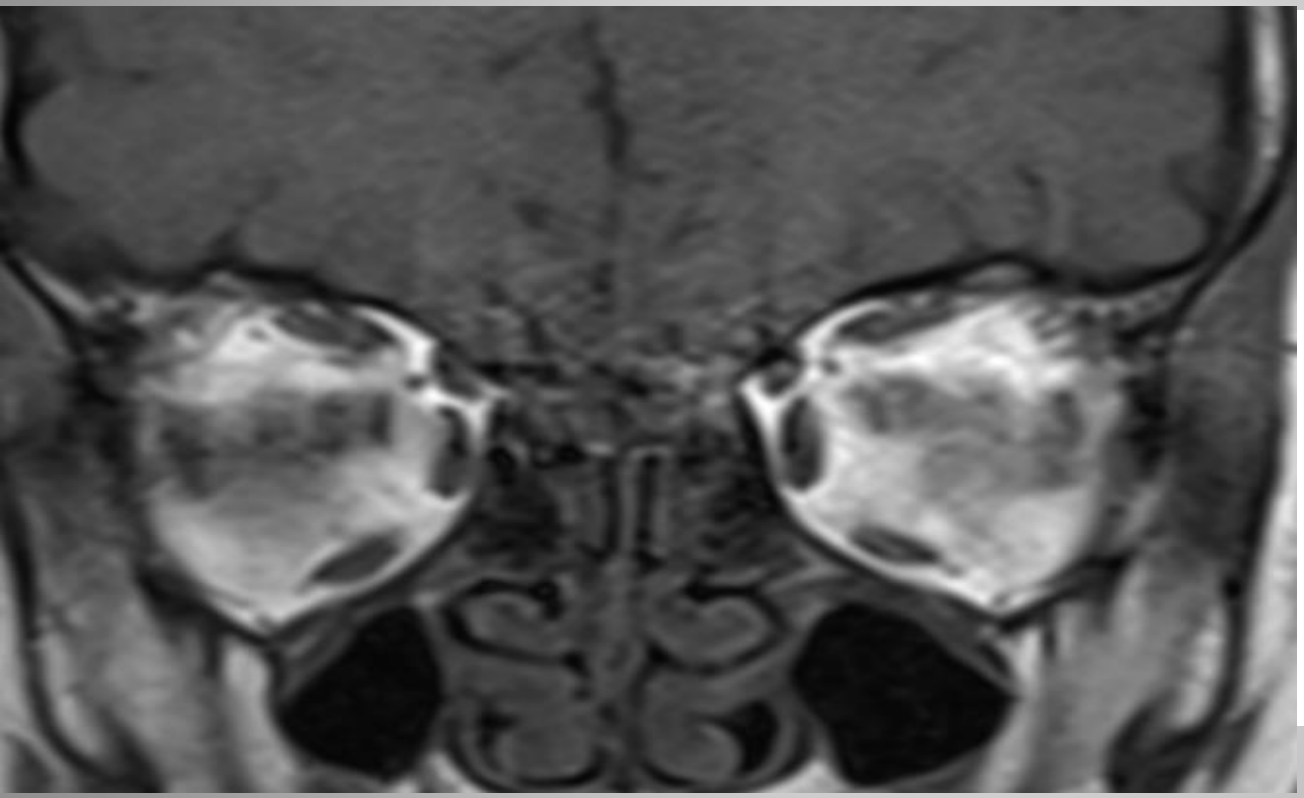
Signs 2021

- *Incomitant exotropia greater on right and down gaze*
- *Left Superior Oblique Overaction and Inferior Oblique Underaction.*
- *Cyclo Refraction : Low +*
- *Titmus fly negative*
- *Fusion with Bagolini striated glasses test*
- *2/24: 100” on Titmus!*
- *Fundus intorsion right more than left*

Investigations

- MRI : small Chiari malformation
- Right A Scan : Axial length 23.8 (on a myopic trajectory)
- Chances of high myopia are 9 %.

