

Eletrocardiograma Normal

O que o Clínico Precisa Saber

Dr. Daniel Medeiros Moreira, MD. MSc. PhD.

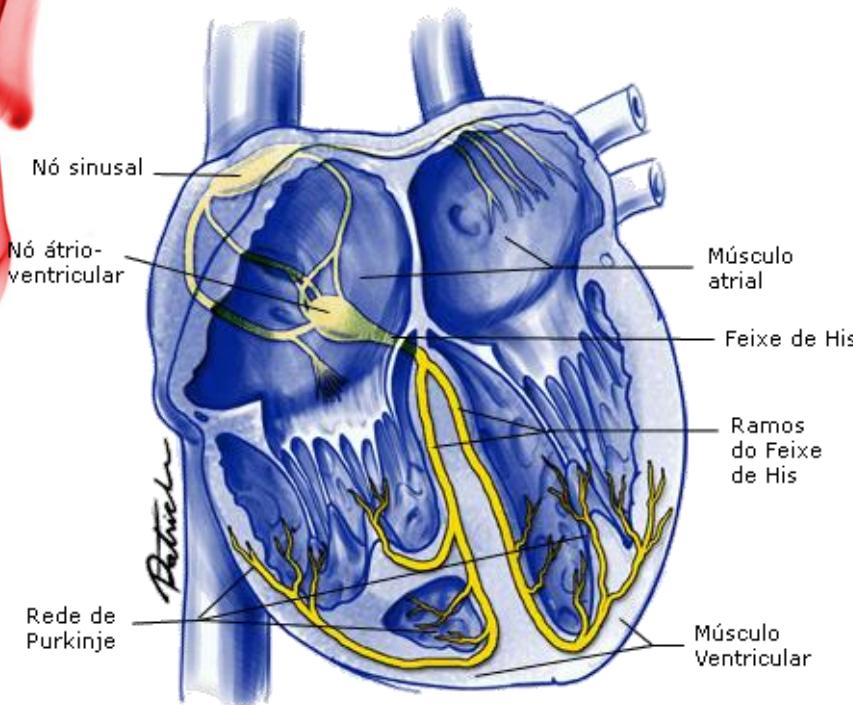
Professor de Semiologia/Cardiologia – Unisul/Palhoça

Cardiologista – Instituto de Cardiologia de Santa Catarina

Cardiologista – Sistema Catarinense de Telemedicina/SES

Sócio proprietário da Sinusal Laudos

Sistema de Condução

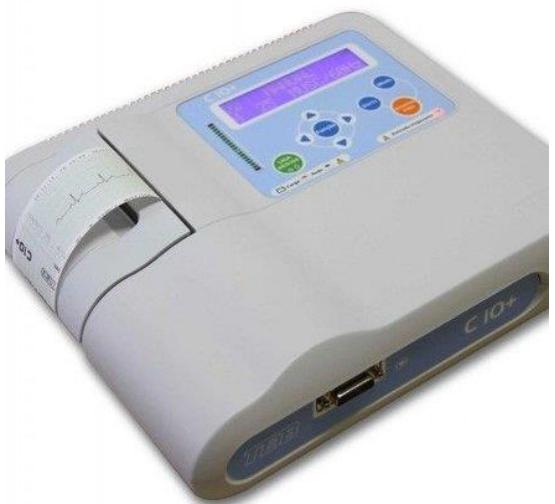


Sequência	Estrutura	Velocidade (m/s)	Frequência de marcapasso (bpm)
1	Nó sinusal	<0,01	60-100
2	Miocárdio atrial	1,0-1,2	-
3	Nó AV	0,02-0,05	40-55
4	Feixe de His	1,2-2,0	25-40
5	Ramos do Feixe	2,0-4,0	25-40
6	Rede de Purkinje	2,0-4,0	25-40
7	Miocárdio ventricular	0,3-1,0	-

