

# THE DYNAMICS OF ELECTROCARDIOGRAPHY:

## BUNDLE BRANCH BLOCKS

Nancy L. Suazo RN, BS, CCRN

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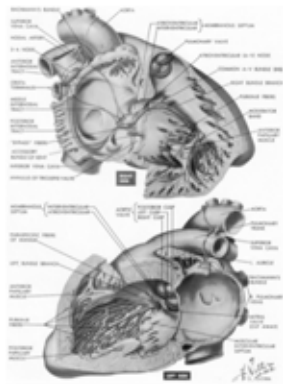
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### Anatomy of the conduction system:

- SA node
- Internodal pathways;
  - Bachmann's Bundle - ant
  - Wenckebach's tract - middle
  - Thorel's tract - posterior
- AV node
- Bundle of His
- RBBB, LBBB
- Purkinje fibers



Notes: P.

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### AV NODE:

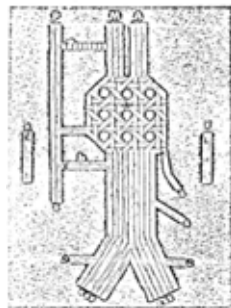
AV Delay: allow for atrial emptying / ventricular filling

Neuropraxia: collision, cancellation, interference in the labyrinth of the AV Node

Accessory pathways:

- Bundles of Kent - WPW
- Mahaim fibers - LGL

FIG. 3. Diagrammatic representation of the A-V node and its connections. P.M.A. = posterior, middle and anterior internodal pathways. K = bundle of Kent. S = Sigen tract. S = septal fibers of the hypan tract and the per-specific fibers of Mahaim. R.B.B. = right bundle branch. L.B.B. = left bundle branch.



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**THE 12 LEAD EKG: IN NSR**

- SET UP TO PRODUCE MAINLY POSITIVE WAVES
- ELECTRODES PLACED TO PRODUCE POSITIVE WAVES
- PEOPLE LIKE TO LOOK AT POSITIVE WAVES
- IN: I, II, III, AVL, AND AVF - MOST WAVES SHOULD BE +
- AVR SHOULD BE NEGATIVE

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Leads	Direction of electrical potential	View of heart	Waveform
<b>STANDARD LIMB LEADS (BIPOLAR)</b>			
I	Between left arm (positive) and right arm (negative)	Lateral wall	
II	Between left leg (positive) and right arm (negative)	Inferior wall	
III	Between left leg (positive) and left arm (negative)	Inferior wall	
<b>AUGMENTED LIMB LEADS (UNIPOLAR)</b>			
aVR	Right arm to heart	Provides no specific view	
aVL	Left arm to heart	Lateral wall	
aVF	Left foot to heart	Inferior wall	
<b>PRECORAL, OR CHEST LEADS (UNIPOLAR)</b>			
V <sub>1</sub>	Fourth intercostal space, right sternal border, to heart	Anteroseptal wall	
V <sub>2</sub>	Fourth intercostal space, left sternal border, to heart	Anteroseptal wall	
V <sub>3</sub>	Midway between V <sub>1</sub> and V <sub>2</sub> to heart	Anterior wall	
V <sub>4</sub>	Fifth intercostal space, mid-axillary line, to heart	Anterior wall	
V <sub>5</sub>	Fifth intercostal space, anterior axillary line, to heart	Lateral wall	
V <sub>6</sub>	Fifth intercostal space, mid-axillary line, to heart	Lateral wall	

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**SEQUENCE OF VENTRICULAR ACTIVATION**

- INITIAL VECTOR OF THE QRS IS:
  - IVS & RV
- TERMINAL VECTOR OF THE QRS IS:
  - ALL THE REST OF THE LV

LET'S LOOK AT LEAD I & V<sub>1</sub>

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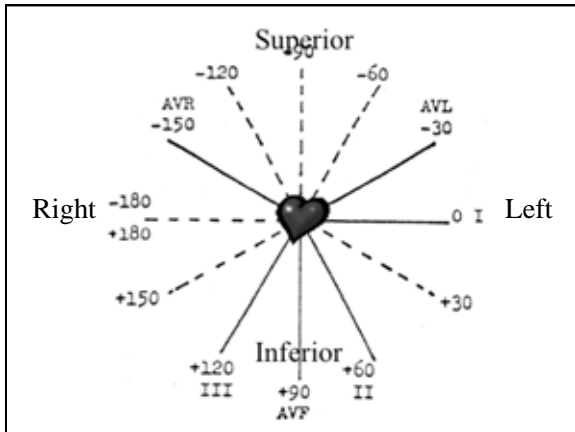
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### BUNDLE BRANCH BLOCKS