Coronal Scans Normal
No LR heterotopy



Journal of AAPOS
Volume 6 Number 6 December 2002

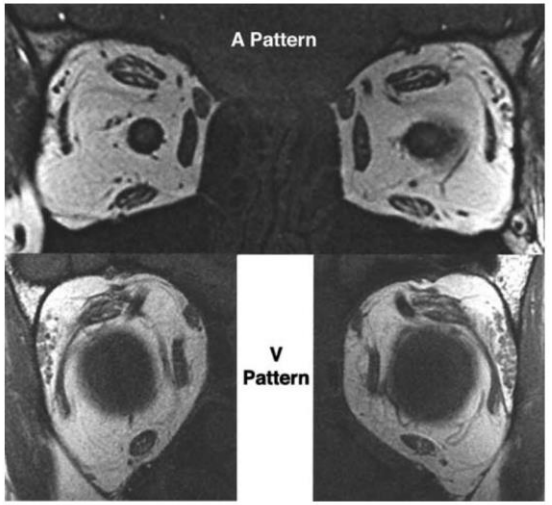
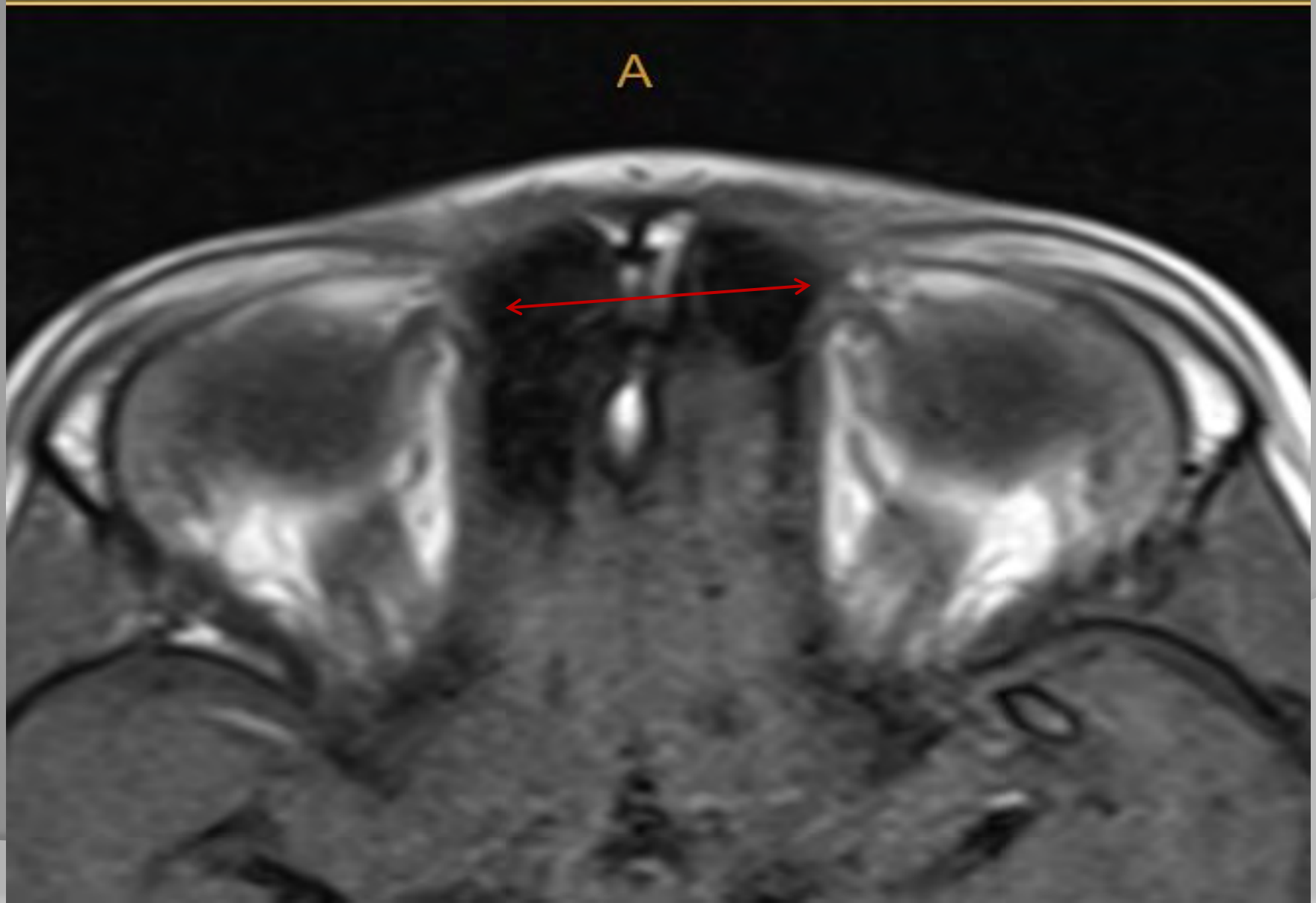
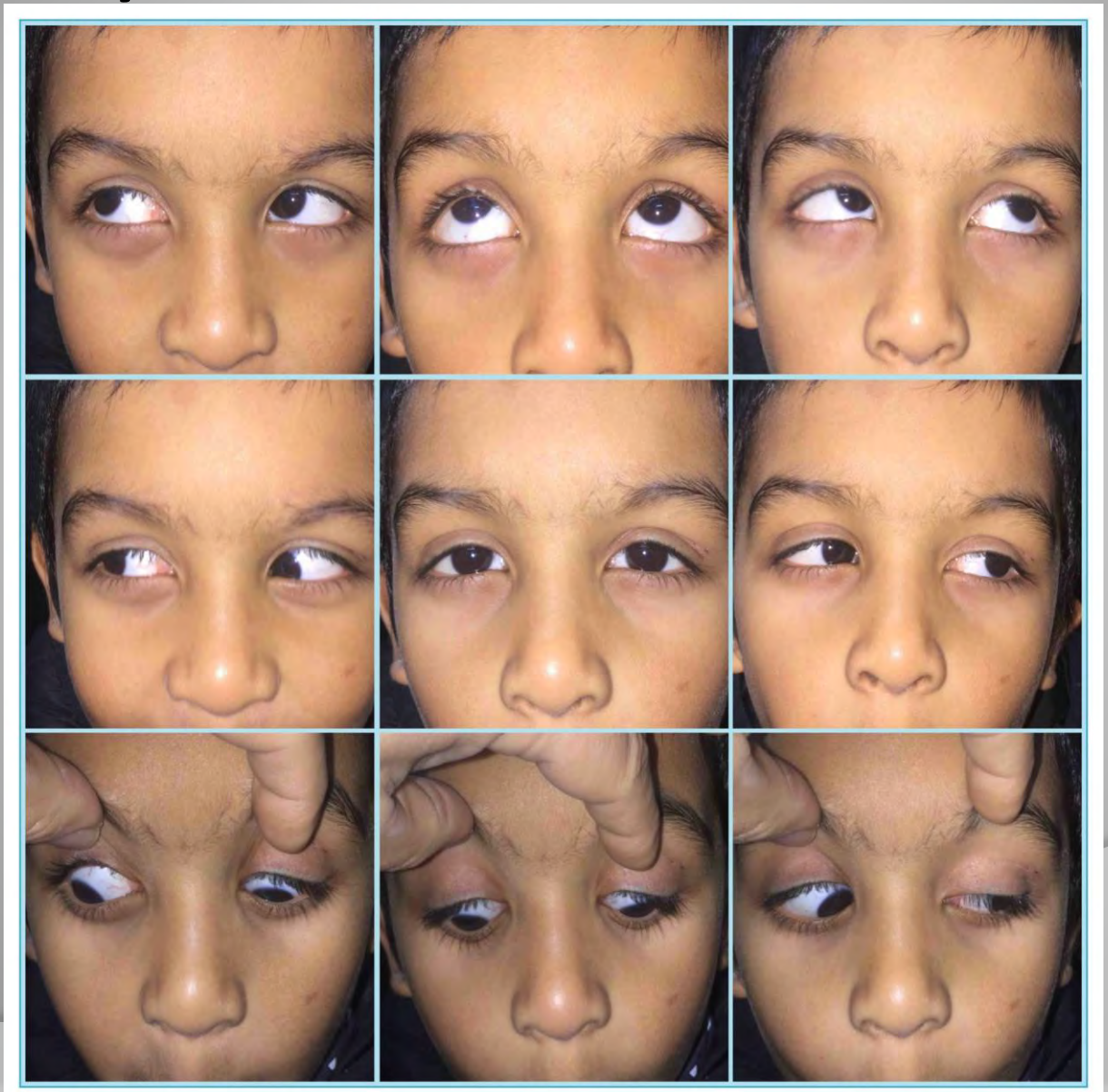


FIG 9. Typical coronal MRI from 2 representative patients showing heterotopic rectus pulleys associated with A-pattern (*top*) and V-pattern (*bottom*) strabismus.