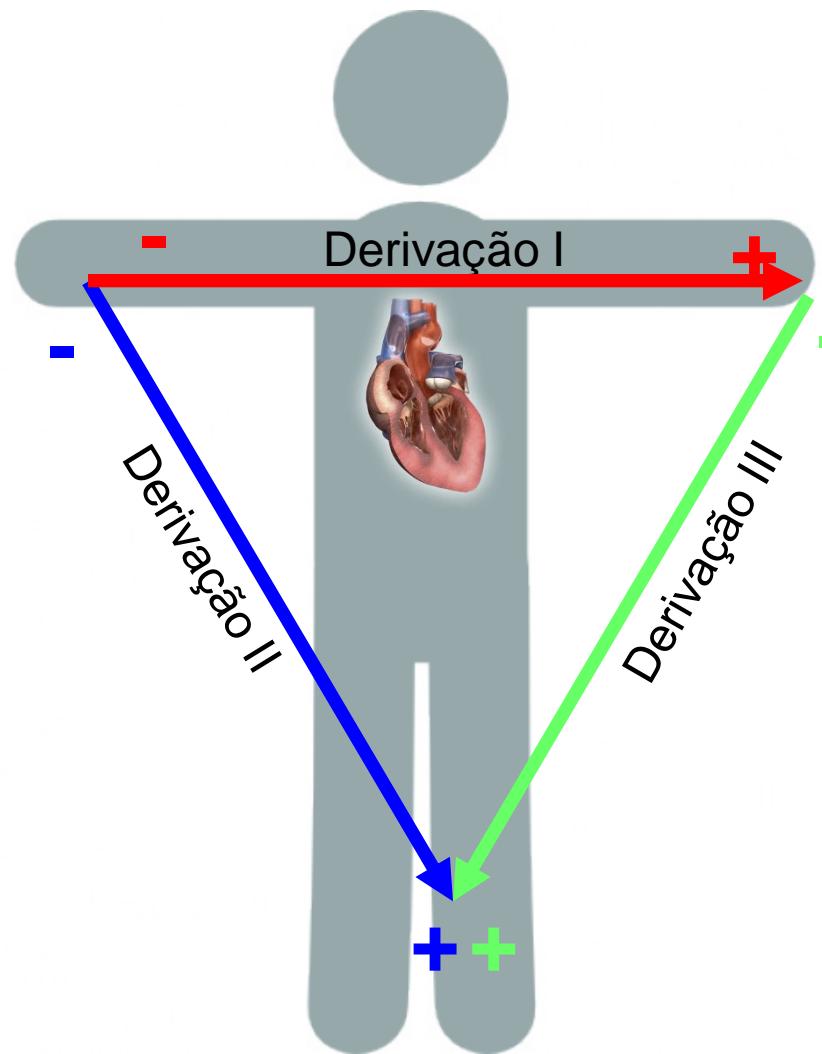


O Eletrocardiograma e as Derivações

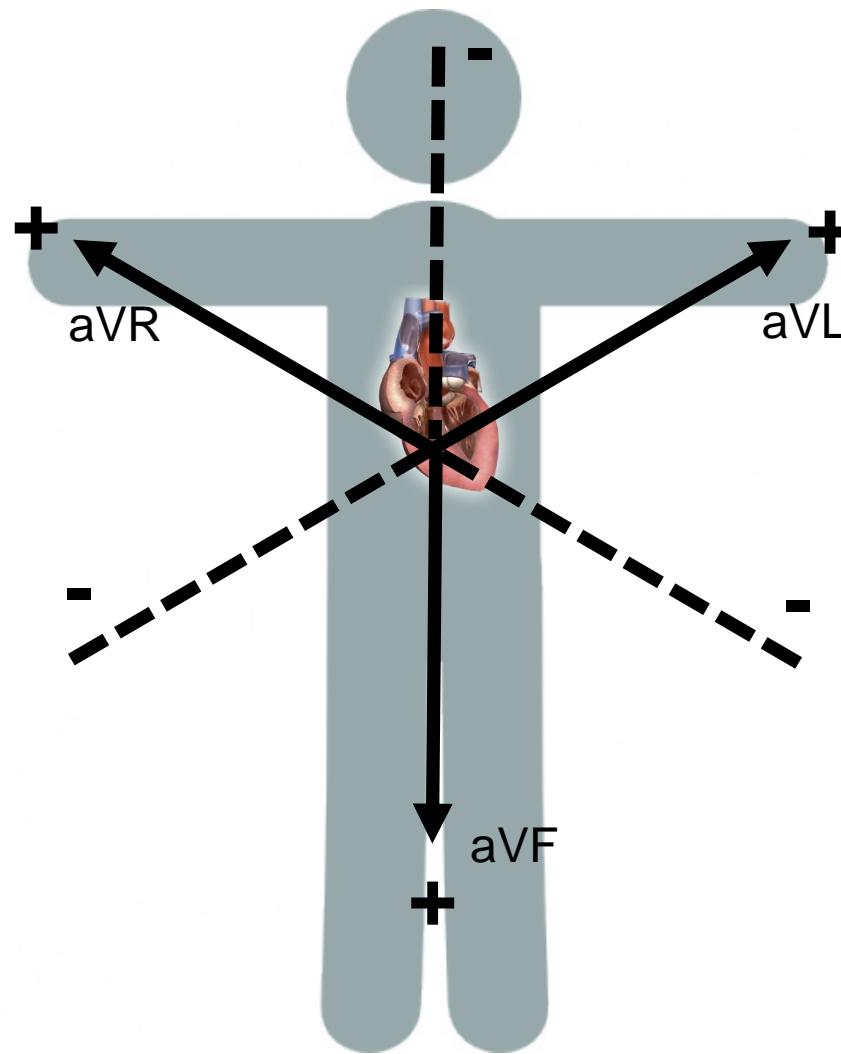




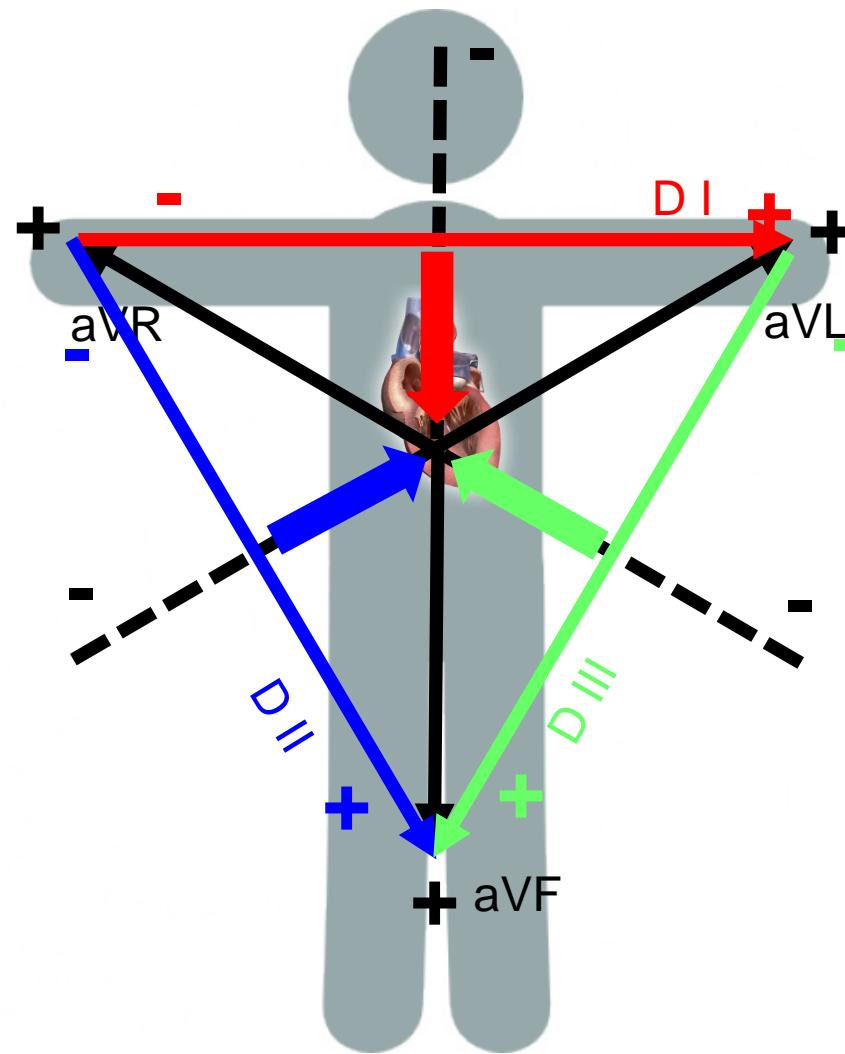
Derivações Bipolares



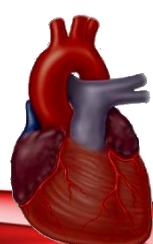
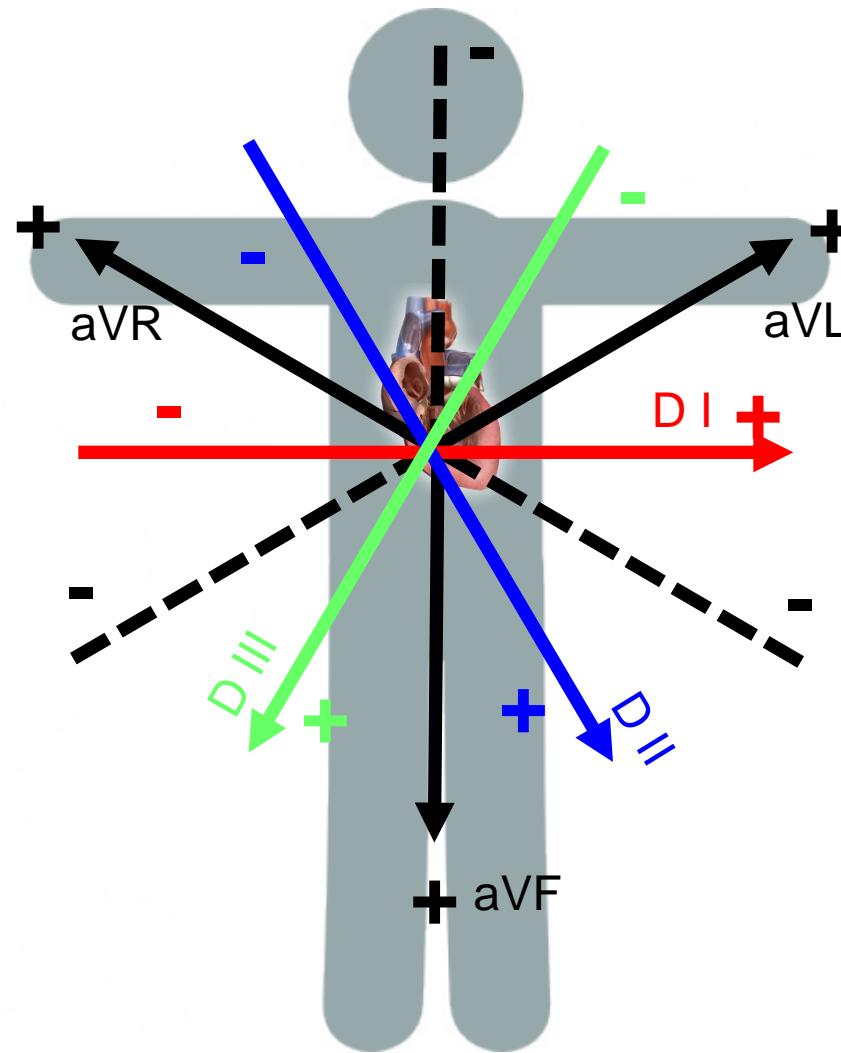
Derivações Unipolares



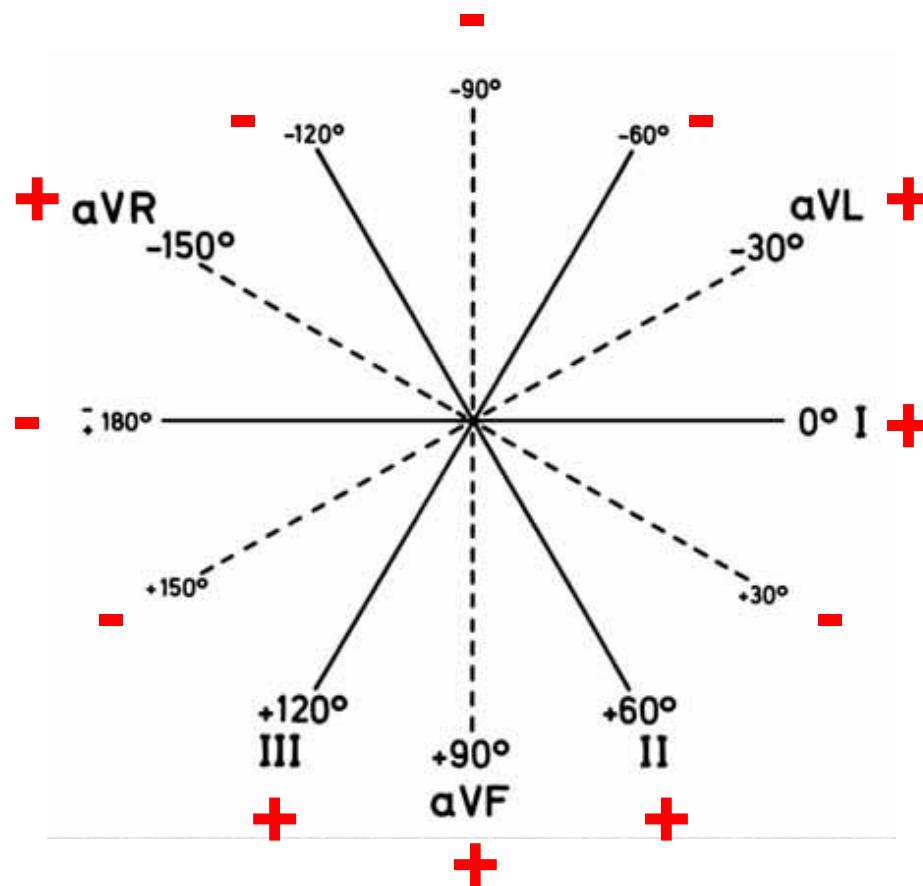
Todas as Derivações Periféricas



Todas as Derivações Periféricas

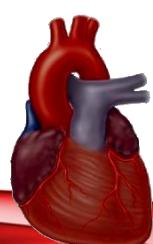
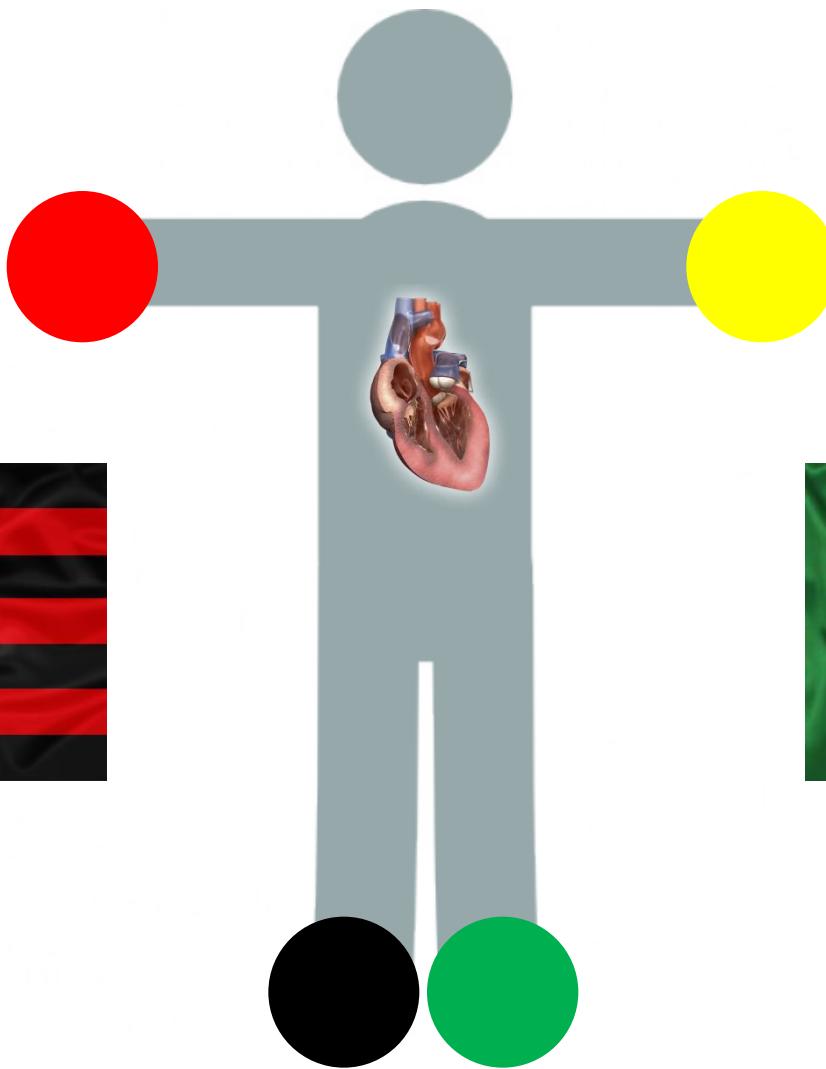


