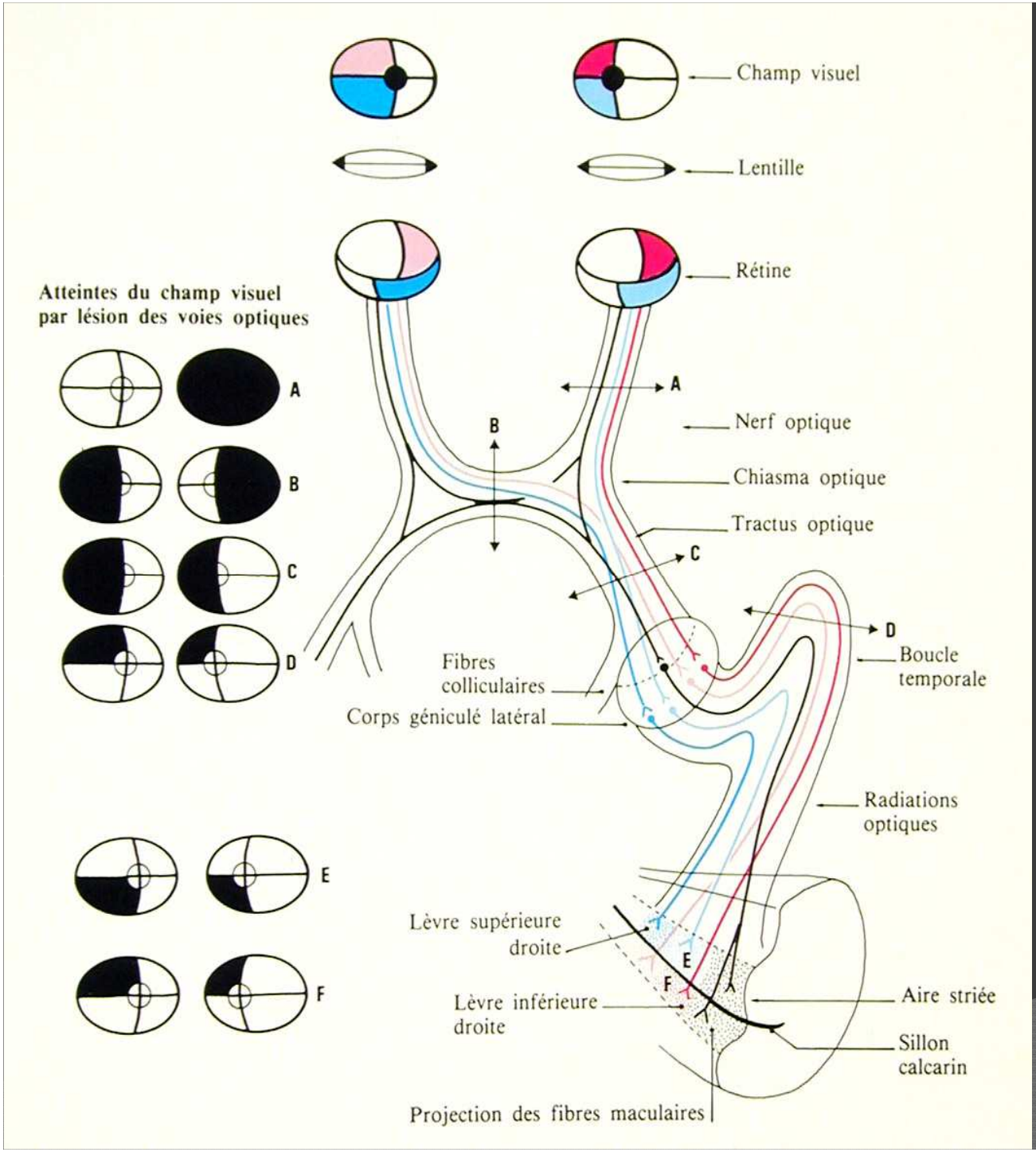
OPHTALMIC PATHOLOGY AND HYPOPHYSIS

Bernard OTTO, Julie KREUTZ
Neuroradiology Unit
P.MEUNIER MD
CHU Liège
DES UCL-ULB-ULG
2015-2016

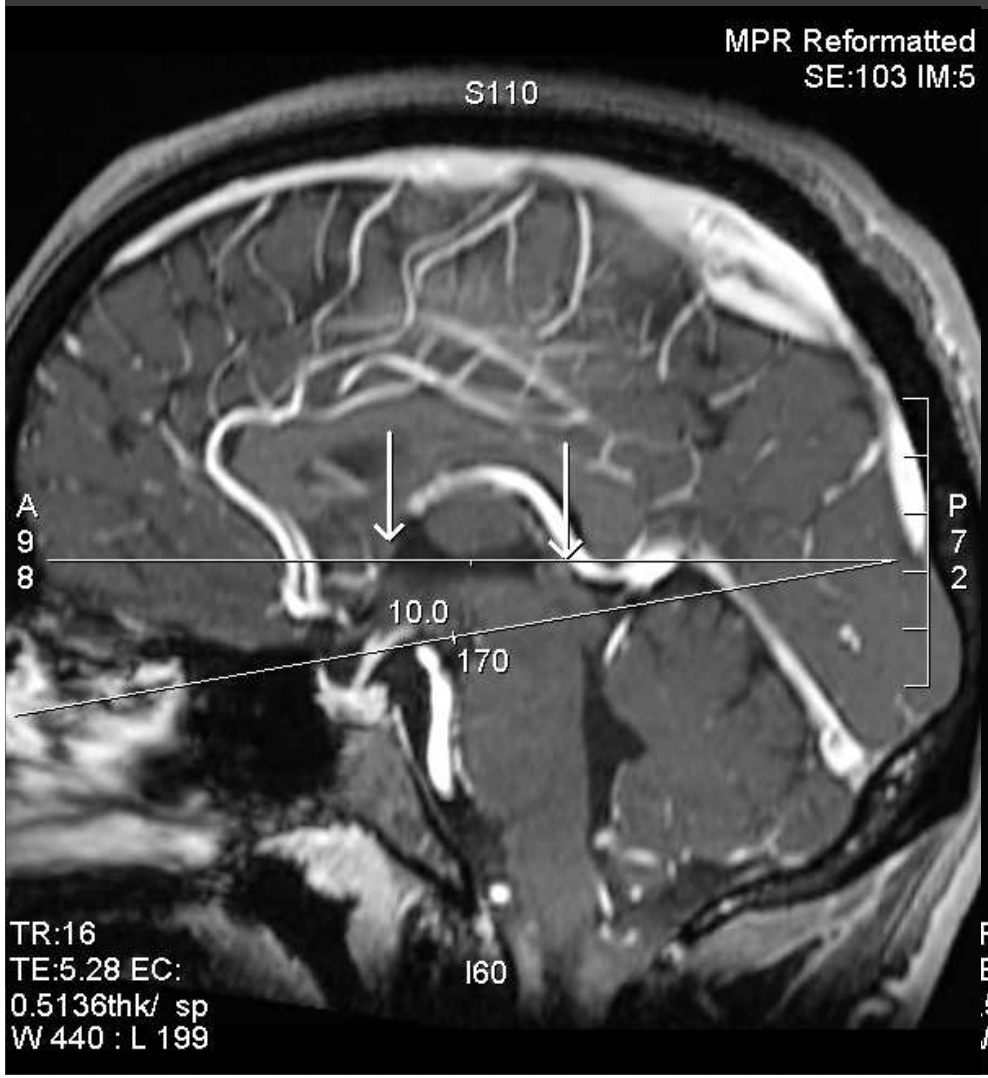


A : optic nerve lesion = monocular blindness
B : chiasmatic lesion= bitemporal hemianopsia

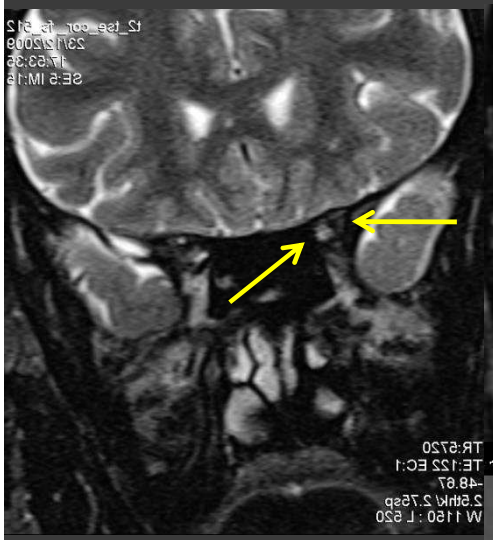
C : retrochiasmatic lesion= homonymous lateral hemianopsia)

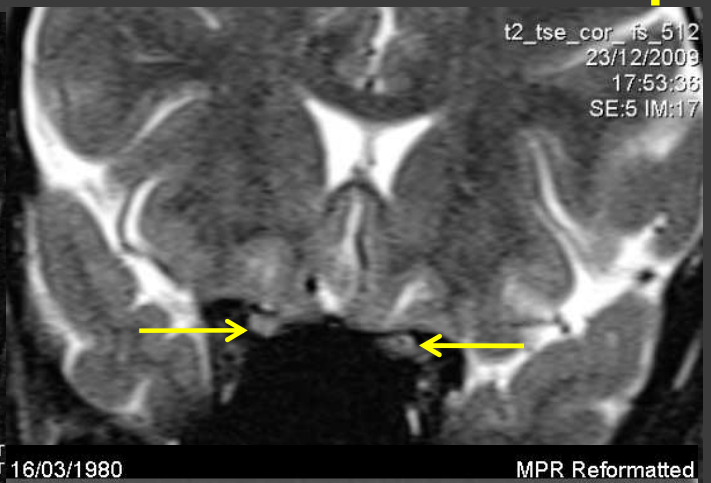
E / F : calcarin cortex lesion = quadranopsiae

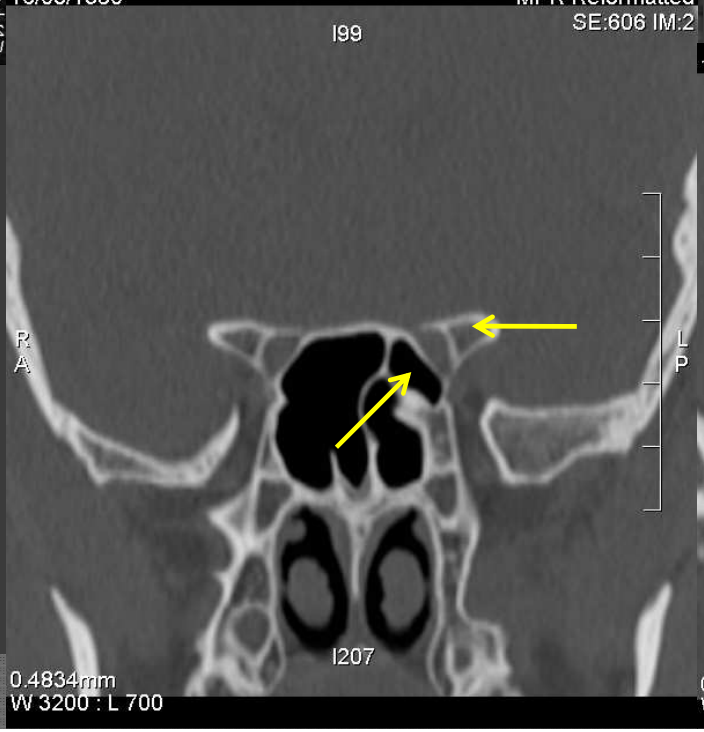
Anatomie : PNO, Plan Neuro-Oculaire
-10° plan CA-CP



Optic nerve
Optic canal



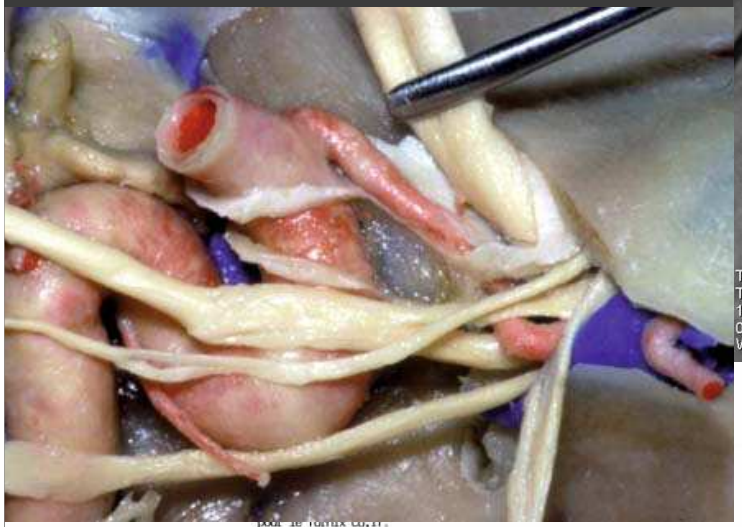


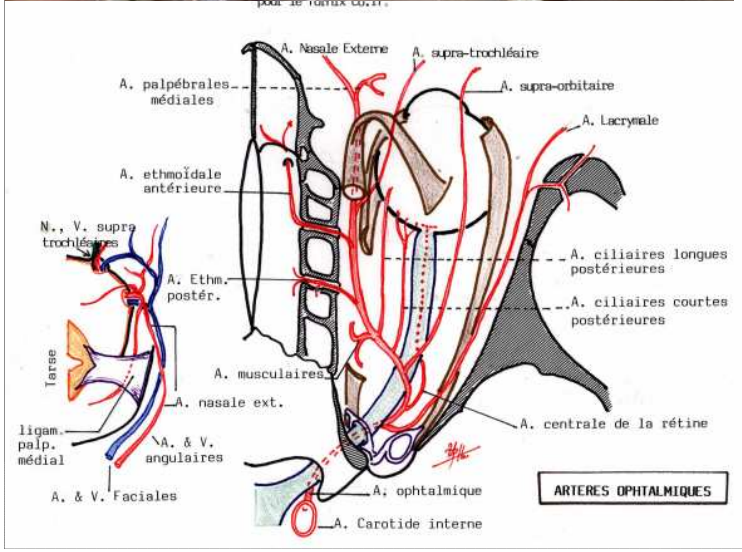


Optic canal

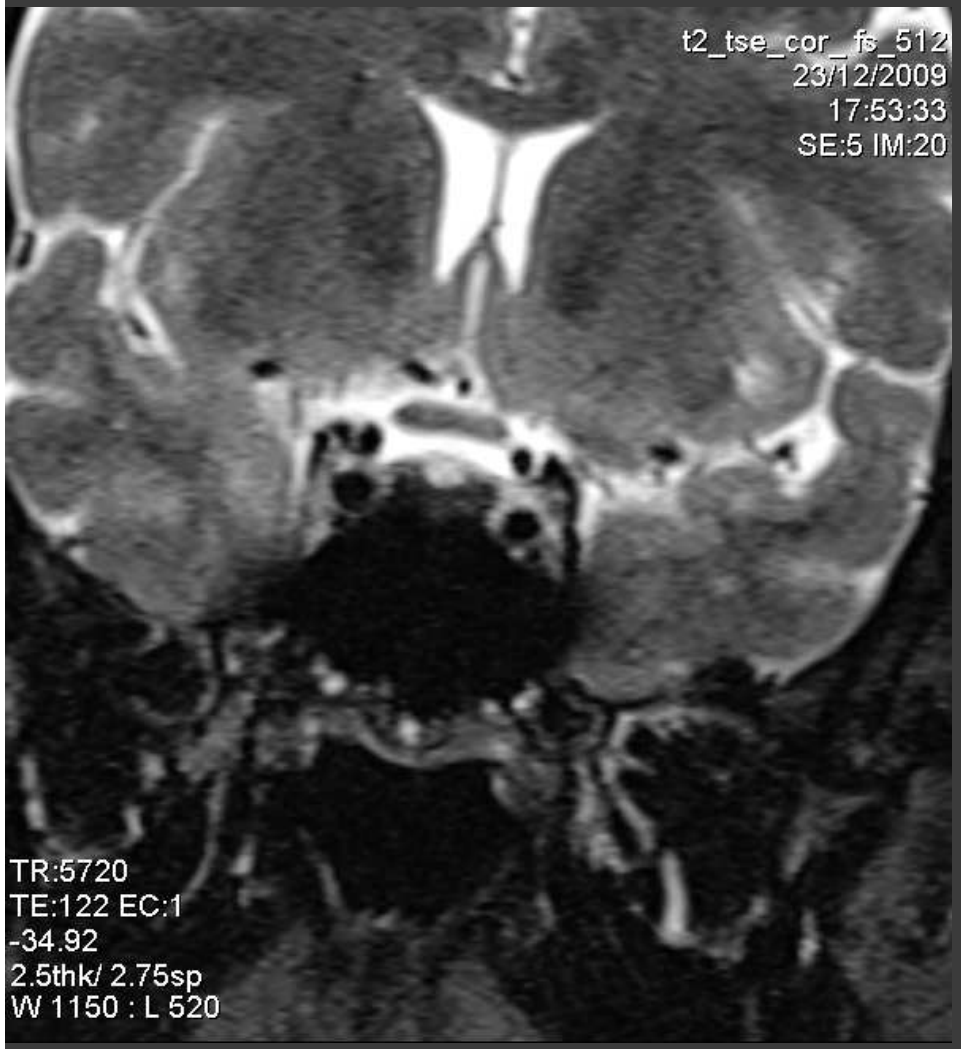

16/03/1980
Crane -C Os 1.0 H70h
16/02/2010
09:17:08
SE:5 IM:91
-187.1
1mm
W 3200 : L 700
16/03/1980
MPR Reformatted
SE:606 IM:3
I99
P
L
I207
t1_se_trans_3mm
30/12/2009
15:04:09
SE:4 IM:12
AI
PS
TR:495
TE:14 EC:1
11.86
3thk/ 3sp
W 838 : L 369

