



ULTRASOUND
PROGRAM



台北市消防局 到院前超音波訓練課程

主持人：陳國智醫師
西園醫院急診醫學科



急救加護重症超音波工作坊負責人
AEACUS Network President
前急診超音波委員會主委

Faculty
-WINFOCUS, PERCUSS, WFPICC

POCUS Academy
Emergency Ultrasound Training Center

POCUS Academy

Point-of-care ultrasound is the visual stethoscope in the 21st century

POCUSACADEMY

POCUSWORLD



CATEGORY

[POCUS Case \(83\)](#)

[POCUS Course \(71\)](#)

[POCUS Education \(129\)](#)

[POCUS Issue \(75\)](#)

MOST VIEWED POSTS

- 1** [外傷超音波的基本報告 \(Trauma EUS\)](#)
- 2** [\[Sonoanatomy\] Liver, Portal vein, hepatic vein](#)
- 3** [\[Sonoanatomy\] IVC](#)

RECENT POSTS

- [受保護的文章：POCUS在急性腹痛的應用](#)
- [2019 4th POCUS Game](#)
- [Pain Management](#)
- [超音波基礎原理和影像](#)

超音波：你一定要知道的事

Physics & Artifacts





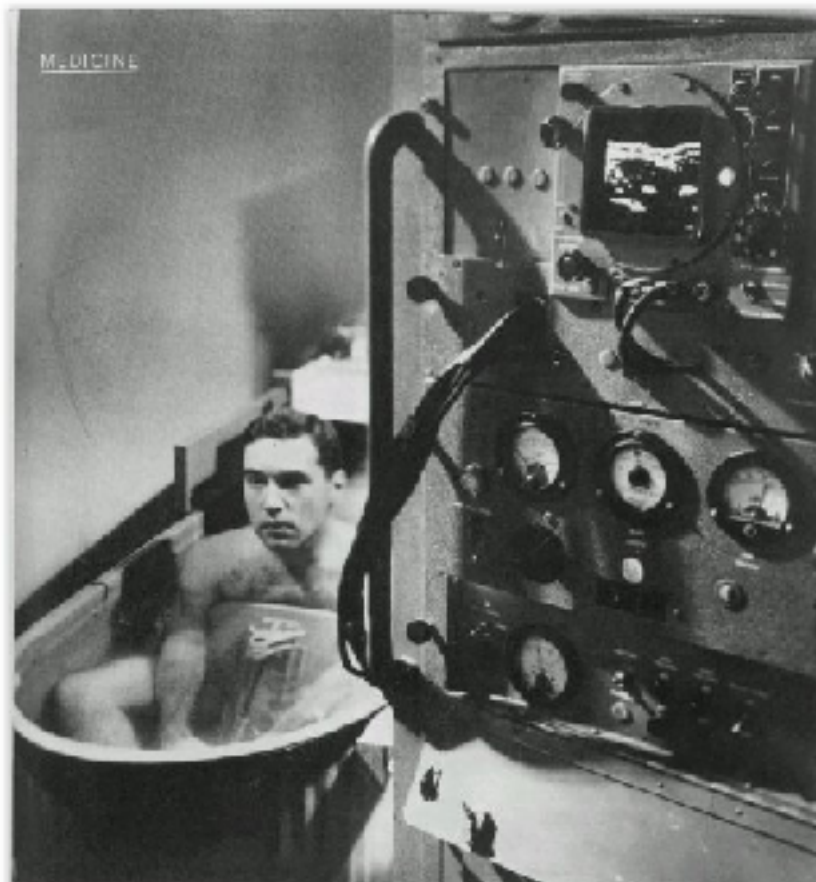
The Anatomy Lesson of Dr. Nicolaes Tulp
How Our Muscles Work
林布蘭 1632



現在你可以這麼做
Live



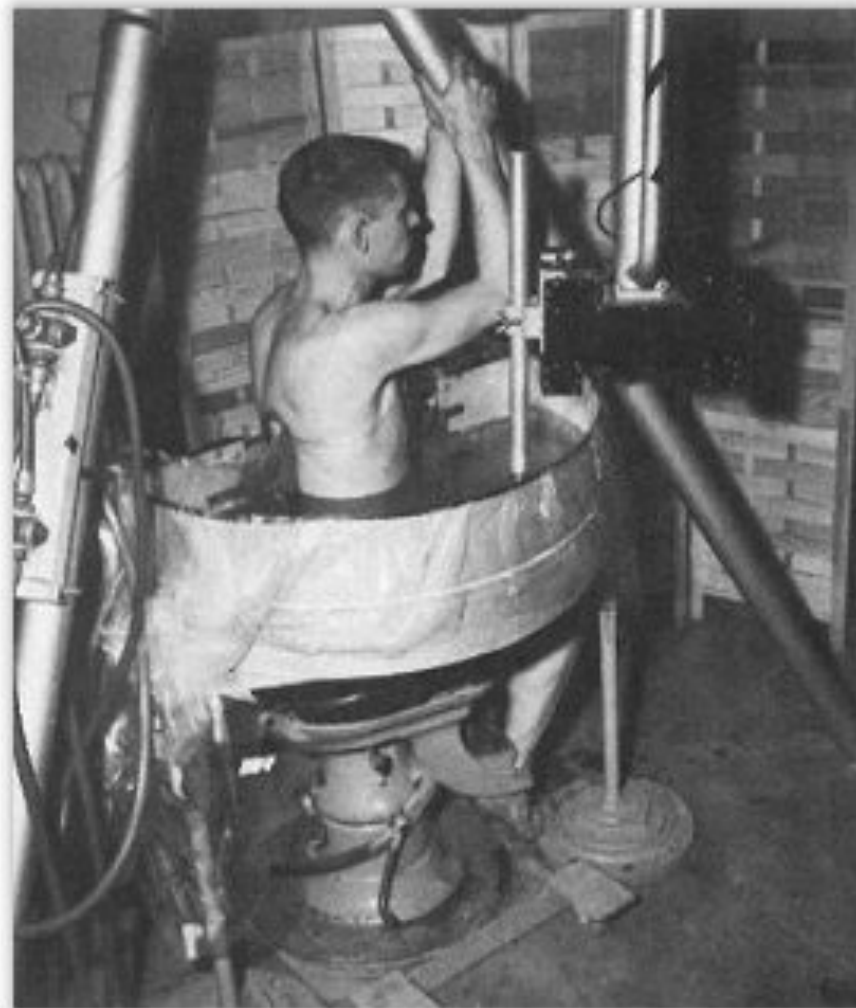
1954



PHOTOGRAPH TAKEN BY DOCTOR SIMON L. FINE, MD. USING WATER SURFACE WAVES FOR FOCUSING SOUND. THE OBJECT'S SHARP IMAGE APPEARS ON SCREEN.

SOUND-WAVE PORTRAIT IN THE FLESH

A sonar-like device produces pictures of the human body's soft tissues which are invisible to X-rays.





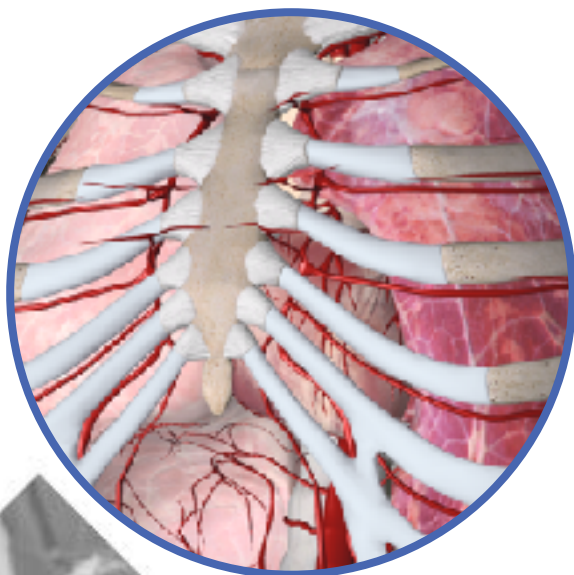
ULTRASOUND
PROGRAM





POCUS

重點式照護超音波



POCUS

Point-of-Care Ultrasound

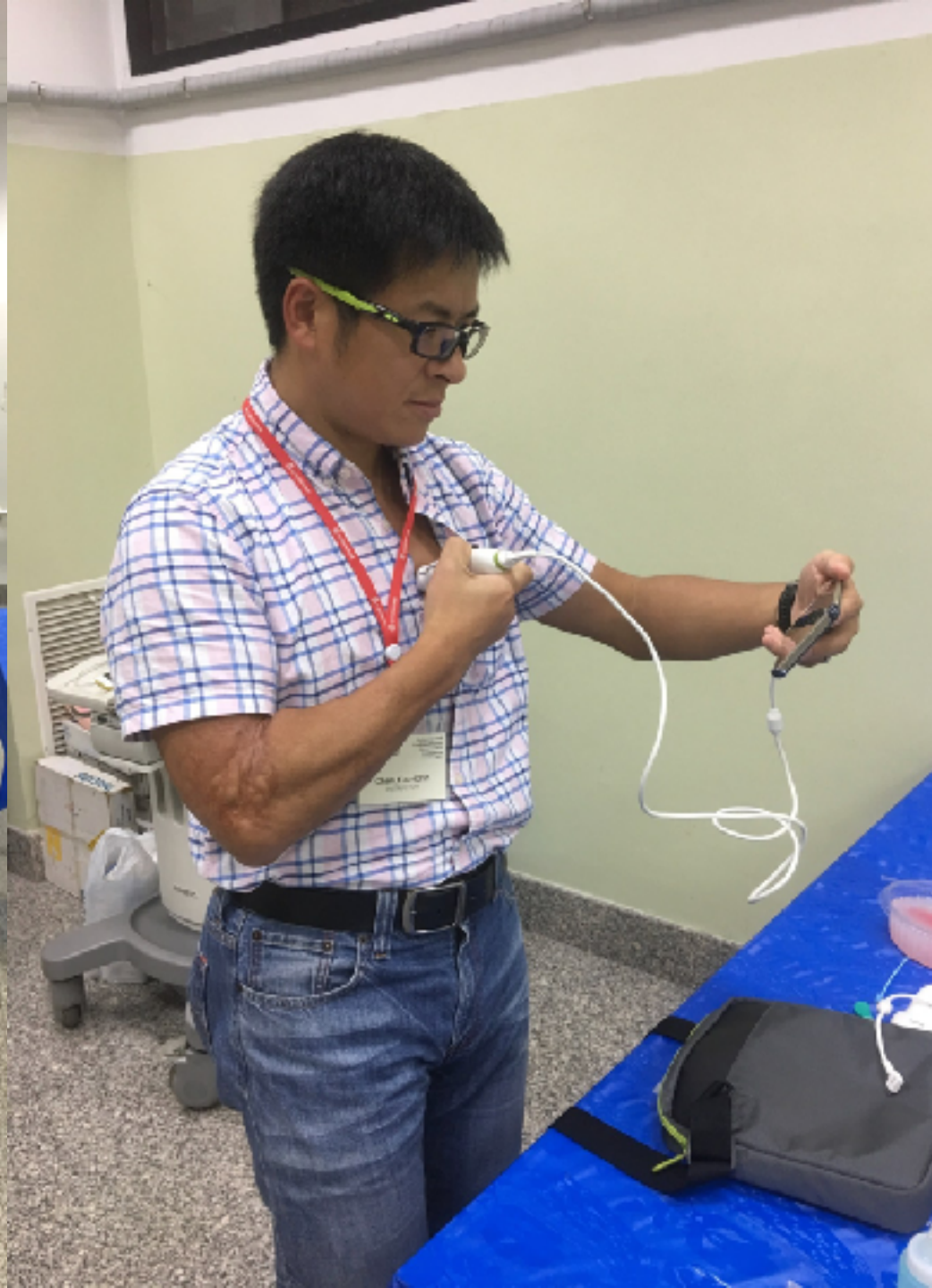
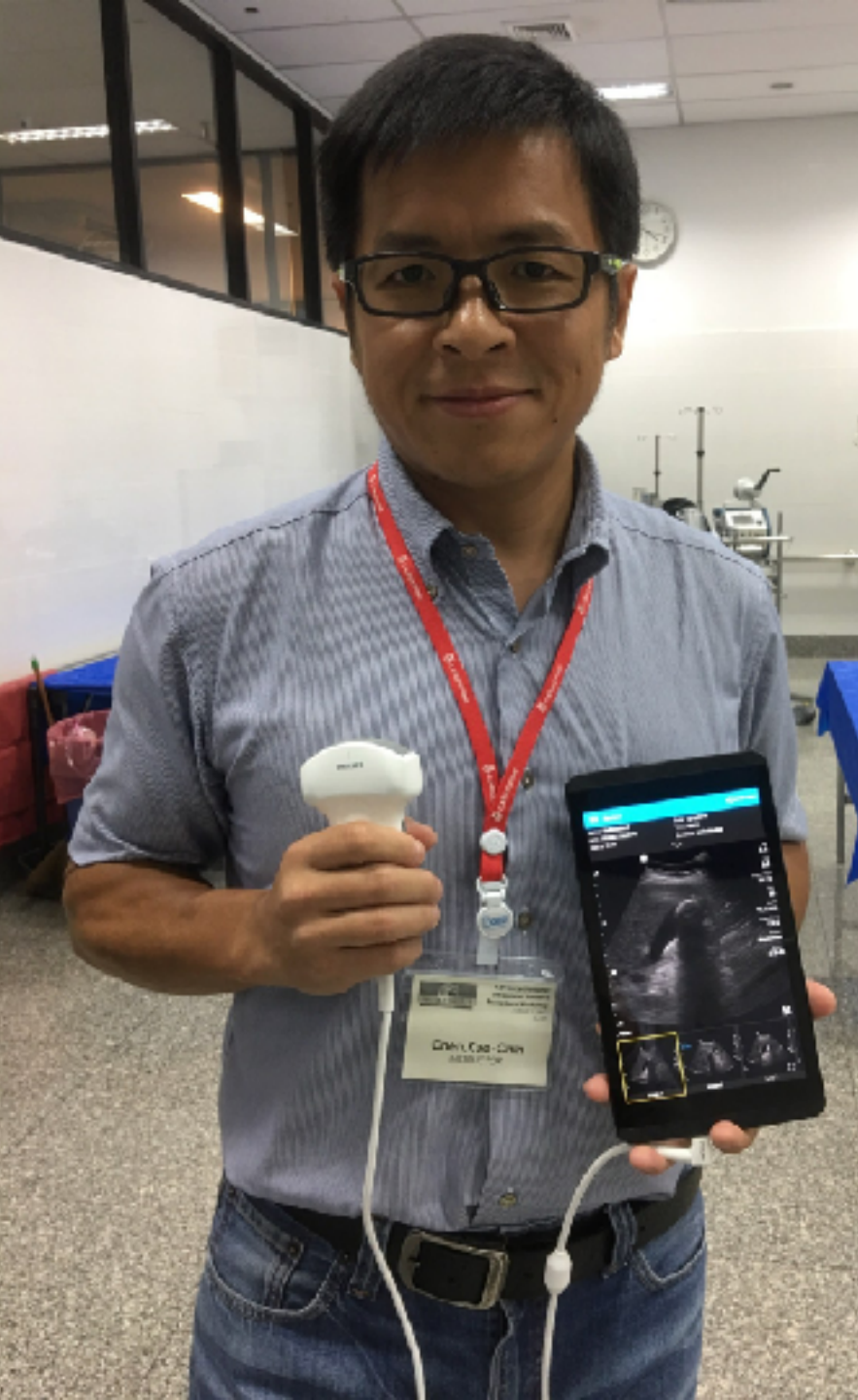
“ultrasonography brought to
the patient and performed by
the provider in real time”