Eixos

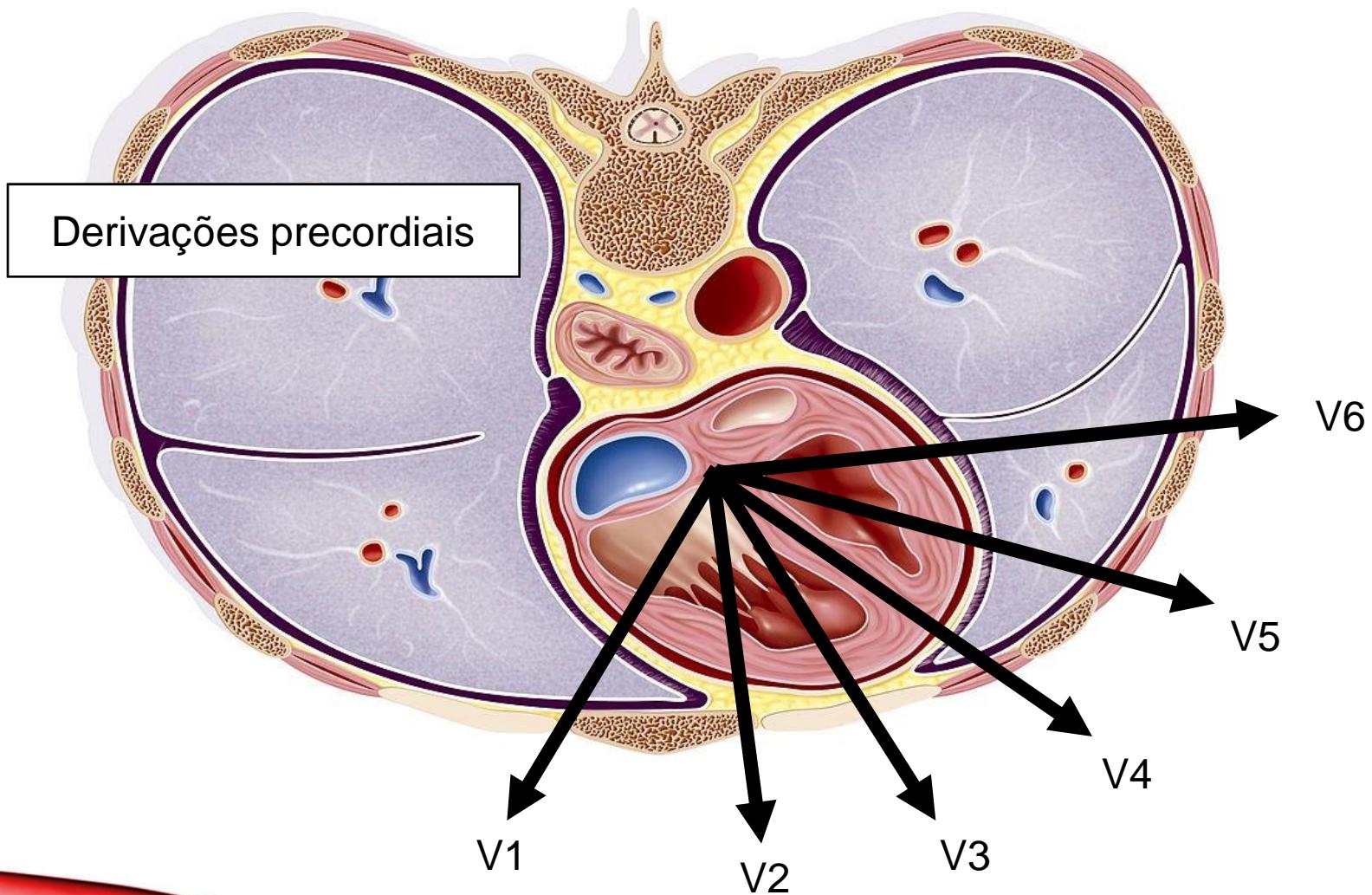




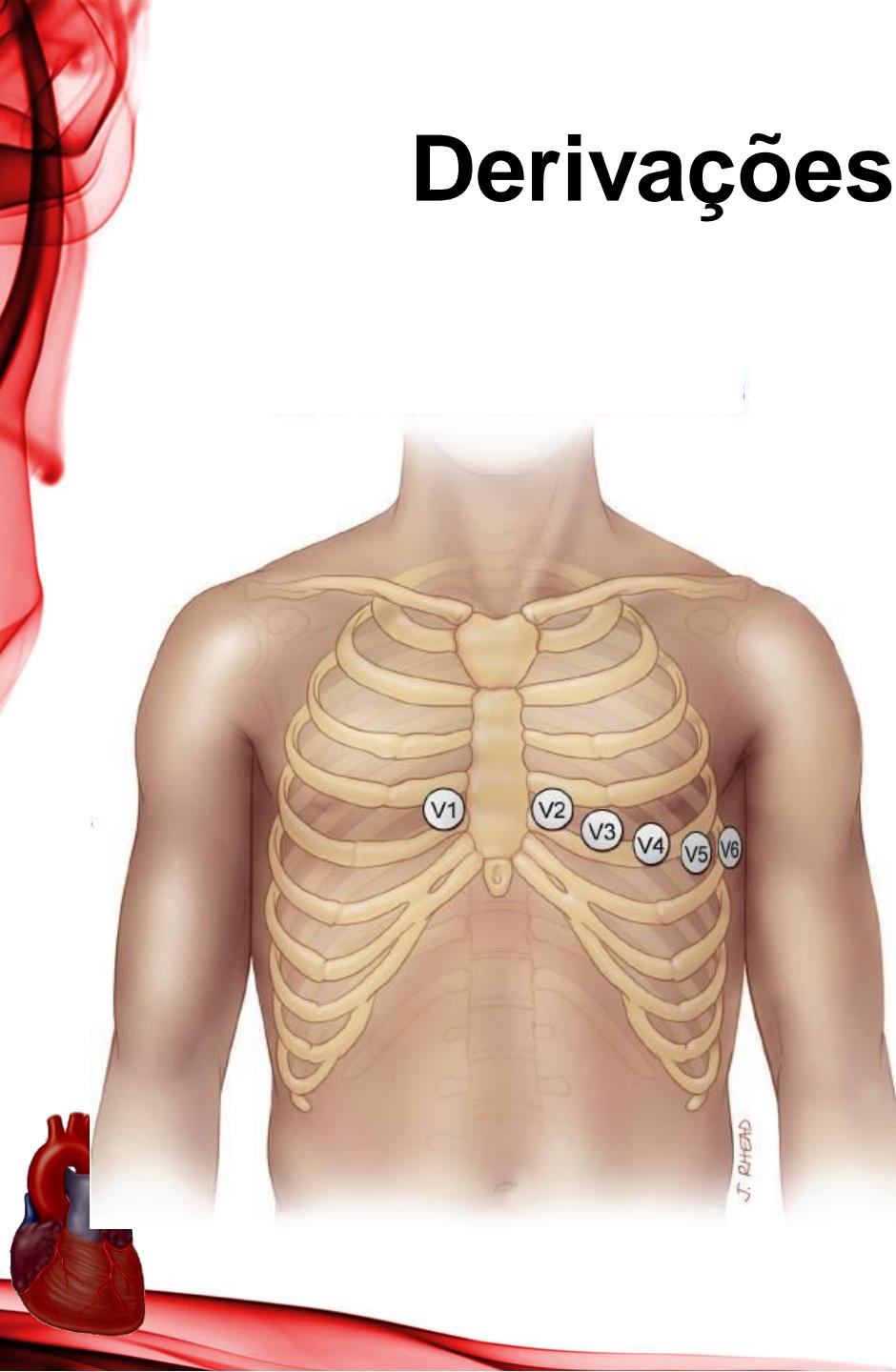
Posição dos Eletrodos Periféricos



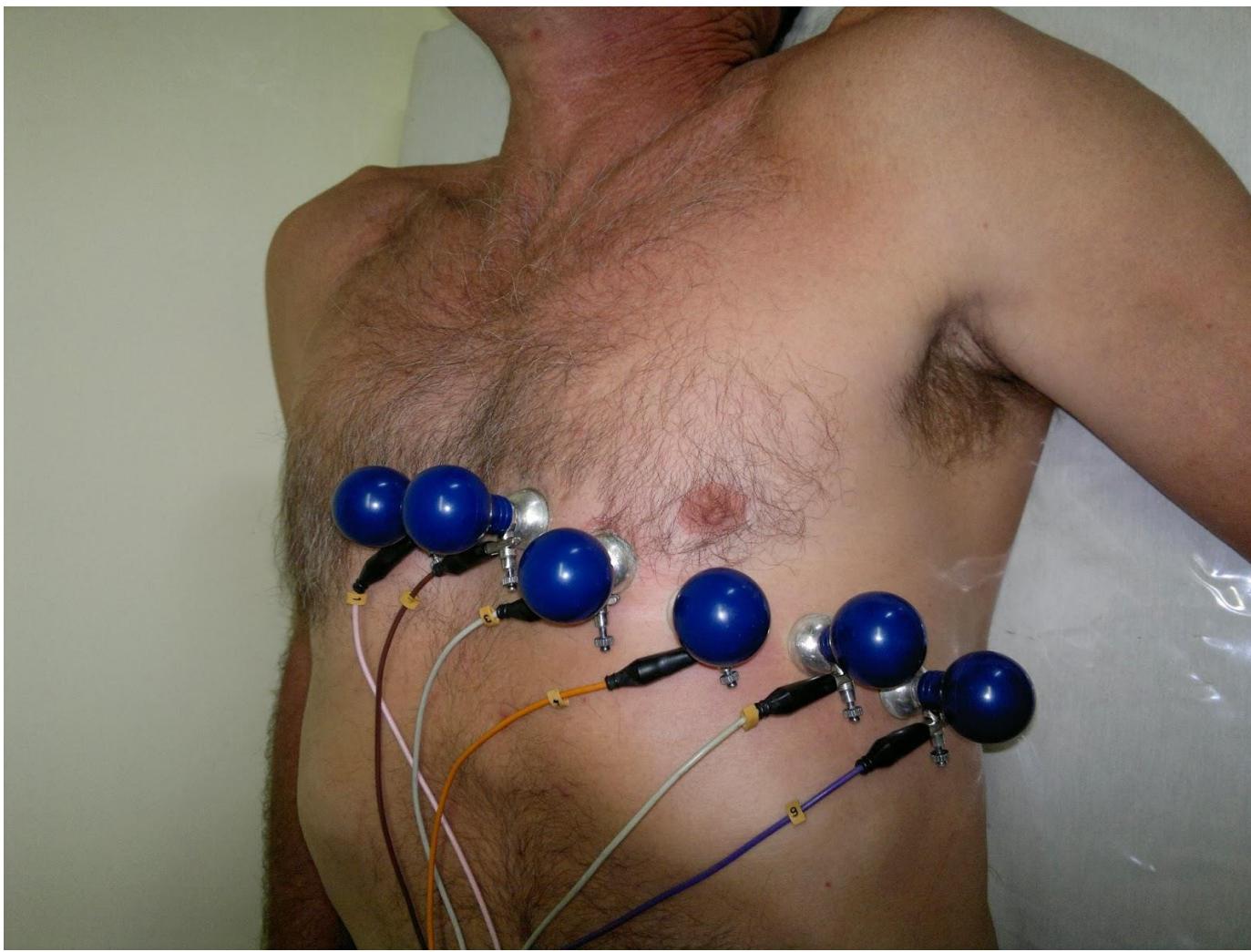
Derivações Precordiais



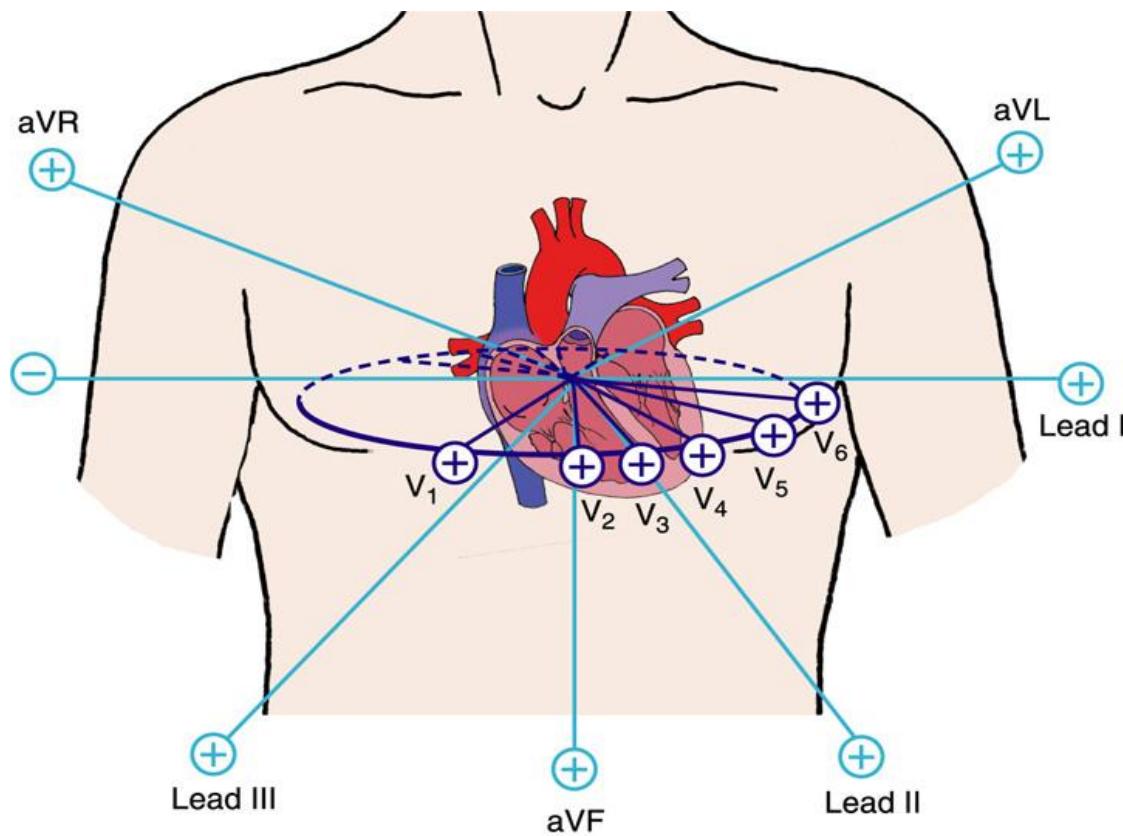
Derivações Precordiais



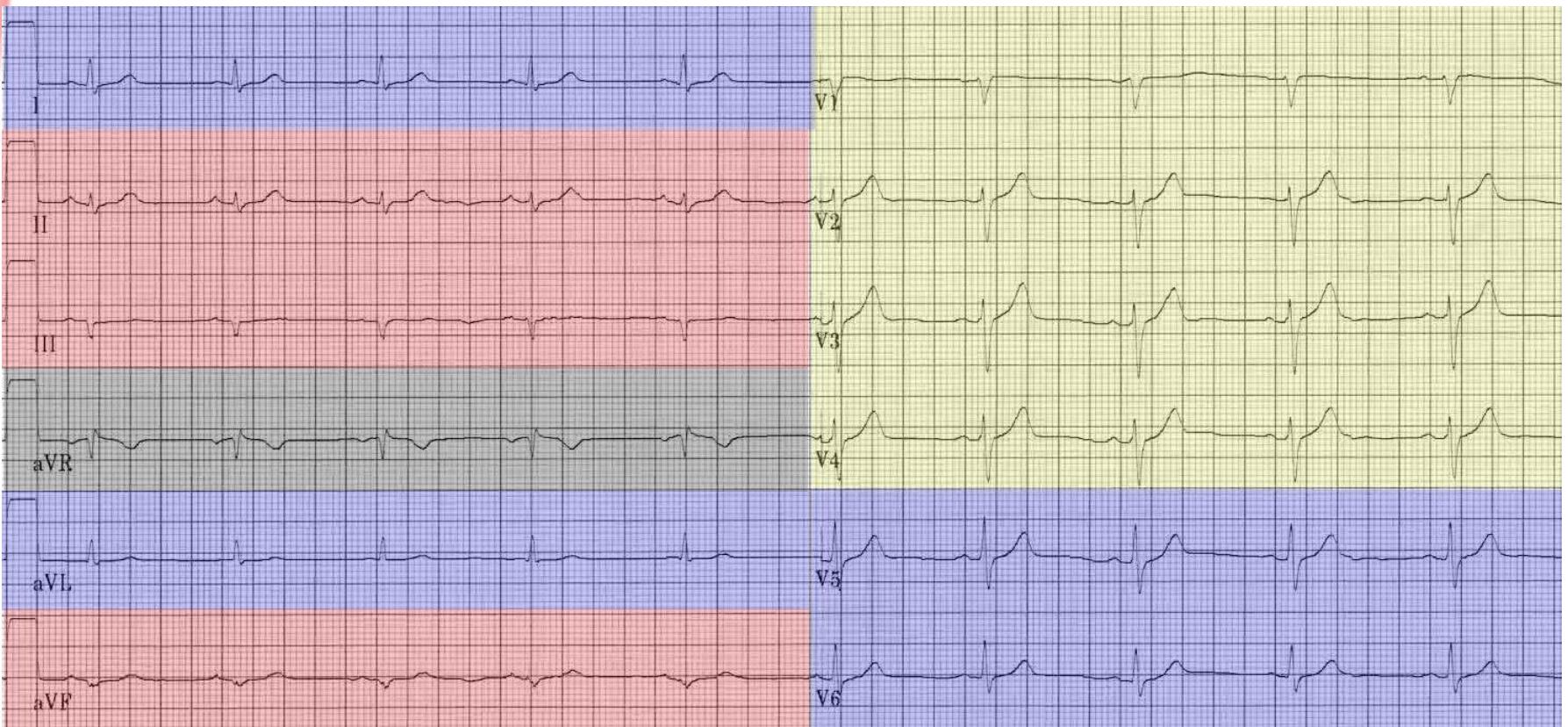
- V₁ – 4^º EIC, linha paraesternal direita
- V₂ - 4^º EIC linha paraesternal esquerda