Optic canal, optic nerve, ophtalmic artery

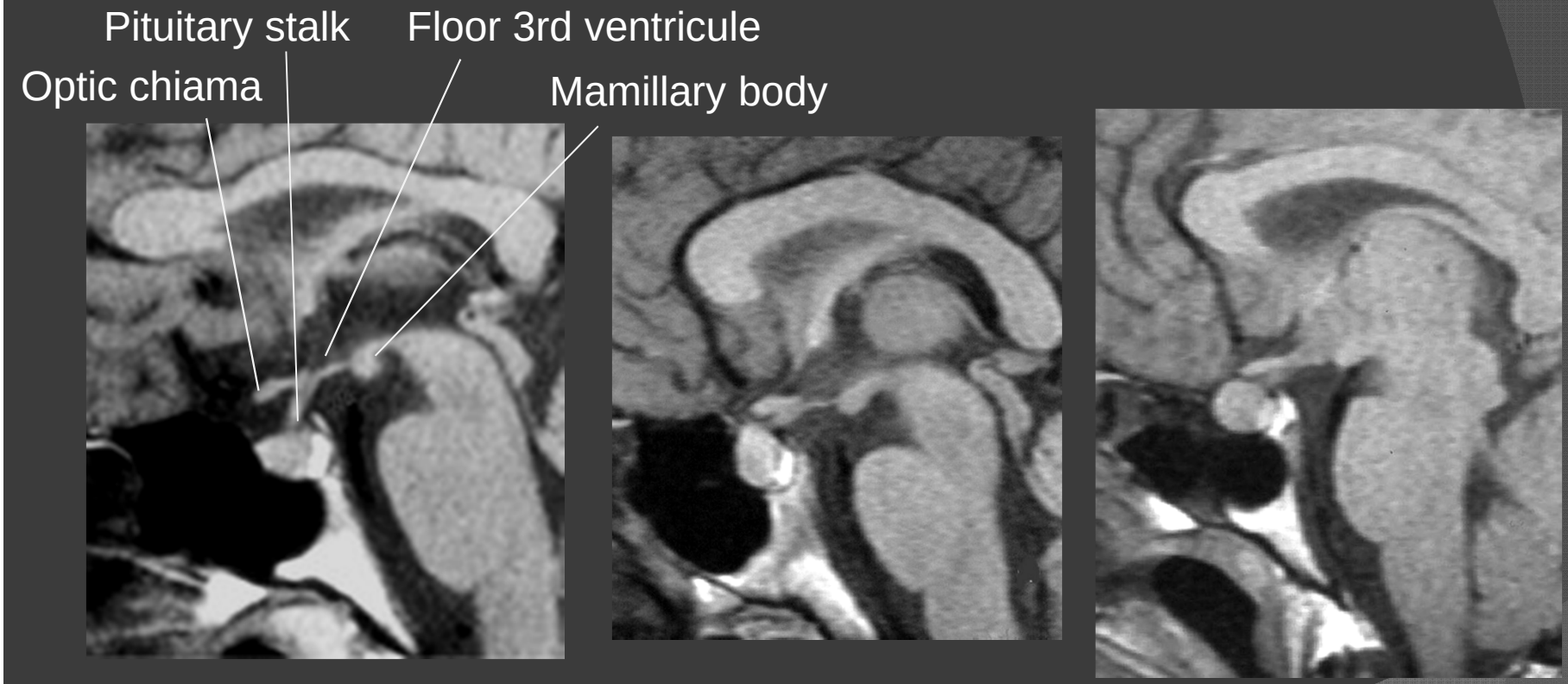




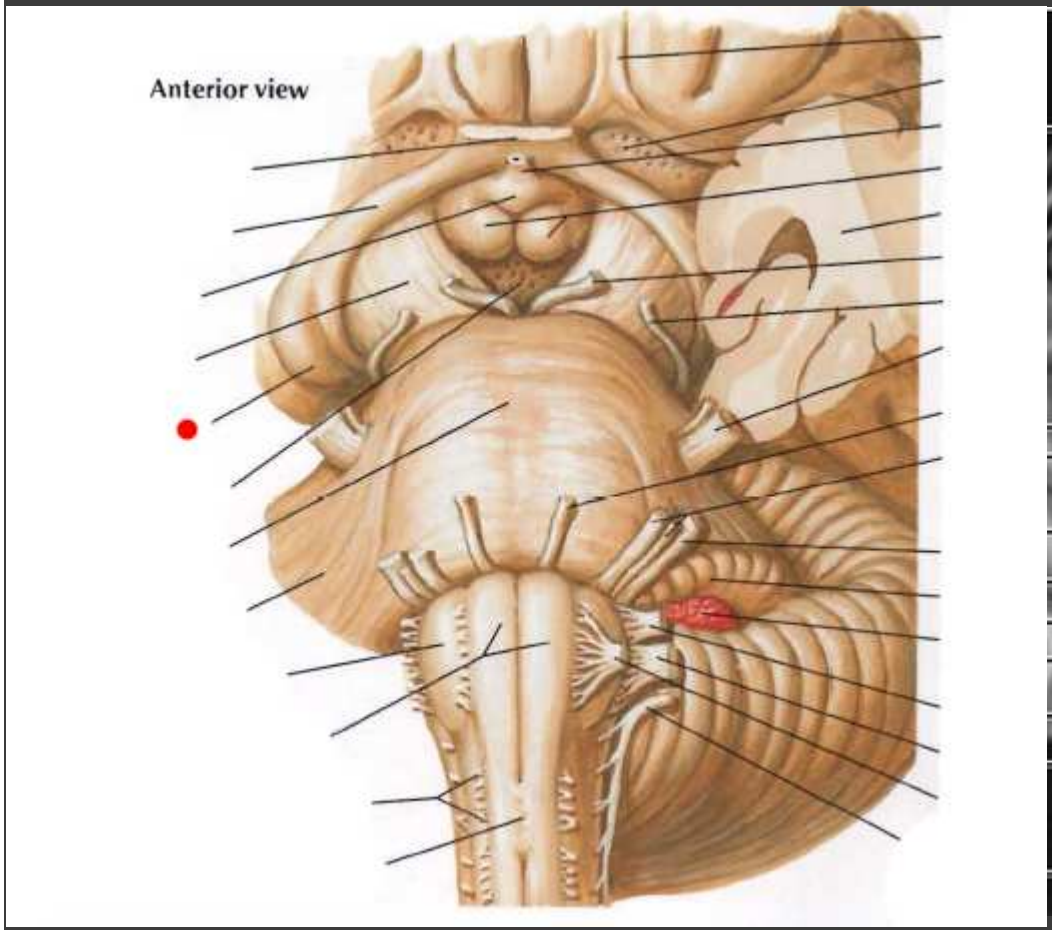
Optic chiasma

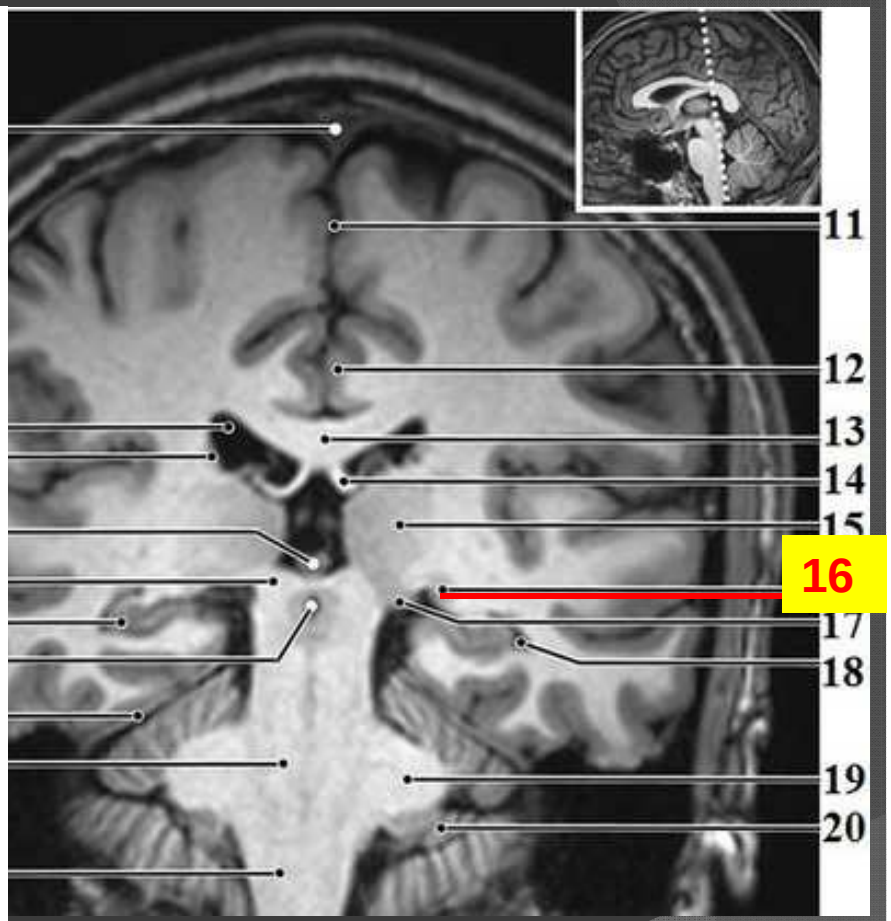


Optic chiasma



Optic tracts, lateral geniculate bodies





NB : medial geniculate body (17) is a thalamic structure suituated in the inferior part of the diencephalon inferior to the caudal end of the dorsal thalamus and is involved in the auditory pathways

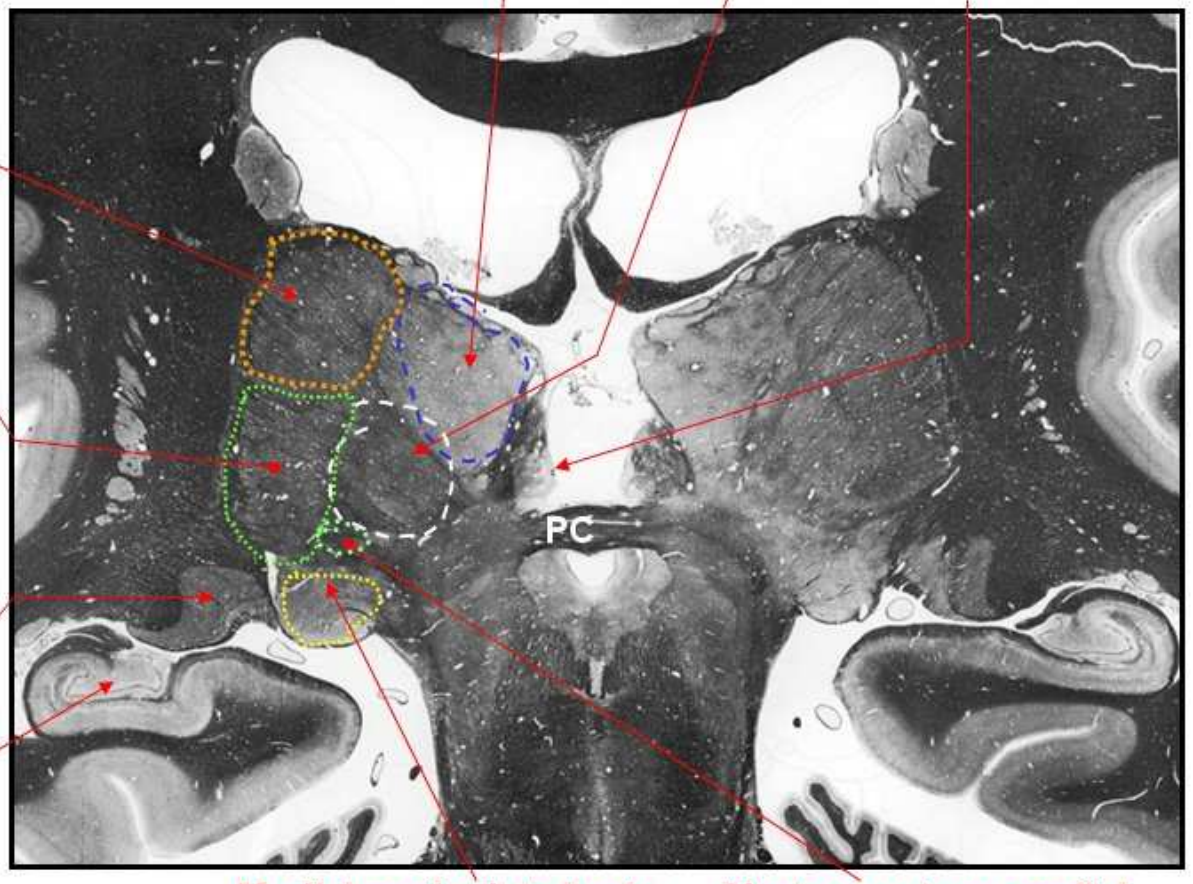
Posterior Nuclear Group. Ventro post. medial

Structure: supra geniculate nucleus, nucleus limitans, posterior nucleus linked to pulvinar.

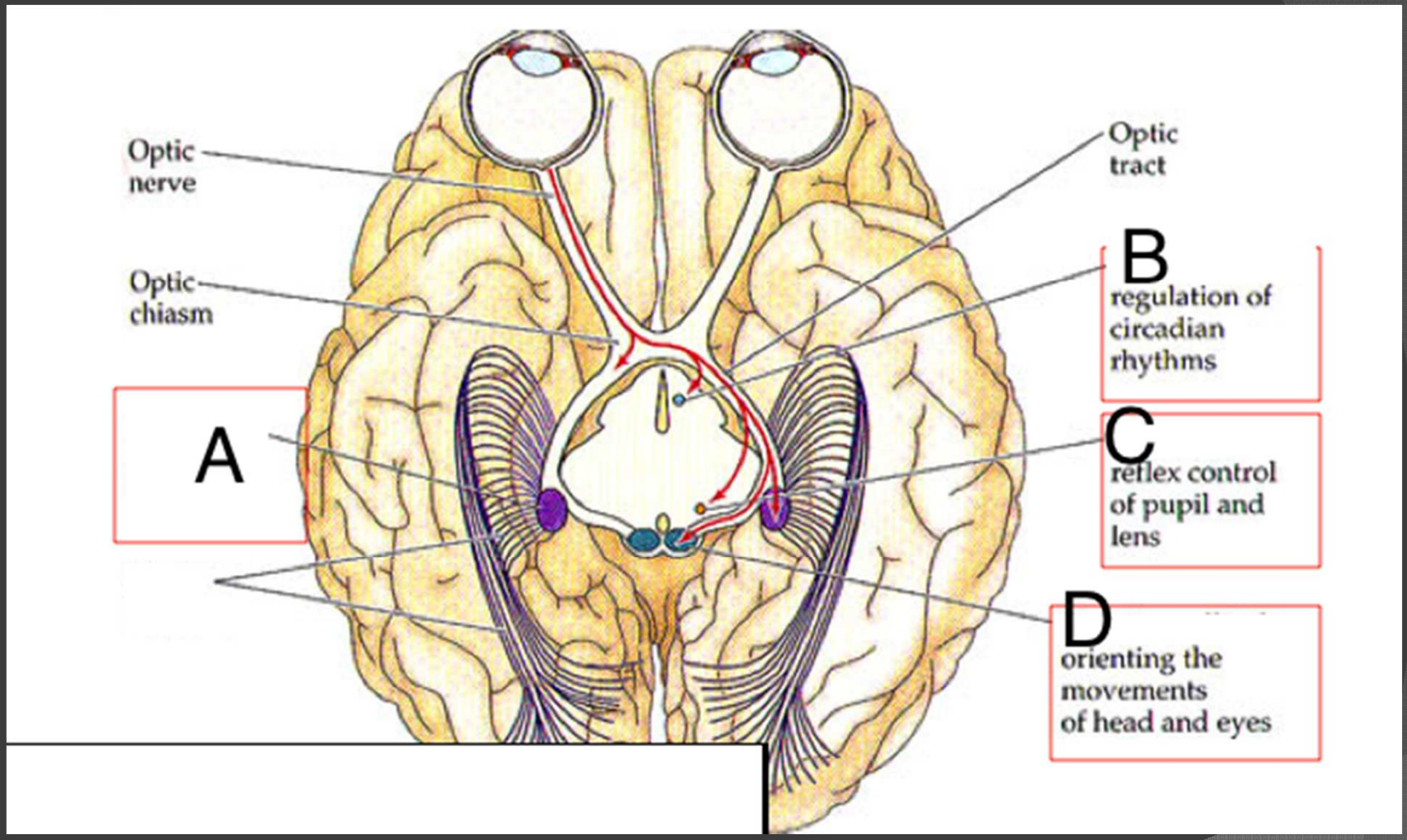
Afferents: spino thalamic tracts.

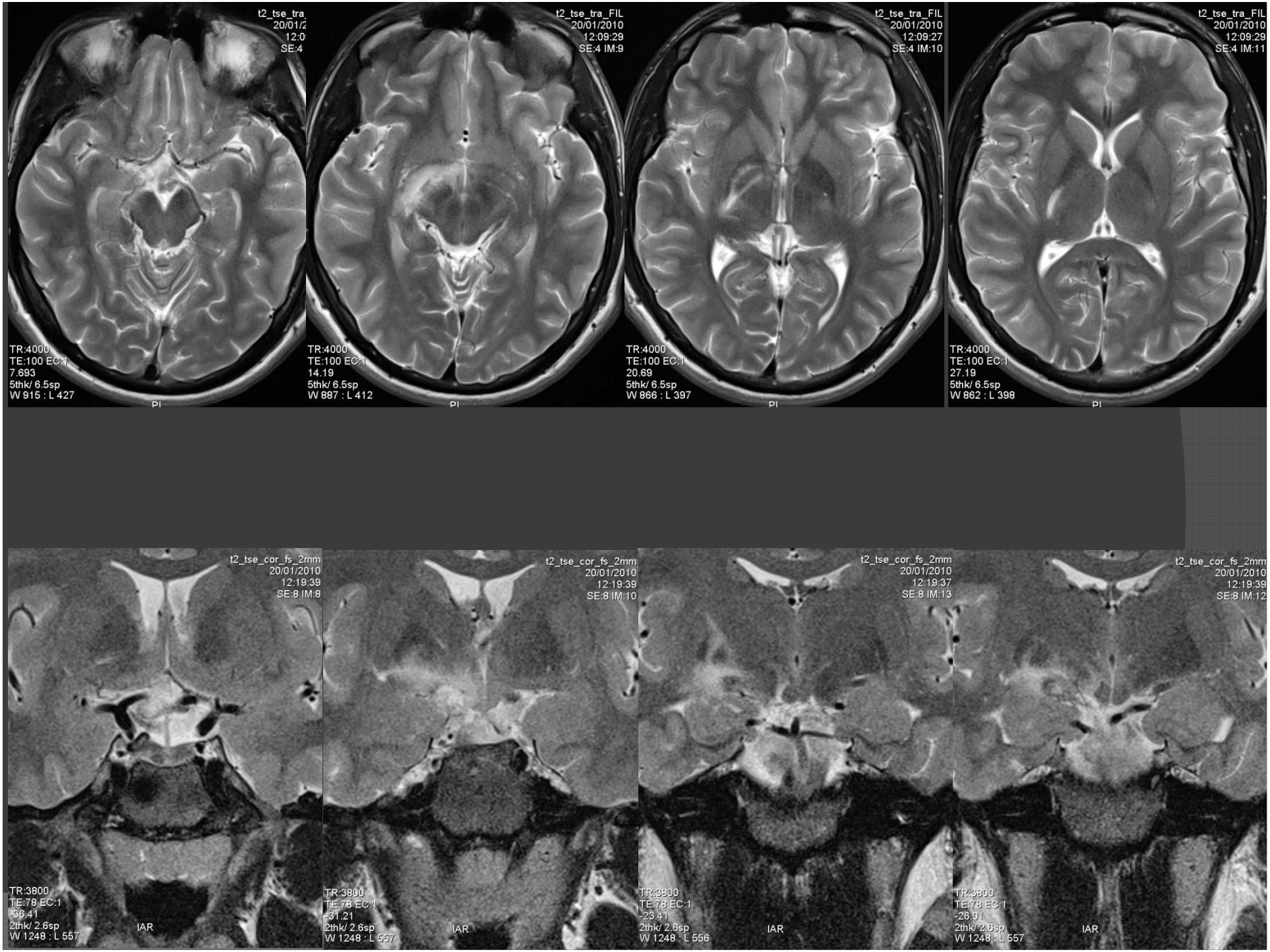
Role: nociception.

