

PHYSICAL EXAMINATION: CARDIOVASCULAR SYSTEM

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PHYSICAL EXAMINATION: CARDIOVASCULAR SYSTEM

- **Arterial pulse**
- **Jugular Venous Pressure**
- **Cardiac Examination:**
 - **Inspection**
 - **Palpation**
 - **Auscultation**

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Arterial pulse

Radial artery



Arterial pulse

Radial artery

- **Heart rate:** (60-100).

- **Rhythm:** **Regular**

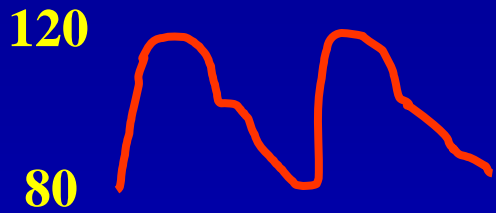
Irregular: Respiration

Early beats

Totally irregular

Arterial pulse

Carotid artery

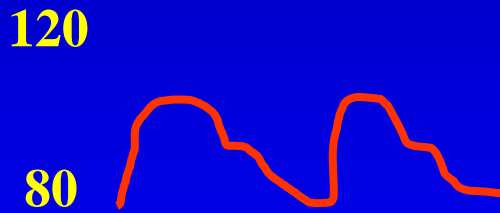


Amplitude/Contour:

- **Hypokinetic** ↓ (weak) - Hypovolemia

Heart failure

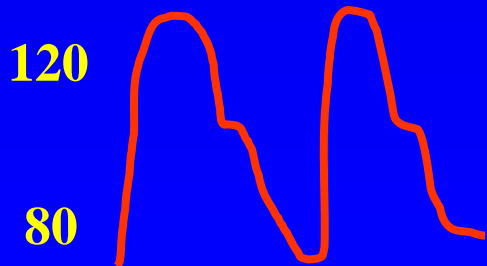
Aortic stenosis.



- **Hyperkinetic** ↑ increased stroke volume

Fever, Anemia, Hyperthyroidism

AR, Bradycardia, Atherosclerosis



Arterial pulse: Carotid artery

Amplitude/Contour:

- **Bisferiens** - AR, Hocm
- **Alternans** - Heart failure
- **Bigeminal** - Premature beats
- **Paradoxical** - Pericardial tamponade
- Constrictive pericarditis
- **Dicrotic** - Cardiomyopathy

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Jugular Venous Pressure:



Jugular Venous Pressure:



Jugular Venous Pressure:

Patient at 30 degrees and oblique lighting

Differentiation from arterial pressure:

- **Two elevations**
- **Eliminated with pressure**
- **Descends with respiration**
- **Changes with position**

Jugular Venous Pressure:

- **Estimate CVP:**

Maximal 3cm from sternal angle

+ 5cm from atrium (Right atrium Pressure)