- V₃ - Entre V₂ e V₄
- V₄ – 5^º EIC na linha hemiclavicular
- V₅ - 5^º EIC, linha axilar anterior
- V₆ - 5^º EIC, linha axilar média







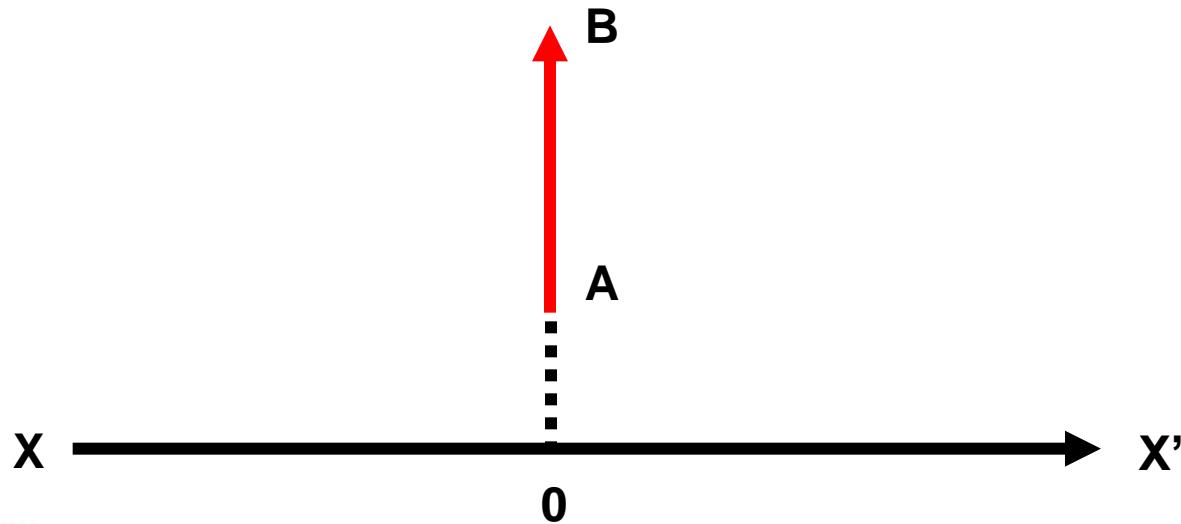
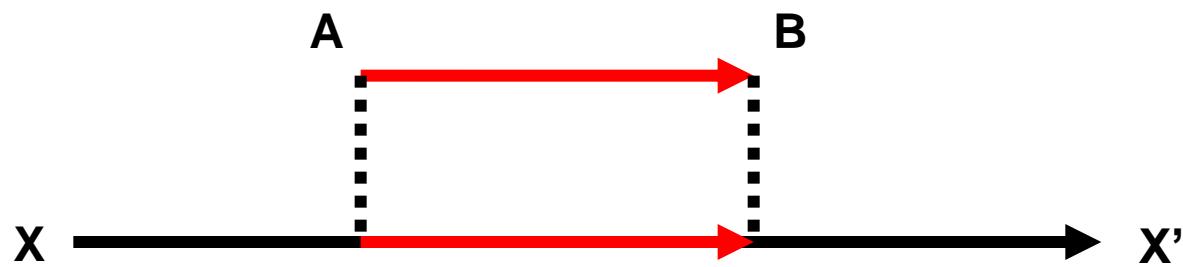
I Lateral	aVR	V1 Septal	V4 Anterior
II Inferior	aVL Lateral	V2 Septal	V5 Lateral
III Inferior	aVF Inferior	V3 Anterior	V6 Lateral



