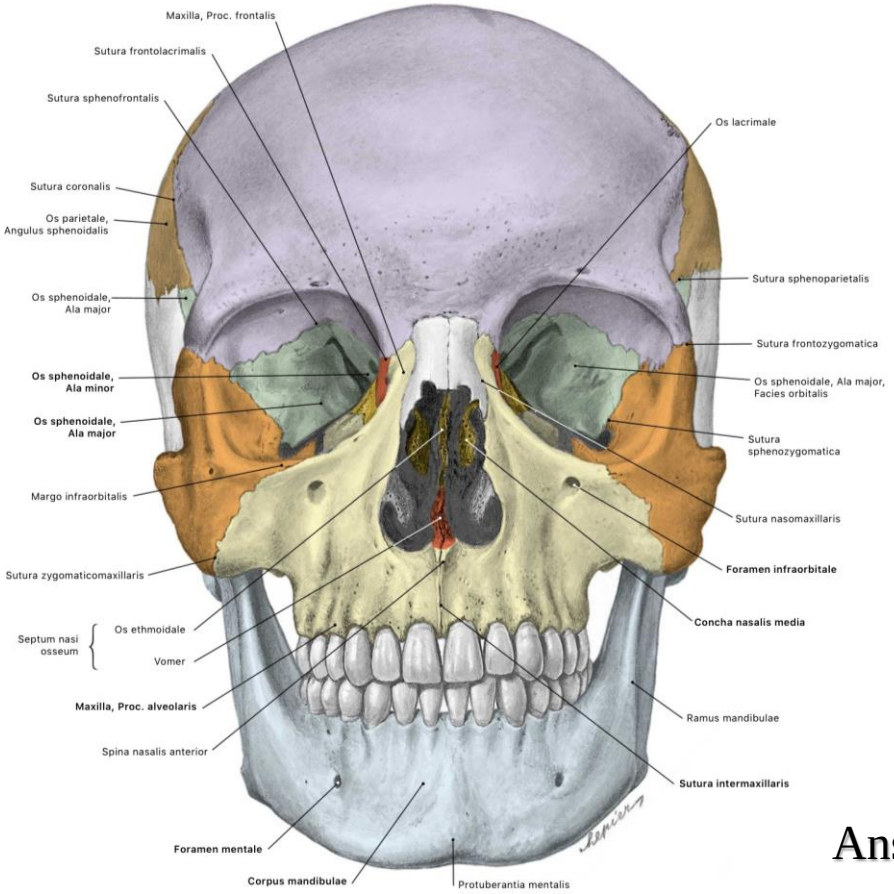
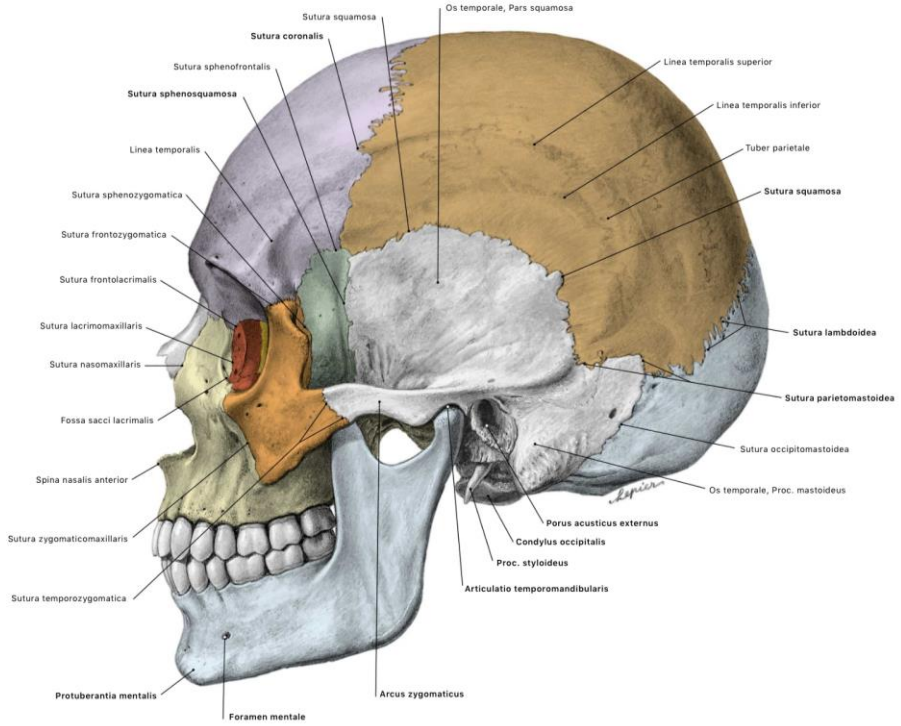
# Ansigt, kranieknogler og encephalon.

*Michel Bach Hellfritzsch*

Neurokraniet:

- Calvariet
- Basis cranii

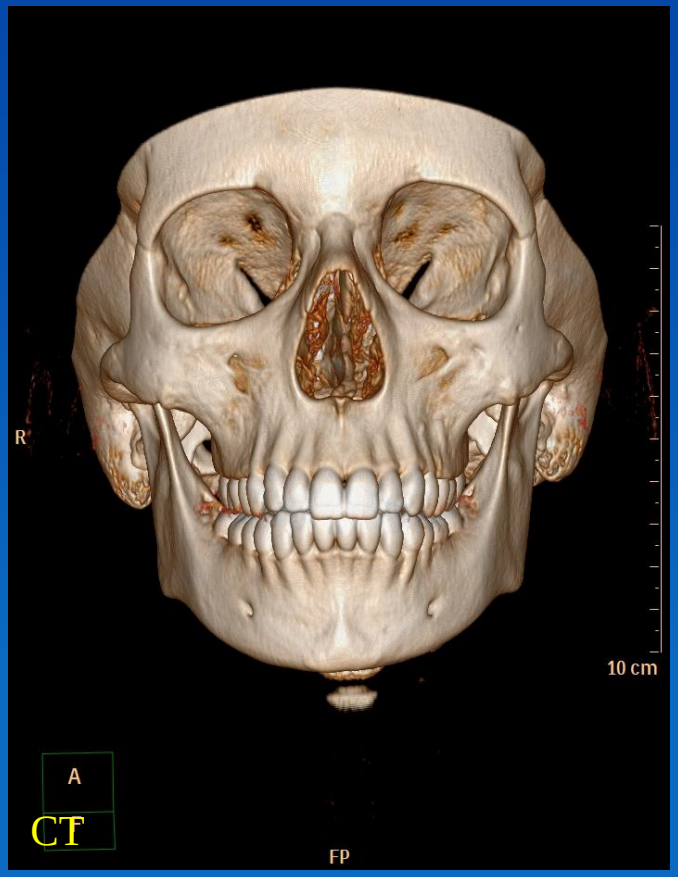


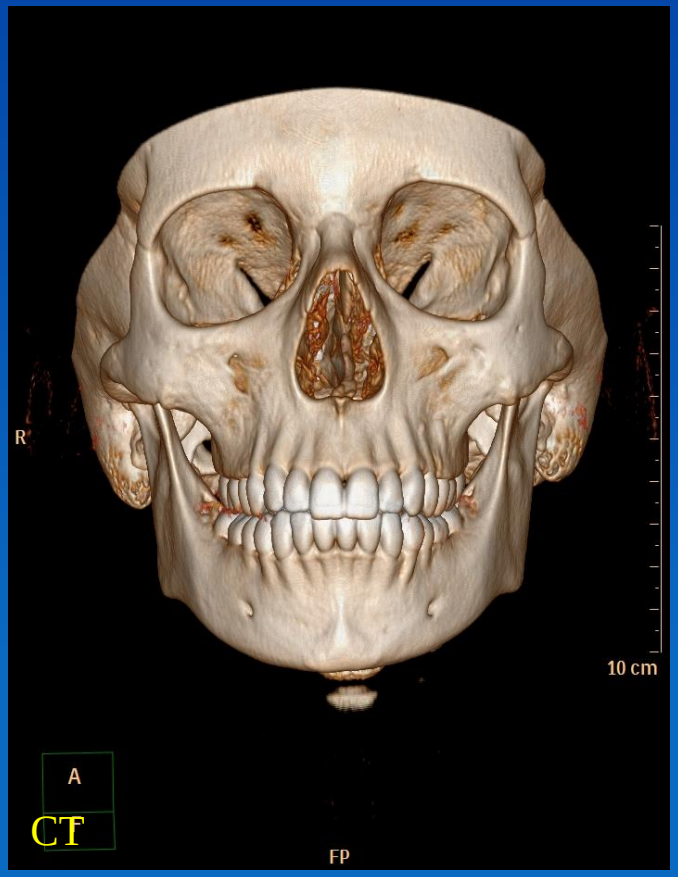

Ansigtskraniet

Sobotta

# 3D rekonstruktion af ansigts skelettet

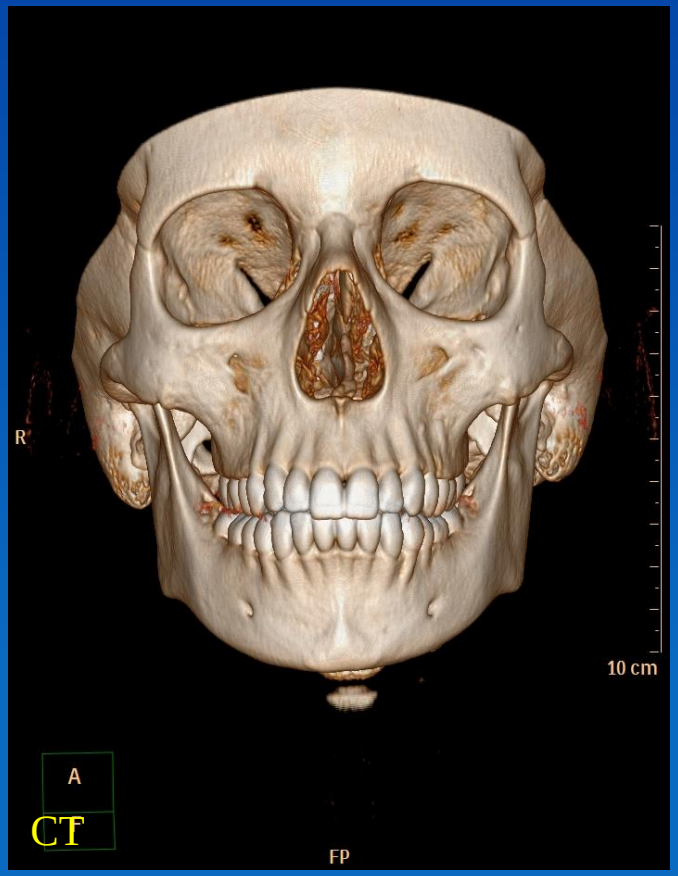



# 3D rekonstruktion af ansigts skelettet

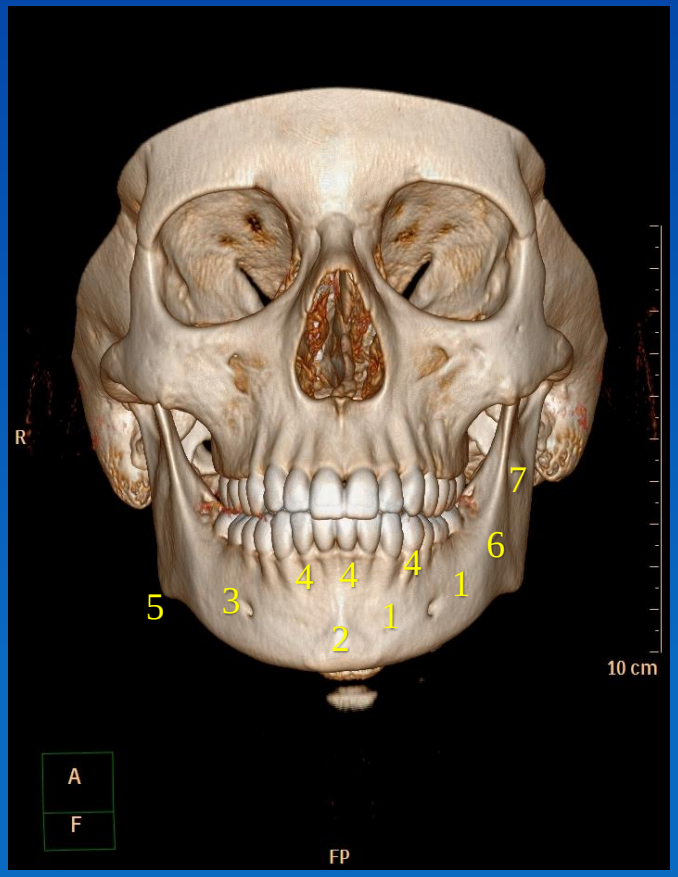



Ved CT skanning af i dette tilfælde ansigtet, opnås et datasæt, hvorfra man kan lave 3D modeller. Man benytter sig her af, at knoglerne har en meget større røntgenstråle absorption, og således opnås god  kontrast til al det øvrige væv og luft.

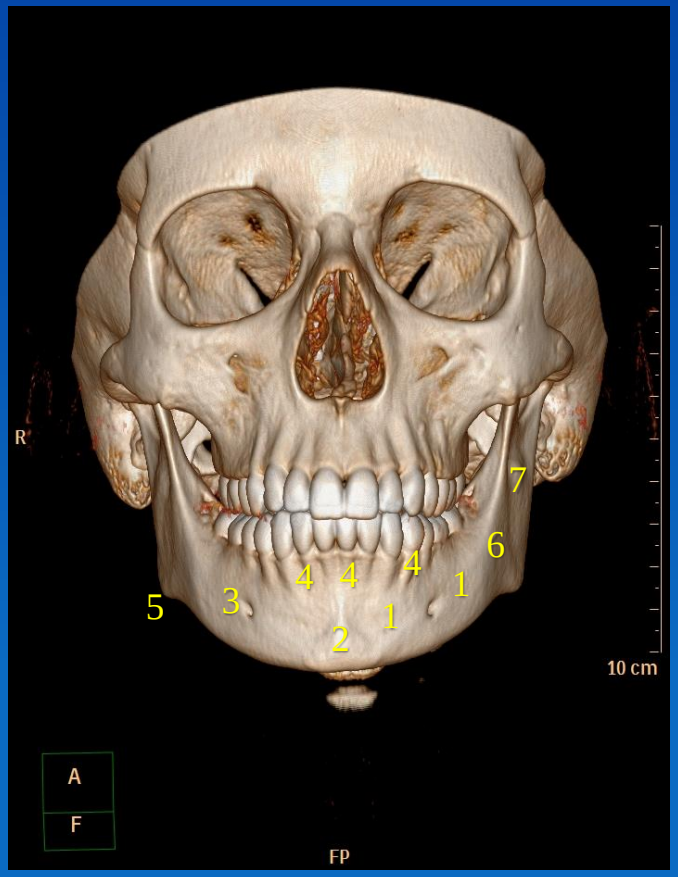
# Mandibula




# Mandibula

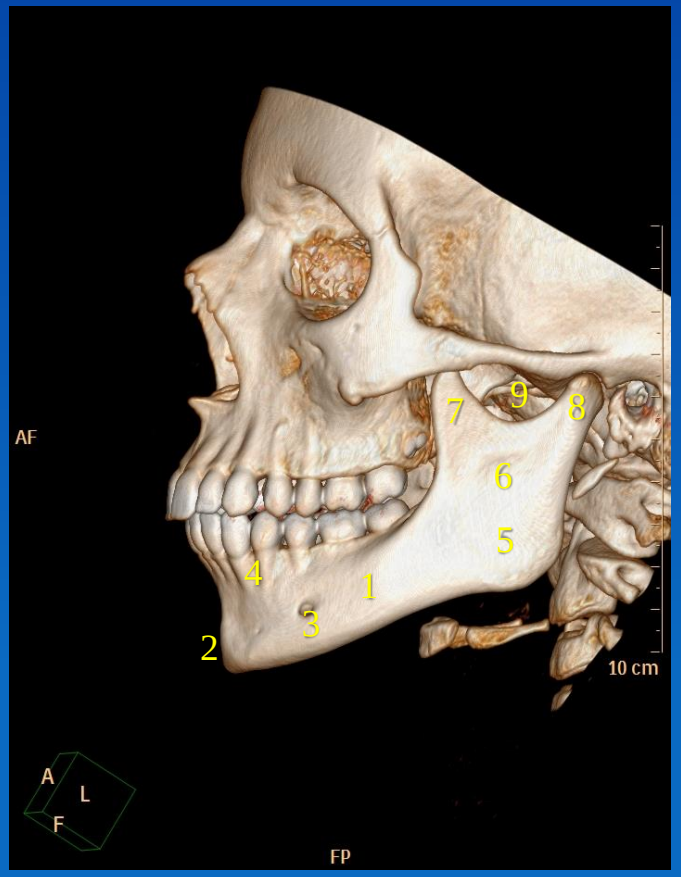


# Mandibula



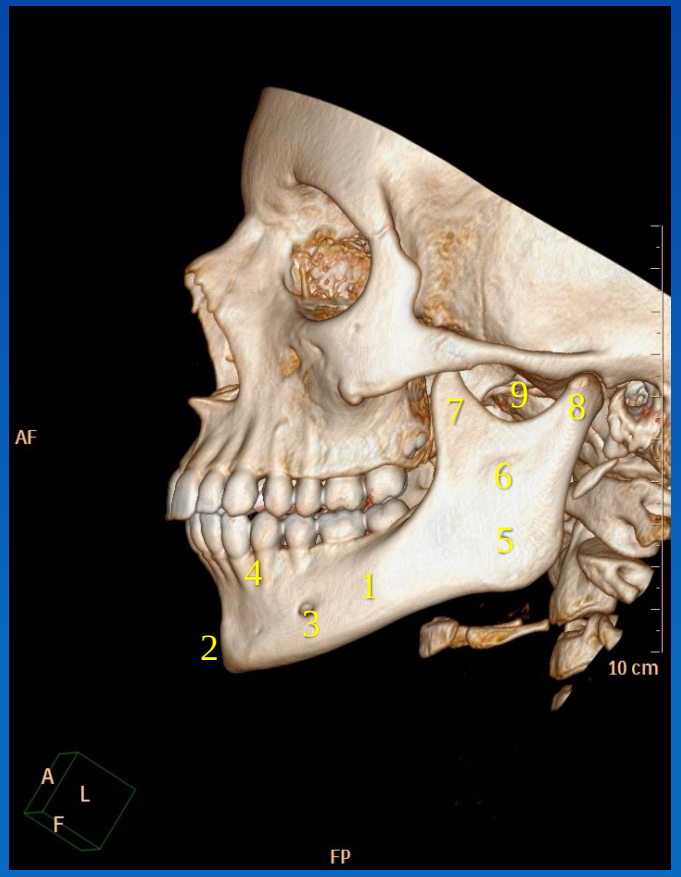

1. Corpus mandibulae
2. Protuberantia mentalis
3. Foramen mentale
4. Pars alveolaris
5. Gonion
6. Angulus mandibulae
7. Ramus mandubulae

# Mandibula

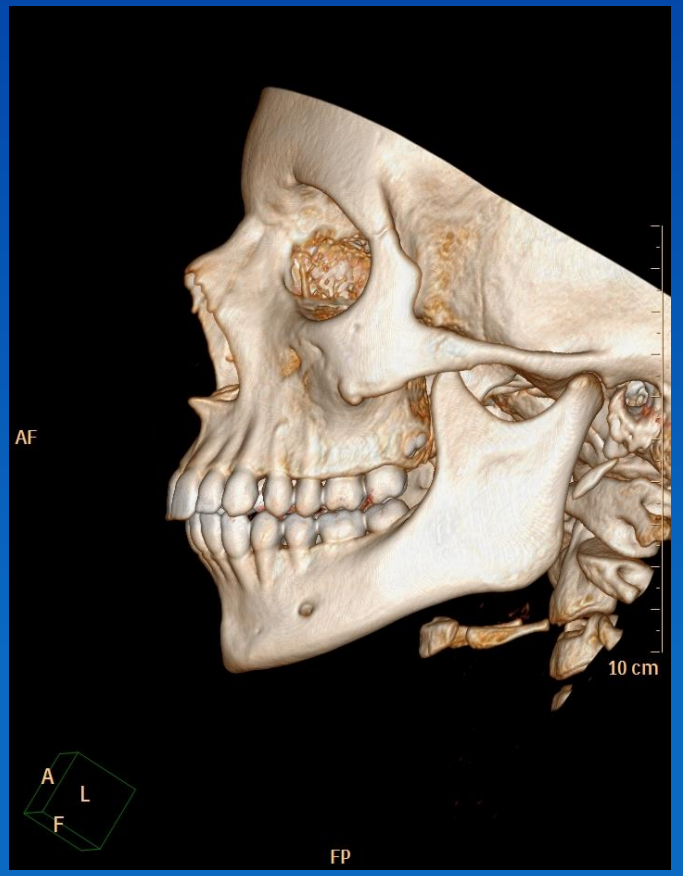


# Mandibula

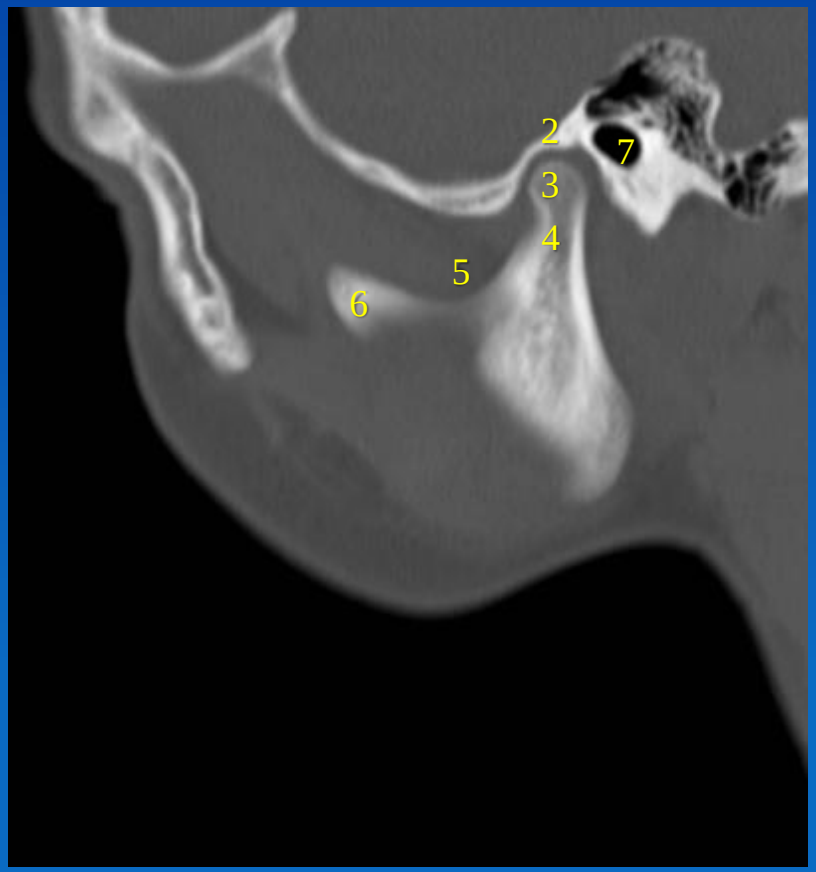
1. Corpus mandibulae
2. Protuberantia mentalis
3. Foramen mentale
4. Pars alveolaris
5. Angulus mandibulae
6. Ramus mandubulae
7. Processus coronoideus
8. Processus condylaris
    1. Caput mandibulae
    2. Collum mandibulae
9. Incisura mandibulae



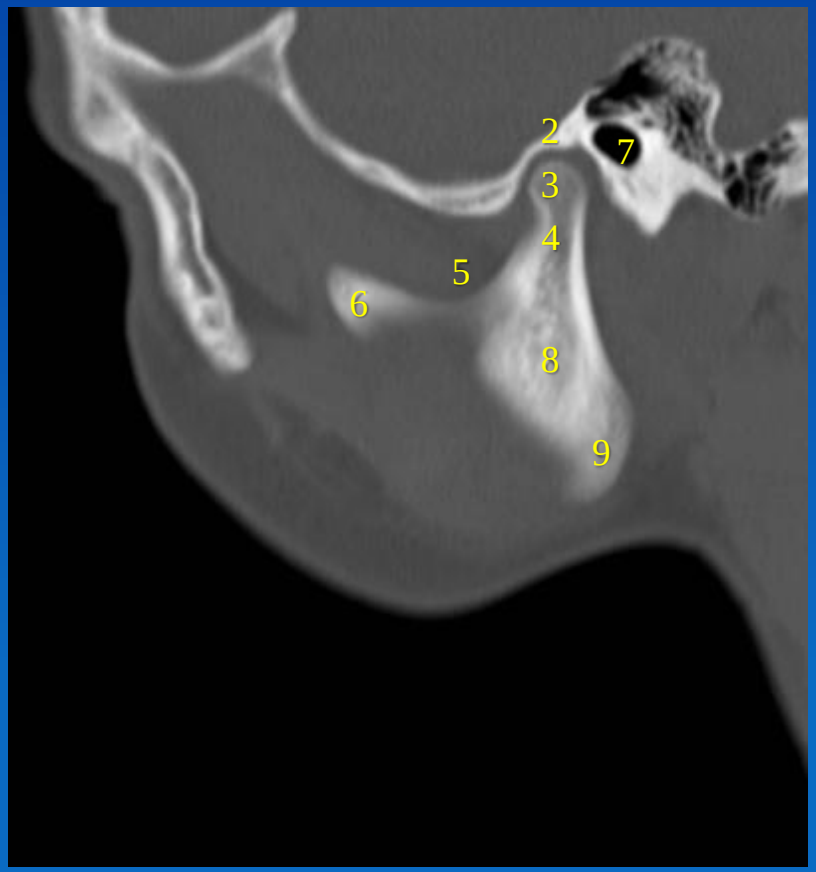
# CT-skanning: 3D og 2D snit



# Sagittal CT snit



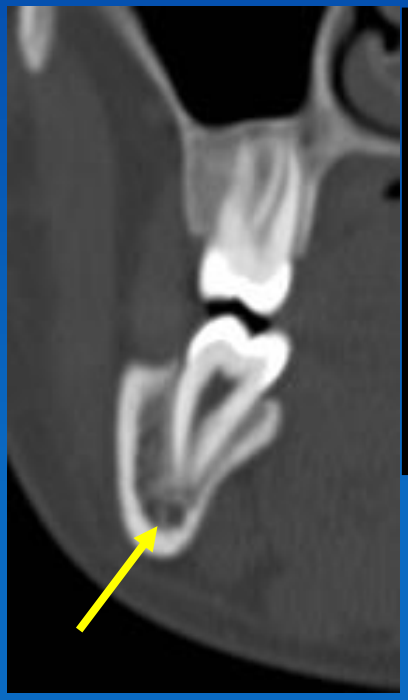
# Sagittal CT snit

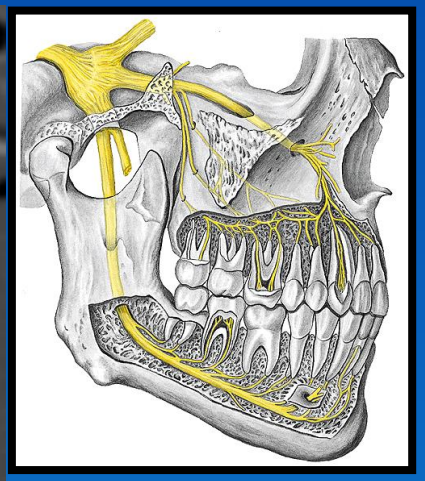



1. Articulatio temeporomandubularis hvor der ses:
2. Fossa mandibularis
3. Caput mandubulae
4. Collum mandibulae
5. Incisura mandibulae
6. Processus coronoideus
7. Meatus acusticus externus
8. Ramus mandibulae
9. Angulus mandibulae

Bemærk at der er tale om et tyndt snit, der er lidt skråt, hvorfor ikke hele processus coronoideus ses.

# Mandibula



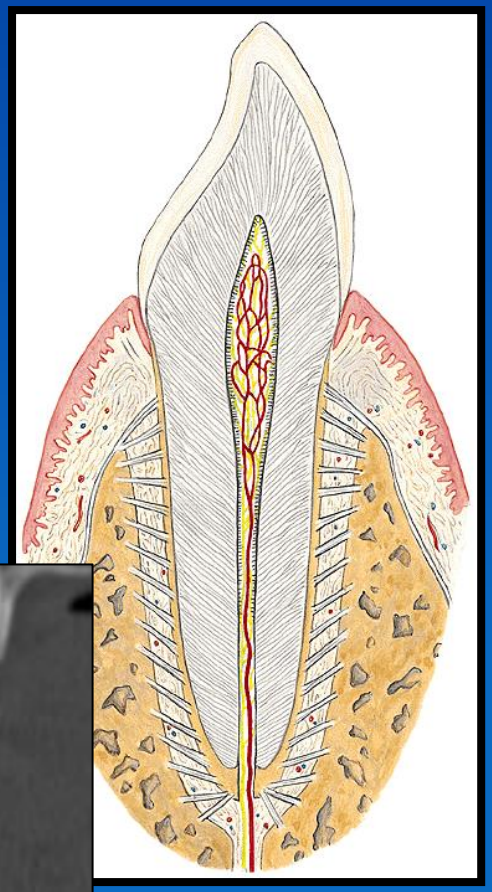


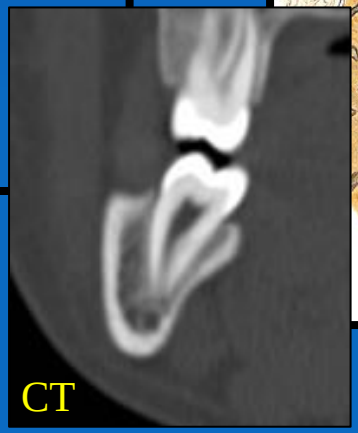
# Dentes

# Tandens opbygning

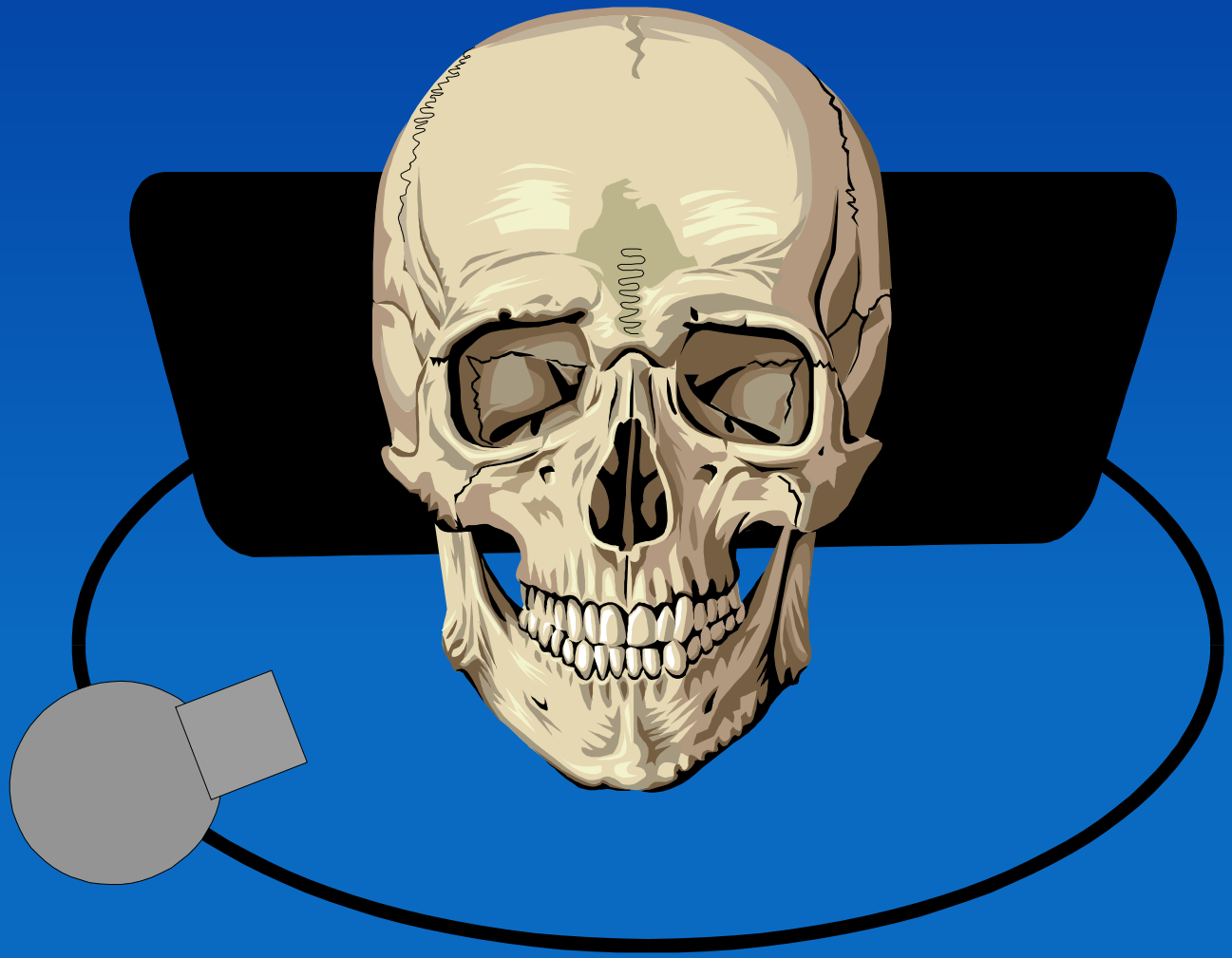
Corona
Cervix
Radix
Cavitas
•(Pulpahule)

Emalje
Dentin
Cement



# Ortopantomografi



Dentes molares

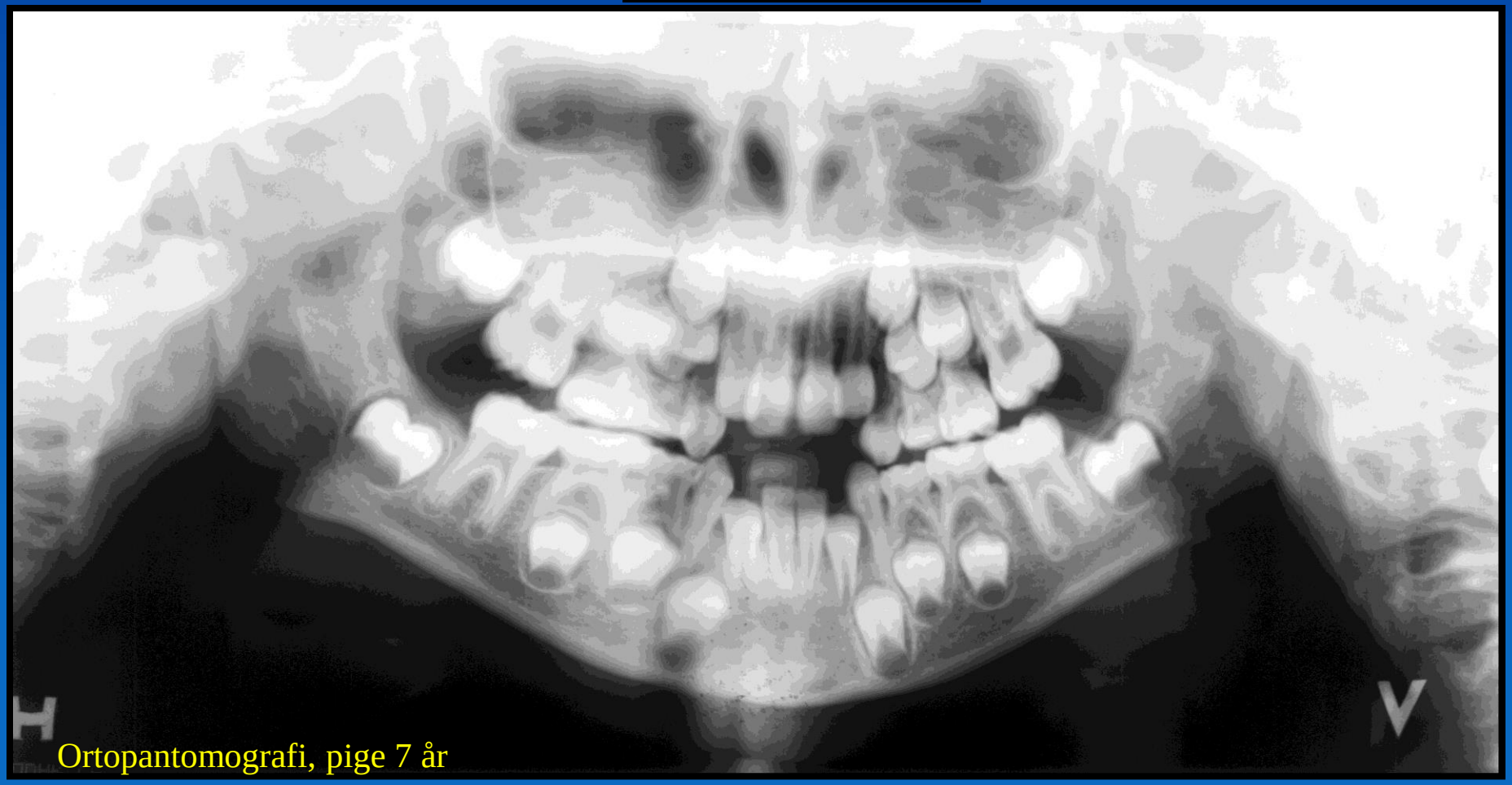
Dentes premolares

Dentes canini

Dentes incisivi

Dentes decudui: 20 stk.

Dentes permanentes: 32 stk.




Ortopantomografi, pige 7 år

Dentes molares

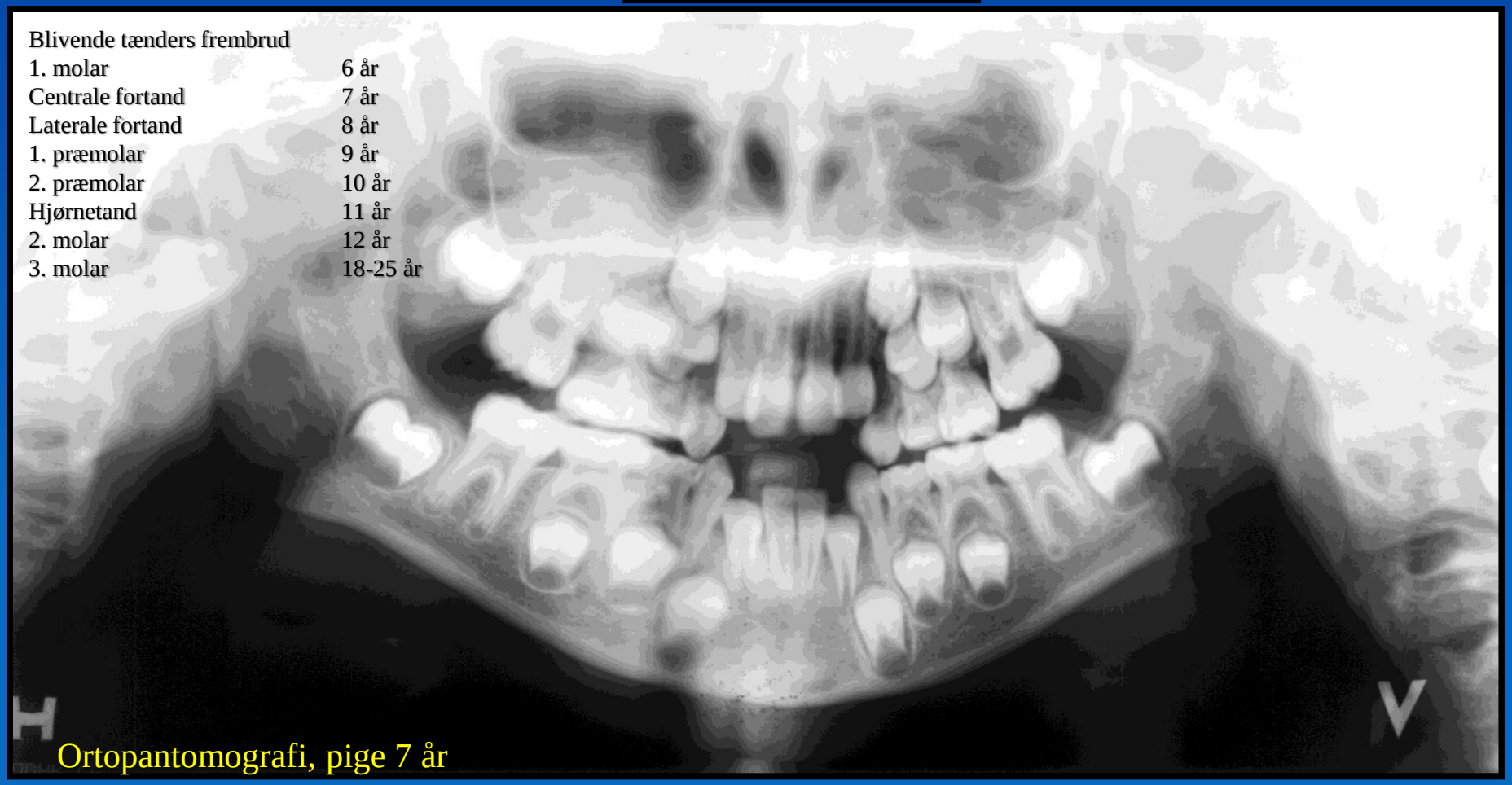
Dentes premolares

Dentes canini

Dentes incisivi

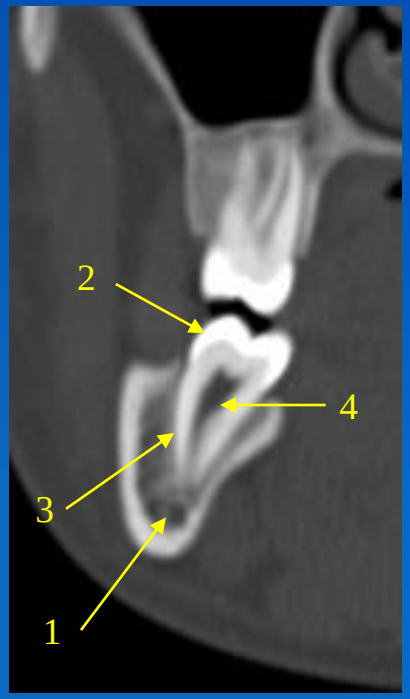
Dentes decudui: 20 stk.

Dentes permanentes: 32 stk.