- **Increased pressure:**

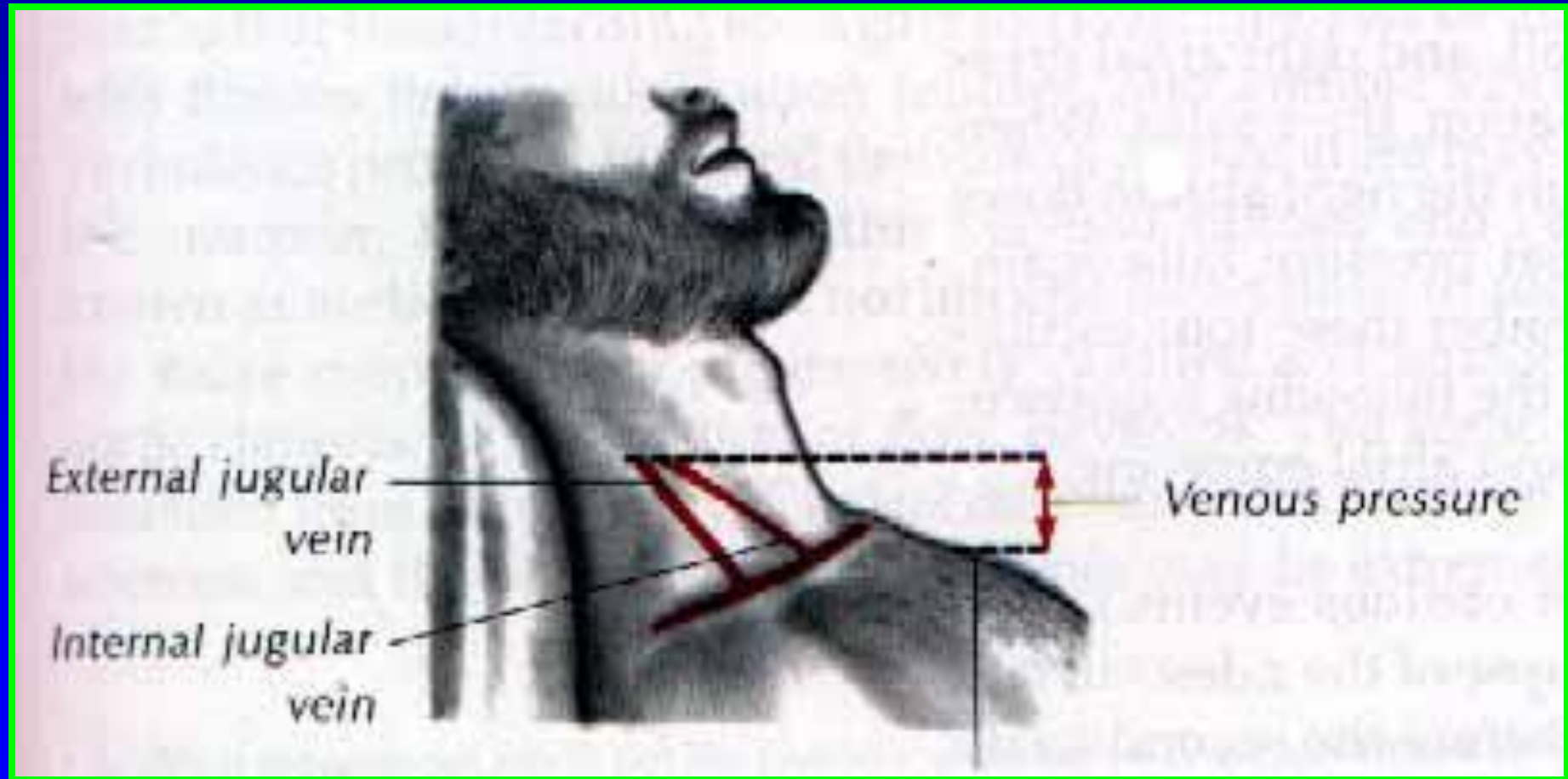
Right side heart failure

Constrictive pericarditis

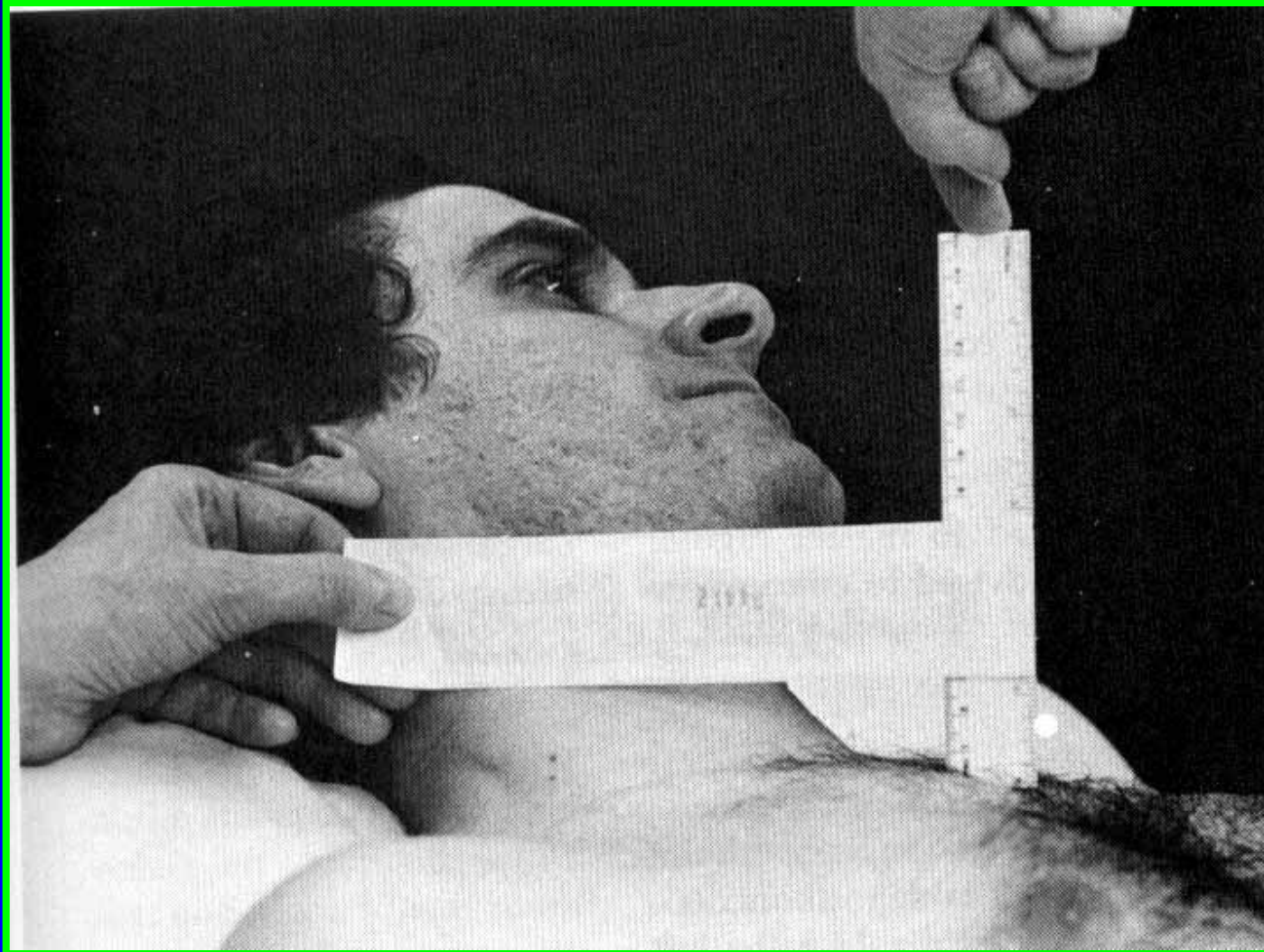
Tricuspid Stenosis

Obstructed SVC

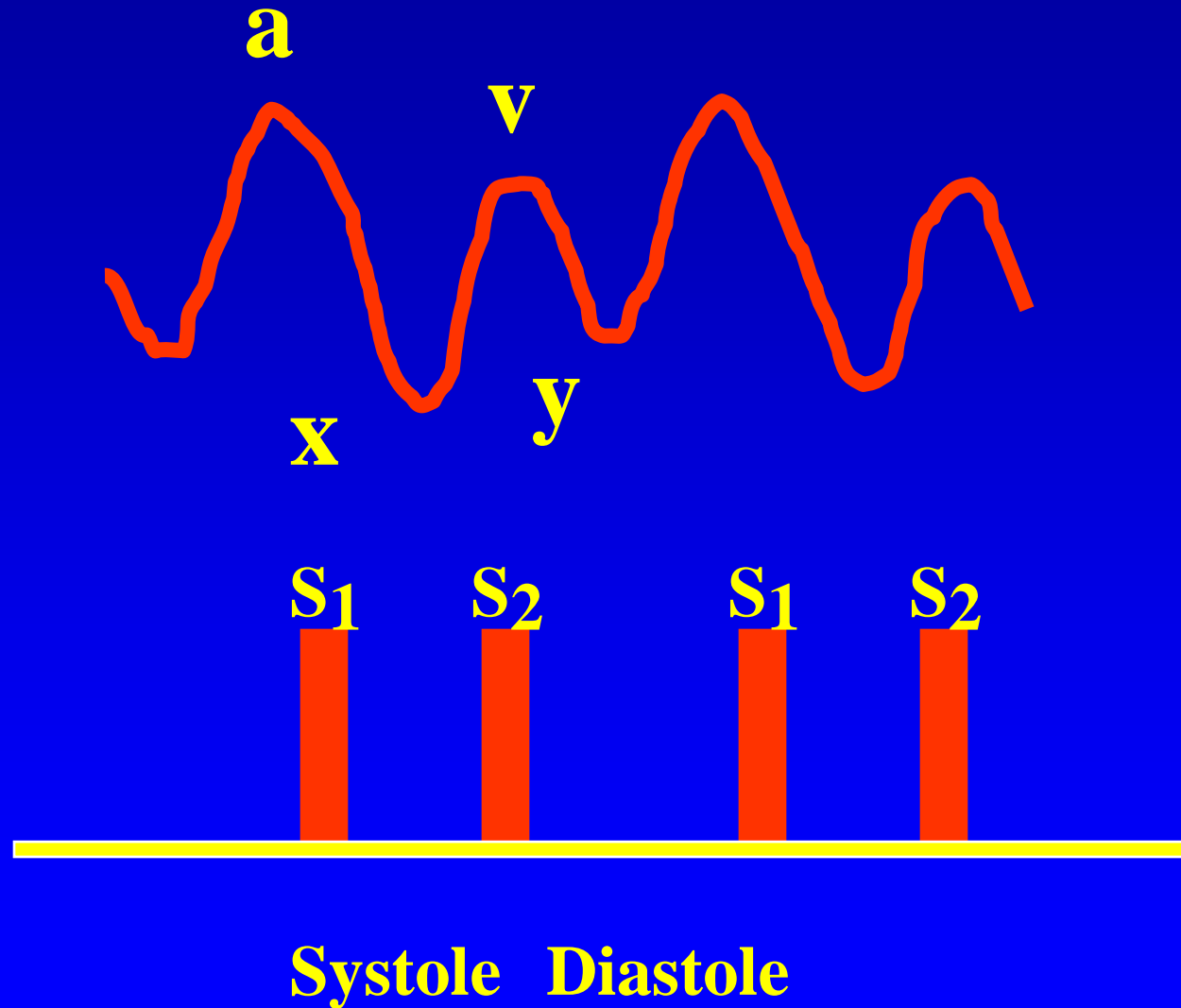
Jugular Venous Pressure:



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Jugular Venous Pressure:



Jugular Venous Pressure:

- **Amplitude of pulsation's:**

a wave, x descent, v wave, y descent

Atrial contraction, relaxation, atrial filling, emptying

- **Absent a wave** - atrial fibrillation
- **Giant a wave** - Tricuspid Stenosis, PHT.
- **Cannon a waves** - AV dissociation
- **Large v wave** - Tricuspid regurgitation.

Jugular Venous Pressure:

- **Hepatojugular reflux** - **Sustained rise of JVP**
Heart failure.
- **Kussmaul sign** - **Increase with inspiration**
Constrictive pericarditis
Heart failure

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Cardiac Examination: Inspection



Cardiac Examination: Inspection

Cardiac pulsation's:

PMI

S3, S4

Dyskinesis

Aneurysm

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Cardiac Examination: Palpation

Areas of palpation:

- **Apical impulse (PMI)**
- **Left sternal border**
- **Left and right 2nd interspace**
- **Epigastric area**
- **Thrills**

Cardiac Examination: Palpation



- **Apical impulse (PMI)**

Cardiac Examination: Palpation



- **Apical impulse (PMI)**

Cardiac Examination: Palpation



- **Apical impulse (PMI)**

Cardiac Examination: Palpation

- **Apical impulse (PMI)** - Left ventricle.

Best felt while exhaling, left decubitus

Location: medial to midclavicular line, 4-5 interspace. **Displacement** - failure.

Diameter: 2cm. Enlarged - LVH, failure.

Amplitude: gentle tap. Increased - hyperkinetic states, pressure, volume overload

Duration: 2/3 systole. Sustained - LVH.

Cardiac Examination: Palpation



- **Left sternal border** - Right ventricle.

Cardiac Examination: Palpation

- **Left sternal border** - Right ventricle.

Location: 3-5th interspace

Amplitude, Duration - increased:

Right pressure overload (PS, PHT).