Moore, C. L., & Copel, J. A. NEJM 2011



破壞性創新





藍鵲守護你的家



應用行動超音波診療作為醫師『手和眼』之延伸 —以臺北市立聯合醫院藍鵲居家醫療計畫為例

文、圖 / 施庭芳

臺大醫院影像醫學部



飛機上，呼吸喘合併休克



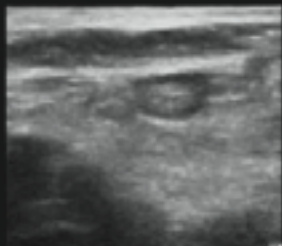
SBS



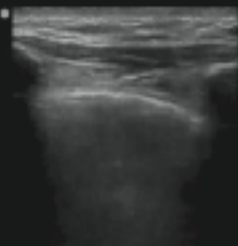
ChenKC@POCUSAcademy

重點式照護超音波

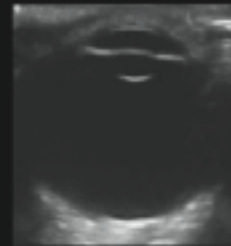
Lymph nodes



Lungs



Eyes



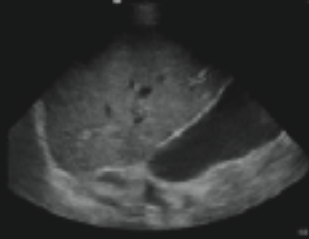
Thyroid



IVC



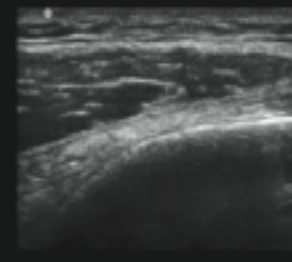
Gallbladder