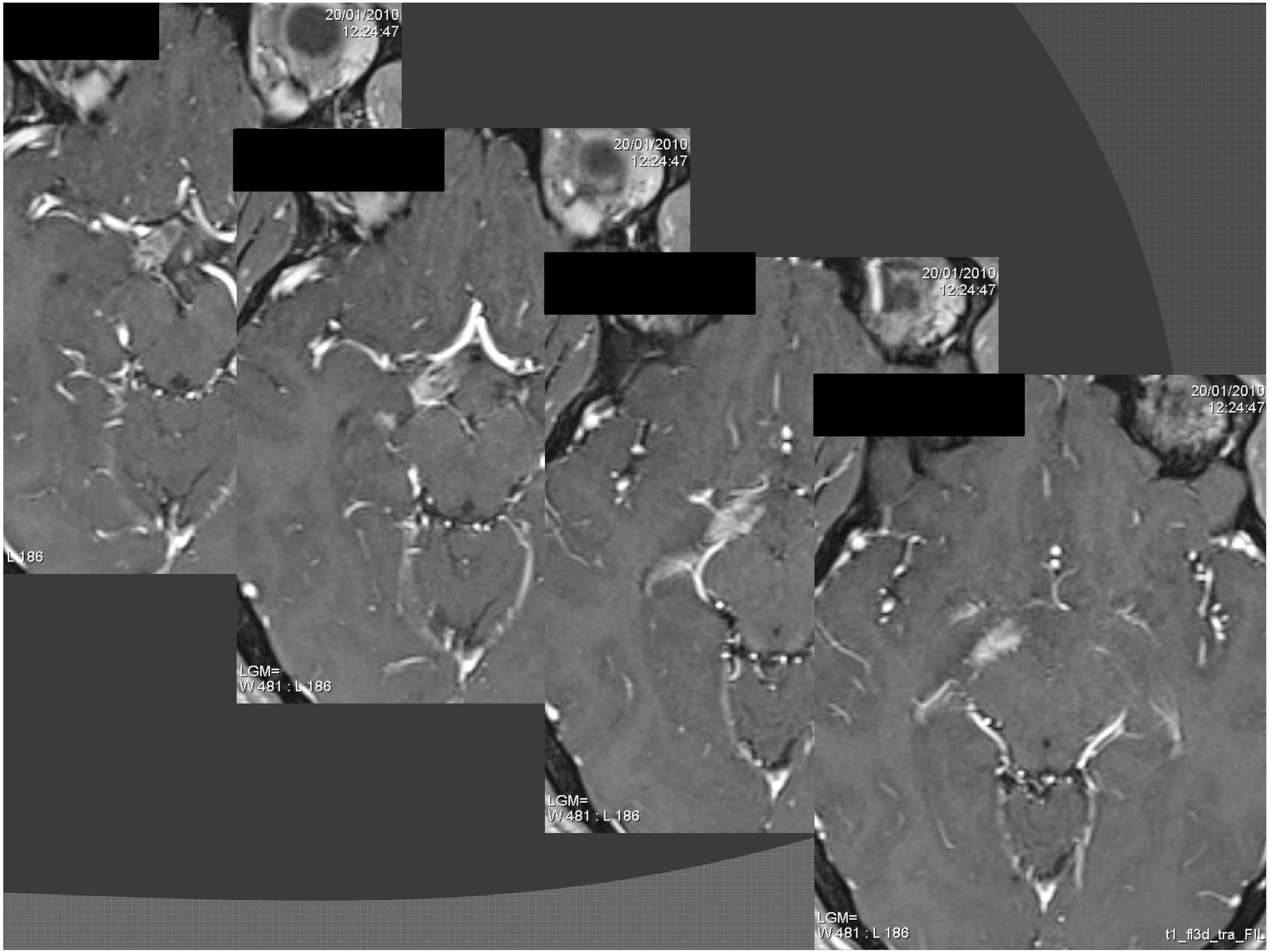
Transverse section of the brainstem at the junction of mesencephalon and diencephalon. The ventro postero medial nuclear group receiving collaterals from spino thalamic fibers is medial to the medial geniculate body.



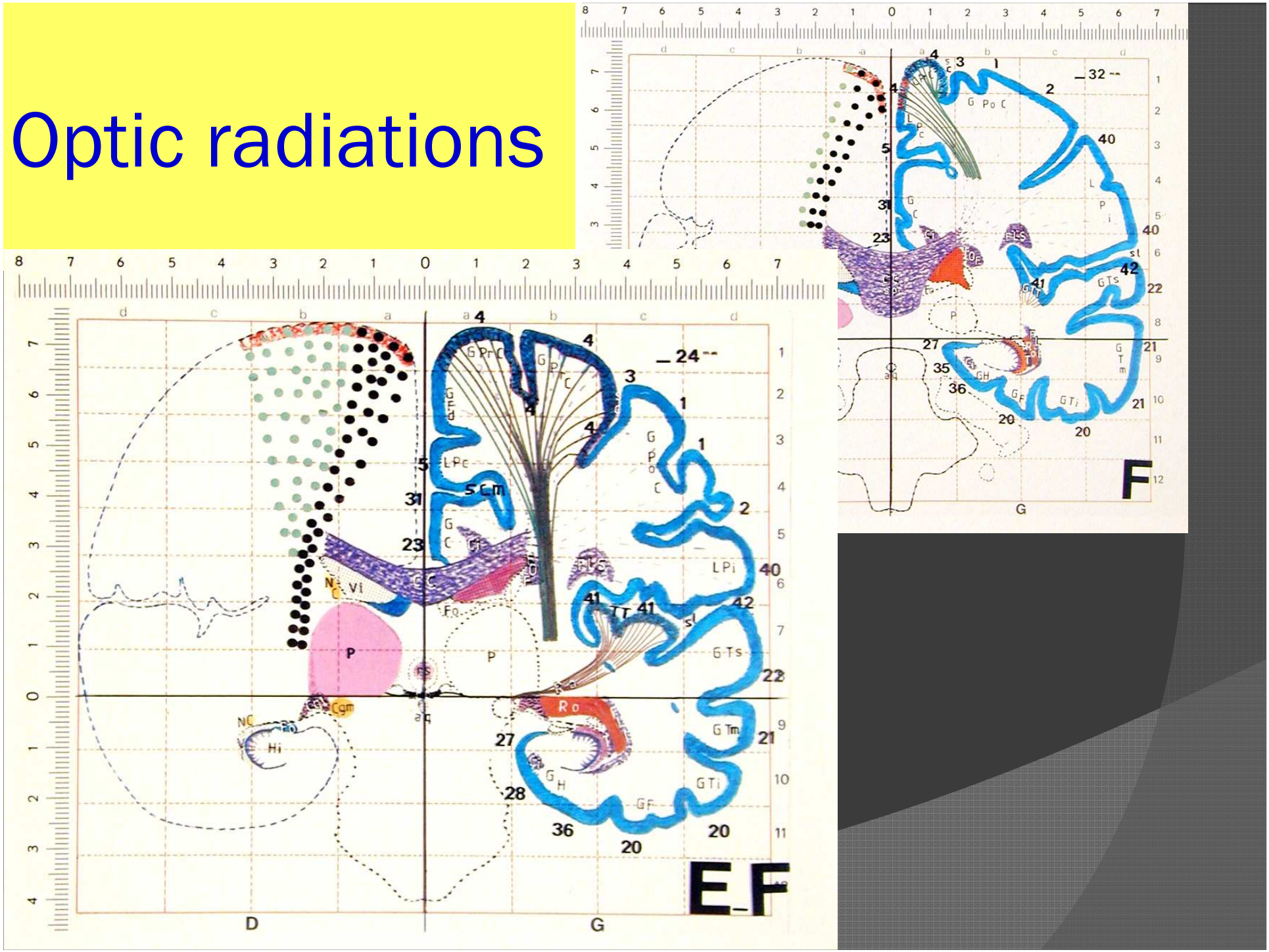
From S.J. De Armond, M.M. Fusco, M.M. Dewey. Structure of the human brain. A photographic Atlas. Oxford University Press. New York Oxford 3rd ed. 1989

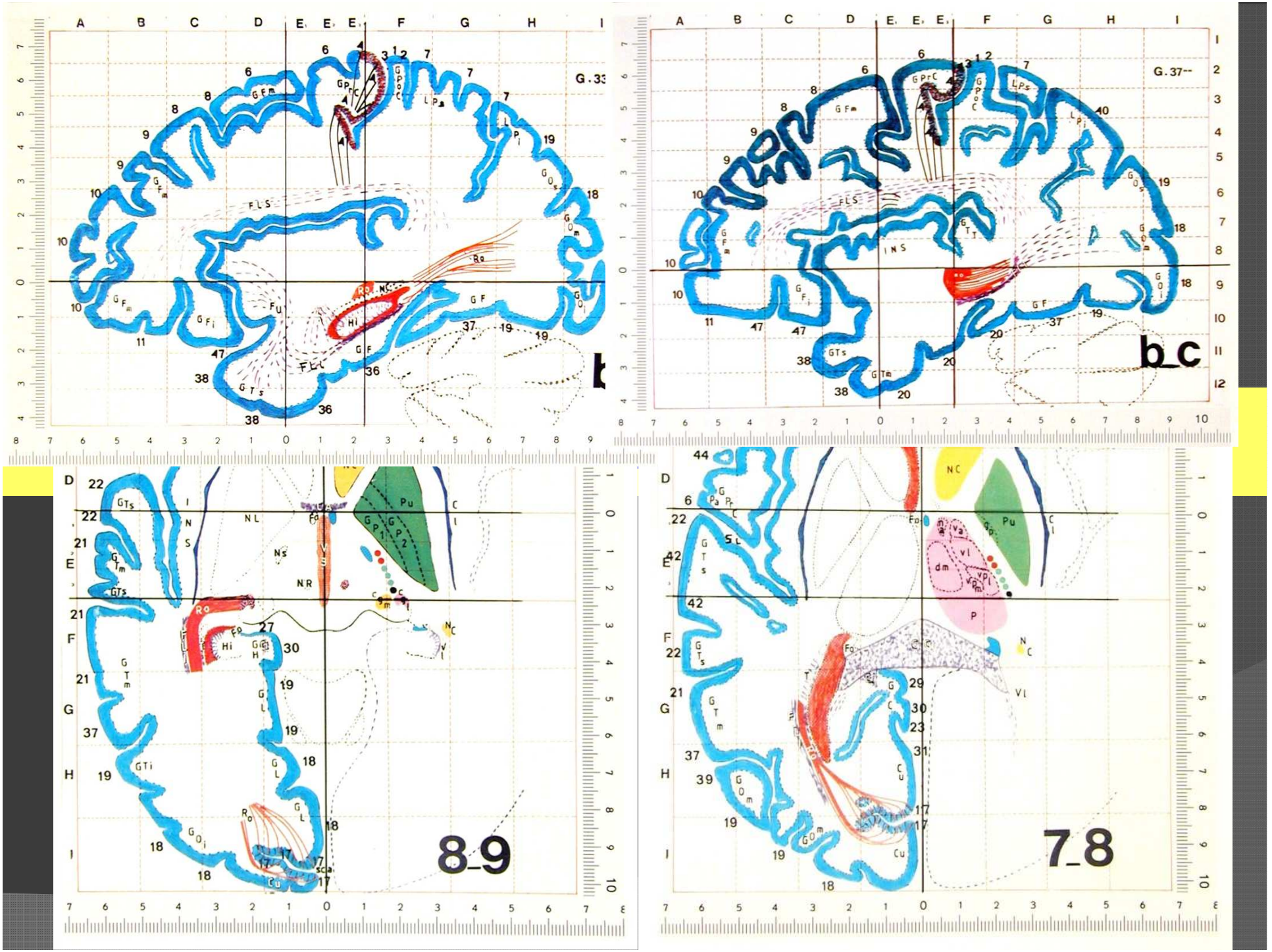

Optic nerve
Optic chiasm
A
Optic tract
B
regulation of circadian rhythms
C
reflex control of pupil and lens
D
orienting the movements of head and eyes


t2_tse_tra
20/01/2
12:0
SE:4
TR:4000
TE:100 EC:1
7.693
5thk/ 6.5sp
W 915 : L 427
PI
t2_tse_tra_FIL
20/01/2010
12:09:29
SE:4 IM:9
TR:4000
TE:100 EC:1
14.19
5thk/ 6.5sp
W 887 : L 412
PI
t2_tse_tra_FIL
20/01/2010
12:09:27
SE:4 IM:10
TR:4000
TE:100 EC:1
20.69
5thk/ 6.5sp
W 866 : L 397
PI
t2_tse_tra_FIL
20/01/2010
12:09:29
SE:4 IM:11
TR:4000
TE:100 EC:1
27.19
5thk/ 6.5sp
W 862 : L 398
PI
t2_tse_cor_fs_2mm
20/01/2010
12:19:39
SE:8 IM:8
TR:3800
TE:78 EC:1
-36.41
2thk/ 2.6sp
W 1248 : L 557
IAR
t2_tse_cor_fs_2mm
20/01/2010
12:19:39
SE:8 IM:10
TR:3800
TE:78 EC:1
-31.21
2thk/ 2.6sp
W 1248 : L 557
IAR
t2_tse_cor_fs_2mm
20/01/2010
12:19:37
SE:8 IM:13
TR:3800
TE:78 EC:1
-23.41
2thk/ 2.6sp
W 1248 : L 556
IAR
t2_tse_cor_fs_2mm
20/01/2010
12:19:39
SE:8 IM:12
TR:3800
TE:78 EC:1
-26.01
2thk/ 2.6sp
W 1248 : L 557
IAR


20/01/2010
12:24:47
L 186
20/01/2010
12:24:47
LGM=
W 481 : L 186
20/01/2010
12:24:47
LGM=
W 481 : L 186
20/01/2010
12:24:47
LGM=
W 481 : L 186
t1_fl3d_tra_FIL