R Trochlea is placed VERY slightly posteriorly



July 2021 L>R SOOA



November 2021

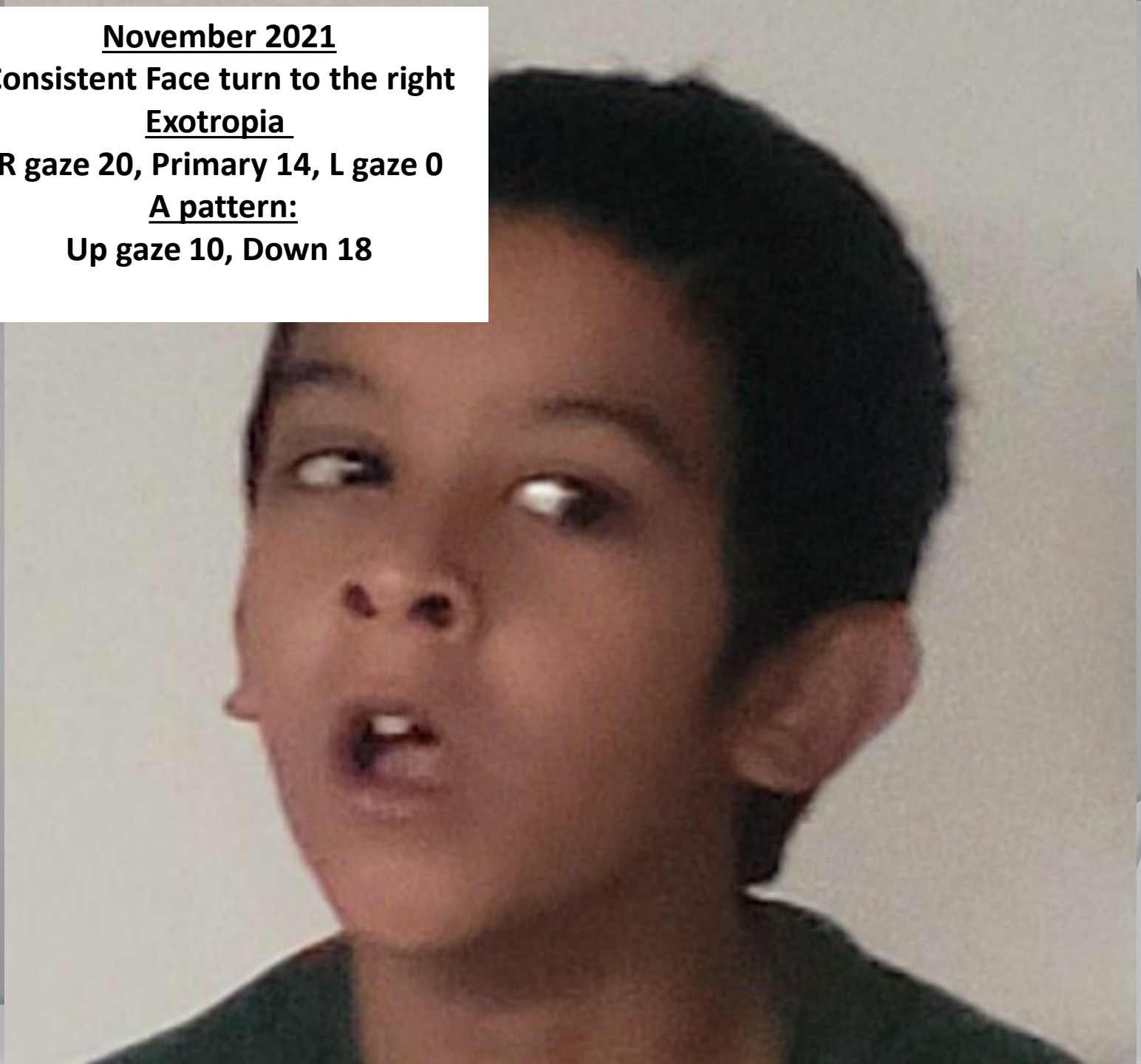
Consistent Face turn to the right

Exotropia

R gaze 20, Primary 14, L gaze 0

A pattern:

Up gaze 10, Down 18



November 2021

March 2022

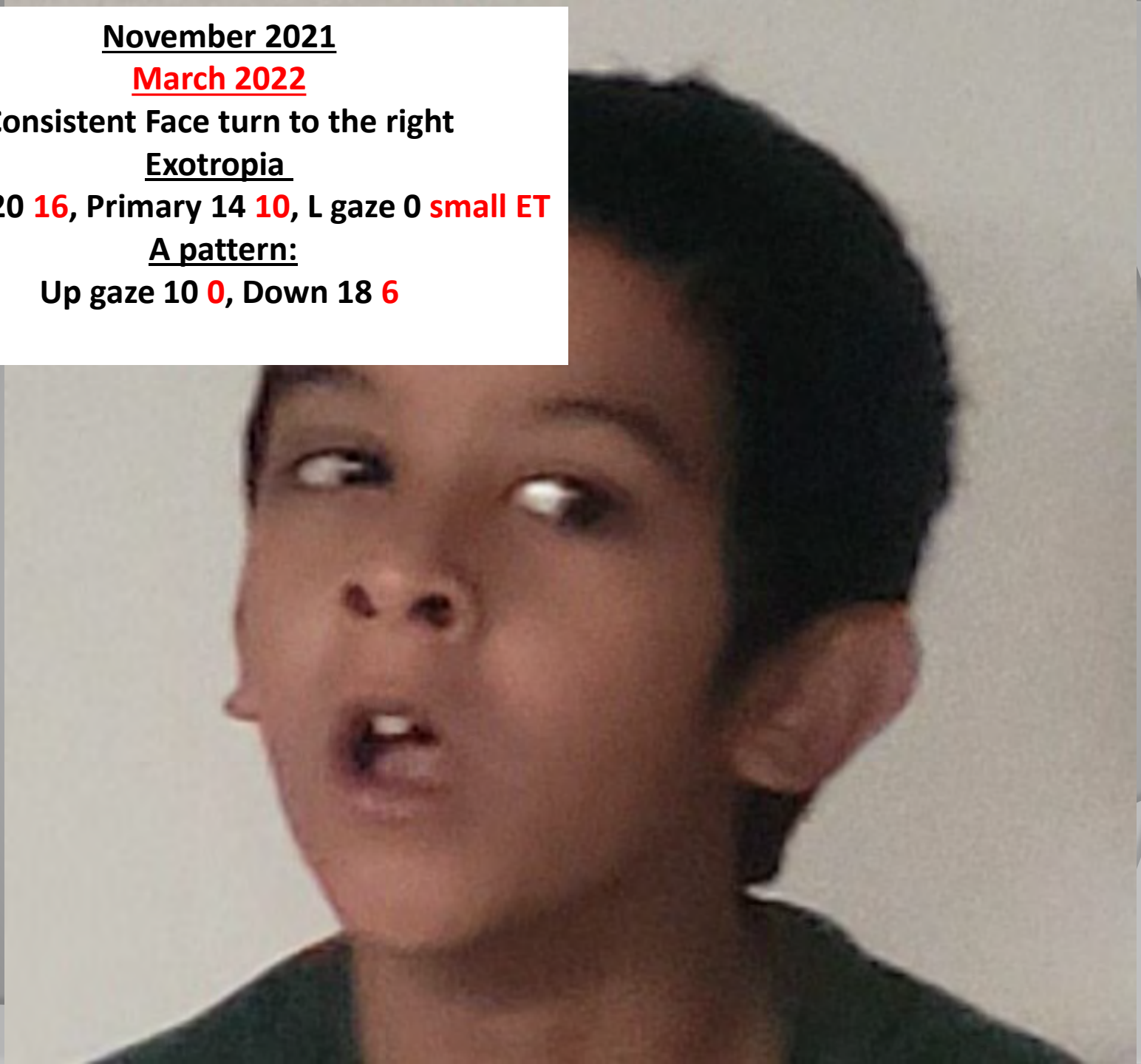
Consistent Face turn to the right

Exotropia

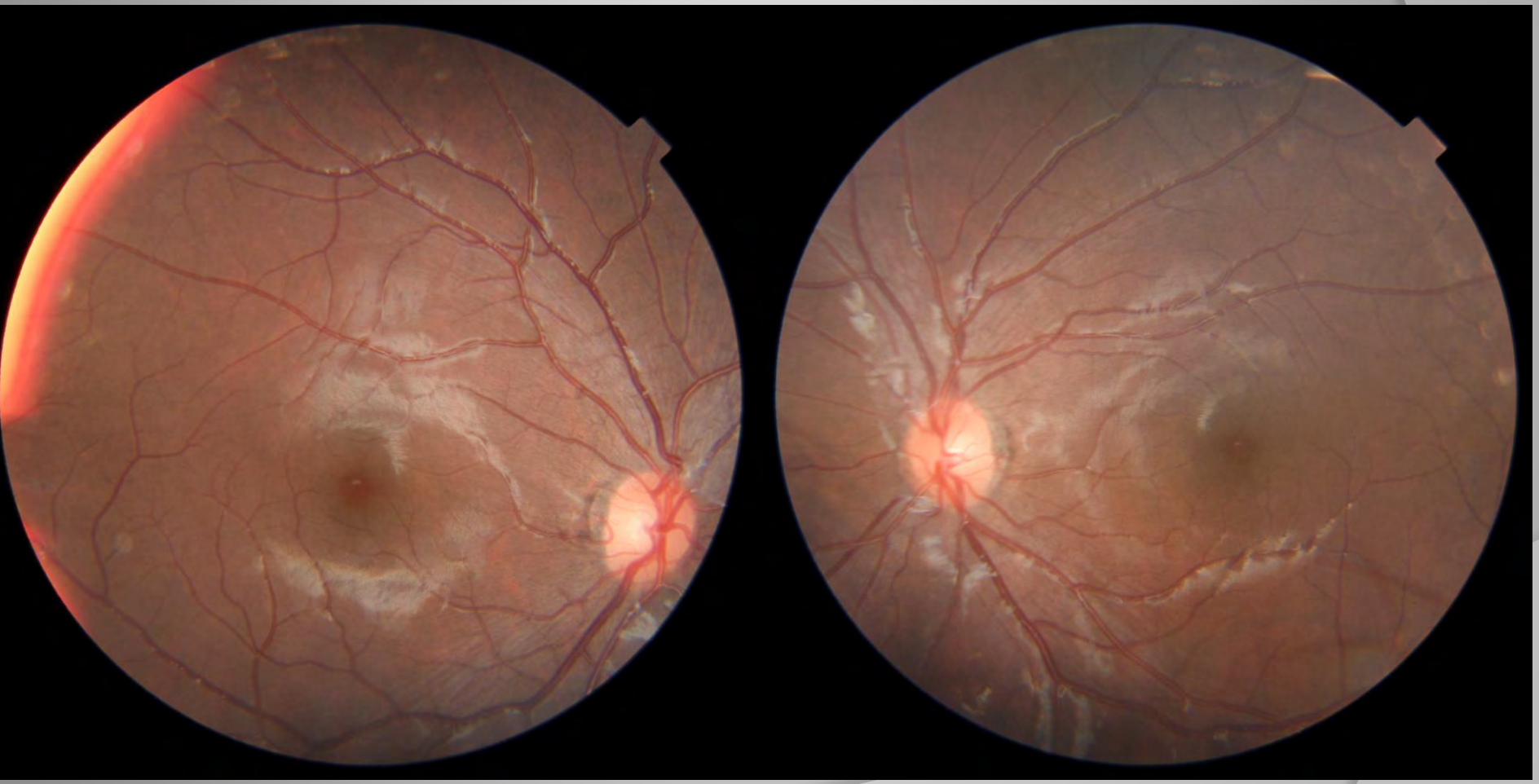
R gaze 20 16, Primary 14 10, L gaze 0 small ET