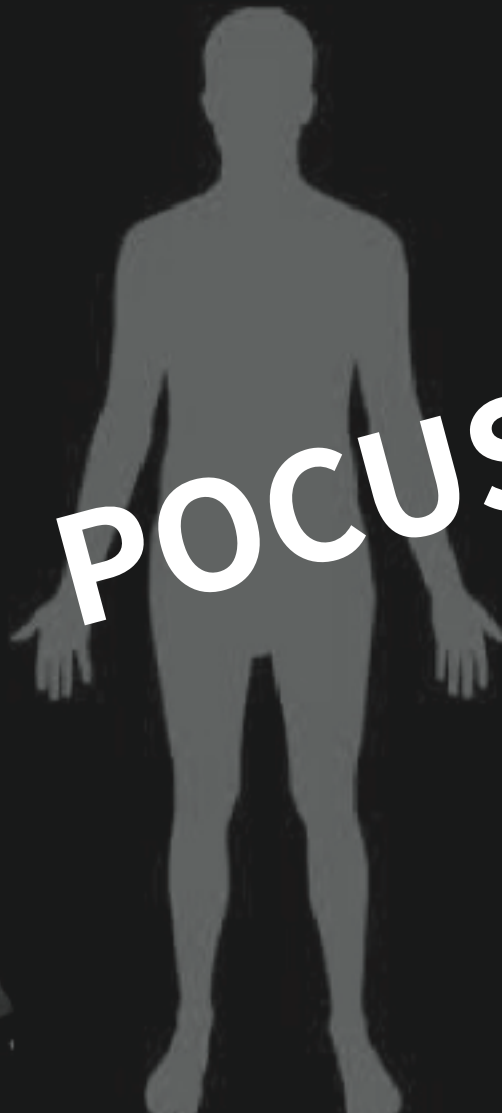
Heart



Musculoskeletal



POCUS



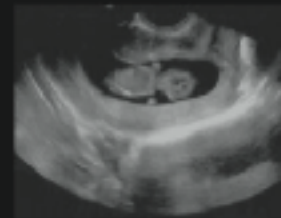
Bladder



Kidneys



Male/female
reprod



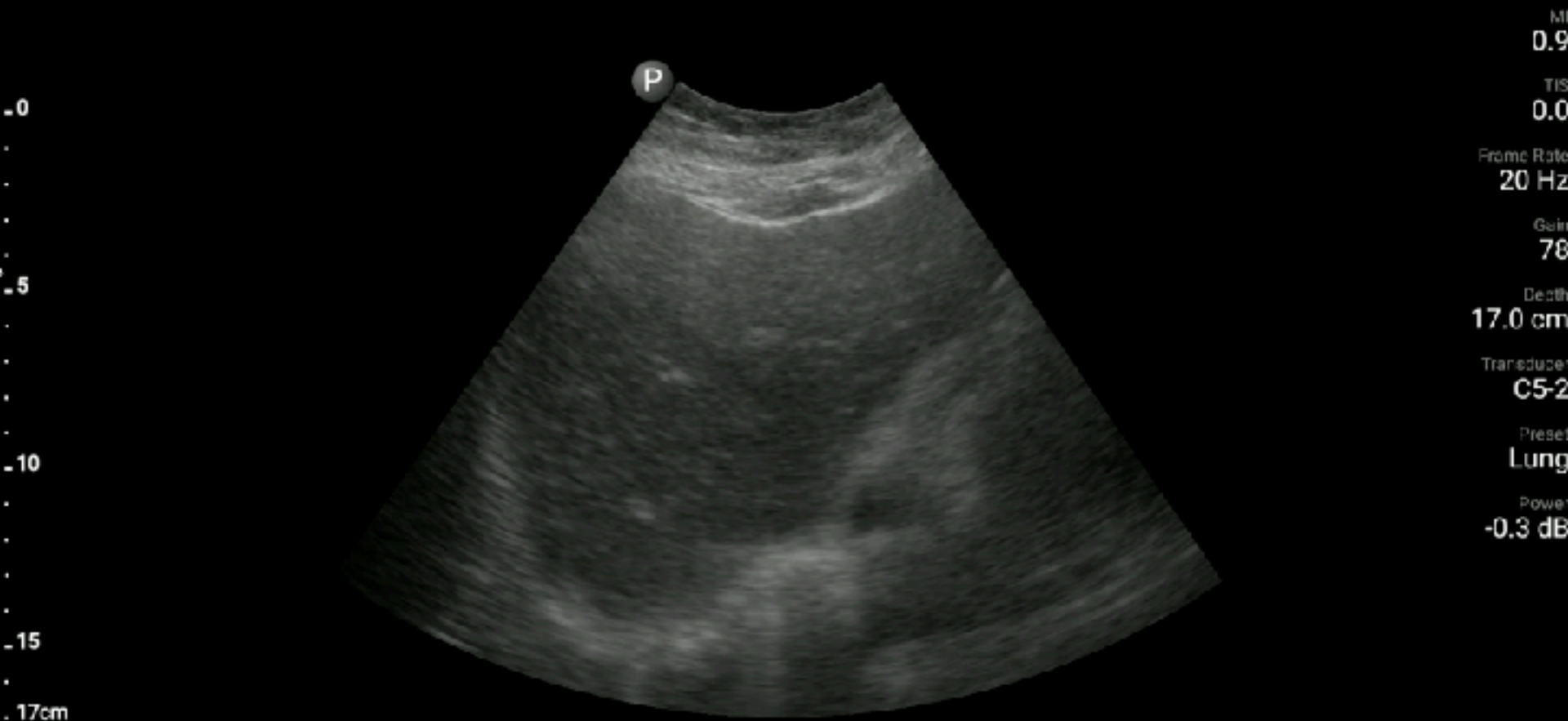
Vascular



超音波是怎麼一回事？

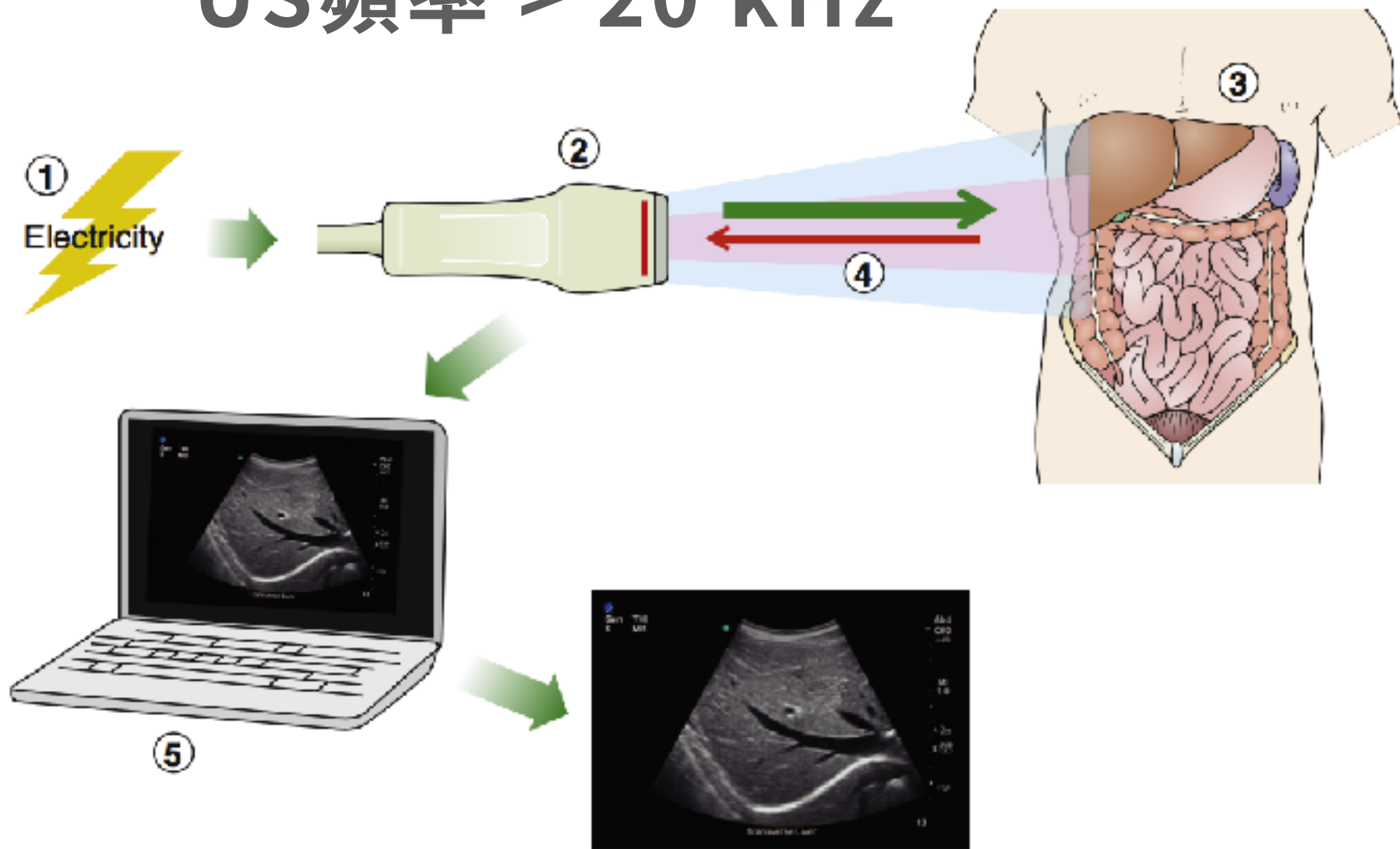
14503766879883 - Chen

10/26/2017 15:17:38

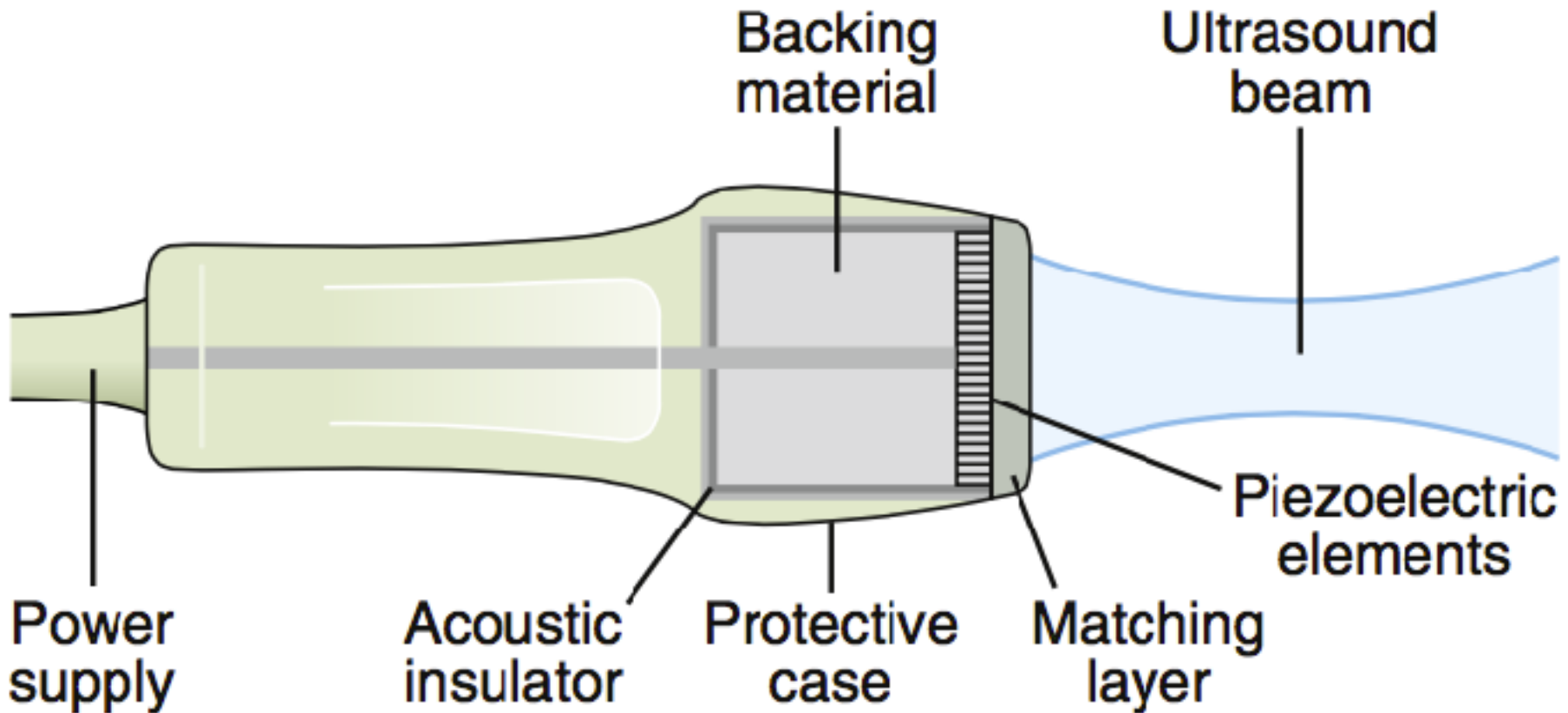


超音波成像原理

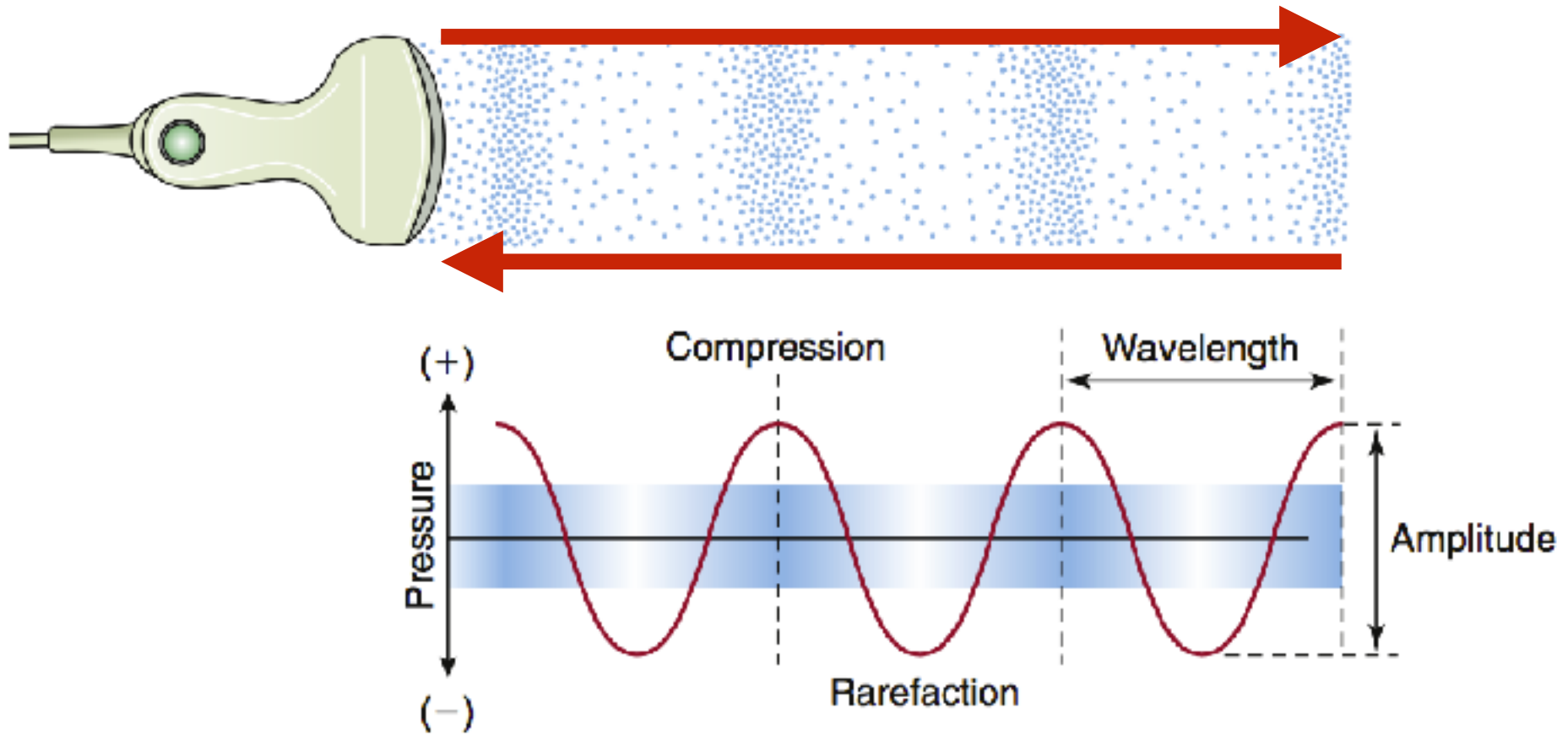
US頻率 > 20 kHz



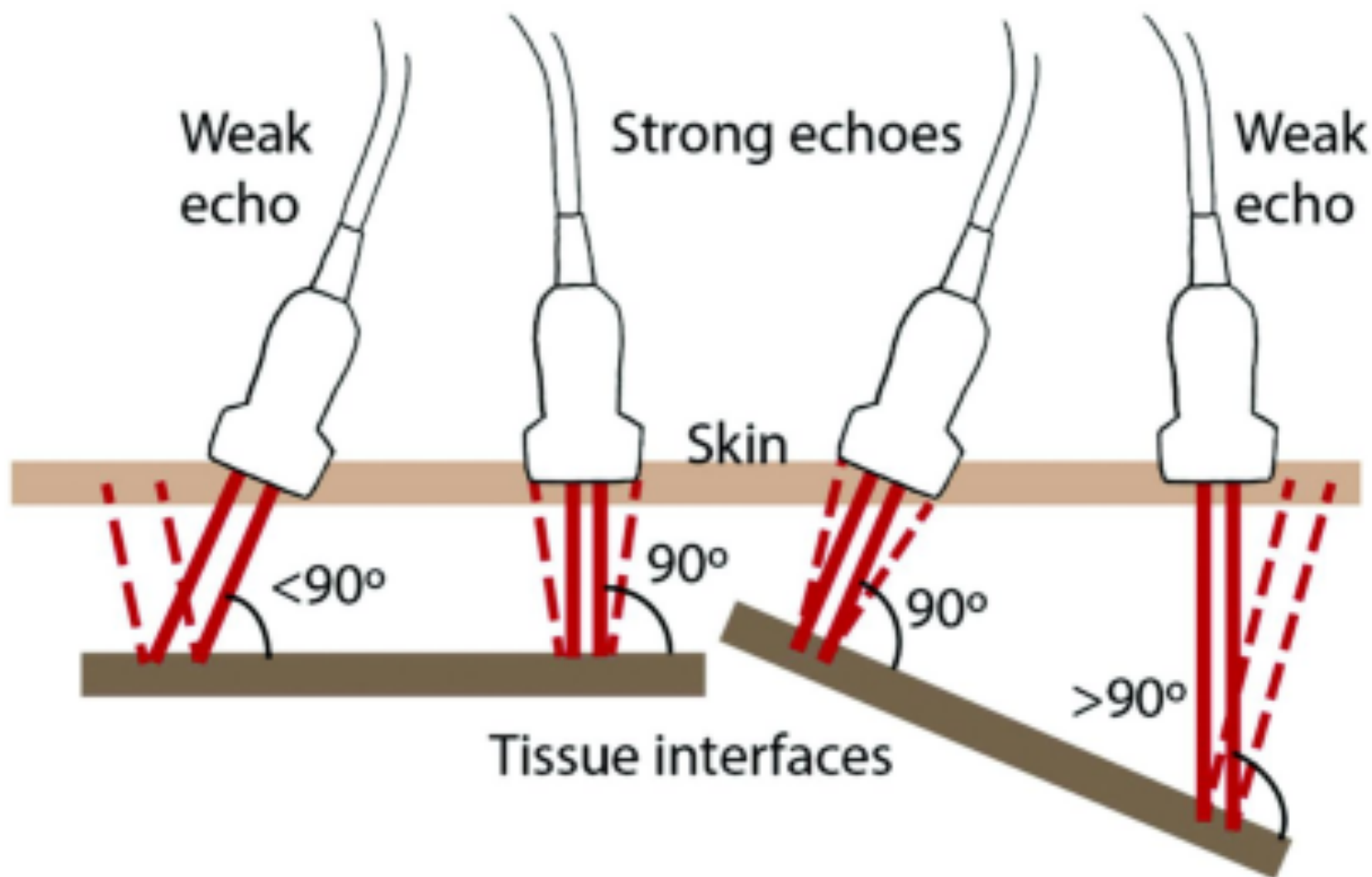
超音波探頭構造



超音波探頭：發射和接收