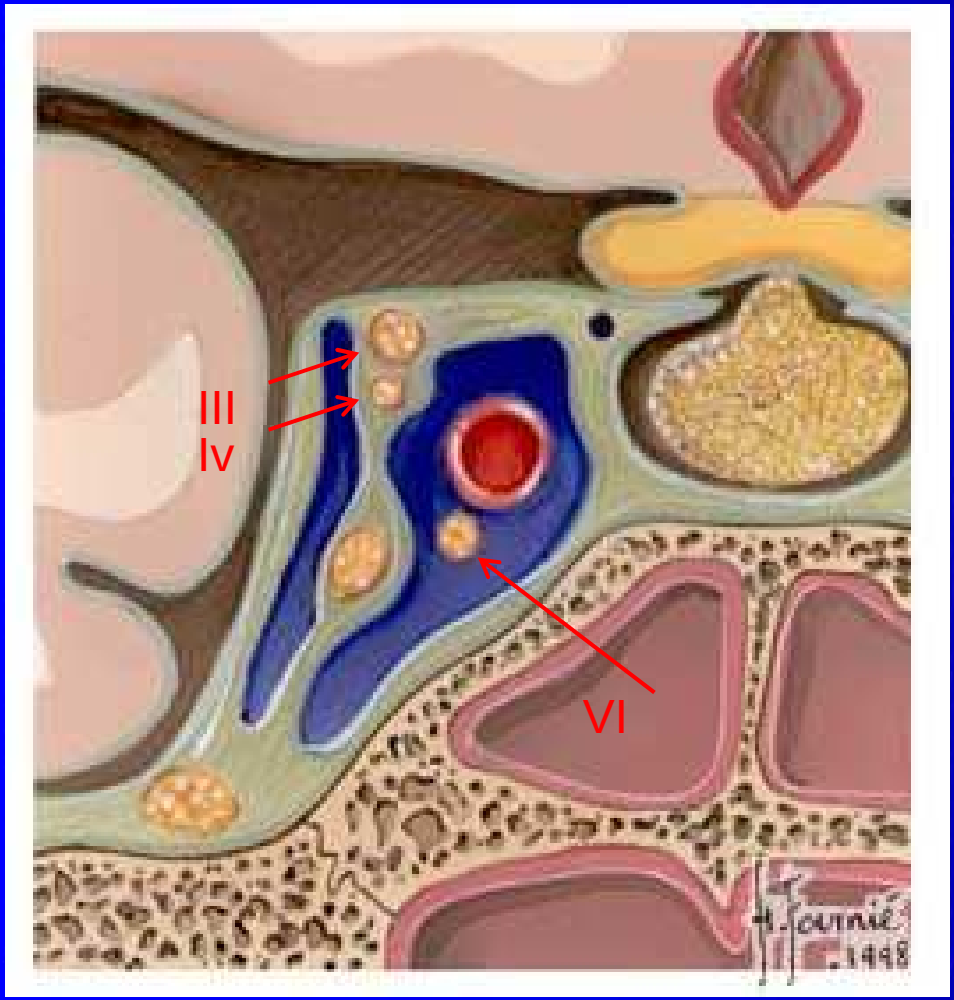
Optic radiations

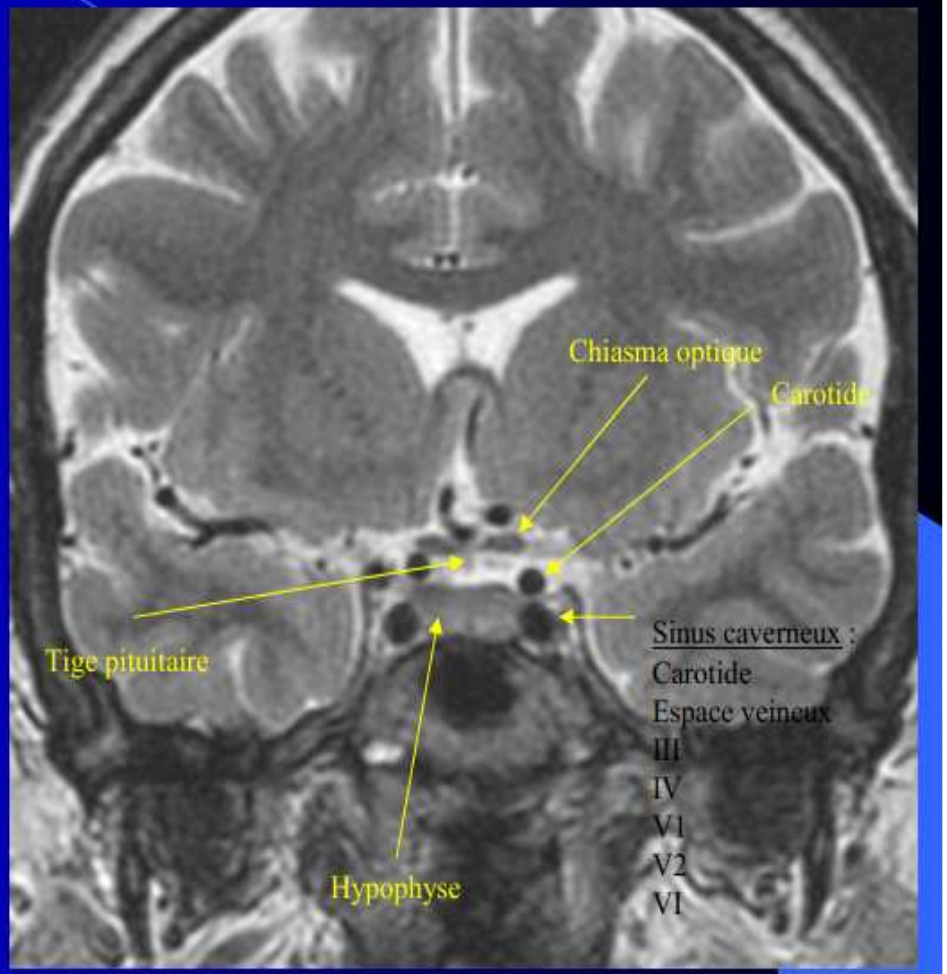


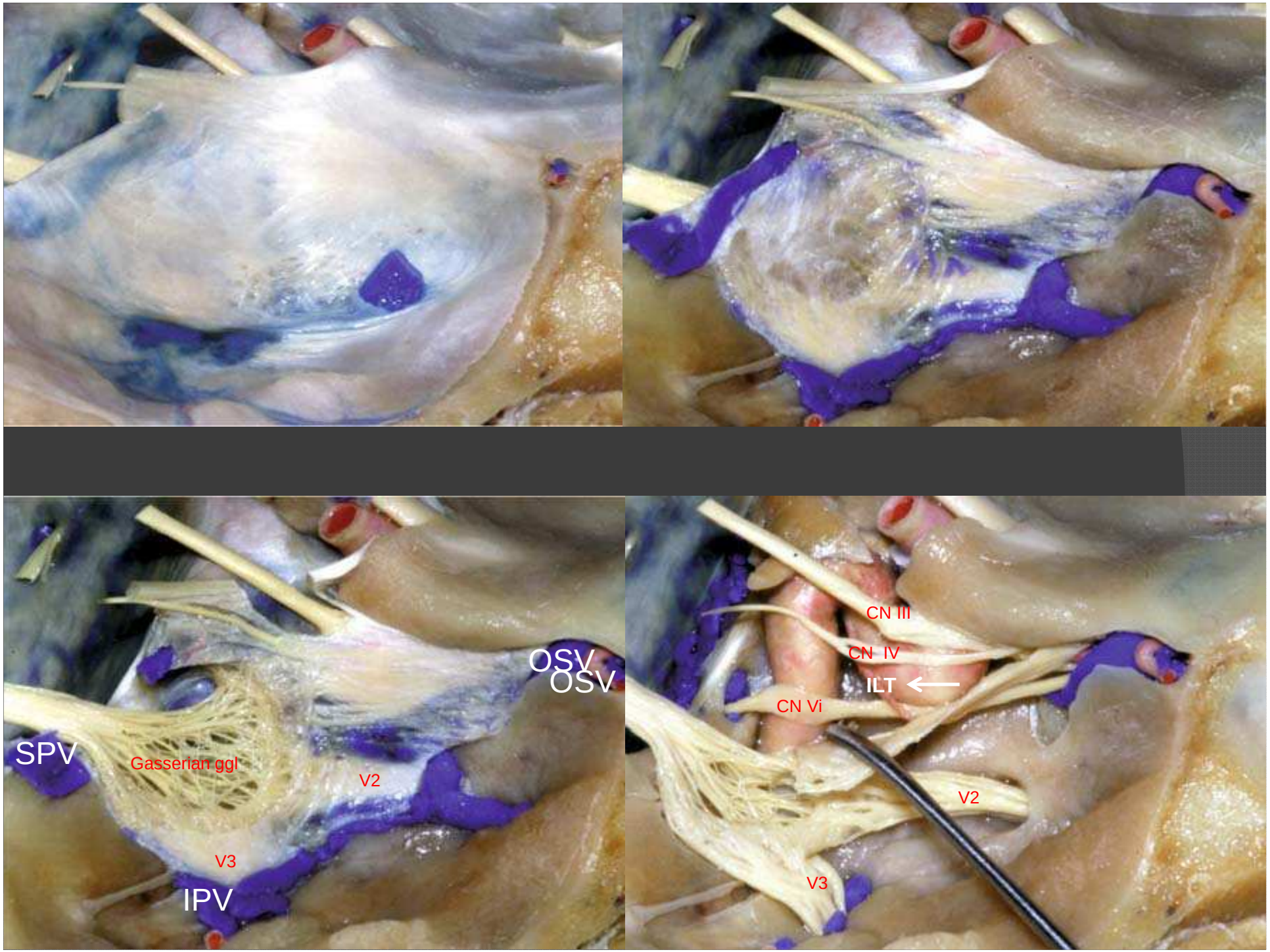

A B C D E E E F G H I
G.33
G.37--
b
b_c
8_9
7_8

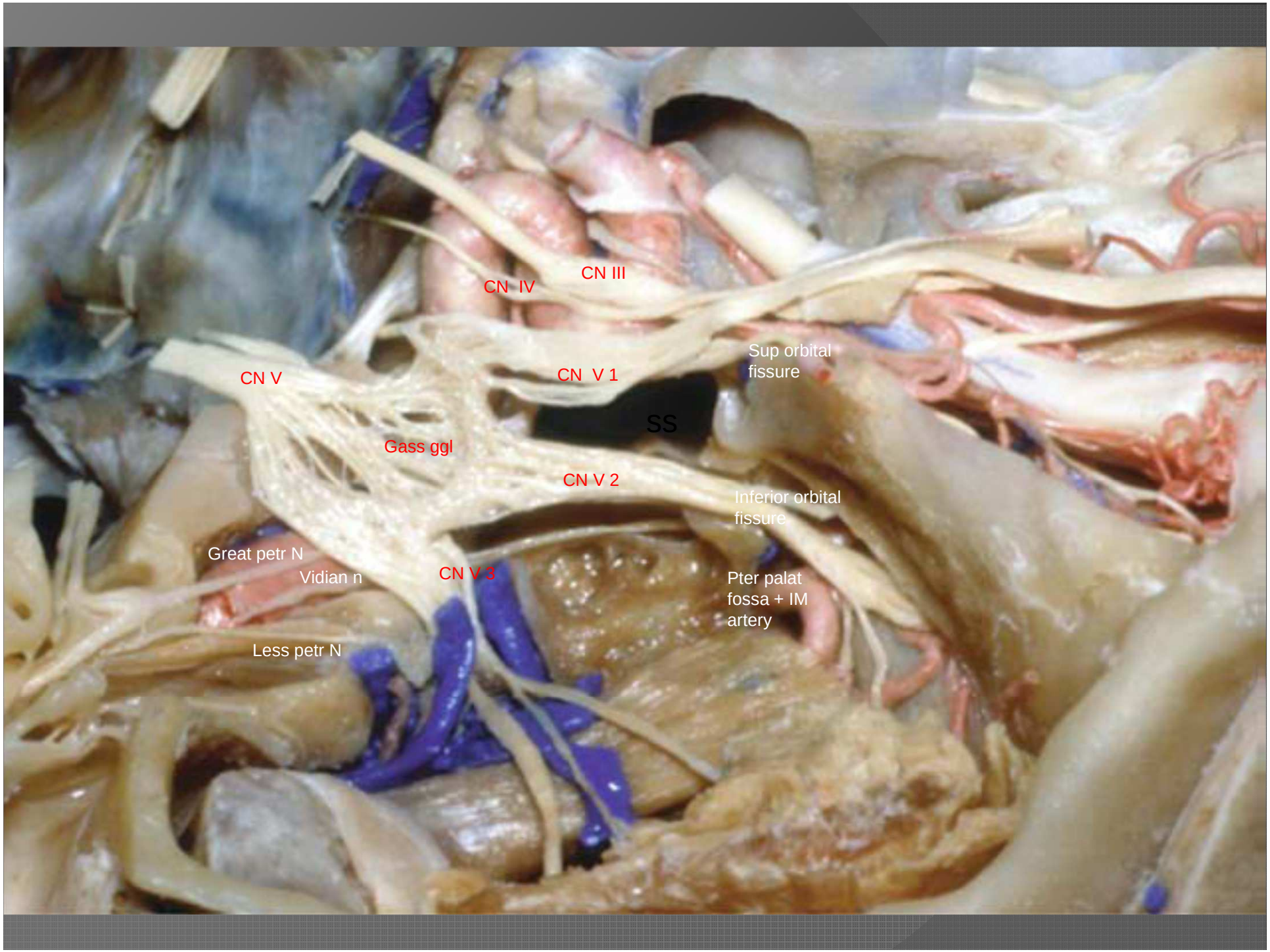
CAVERNOUS SINUS AND OCULOMOTOR NERVES

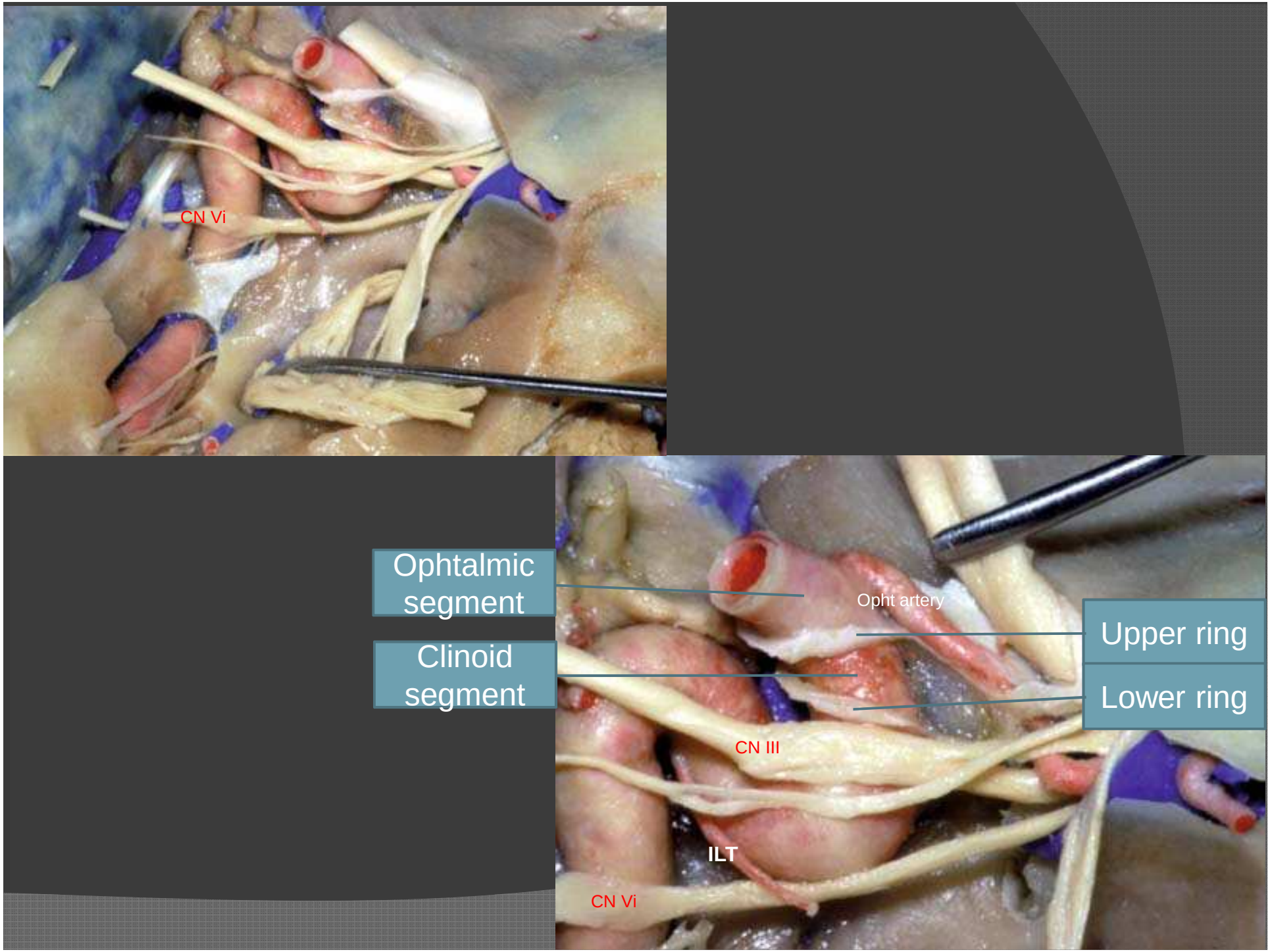
Rappel anatomique





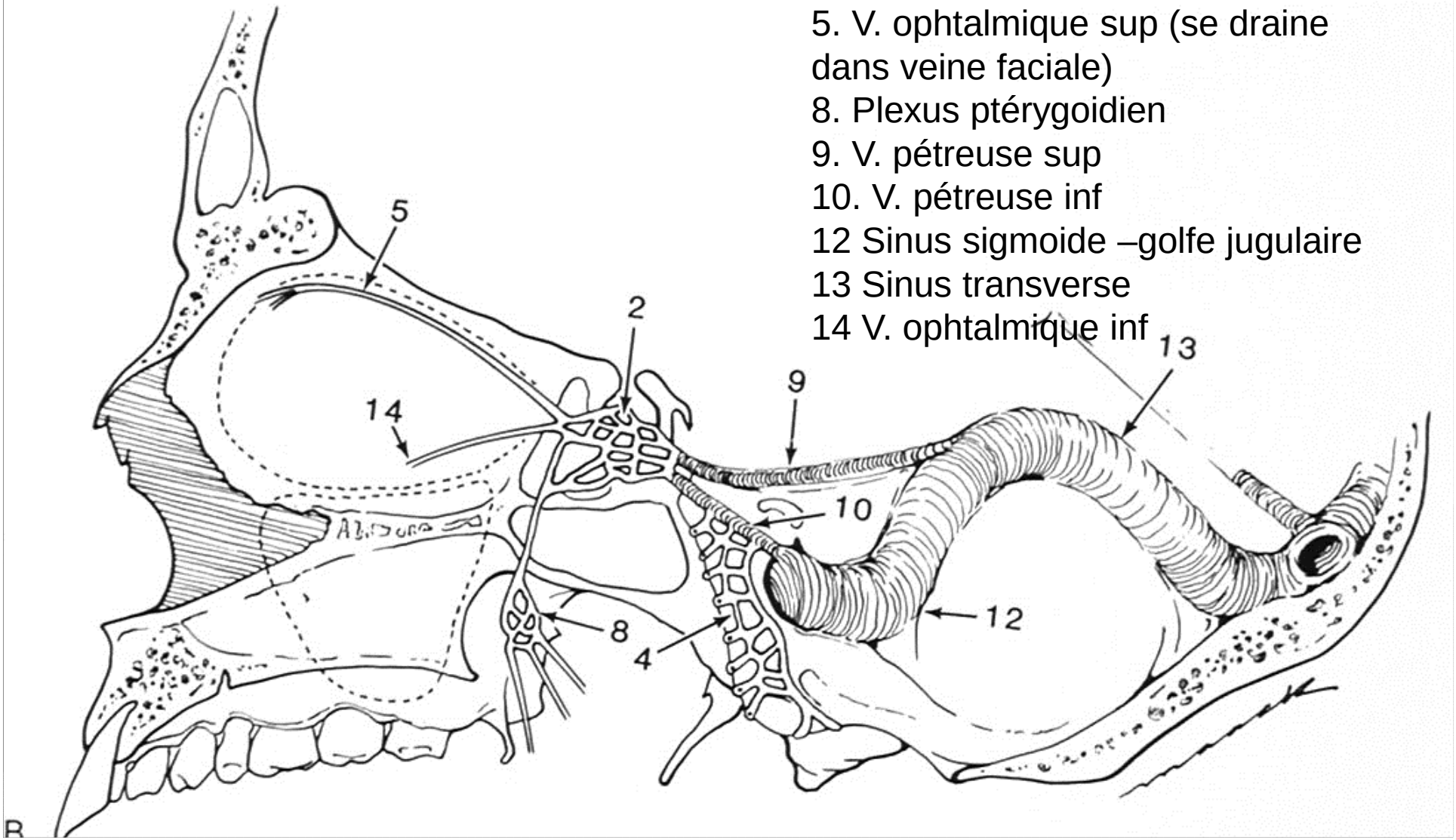

OSV
OSV
SPV
Gasserian ggl
V2
V3
IPV
CN III
CN IV
ILT
CN Vi
V2
V3


CN III
CN IV
Sup orbital fissure
CN V
CN V 1
SS
Gass ggl
CN V 2
Inferior orbital fissure
Great petr N
Vidian n
CN V 3
Pter palat fossa + IM artery
Less petr N

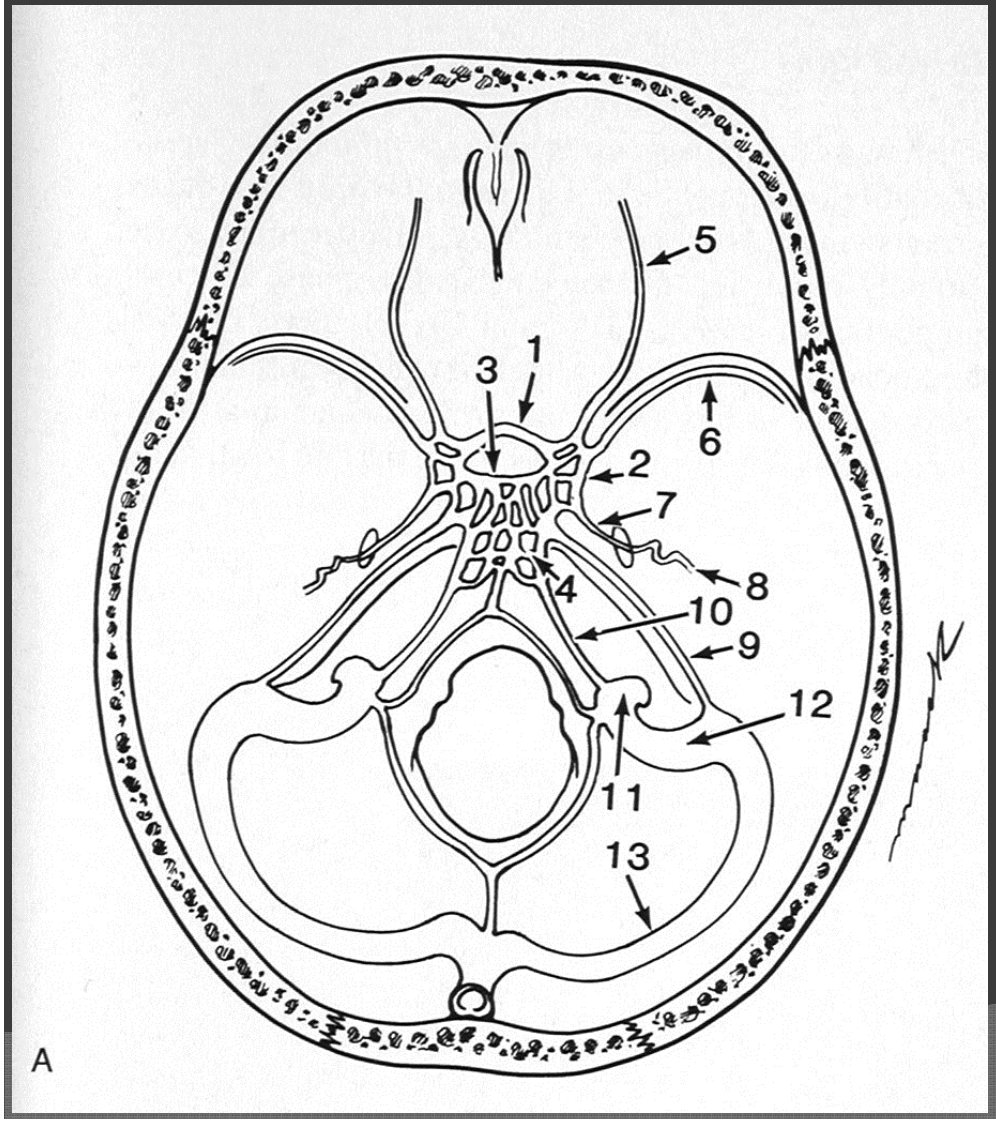

CN Vi
Ophtalmic segment
Clinoid segment
Opht artery
Upper ring
Lower ring
CN III
ILT
CN Vi

