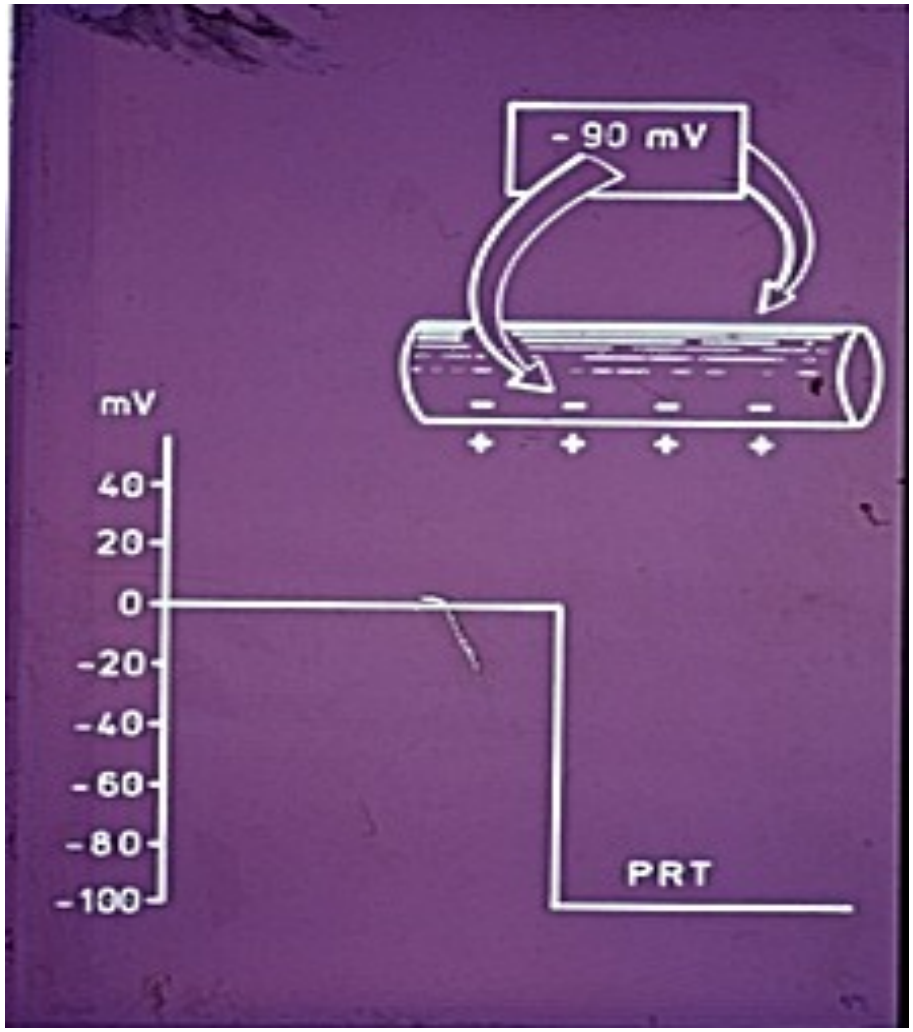
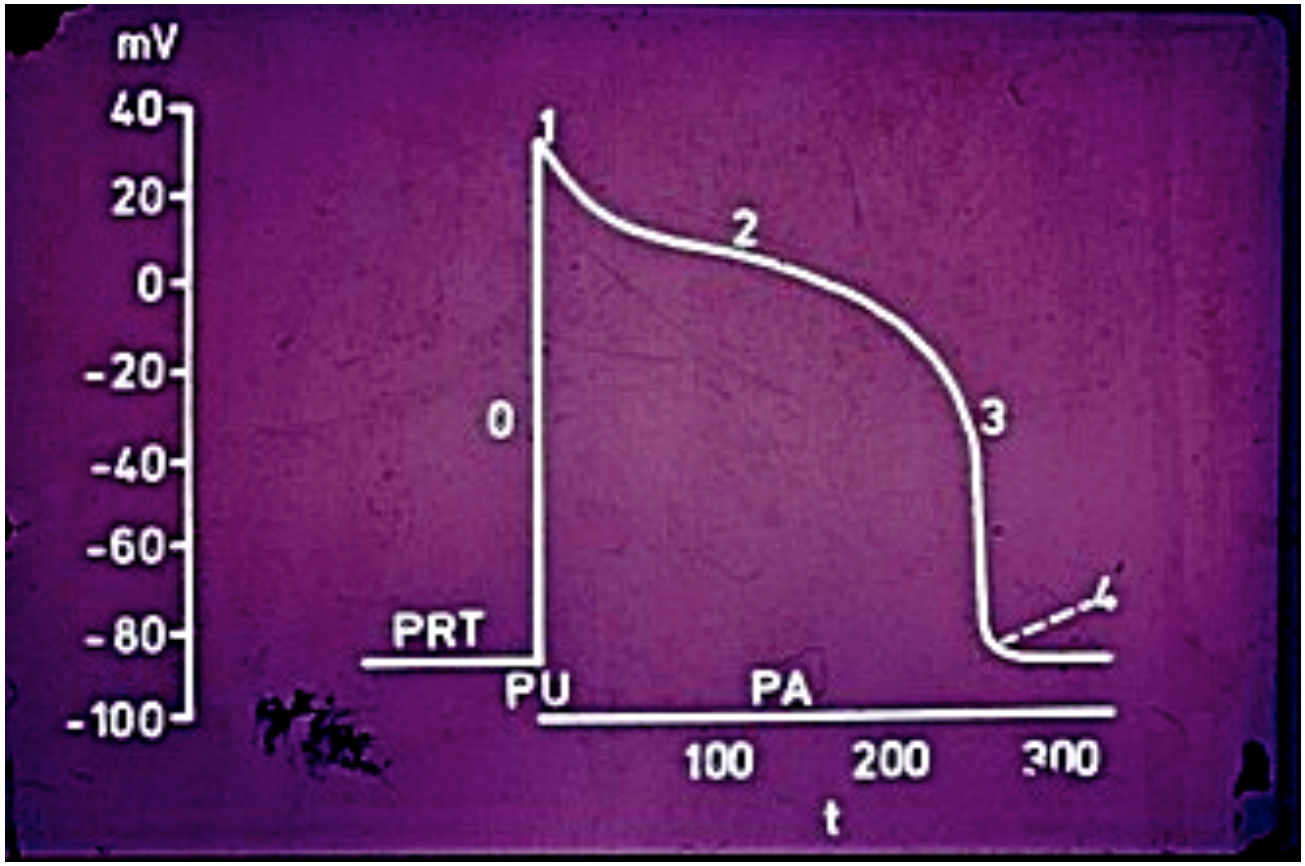
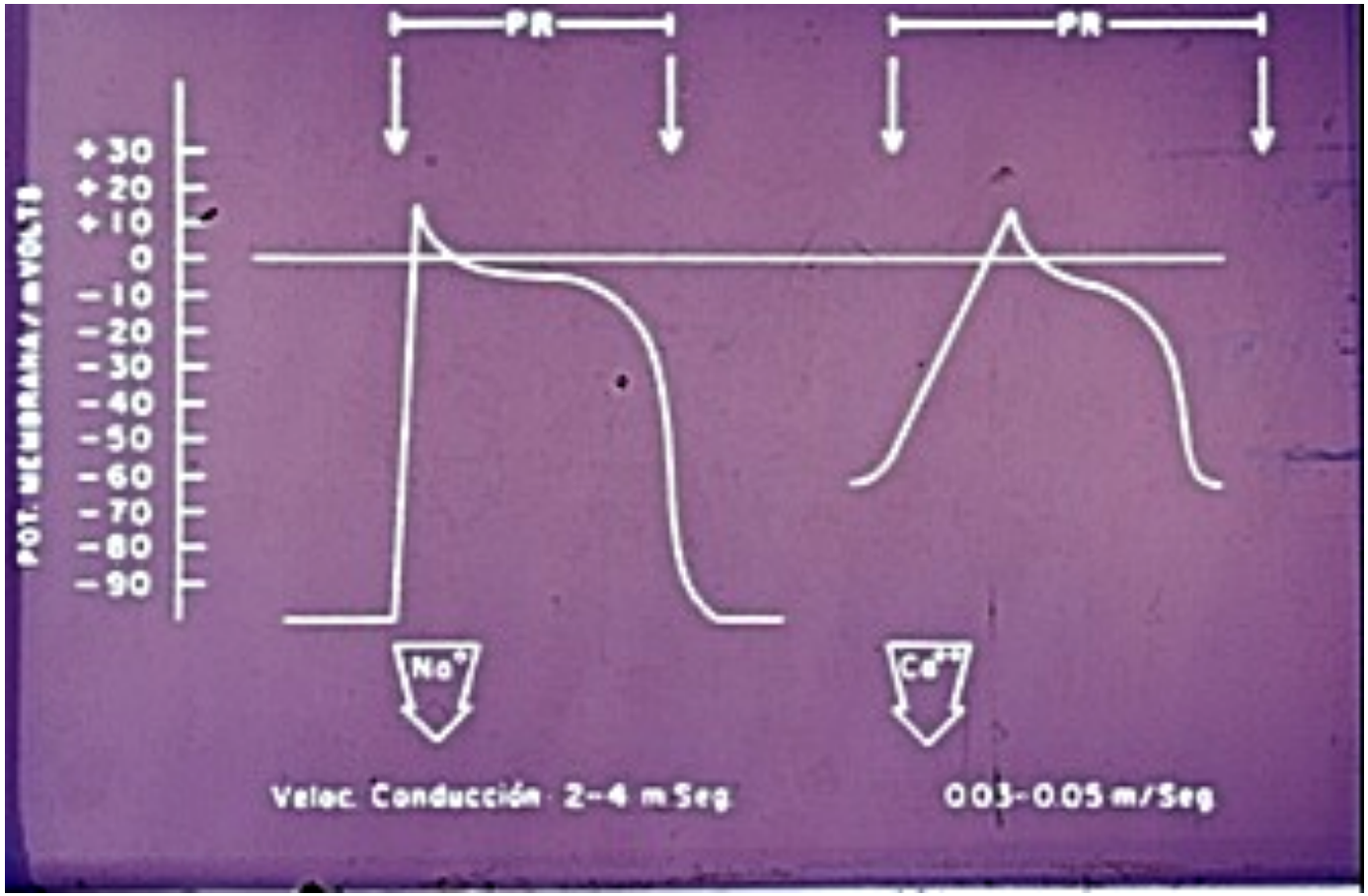
Potencial de Reposo Transmembrana

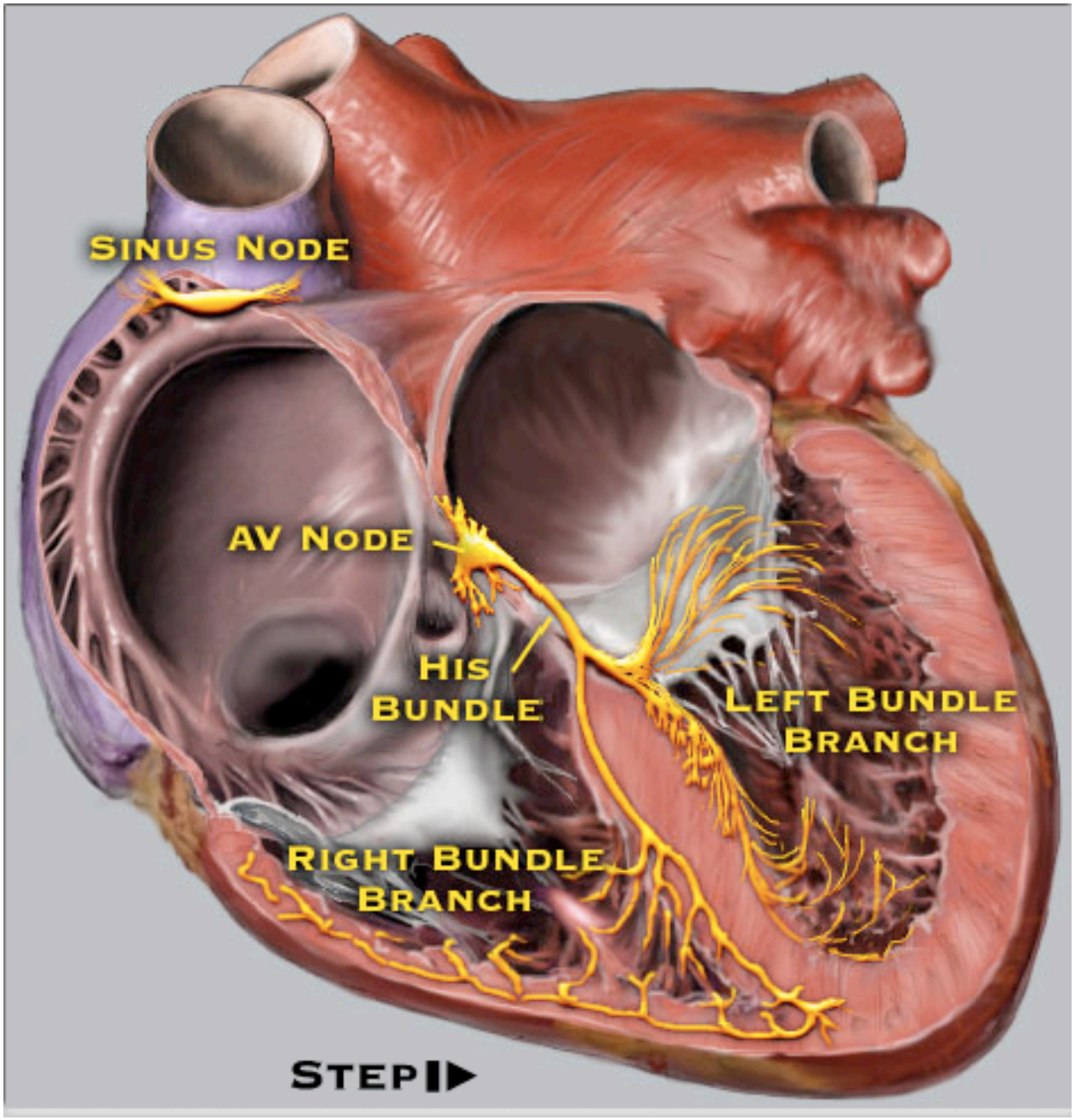


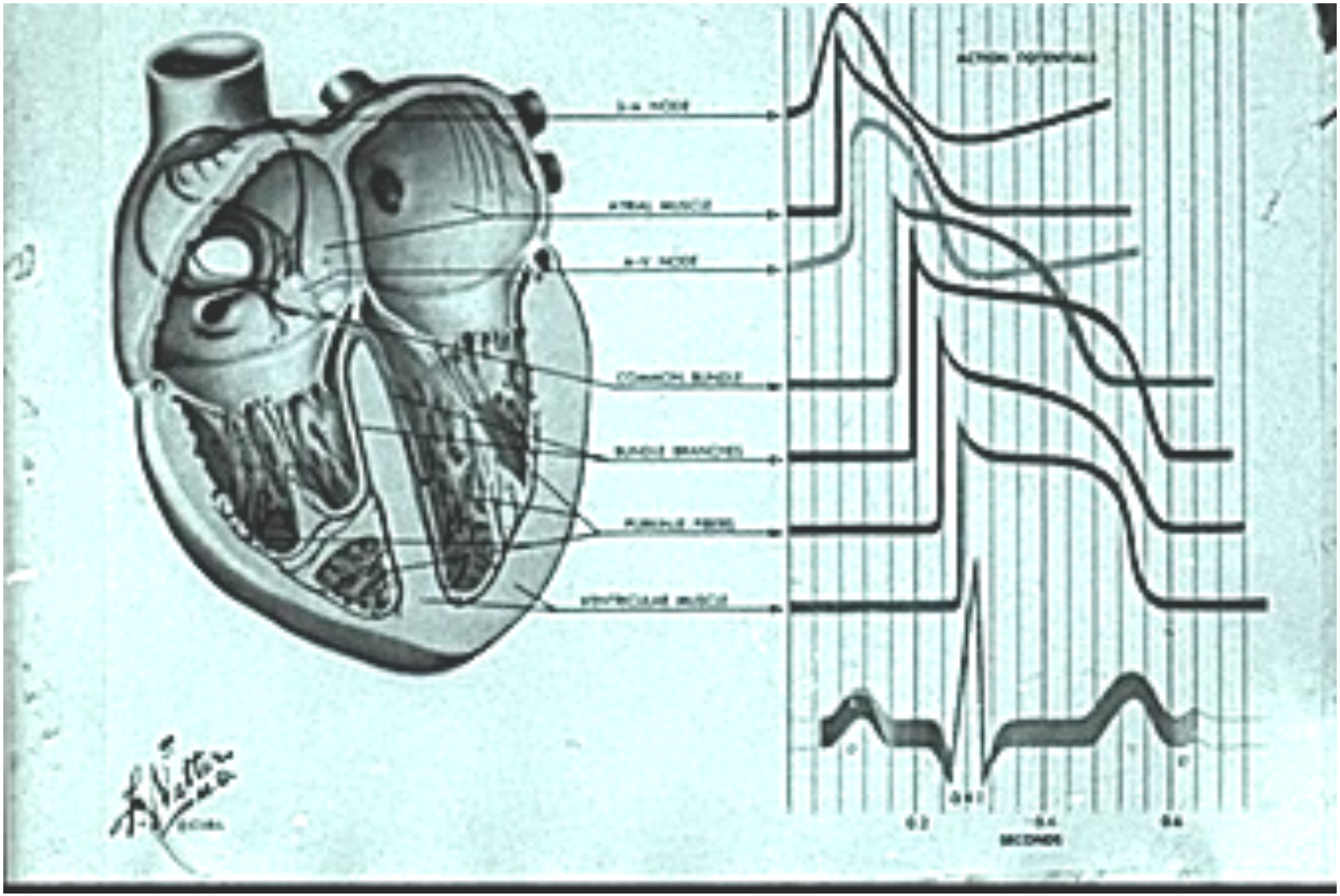
Potencial de Acción



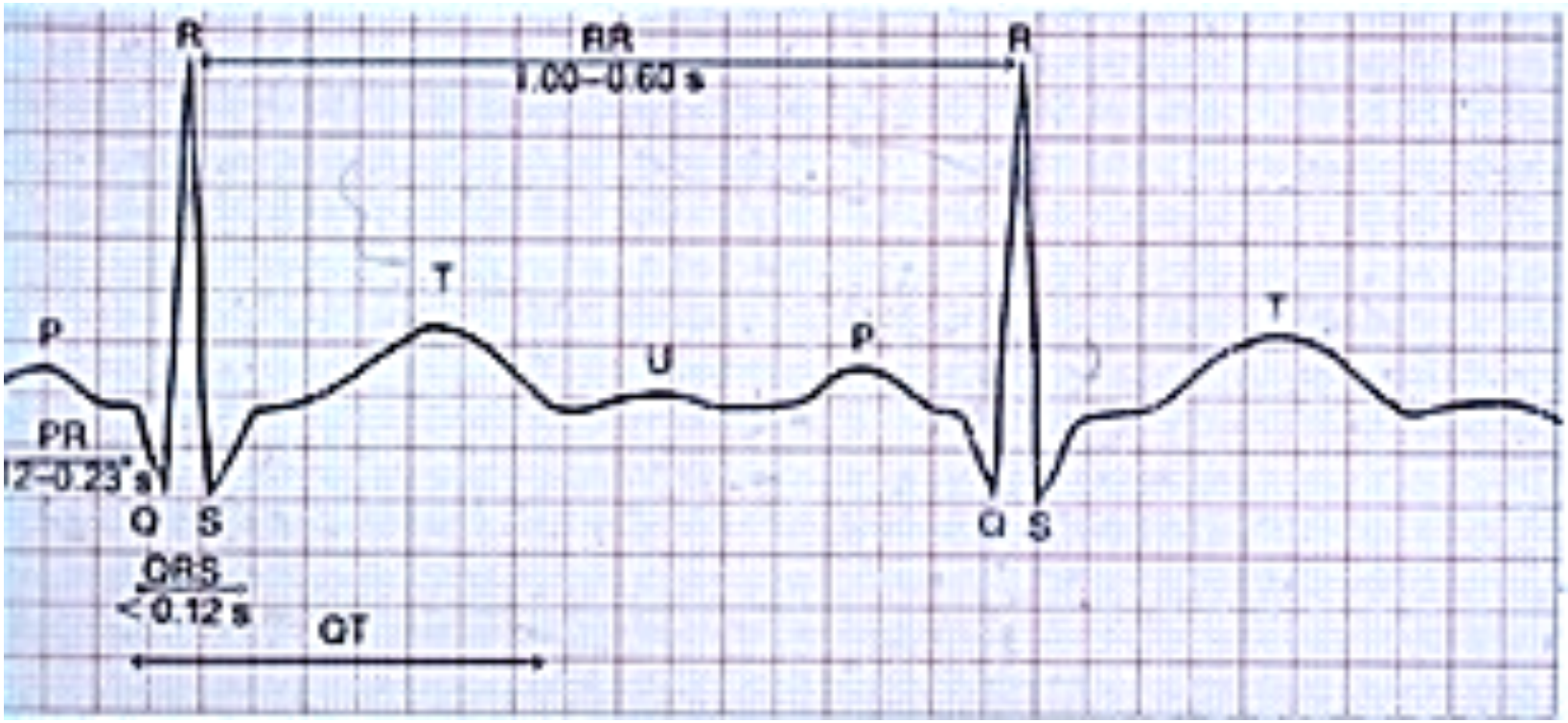
Potenciales de Acción de Fibras rápidas y lentas



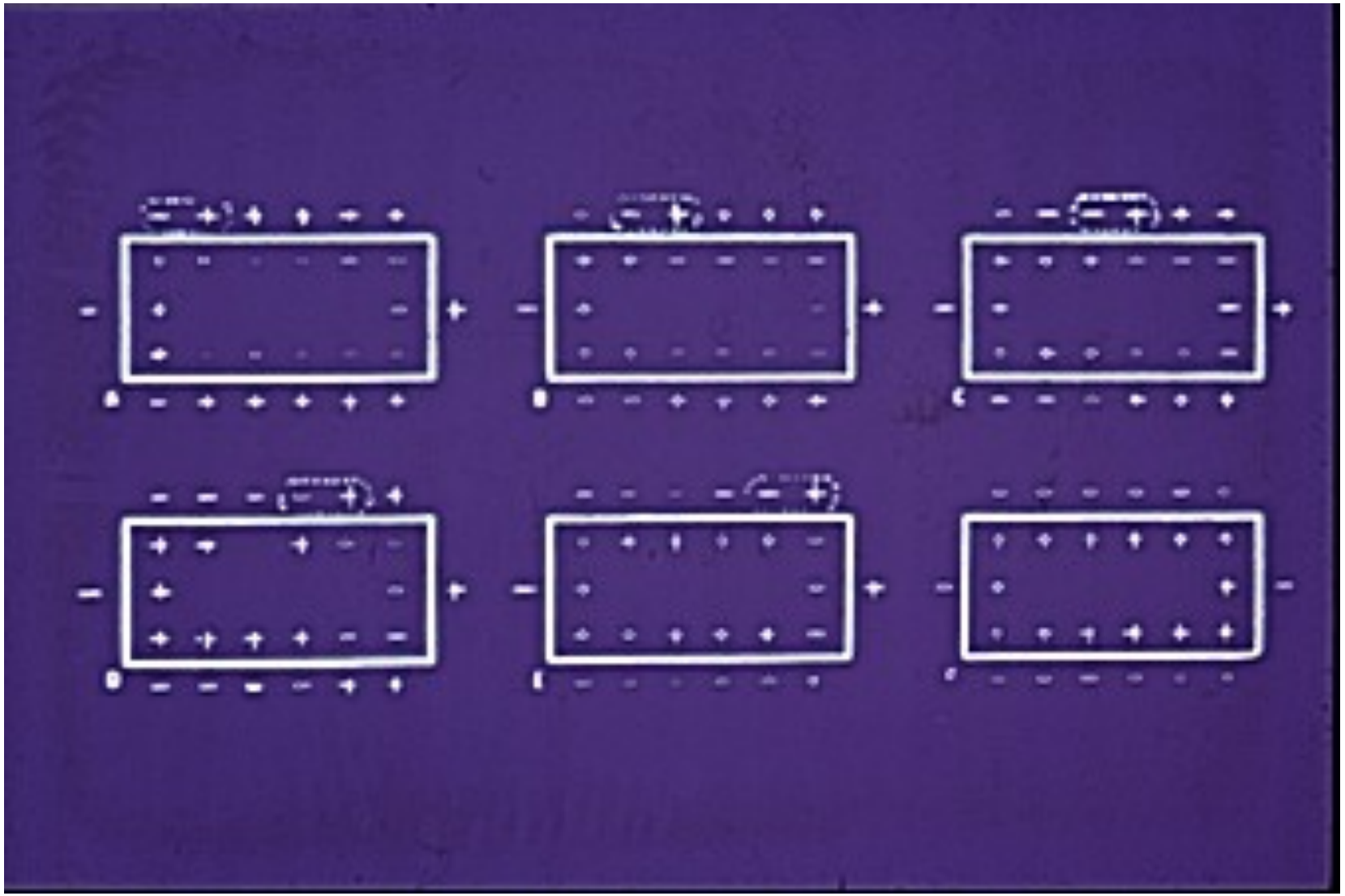

SINUS NODE
AV NODE
HIS BUNDLE
LEFT BUNDLE BRANCH
RIGHT BUNDLE BRANCH
STEP


ACTION POTENTIALS
S-A NODE
ATRIAL MUSCLE
A-V NODE
COMMON BUNDLE
BUNDLE BRANCHES
PURKINJE FIBERS
VENTRICULAR MUSCLE
0.2
0.4
0.6
SECONDS