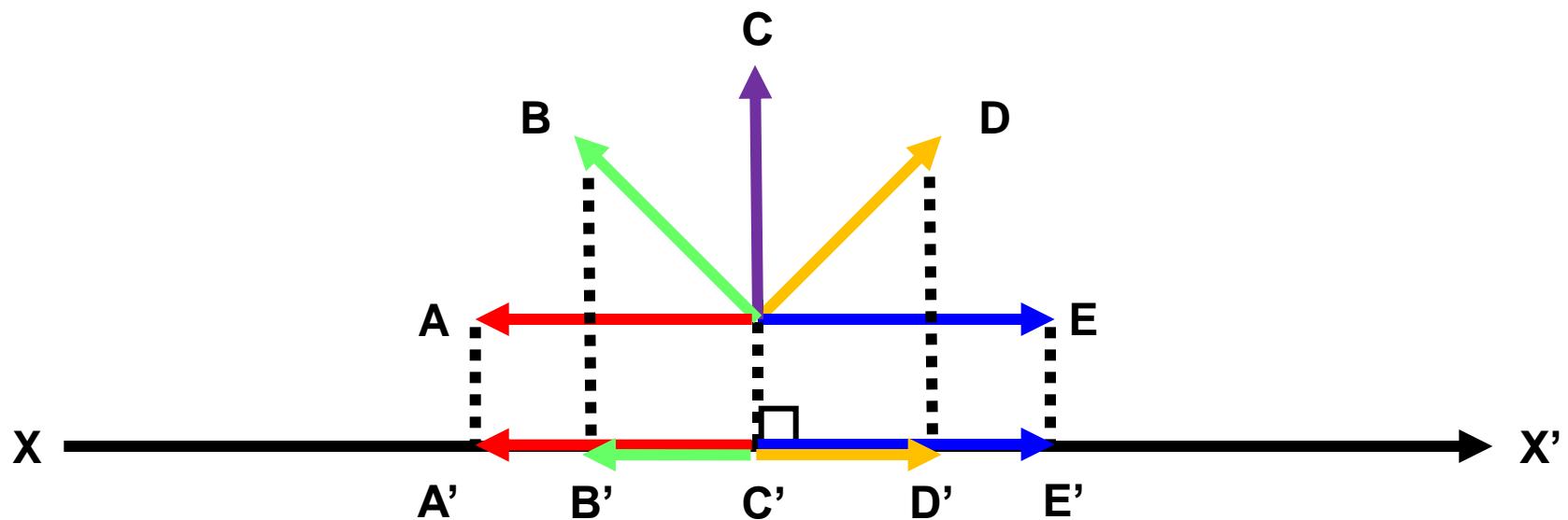
Vetores



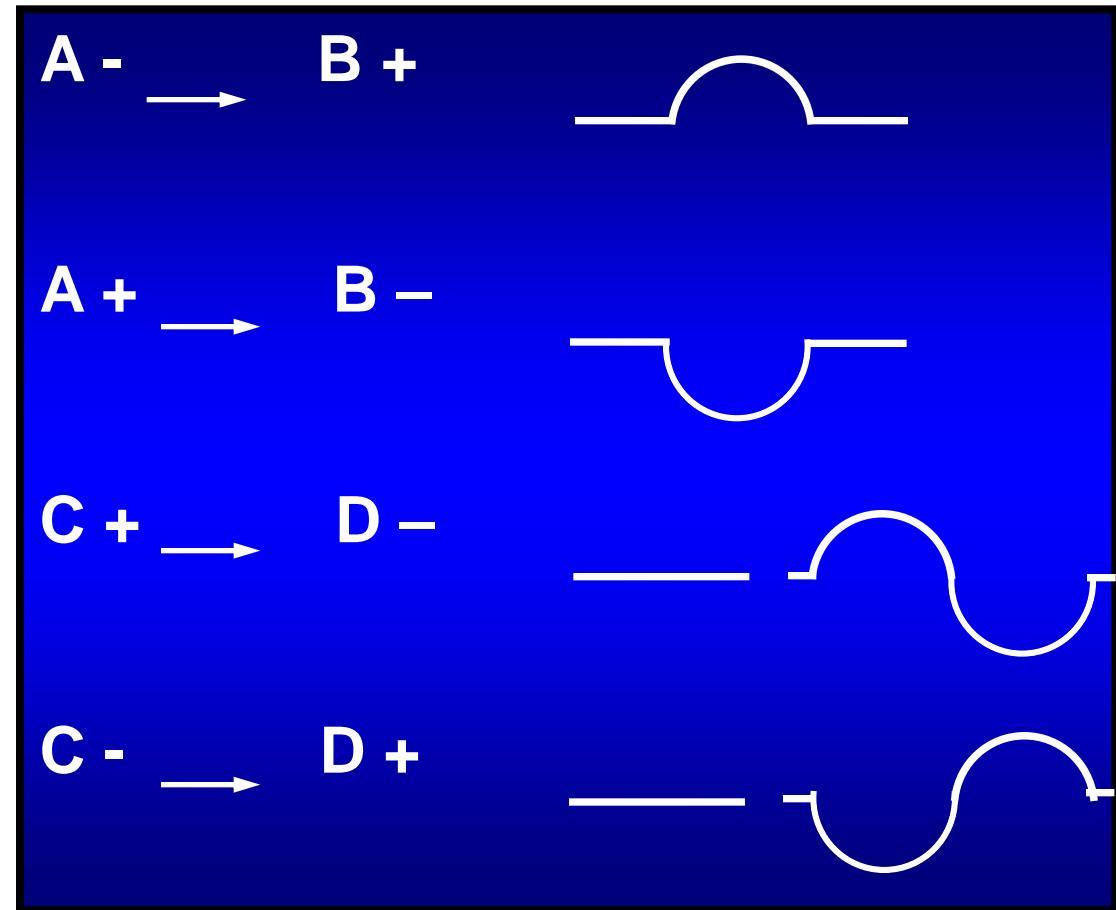
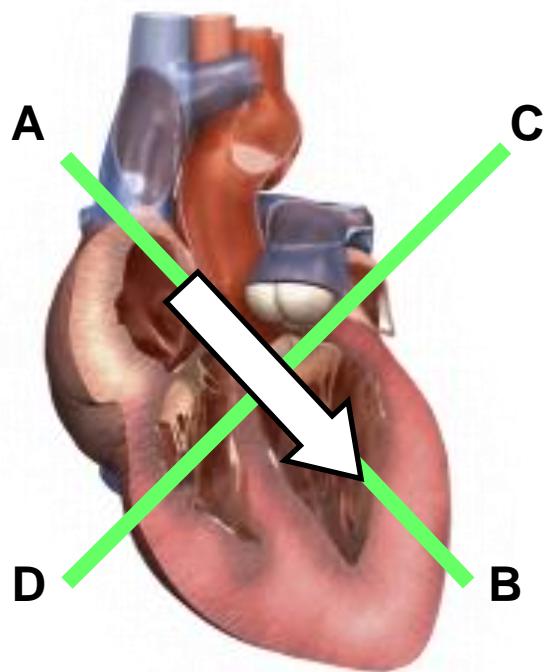
Projeção Vetorial



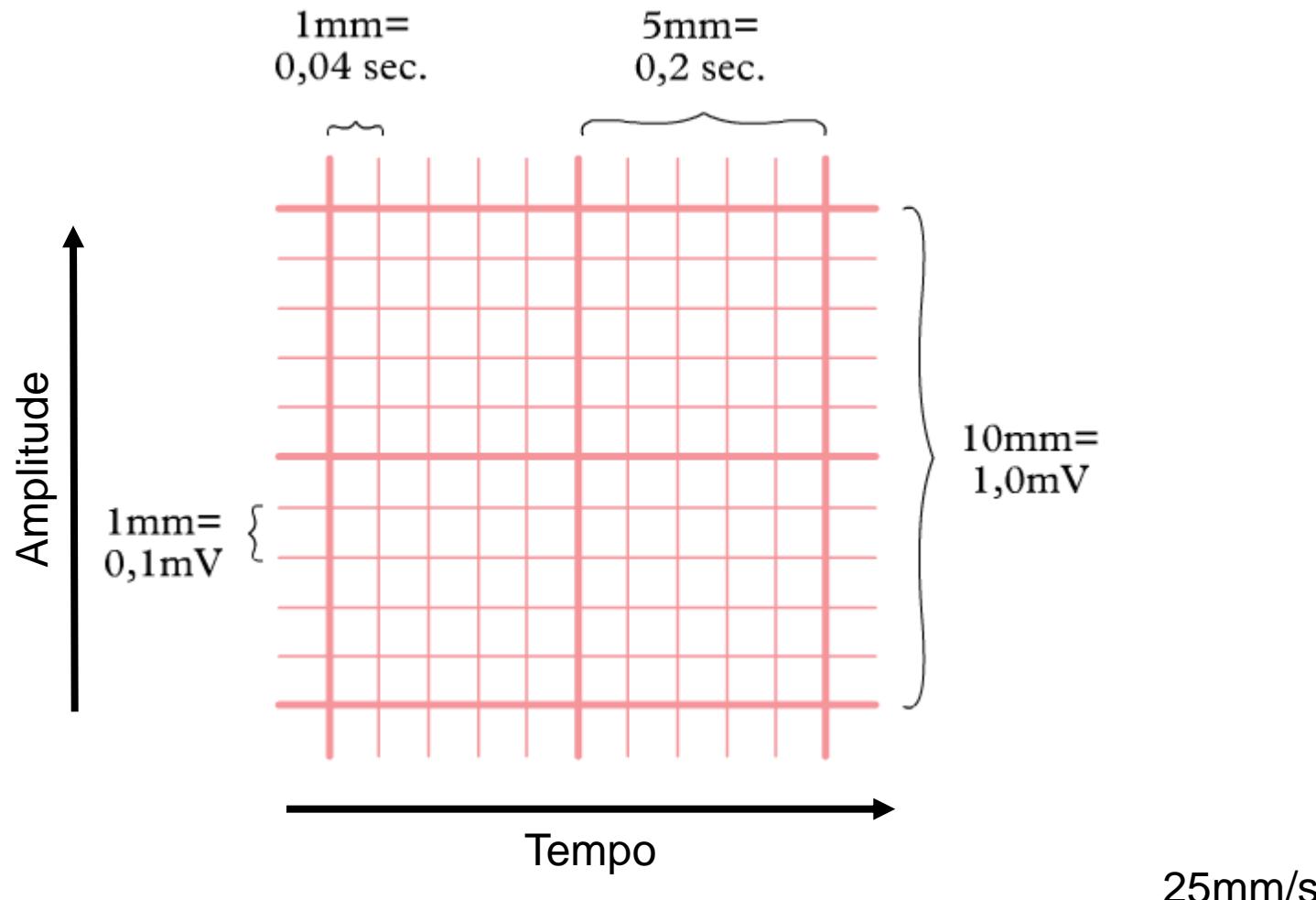
Projeção Vetorial



Projeção Vetorial



Registro do ECG



Antes de Analisar o ECG

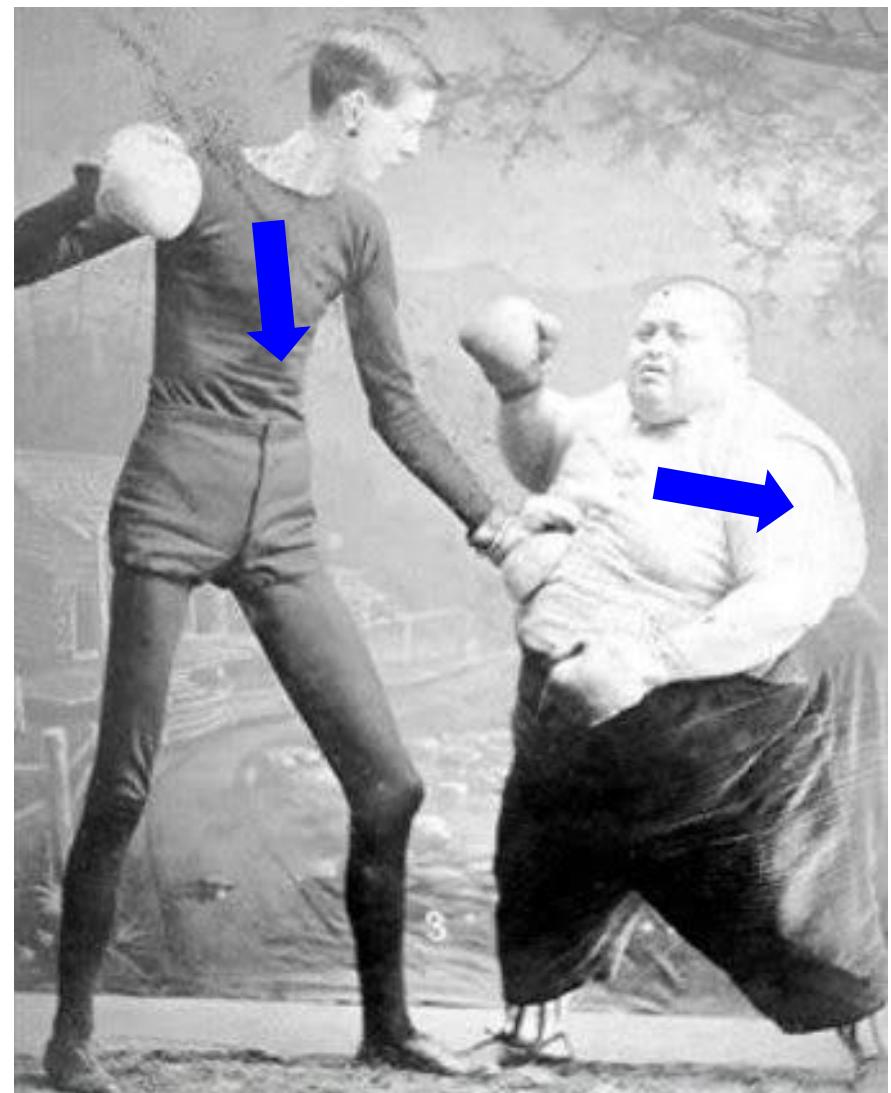
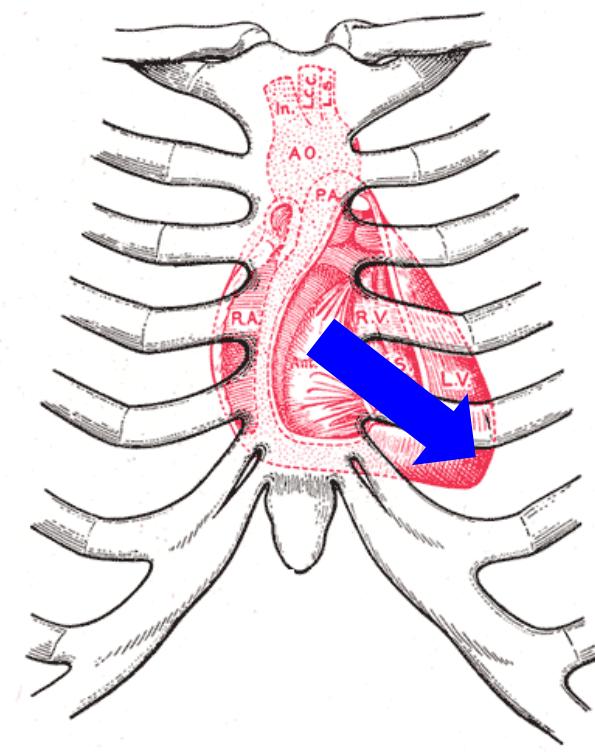