Drainage de la loge caverneuse

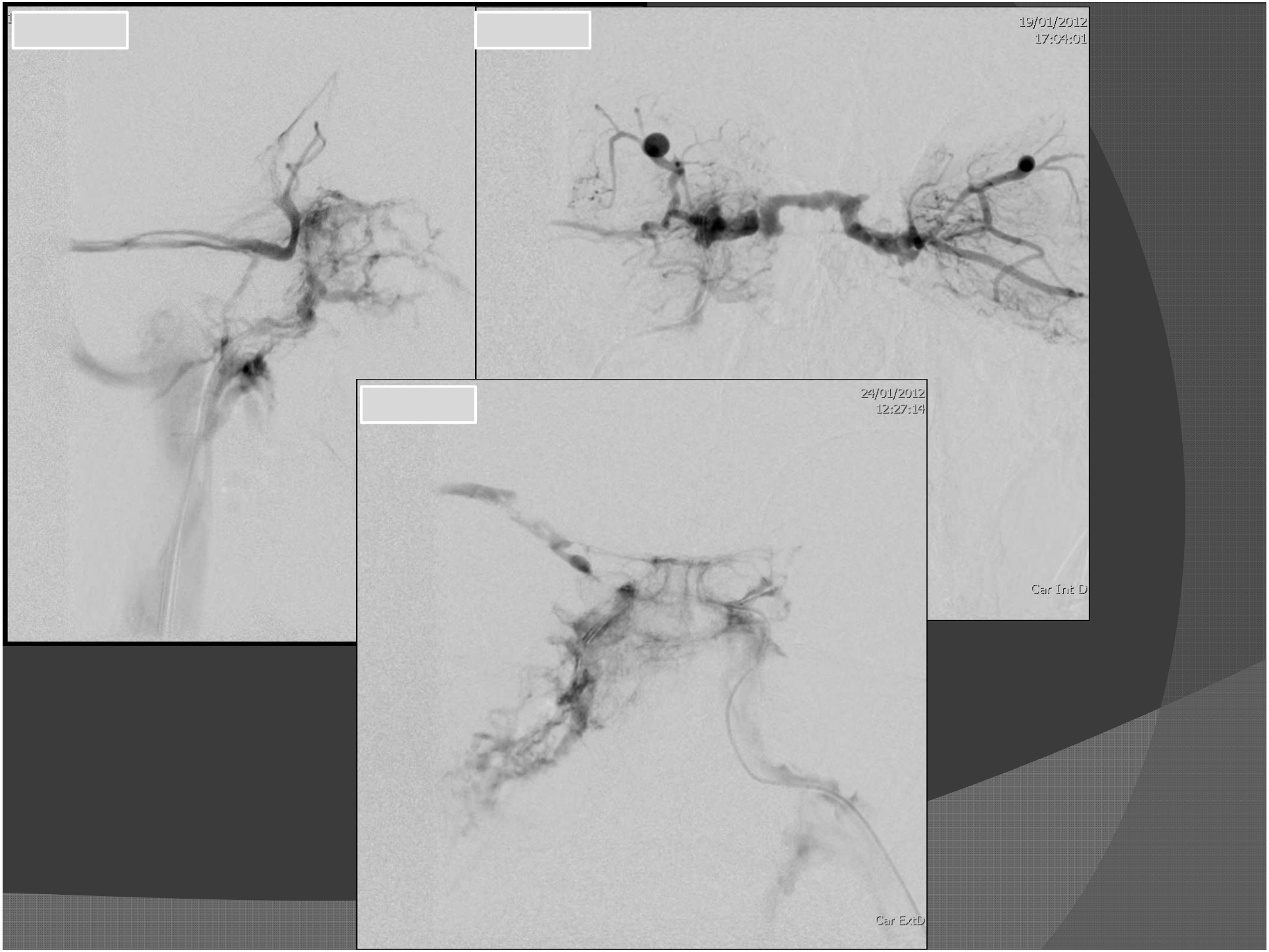
2. Loge caverneuse
4. Plexus clival et basilaire
5. V. ophtalmique sup (se draine dans veine faciale)
8. Plexus ptérygoidien
9. V. pétreuse sup
10. V. pétreuse inf
12 Sinus sigmoide –golfe jugulaire
13 Sinus transverse
14 V. ophtalmique inf



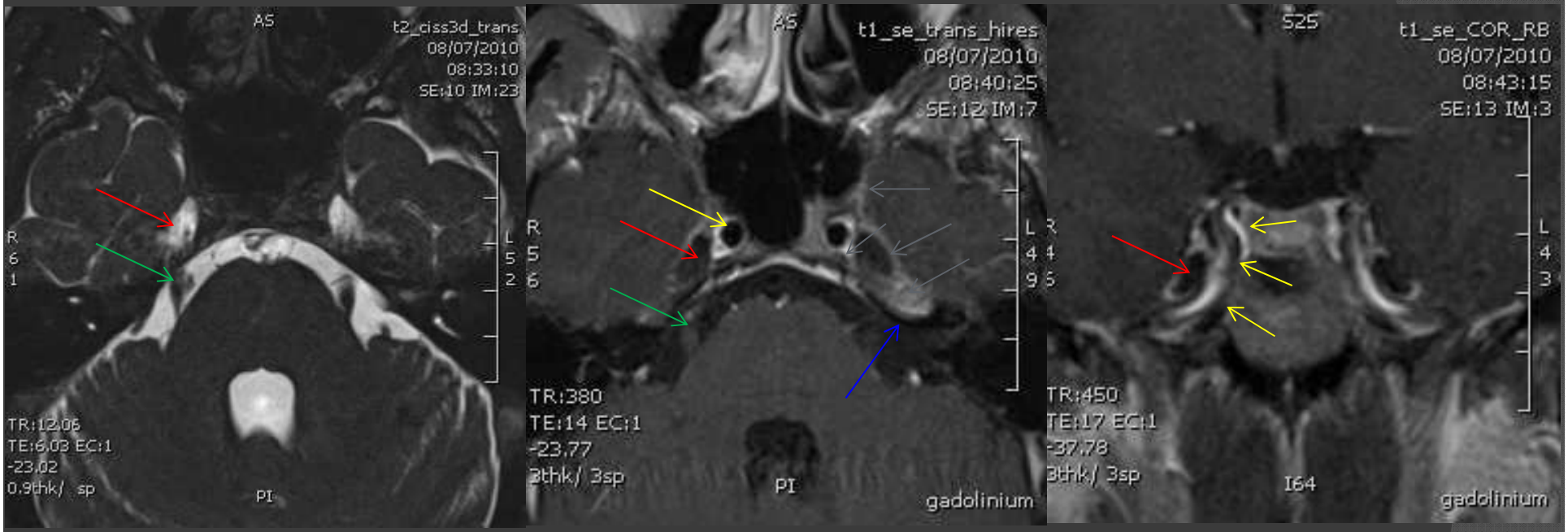
- Drainage vers veine sylvienne



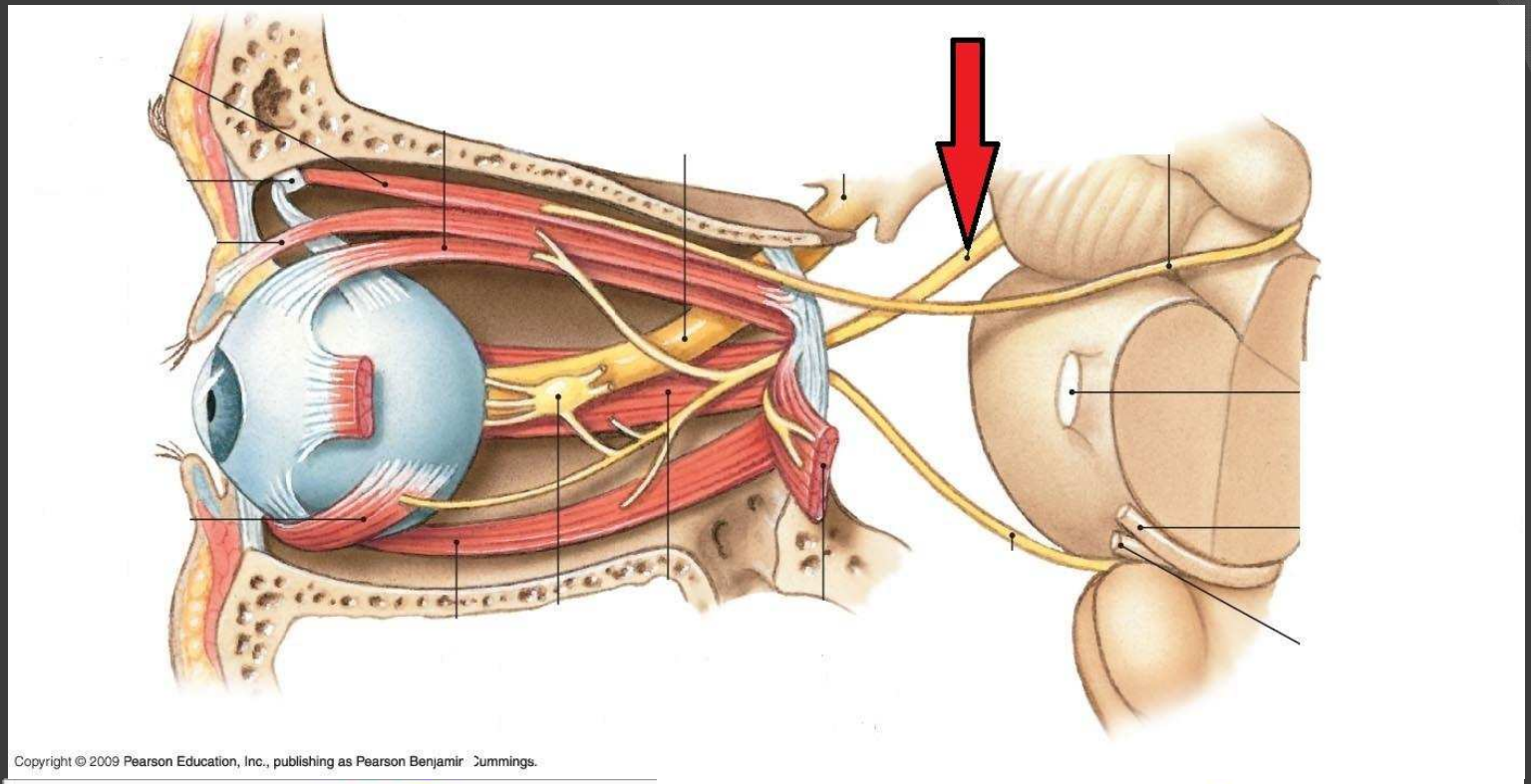
1) Anterior intercavernous sinus
2) Cavernous sinus
3) Posterior intercavernous sinus
4) Basila (clival) sinus
5) Superior ophtalmic v
6) Spenoparietal sinus and/or sylvian v.
7) Foramen ovale plexus
8) Pterygoid plexus
9) Superior petrousal sinus
10) Inferior petrousal sinus
11) Internal jugular bulb
12) Sigmoid sinus
13) Transverse sinus

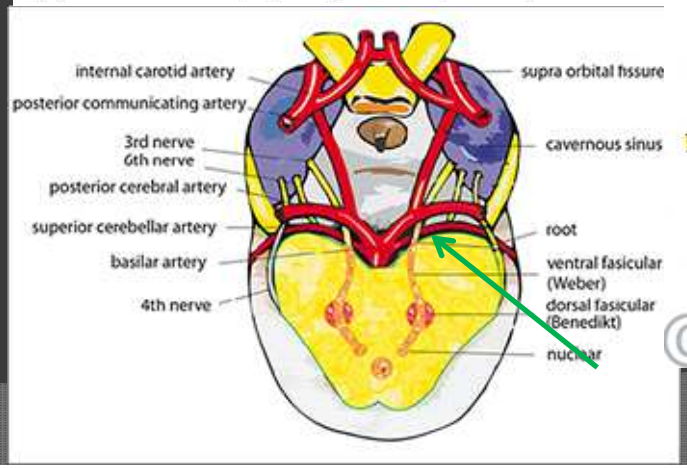

19/01/2012
17:04:01
24/01/2012
12:27:14
Car Int D
Car ExtD

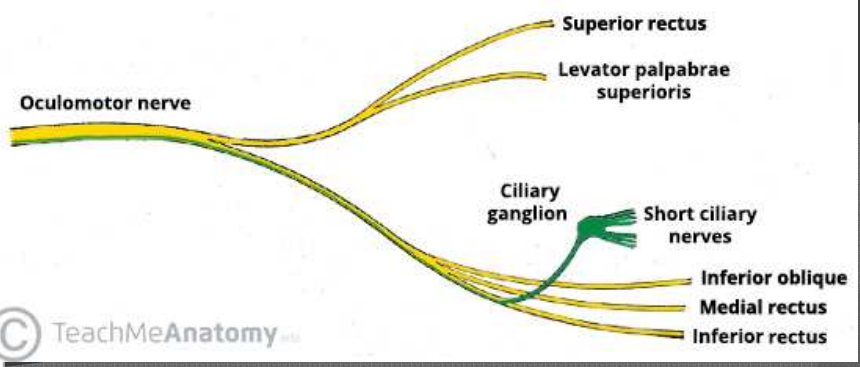
Cavum de Meckel



IIIrd nerve (Oculomotor nerve)

