

Ultrasound of the neck –mistakes to avoid .

Rhodri M Evans

Avoiding mistakes : the neck

- Fundamental rules and knowledge
- Key landmarks : salivary glands
- Lymph node staging
- Biopsy techniques
- Signs : counter – intuitive
- Mimics
- Mistakes/avoidance/learning/tips

Key landmarks

Salivary glands

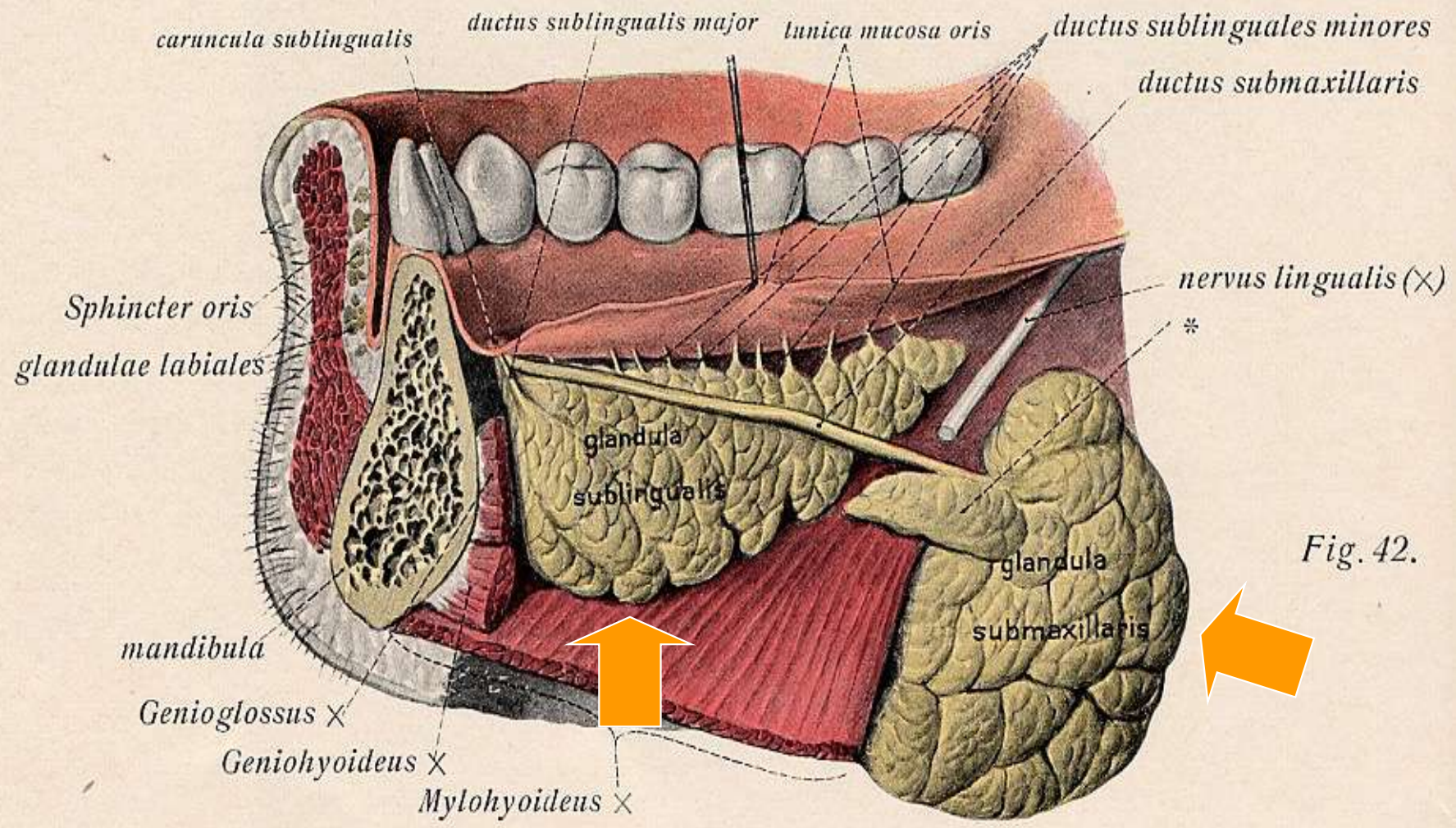
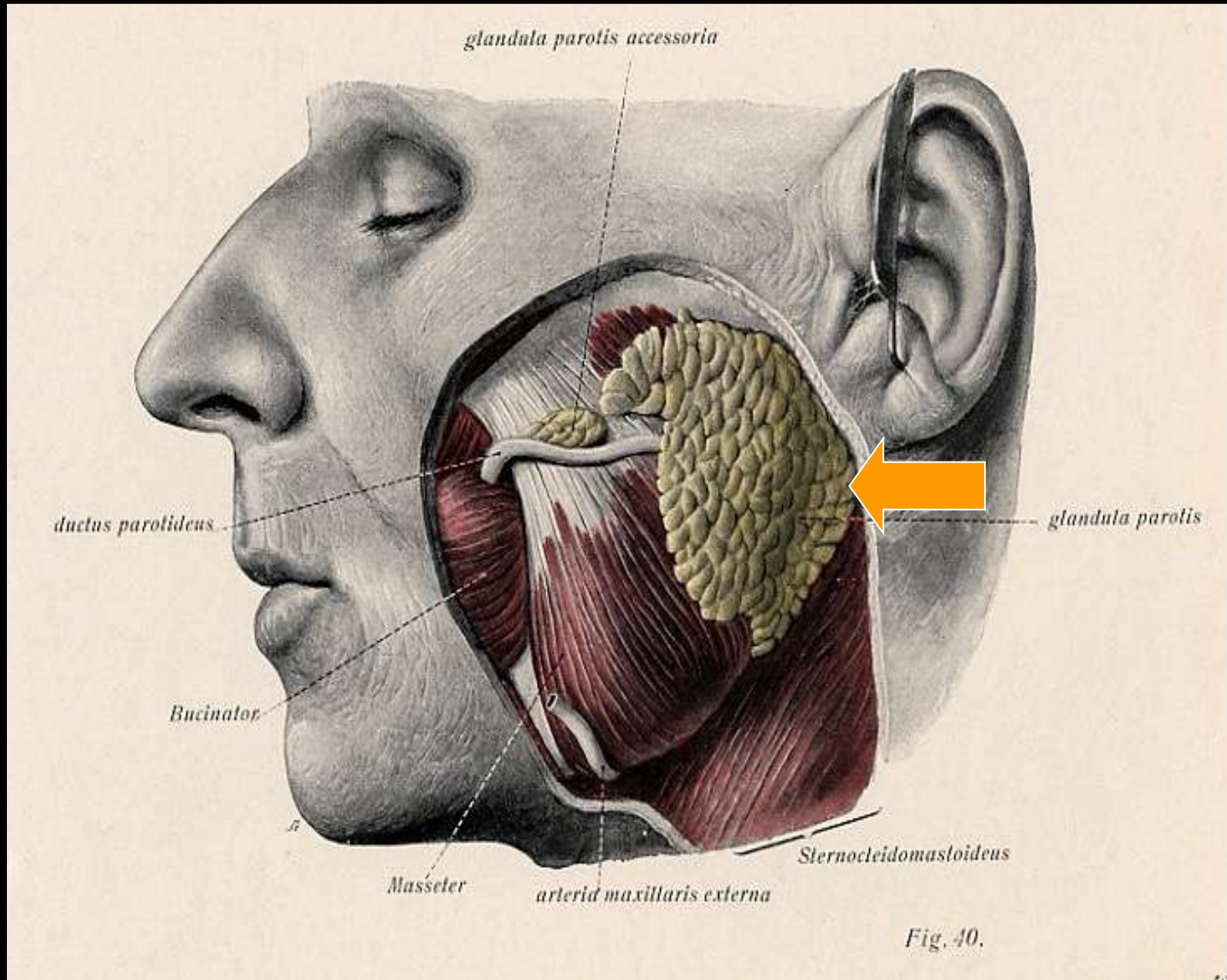


Fig. 42.



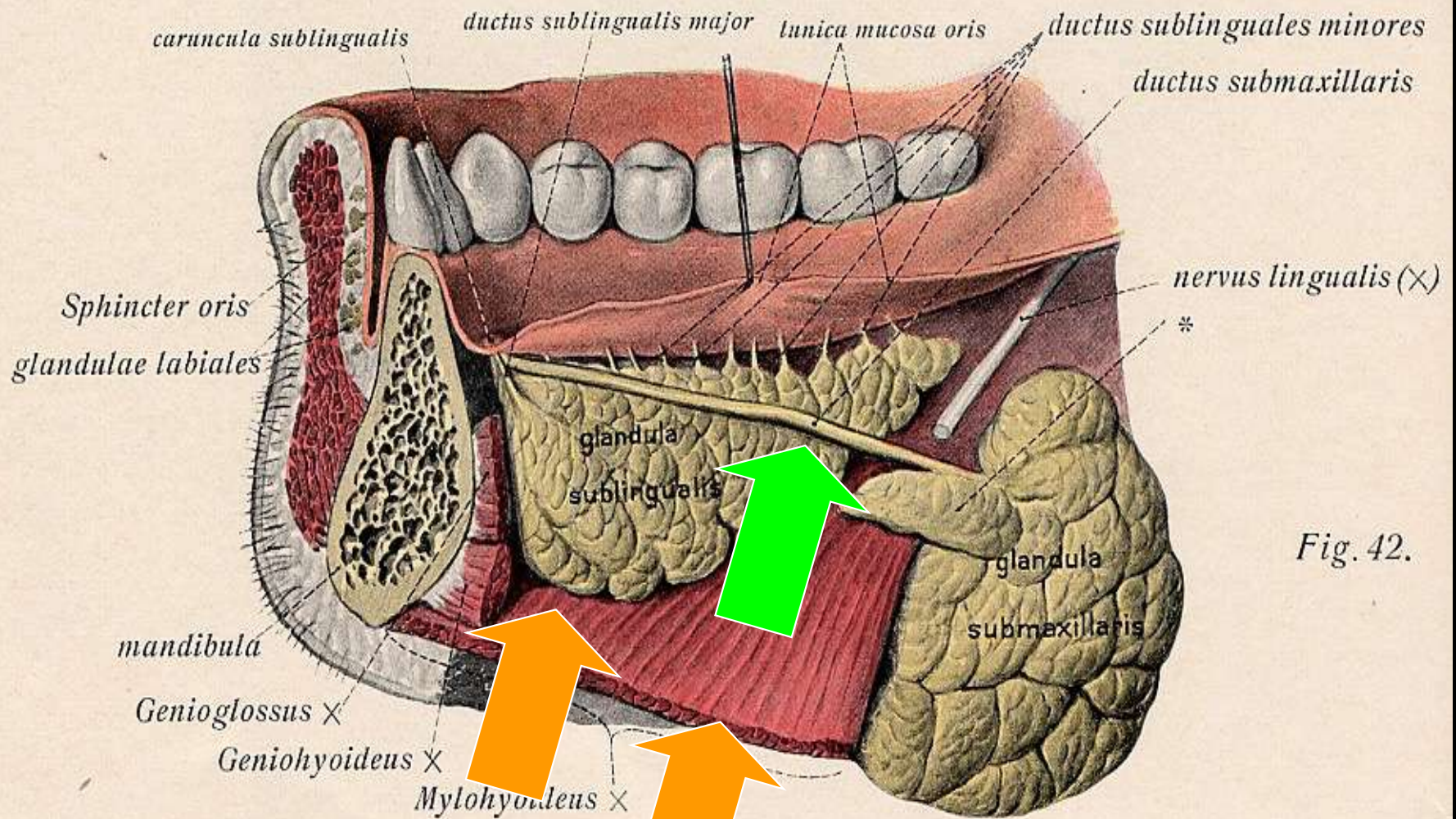
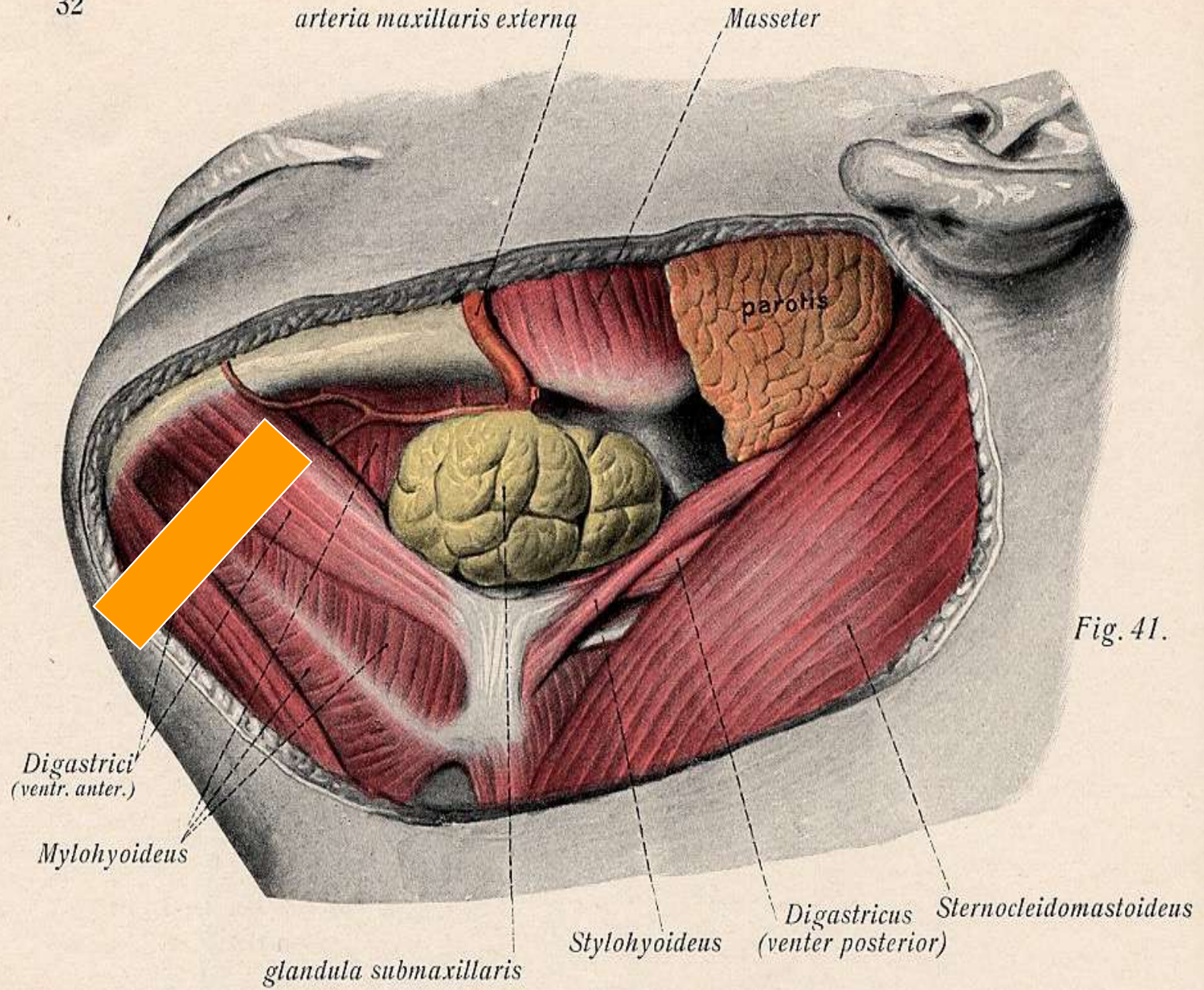
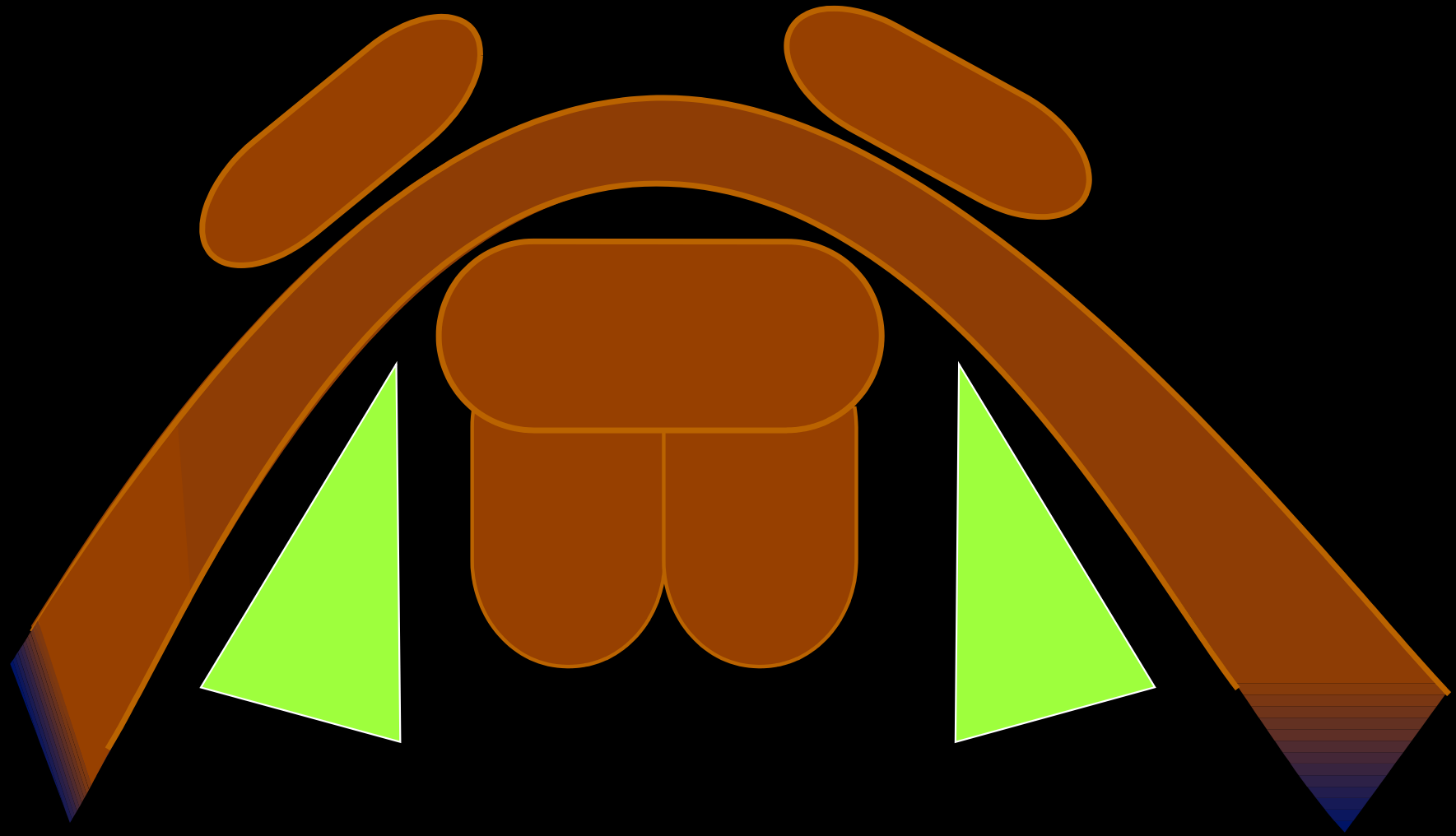
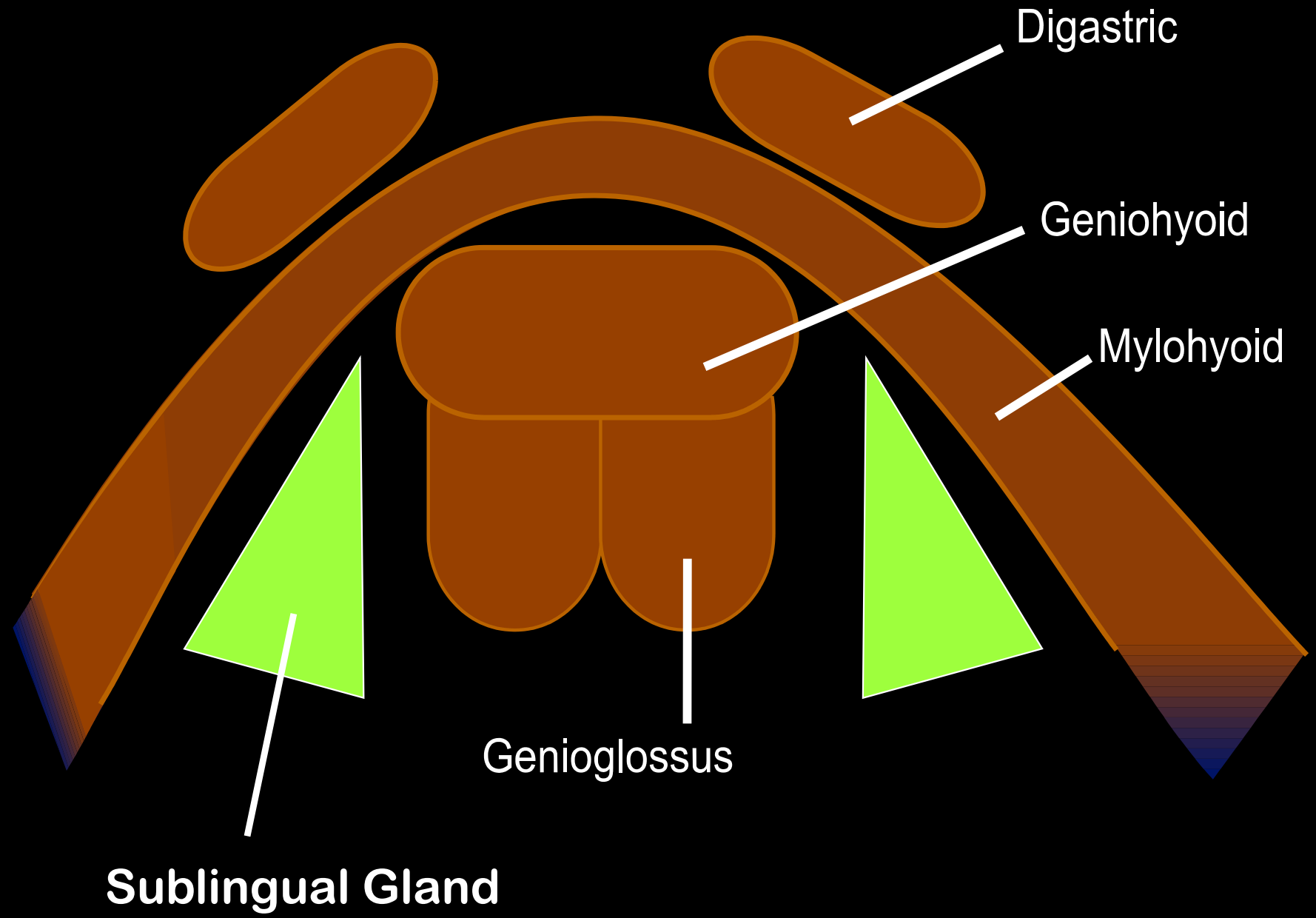
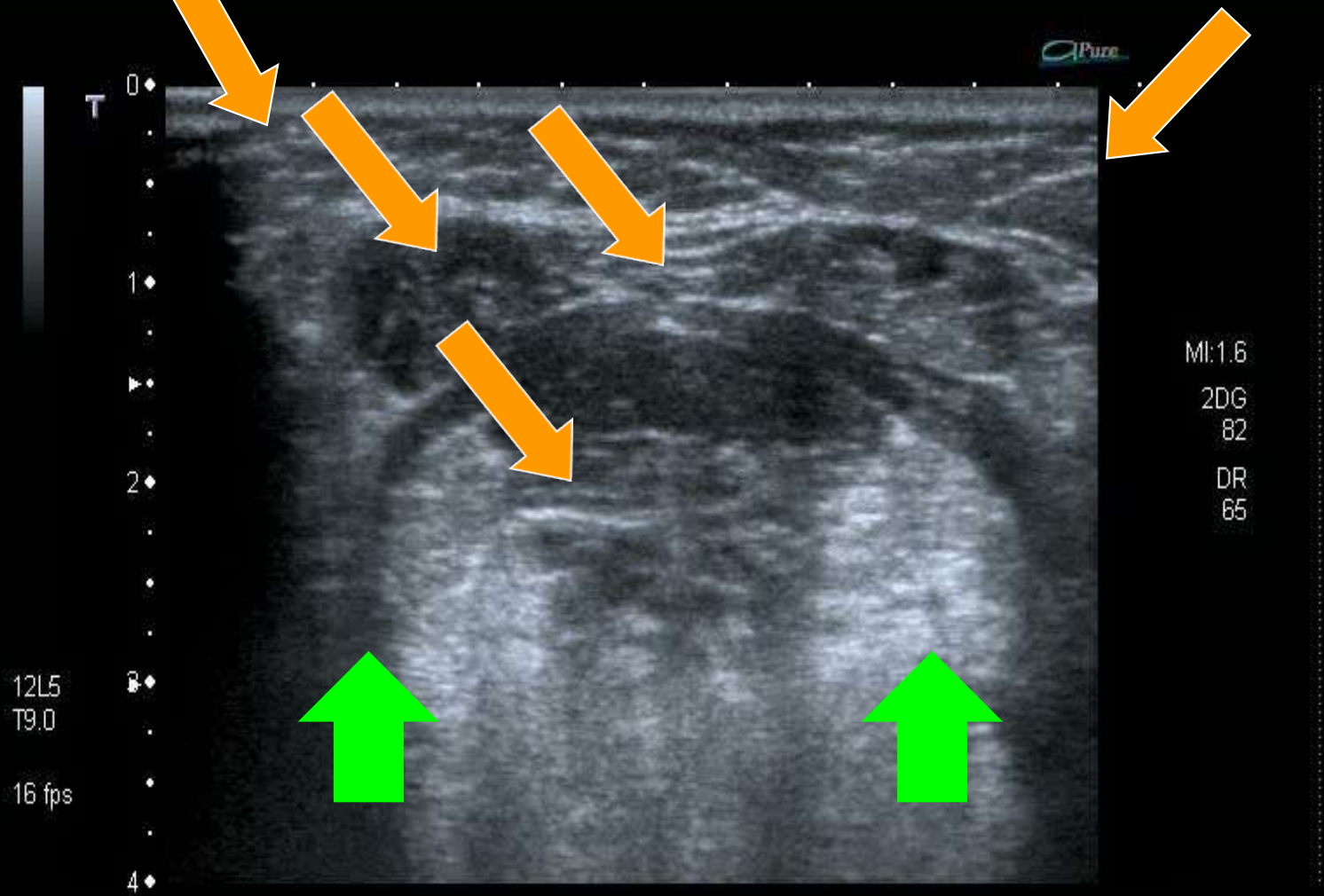


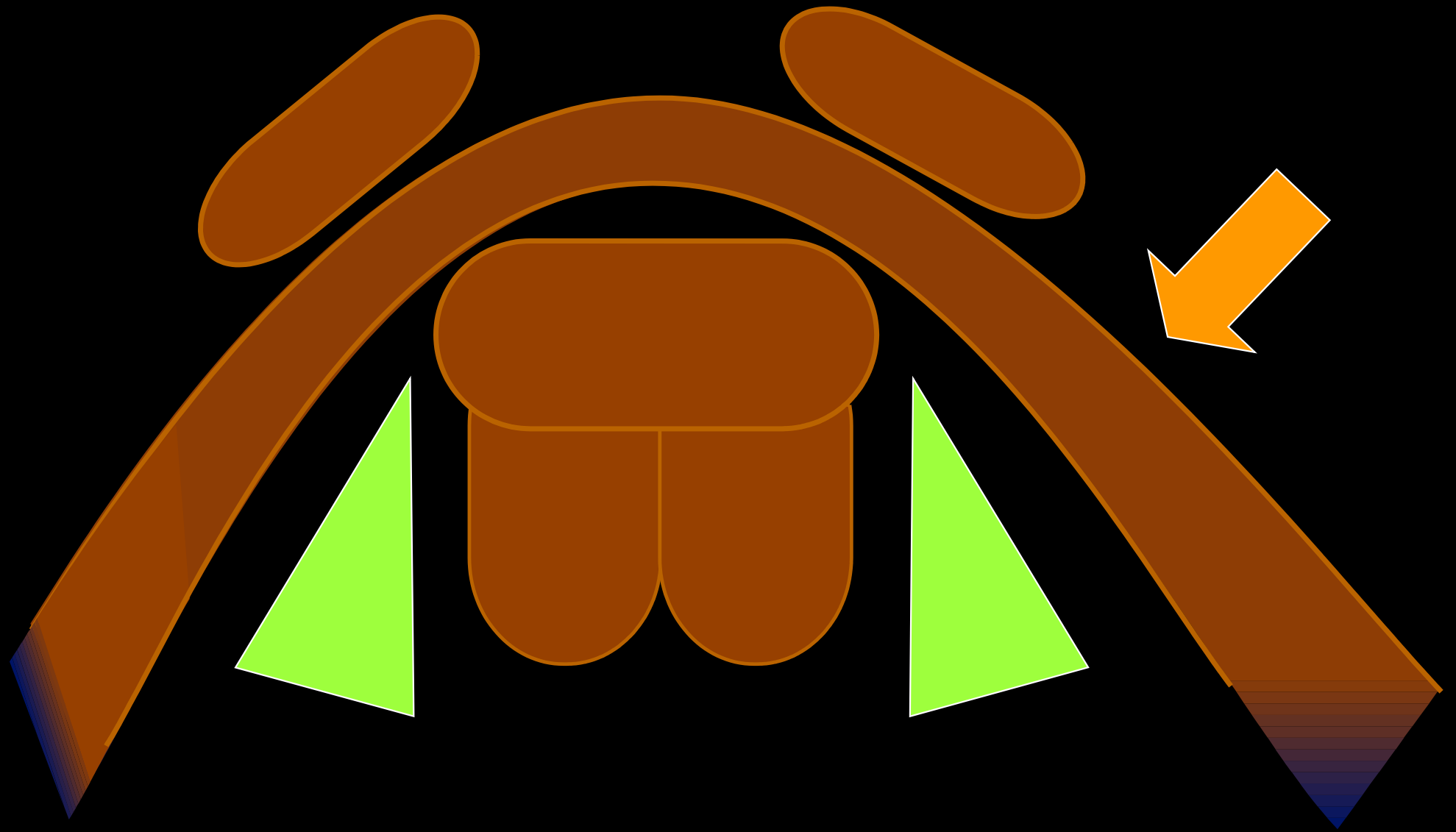
Fig. 42.

