DISCLAIMER:
Video will be taken at this clinic and potentially used in Project ECHO promotional materials. By attending this clinic, you consent to have your photo taken and allow Project ECHO to use this photo and/or video. If you don’t want your photo taken, please let us know. Thank you!

ECHO Nevada emphasizes patient privacy and asks participants to not share ANY Protected Health Information during ECHO clinics.
Basic Images in a Transthoracic Echocardiogram and Diastolic Function

Ivan Anderson, MD
Cardiologist, RIHVVH
Echo Images

Suprasternal

R. Parasternal

L. Parasternal

R. Apical

L. Apical

Subcostal
Parasternal Long Axis

RVOT

AoV

LV

LA

Parasternal Long Axis
PLAX
Parasternal Long Axis
GROOVE (STERNUM) 9-10 O’CLOCK

RV
LV
LA
Ao
Ant
Inf
Sup
Post
Parasternal Long
Right Ventricular Inflow View

Angle Medially and Rotate Clockwise slightly
Parasternal Short Axis

RV

IVS

LV

Parasternal Short Axis
PSAX LV
Parasternal Short Axis Mid Level
GROOVE (AXILA) 1-2 O’CLOCK
ANGLE POSTERIORLY

RV
LV
PM
PSAX MV
Parasternal
Short Axis
Basal Level

Groove (Axila) 1-2 O’Clock
Neutral

RV
LV
PSAX AO

Parasternal
Short Axis

GROOVE (AXILA) 1-2 O’CLOCK

ANGLE ANTERIORLY

TV

RVOT

RA

PV

LPA

SVC

AV

RPA
AP4
Apical
4 Chamber
GROOVE (AXILA) 2-4 O'CLOCK

RV
LV
TV
MV
RA
SVC

Inf-Ant
R L
Sup-Post
AP5
Apex
LVOT View
GROOVE (AXILA-ANGLE ANTERIORLY) 2-4 O'CLOCK

RV
TV
RA
Ao
LV
LA
MV
AP3/AP Long Axis View

LV

AoV

LA

AP3/AP Long Axis View
SUBCOSTAL
Subcostal LVOT View

GROOVE (LEFT LATERAL) 3-5 O’CLOCK

TV
Interatrial Septum
RV
RA

To visualize IVC: Push in, rotate posteriorly and counter-clockwise (groove 1-2 o’clock)

LV
LAA
Ao
Parasternal Long Axis

RV

AoV

LV

CS

AO

LA

Parasternal Long Axis
Questions/Comments?
Active relaxation

Restoring forces

Lengthening load
Early Atrial Filling (E wave)

Late Atrial Filling from atrial contraction (A wave)
E = Early Atrial Filling
A = Active filling (from left atrial contraction)
## Echocardiographic Classification of Diastolic Dysfunction

<table>
<thead>
<tr>
<th>Stage I: Impaired Relaxation</th>
<th>Stage II: Pseudonormal</th>
<th>Stage III: Reversible Restrictive</th>
<th>Stage IV: Fixed Restrictive</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75 &lt; E/A &lt; 1.5 DT &gt; 140 ms</td>
<td>E/A ≤ 0.75 DT &gt; 140 ms</td>
<td>E/A &gt; 1.5 DT ≤ 140 ms</td>
<td>E/A &gt; 1.5 DT &lt; 140 ms</td>
</tr>
</tbody>
</table>

### Mitral Inflow

- **Normal Diastolic Function**
- **Stage I: Impaired Relaxation**
- **Stage II: Pseudonormal**
- **Stage III: Reversible Restrictive**
- **Stage IV: Fixed Restrictive**

### Mitral Inflow at Peak Valsalva Maneuver

- ΔE/A < 0.5
- ΔE/A ≥ 0.5

### Pulmonary Venous Flow

- S ≥ D ARdur < Adur
- S > D ARdur < Adur
- ΔE/A < 0.5
- ΔE/A ≥ 0.5

### Color M-Mode Propagation Velocity

- Vp > 45
- Vp < 45

### Doppler Tissue Imaging of Mitral Annular Motion

- E/Ea < 10
- E/Ea ≥ 10

### LV Relaxation
- Normal
- Impaired

### LV Compliance
- Normal
- Normal to ↓

### Atrial Pressure
- Normal
- ↑↑
In patients with normal LV EF:

1. Average E/e' > 14
2. Septal e' velocity < 7 cm/s or Lateral e' velocity < 10 cm/s
3. TR velocity > 2.8 m/s
4. LA volume index > 34 ml/m²

- <50% positive: Normal Diastolic function
- 50% positive: Indeterminate
- >50% positive: Diastolic Dysfunction