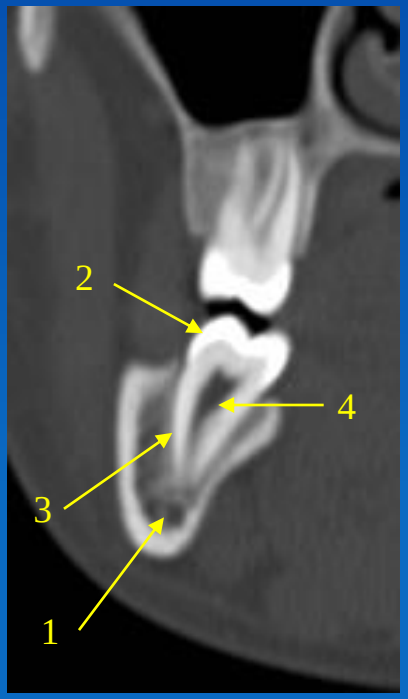



Ortopantomografi, pige 7 år

# Tanden: CT

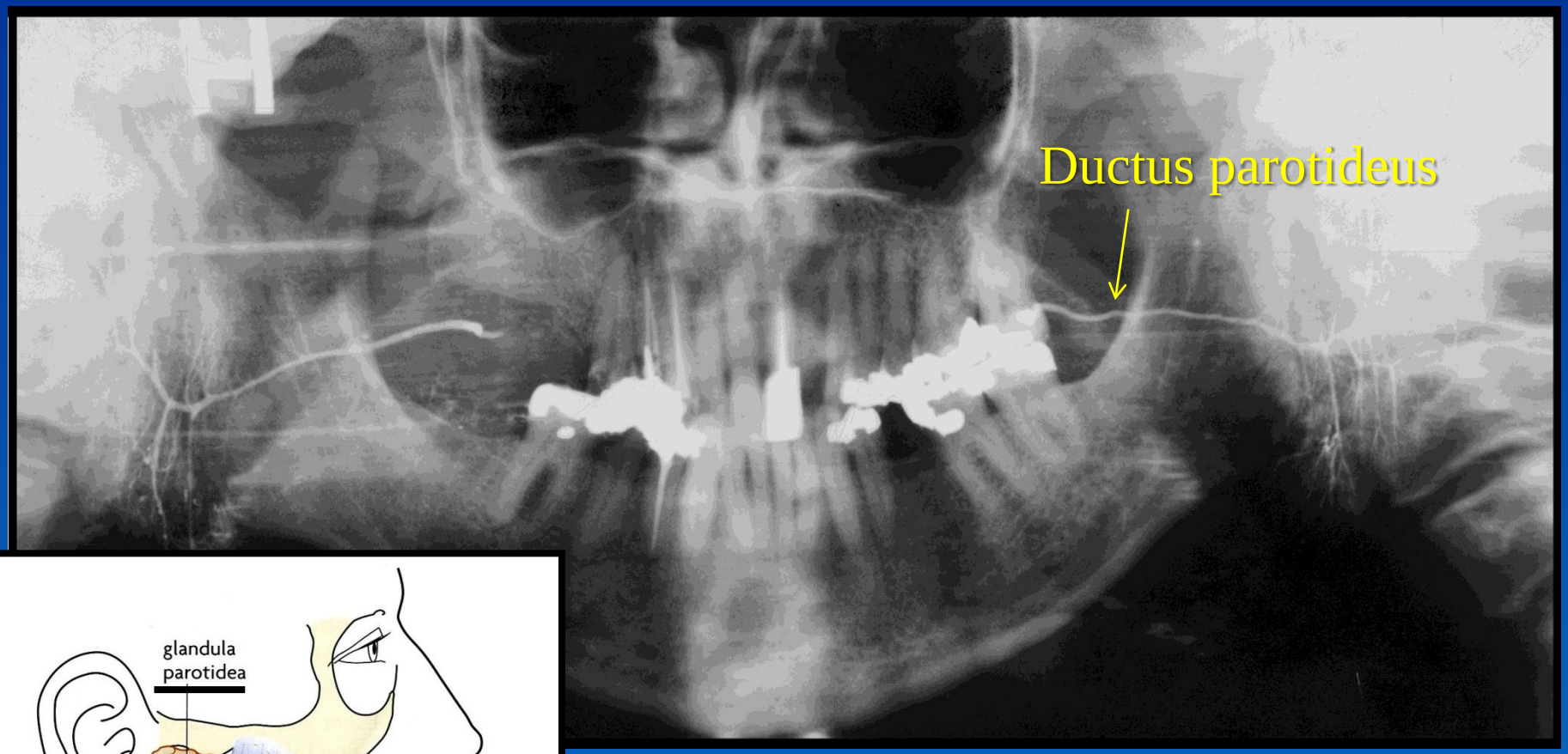


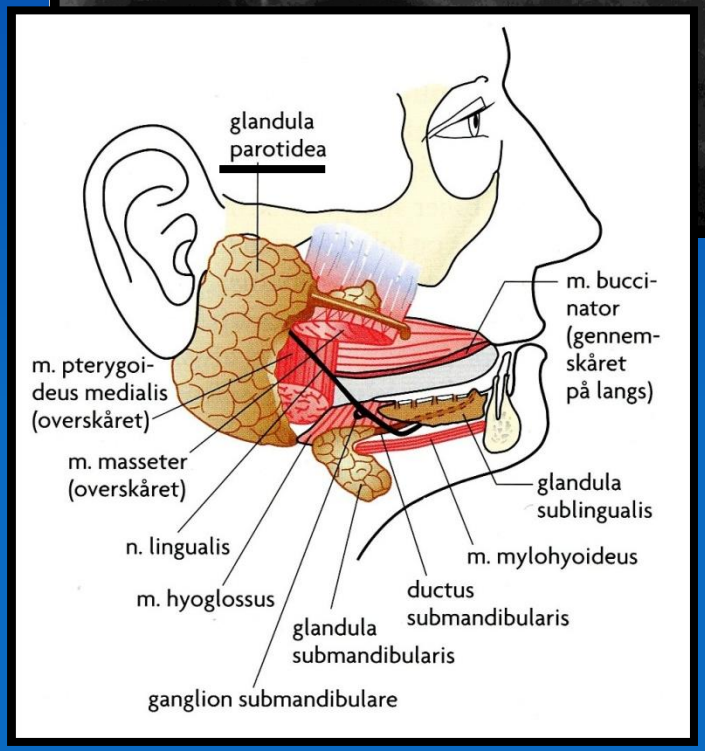
# Tanden: CT

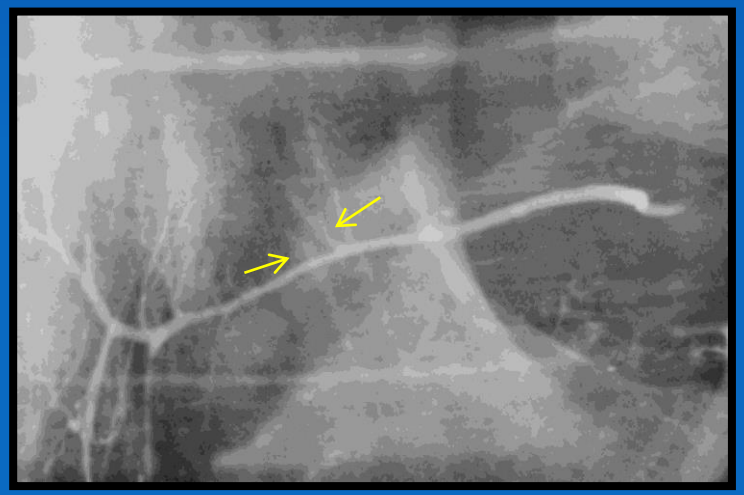



1. Canalis mandibulae
2. Corona dentis
3. Radix dentis
4. Cavitas dentis

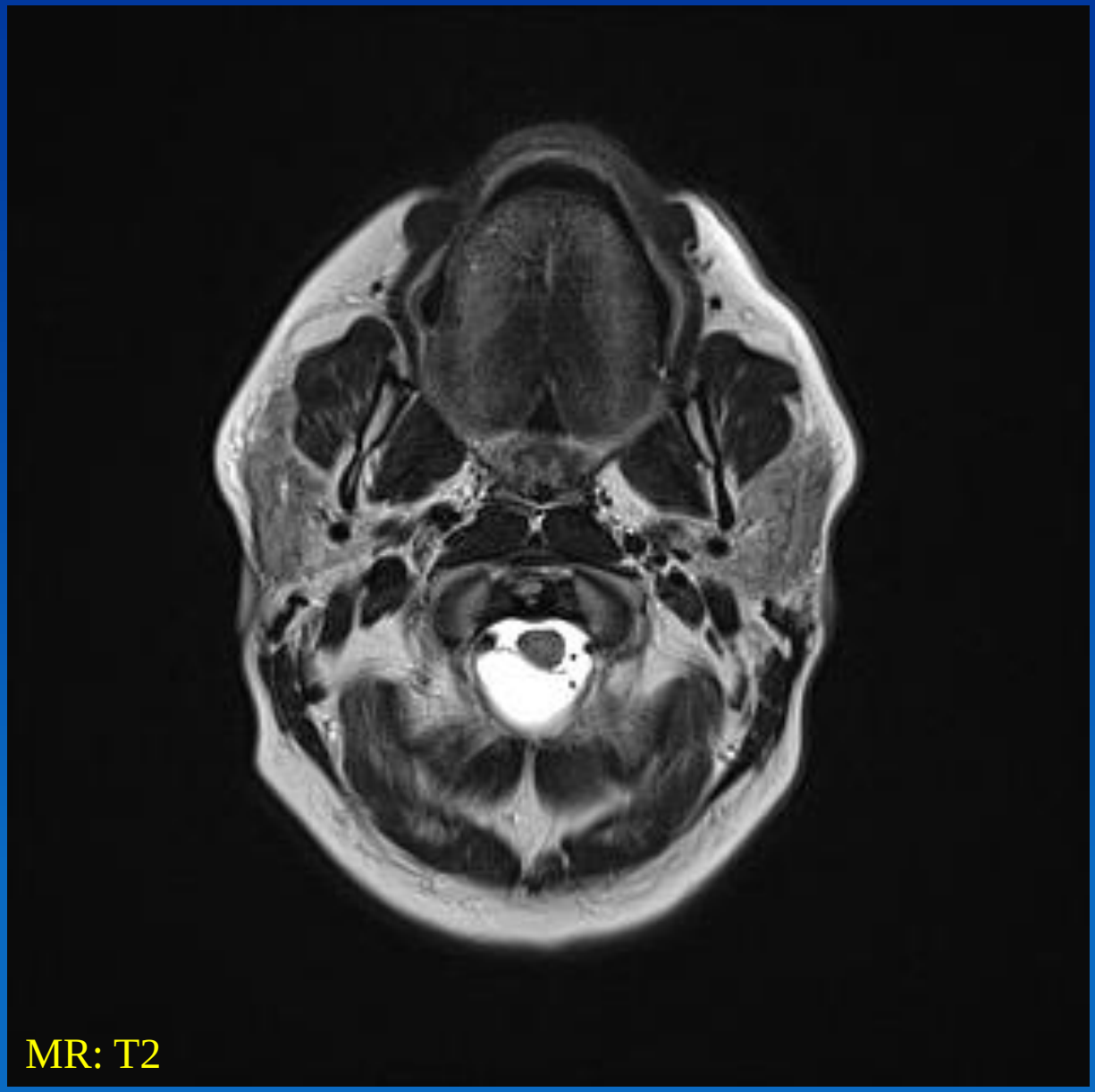
Bemærk at emaljen er mere hvid end dentinen pga. et større indhold af mineralindhold, og dermed større absorption af røntgenstrålerne.

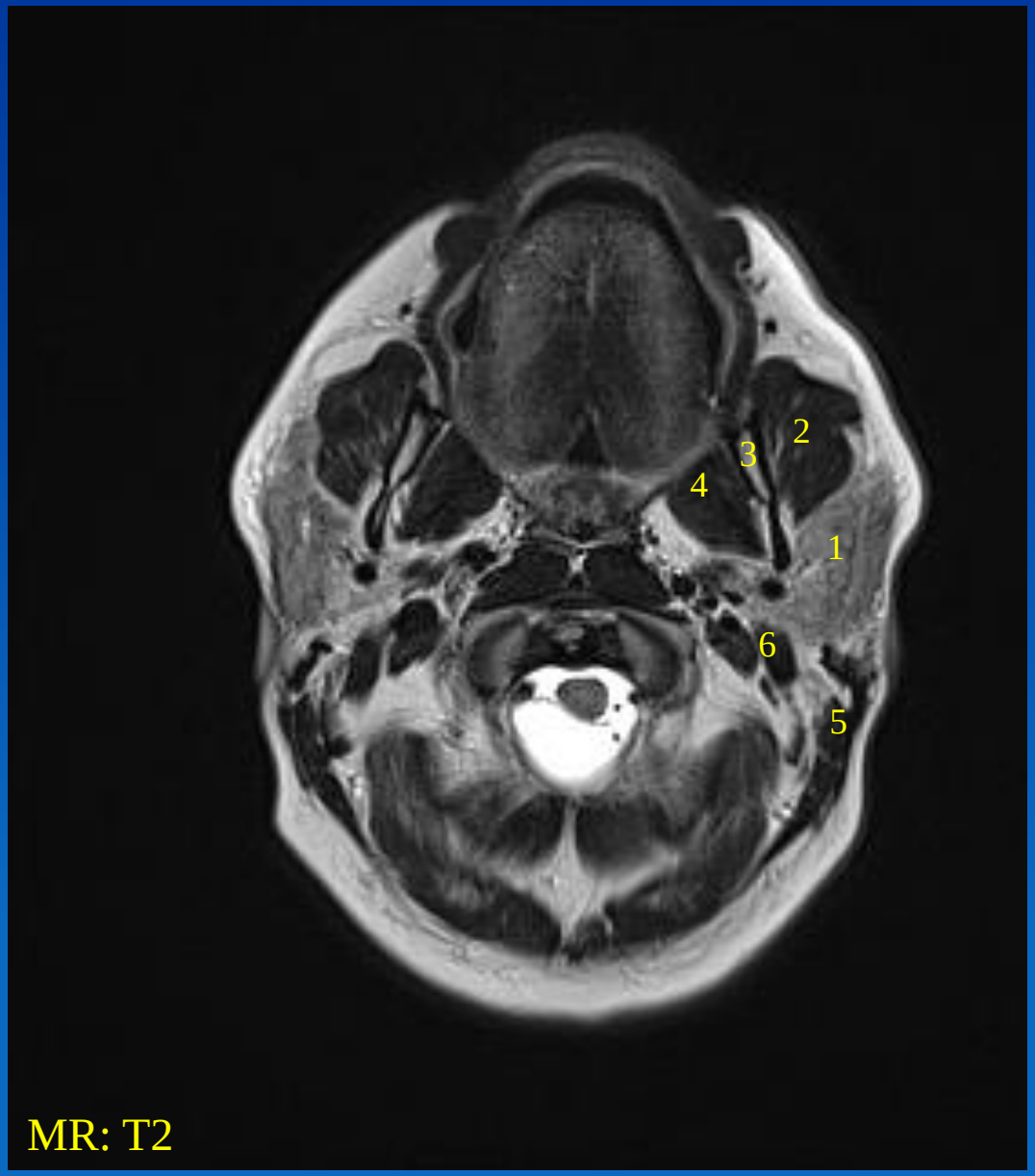


Gld. parotidea accessoria


MR: T2


2
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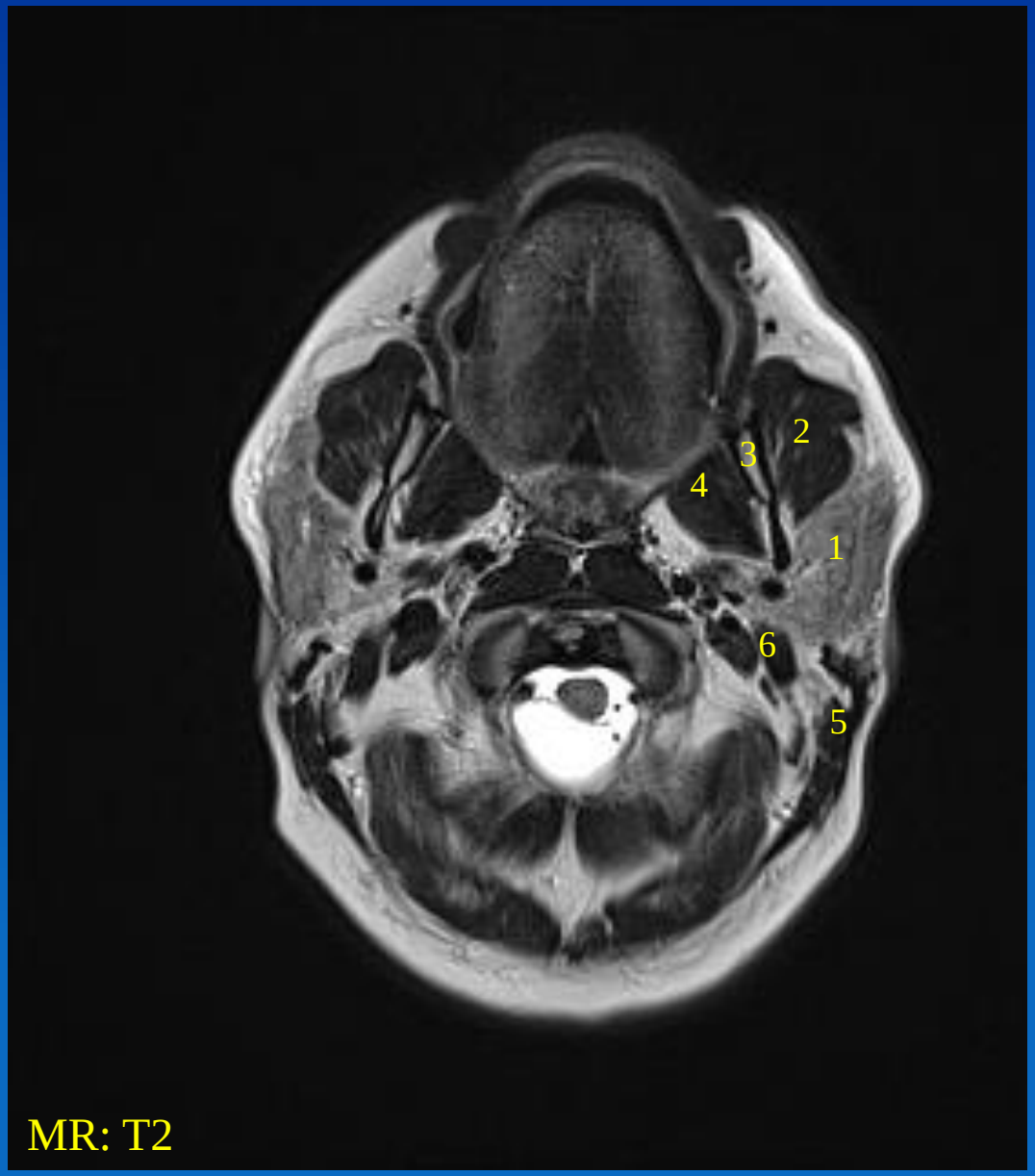
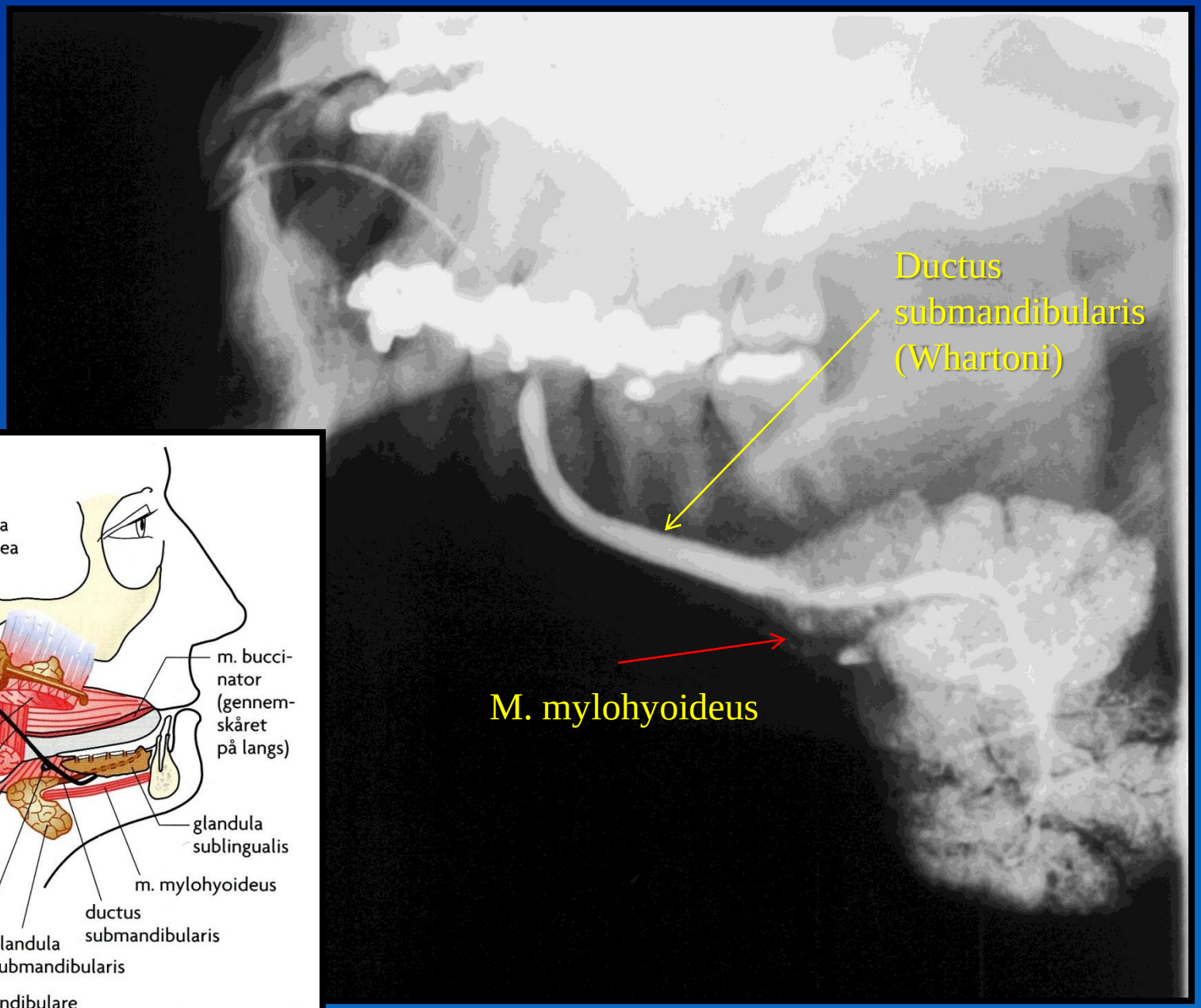
MR: T2



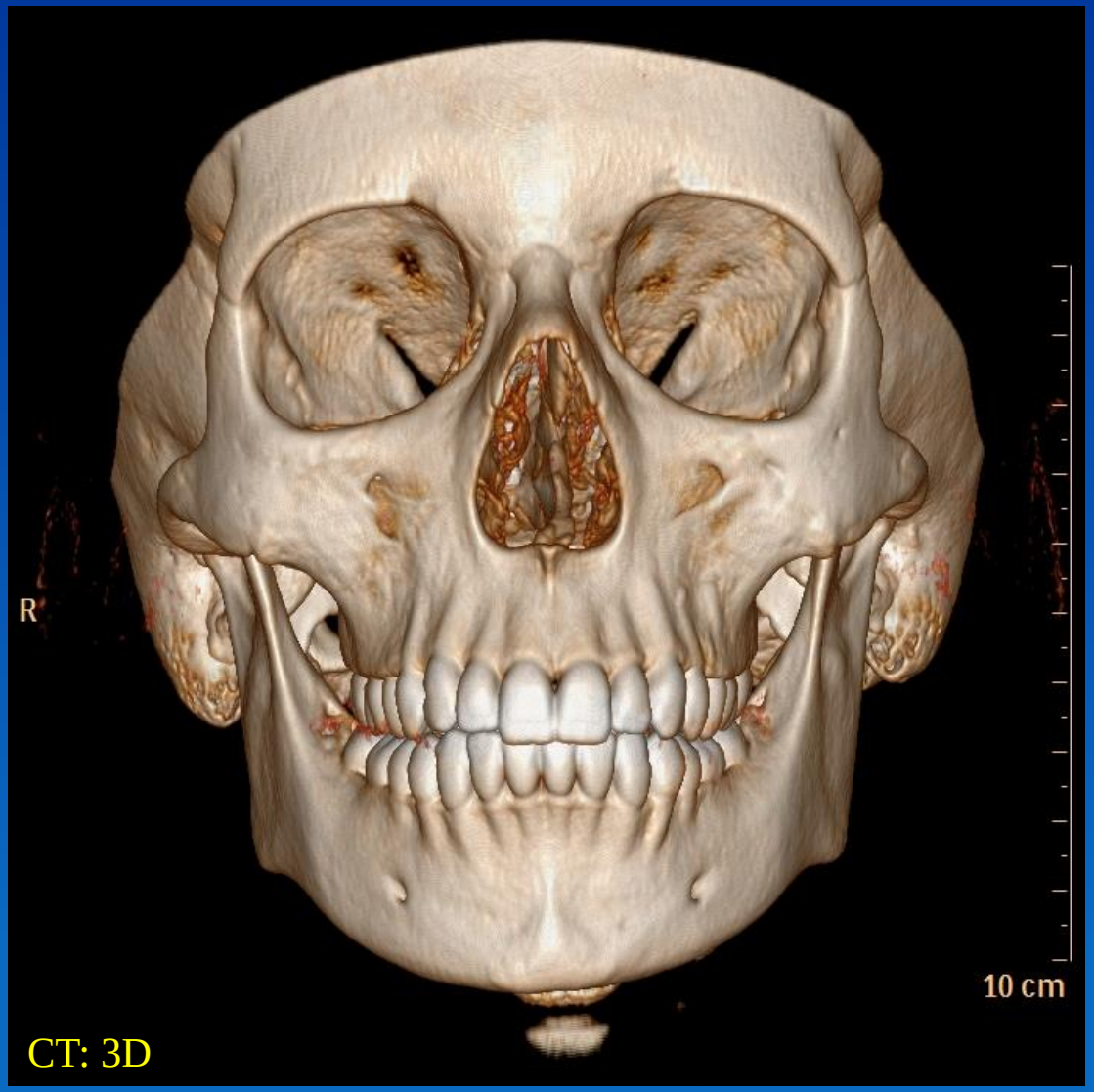

MR: T2

1) Gld. Parotidea
2) M. masseter
3) Ramus mandibulae
4) M. pterygoideus medialis
5) M. sternocleidomastoideus
6) M. digastricus (vent. post.)

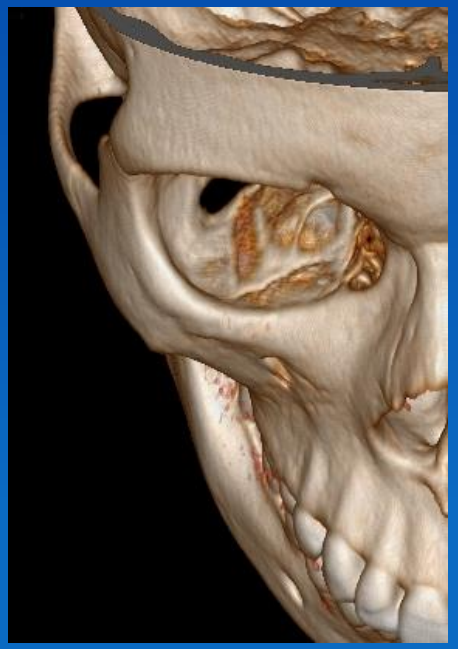

Ductus submandibularis (Whartoni)
M. mylohyoideus

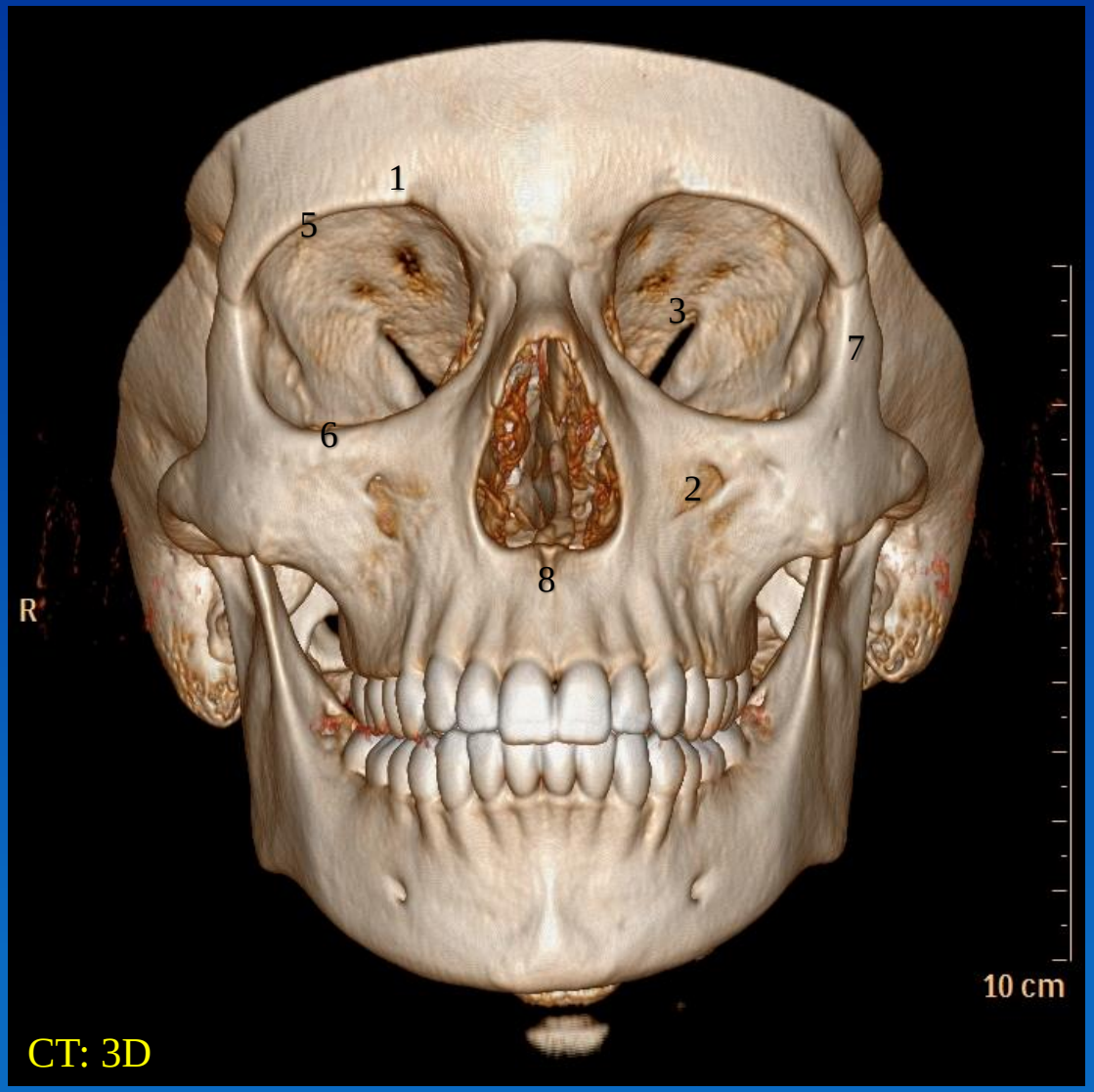

glandula parotidea
m. buccinator (gennemskåret på langs)
m. pterygoideus medialis (overskåret)
m. masseter (overskåret)
glandula sublingualis
n. lingualis
m. mylohyoideus
m. hyoglossus
ductus submandibularis
glandula submandibularis
ganglion submandibulare

# Orbita

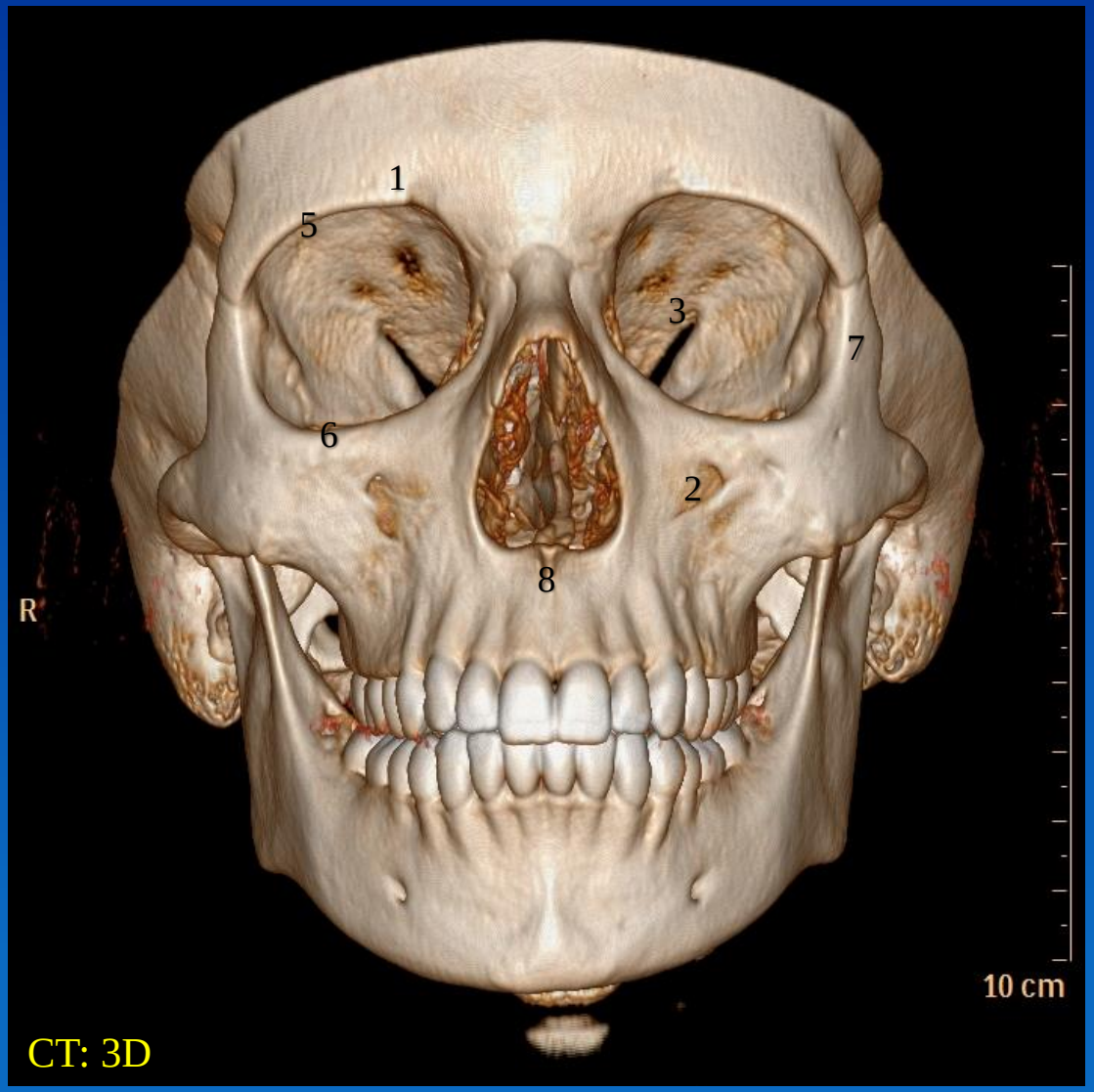



CT: 3D



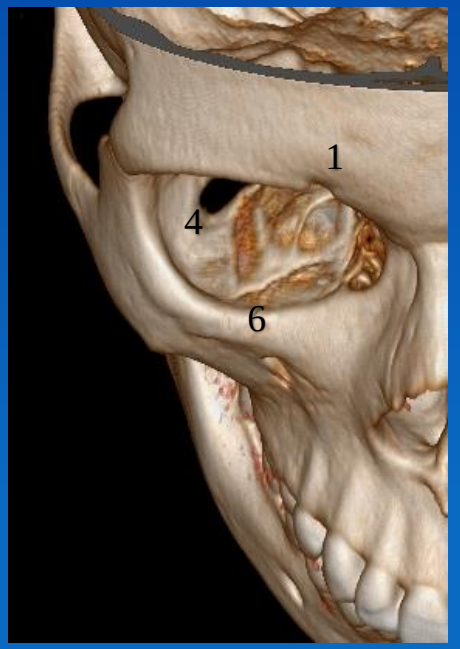



CT: 3D



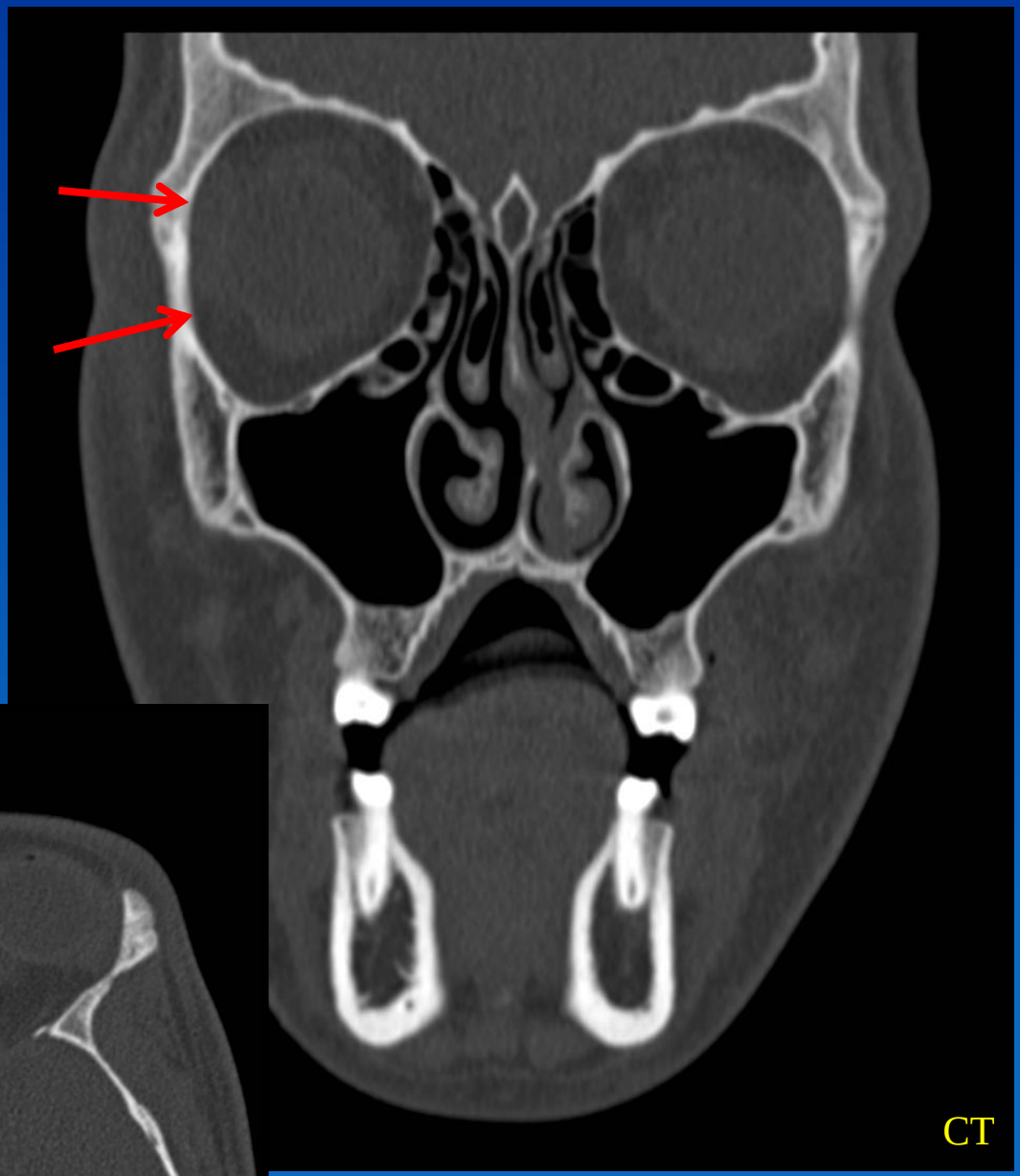

CT: 3D

1) Incisura supraorbitalis
2) Foramen infraorbitale
3) Fissura orbitalis superior
4) Fissura orbitalis inferior
5) Margo supraorbitale
6) Margo infraorbitale
7) Processus frontalis ossis zygomatici
8) Spina nasalis ant.

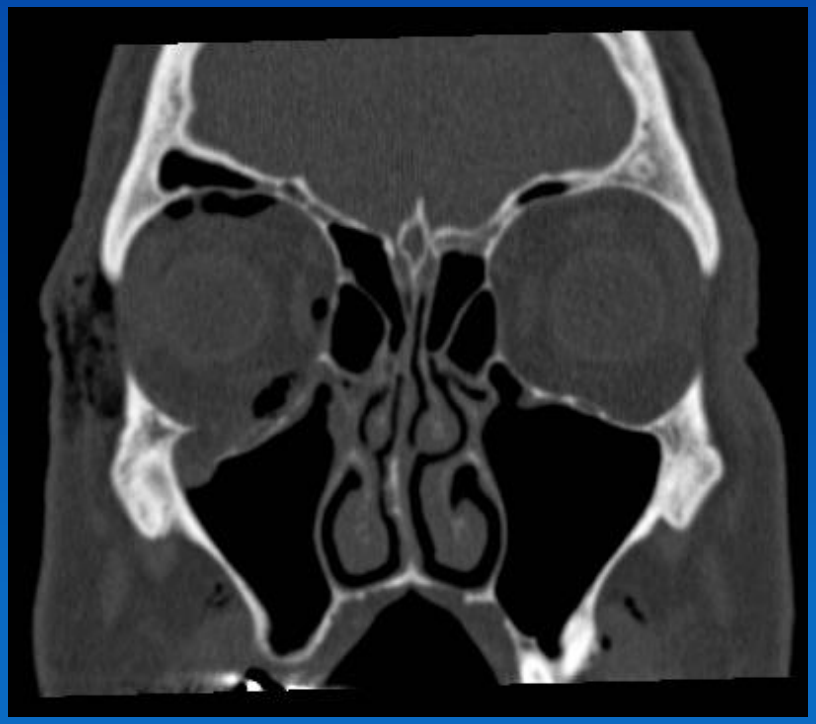


Lateralvæggen
Loftet
Medialvæggen
Gulvet

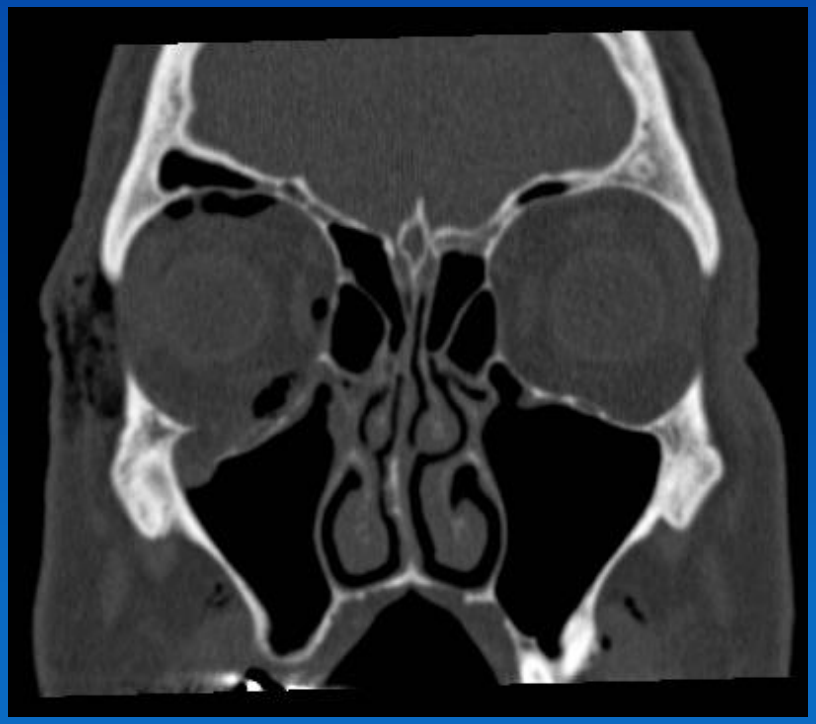
Glandula lacrimalis



# Normal anatomi?

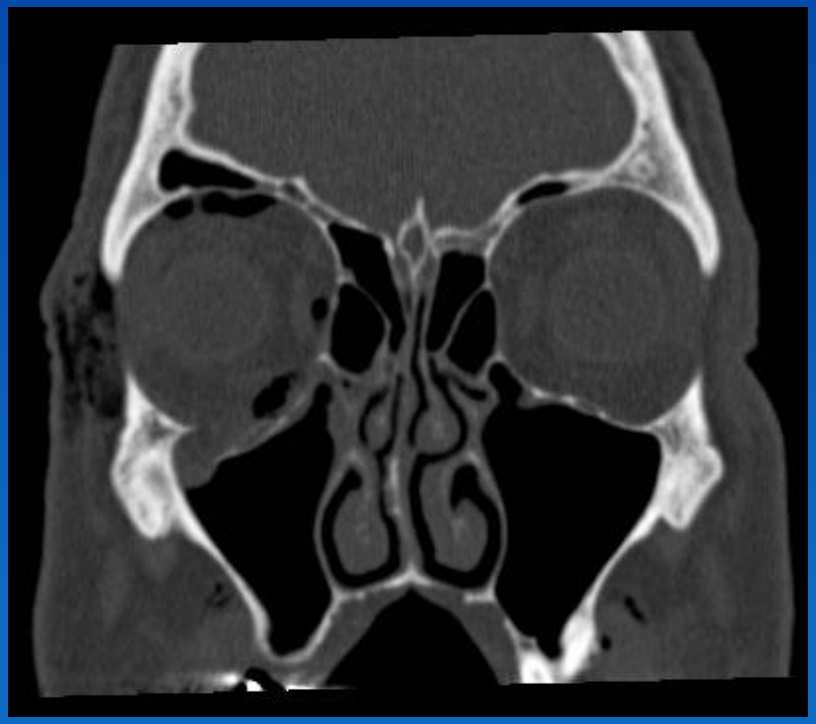


# Normal anatomi?



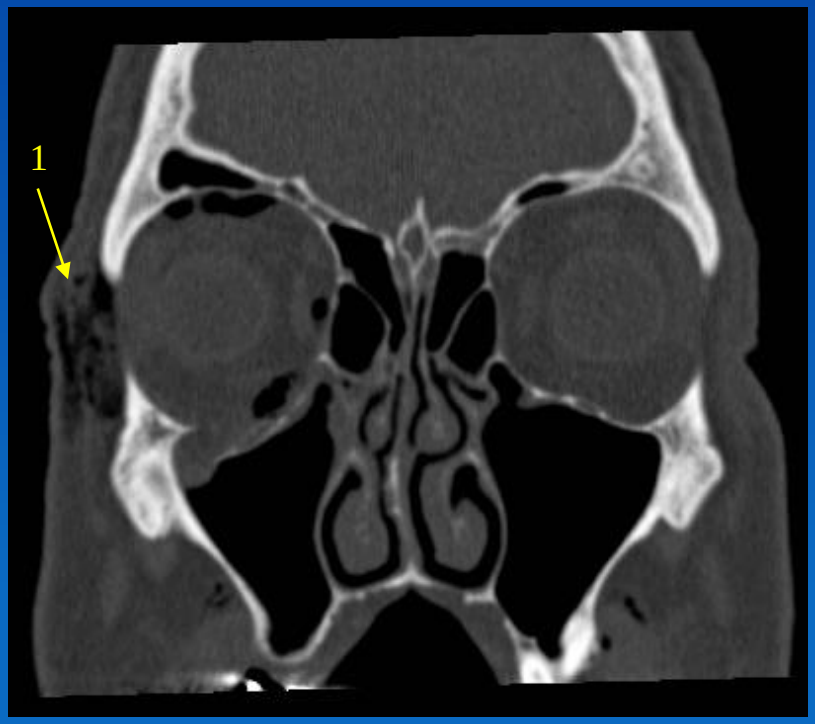
- Gennemgå billedet systematisk. Er der afvigelser fra den forventede normalanatomi?