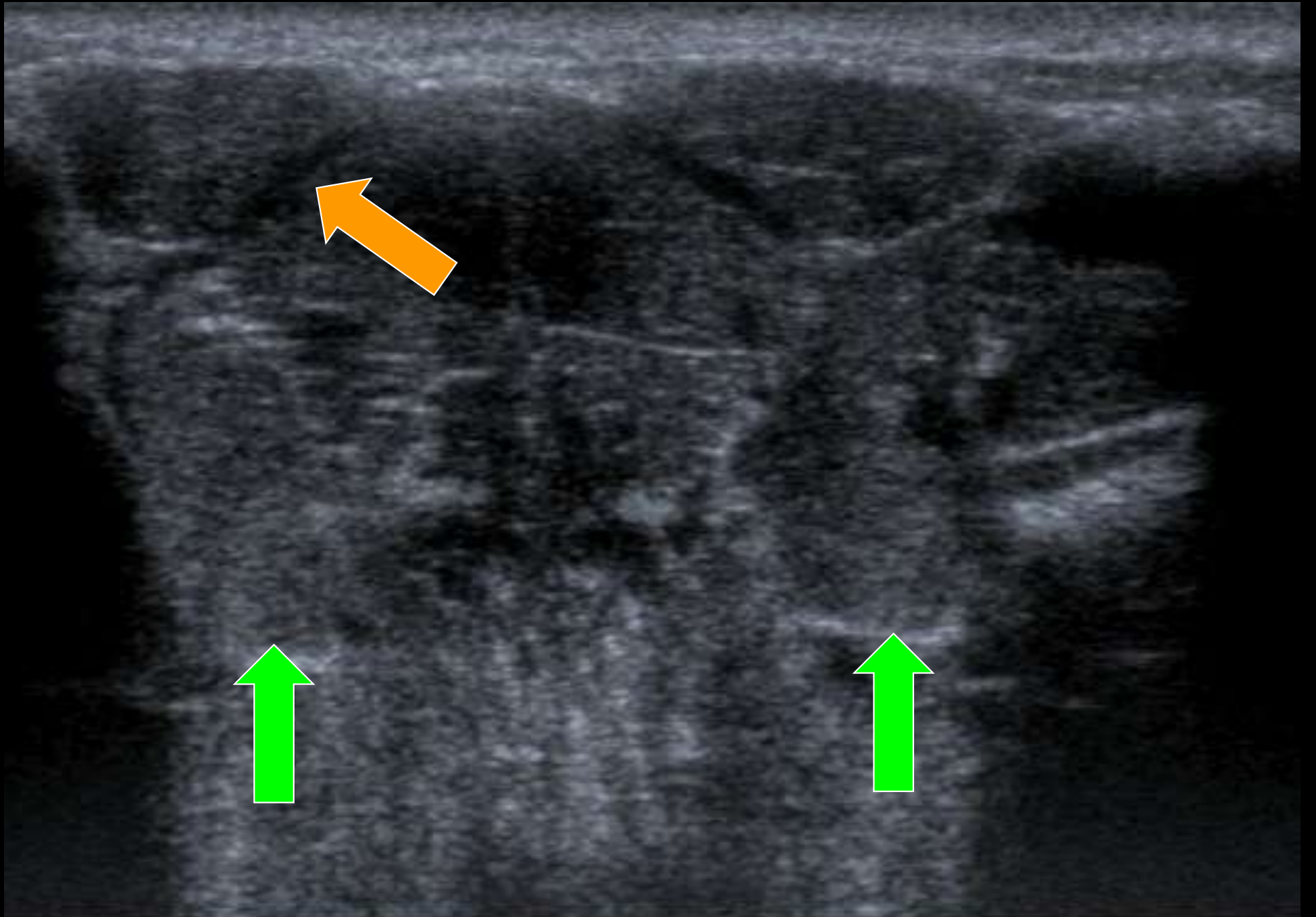


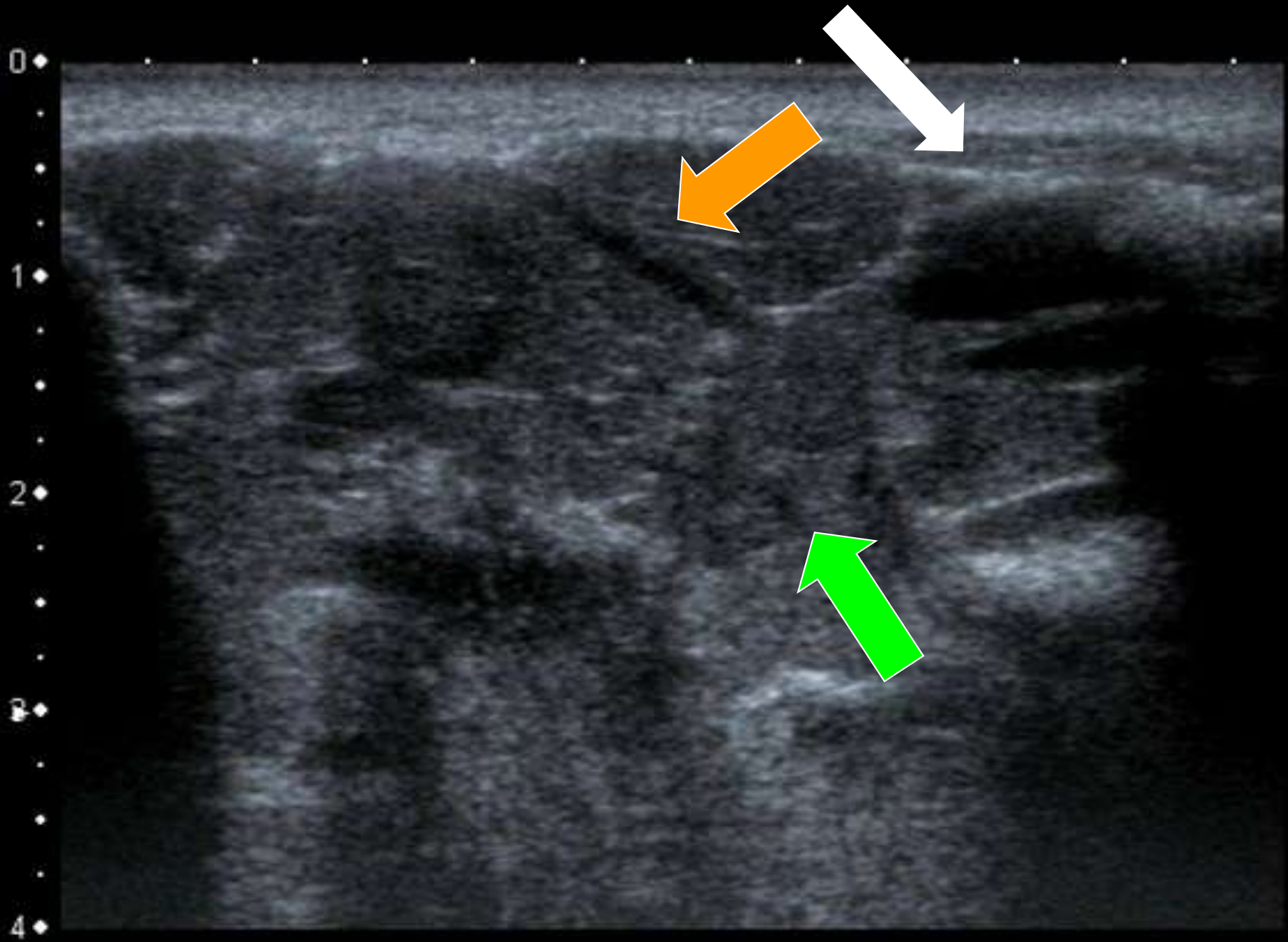


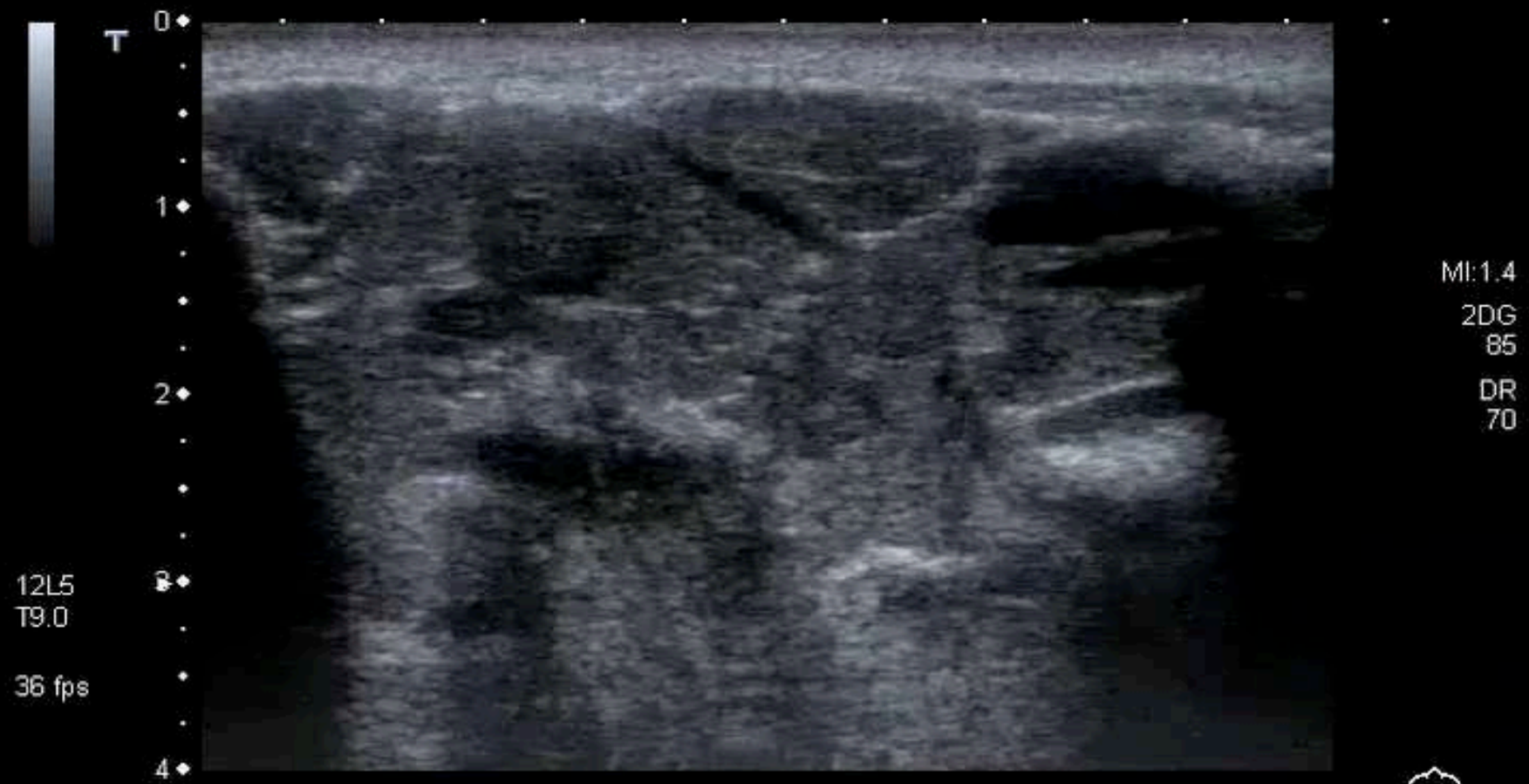


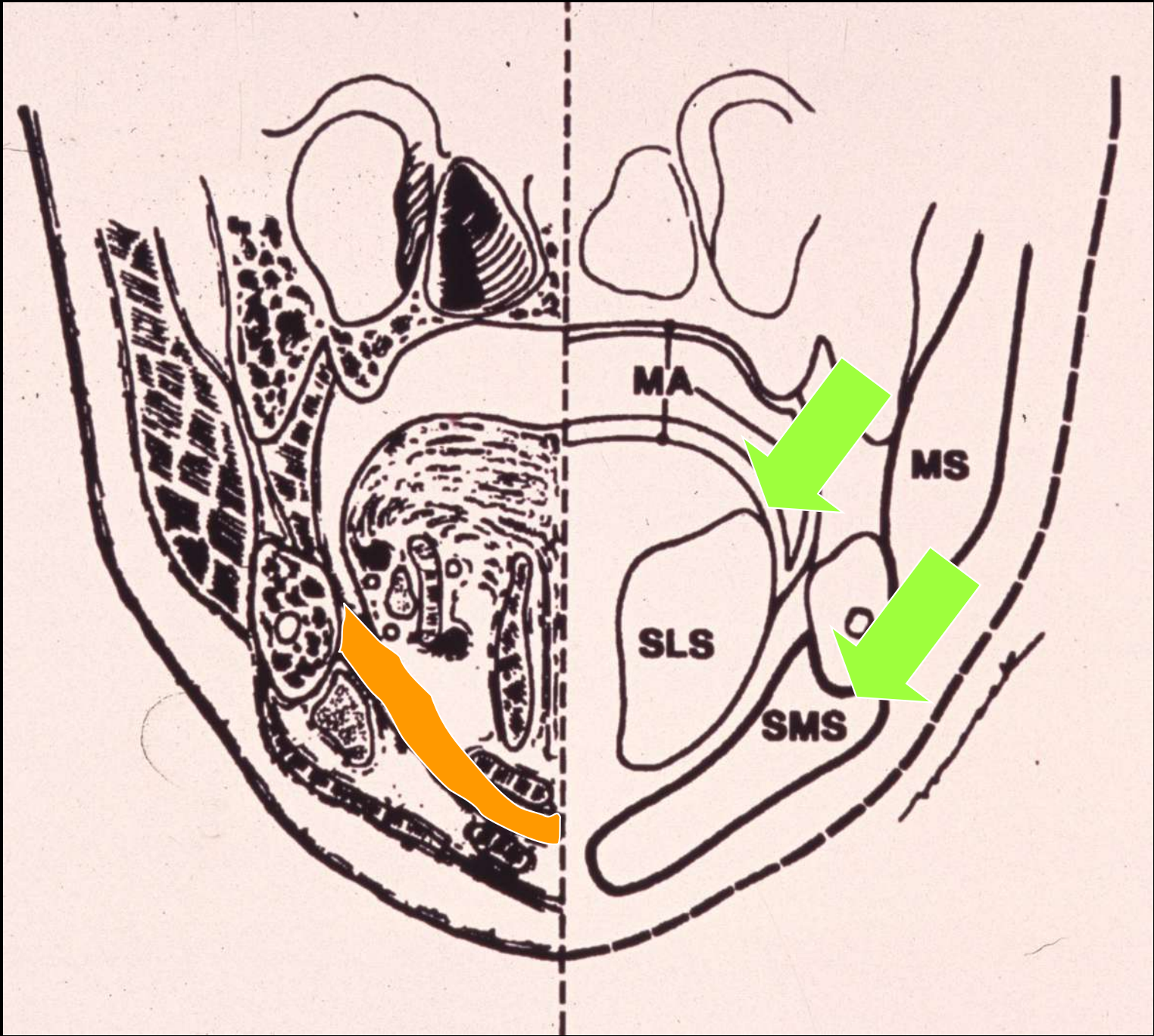


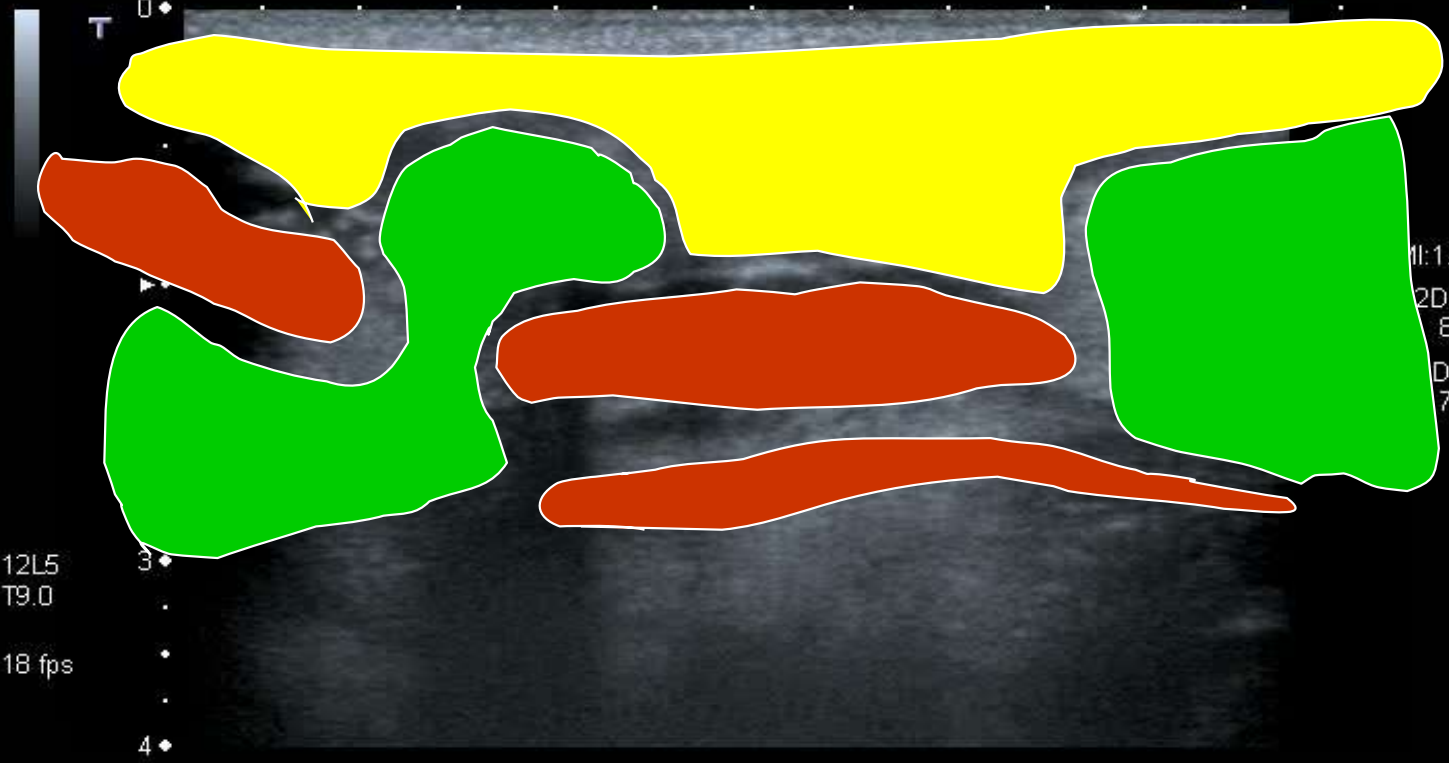






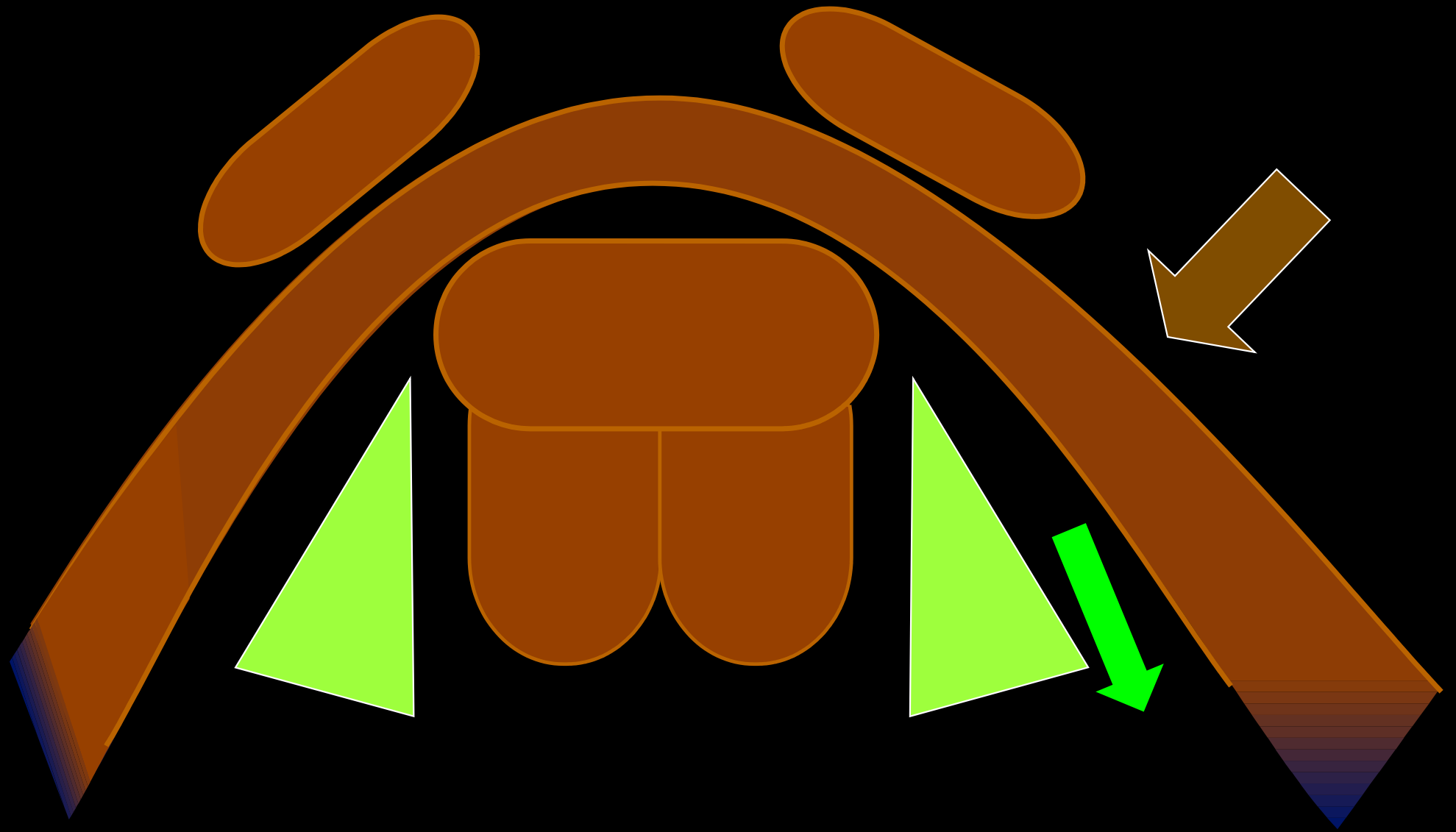






QPure



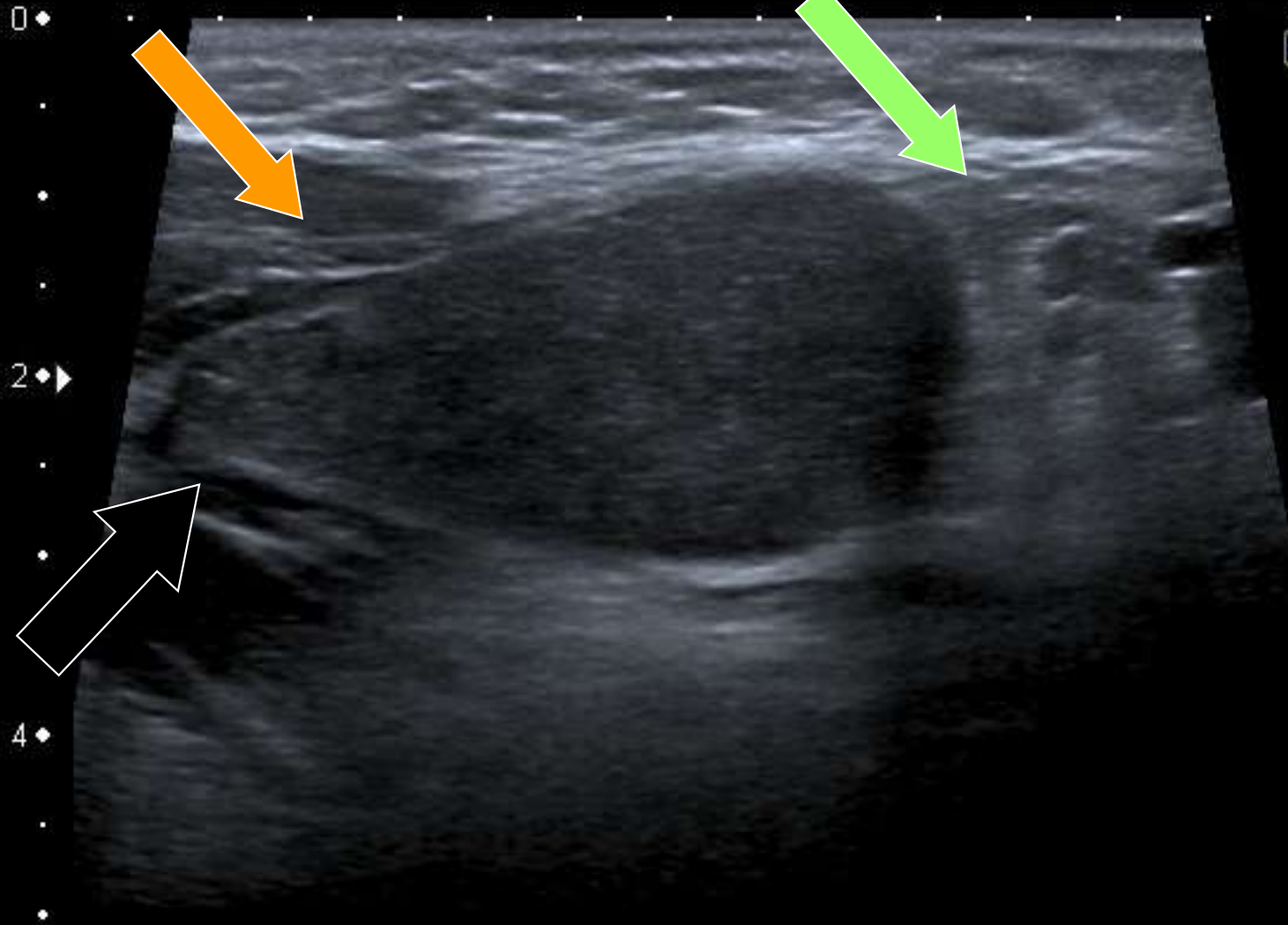




0 ◆
2 ◆▶
4 ◆

12L5
diffT8.0

34 fps



MI: (1.6)
2DG
80
DR
65

TOSHIBA 00926760:ULYETT FIONA 36 F
MORRISTON HOSPITAL - -

Thyroid

1.11.2011
3:27:46 PM

Precision Pure+



0 ◆
◆
◆
2 ◆▶
◆
◆
4 ◆
◆
◆

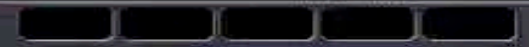
12L5
diffT8.0
34 fps



MI:1.6
2DG
80
DR
65

A 4 IP6

HDD:49% Free



Submandibular glands

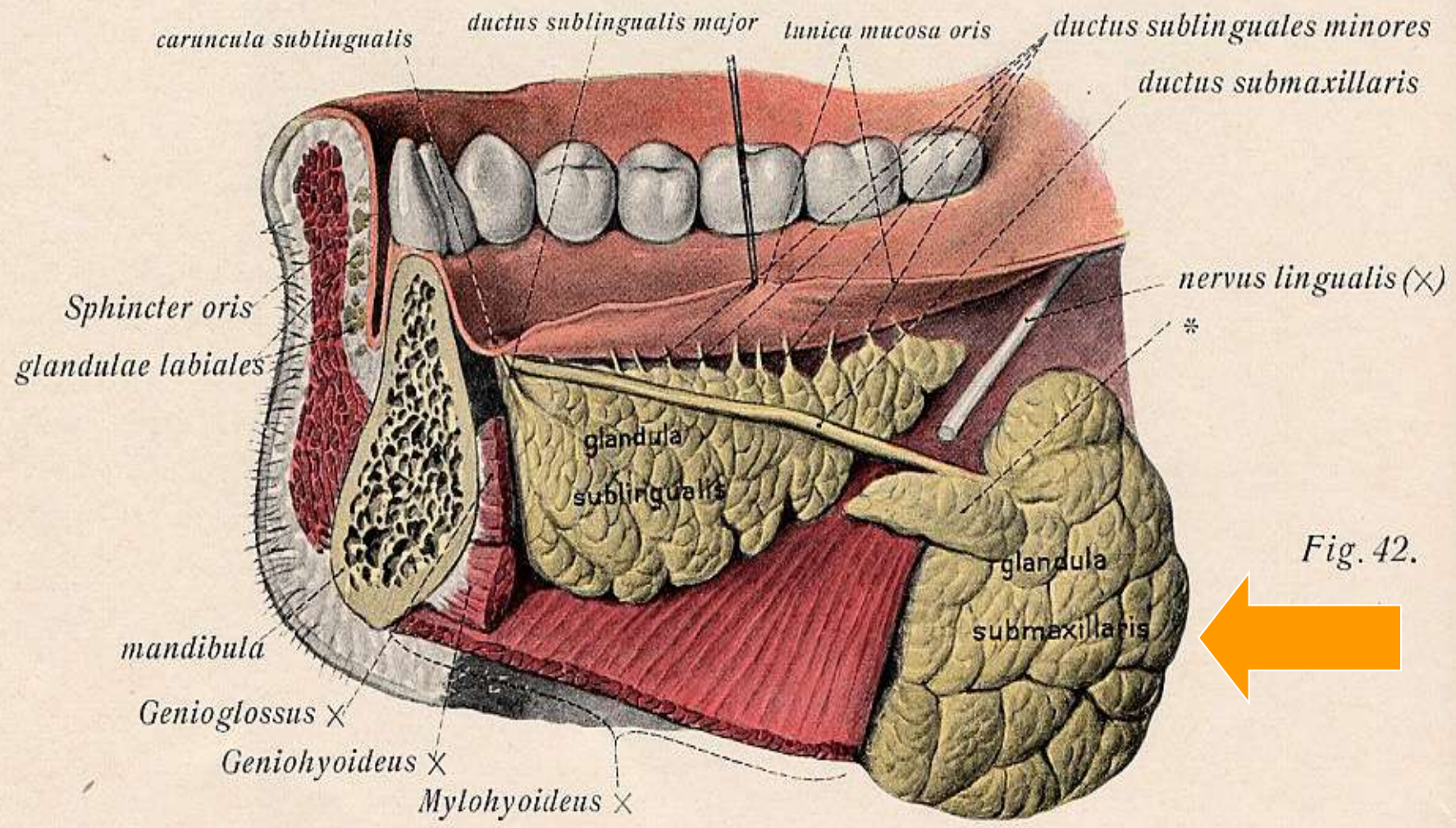


Fig. 42.



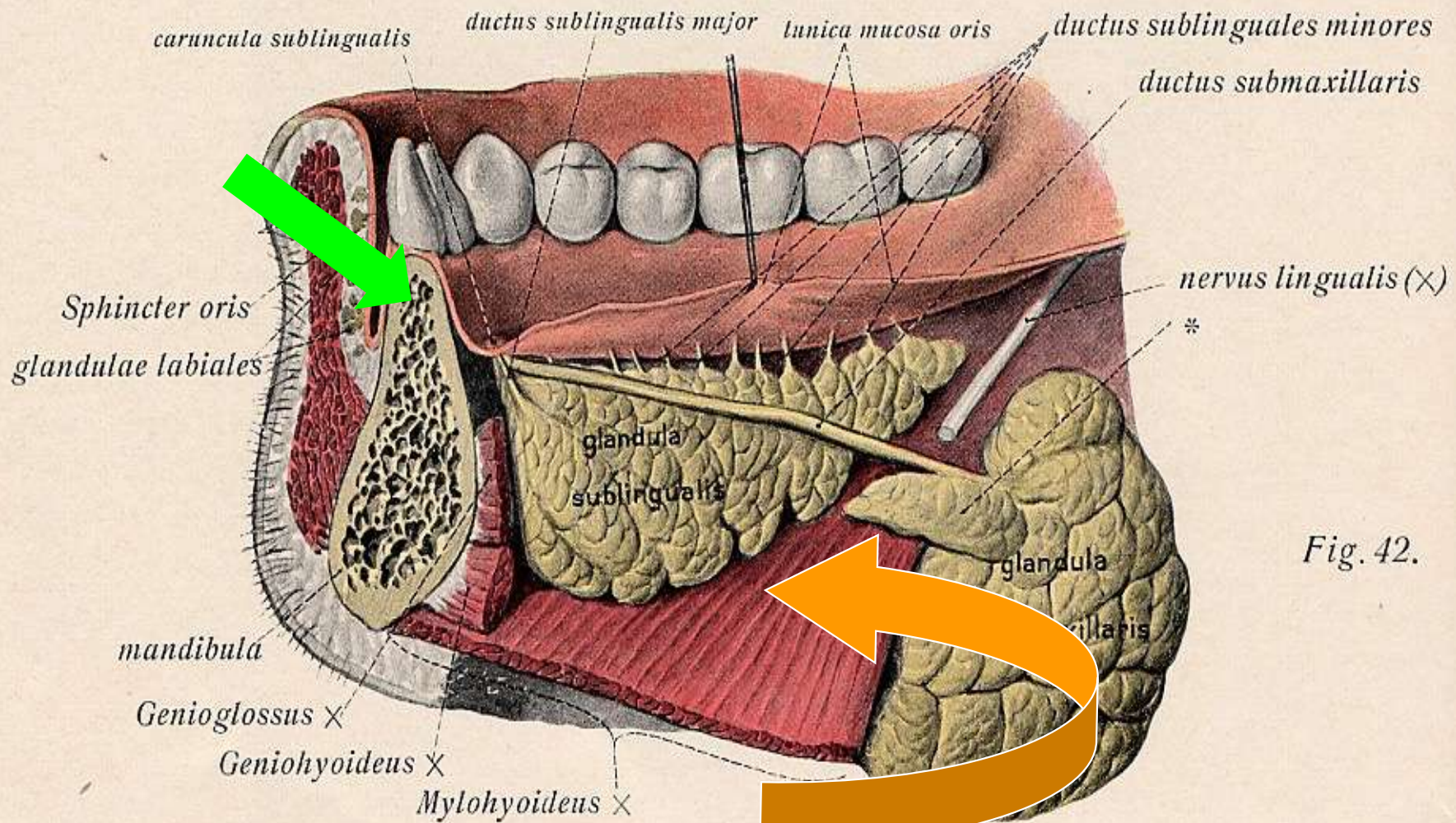
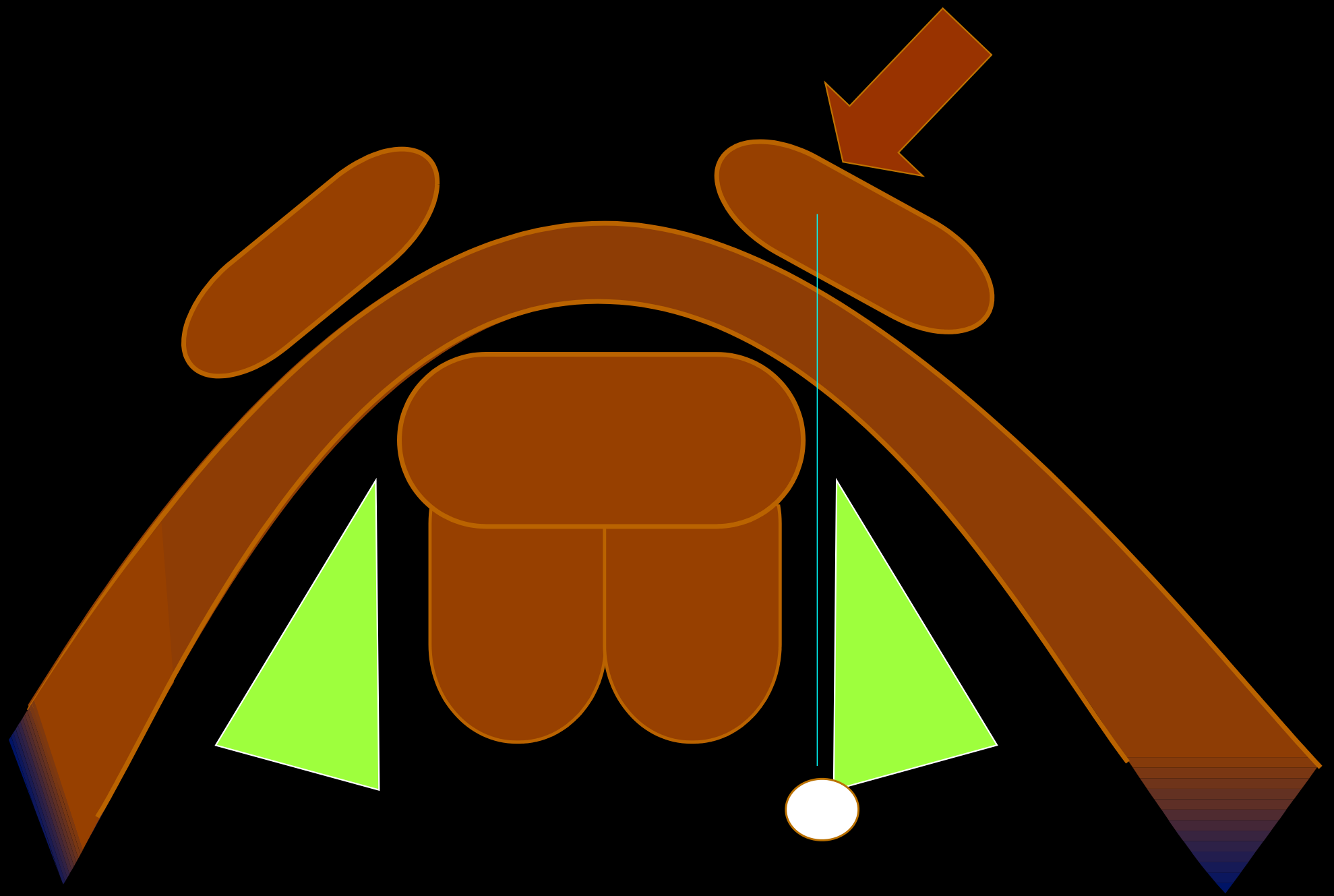


Fig. 42.





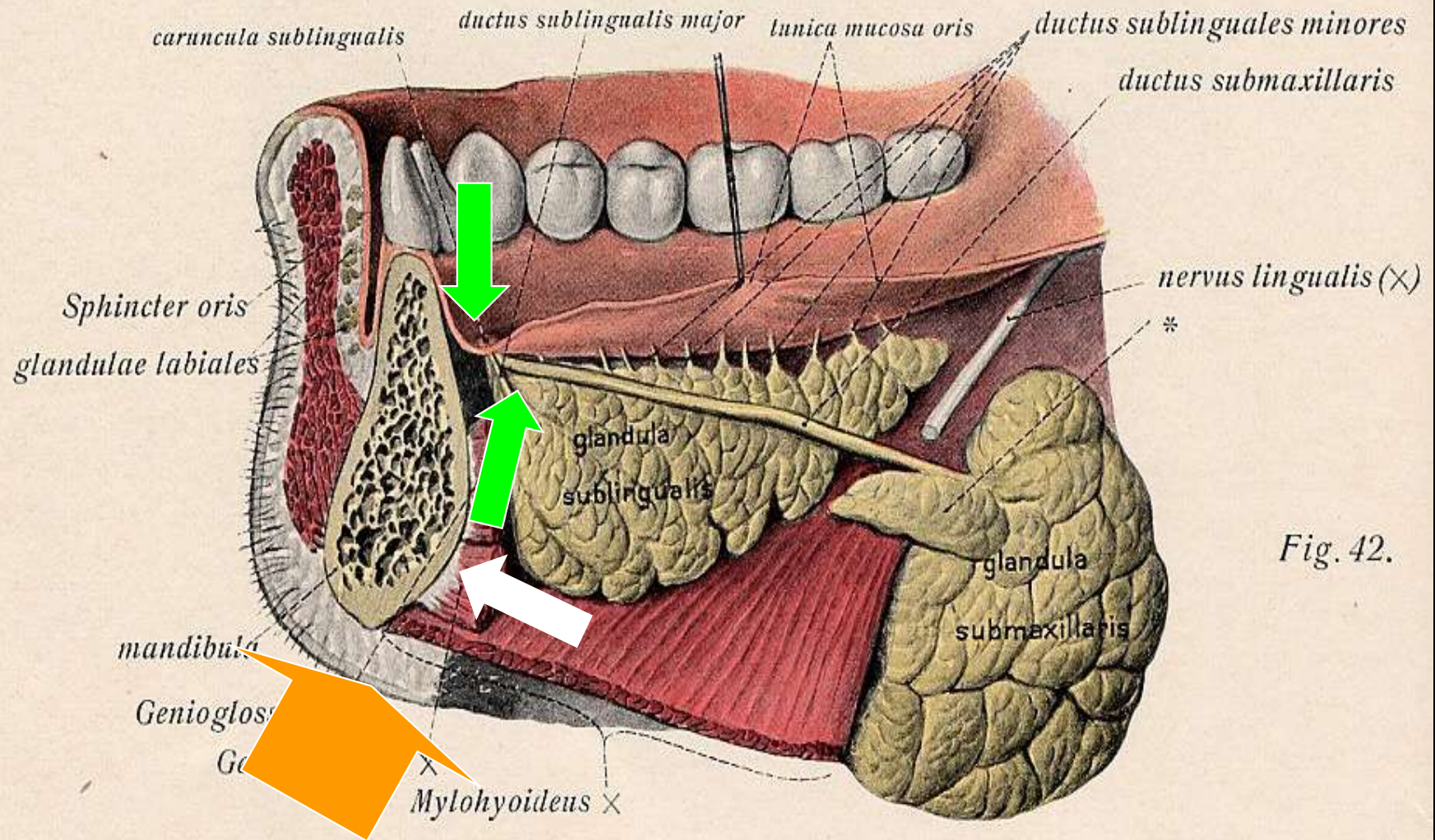
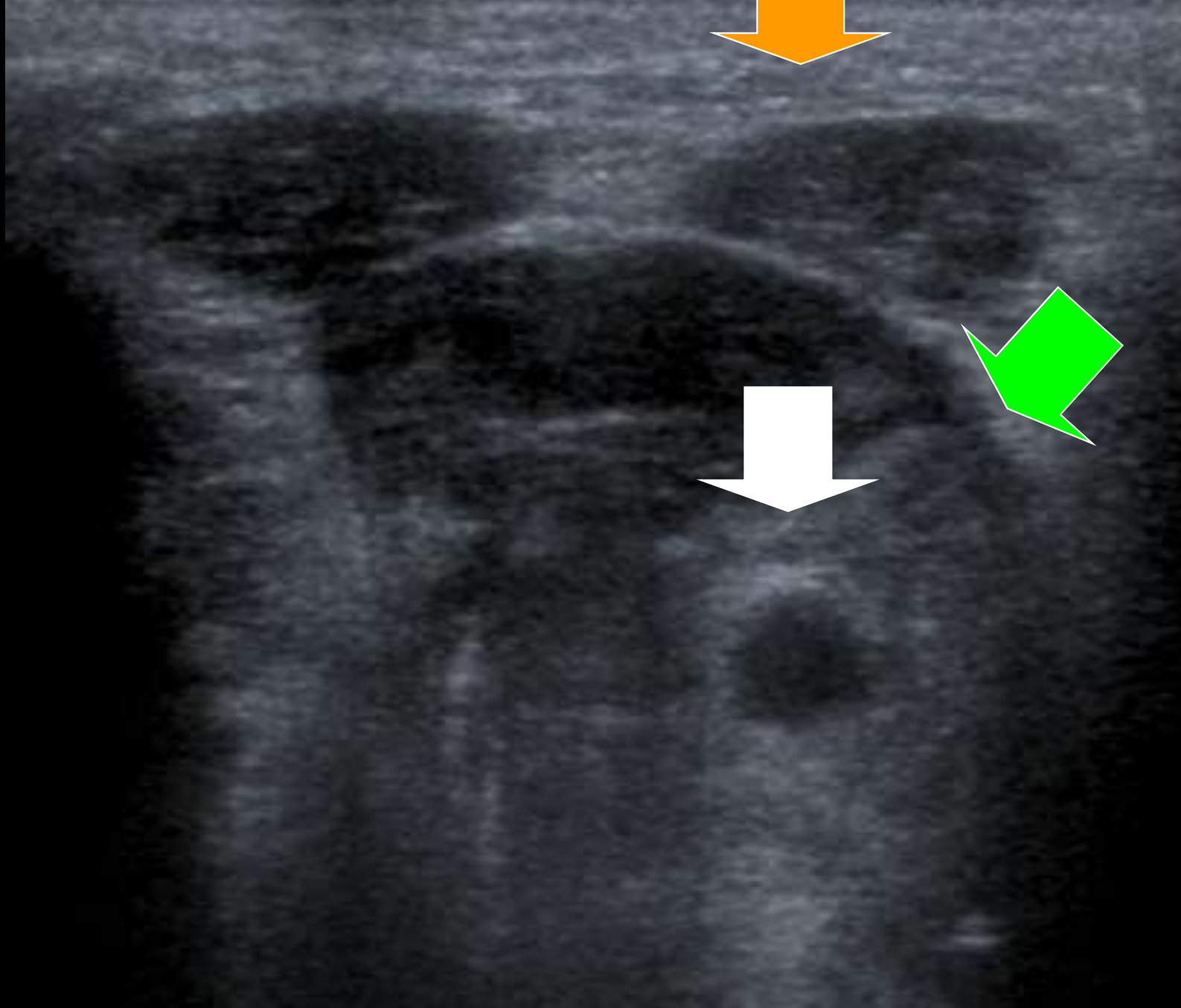


Fig. 42.



APure



0 ♦ T

2 ♦

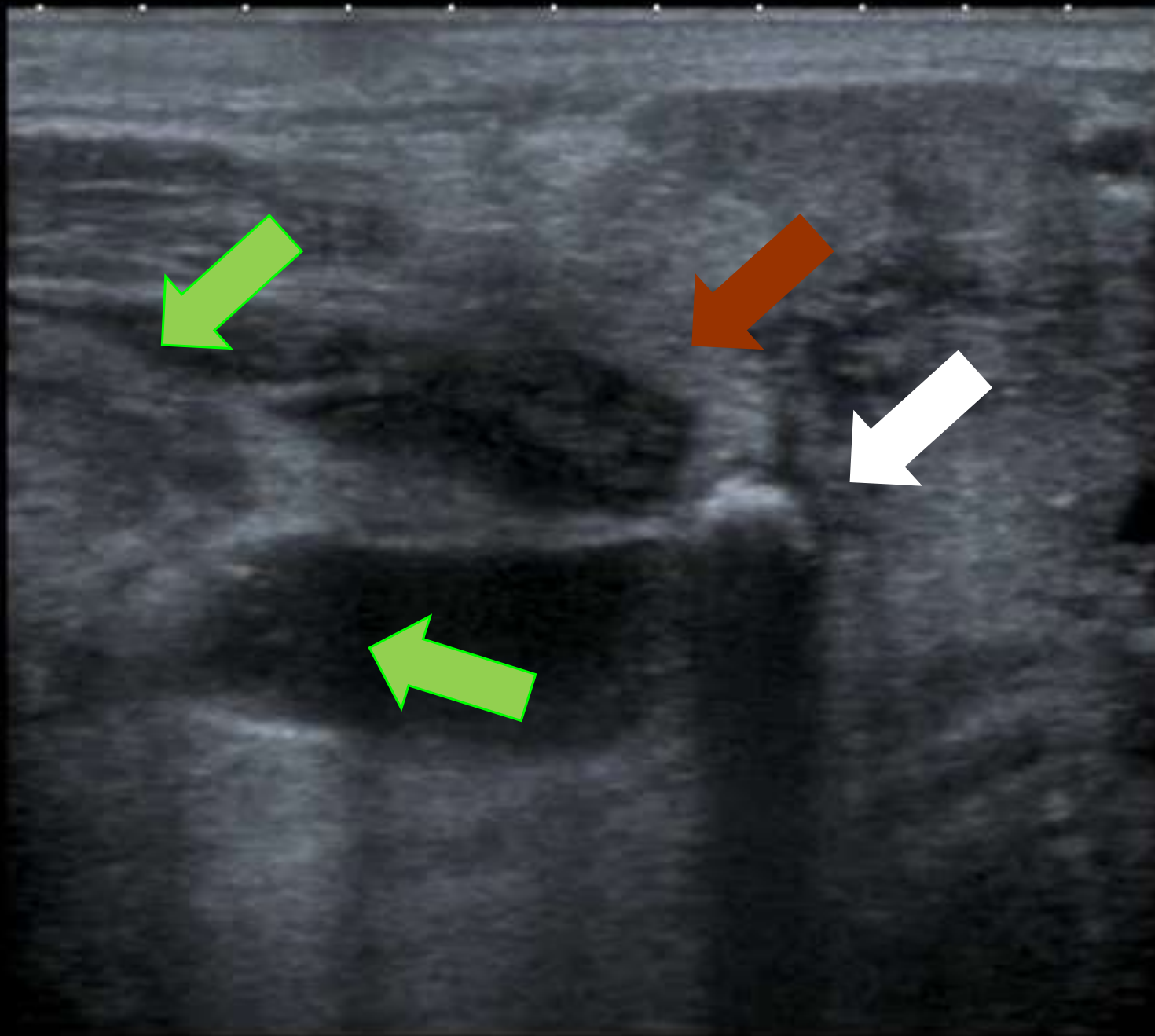
4 ♦



MI:1.6
2DG
97
DR
70

12L5
T9.0
18 fps





QPure

0 ◆ T
.
.
.
2 ◆
.
▼ ◆
.
4 ◆
.
.
12L5
T9.0
18 fps



MI:1.6
2DG
97
DR
70



Calculi - submandibular

- Ultrasound routinely used for detection of submandibular calculi
- 85% of calculi in Wharton's duct
- 35% found at genu – bend around mylohyoid
- 20% found in mid duct
- 30% found in region distal duct

Ref : Salivary gland calculi – contemporary methods of imaging. PolJRadiol.2010 Jul-Sept ; 75 (3) :25-37.

Calculi - submandibular

- Sensitivity for calculi : 59.1% – 93.7%
- 30% stones impacted at ostium – may not be seen
- 65% associated with duct dilatation

Ref : Diseases of the submandibular gland as demonstrated using high resolution ultrasound . BJR A 1, 2005 vol. 78 no. 928 362-369

Precision APure+

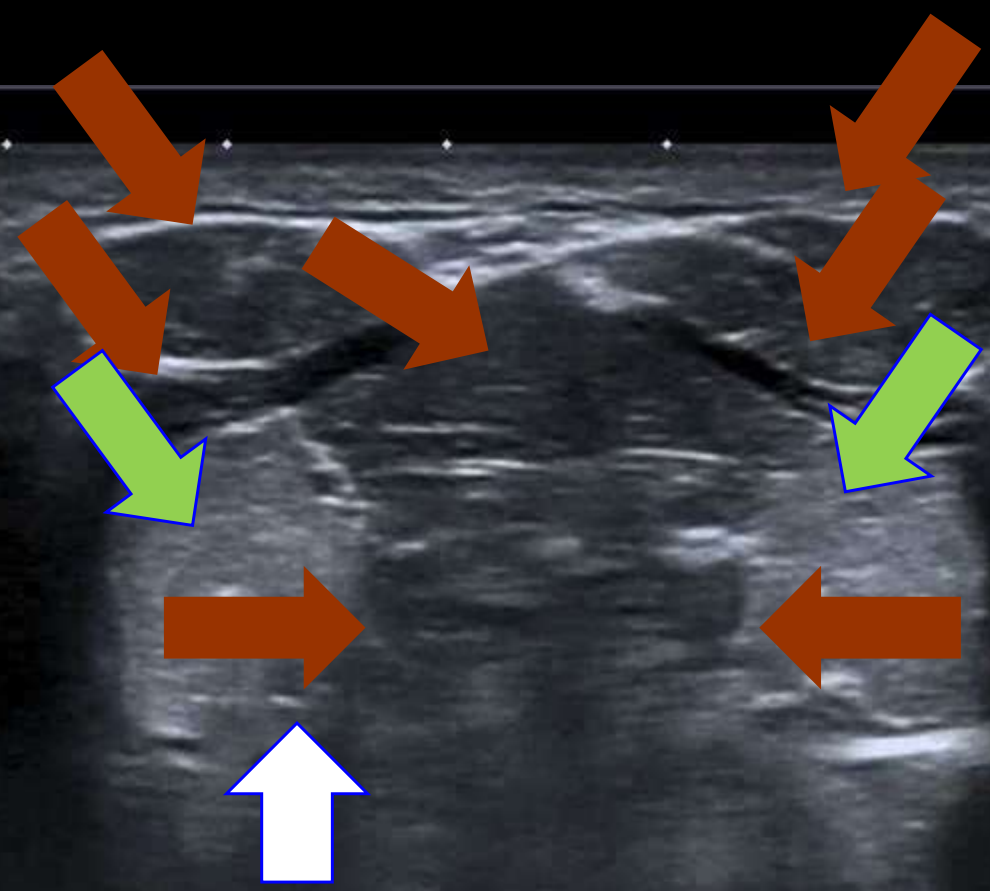


12L5
diffT9.0
32 fps
G:79
DR:75
A:6
P:3

0
1
2
3
4
4.5

CG RT

727



TOSHIBA

SM TEST:- -

28.11.2013

Aplio 500

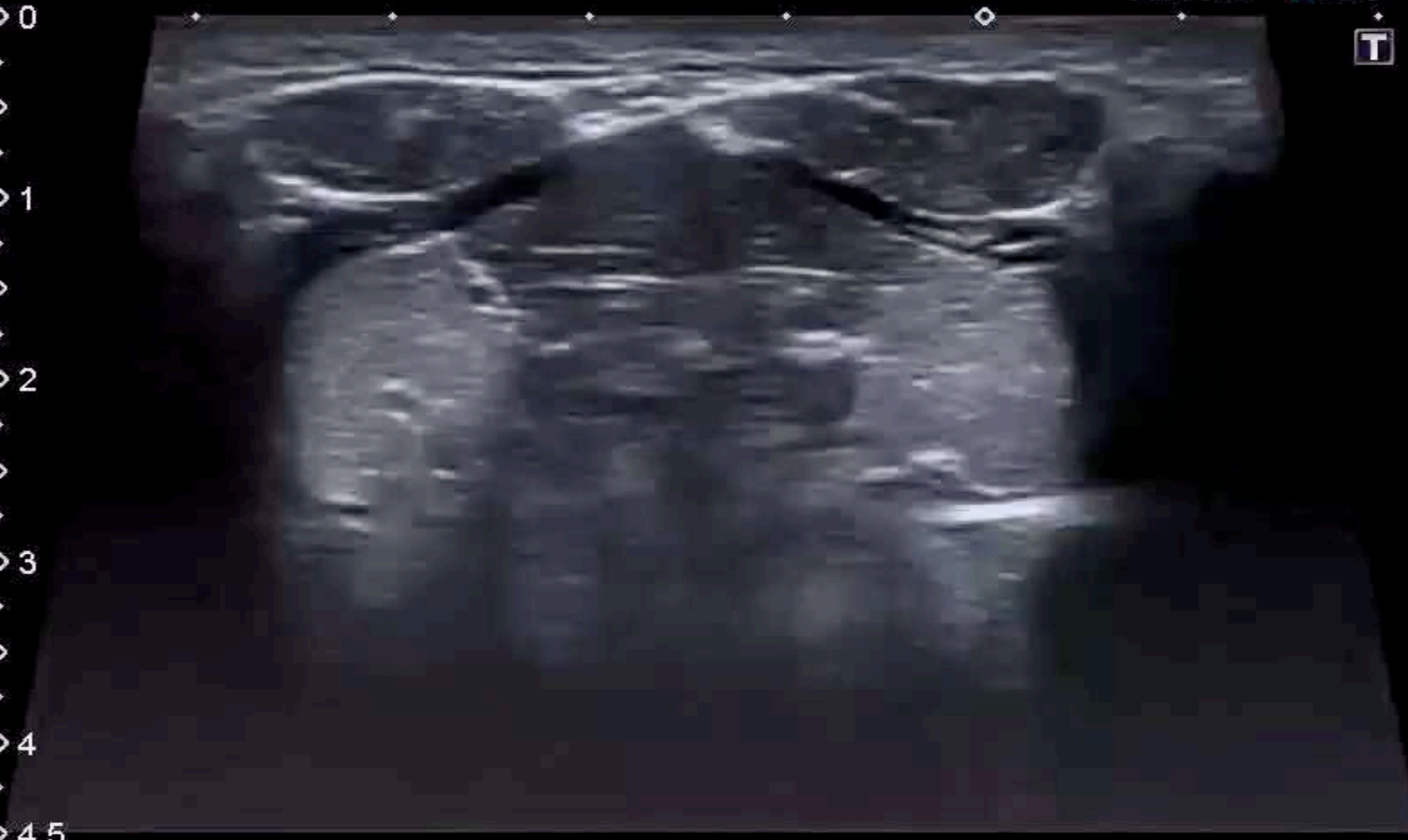
SINGLETON HOSPITAL

Thyroid 2

Precision APure+

T

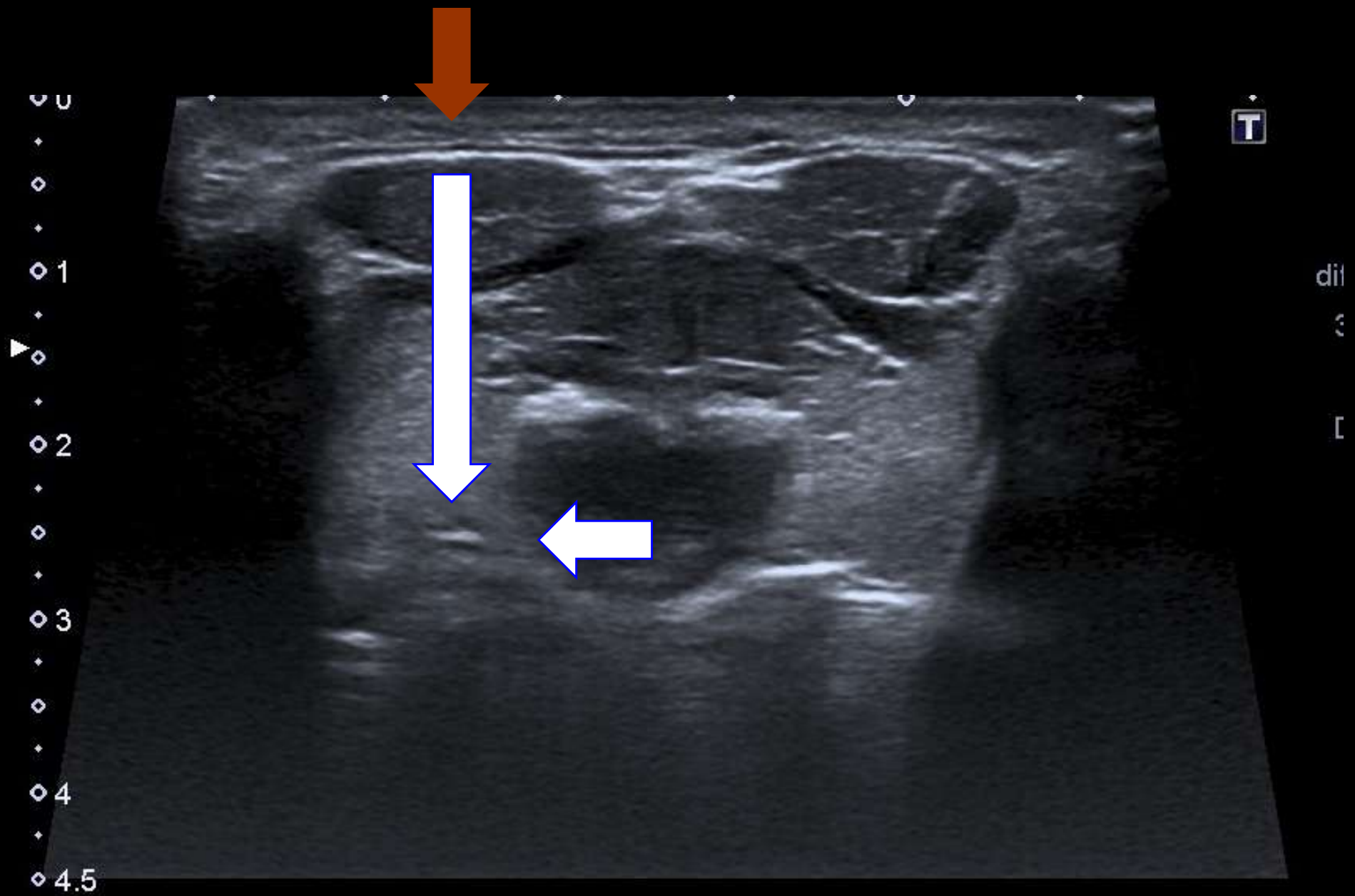
0
+
1
+
2
+
3
+
4
+
4.5



12L5
diffT9.0
32 fps
G:79
DR:75
A:6
P:3

CG RT

727



CG RT

T

12L5
diffT9.0

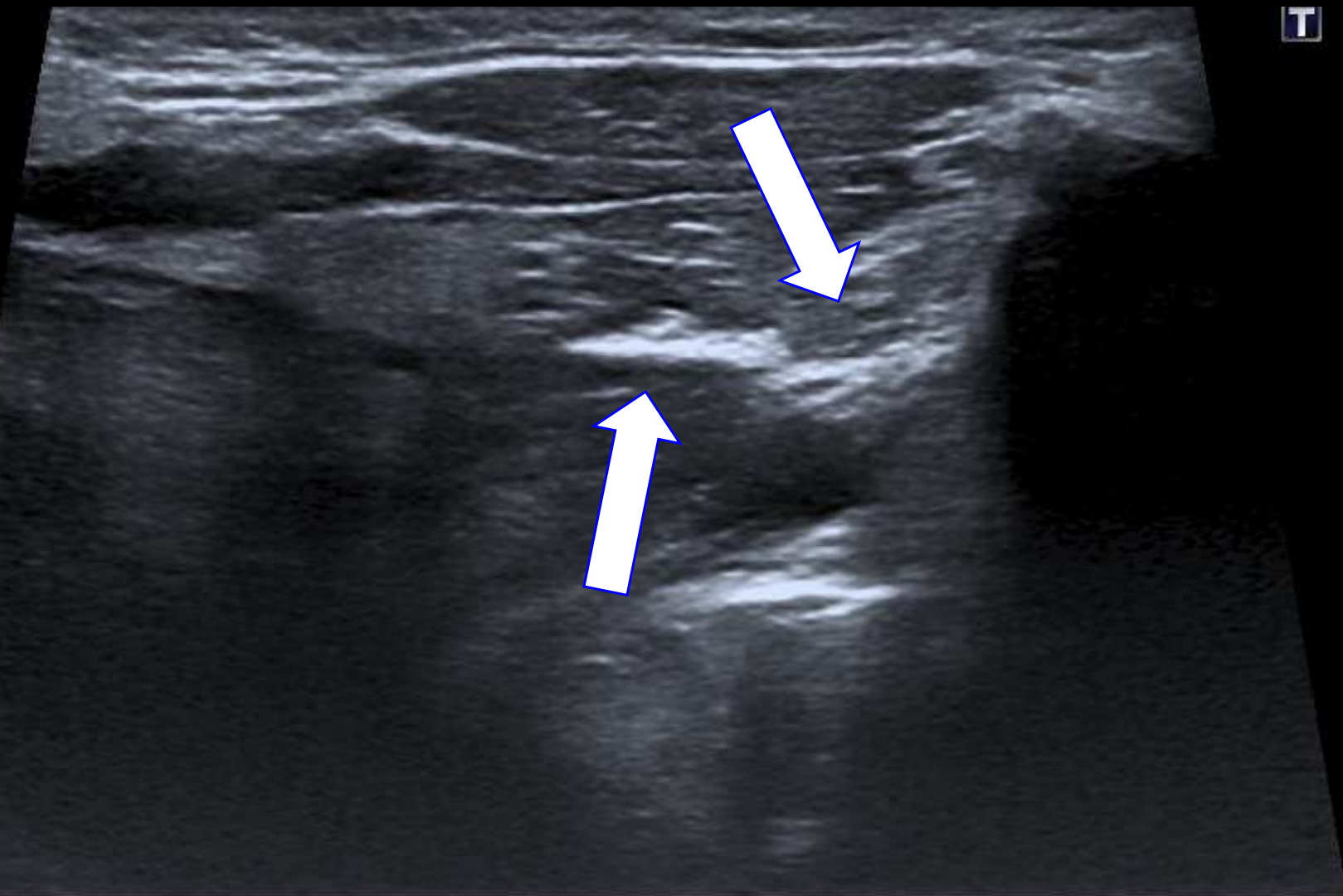
32 fps

G:79
DR:75
A:6
P:3

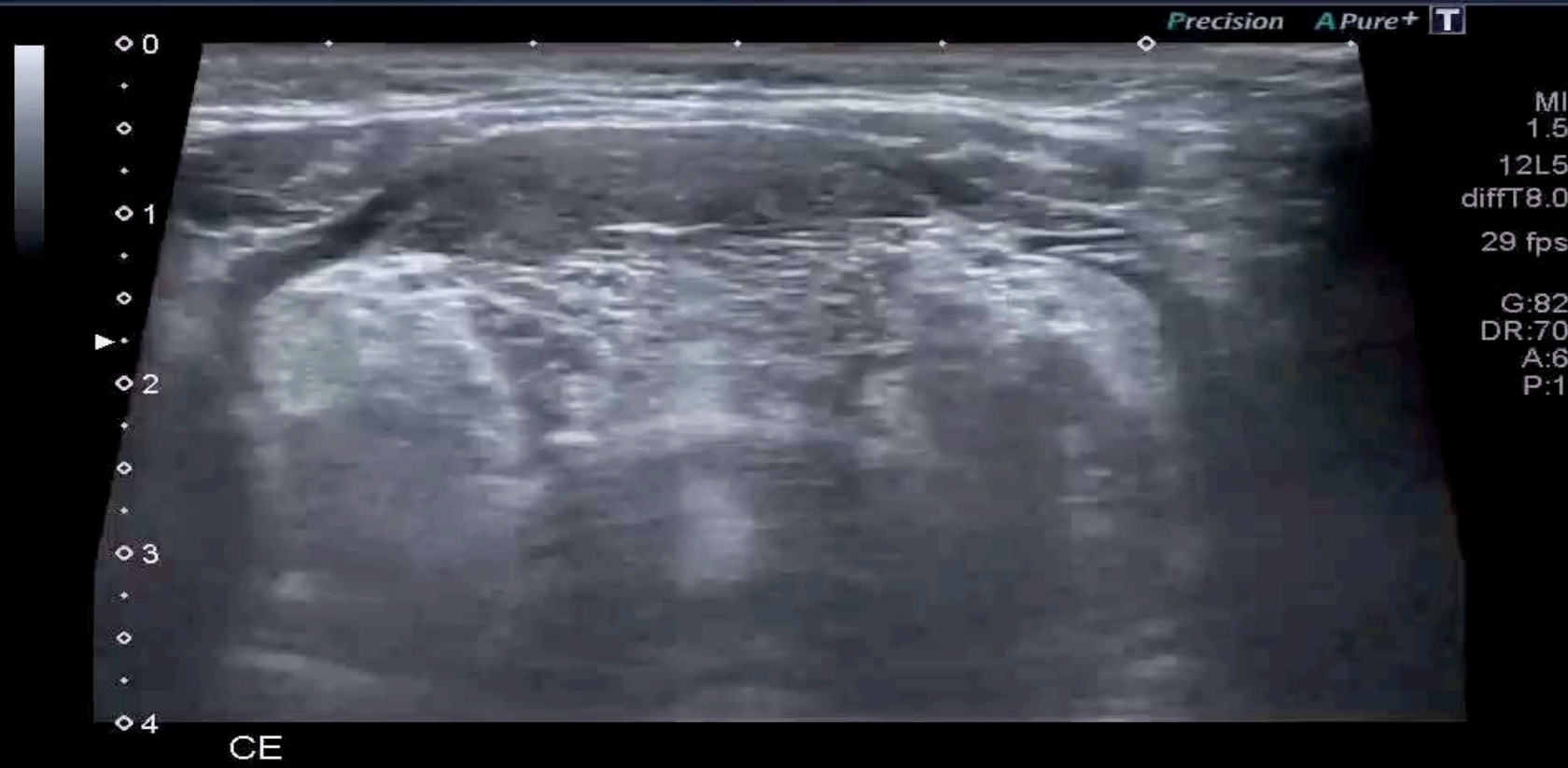
◊
◊
◊ 1
◊
◊
◊ 2
◊
◊
◊
◊ 3
◊
◊
◊
◊ 4
◊
◊
◊ 4.5