- CAUSES:
  - THE 3 "I's" – Ischemia, Injury, Infarction
  - Hypertrophic cardiomyopathy
  - RVH, LVH
  - Calcification
  - Fibrous / sclerosing disease
  - Drugs / electrolytes - potassium
  - Heart failure, acute PE, valve disease, trauma

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### BUNDLE BRANCH BLOCKS

- CHARACTERISTICS:
  - QRS duration: > 100 msec = IVCD
  - ICBBB > 100 < 120 msec
  - CBBB ≥ 120 msec
- ABNORMAL "R" wave in the lead which looks over the ventricle with the BBB;
- "T" wave inversion in the lead with the abnormal R wave
- ♦ V<sub>1</sub> – RBBB, V<sub>6</sub> – LBBB (I, AVL)

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## BUNDLE BRANCH BLOCKS

- RBBB CHARACTERISTICS:

It doesn't matter what Begins the QRS complex in lead  $V_1$  - Only what Ends the QRS

You will not always have an  $rSR^1$

“TERMINAL R” IN RBBB;

“T” wave inversion in  $V_1$  – RBBB,

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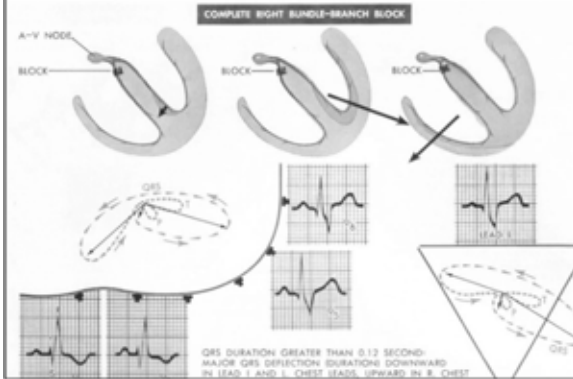
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## RBBB