原則：垂直於掃描標的



POCUS常用探頭



弧

線

扇

POCUS常用探頭



表面



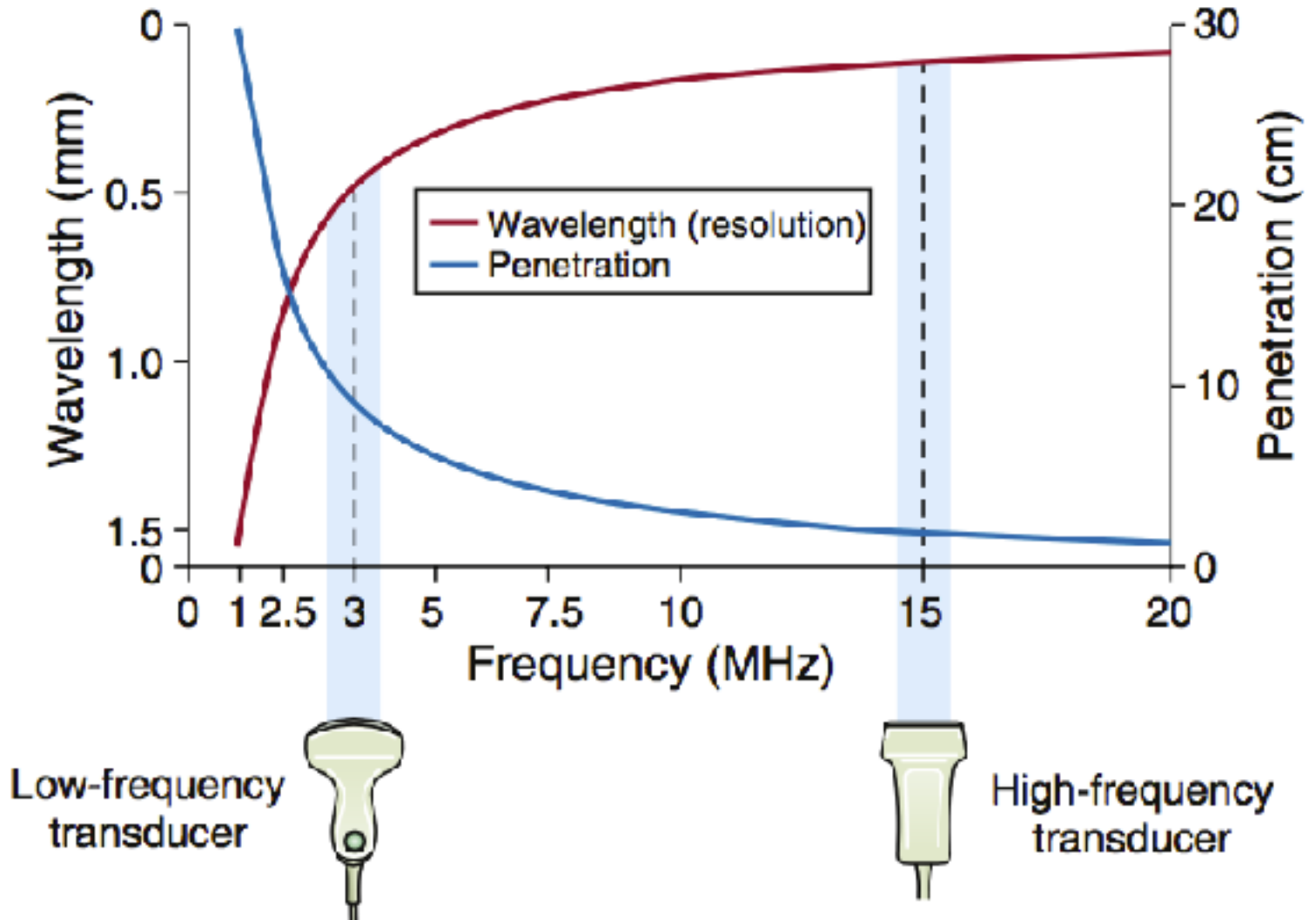
頻率



深度



頻率 / 波長 / 深淺 / 解析



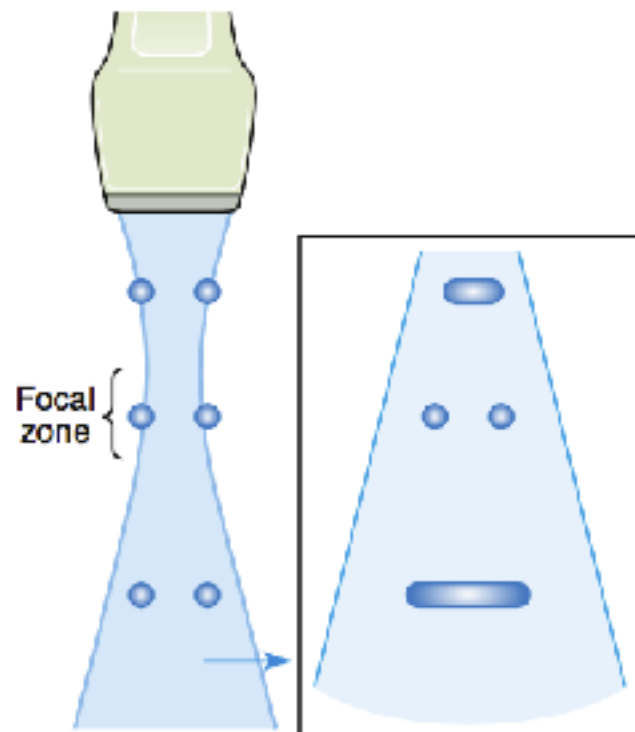
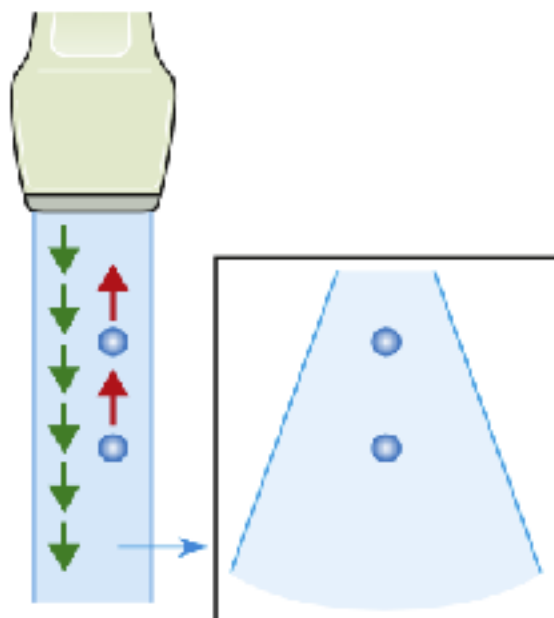
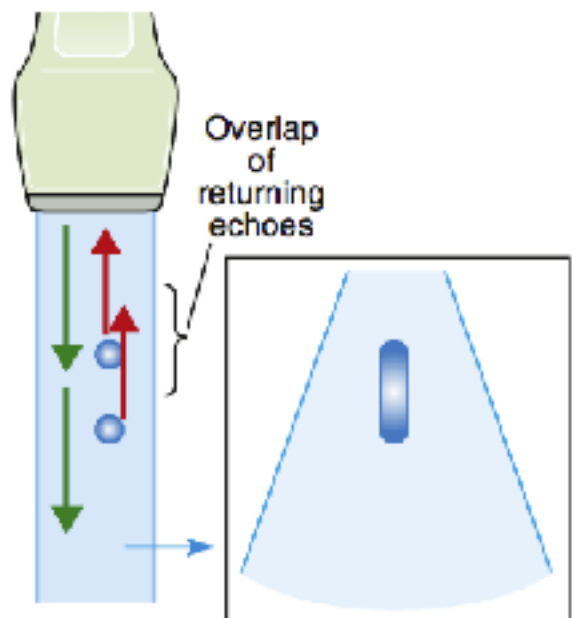
漂亮影像的要素

Axial resolution

Lateral resolution

Lower frequency

Higher frequency

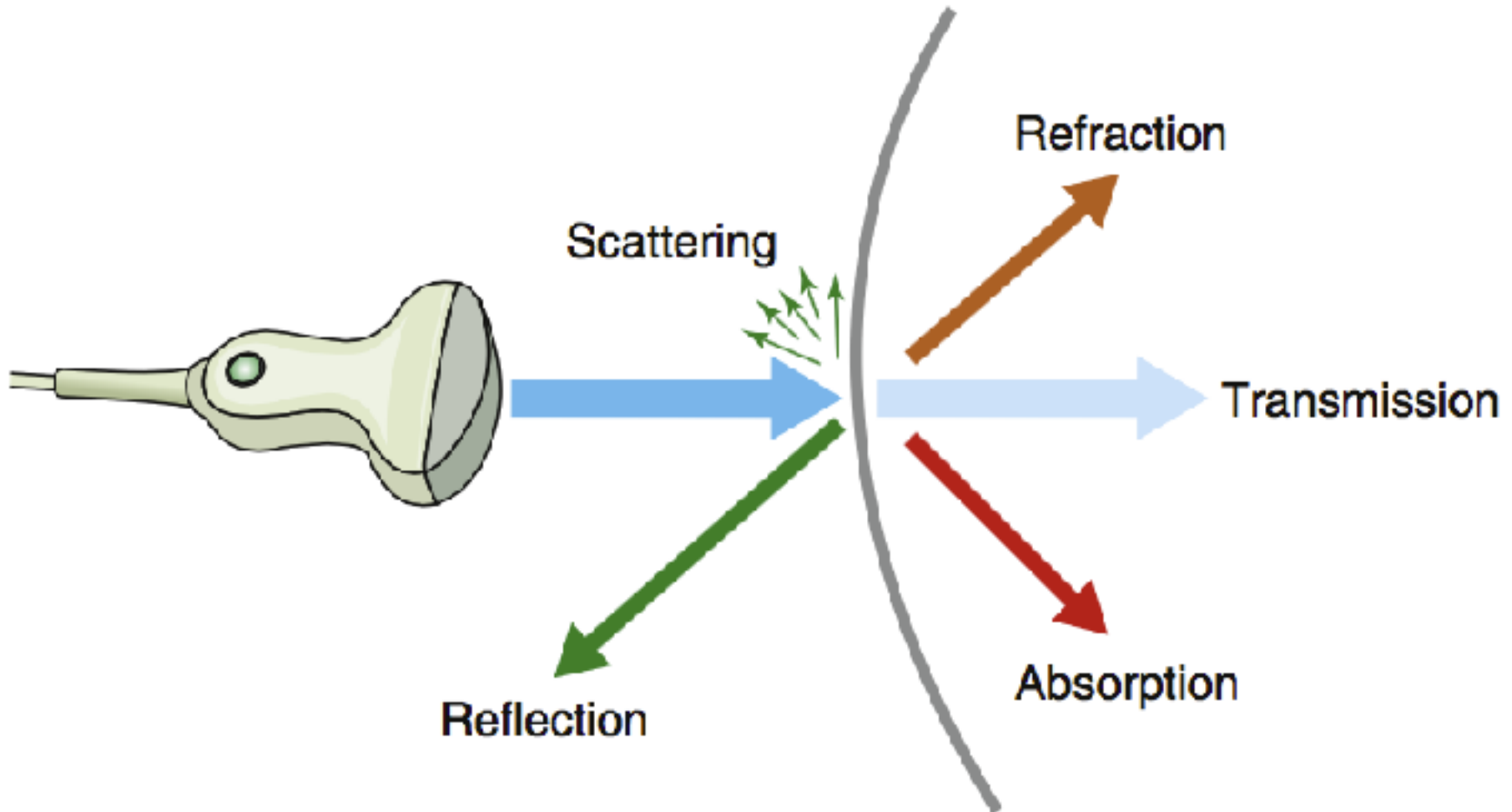


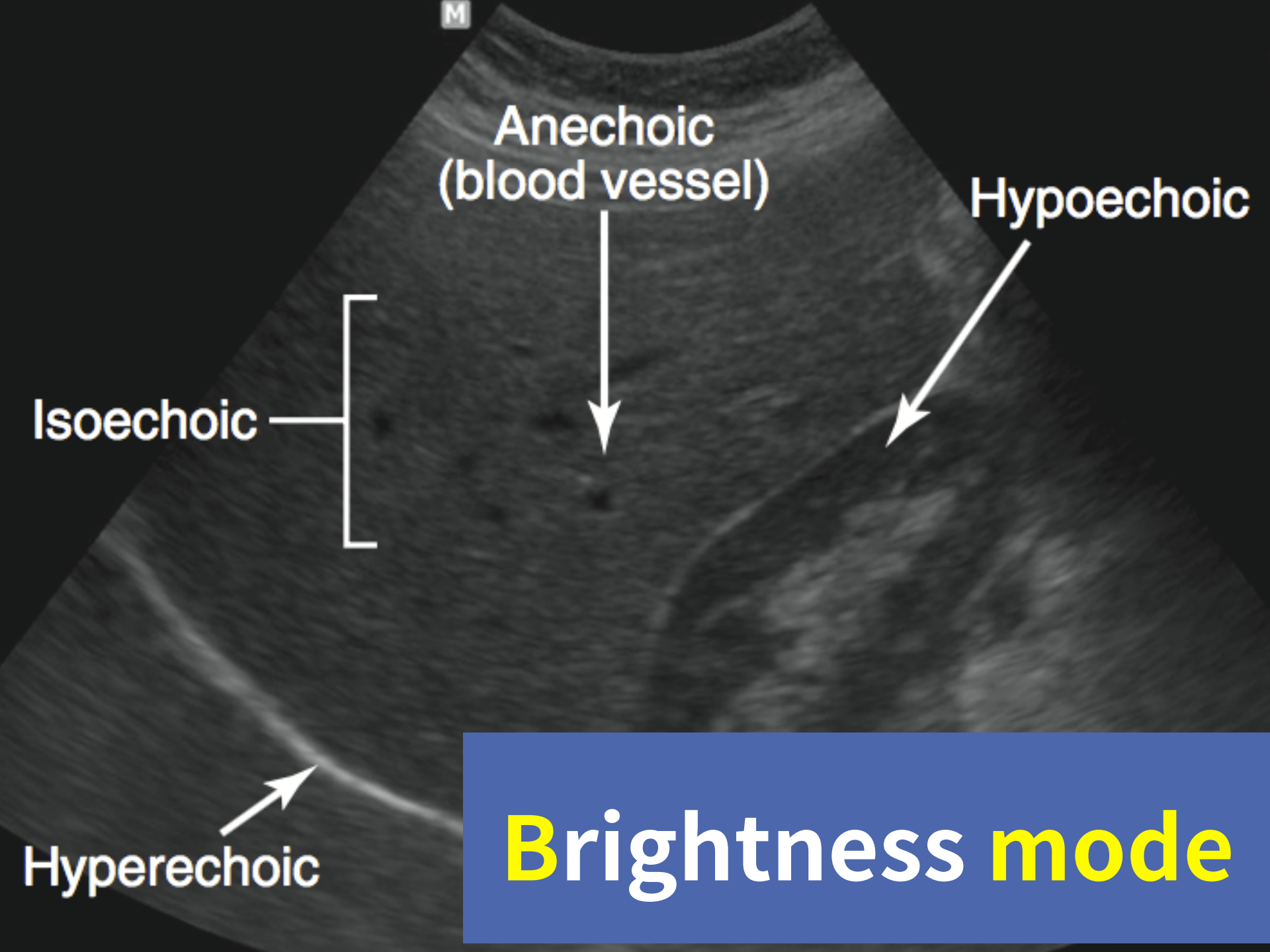
位置

探頭

焦點

如何對抗這些【敵人】？





Anechoic
(blood vessel)