CG RT

1000





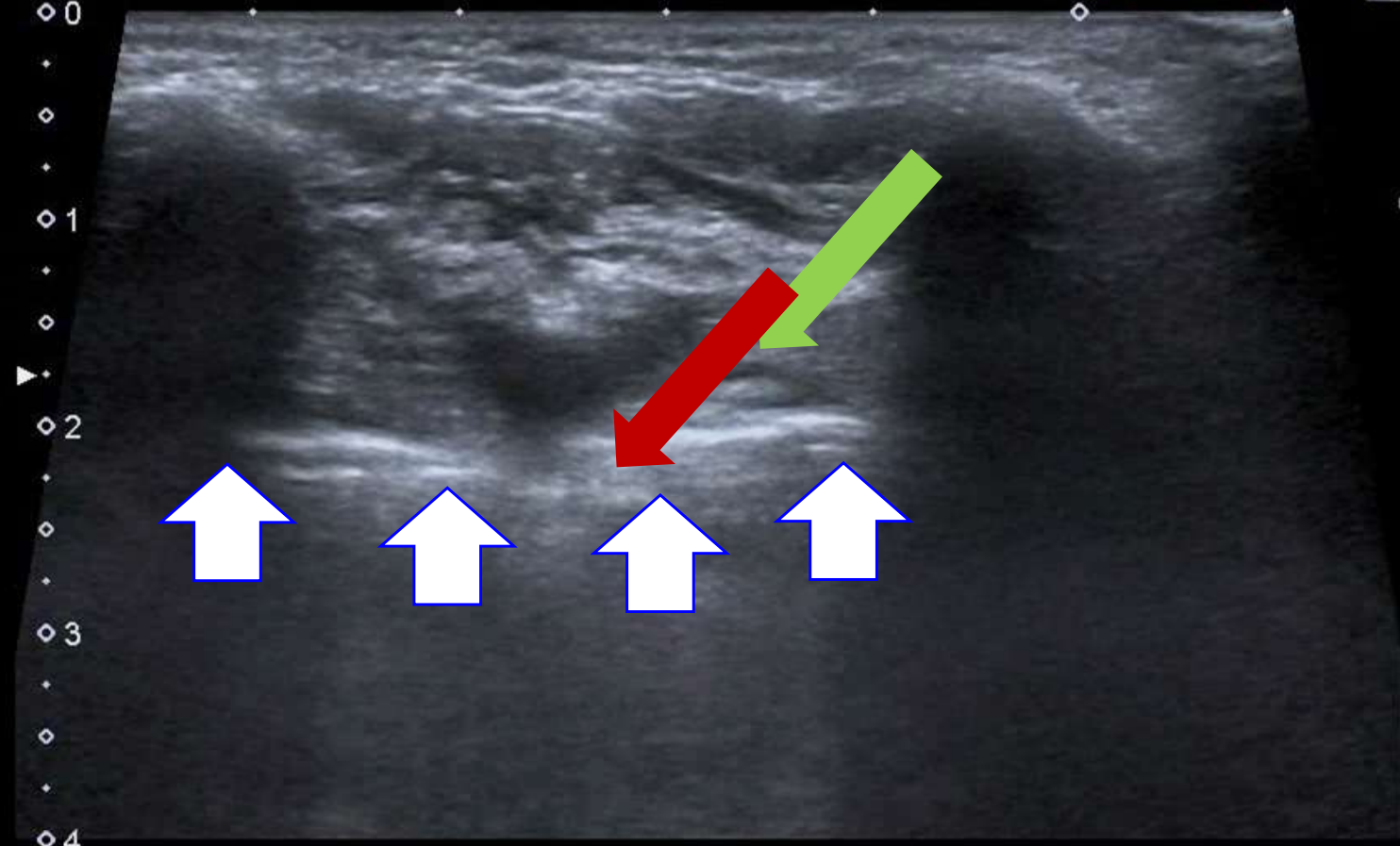


Index finger pressure on papilla

Precision APure+ T

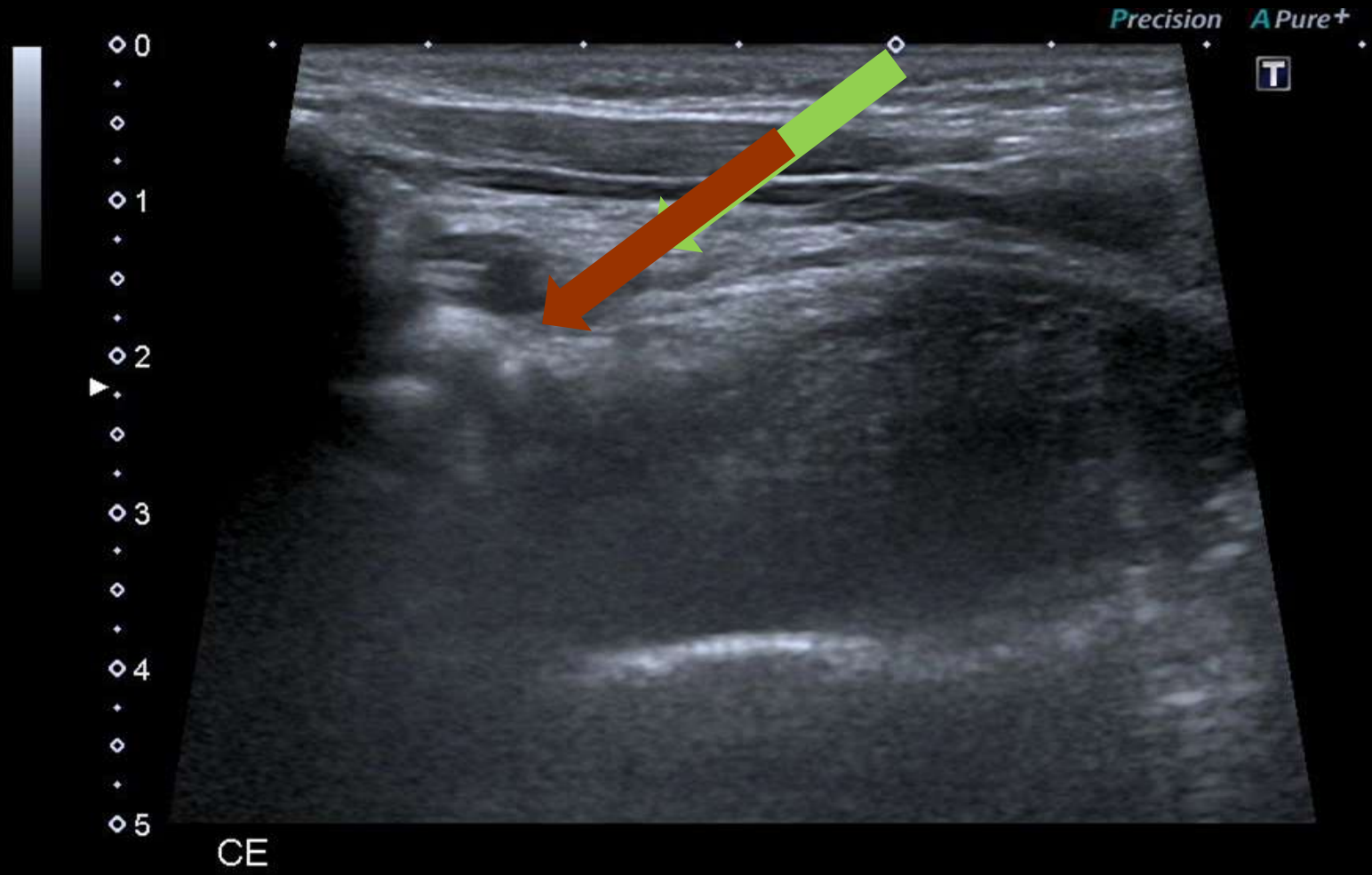


0
.
1
.
2
.
3
.
4



MI
1.5
12L5
diffT8.0
29 fps
G:82
DR:70
A:6
P:1

CE



TOSHIBA
Aplio 500

SM TEST:- -
SINGLETON HOSPITAL

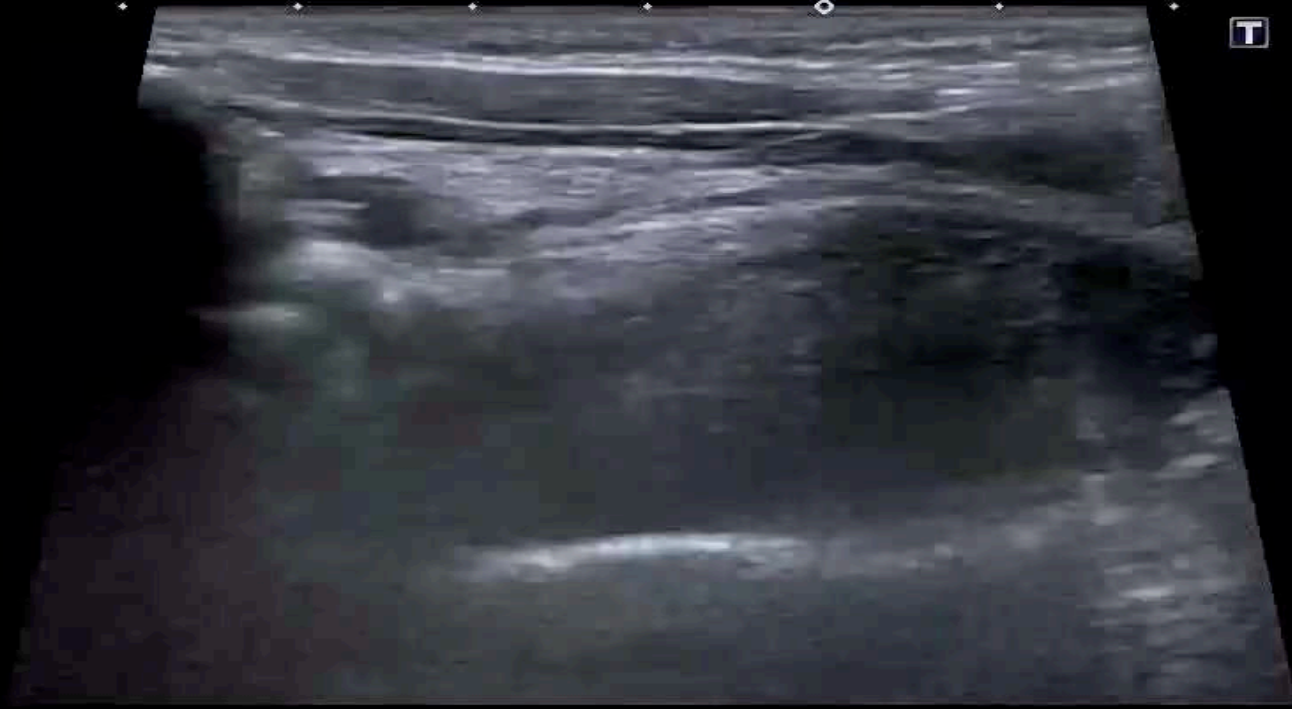
Thyroid 1

28.11.2013
19:16:28

Precision A Pure+



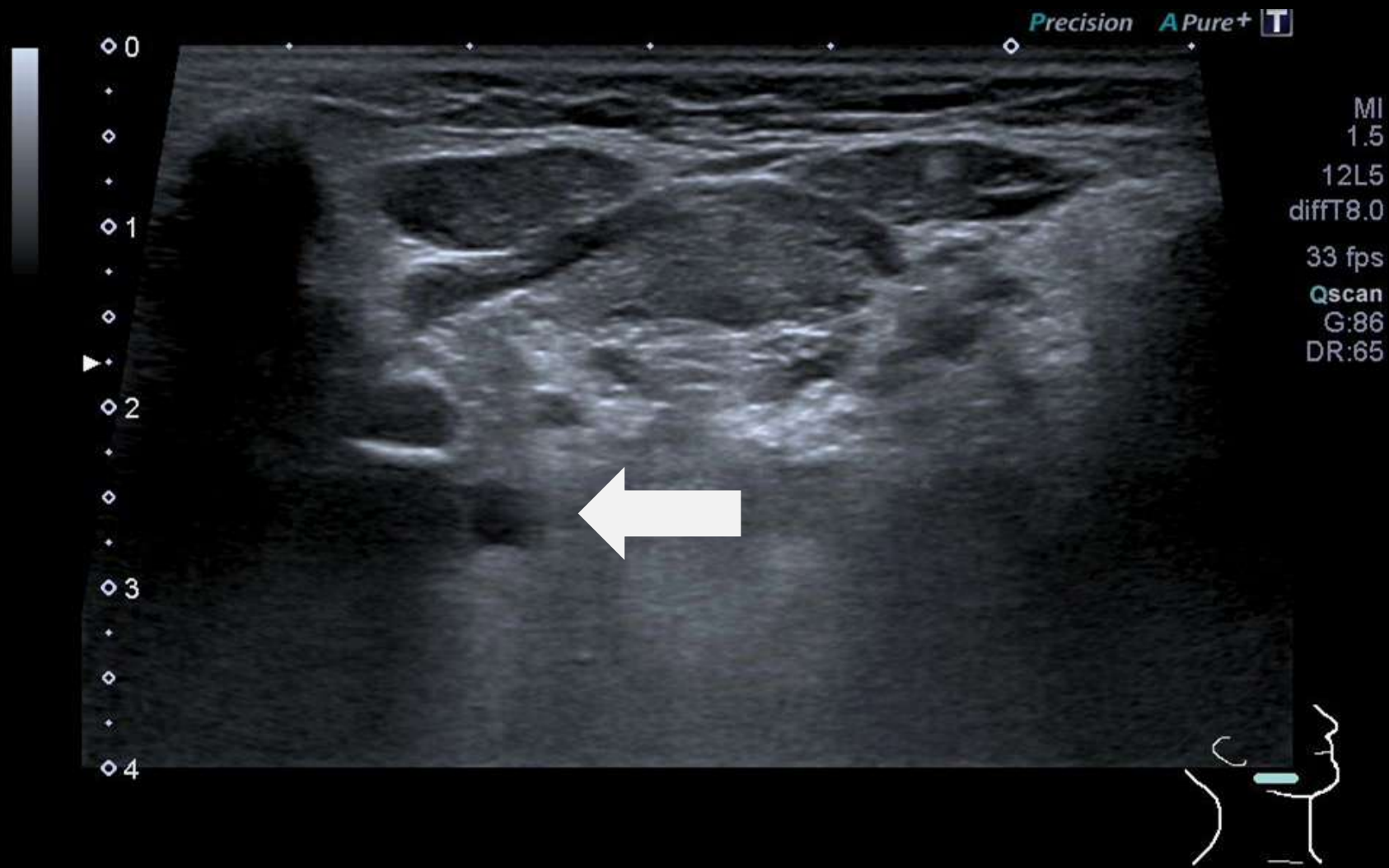
- ◊ 0
- +
- ◊
- +
- ◊ 1
- +
- ◊
- +
- ◊ 2
- ▶
- ◊
- +
- ◊
- +
- ◊ 3
- +
- ◊
- +
- ◊ 4
- +
- ◊
- +
- ◊ 5



T

MI
1.5
12L5
diffT8.0
25 fps
G:82
DR:70
A:6
P:1

CE



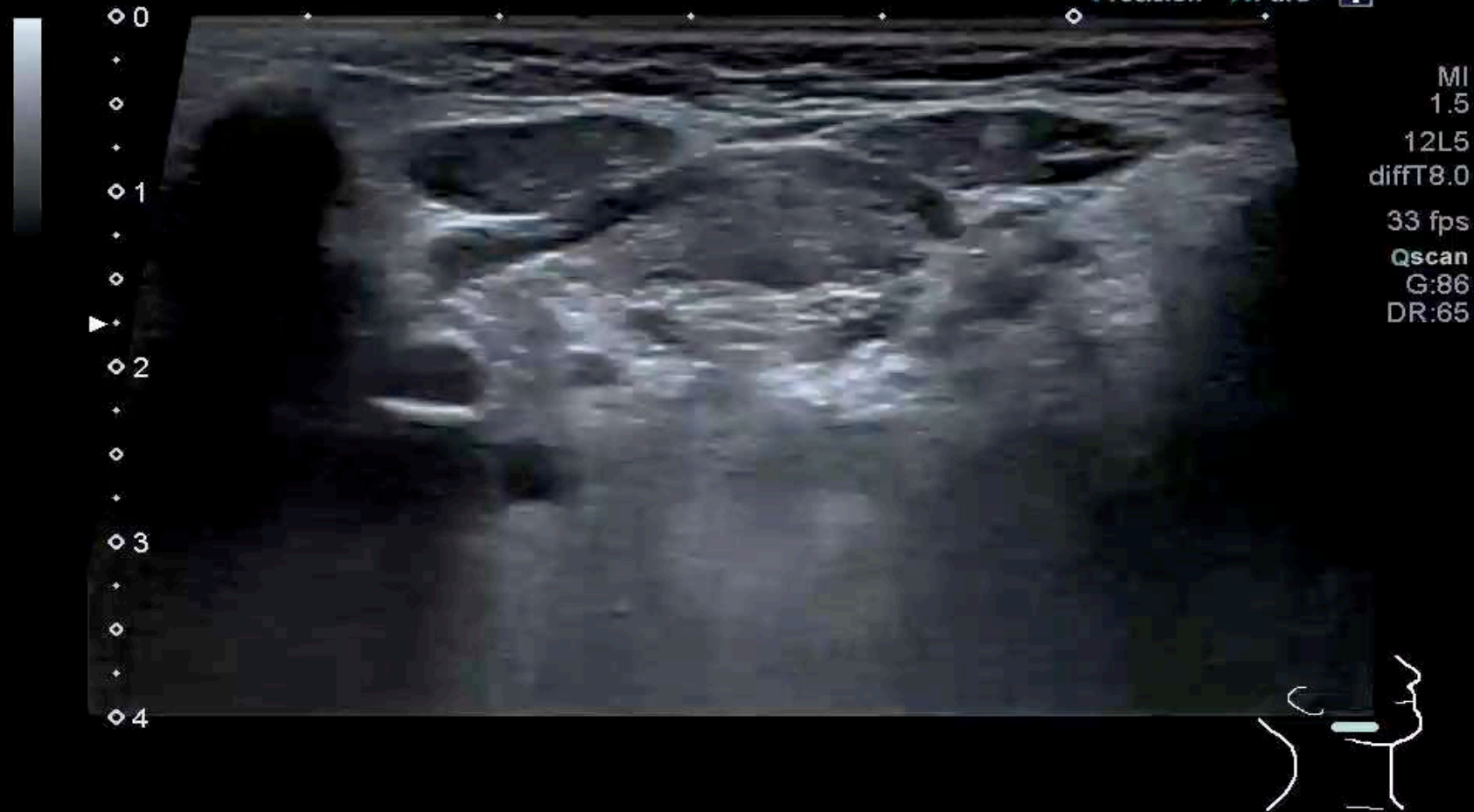
TOSHIBA
Aplio 500

072305: JAMES MARGARET ELUNED
SINGLETON HOSPITAL
Thyroid 1

F 84

21.11.2013
03:04:45 PM

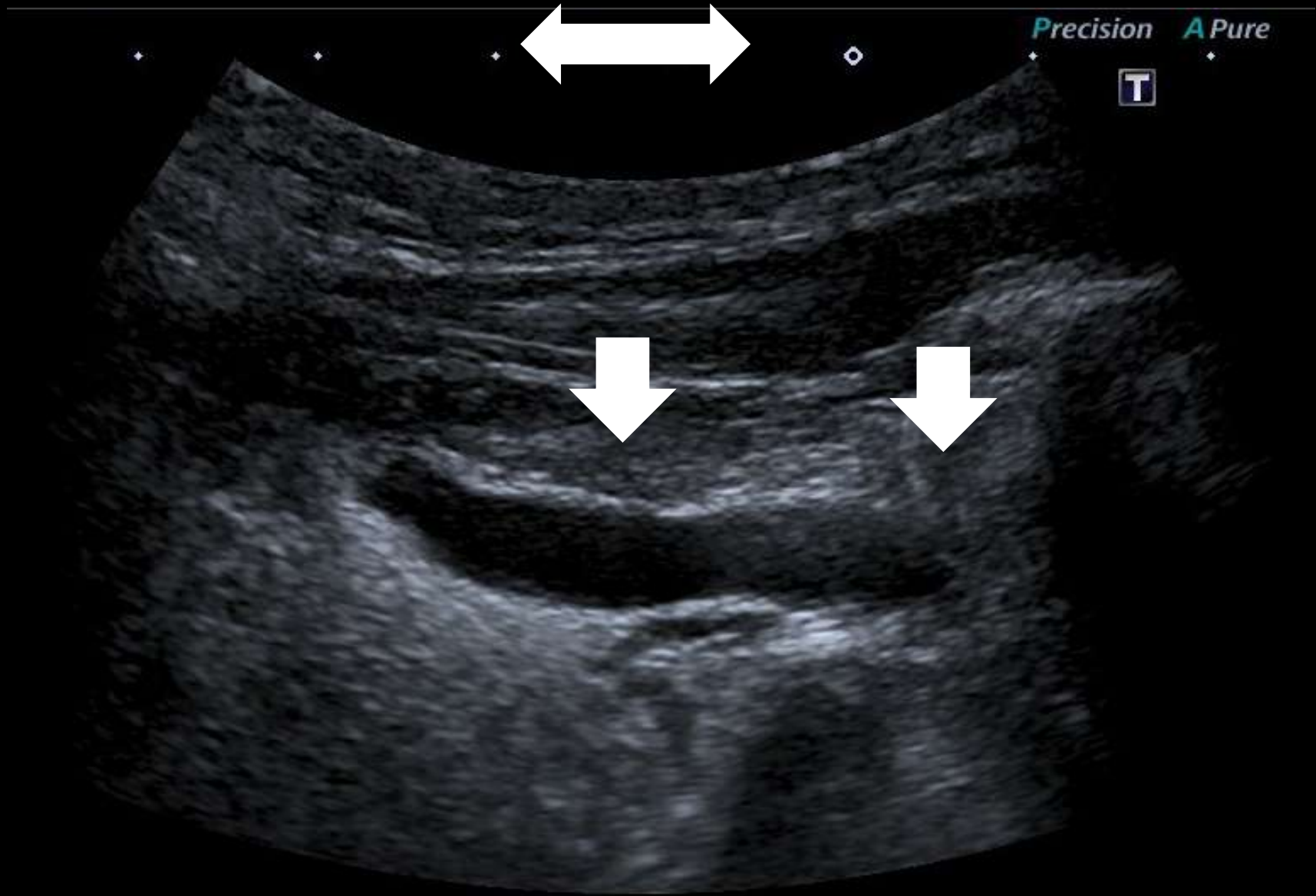
Precision APure+ T





TOSHIBA 072305: JAMES MARGARET ELUNED F 84 21.11.2013
Aplio 500 SINGLETON HOSPITAL Thyroid 1 03:06:49 PM

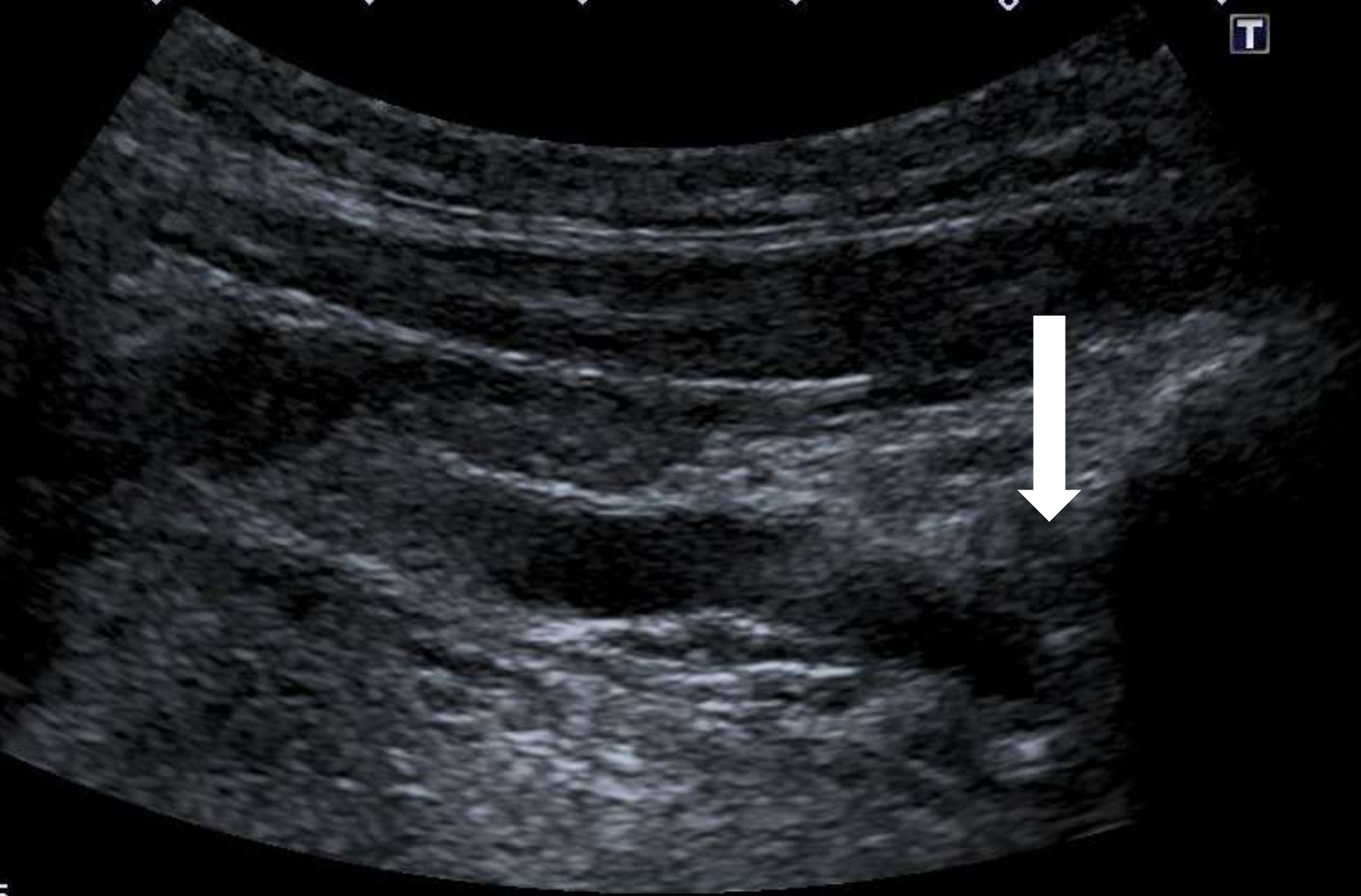




Precision A Pure

T

0
1
2
3
3.5

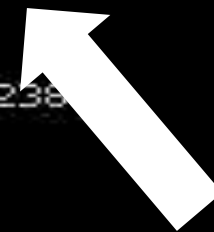


TECHNICAL: 4 0001 PAVAS RICHKOLARINATHAN ET AL. M 23 23 11 20 14
SINGLETON HOSPITAL 1197000 1 04 15 07 PM



(RANK) RIS No:3822386
SINGLETON HOSPITAL

(RANK) Order No:3822386



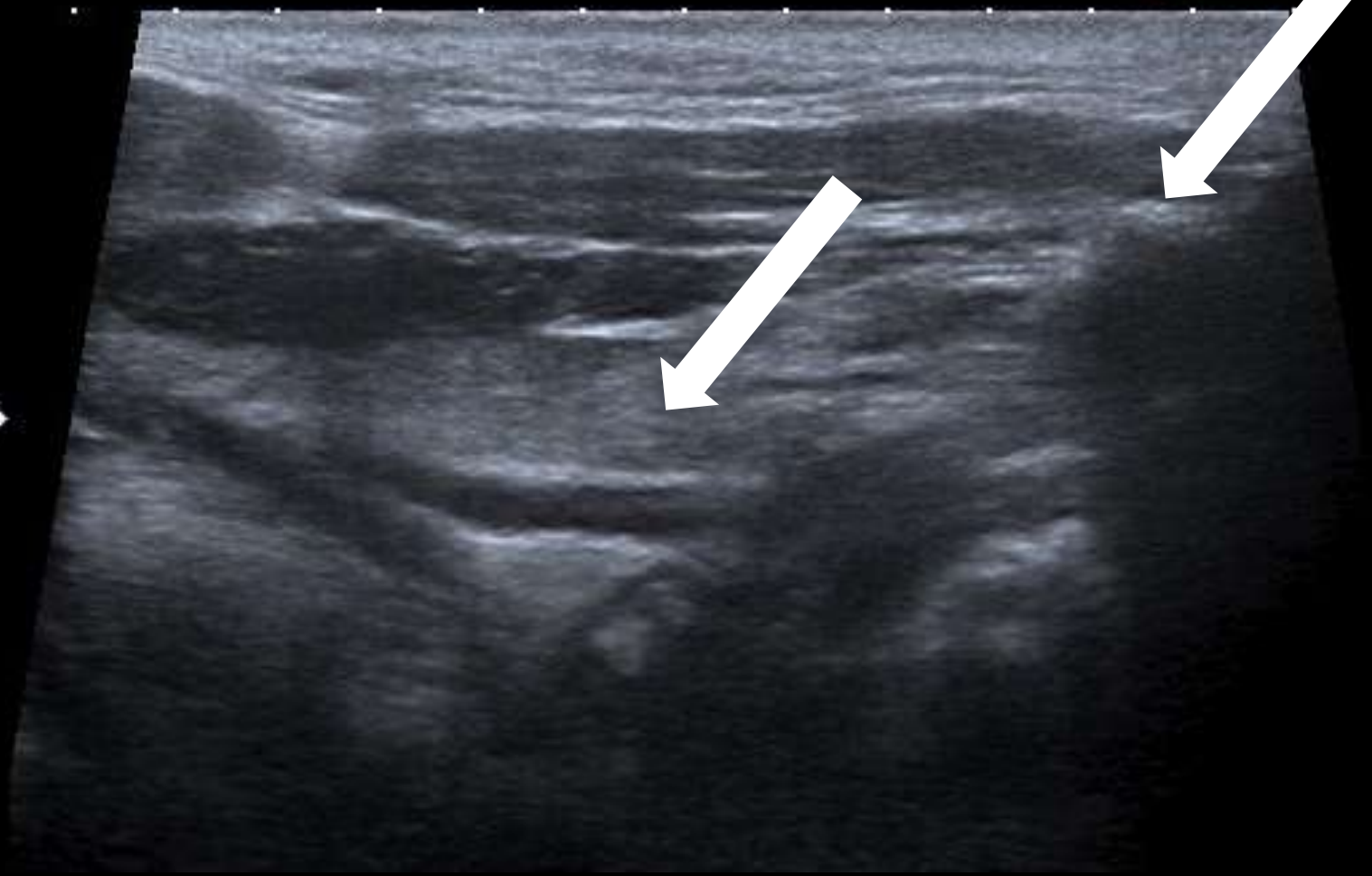
Precision A Pure

T



0 ◆
.
.
2 ◆▶
.
.
4 ◆

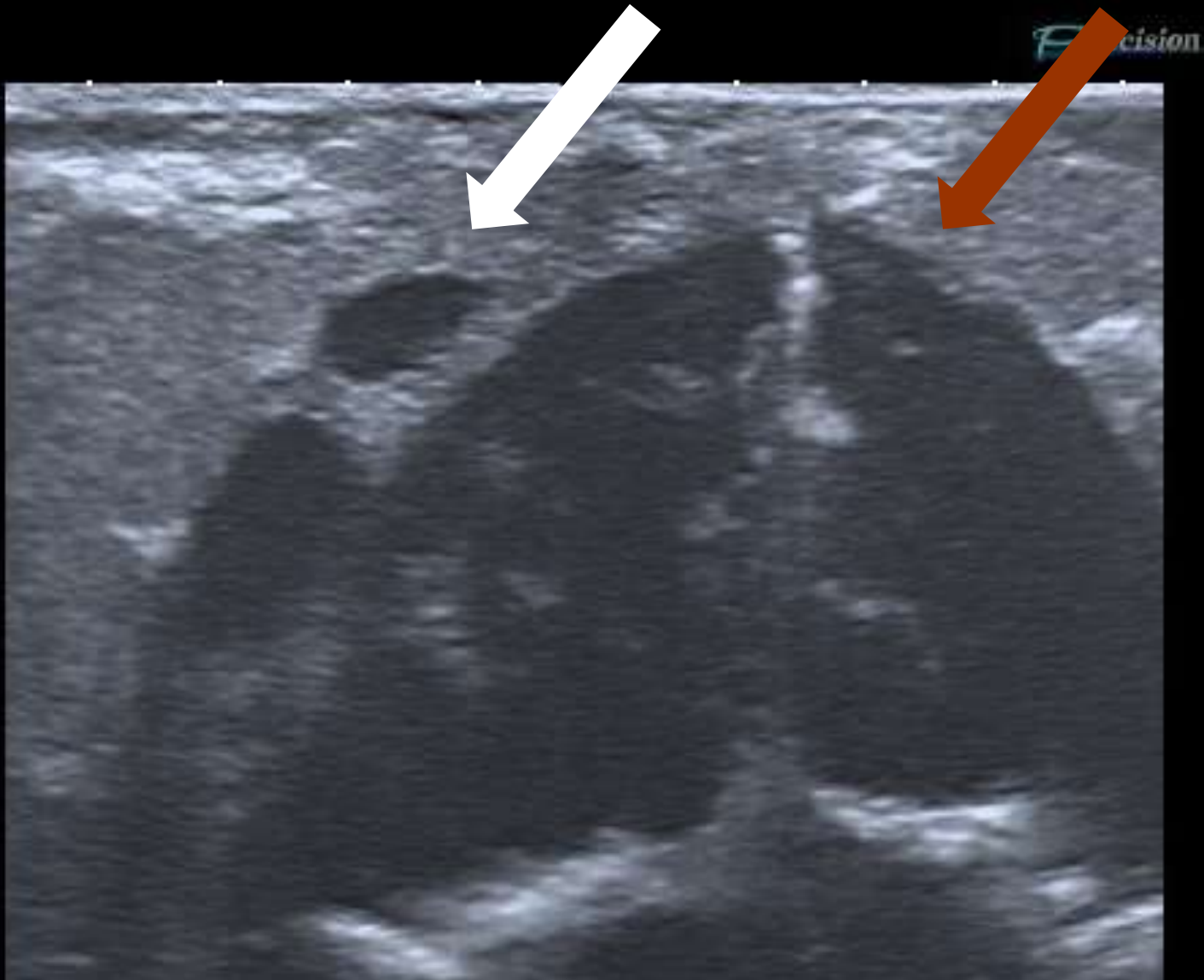
Precision



recision.

T





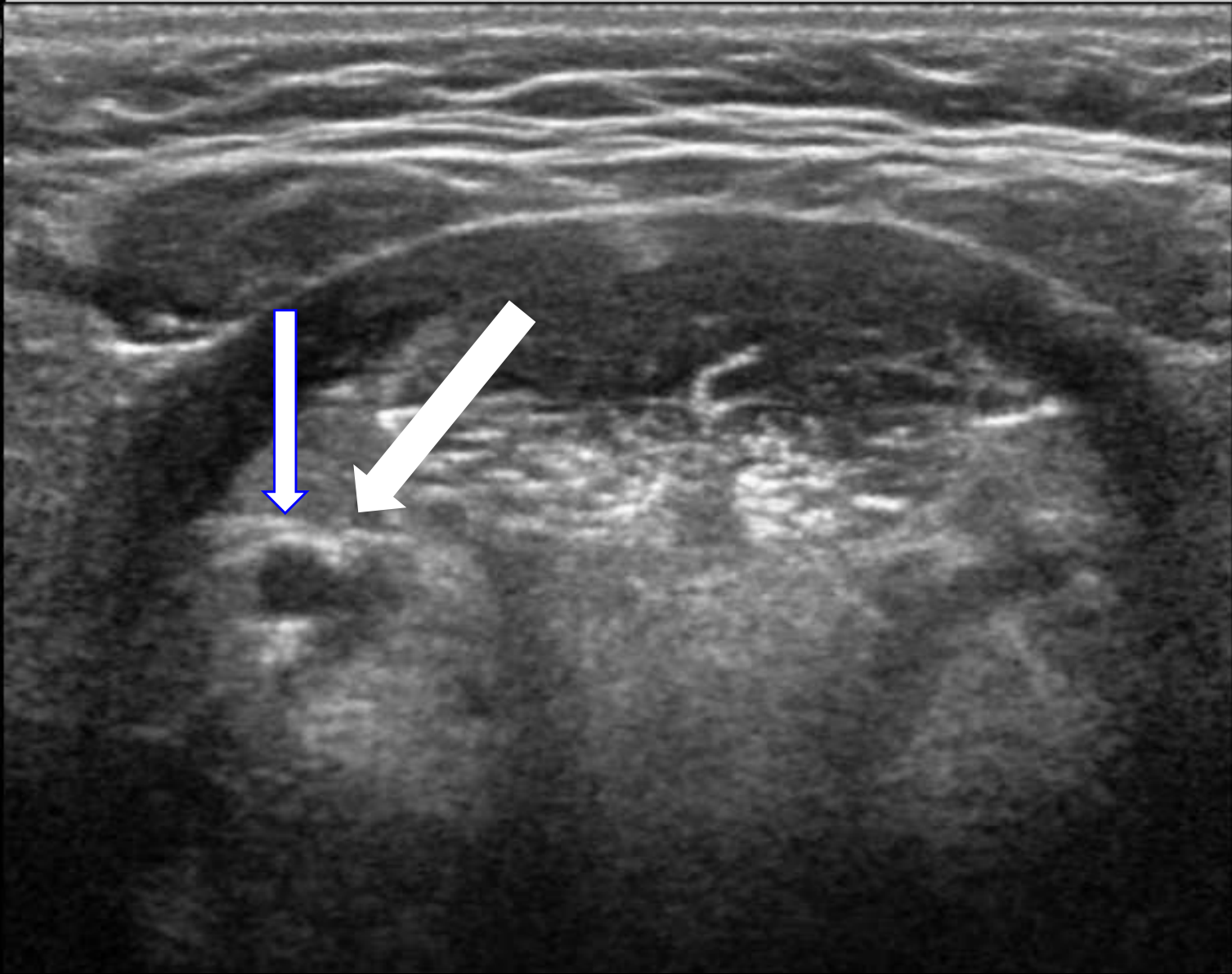
Precision





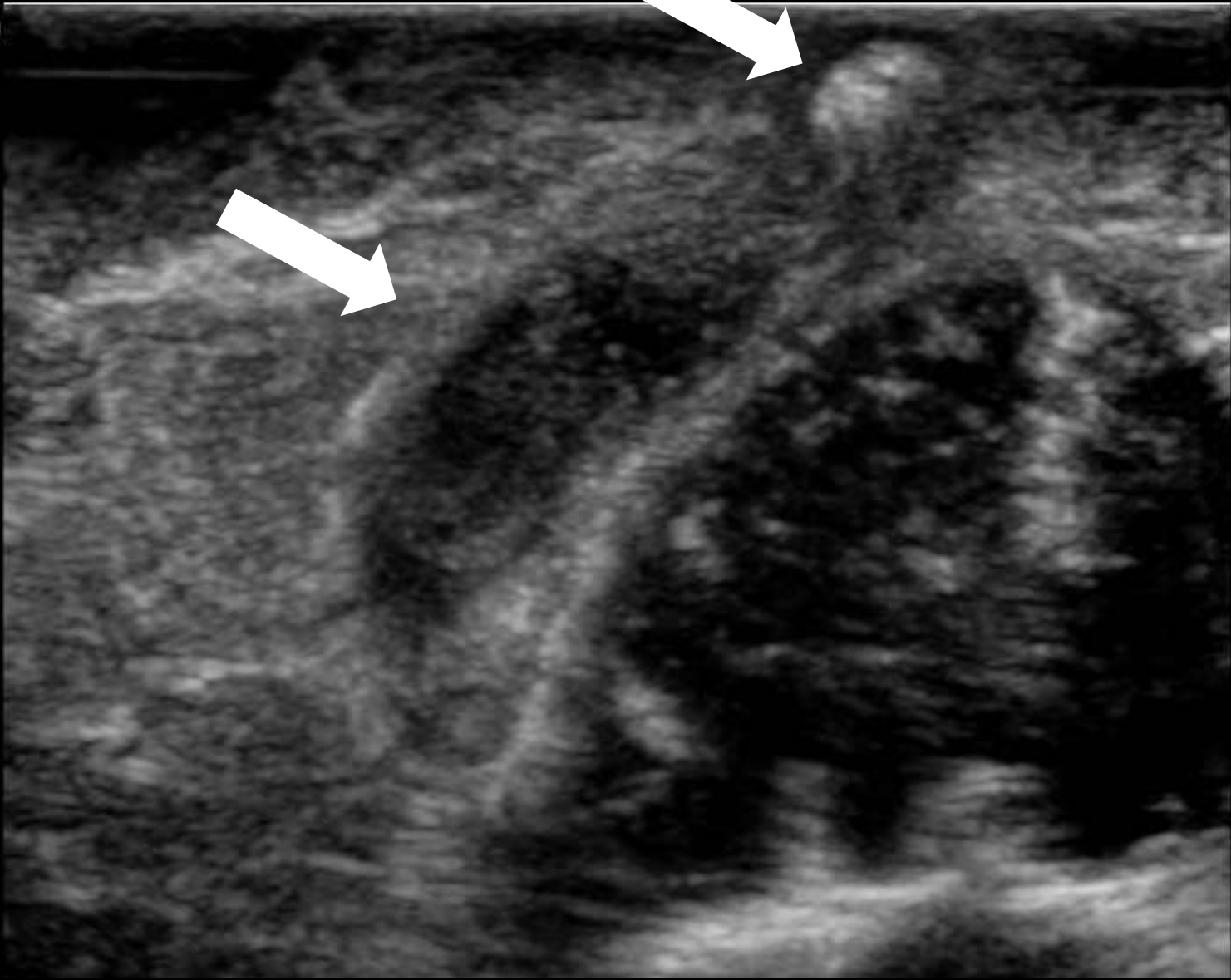
15 months later

P



No stone?

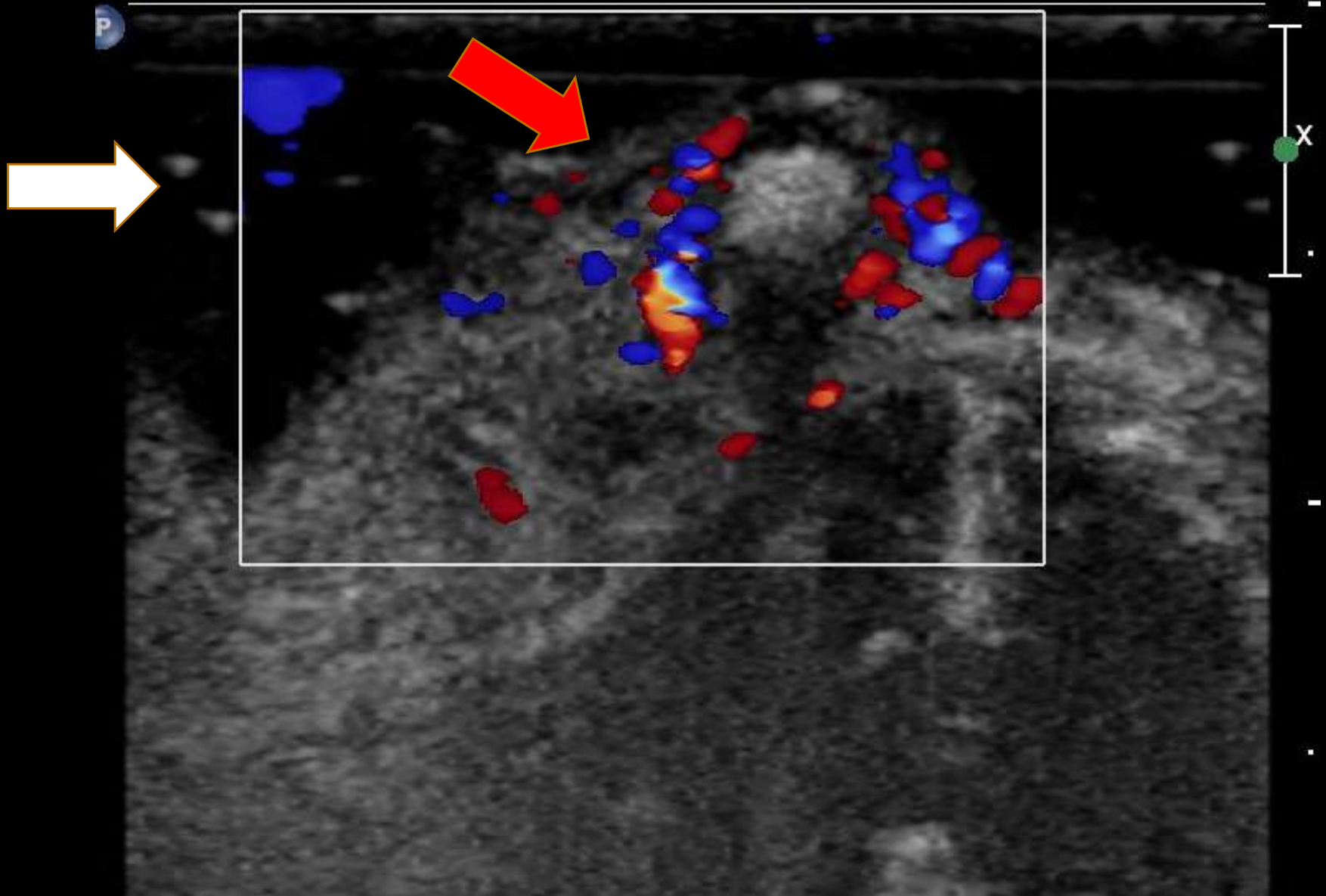
P



X
1

P

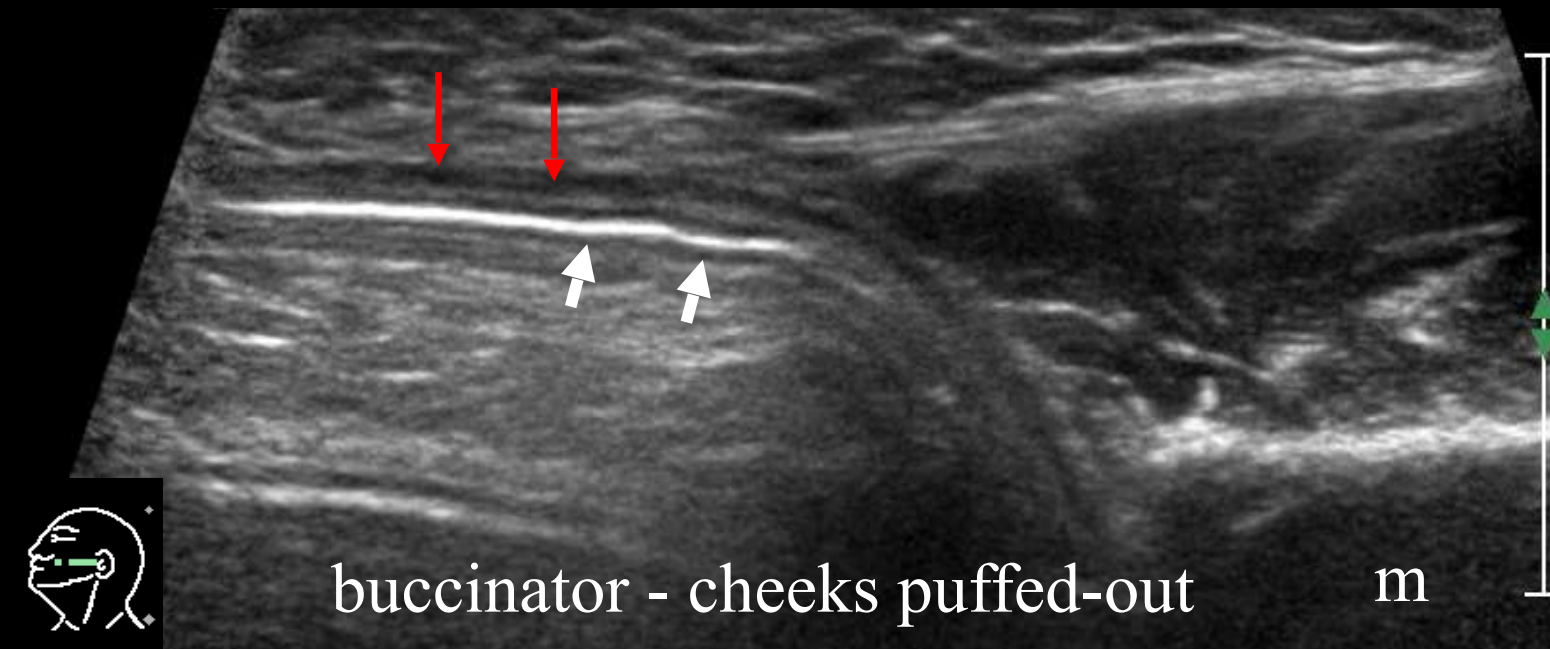
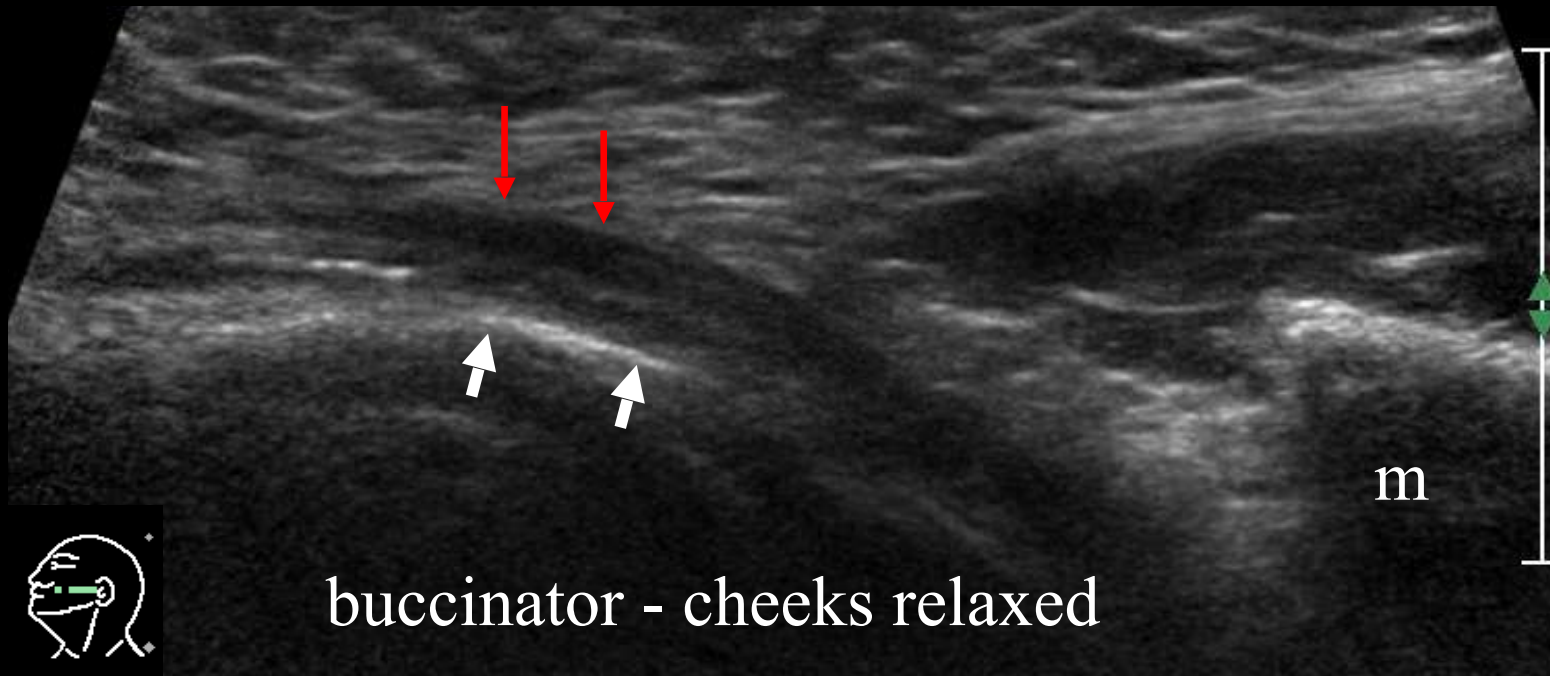




Fundamental rules & knowledge

Tongue

Buccinator



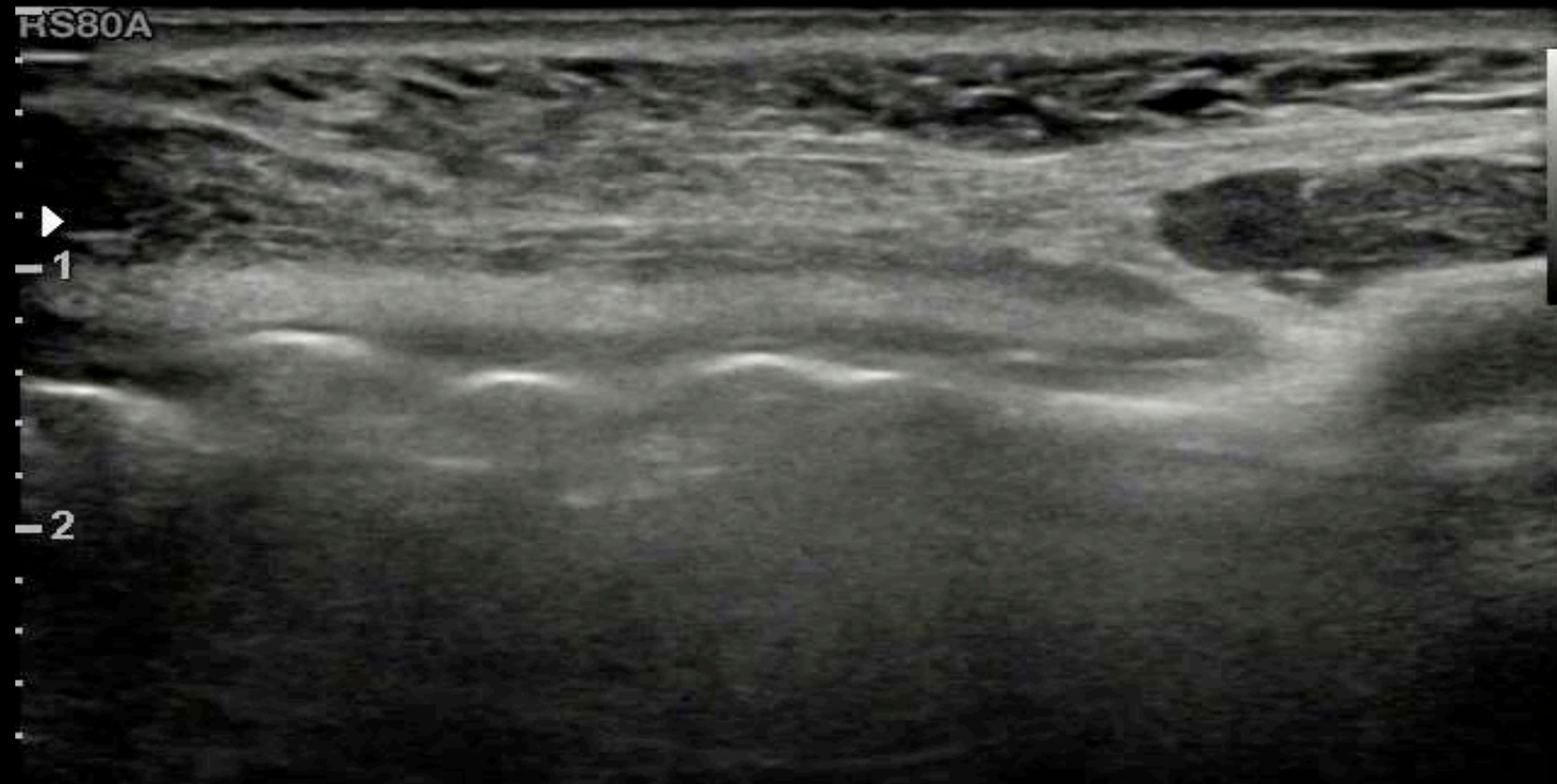
RS80A

1

2



L3-12A / SmallParts / FPS65 / MI0.48 / TIs0.0 / 08-12-2015 12:31:21
2D G59/DR56/FA12/P90/Frq Res./3.0cm



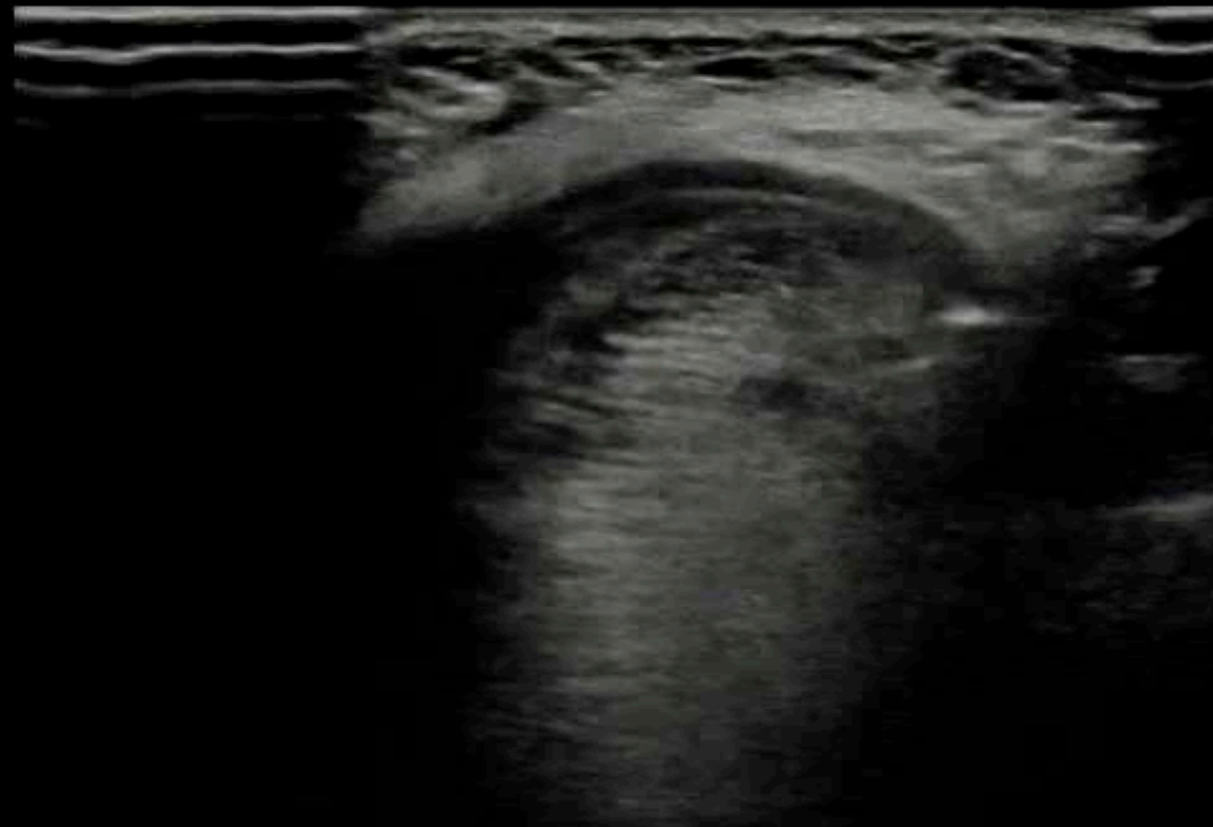
L3-12A / SmallParts / FPS65 / MI0.67 / TIs0.0 / 08-12-2015 13:02:51
2D G50/DR56/FA12/P90/Frq Res./4.0cm