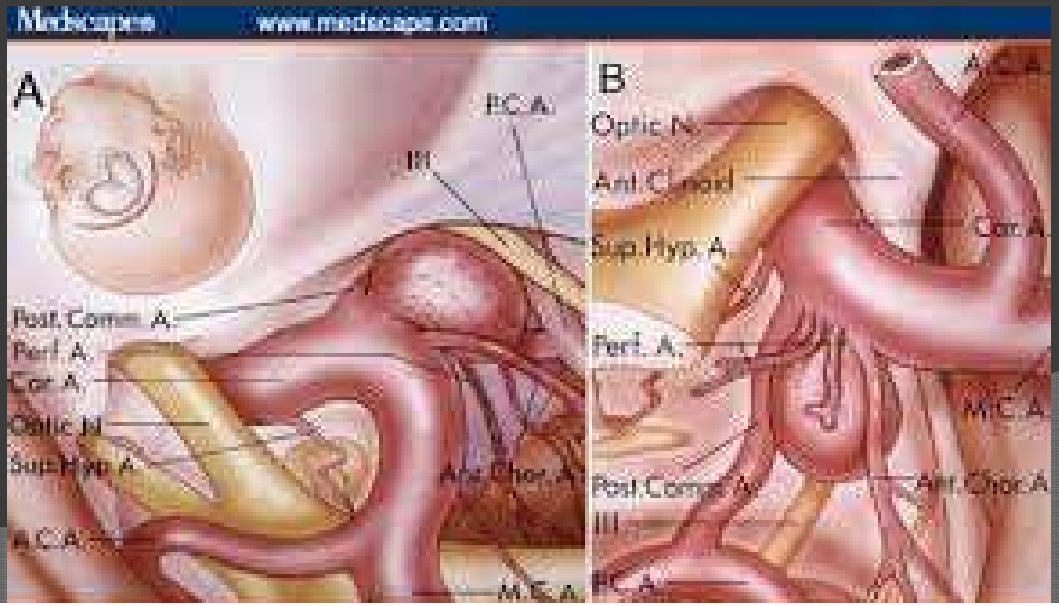




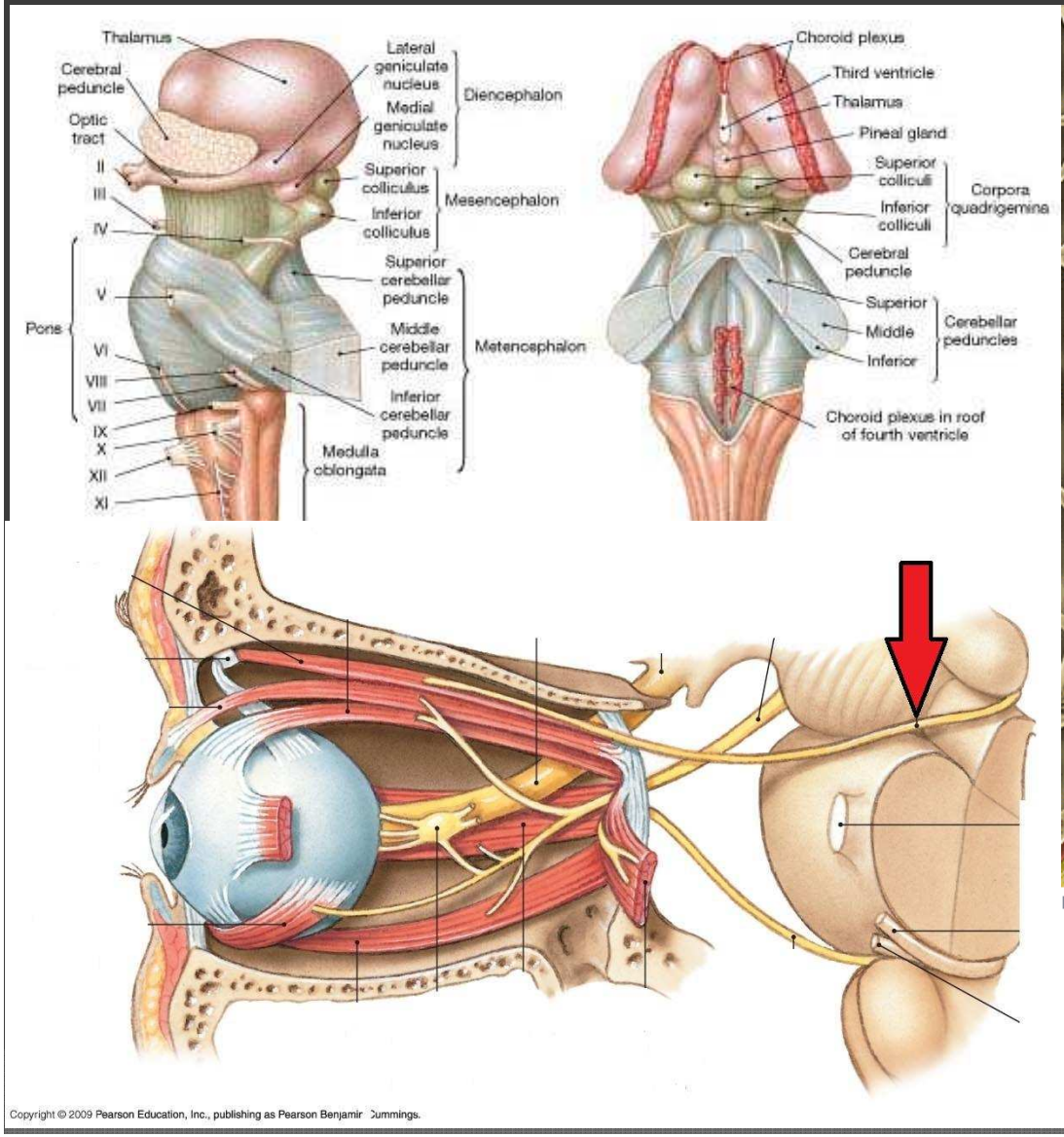


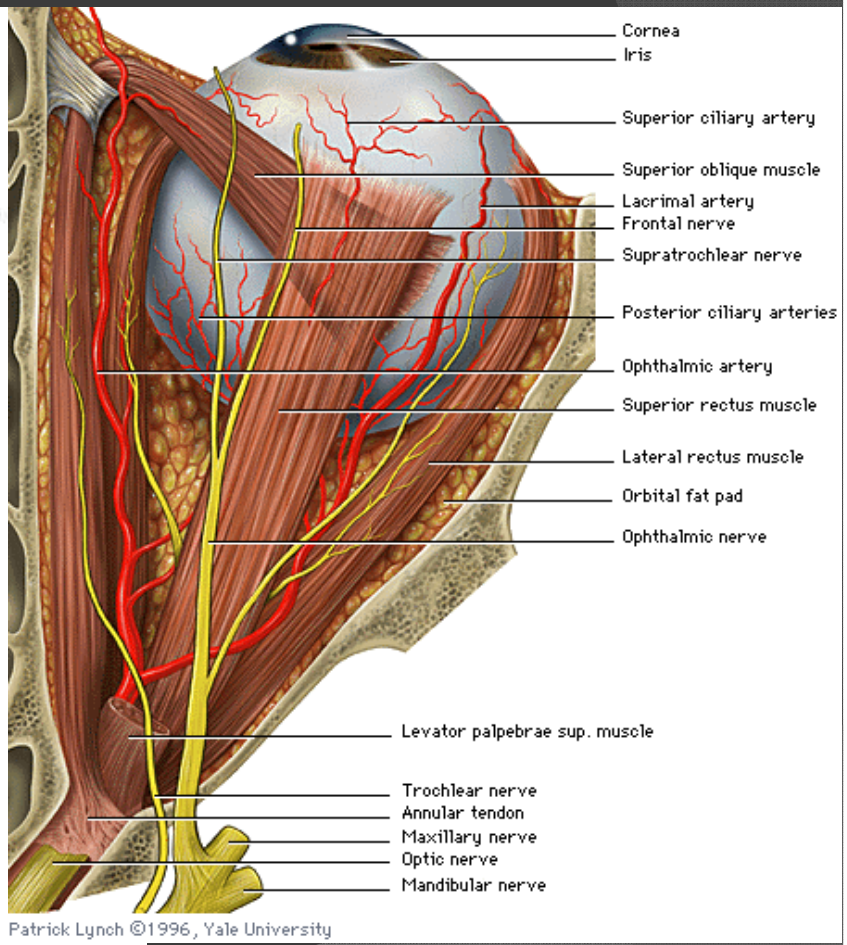
IIIrd nerve palsy

- Complete IIIrd nerve palsy
- Diplopia, ptosis, pupillary dilatation, eye resting in down and lateral (out) position
- Diabetes and hypertension
- Sudden headache and III rd nerve palsy : pcar or basilar tip aneurysm (rupture)

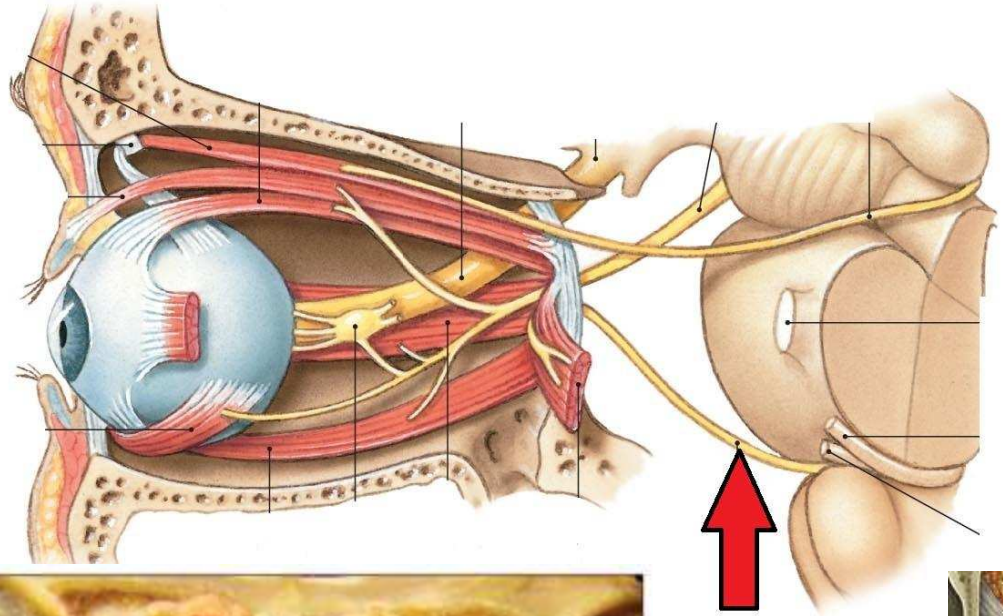


IVth (trochlear) cranial nerve





VIth nerve (Abducent nerve)



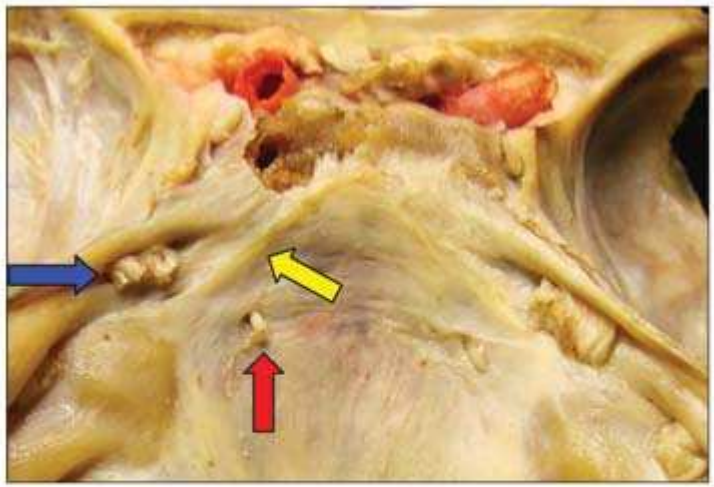
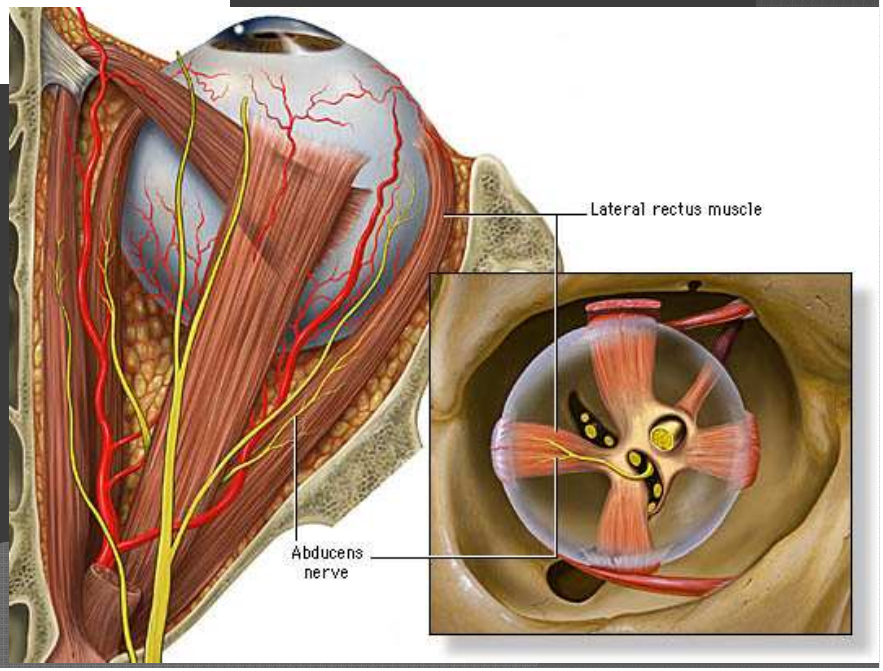


Fig 8. Posterior view of the petro-clival region. The yellow arrow indicates the Gruber's ligament. The blue arrow shows the trigeminal nerve and the red arrow points at the abducnes nerve leading itself through the Dorello's channel to the cavernous sinus.



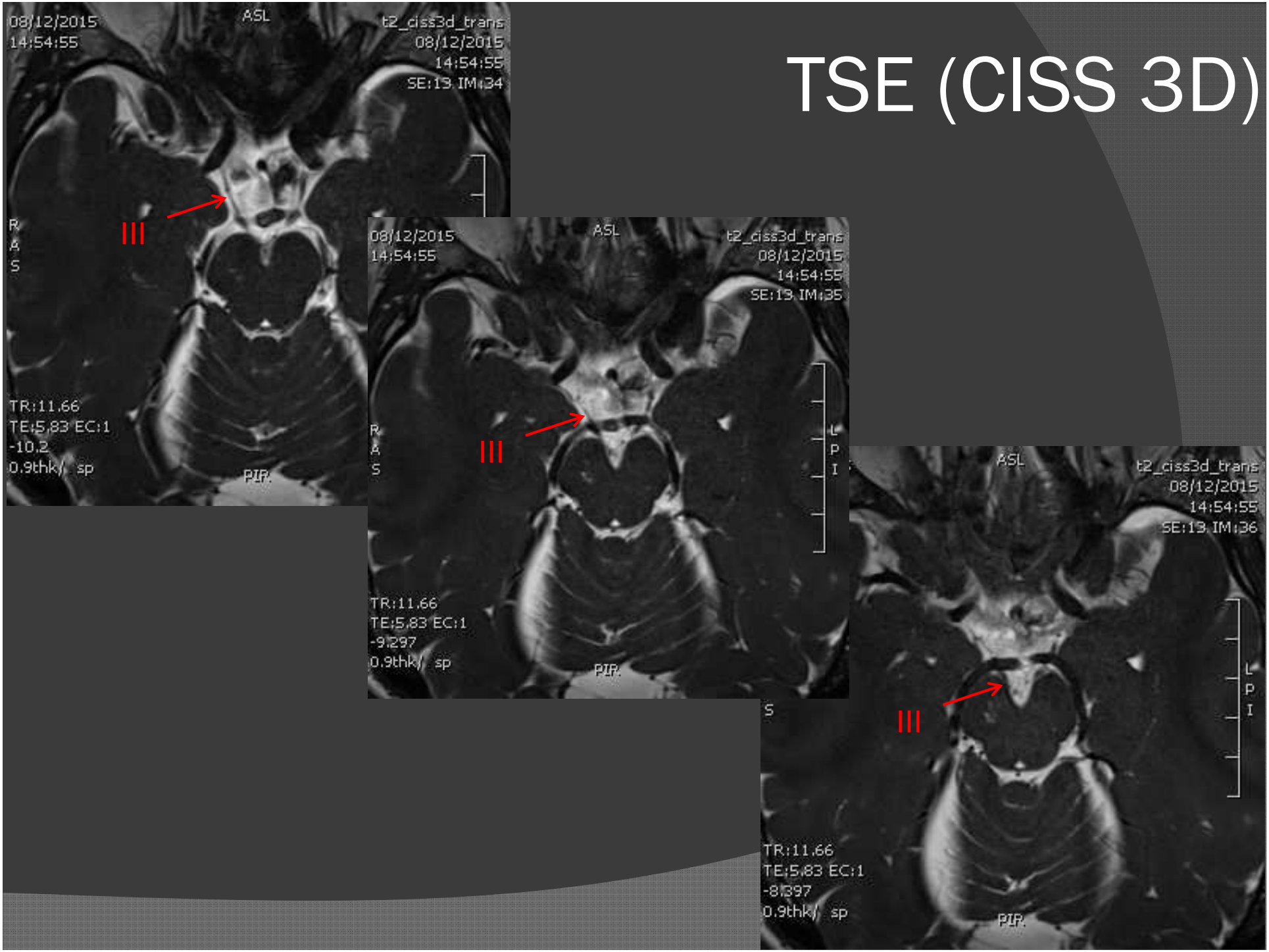
IVth nerve palsy

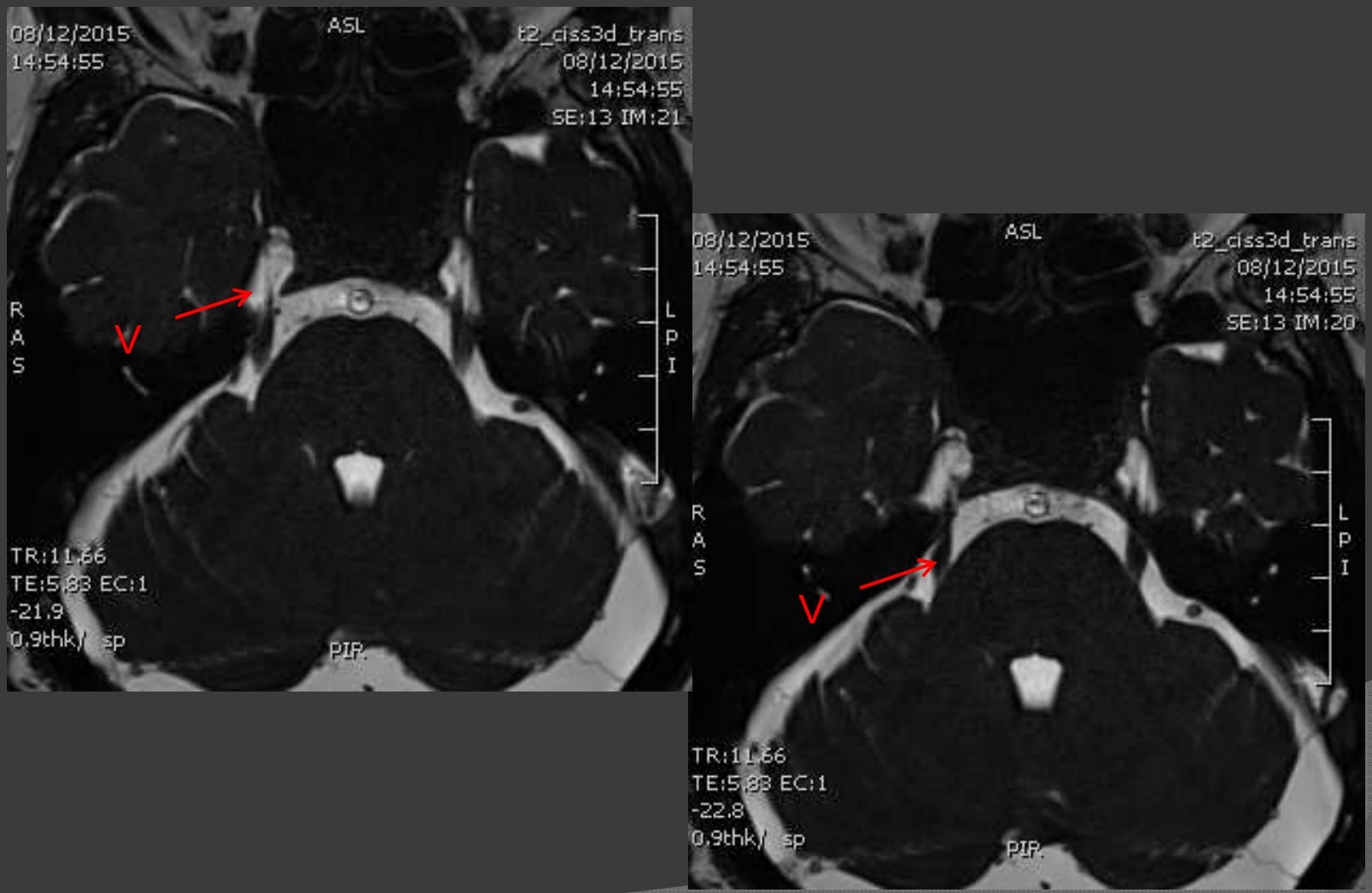
- Diplopia wich is worse in downgaze
- Head tilting

VI th nerve palsy

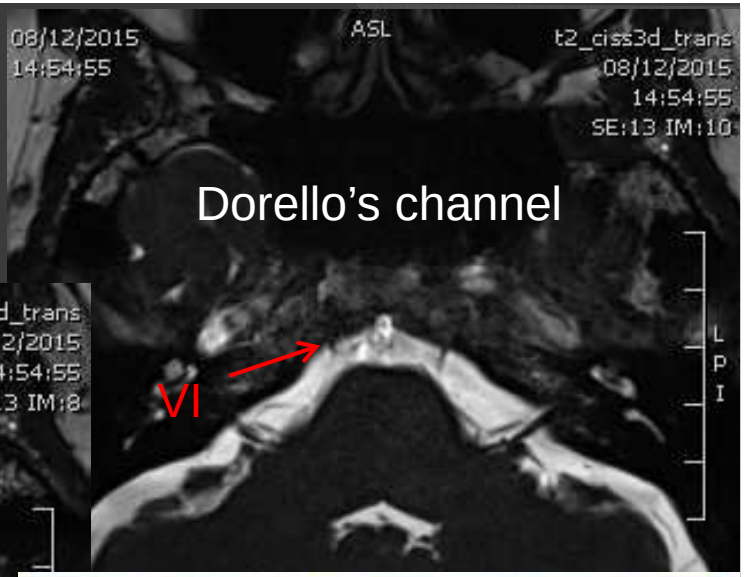
- Diplopia
- Convergent strabismus

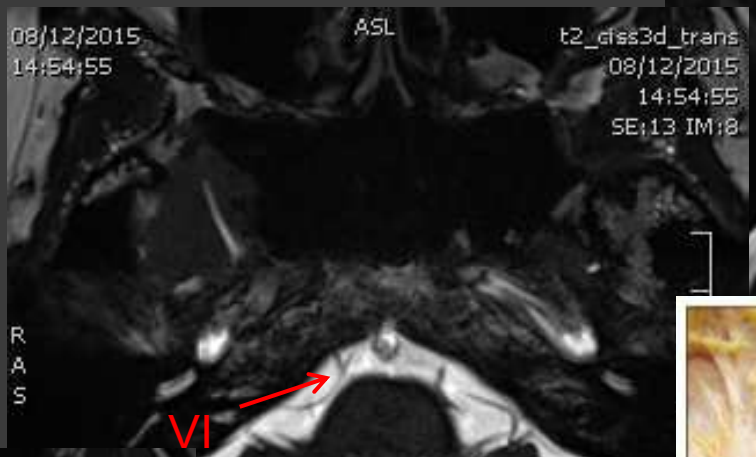
TSE (CISS 3D)