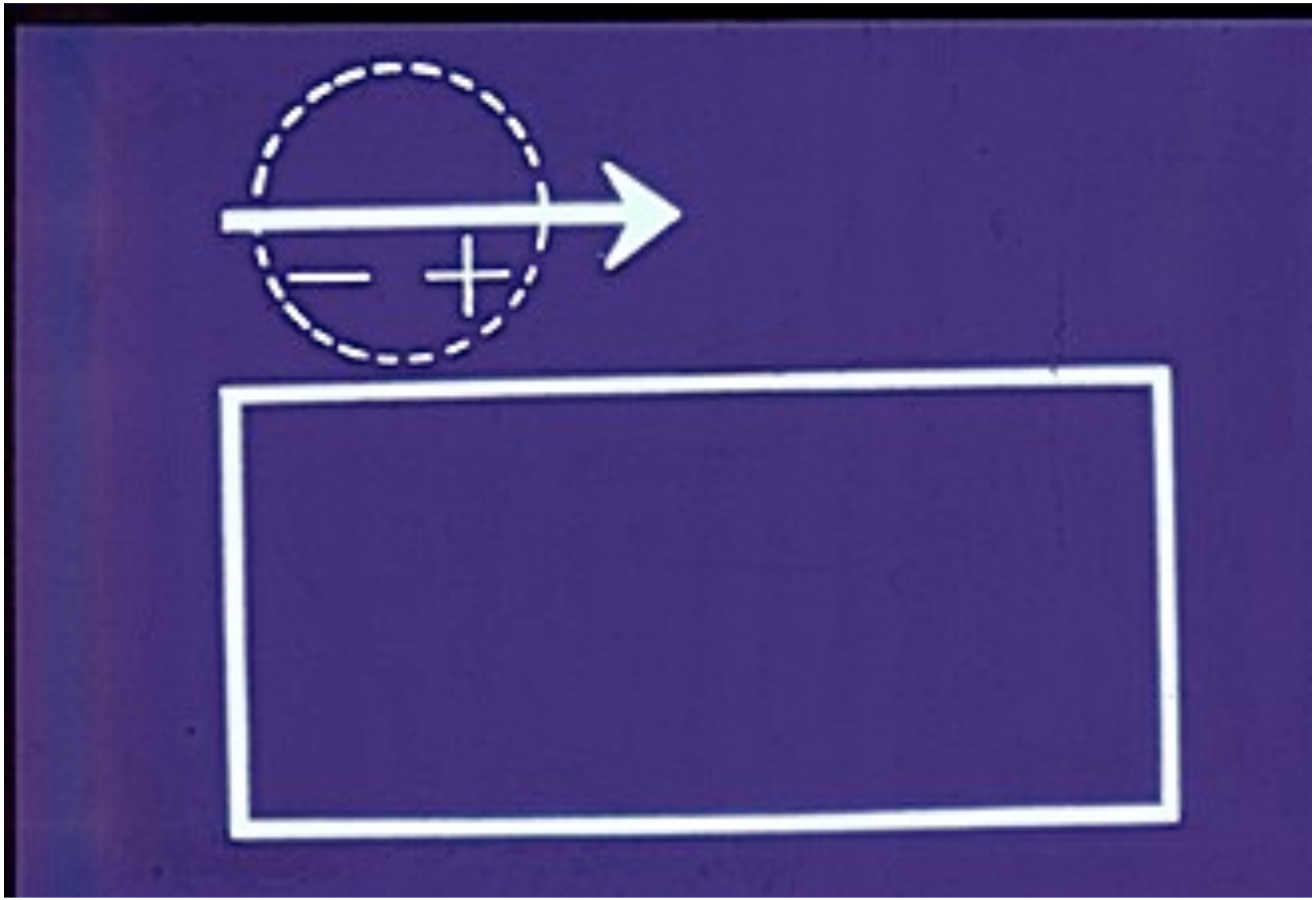
Ondas y Segmentos del ECG



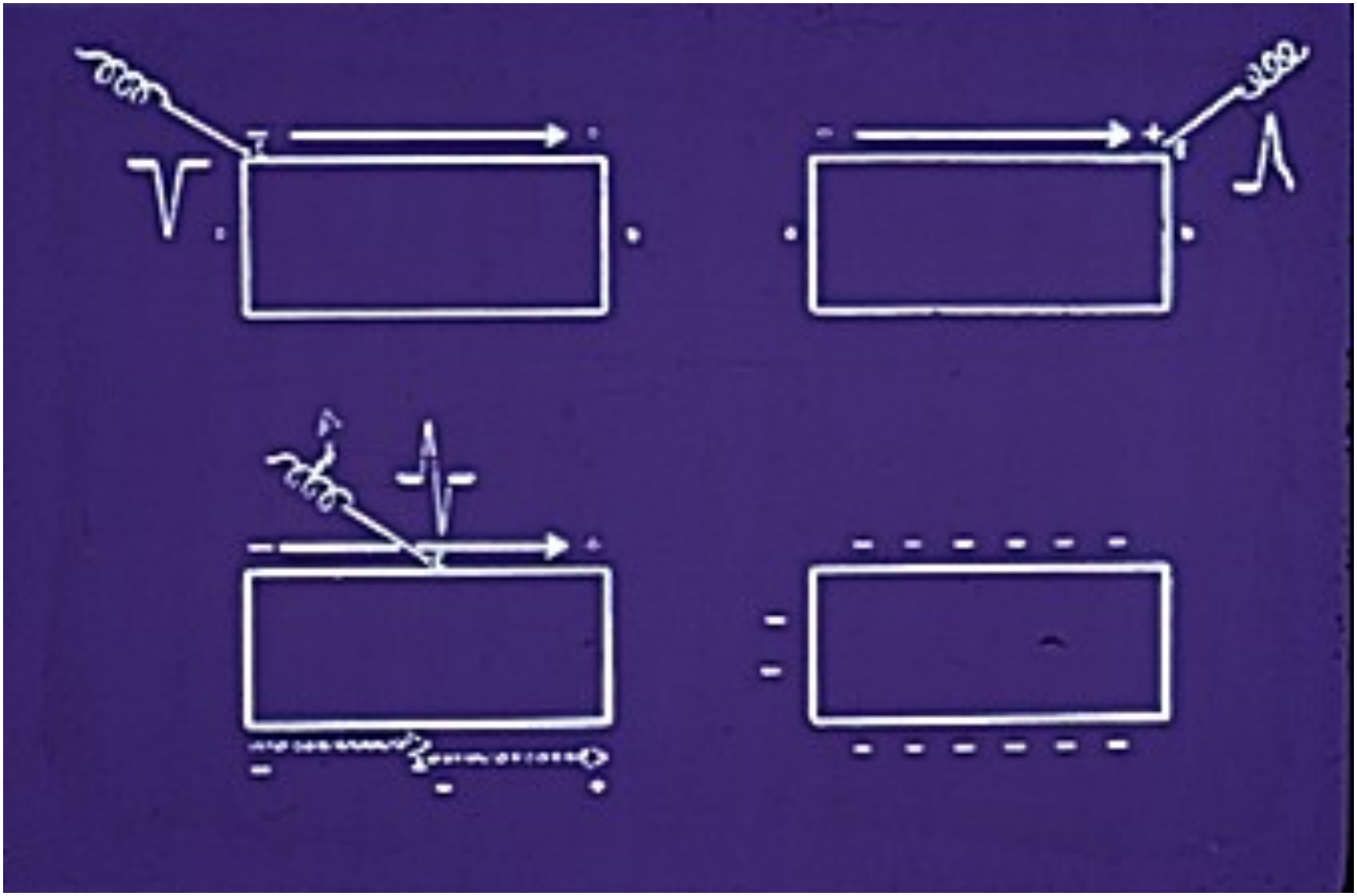
Depolarización



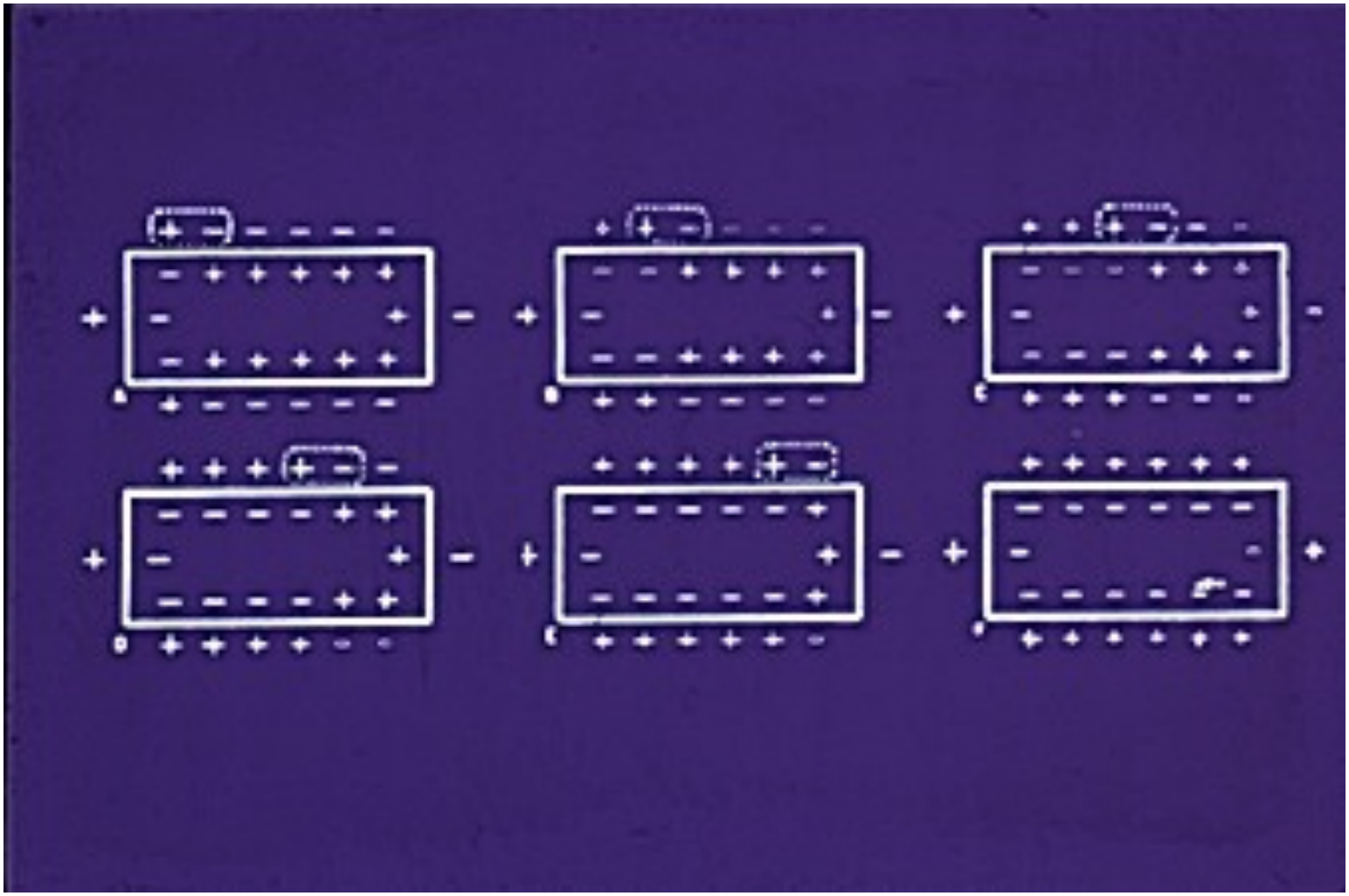
Dipolo



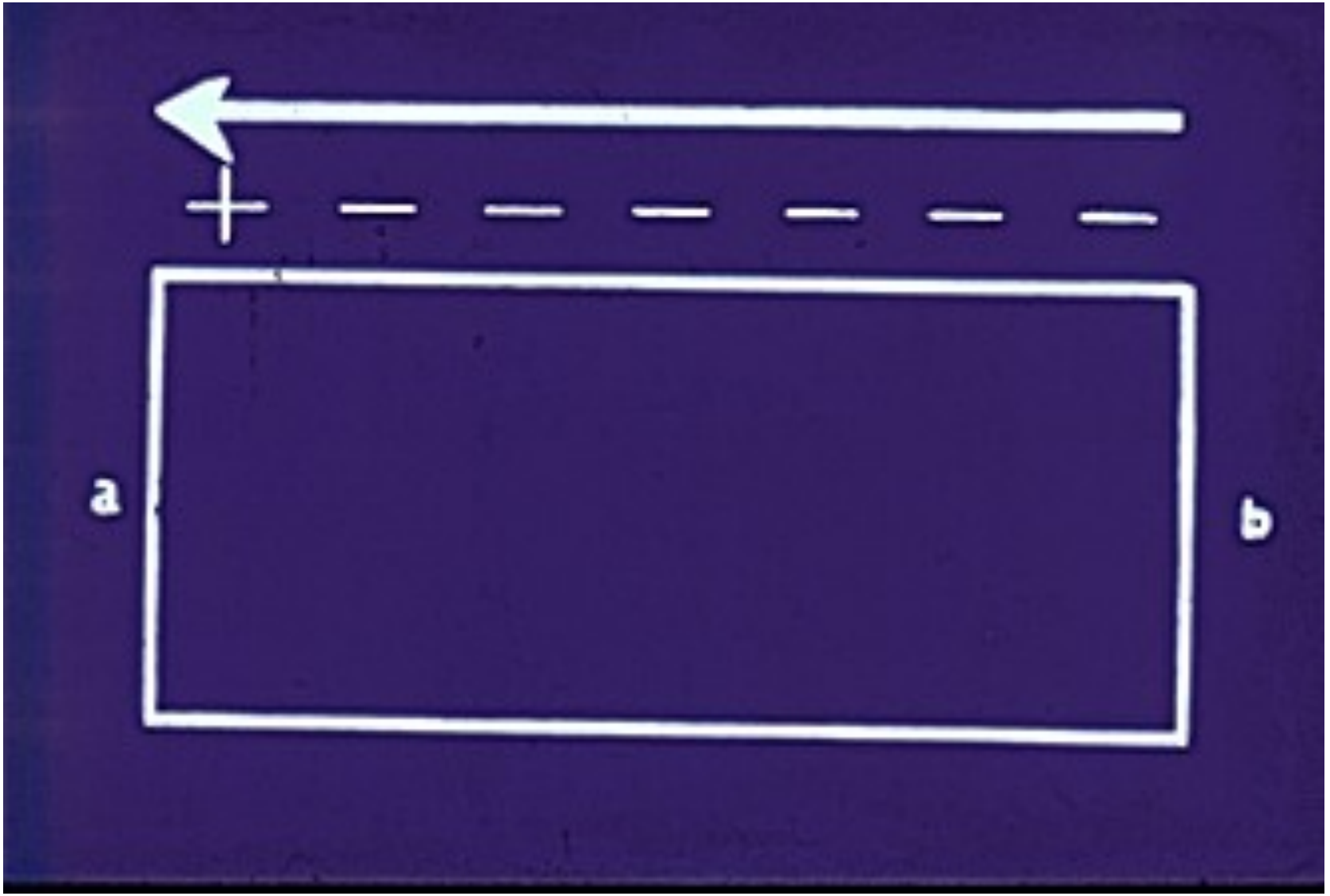
Vector de depolarización



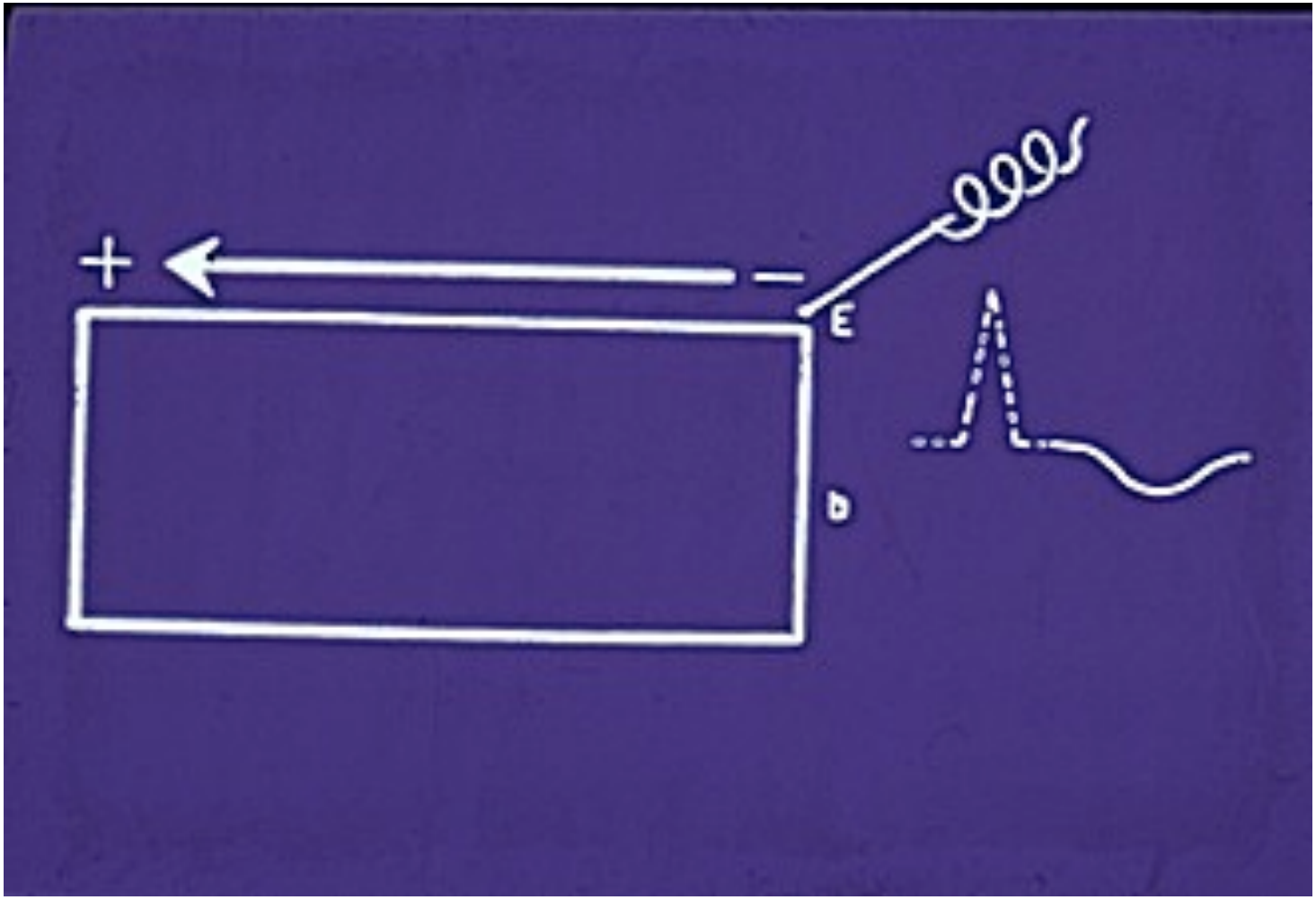
Repolarización



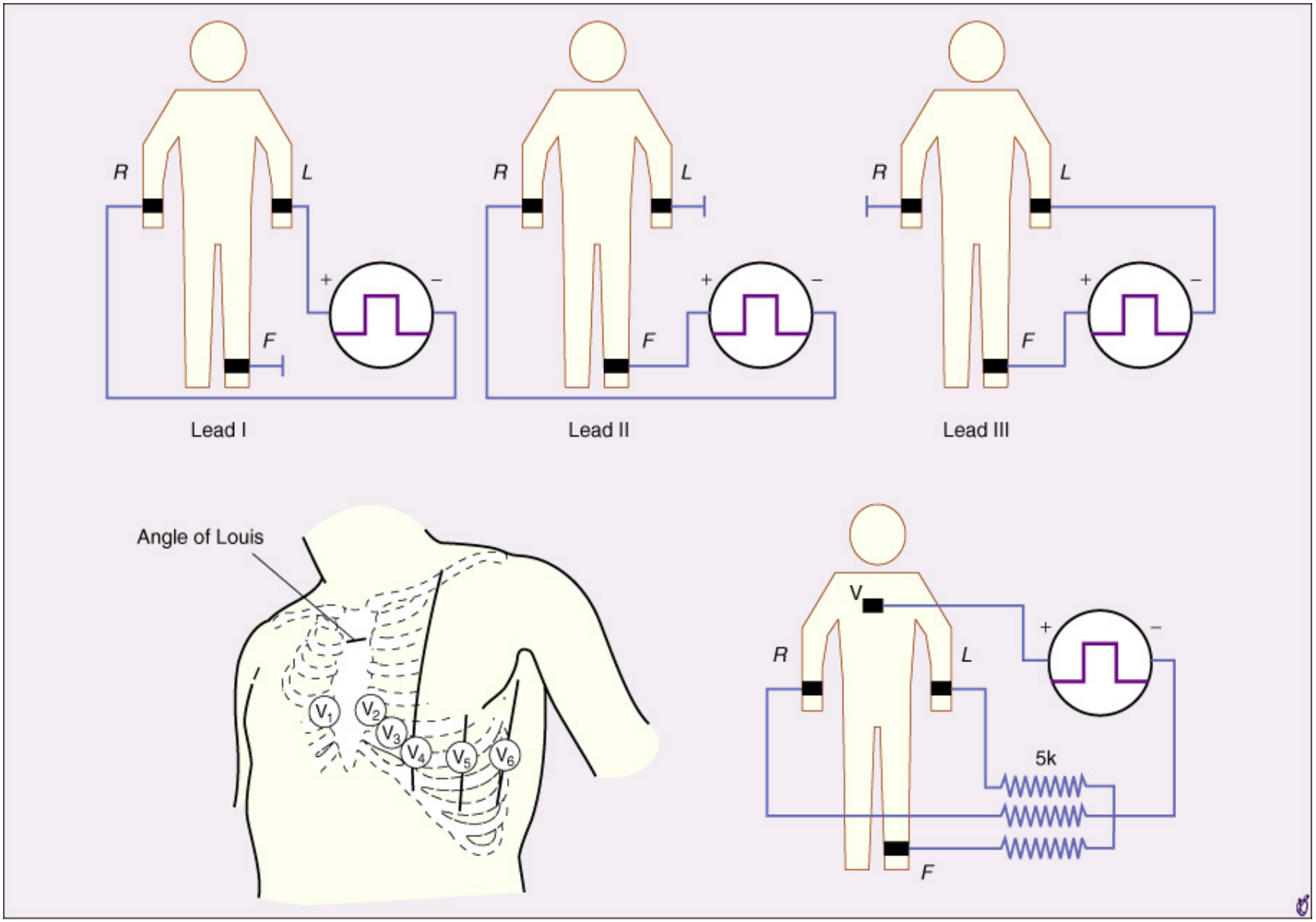
Vector de repolarización



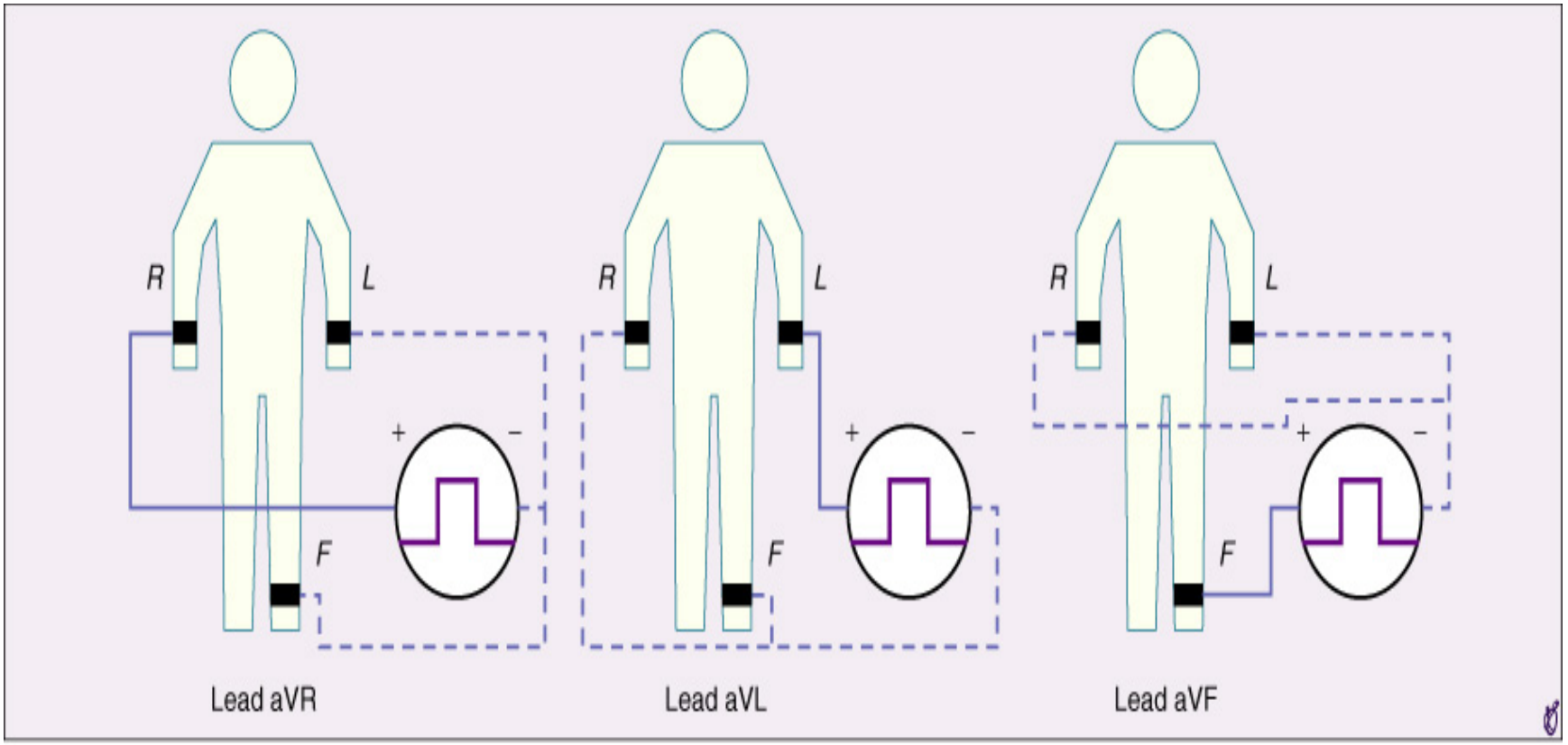
Polaridad de la repolarización



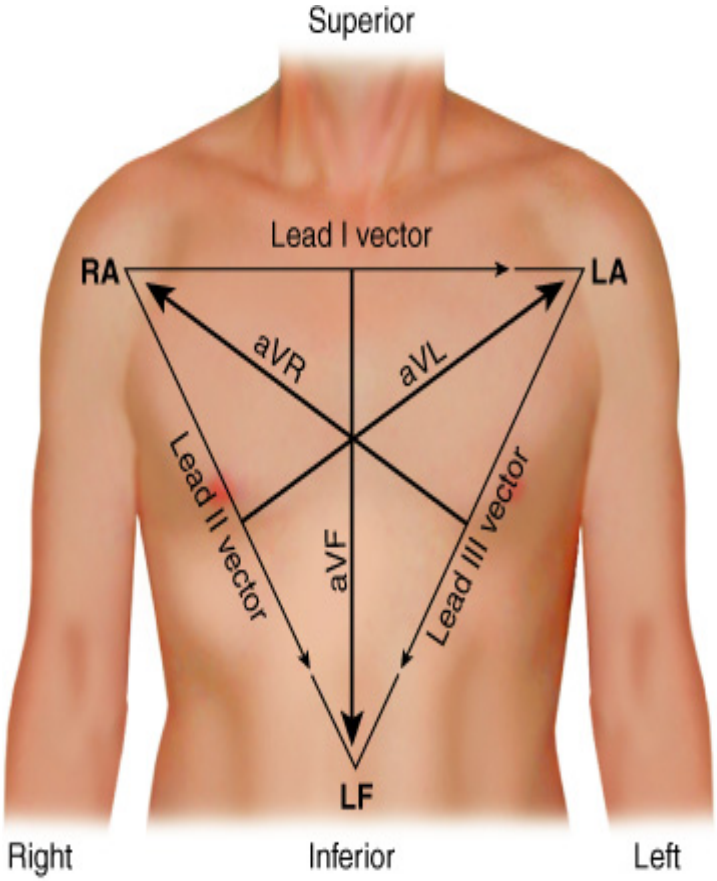
Derivaciones

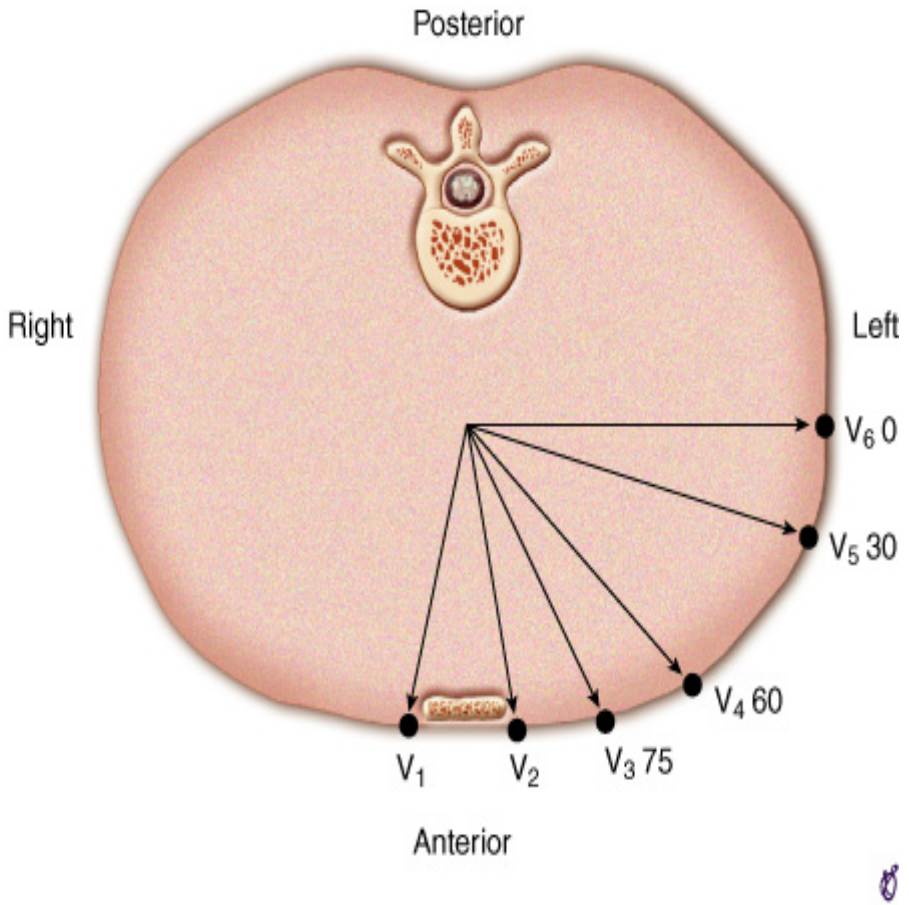


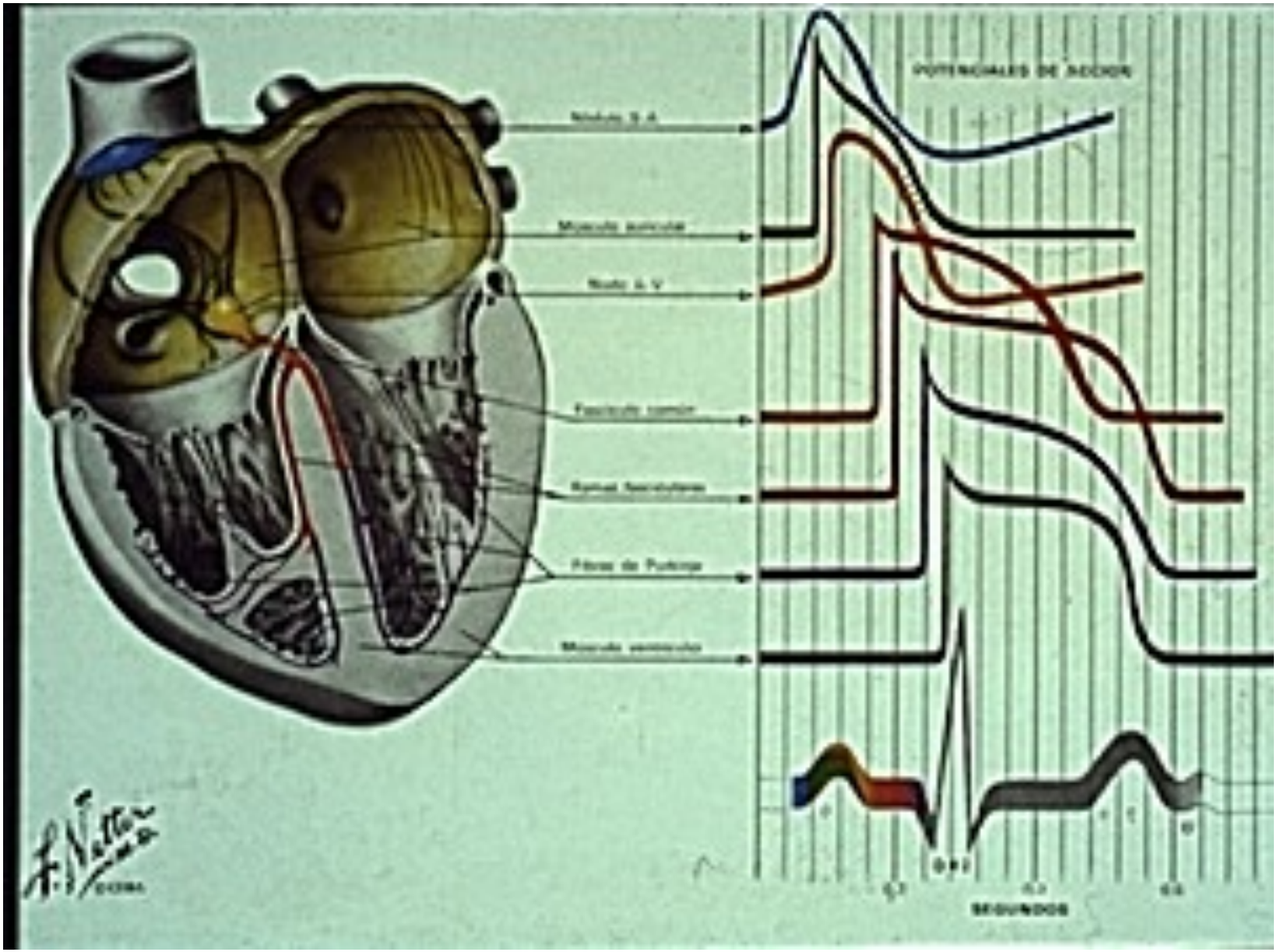
Derivaciones unipolares de los miembros



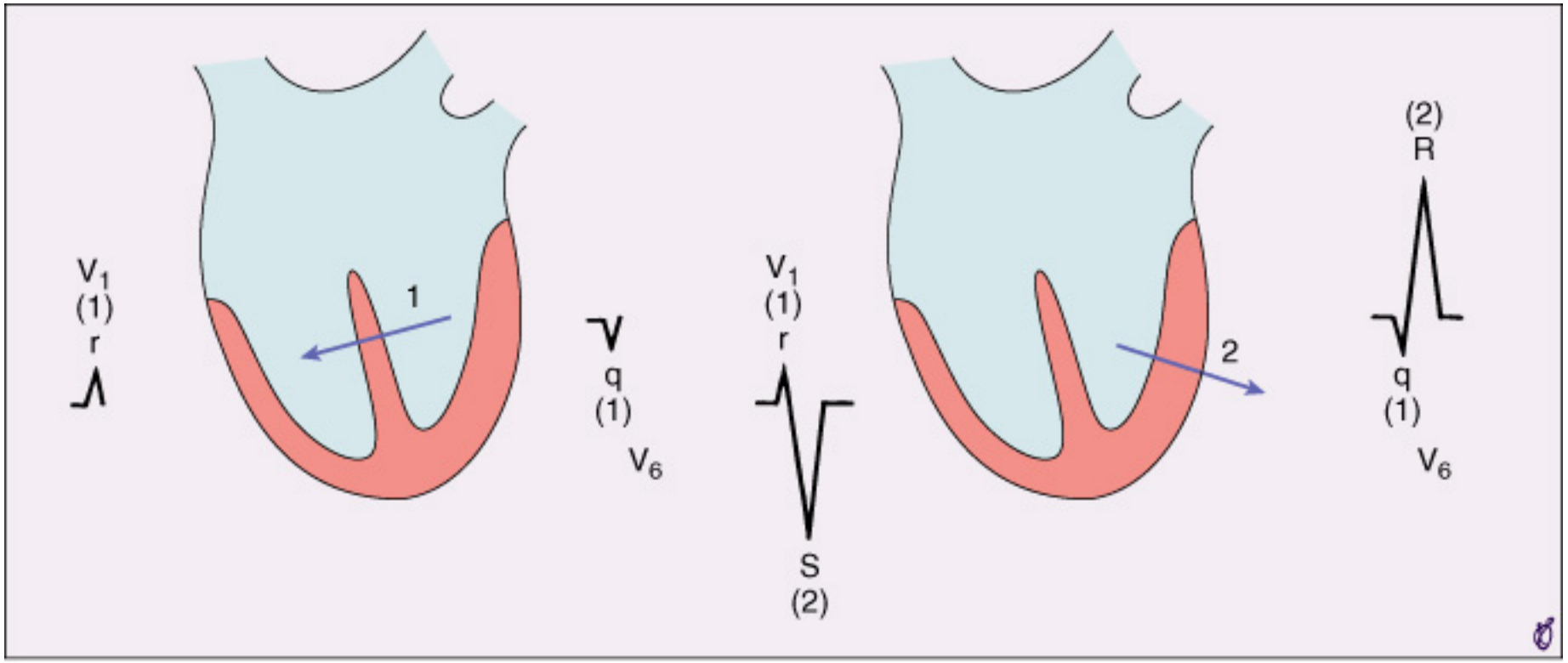
Derivaciones



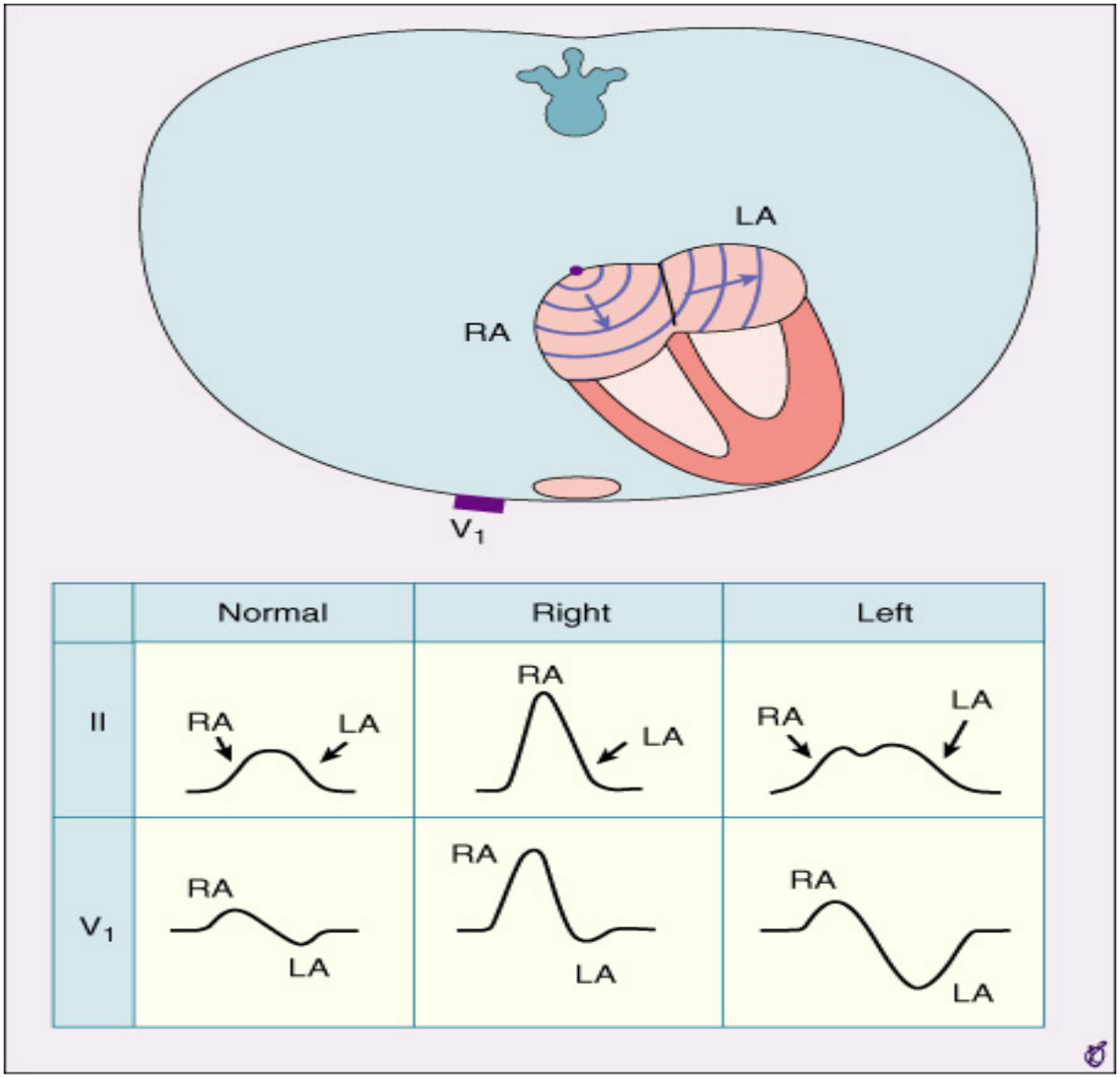



POTENCIALES DE ACCION
Nódulo S-A
Músculo auricular
Nodo A-V
Fascículo común
Ramas fasciculares
Fibras de Purkinje
Músculo ventricular
SEGUNDOS

Vectores de depolarización ventricular

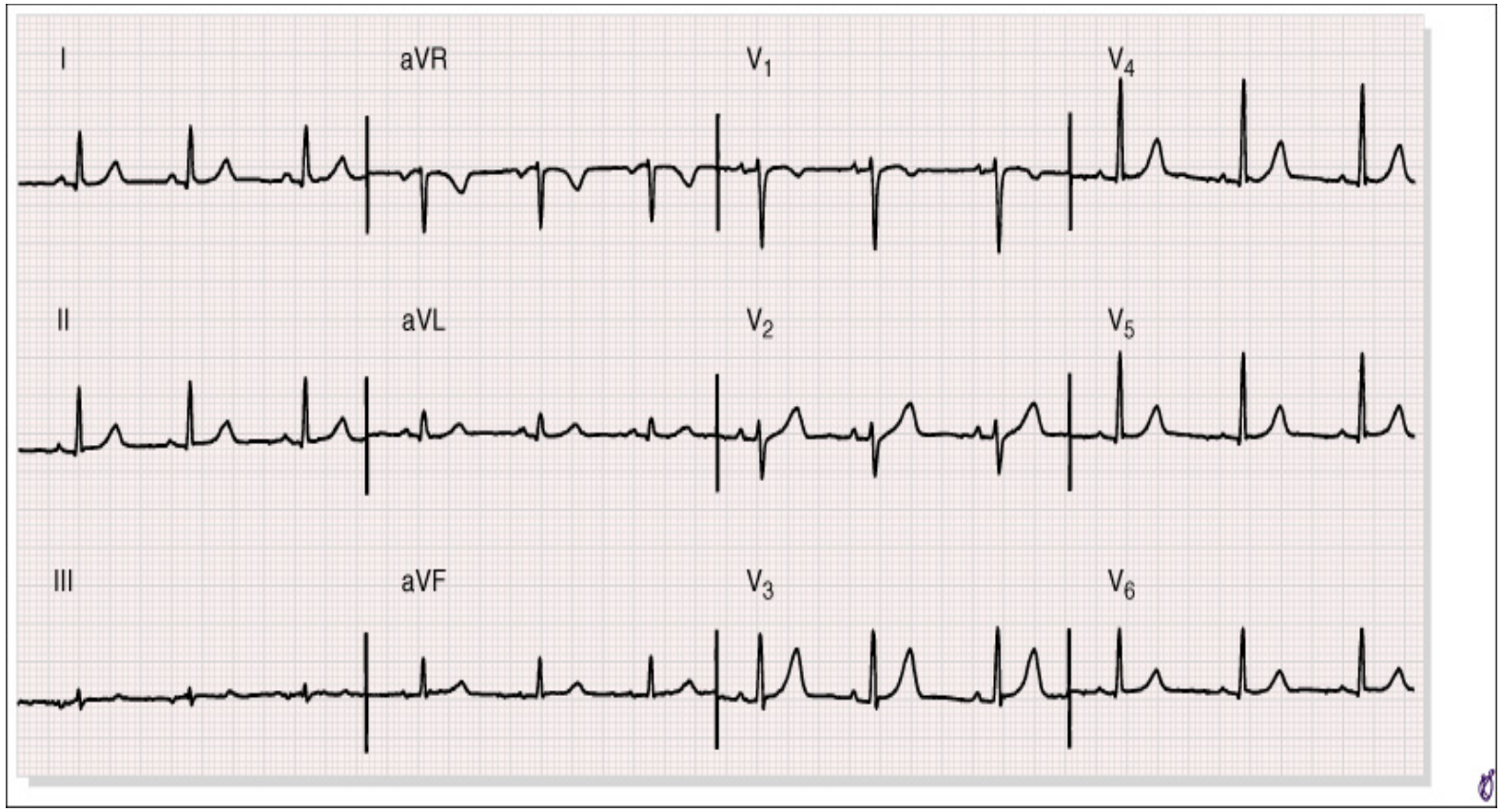


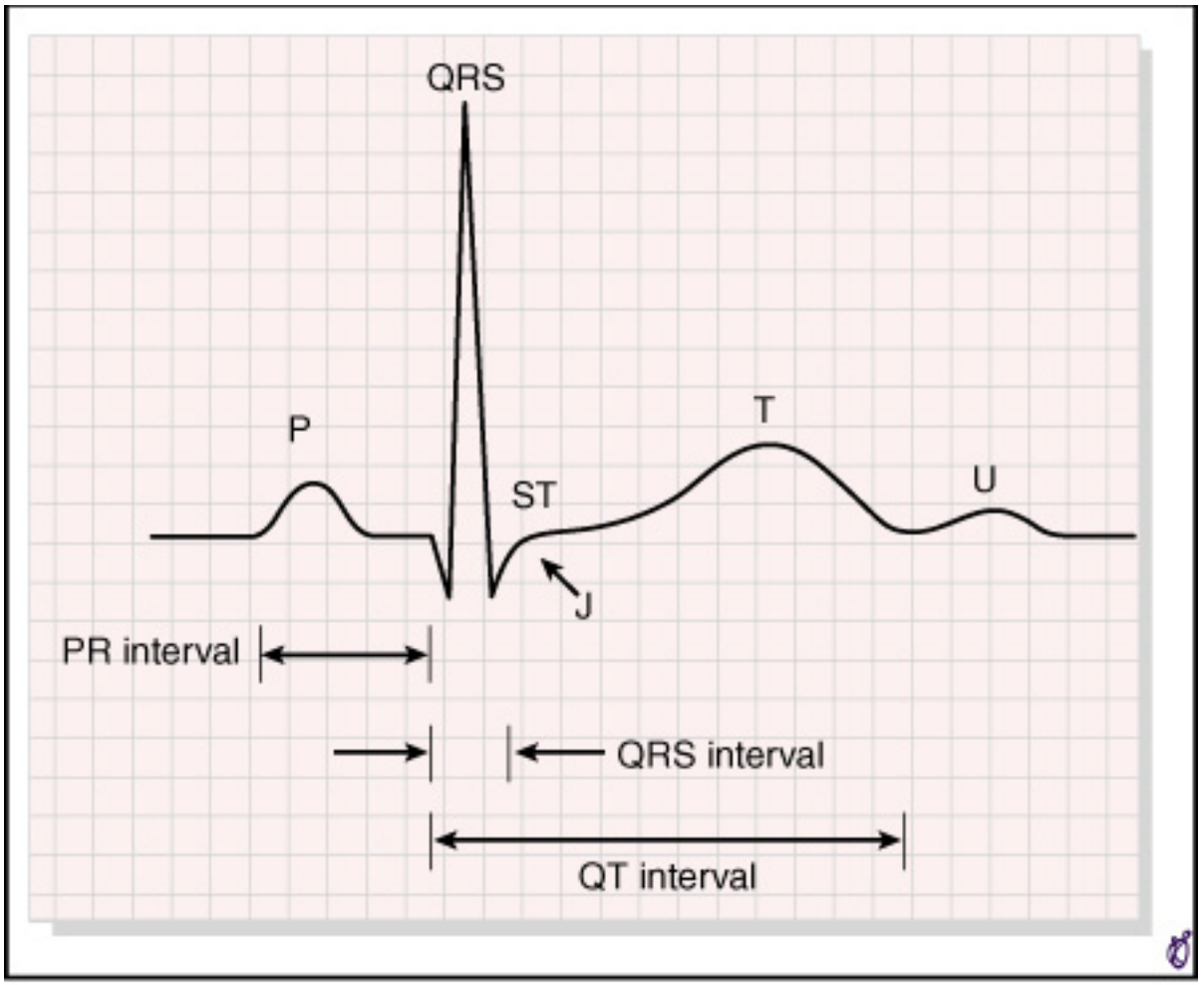
Depolarización auricular



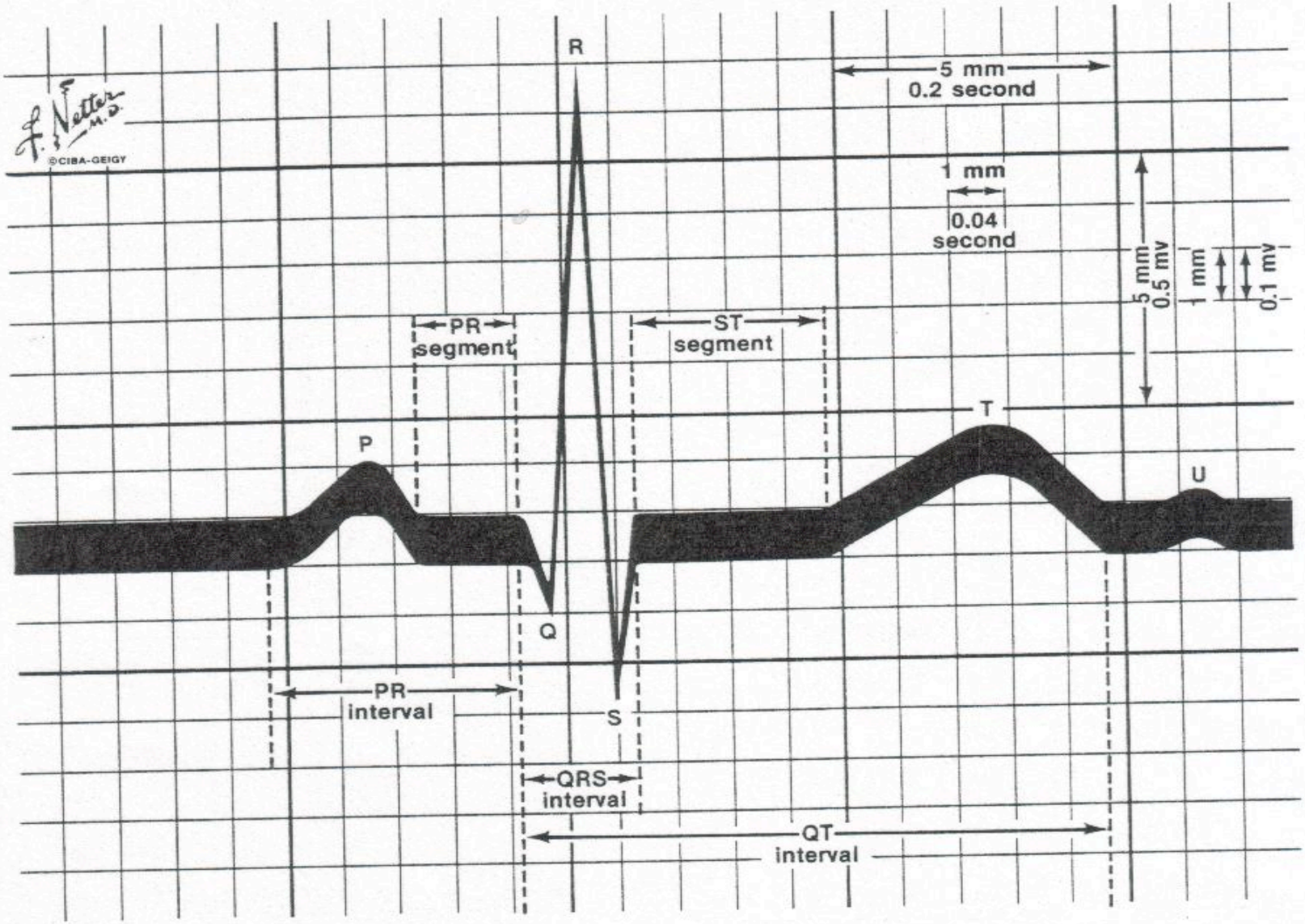
ECG normal

AQRS+30 grados

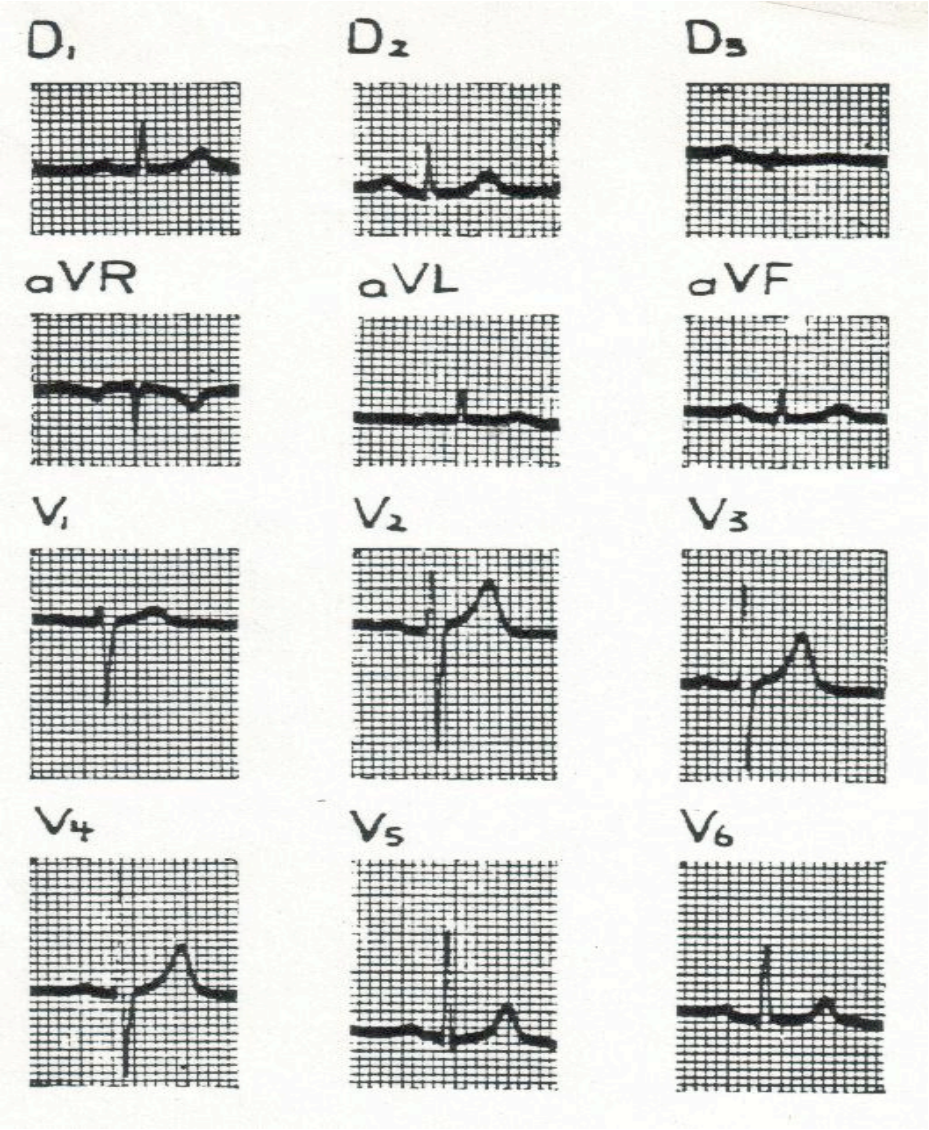




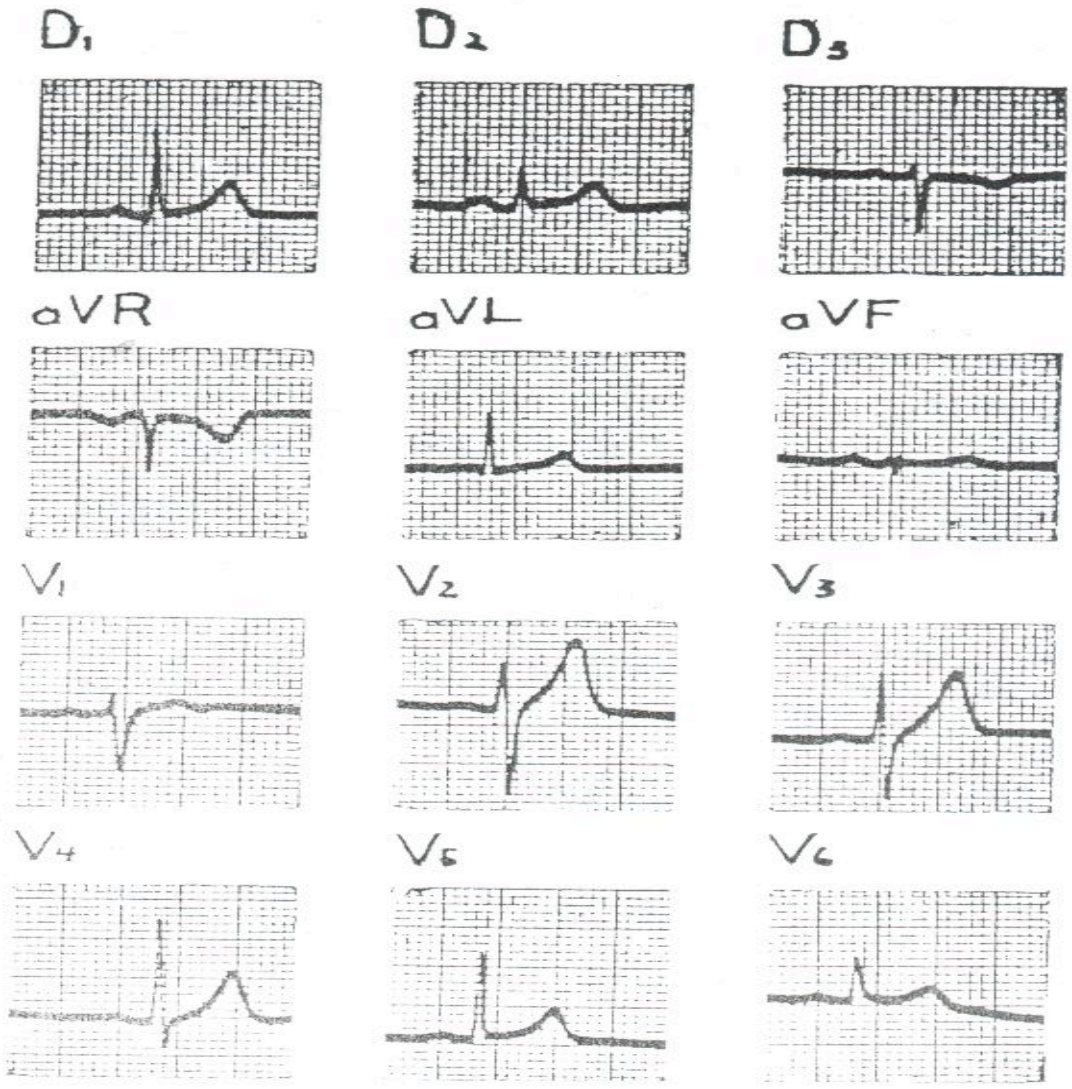
Electrocardiographic Waves, Intervals, and Segments



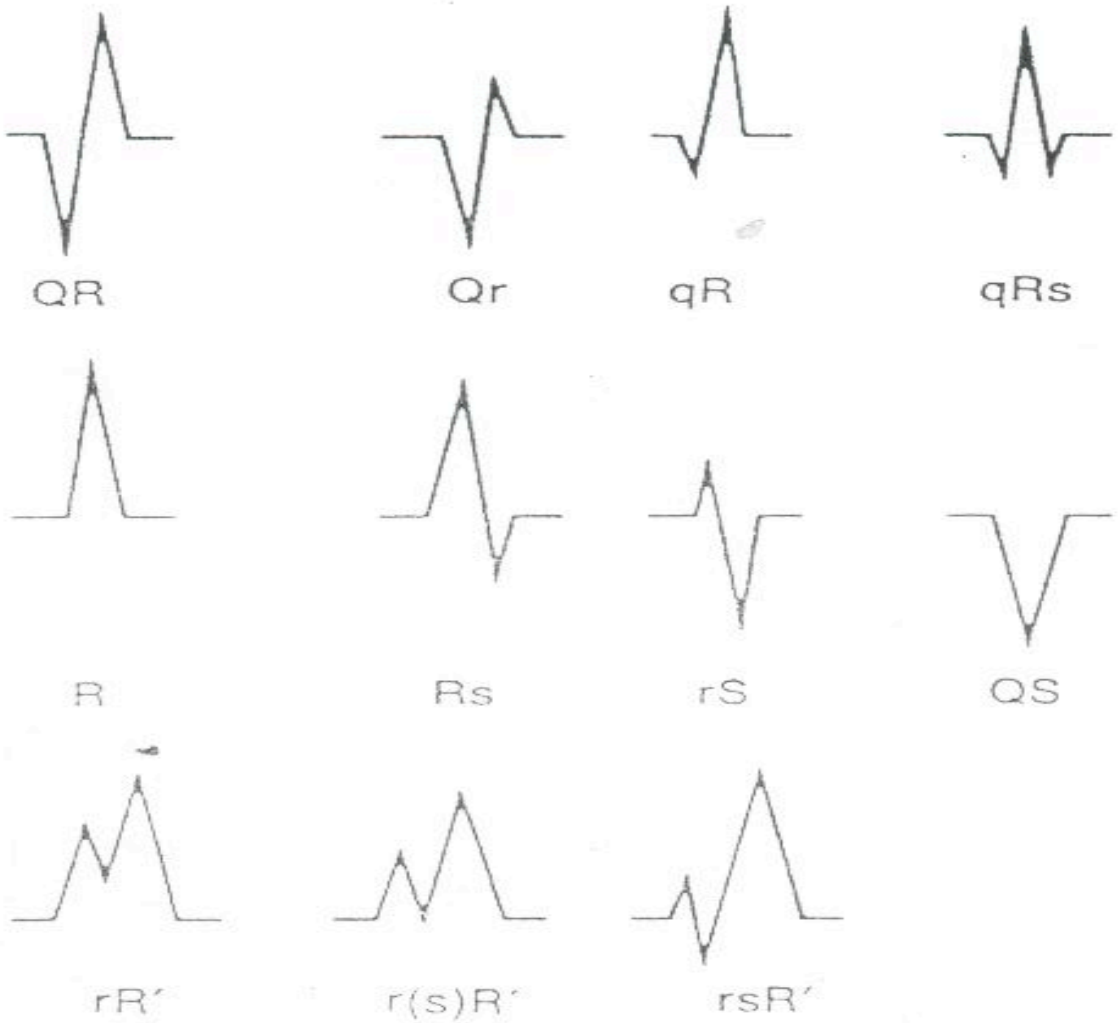
ECG normal.AQRS + 30 grados



ECG normal AQRS 0 grado



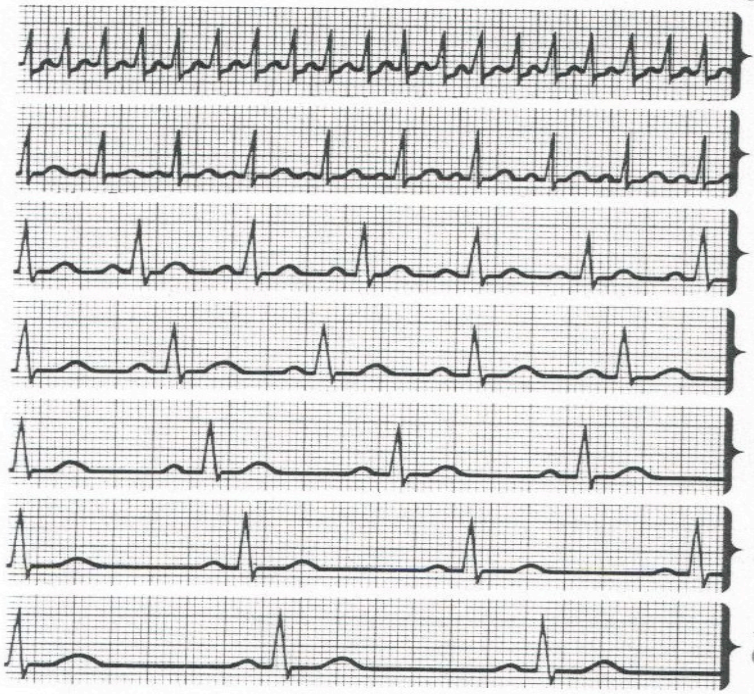
Nomenclatura QRS



Determination of Heart Rate

Regular rhythms

Measure interval between adjacent complexes and relate to large boxes ruled on ECG paper (1 large box represents 0.2 second; thus, there are 300 large boxes/minute)