A pattern:

Up gaze 10 0, Down 18 6



Intorsion OU



XT more on right gaze

Date	RG XT/ RH Δ	PP XT / RH Distance Δ	LG XT Δ **RG minus LG**
7/21	20/RH	10	0 **20**
11/21		14	0 **>14**
3/22	16/RH	10	ET8 **24**
8/22	12/12	10	0 **12**
10/22	20/6	20/6	0 **20**
4/23	18/5	16	0 **18**
2/24	10/10	12	0 **10**

A pattern fairly consistent

Date	A pattern Up – primary – down Δ	PP XT Δ	**DG minus UG** Δ
7/21	0-10-16	10	16
3/22	0-10-6	10	6
10/22	0-20-20	20	20
4/23	0-16-16	16	16
2/24	0-12-14	12	14

XT

Date	Primary Position XT/ RH Distance Δ	PP XT/ RH Near Δ	Face turn to R °	Head tilt
7/21	10/	20/	Y	no
11	14	14	15	no
3/22	10	14		
8/22	10/0	20/0	15	no
10	20/6		15	
4/23	16/0	16/3	15	no
2/24	10/0			no

- Near XT ≥ Distance XT
- Consistent Face turn to the right
- No head tilt

Version and Torsion

Date	Versions	Torsion	P4D
7/21	IO-, SO+,OU	L Fundus intorsion	Only fuses with Bagolini
11	LSO>RSO		fusion
3/22	LSO>RSO		None
8/22	LSO=LIO-LSR-LIR-		none
10	LSO+		yes
4/23	LSO+		yes
2/24	LSO+		**100”**

- Superior Oblique Overaction Right more than Left
- Fusion varies
- R>L Fundus intorsion

Discussion

- Incomitant XT from right gaze to left gaze and up gaze to down gaze

- **Asymmetry of oblique function: is this disrupting horizontal fusion & causing the incomitant XT ?**

Diplopia after PreserFlo MicroShunt

Drs Shilpa Kulkarni, Lionel Kowal

Case

- A 70 year old woman presented with new onset diplopia in the left eye in left & down gaze a year after MIGS surgery.

Past Ocular history

Ocular

- Previous myope
- Cataract surgery 20 y ago
- Strong FH glaucoma grandmother, father, sister