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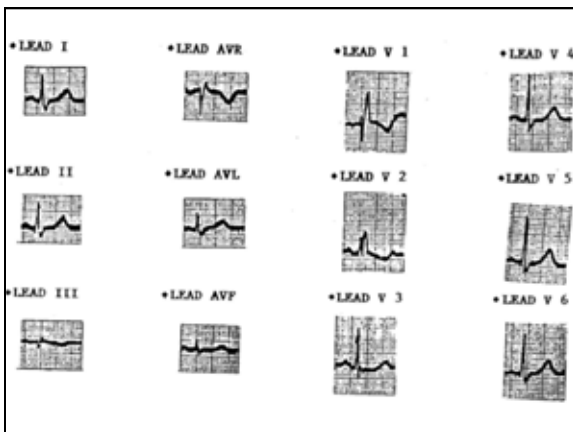
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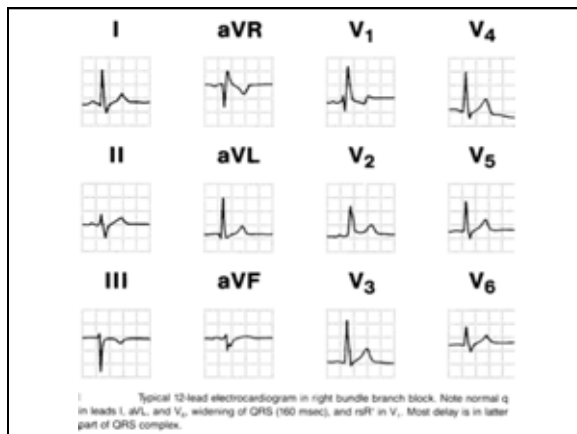
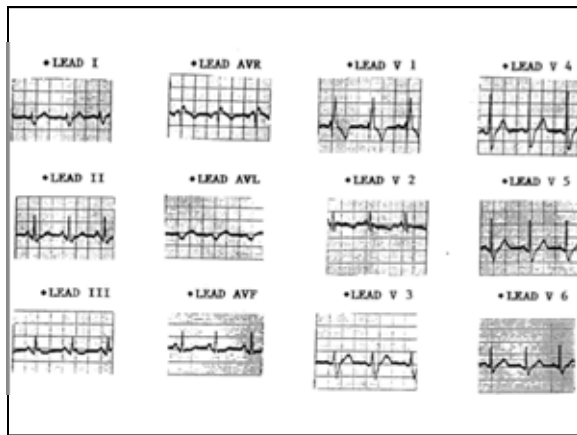
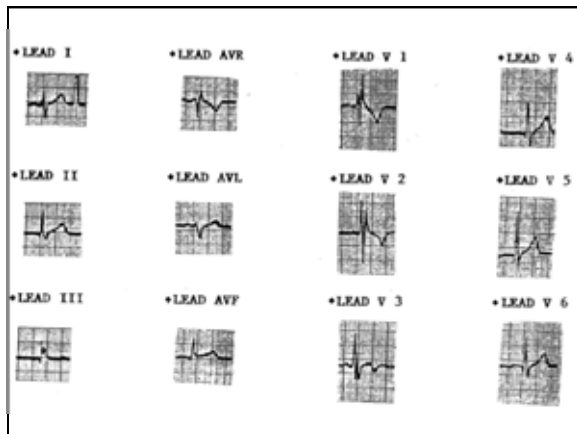
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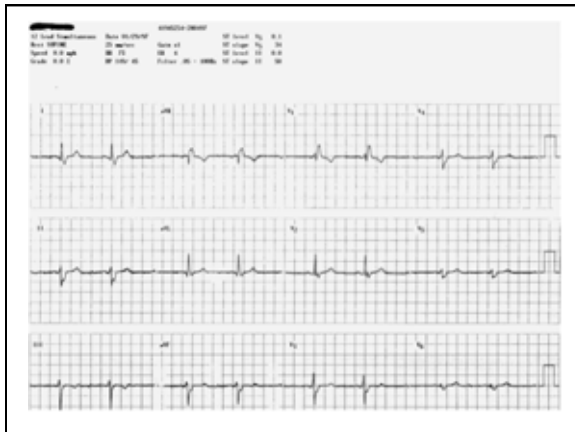
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### BUNDLE BRANCH BLOCKS

- **LBBB CHARACTERISTICS:**

In the leftward oriented leads:

I, AVL, V<sub>5-6</sub>

QRS complex is: an “R” wave wide enough to drive a truck through!

“BROAD R” IN LBBB;