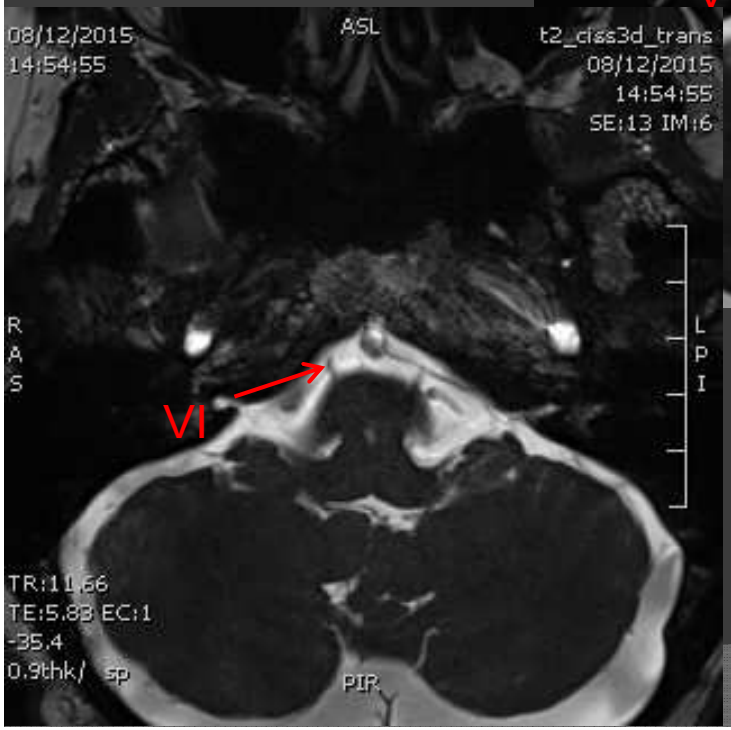

08/12/2015
14:54:55
ASL
t2_ciss3d_trans
08/12/2015
14:54:55
SE:13 IM:34
III
R
A
S
TR:11.66
TE:5.83 EC:1
-10.2
0.9thk/ sp
PIR
08/12/2015
14:54:55
ASL
t2_ciss3d_trans
08/12/2015
14:54:55
SE:13 IM:35
III
R
A
S
L
P
I
TR:11.66
TE:5.83 EC:1
-9.297
0.9thk/ sp
PIR
ASL
t2_ciss3d_trans
08/12/2015
14:54:55
SE:13 IM:36
S
III
L
P
I
TR:11.66
TE:5.83 EC:1
-8.397
0.9thk/ sp
PIR

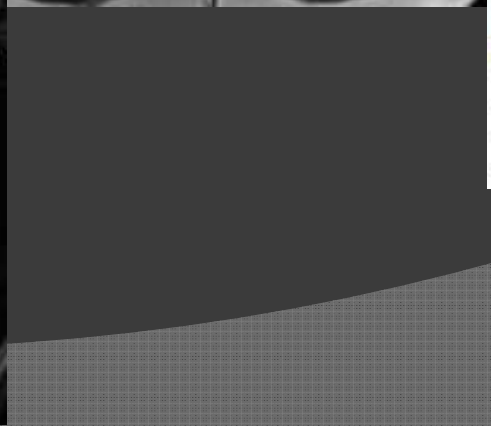

08/12/2015
14:54:55
ASL
t2_ciss3d_trans
08/12/2015
14:54:55
SE:13 IM:21
R
A
S
L
P
I
V
TR:11.66
TE:5.03 EC:1
-21.9
0.9thk/ sp
PIR
08/12/2015
14:54:55
ASL
t2_ciss3d_trans
08/12/2015
14:54:55
SE:13 IM:20
R
A
S
L
P
I
V
TR:11.66
TE:5.03 EC:1
-22.8
0.9thk/ sp
PIR

TSE 3D CISS









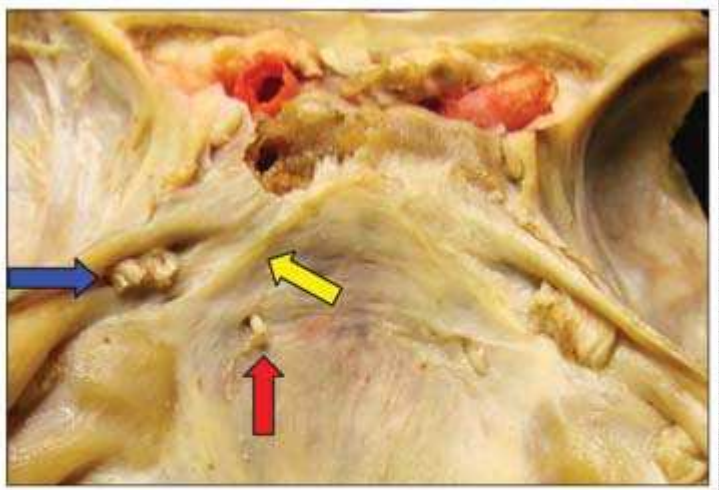
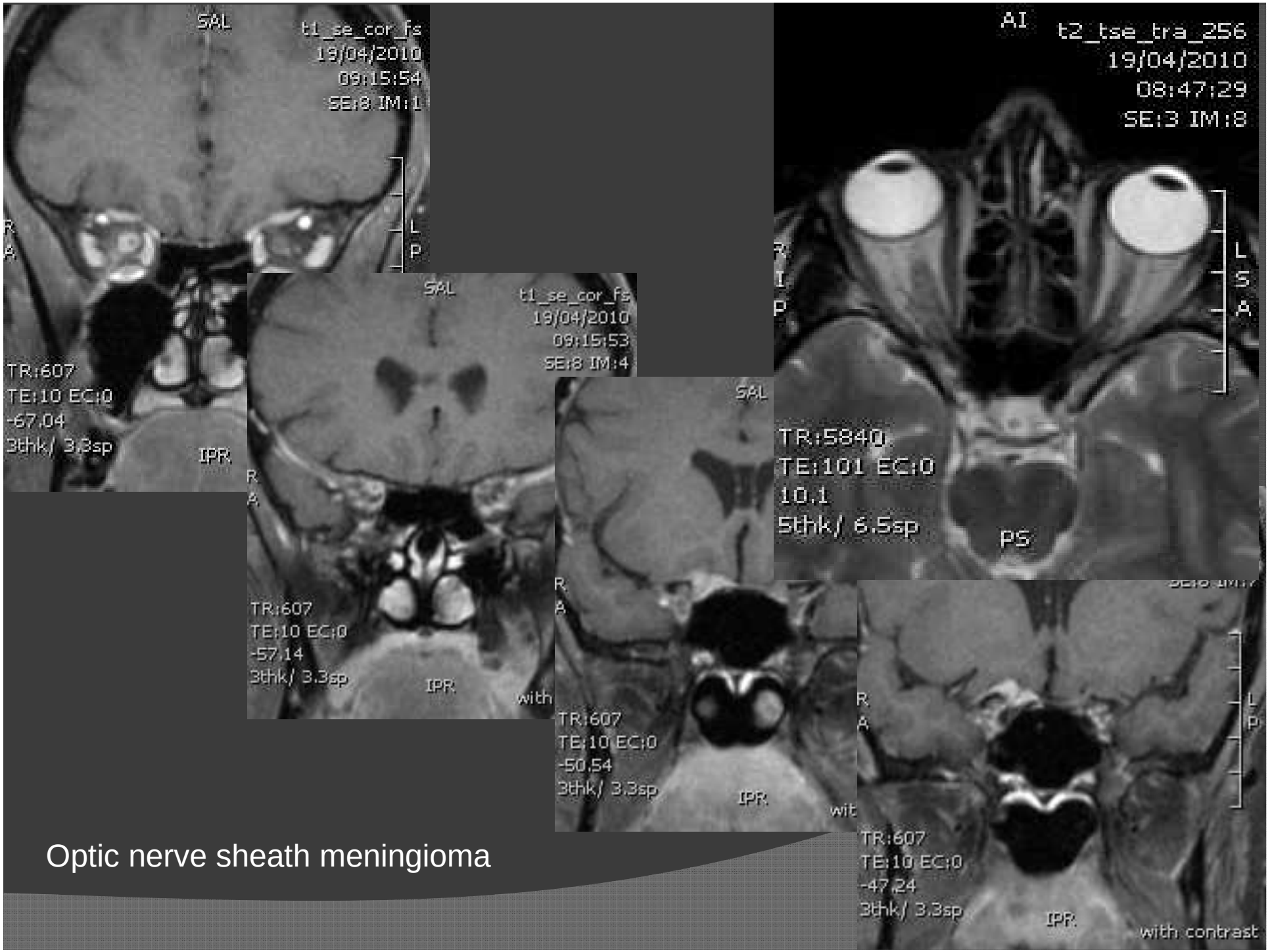
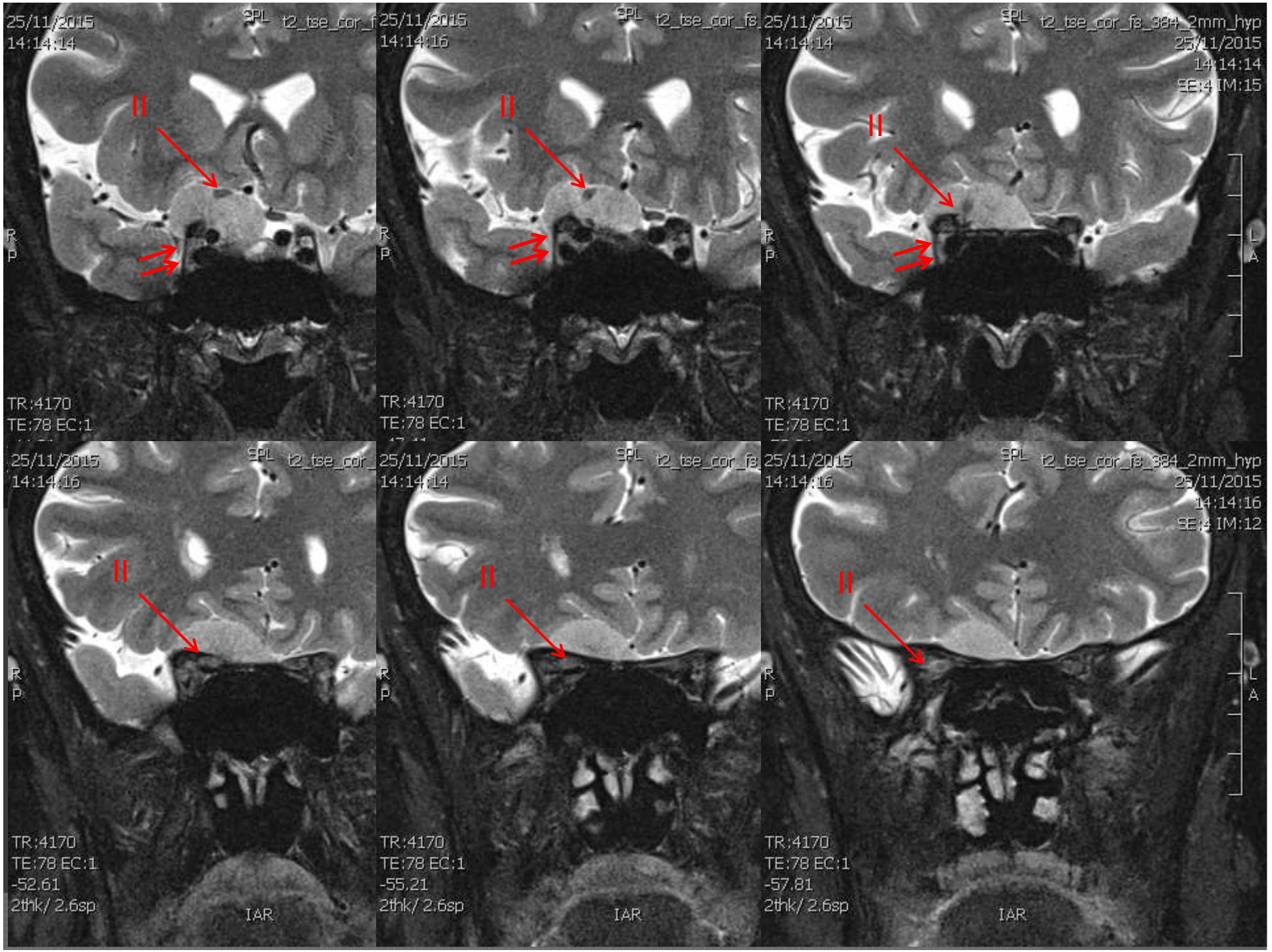


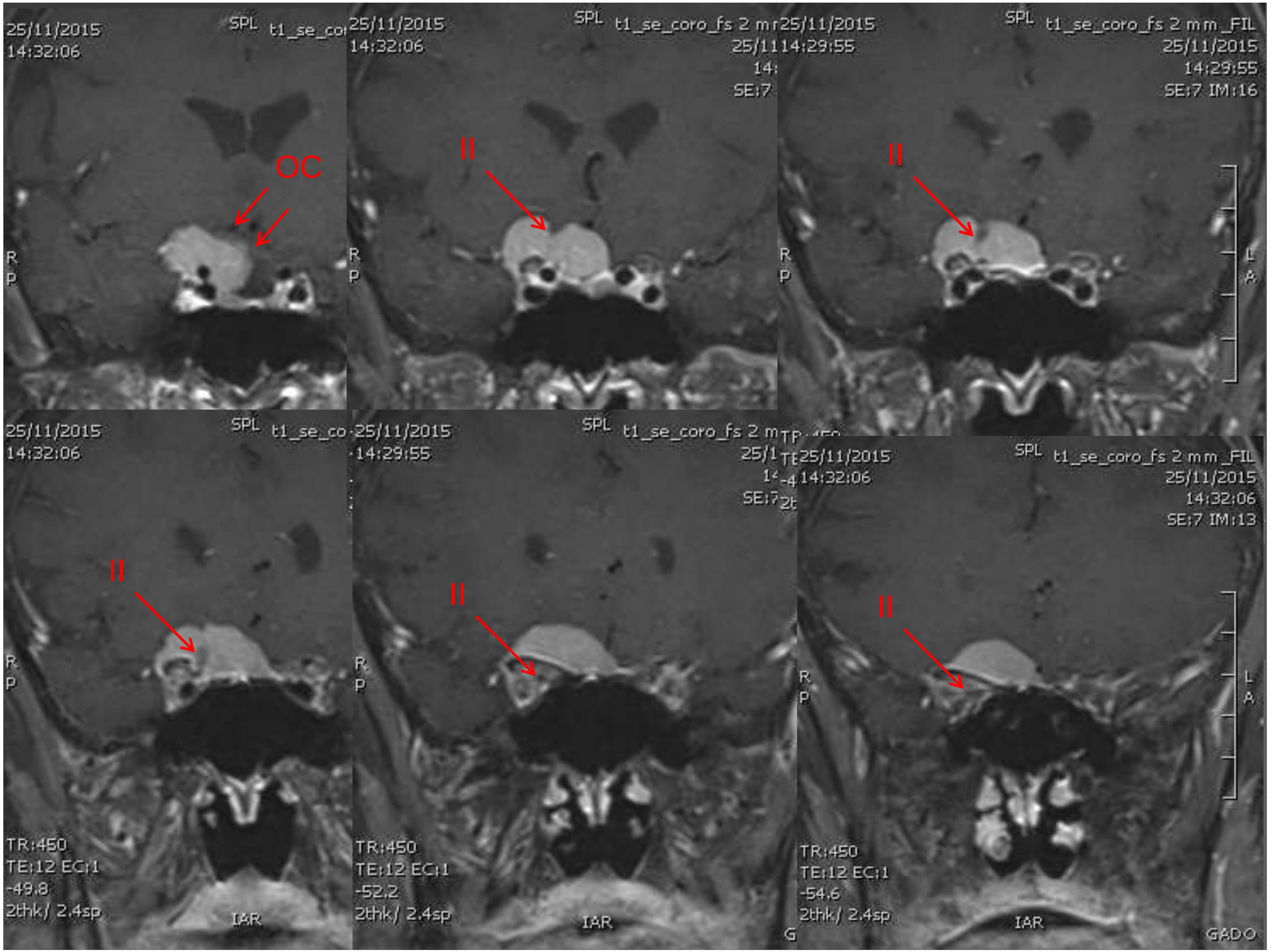
Fig 8. Posterior view of the petro-clival region. The yellow arrow indicates the Gruber's ligament. The blue arrow shows the trigeminal nerve and the red arrow points at the abducnes nerve leading itself through the Dorello's channel to the cavernous sinus.

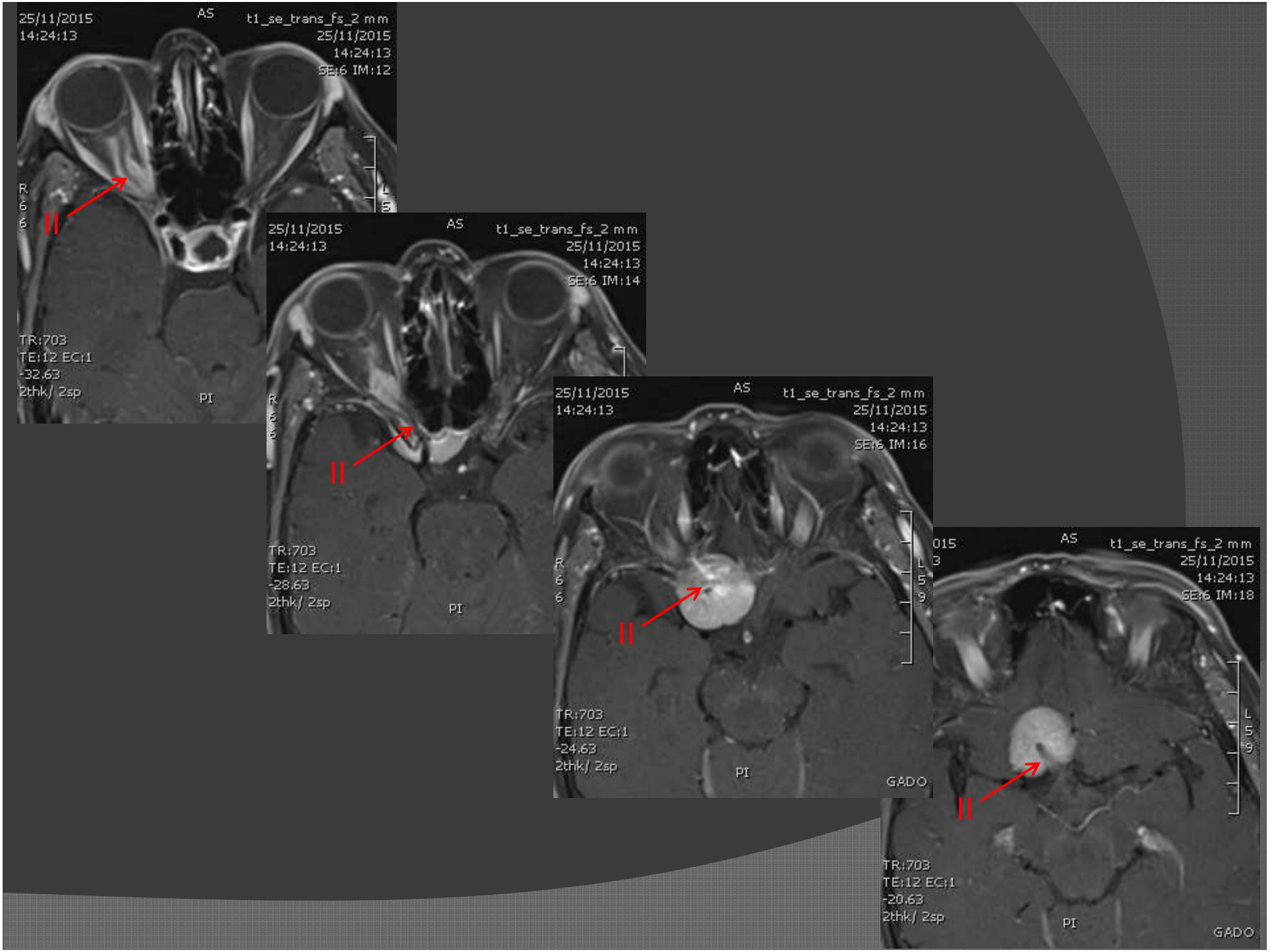
- Explore the cranial nerves pathways
- Differential diagnosis between brain stem, nerve or musculo-tendinous (orbital) deseases (ex : brown syndrom)
- Etiology
  - Tumors or expansil lesions, white matter desease, ischemia, congenital…