Hypoechoic

Isoechoic

Hyperechoic

Brightness mode

超音波在不同物質中的衰退

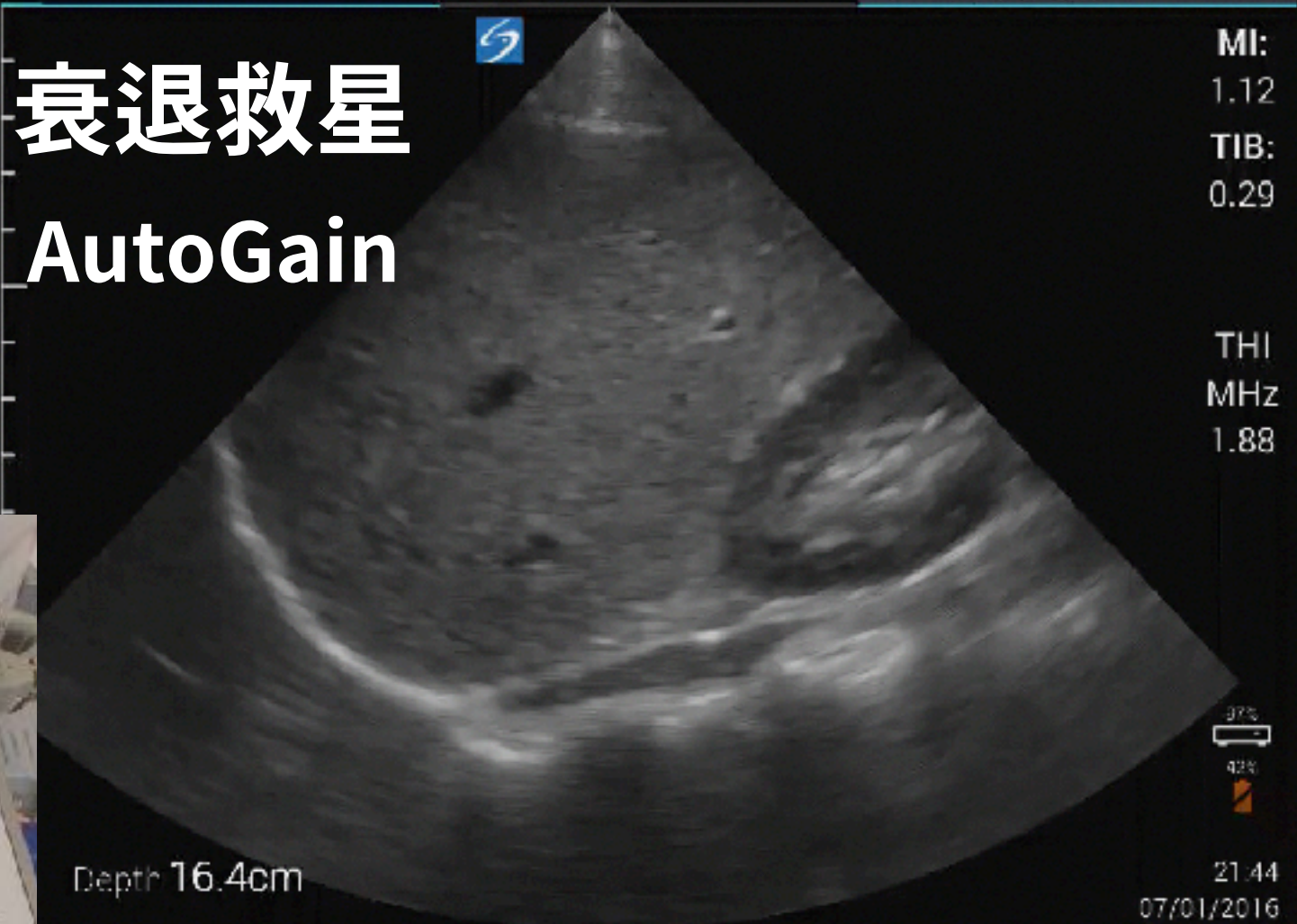
水是最好的視窗

Tissue or Material	Attenuation (dB/cm/MHz)
Water	0.0022
Blood	0.15
Soft tissues	0.75
Air	7.50
Bone	15.00

Time Gain Compensation

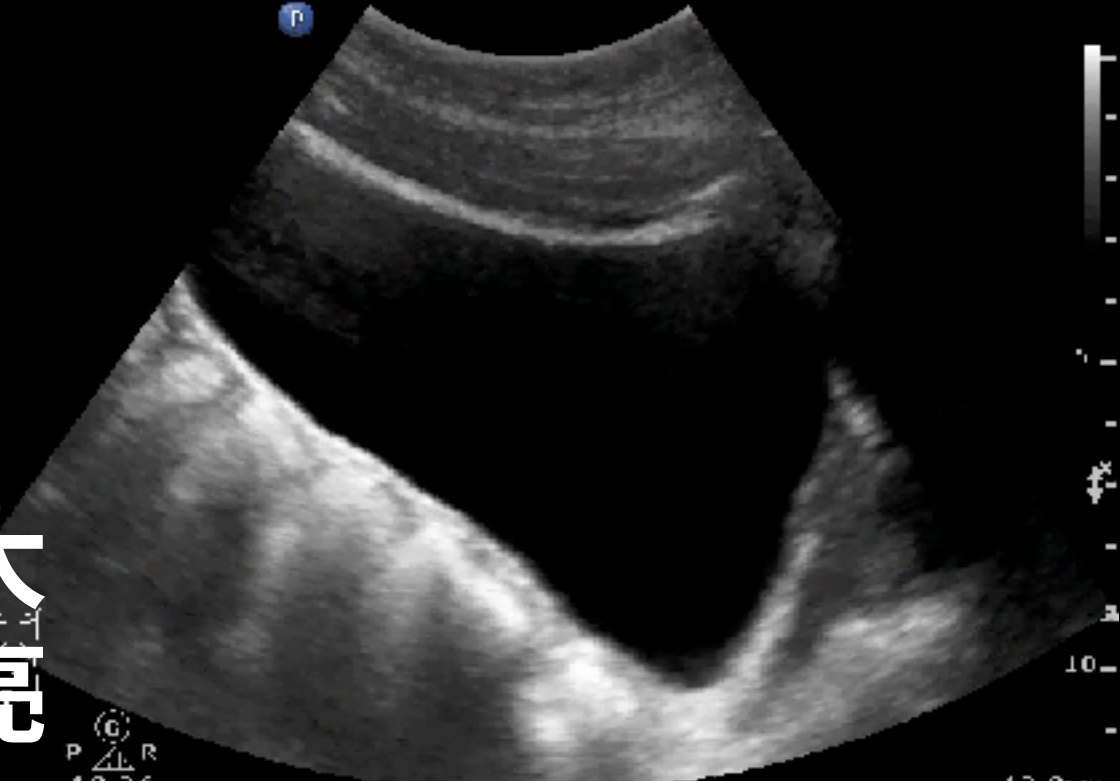
衰退救星
AutoGain

P21: Abdomen



Abd Gen
1.5 1
39 Hz
12.0cm

2D
11Gen
Gr 63
C 56
R/R/R



阻抗差愈大
交界面愈亮

TABLE 2.1 ■ Acoustic Impedance of Different Tissues⁶⁻⁸

Tissue or Material	Density (g/cm ³)	Speed of Sound (m/s)	Acoustic Impedance (kg/(s m ²)) × 10 ⁶
Air	0.001225	340	0.0004
Fat	0.95	1450	1.38
Blood	1.055	1575	1.66
Liver	1.06	1590	1.69
Bone	1.9	4080	7.75
Metal (e.g., titanium)	4.5	5090	22.9

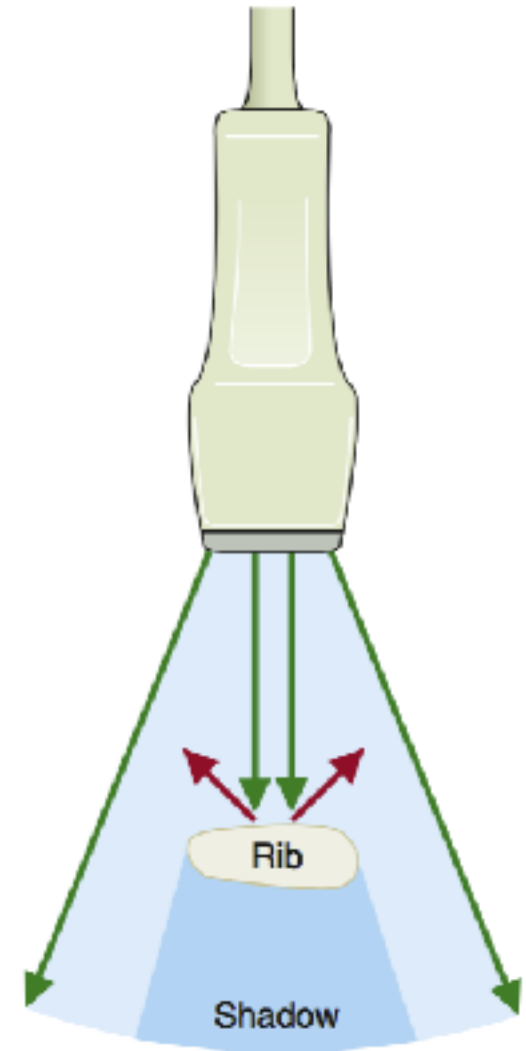
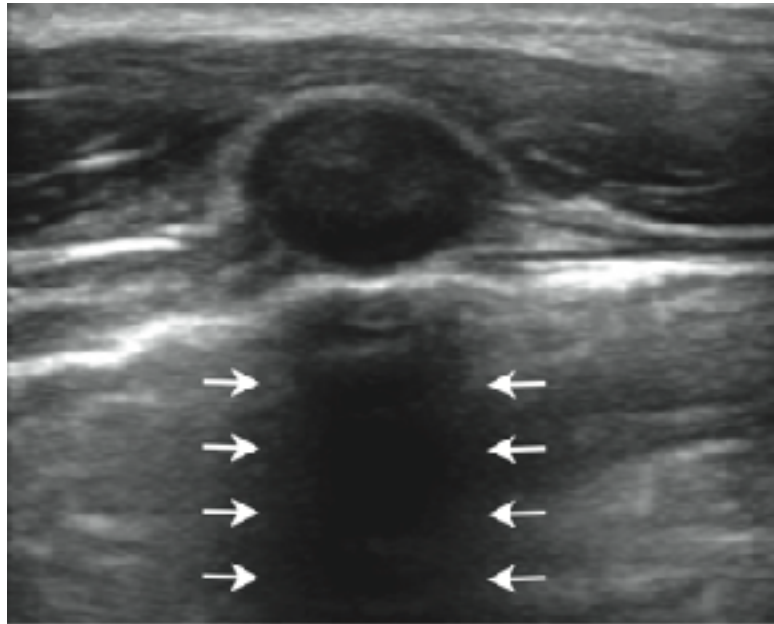
2 種影片中的假影和成因

Abd Gen
C5-1
39 Hz
12.0cm

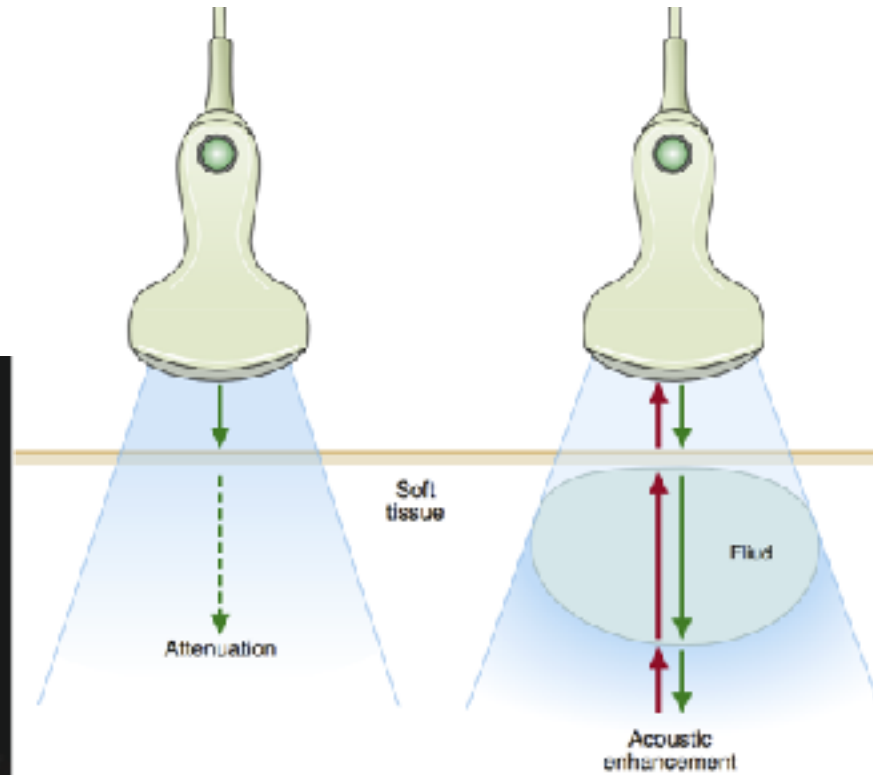
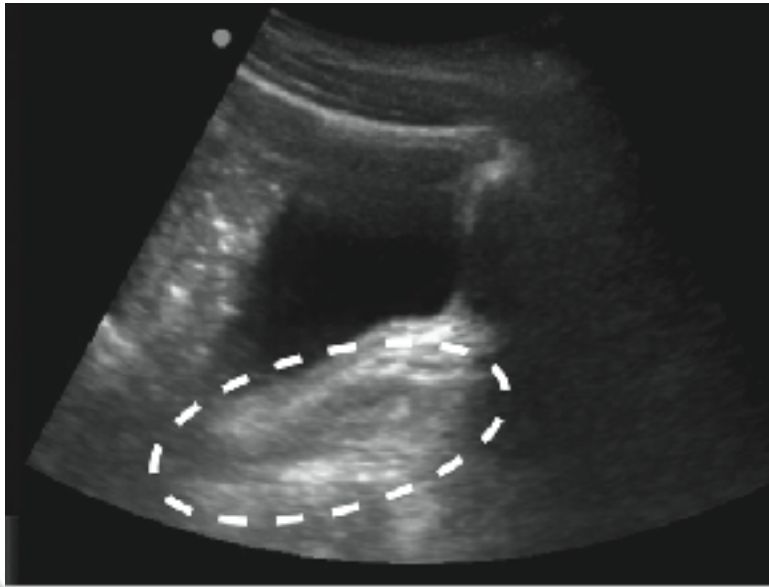
2D
HGen
Gn 72
C 56
3 / 3 / 3