F. Netter M.D.
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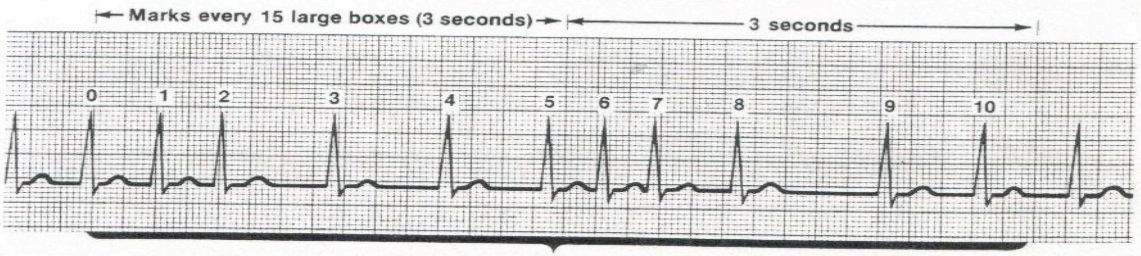
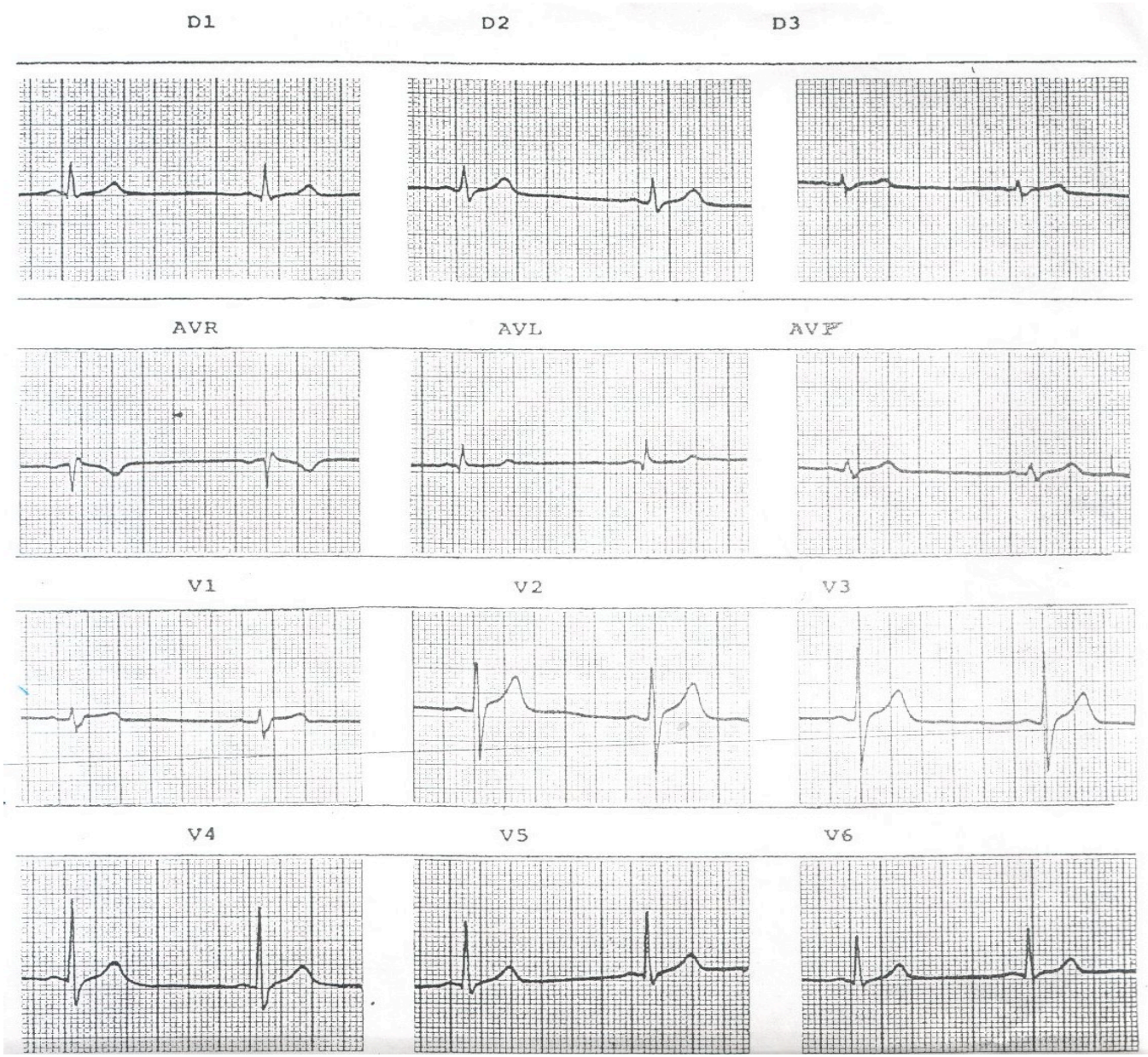
Irregular rhythms

Count number of complexes over given period of time, usually in 6-second interval included within 2 time markers at top border of ECG paper



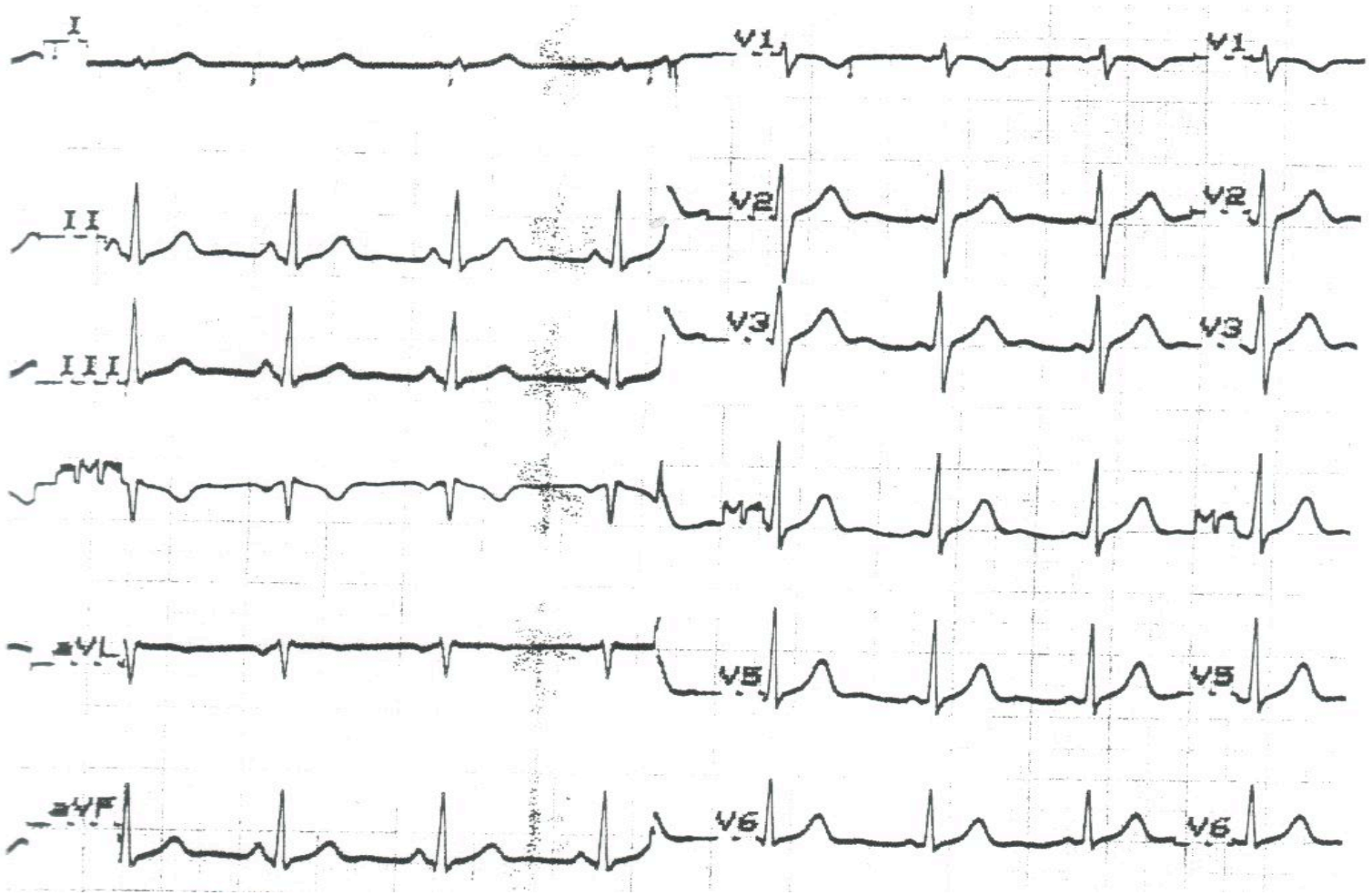
Find complex that coincides with time marker at top. Then count number of complexes in span of 30 large boxes, i.e., 2 groups of 15 boxes each as marked by lines or dots at top of ECG paper (in this case, 10½). Since each large box = 0.2 second, 30 large boxes = 30 x 0.2 = 6 seconds. Multiply by 10 to give rate/60 seconds (in this case, 10½ x 10 = rate of 105/minute)