Identificação/História

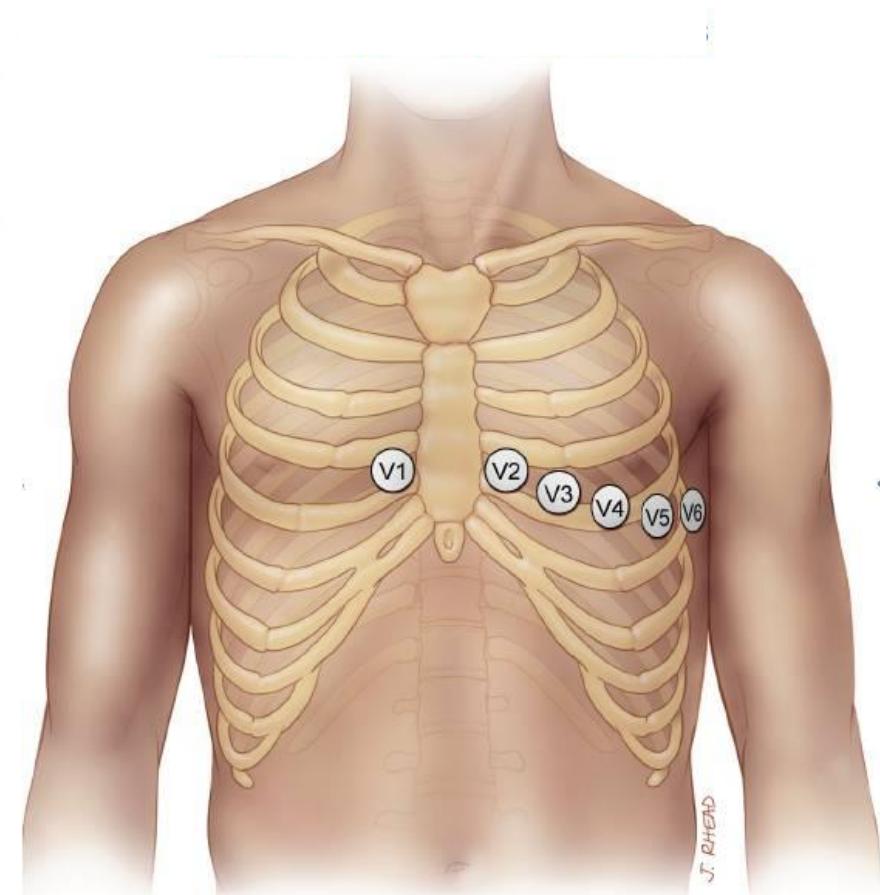
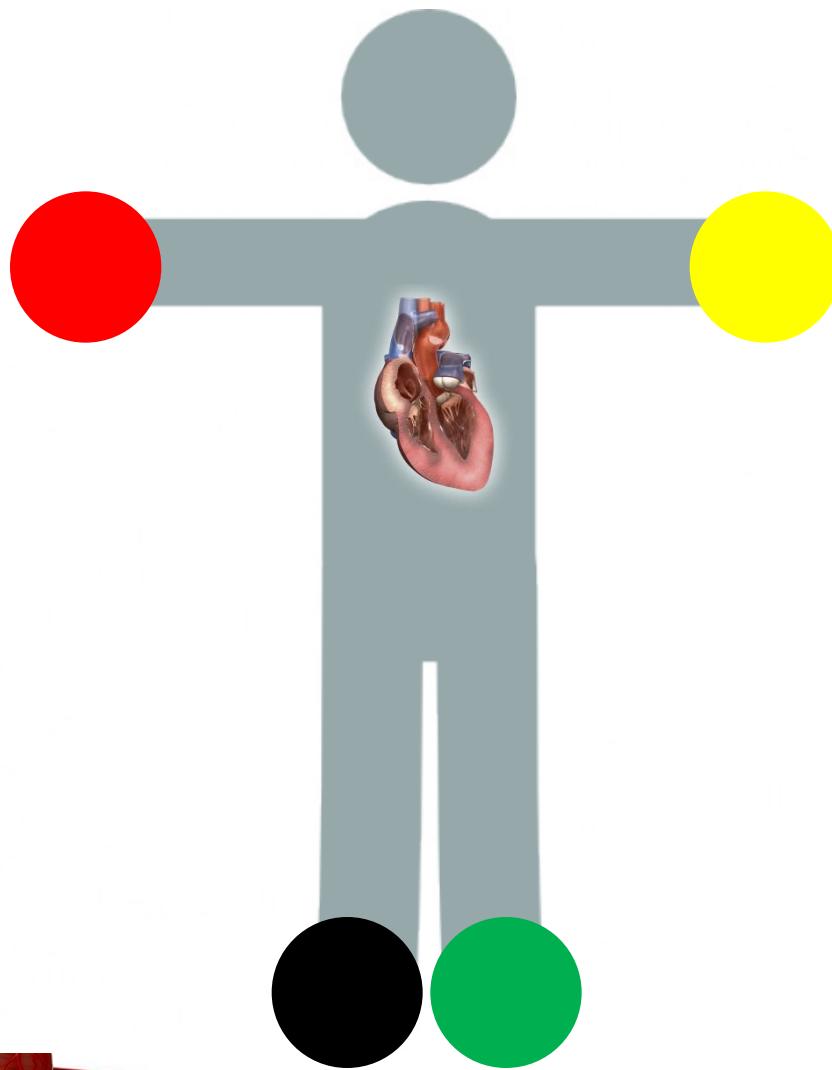
Idade

Sexo

Peso



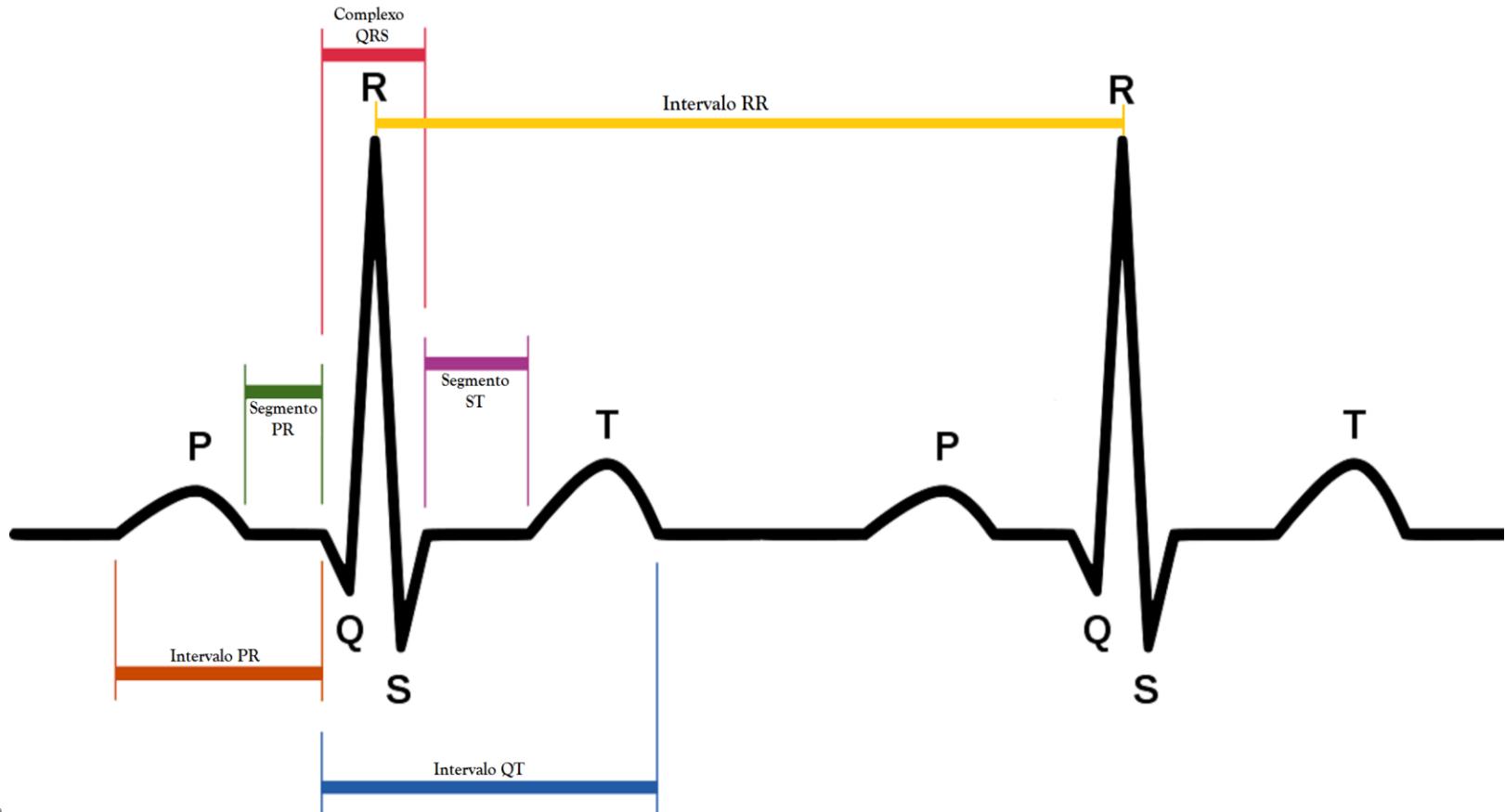
Derivações Corretas?