“T” wave inversion in I, AVL, V<sub>5-6</sub> – LBBB,

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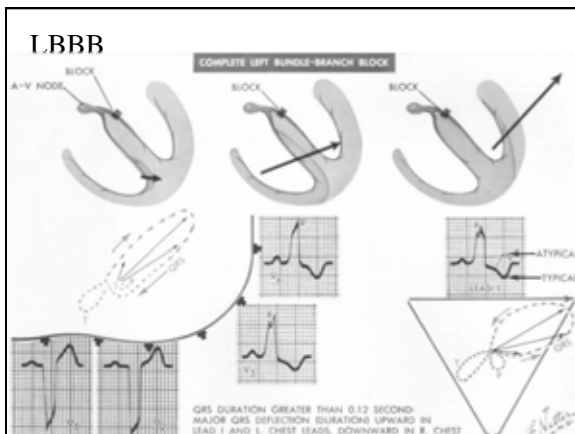
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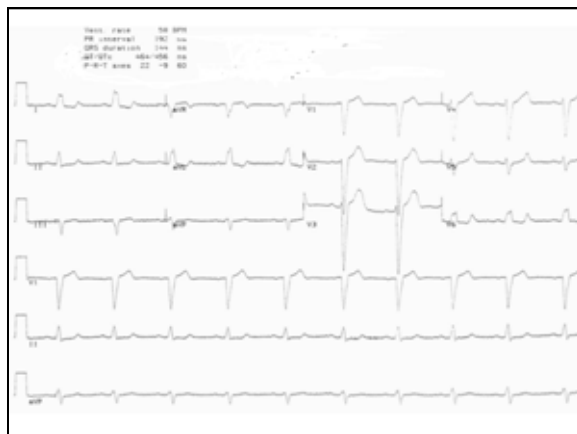
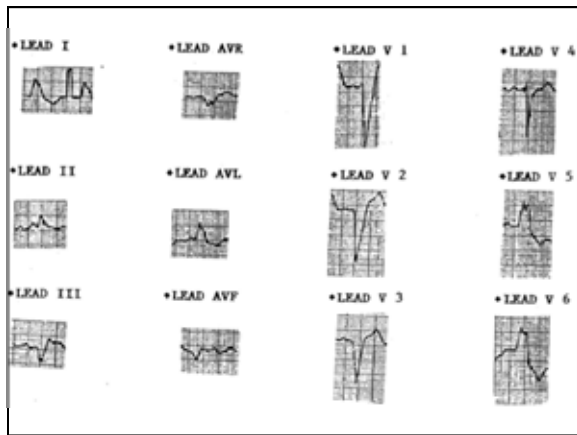
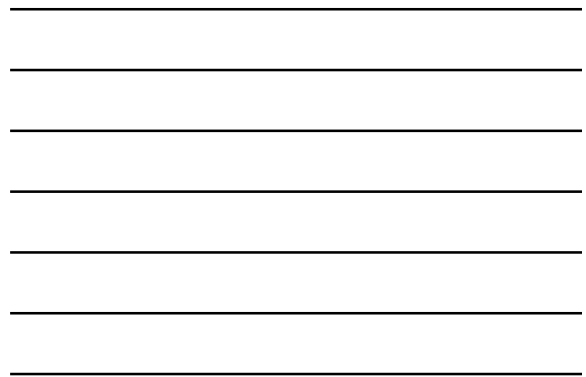
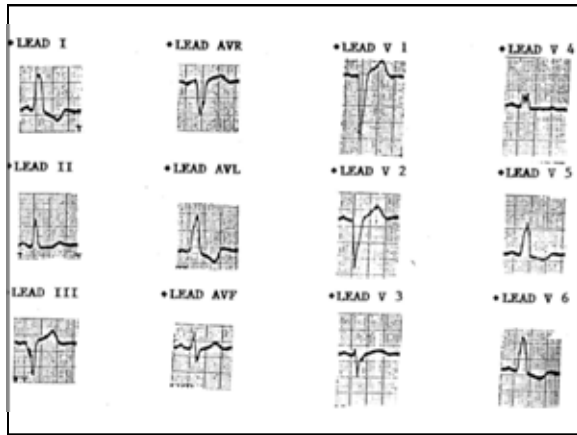
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**THE DYNAMICS OF  
ELECTROCARDIOGRAPHY:**

**HEMI BLOCKS**

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**HEMI BLOCKS: LASH, LPIH**

- CAUSES:
  - THE 3 "I's" – Ischemia, Injury, Infarction
  - Hypertrophic cardiomyopathy
  - RVH, LVH
  - Calcification
  - Fibrous / sclerosing disease
- LASH most common of the Hemiblocks
- LPIH is rare due to its dual blood supply

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**HEMI BLOCKS: LASH, LPIH**

- CHARACTERISTICS OF LASH:
  - Mean QRS axis  $> -45$  to  $-90$
  - Deep S waves in II, III, AVF
  - Taller R wave in AVL than I
  - QRS usually not widened
  - If QRS is  $> 100 - 110$  msec look for RBBB
- RBBB + LASH = Bifascicular block
- RBBB + LASH + PR  $> 200$  msec = Trifascicular block