# Normal anatomi?



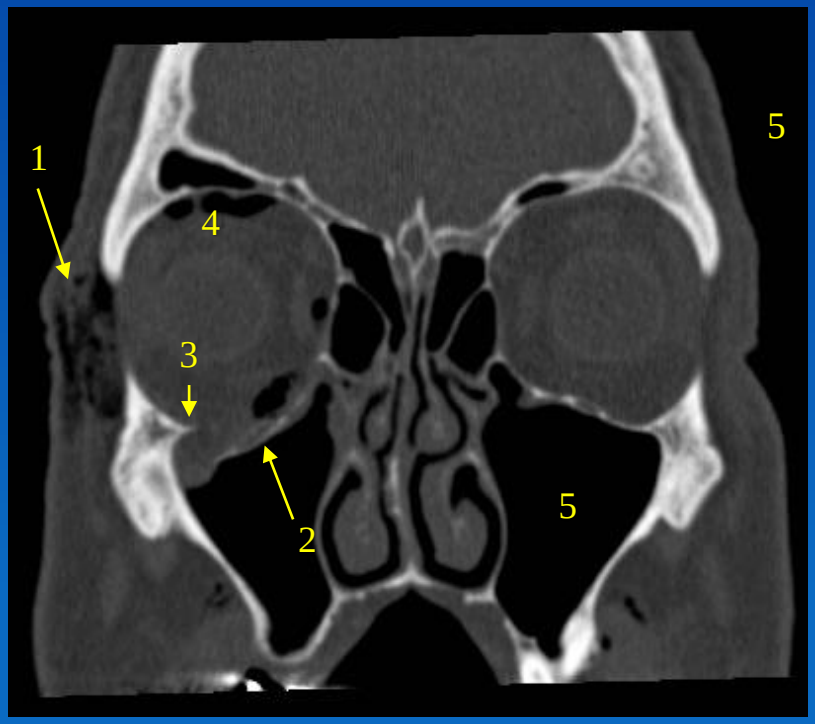
- Gennemgå billedet systematisk. Er der afvigelser fra den forventede normalanatomi?
- Det kan være en fordel at sammenligne højre og venstre side.

# Normal anatomi?



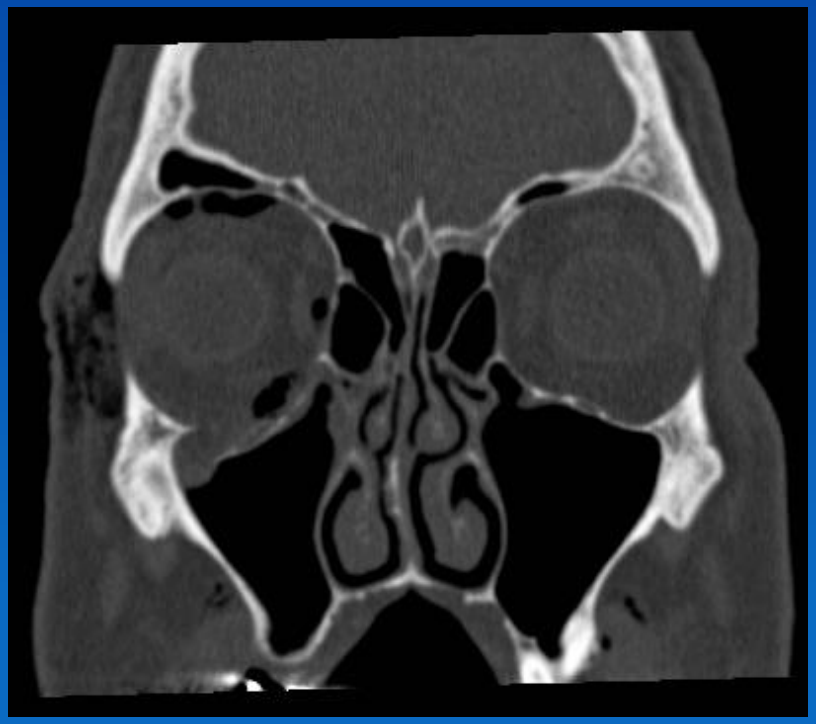

- Gennemgå billedet systematisk. Er der afvigelser fra den forventede normalanatomi?
- Det kan være en fordel at sammenligne højre og venstre side.
- Hvad skyldes den mørke farve ved (1) ?

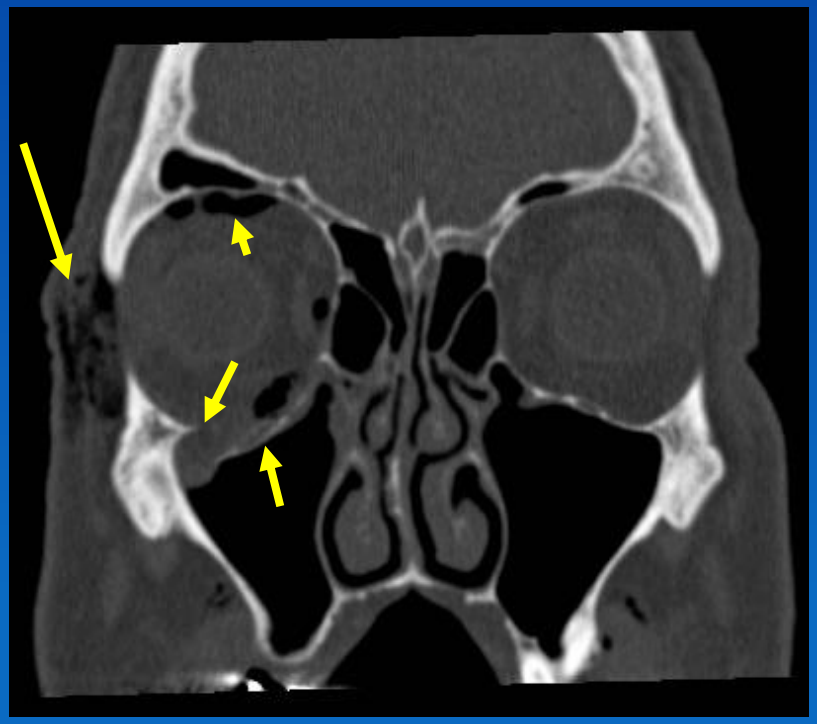
# ”Blow-out” fraktur af gulvet i højre orbita ned i sinus maxillaris



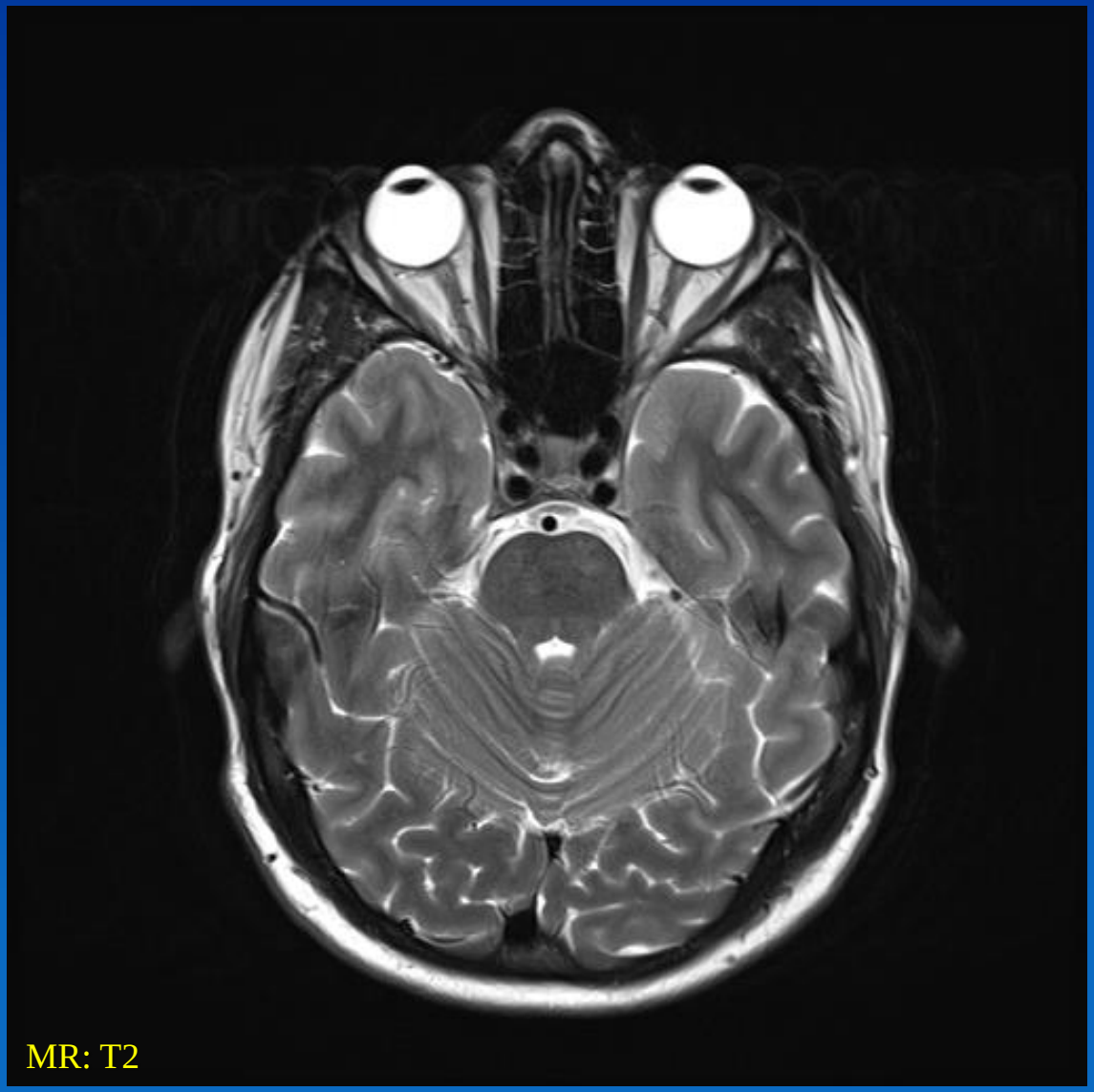

- Gennemgå billedet systematisk. Er der afvigelser fra den forventede normalanatomi?
- Det kan være en fordel at sammenligne højre og venstre side.
- Hvad skyldes den mørke farve ved (1) ? Der er tale om luft i bløddelene lateralt for orbita på højre side. Gulvet i højre orbita ligger for lavt i forhold til venstre side og vinkler mere kaudalt lateralt (2) , hvor der er et brud i knoglen. Endelig ses luft i orbita (4). Læg mærke til at luften i sinus maxillaris og udenfor personen er sort (5)

# ”Blow-out” fraktur af gulvet i højre orbita ned i sinus maxillaris

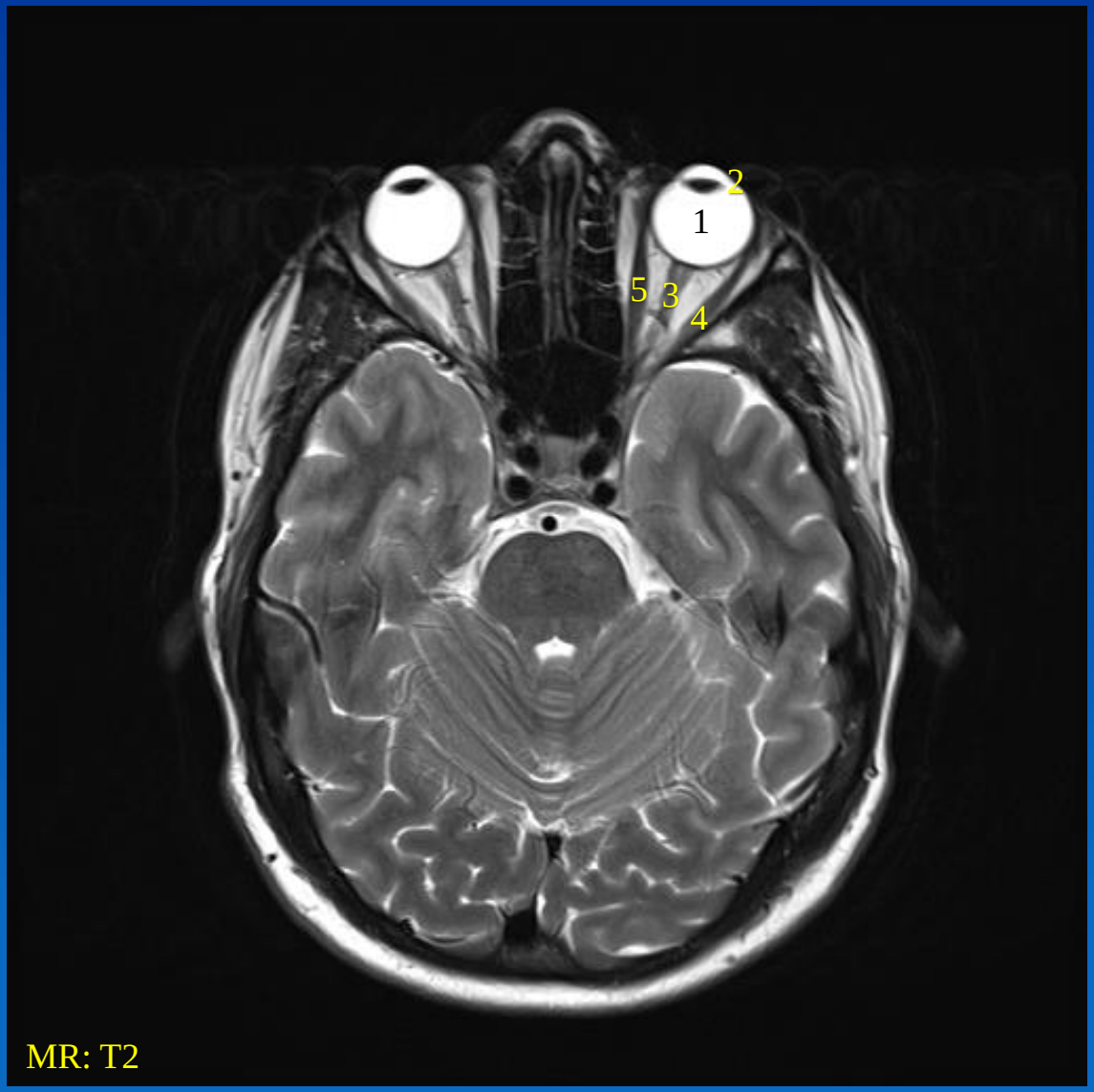




# Bulbus oculi og nervus opticus



MR: T2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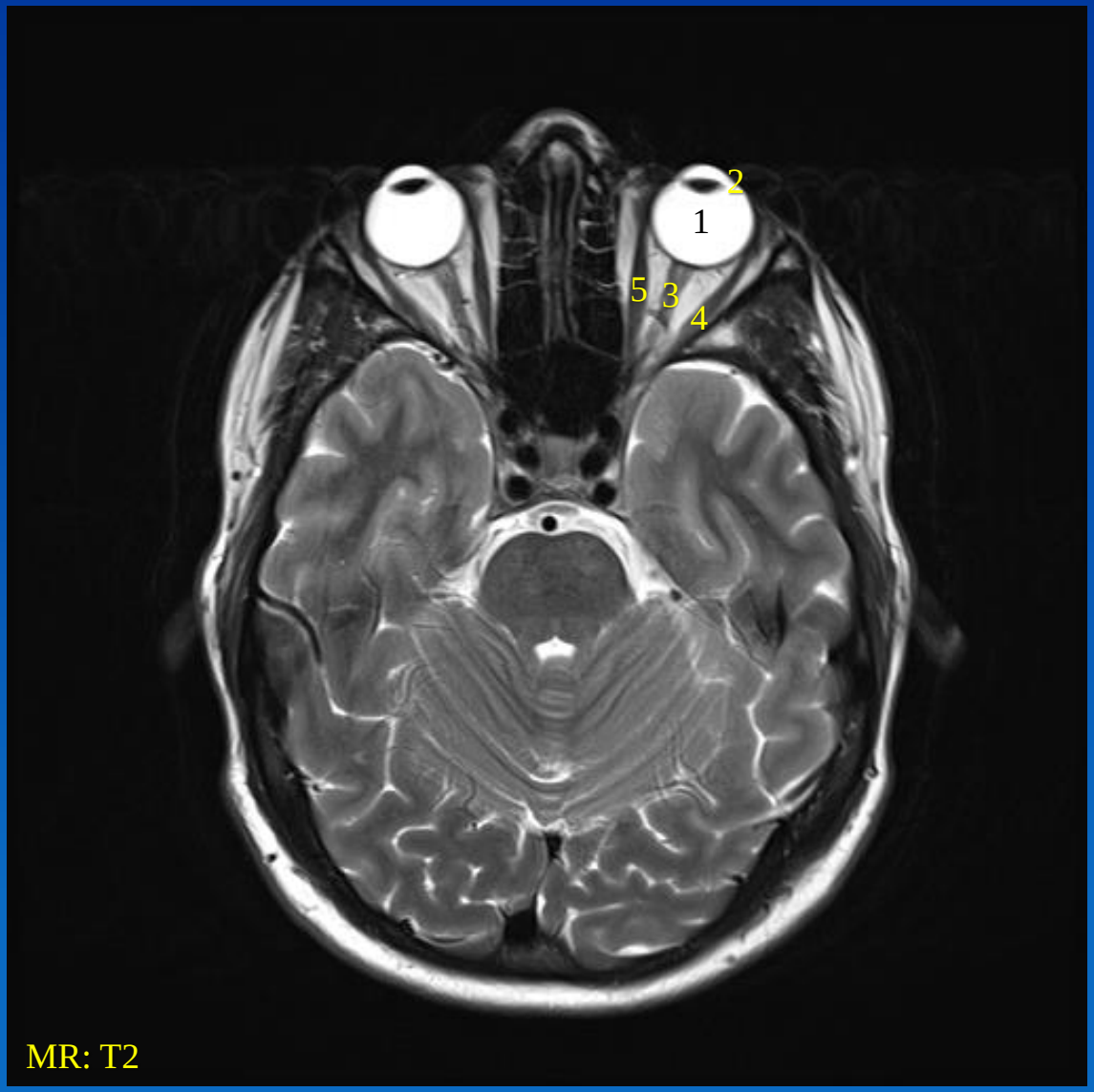
MR: T2




1) Bulbus oculi
2) Lens (Signal fattig (mørk))
3) N. opticus
4) M. rectus lateralis
5) M. rectus medialis

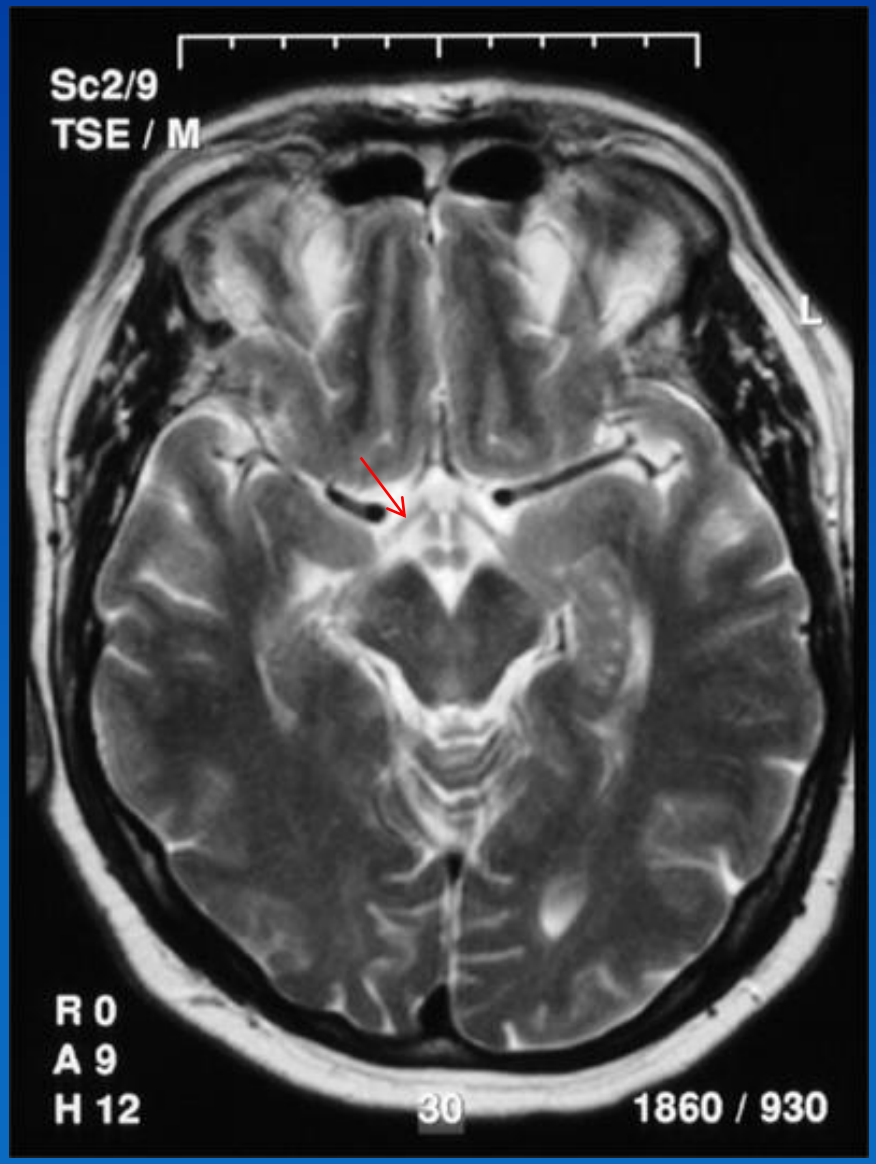

Strukturerne i orbita:

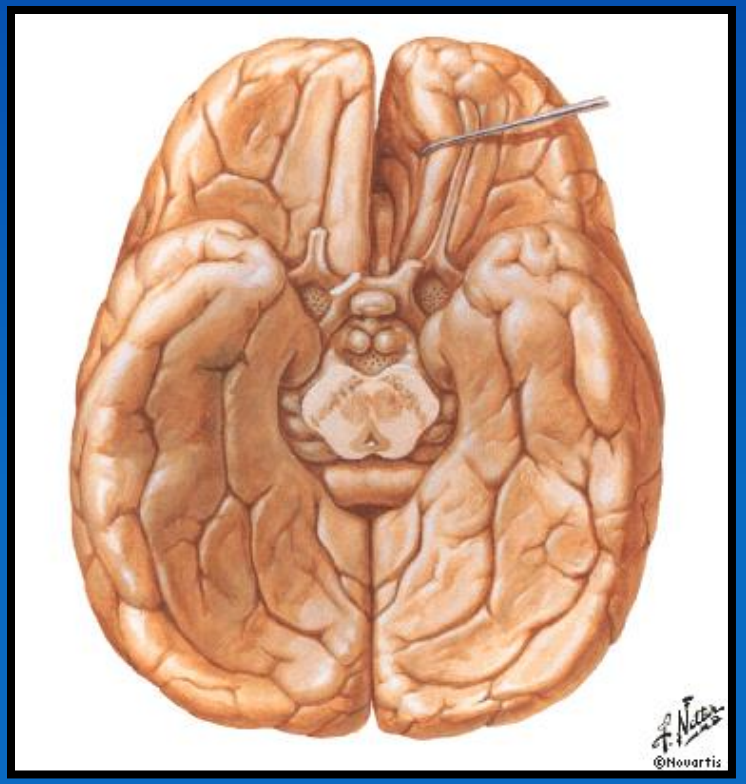
Strukturerne i orbita:


Strukturerne i orbita:

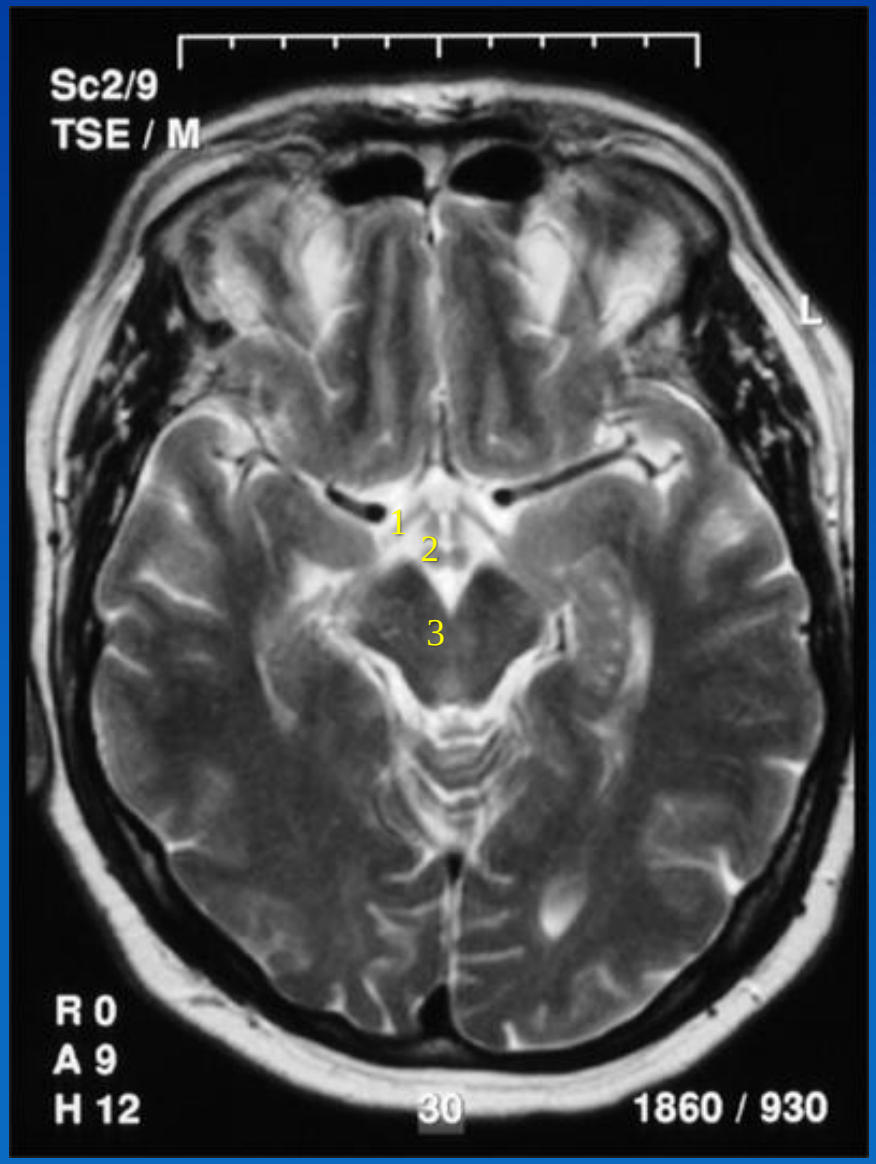
1) M. rectus superior
2) M. rectus medialis
3) M. rectus inferior
4) M. rectus lateralis
5) M. obliquus sup.
6) N. opticus

# MR cerebrum, mand 34 år: Tractus opticus



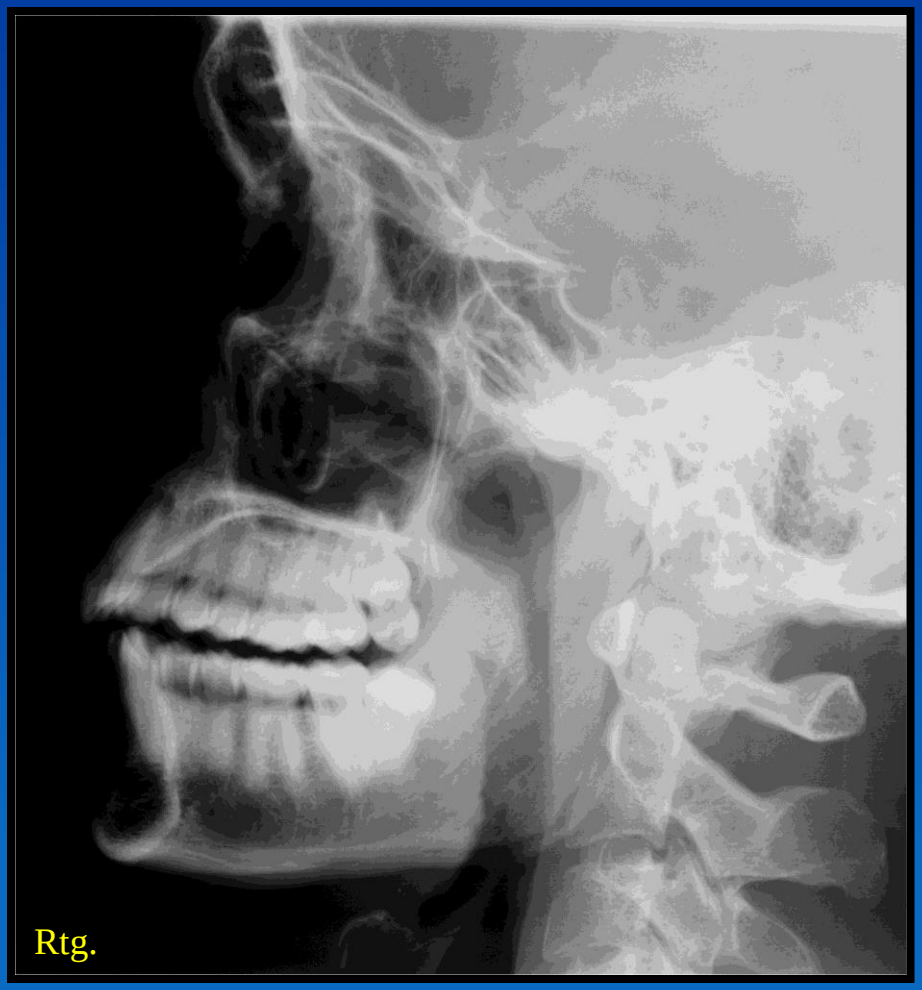



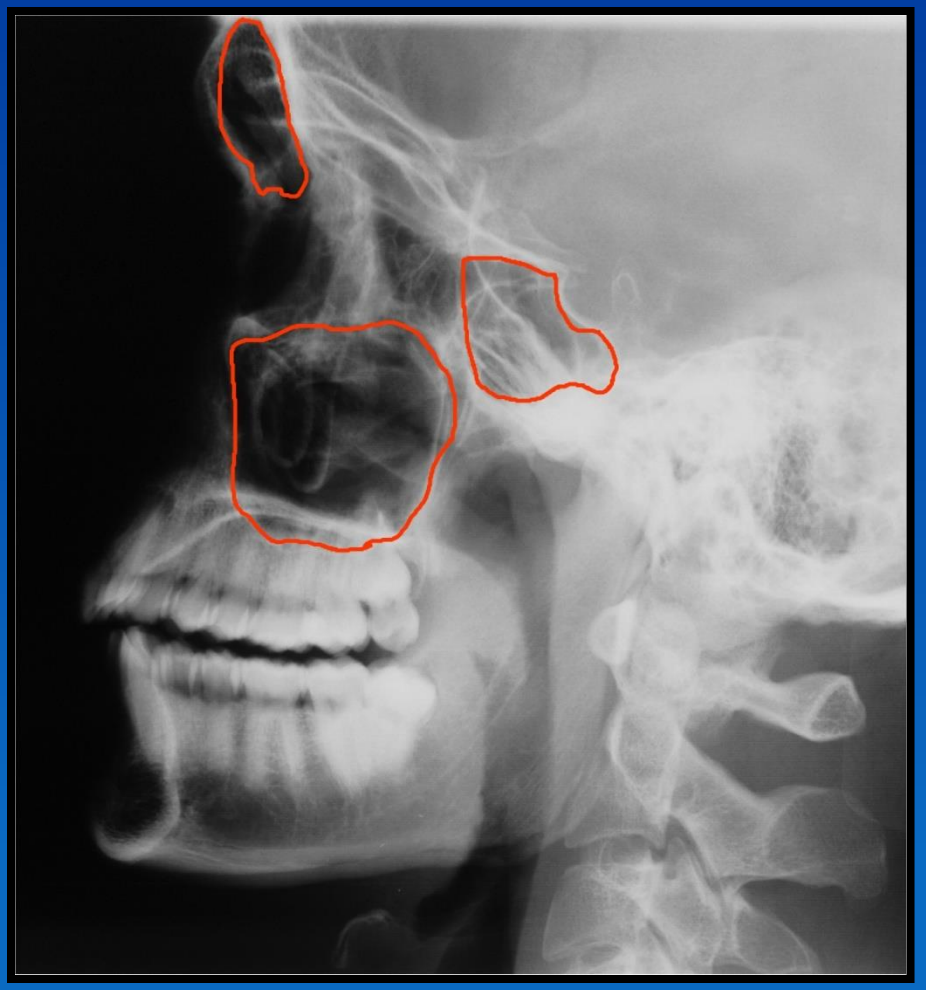
# MR cerebrum, mand 34 år: Tractus opticus

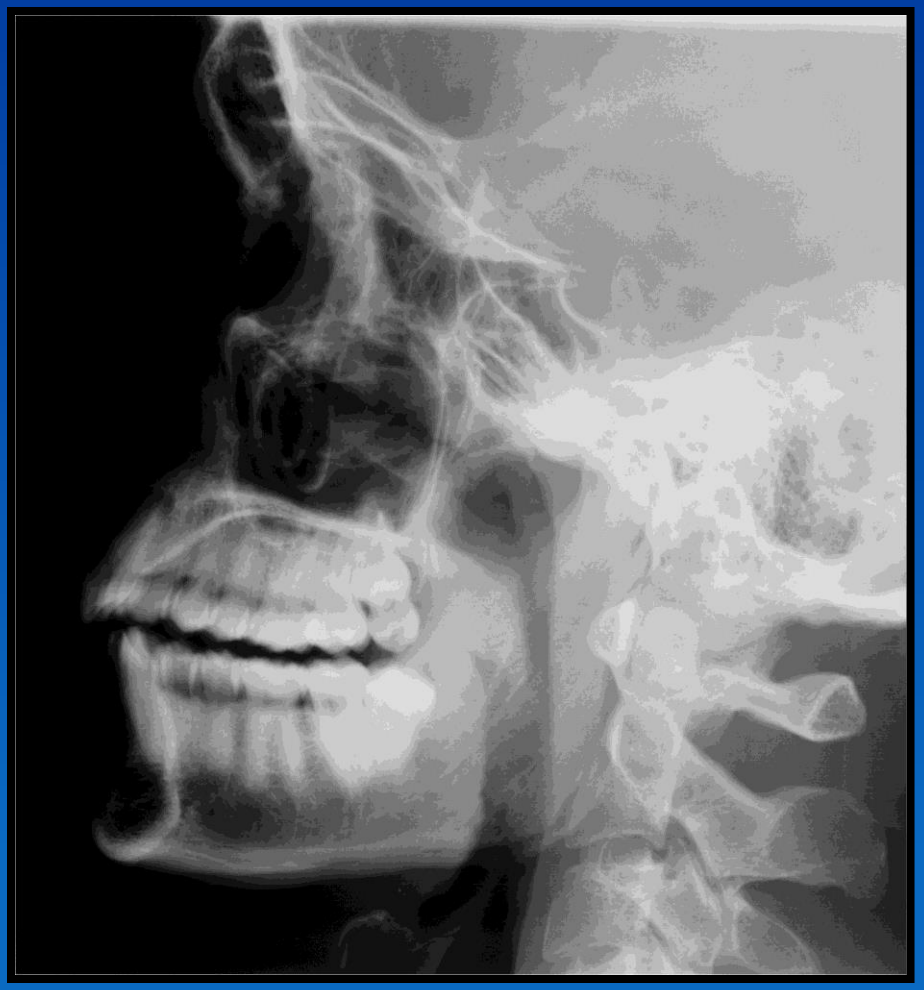


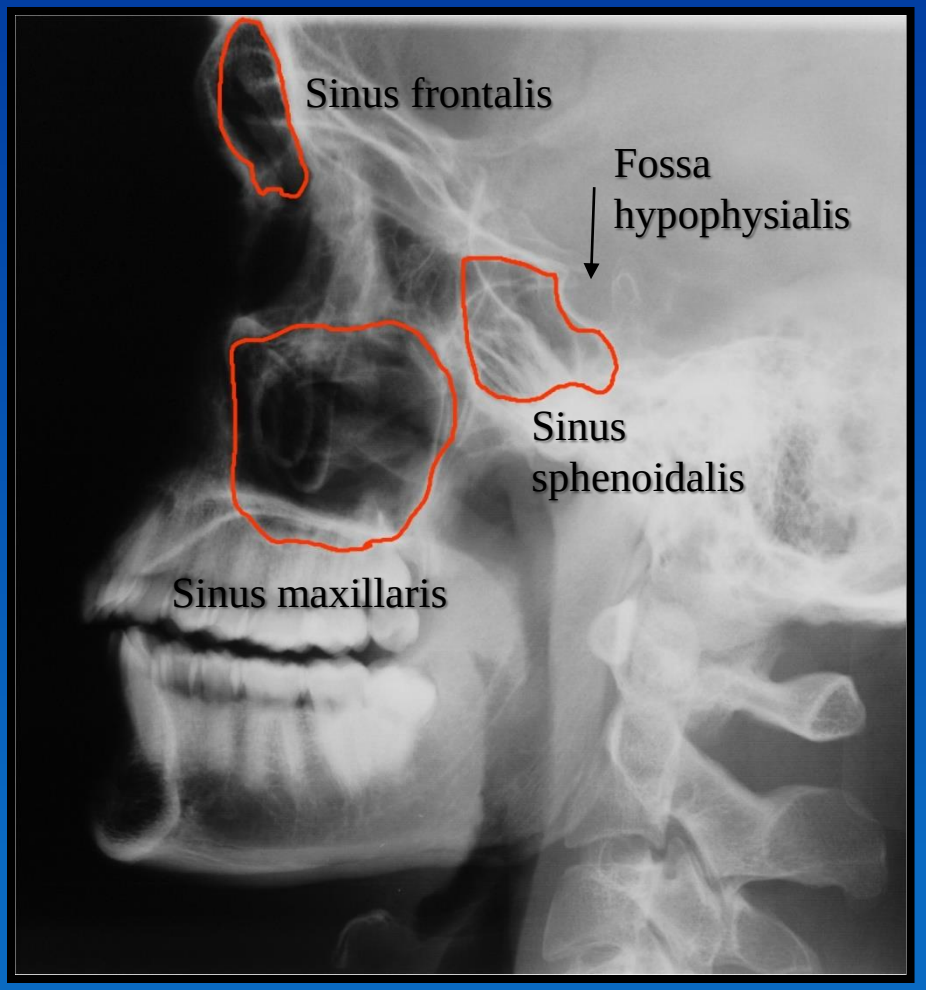

1) Tractus opticus
2) Corpus mammilare
3) Mesencephalon

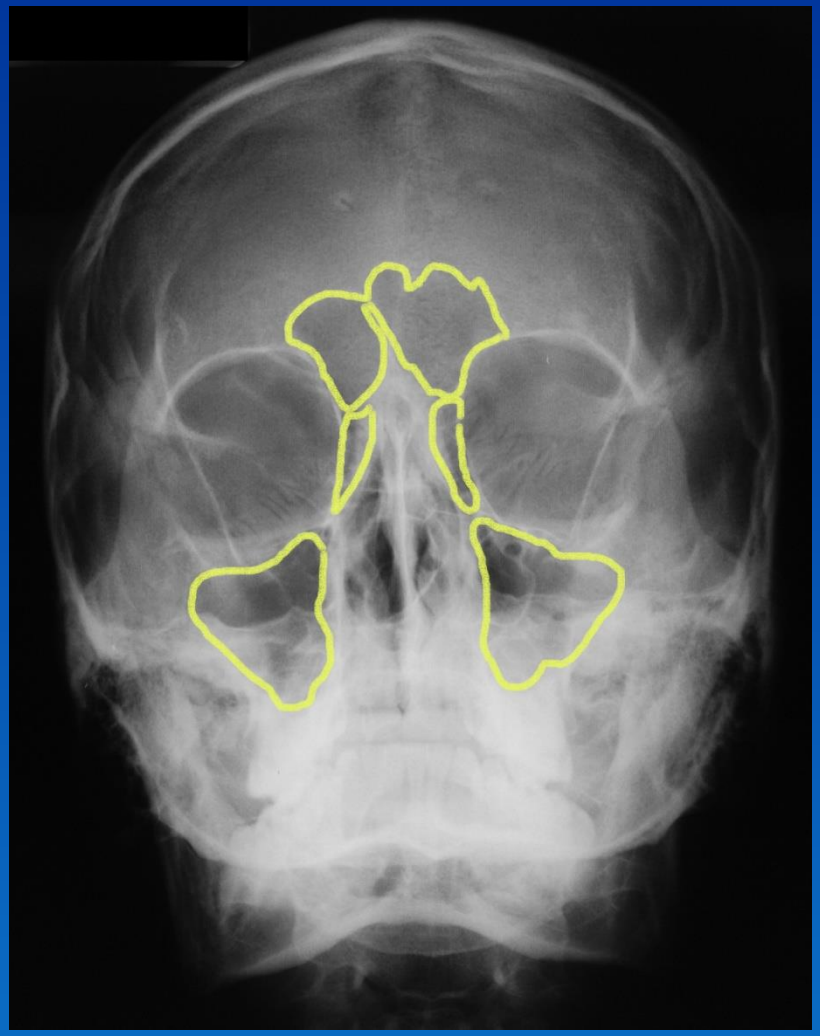
# Sinus paranasales
# Cavitas nasi

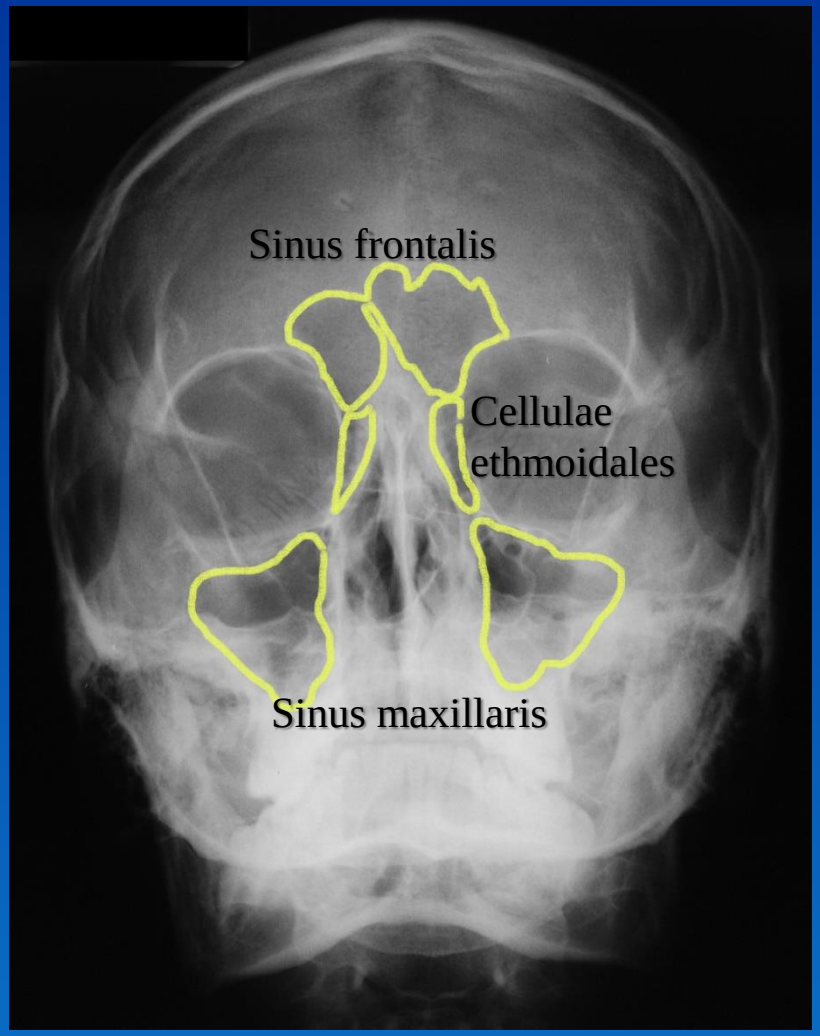

Rtg.