Cardiac Examination: Palpation

- **Left 2nd interspace** - Pulmonic: PHT
- **Right 2nd interspace** - Aortic: HTN
- **Epigastric area** -
 Right ventricle in Hyperinflated lungs
- **Thrills** - Murmurs grade 4+

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Cardiac Examination: Auscultation

Areas of auscultation:

- **Apex**
- **Left Sternal Border**
- **Aortic**
- **Pulmonic**

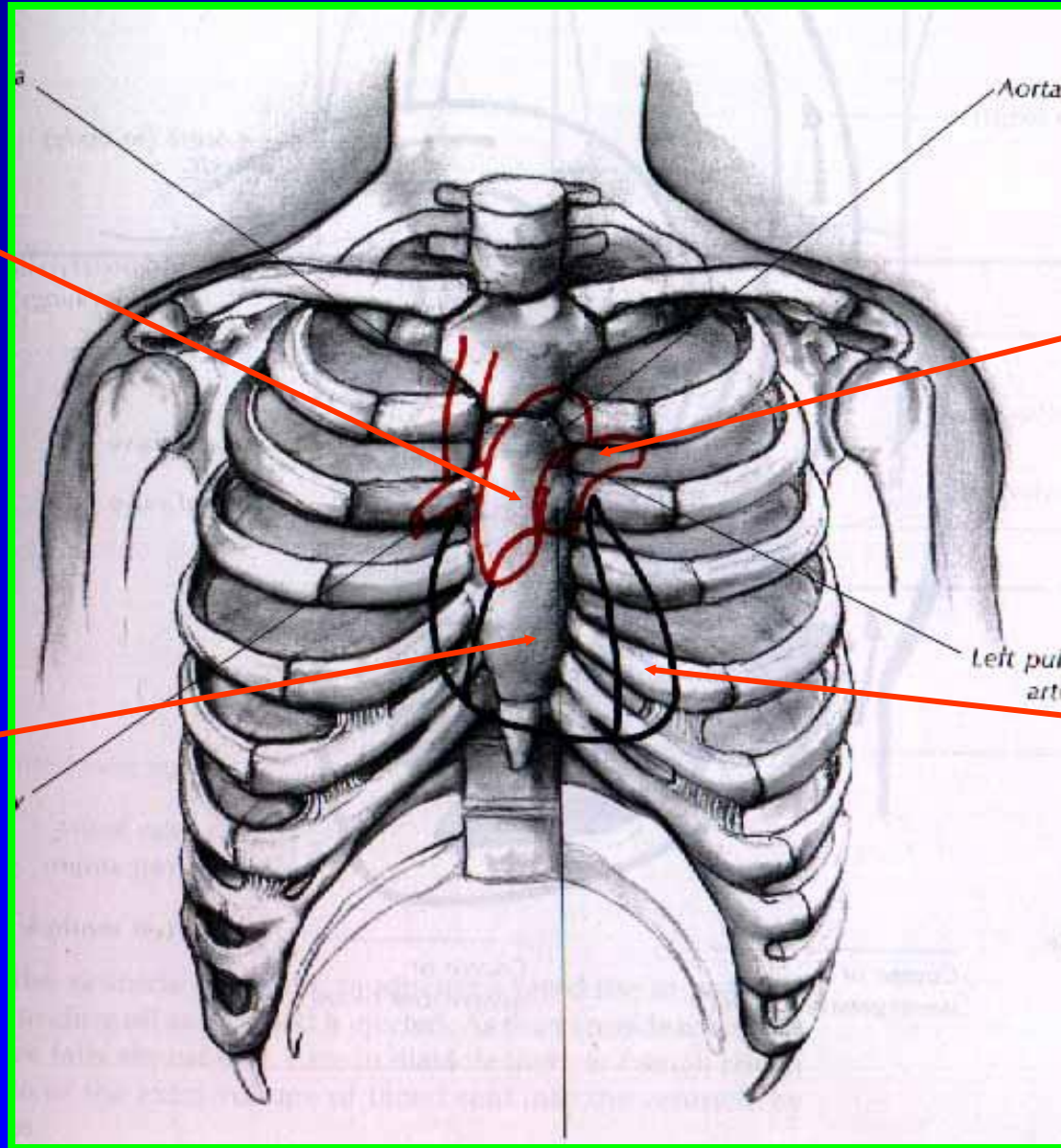
Areas of auscultation:

Aorta

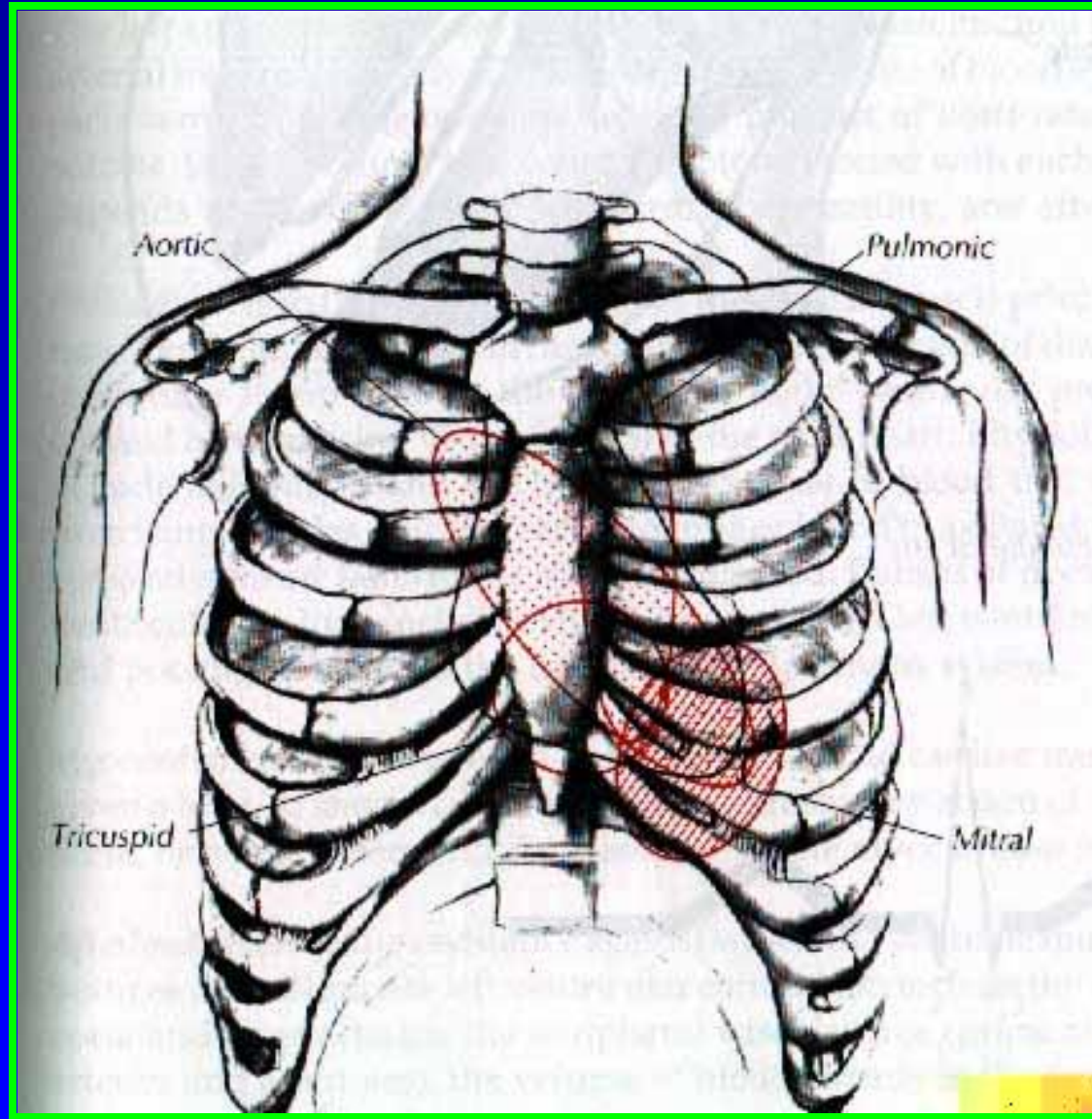
**Pulmonary
artery**

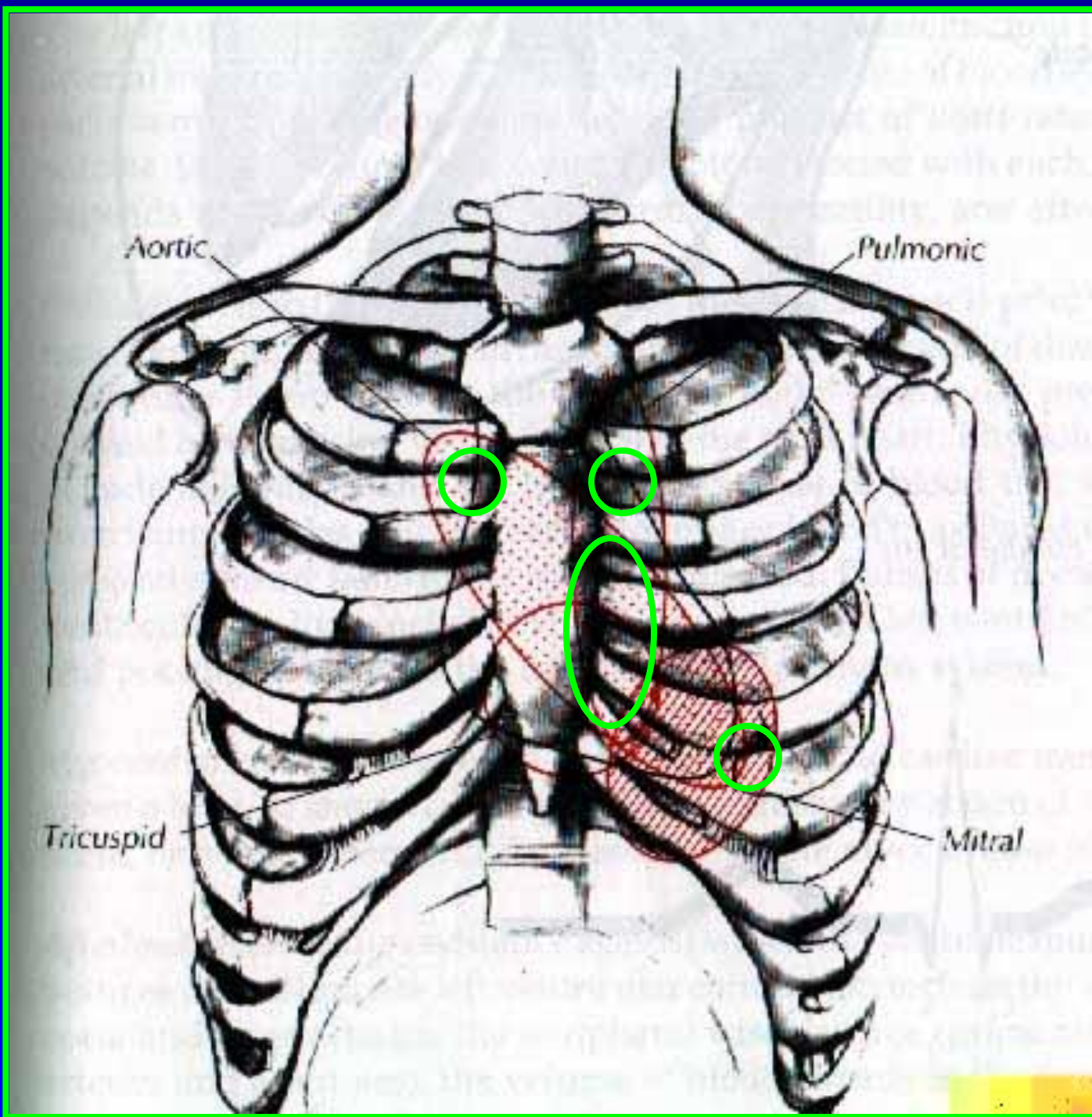
**Right
ventricle**

**Left
Ventricle**



Areas of auscultation:





Cardiac Examination: Auscultation



Areas of auscultation: **Apex**

Cardiac Examination: Auscultation



Areas of auscultation: **Left Sternal Border**

Cardiac Examination: Auscultation



Areas of auscultation: Aortic, Pulmonic

Cardiac Examination: Auscultation

Auscultation:

- **Diaphragm** (high pitched) - S1,S2,AR,MR,clicks,friction rubs.
- **Bell** (low pitched) - S3,S4,MS.

Position:

- **Left decubitus** - S3,S4,mitral sounds (MS).
- **Lean forward and exhale** - Aortic (AR).



Left Decubitus

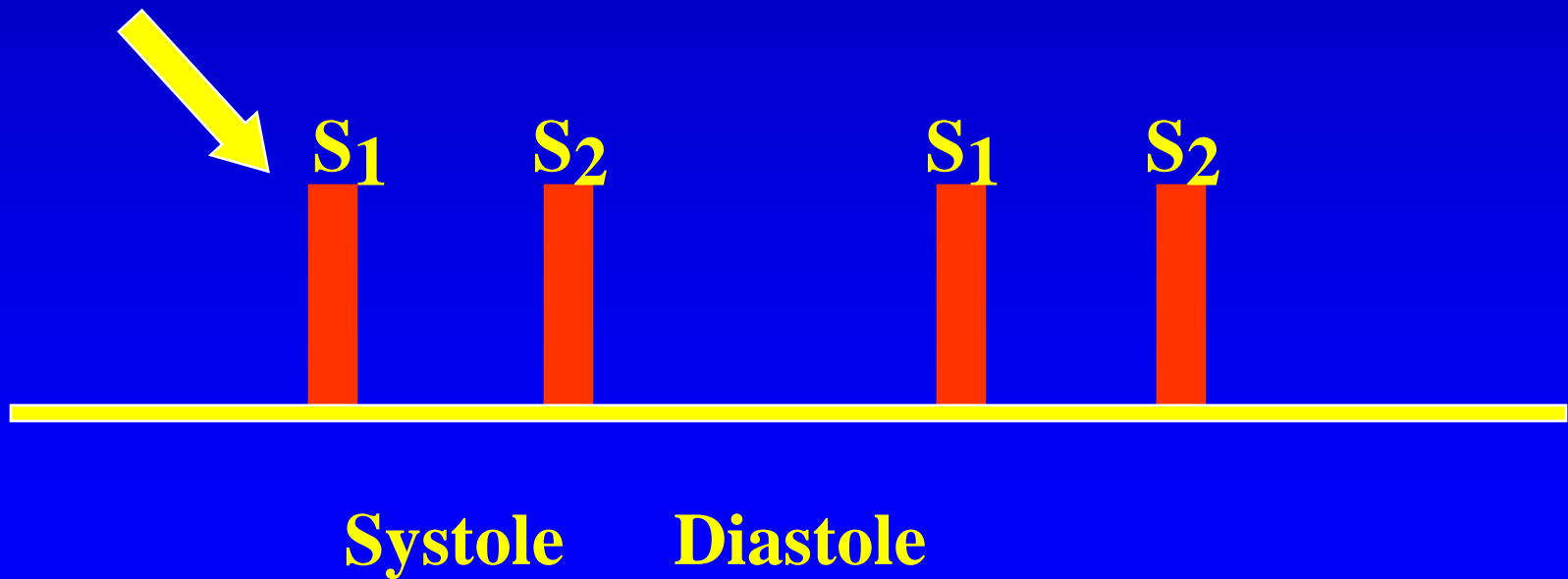


Lean forward and exhale

Cardiac Examination: Auscultation

- **First heart sound (S1):**

Closure of Mitral and Tricuspid valves



Cardiac Examination: Auscultation

- **First heart sound (S1):**

Intensity - Accentuated:

high cardiac output states, MS

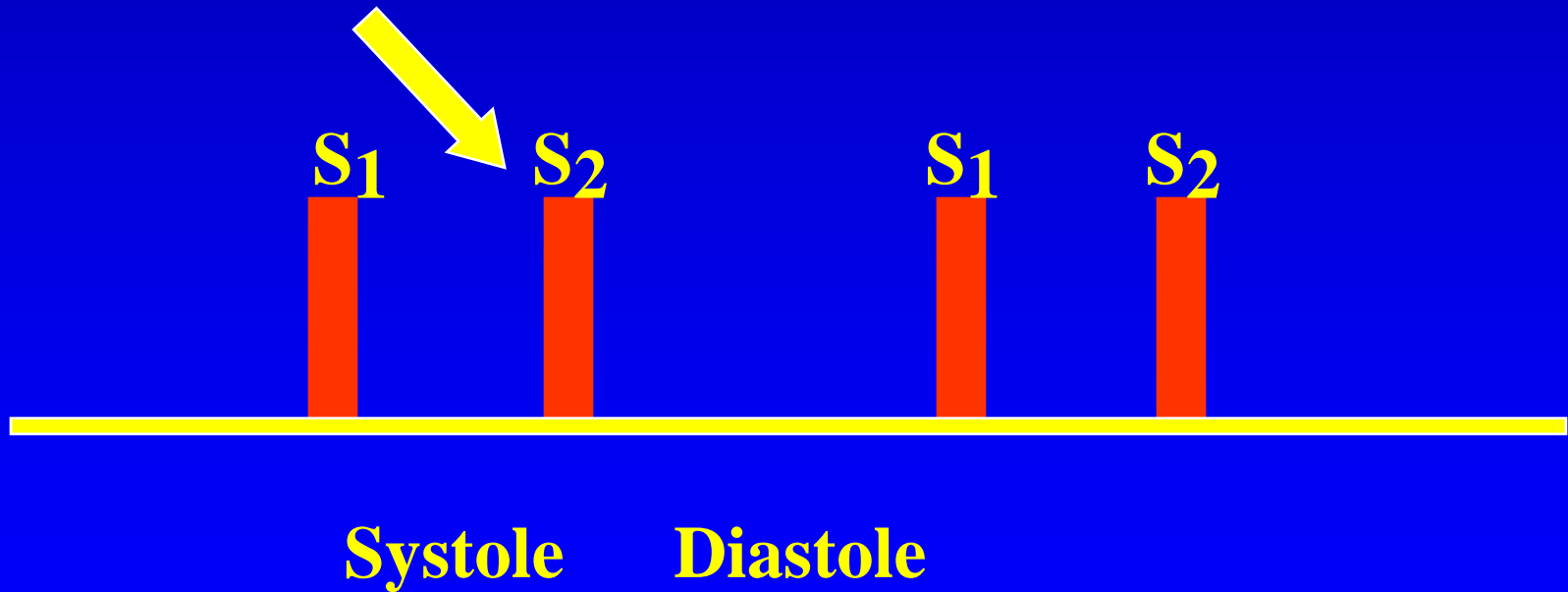
Diminished: 1st AVB, MR.