ECG normal

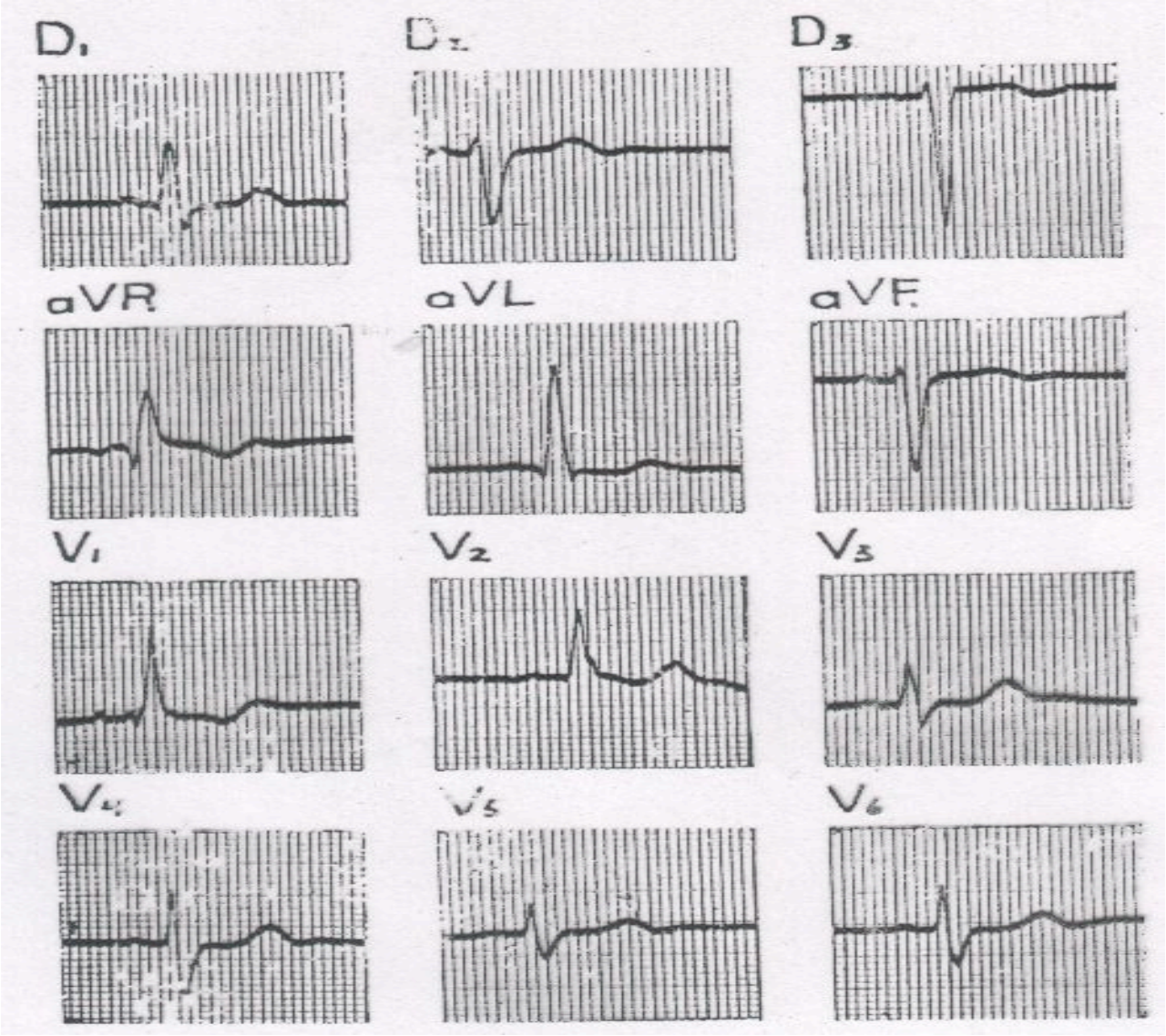


AQRS +45

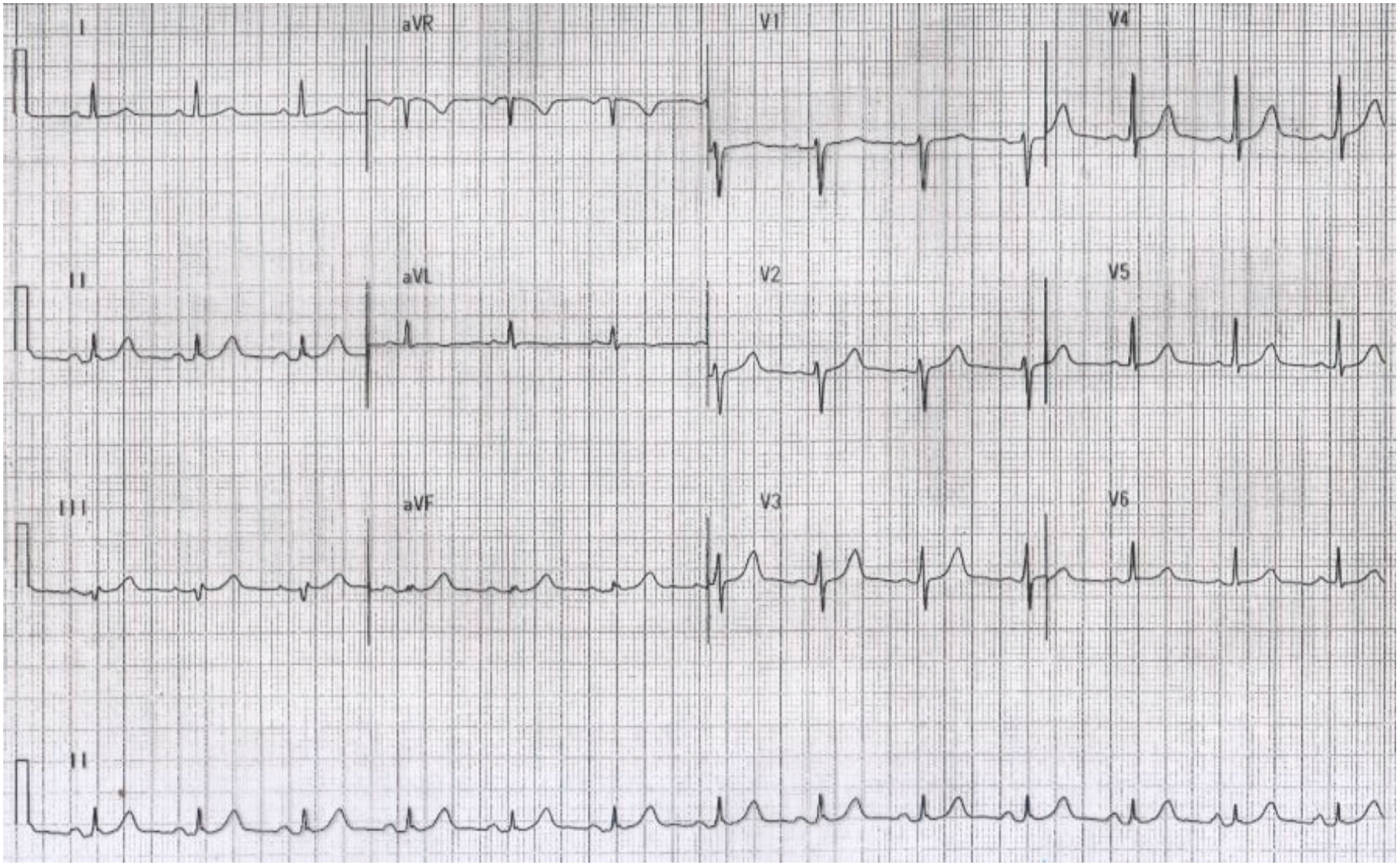
ECG normal. AQRS + 75 grados



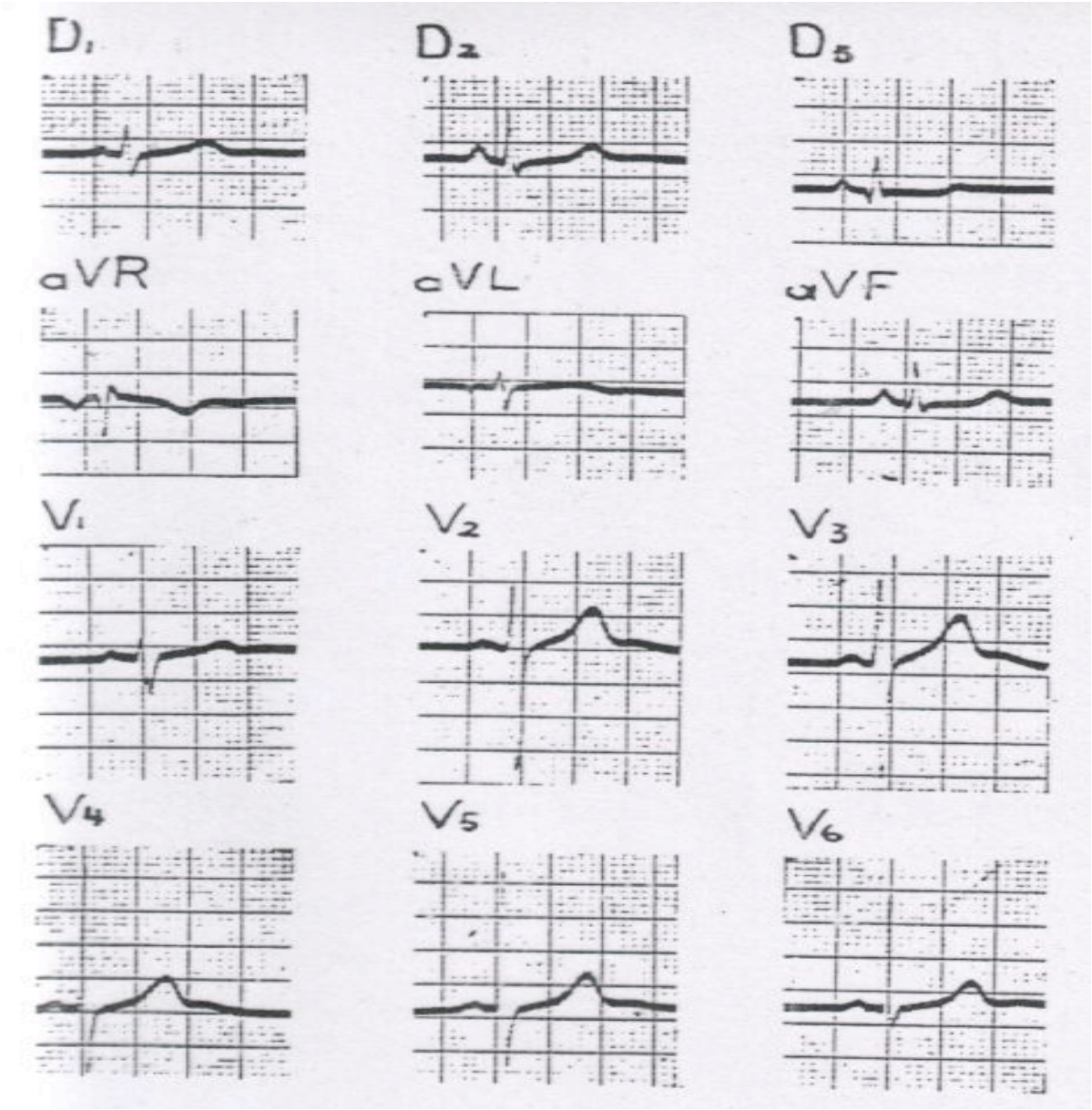
ECG anormal(BCRD+HBAI) AQRS -75 grados



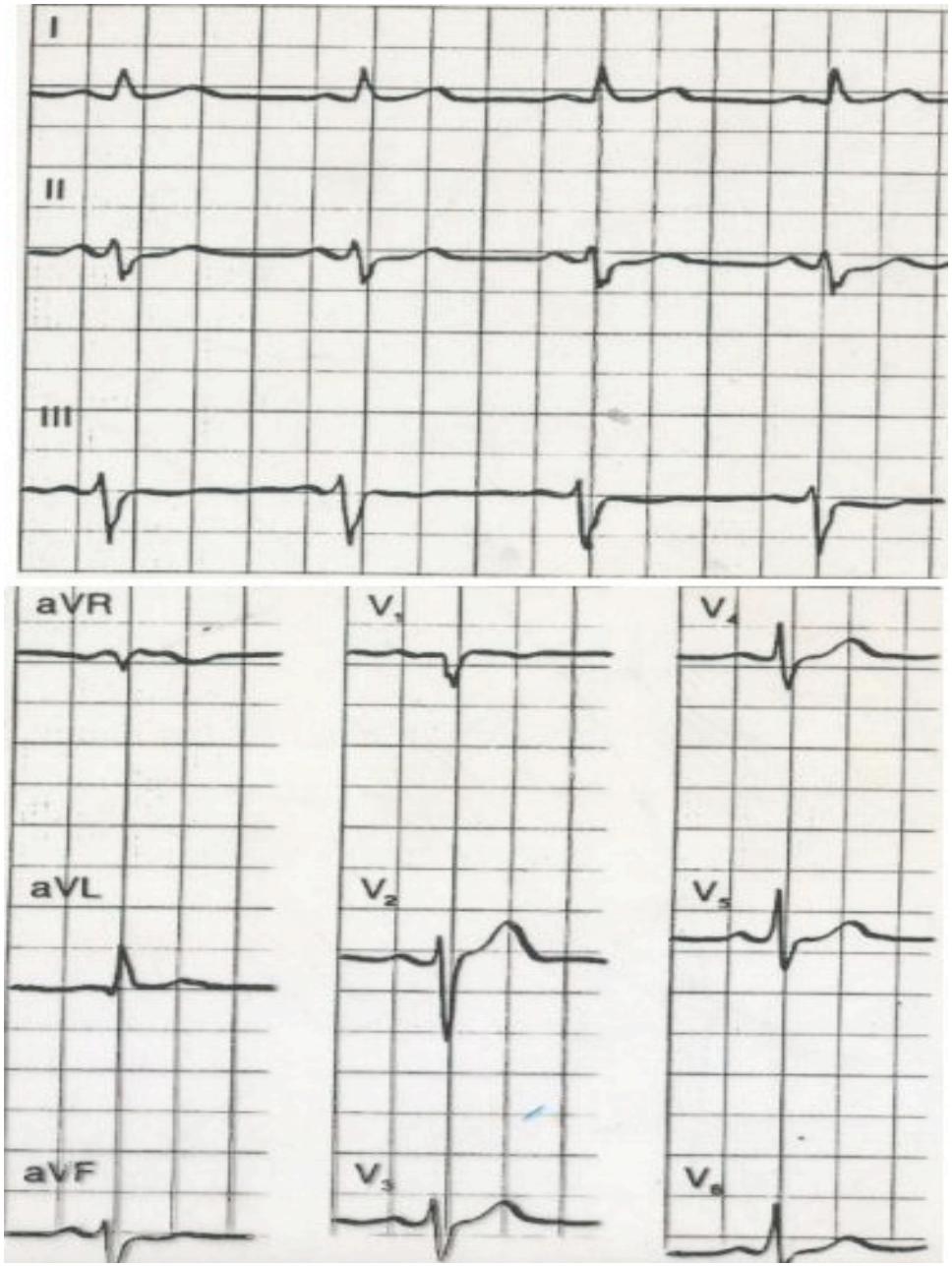
ECG normal AQRS +30 grados



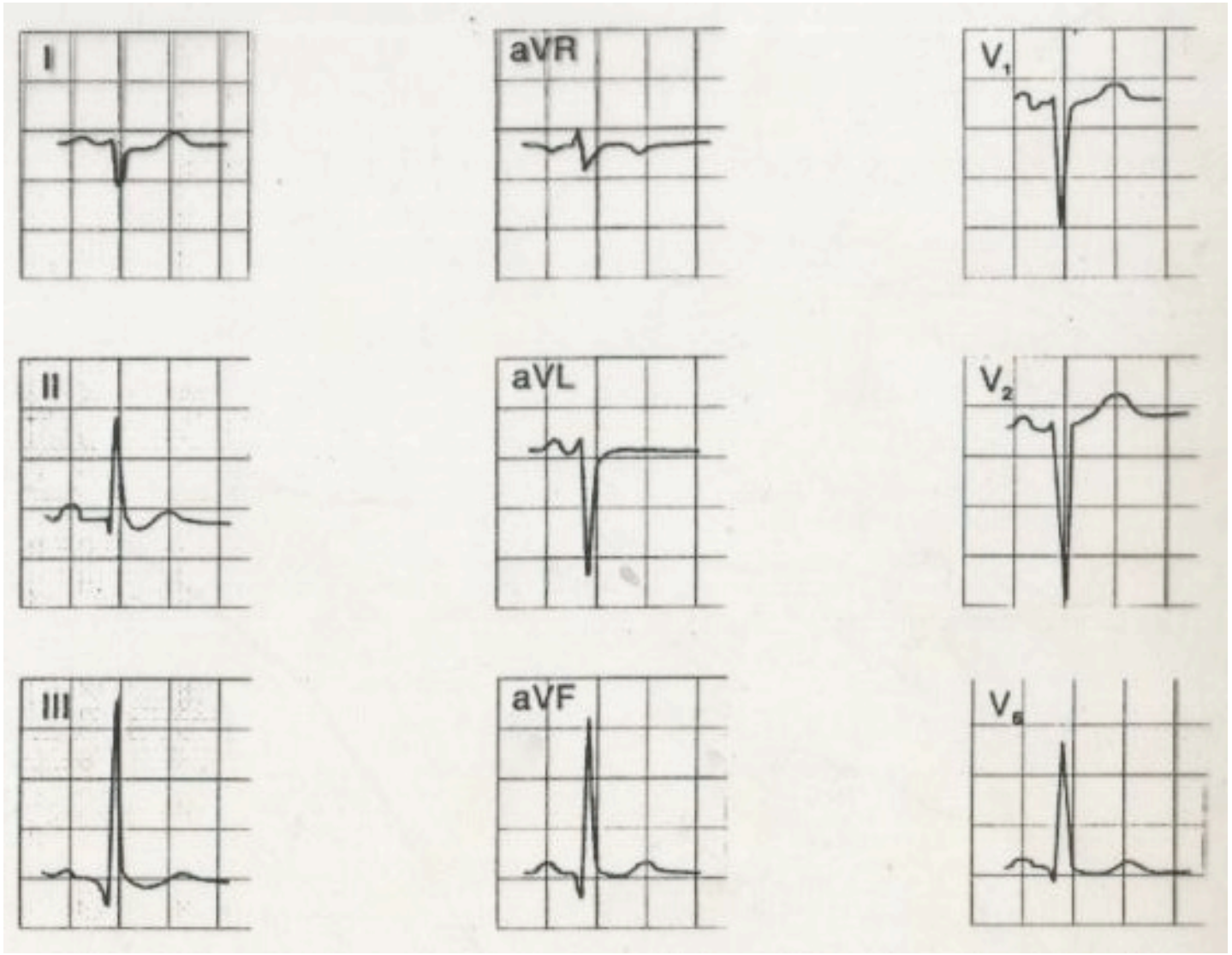
ECG normal.AQRS +90 grados



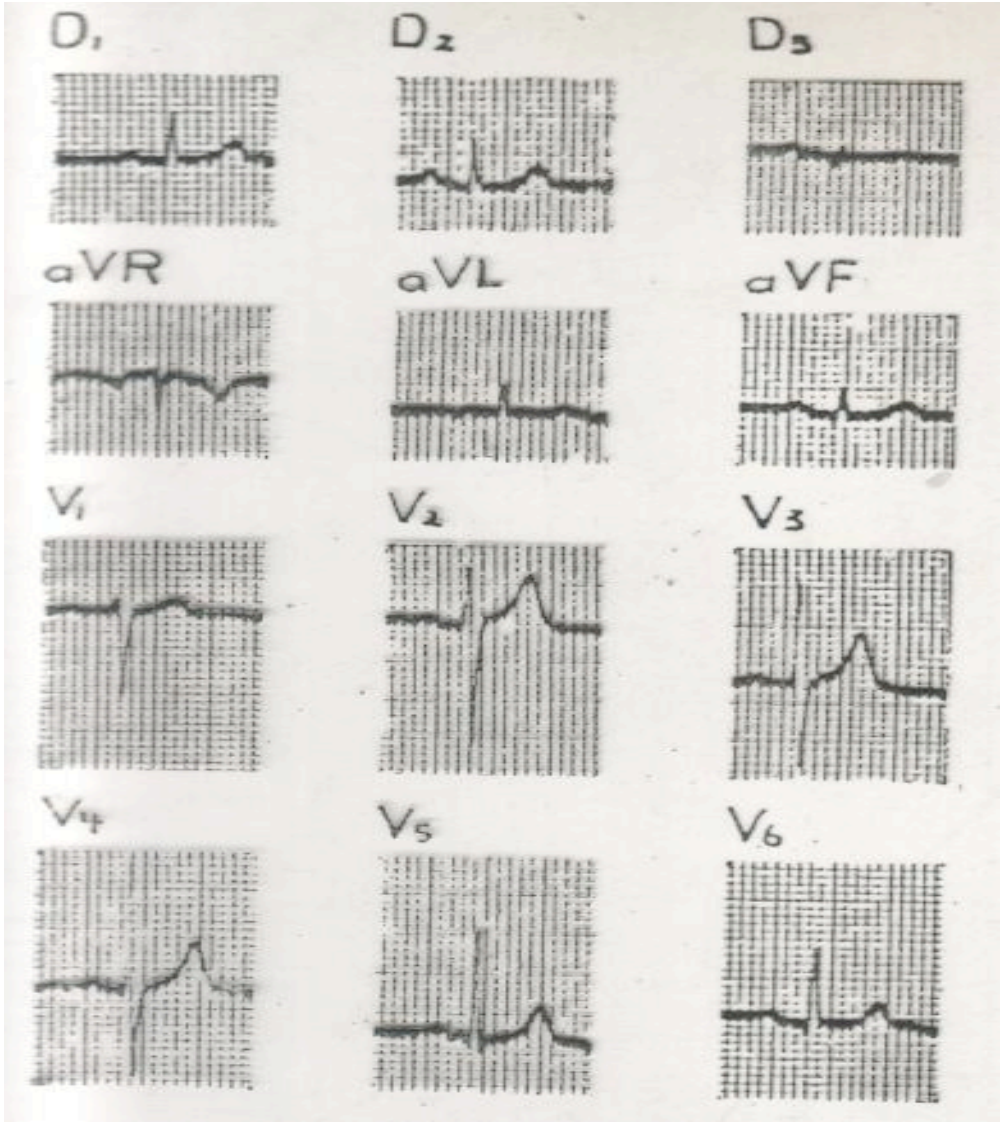
ECG con AQRS -30 grados



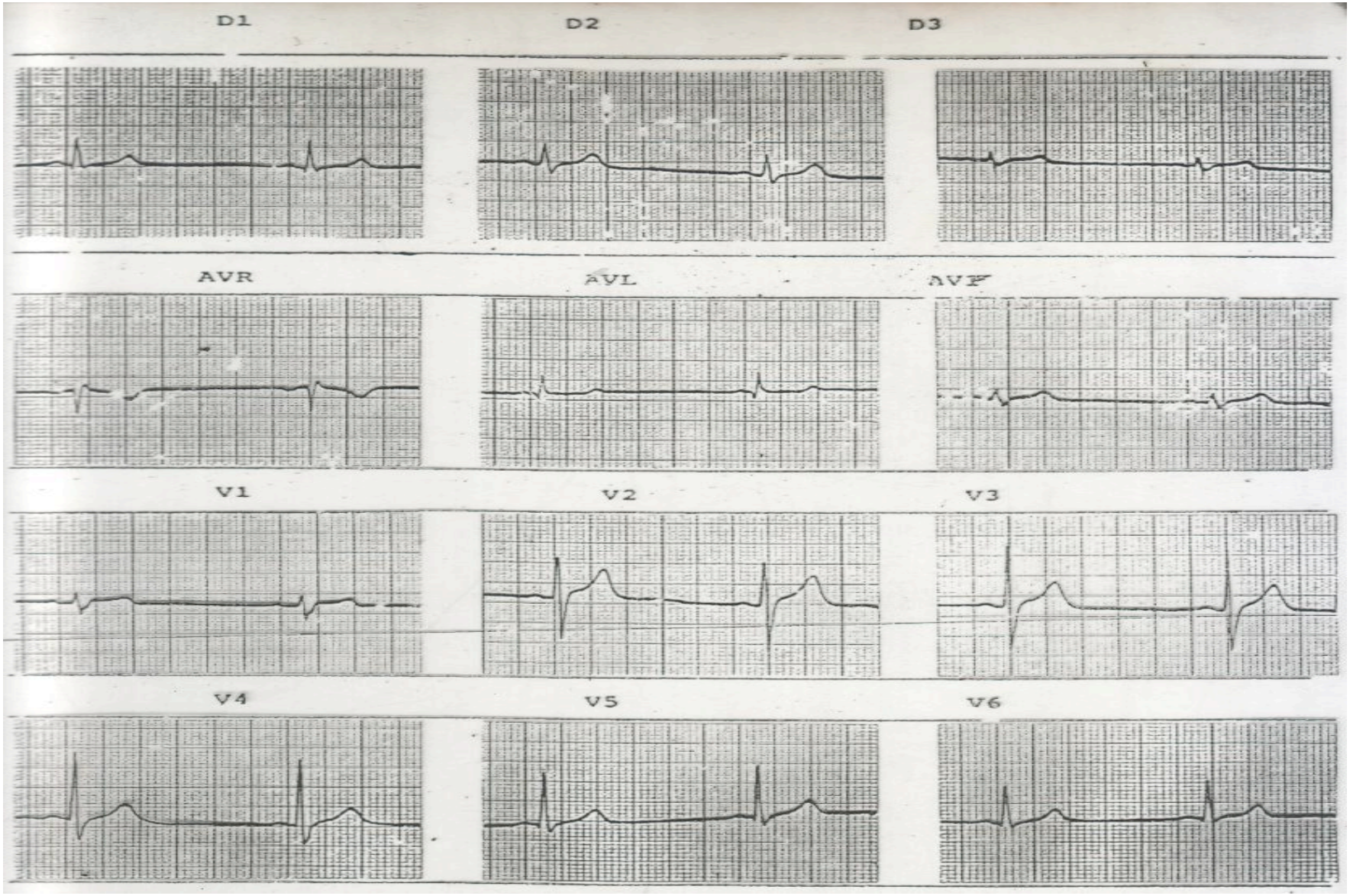
HBIP AQRS +120 grados



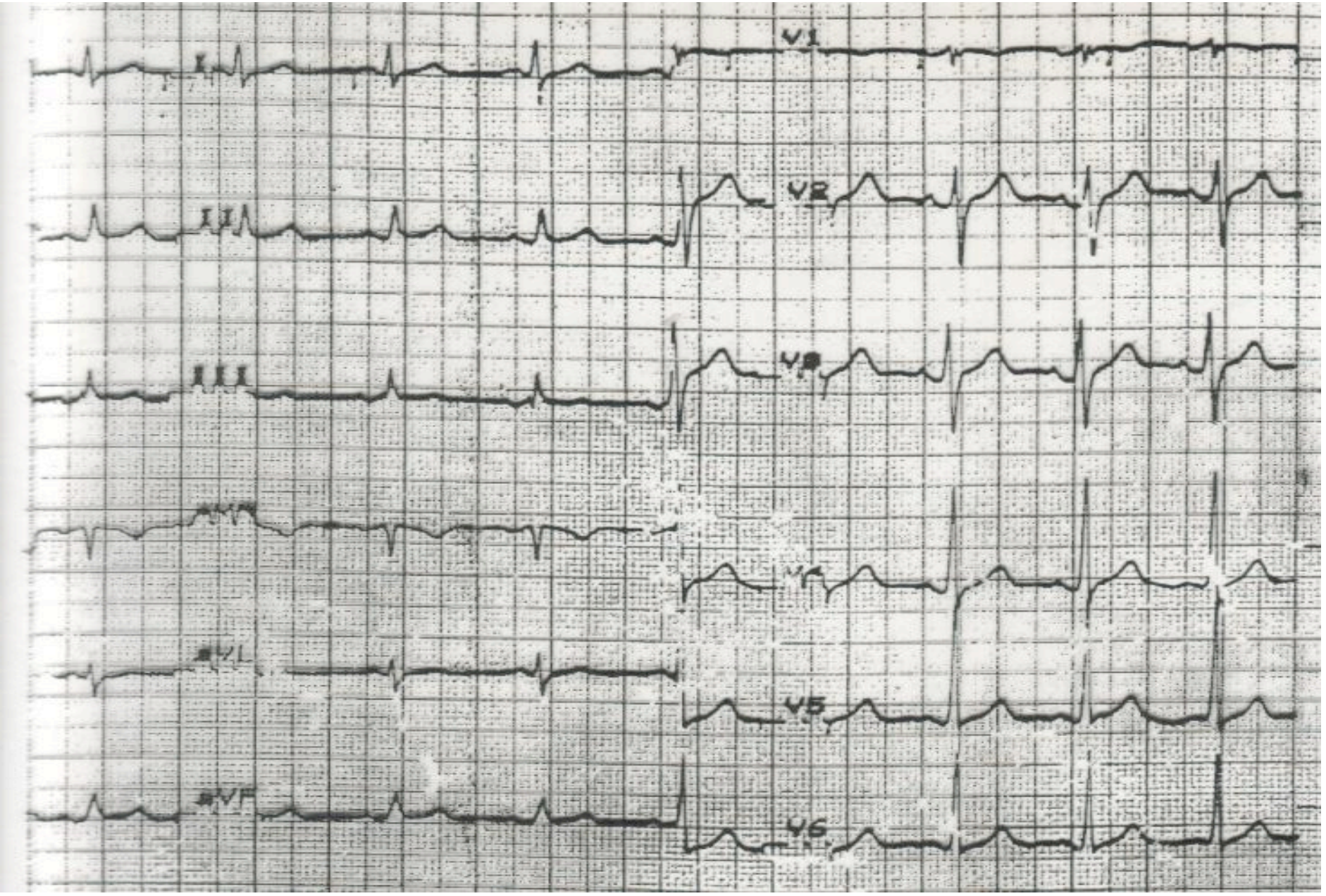
Calcule el eje eléctrico



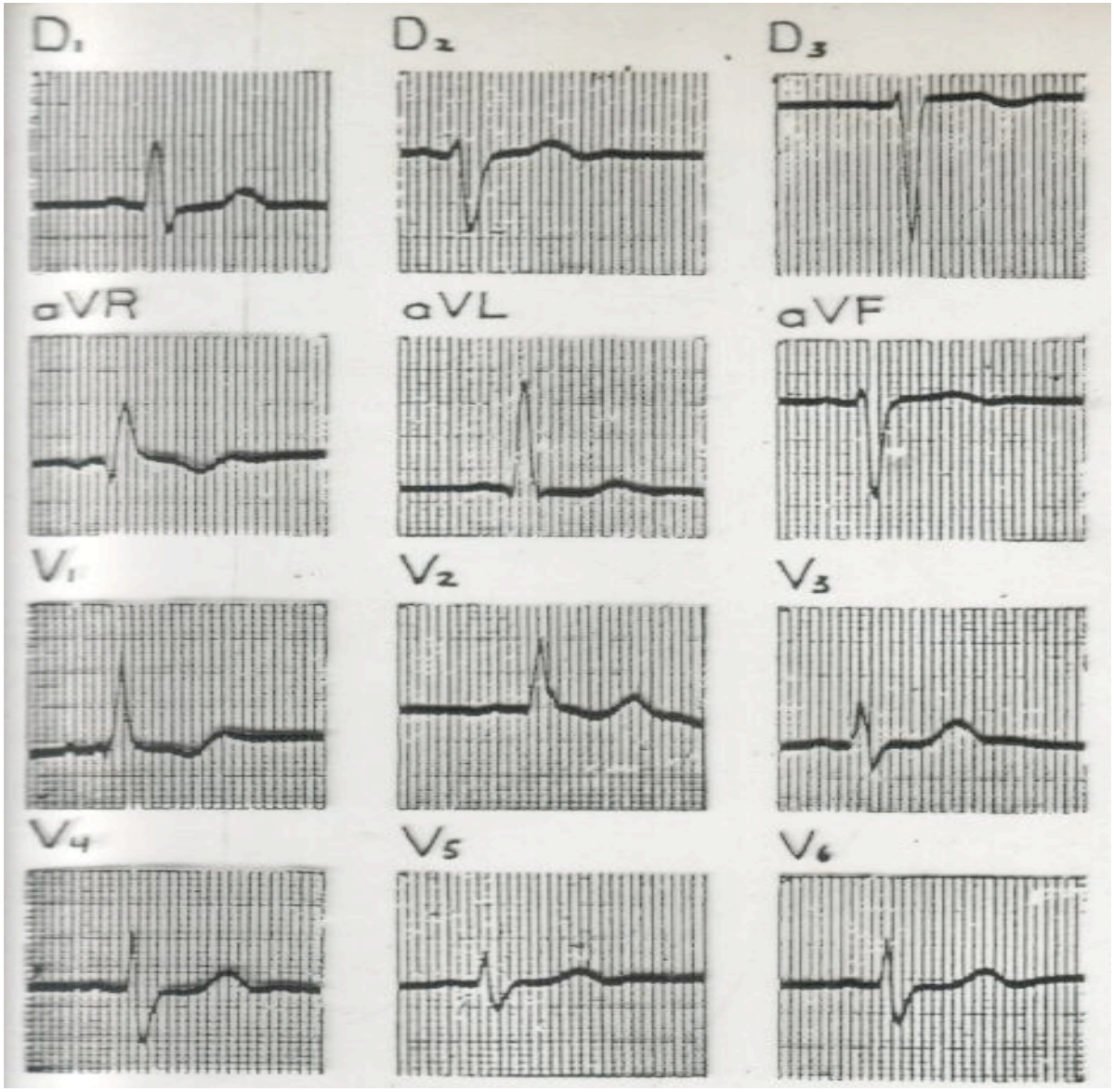
Calcule el eje eléctrico



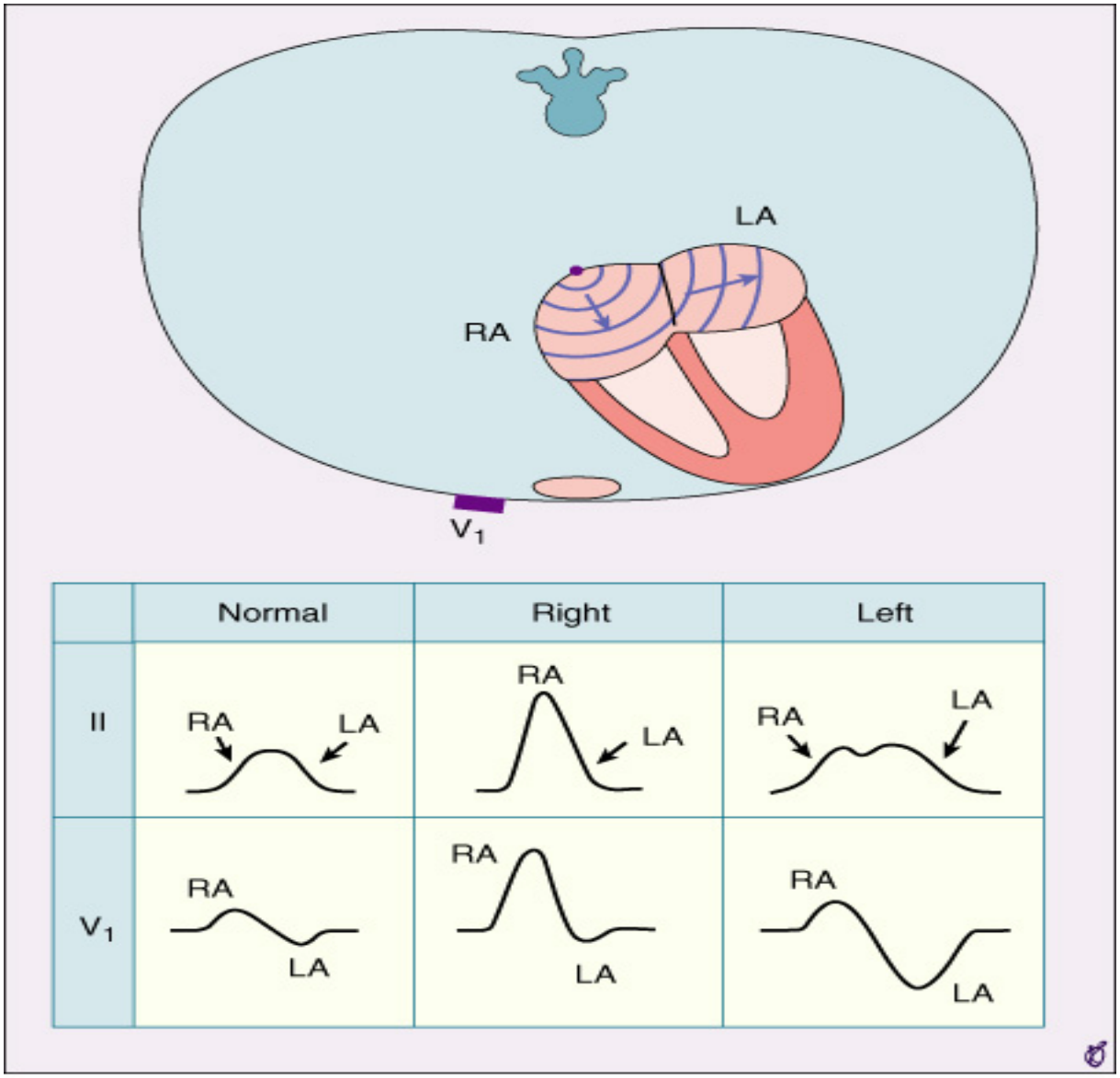
Calcule el eje eléctrico



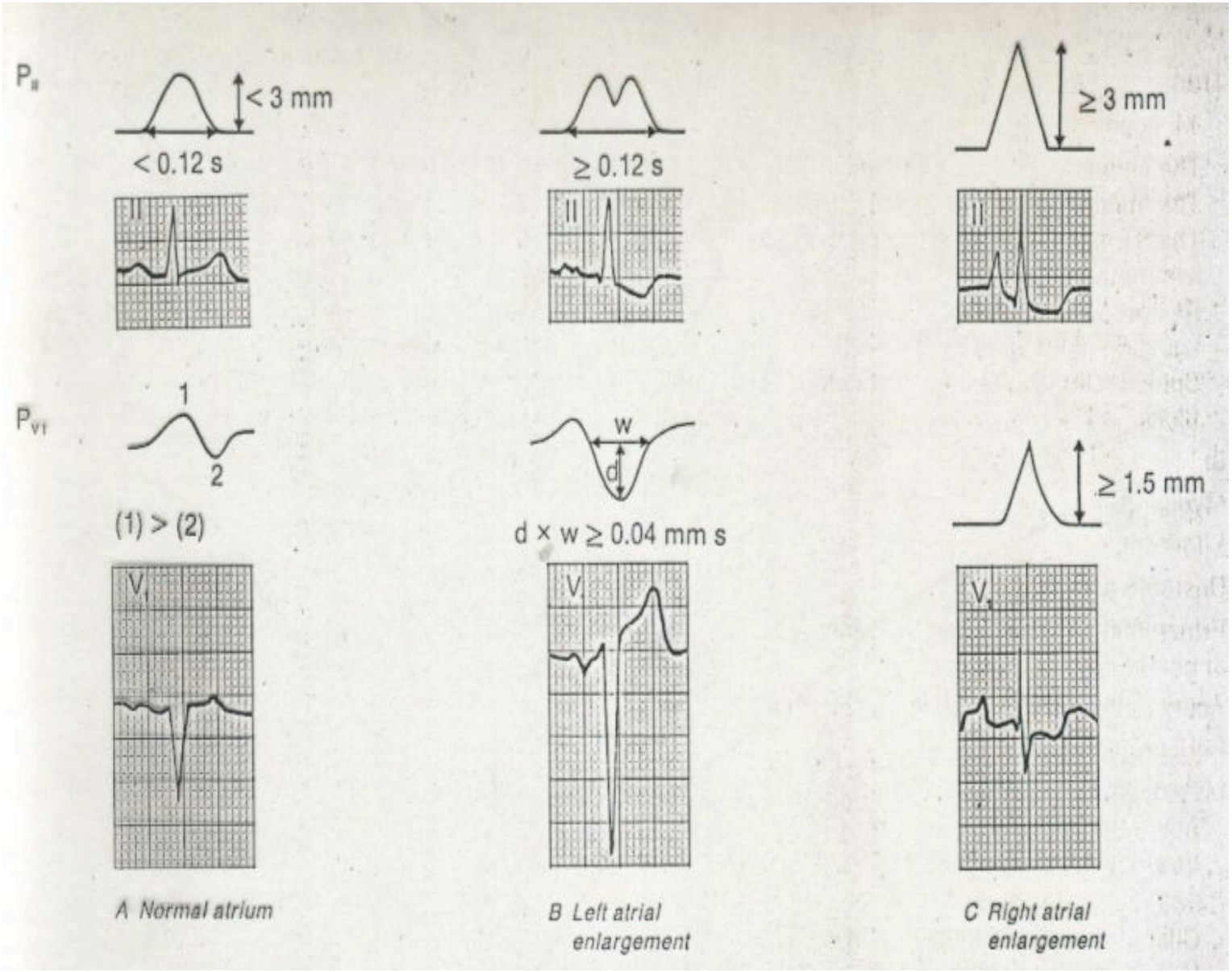
Calcule el eje eléctrico



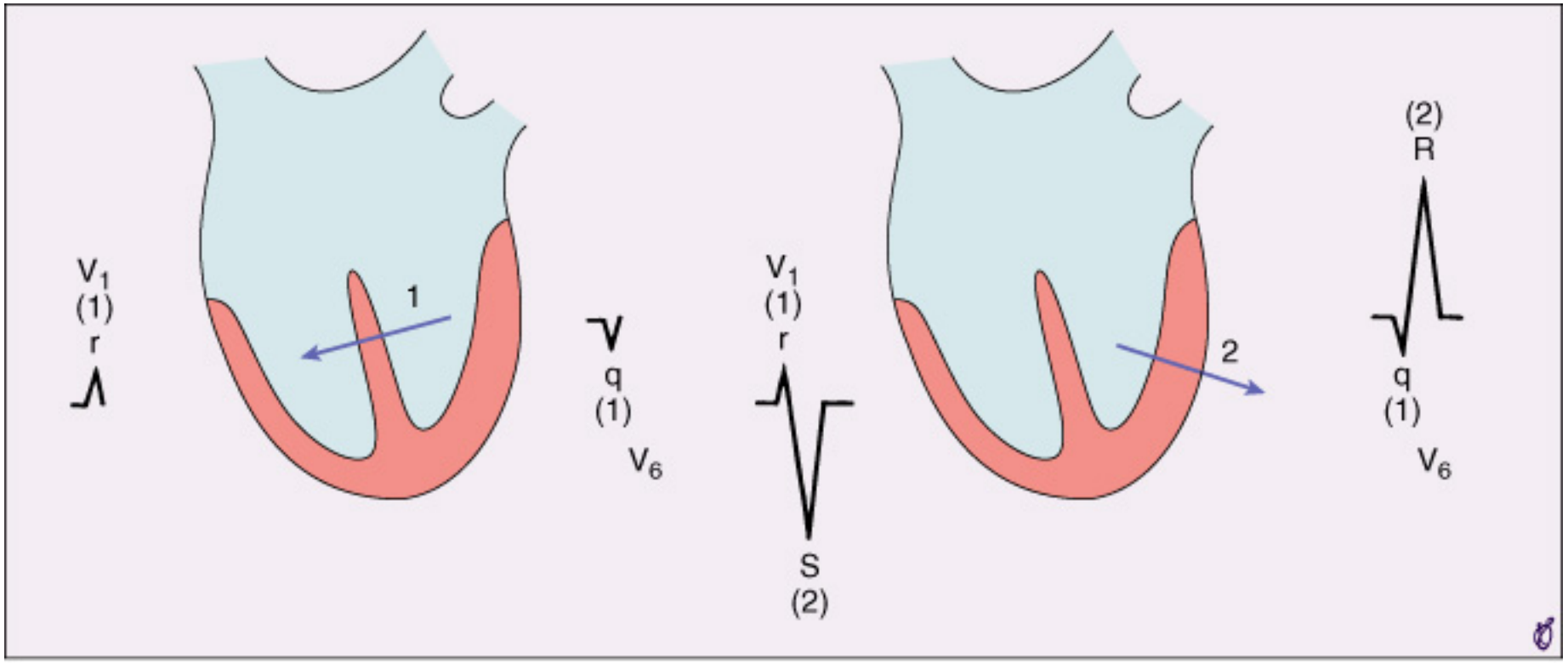
Depolarización auricular



Onda P


P_{II}
< 3 mm
< 0.12 s
II
≥ 0.12 s
II
≥ 3 mm
II
P_{V1}
1
2
(1) > (2)
V_1
A Normal atrium
w
d
d × w ≥ 0.04 mm s
V_1
B Left atrial enlargement
≥ 1.5 mm
V_1
C Right atrial enlargement