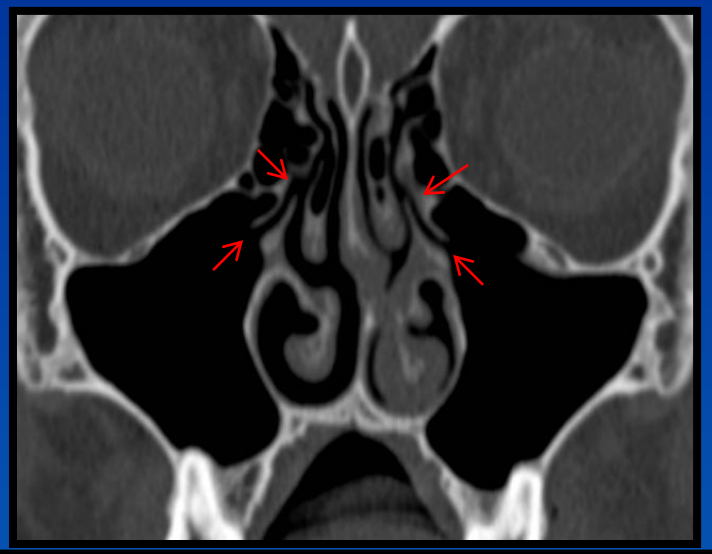


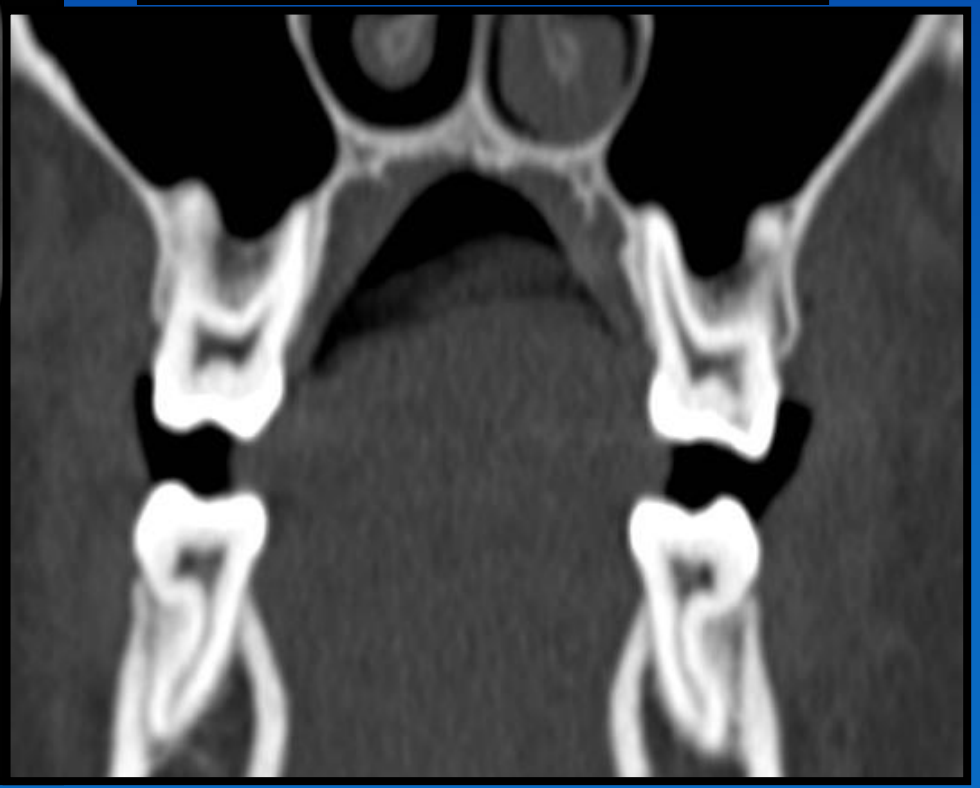


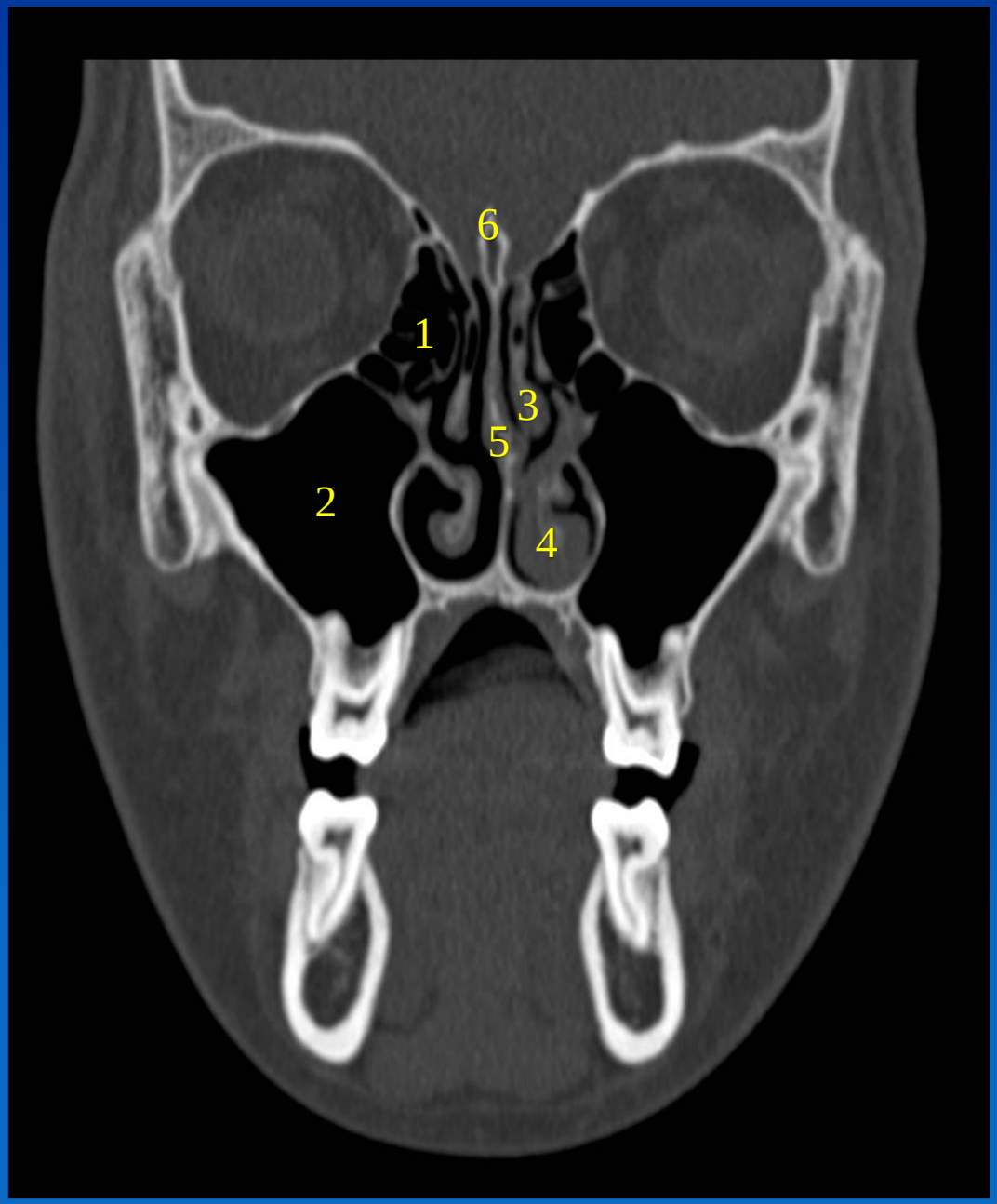

Sinus frontalis
Fossa
hypophysialis
Sinus
sphenoidalis
Sinus maxillaris



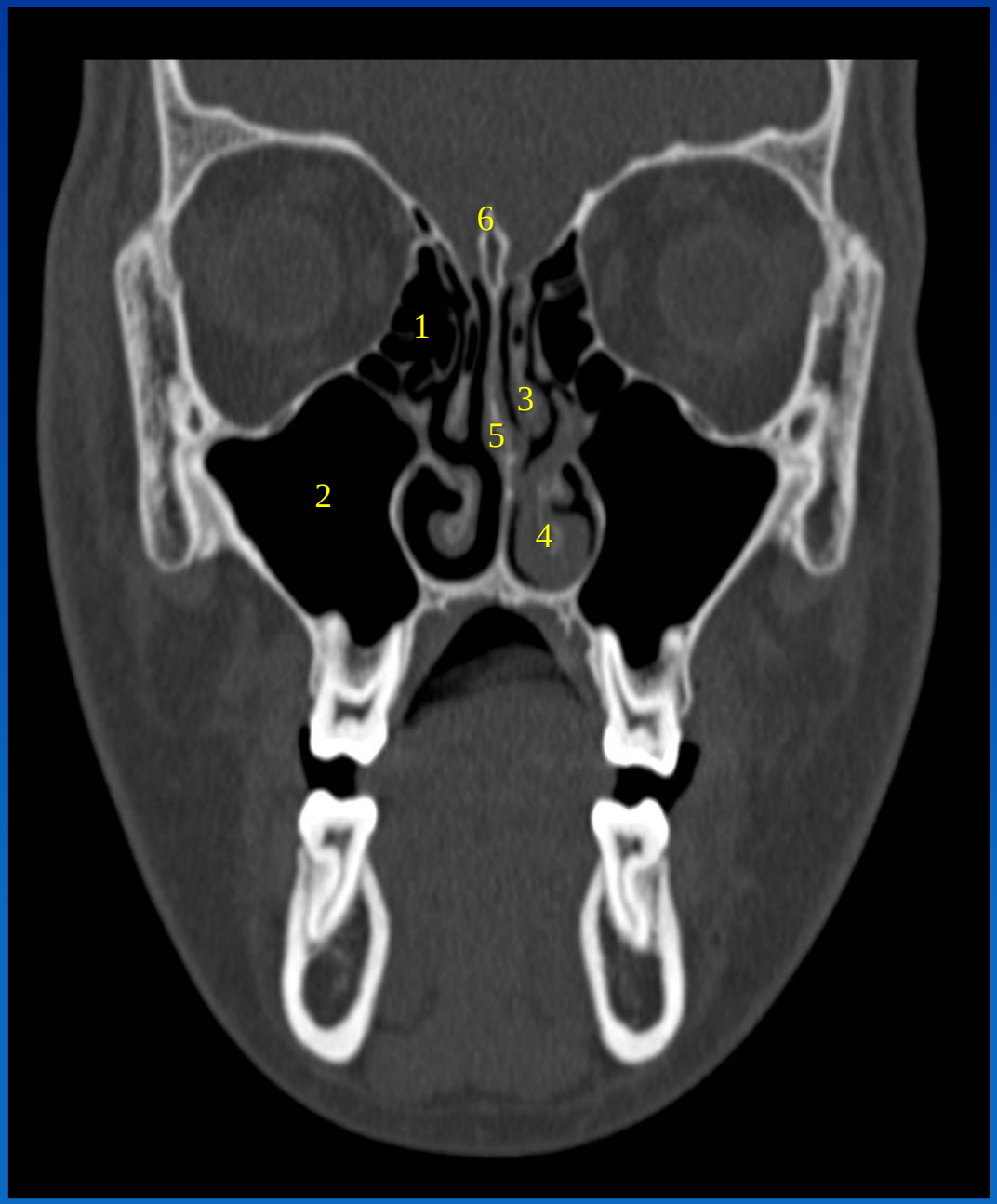

Sinus frontalis
Cellulae ethmoidales
Sinus maxillaris







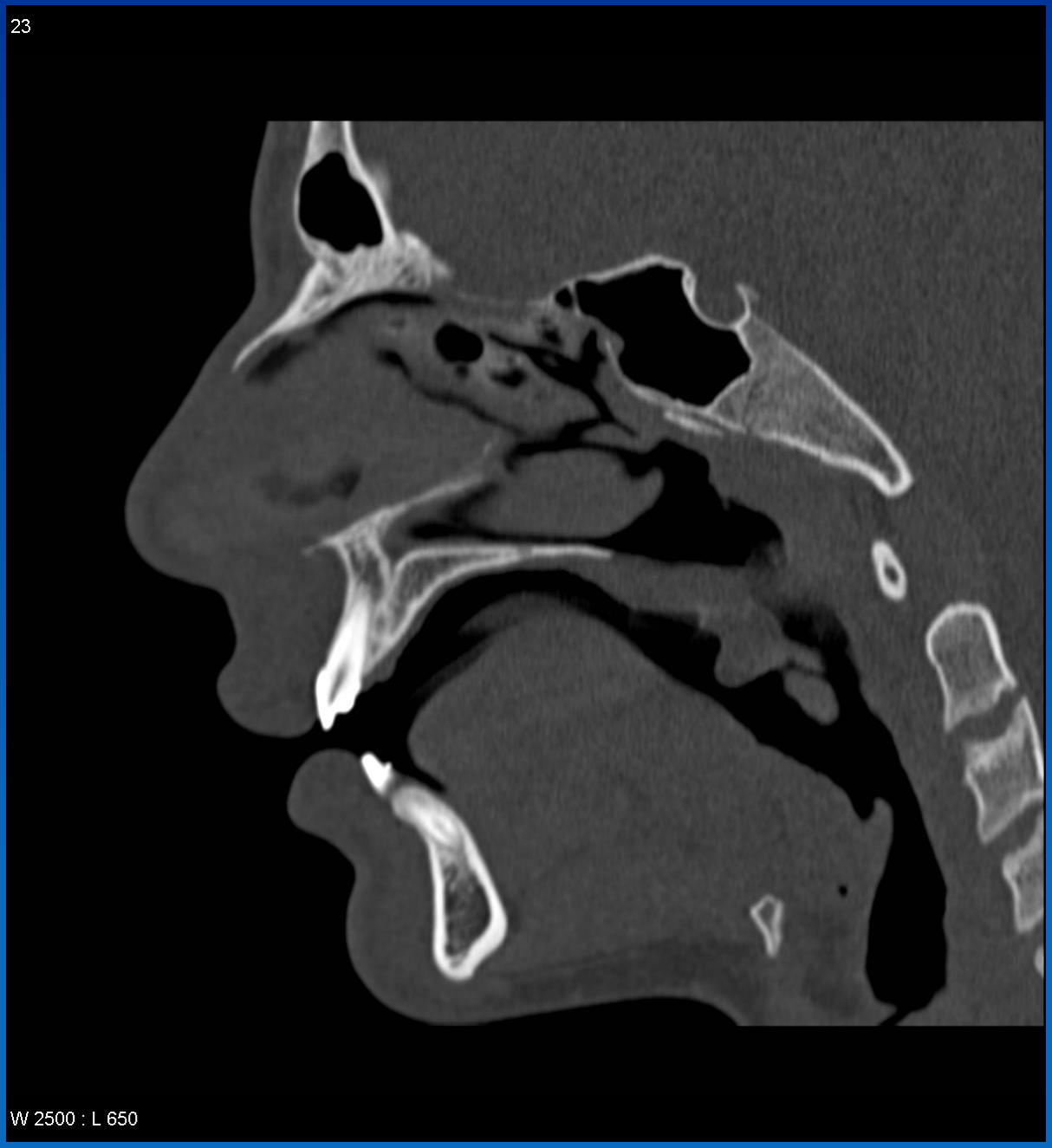

Sinus paranasales og cavitas nasi:




Sinus paranasales og cavitas nasi:

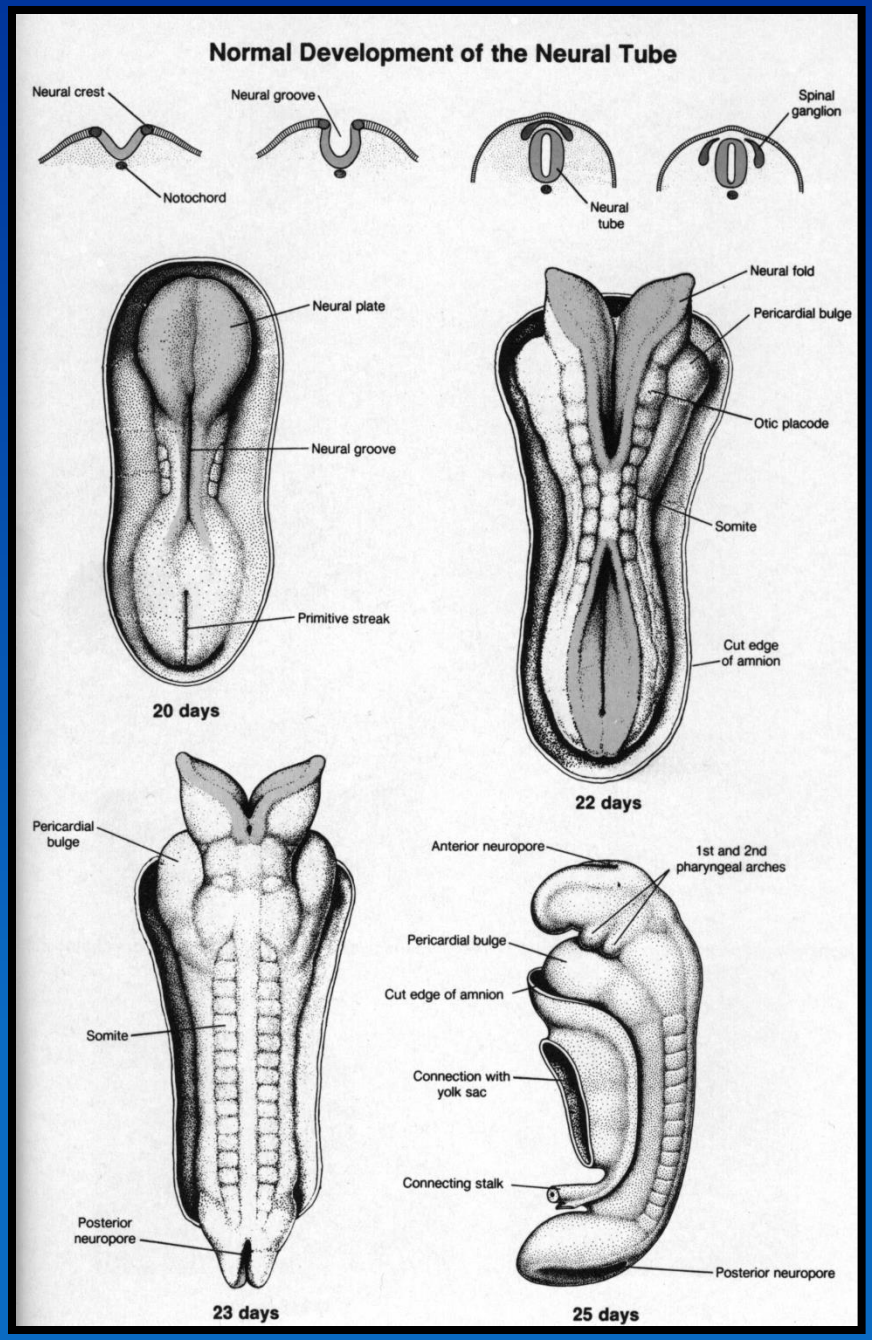
1) Cellulae ethmoidales
2) Sinus maxillaris
3) Chonca nasalis media
4) Chonca nasalis inferior
5) Septum nasi
6) Crista galli


241
W 2500 : L 650


23
W 2500 : L 650

# Neurokraniet

# Anencephali (gr. *an* uden, *kefalos* hjerne)

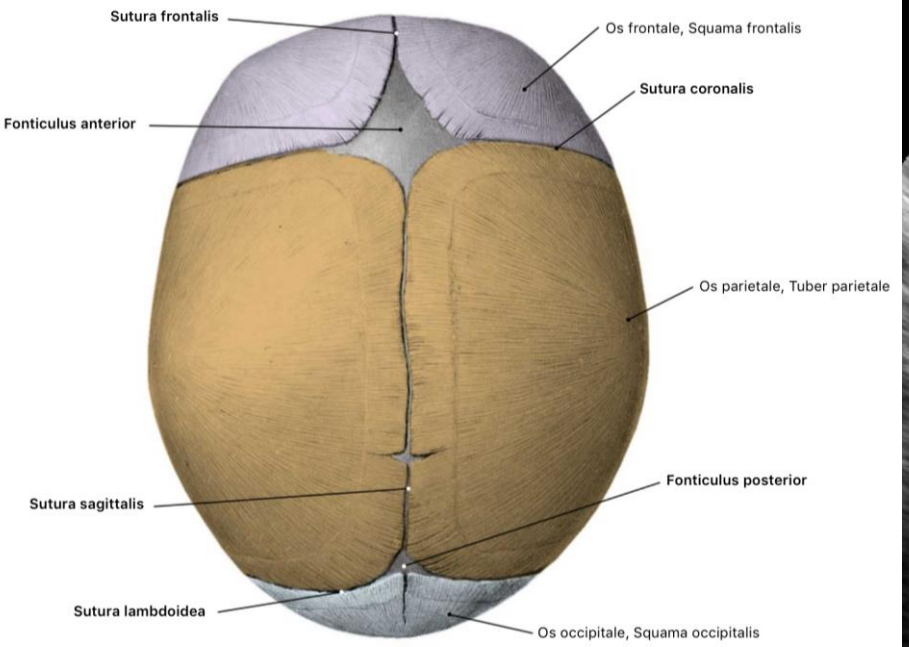



Udviklingen af neuralrøret frem til dannelsen af den anteriore og posteriore neuropore. Disse lukkes normalt hhv. 25. og 27. dag. Anencephali er kendetegnet ved at den cephale ende af neuralrøret ikke lukker.

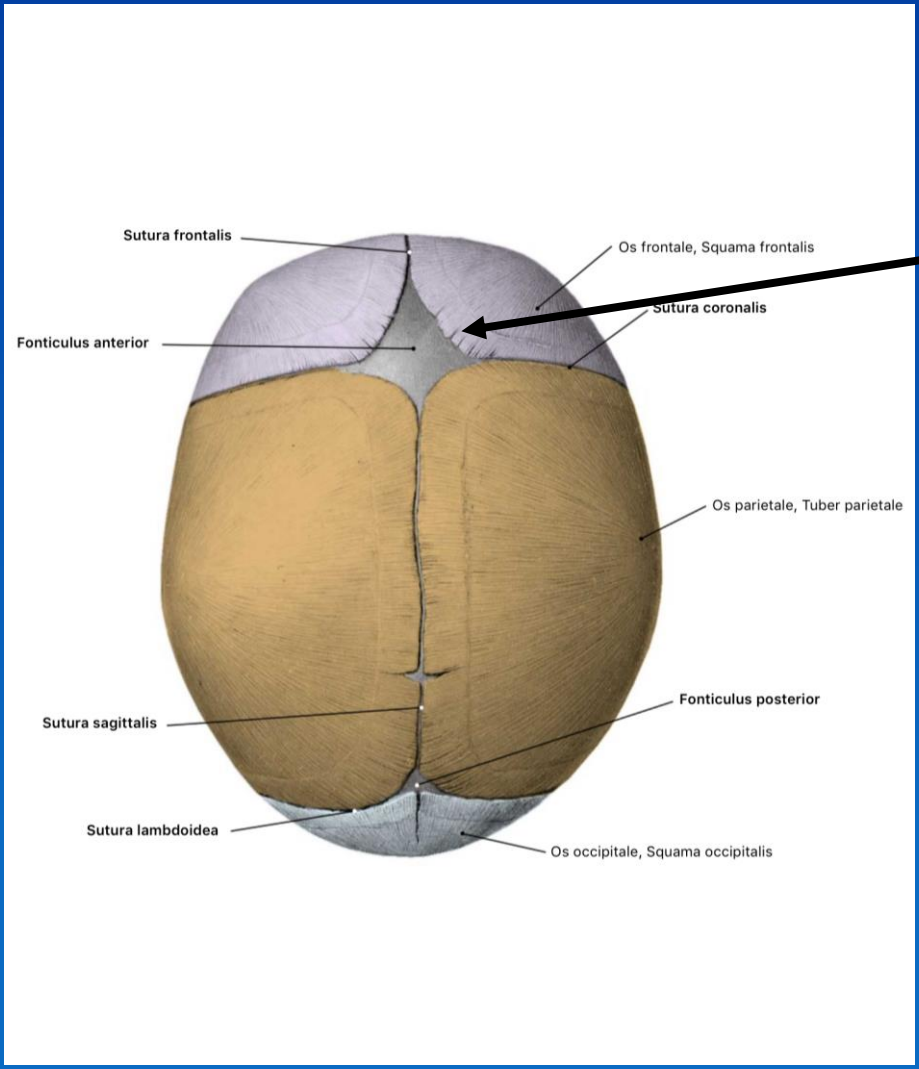
Neuralrørsdefekt:

Forøget mængde alfa-foetoprotein i amnionvæske og moderens blod

Indtagelse af folsyre tre måneder før ønsket graviditet nedsætter risikoen for neuralrørsdefekt betydeligt (75%).

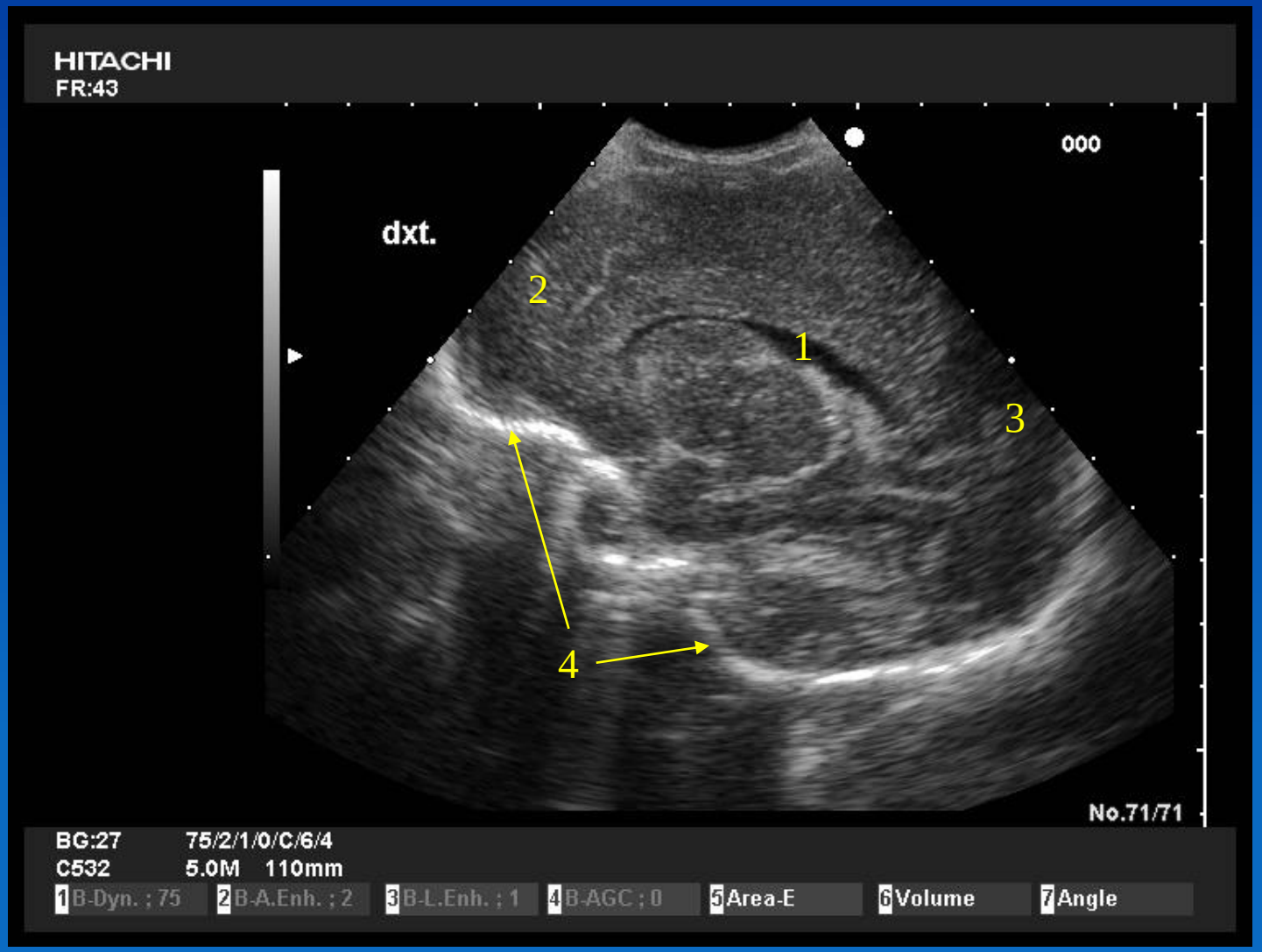

Sutura frontalis
Os frontale, Squama frontalis
Sutura coronalis
Fonticulus anterior
Os parietale, Tuber parietale
Fonticulus posterior
Sutura sagittalis
Sutura lambdoidea
Os occipitale, Squama occipitalis

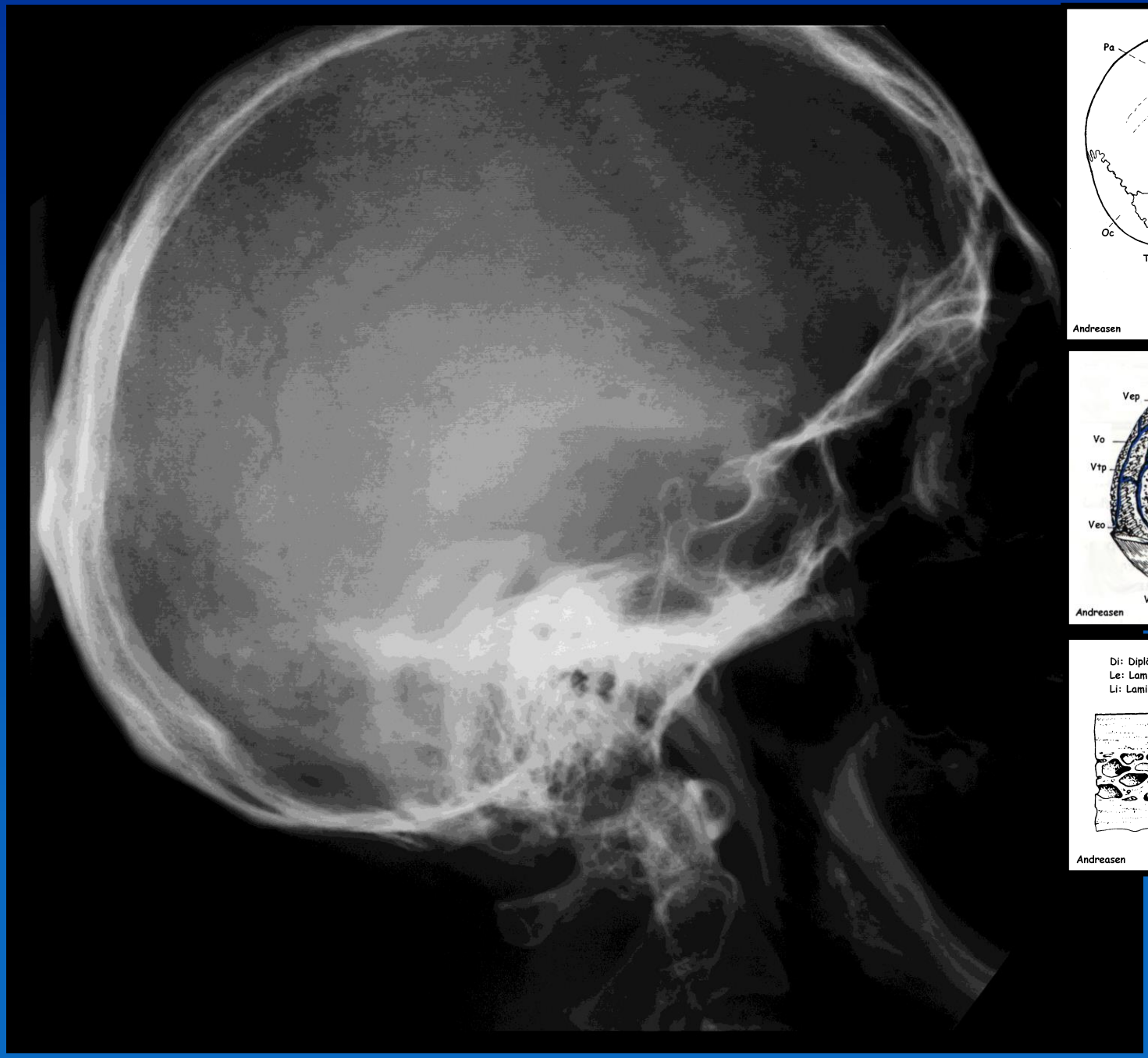

000
No.71/71
Enh. ; 1
4 B-AGC ; 0
5 Area-E
6 Volume
7 Angle

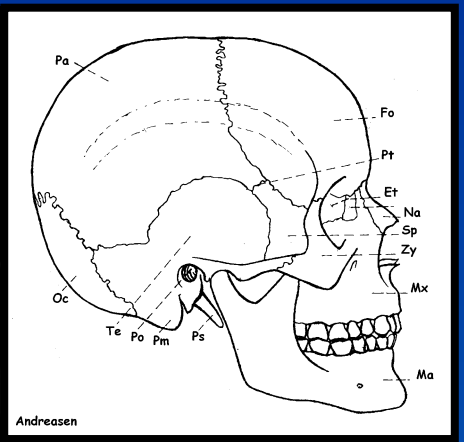



Fra fødslen og nogle måneder frem, kan fonticulus anterior benyttes som akustisk vindue for ultralydskanning af cerebrum. På et tidspunkt bliver fonticulus anterior under normale omstændigheder så lille, at indblikket bliver for dårligt, og ultralyd kan således ikke benyttes til diagnostik længere.

1) Ventriculus lateralis
2) Lobus frontalis
3) Lobus occipitalis
4) Basis cranii






Pa
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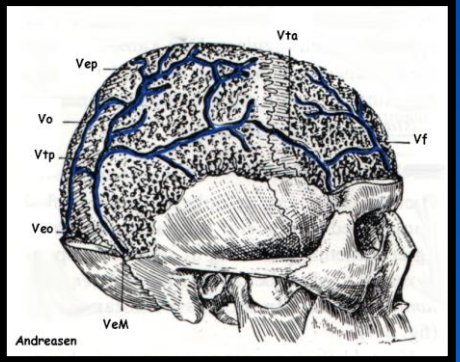
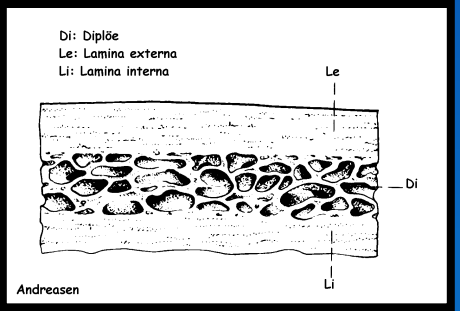
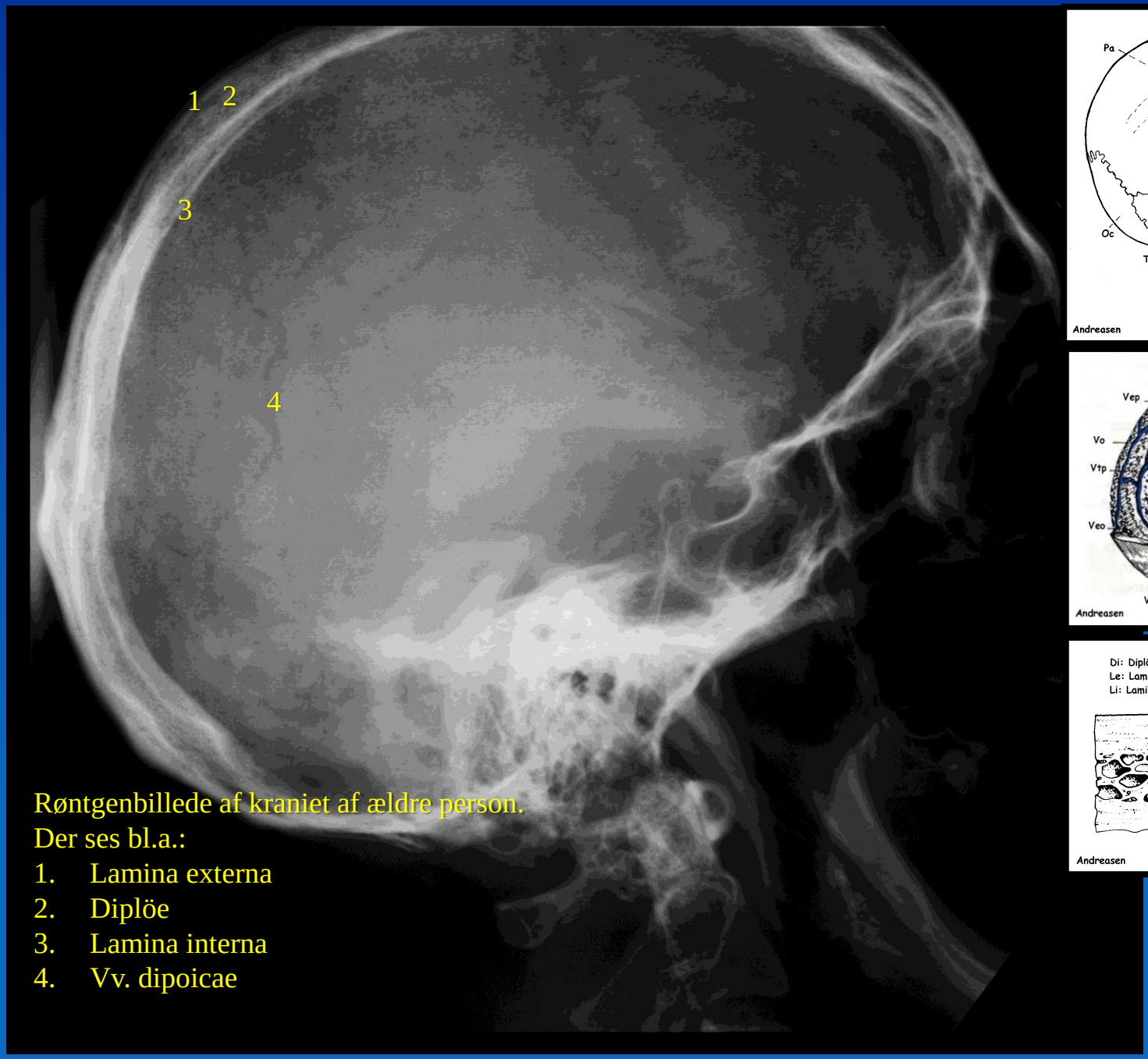
Ma
Andreasen

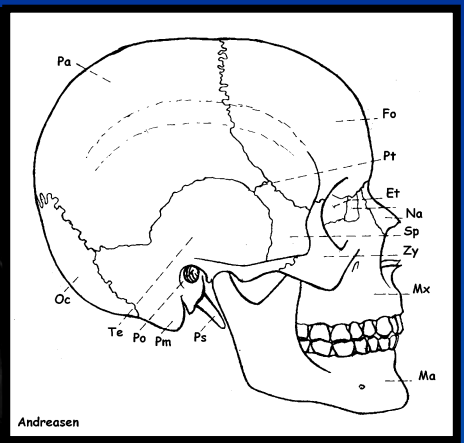

Vta
Vep
Vo
Vtp
Vf
Veo
VeM
Andreasen

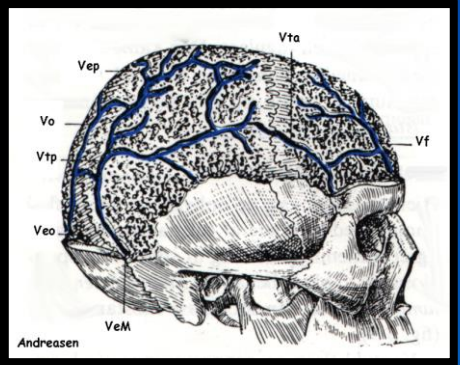

Di: Diplöe
Le: Lamina externa
Li: Lamina interna
Le
Di
Li
Andreasen

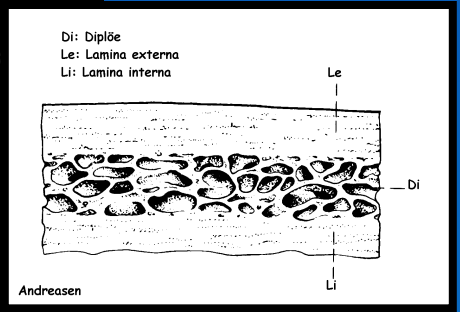



Røntgenbillede af kraniet af ældre person.
Der ses bl.a.:

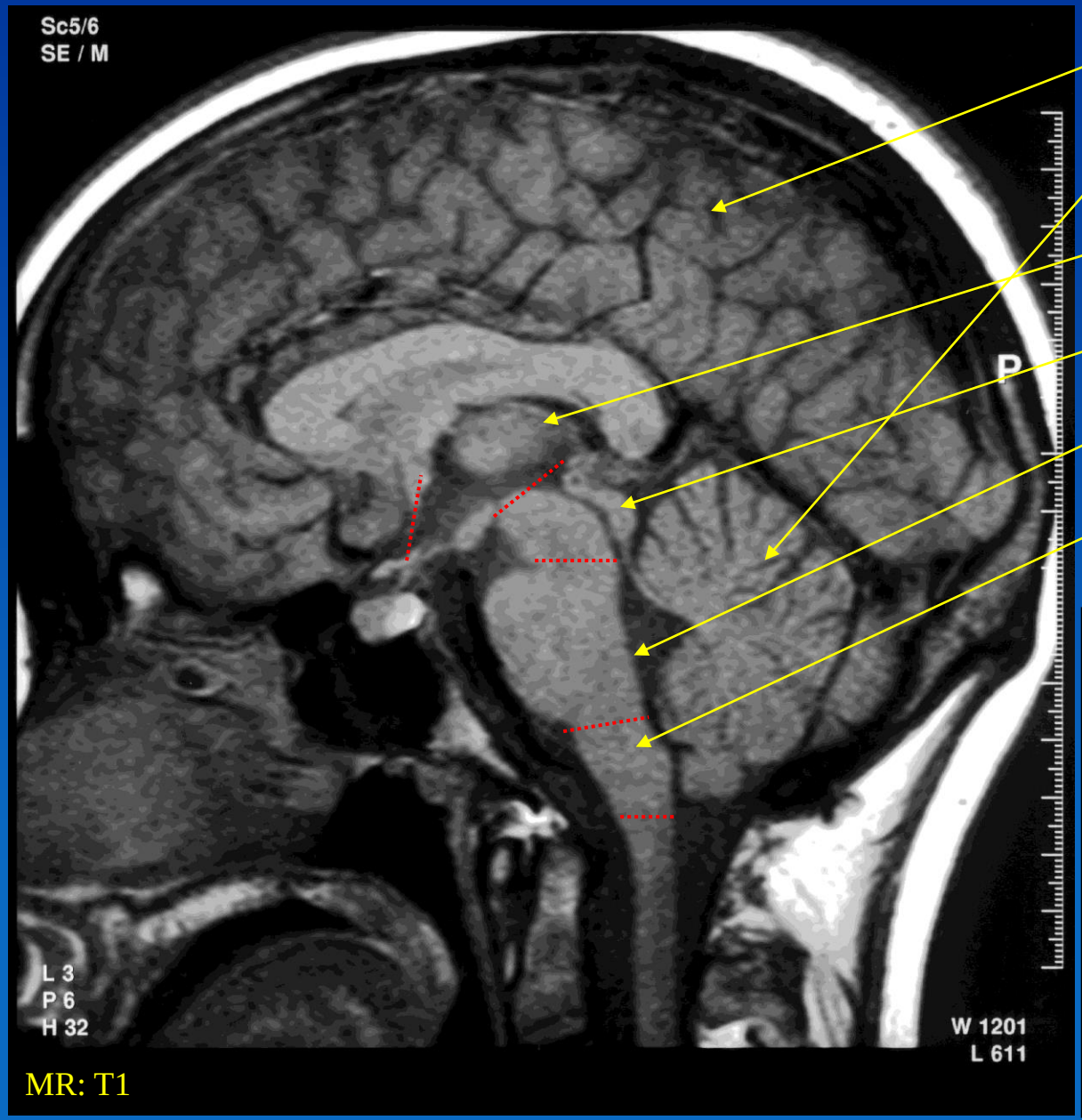
1. Lamina externa
2. Diplöe
3. Lamina interna
4. Vv. dipoicae



# Encephalon




MR: T1

Cerebrum

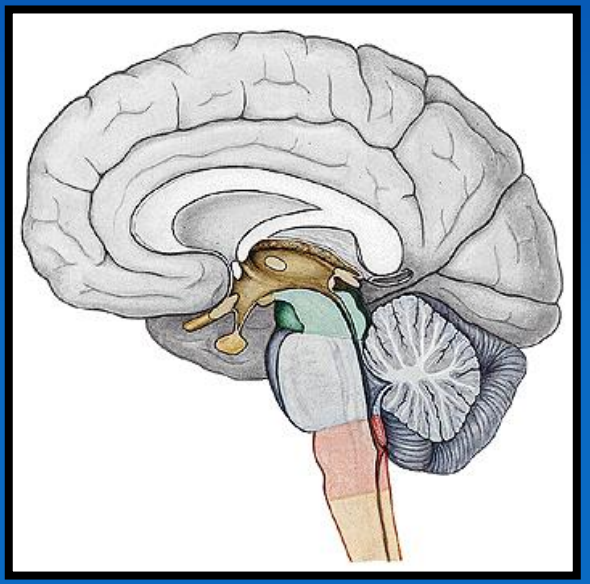
Cerebellum

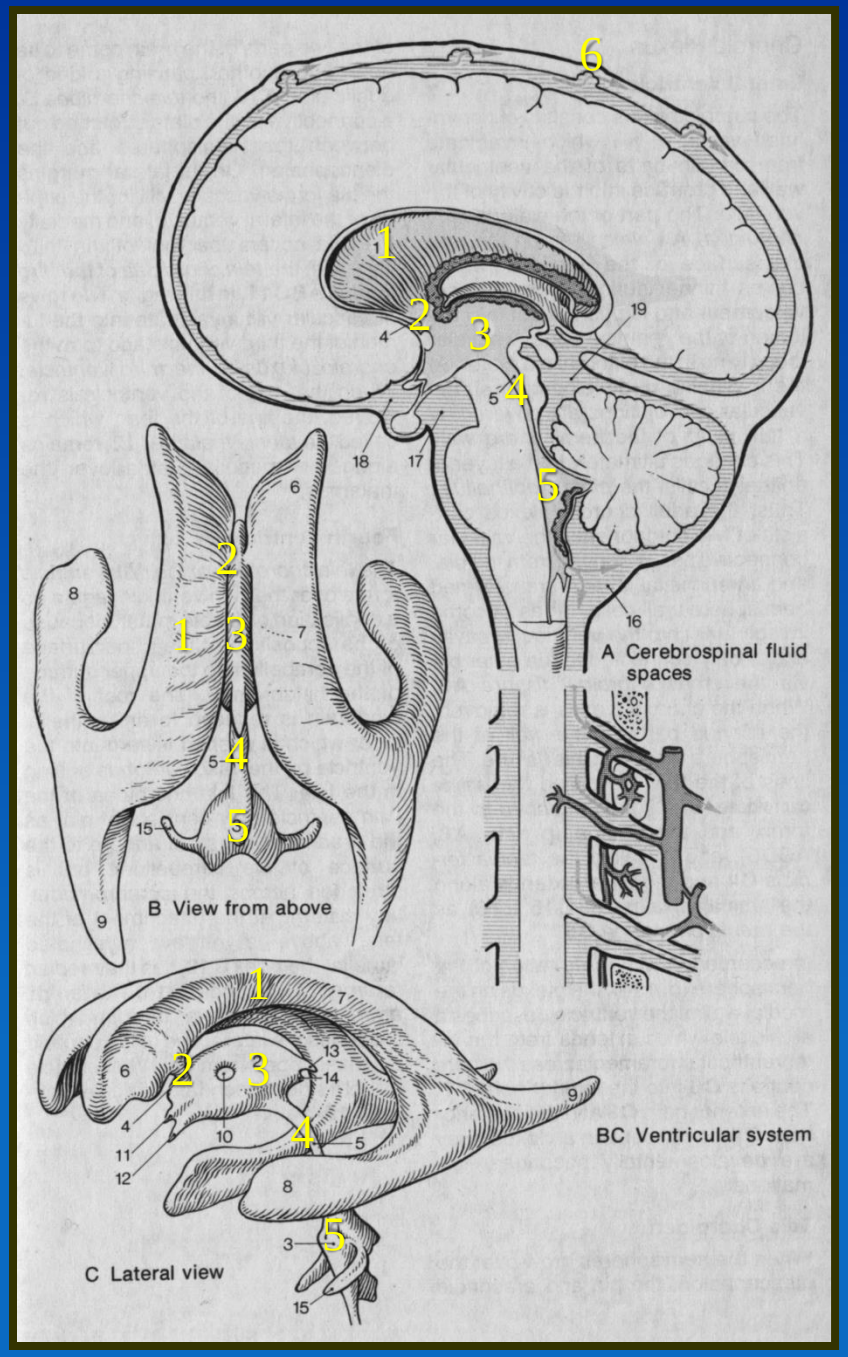
Diencephalon

Mesencephalon

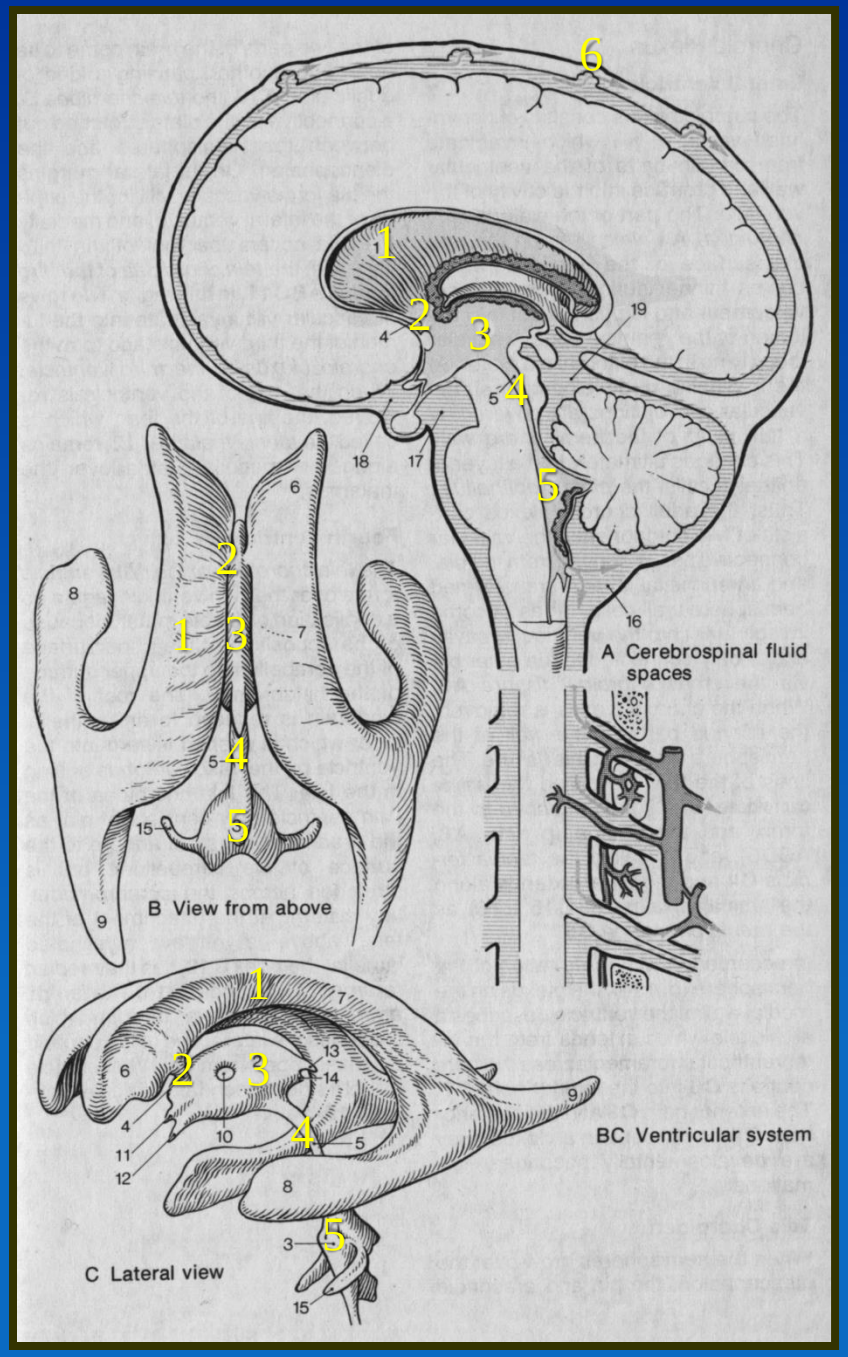
Pons

Medulla obl.




A Cerebrospinal fluid spaces
B View from above
BC Ventricular system
C Lateral view

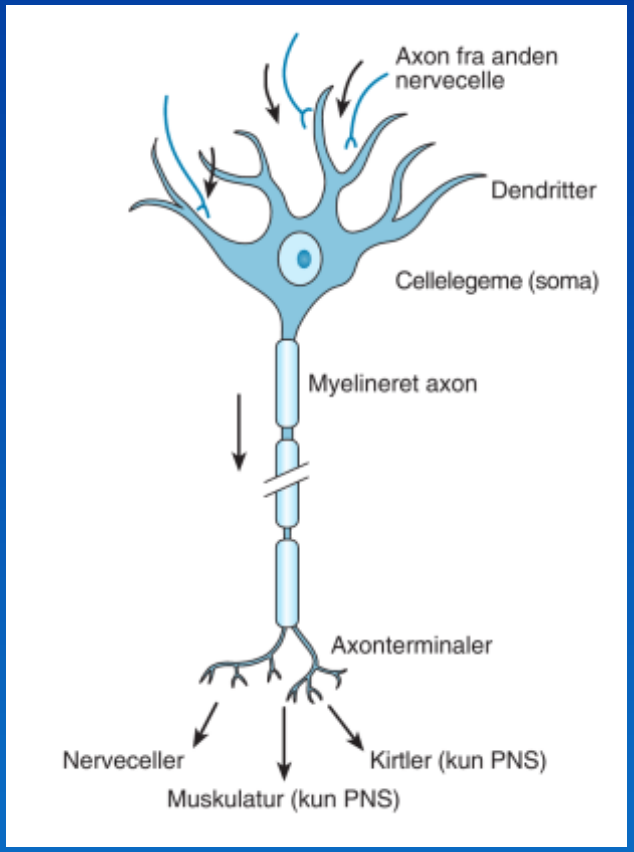
W. Kahle et al.

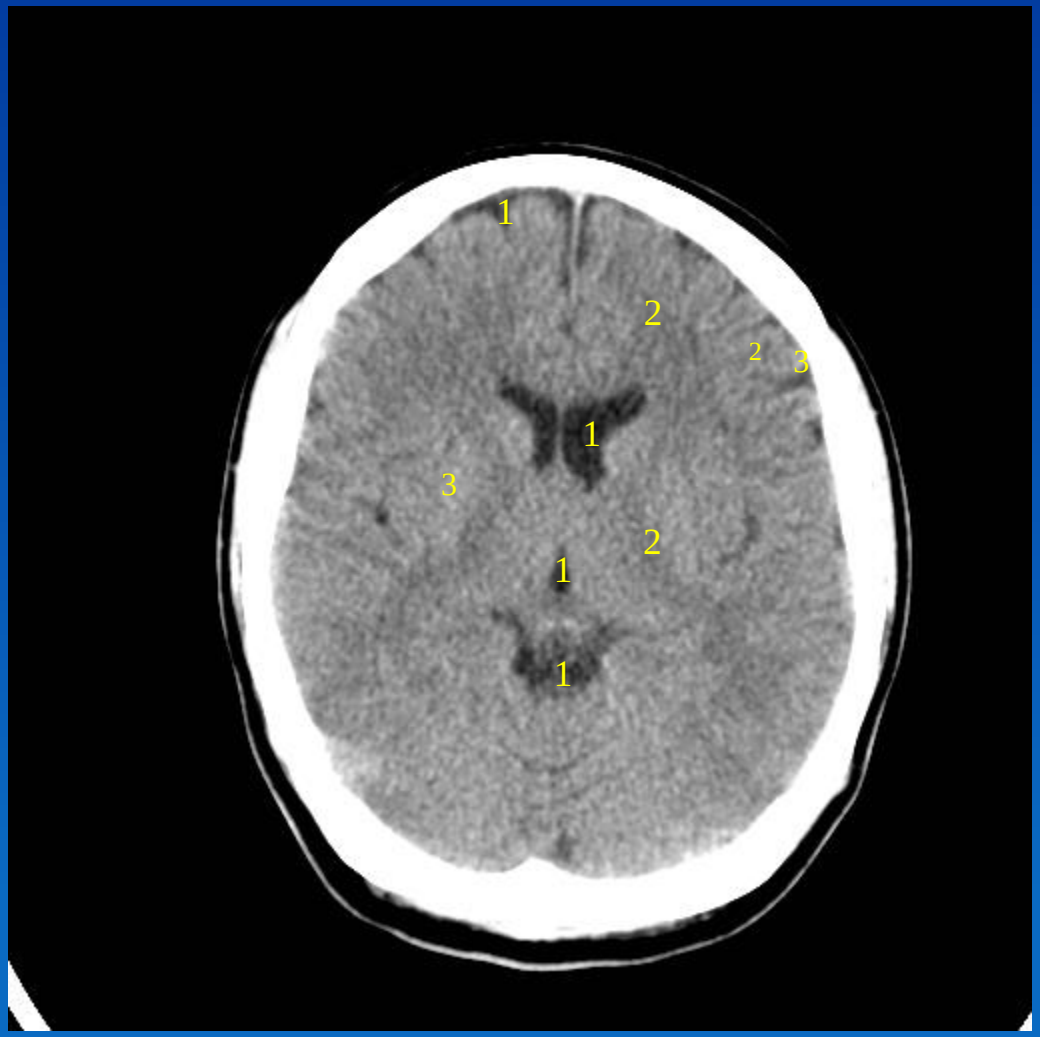



Ventrikelsystemet:

1) Ventriculus lateralis
2) Foramen interventriculare
3) Ventriculus tertius
4) Aquaductus cerebri
5) Ventriculus quartus
6) Granulatio arachnoidea

W. Kahle et al.




Enkelt snit fra CT skanning af cerebrum. De helt sorte områder (1) er cerebrospinalvæske. De mørk grå områder er den hvide substans (2) – samlinger af axoner – og de lys grå områder er den grå substans – samlinger af somaer (3).

0
12
12
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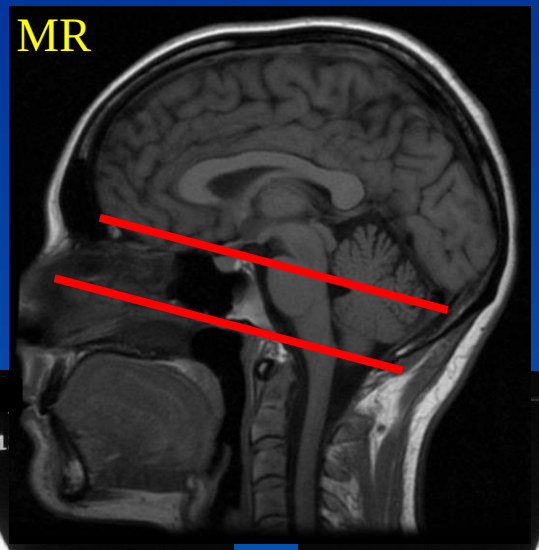
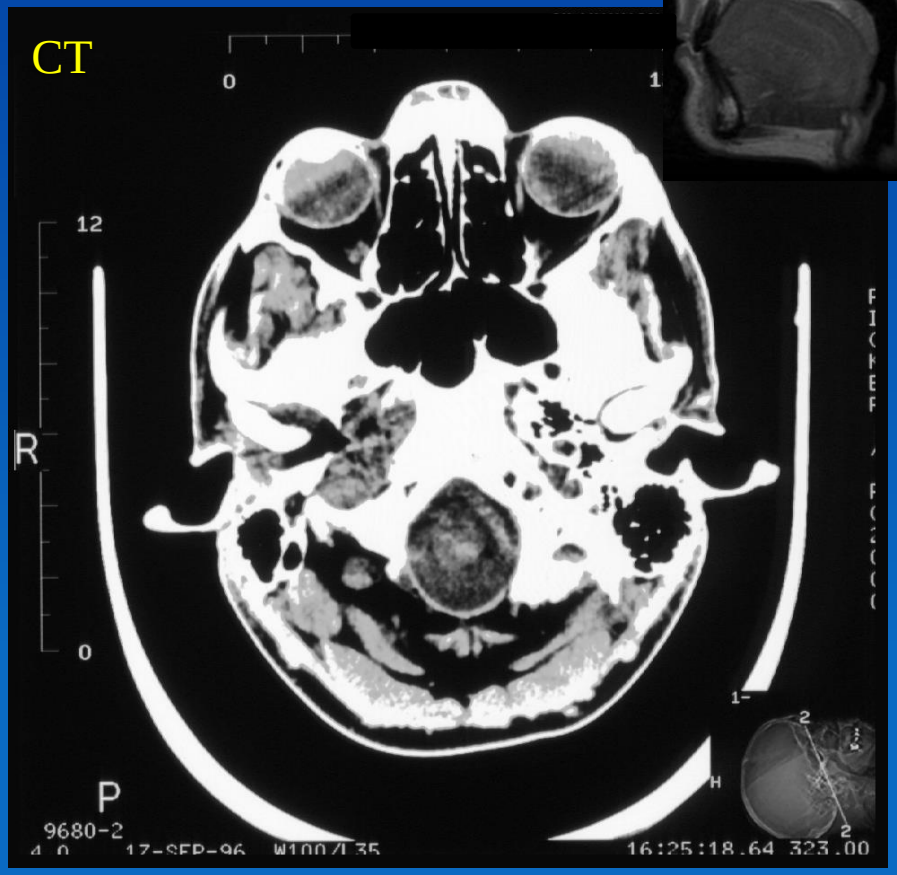
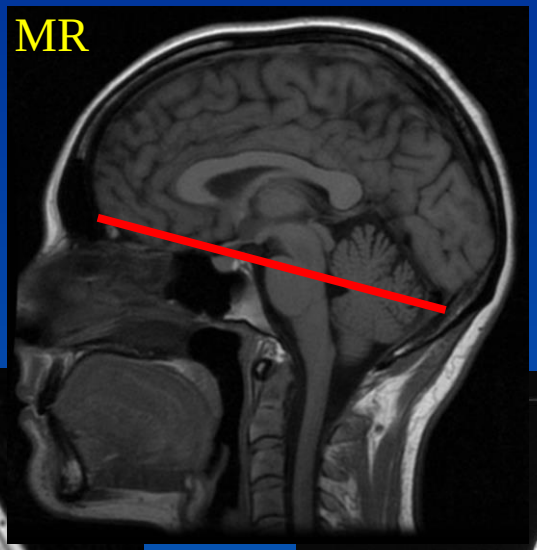
0
PICKER


MR


CT
0
12
R
0
P
9680-2
17-SEP-96 W100/L35
16:25:18.64 323.00


INSTAVIEW
12
R
0
P
9680-6
17-SEP-96 W100/L35
16:25:42.58 307.06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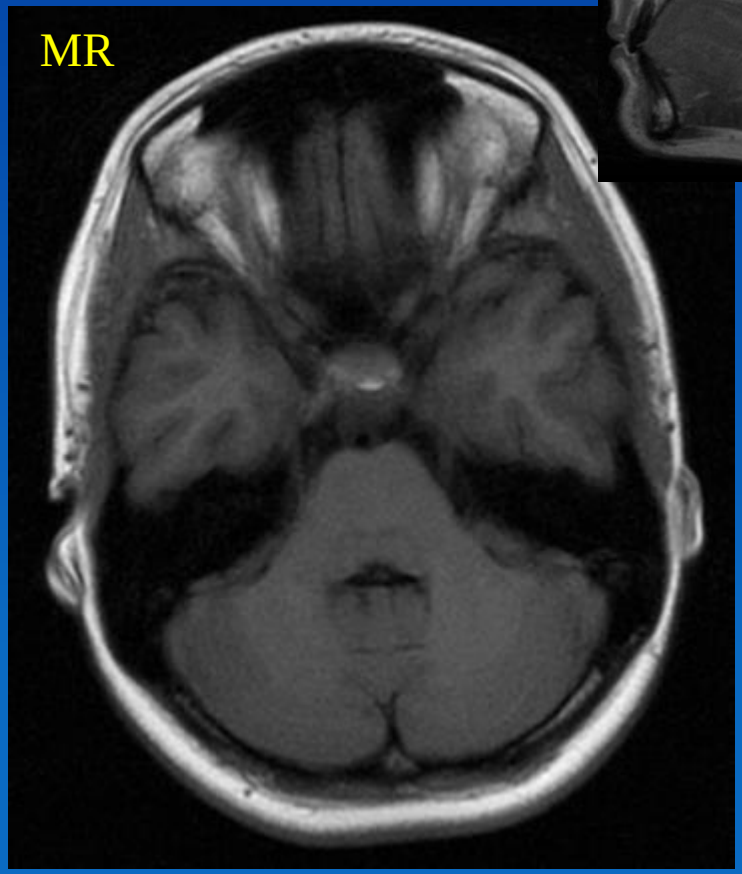
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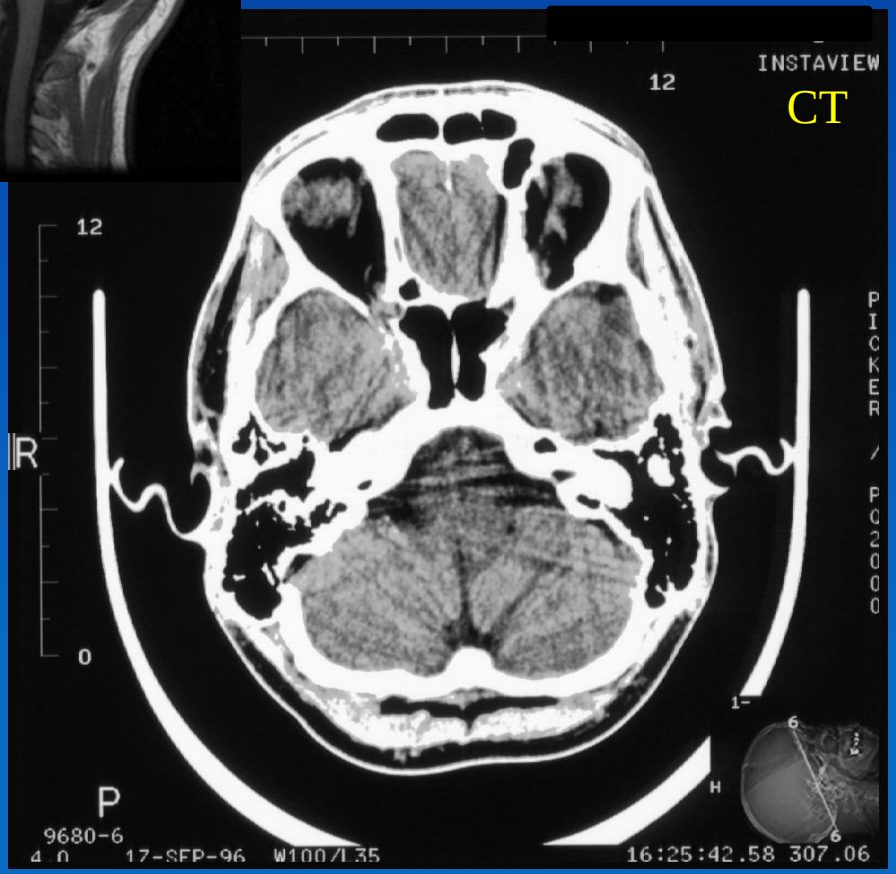
INSTAVIEW
12
CT
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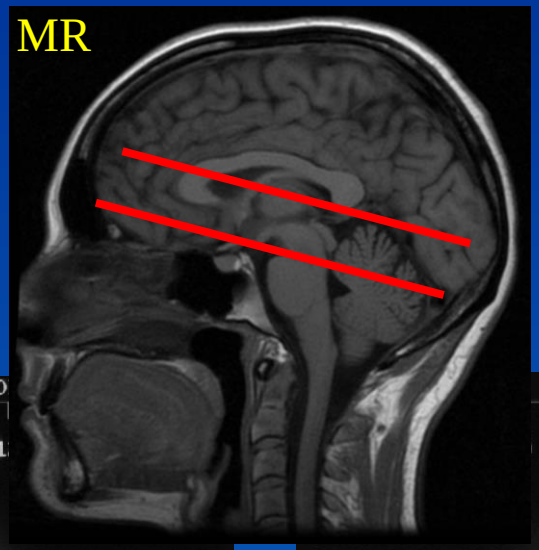
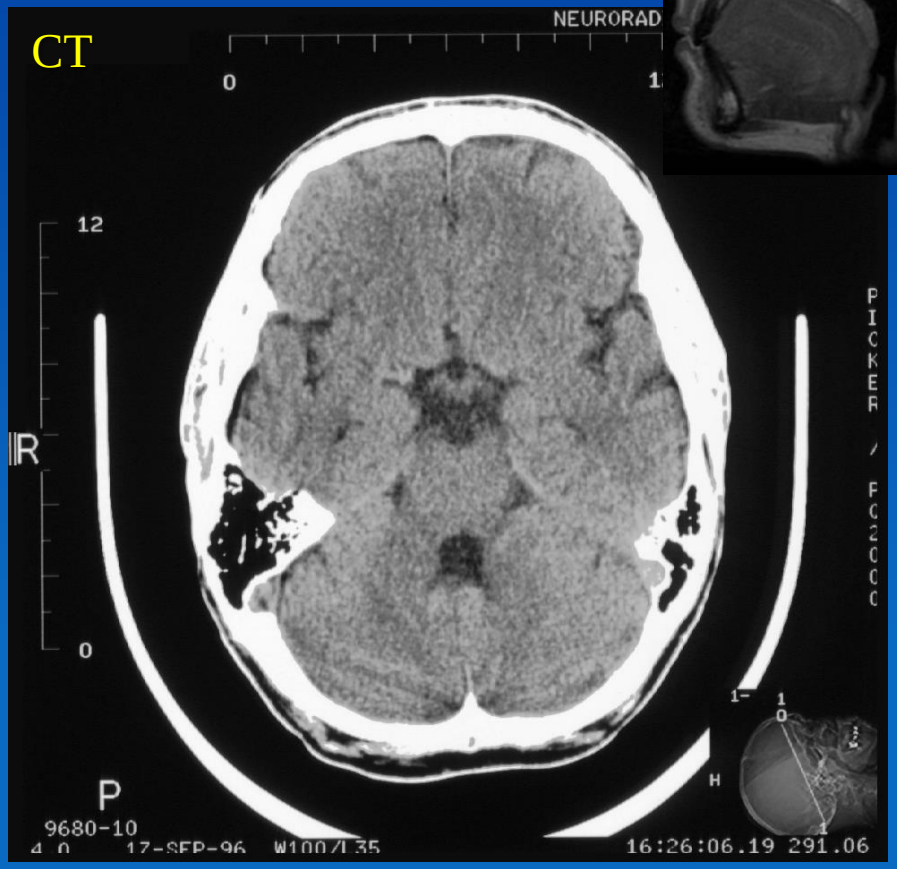
0
PICKER / PQ2000
P
9680-6
17-SEP-96
W100/L35
16:25:42.58 307.06


MR


CT
NEURORAD
0
12
IR
0
P
PICKER
9680-10
17-SEP-96
16:26:06.19 291.06


INSTAVIEW
CT
12
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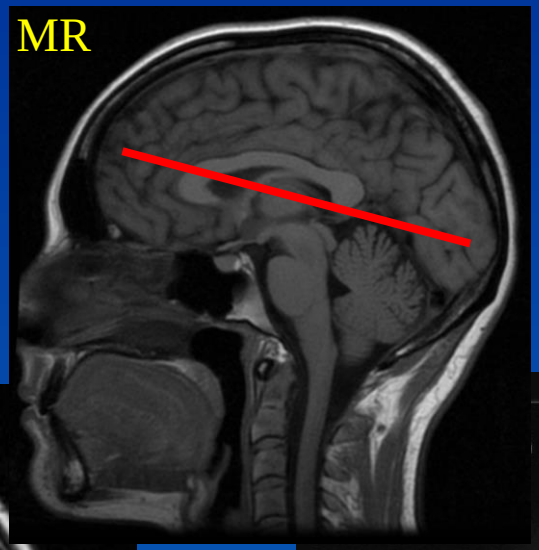
P
PICKER
9680-12
17-SEP-96
16:26:17.89 283.06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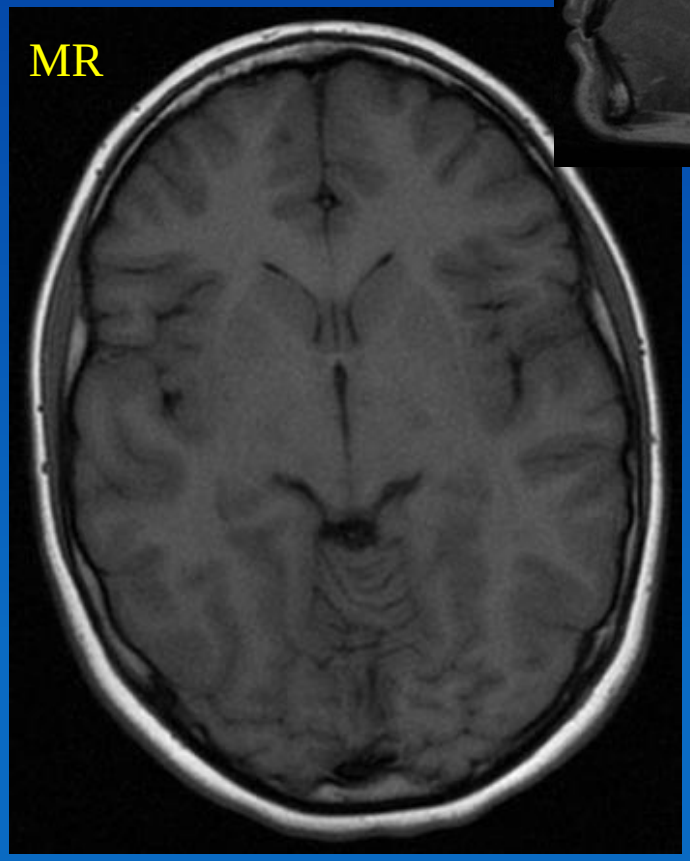
MR


INSTAVIEW
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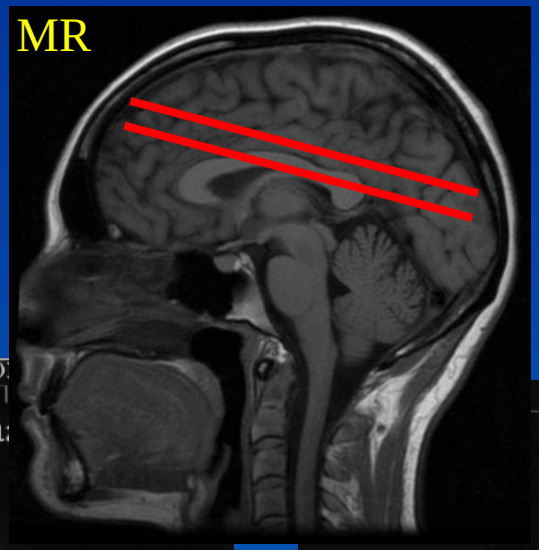
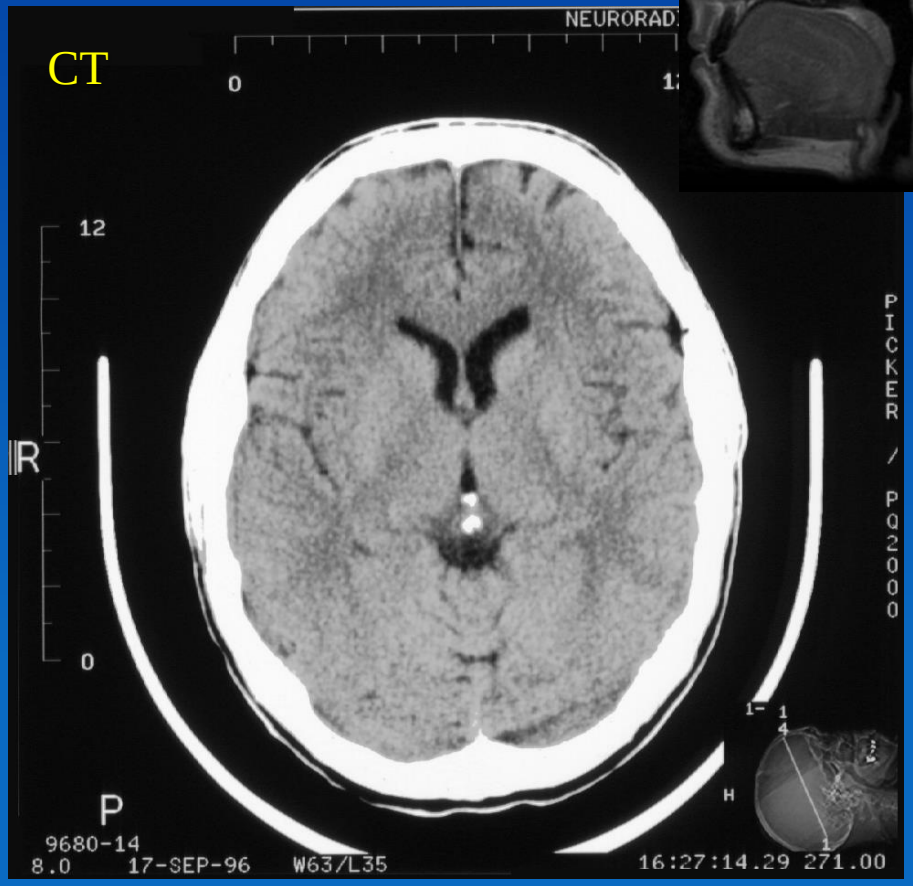
9680-12
16:26:17.89 283.06


MR


CT
NEURORAD
0
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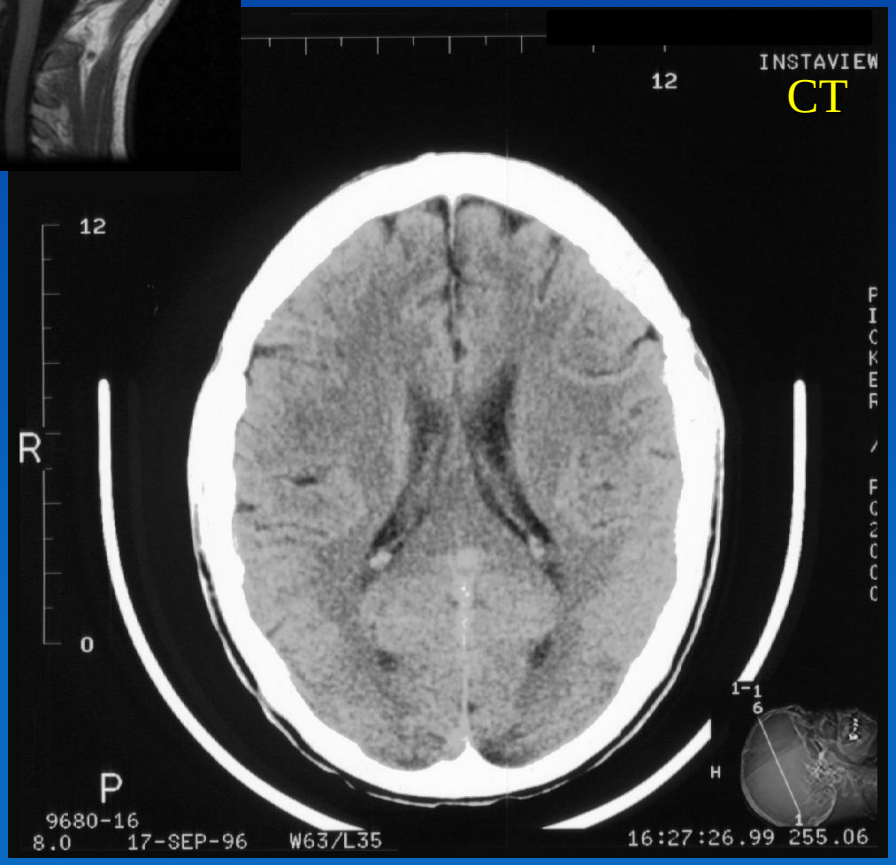
PICKER / PQ2000
9680-14
8.0 17-SEP-96 W63/L35
16:27:14.29 271.00


INSTAVIEW
CT
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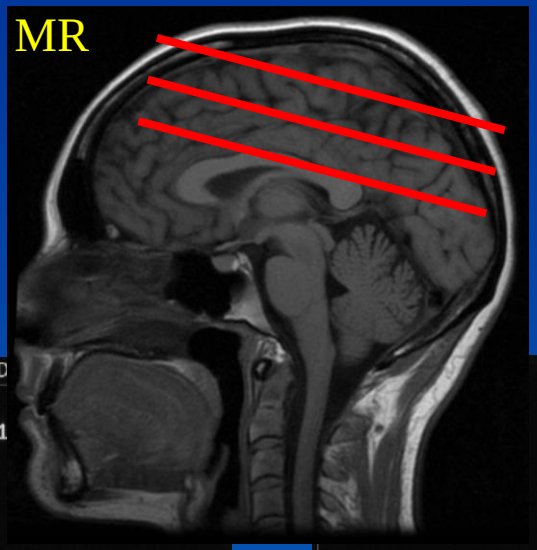
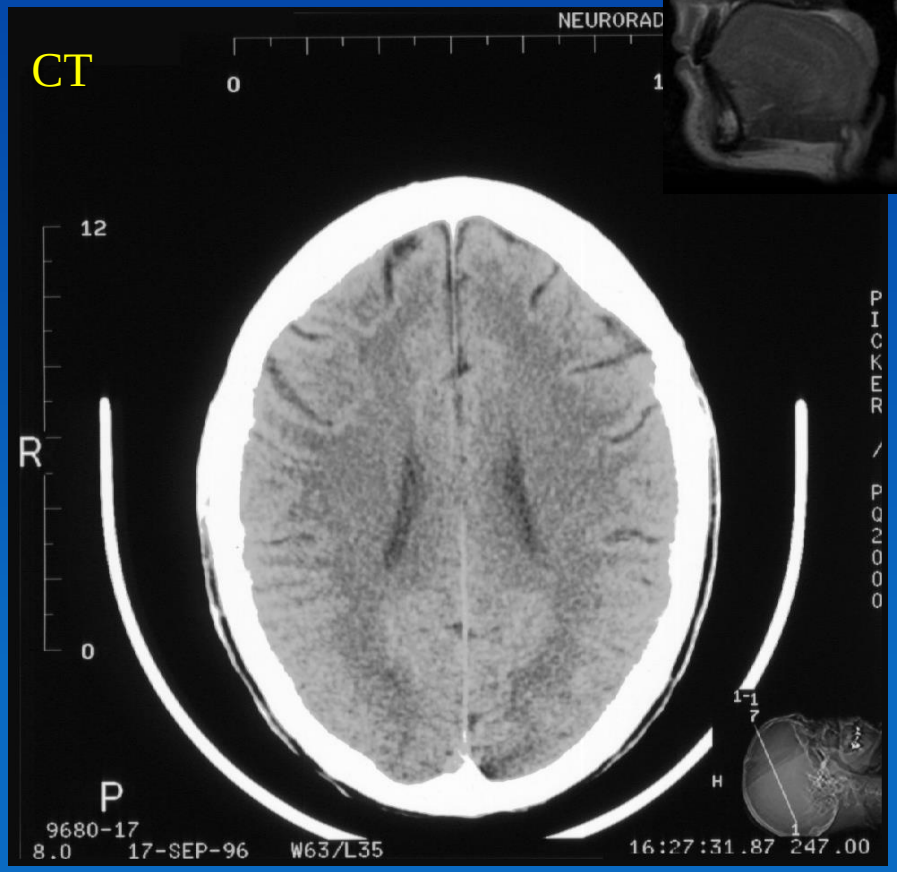
PICKER / PQ2000
9680-16
8.0 17-SEP-96 W63/L35
16:27:26.99 255.06