ECG Passo a Passo



1. Ondas e Intervalos



2. Frequência Cardíaca e Ritmo

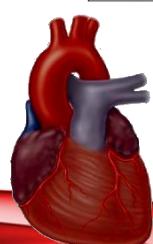
1500/“quadradinhos”;
300/“quadradões”;



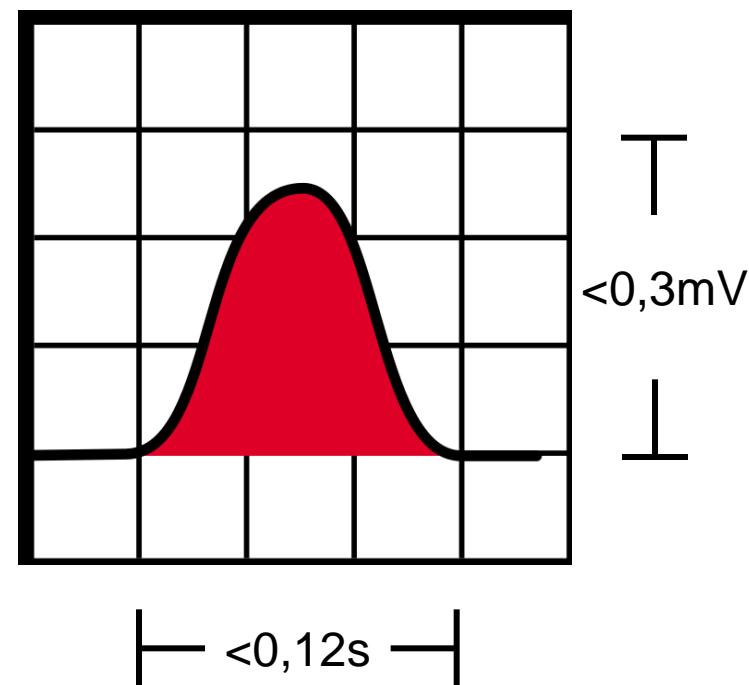
D2 N/2

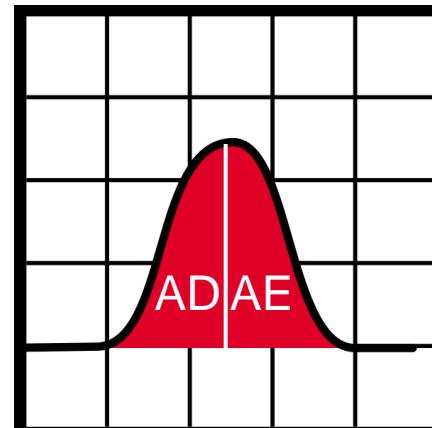


DII 10

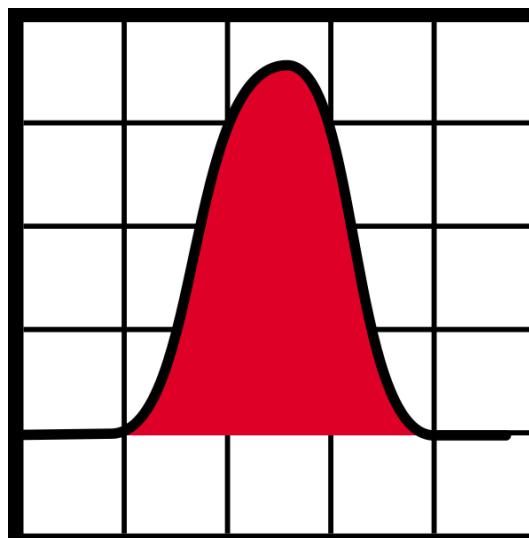


3. Onda P

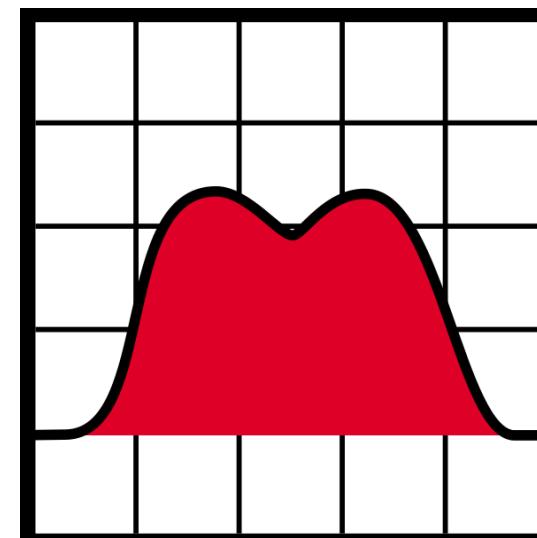




AD|AE



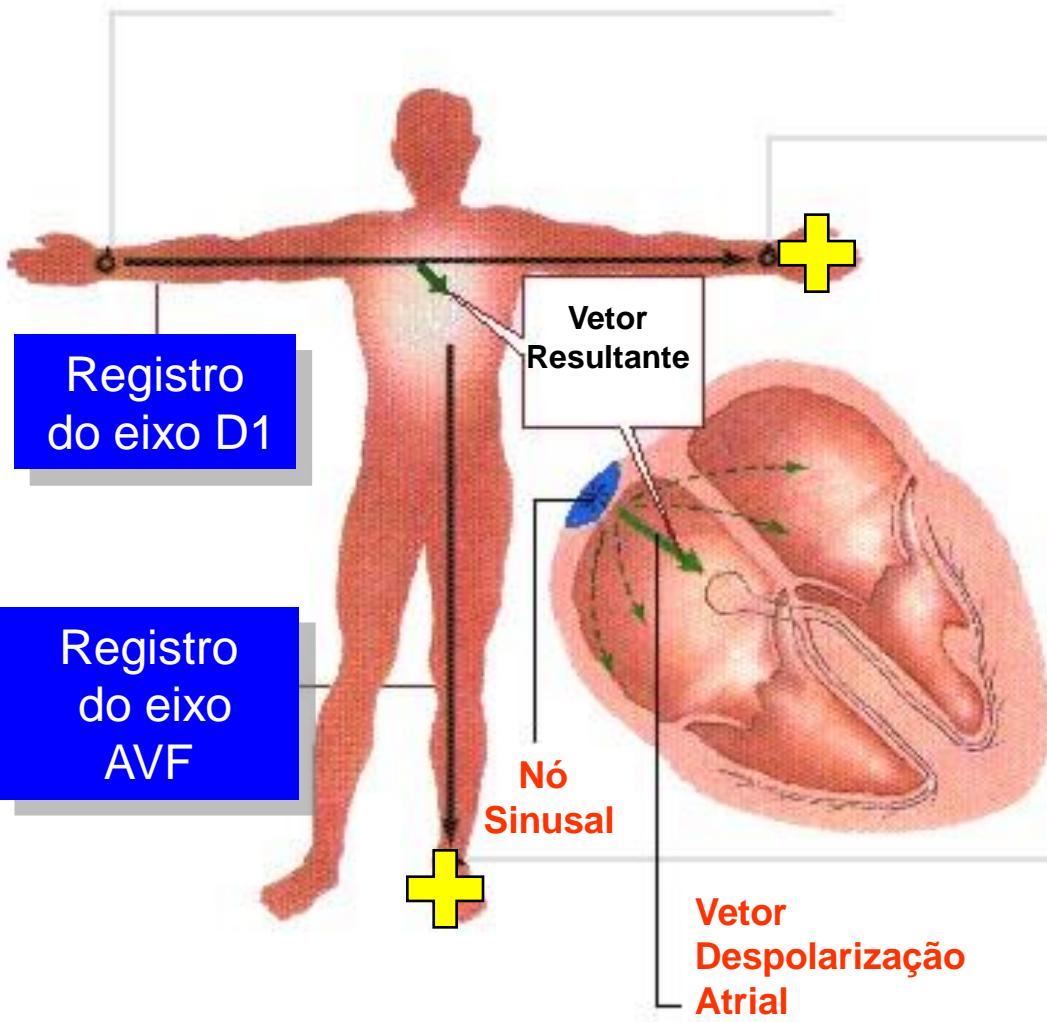
Sobrecarga atrial D