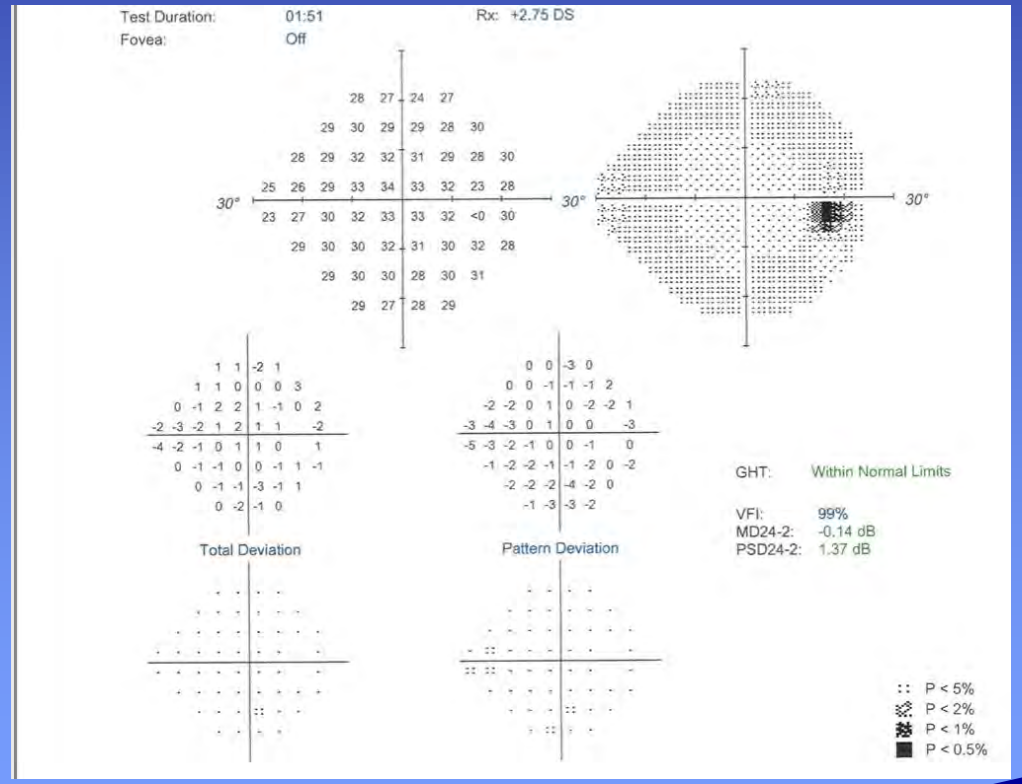
Glaucoma

- Laser Rx ‘unsuccessful’
- MIGS inserted 2021
- Preserflow

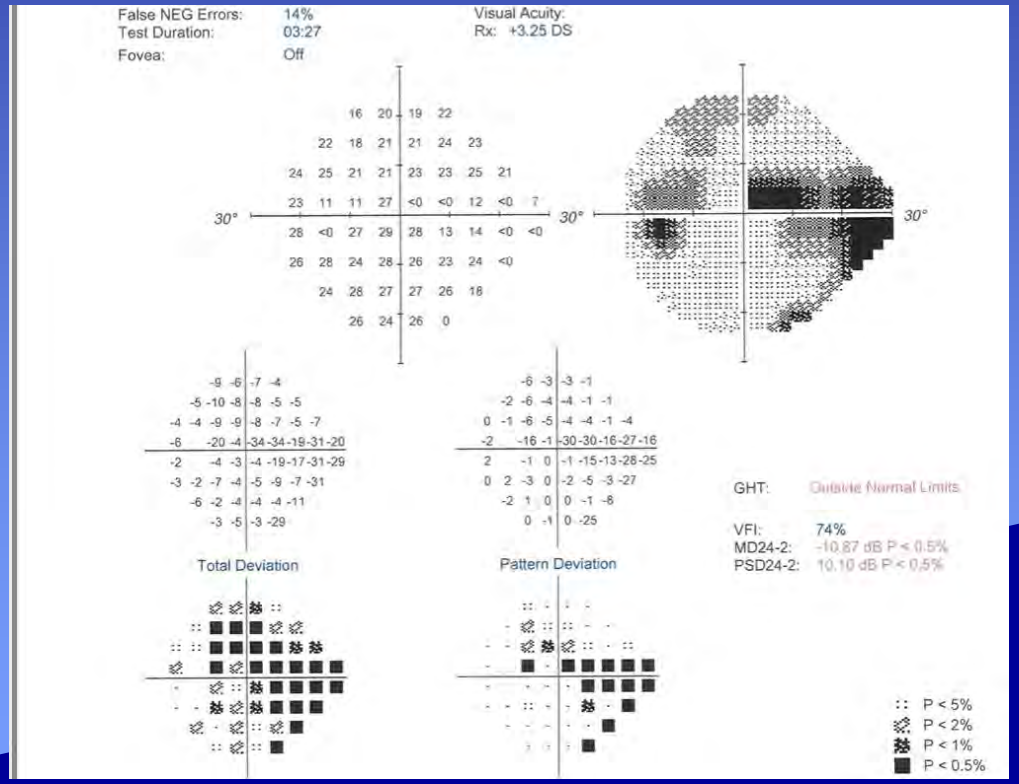
- RE 6/7.5 LE 6/7.5
- BE ant segment normal
- Pseudophakia
- IOP RE 16, LE 12
- Titmus fly 5/9 circle 100 second
- RE -1 DS, LE -0.5 DC cyl 30

Glaucoma

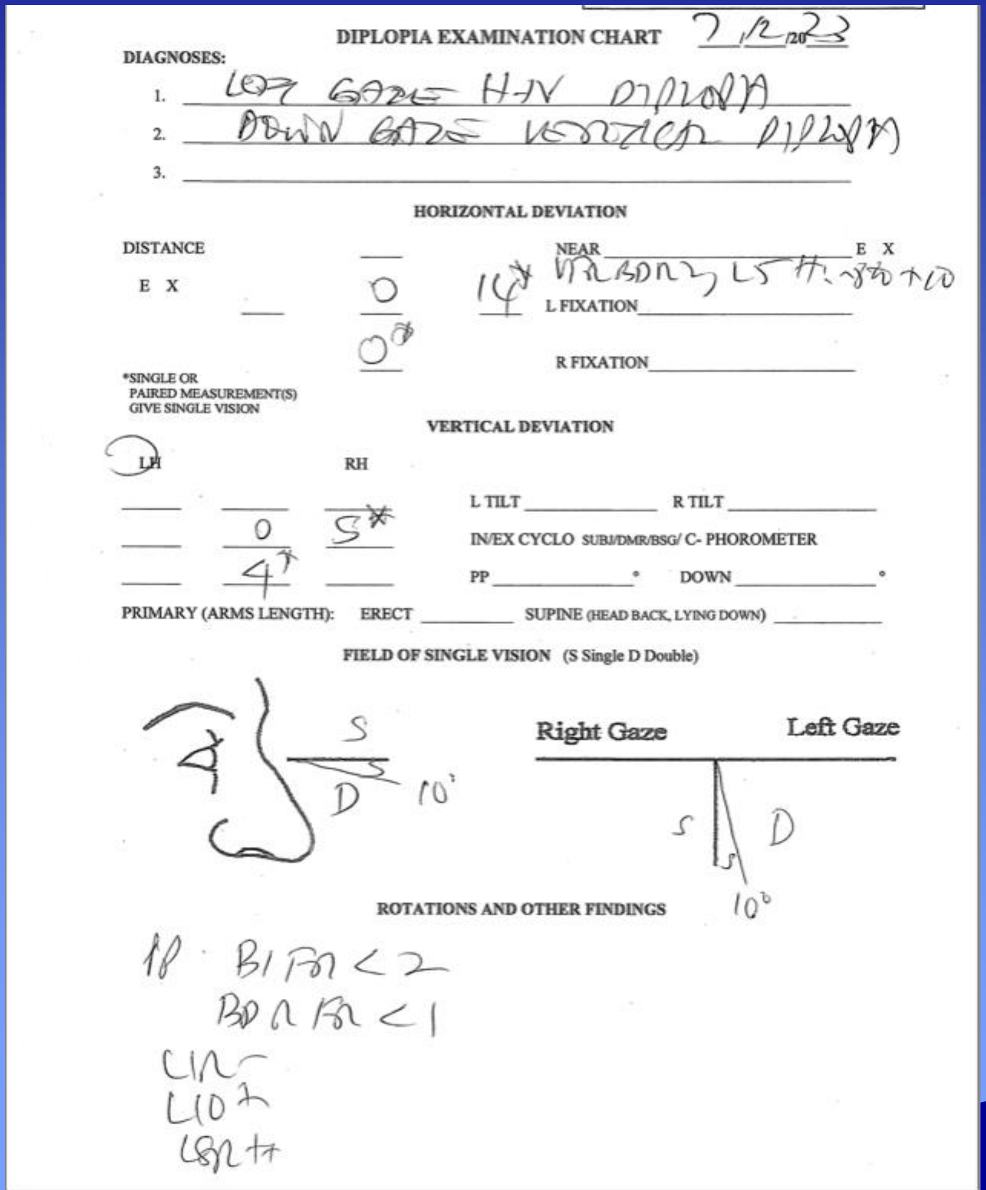
IOP R 16,L 12



Visual fields



Diplopia 2023


DIPLOPIA EXAMINATION CHART 7/12/2023

DIAGNOSES:

1. LEFT GAZE H+V DIPLOPIA
2. DOWN GAZE VERTICAL DIPLOPIA
3.

HORIZONTAL DEVIATION

DISTANCE

E X 0 0

NEAR E X

L FIXATION

R FIXATION

*SINGLE OR PAIRED MEASUREMENT(S) GIVE SINGLE VISION

VERTICAL DEVIATION

LH RH

0 5* 4*

L TILT R TILT

IN/EX CYCLO SUBJ/DMR/BSG/ C- PHOROMETER

PP ° DOWN °

PRIMARY (ARMS LENGTH): ERECT SUPINE (HEAD BACK, LYING DOWN)