MR


CT
NEURORAD
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1
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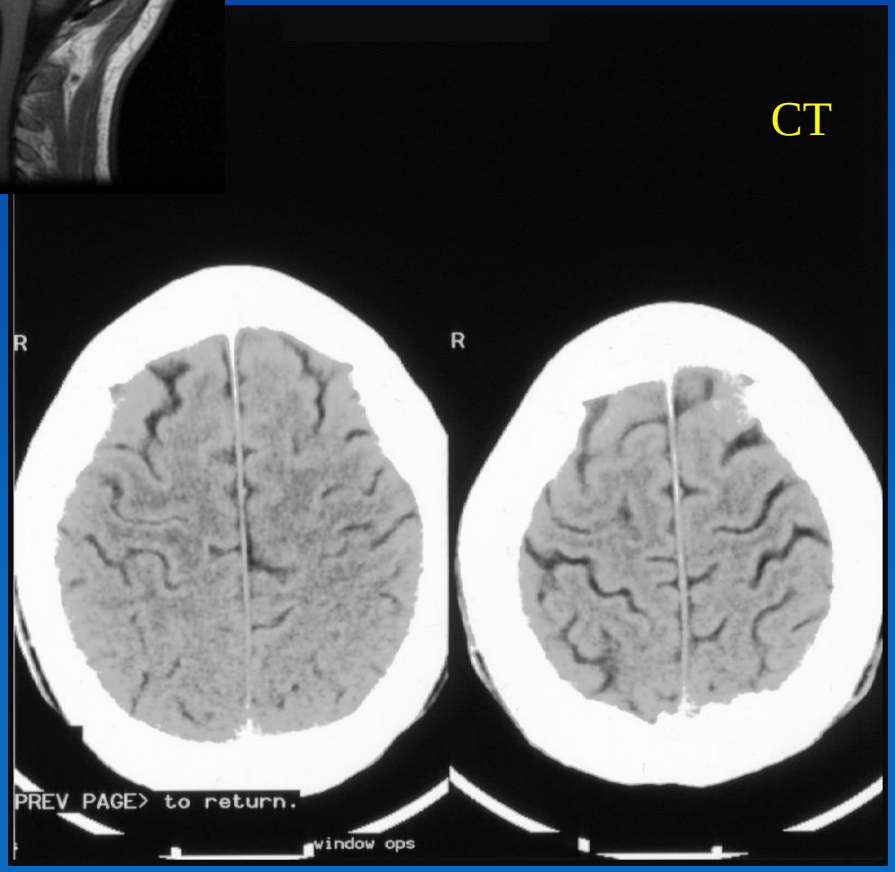
PICKER / PQ2000
9680-17
8.0 17-SEP-96 W63/L35
16:27:31.87 247.00

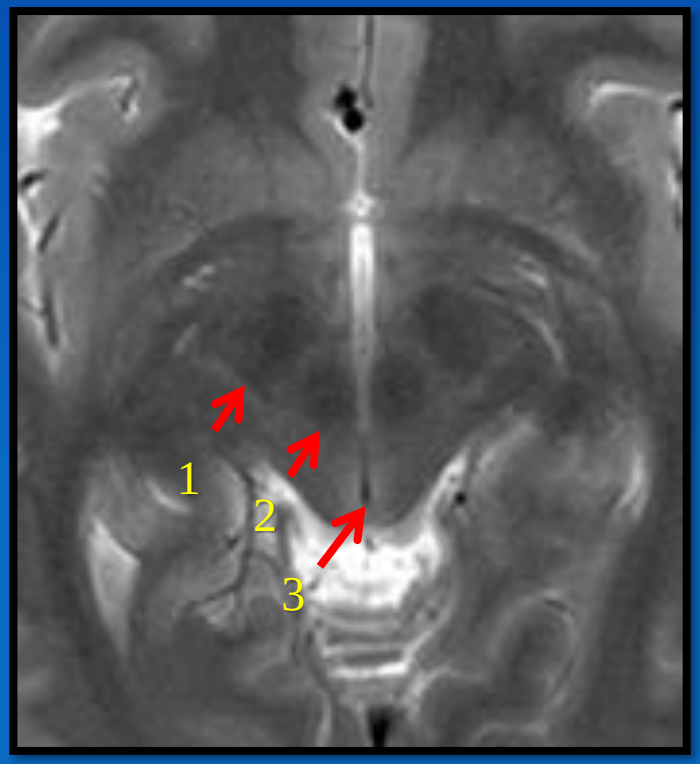

CT
R
R
PREV PAGE> to return.
window ops

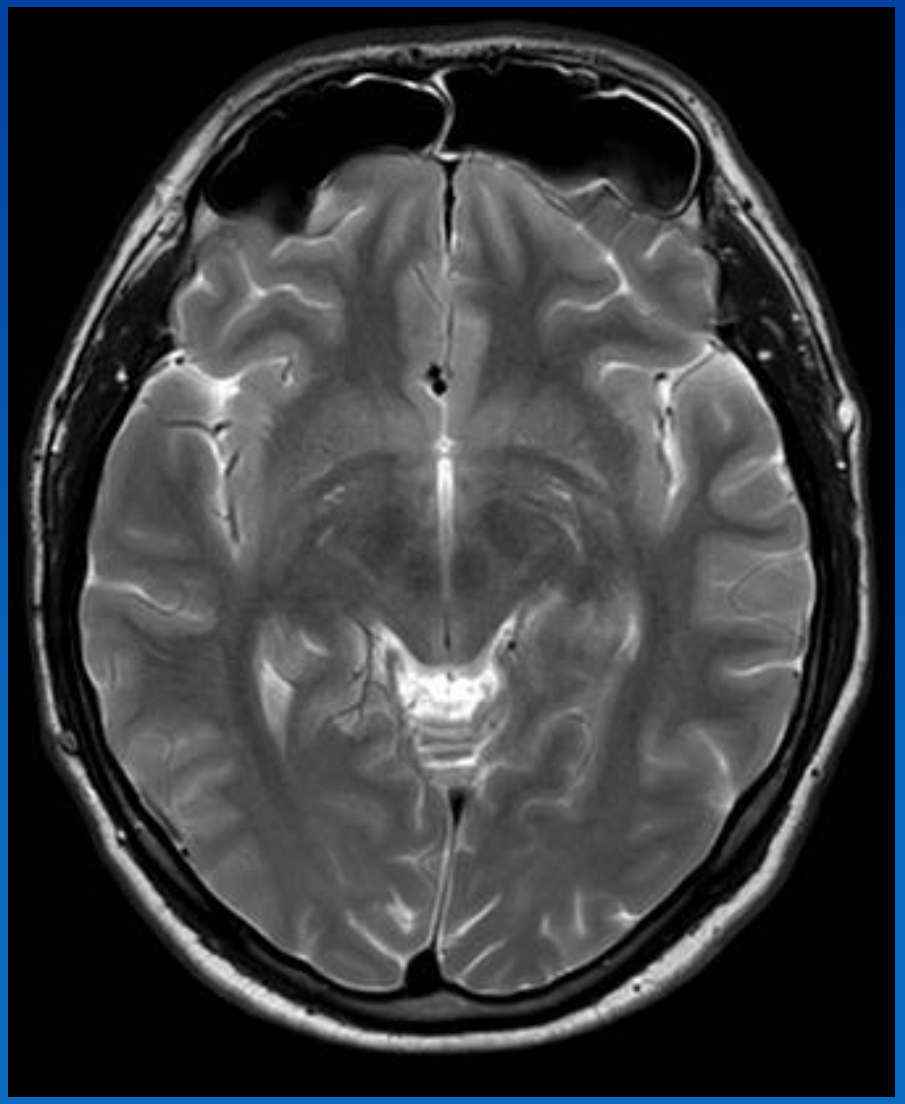
# Mesencephalon

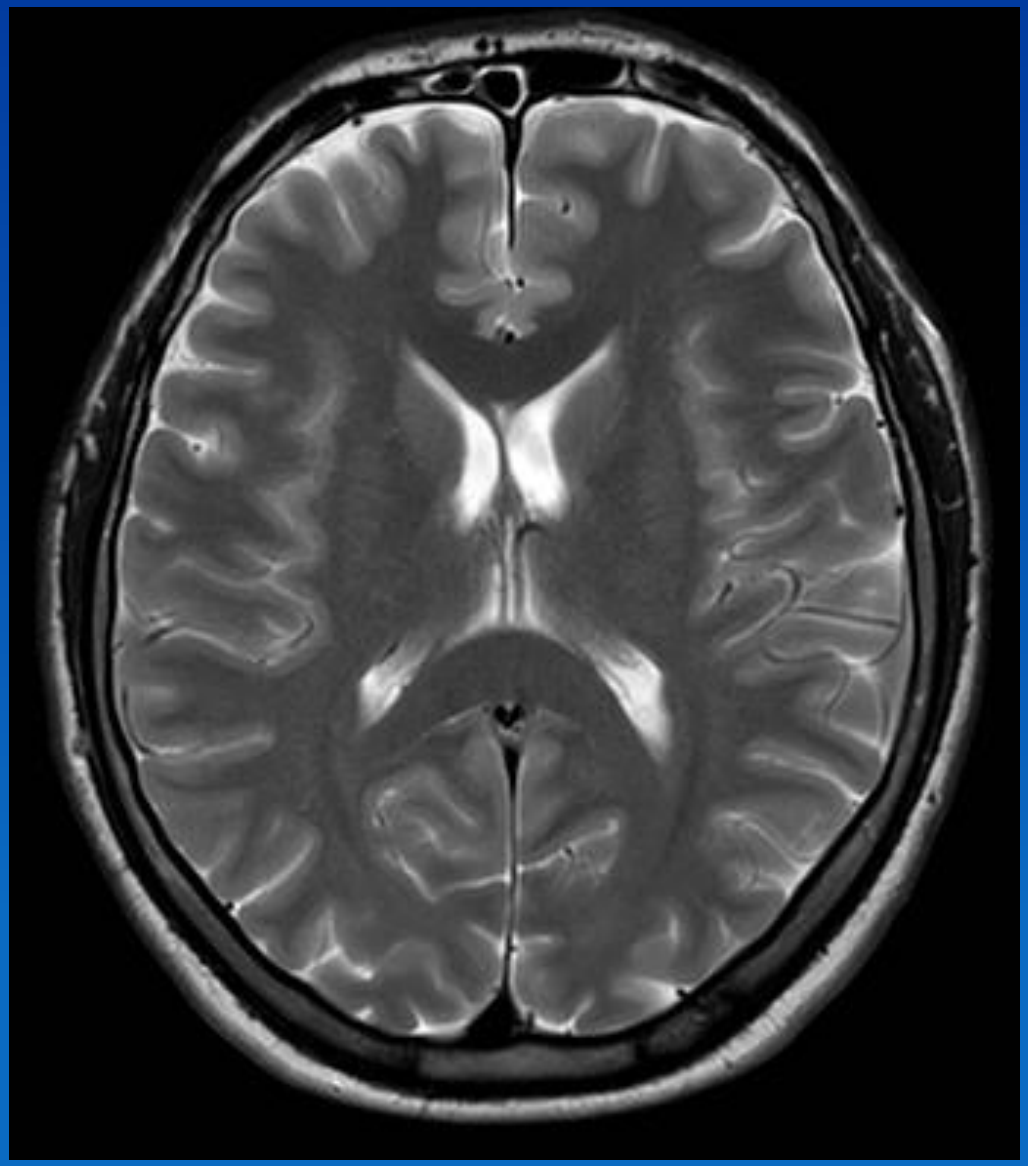
Substantia nigra (Melanin) 1

Nucleus ruber (Jern) 2

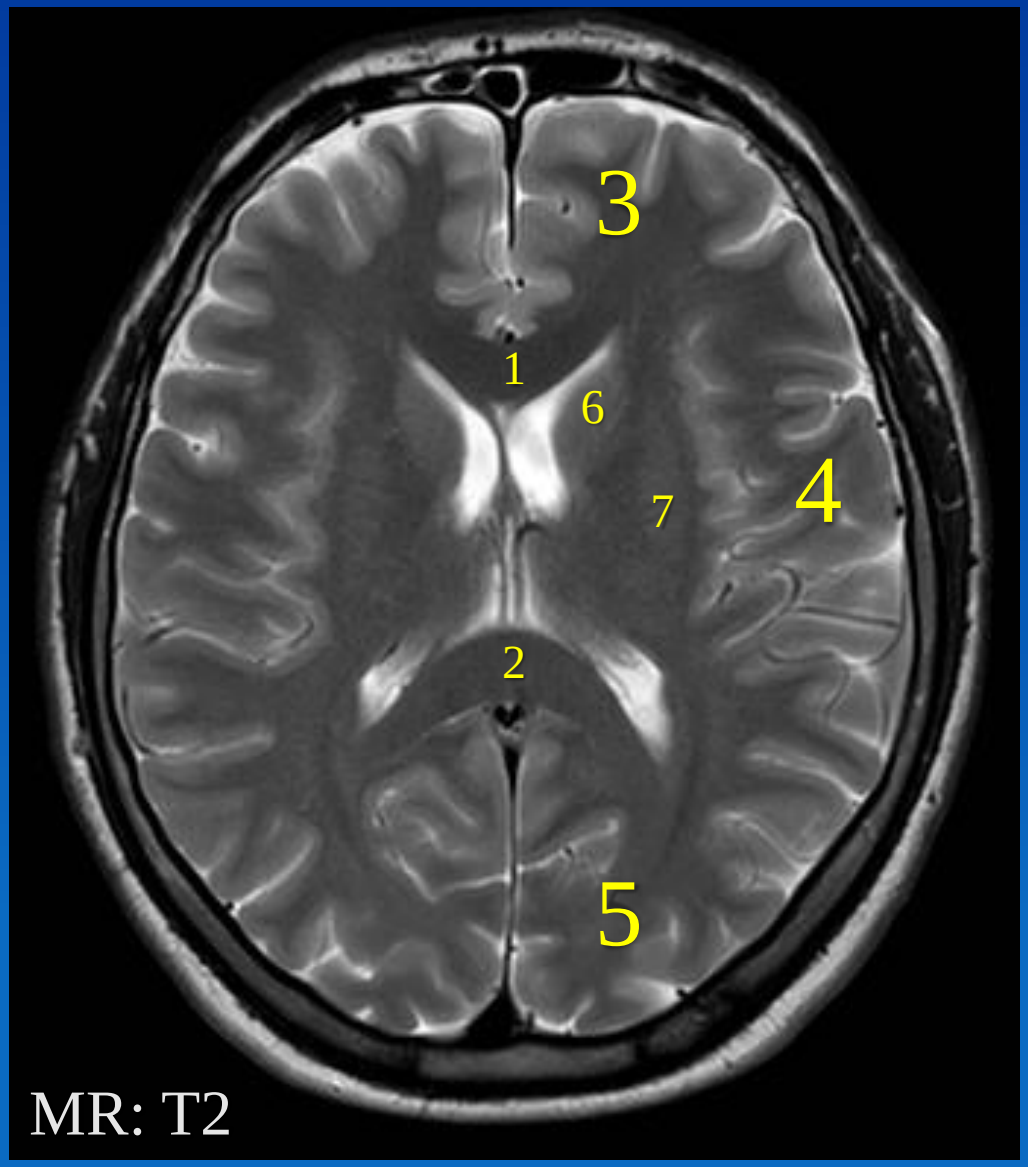
Aquaductus cerebri 3



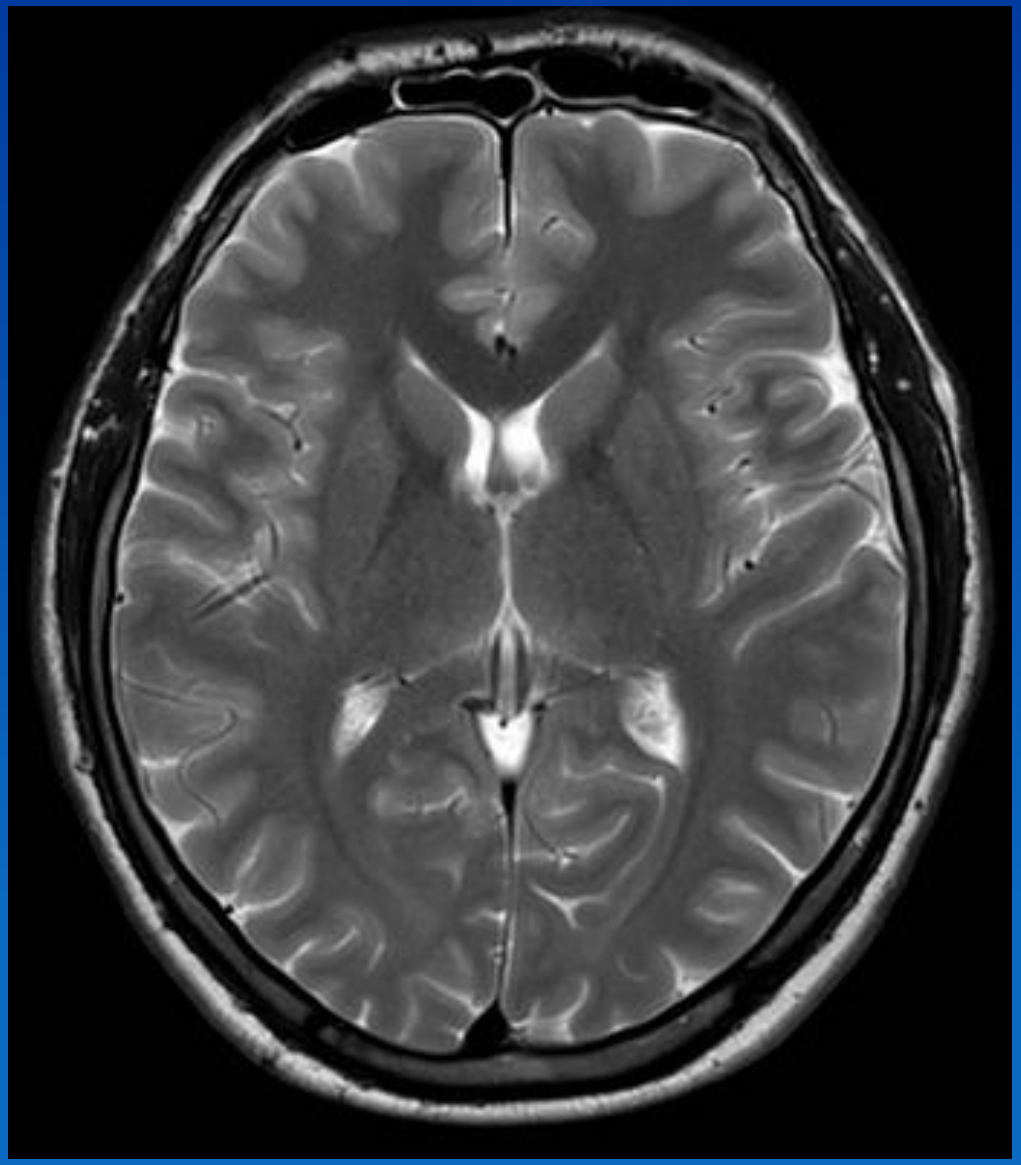





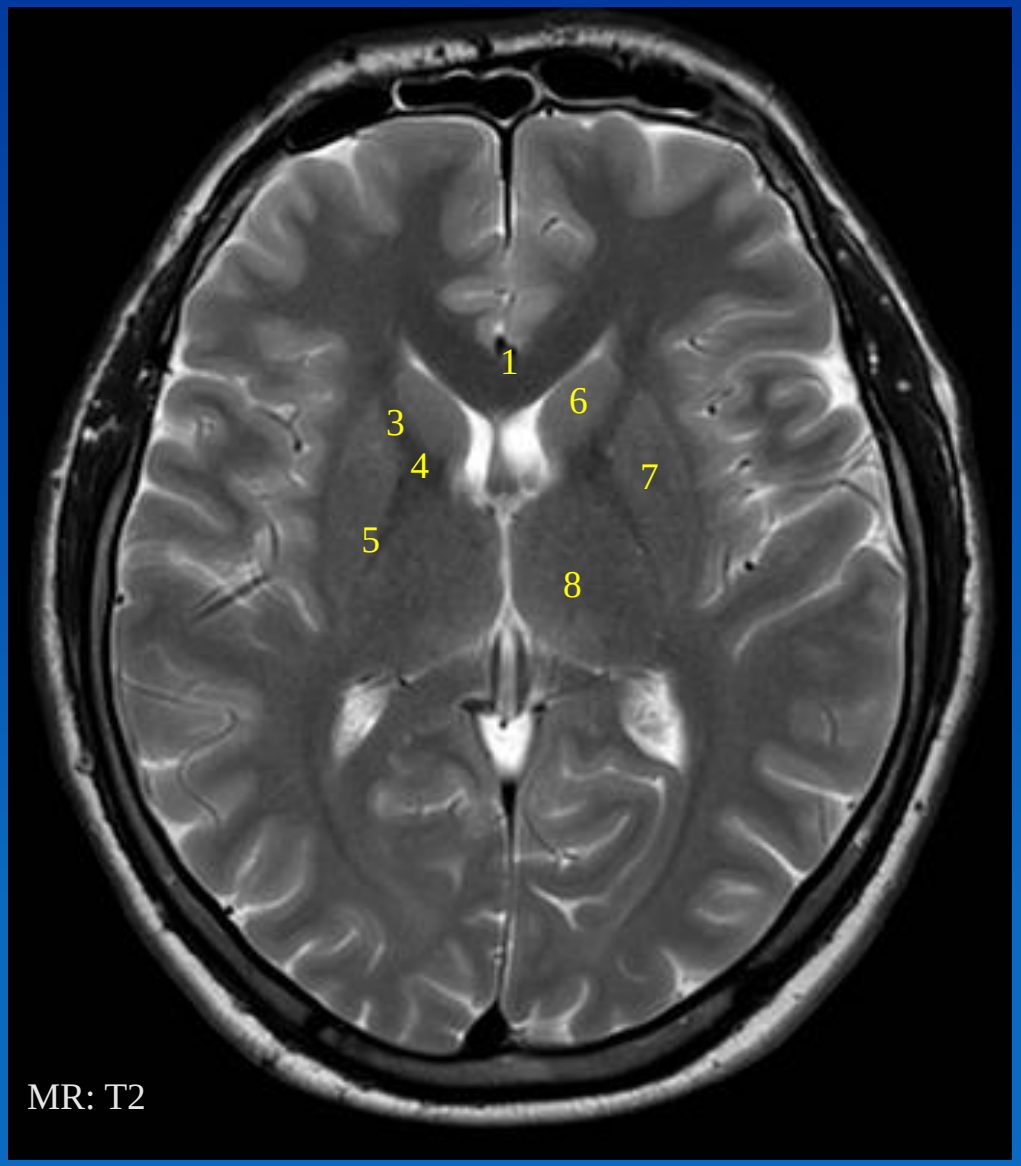
1) Genu corporis callosi
2) Splenium corporis callosi
3) Lobus frontalis
4) Lobus parietalis
5) Lobus occipitalis
6) Caput nuclei caudati
7) Putamen




1) Genu corporis callosi
2) Splenium corporis callosi
3) Lobus frontalis
4) Lobus parietalis
5) Lobus occipitalis
6) Caput nuclei caudati
7) Putamen

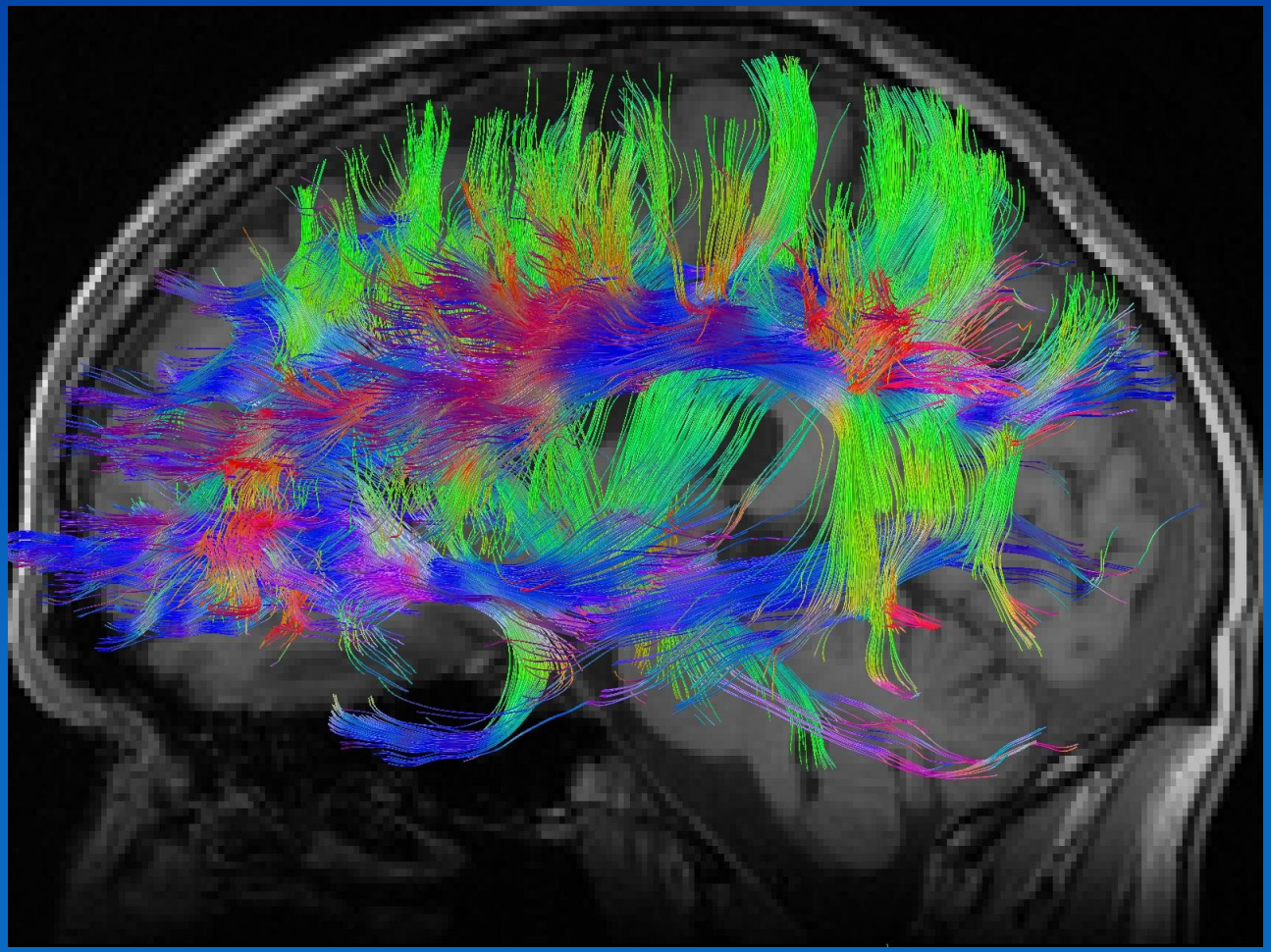


1) Genu corporis callosi
2) Capsula interna:
3) Crus anterius
4) Genu
5) Crus posterius
6) Caput nuclei caudati
7) Nucleus lentiforme
8) Thalamus




1) Genu corporis callosi
2) Capsula interna:
3) Crus anterius
4) Genu
5) Crus posterius
6) Caput nuclei caudati
7) Nucleus lentiforme
8) Thalamus

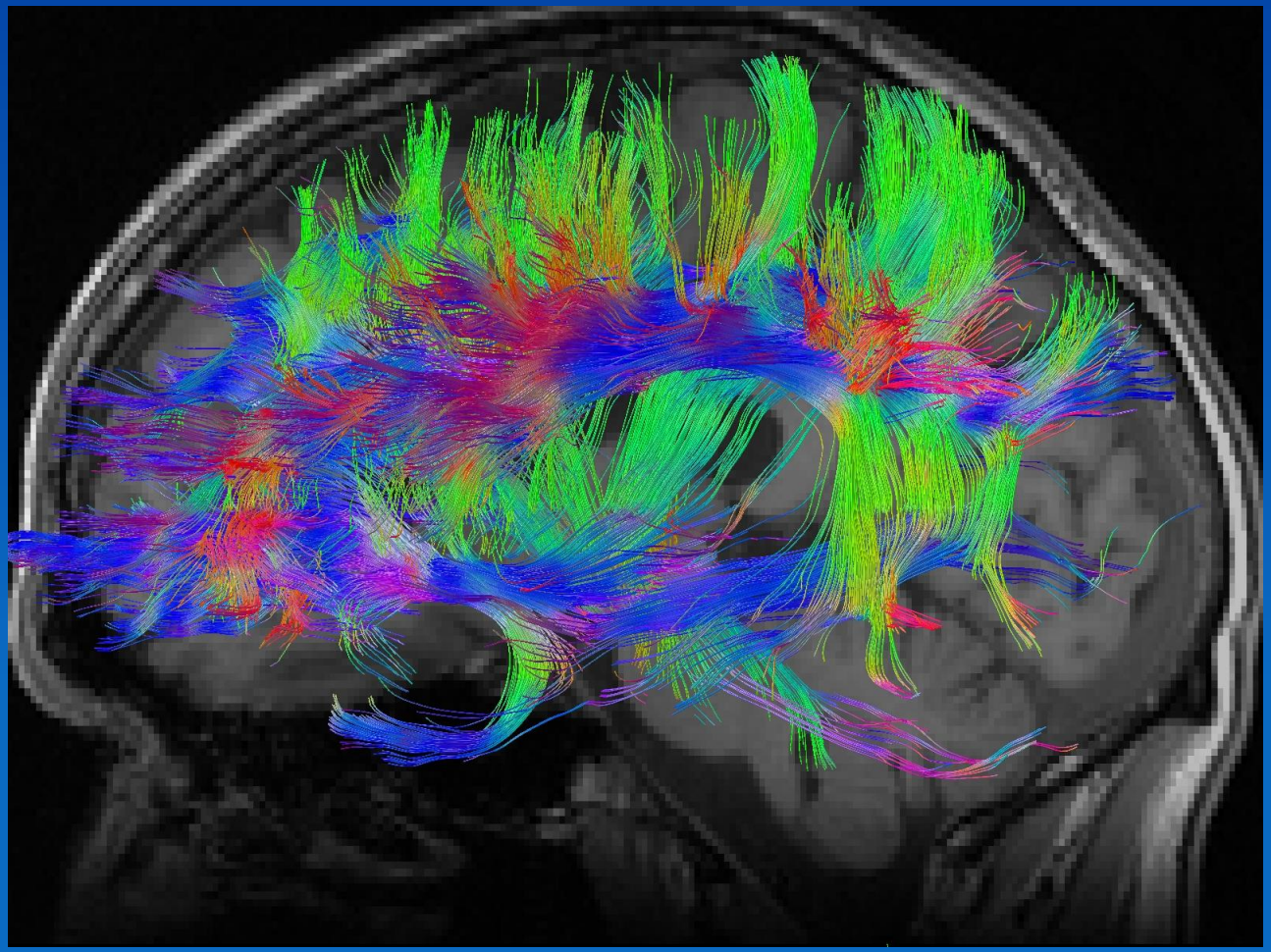
# MR: DTI fibertracking



Venligst udlånt af
læge
Rikke Beese Dalby

Rikke Beese Dalby: Kan man se depression I hjernen?

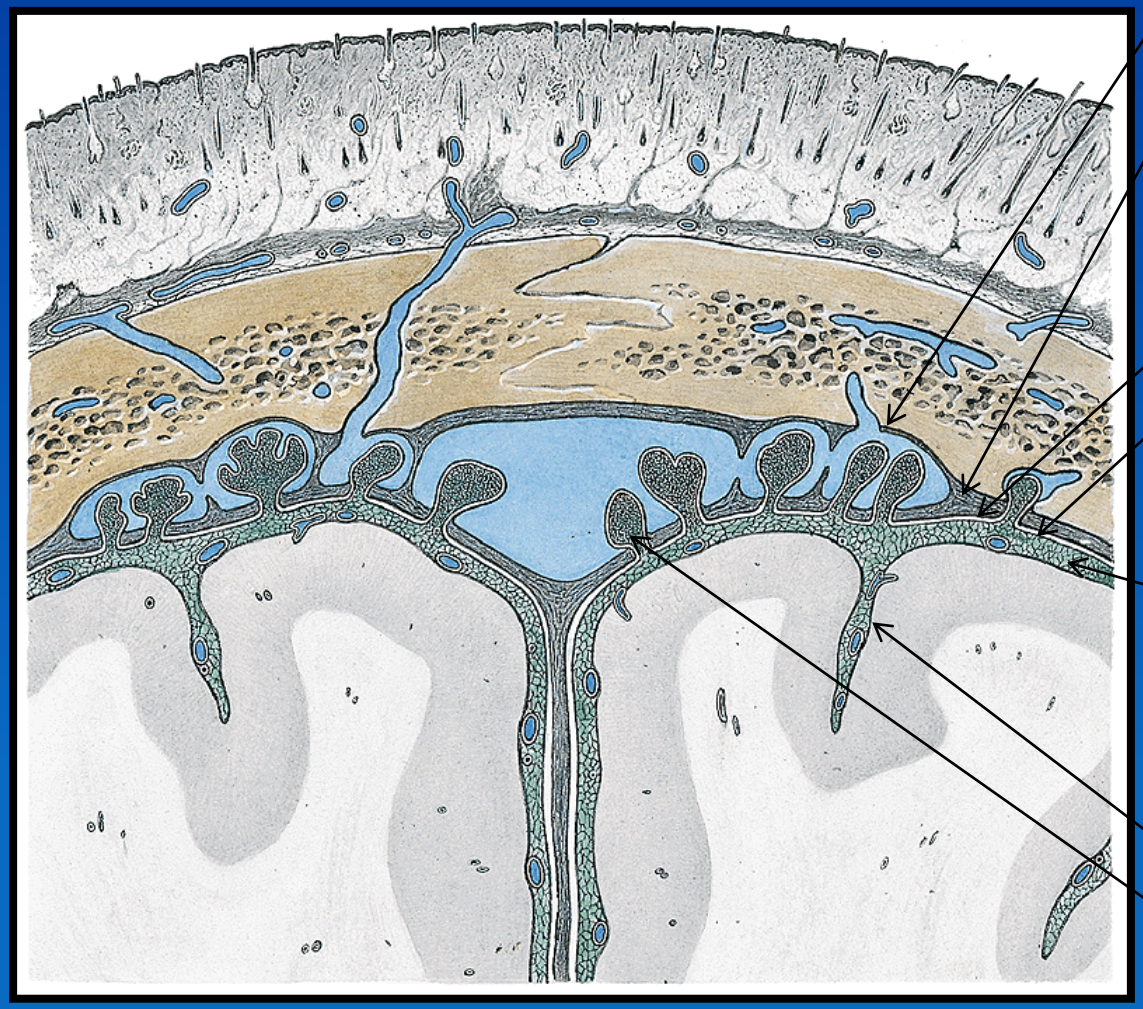
https://www.youtube.com/watch?v=9CZeddl1hkk



Venligst udlånt af
læge
Rikke Beese Dalby

# Hjernens hinder

# Meninges



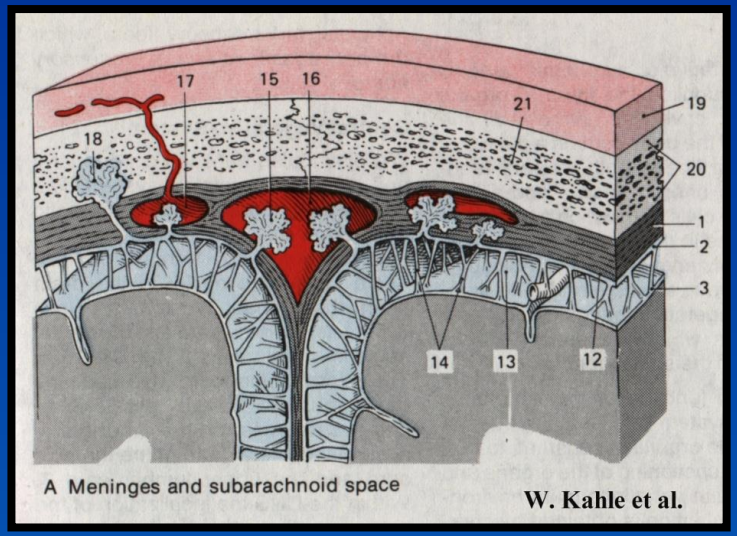
- *Spatium epidurale **
- Dura mater encephali
- *Spatium subdurale**
- Arachnoidea mater enchephali
- *Spatium subarachnoideum*
- Pia mater enchephali
- Granulatio arachoidea

(*: Virtuelt spalterum)

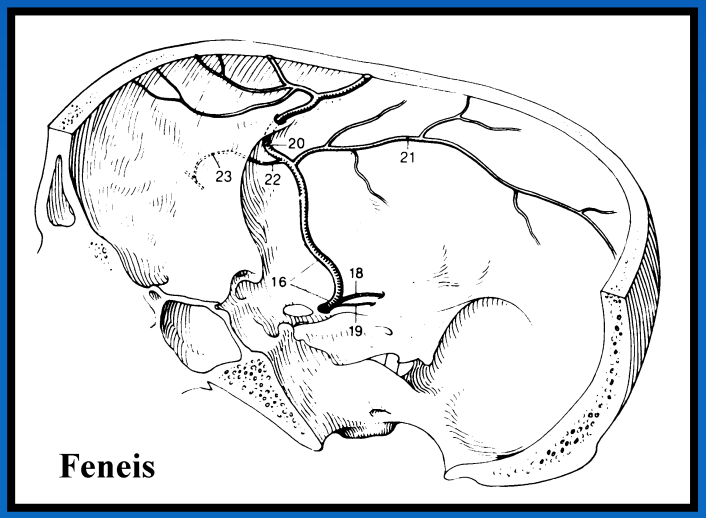
Yngre mand udsat for svært hovedtraume (Epidural hæmatom)


VIEW STUDY
CUSTOM POSTERIOR FOSSA 134
COUCH: 395.8
TILT: 0.0
FIELD: HALF
THICK: 1.5
INDEX: -256
kV: 130
mA: 30
mAs: 76
0
12
12
HEAD
0
W: 800
L: 550
SIZE: 256
PICKER - PQ2000
POSTERIOR
Select feature.
-2
SET ACQ
RESET
MASK DOTS
MASK LINES
SPLIT
minified
CURSOR

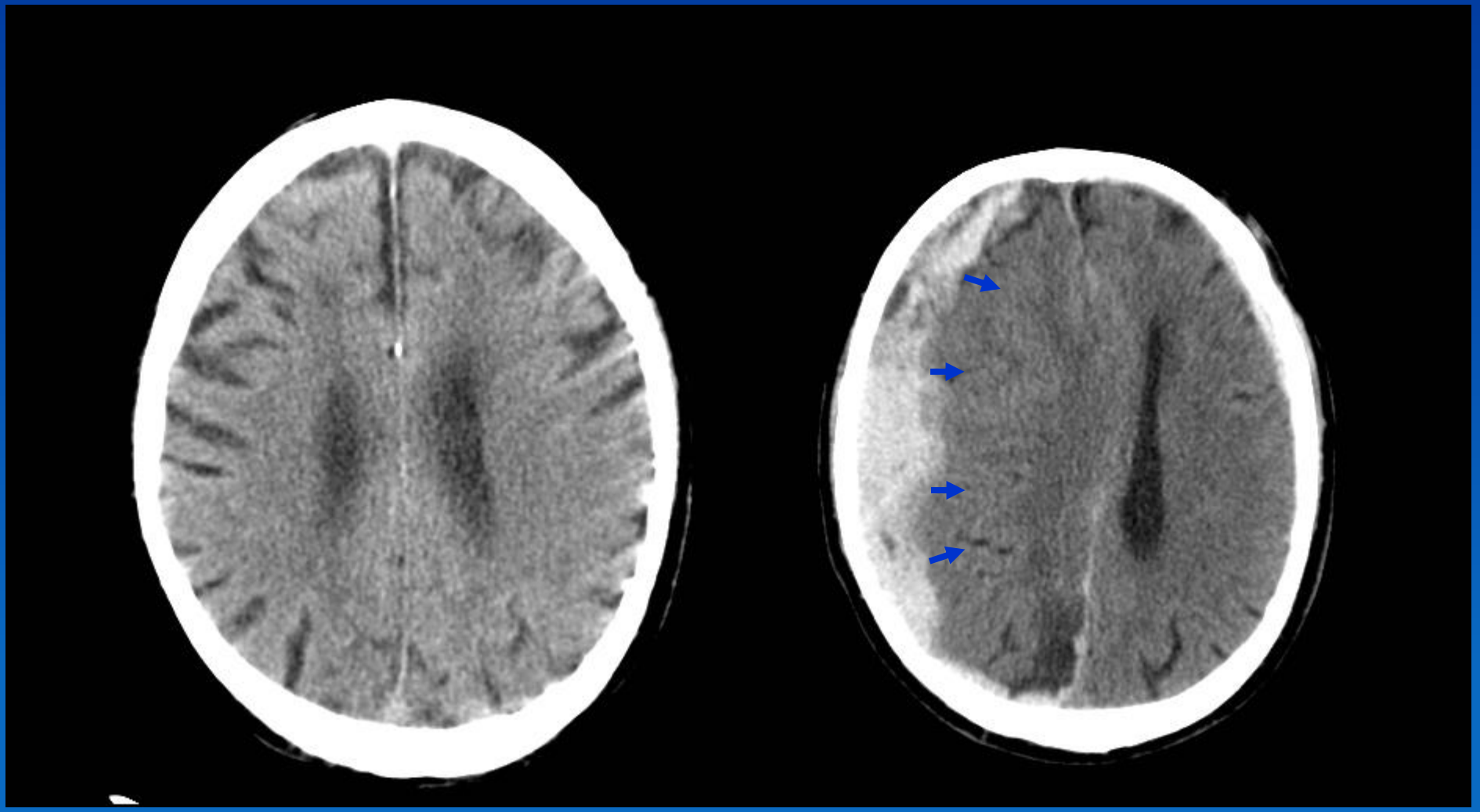

SINGLE IMAGE
MODIFIED POSTERIOR FOSSA
COUCH: 265.5
TILT: -18.0
FIELD:HALF
THICK: 8.0
INDEX: -8.0
kV: 130
mA: 200
mAs: 315
STUDY: 6619-22
CONT: NO
0
12
RIGHT
PICKER - PQ2000
W: 104
L: 57
SIZE: 240
POSTERIOR
Select Operation.
cursor op
multi op
image op
window op
stack op
view stdy
plan stdy


17
15
16
21
19
18
20
1
2
3
14
13
12
A Meninges and subarachnoid space
W. Kahle et al.