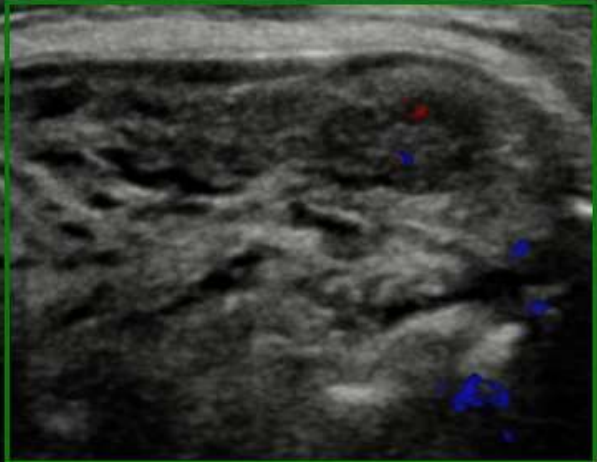
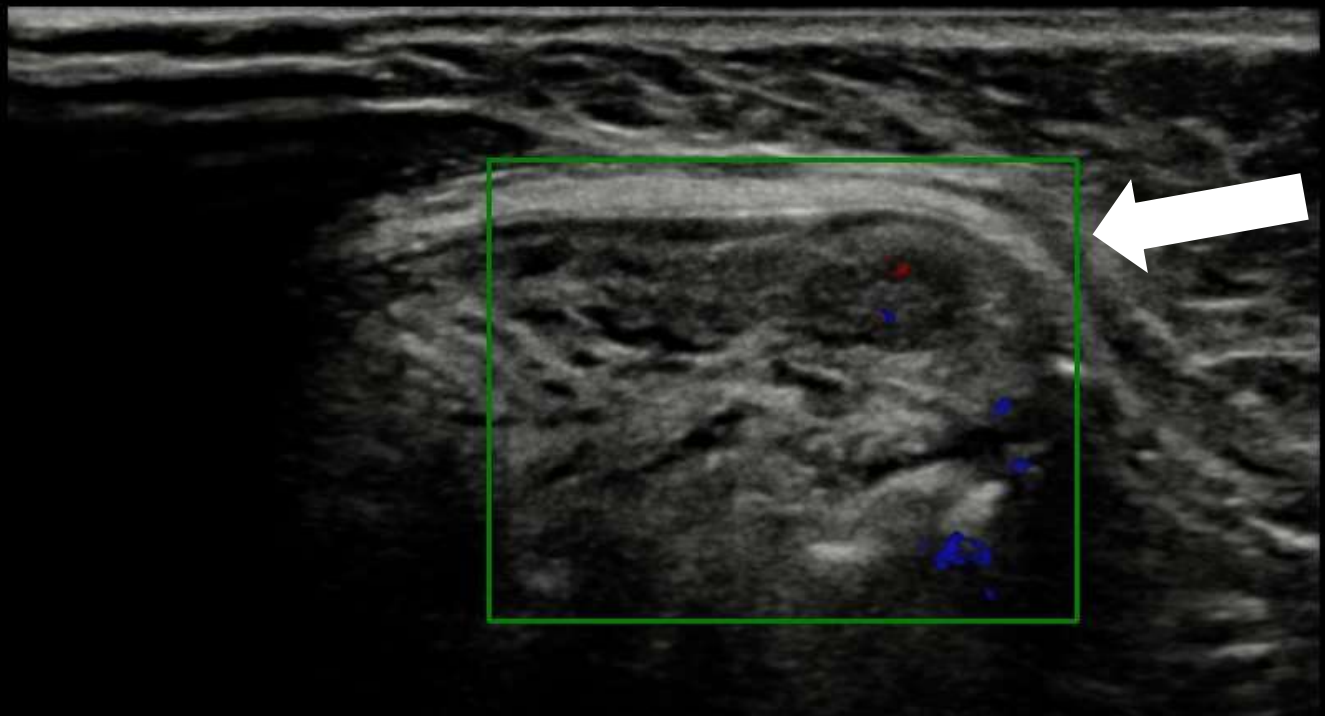
RS80A



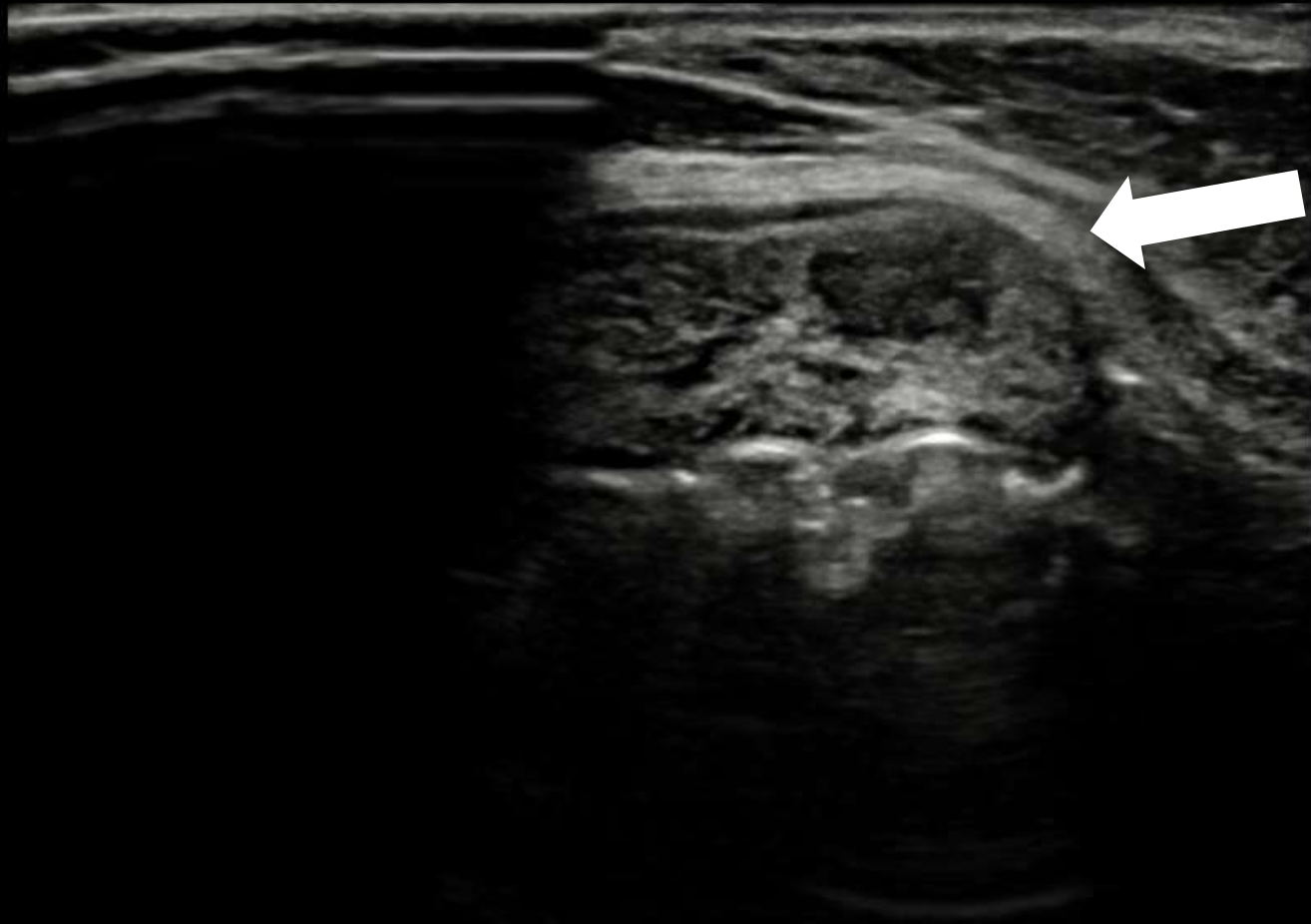
-2

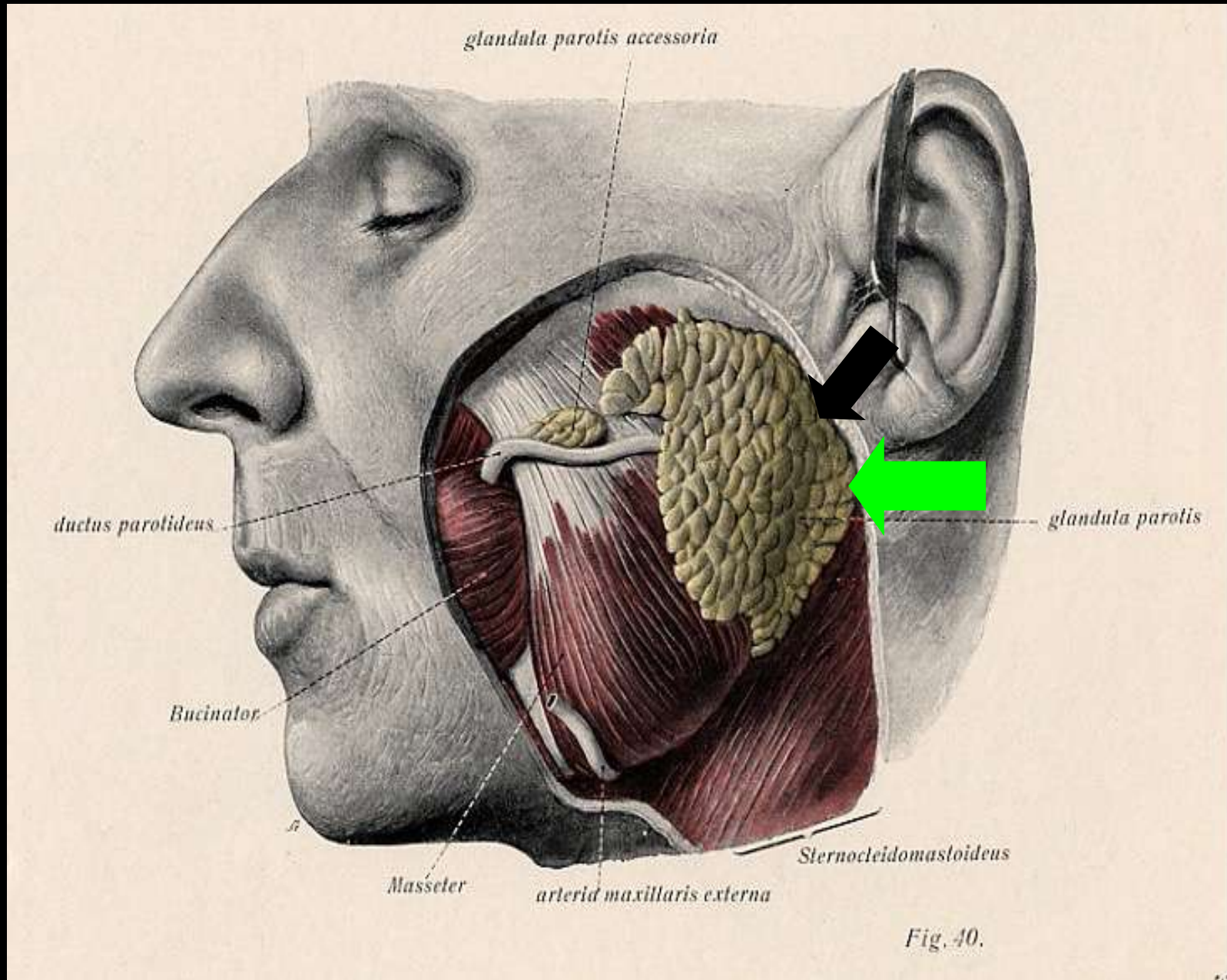


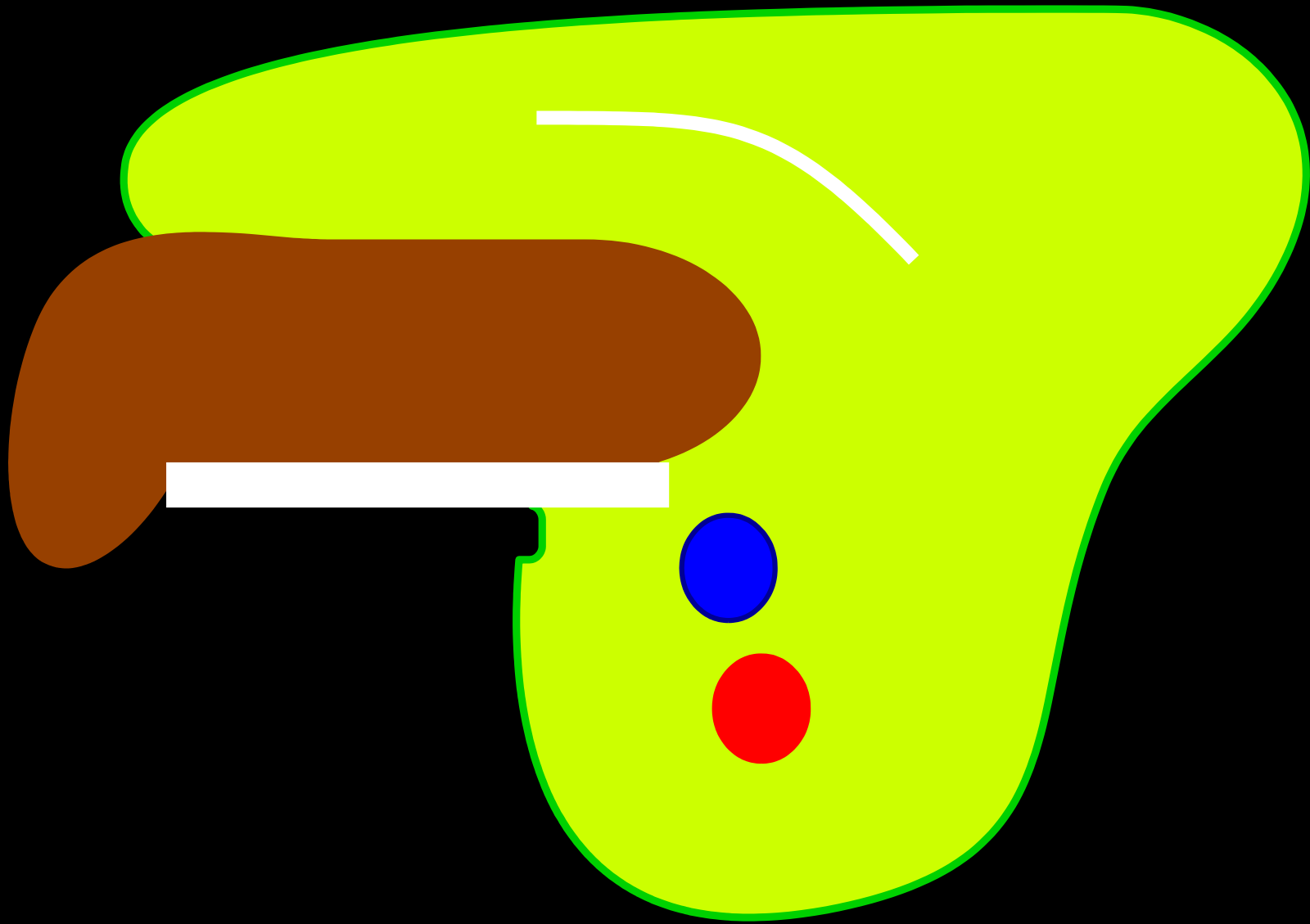
RS80A

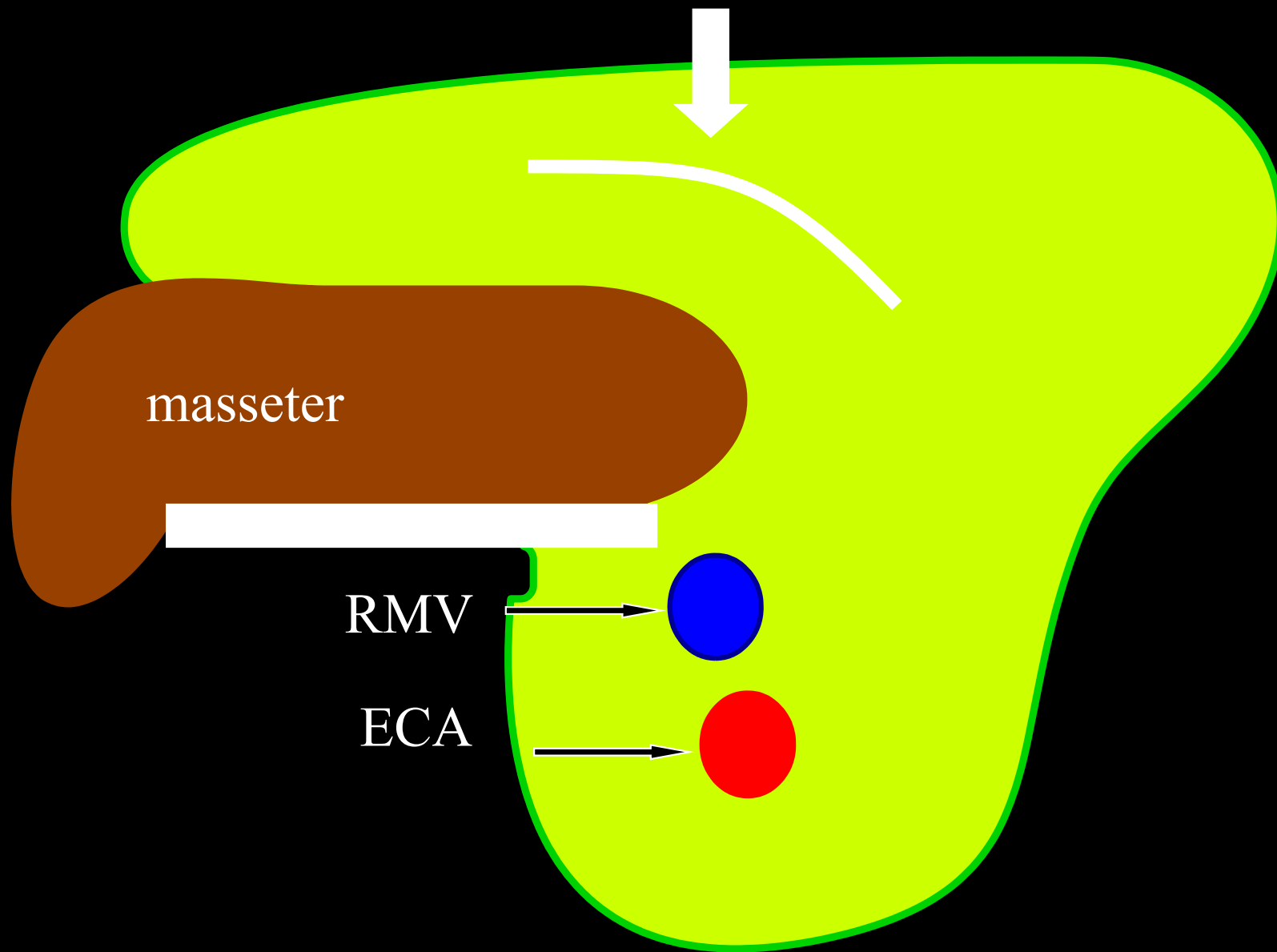


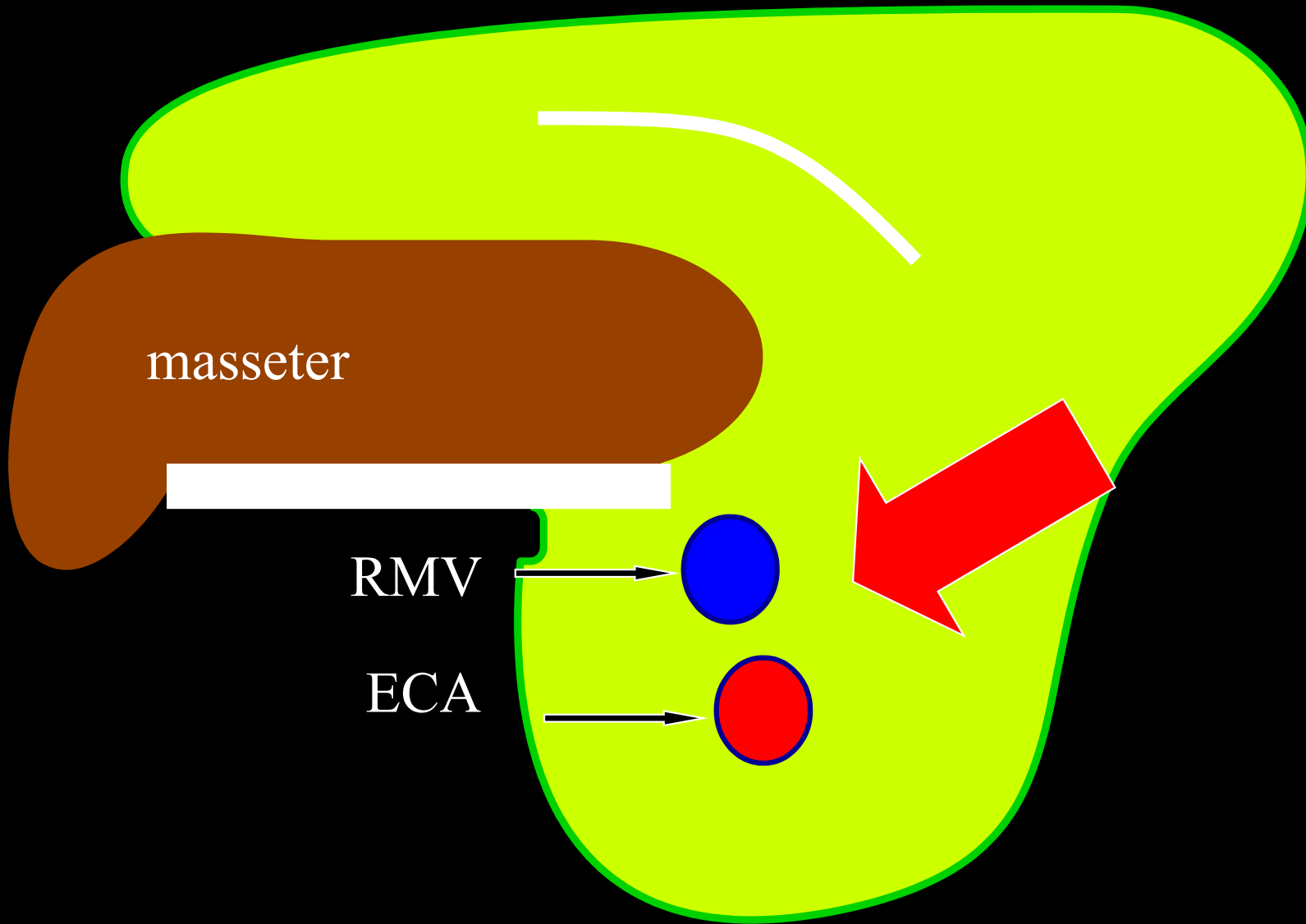
RS80A

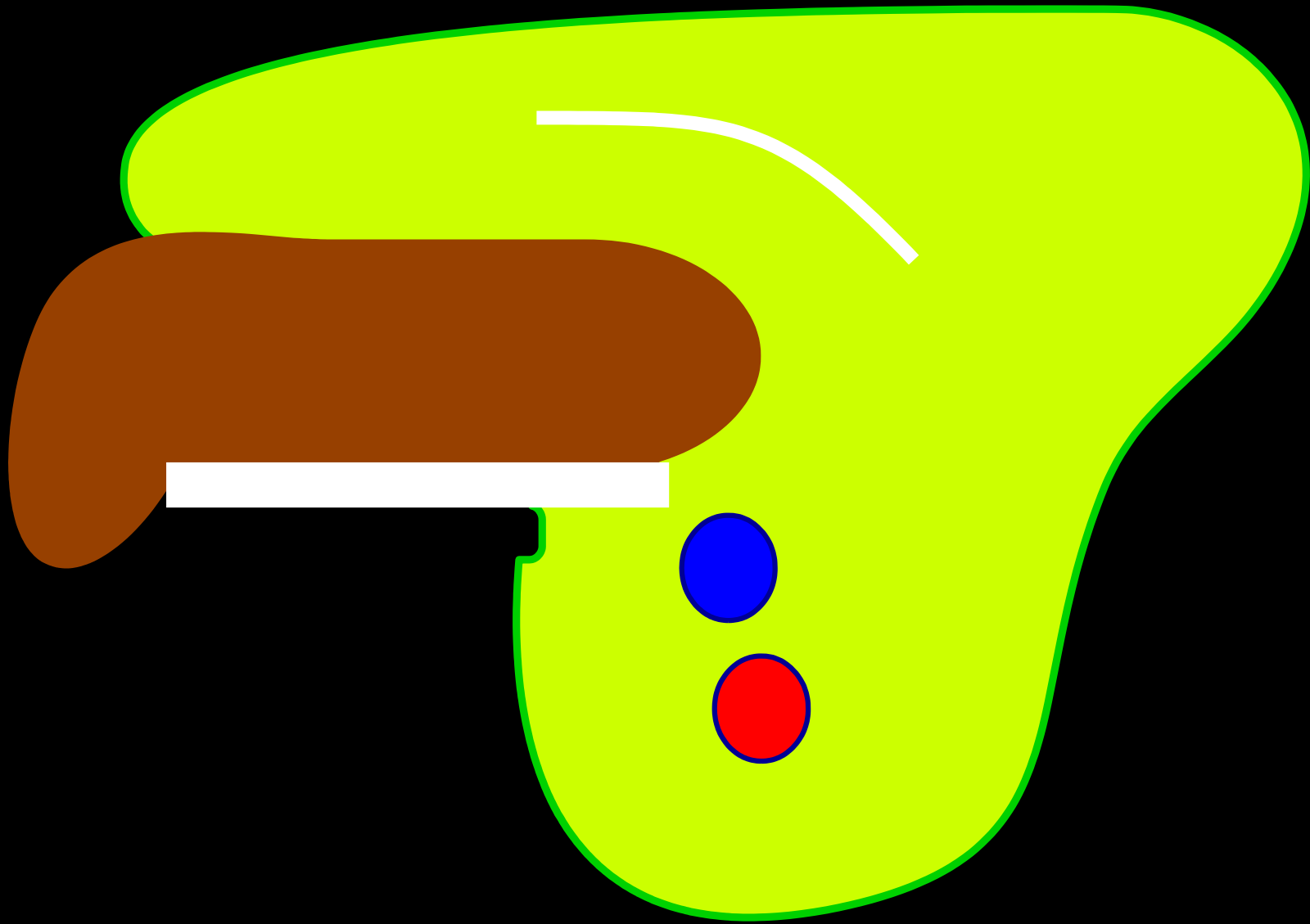


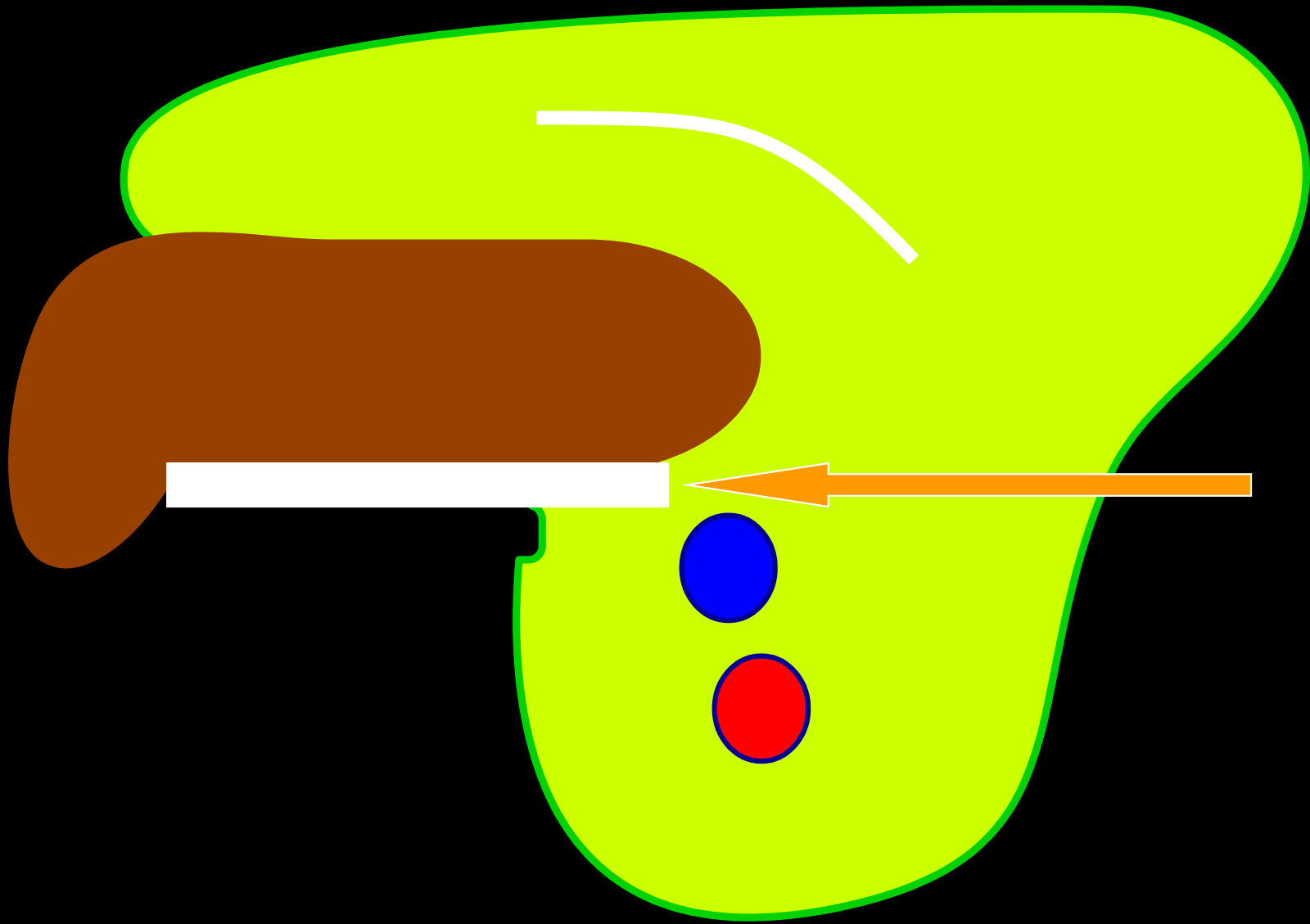


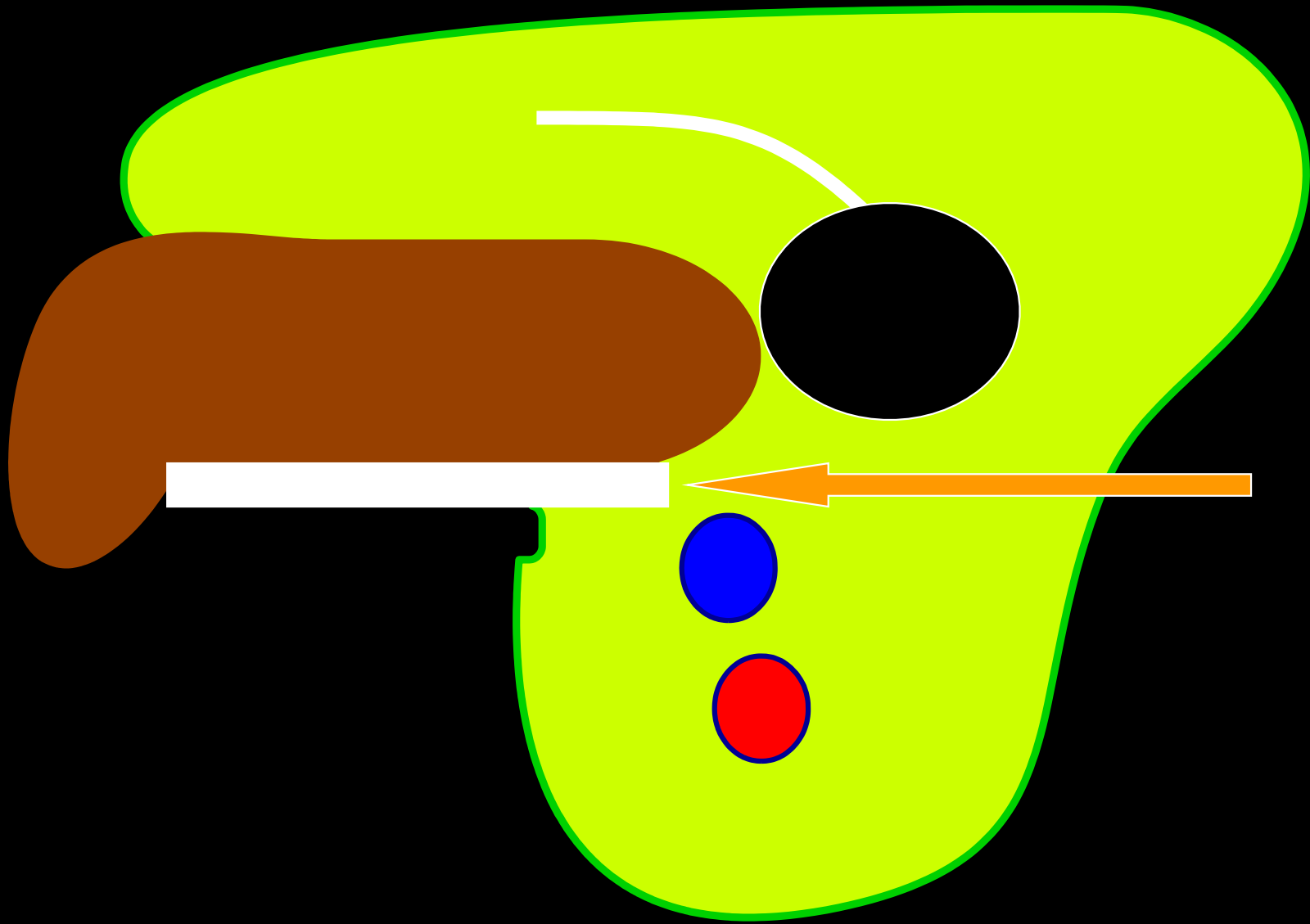


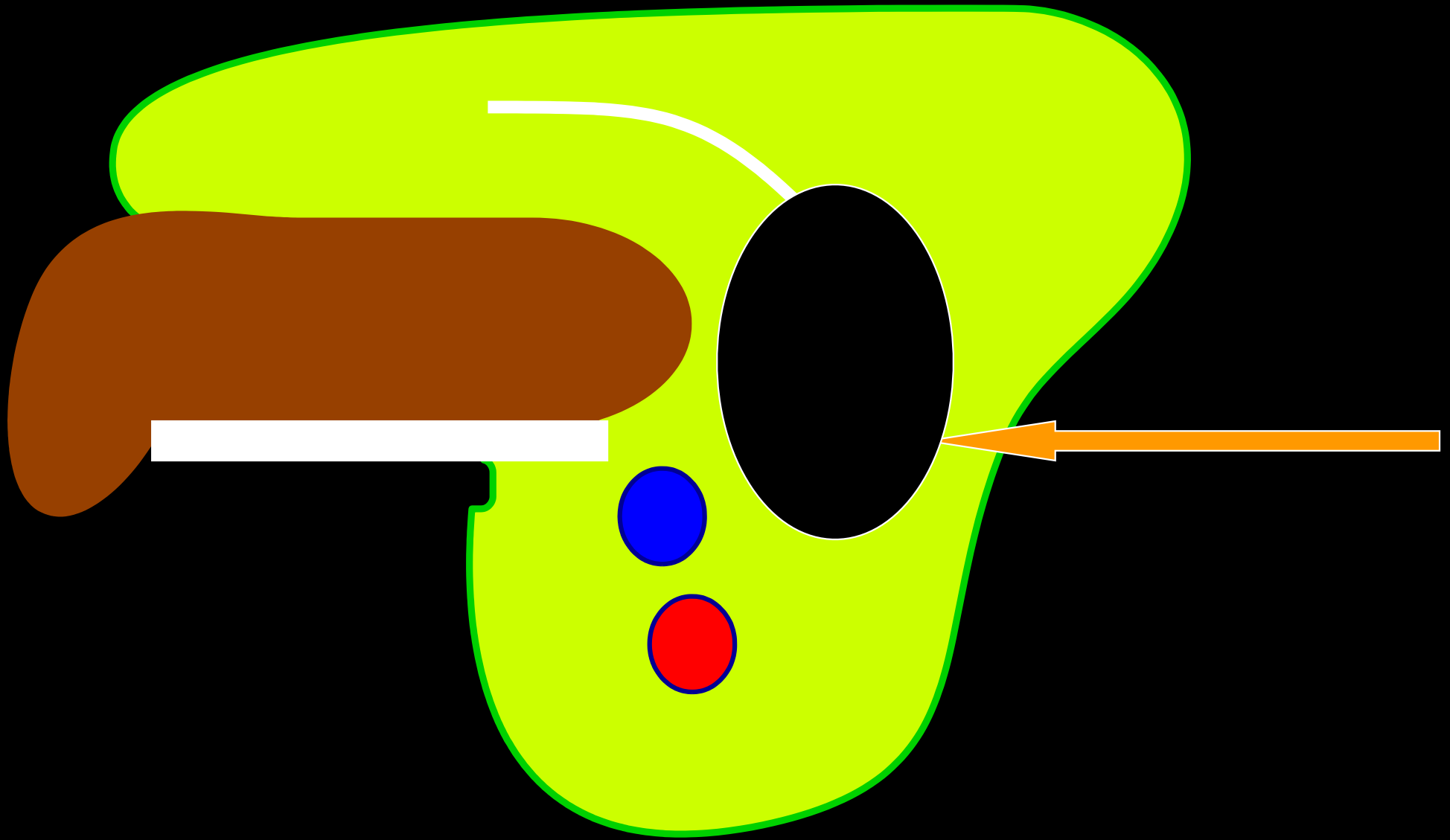


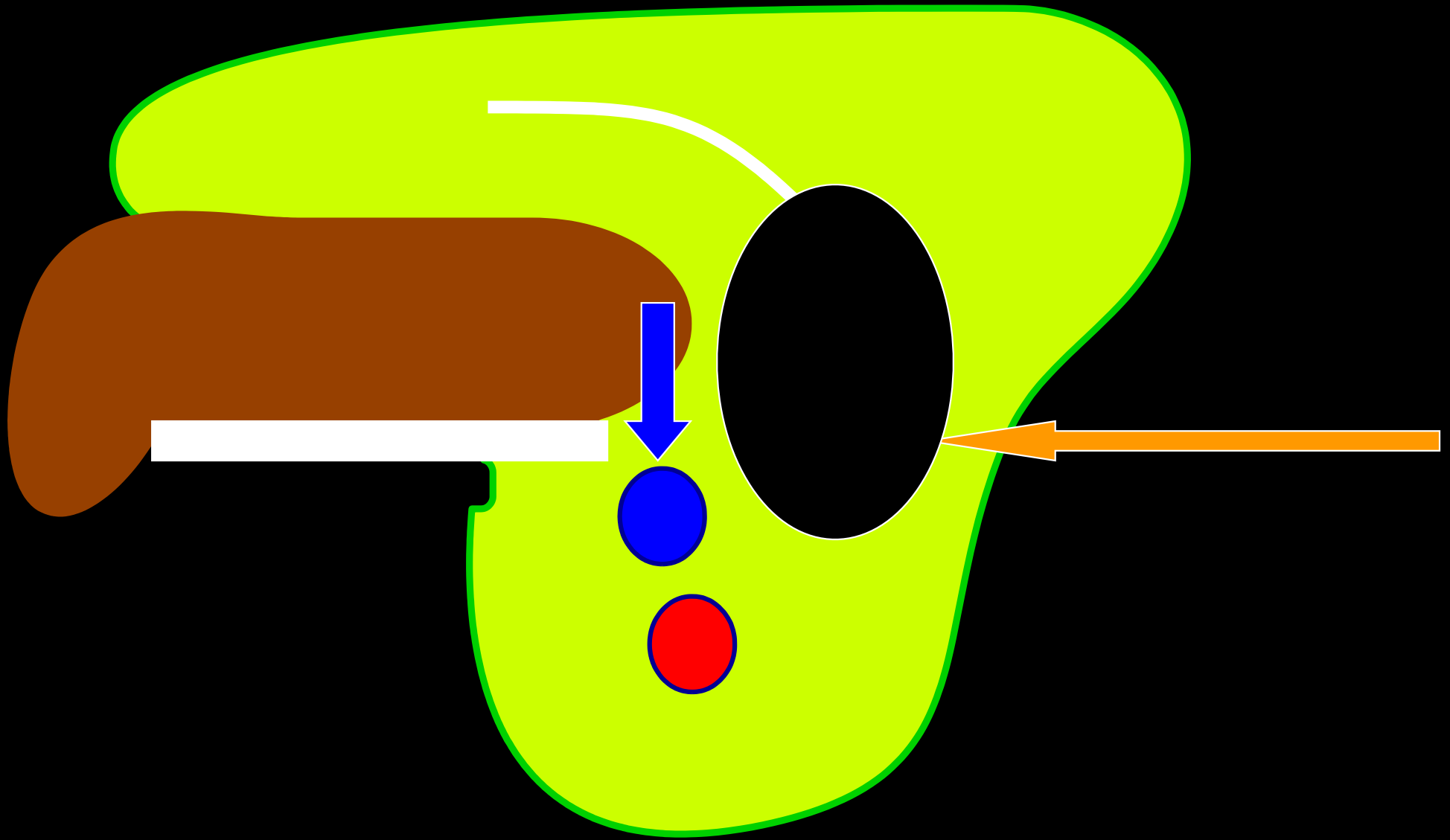


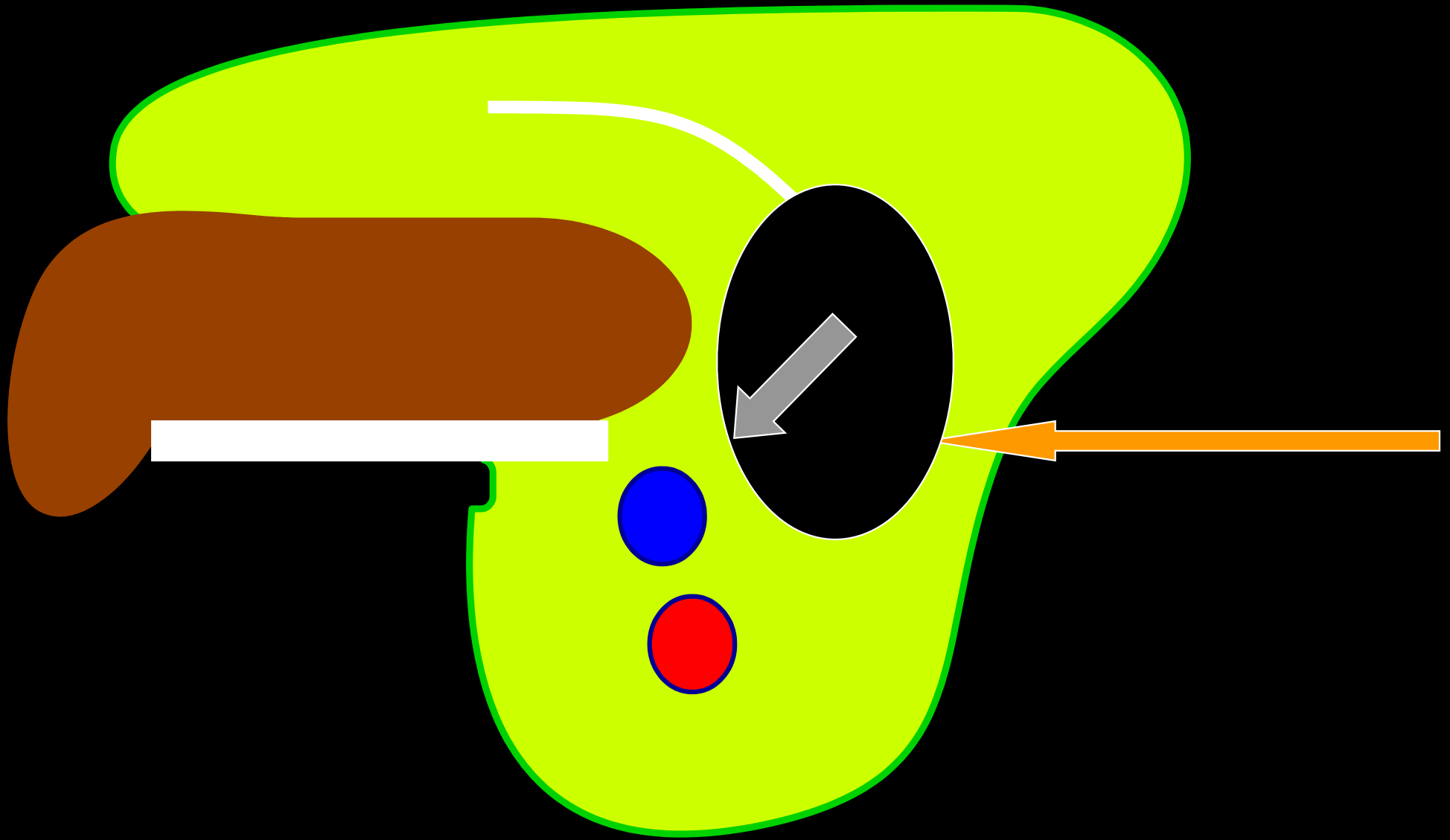


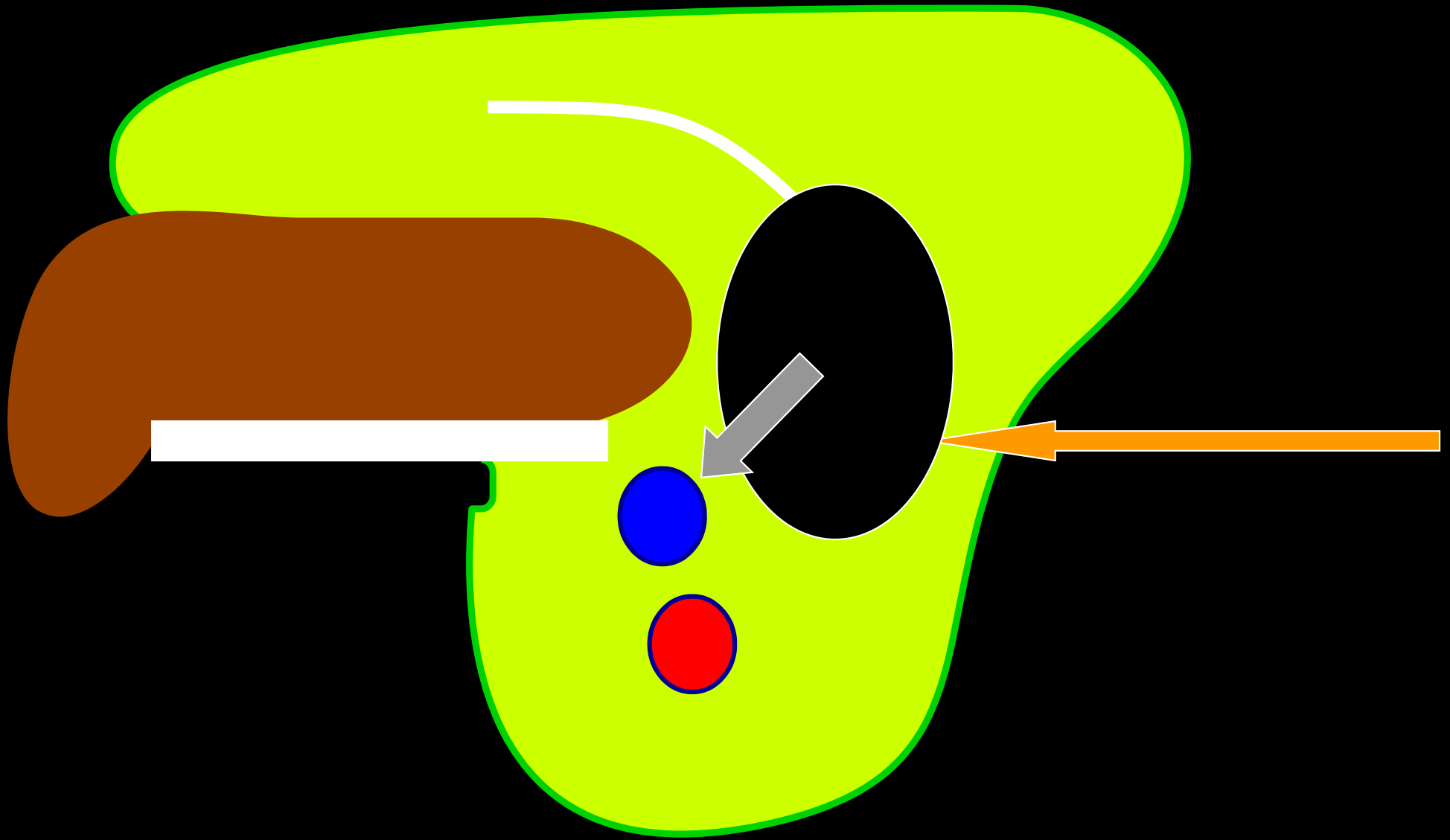


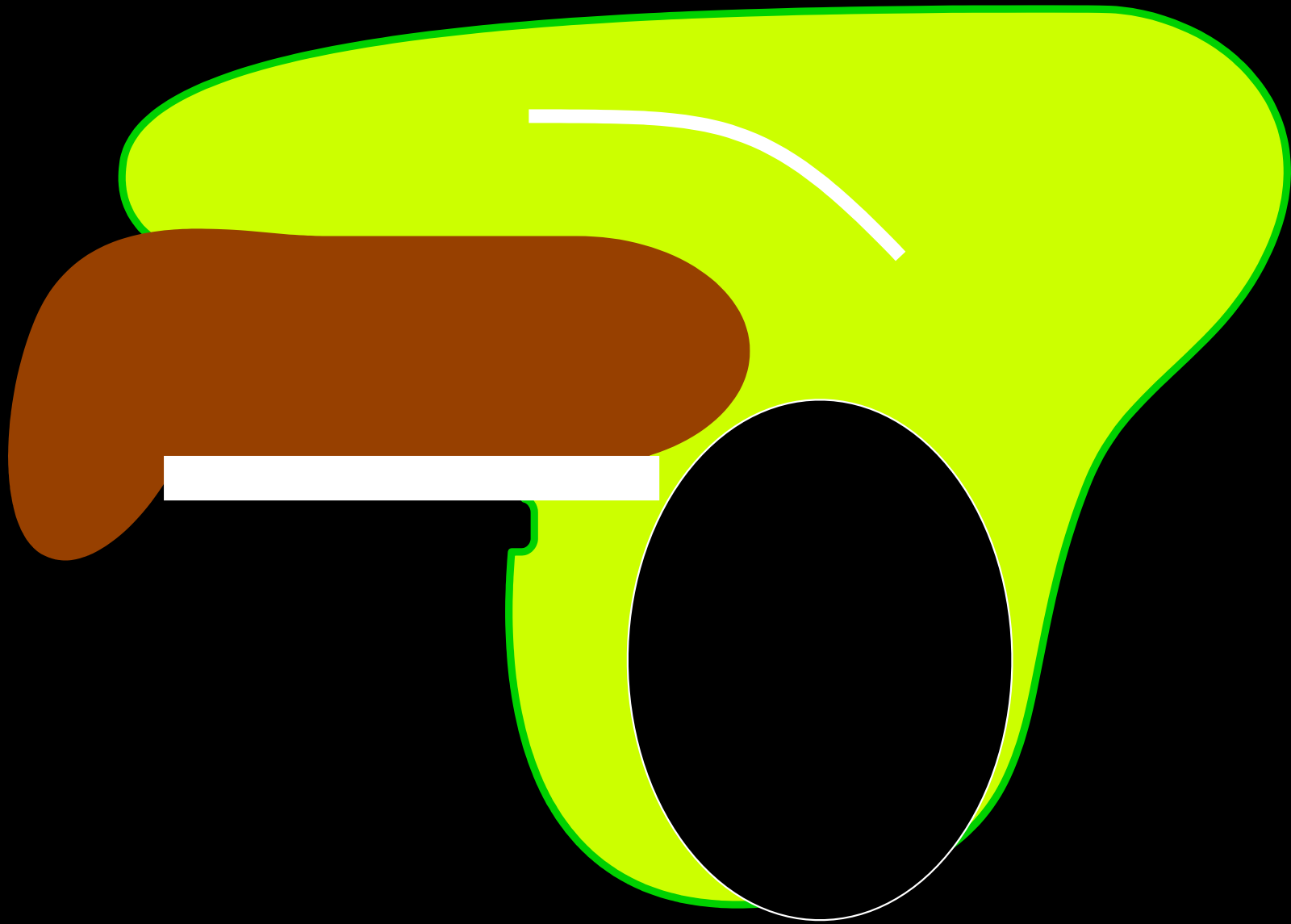


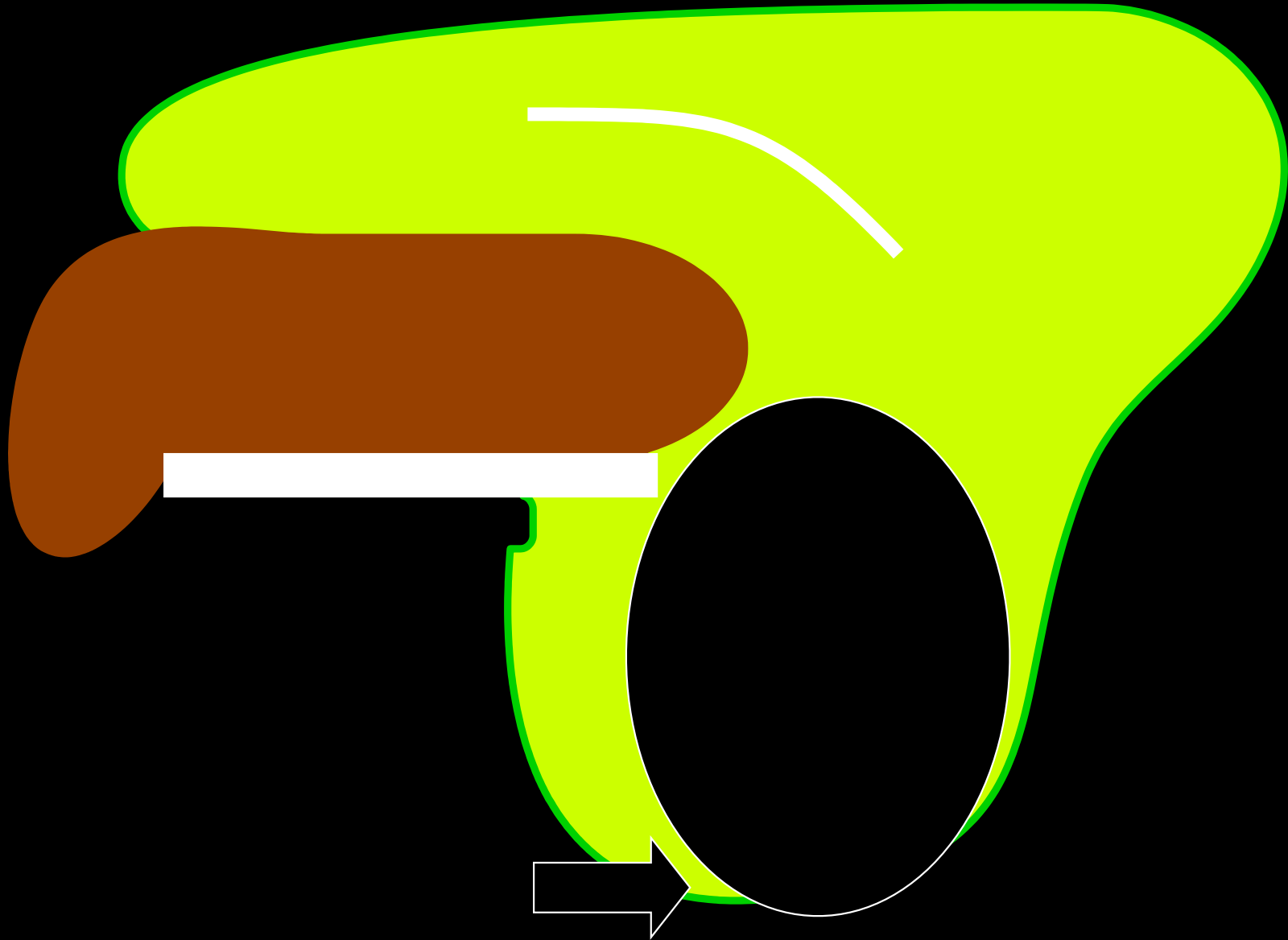




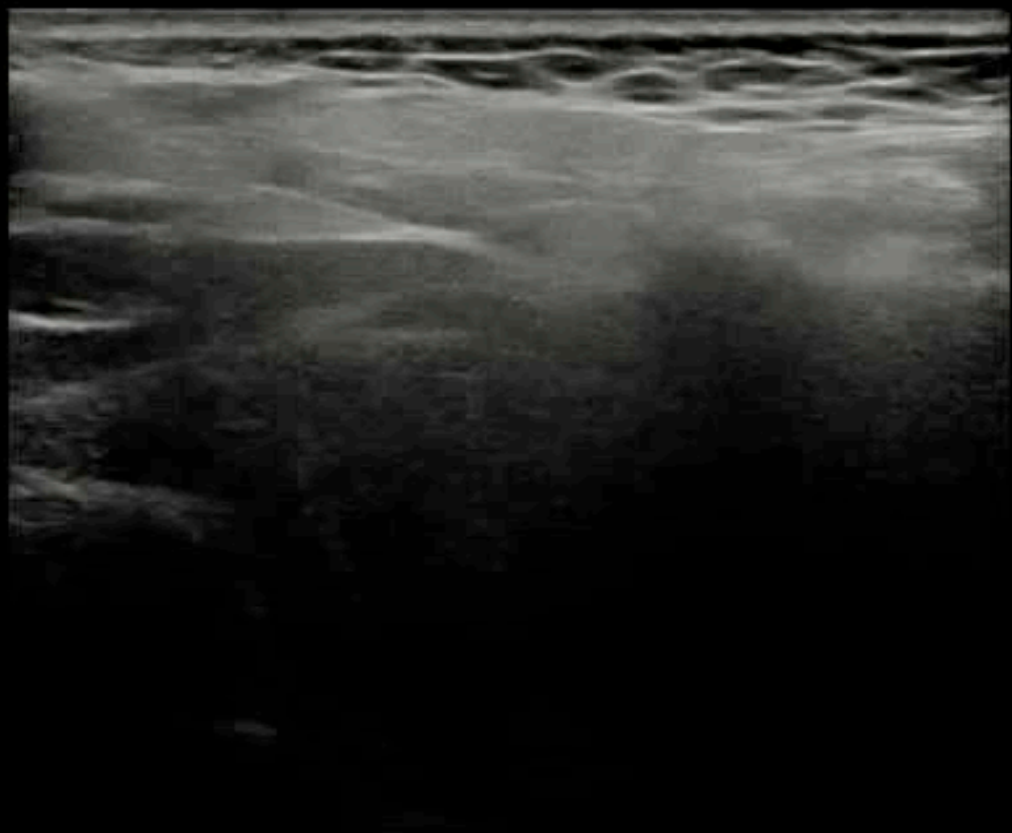
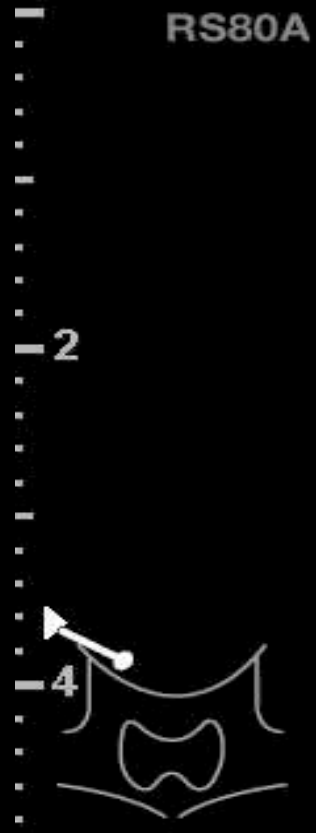