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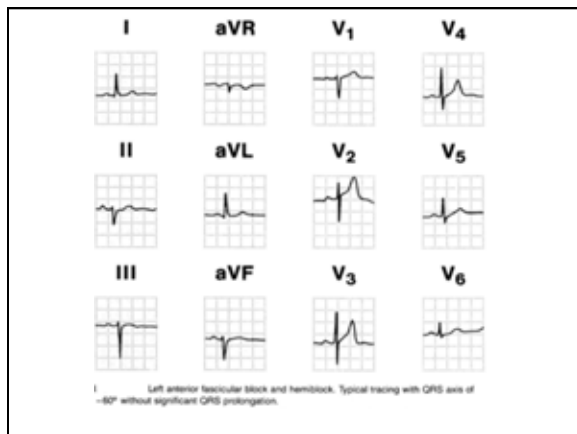
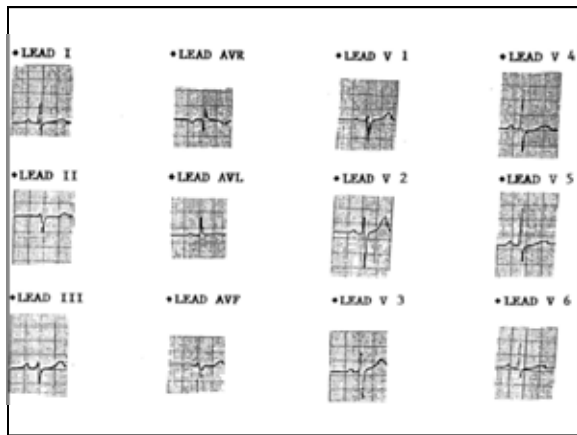
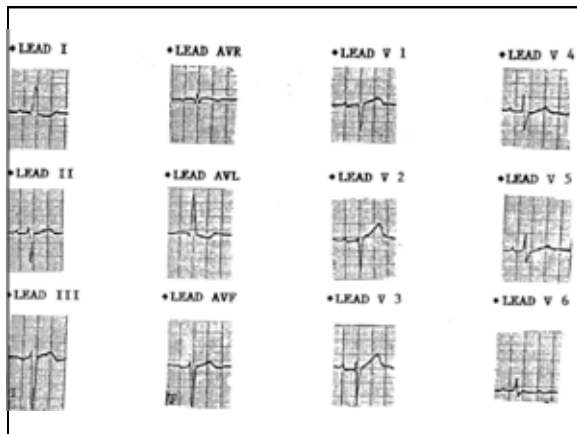
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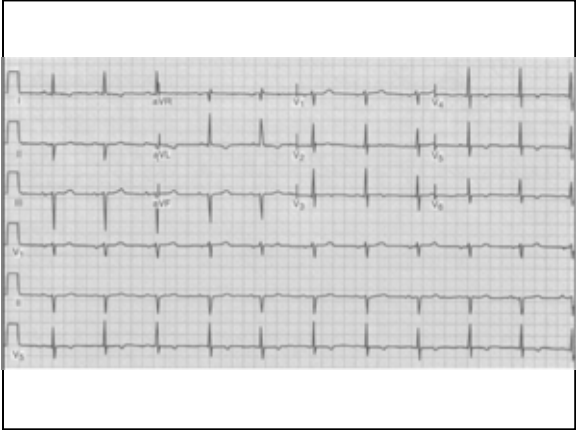
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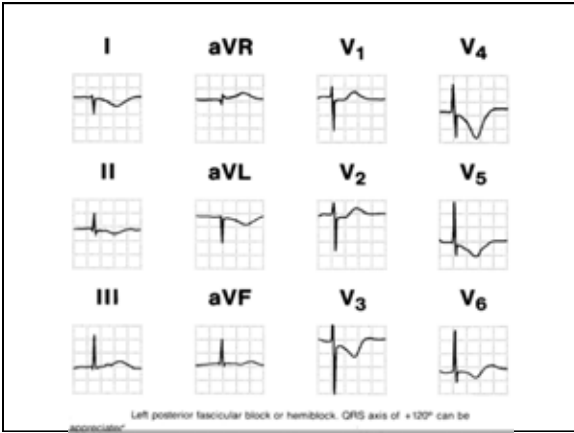
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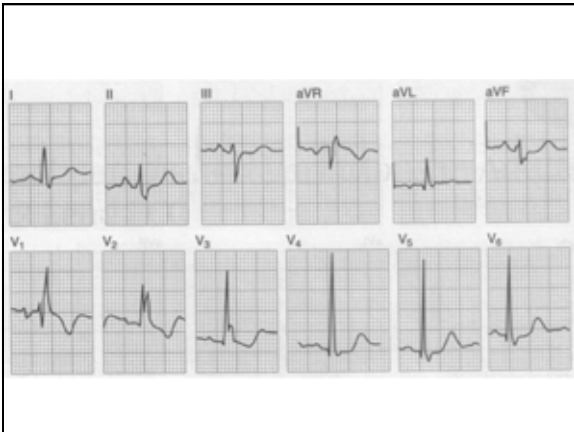
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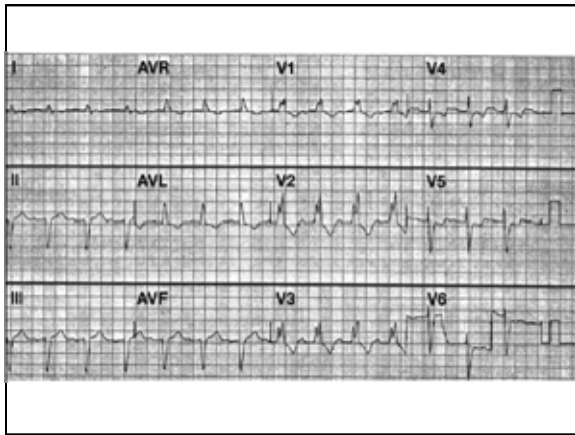
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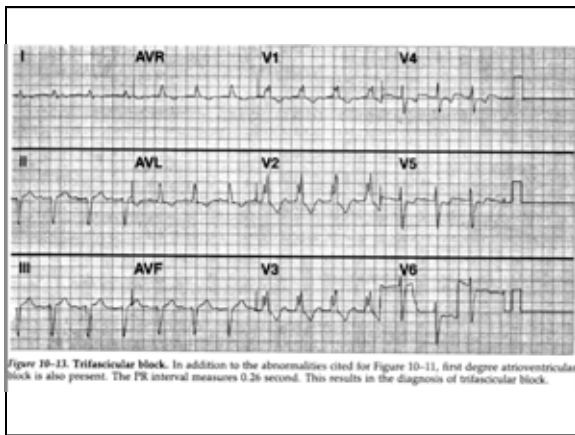