Splitting - RBBB, VPB's.

Cardiac Examination: Auscultation

- **Second heart sound (S2):**

Closure of Aortic and Pulmonic valves



Cardiac Examination: Auscultation

- **Second heart sound (S2):**

Intensity - **Increased:** hypertension, PHT (P2)

Decreased: AS, PS.

Splitting - physiological (P2)

disappears on expiration.

Wide splitting: PS, RBBB, MR

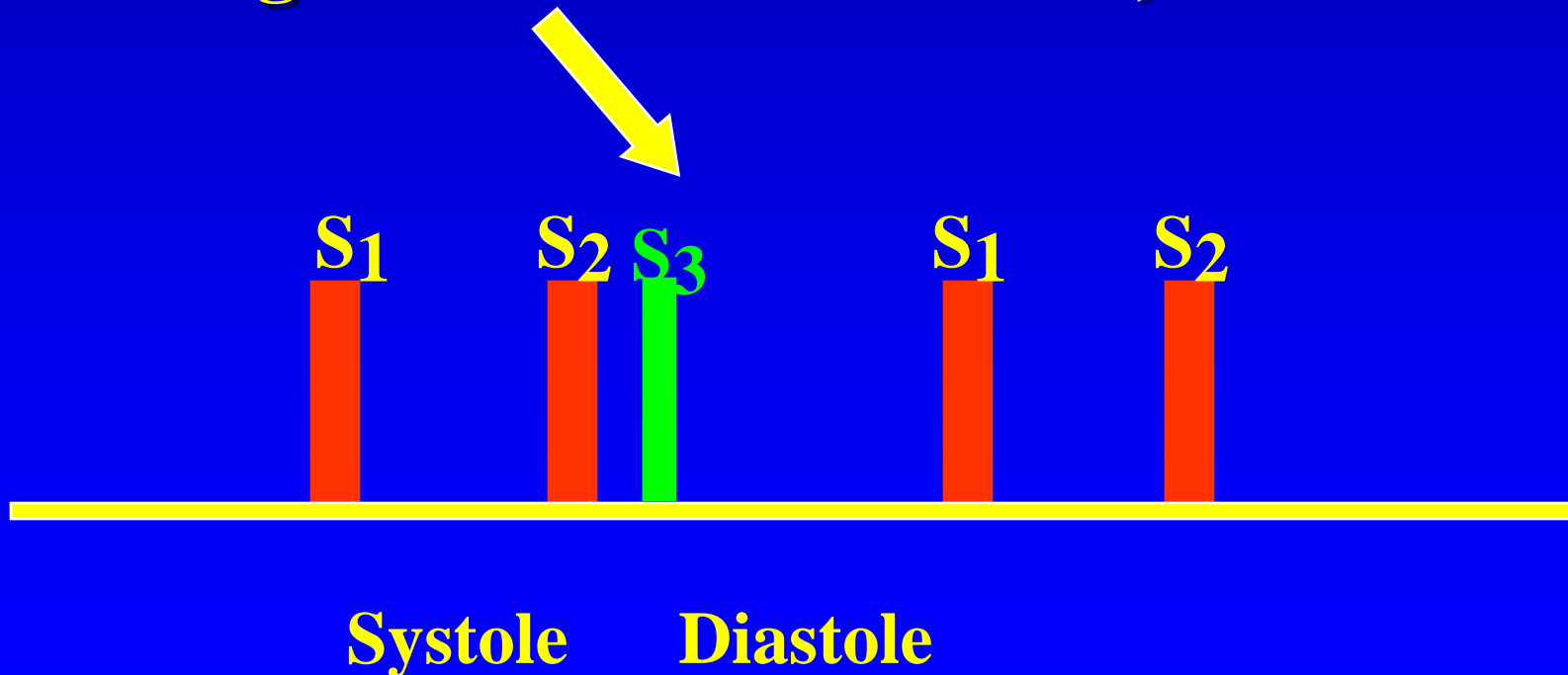
Fixed splitting: ASD, right failure

Paradoxical splitting: LBBB, AS, HOCM.

Cardiac Examination: Auscultation

Third heart sound (S3)

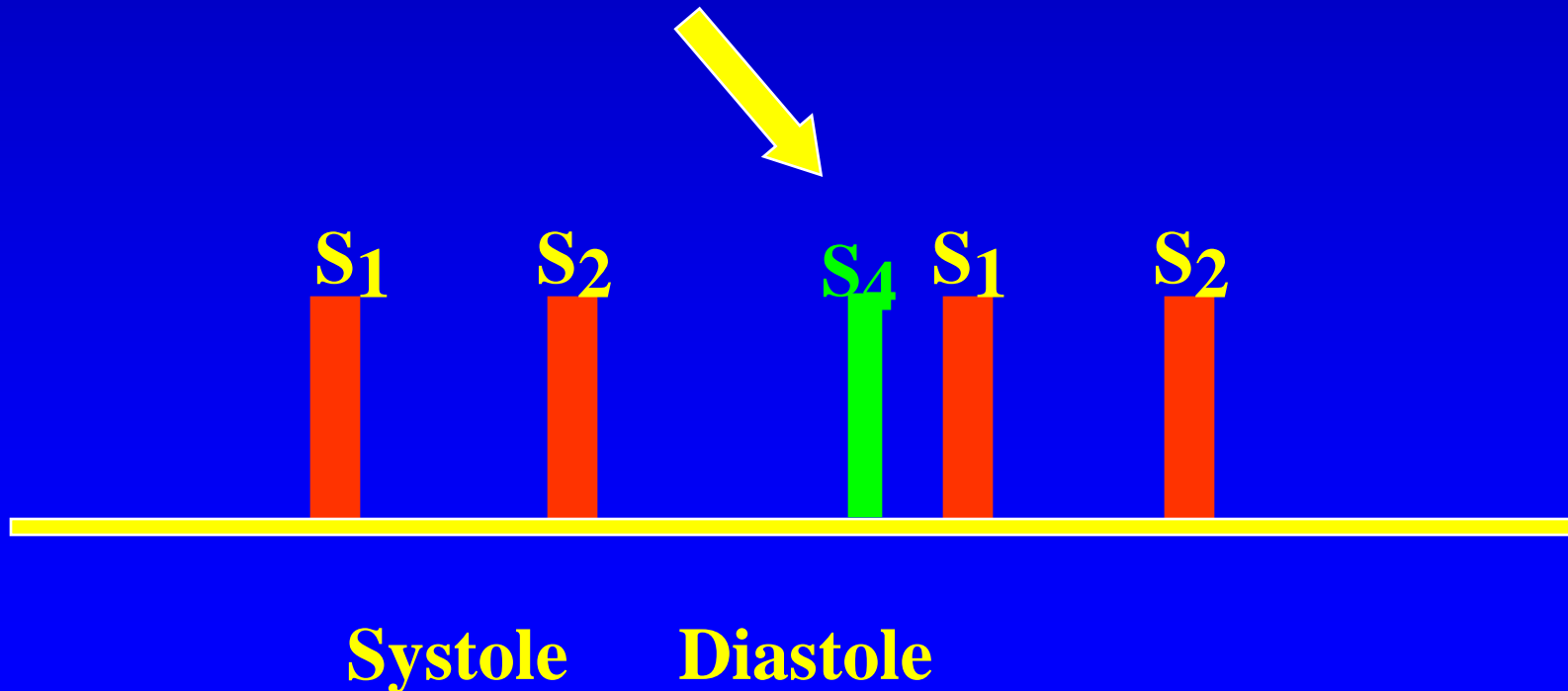
- **Physiological** in young people.
- **Pathological** in volume overload, heart failure.