Vectores de depolarización ventricular



Reacción Ventricular Izquierda

Pattern de Hipertrofia: QRS

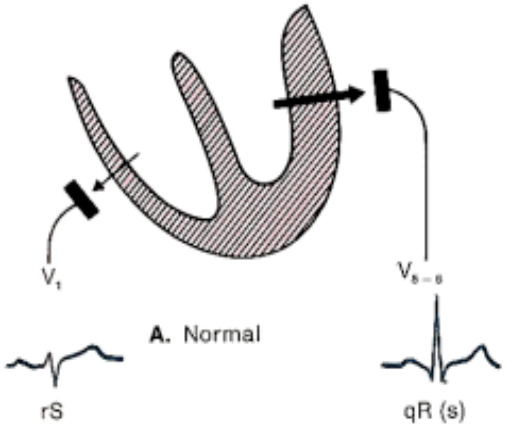
Pattern de Stress : ST-T

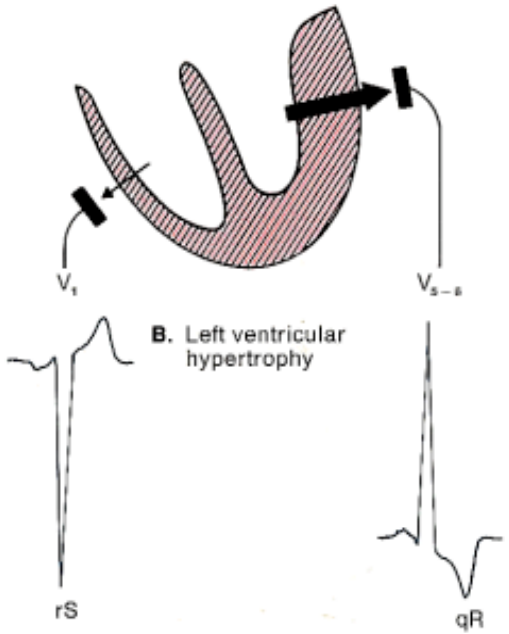
Reacción Ventricular Derecha

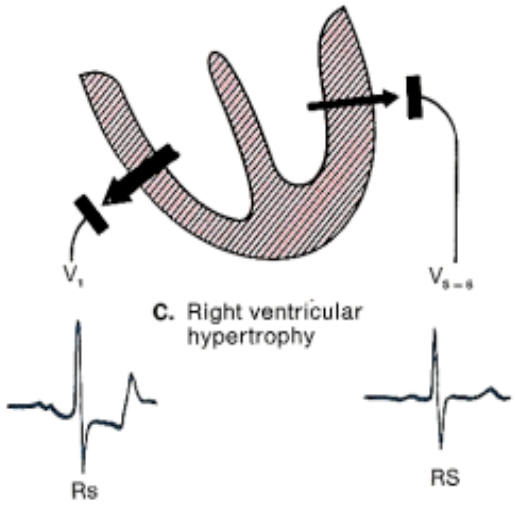
Pattern de Hipertrofia: QRS

Pattern de Stress : ST-T

Vectores en Hipertrofias Ventriculares





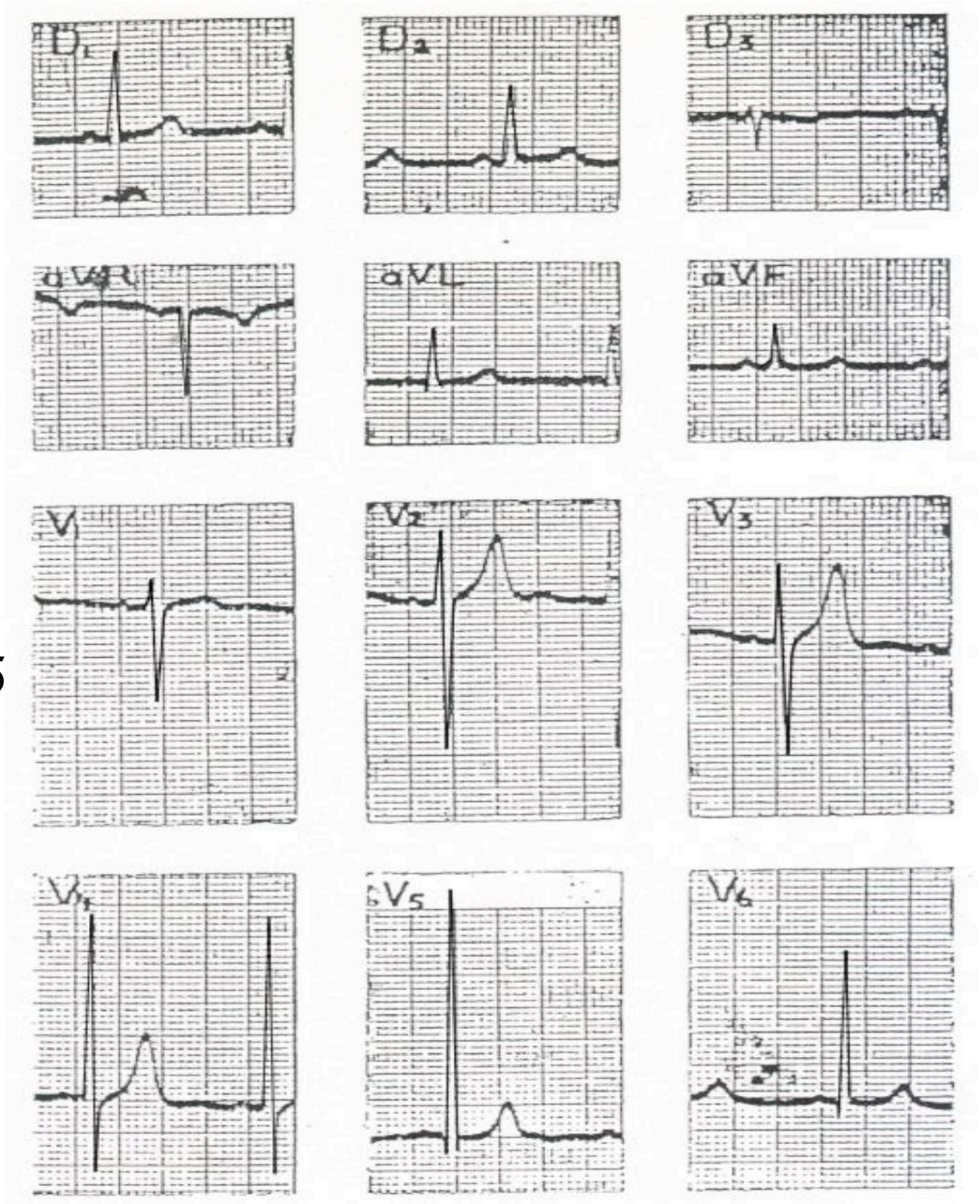


ECG en Hipertrofias

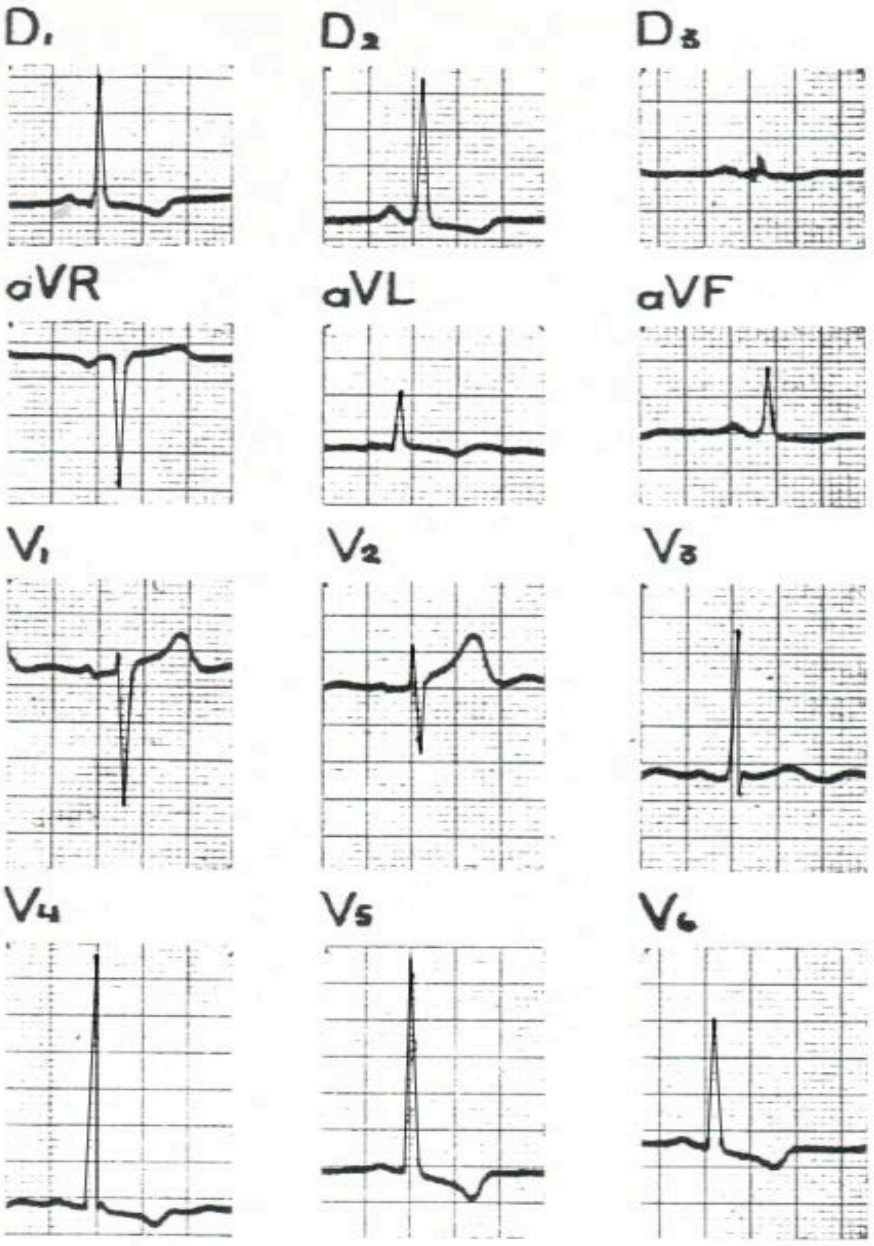
Hipertrofia ventricular derecha

Hipertrofia ventricular izquierda

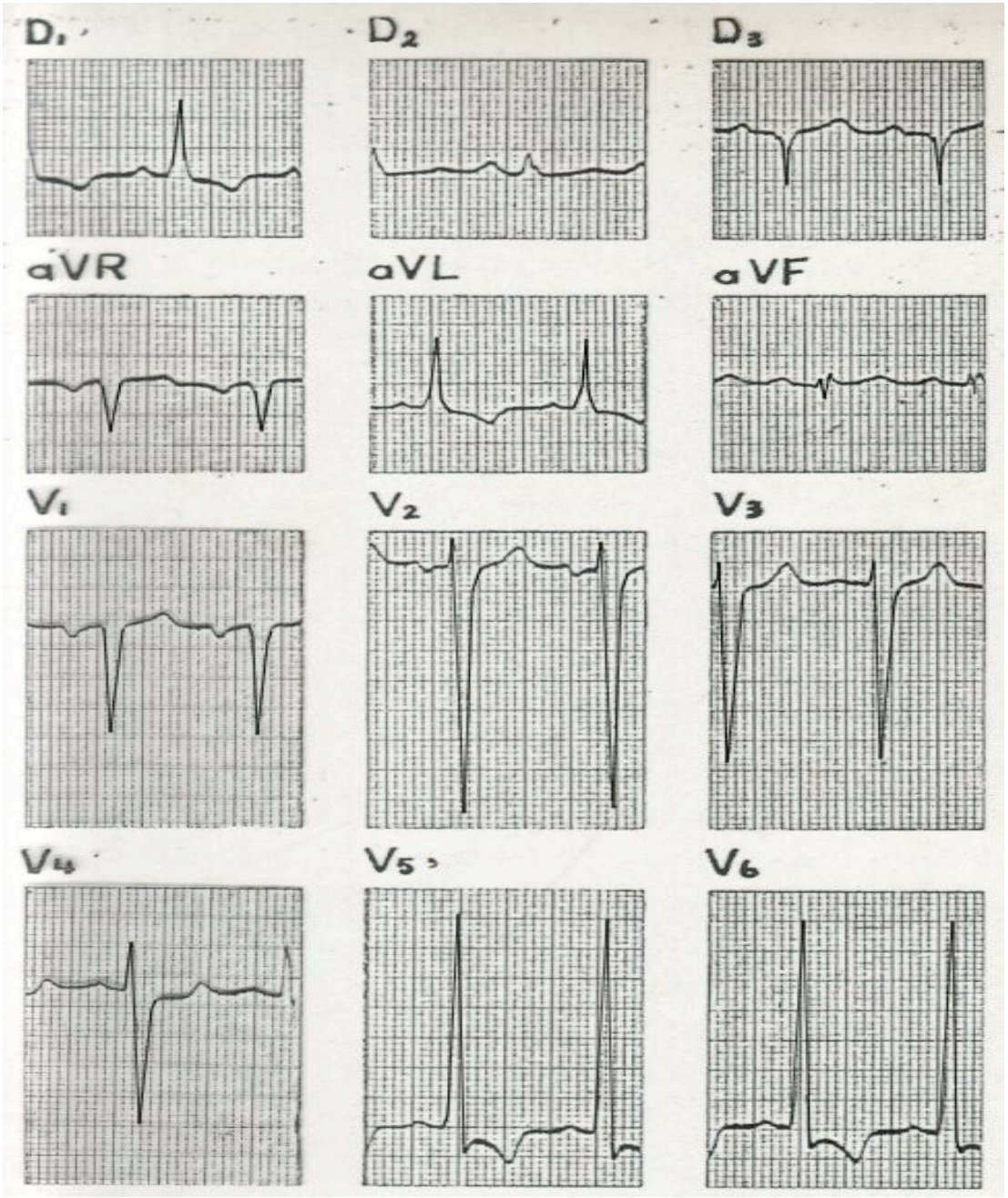
HVI
R alta V5



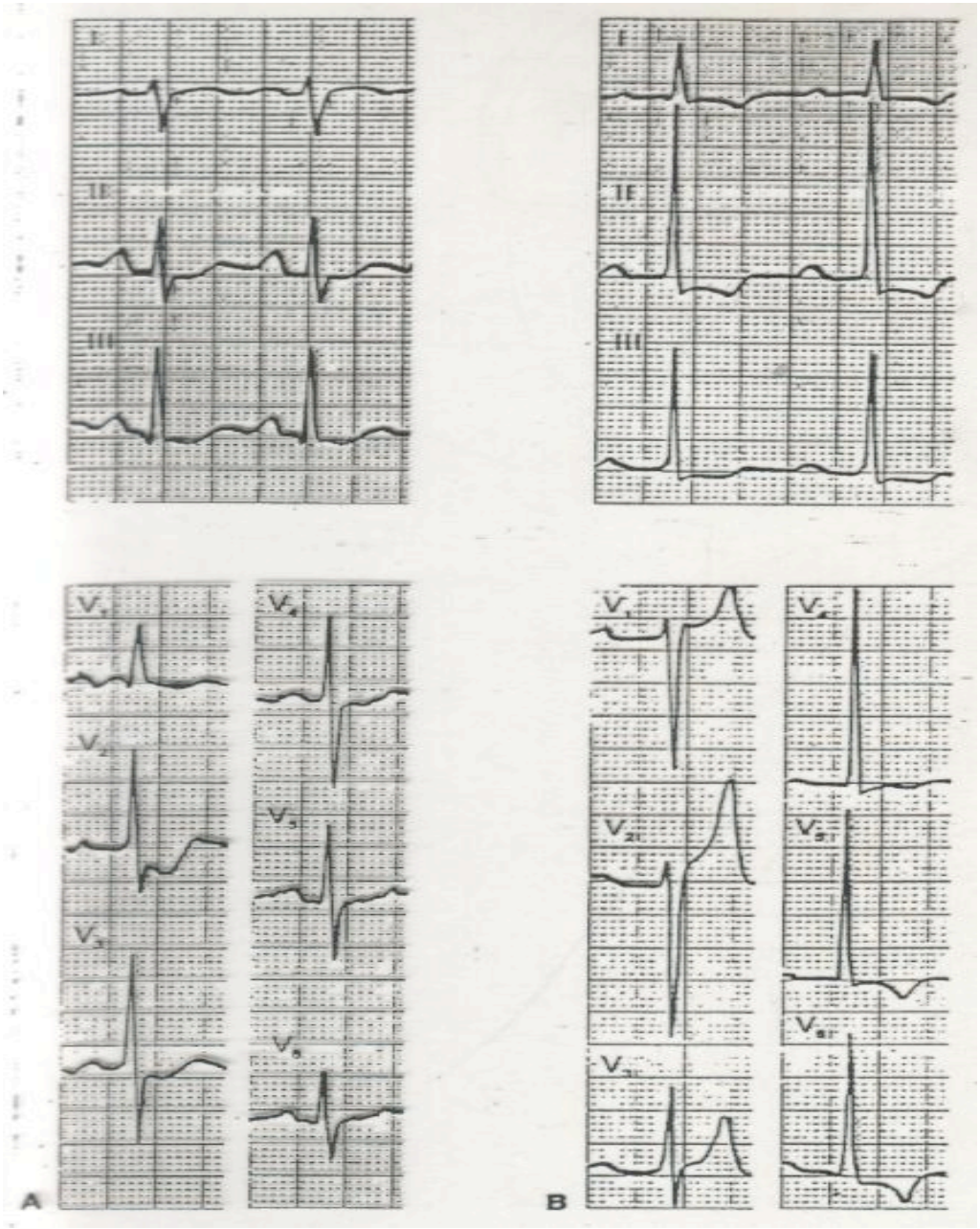
HVI



HVI

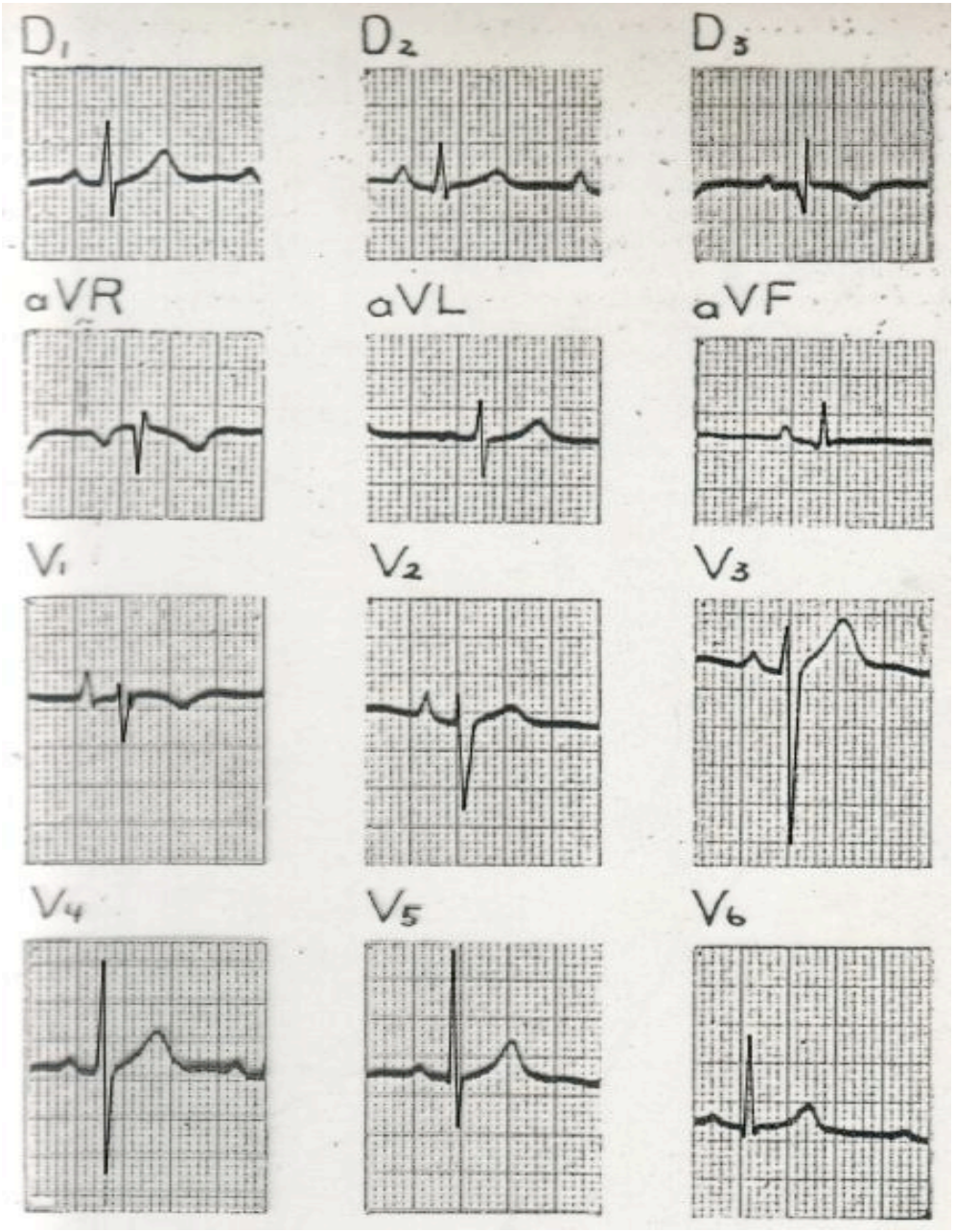


HVD

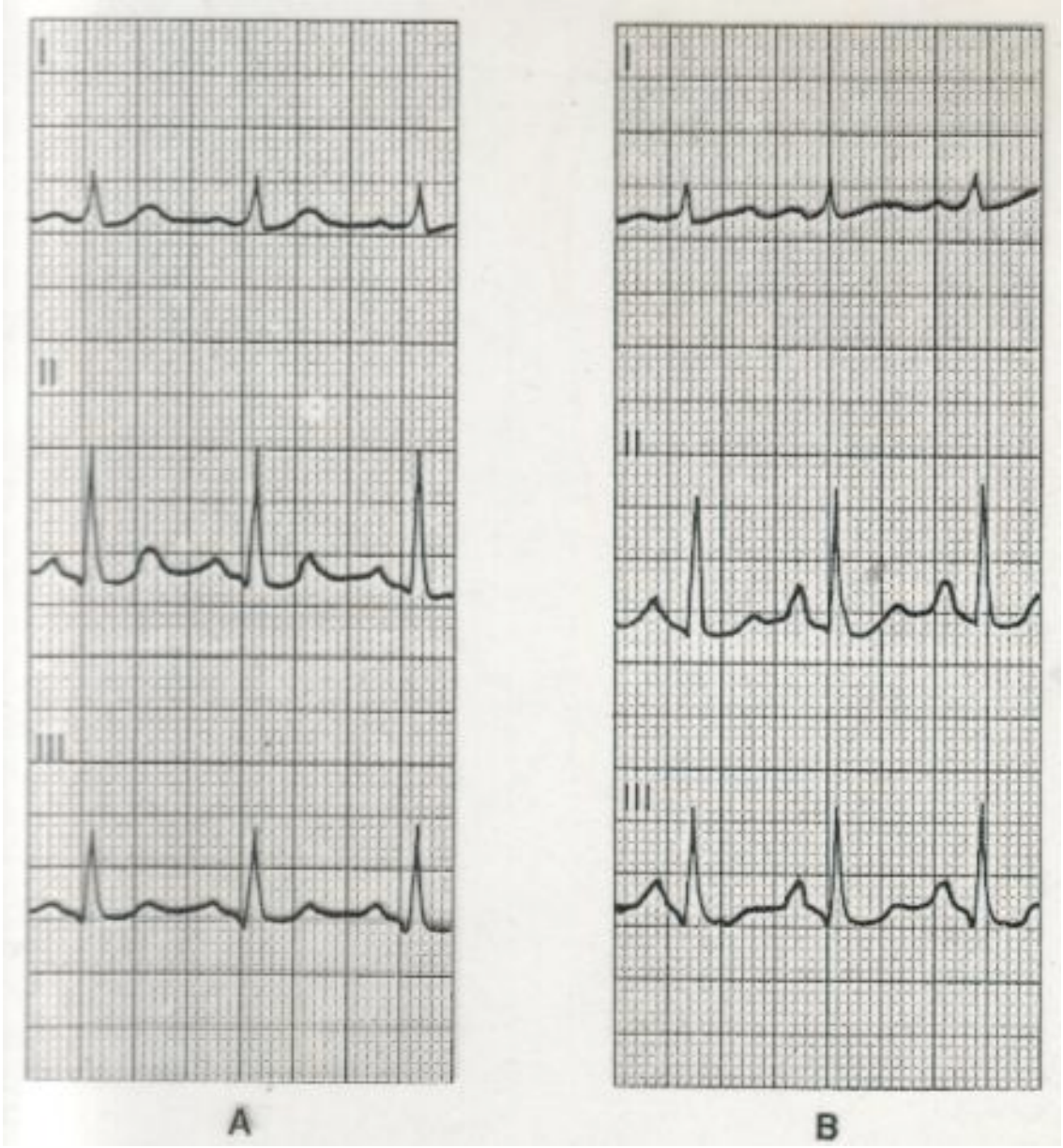


HVI

RAD

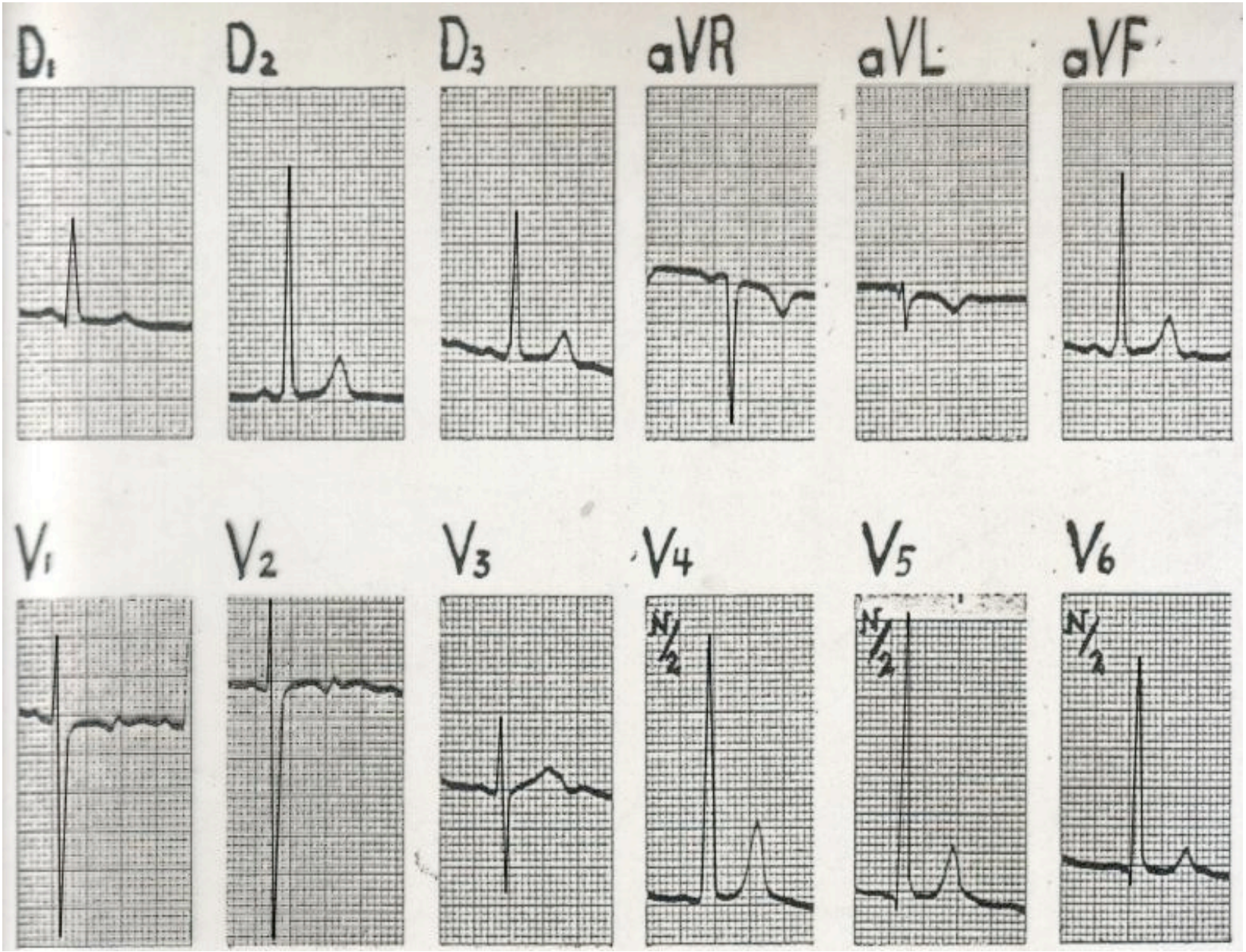


P normal

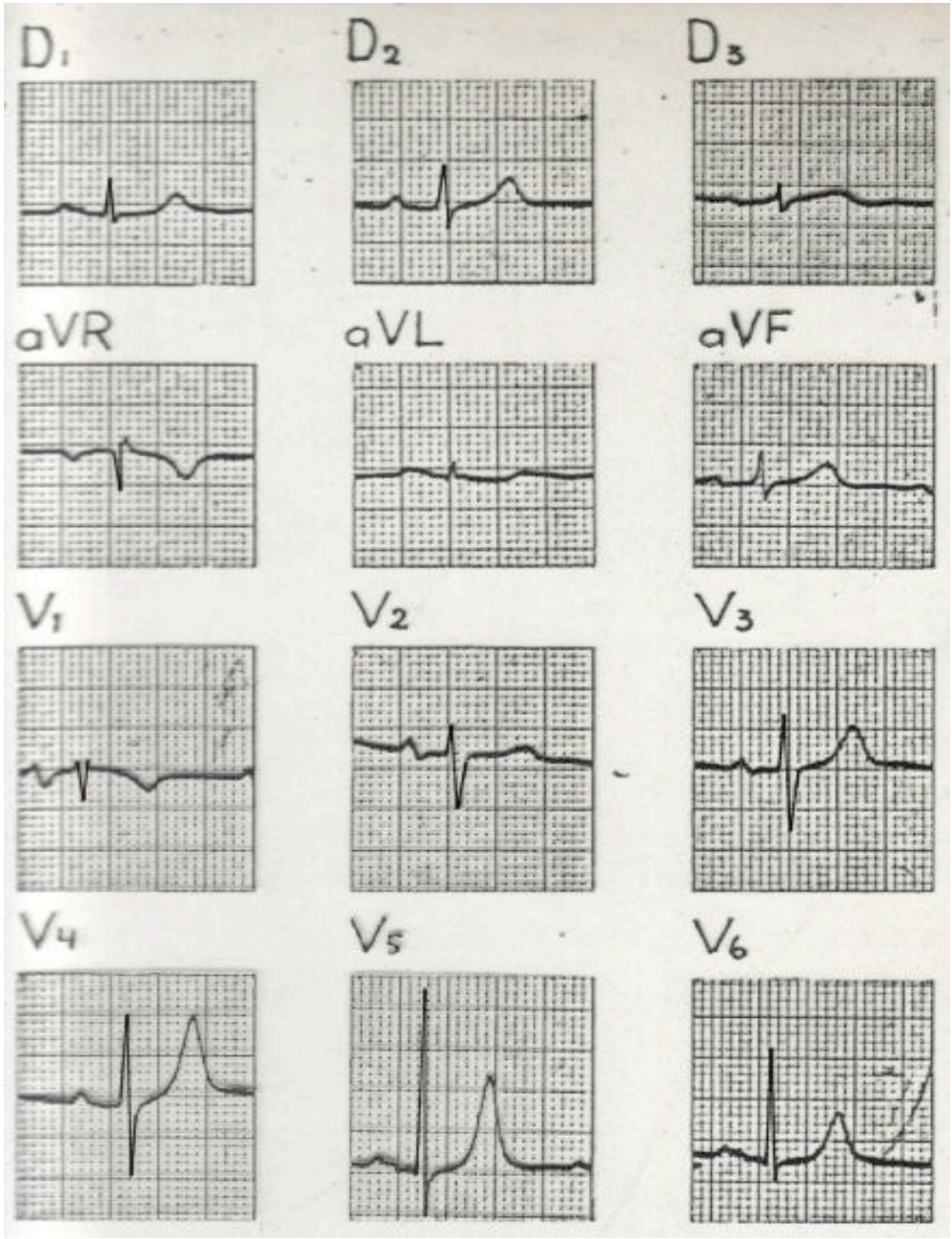


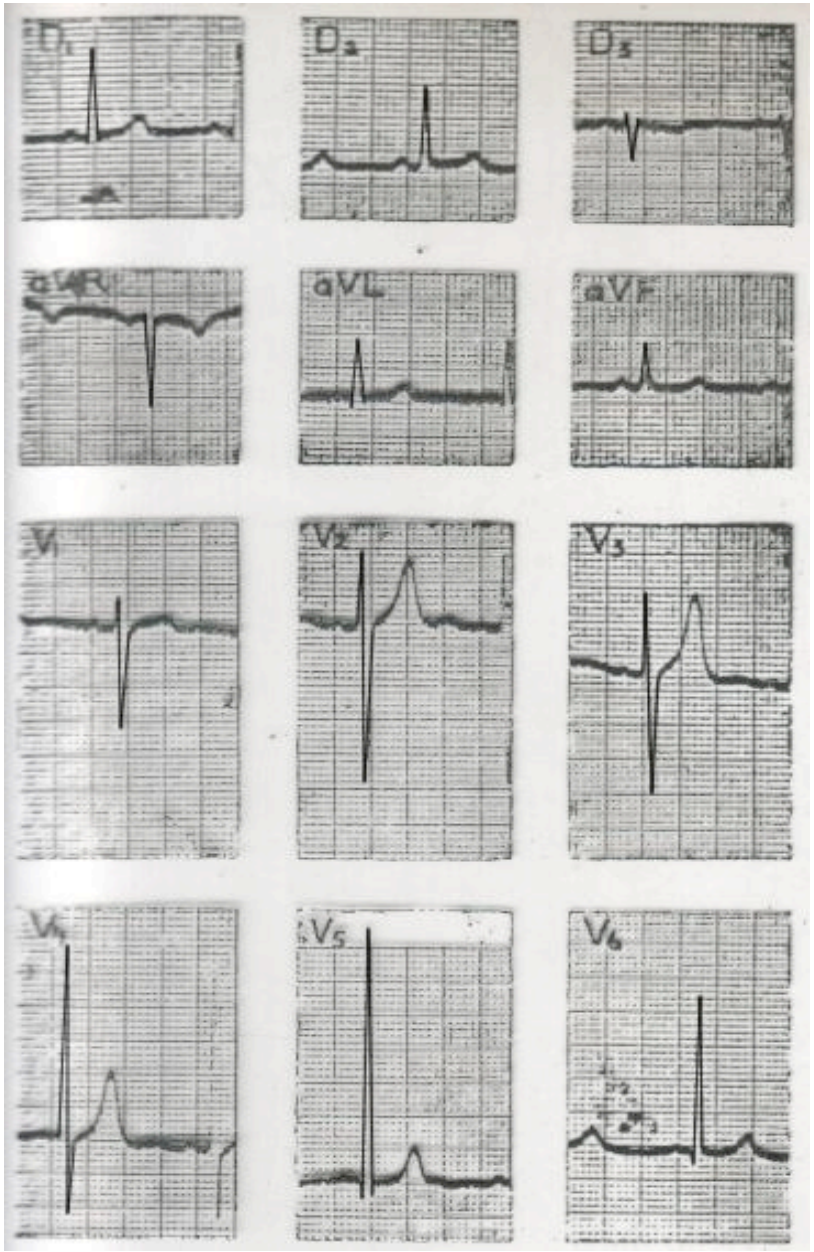
RAD

HVI

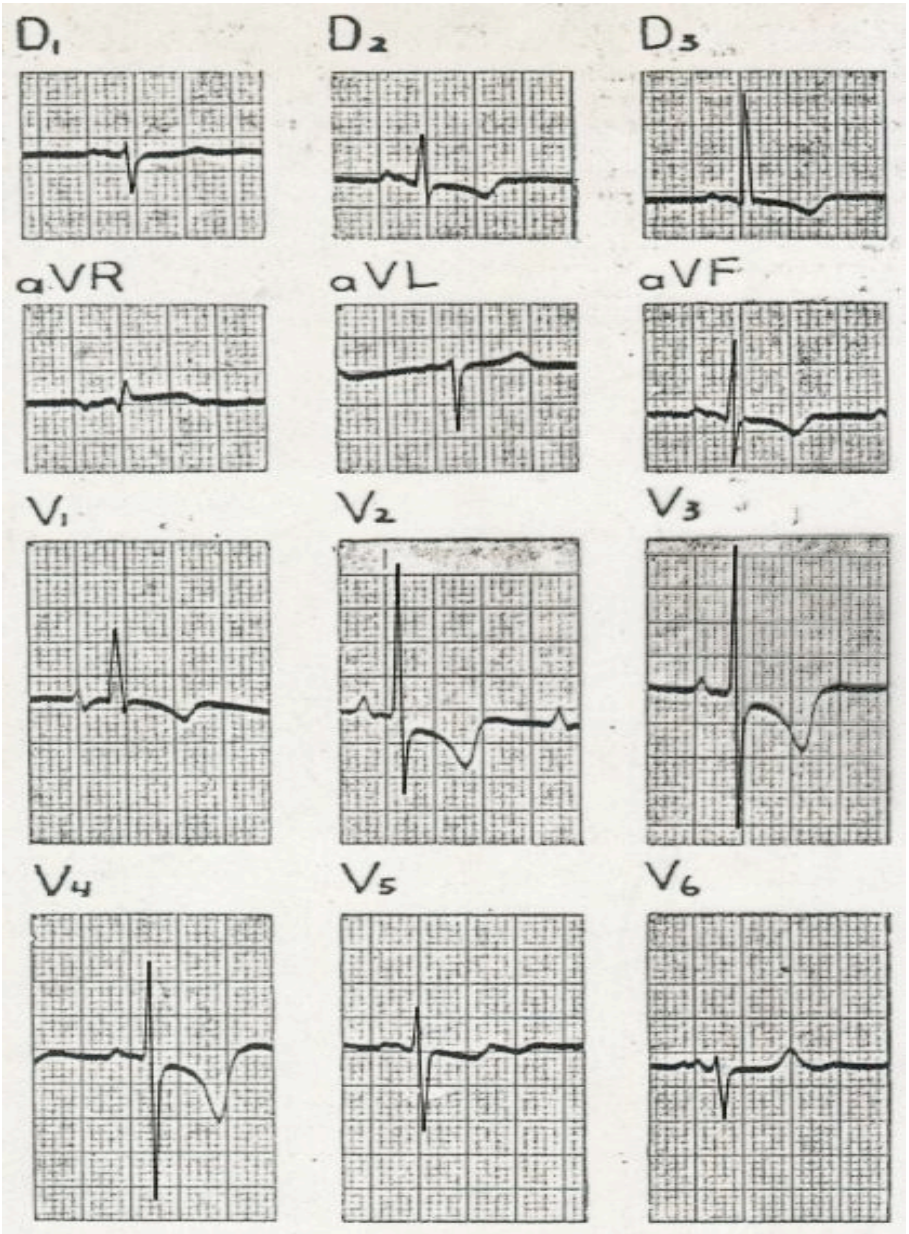


RAI





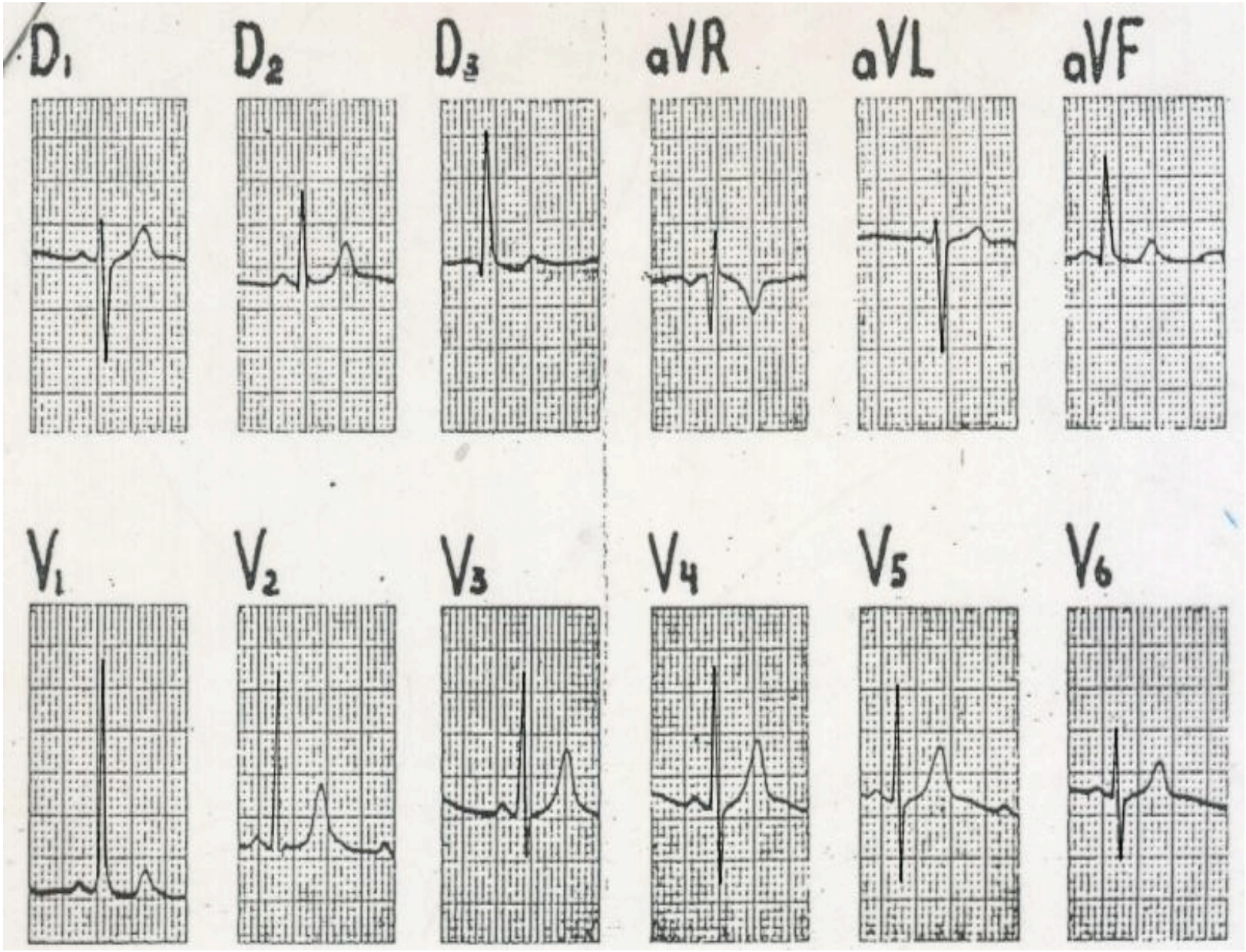
R alta en V5



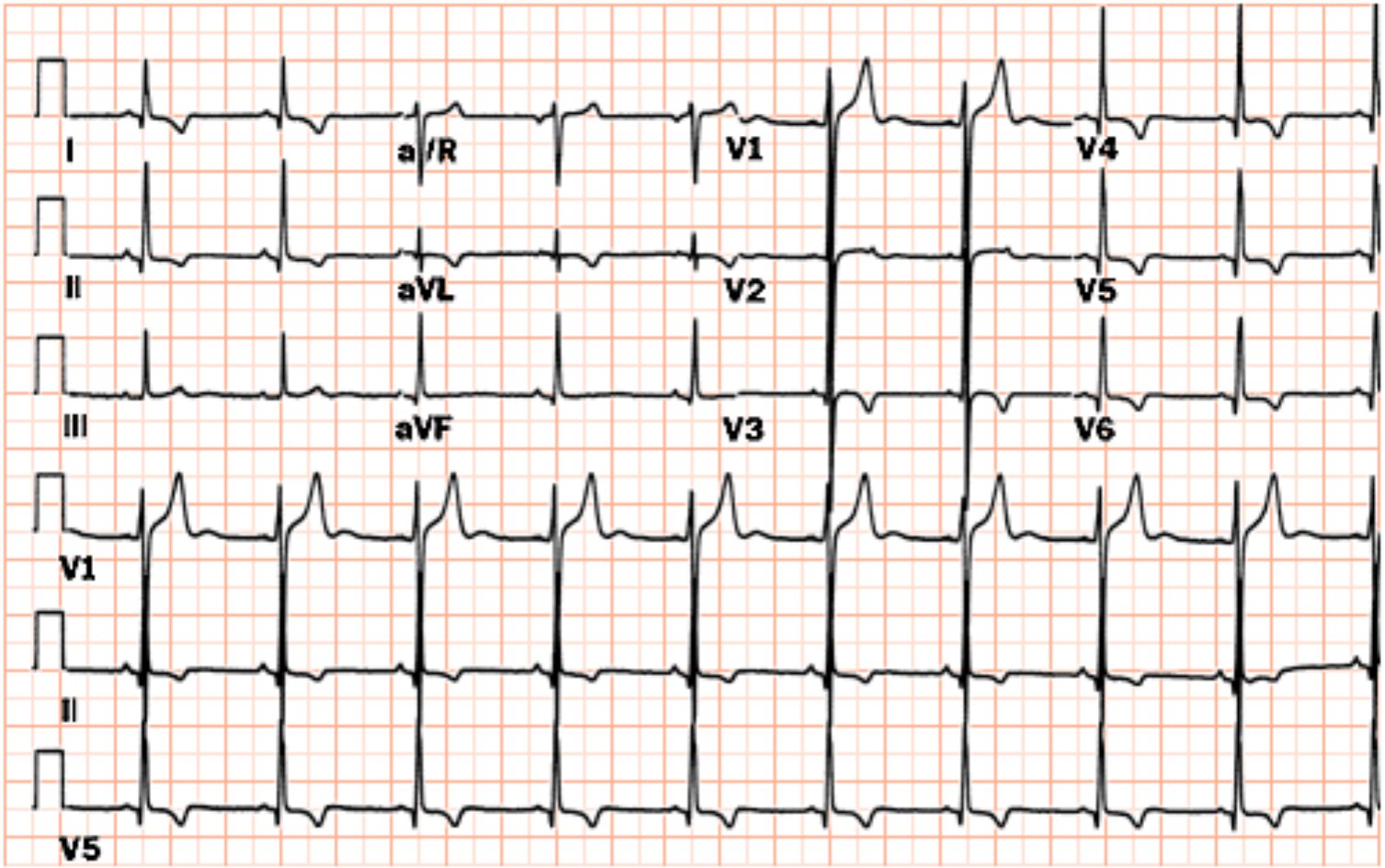
RAI+HVD

Estenosis Mitral
+ Hipertensión
pulmonar

HVD



Miocardiopatía Hipertrófica



Criterios Electrocardiográficos de Hipertrofias

RAI

P ancha ≥ 0.12 seg

Bimodal en D2-D3-aVF

Bifásica con predominio negativo en V1

Criterios Electrocardiográficos de Hipertrofias

RAD

P alta > 3 mm (0.3 mV)

Criterios Electrocardiográficos de Hipertrofias

RVI *

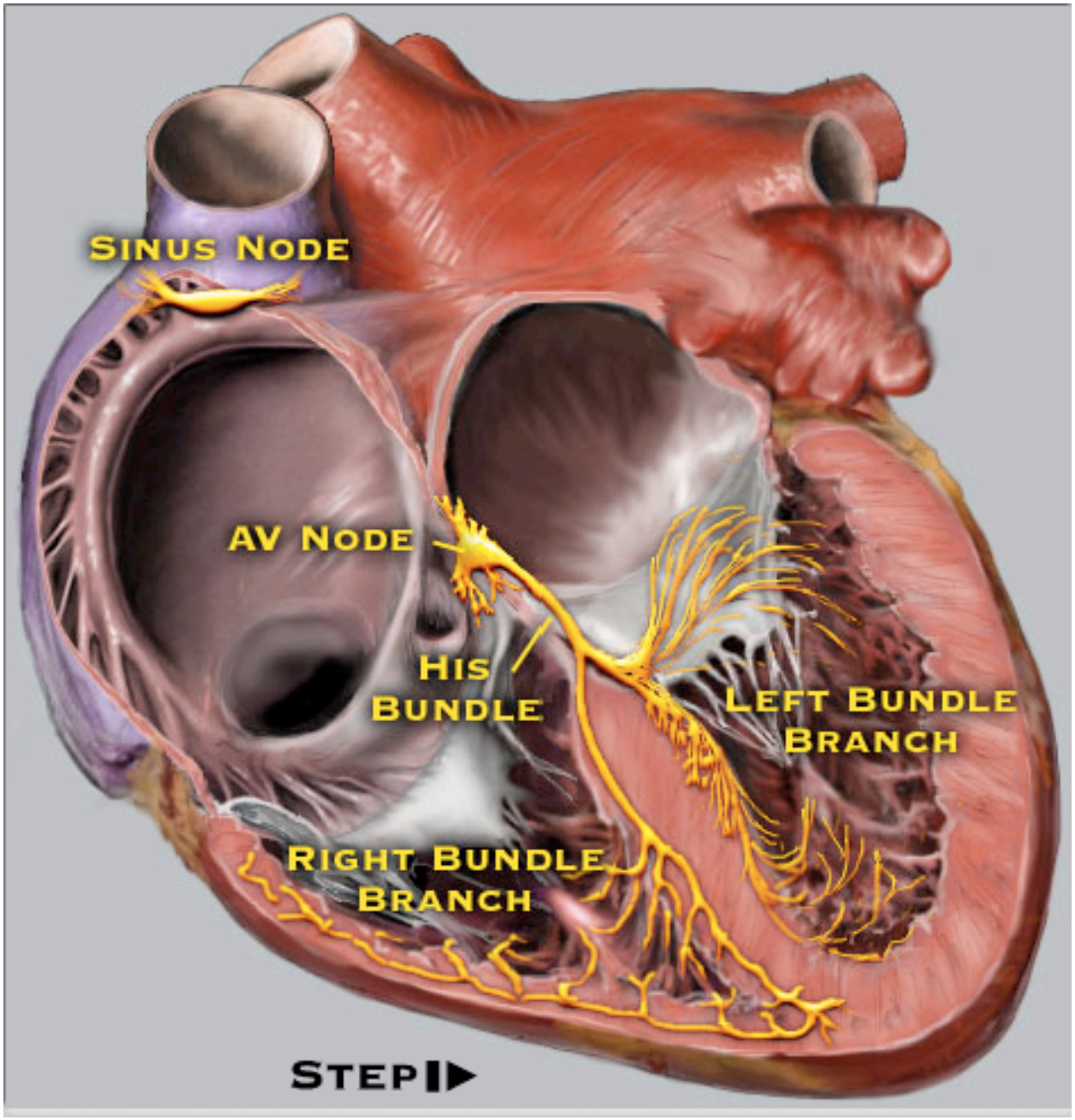
- R >11 mm en aVL
- R > 13 mm en D1
- SV1+RV5 o V6 > 35 mm
- R1+S3 > 25 mm
- SV1>24 mm
- R > 25 mm V5 o V6
- R o S > 20 mm en cualquier derivación de los miembros
- SV antes de transición > 30 mm
- SV antes de transición+RV después de transición ≥ 45 mm
- Cambios de ST y T
- RAI
- Eje izquierdo

* 10 mm = 1mV

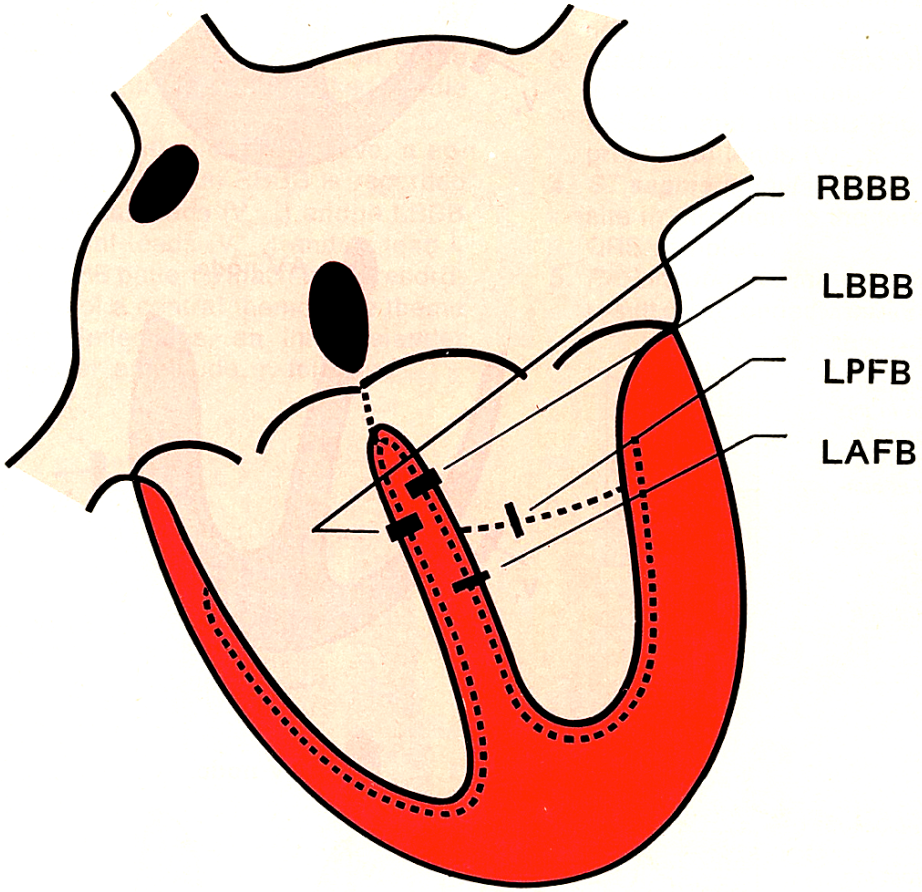
Criterios Electrocardiográficos de Hipertrofias

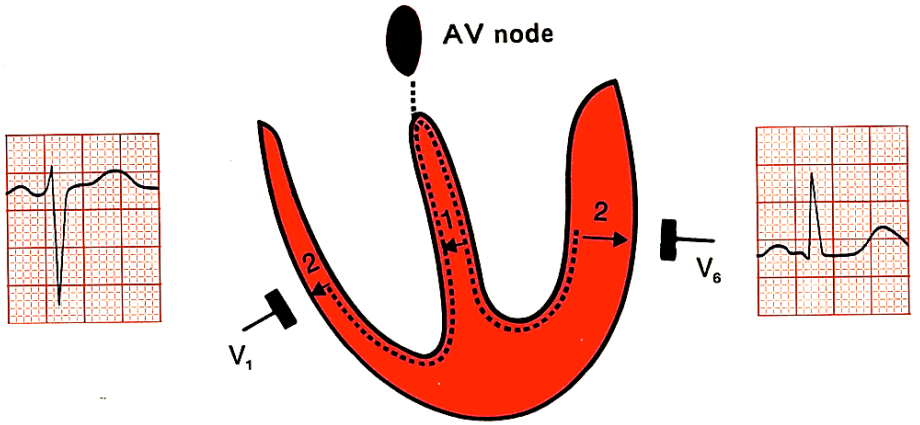
RVD

R > S V1
S > R V5 o V6
R > 7 mm V1
RAD
Cambios de ST y T
Eje derecho

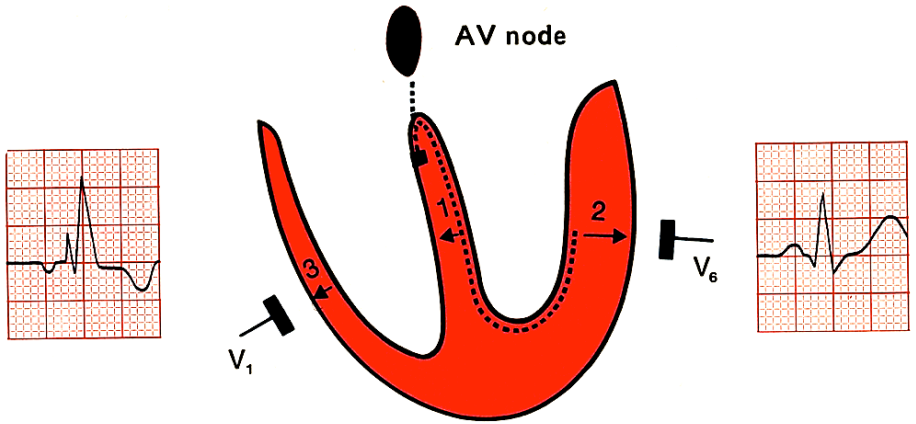

SINUS NODE
AV NODE
HIS BUNDLE
LEFT BUNDLE BRANCH
RIGHT BUNDLE BRANCH
STEP

Transtornos de Conducción Intraventricular

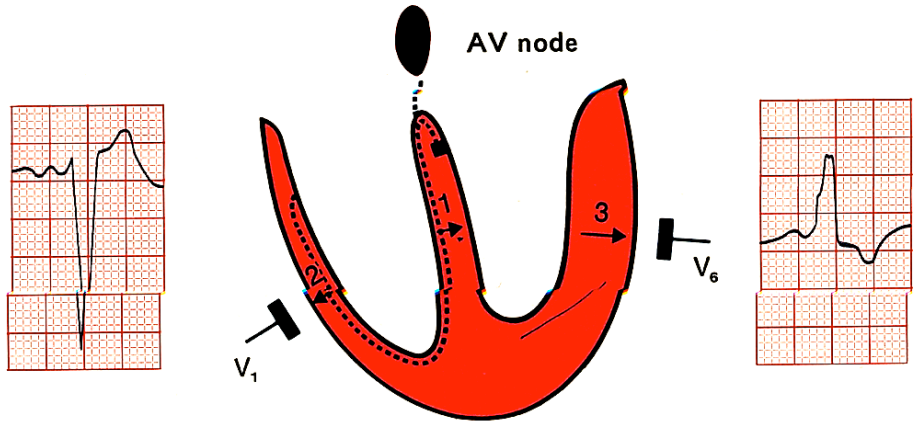




Normal

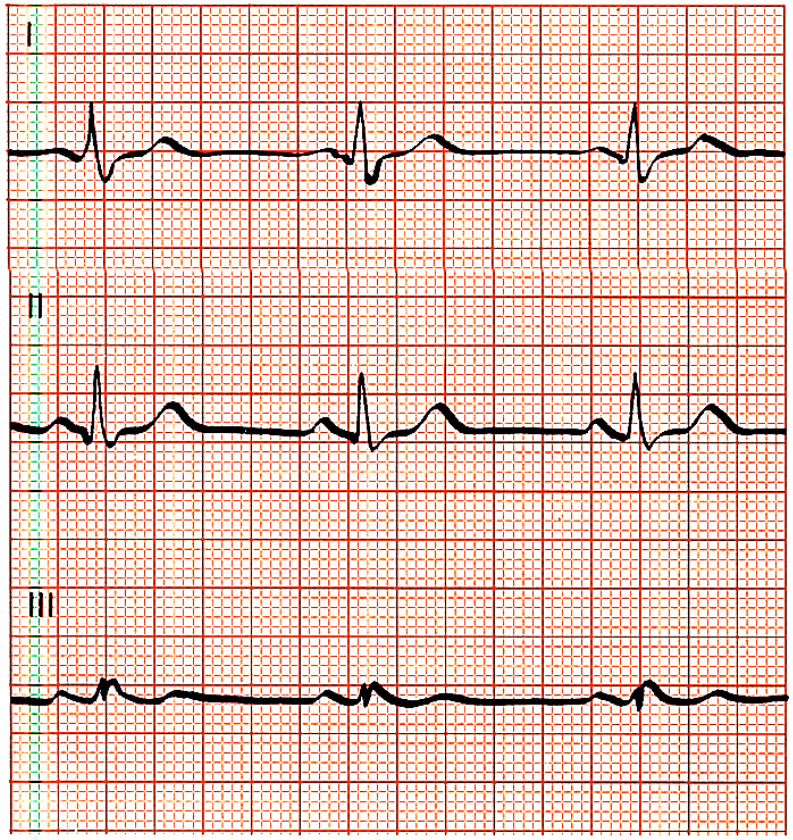


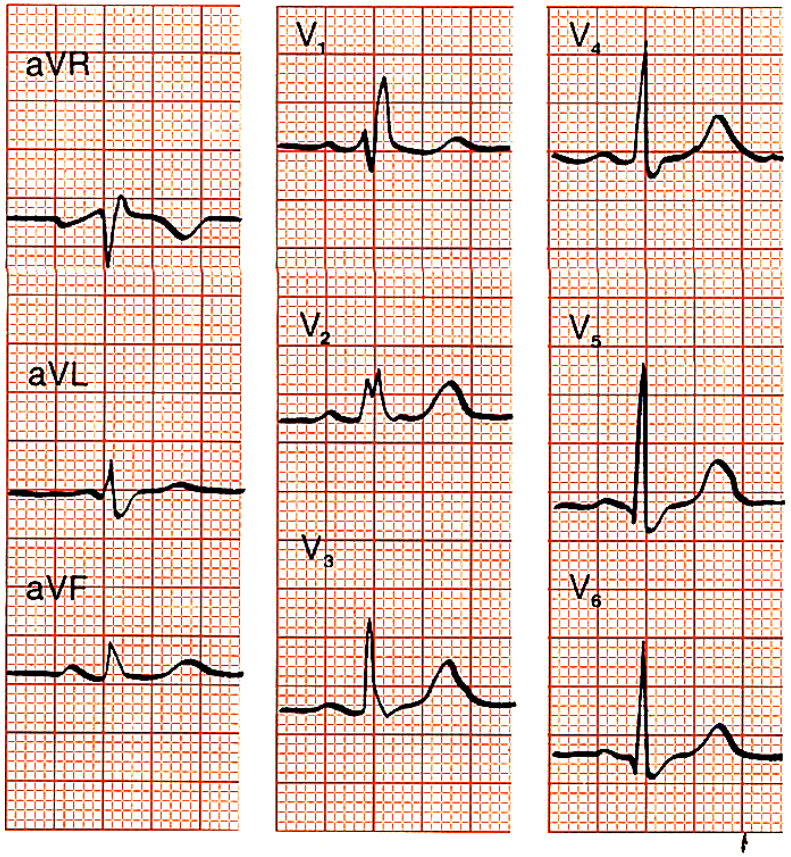
BCRD



BCRI

BCRD





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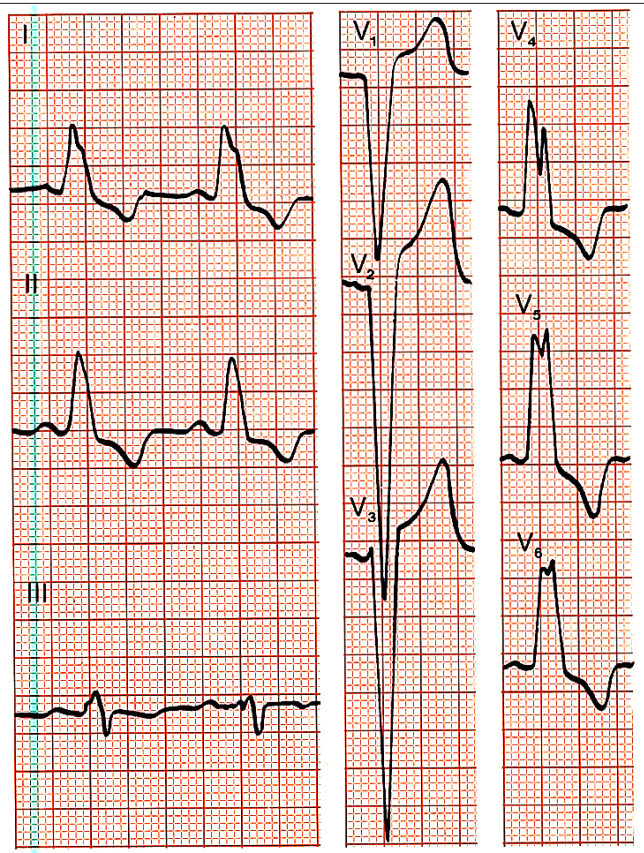
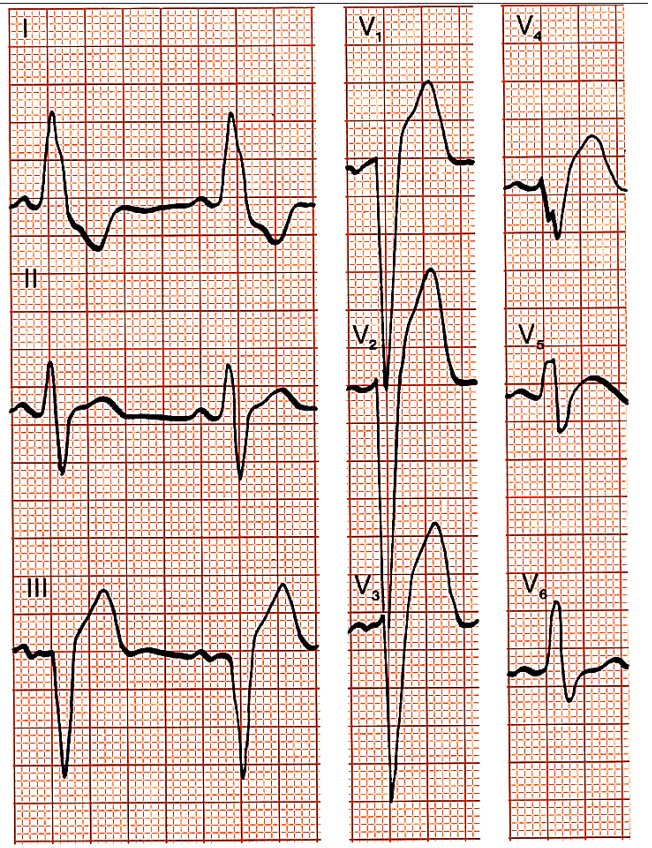
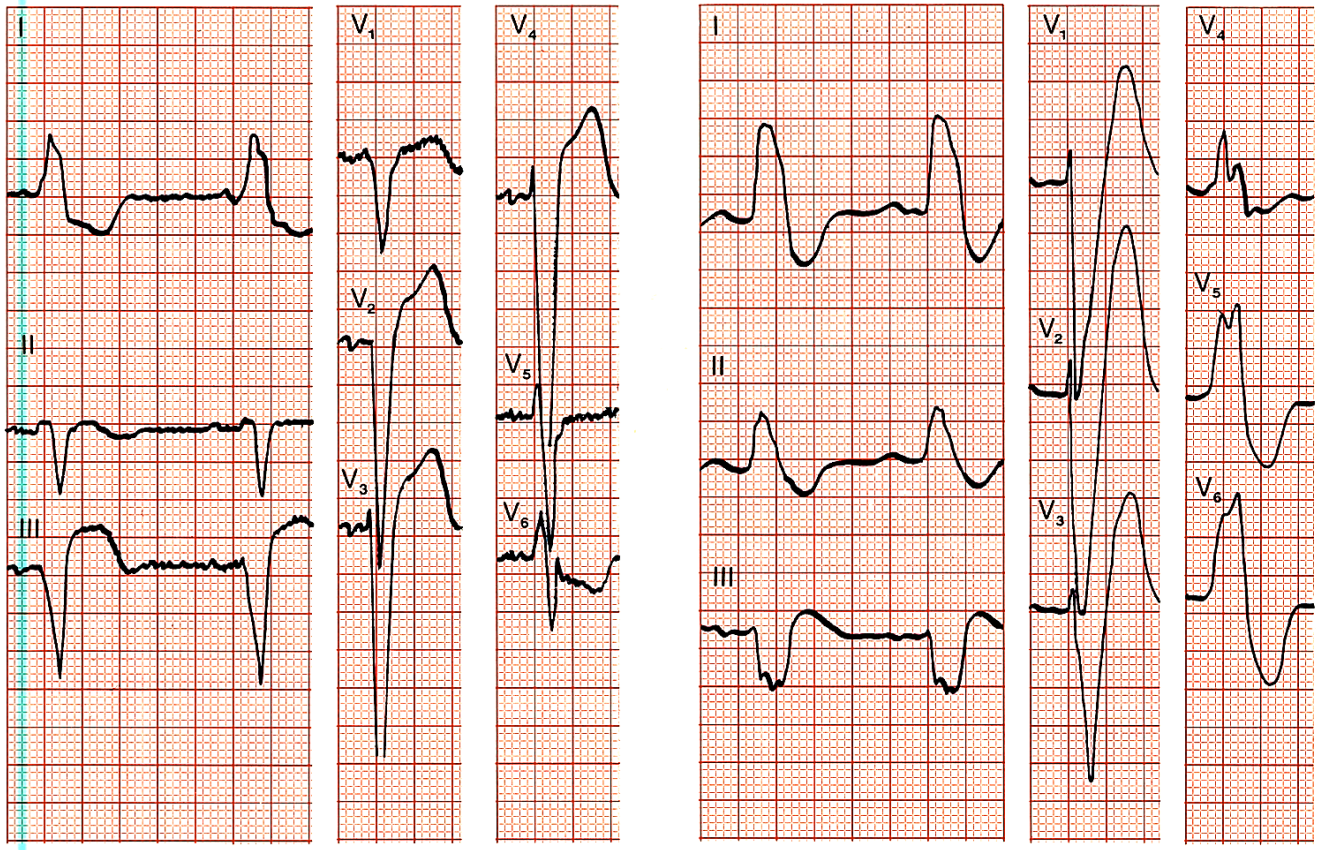