SYGEHUS
SINGLE IMAGE
MODIFIED POSTERIOR FOSSA
COUCH: 265.5
TILT: -18.0
FIELD:HALF
THICK: 8.0
INDEX: -8.0
kV: 130
mA: 200
mAs: 315
0
12
RIGHT
PICKER - PQ2000
W: 104
L: 57
SIZE: 240
POSTERIOR
Select Operation.
cursor op
multi op
image op
window op
stack op
view stdy
plan stdy


20
21
23
22
16
18
19
Feneis

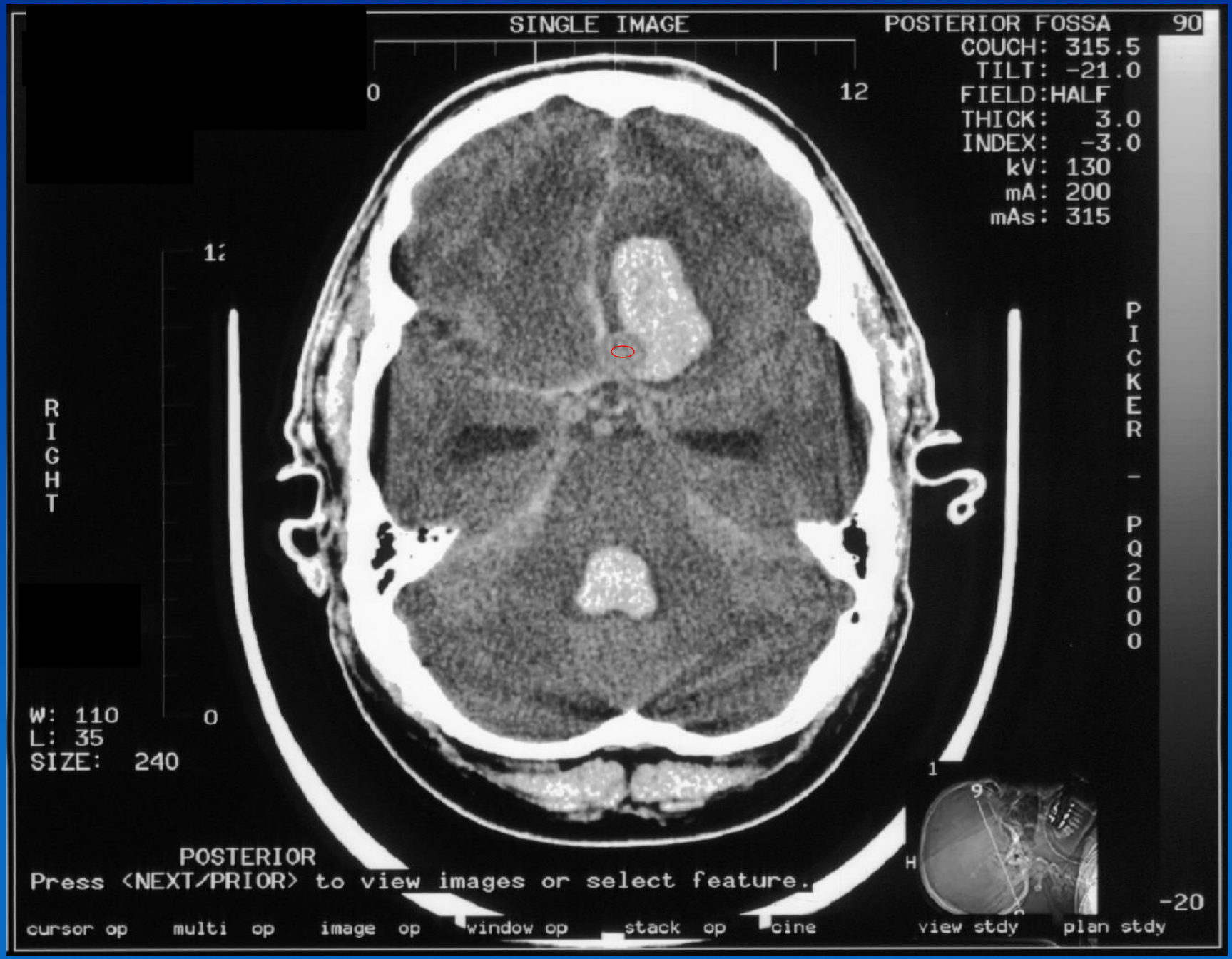
Ældre mand udsat for mindre hovedtraume (Subduralt hæmatom)

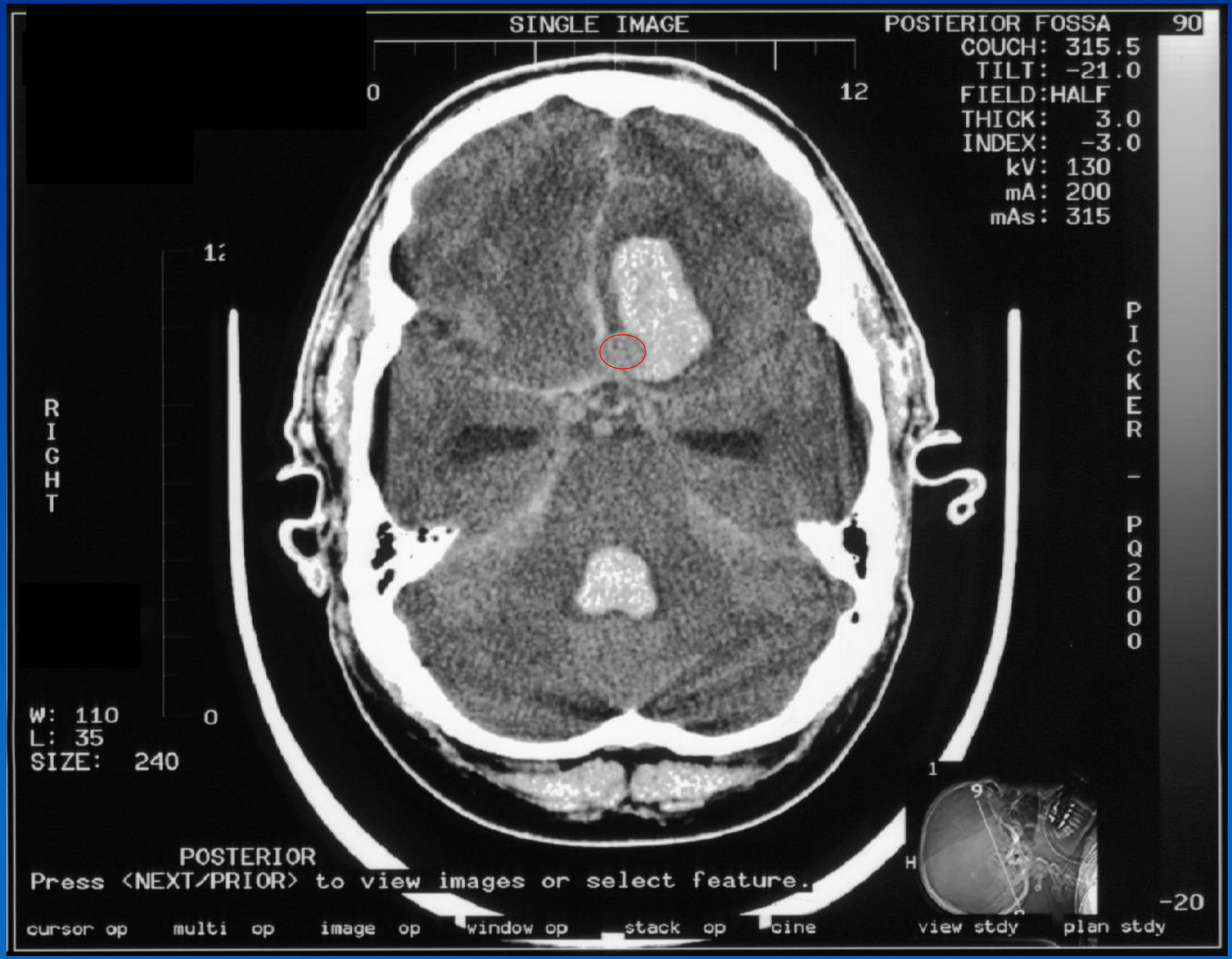


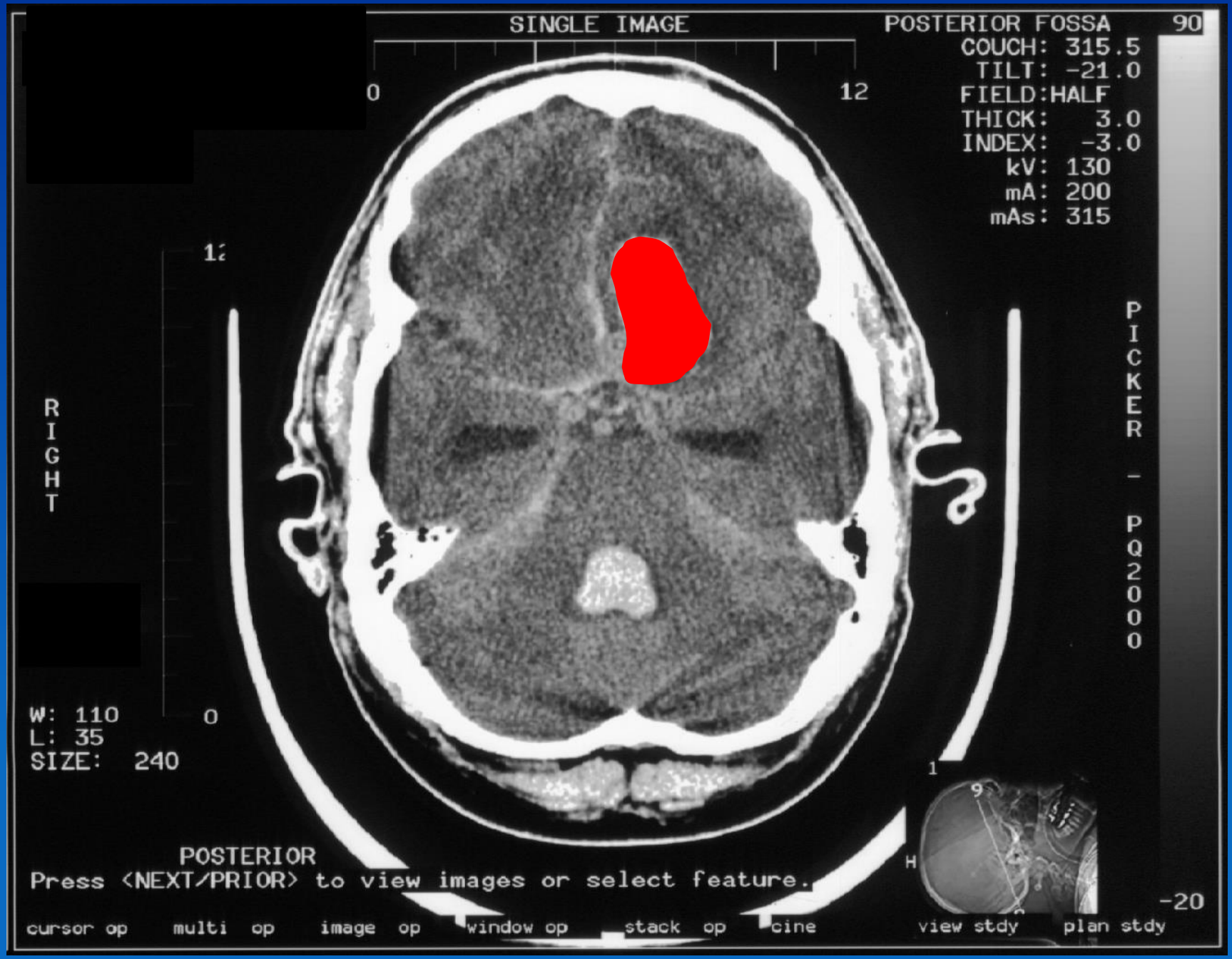
Tidligere skanning

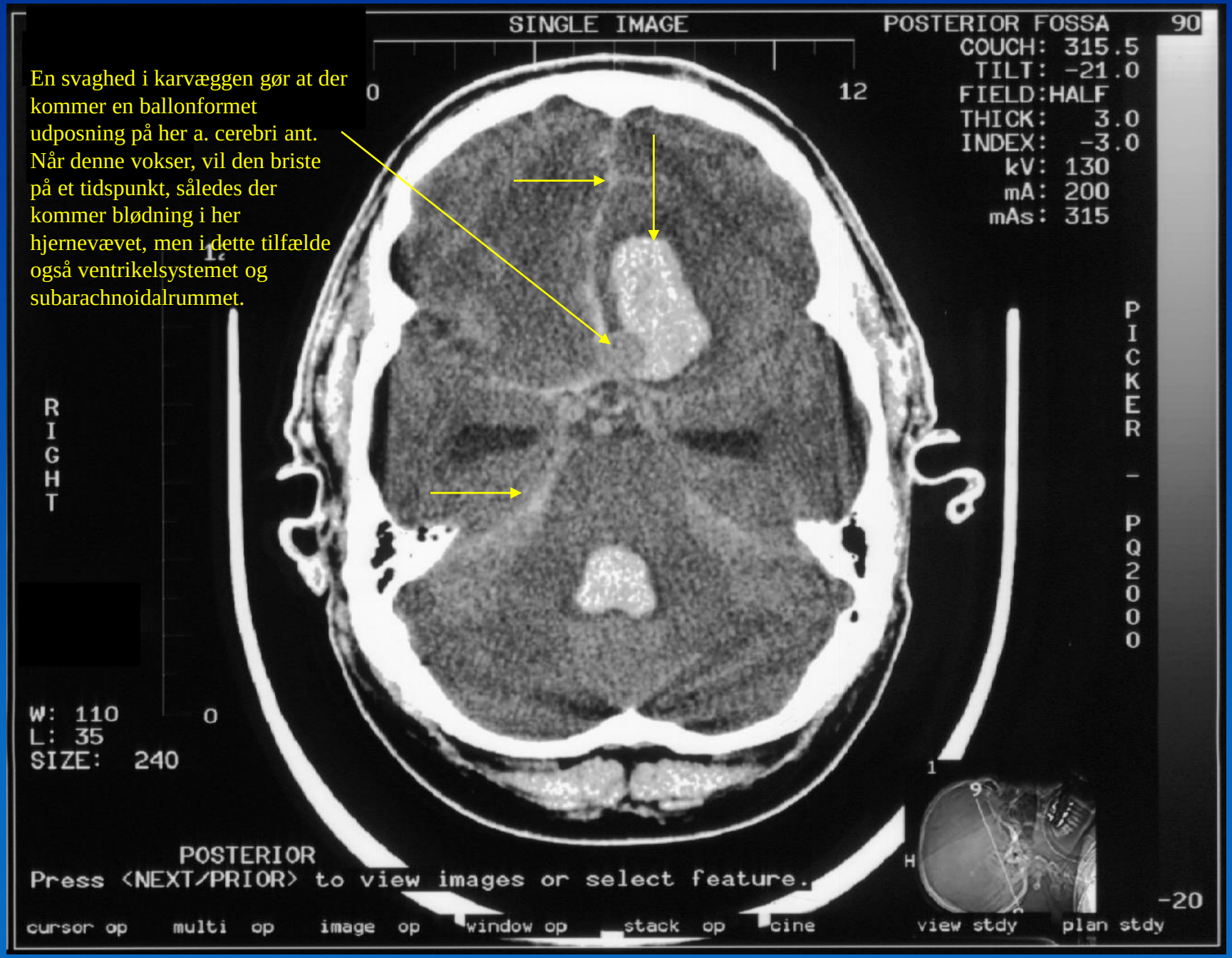
Skanning efter mindre traume

# Aneurismeblødning (Subarachnoidal blødning)


SINGLE IMAGE
POSTERIOR FOSSA
90
COUCH: 315.5
TILT: -21.0
FIELD:HALF
THICK: 3.0
INDEX: -3.0
kV: 130
mA: 200
mAs: 315
0
12
RIGHT
PICKER - PQ2000
W: 110
L: 35
SIZE: 240
0
POSTERIOR
Press <NEXT/PRIOR> to view images or select feature.
-20
cursor op
multi op
image op
window op
stack op
cine
view stdy
plan stdy

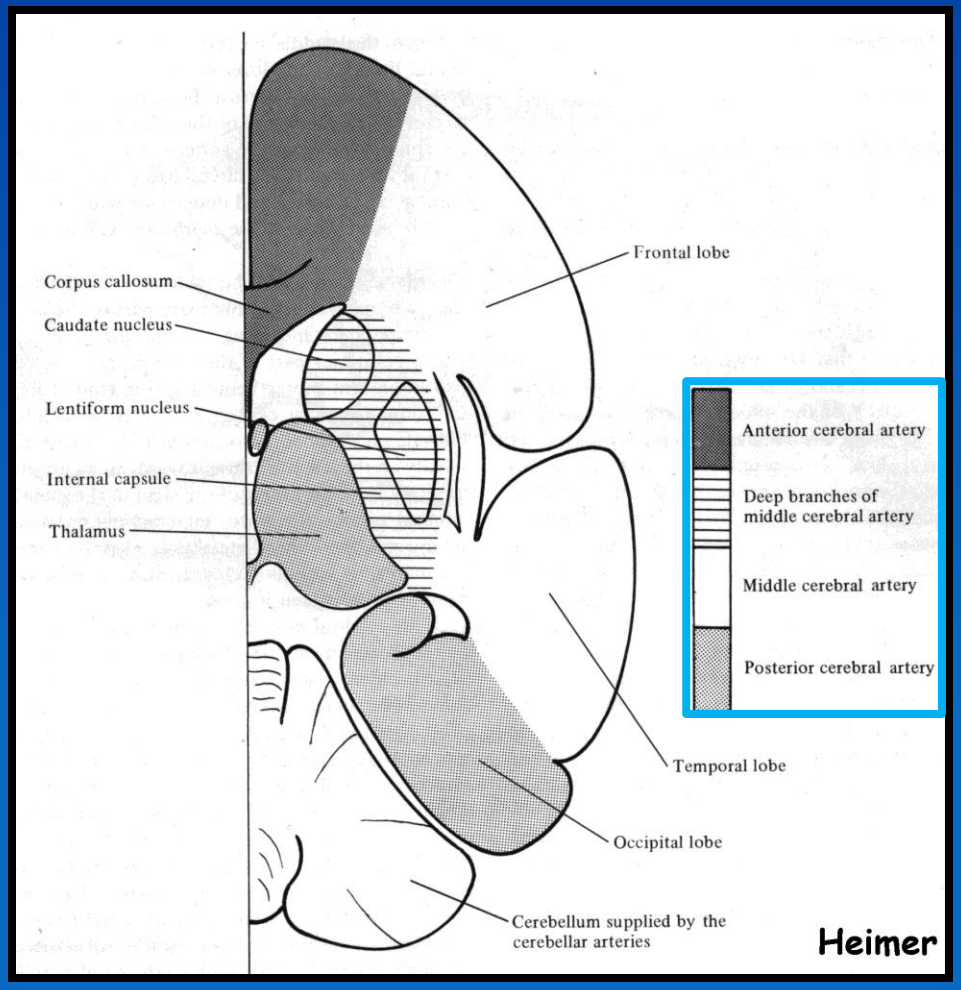

SINGLE IMAGE
POSTERIOR FOSSA
90
0
12
COUCH: 315.5
TILT: -21.0
FIELD:HALF
THICK: 3.0
INDEX: -3.0
kV: 130
mA: 200
mAs: 315
RIGHT
PICKER - PQ2000
W: 110
L: 35
SIZE: 240
0
1
9
H
-20
POSTERIOR
Press <NEXT/PRIOR> to view images or select feature.
cursor op
multi op
image op
window op
stack op
cine
view stdy
plan stdy

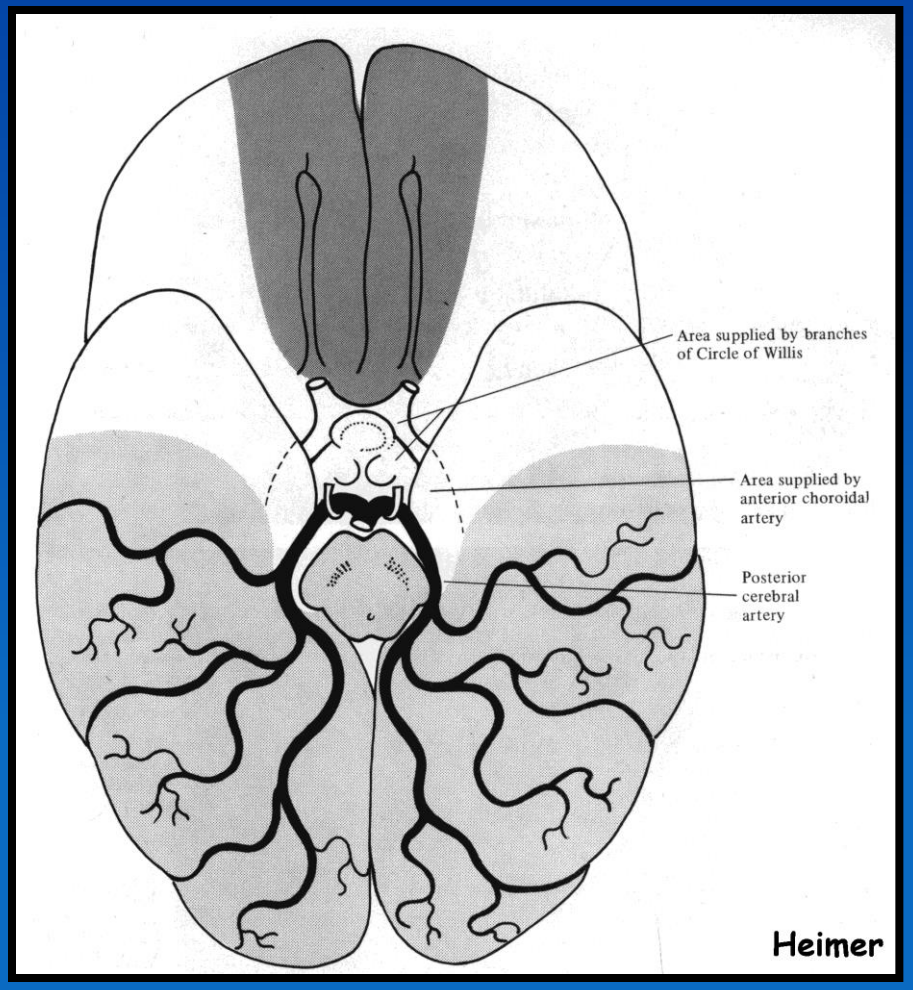

SINGLE IMAGE
POSTERIOR FOSSA
90
COUCH: 315.5
TILT: -21.0
FIELD:HALF
THICK: 3.0
INDEX: -3.0
kV: 130
mA: 200
mAs: 315
0
12
RIGHT
PICKER - PQ2000
W: 110
L: 35
SIZE: 240
POSTERIOR
Press <NEXT/PRIOR> to view images or select feature.
-20
cursor op
multi op
image op
window op
stack op
cine
view stdy
plan stdy


En svaghed i karvæggen gør at der kommer en ballonformet udposning på her a. cerebri ant. Når denne vokser, vil den briste på et tidspunkt, således der kommer blødning i her hjernevævet, men i dette tilfælde også ventrikelsystemet og subarachnoidalrummet.
SINGLE IMAGE
POSTERIOR FOSSA
90
COUCH: 315.5
TILT: -21.0
FIELD:HALF
THICK: 3.0
INDEX: -3.0
kV: 130
mA: 200
mAs: 315
0
12
RIGHT
PICKER - PQ2000
W: 110
L: 35
SIZE: 240
0
POSTERIOR
Press <NEXT/PRIOR> to view images or select feature.
-20
cursor op
multi op
image op
window op
stack op
cine
view stdy
plan stdy

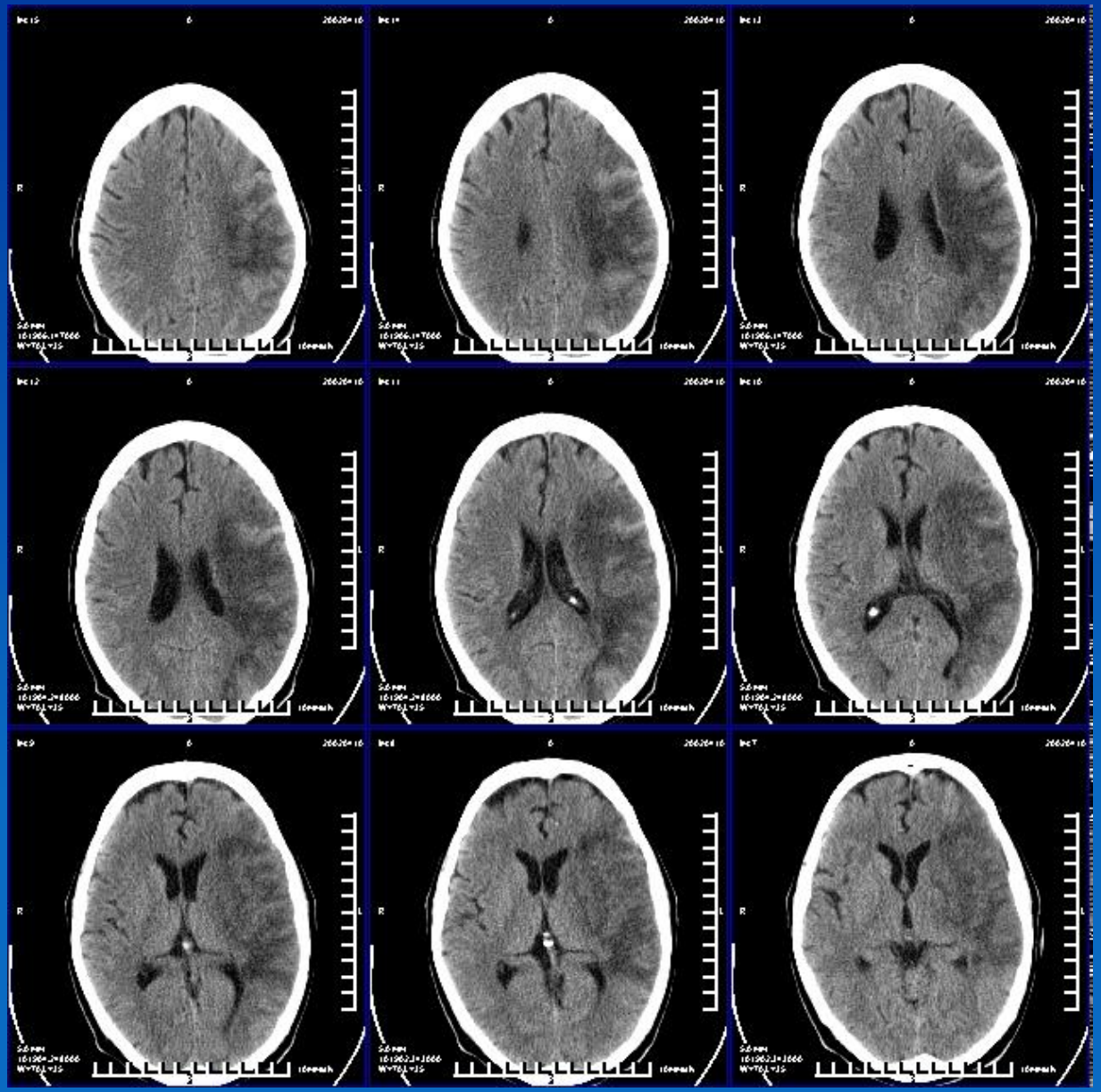
# Hjernens kar: Infarkt

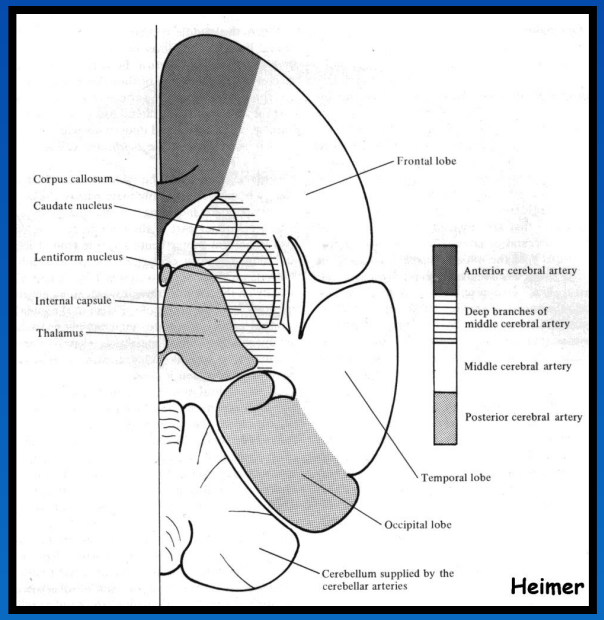
# Hjernens blodforsyning



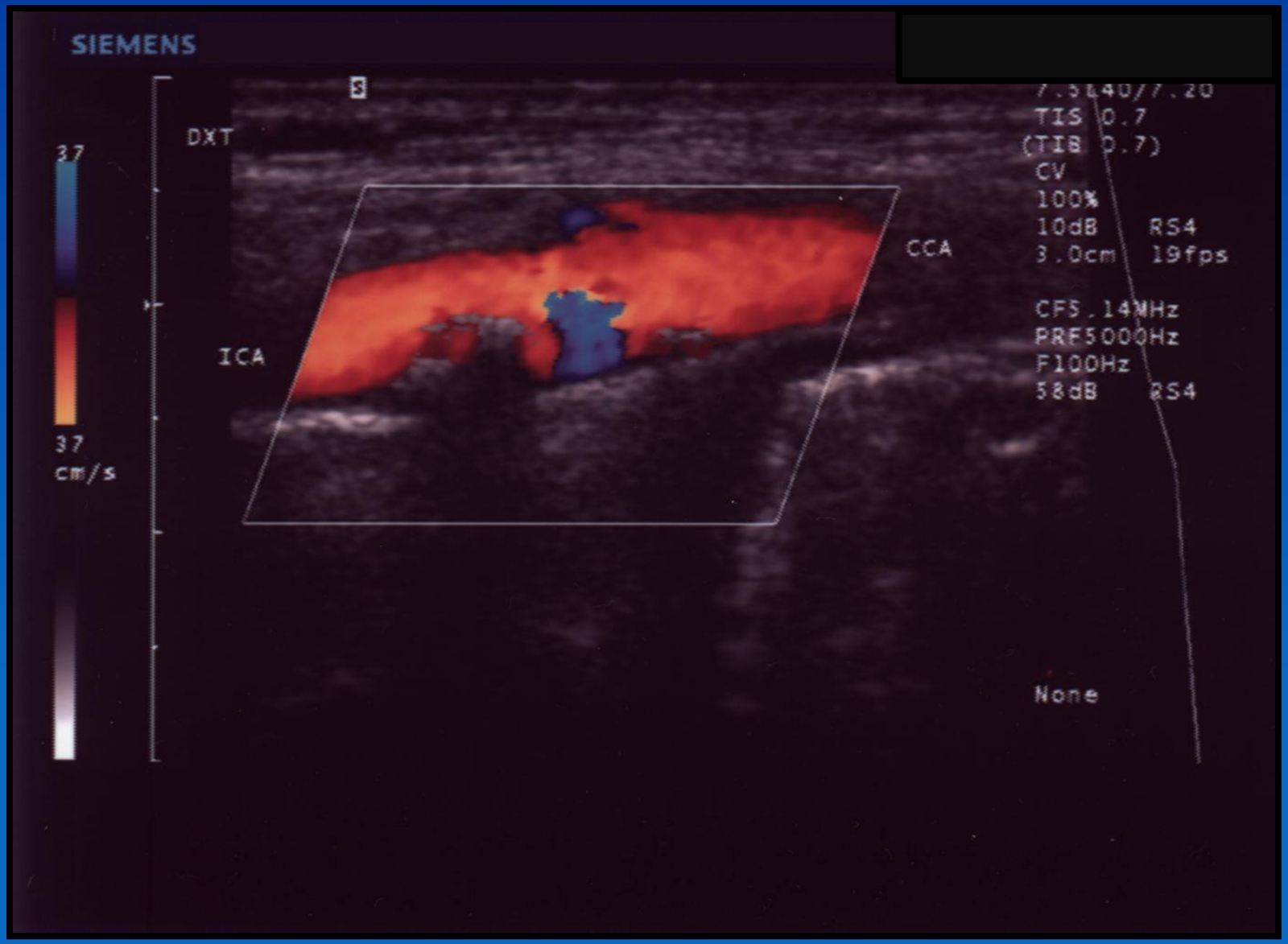
# CT cerebrum, mand 66 år



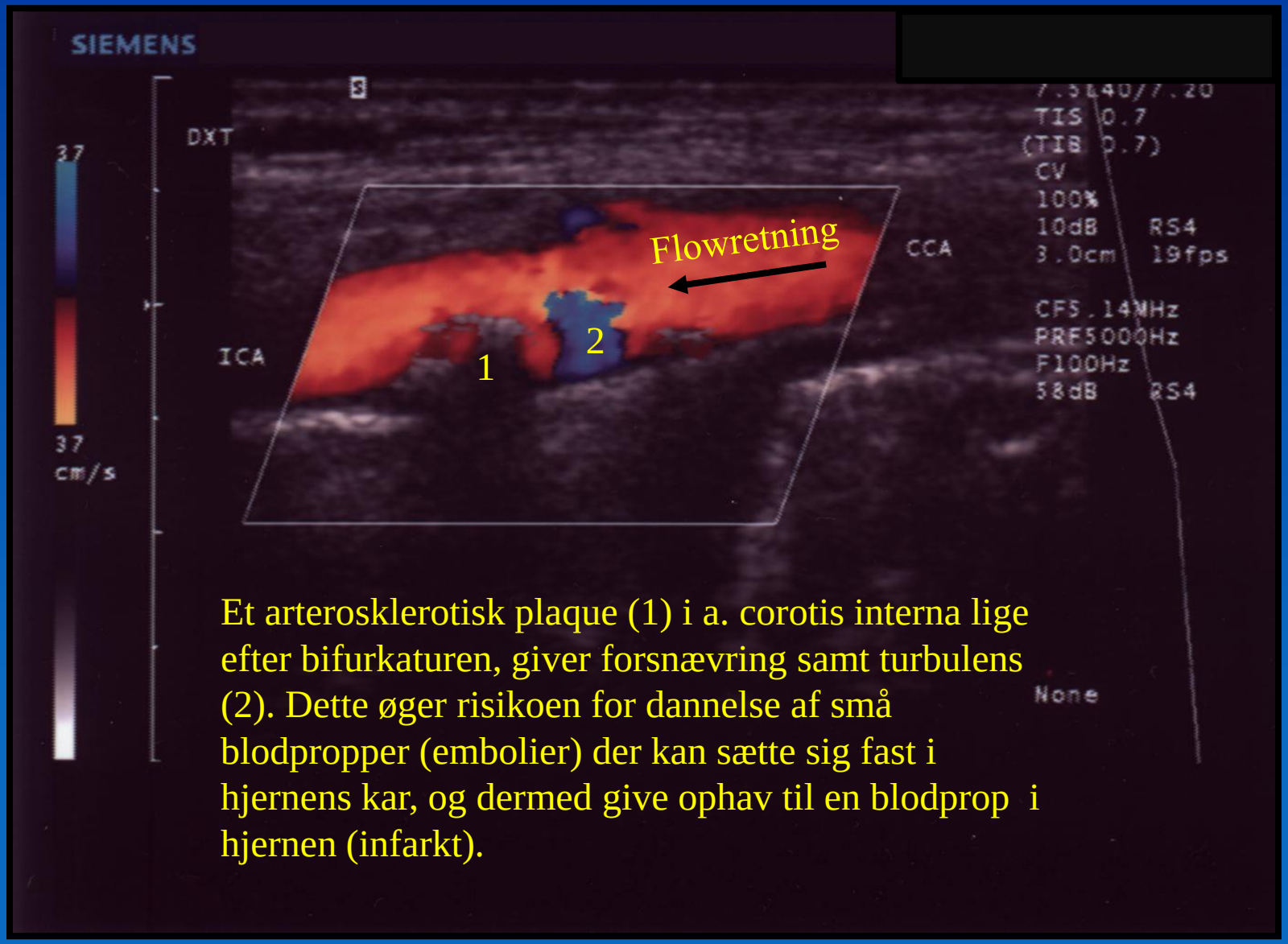



Blodprop (trombose) i a. cerebri media, med efterfølgende død af hjernevævet (infarkt) svarende til forsyningsområdet.

# Ultralydskanning af halskar, kvinde 59 år.

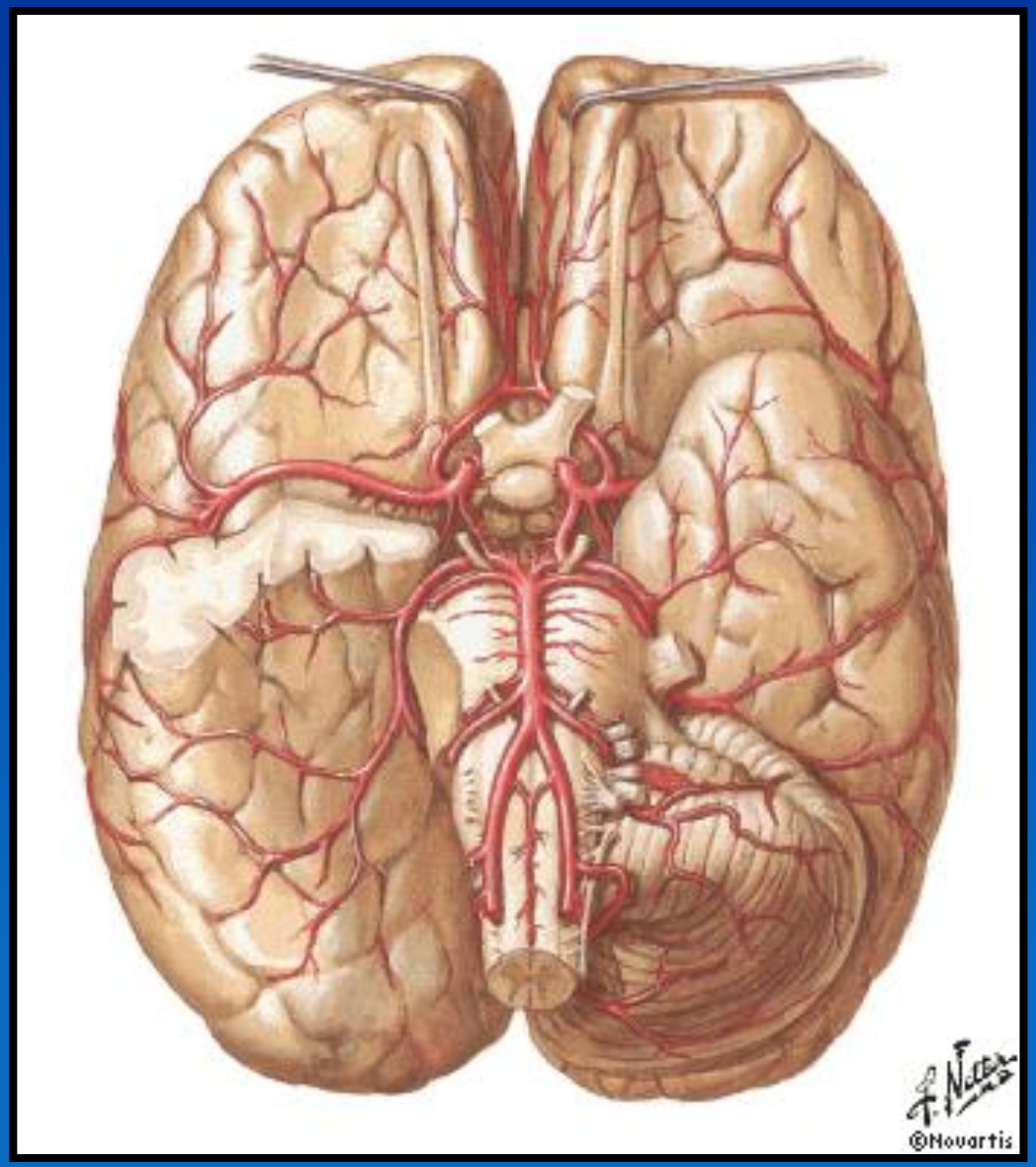


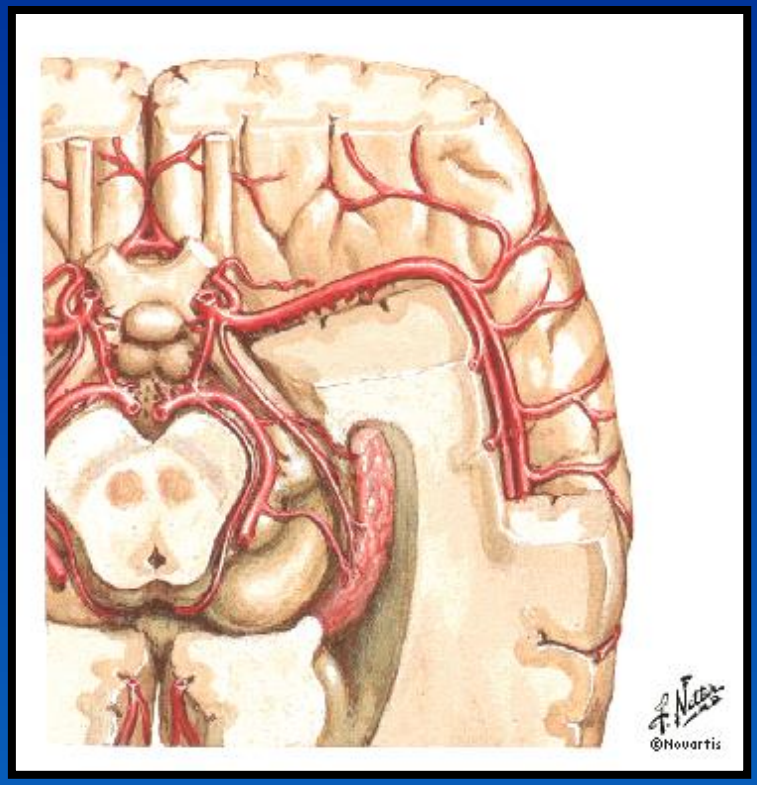
# Ultralydskanning af halskar, kvinde 59 år.

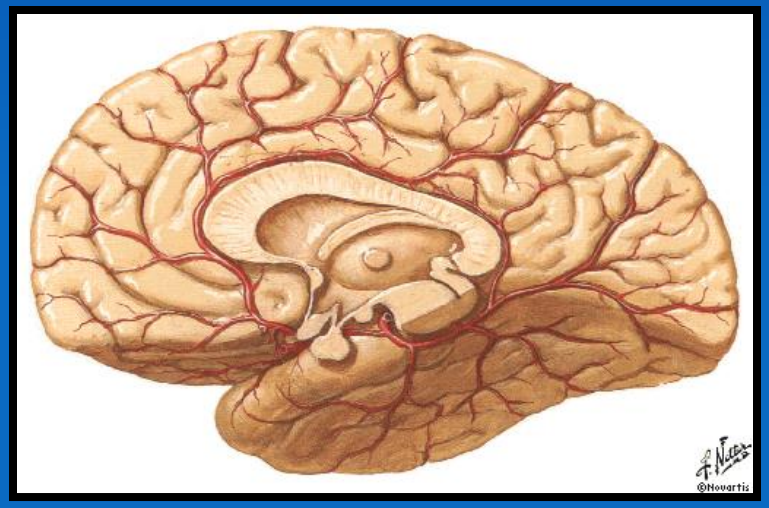



Et arterosklerotisk plaque (1) i a. corotis interna lige efter bifurkaturen, giver forsnævring samt turbulens (2). Dette øger risikoen for dannelse af små blodpropper (embolier) der kan sætte sig fast i hjernens kar, og dermed give ophav til en blodprop i hjernen (infarkt).