FIELD OF SINGLE VISION (S Single D Double)

S D 10°

Right Gaze Left Gaze

S D 10°

ROTATIONS AND OTHER FINDINGS

- Diplopia on L gaze : ET & LH
- Diplopia on downgaze: LH
- Primary position: poor horizontal & vertical fusional reserves c/w intermittent diplopia

Diplopia 2023

- small LLR, LIR deficit
- LSR small OA

- Small superonasal bleb

Investigations

- MRI Brain - Normal brain & orbital imaging
- No abnormality was noted along the 3rd, 4th & 6th nn
- Extraocular muscles are symmetrical, no thyroid orbitopathy
- Normal thyroid function and antibody tests
- AChReceptor antibodies negative

Management / Qs

- Small vertical prism in readers effective – good!
- To where does the bleb extend? Will Ant seg OCT/ UBM help?
- If I operate on the LLR is there any risk of damaging the bleb and getting a flat AC?
- ? LLR resect / lower, adjustable
- If I operate on the LLR what do I need to do re: postop glaucoma management?
- Consider RMR Faden/pulley suture for L gaze ET

Diplopia post Orbital Floor Injection OFI

Idiopathic intermediate uveitis

June ‘23

- LE intermediate uveitis
- Not improving with topical Rx
- **LE OFI triamcinolone 40mg July 2023**
- Acuity improves but notices diplopia & need for face turn
- Little/no change for months

December ‘23

- Cc 6/4 OU
- Diplopia on L gaze
- Exotropia, N>D
- L hyper > L gaze
- Closes LE for L gaze

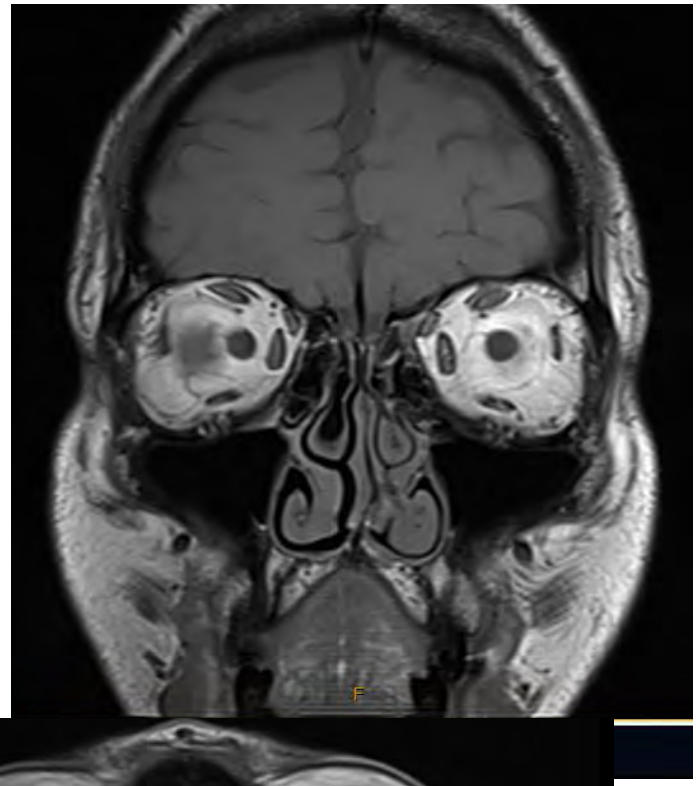
December ‘23

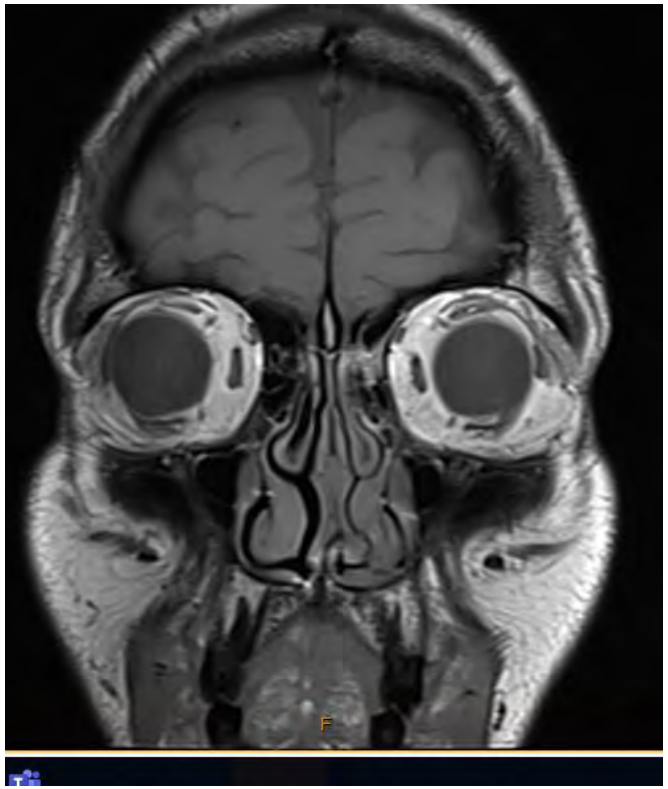
MADDOX ROD	Δ	
Up right LH 2		Up left LH 14
Right gaze 0	Primary LH 5.5	Left gaze LH 19
Down right RH 3		Down left LH 18