Cardiac Examination: Auscultation

Fourth heart sound (S4)

- **Physiological** in athletes, older people.
- **Pathological** due to decreased compliance



Cardiac Examination: Auscultation

Fourth heart sound (S4)

- **Physiological** in athletes, older people.
- **Pathological** due to decreased compliance:
 - Pressure overload - HTN, AS
 - Ischemia, Cardiomyopathies
- **Right sided S4:** pressure overload
(PS, PHT)

Cardiac Examination: Auscultation

Extra systolic sounds:

- **Ejection sound:** Aortic Senosis
- **Midsystolic click:** Mitral Valve Prolapse

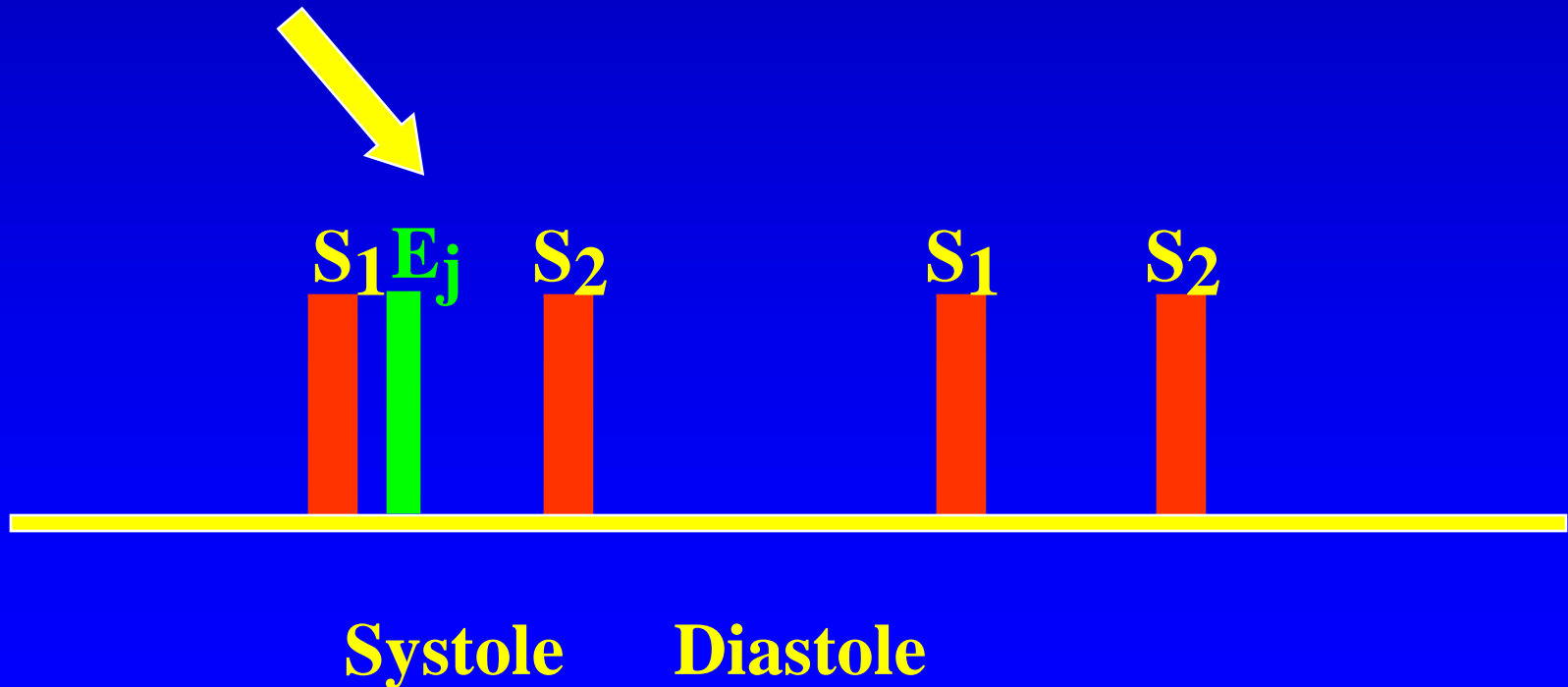
Extra diastolic sounds:

- **Opening snap:** Mitral Stenosis

Cardiac Examination: Auscultation

Extra systolic sounds:

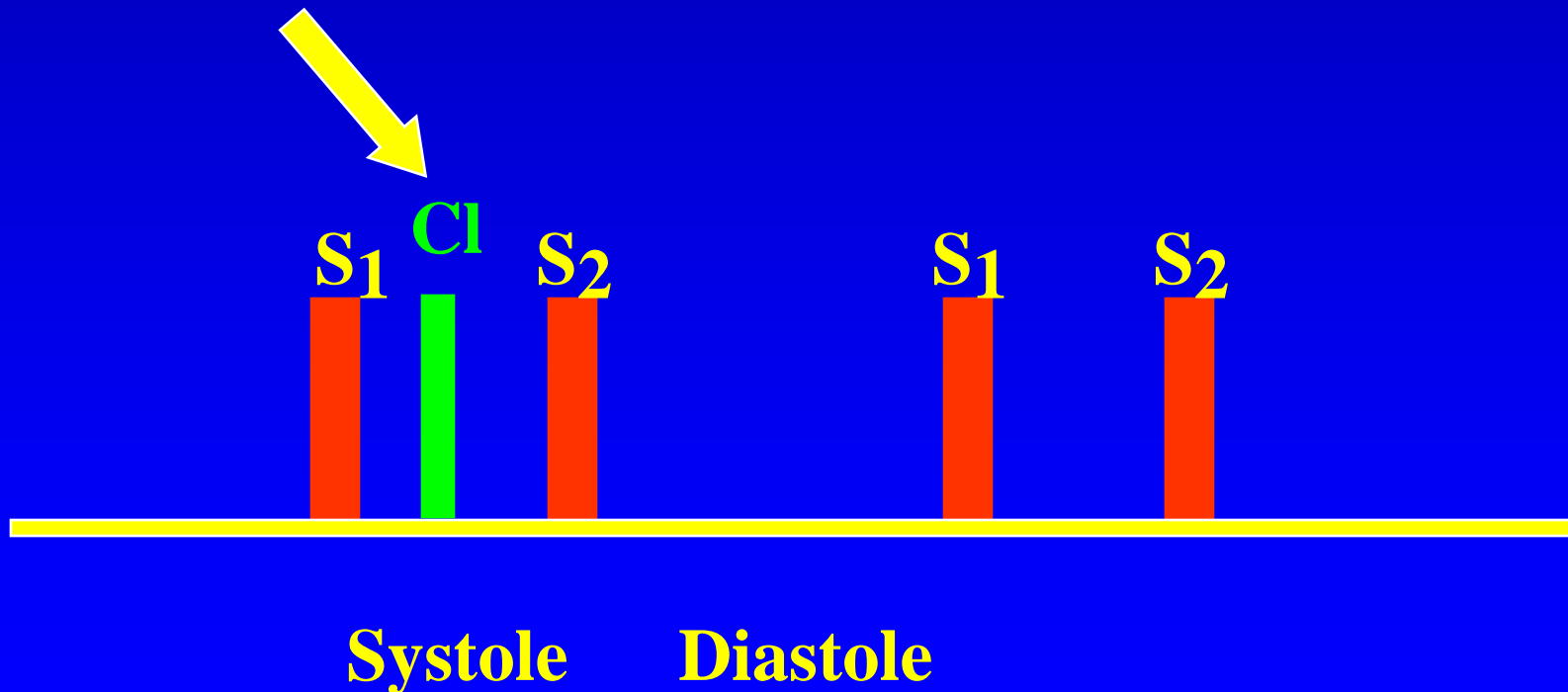
- **Ejection sound:** Aortic Stenosis



Cardiac Examination: Auscultation

Extra systolic sounds:

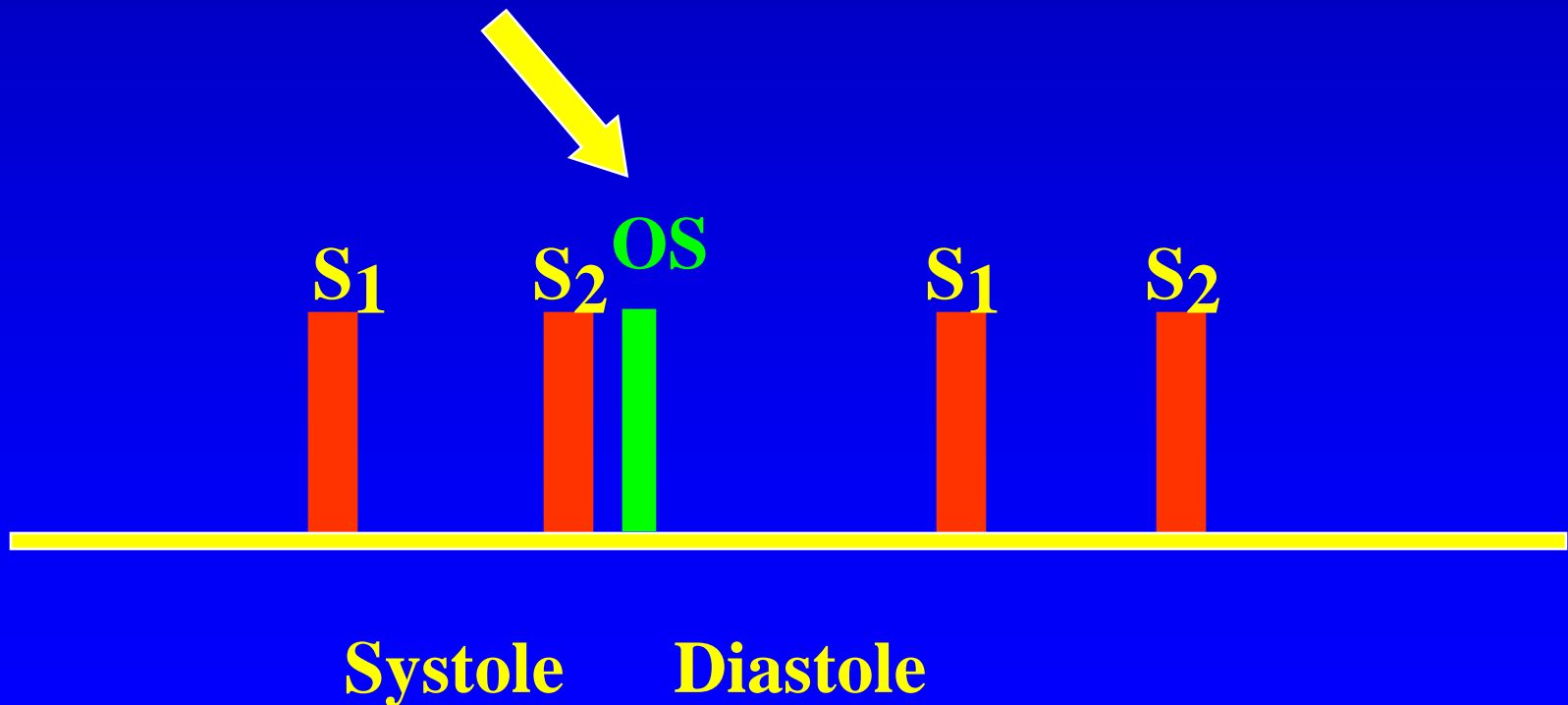
- **Midsystolic click:** Mitral Valve Prolapse



Cardiac Examination: Auscultation

Extra diastolic sounds:

- **Opening snap:** Mitral Stenosis



Cardiac Examination: Auscultation

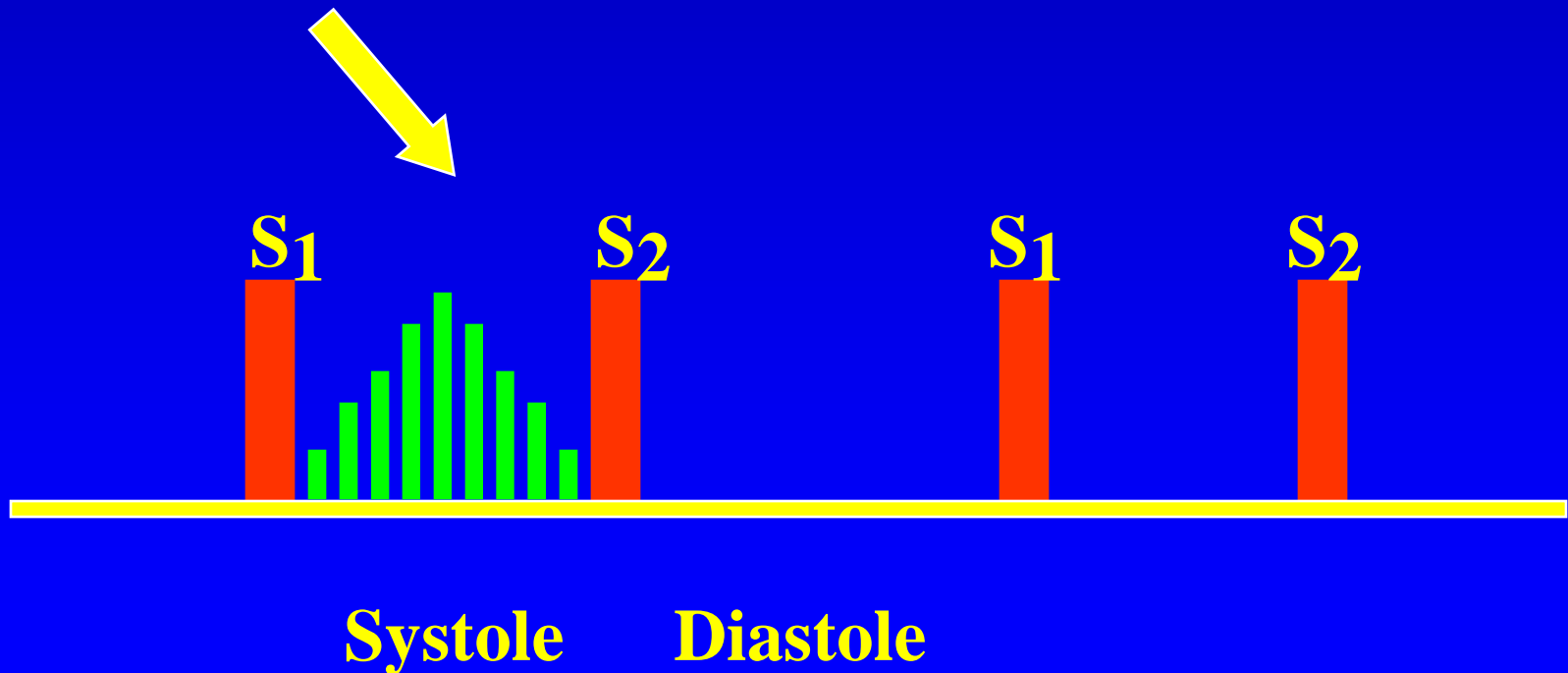
Murmurs:

- **Timing** - Systolic - (mid, pan)
Diastolic - (early, mid, late).
- **Shape** - crescendo, decrescendo, diamond, plateau.
- **Location**
- **Radiation** - Axilla, Throat
- **Intensity** (1 - 6).
- **Pitch**
- **Quality** - blowing, harsh, rumbling, musical

Cardiac Examination: Auscultation

Murmurs:

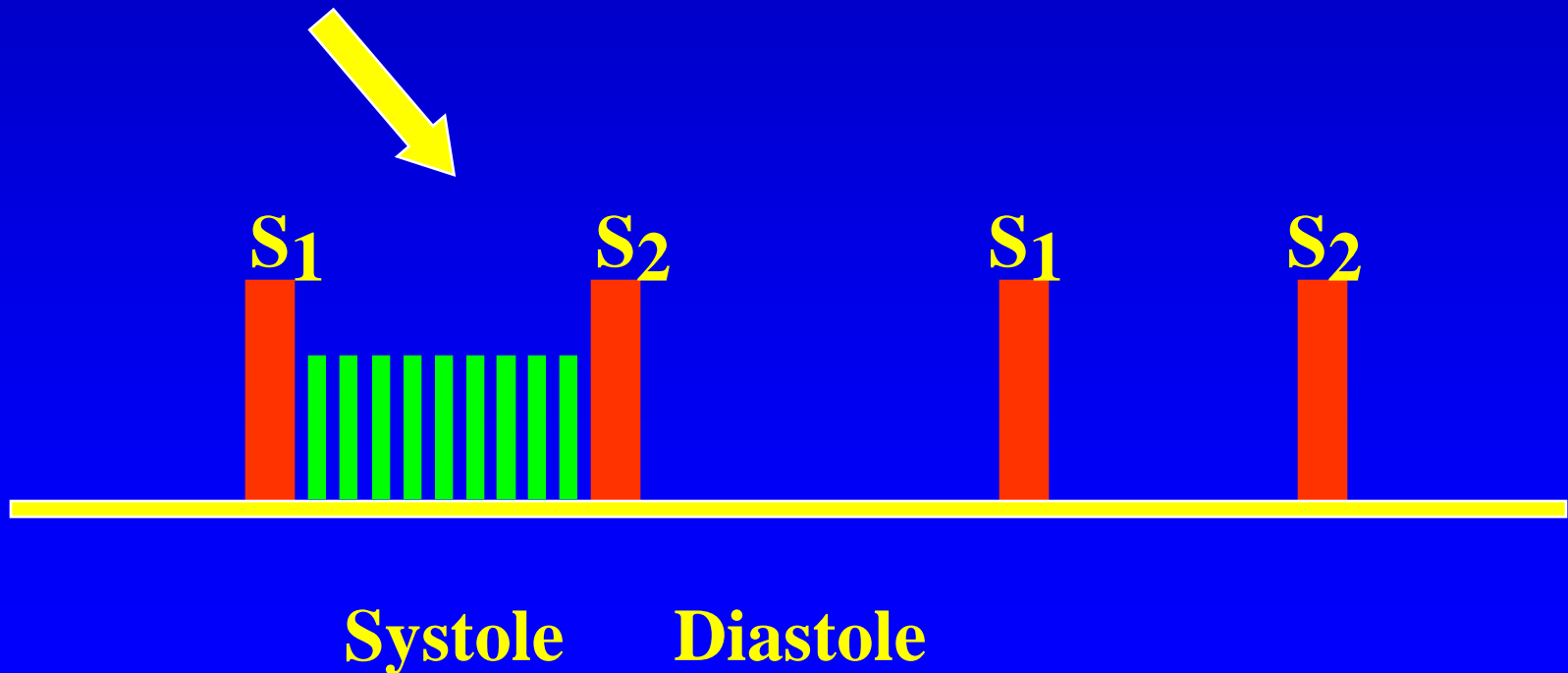
- **Mid-Systolic: Aortic, Pulmonic Stenosis**