# Hjernens kar: Cerebral a-grafi


©Novartis


©Novartis


©Novartis

Cerebral a-grafi: A. carotis int. dx., 63 årig mand: Sideoptagelse


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
2.28
T-run:
07:59:37
ICA 0%
A. carotis int.
RUN
1
28
MASK IMAGE
2 7


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
2.64
T-run:
07:59:37
ICA DX
RUN
1
28
MASK IMAGE
2 8


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
3.00
T-run:
07:59:37
ICA DX
RUN
1
28
MASK IMAGE
2 9


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
3.36
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 10


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
3.72
T-run:
07:59:37
ICA DX
RUN
1
28
MASK IMAGE
2 11


LS
ROT
90
ANG
0
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T-image:
4.08
T-run:
07:59:37
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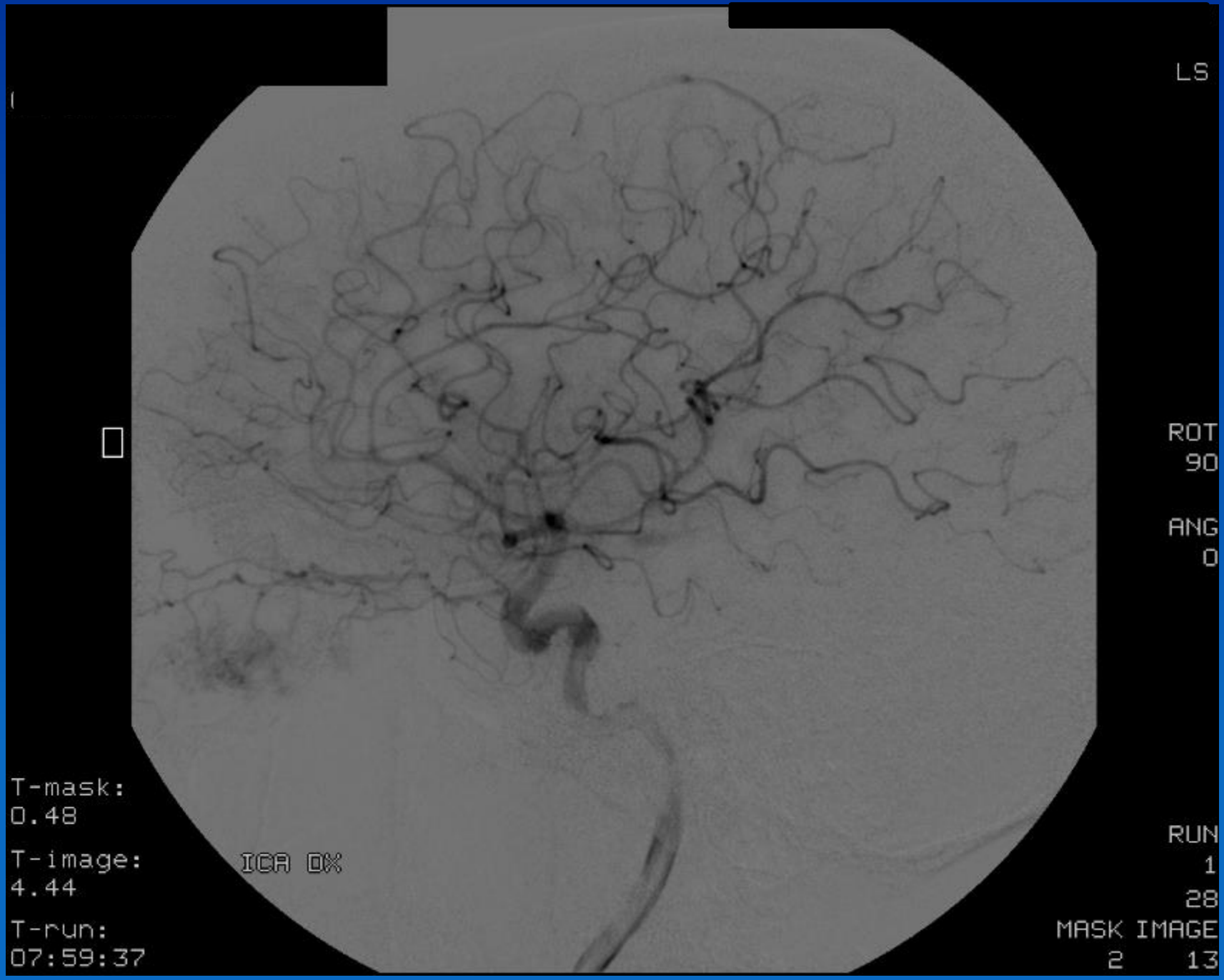
RUN
1
28
MASK IMAGE
2 12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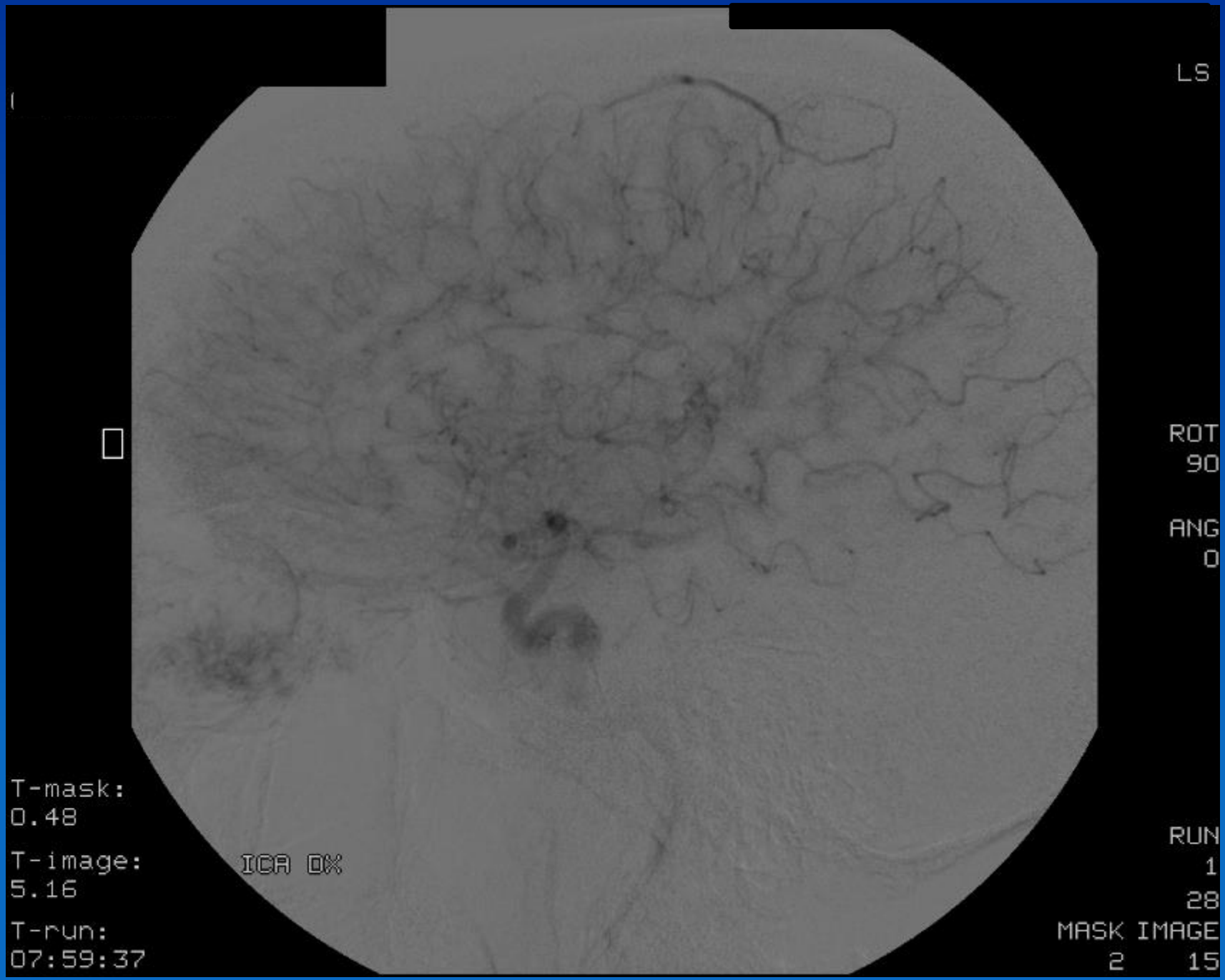
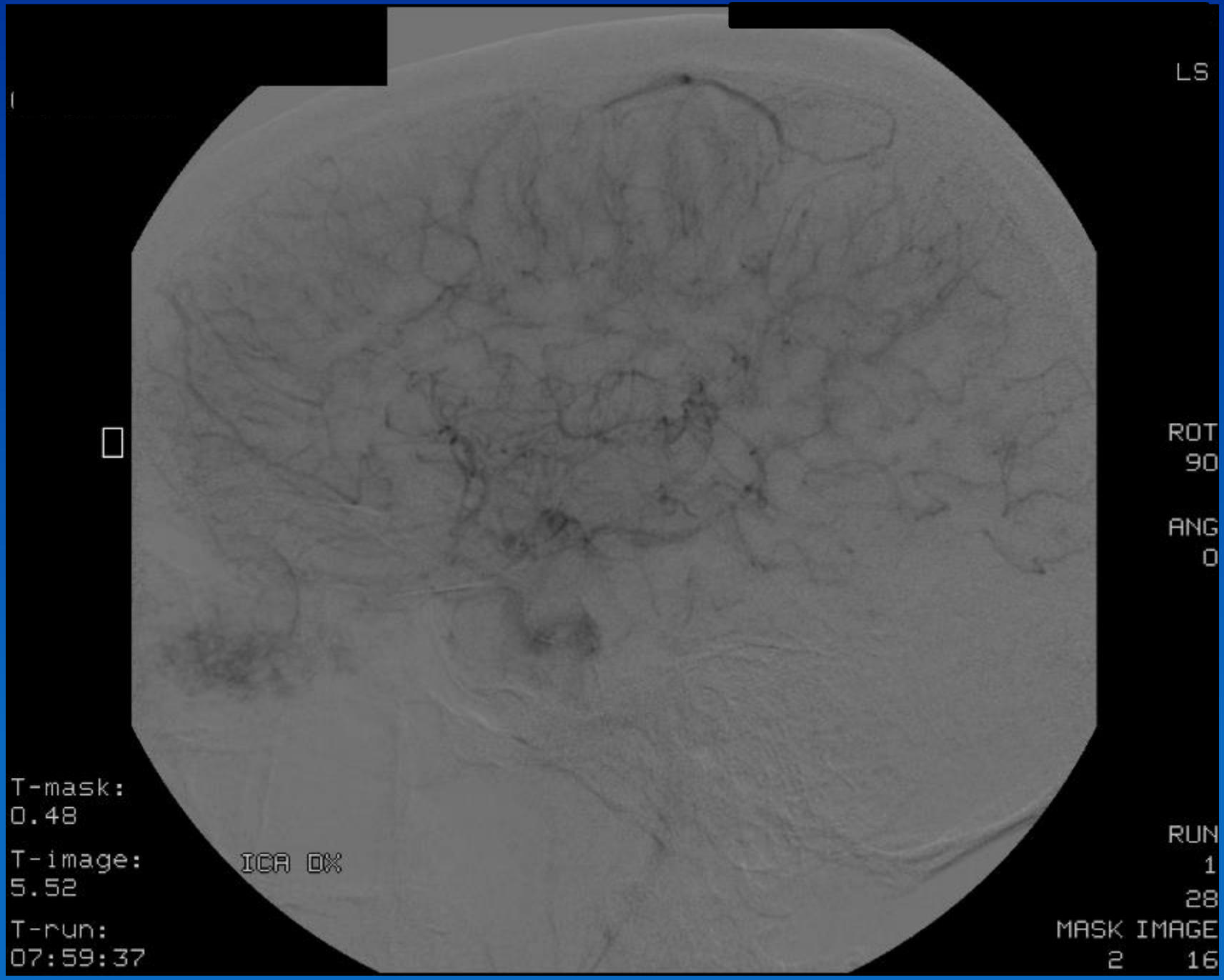
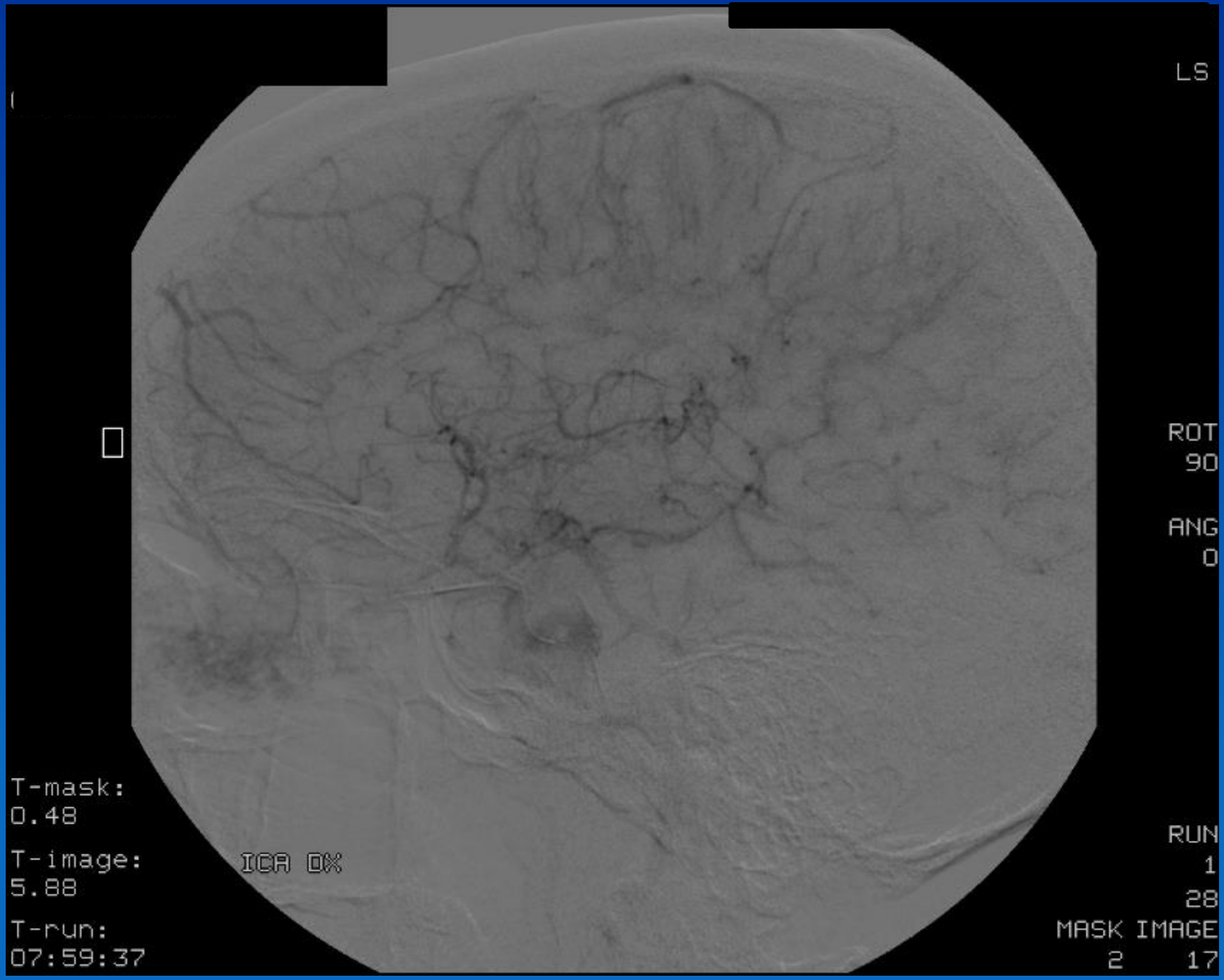
ANG
0
T-mask:
0.48
T-image:
4.44
T-run:
07:59:37
ICA OX
RUN
1
28
MASK IMAGE
2 13


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
4.80
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 14


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
5.16
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 15


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
5.52
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 16


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
5.88
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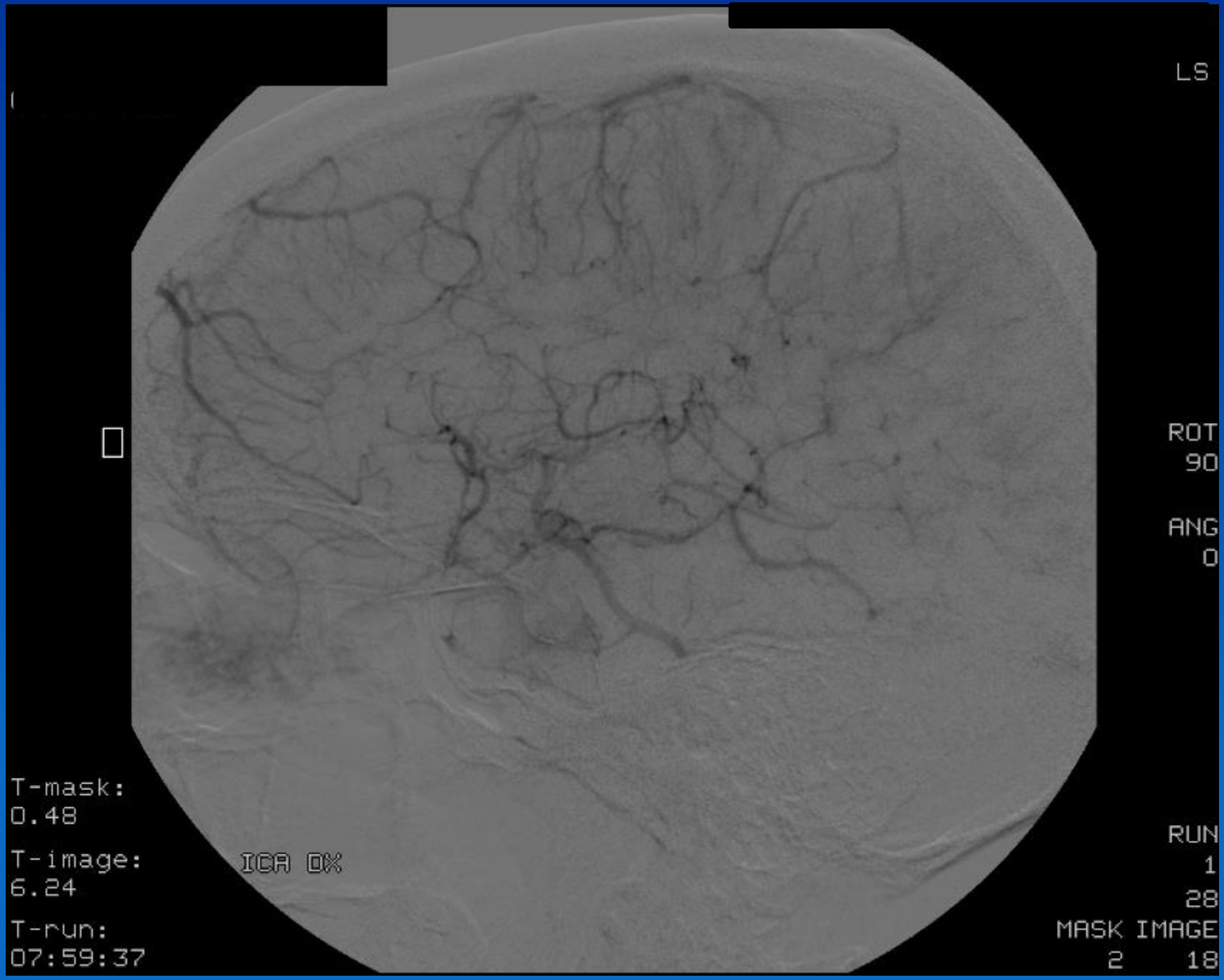
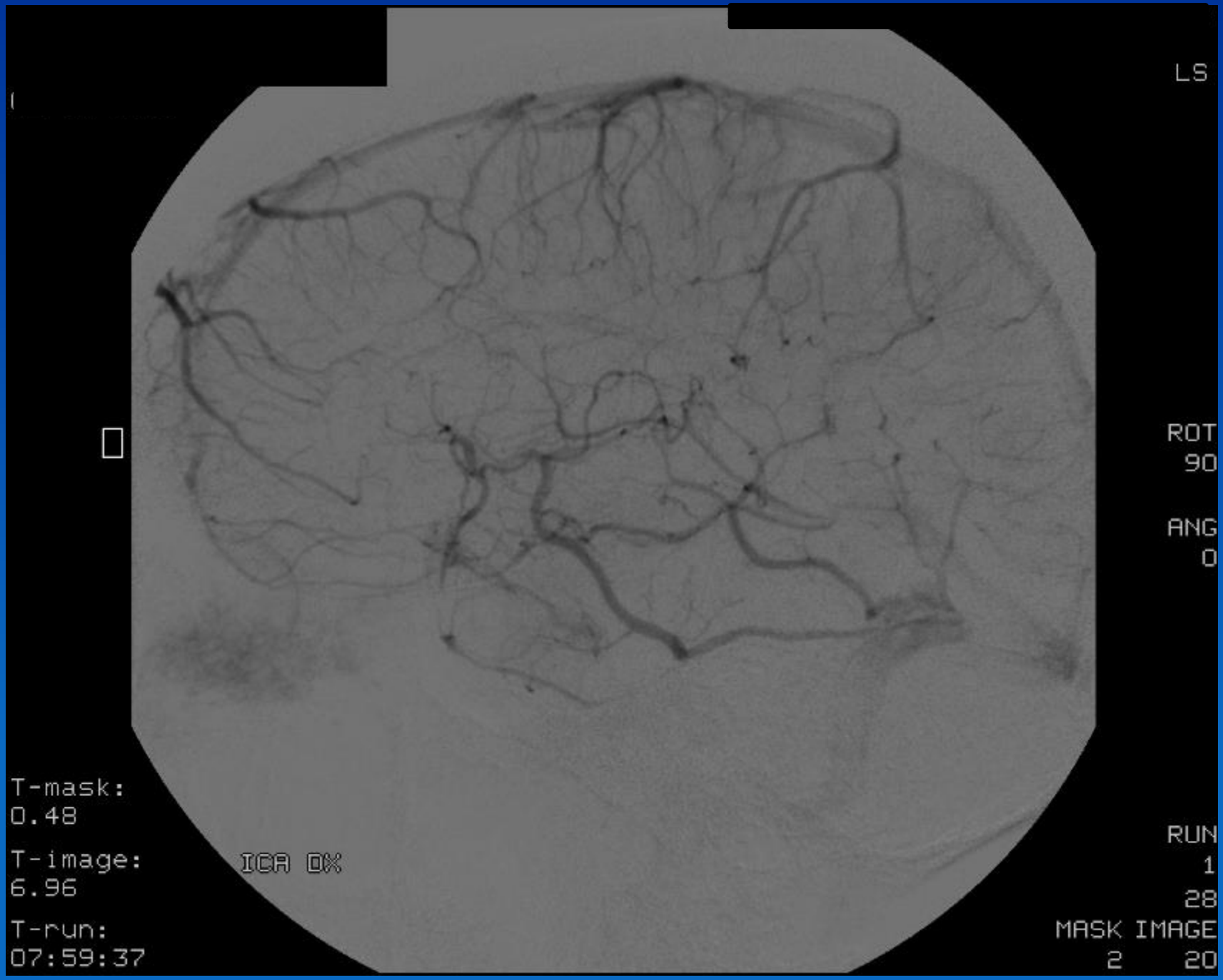
ICA 0%
RUN
1
28
MASK IMAGE
2 17

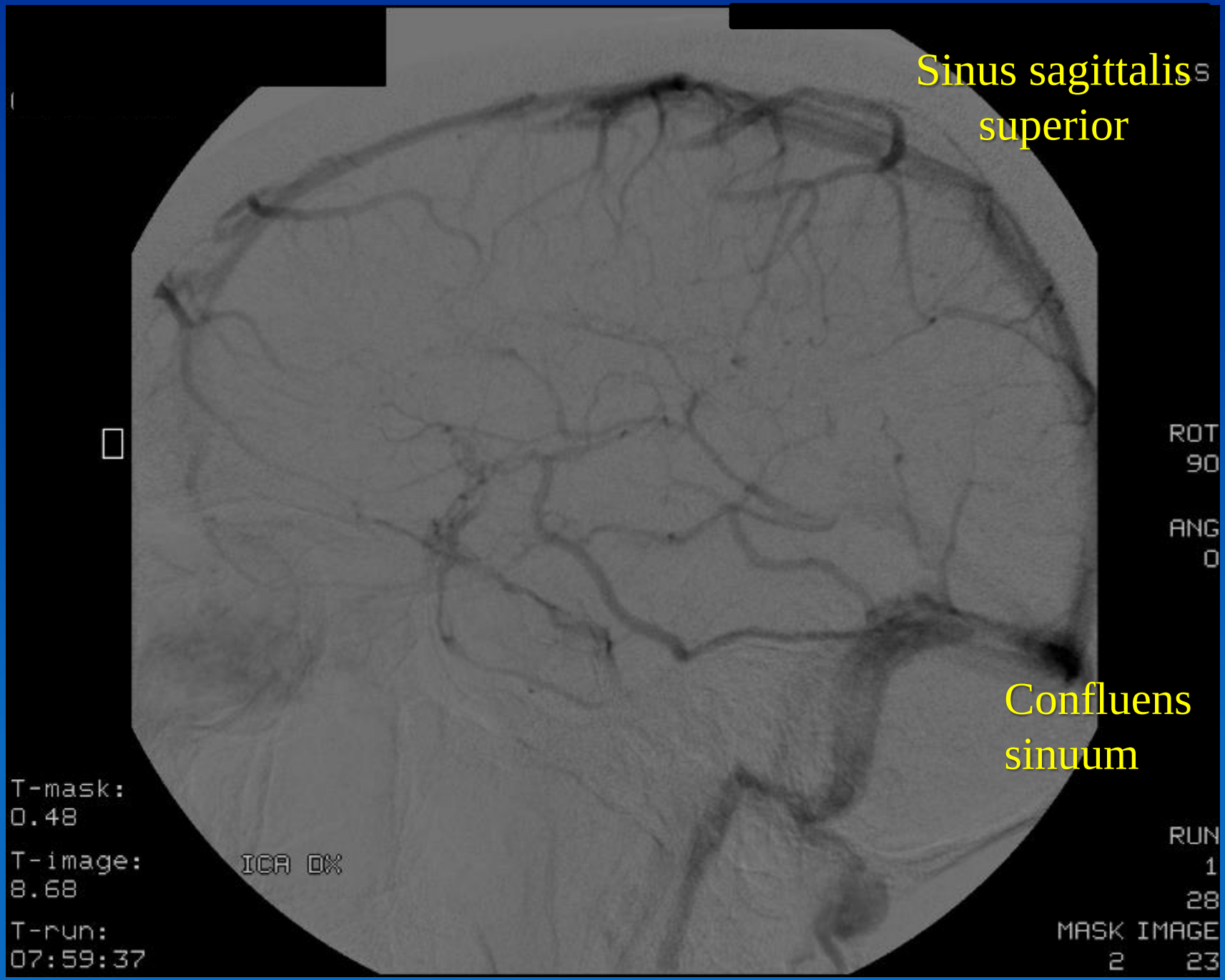

LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
6.24
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 18


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
6.60
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 19


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
6.96
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 20


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
7.32
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 21

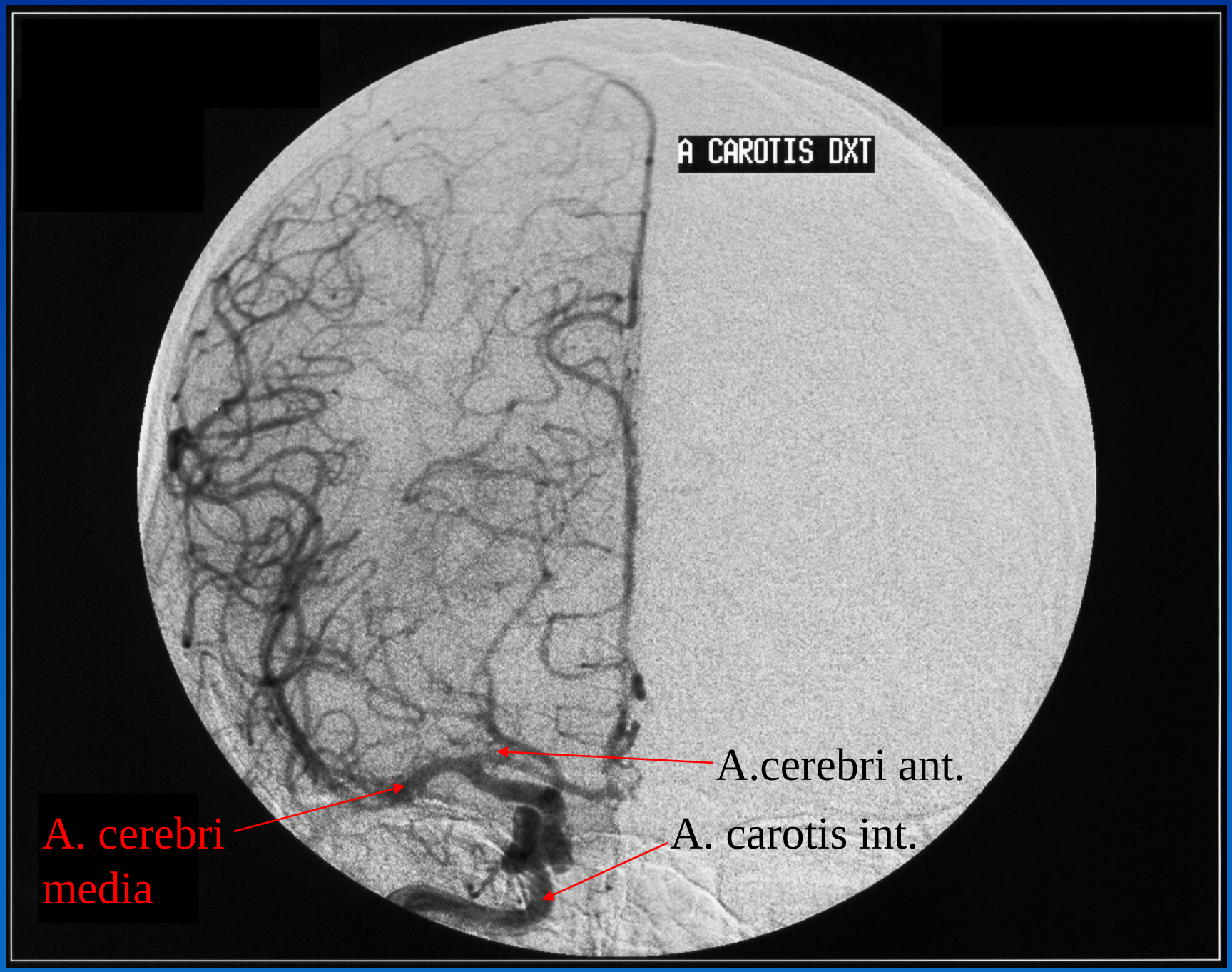

LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
7.68
T-run:
07:59:37
ICA 0%
RUN
1
28
MASK IMAGE
2 22

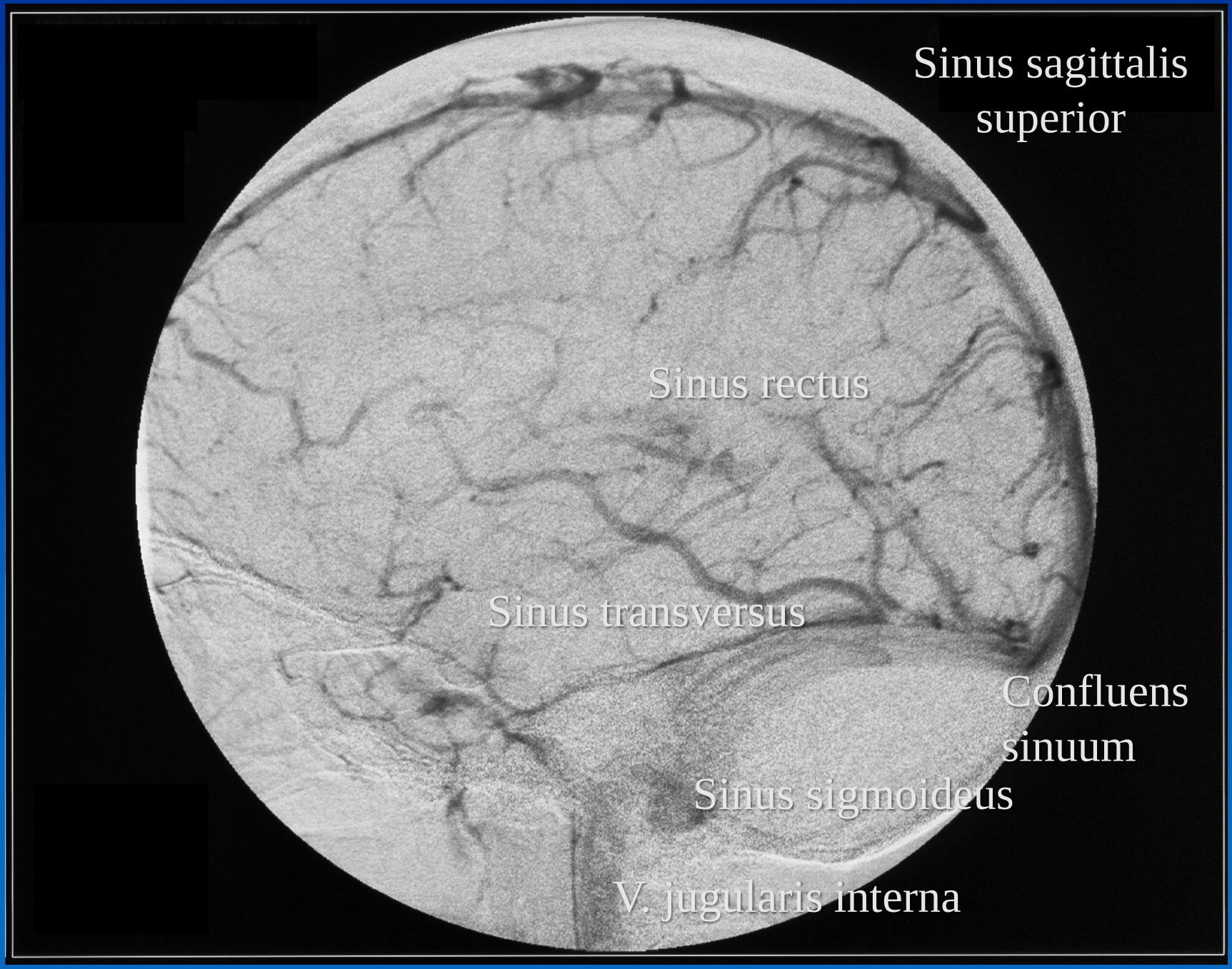

Sinus sagittalis superior
Confluens sinuum
ROT
90
ANG
0
T-mask:
0.48
T-image:
8.68
T-run:
07:59:37
ICA DX
RUN
1
28
MASK IMAGE
2 23

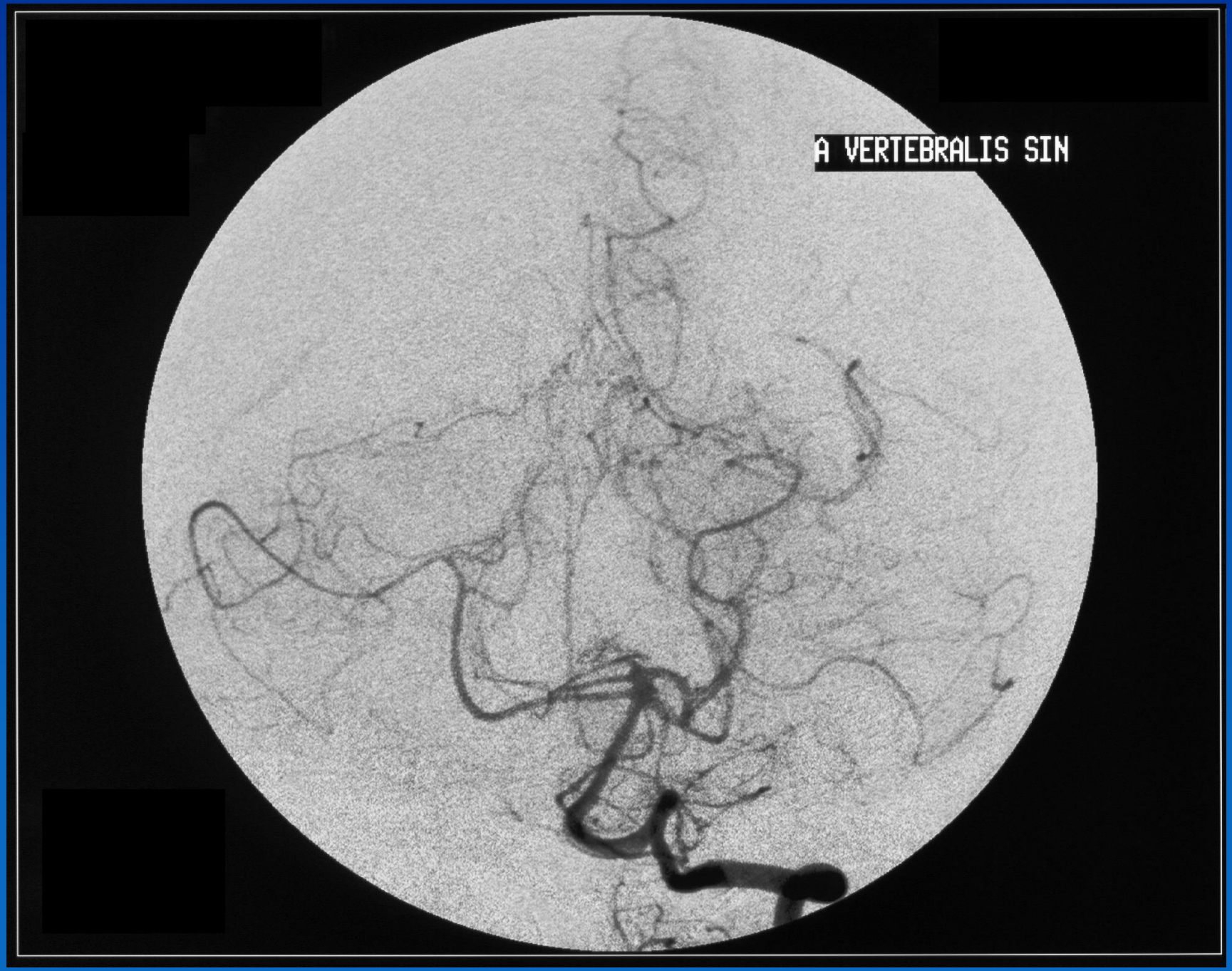

LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
9.68
T-run:
07:59:37
ICA DX
RUN
1
28
MASK IMAGE
2 24


LS
ROT
90
ANG
0
T-mask:
0.48
T-image:
10.68
T-run:
07:59:37
ICA OX
RUN
1
28
MASK IMAGE
2 25

# Cerebral a-grafi: Gennemgang.

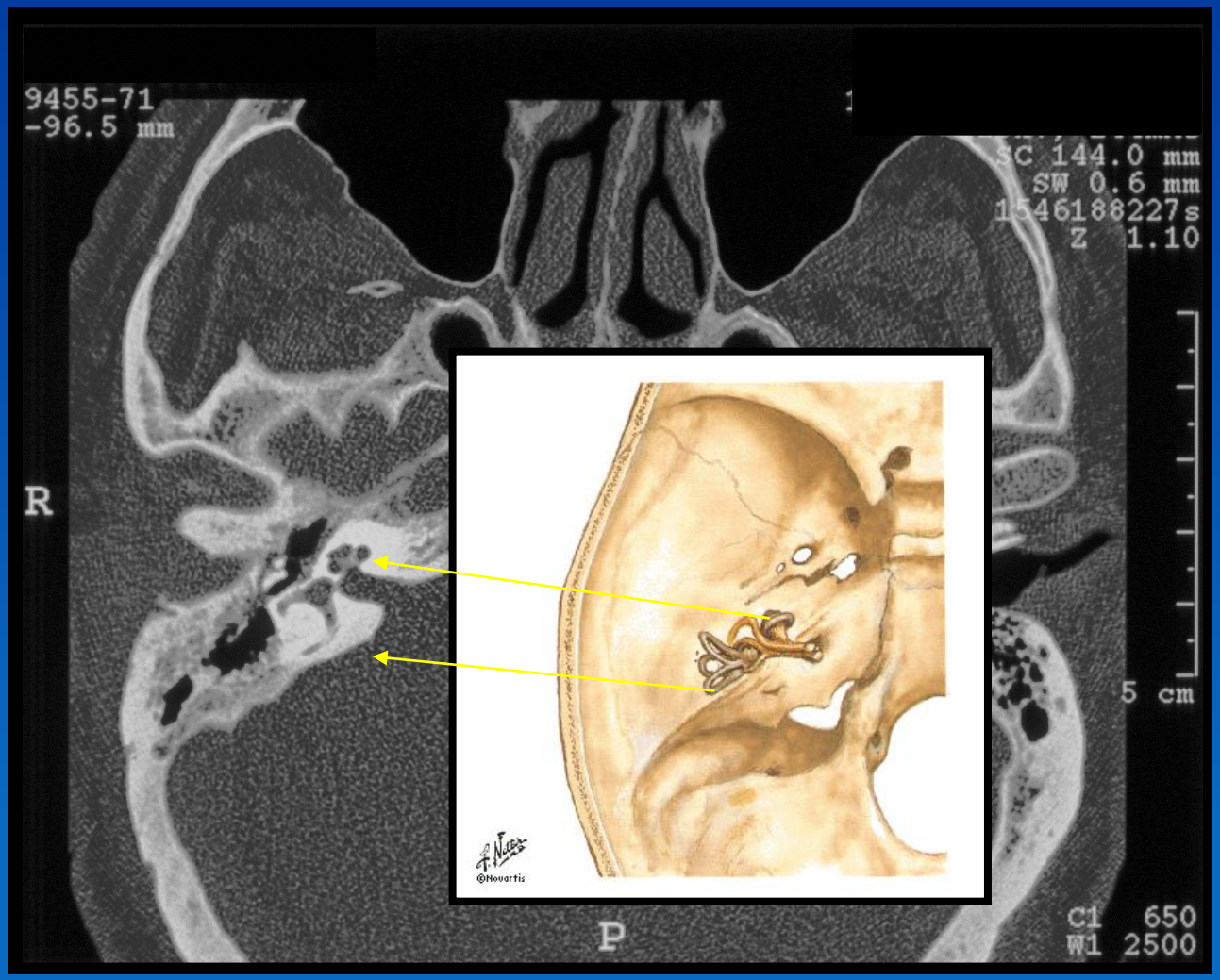

A CAROTIS DXT
A.cerebri ant.
A. carotis int.
A. cerebri media


Sinus sagittalis superior
Sinus rectus
Sinus transversus
Confluens sinuum
Sinus sigmoideus
V. jugularis interna

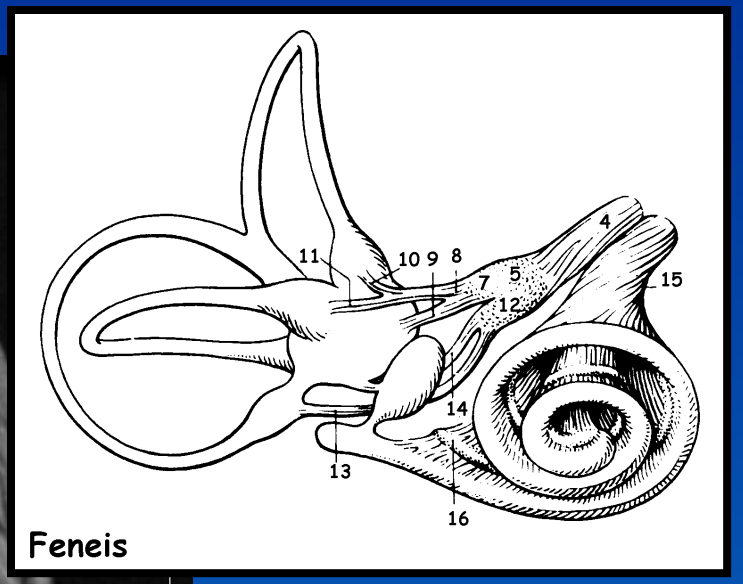

A VERTEBRALIS SIN

# Vestibulocochlear organet

CT


9455-71
-96.5 mm
SC 144.0 mm
SW 0.6 mm
1546188227s
Z 1.10
R
5 cm
P
C1 650
W1 2500
©Novartis


MR




Feneis