A *ECG from a 54-year-old male with aortic stenosis*

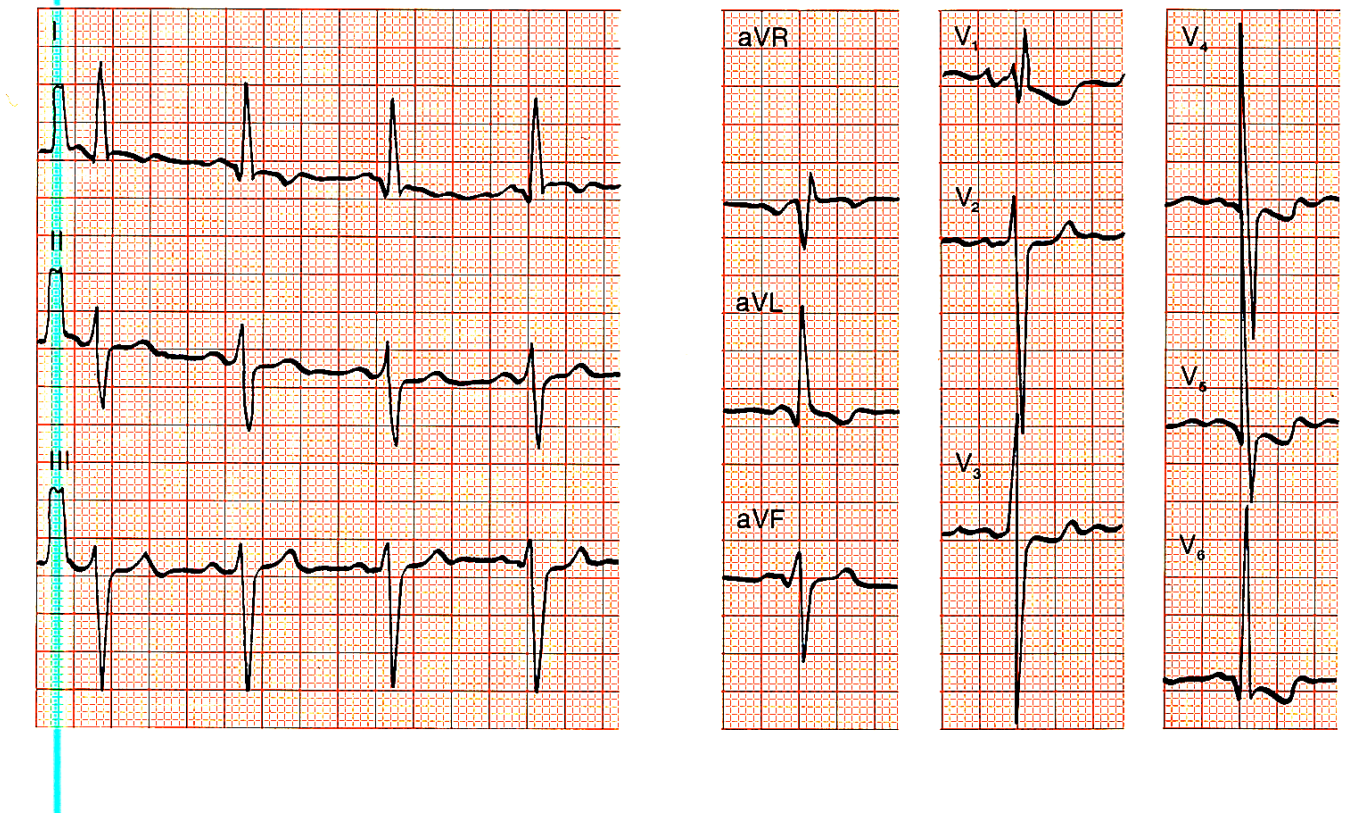


B *ECG from a 62-year-old female with coronary artery disease and stable angina*

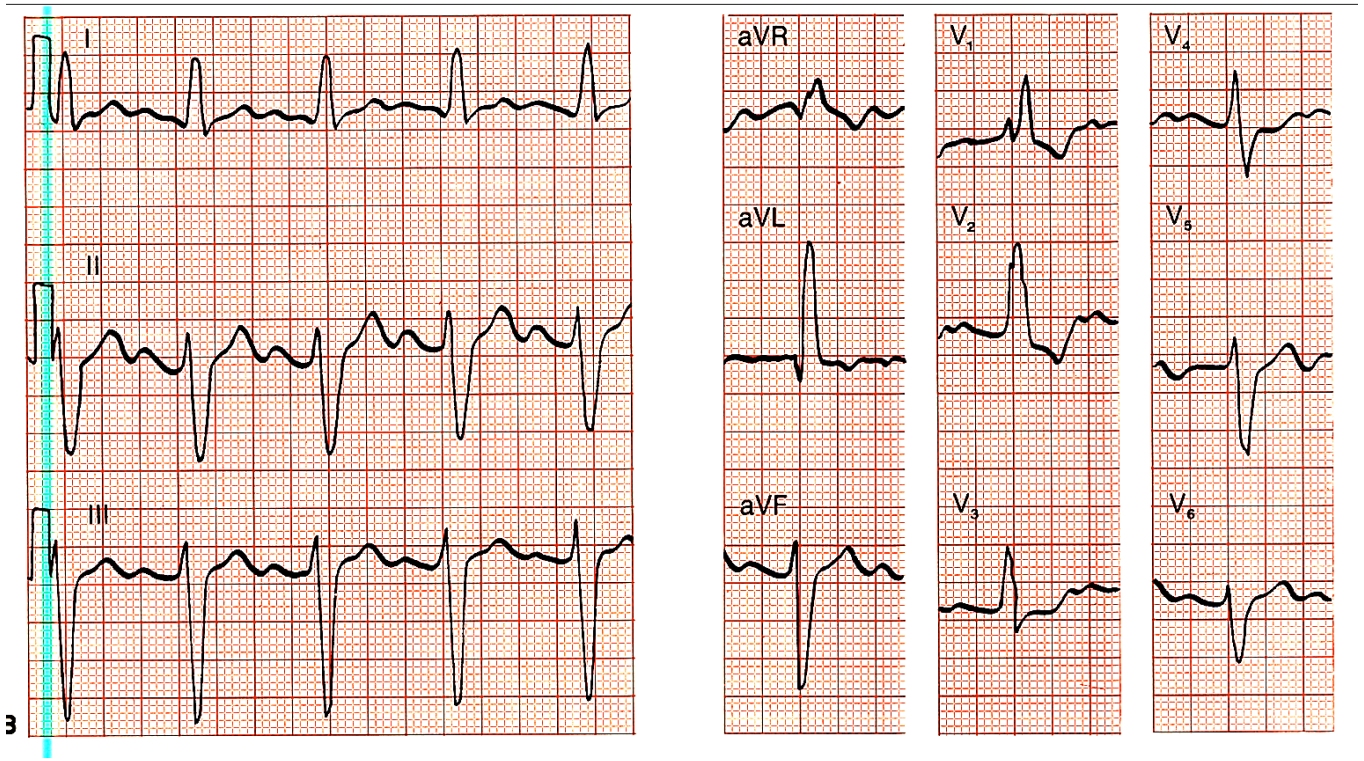
BCRI



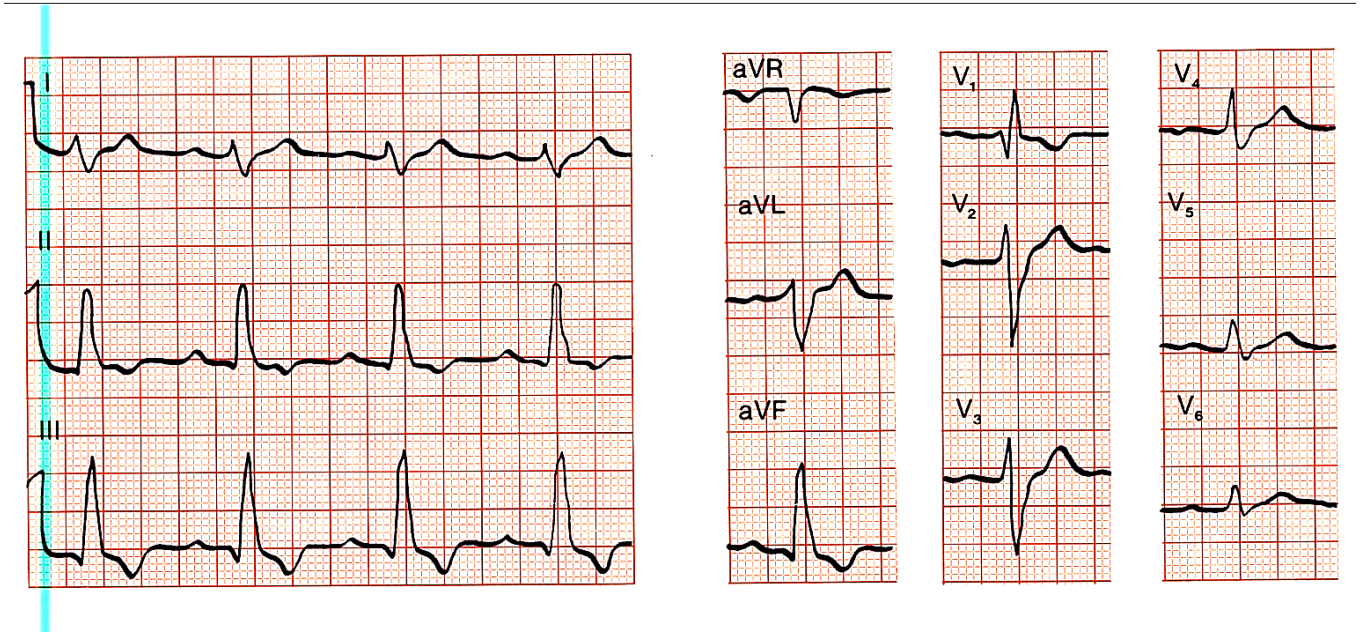
BRD +HBAI+HVI



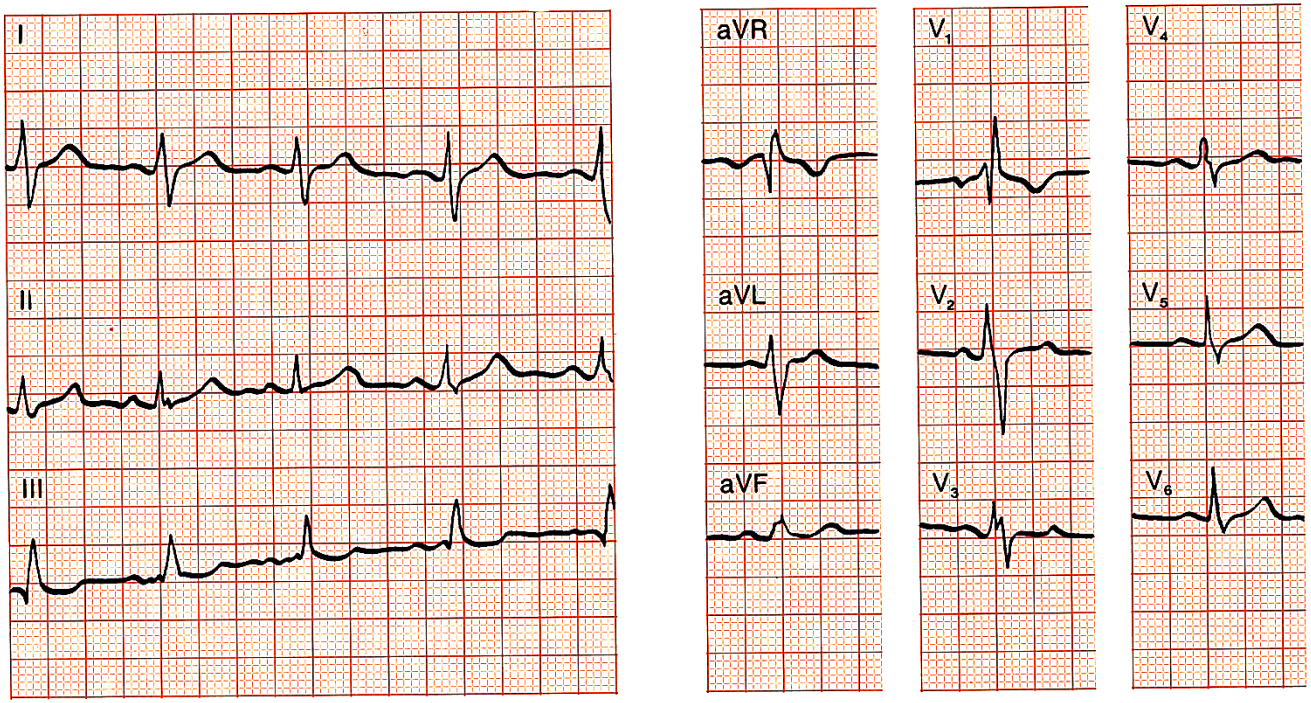
BCRD+HBAI



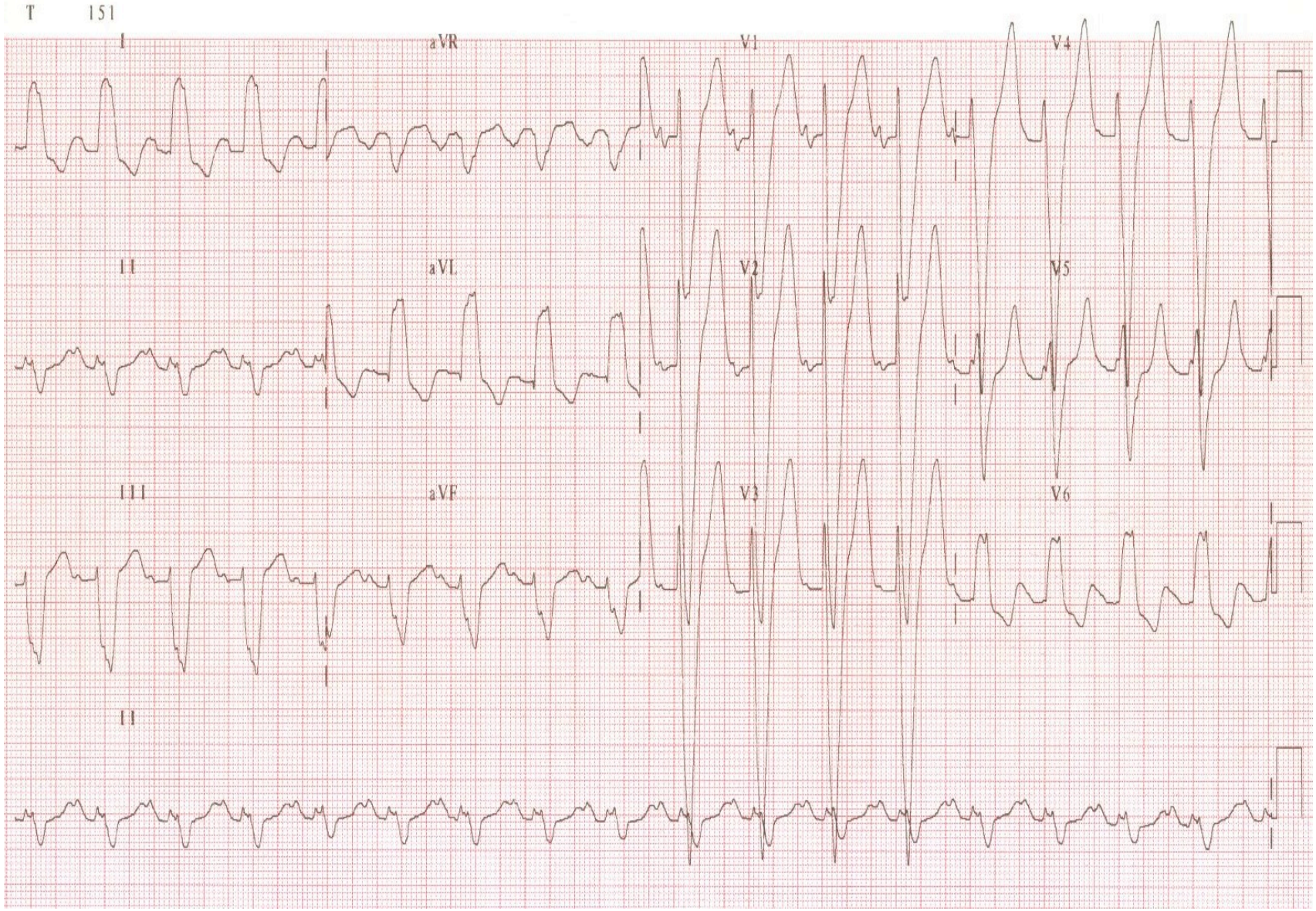
BCRD+HBIP



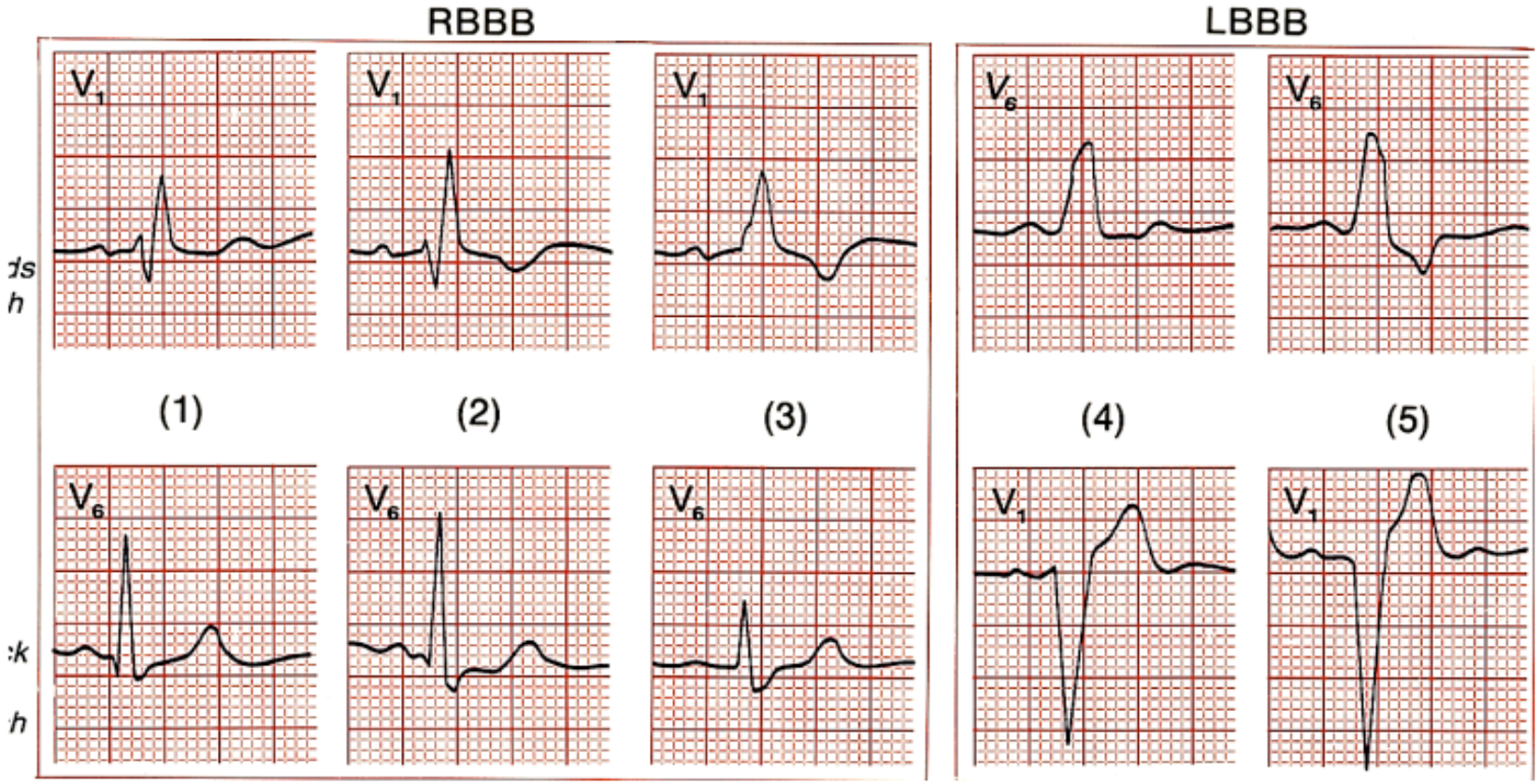
BIRD



BCRI.Taquicardia sinusal



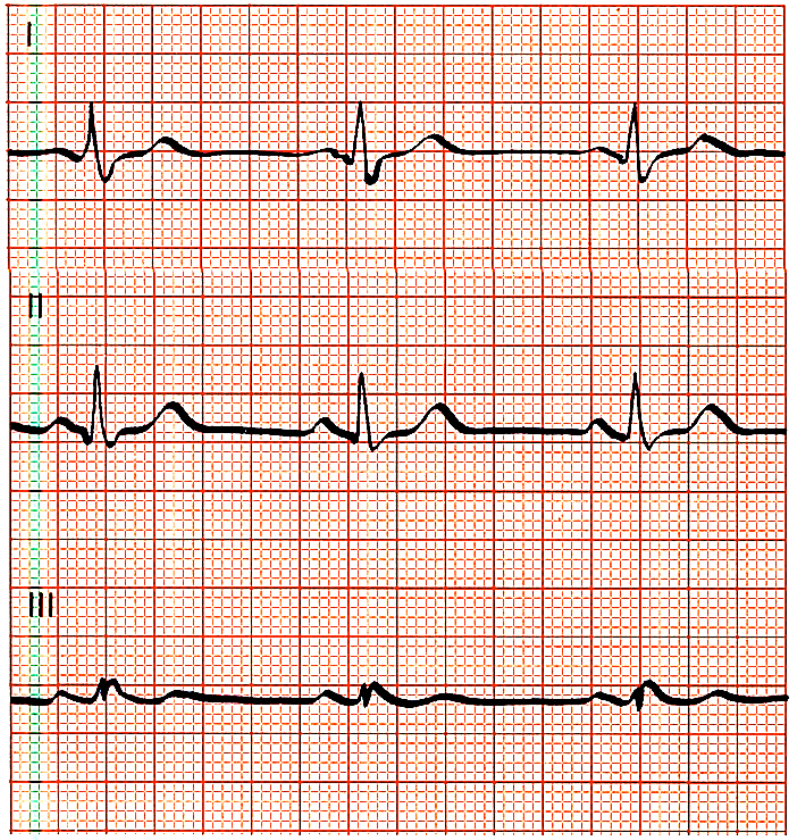
Aspecto del ECG en Bloqueos de rama en derivaciones V1 y V6

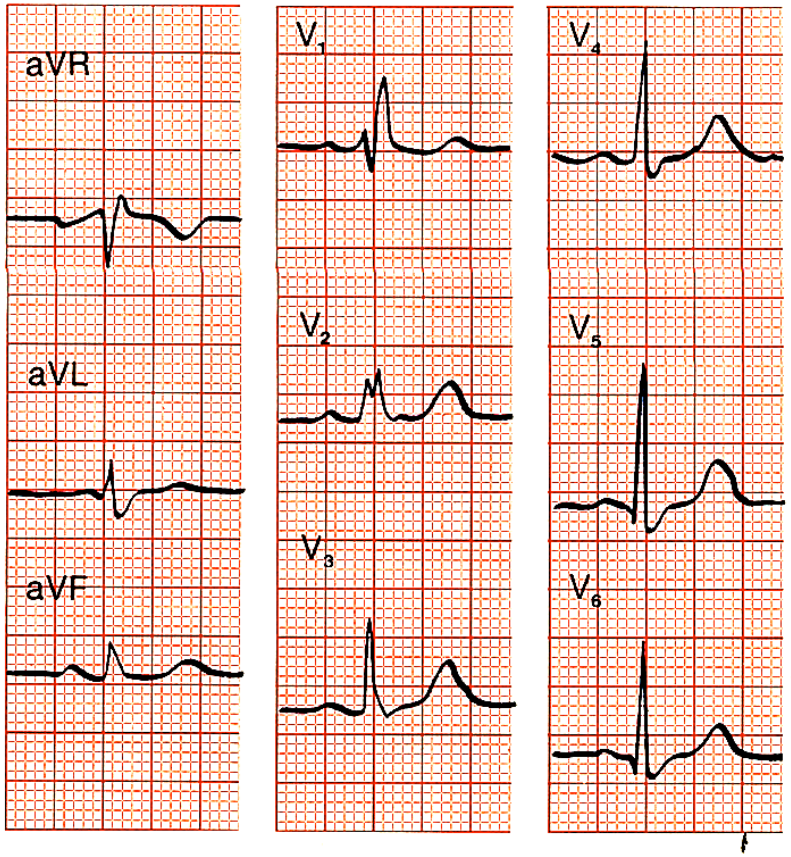


Los criterios de BCRI invalidan los criterios de HVI

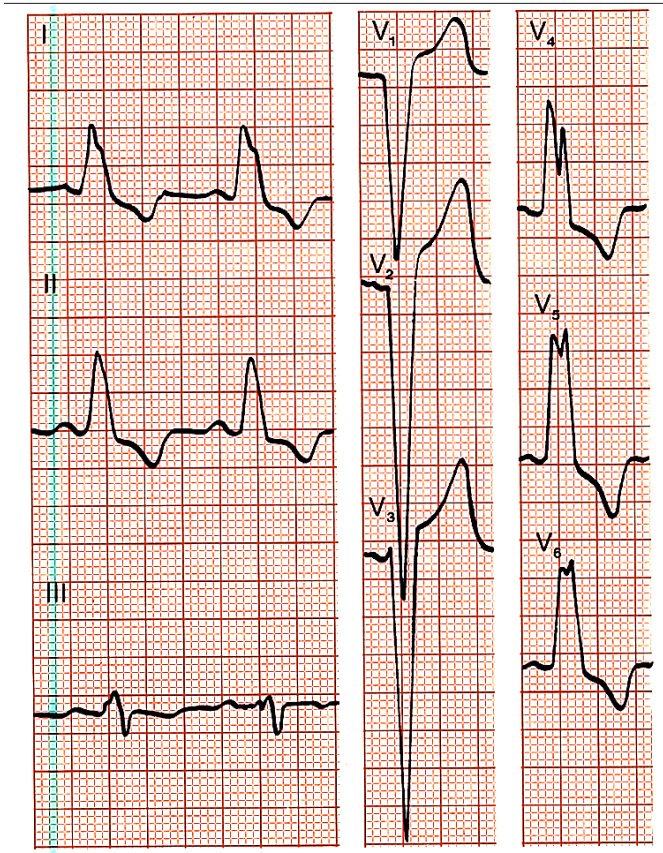
Los criterios de BCRD invalidan los criterios de HVD

Haga su diagnóstico

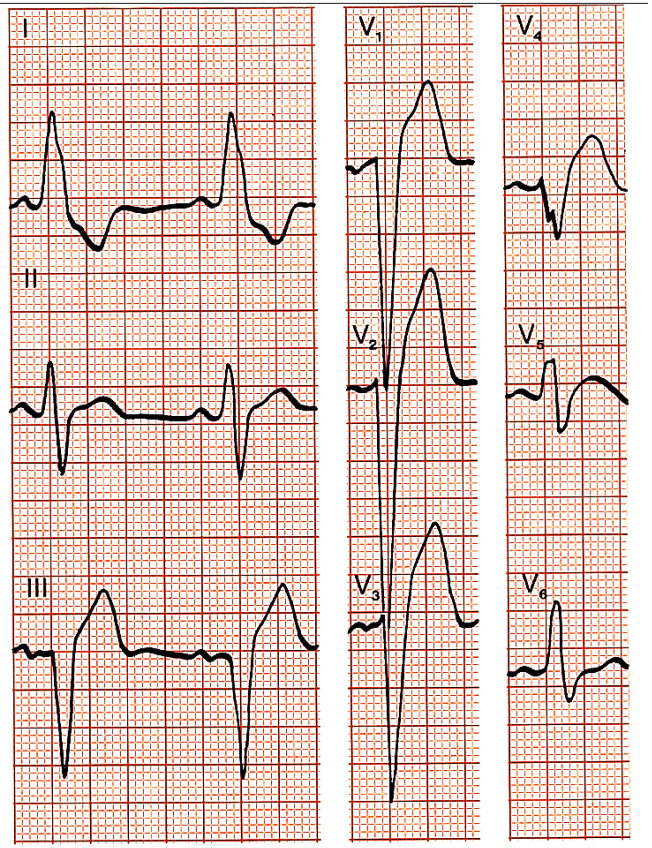




Haga su diagnóstico

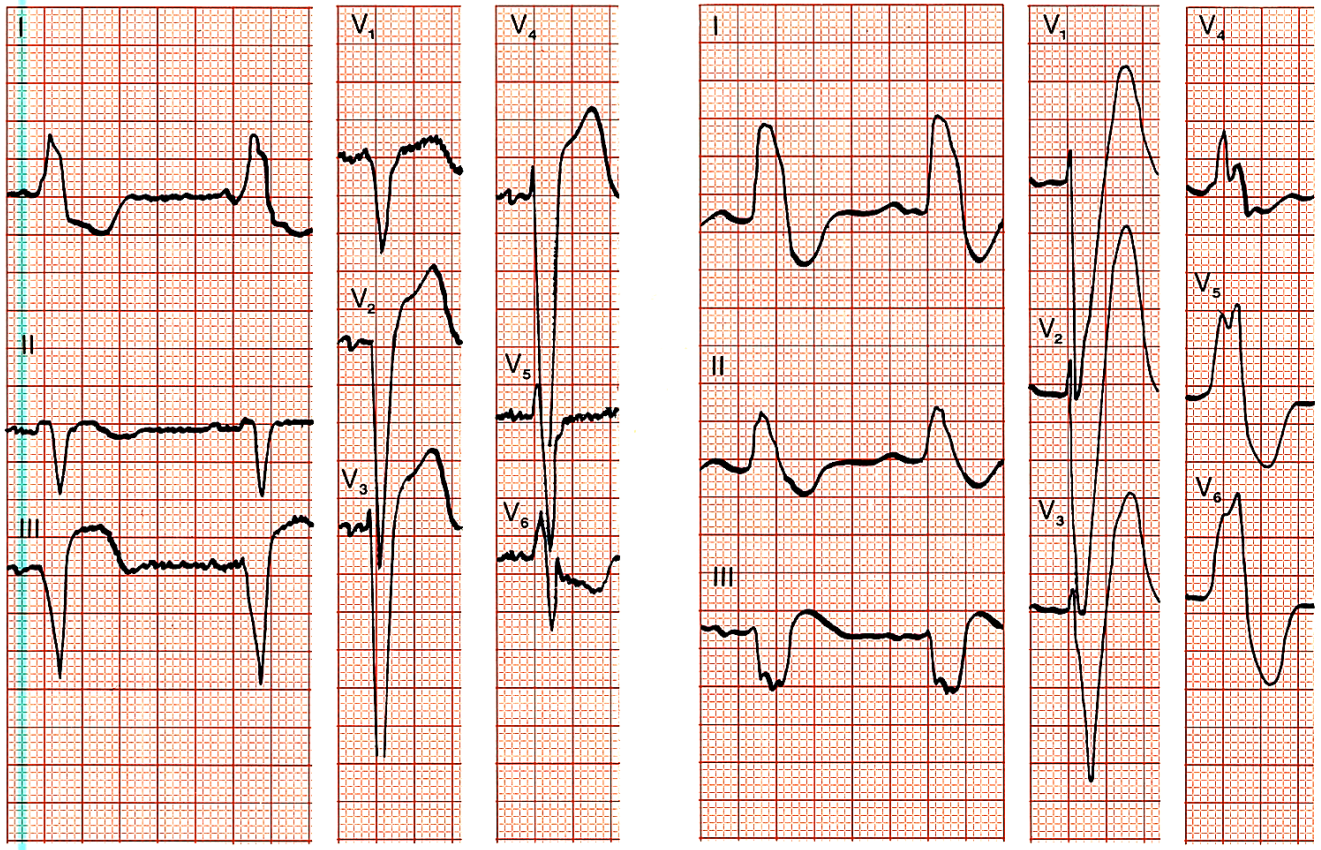


A *ECG from a 54-year-old male with aortic stenosis*

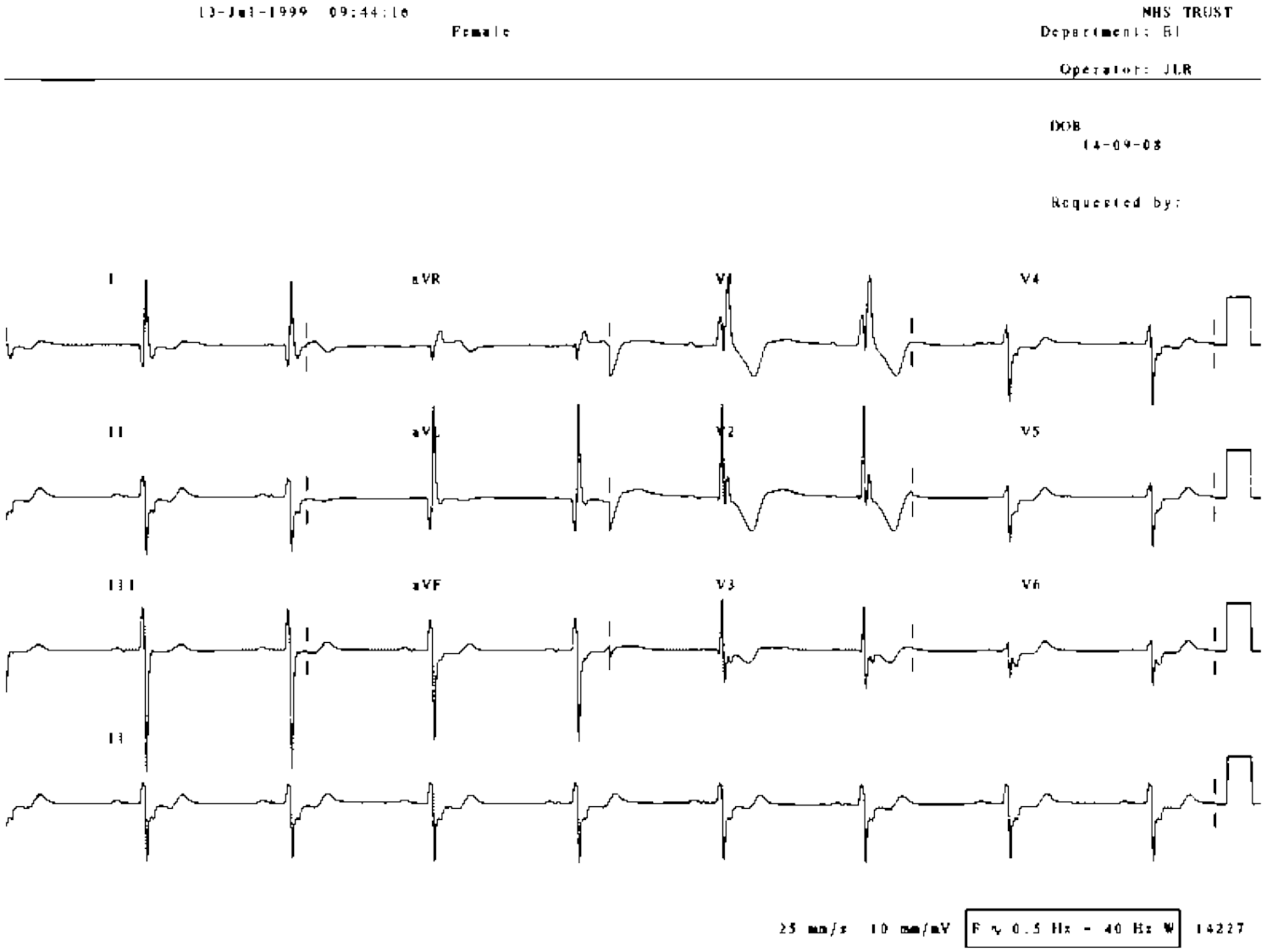


B *ECG from a 62-year-old female with coronary artery disease and stable angina*

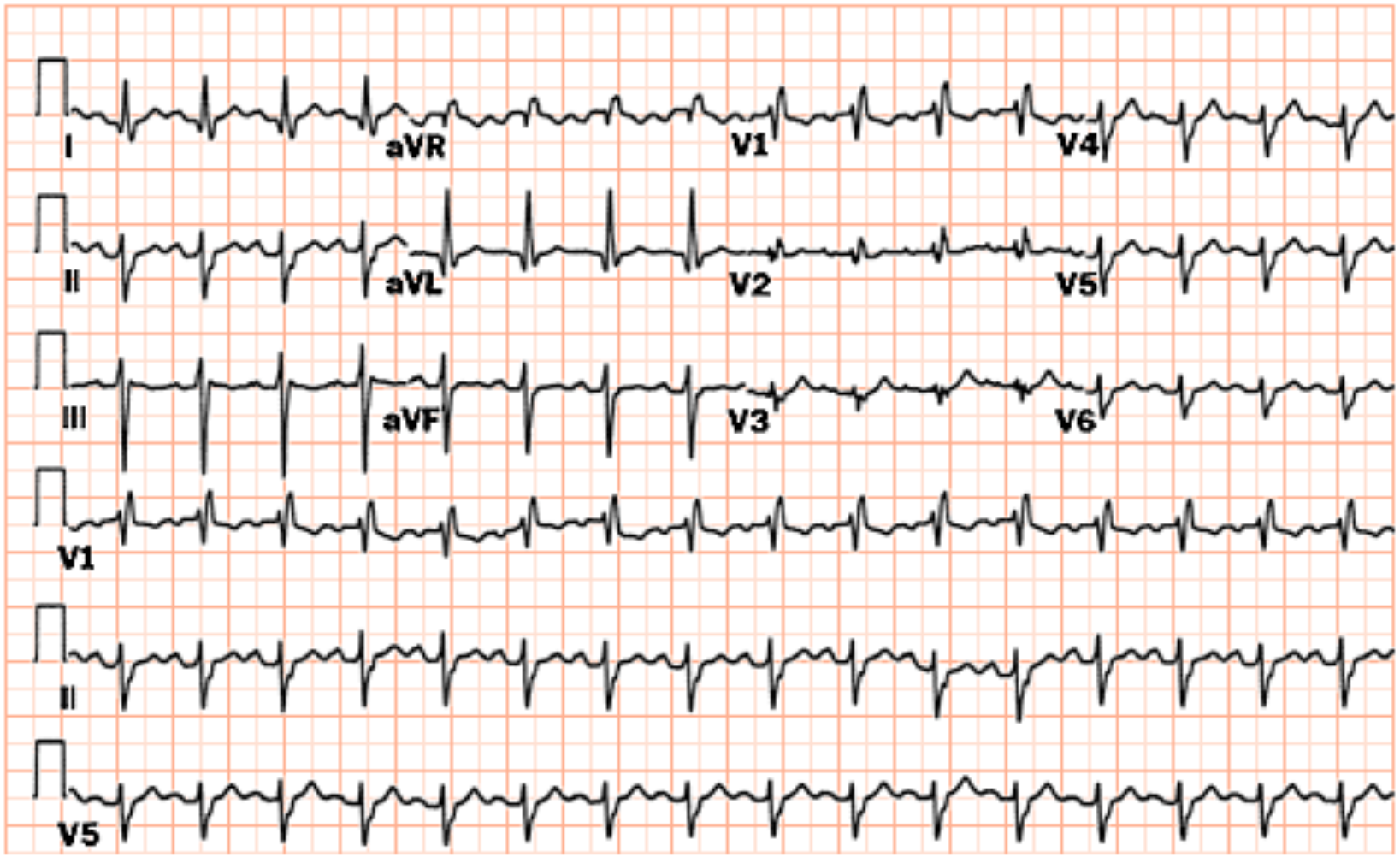
Haga su diagnóstico



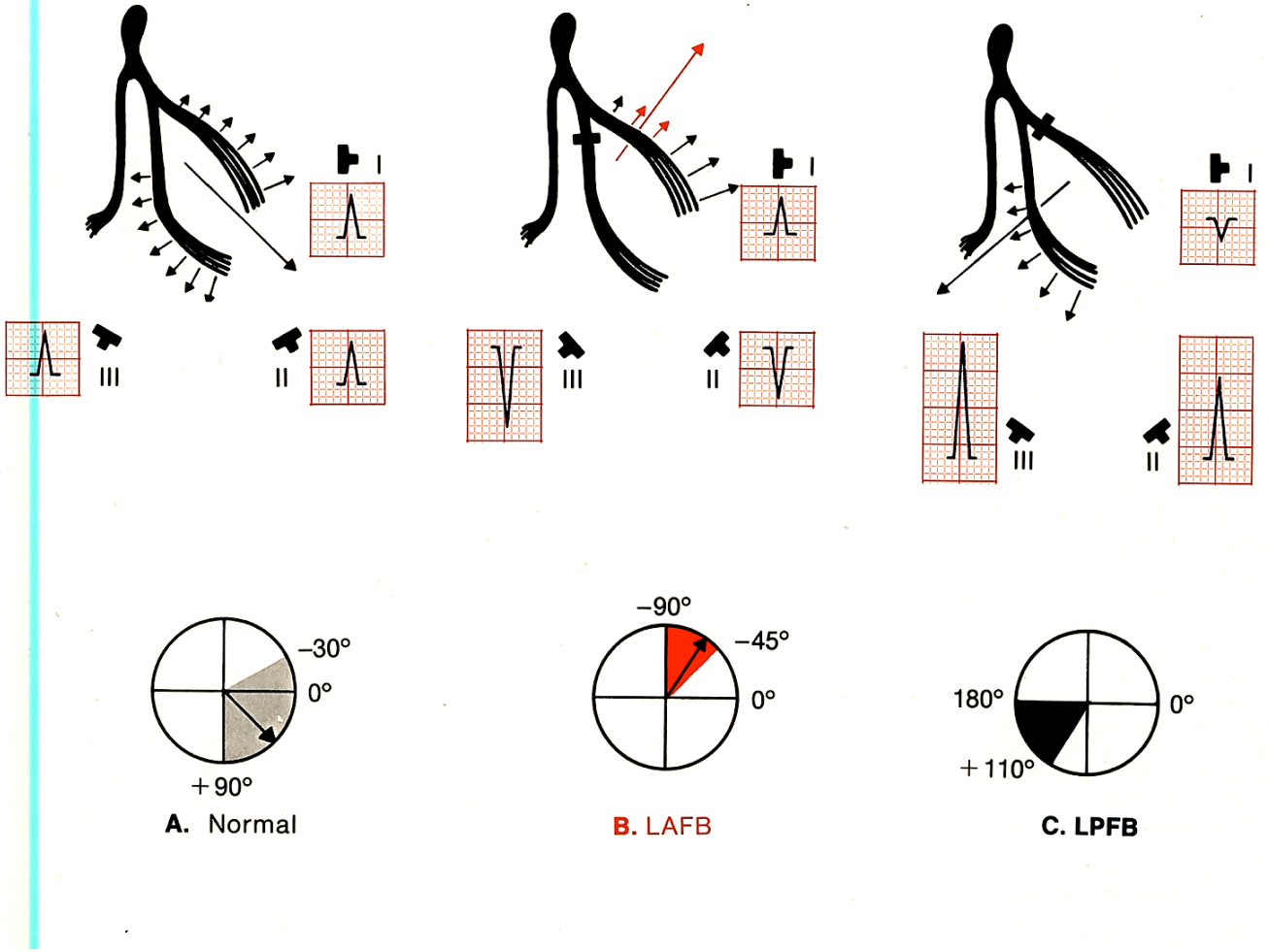
Haga su diagnóstico

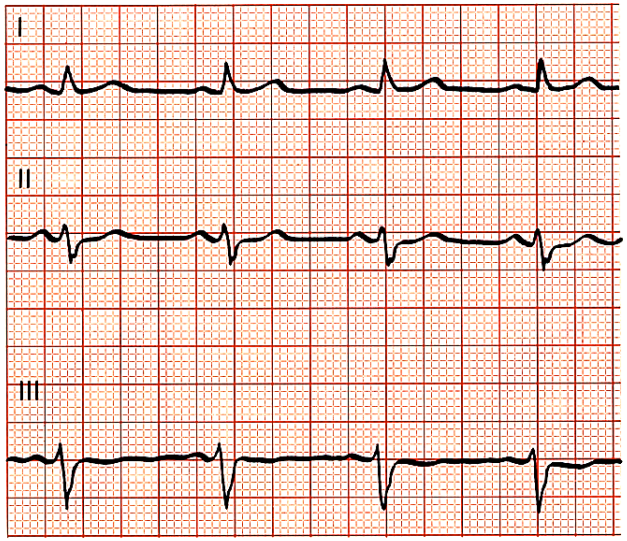


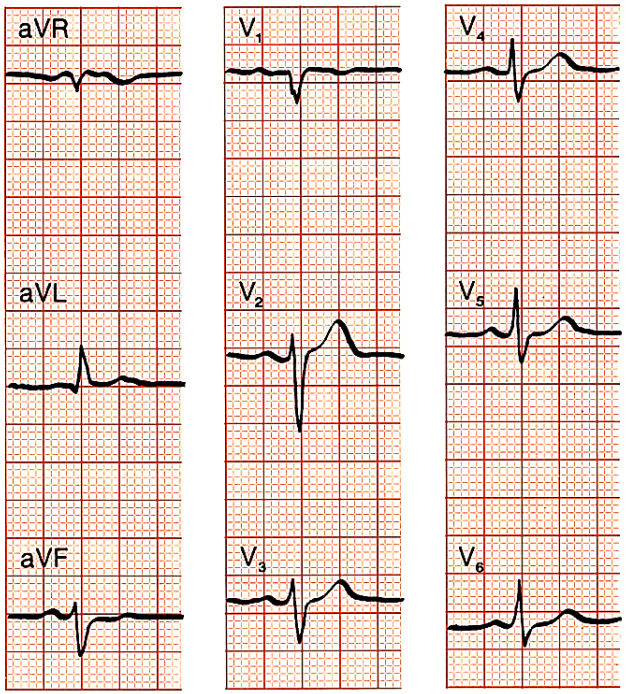
Haga su diagnóstico



Hemibloqueos

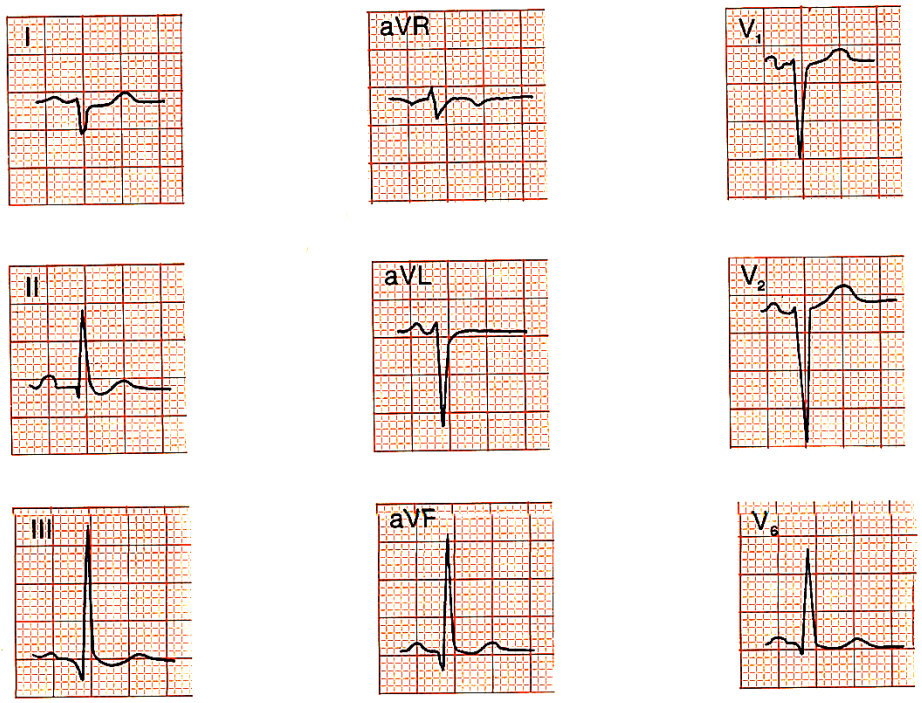




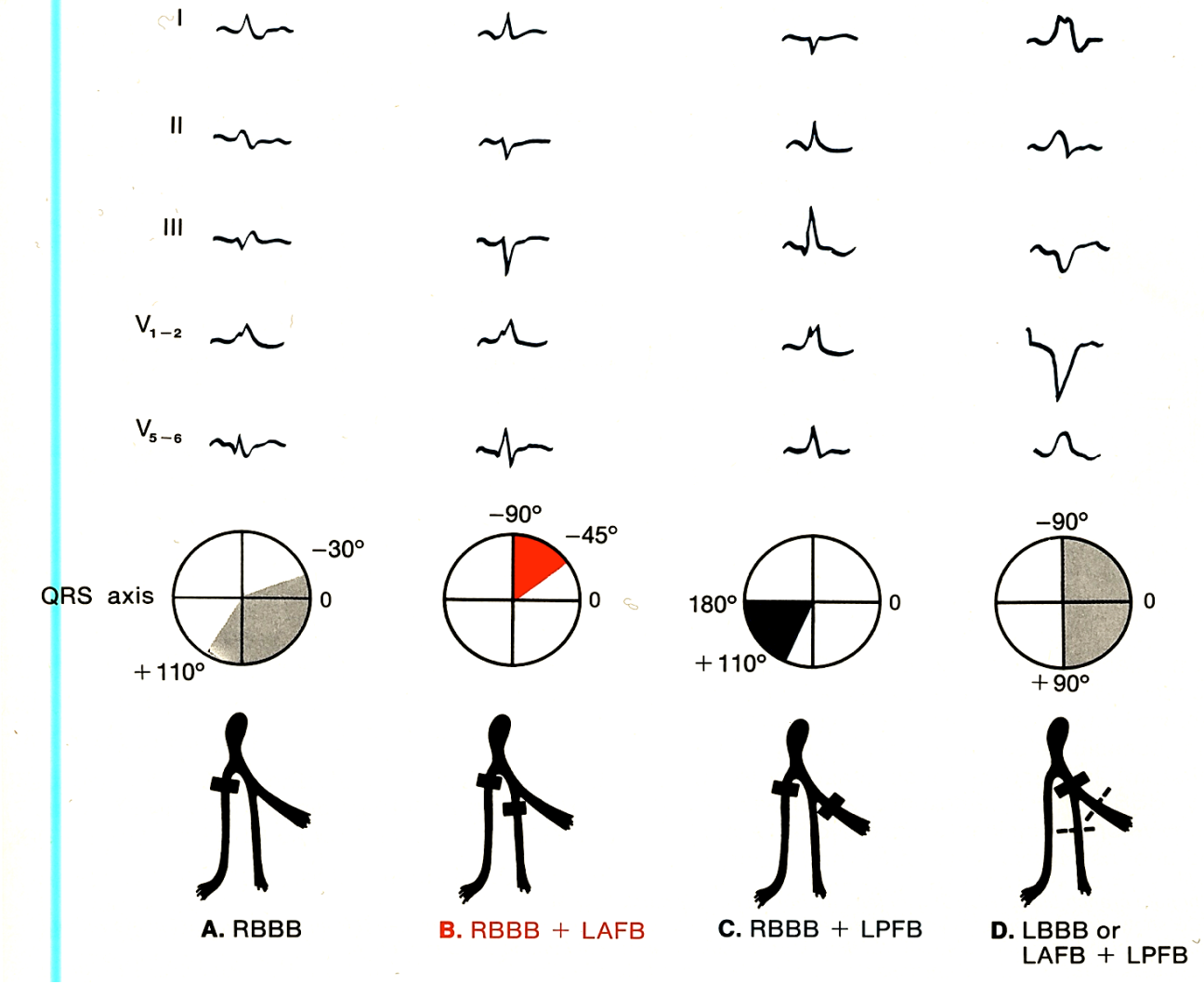


HBAI

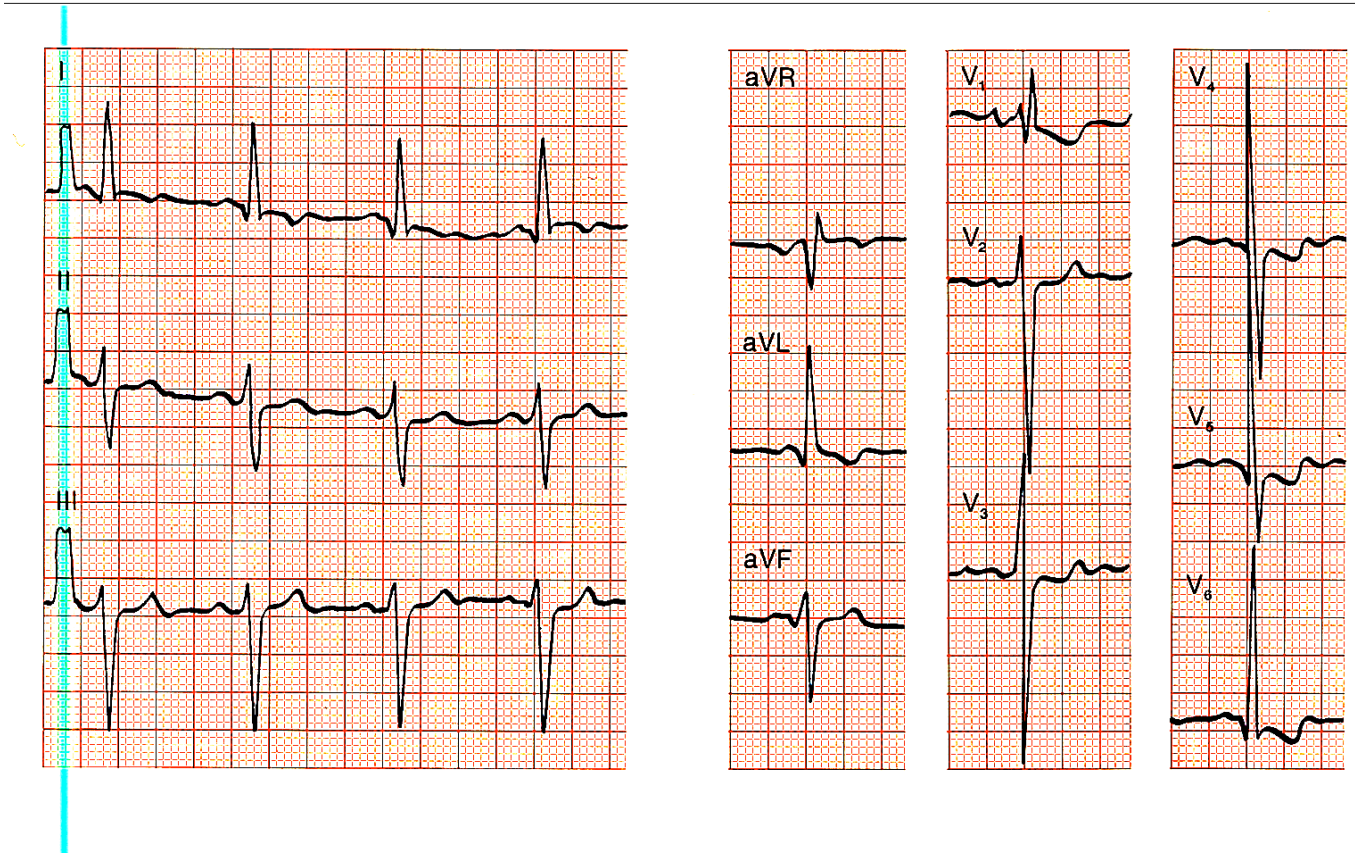
HBIP



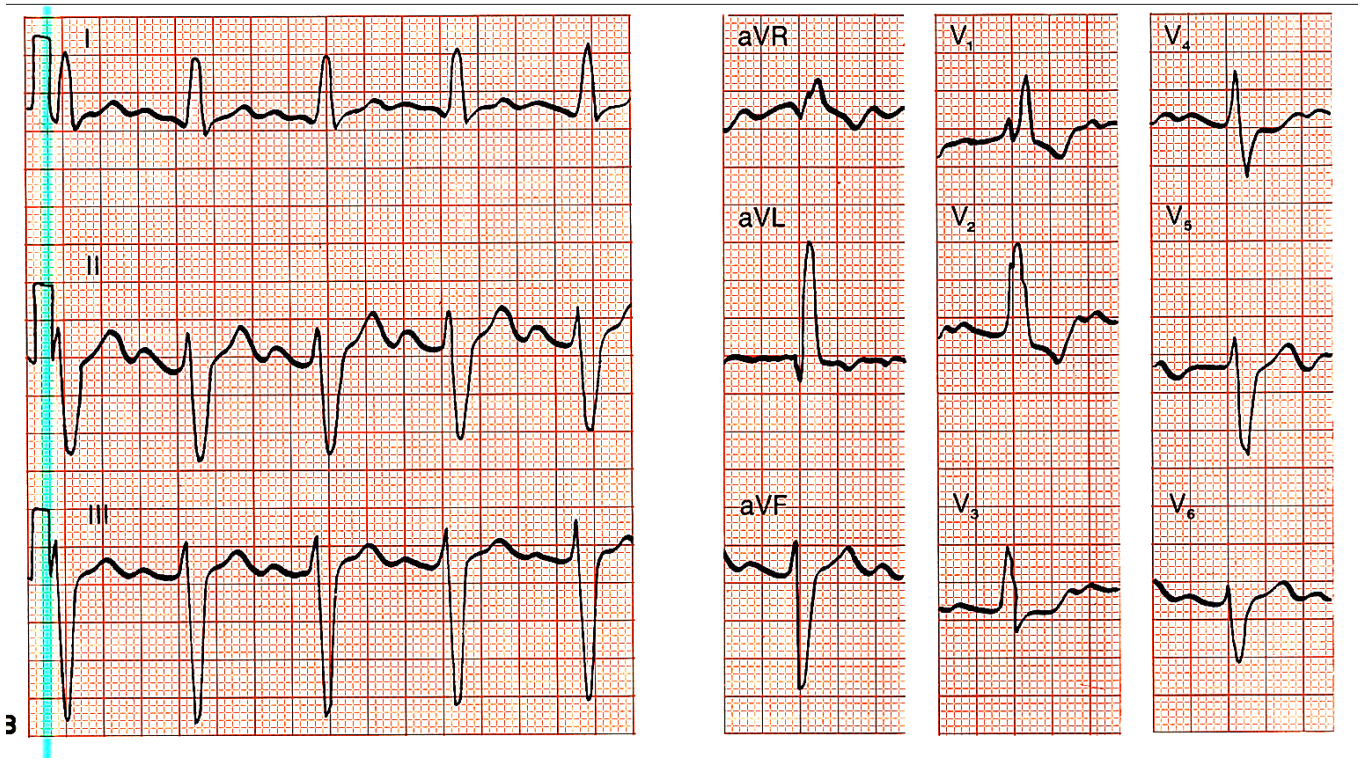
Eje eléctrico y transtornos de conducción intraventricular