Cardiac Examination: Auscultation

Murmurs:

- **Pansystolic: Mitral, Tricuspid Regurgitation, VSD**

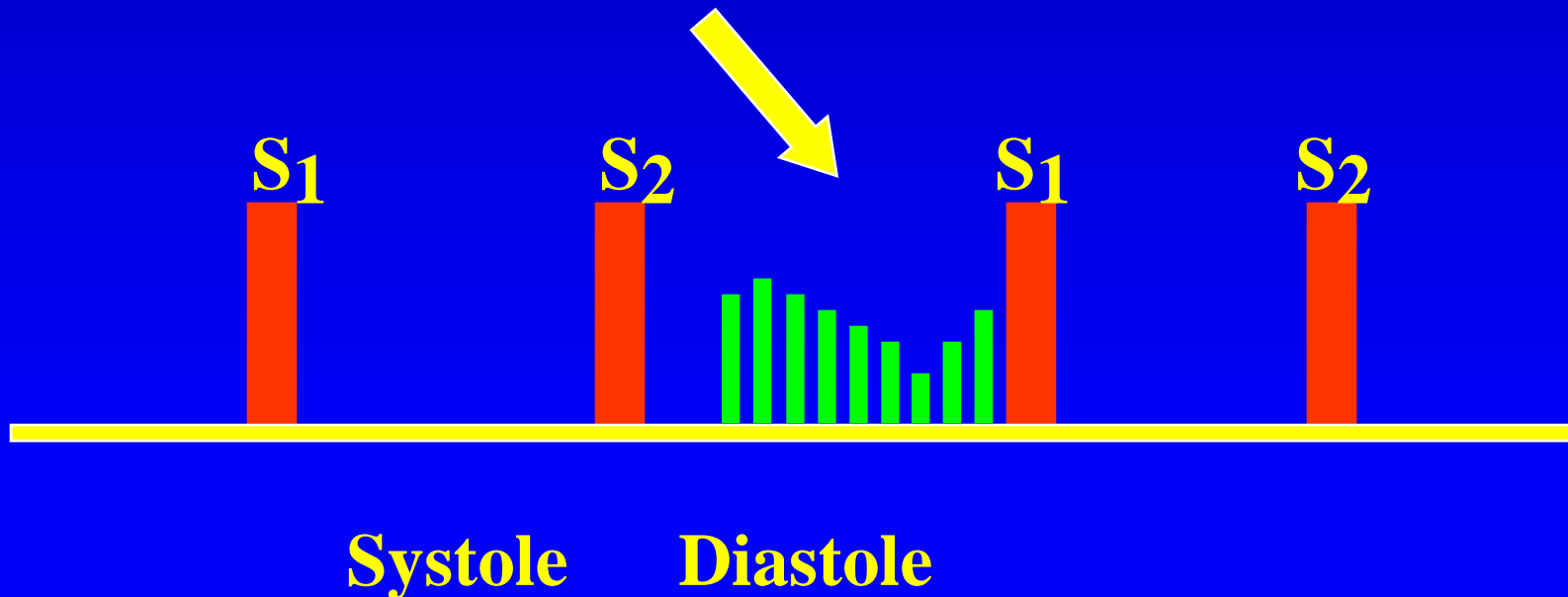


Cardiac Examination: Auscultation

Murmurs:

- Mid-diastolic+presystolic :

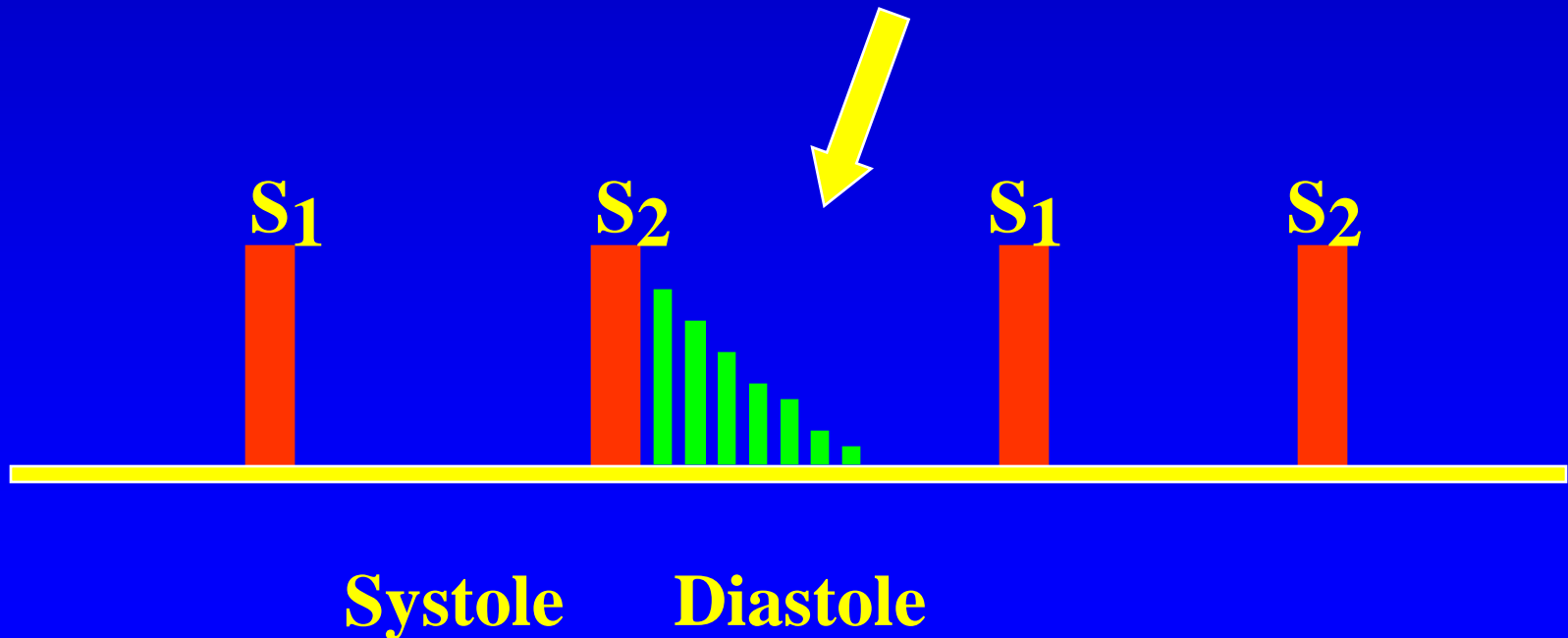
Mitral, Tricuspid Stenosis



Cardiac Examination: Auscultation

Murmurs:

- Early diastolic: Aortic Insufficiency



Cardiac Examination: Auscultation

Special maneuvers:

- **Squatting** -

venous return \uparrow , vascular resistance \uparrow - LV volume \uparrow

Murmurs of MVP \downarrow , HOCM \downarrow , AS \uparrow .

- **Valsalva, Standing**

The opposite effect.