Acoustic Shadowing 回音陰影



Acoustic Enhancement 回音增強



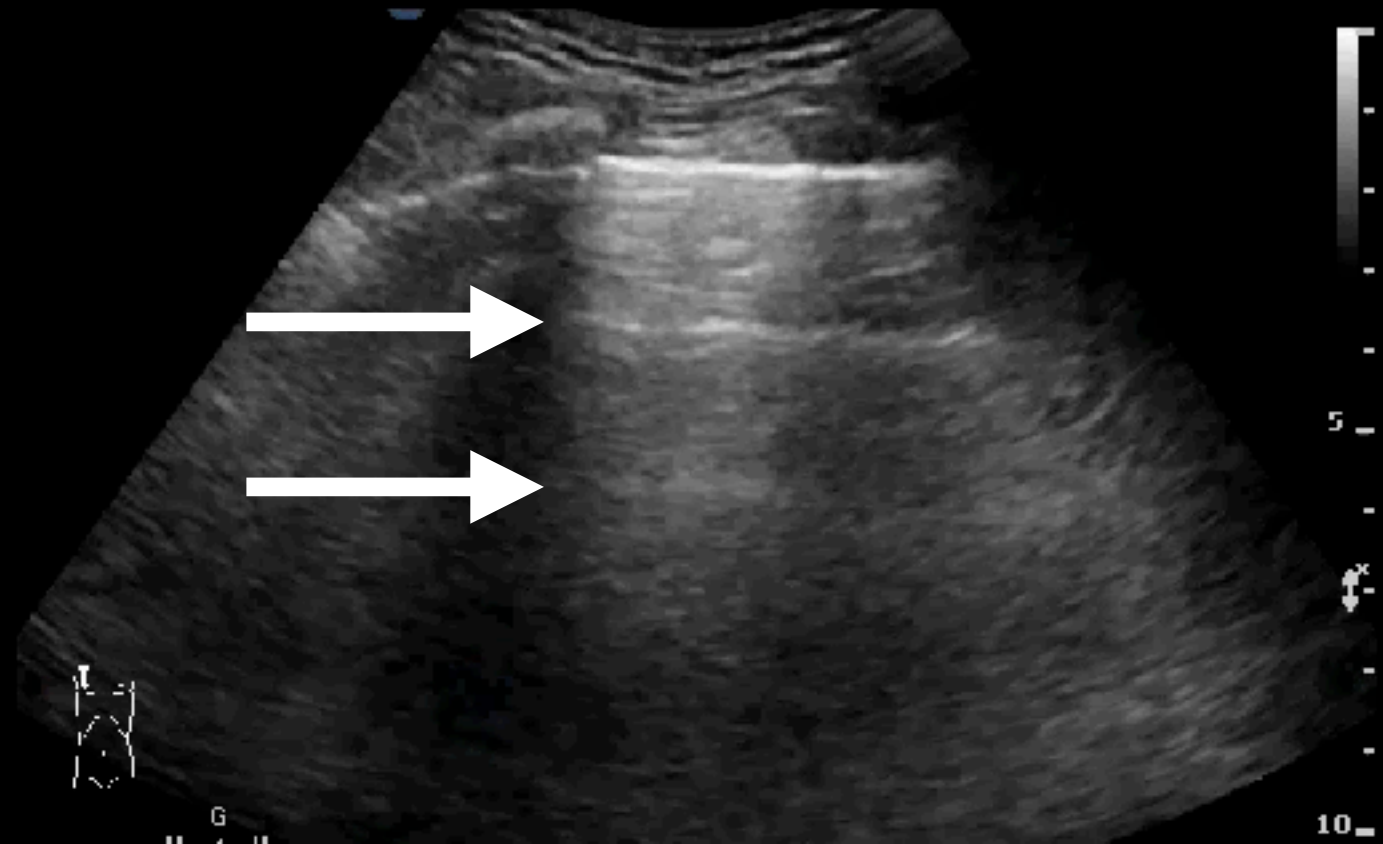
影片中所指的假影和成因

PHILIPS

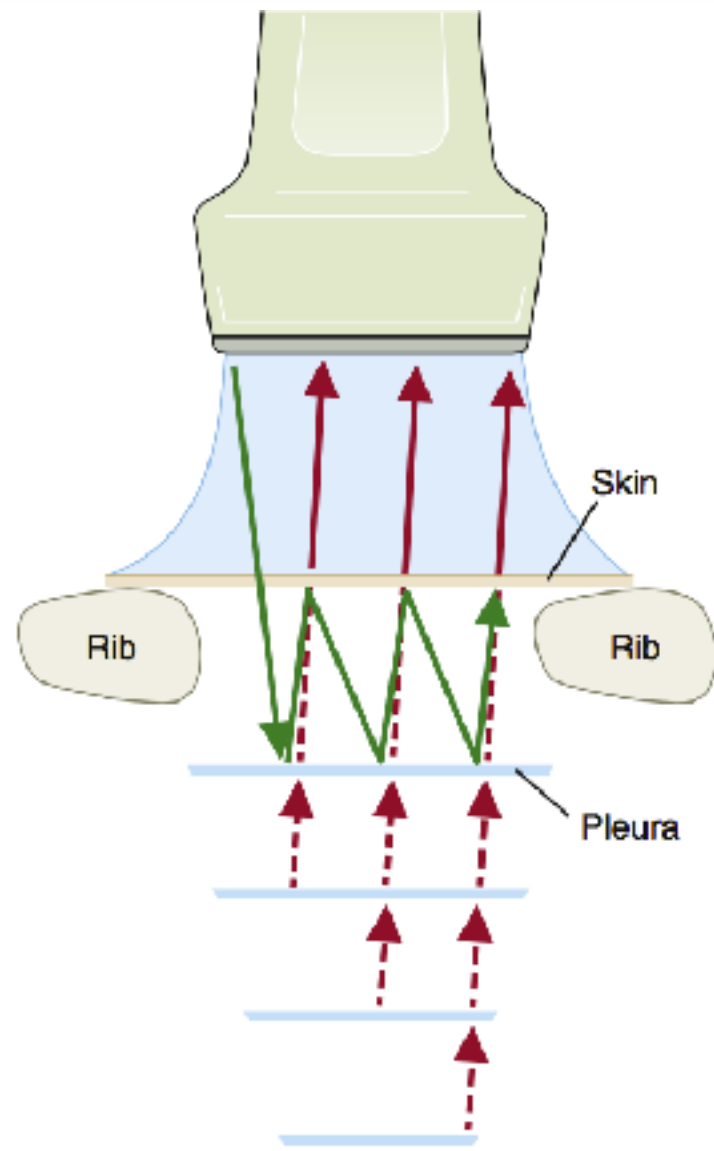
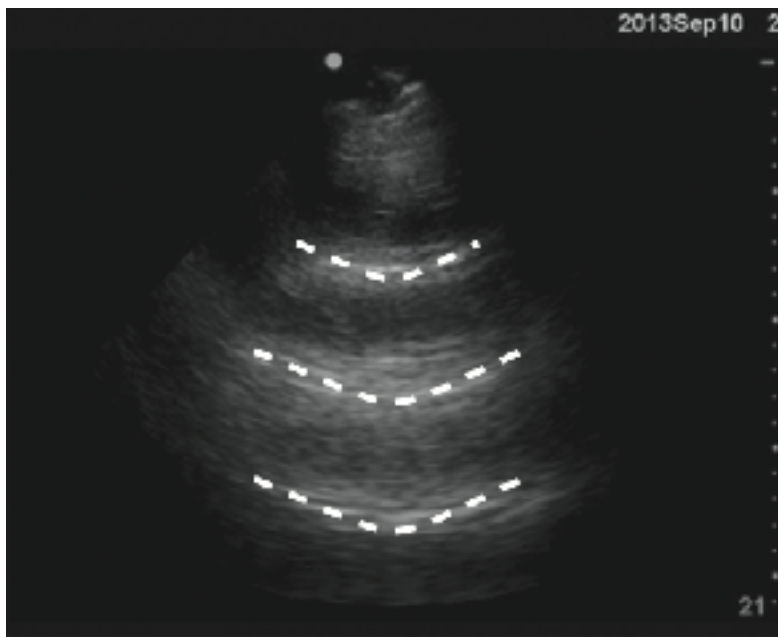
SKH-EUTC@ChenKC