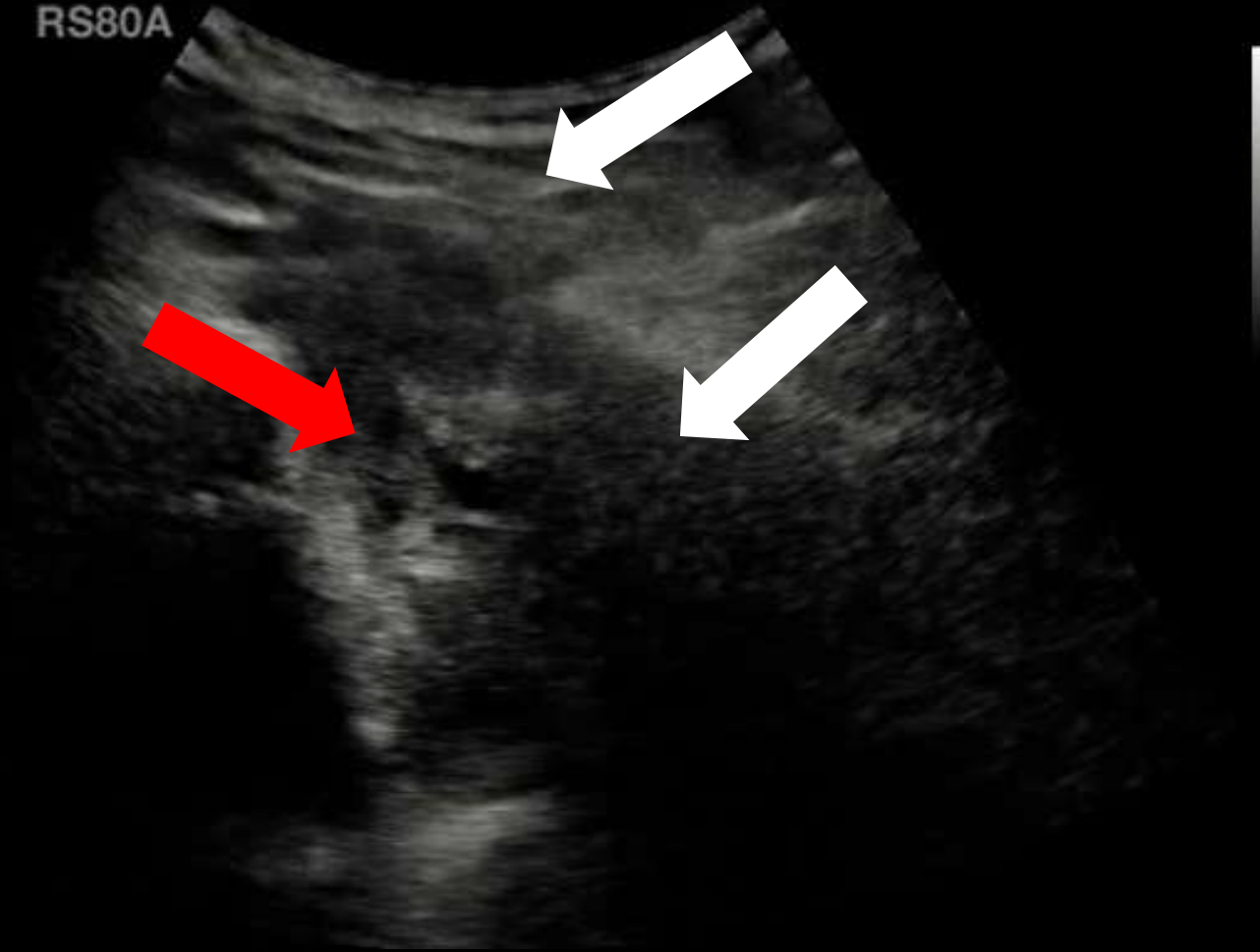


L3-12A / SmallParts / FFS / M0.58 / TIs0.1 / 14-06-2016 11:37:45
2D G50/DR56/FA12/P90/Frq / 5.0cm



RS80A

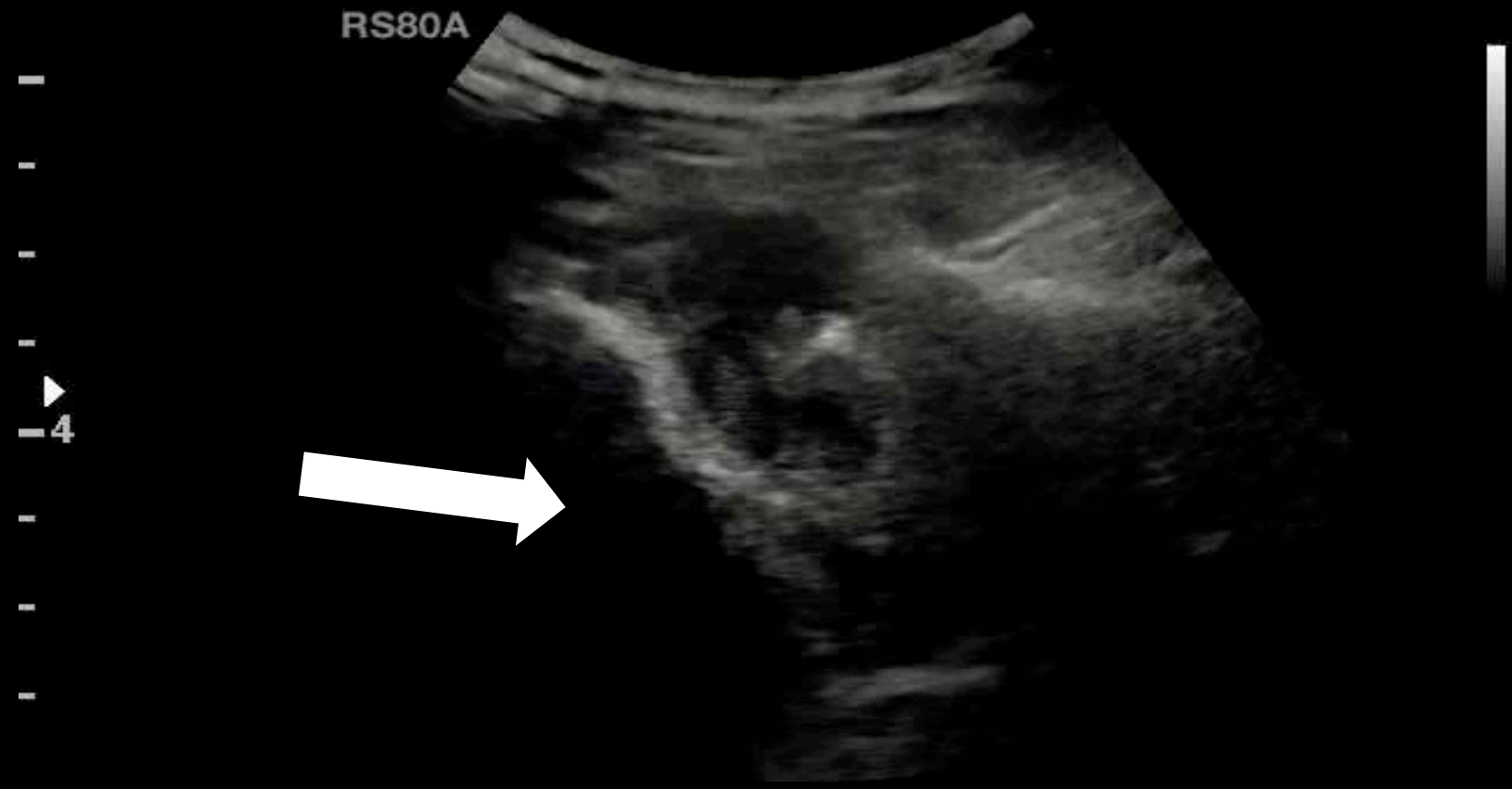
-
-
-
-
▶
-4
-
-
-



CA1-7A / Abdomen / FPS52 / MI1.4 / Tls0.3 / 14-06-2016 11:39:59
2D G53/DR48/FA11/P95/Frq Gen./8.0cm

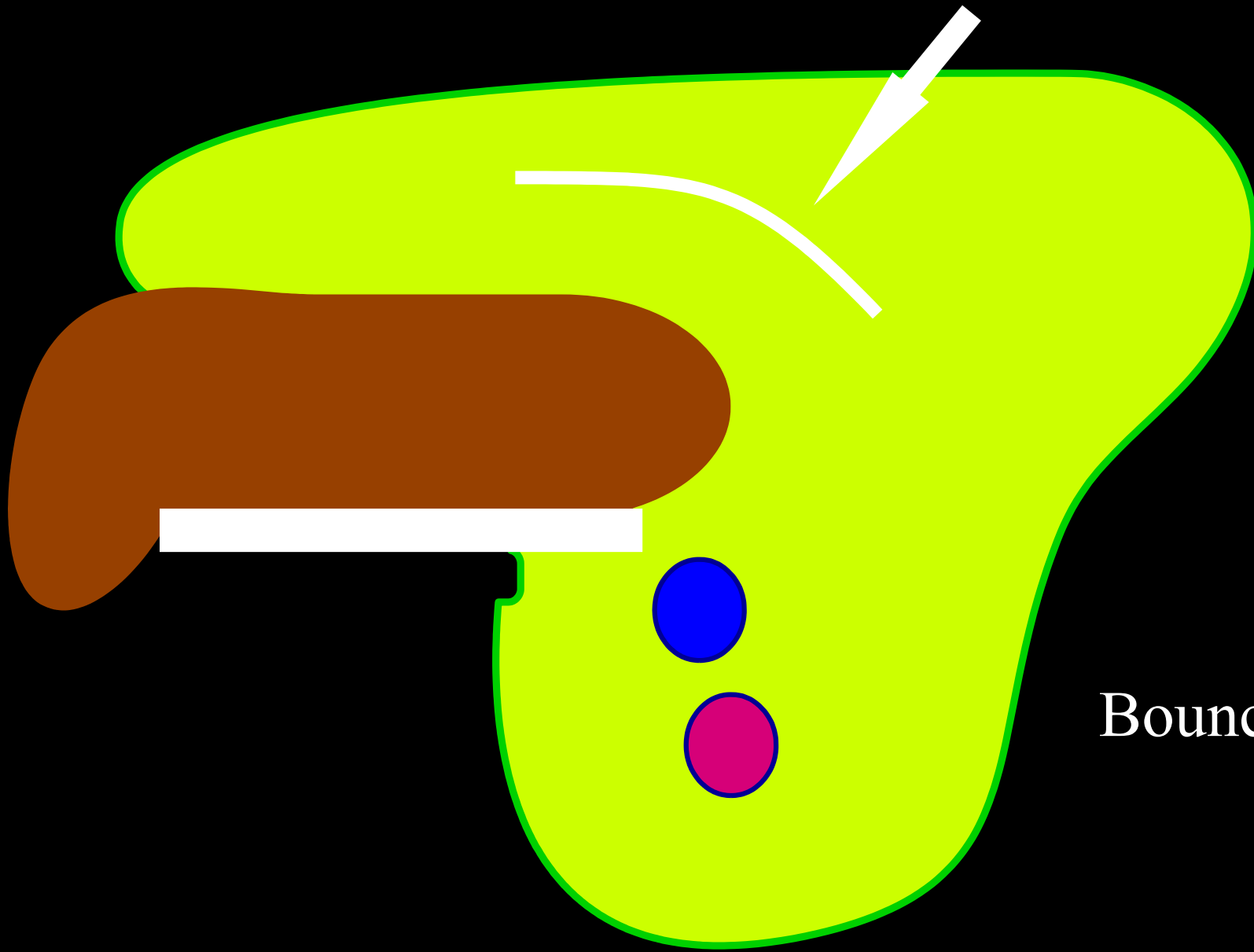


RS80A



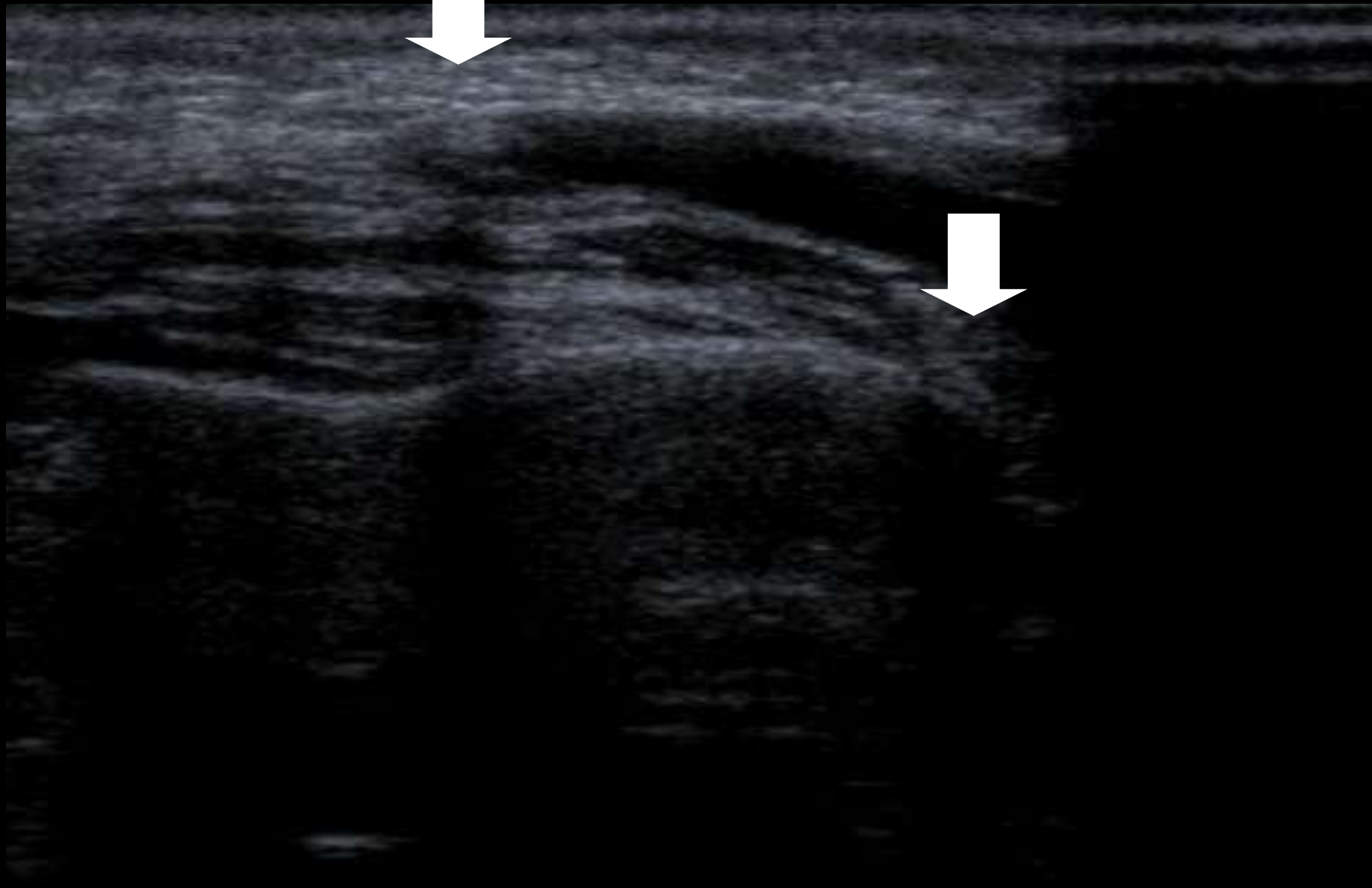
4





Bounce the probe !





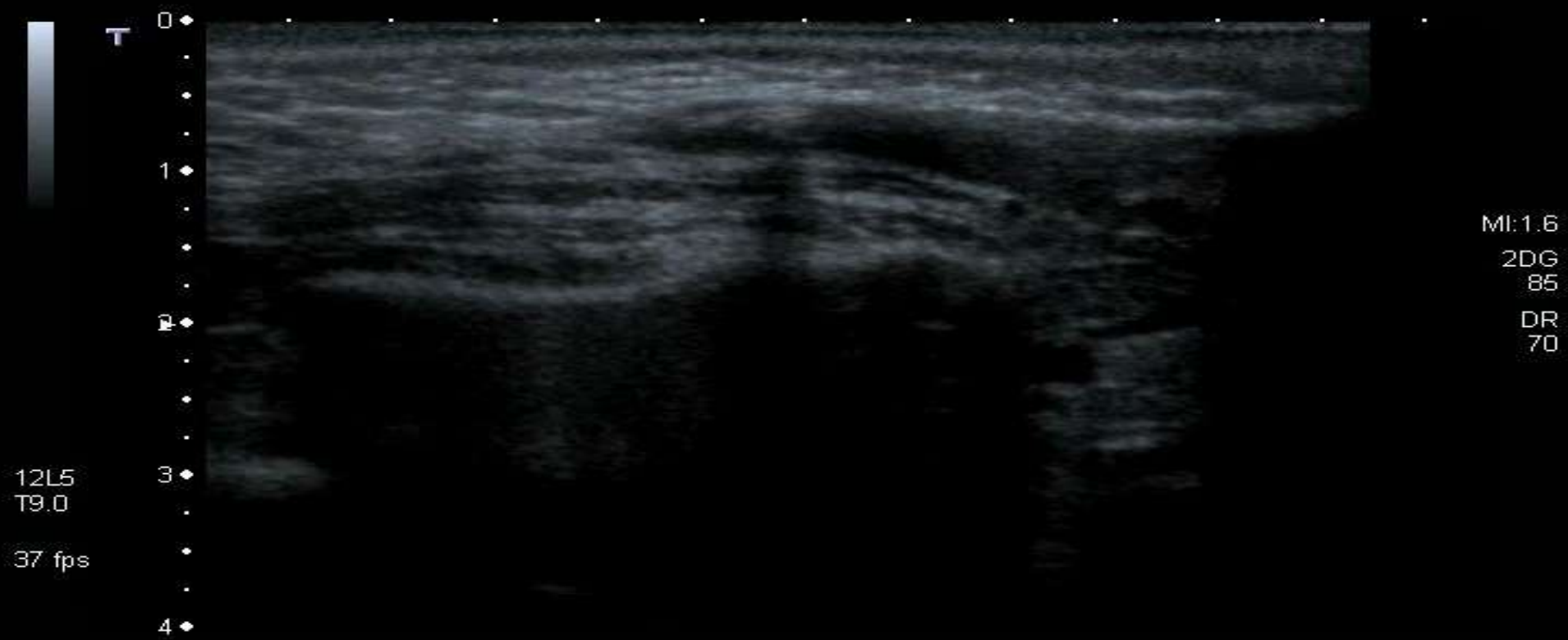
TOSHIBA

158974:THOMAS JANINE
MORRISTON HOSPITAL

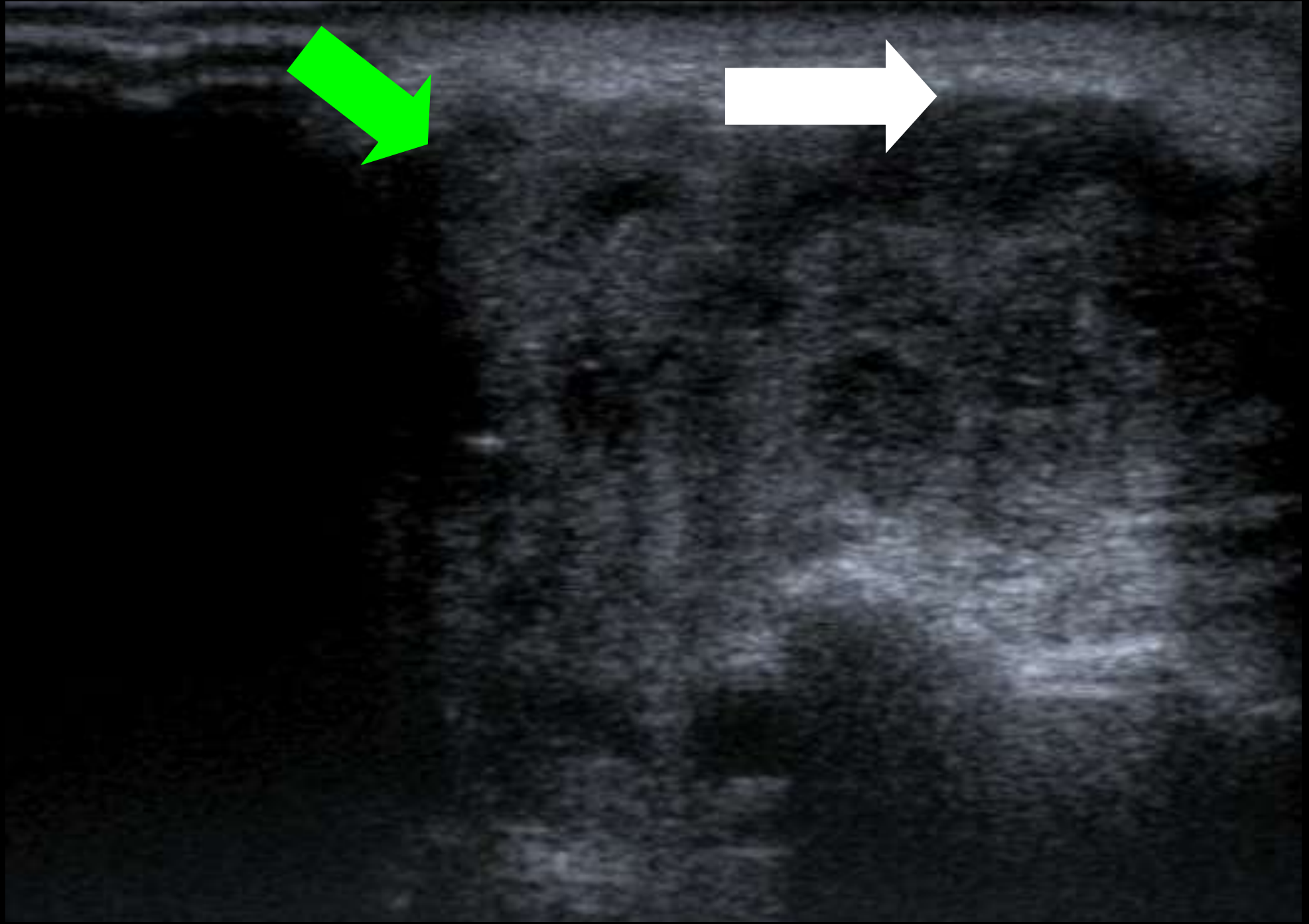
O
- ... -

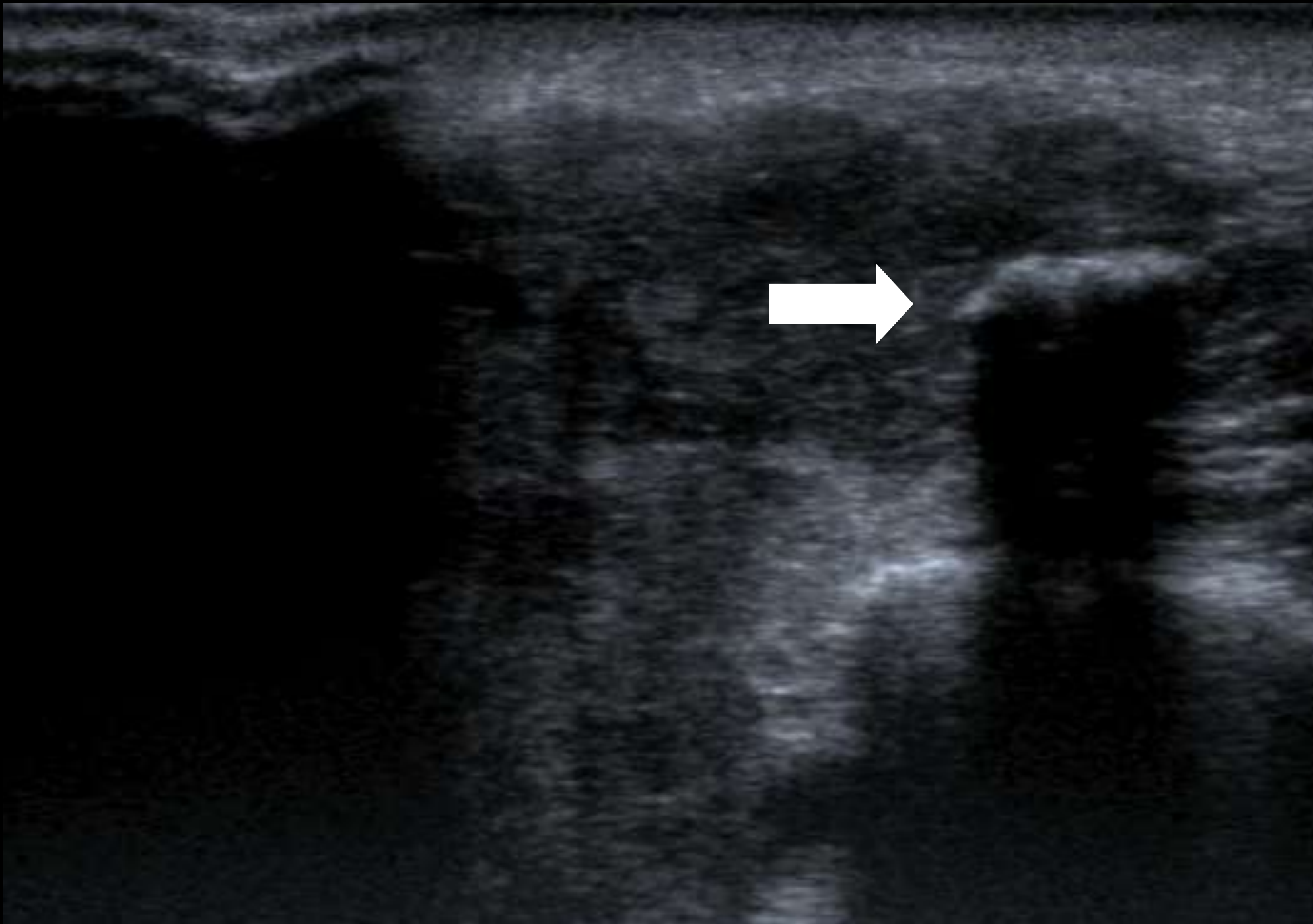
Thyroid UK

21/08/2006
14:40:35



HDD:79% Free





TOSHIBA

548206:PRYOR HELEN
MORRISTON HOSPITAL

O

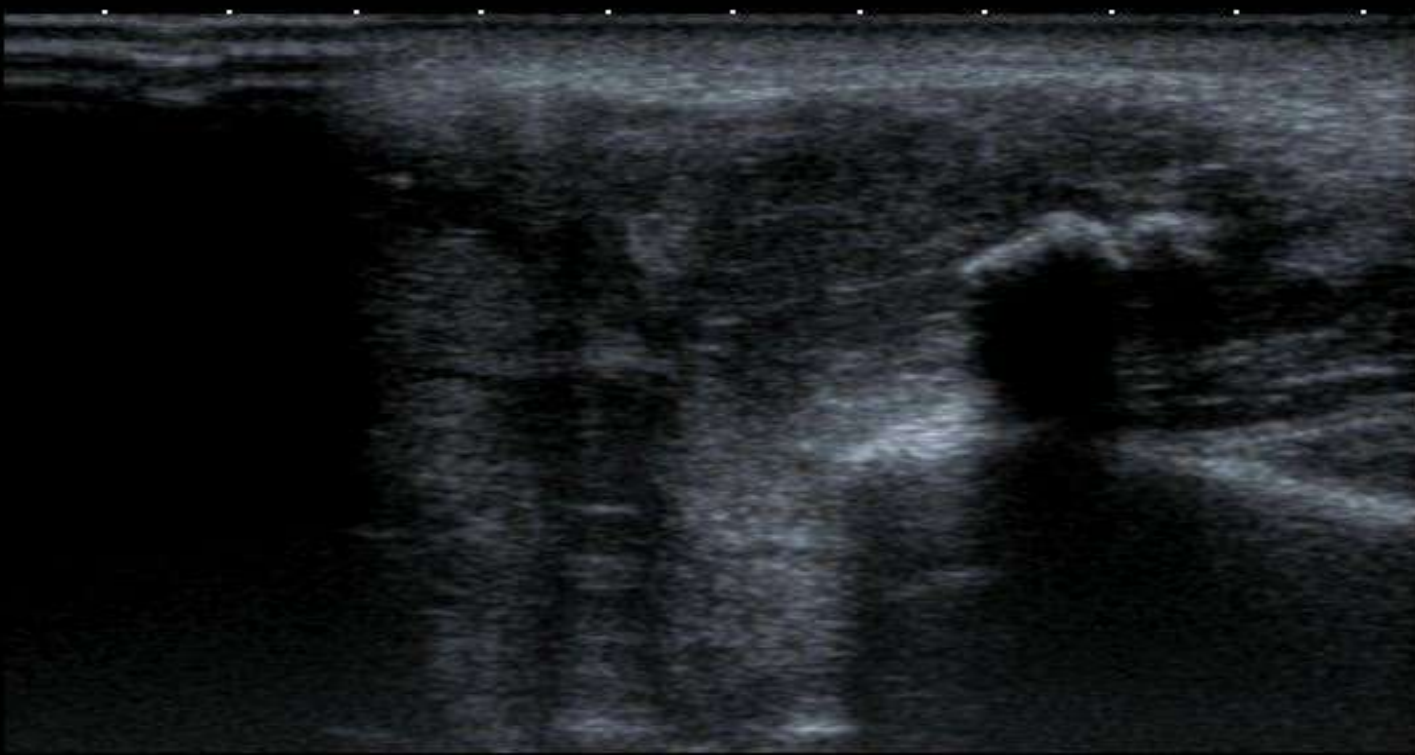
- ... -

Thyroid UK

23/01/2006
15:39:25



0 ◆
.
.
1 ◆
.
.
2 ◆
.
.
3 ◆
.
.
4 ◆



12L5
T9.0

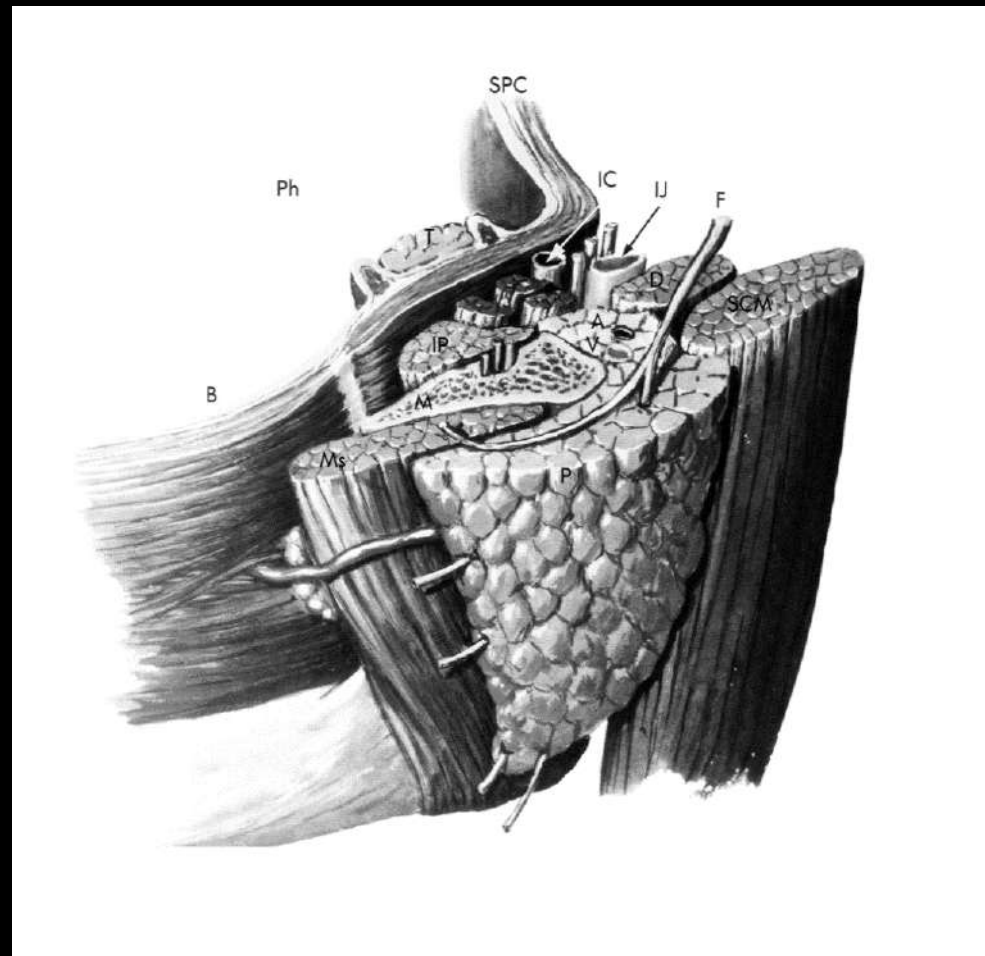
37 fps

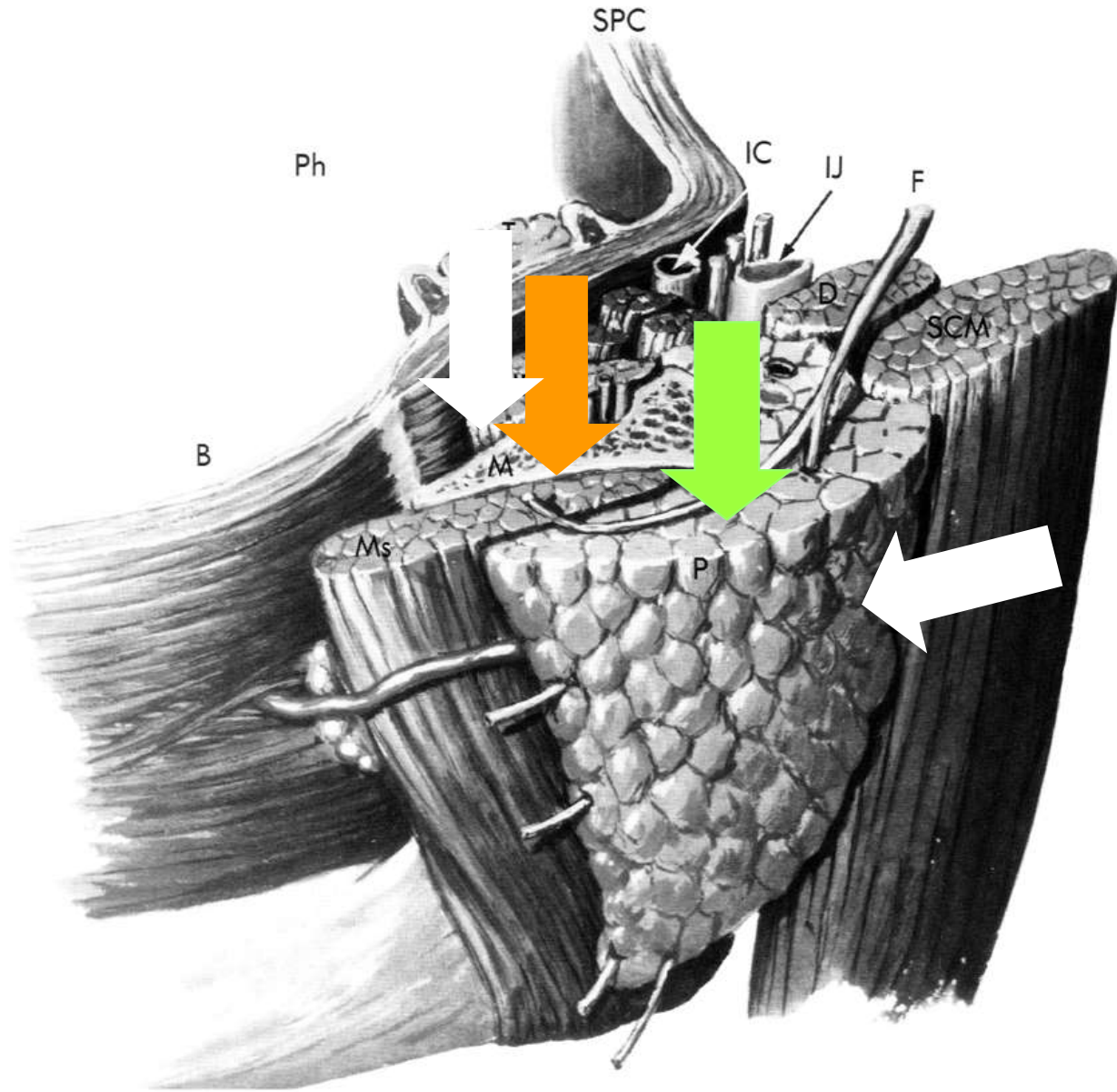
MI:1.6
2DG
85
DR
70

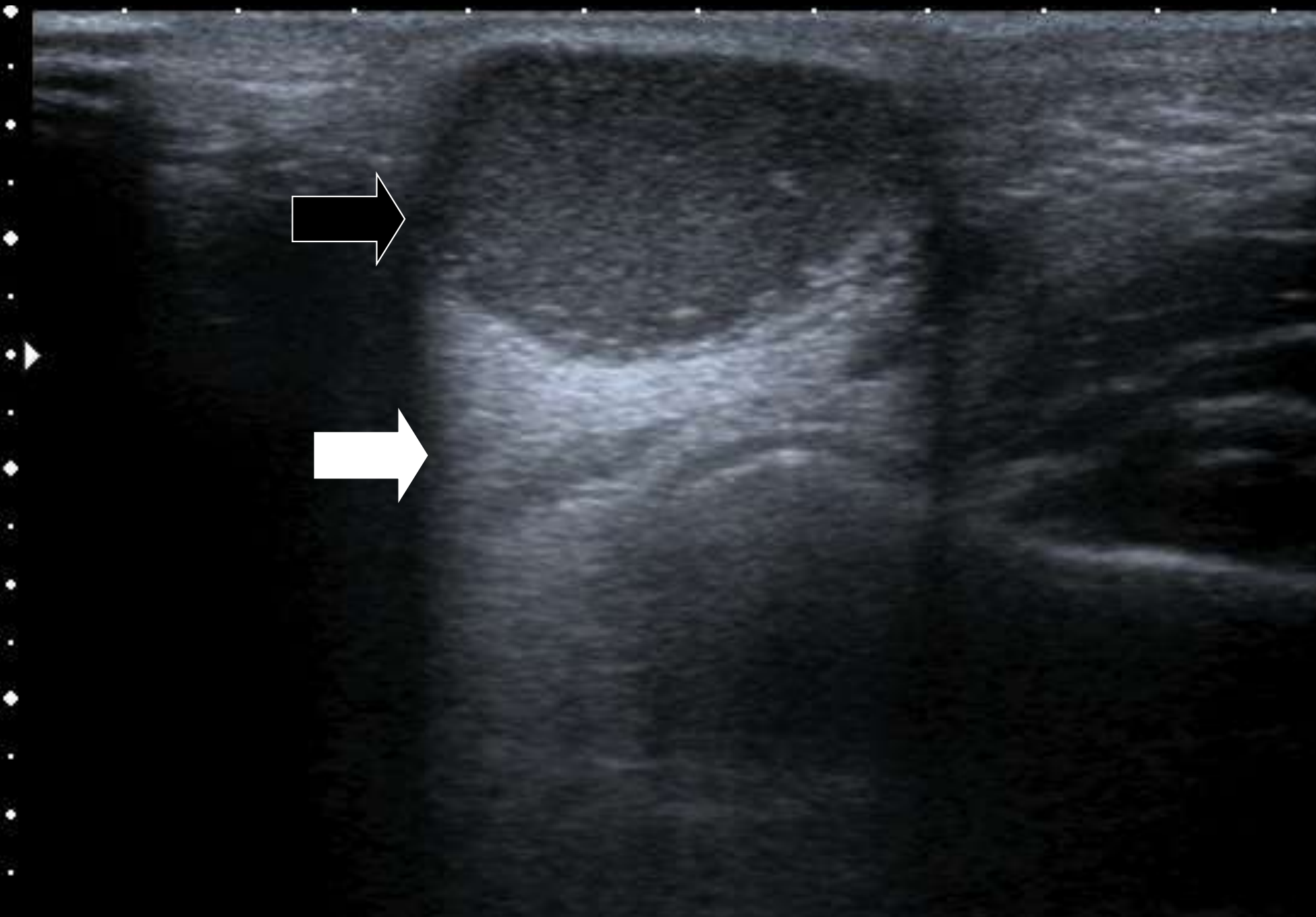
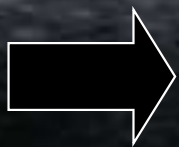
HDD:83% Free