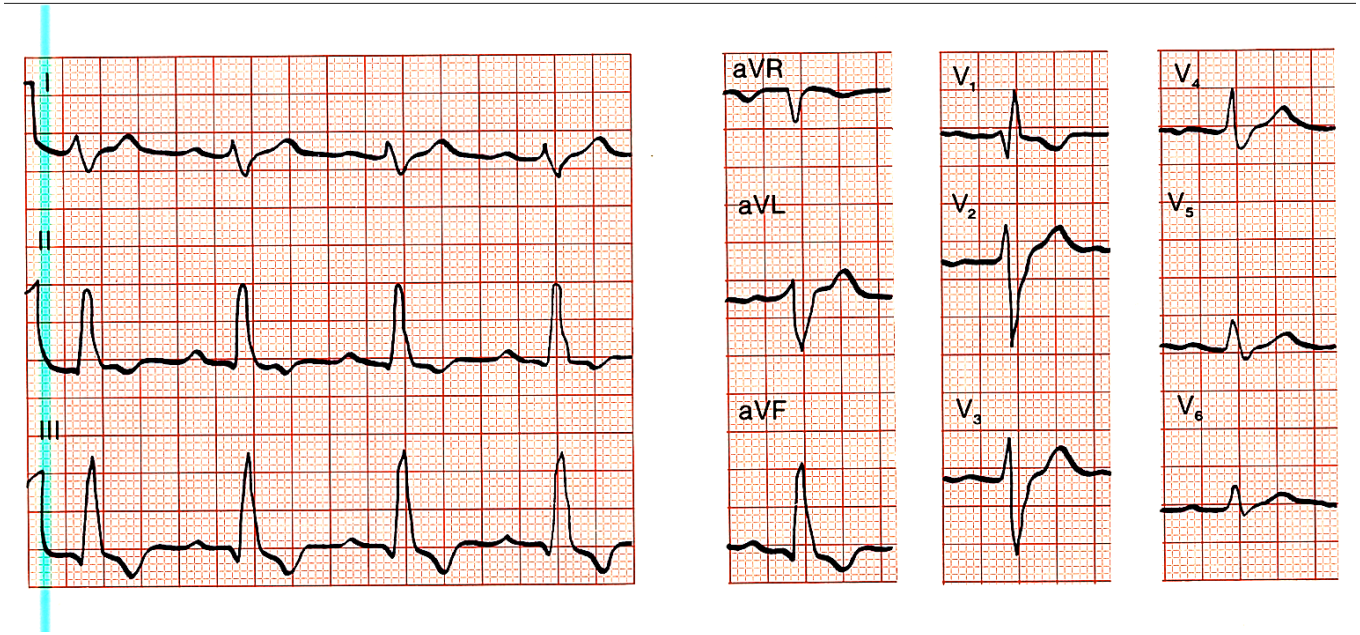
Haga su diagnóstico



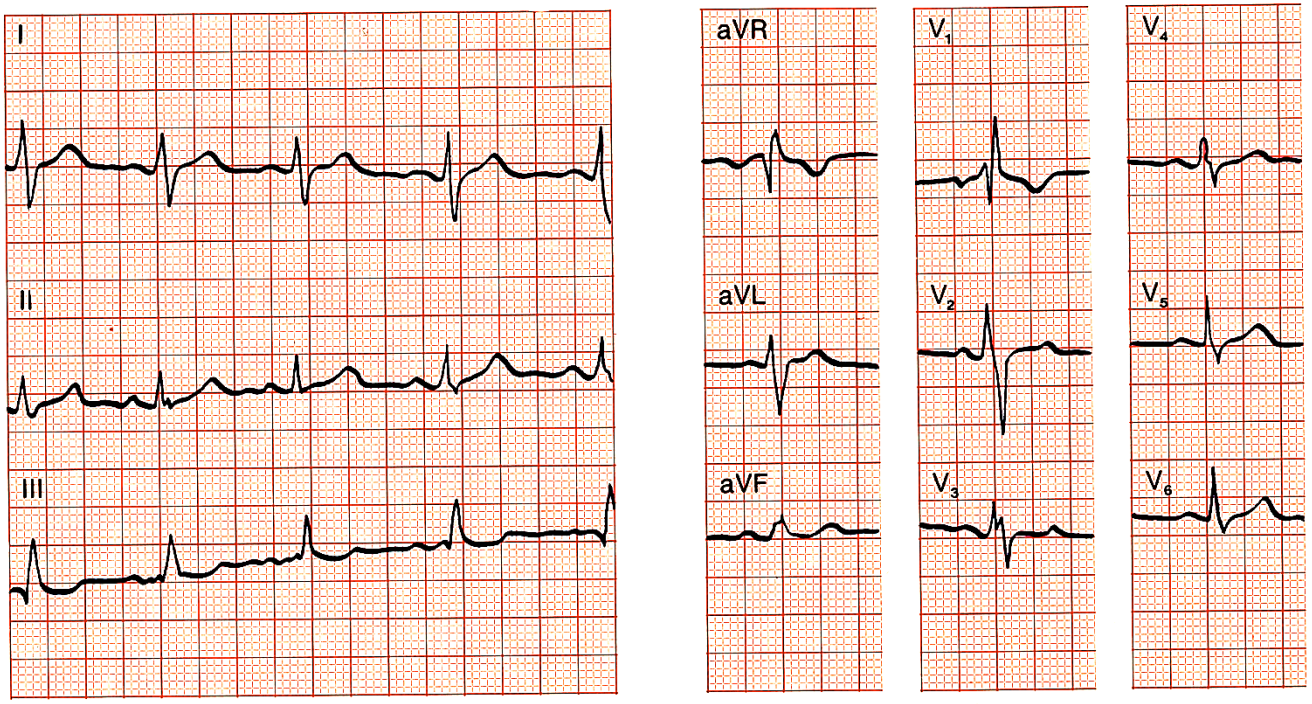
Haga su diagnóstico



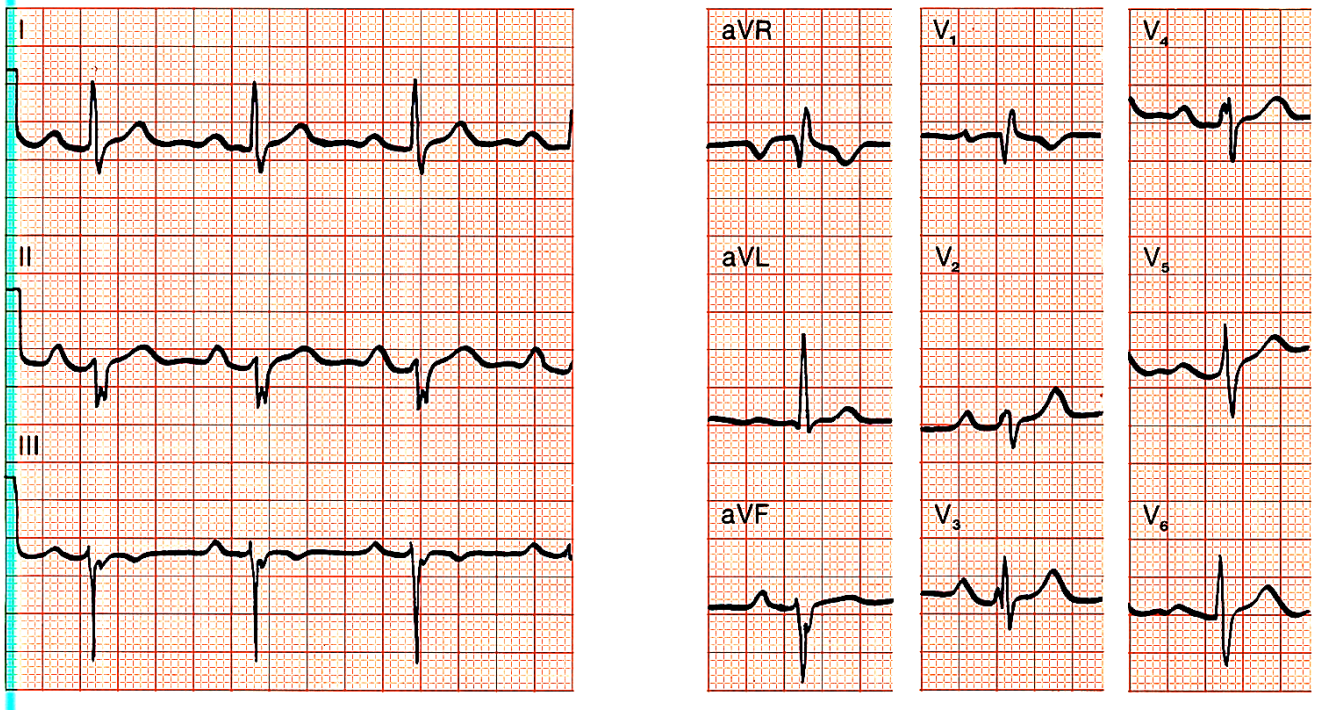
Haga su diagnóstico

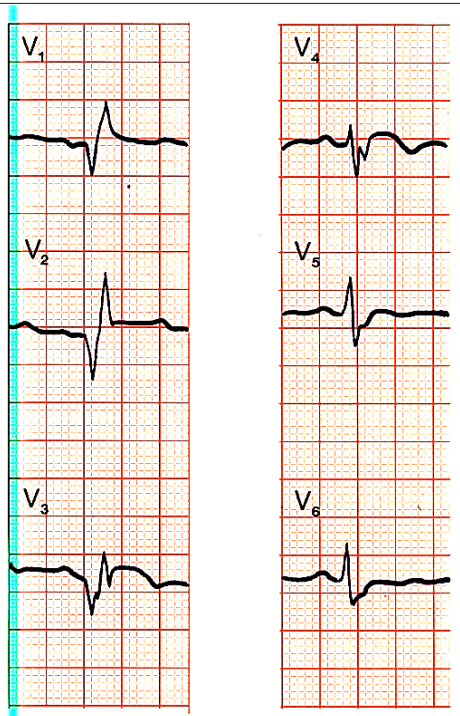


Haga su diagnóstico

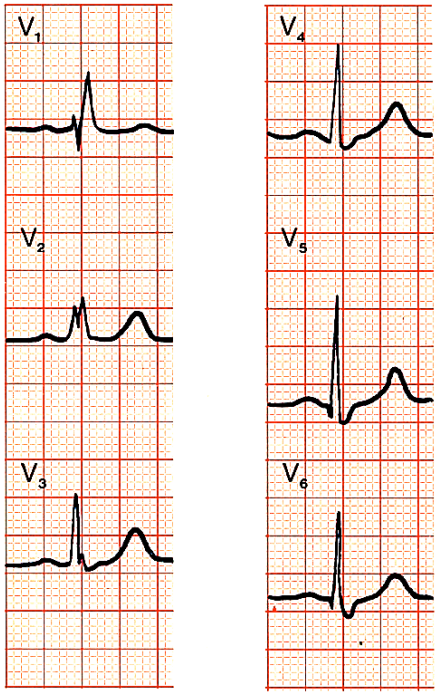


BRD+HBAI



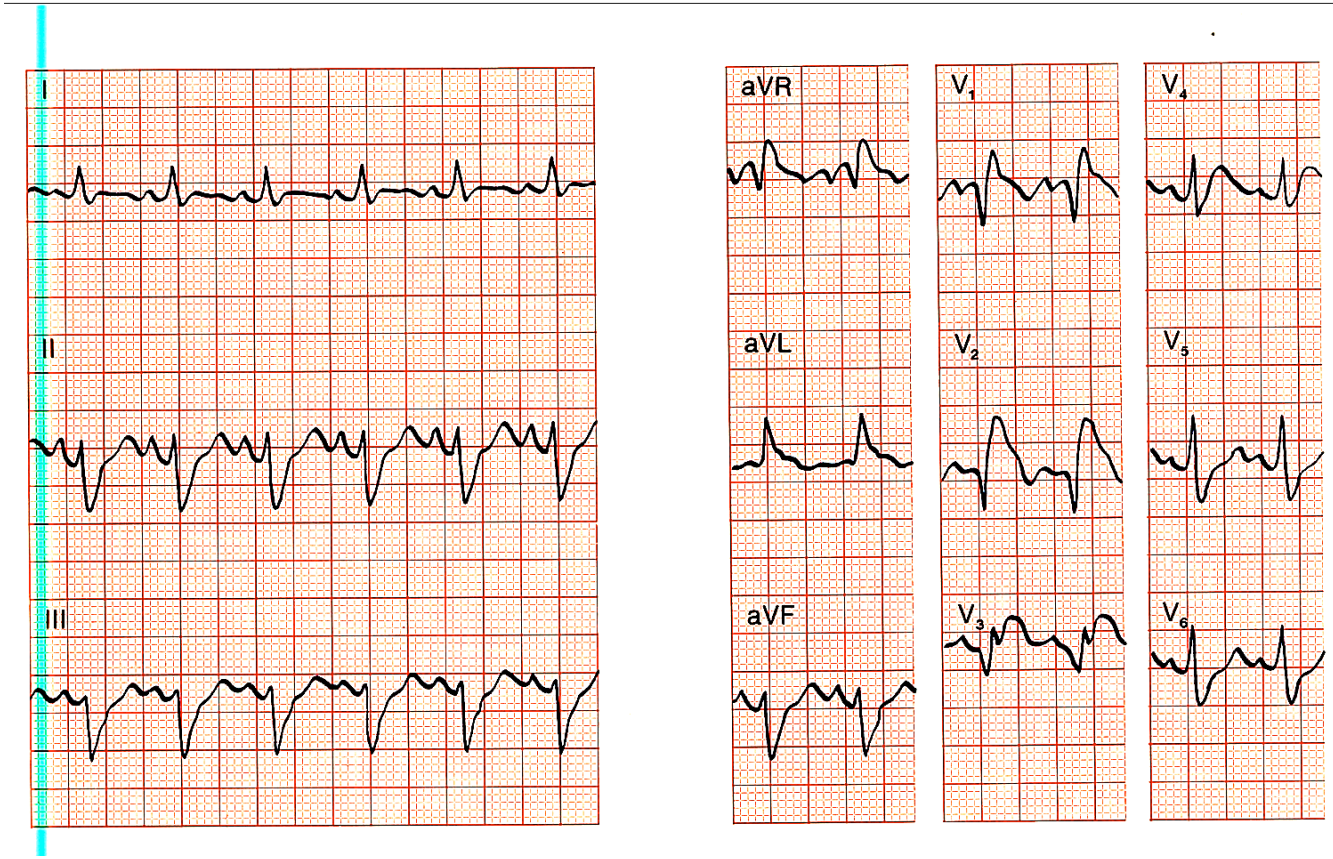


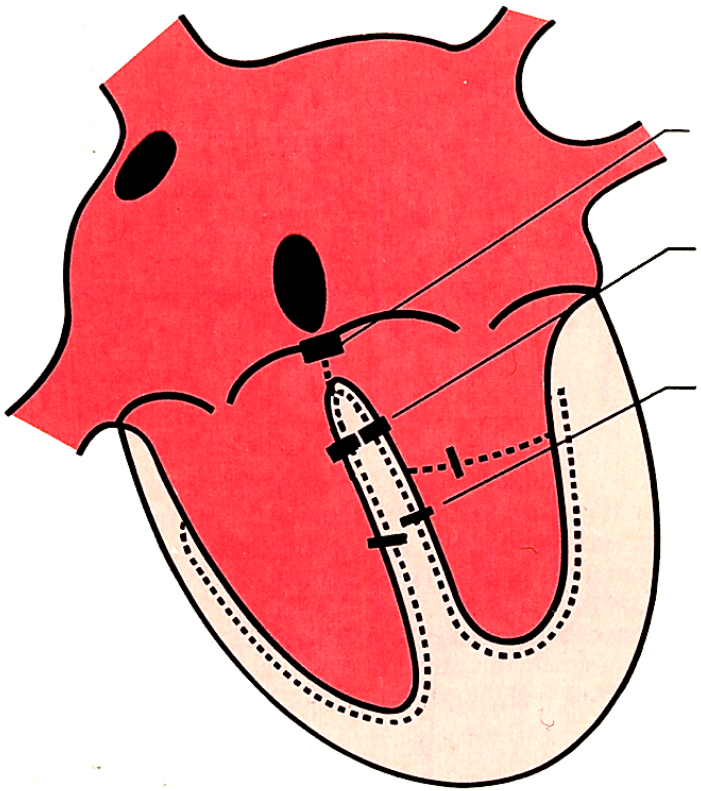
A *Right bundle branch block and anteroseptal infarction*



B *For comparison right bundle branch block without underlying infarction*

BCRD+HBAI+IAM anteroseptal reciente



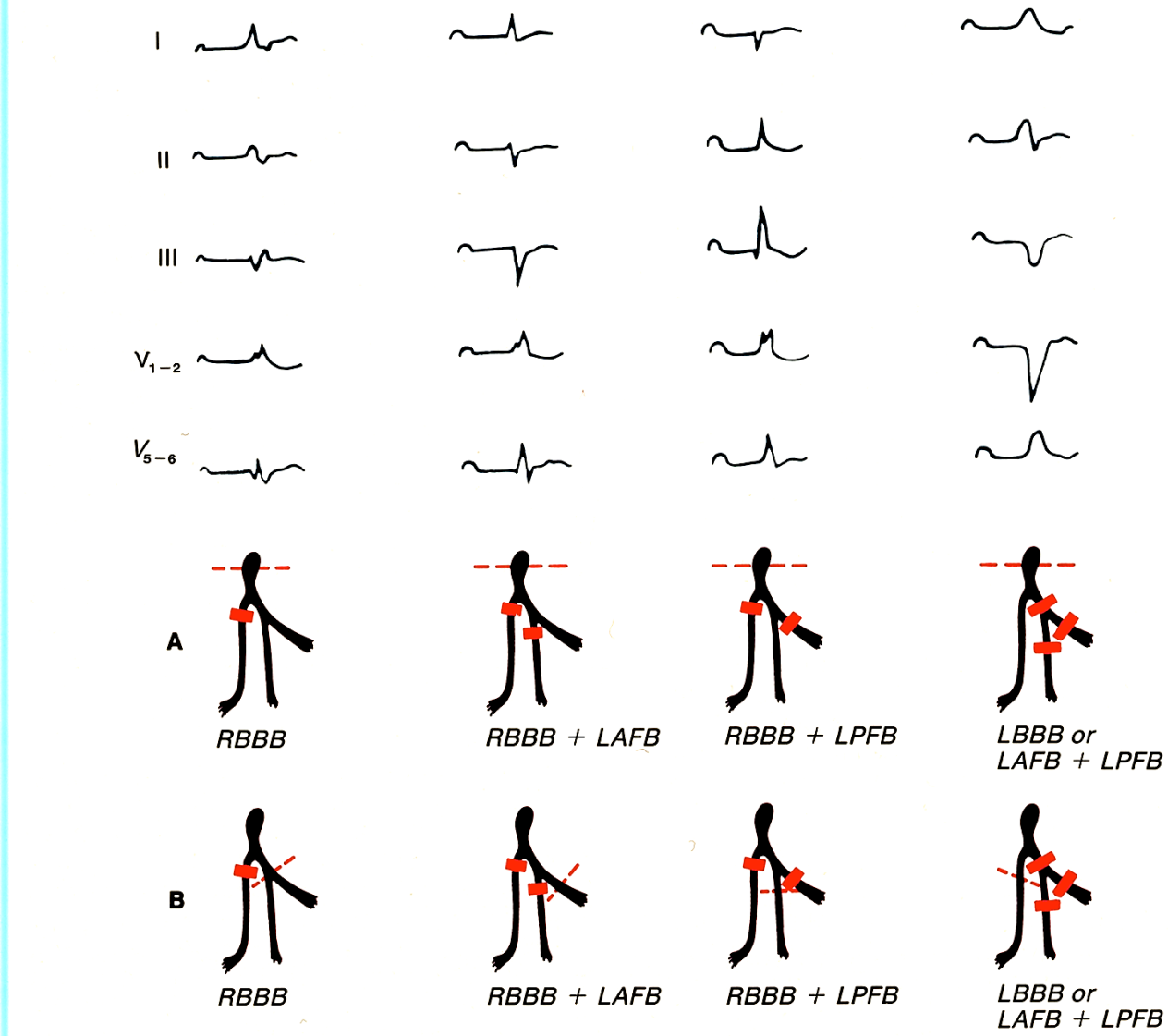


Monofascicular AV block
or PROXIMAL AV BLOCK

Bifascicular AV block
= RBBB + LBBB

Trifascicular AV block
= RBBB + LAFB + LPFB

DISTAL AV BLOCK


I
II
III
V_{1-2}
V_{5-6}
A
RBBB
RBBB + LAFB
RBBB + LPFB
LBBB or
LAFB + LPFB
B
RBBB
RBBB + LAFB
RBBB + LPFB
LBBB or
LAFB + LPFB
Delay in conduction due to incomplete block
Interruption of conduction due to complete block

Trazados de un mismo sujeto (Bl.rama alternante)

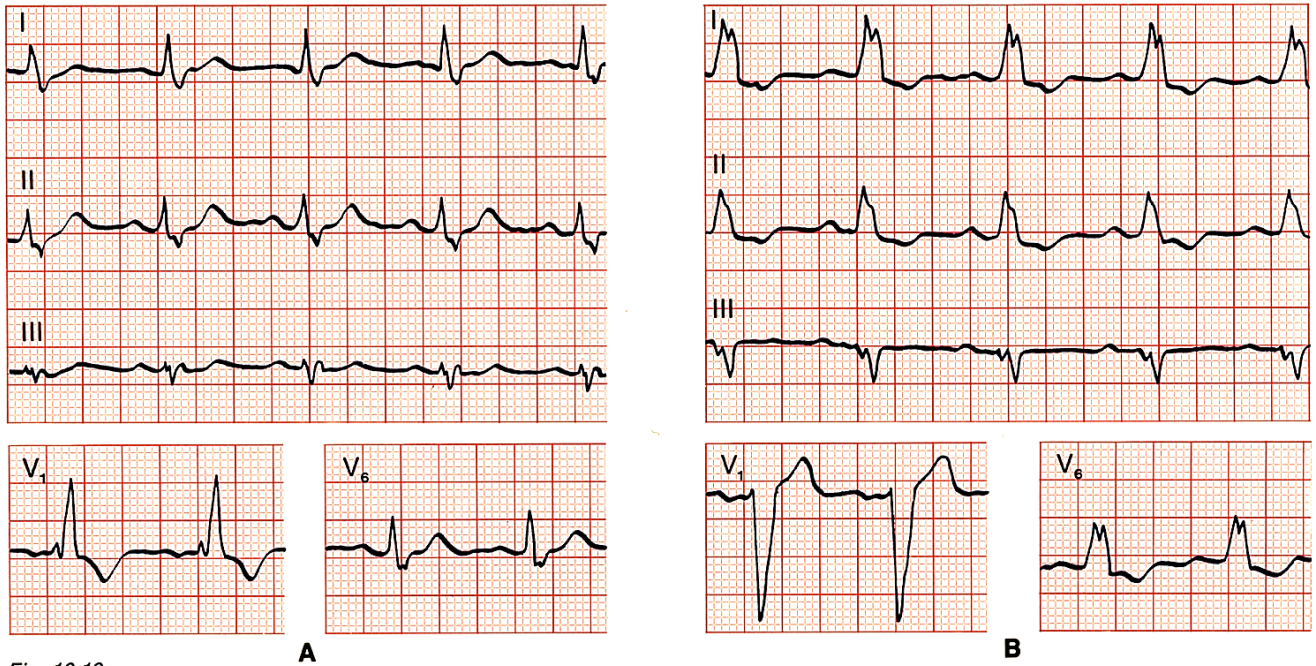
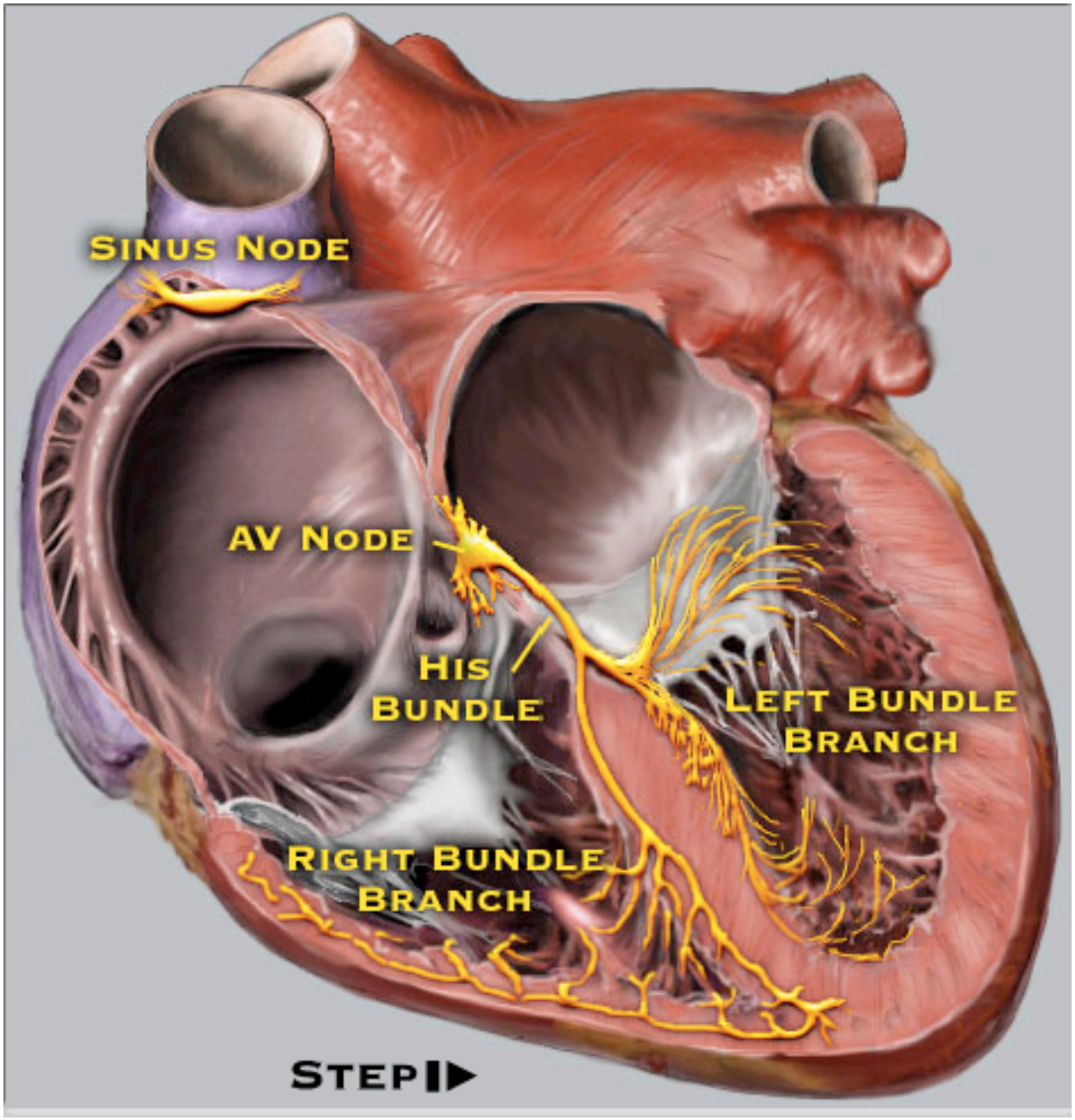


Fig. 10.19


SINUS NODE
AV NODE
HIS BUNDLE
LEFT BUNDLE BRANCH
RIGHT BUNDLE BRANCH
STEP

Atrioventricular Conduction Variations

A. Fixed normal PR interval

Sinus rhythm (see Plate 10 A)

B. Fixed but short PR interval

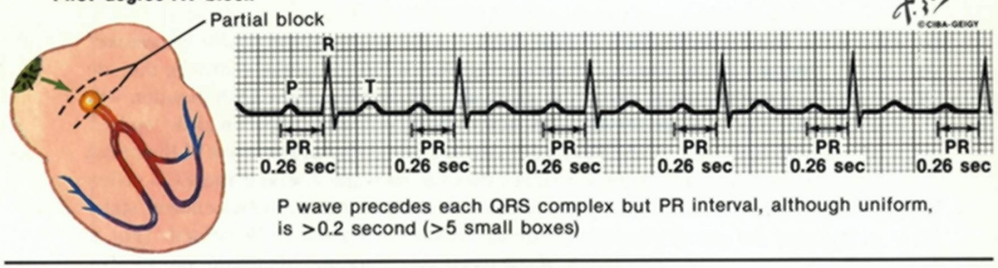
1. **Junctional or coronary sinus rhythm** (see Plate 11 K)
2. **Wolff-Parkinson-White syndrome** (see Plate 12 B,2)

C. P wave related to each QRS complex, but variable PR interval

1. **Wandering atrial pacemaker** (see Plate 10 F)
2. **Multifocal atrial tachycardia** (see Plate 11 G)

D. Fixed but prolonged PR interval

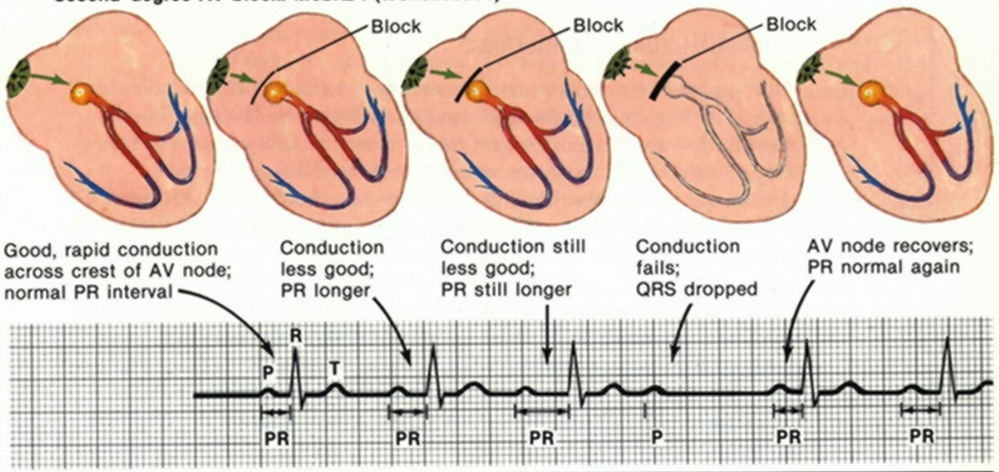
First-degree AV block



P wave precedes each QRS complex but PR interval, although uniform, is >0.2 second (>5 small boxes)

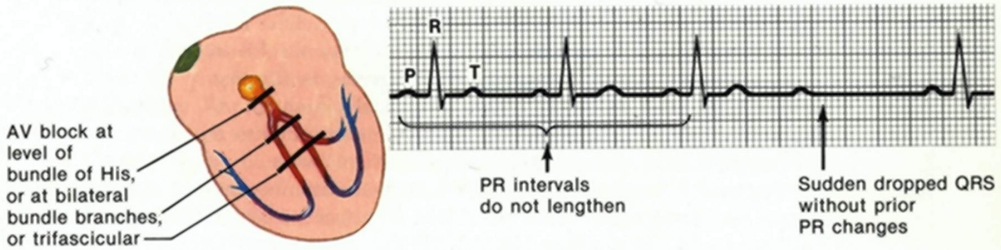
E. Progressive lengthening of PR interval with intermittent dropped beats

Second-degree AV block: Mobitz I (Wenckebach)



F. Sudden dropped QRS without prior PR lengthening

Second-degree AV block: Mobitz II (non-Wenckebach)

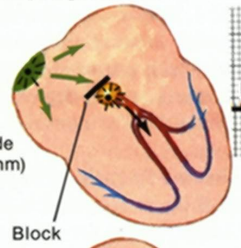


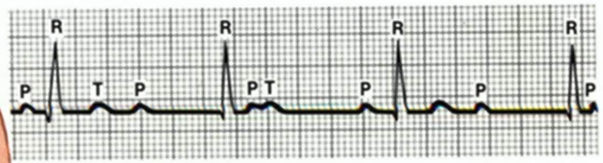
Atrioventricular Conduction Variations (continued)

G. No relationship between P waves and QRS complexes: QRS rate *slower* than P rate

Third-degree (complete) AV block

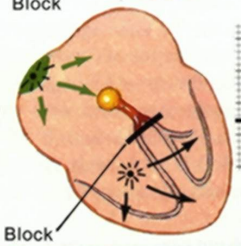
1. Impulses originate at both SA node (P waves) and below site of block in AV node (junctional rhythm) conducting to ventricles

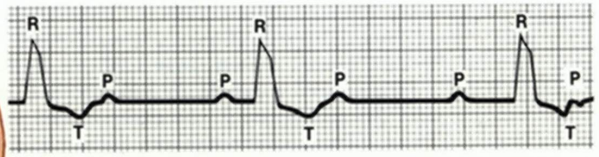




Atria and ventricles depolarize independently. QRS complexes less frequent; regular at 40 to 55/minute but normal in shape

2. Impulses originate at SA node (P waves) and also below site of block in ventricles (idioventricular rhythm)

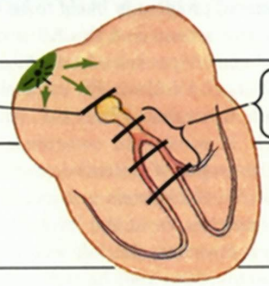




Atria and ventricles depolarize independently. QRS complexes less frequent; regular at 20 to 40/minute but wide and abnormal in shape

Features of two types of atrioventricular block

	"High"	"Low"
Site of block	Crest of AV node	Bundle of His, bilateral bundle branch, or trifascicular
Type of escape rhythm	Junctional escape rhythm Narrow QRS Adequate rate (40–55)	Ventricular escape rhythm Wide QRS Inadequate rate (20–40) Danger of asystole or ventricular tachycardia
Underlying pathology	Right coronary artery disease, diaphragmatic infarction, edema around AV node	Left anterior descending coronary artery disease, large anteroseptal infarction, or chronic degeneration of conduction system
Rhythm before complete block	Preceded by Mobitz I (Wenckebach) second-degree AV block	Preceded by Mobitz II second-degree AV block

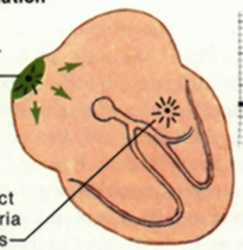


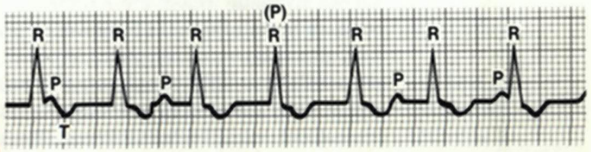
H. No relationship between P waves and QRS complexes. QRS rate faster than P rate

AV dissociation

Slower supraventricular rhythm

Rapid ventricular rhythm, which does not conduct retrograde to atria or shut off sinus





P waves less frequent than QRS complexes and totally unrelated to them

F. Netter M.D.
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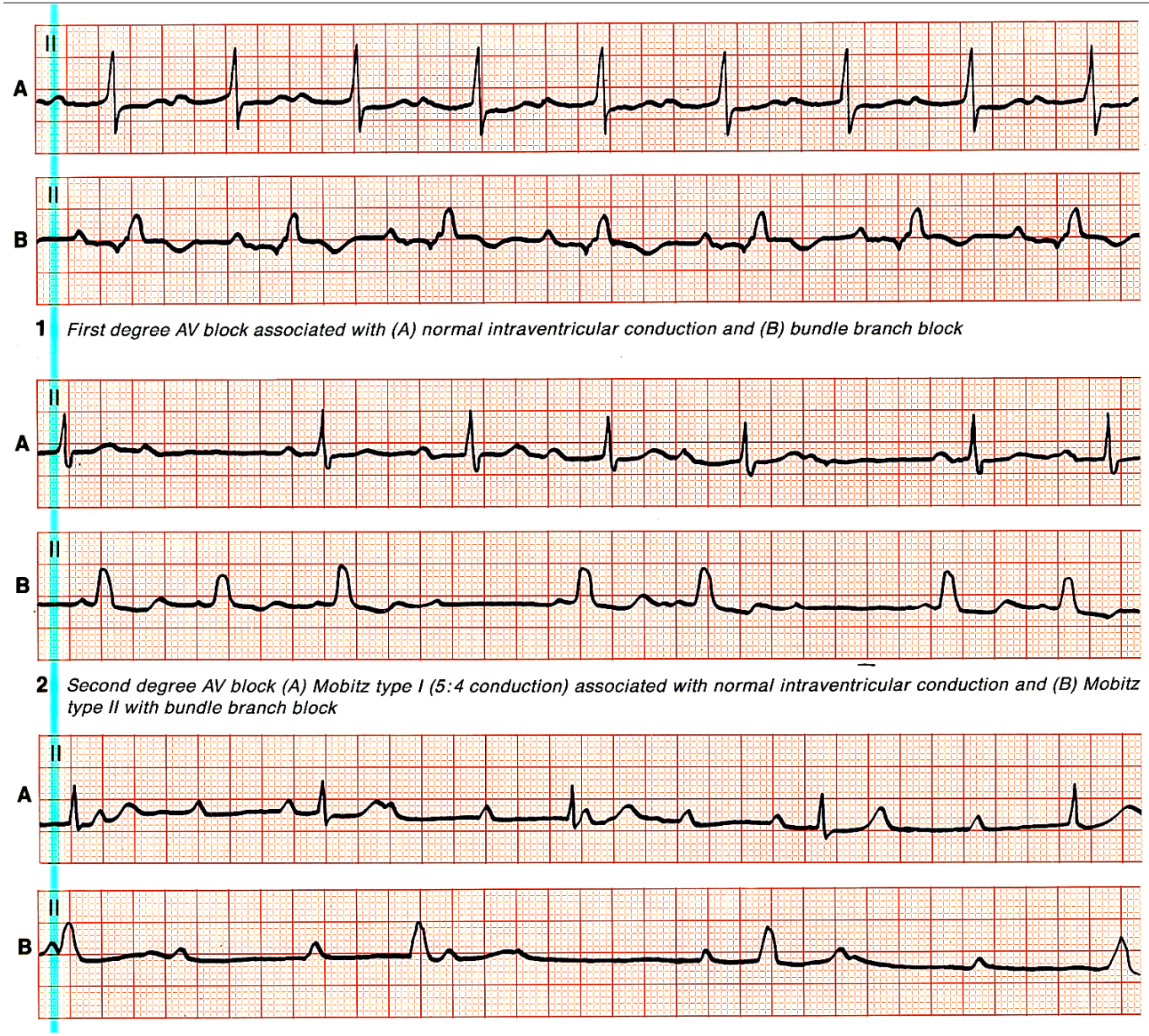
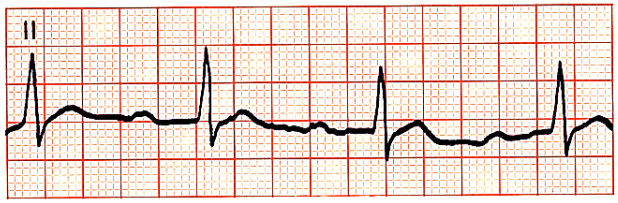
Bloqueos AV