FAST
C5-1
42 Hz
11.0cm

2D
Gen
Cn 60
C. 56
1 / 3 / 3



Reverberation 回響假影

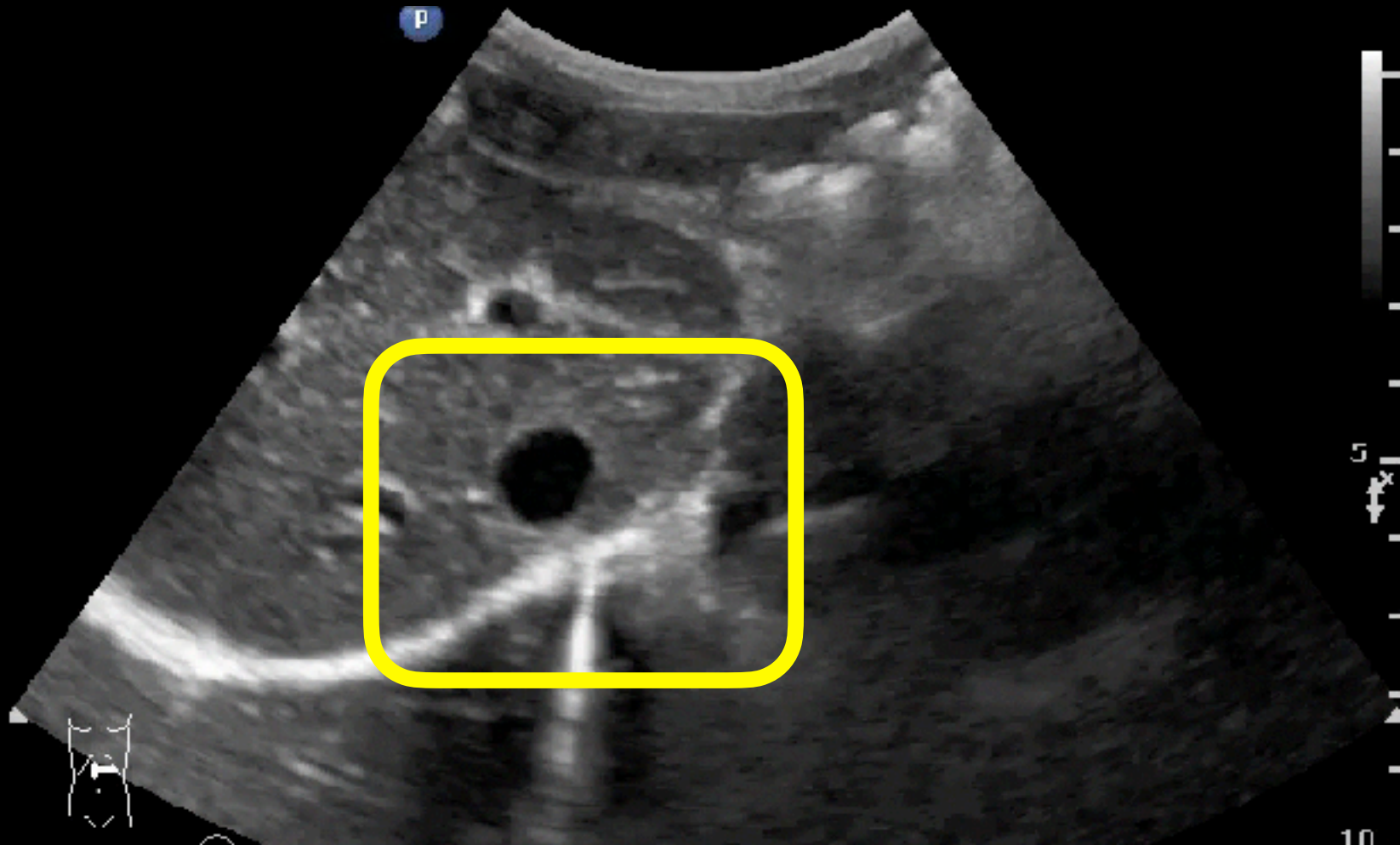


影片中所指的假影和成因

Abd Gen
C5-1
47 H7
11.0cm

2D

HGen
Gn 81
C 56
3 / 3 / 3





ULTRASOUND
PROGRAM



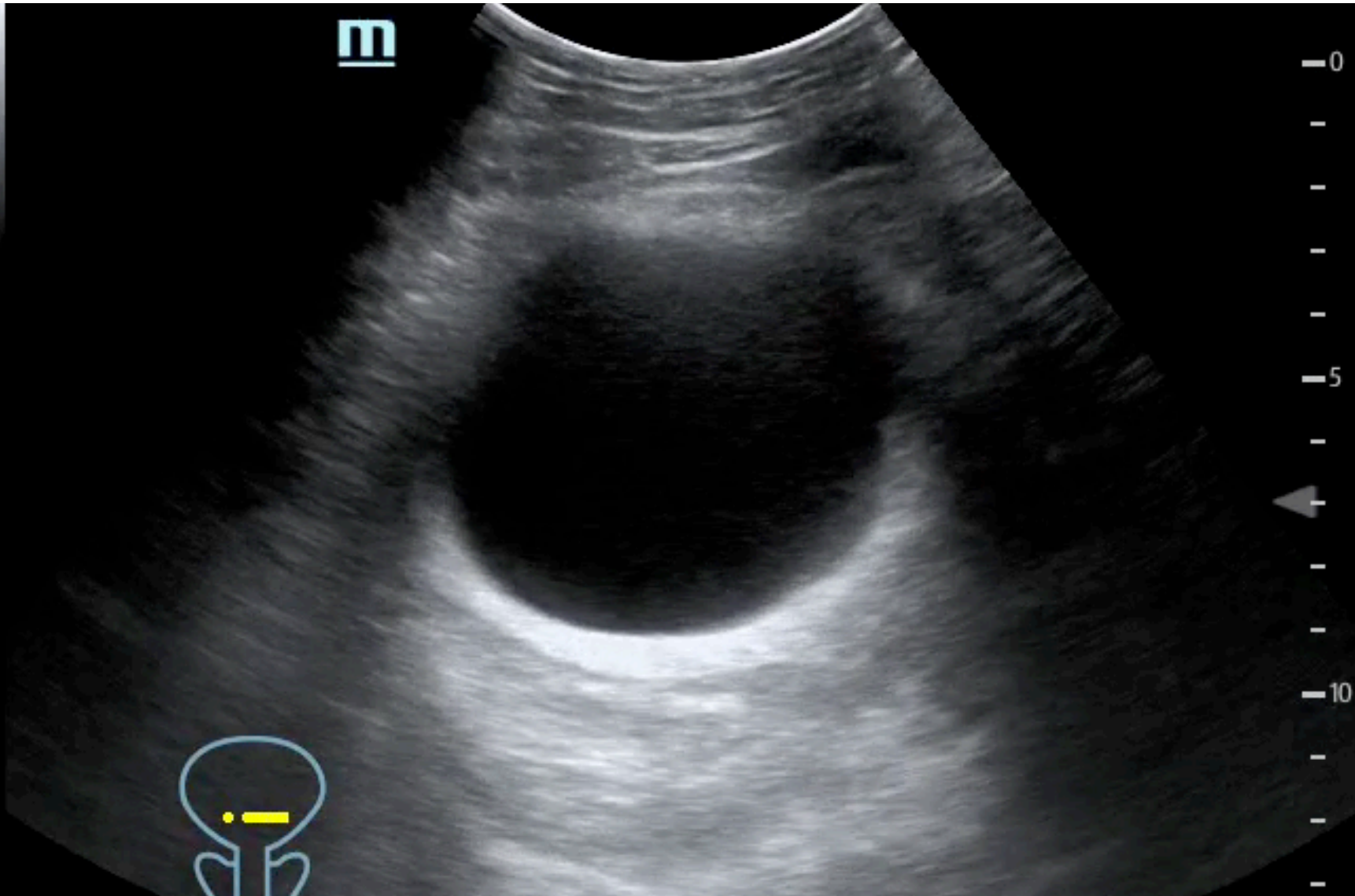


影片中的 2 種假影和成因

TIS 0.7

B
FH5.0
DR 120
FR 22
D 15.0
G 50

m

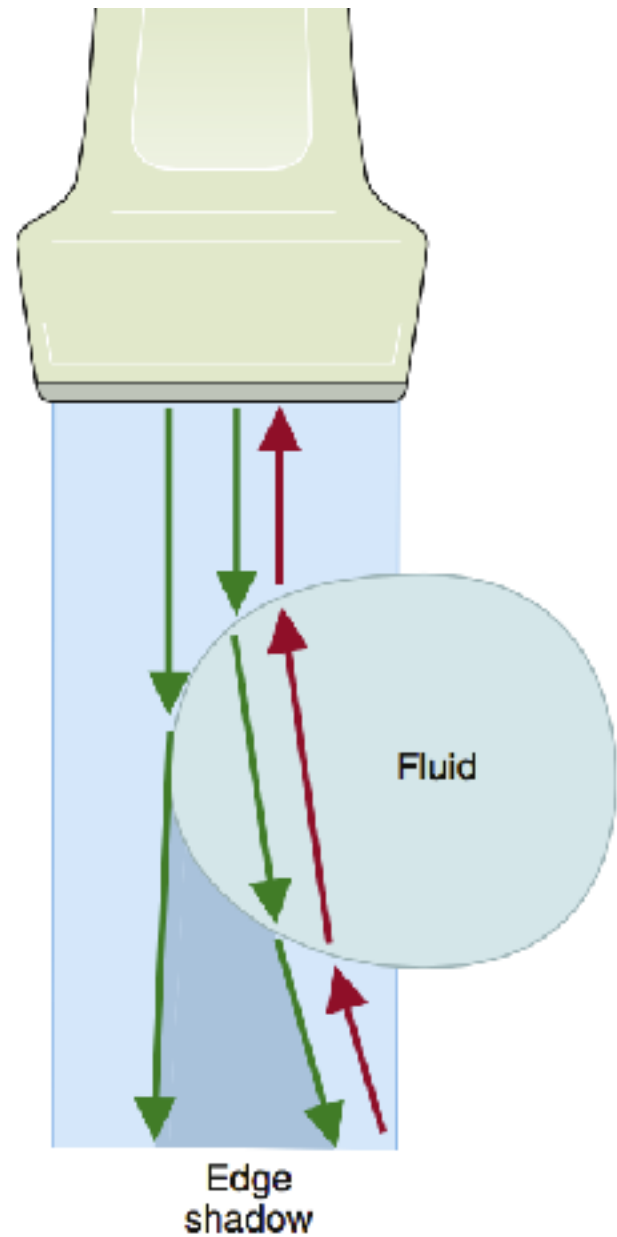


0

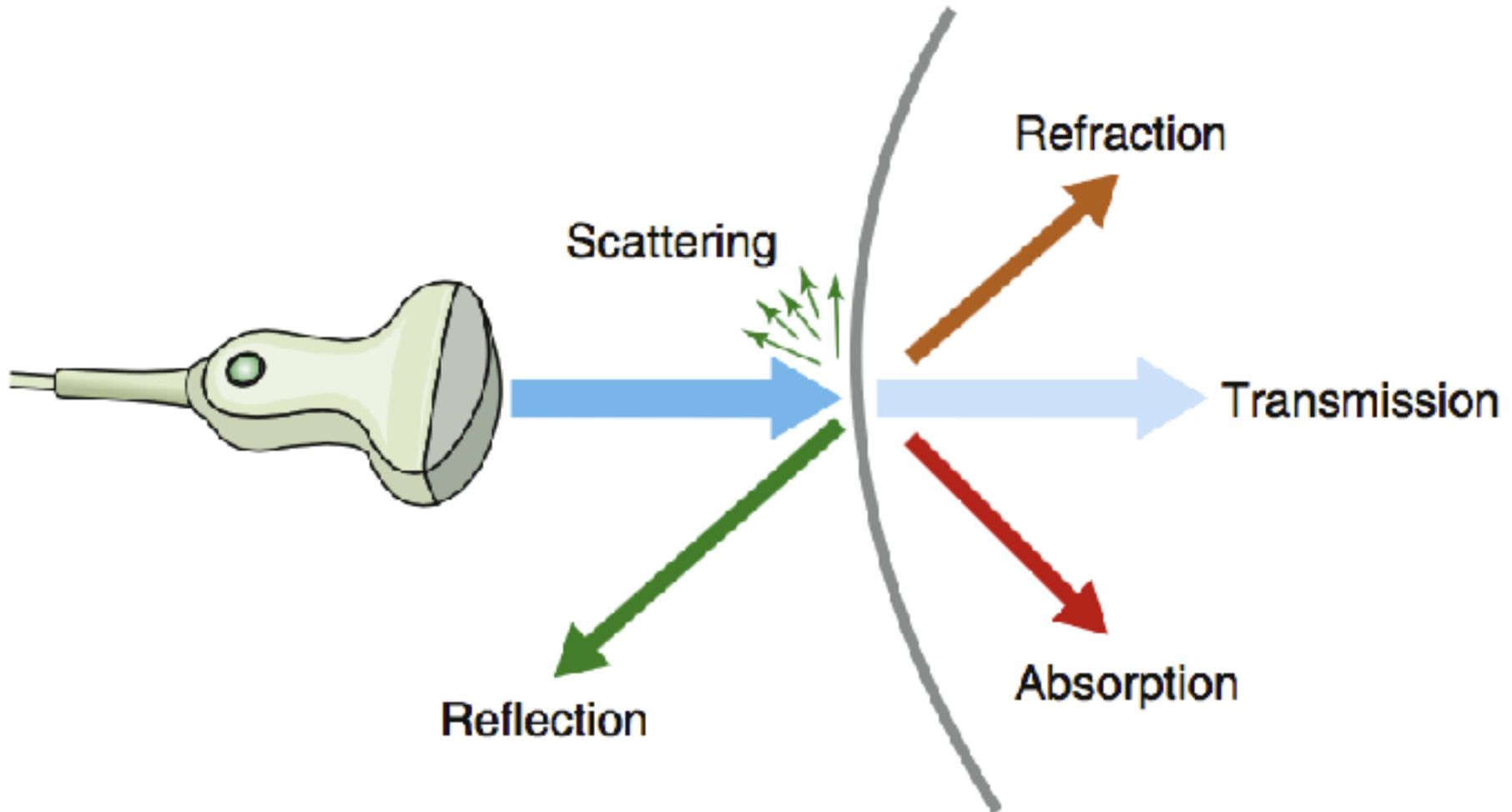
5

10

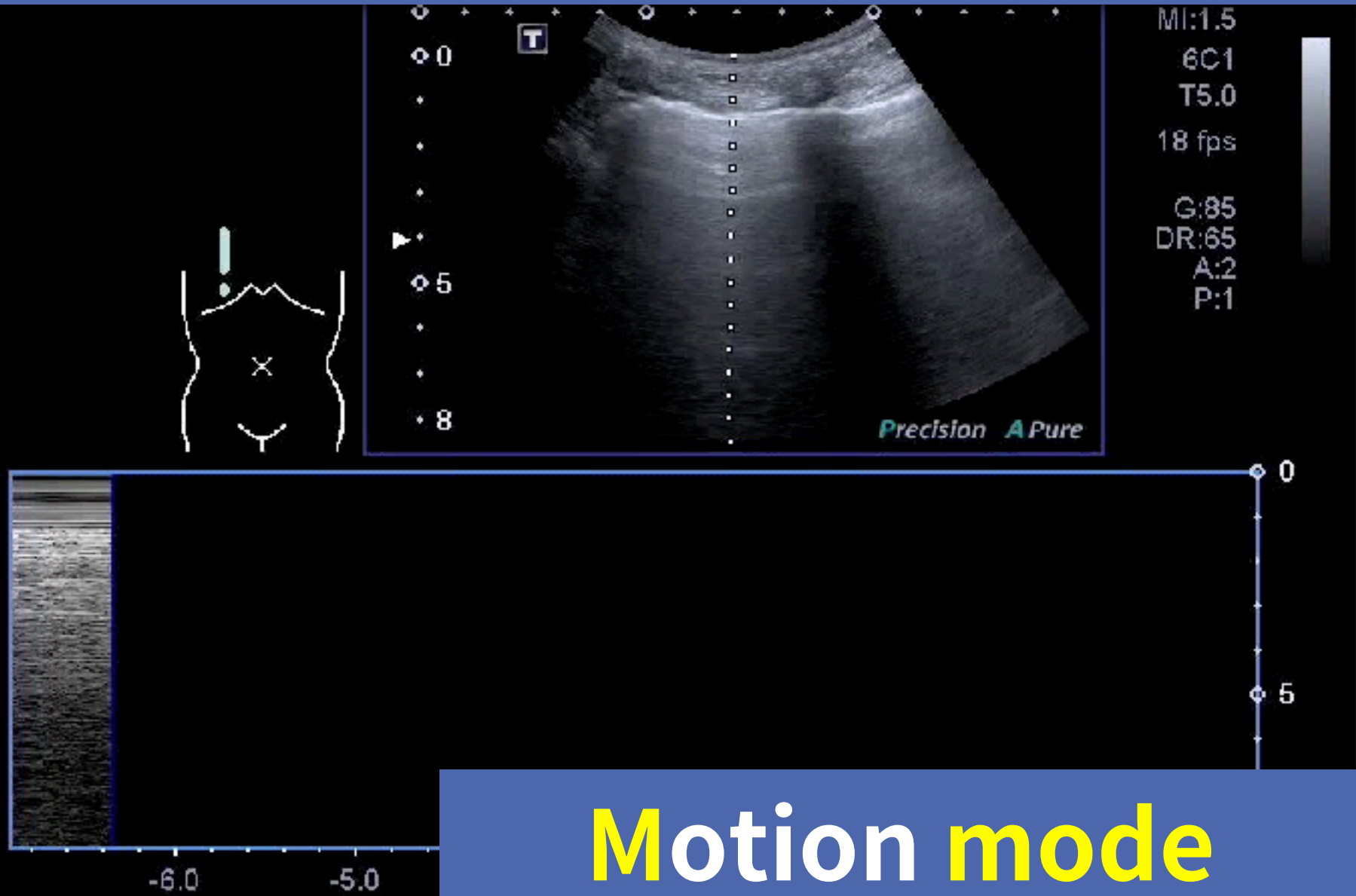
Edge shadow Side lobe 折射陰影



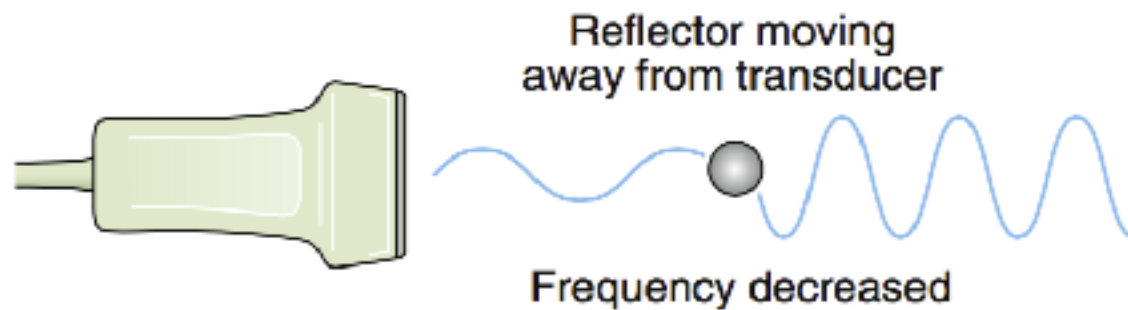
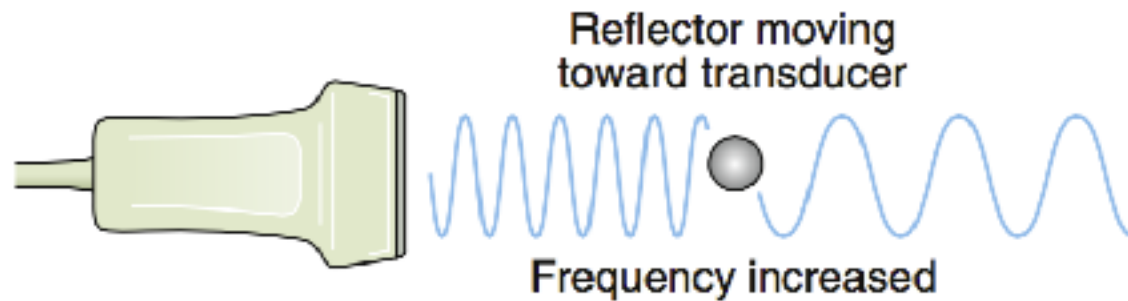
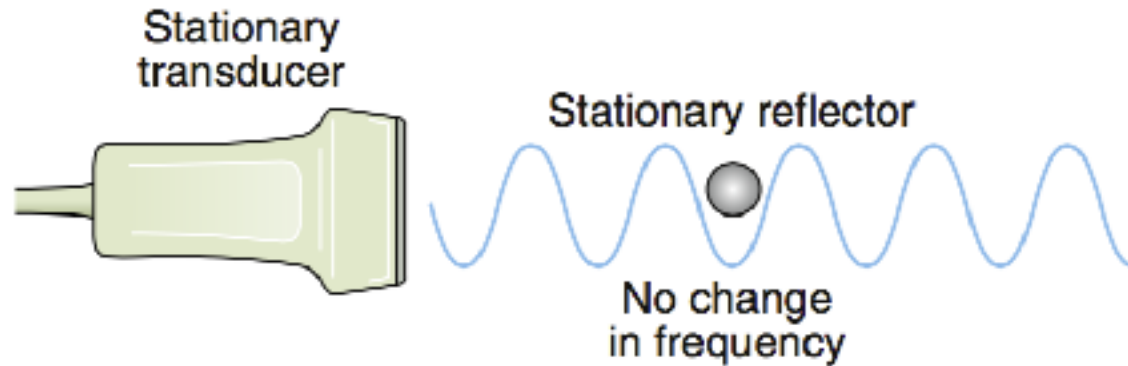
如何對抗這些【敵人】？