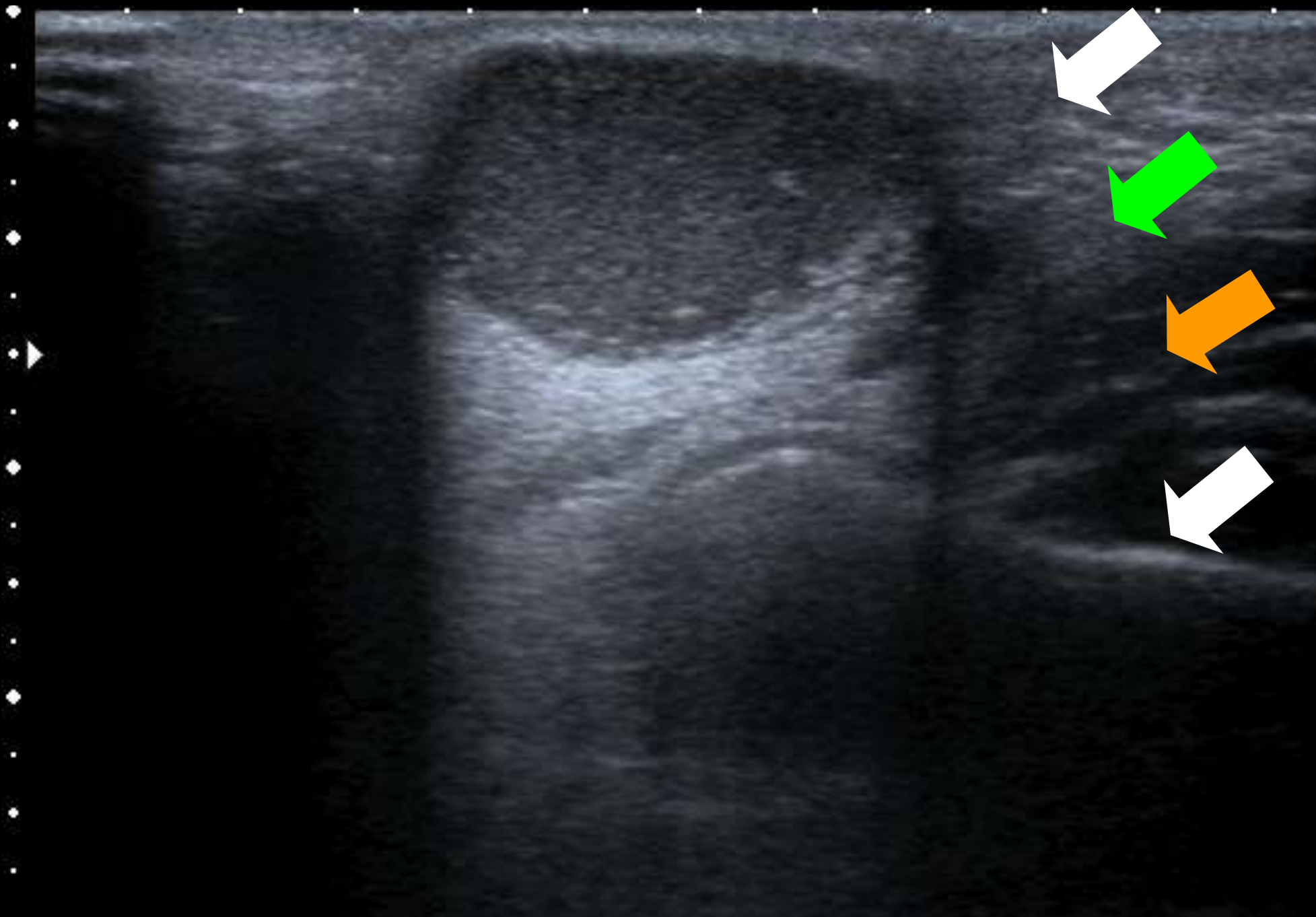


20% “parotid” masses are extra-parotid









TOSHIBA

T930853:OWEN THOMAS
SINGLETON HOSPITAL

22 M
- RME - Thyroid

13/03/2008
2:14:24 PM



0 ◆
.
.
1 ◆
.
▶
2 ◆
.
.
3 ◆
.
.
4 ◆



T

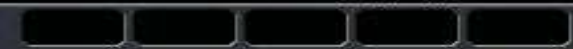
MI:1.6
2DG
80
DR
65

12L5
diffT8.0

36 fps

A0 IP4

HDD:91% Free





Left

0

1

2

3



Left





RT

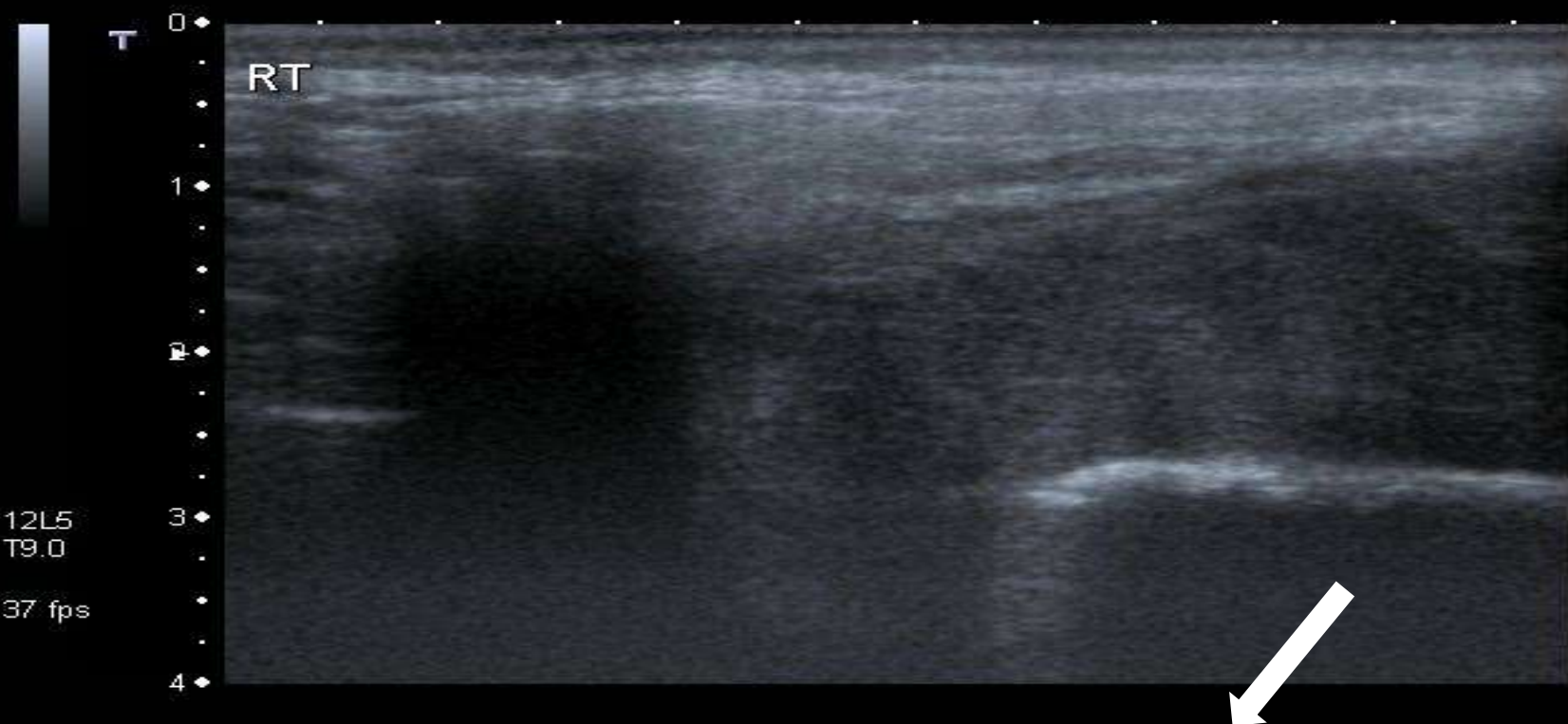


TOSHIBA

577590:BECKETT TUDOR 53 M
MORRISTON HOSPITAL - -

Thyroid UK

12/06/2007
10:56:22



HDD:68% Free

TOSHIBA

577590:BECKETT TUDOR 53 M
MORRISTON HOSPITAL - -

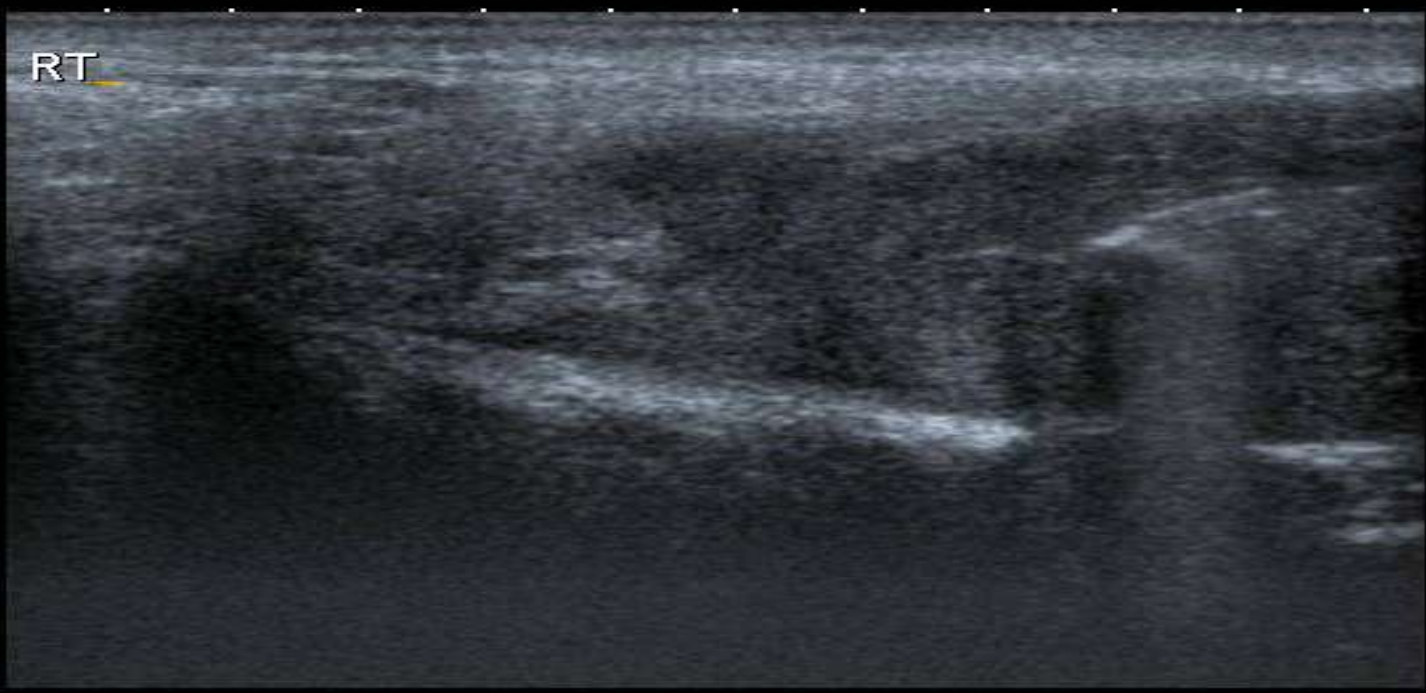
Thyroid UK

12/06/2007
11:08:30



0 ◆
1 ◆
2 ◆
3 ◆
4 ◆

RT



MI:1.6
2DG
85
DR
70

12L5
T9.0

37 fps

HDD:68% Free



TOSHIBA

577590:BECKETT TUDOR 53 M
MORRISTON HOSPITAL - -

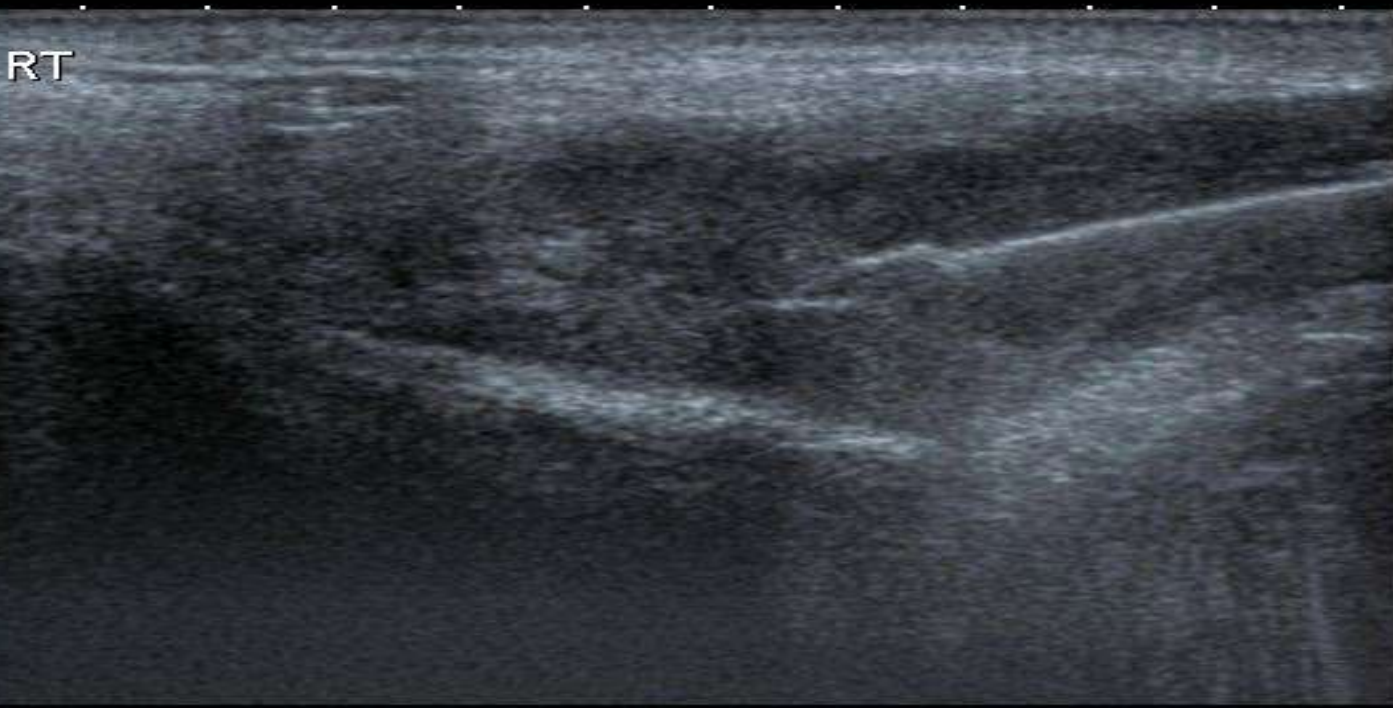
Thyroid UK

12/06/2007
11:08:44



T

0 ◆
1 ◆
2 ◆
3 ◆
4 ◆



MI:1.6
2DG
85
DR
70

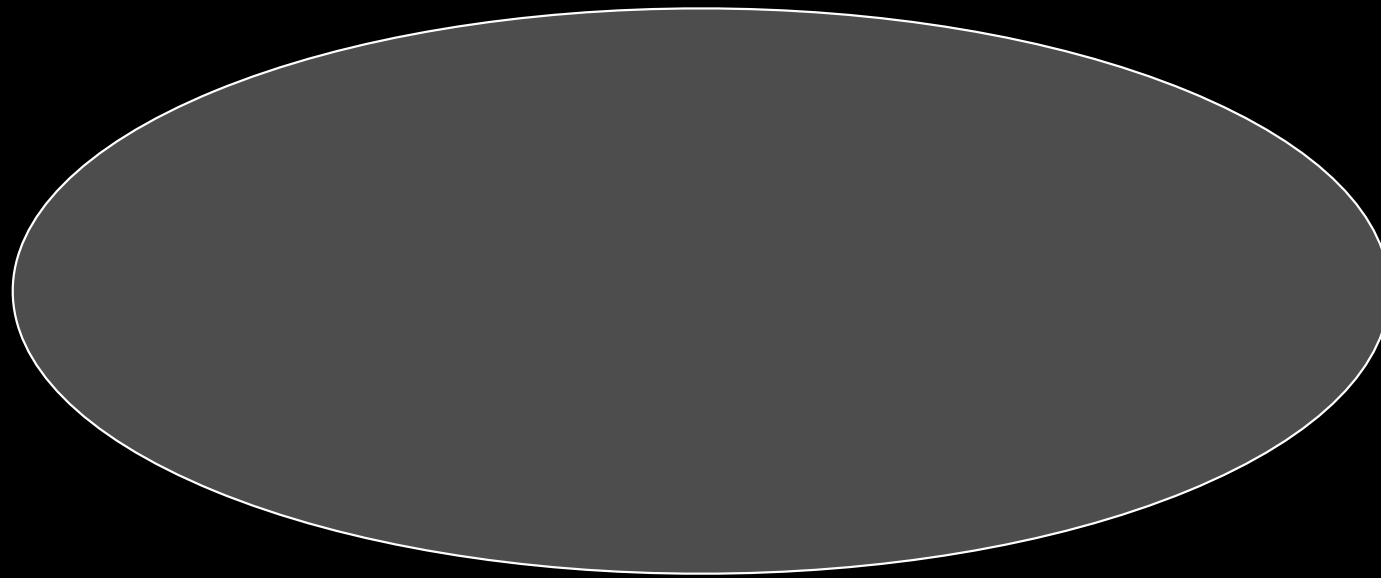
12L5
T9.0
37 fps

HDD:68% Free

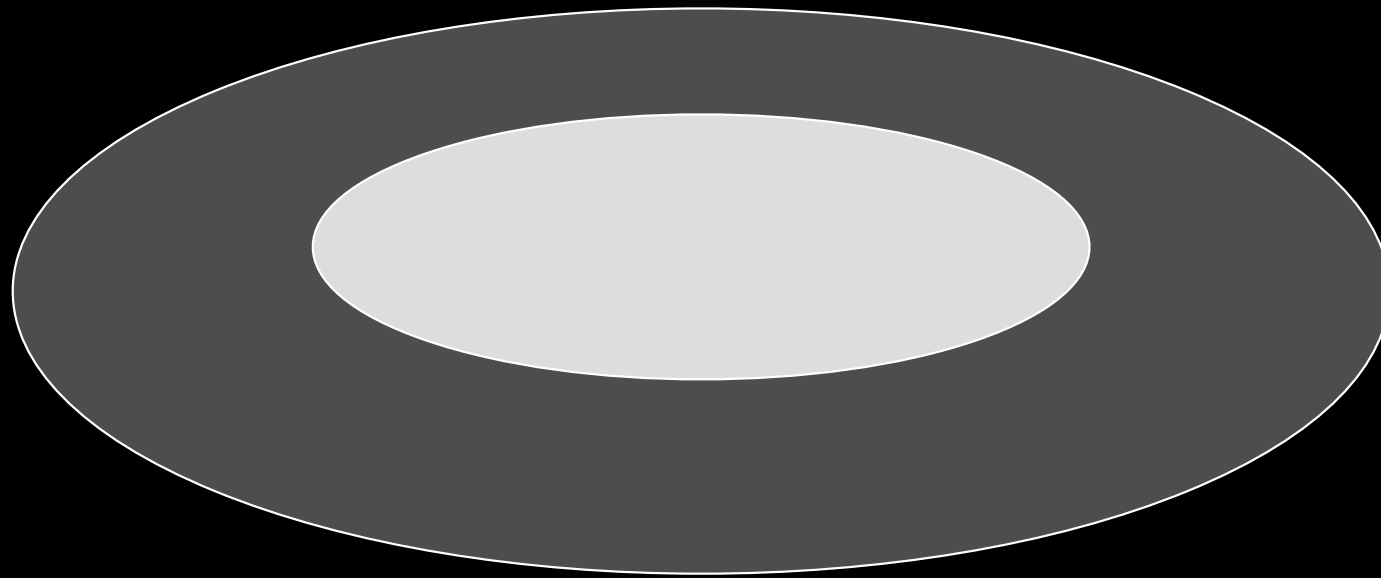


Lymph Node staging

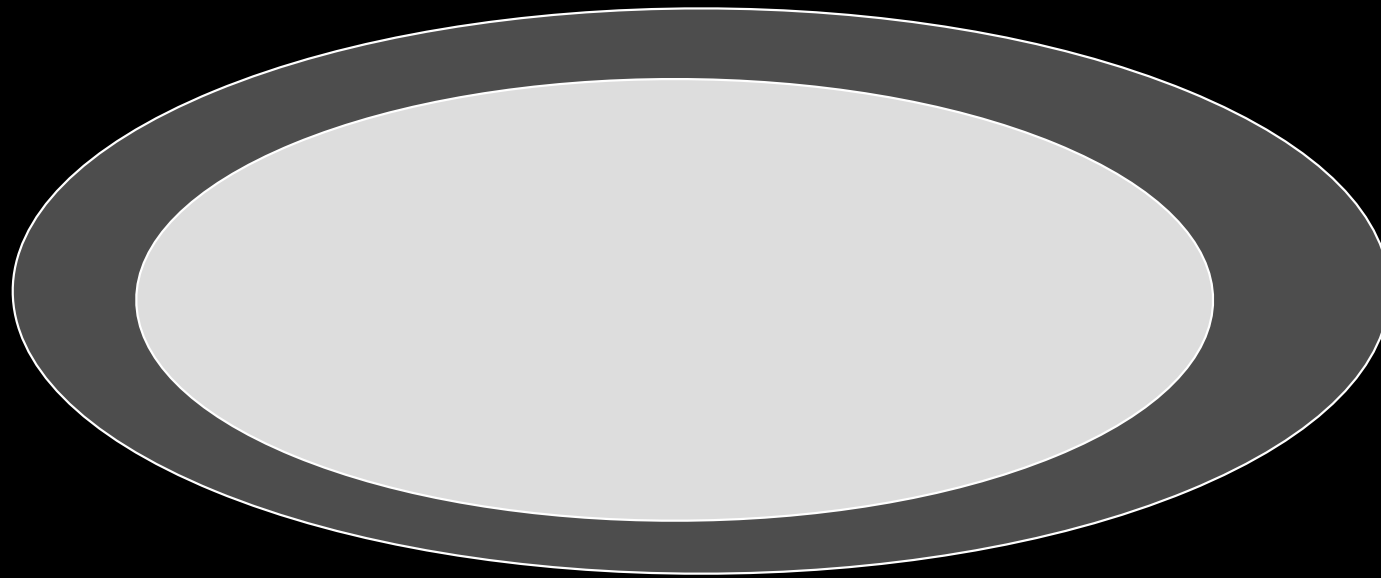
Normal lymph nodes.



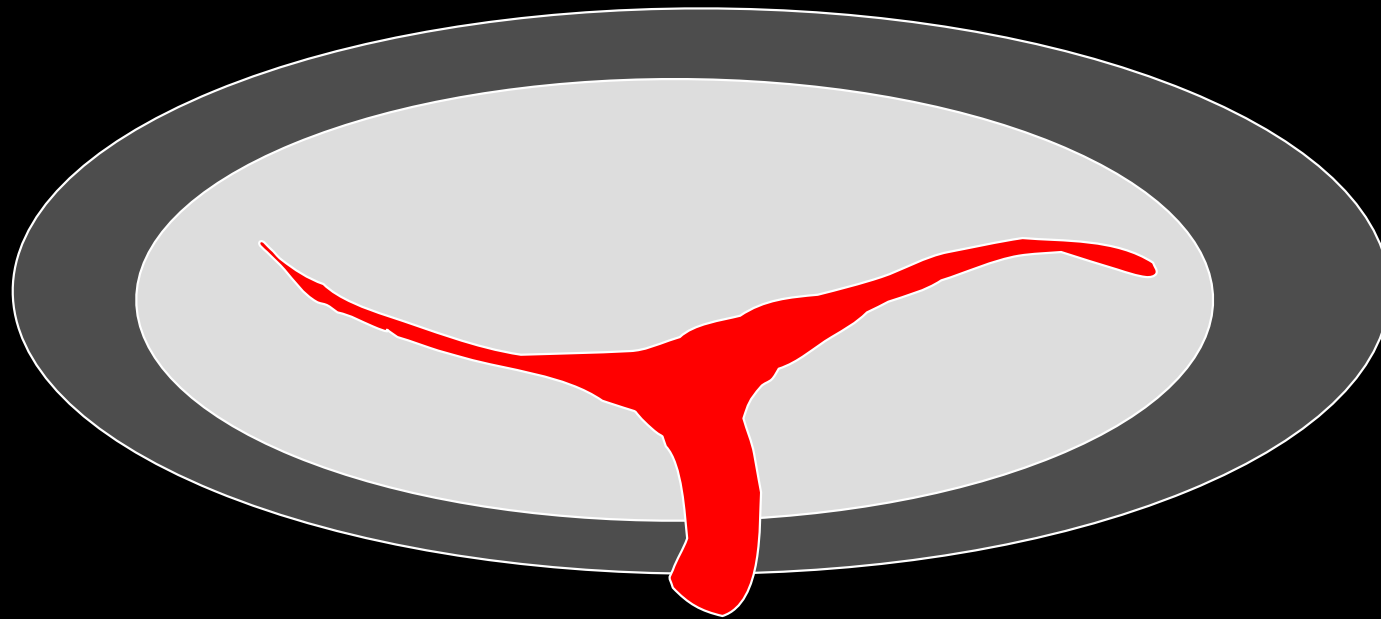
Normal lymph nodes.



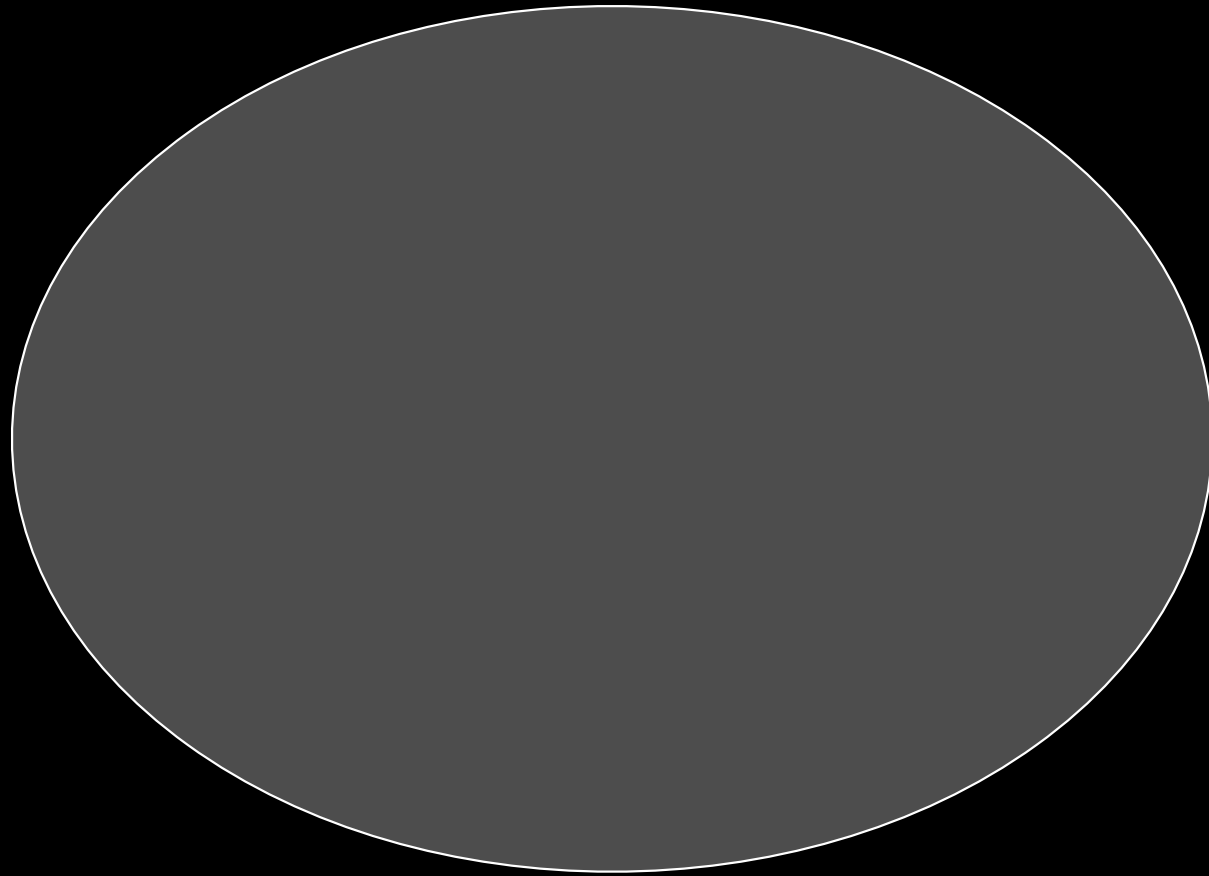
Normal lymph nodes.



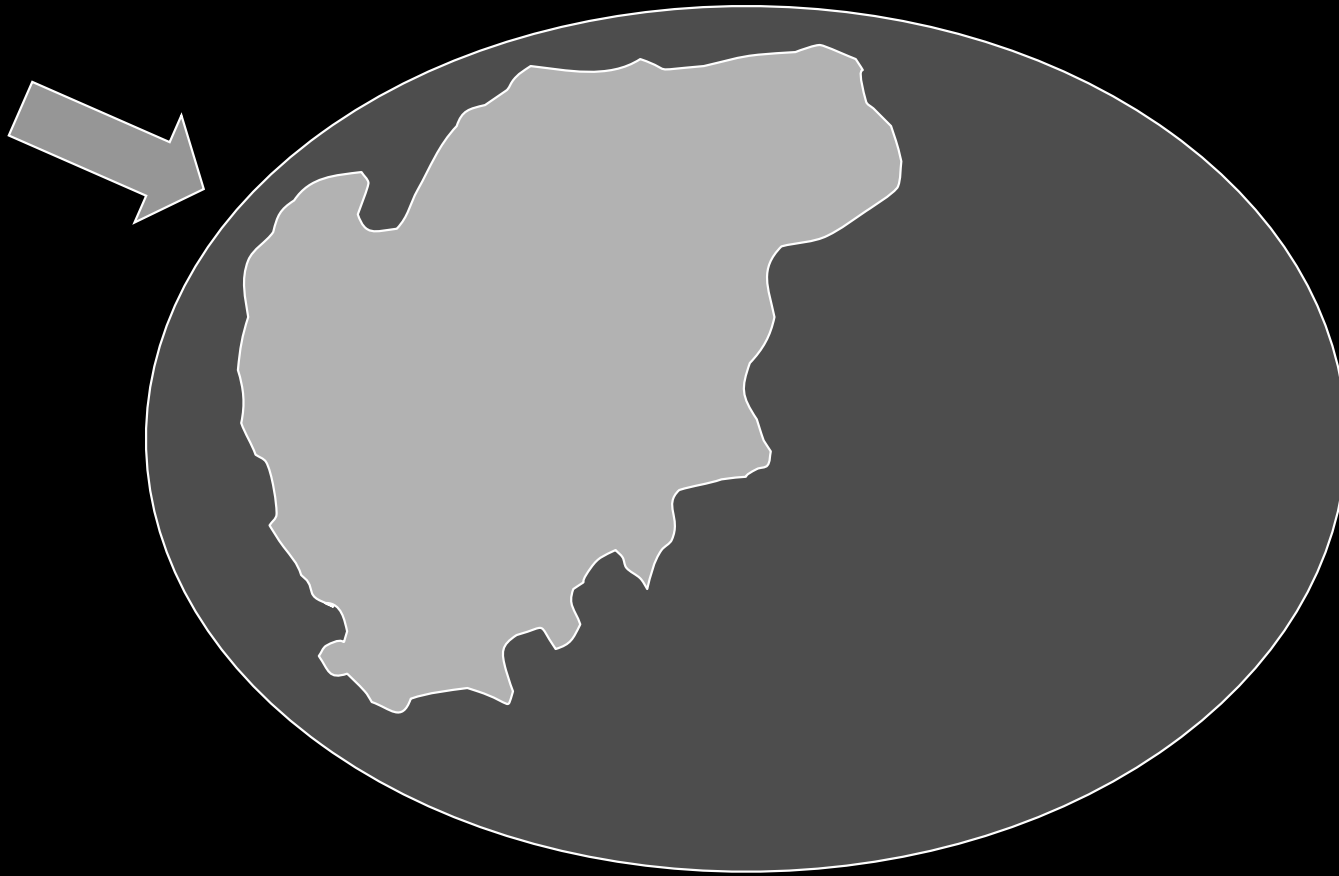
Normal lymph nodes.



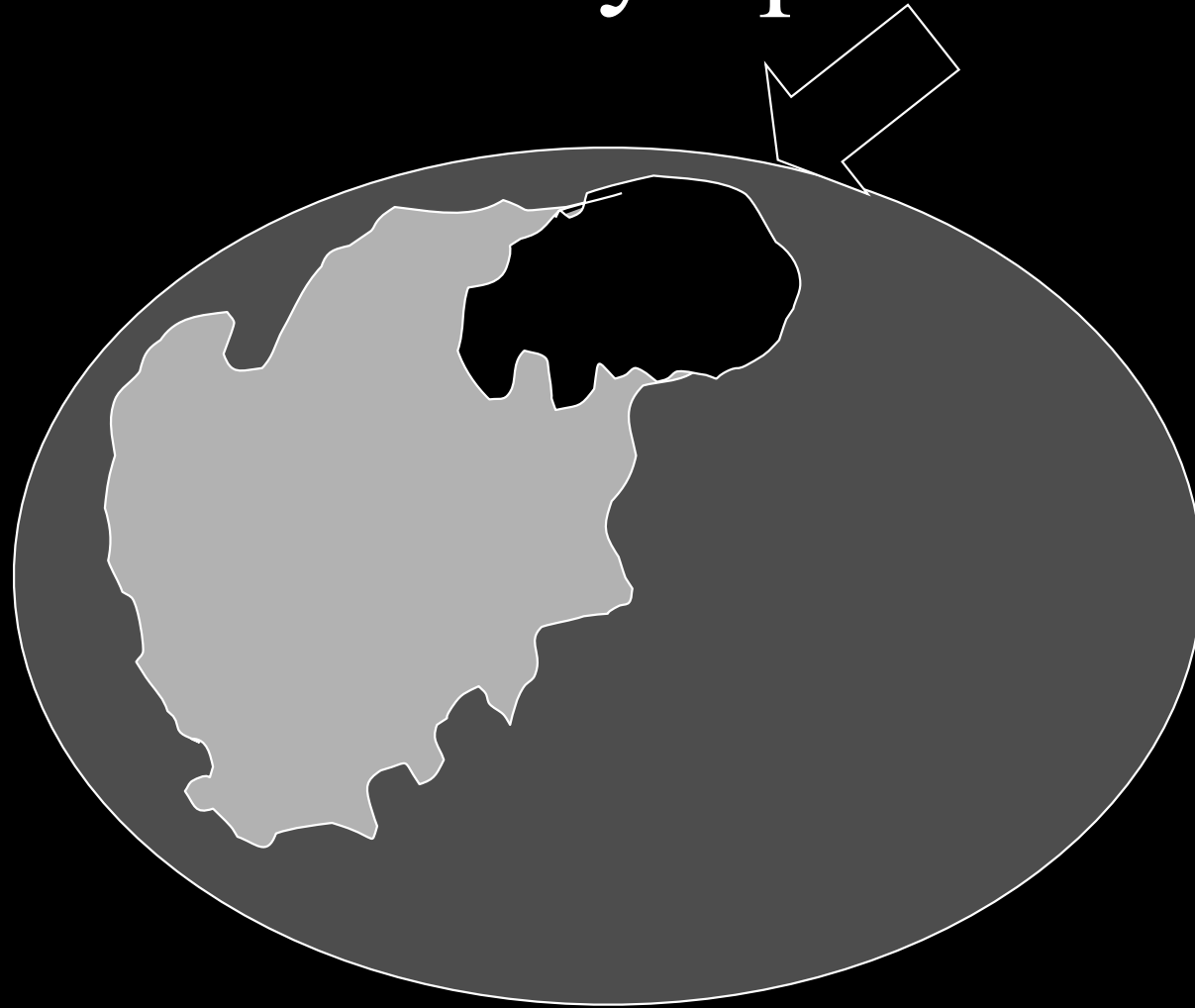
Metastatic lymph nodes



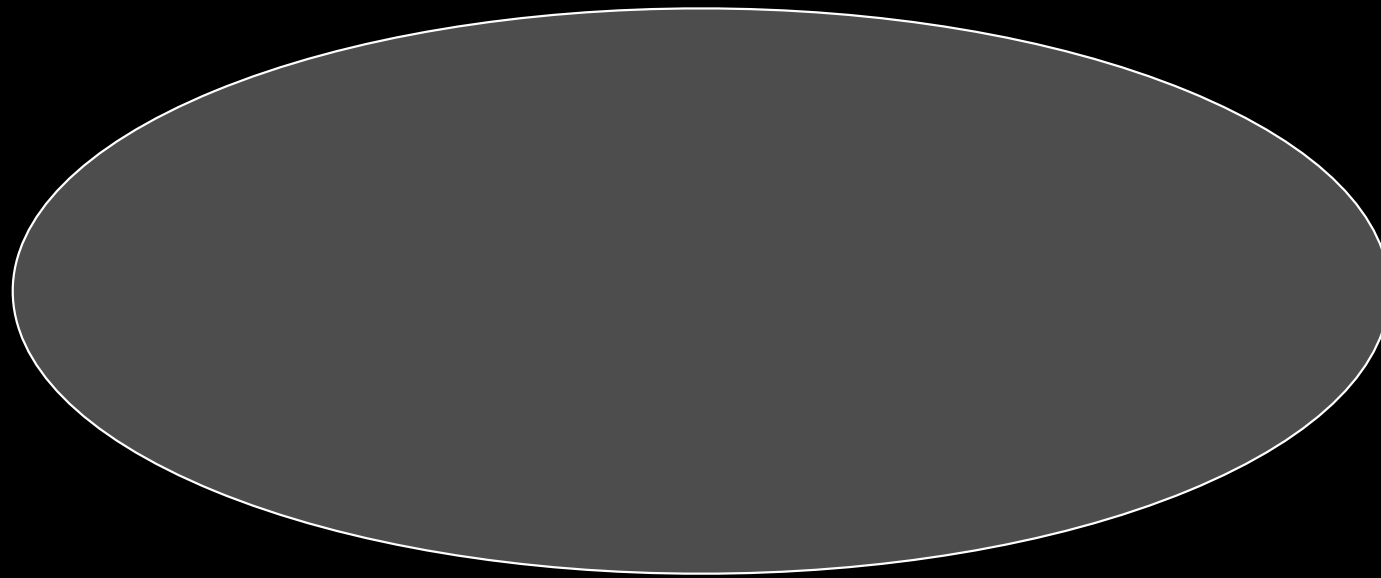
Metastatic lymph nodes



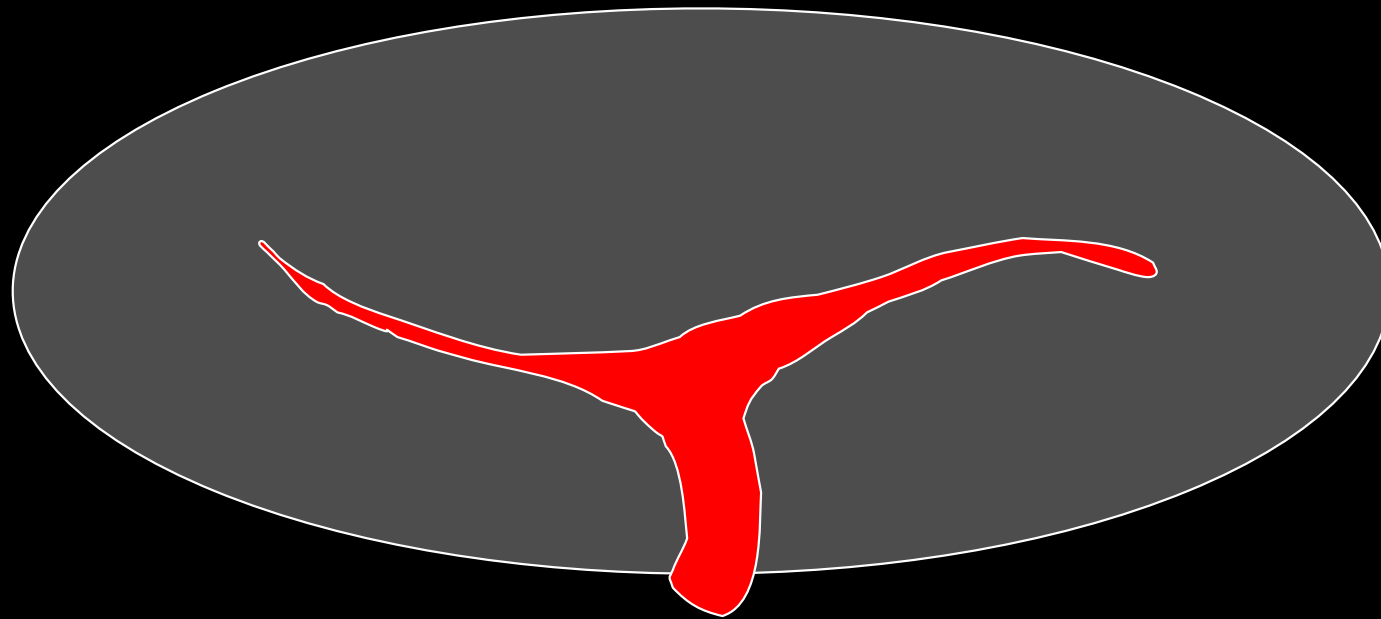
Metastatic lymph nodes



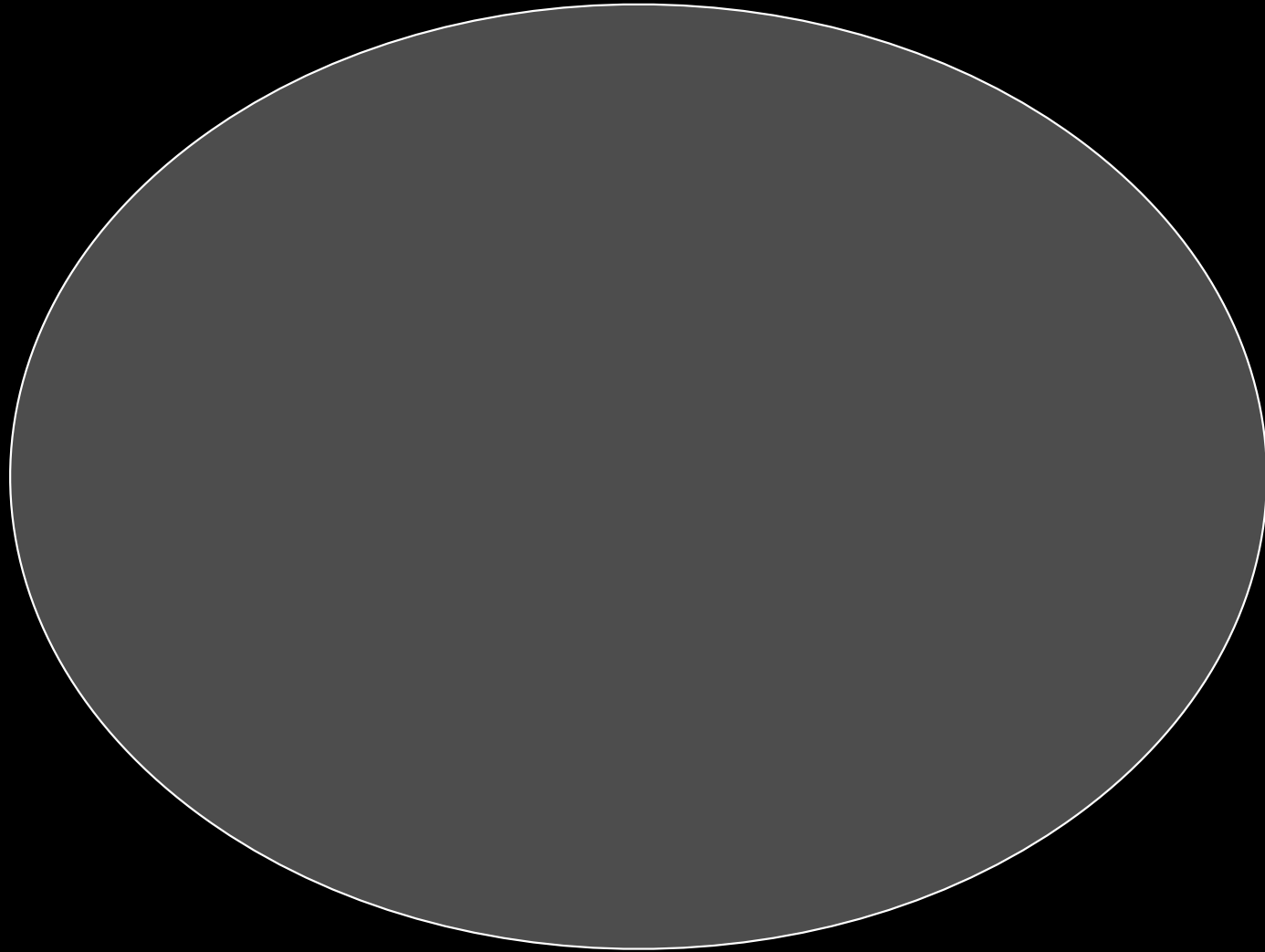
Normal lymph nodes.



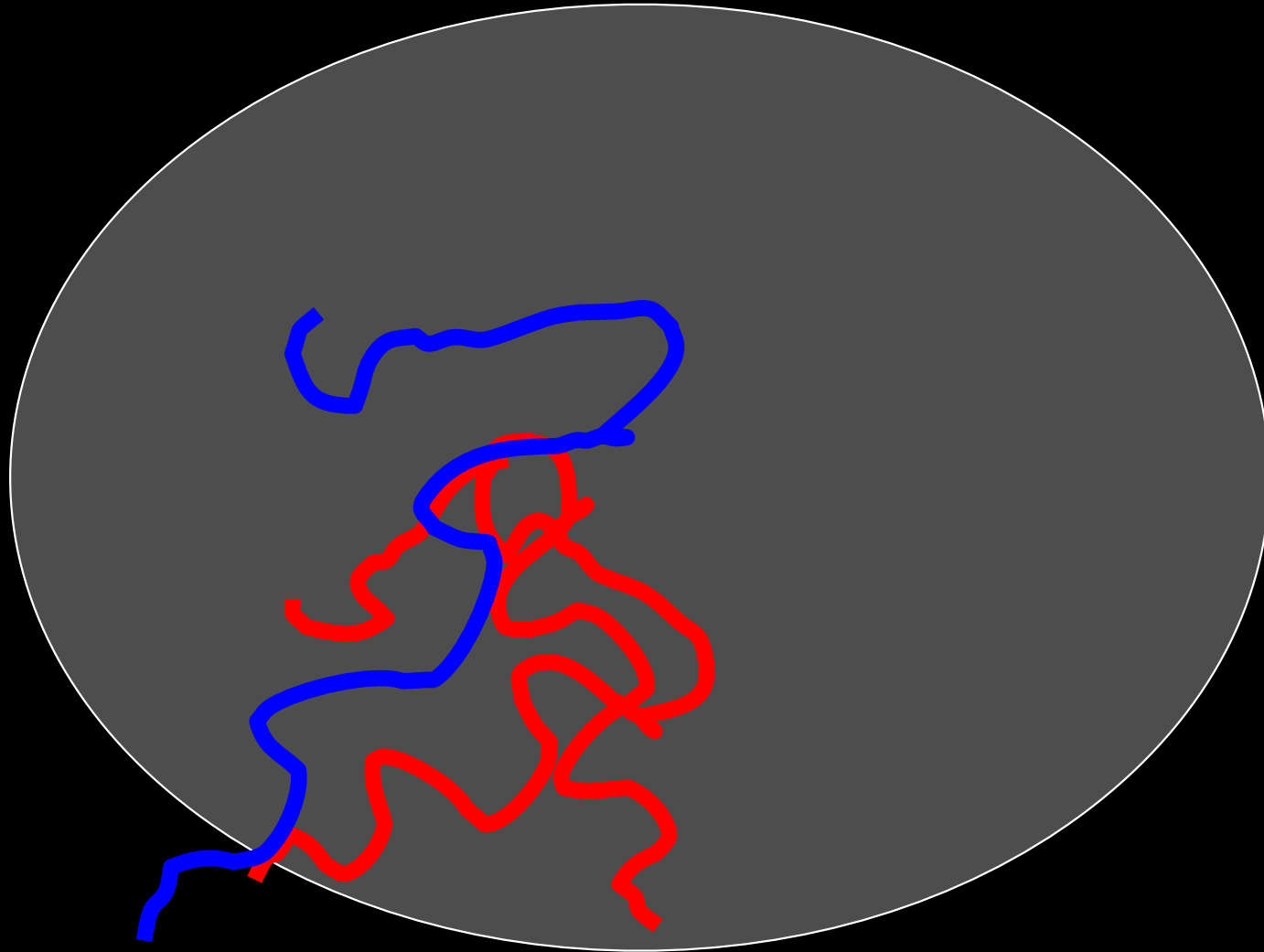
Normal lymph nodes.



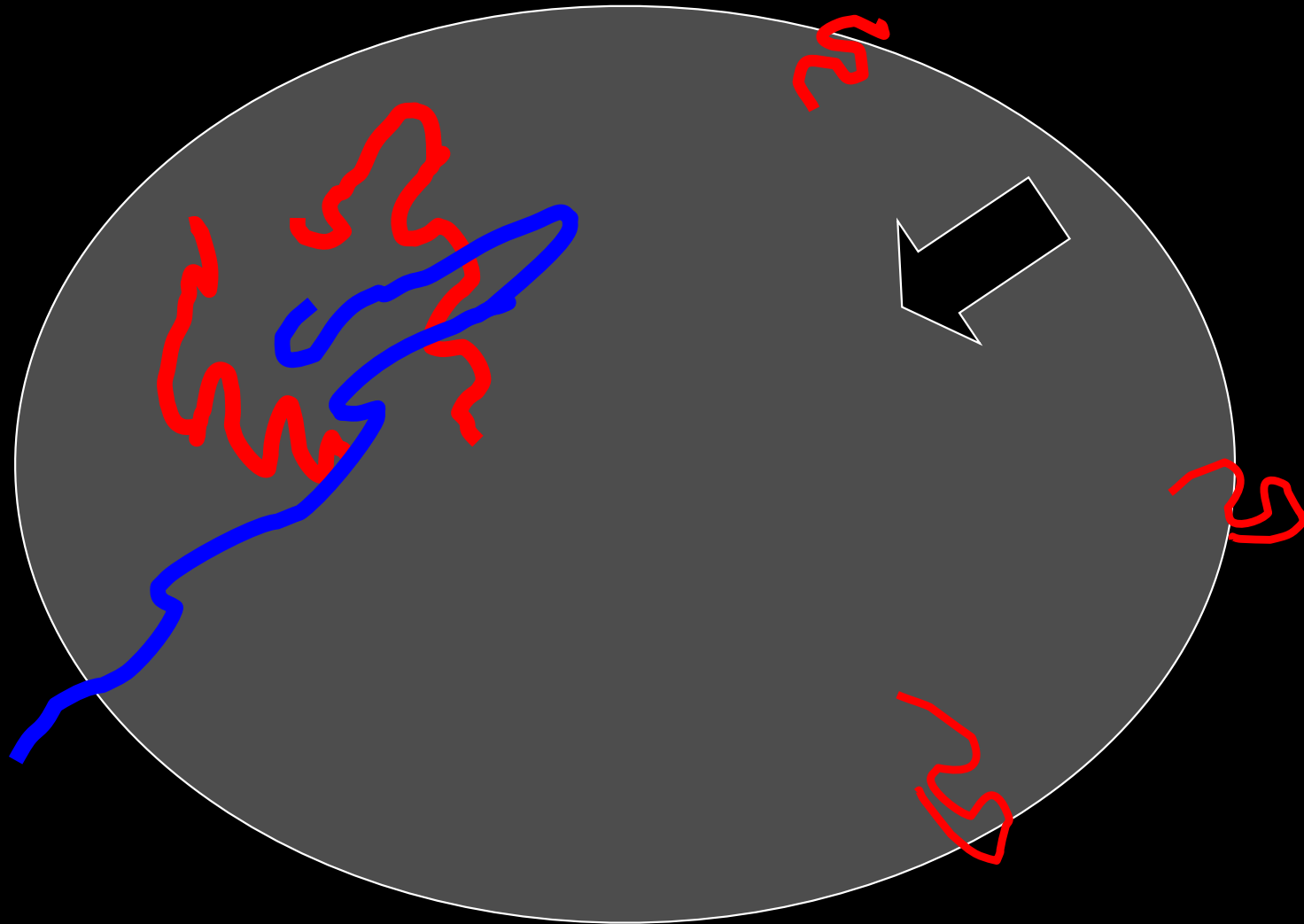
Malignant lymph nodes.

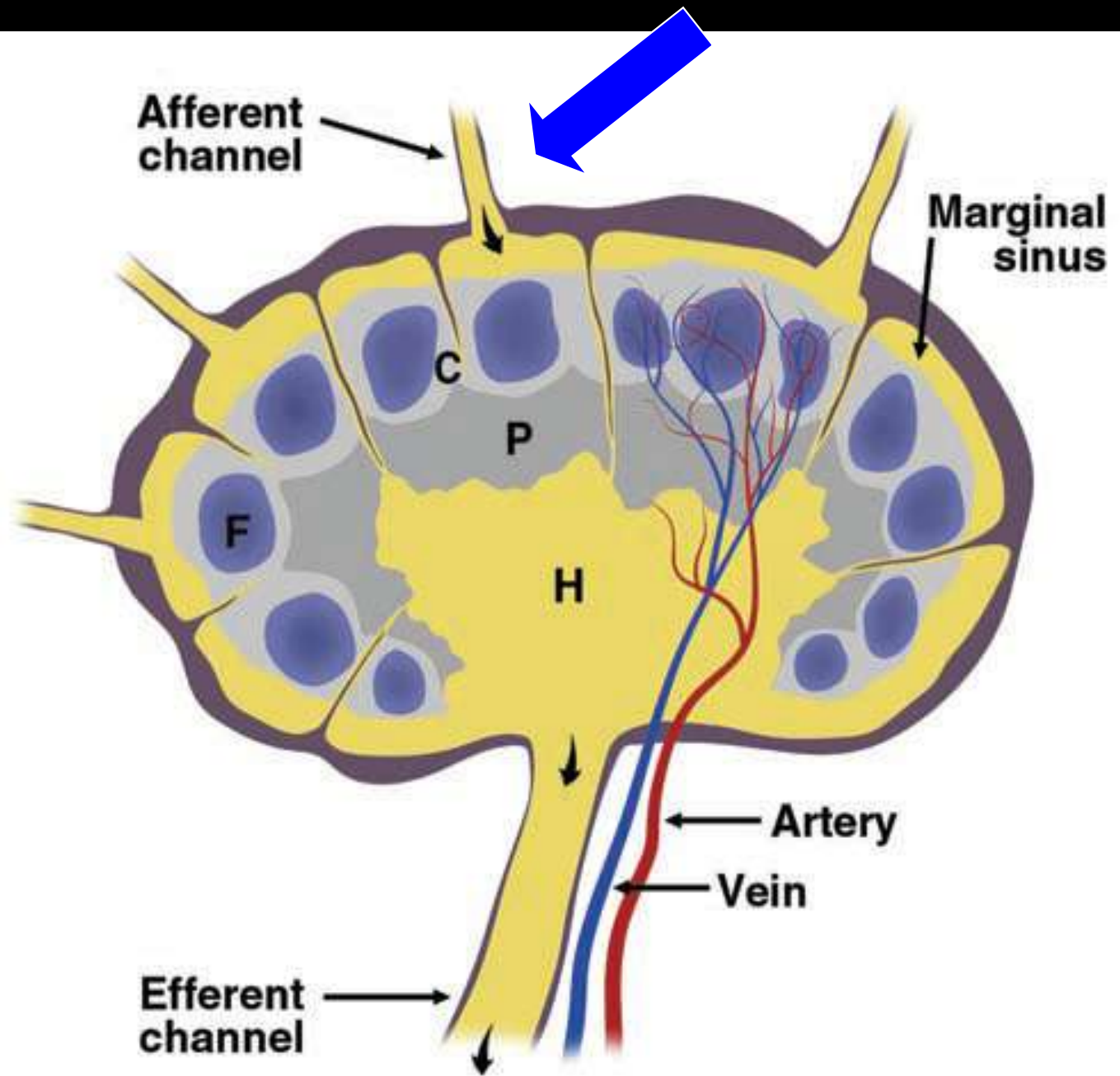


Malignant lymph nodes.