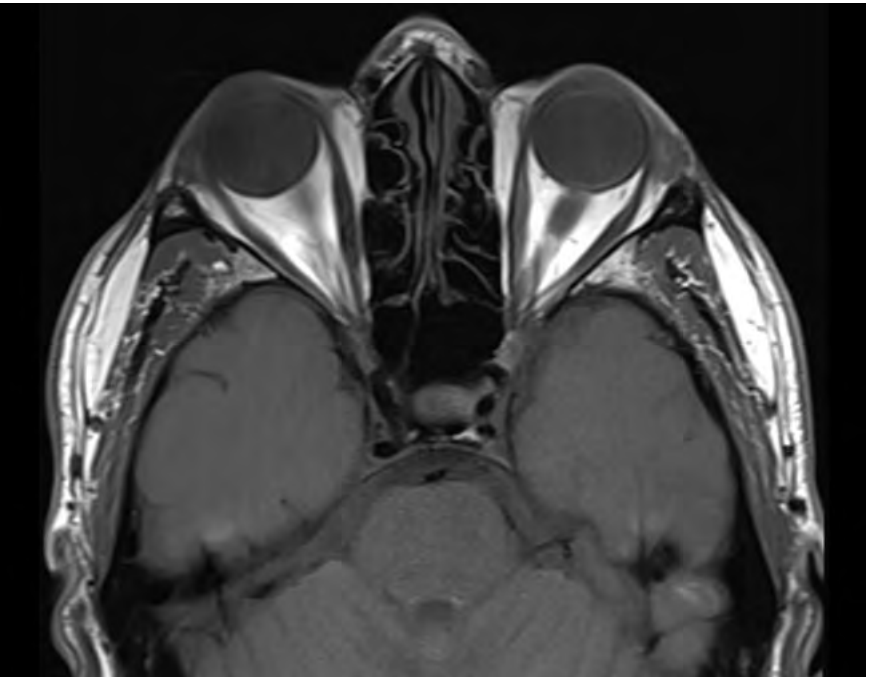
	Synoptophore °	
L1, -3, 2° incyclo	L2, -3, 1° incyclo	L7 -2, 2° incyclo
L1, -3, 2° incyclo	L3, -5, 2° incyclo	L9, -5, 2° incyclo
L1, -5, 2° incyclo	L5, -7, 5° incyclo	L9, -6, 5° incyclo

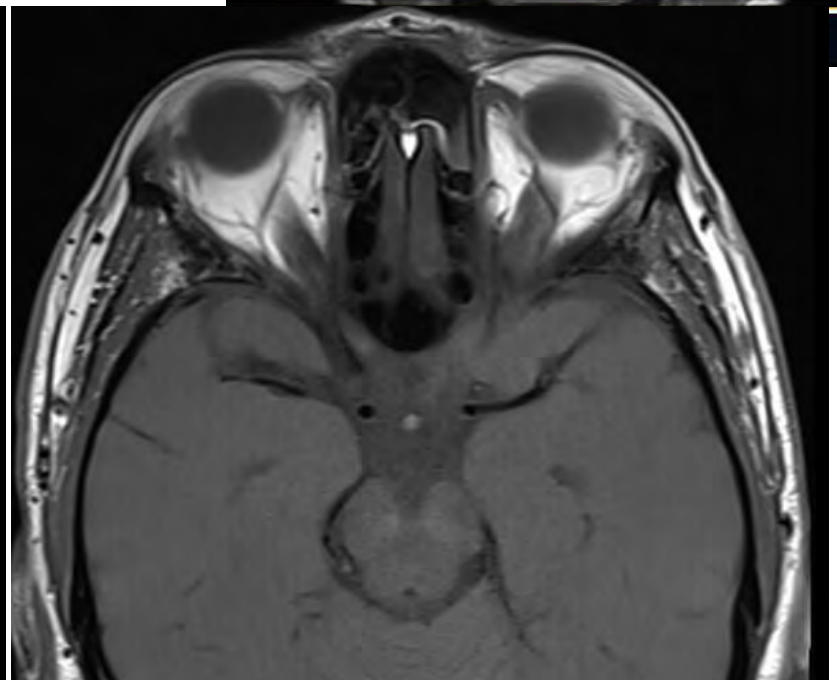
ROSV = Range Of Single Vision to L 10°

MRI Jan ’24
LIR normal









Maddox Rod

December ‘23

MADDOX ROD	Δ	
Up right LH 2		Up left LH 14
Right gaze 0	Primary LH 5.5 ROSV TO L 10°	Left gaze LH 19
Down right RH 3		Down left LH 18

January ‘24

MADDOX ROD	Δ	
Right gaze RH1	Primary LH 0 ROSV TO L 20°	Left gaze LH 16

ROSV = Range Of Single Vision

Hint of **BETTER!**

Synoptophore

December ‘23

Synoptophore	°	
L1, -3, 2° incyclo	L2, -3, 1° incyclo	L7, -2, 2° incyclo
L1, -3, 2° incyclo	L3, -5, 2° incyclo	L9, -5, 2° incyclo
L1, -5, 2° incyclo	L5, -7, 5° incyclo	L9, -6, 5° incyclo

February ‘24

Synoptophore	°	
R 0.5° incyclo	L1, -1, 8° incyclo	L5, 10° incyclo
L1 -1, 5° incyclo	L2, 5° incyclo	L7.5, 11° incyclo
L1, -2, 5° incyclo	L3, -4, 8° incyclo	L9, -5, 12° incyclo

Torsion **worse**

Synoptophore

Feb ‘24

Synoptophore	°	
R 0.5° incyclo	L1, -1, 8° incyclo	L5, 10° incyclo
L1 -1, 5° incyclo	L2, 5° incyclo	L7.5, 11° incyclo
L1, -2, 5° incyclo	L3, -4, 8° incyclo	L9, -5, 12° incyclo

April ‘24

5 ° intorsion in all positions

Synoptophore	°	
-1	-1, L2	L7
-2	-4,L3	-2,L8
-2	-5,L3	-5,L8

Fuses @ -4, L/2
3° intorsion R
8° Intorsion L
Conv 10°
Div 2°

ROSV to L

- December 10°
- January 20°
- Feb, Apr 10°

- Can’t ride his motorbike
- Face turn to watch TV, talk to friends
- Covers LE when weary

Photos

How to make him better

- How can we help this patient with his persistent left gaze diplopia?

- Incomitant left hypertropia and progressive incyclotorsion, presumably due to left IR damage ?

How to to expand ROSV to L

?adjustable RSO recession

?resect temporal ½ LIR

January ‘24

MADDOX ROD	Δ	
Right gaze RH1	Primary LH 0 ROSV TO L 20°	Left gaze LH 16

Left gaze
Can’t fuse with prism because of torsion