To record Motion



Motion mode



Color Doppler with Directions

Adult Echo

S5-1

18 Hz

18.0cm

都卜勒效應

2D

HGen

Gn 34

C. 50

3/2/0

Color

2.5 MHz

Gn 60

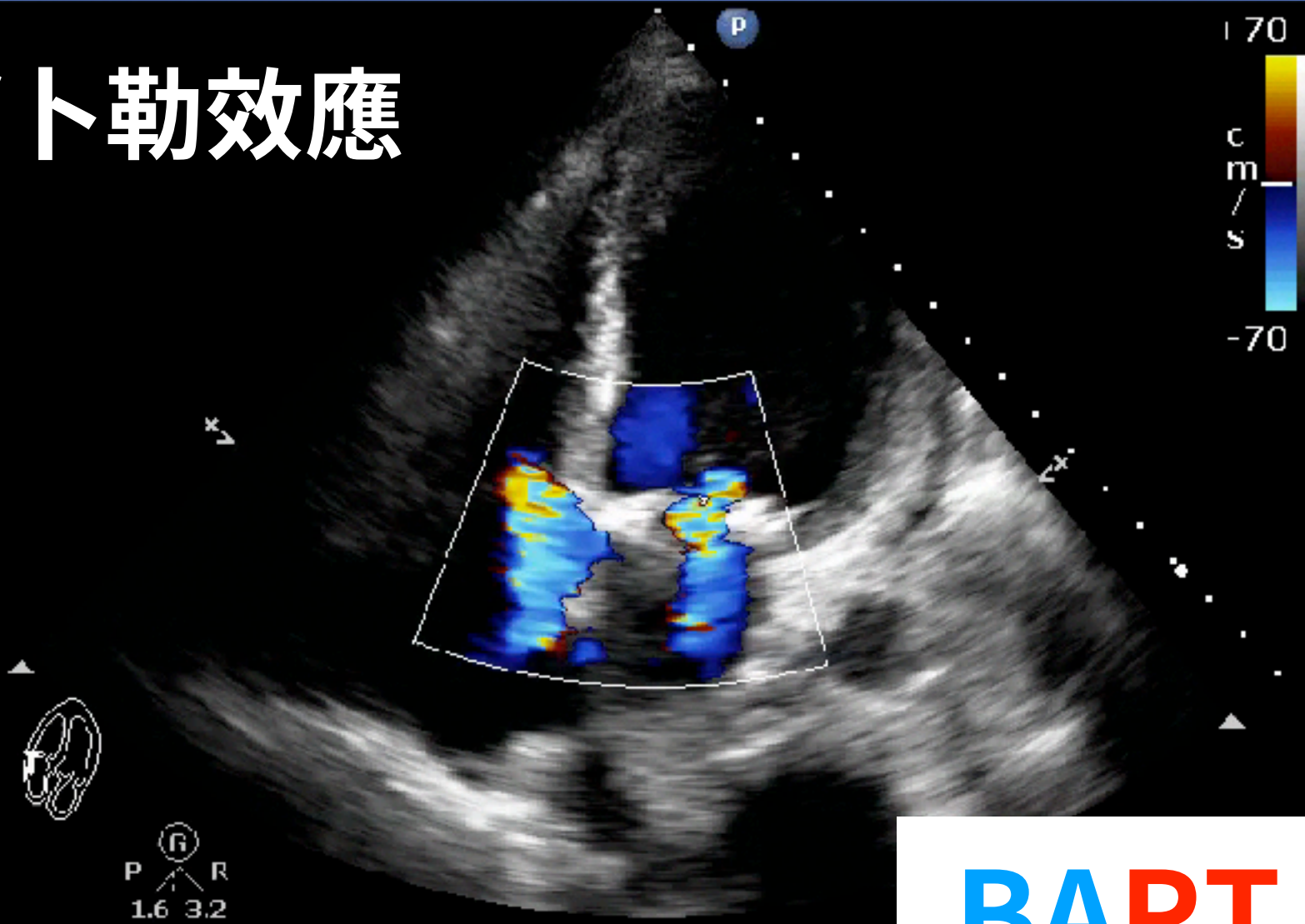
4/5/0

Fltr High

70



-70



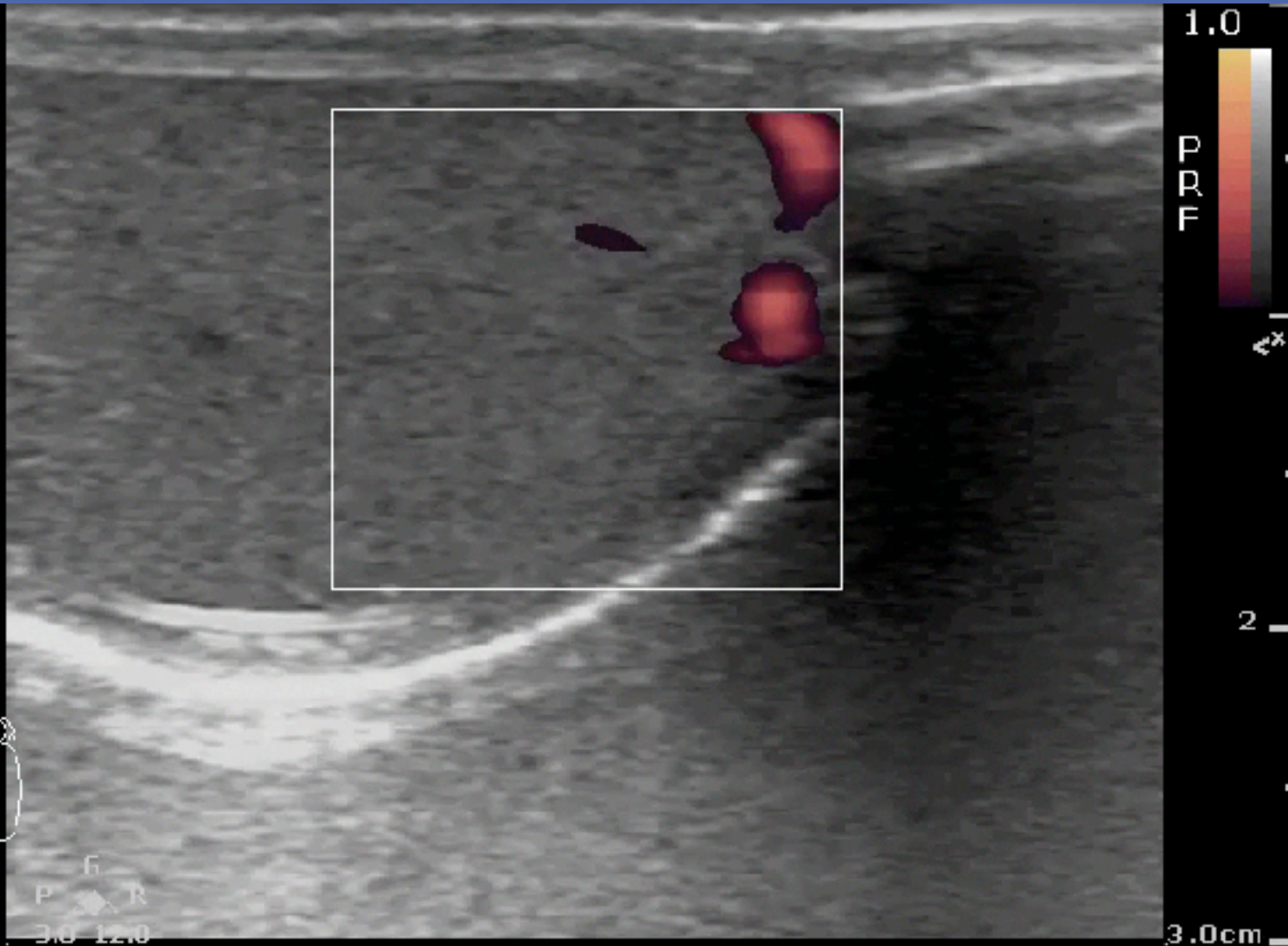
BART

Power Doppler for Low Flow

Superficial
L12-3
42 Hz
3.0cm

2D
Gen
Gn 100
C. 57
4/3/2

CPA
5.0 MHz
Gn 57
1/5/4
Filtr Med
BasIn 3



影像品質如何？要改善嗎？



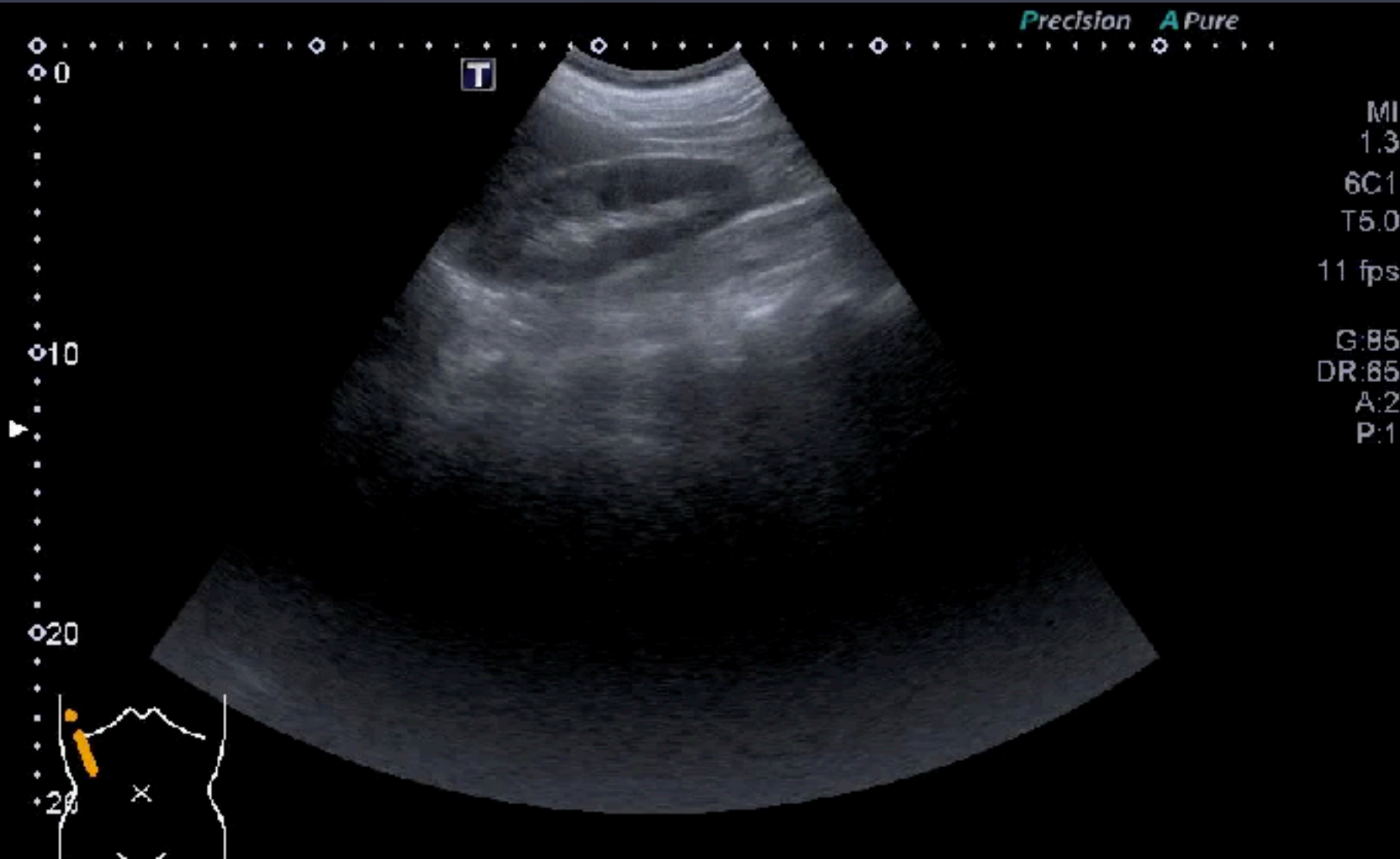
影片中做了什麼調整？



影片中做了什麼調整？



這段影片需要調整嗎？



POCUS幫你練就透視眼