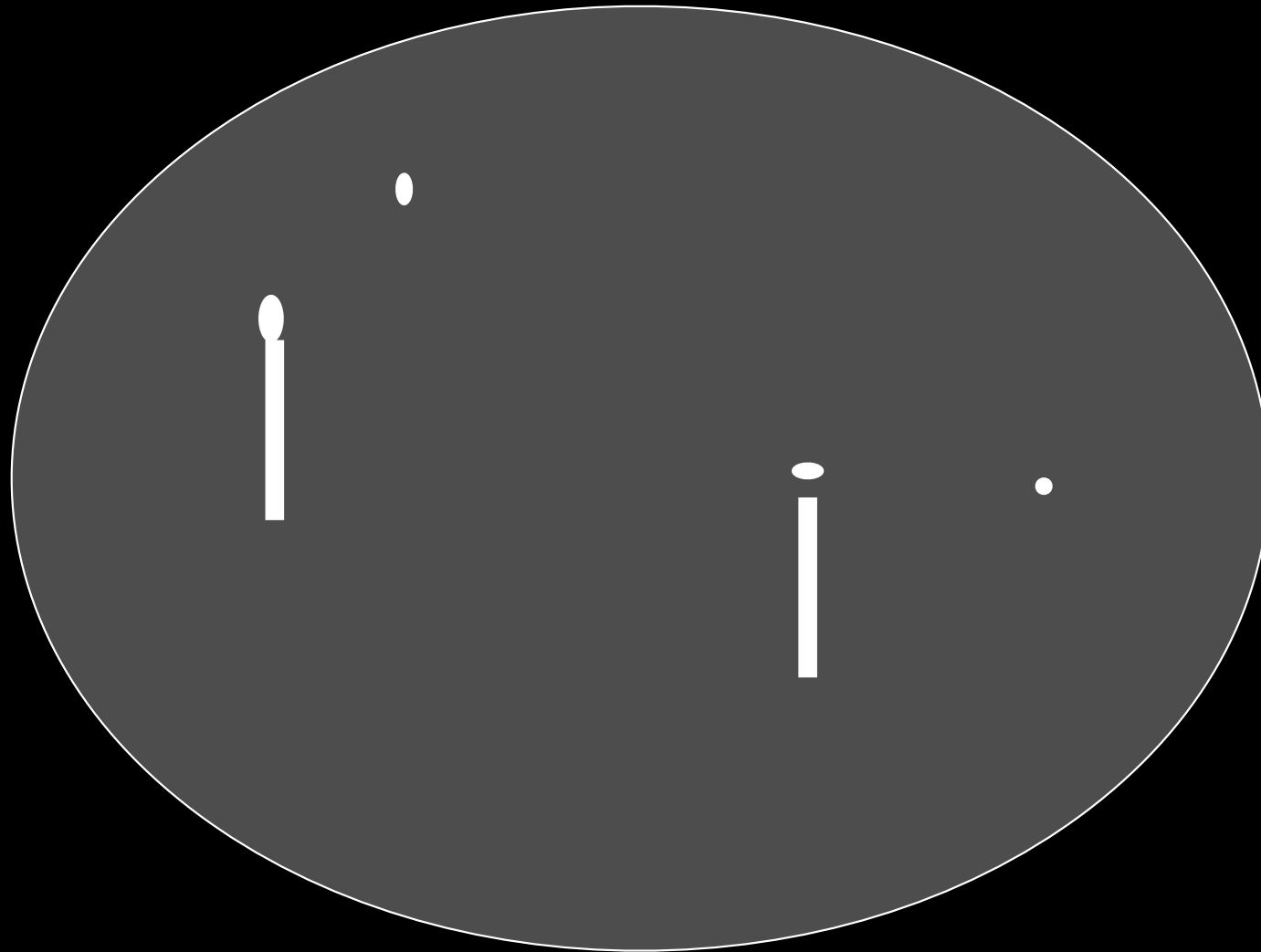


Malignant lymph nodes.





Malignant lymph nodes.





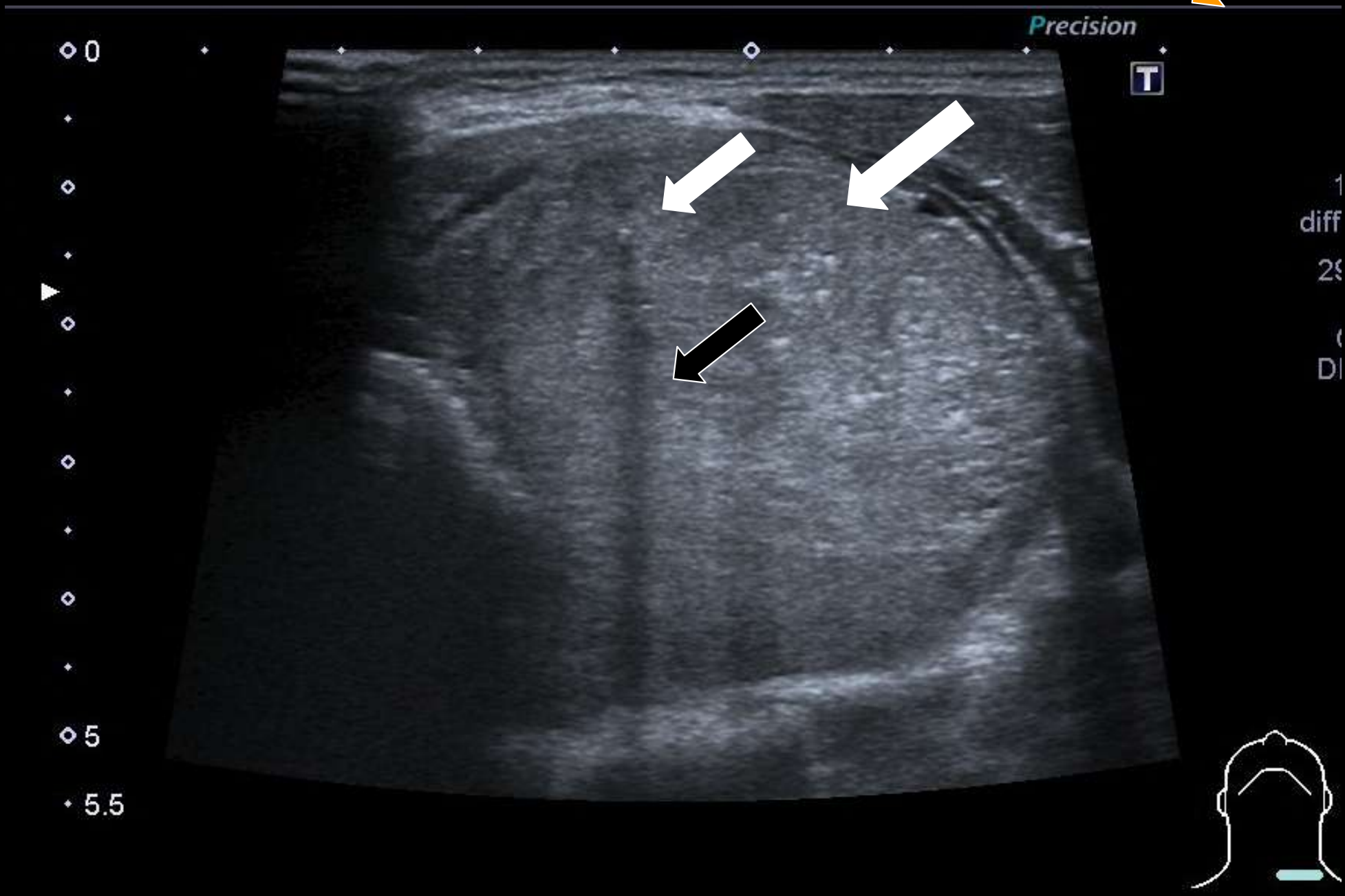
Precision A Pure

T

0

5

5.5



Precision

T

1
diff
29
(
DI

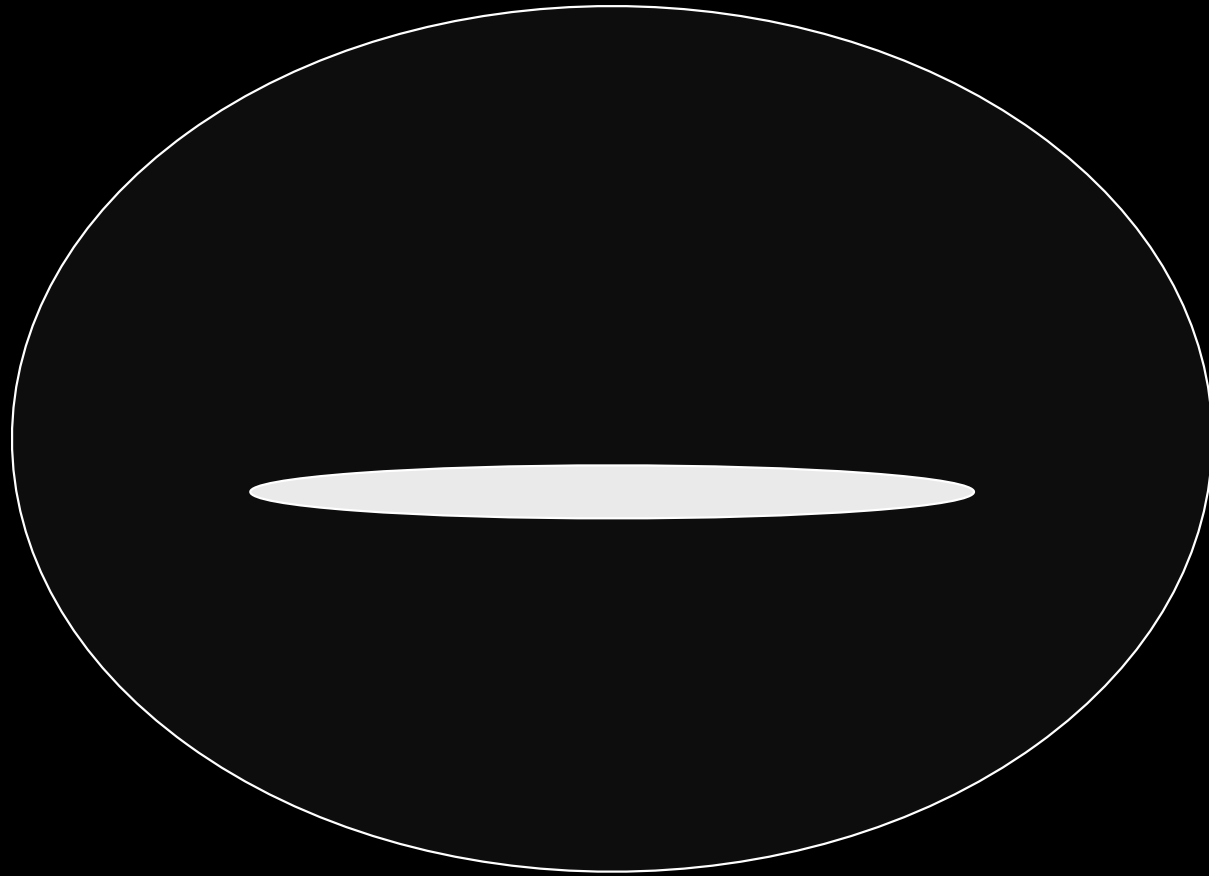


0

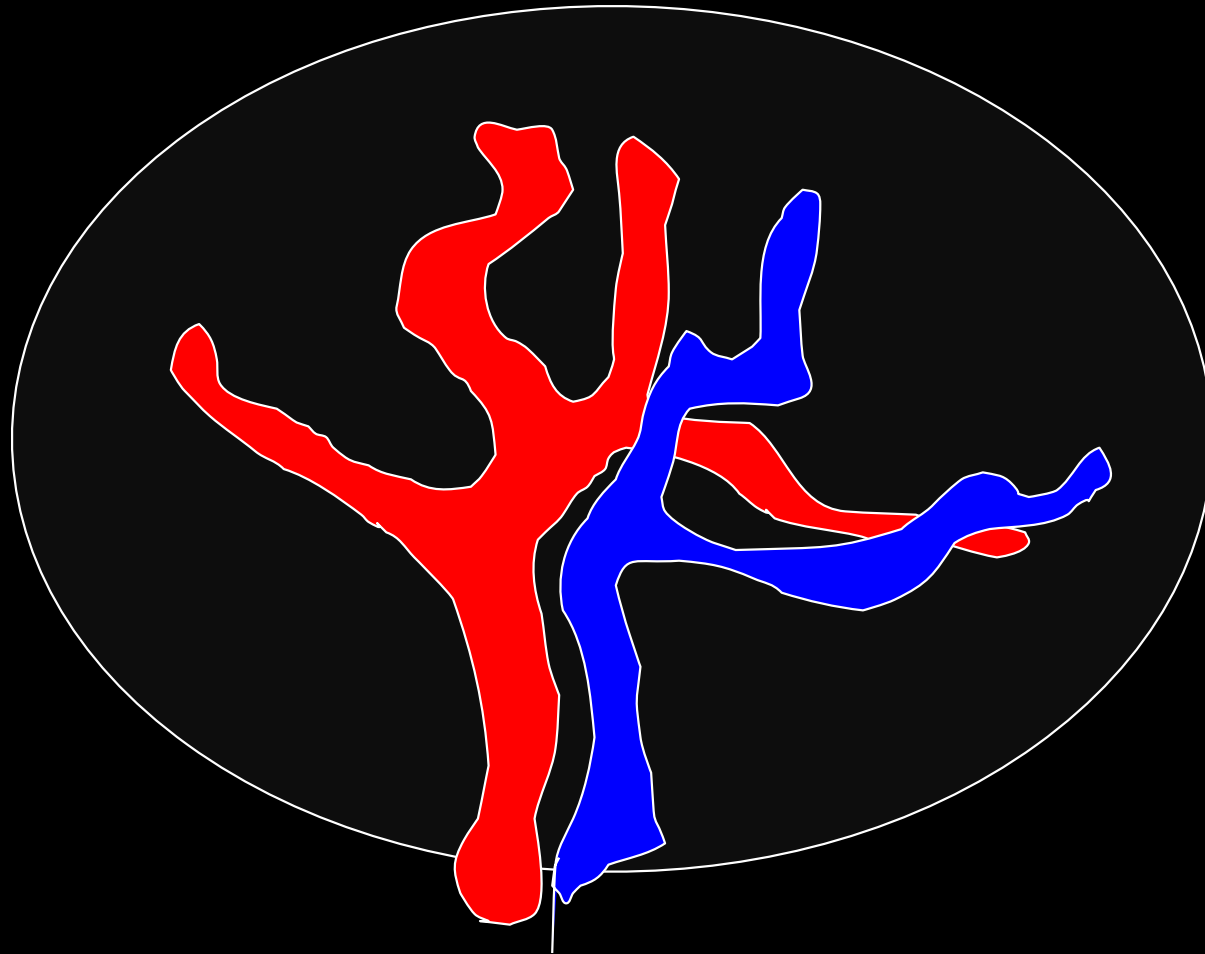
5

5.5

Lymphoma



Lymphoma



Size?

- 3-4 cm in normal young Adults
- Maximum Axial Diameter (Short axis)
- 7mm : Submental and Submandibular
- 8mm : All other nodes
- 4mm :N0, SCC patients (Van den Brenkel)

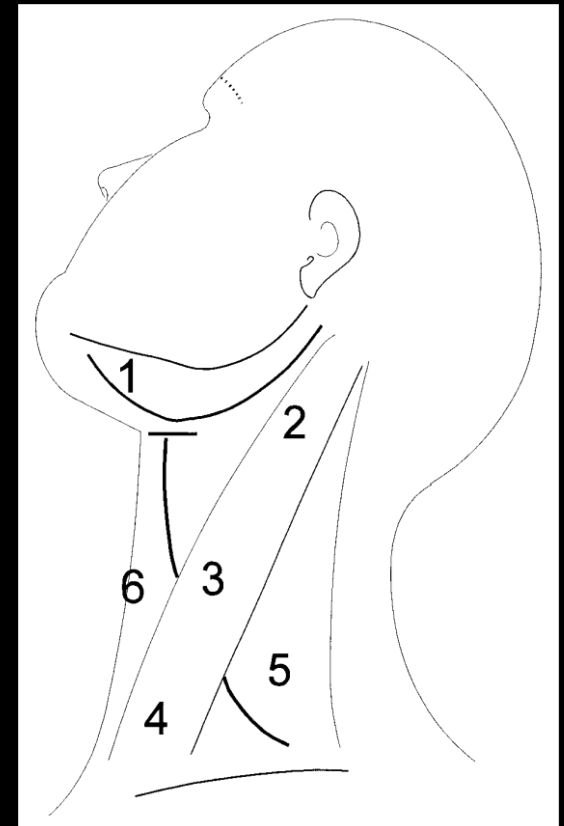
The Size of Lymph Nodes in the Neck on Sonograms as a Radiologic Criterion for Metastasis: How Reliable Is It?

Michiel W. M. van den Brekel, Jonas A. Castelijns, and Gordon B. Snow. AJNR 1998

Large ,mixed series : 117 pts with palpable nodes,131 without.

Propose N0 : II – 7mm,remainder 6mm

Others : II – 8/9mm,remainder 7/8mm

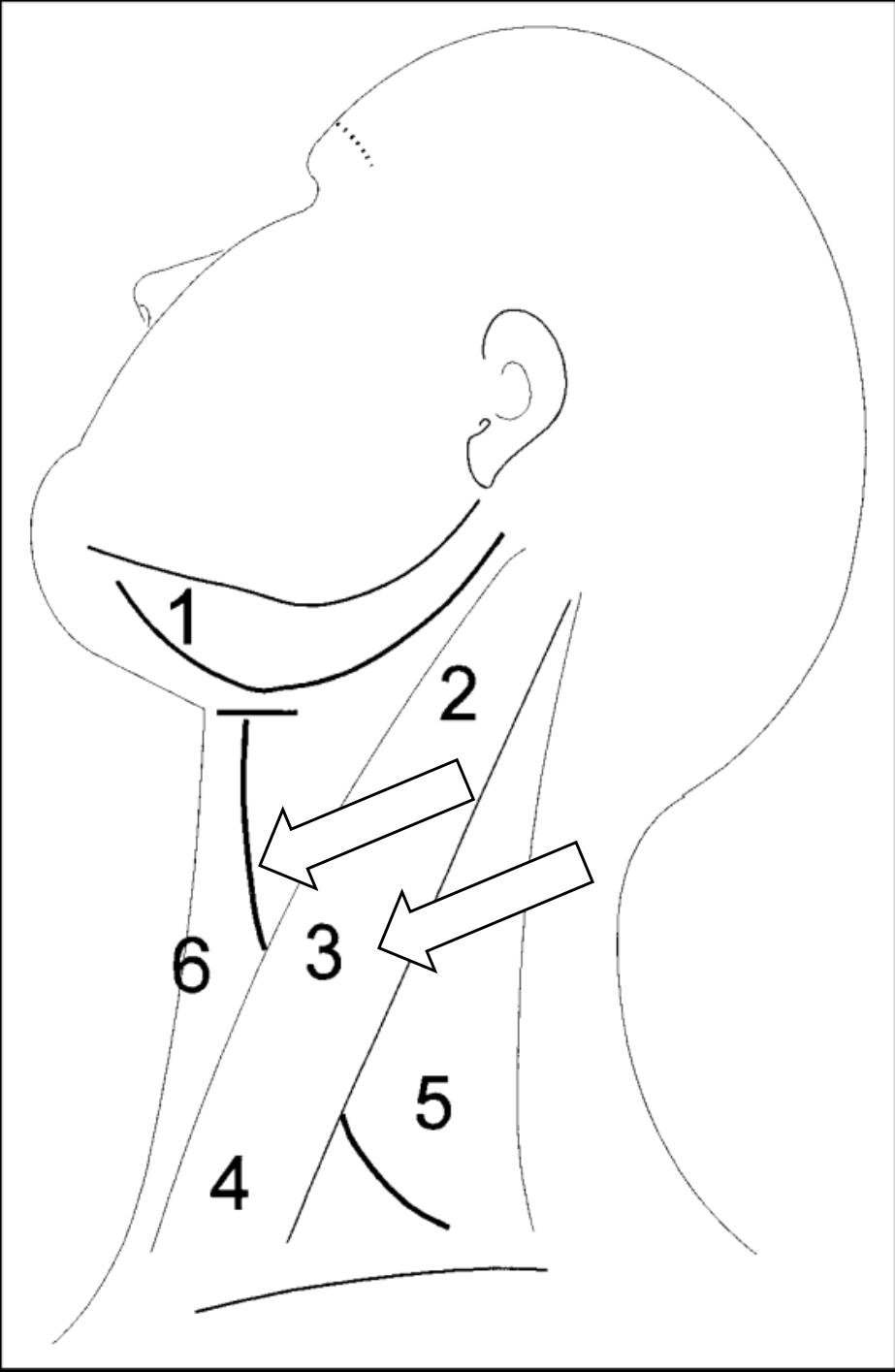


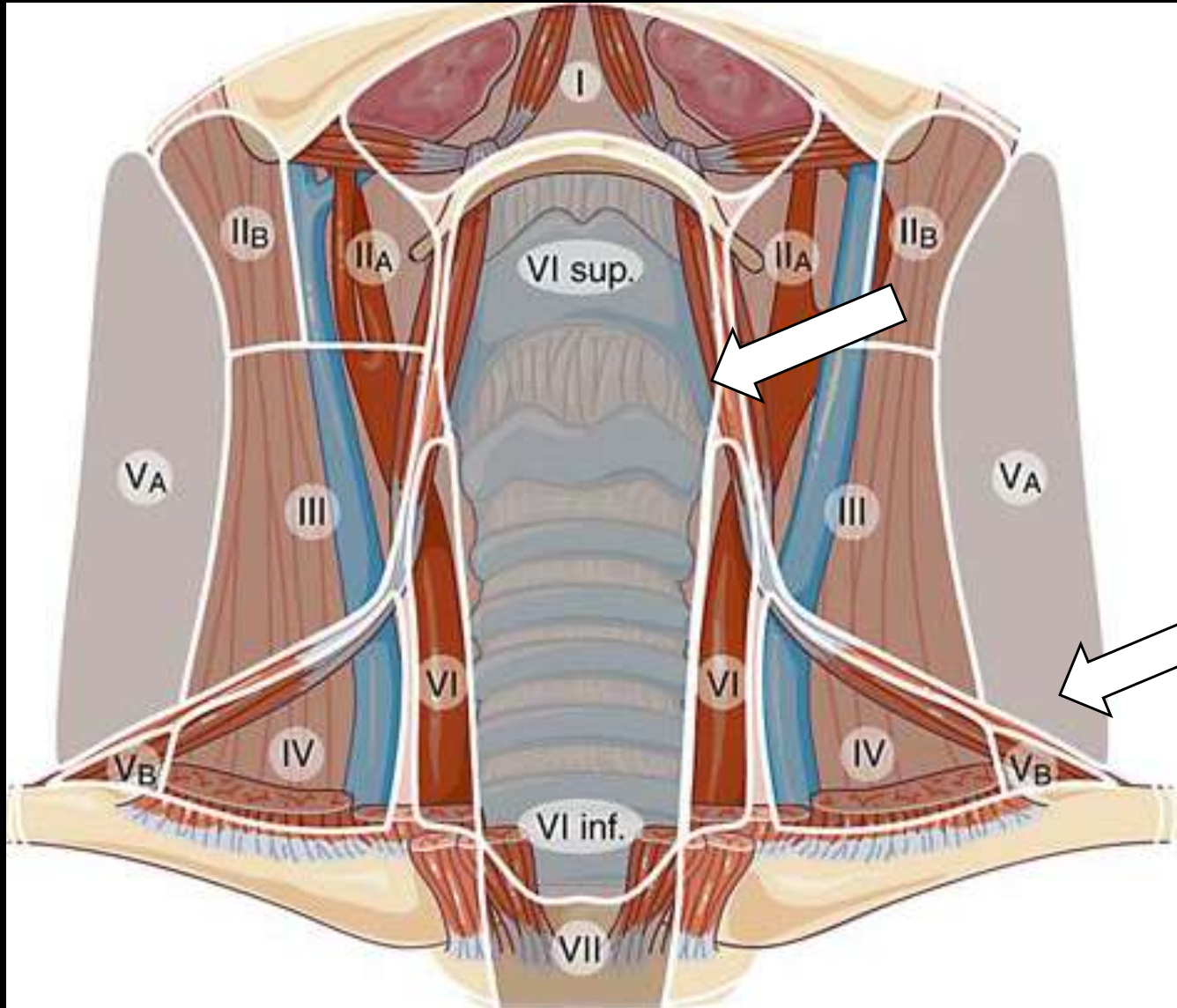
Size

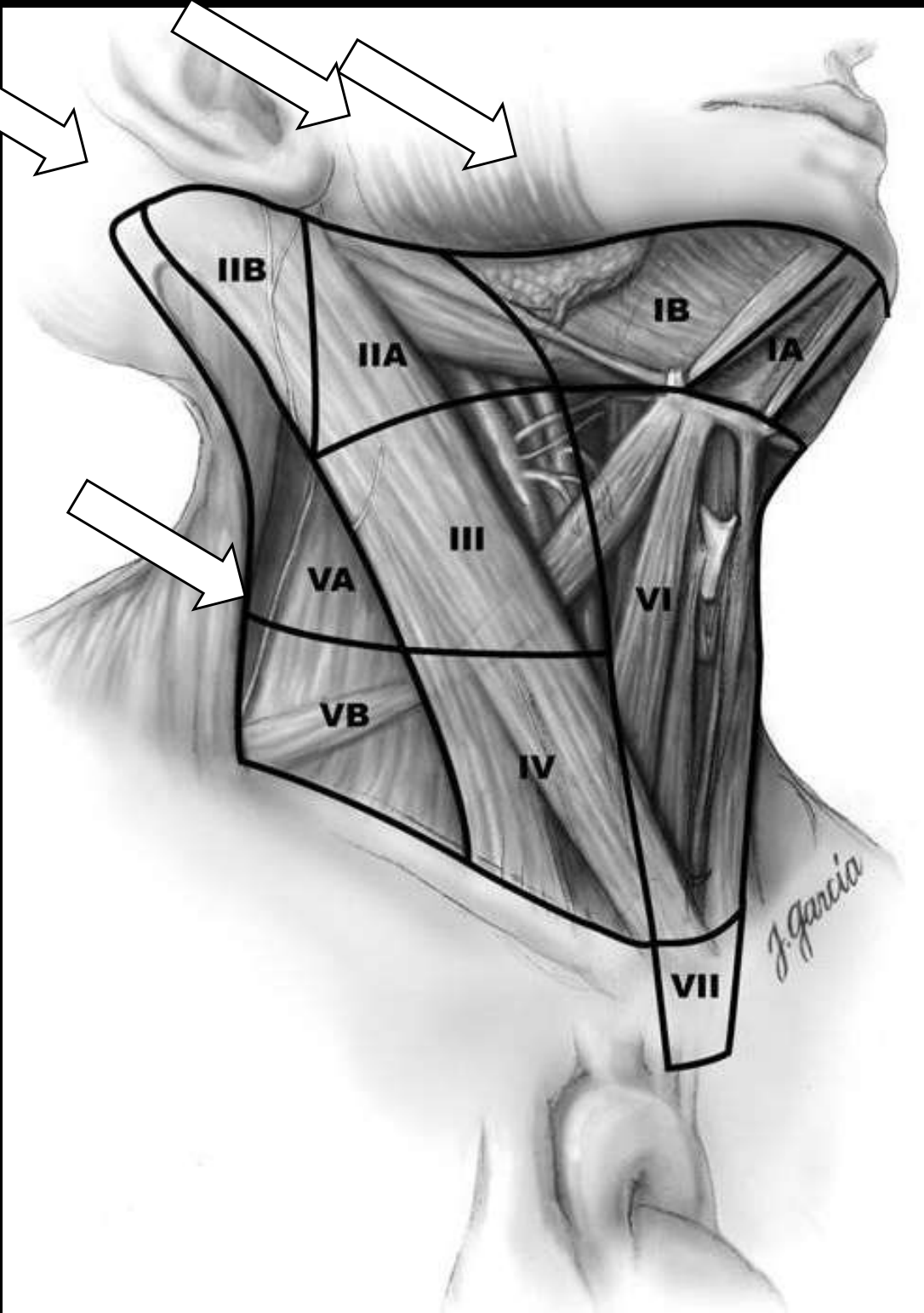
- Does matter
- Single criterion ?
- Specify what is being measured
- When
- Pre - test probability : usage
- Where – levels?

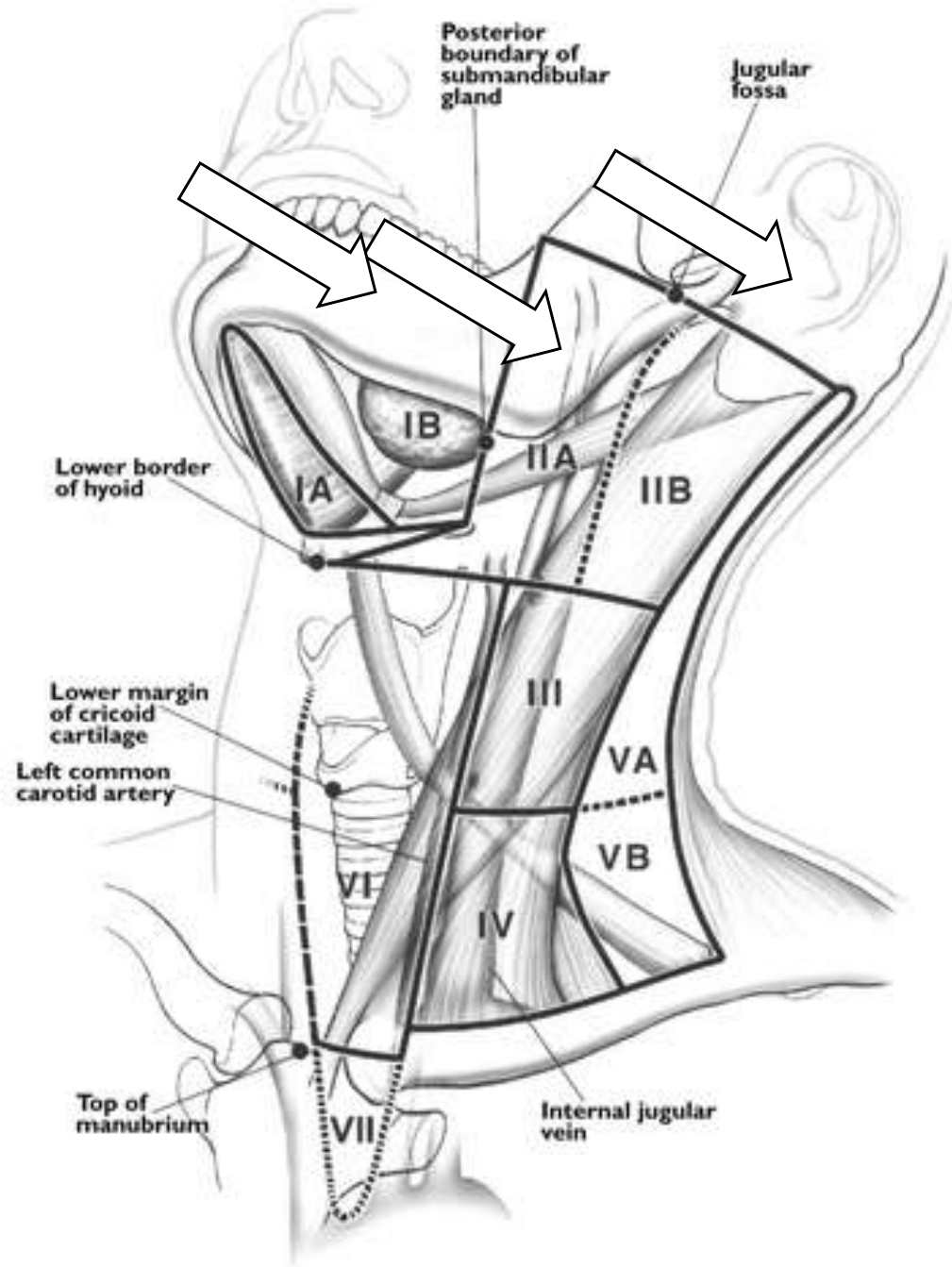
Avoiding mistakes

- Levels – speak the same language
- Anatomical
- Levels : moving feast!

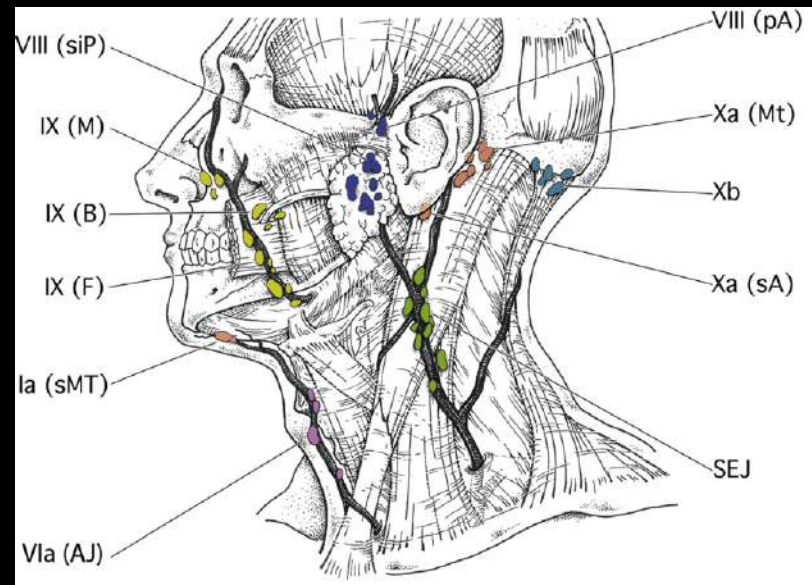




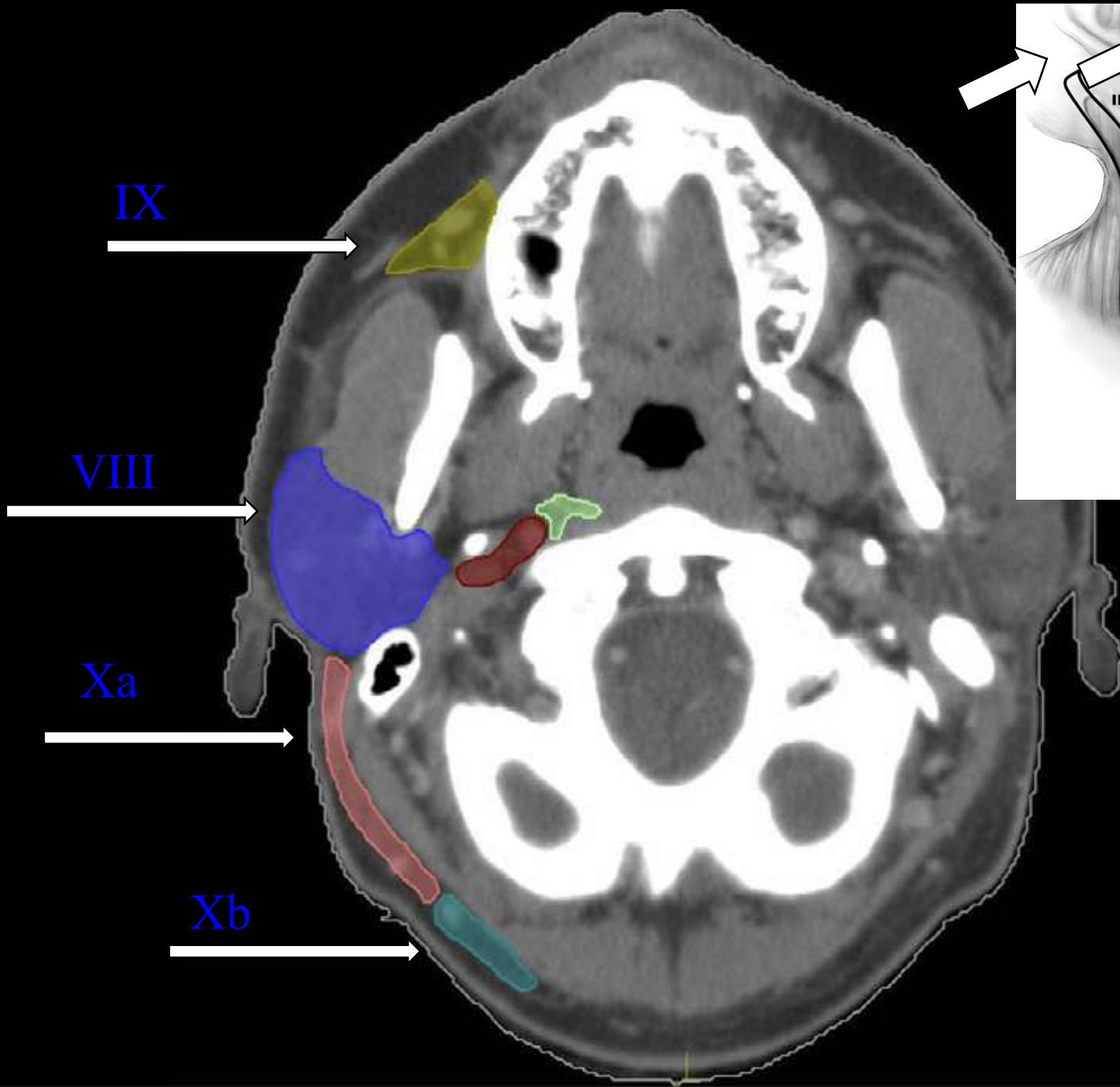
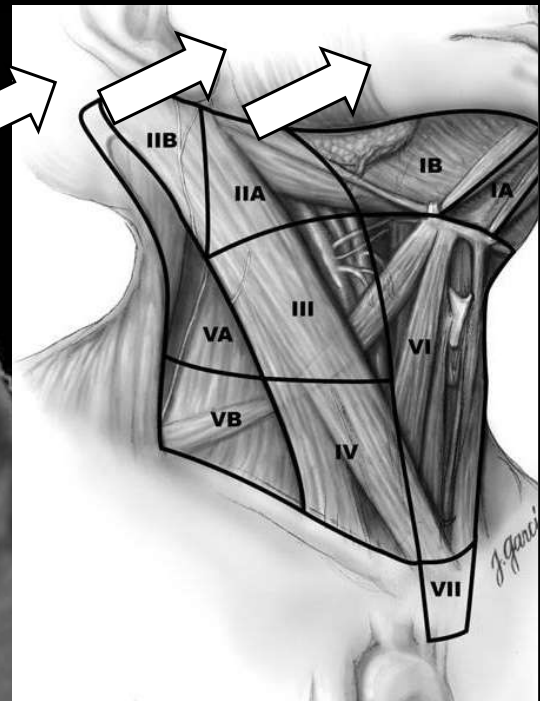




Guidelines : Delineation of the neck node levels for head and neck tumors: A 2013 update.
DAHANCA, EORTC, HKNPCSG, NCIC CTG,
NCRI, RTOG, TROG consensus guidelines



Radiotherapy & Oncology 2014



IX



VIII



Xa



Xb



Biopsy techniques

Fine needle aspiration/Core biopsy

- FNA first line
- Non –diagnostic rate : 13%
- ?Lymphoma – core biopsy (14G)
- FNA : aspiration (21g)
- FNA : non-aspiration (spinal 22G)
- Non-diagnostic FNA : core biopsy



