AGENDA

- Physics of 2D Echocardiography
- Practical Issues
- Standard 2D Views
- Basic Concepts
PHYSICS | Acoustic Waves

PHYSICS | Ultrasound Waves

- **Low Pitch**: 20 Hz
- **High Pitch**: 20,000 Hz (20 kHz)

The range of human hearing is shown, with ultrasound frequencies above 20,000 Hz.
PHYSICS | Echo

- Source/Generator
- Transmitting medium
- Reflecting interface
- Receiving end

PHYSICS | Source/Probe

- metal outer casing
- backing block
- electrodes apply an alternating potential difference
- piezoelectric crystal
- plastic ‘nose’
- power cable
- acoustic insulator
The piezoelectric element vibrates to generate a sound wave when applied with a voltage.

The piezoelectric element generates a voltage when applied with vibration (an ultrasonic wave).
PHYSICS | Image Formation

- Acoustic Impedance
- Incident Beam Angle
- Distance from Probe

→ Amplitude (Echogenicity)
→ Time (Depth)

---

PHYSICS | Image Formation

- P
- a
- b
- c
PHYSICS | Image Formation

PRACTICAL ISSUES | Transducer
PRACTICAL ISSUES | Transducer

PRACTICAL ISSUES | Depth
PRACTICAL ISSUES | Gain

PRACTICAL ISSUES | Gain (TGC)
PRACTICAL ISSUES | Transducer Manipulation

Sliding

PRACTICAL ISSUES | Transducer Manipulation

Rocking
PRACTICAL ISSUES | Transducer Manipulation

- Tilting
- Rotation
PRACTICAL ISSUES | Transducer Manipulation

STANDARD VIEWS | Importance

- Examination of cardiac anatomy and geometry
- Surrogate for hemodynamic and functional data
- Detection of pathology
- Window for other echo modalities
STANADARD VIEWS | Acoustic Windows

1. Parasternal
2. Apical
3. Subcostal
4. Suprasternal Notch

STANADARD VIEWS | Scheme

- Where to put probe
- How to put probe
- Plane of scanning
- What does it look like
- Scanned structures
- Subsidiary views
PLAX VIEW | What is Plane of Scanning

PLAX VIEW | What does it Look Like
PLAX VIEW | What are Scanned Structures

PLAX VIEW | RV Inflow View
PLAX VIEW | RV Outflow View

PSAX VIEW | Where to Put Probe
PSAX VIEW  |  How to Put Probe

PSAX VIEW  |  What is Plane of Scanning
PSAX VIEW | Scanned Planes and Structures

Apical

PSAX VIEW | Aortic Valve Level
PSAX VIEW | Mid-ventricular Level

APICAL 4C | Where to Put Probe
APICAL 4C | How to Put Probe

APICAL 4C | What is Plane of Scanning
APICAL 4C | What does it Look Like

APICAL 4C | What are Scanned Structures
APICAL 4C | Apical 5C View

APICAL 2C | Where to Put Probe
APICAL 2C | How to Put Probe

APICAL 2C | What is Plane of Scanning
APICAL 2C  What does it Look Like

APICAL 2C  What are Scanned Structures
APICAL 2C  |  Apical Long Axis View

SUBCOSTAL VIEW  |  Where to Put Probe
SUBCOSTAL VIEW  |  How to Put Probe

SUBCOSTAL VIEW  |  What is Plane of Scanning
SUBCOSTAL VIEW | What does it Look Like

SUBCOSTAL VIEW | What are Scanned Structures
SUBCOSTAL VIEW | IVC View

[Image of subcostal view]

SUBCOSTAL VIEW | IVC View

[Image of IVC view]
SUPRASTERNAL VIEW | Scanned Structures

BASIC CONCEPTS | Be Knowledgeable

- Physics
- Anatomy
- Optimal Views
- Physiology
- Pathology
BASIC CONCEPTS  |  Be Knowledgeable

Physics

Anatomy

Chiari Network  Eustachian Valve  Moderator Band
BASIC CONCEPTS  |  Be Knowledgeable

Optimal Views

Physiology
BASIC CONCEPTS  □ Be Knowledgeable

Pathology

BASIC CONCEPTS  □ Address Limitations

- Limited Acoustic window
- It is not a true visualization of the heart
- It is examining a 3D organ
- It should be integrated with clinical, hemodynamic, and even other imaging modalities
Hey, yo! Great scenery!

Hey, yo!

GREAT SCENERY!

Echo Tourism