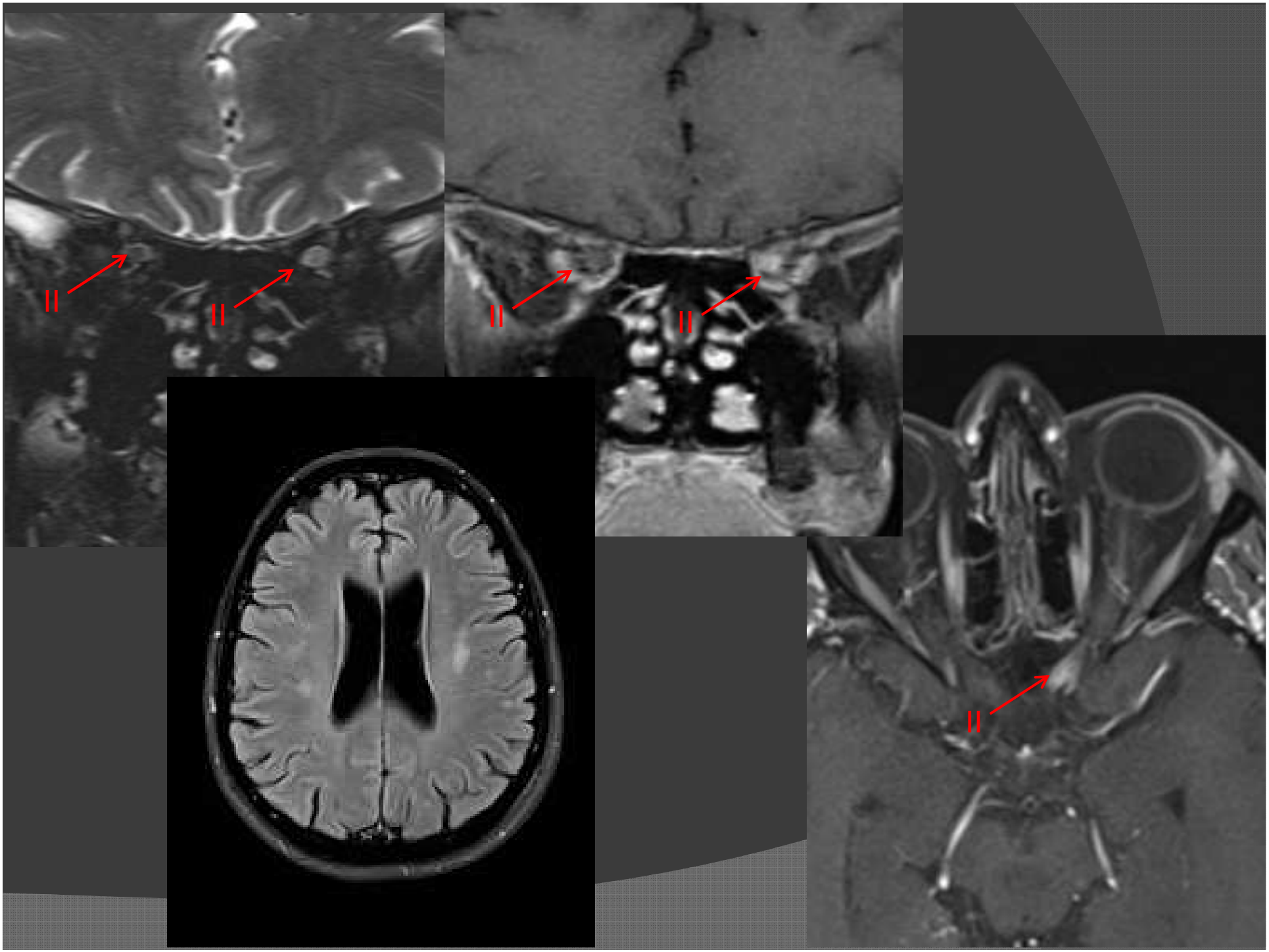


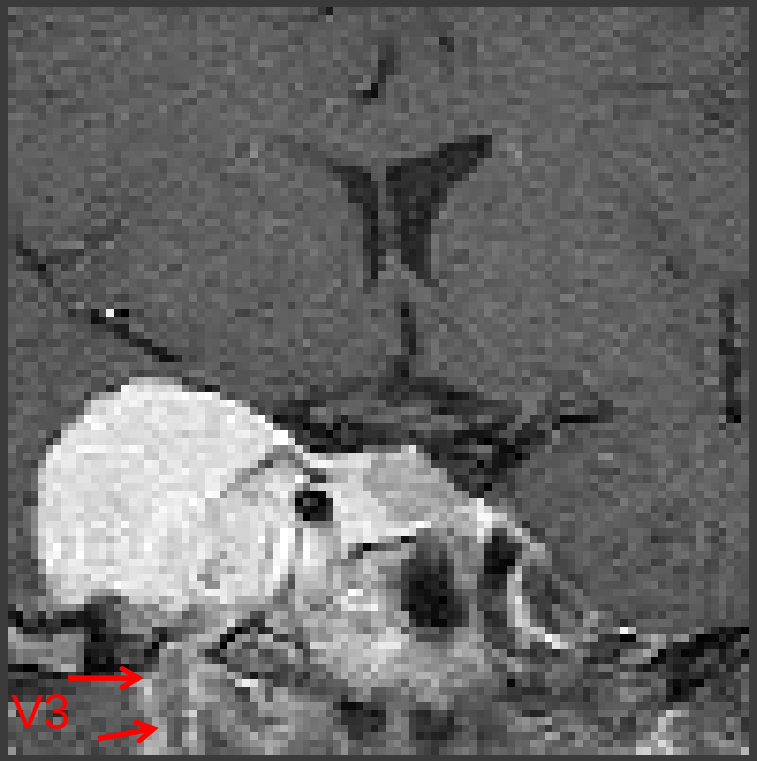
Optic nerve sheath meningioma

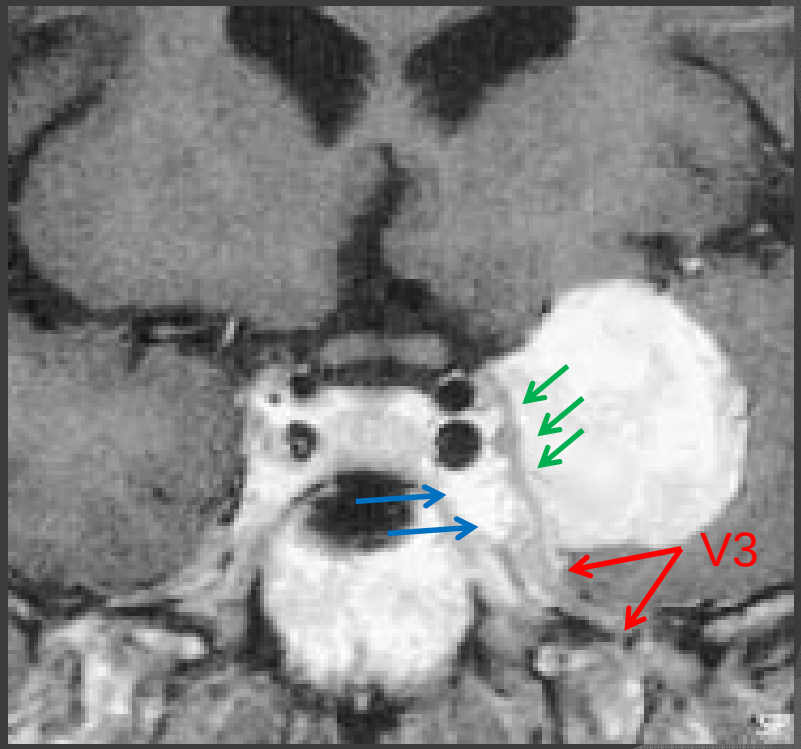

25/11/2015
14:14:14
SPL t2_tse_cor_f
R
P
TR:4170
TE:78 EC:1
25/11/2015
14:14:16
SPL t2_tse_cor_fs
R
P
TR:4170
TE:78 EC:1
25/11/2015
14:14:14
SPL t2_tse_cor_fs_384_2mm_hyp
25/11/2015
14:14:14
SE:4 IM:15
R
P
L
A
TR:4170
TE:78 EC:1
25/11/2015
14:14:16
SPL t2_tse_cor_
R
P
TR:4170
TE:78 EC:1
-52.61
2thk/ 2.6sp
IAR
25/11/2015
14:14:14
SPL t2_tse_cor_fs
R
P
TR:4170
TE:78 EC:1
-55.21
2thk/ 2.6sp
IAR
25/11/2015
14:14:16
SPL t2_tse_cor_fs_384_2mm_hyp
25/11/2015
14:14:16
SE:4 IM:12
R
P
L
A
TR:4170
TE:78 EC:1
-57.81
2thk/ 2.6sp
IAR


25/11/2015
14:32:06
SPL
OC
II
25/11/2015
14:29:55
SE:7 IM:16
TR:450
TE:12 EC:1
-49.8
-52.2
-54.6
2thk/ 2.4sp
IAR
GADO


25/11/2015
14:24:13
AS
t1_se_trans_fs_2 mm
25/11/2015
14:24:13
SE:6 IM:12
TR:703
TE:12 EC:1
-32,63
2thk/ 2sp
PI
25/11/2015
14:24:13
AS
t1_se_trans_fs_2 mm
25/11/2015
14:24:13
SE:6 IM:14
TR:703
TE:12 EC:1
-28,63
2thk/ 2sp
PI
25/11/2015
14:24:13
AS
t1_se_trans_fs_2 mm
25/11/2015
14:24:13
SE:6 IM:16
TR:703
TE:12 EC:1
-24,63
2thk/ 2sp
PI
GADO
AS
t1_se_trans_fs_2 mm
25/11/2015
14:24:13
SE:6 IM:18
TR:703
TE:12 EC:1
-20,63
2thk/ 2sp
PI
GADO

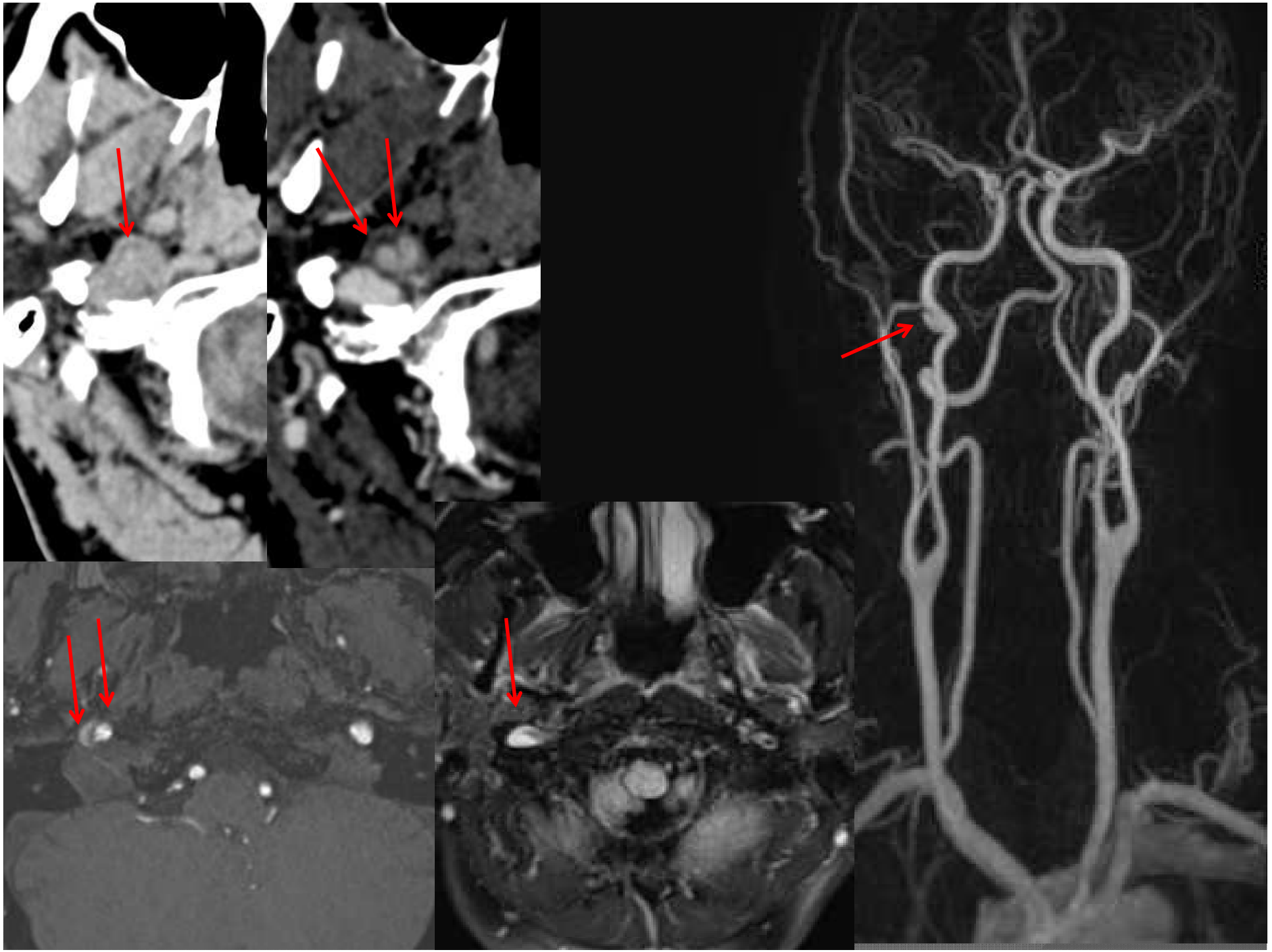

II
II
II
II
II


V3


V3

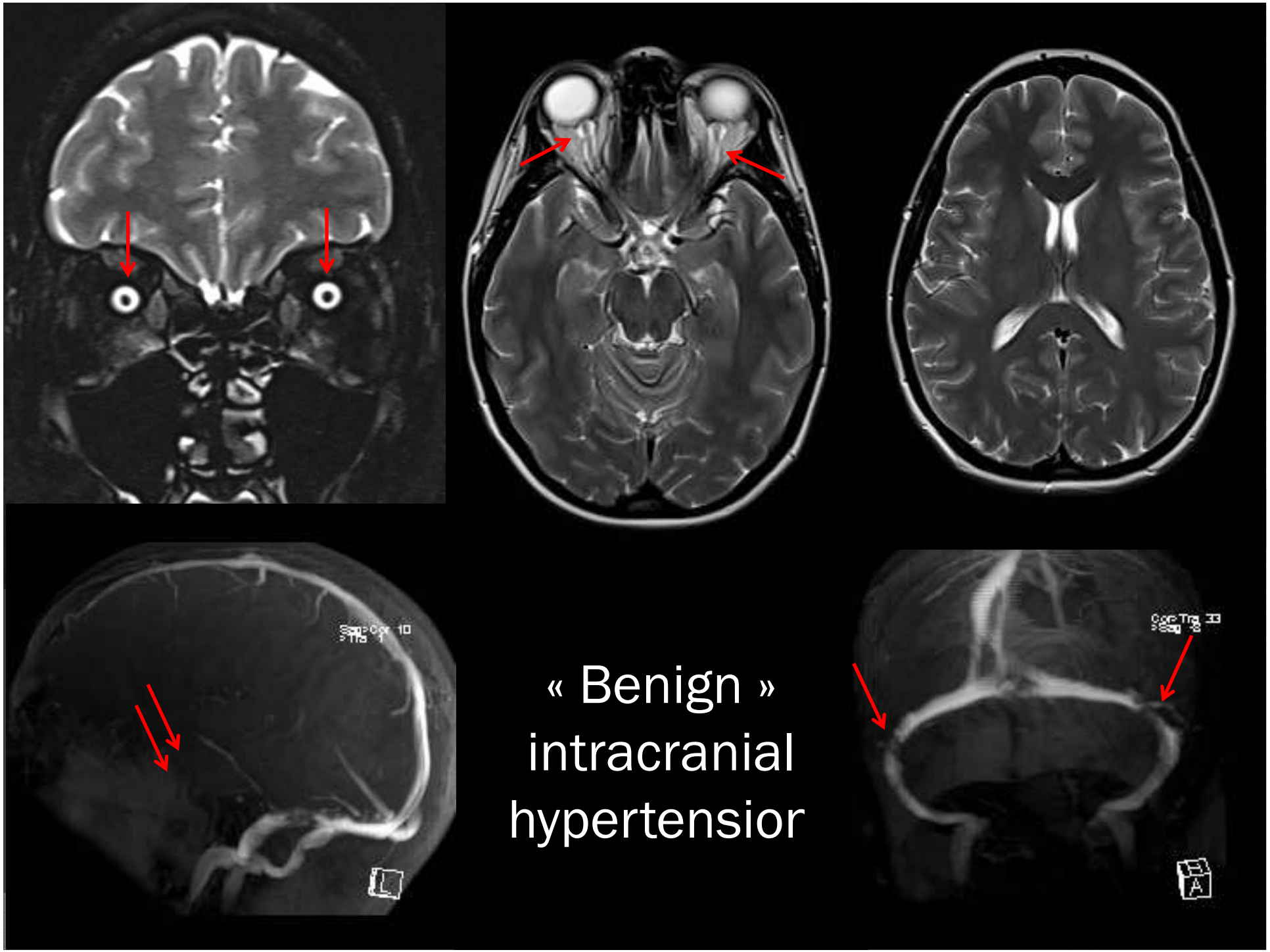
Horner's (Claude Bernard Horner) syndrome

- Ptosis (muscle of Müller sympathetic denervation), myosis, enophtalmos (orbital fat atrophy)
- Central (from hypothalamus, and brainstem to cervical or thoracic (T 1st or 2nd) segment) or peripheral (cervical sympathetic chain : C8 to T1 nerve root lesion or compression, Pancoast-Tobia, carotid dissection, cavernous sinus or orbital pathology)
- Headache and lateral cervical pain in case of dissection



« Benign » intracranial hypertension

- Headache and visual impairement or visual loss, diplopia
- Bilateral papiledema
- Bilateral VIth nerve palsy
- Obesity or weight gain
- « normal » MRI with « small » ventricules, no periventricular white matter lesion, large optic nerve sheath, empty sella syndrome and stenosis of dural sinus or jugular veins
- Raised intracranial pressure (lumbar punction) or better condition with acetazolamide
- Treatment : weight loss, acetazolamide (Diamox®), CSF shunting, optic nerve sheath fenestration and venous stenting


« Benign »
intracranial
hypertensior