d



TOSHIBA

135908:MOSS TINA B

F 57

3.12.2015

Aplio 500

SINGLETON HOSPITAL

Thyroid 2

Precision APure+ T

- ◊ 0
- +
- ◊ 1
- +
- ◊ 2
- +
- ◊ 3
- +
- ◊ 4



12L5
diffT9.0
35 fps
G:75
DR:75



482

FNA:aspiration

TOSHIBA

2251230:WESTOVER ANNE 54 O

03/09/2008

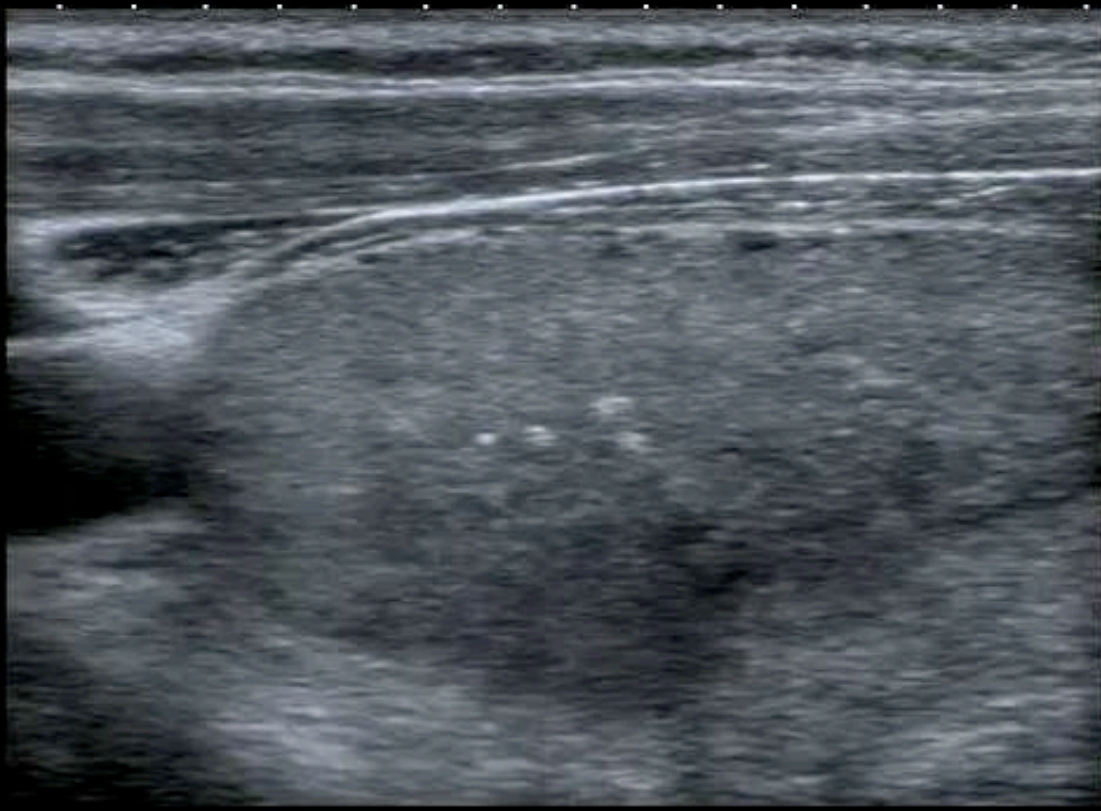
YSTRADGYNLAIS

- OPE - Thyroid 2

11:28:32 AM



0 ◆
.
.
1 ◆▶
.
.
2 ◆
.
.
3 ◆



T

14L7
diffT13.0
25 fps

MI:1.4
2DG
80
DR
65

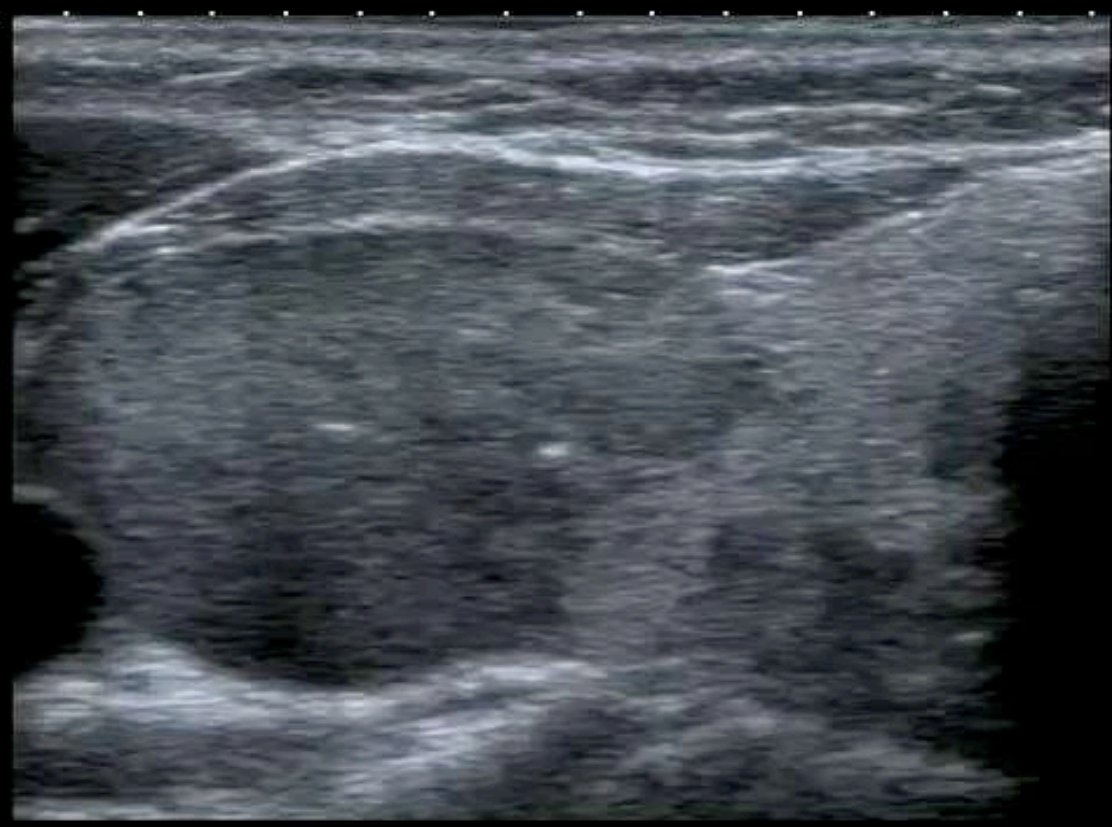
IP4

HDD:63% Free



0 ◆
1 ◆▶
2 ◆
3 ◆

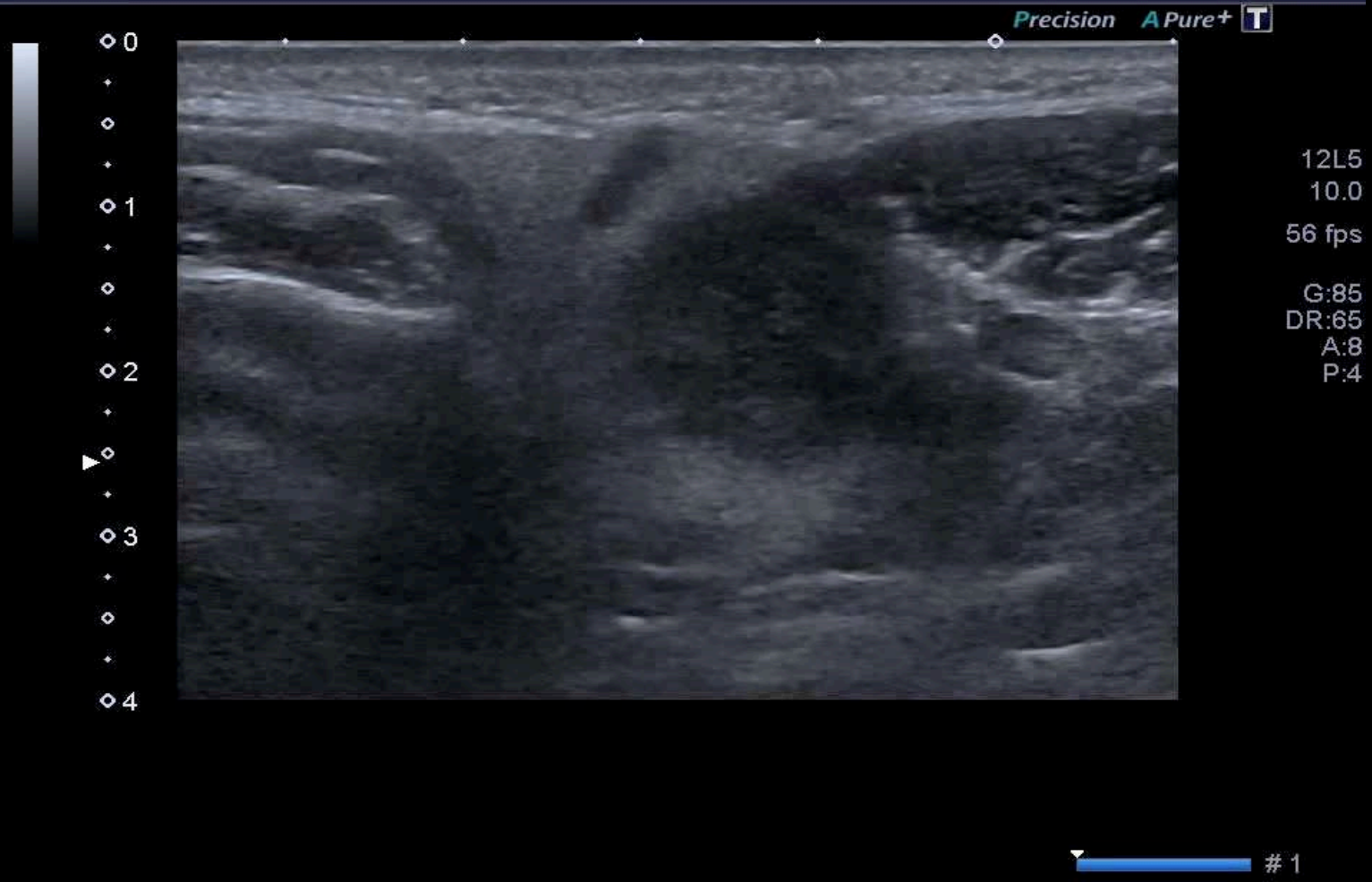
14L7
diffT13.0
25 fps



T

MI:1.4
2DG
80
DR
65

IP4

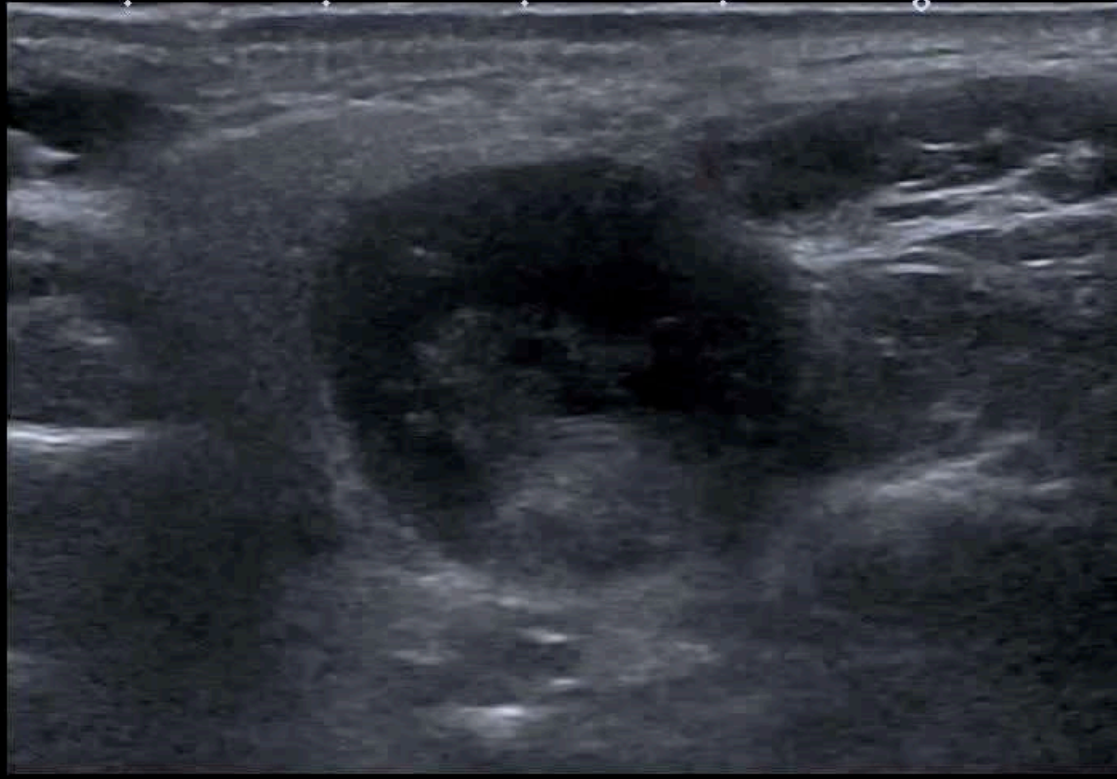


FNA:non-diagnostic

Precision A Pure+ T



- ◊ 0
- +
- ◊
- +
- ◊ 1
- +
- ◊
- +
- ◊ 2
- +
- ◊
- +
- ◊ 3
- +
- ◊
- +
- ◊ 4



12L5
10.0
56 fps
G:85
DR:65
A:8
P:4

TOSHIBA

1465041:JENKINS PAUL

M 46

31/05/2016

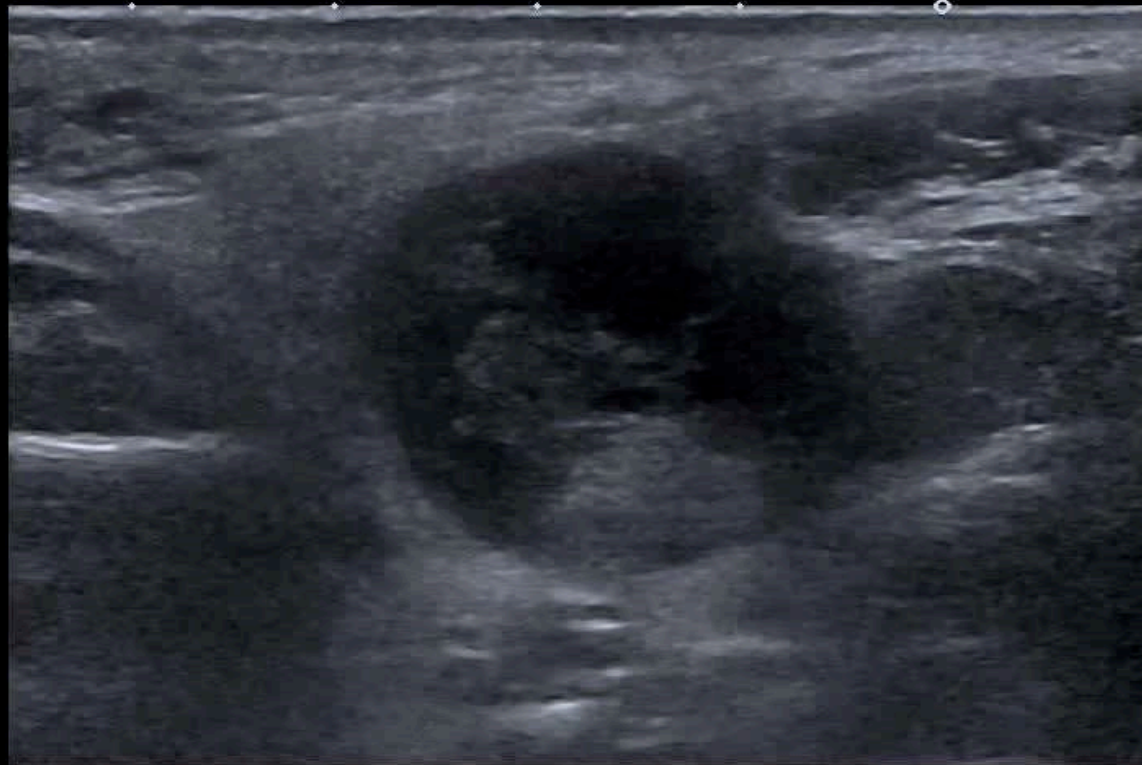
Aplio 500

Morrison Hospital Rm5

Thyroid

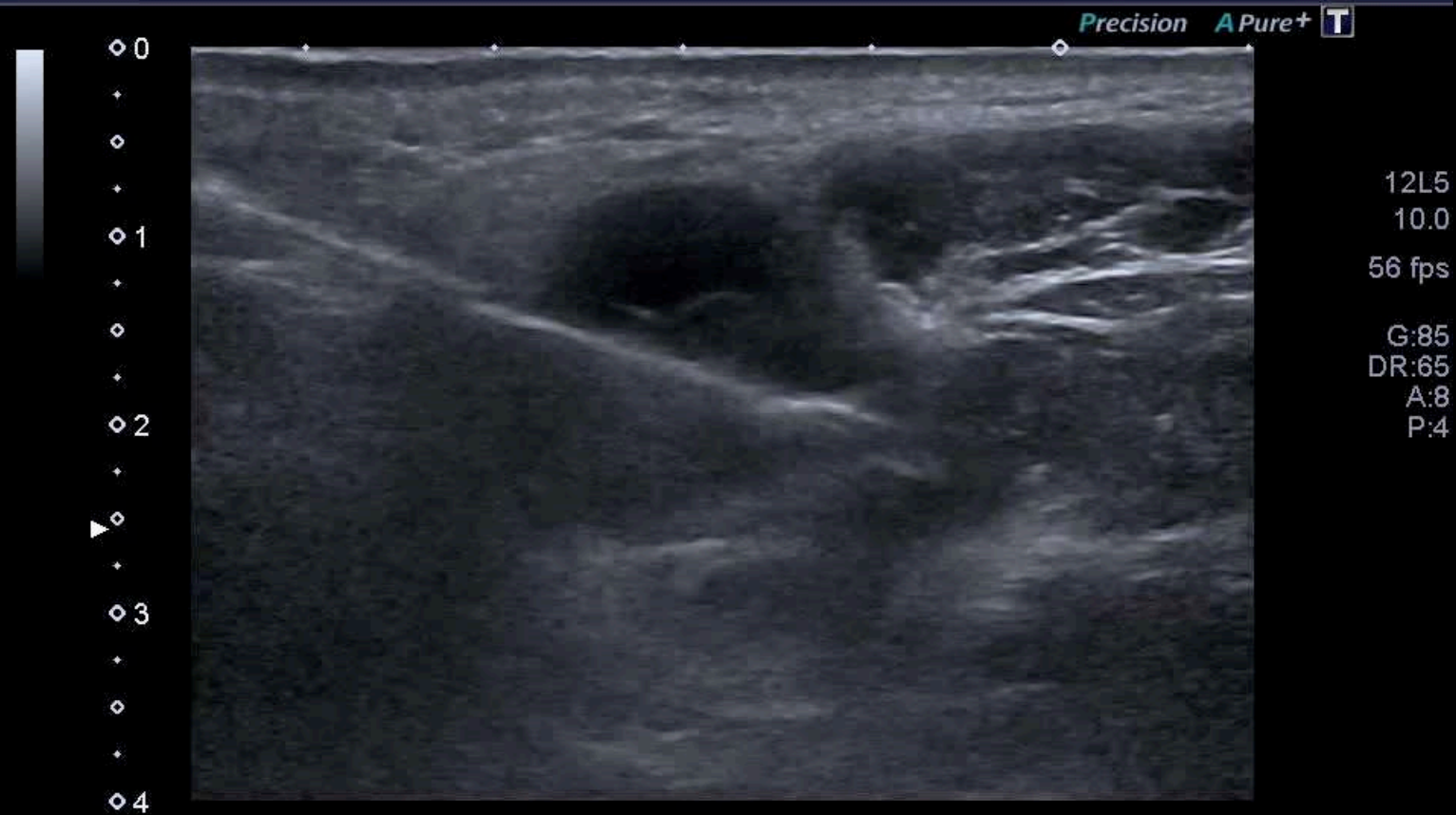
Precision A Pure+ T

- ◊ 0
- +
- ◊
- +
- ◊ 1
- +
- ◊
- +
- ◊ 2
- +
- ◊
- +
- ◊ 3
- +
- ◊
- +
- ◊ 4



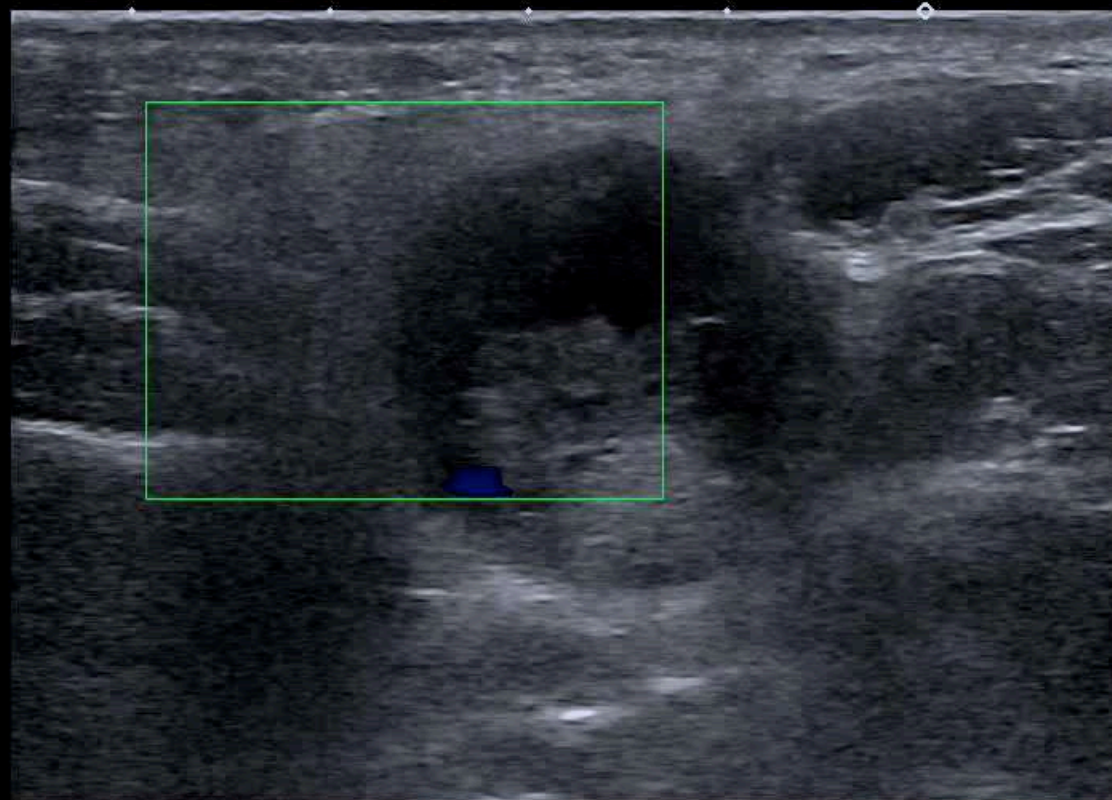
12L5
10.0
56 fps
G:85
DR:65
A:8
P:4

443



443

Core biopsy :non-advancing

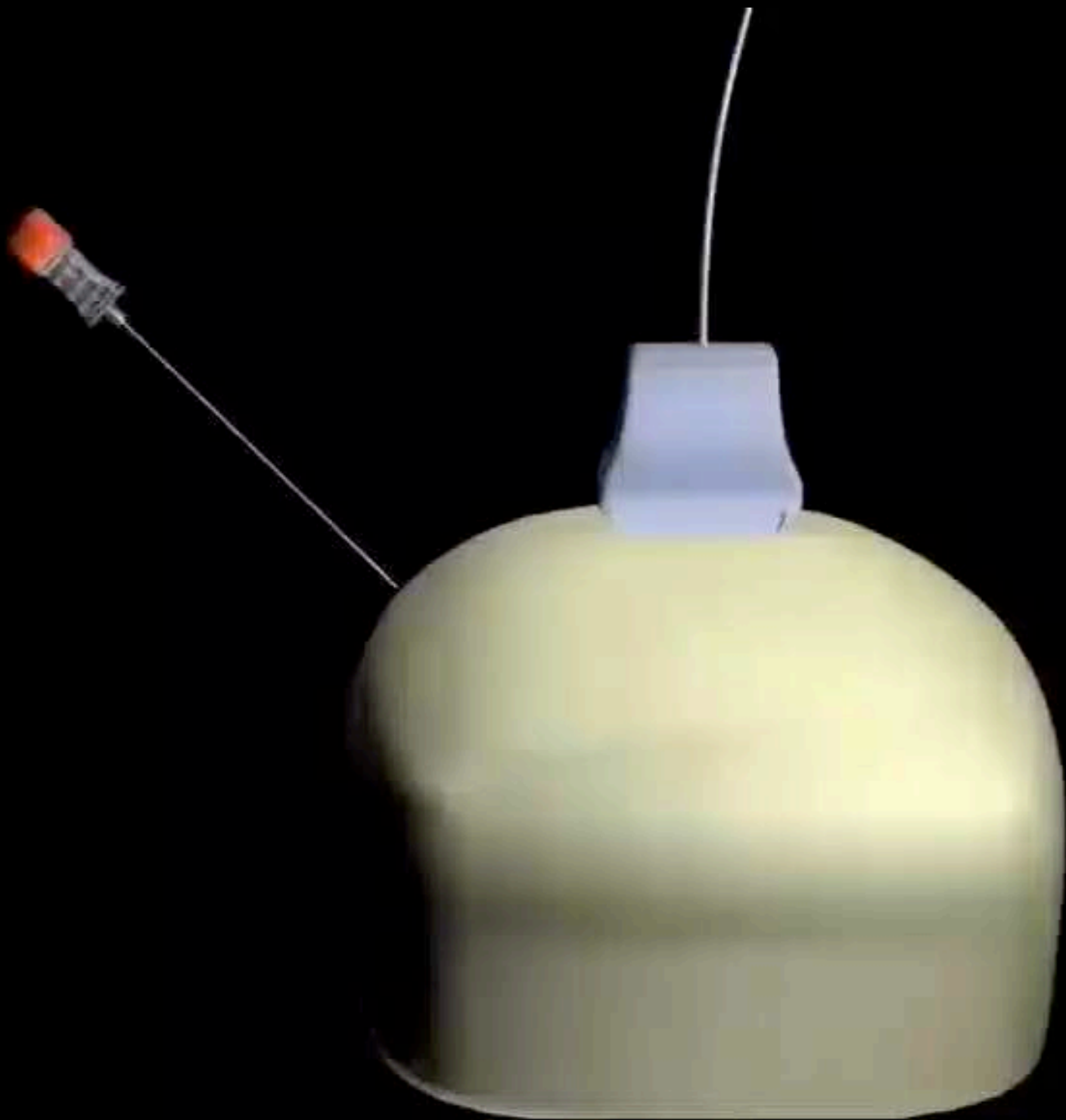


Precision APure+ T

12L5
10.0
12 fps
G:85
DR:65
CF 5.3
CG:38
13.7k
F:3

1

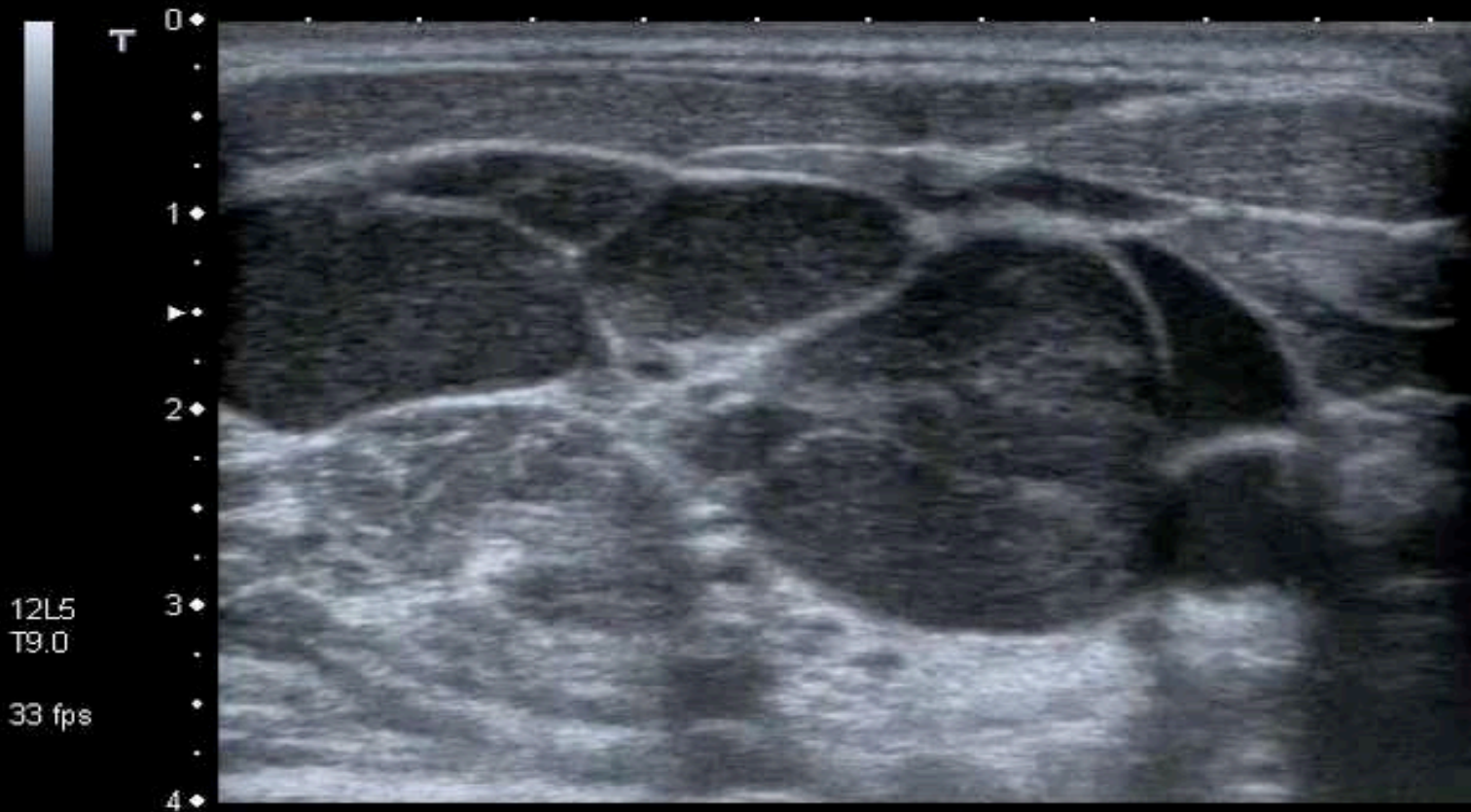
Post biopsy



TOSHIBA

T856808:KARURI DENNIS 15 M
SINGLETON HOSPITAL - RME - THYROID 1

14/02/2008
04:59:24 PM

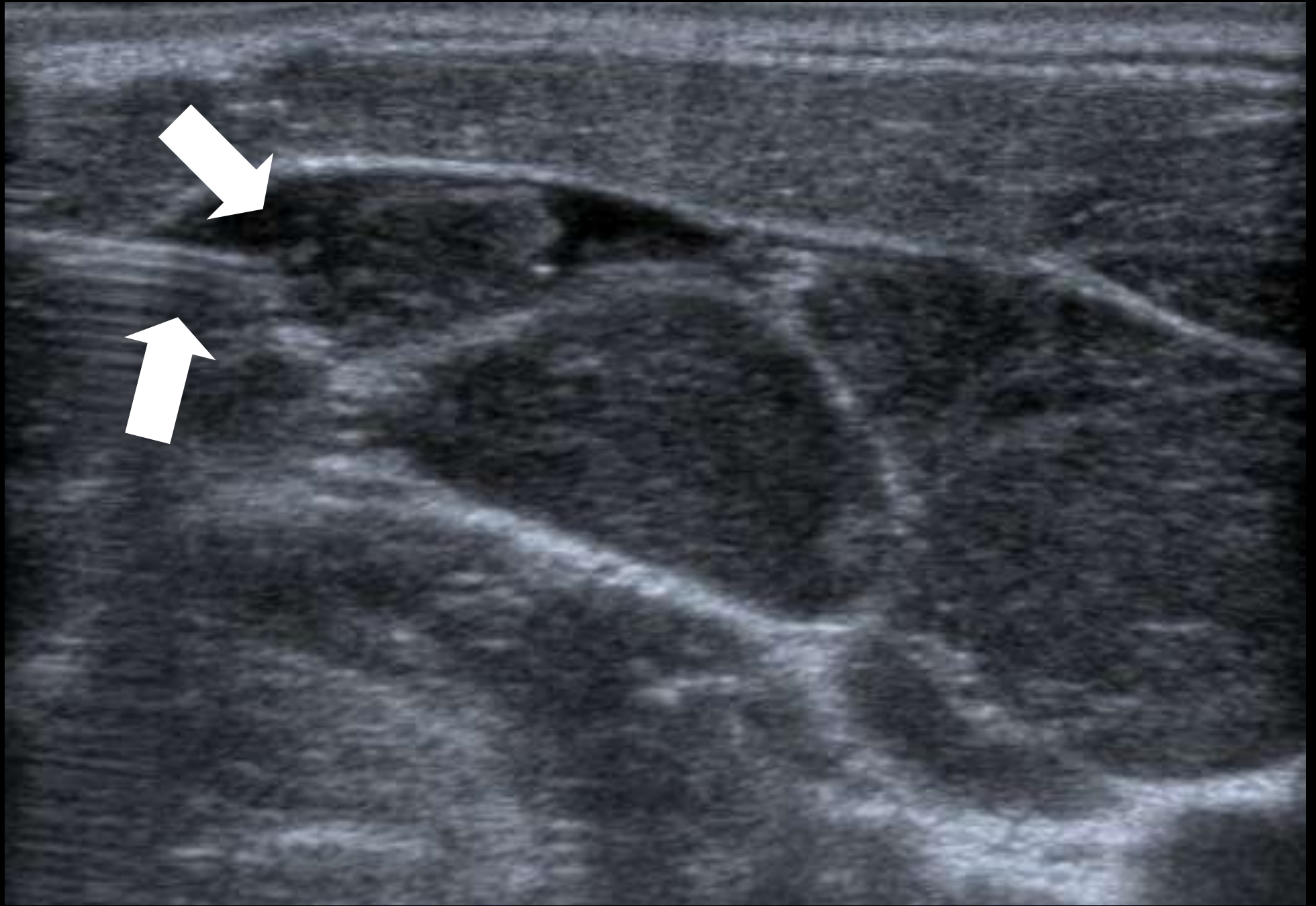


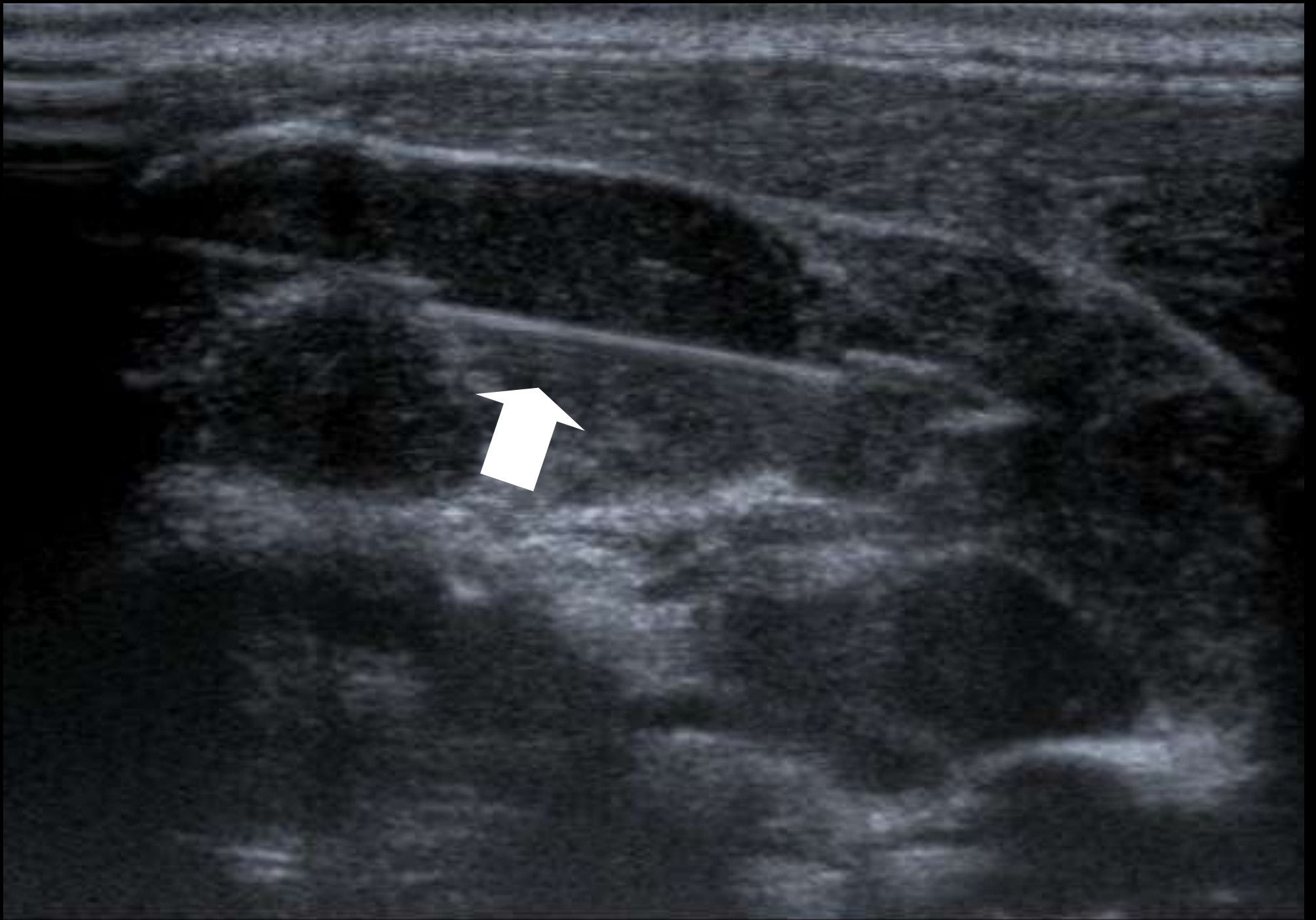
12L5
T9.0
33 fps

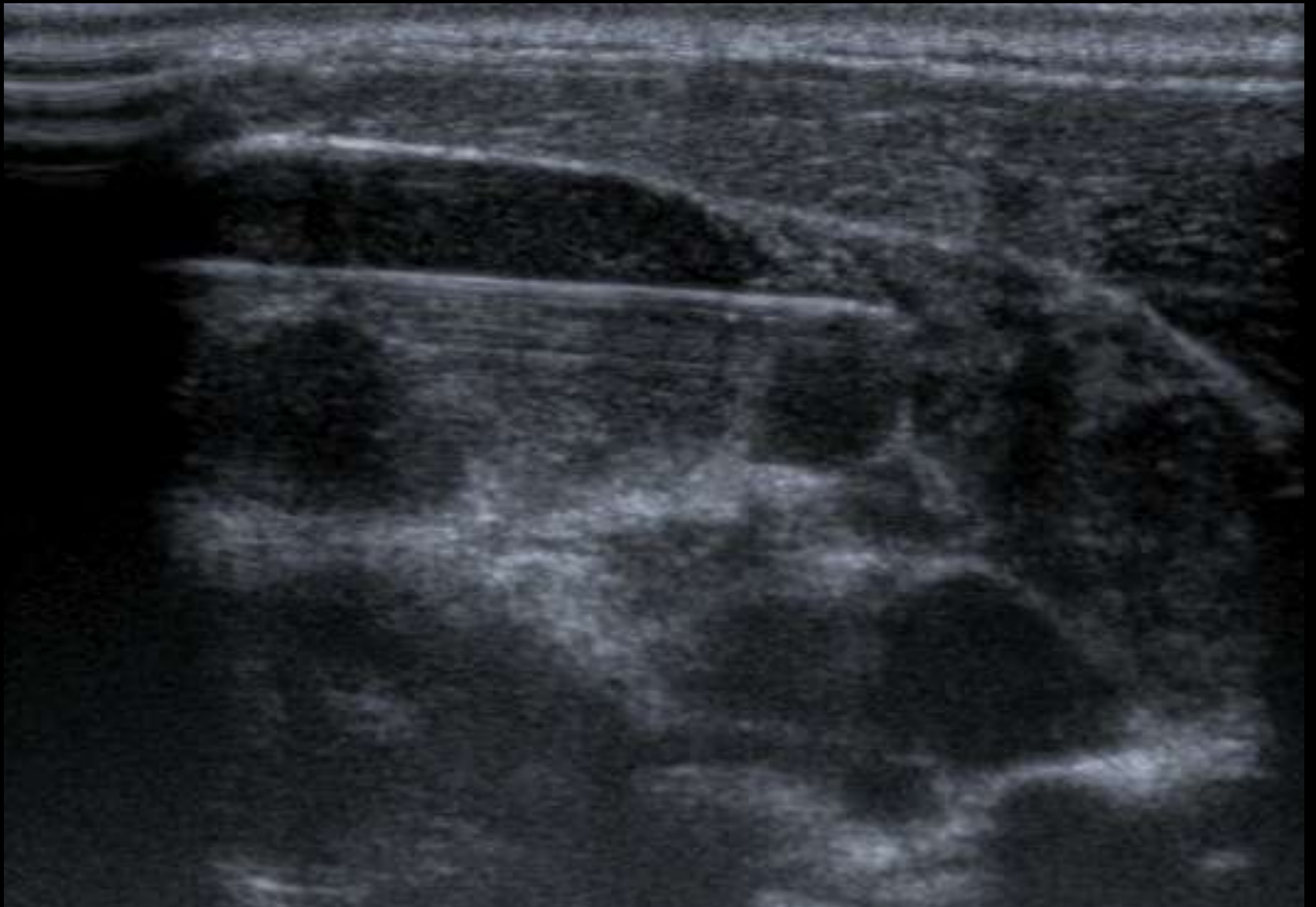
MI: 1.6
2DG
80
DR
70

HDD:61% Free



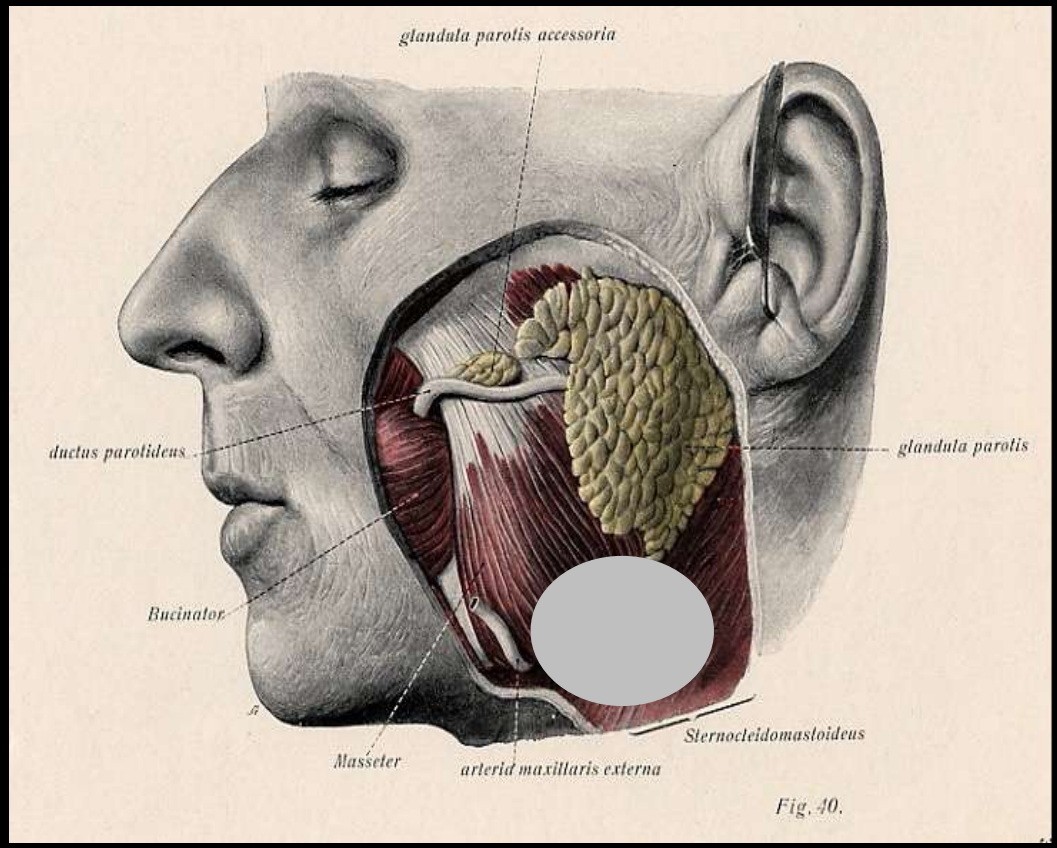






Signs

Counter-intuitive ?



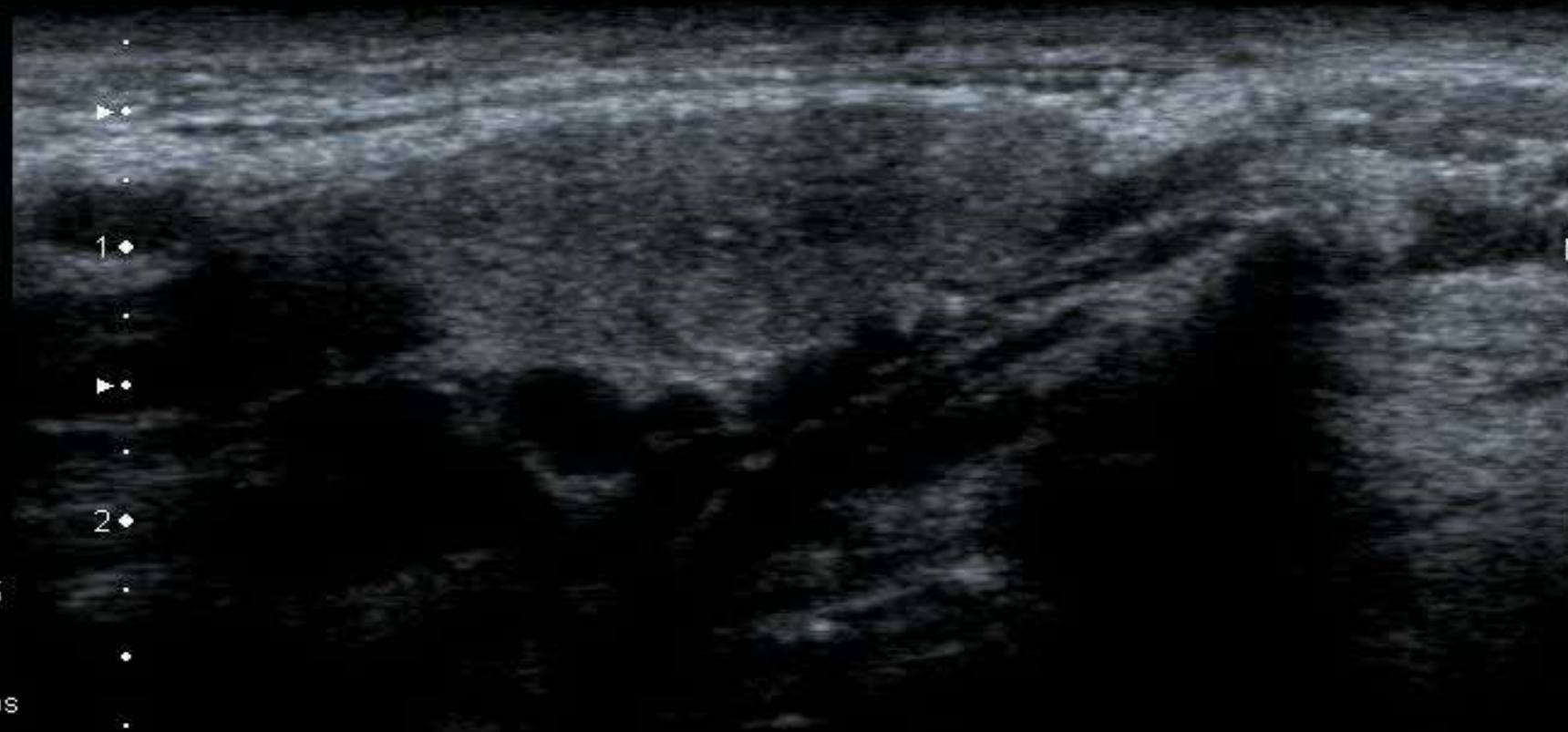
T

0 ◆

1 ◆

2 ◆

3 ◆



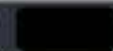
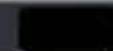
12L5
T9.0

16 fps

MI:1.6

2DG
81

DR
60



T
0 ◆
.
.
.
1 ◆
.
.
2 ◆
.
.
3 ◆
.
.
4 ◆

12L5
12.0

33 fps



MI:0.5
2DG
81
DR
60



T
0 ◆
1 ◆
2 ◆
3 ◆
4 ◆
12L5
12.0
33 fps



MI:0.5
2DG
81
DR
60

Rules .

- Cysts look solid.
- Solids can look cystic.

Rules .

- Cysts don't usually look like cysts.
- Cysts will invariably look solid.
- If a mass looks cystic, it probably won't be a cyst.
- Solids can look cystic



0 ◆
.
1 ◆
.
2 ◆
.
3 ◆
.
4 ◆



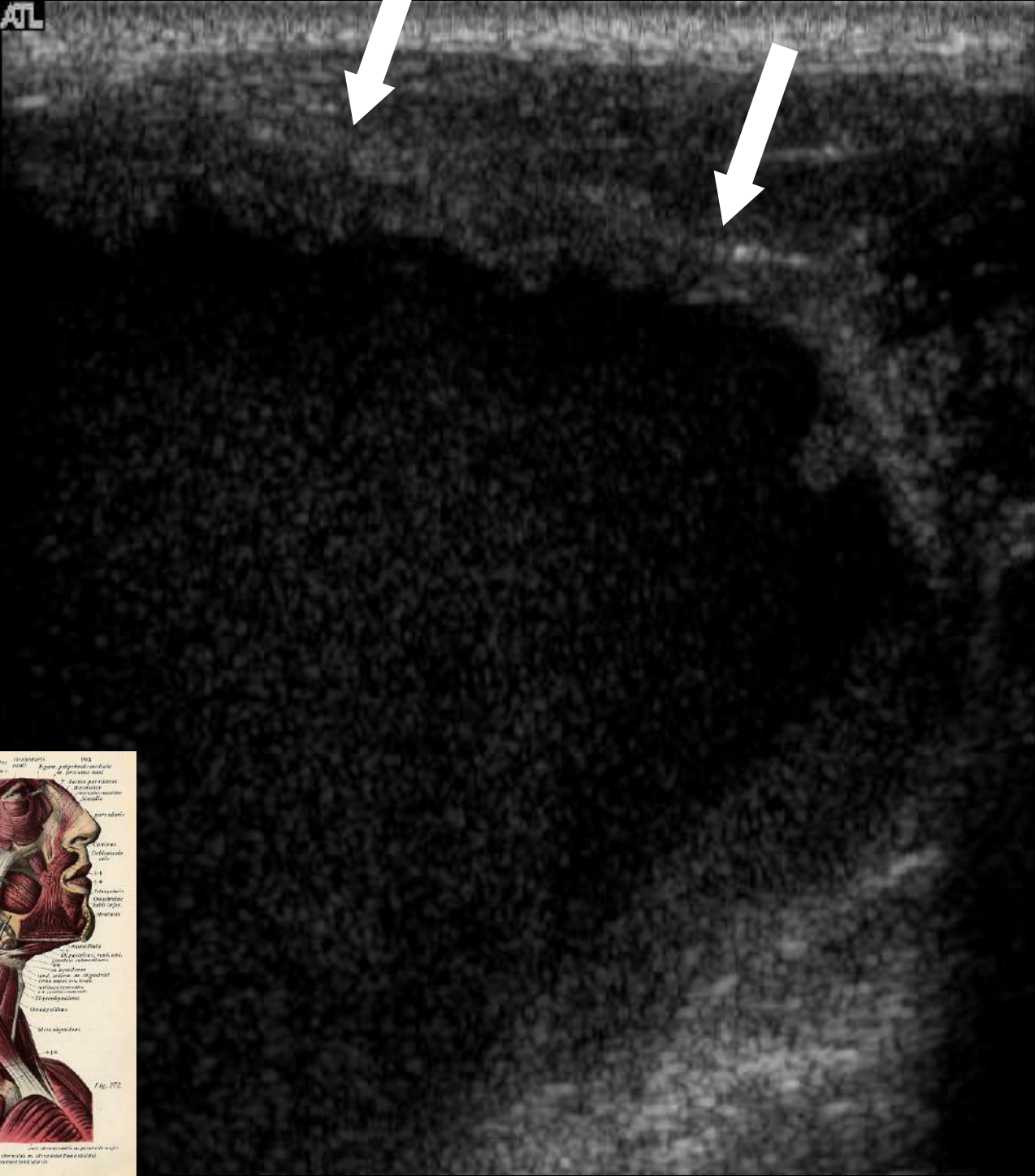
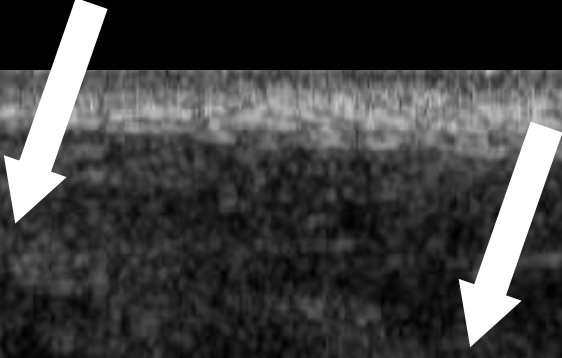
MI:1.6
2DG
80
DR
70

12L5
T9.0

33 fps



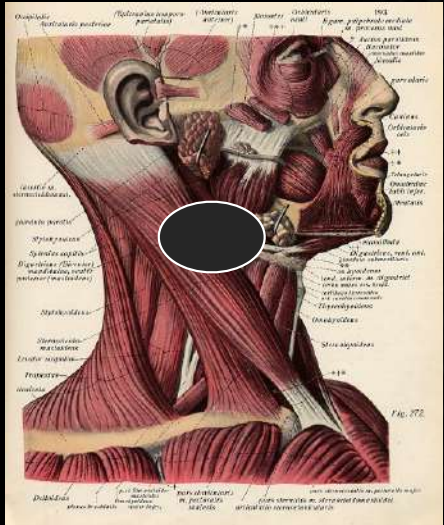
ATL



-1

-2

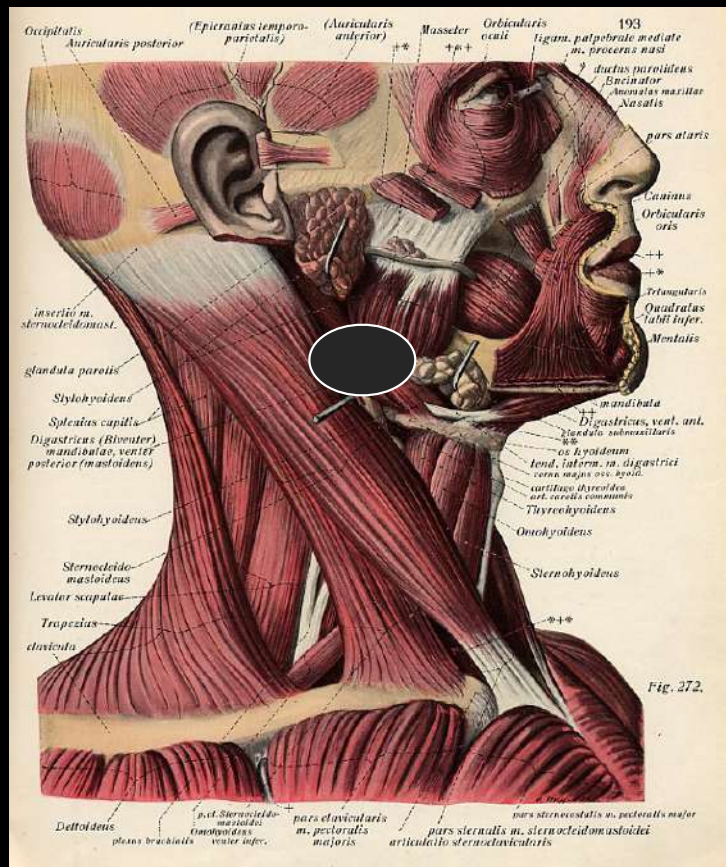
-3



Upper cervical cystic mass

Second branchial cleft cyst

Metastatic lymph node :SCC



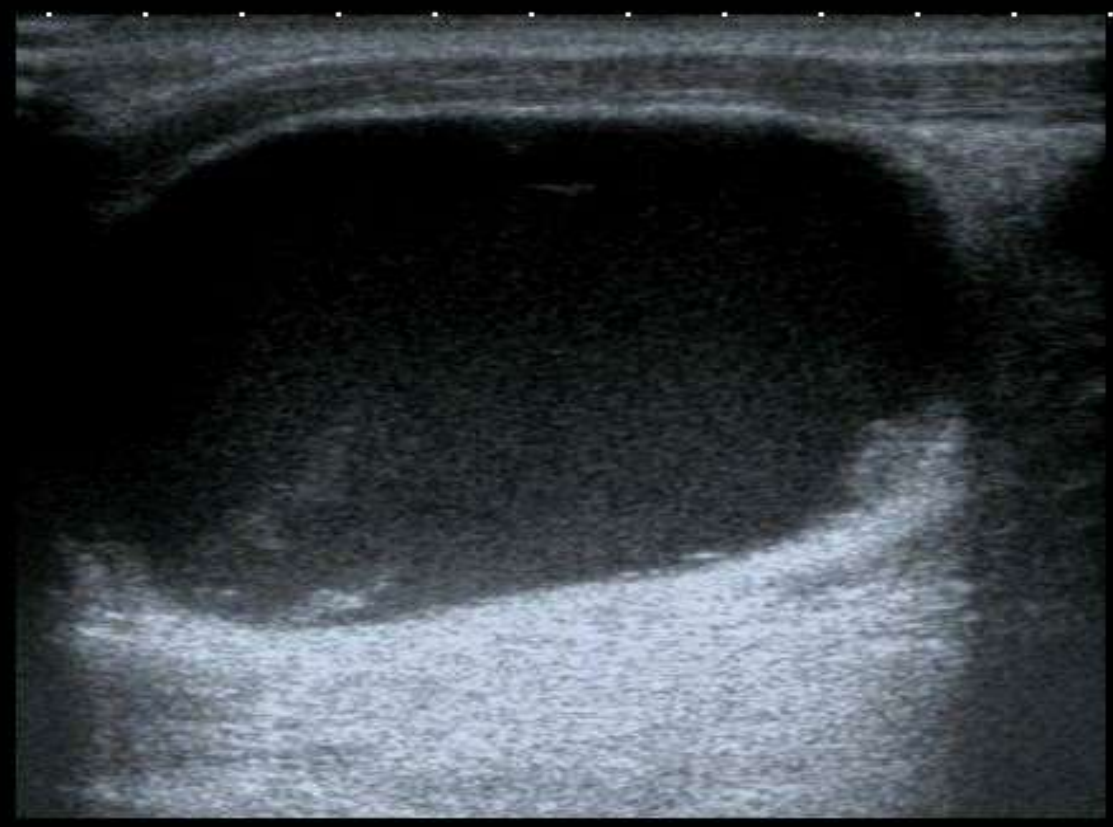
TOSHIBA

N065790:SCOURFIELD ROGER 53 M
SINGLETON HOSPITAL - - THYROID 1

23/04/2009
02:10:40 PM



0 ◆
T
.
.
P ◆
.
.
4 ◆
.
.



MI:1.6
2DG
80
DR
70

12L5
T9.0
27 fps

HDD:28% Free



TOSHIBA

00799884:JERVIS CHRISTOPHER 65 M
MORRISTON HOSPITAL - - Thyroid UK

11/04/2008
16:43:03

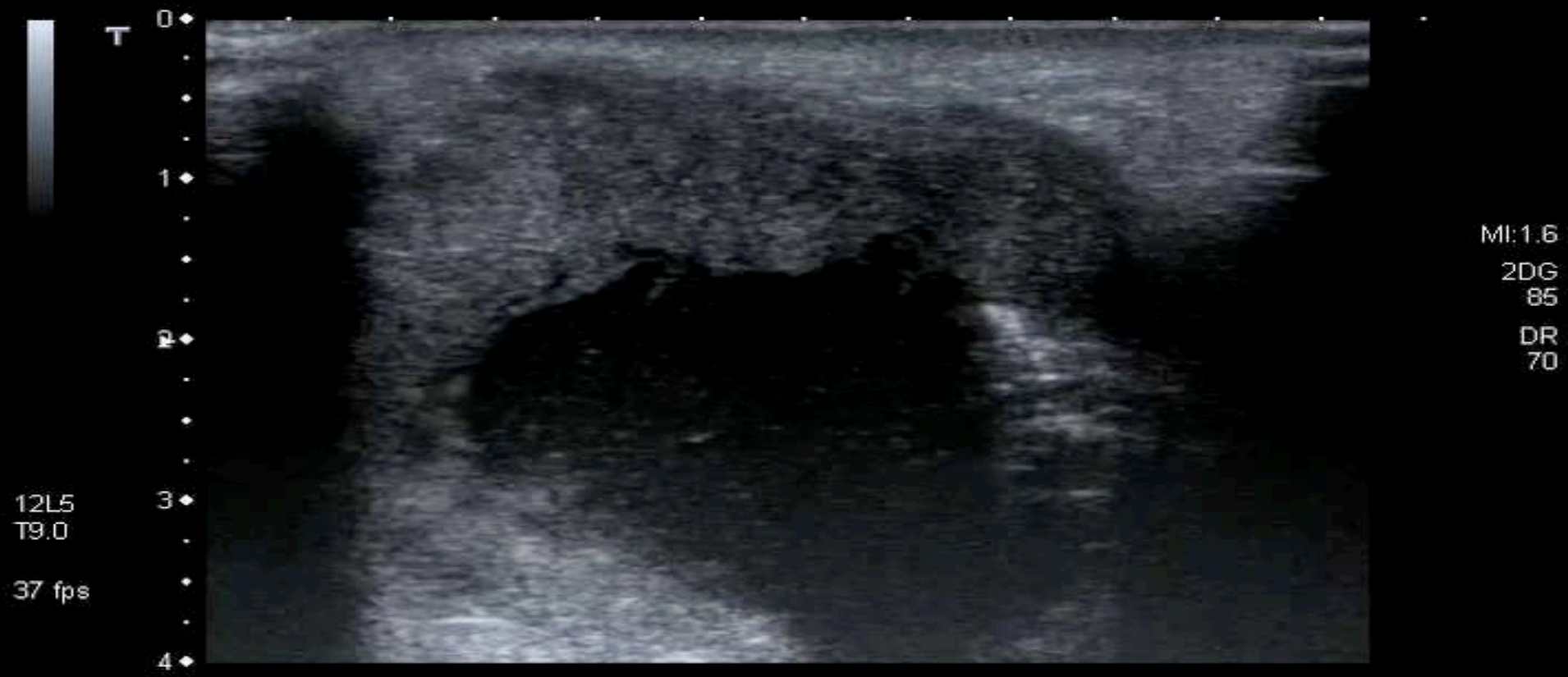


HDD:52% Free

TOSHIBA

00799884:JERVIS CHRISTOPHER 65 M
MORRISTON HOSPITAL - - Thyroid UK

11/04/2008
16:45:46

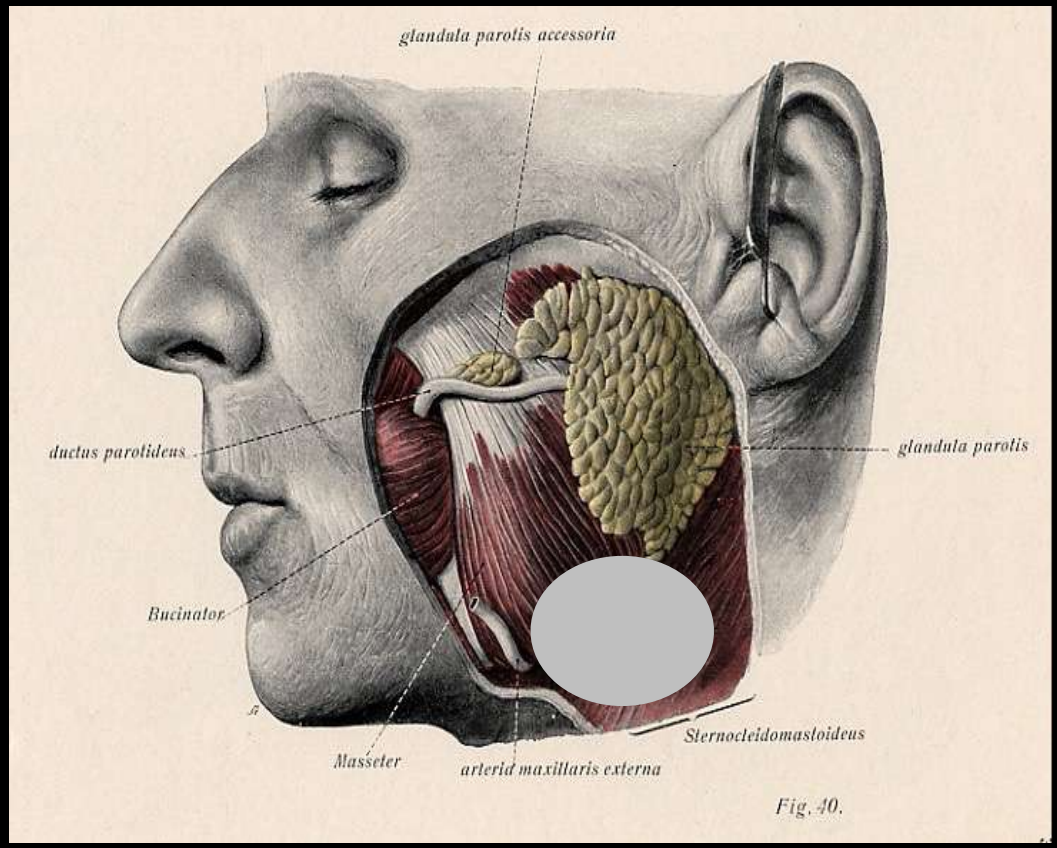


HDD: 51% Free



Rules .

- Cysts don't usually look like cysts.
- Cysts will invariably look solid.
- If a mass looks cystic, it probably won't be a cyst.



Mimics