Figure 10-11. Trifascicular block. In addition to the abnormalities cited for Figure 10-11, first degree atrioventricular block is also present. The PR interval measures 0.26 second. This results in the diagnosis of trifascicular block.

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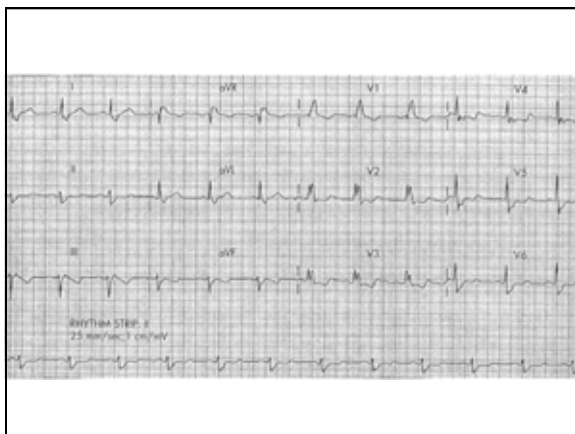
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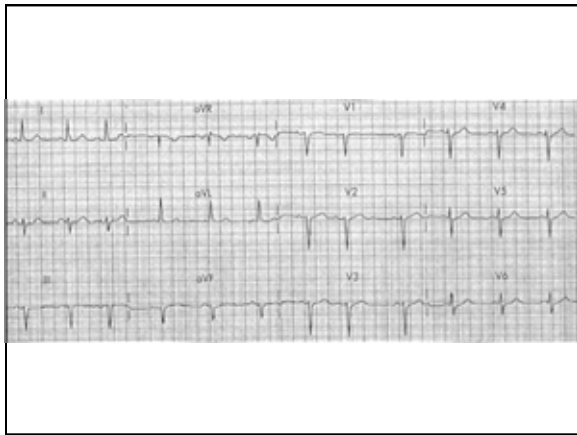
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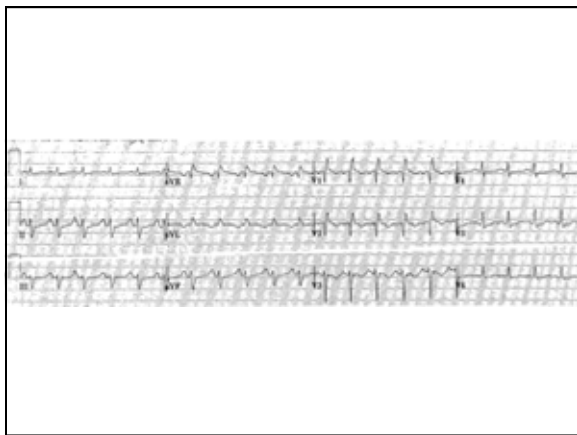
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