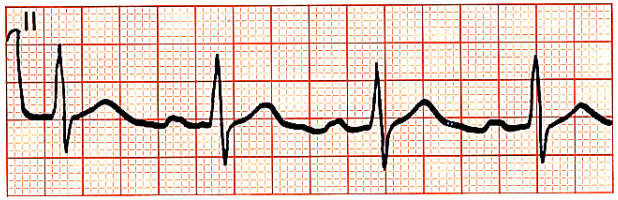


1 *First degree AV block associated with (A) normal intraventricular conduction and (B) bundle branch block*

2 *Second degree AV block (A) Mobitz type I (5:4 conduction) associated with normal intraventricular conduction and (B) Mobitz type II with bundle branch block*



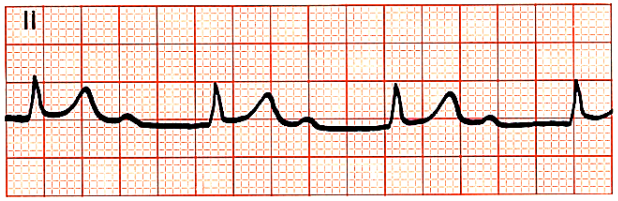
A ECG at admission. First degree AV block with prolonged PR interval (= 0.36 s)



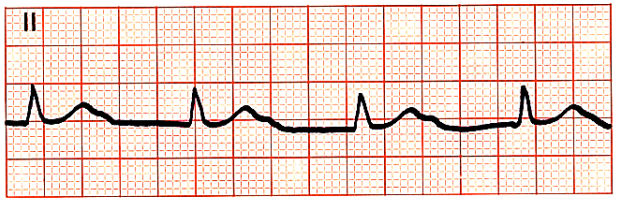
B ECG 3 days after cessation of digoxin therapy. PR interval normal (= 0.22 s)

Fig. 10.2
First degree AV block caused by digitalis intoxication. ECG from a 77-year-old female who had received 250 micrograms of digoxin daily for one year

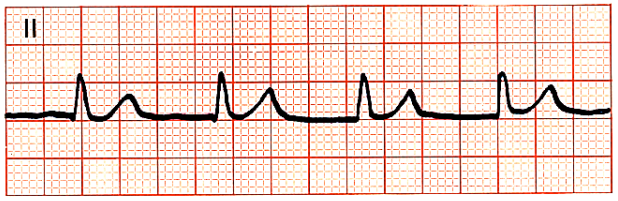
Bloqueo AV primer grado



A Heart rate 64/min: The P wave is seen distinctly shortly after the preceding T wave



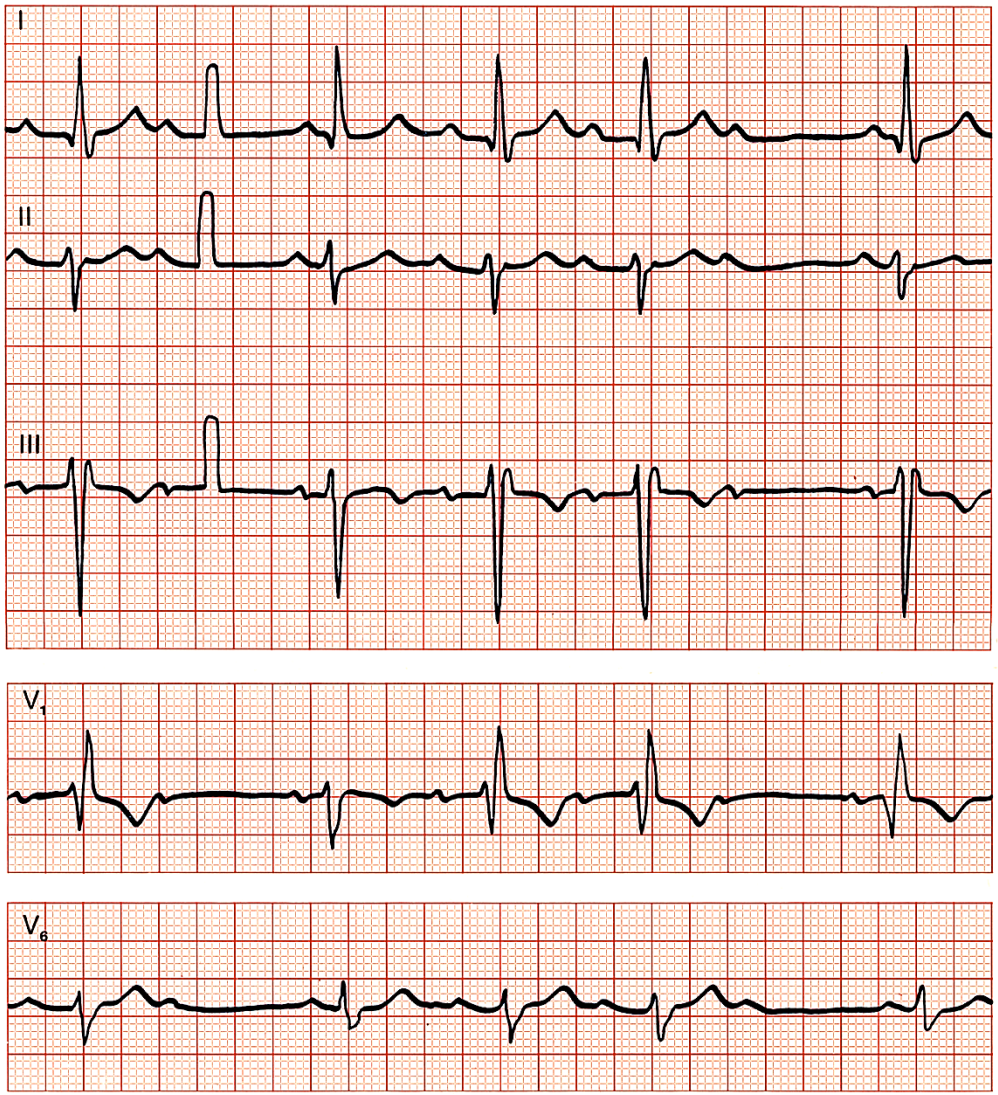
B Heart rate 70/min: The P wave merges with the T wave



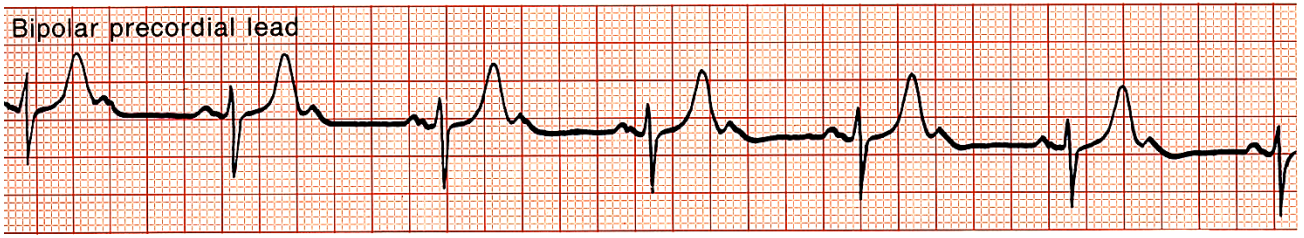
C Heart rate 81/min: The P wave is now concealed by the preceding T wave

Fig. 10.3
First degree AV block, concealment of the P wave by the preceding T wave. ECG recording from a graded exercise test on a bicycle ergometer. The PR interval in all three tracings is prolonged to 0.48 s

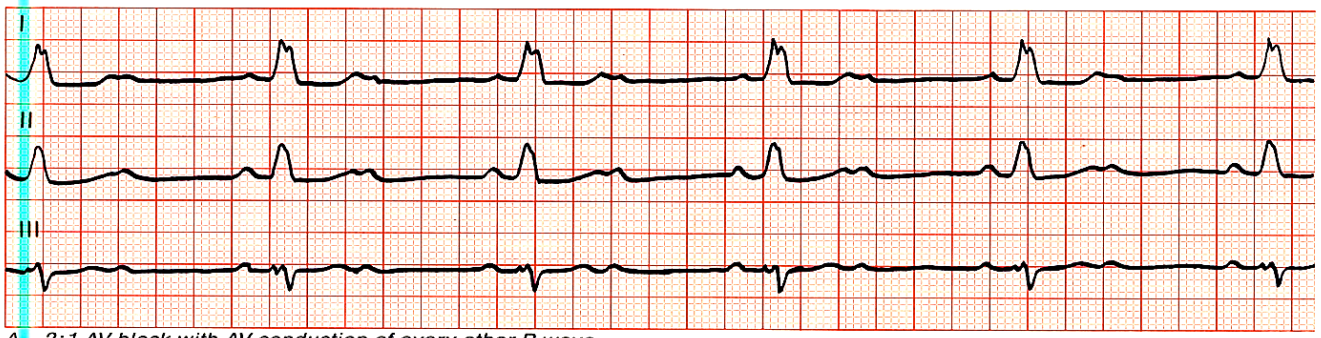
Bloqueo de Wenkebach +BRD intermitente



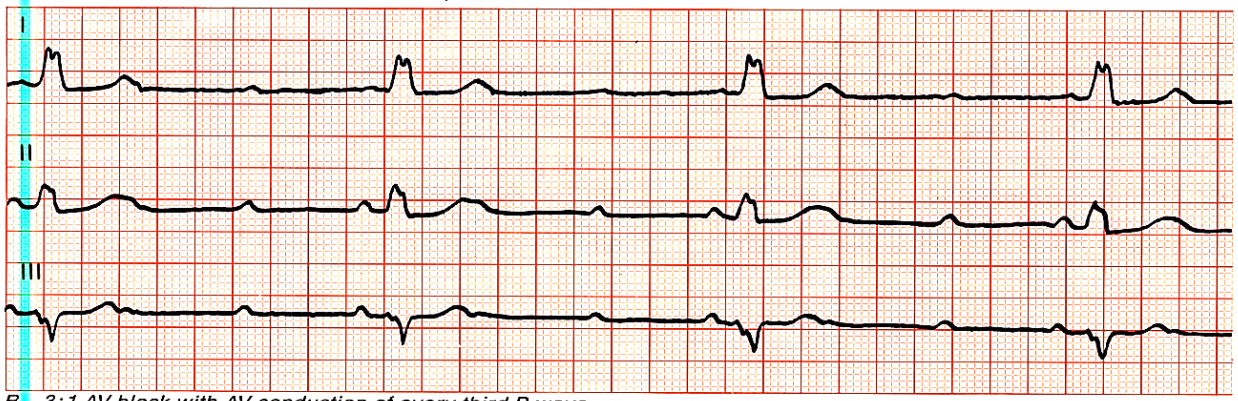
Bloqueo AV 2:1



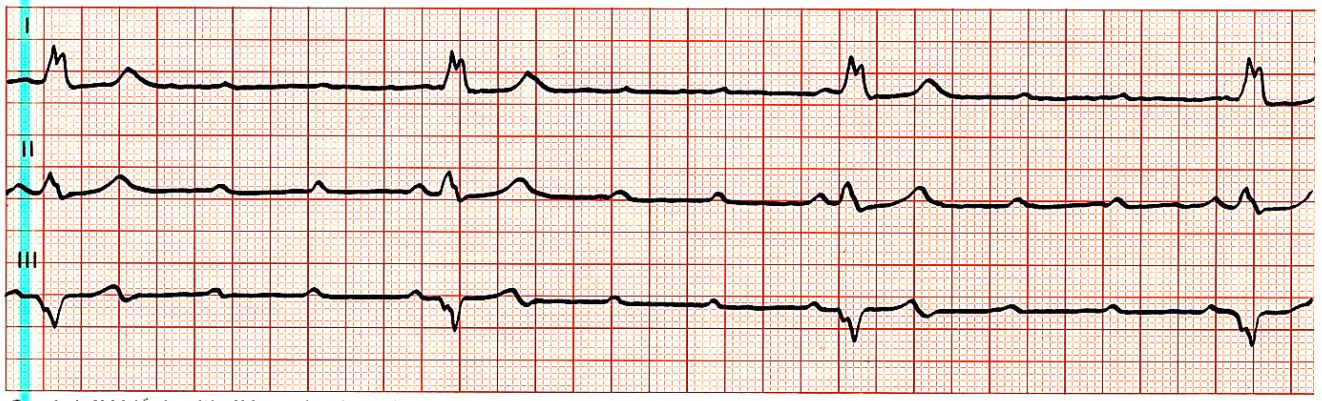
Bloqueos AV de alto grado



A 2:1 AV block with AV conduction of every other P wave

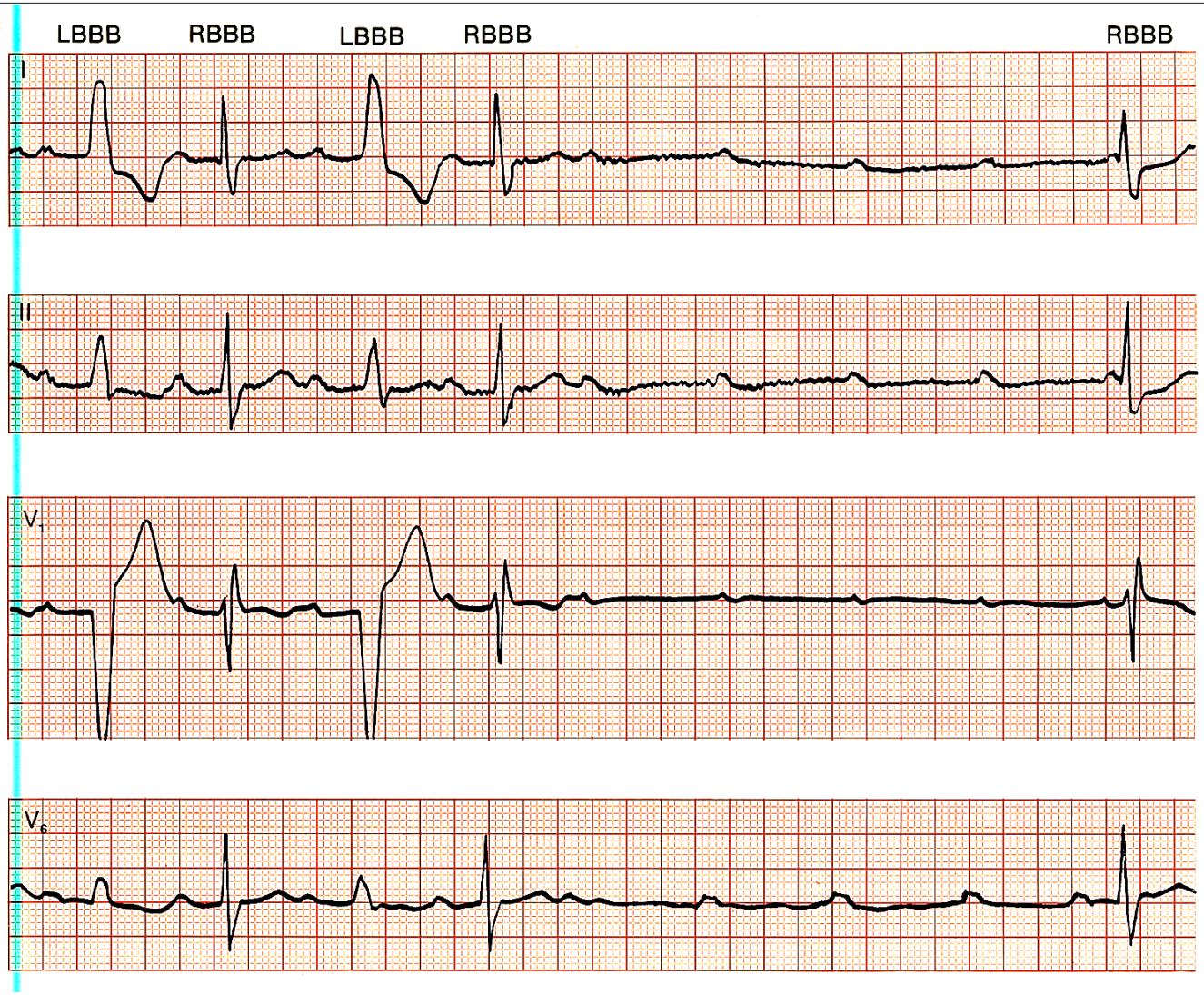


B 3:1 AV block with AV conduction of every third P wave

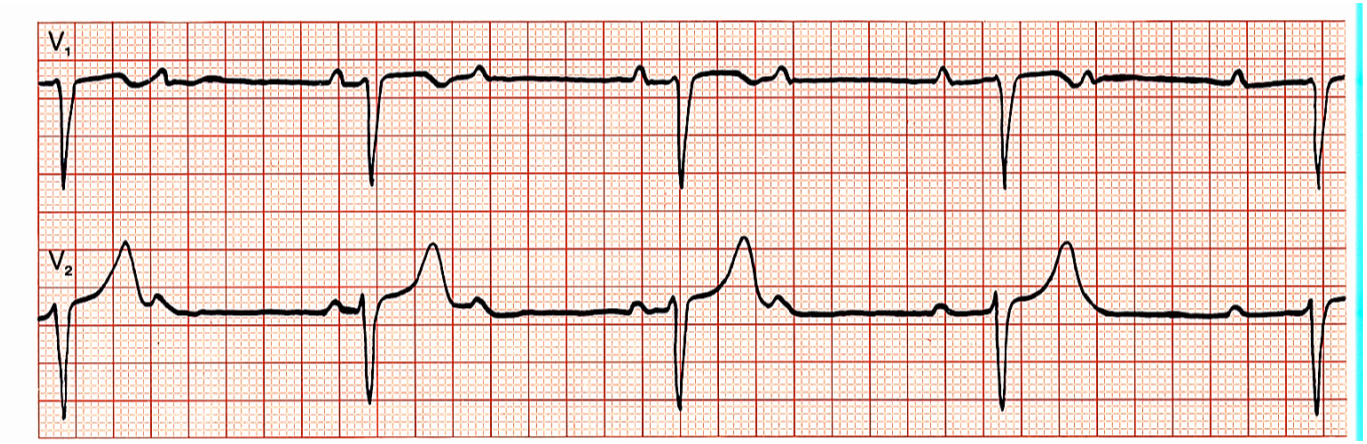


C 4:1 AV block with AV conduction of every fourth P wave

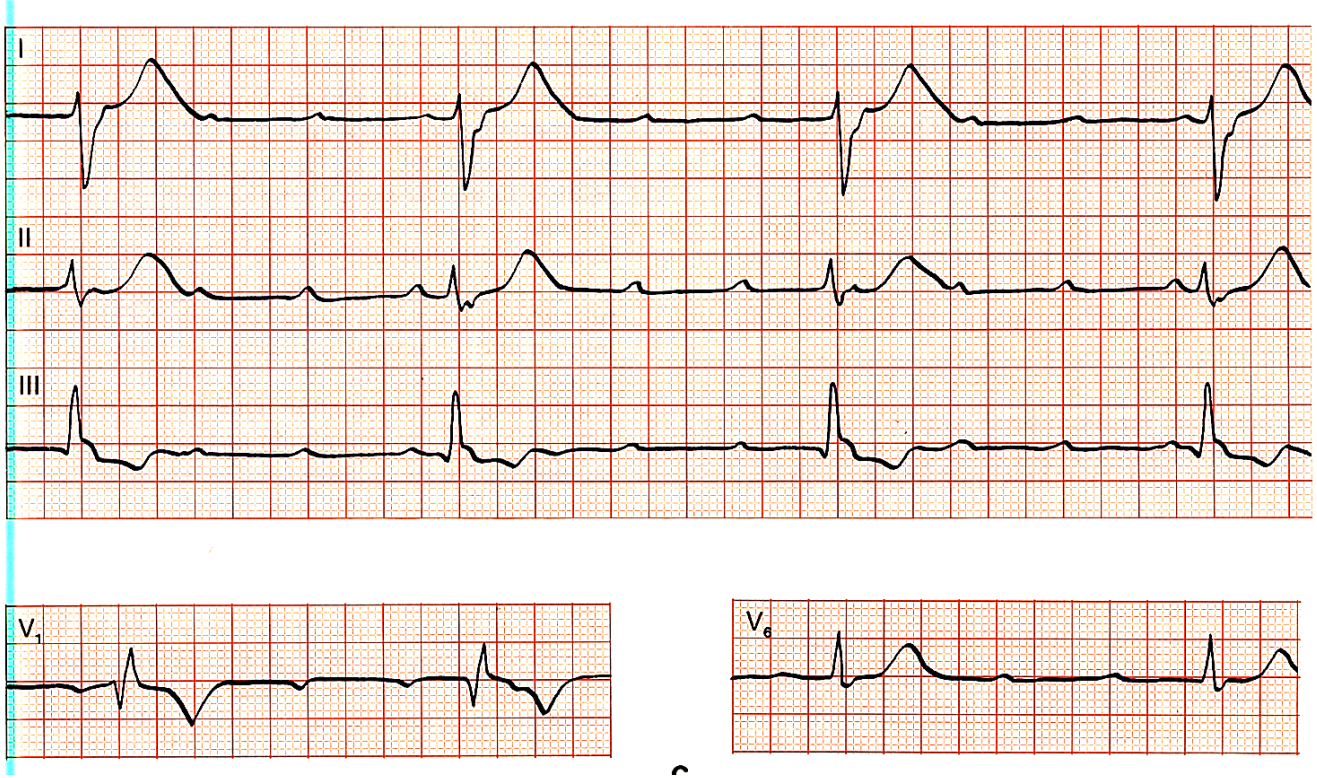
Bloqueo de rama alternante +BAV paroxístico



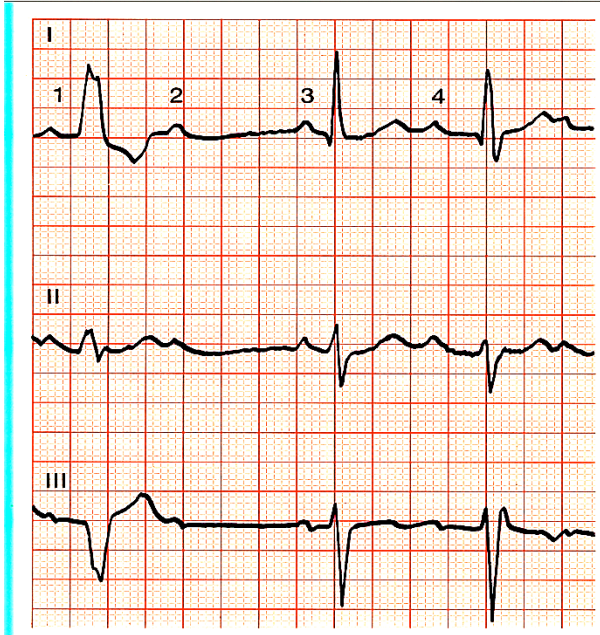
Bloqueo AV completo

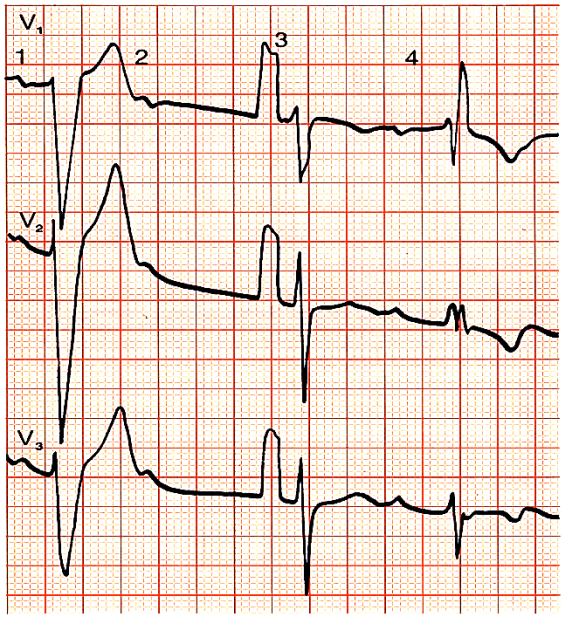


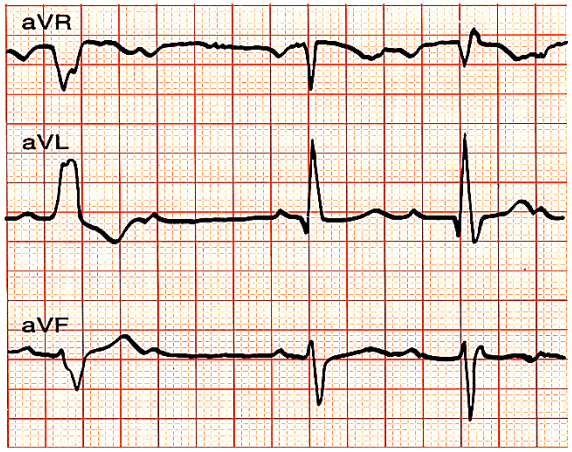
Bloqueo AV completo

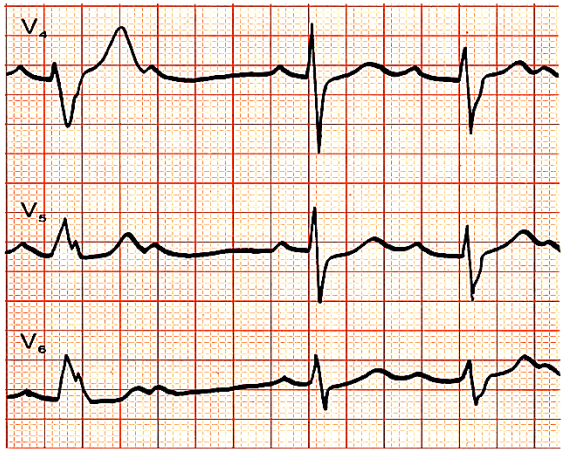


Haga sus diagnósticos

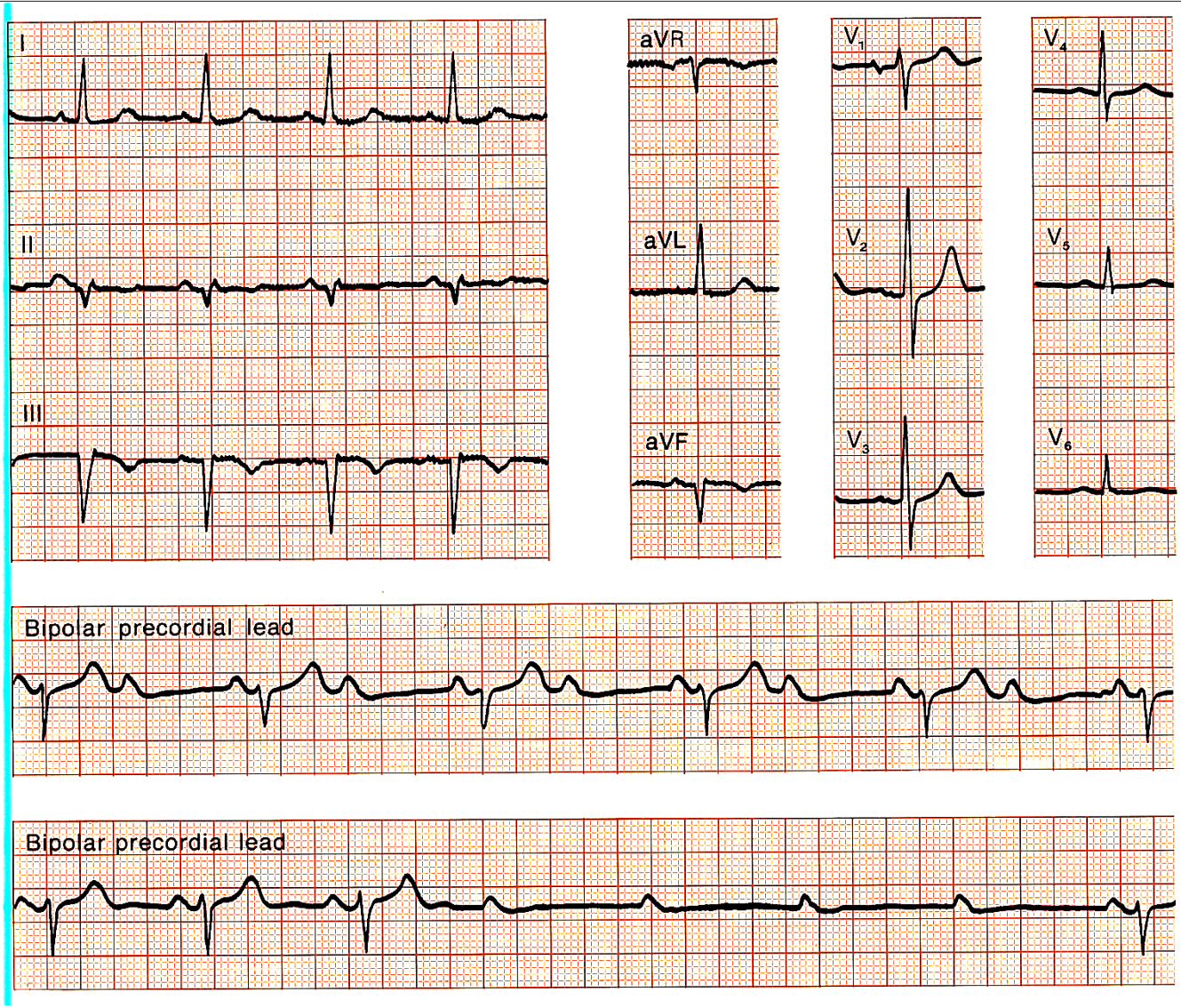


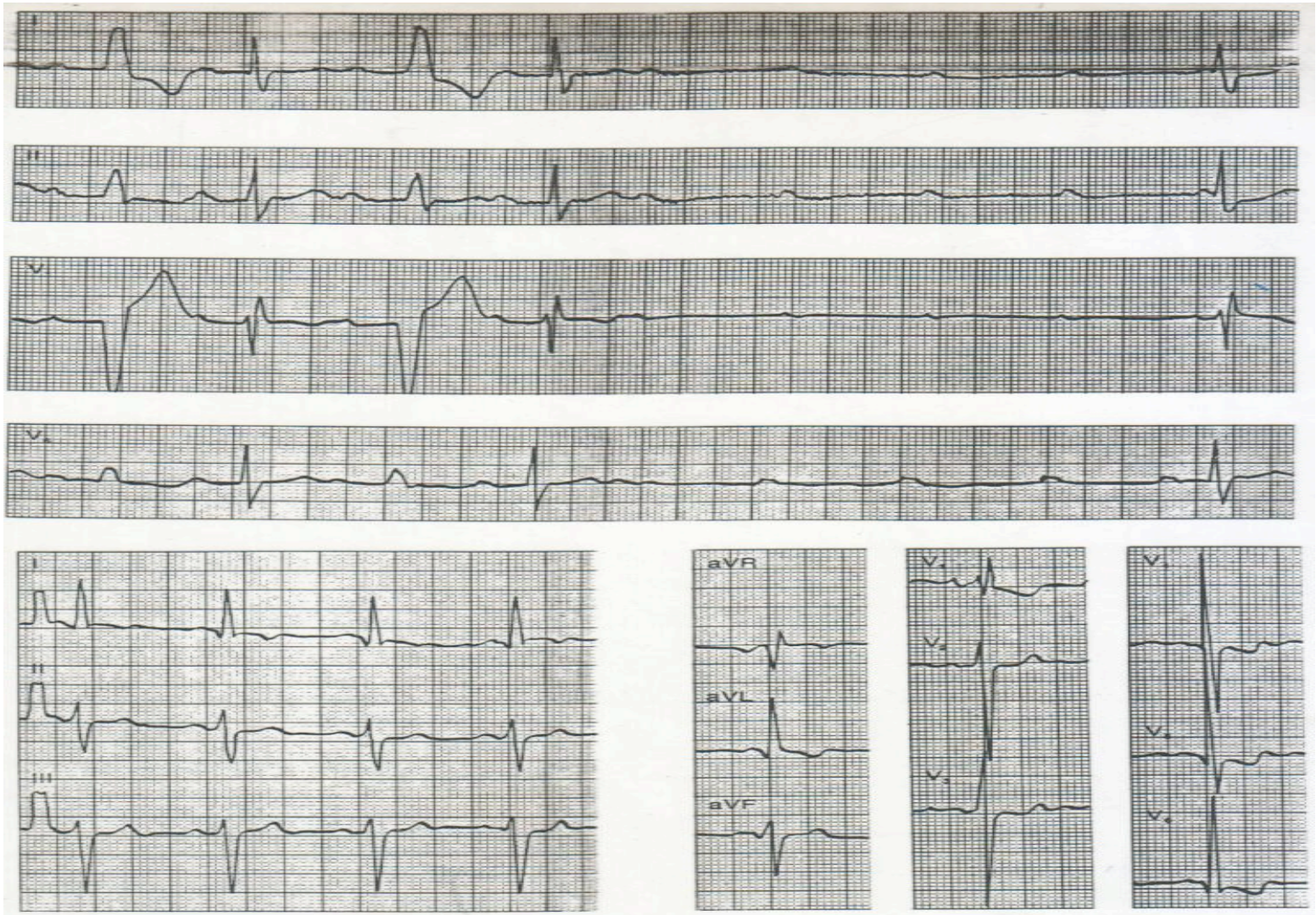






Haga sus diagnósticos



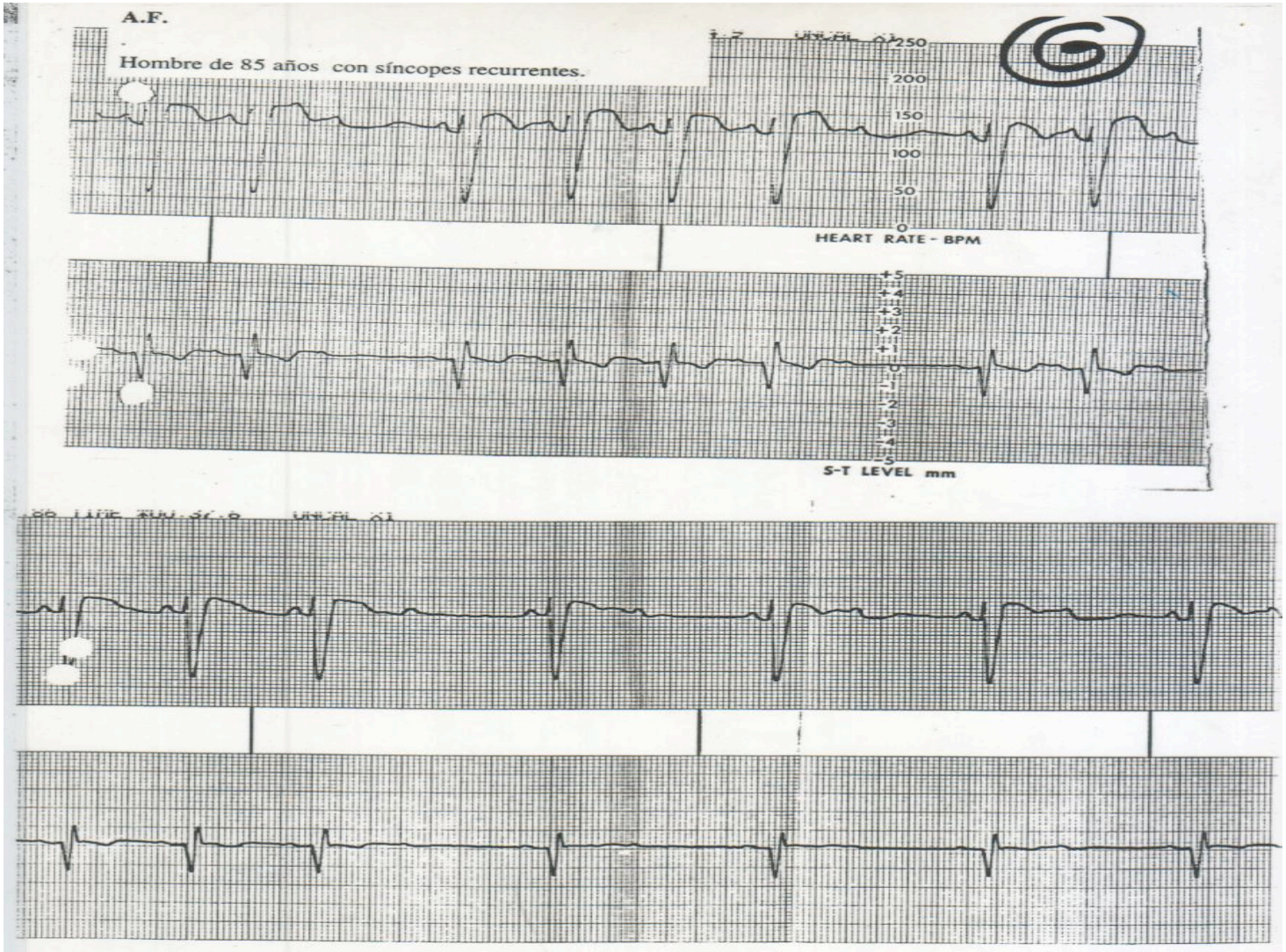


E.G. .

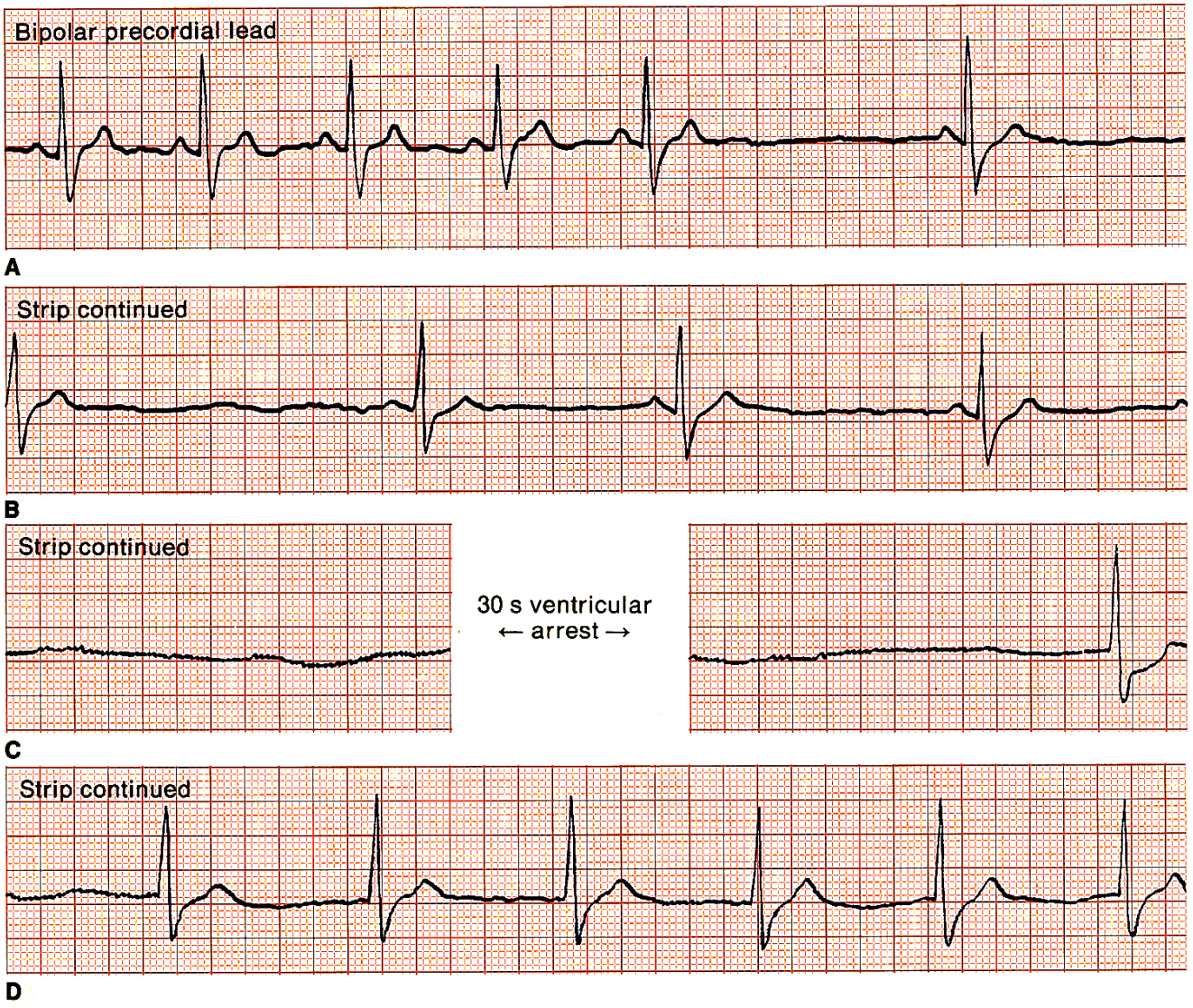
Hombre de 81 años, hipertenso con síncopes recurrentes.
Se adjunta ECG basal

A.F.

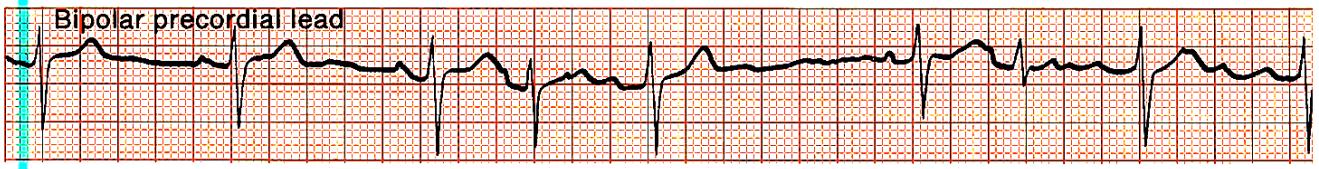
Hombre de 85 años con síncopes recurrentes.



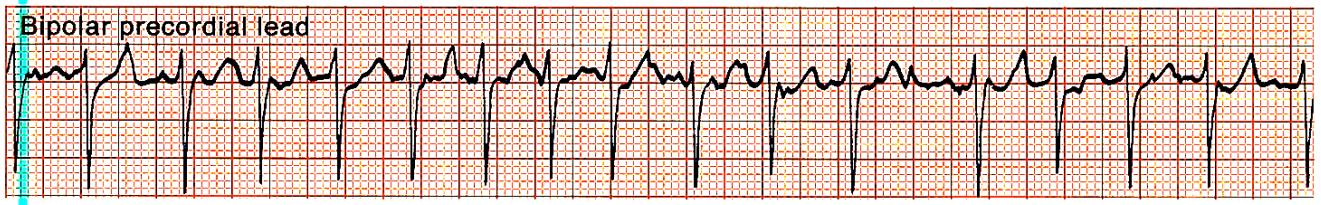
Enfermedad del nódulo sinusal



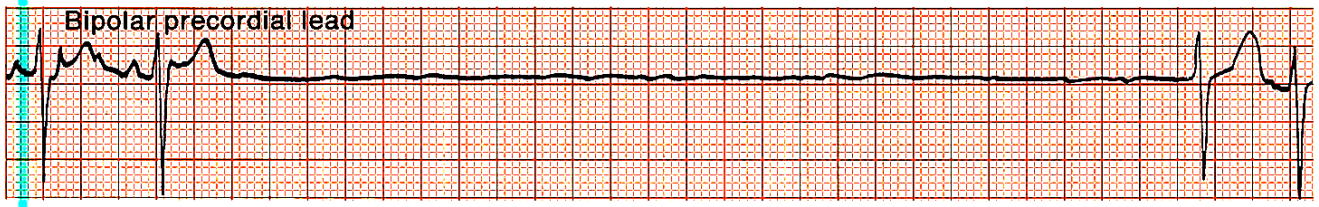
Sindrome taquicardia-bradicardia



A Alternation between sinus bradycardia and atrial flutter



B Atrial flutter



C The end of an episode of atrial flutter followed by SA block or sinus arrest with no signs of atrial activity for a period of 5.5 s ending with an AV junctional escape