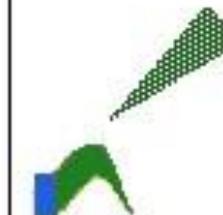
Sobrecarga atrial E



Onda P

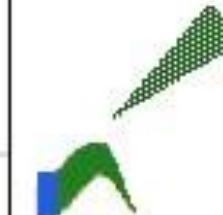


D1

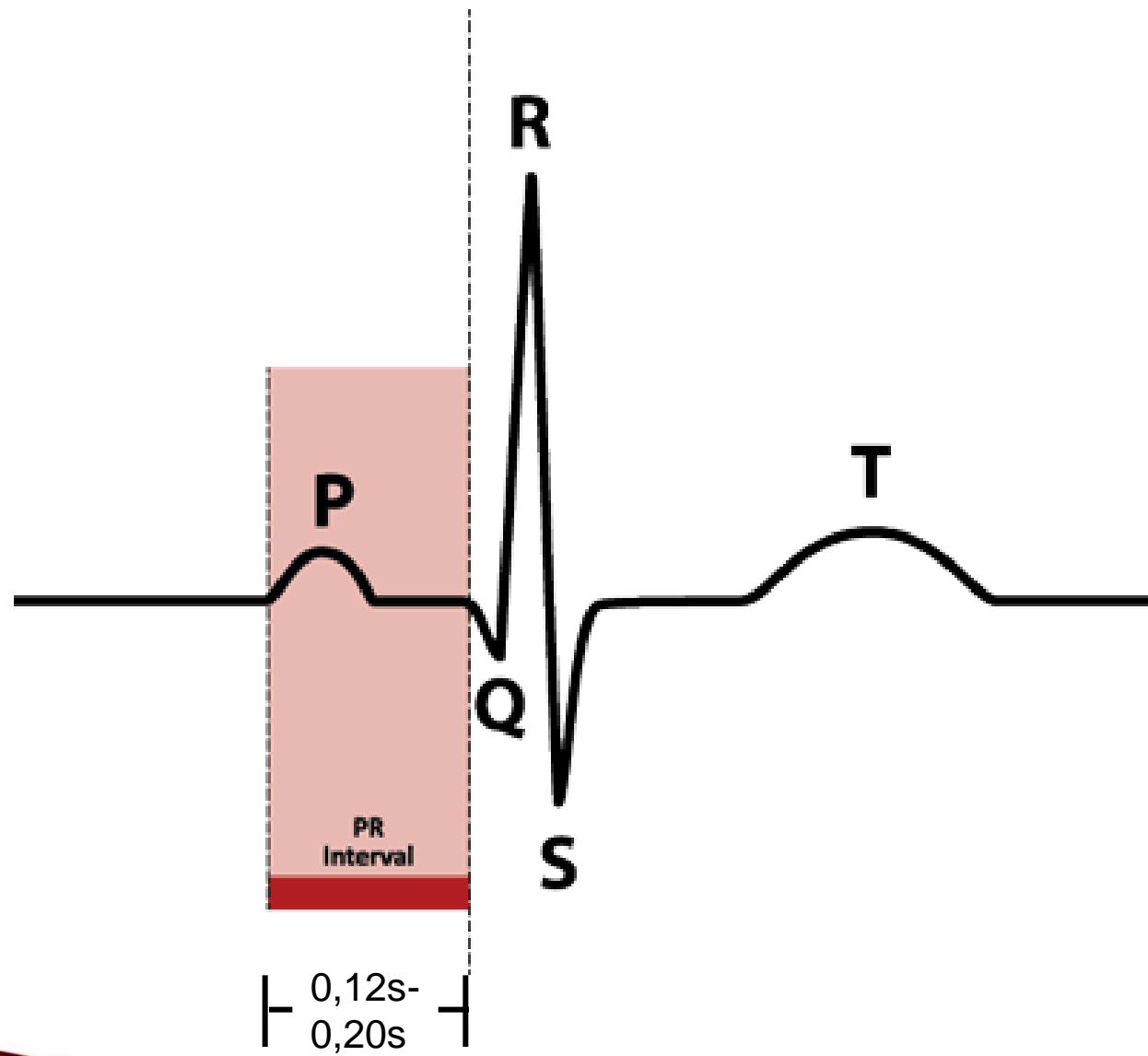


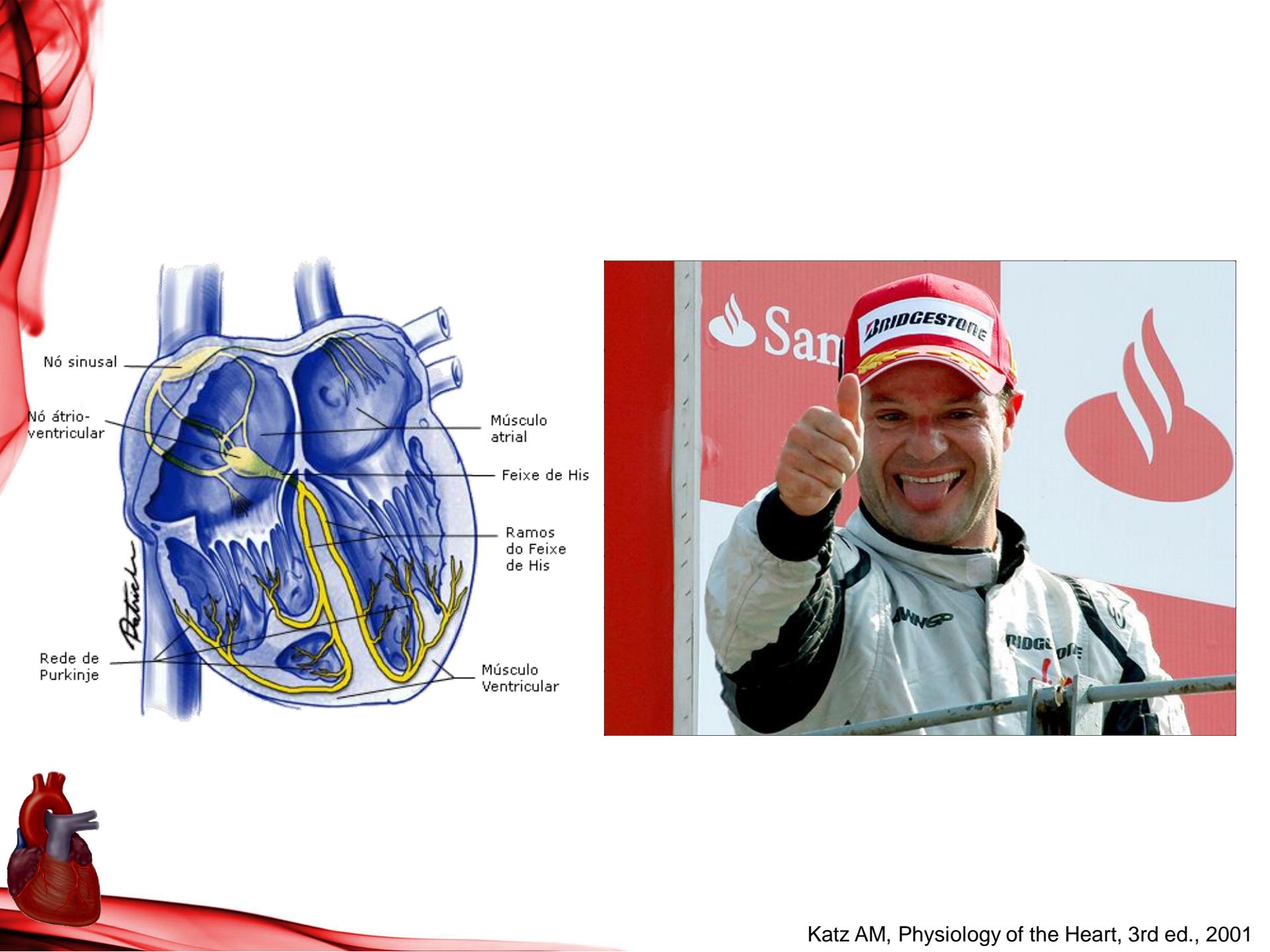
Onda P

AVF

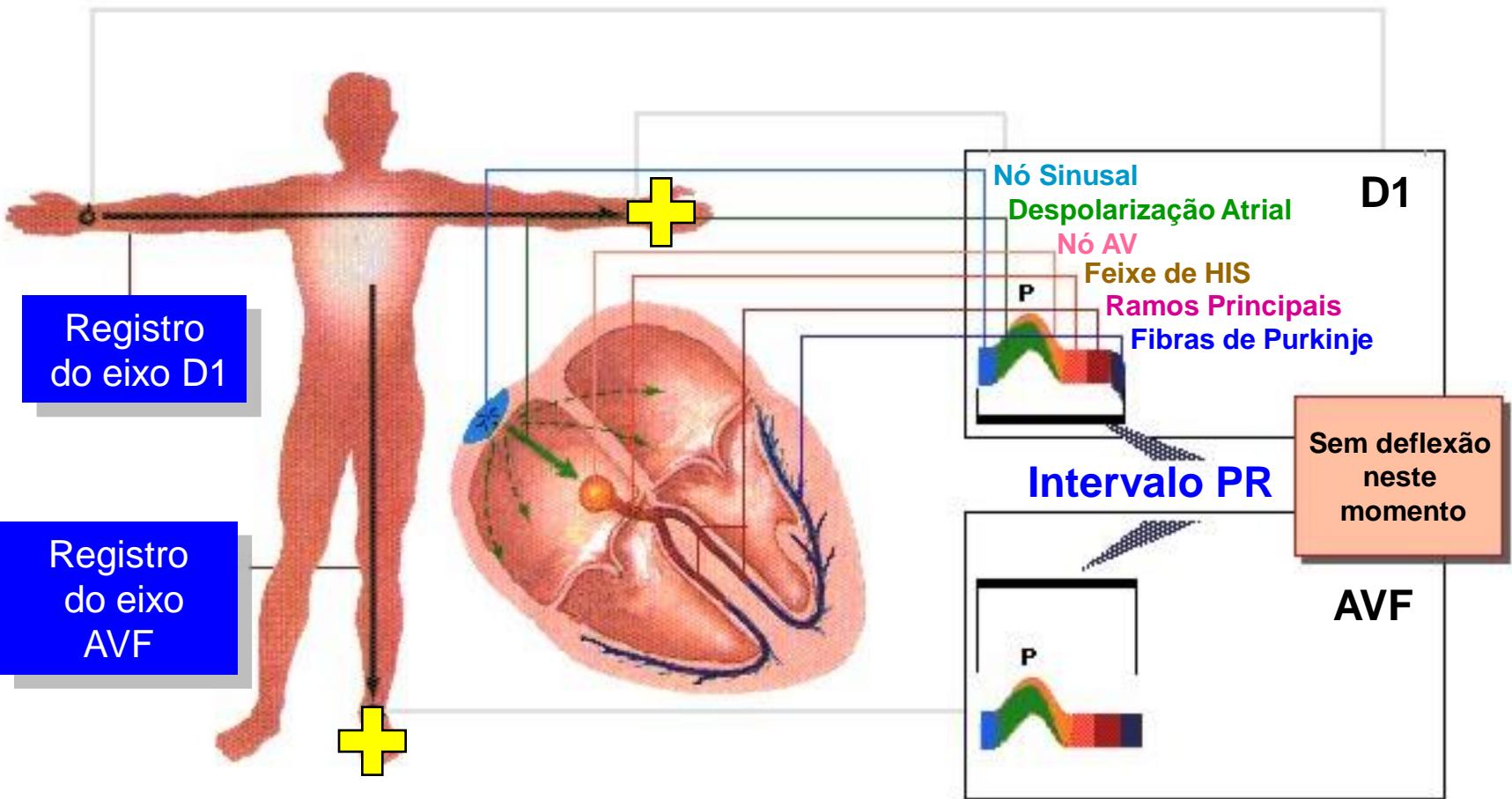


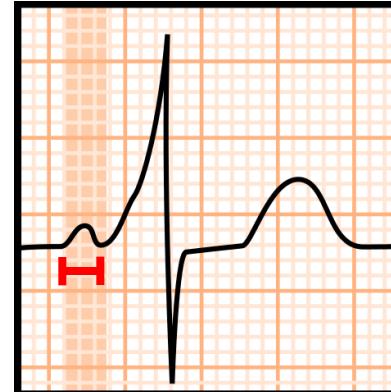
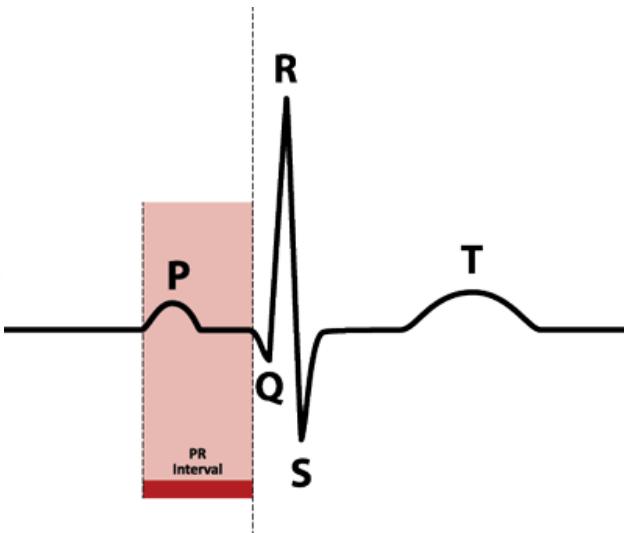
4. Interval PR





Intervalo PR



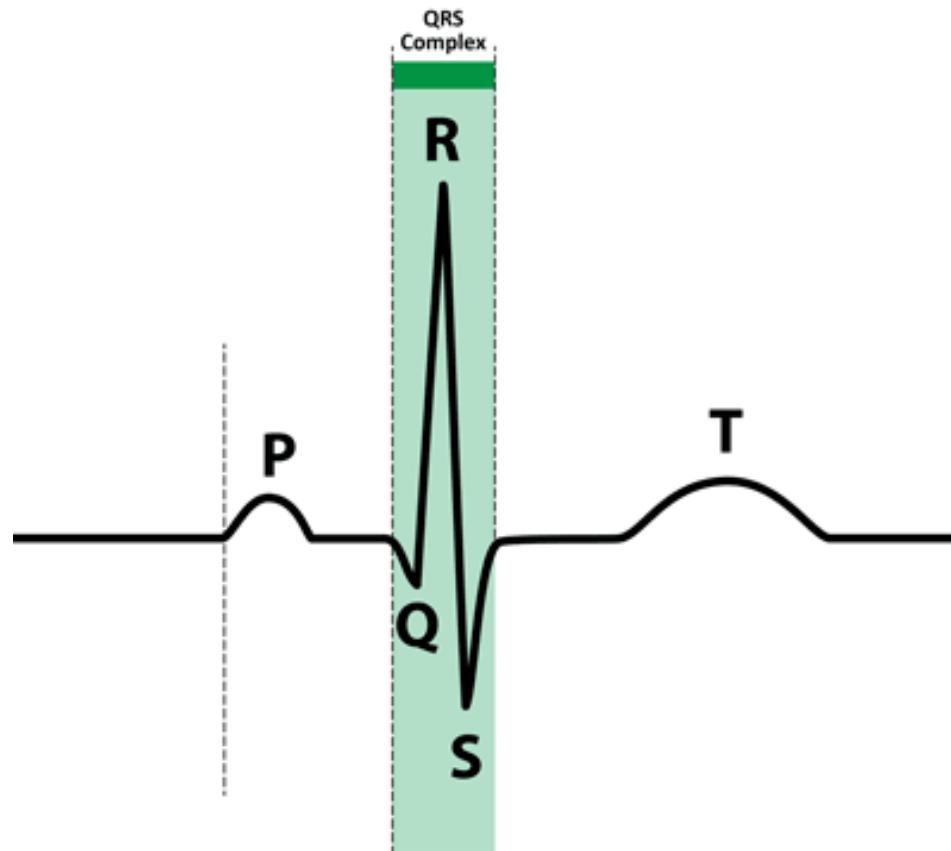


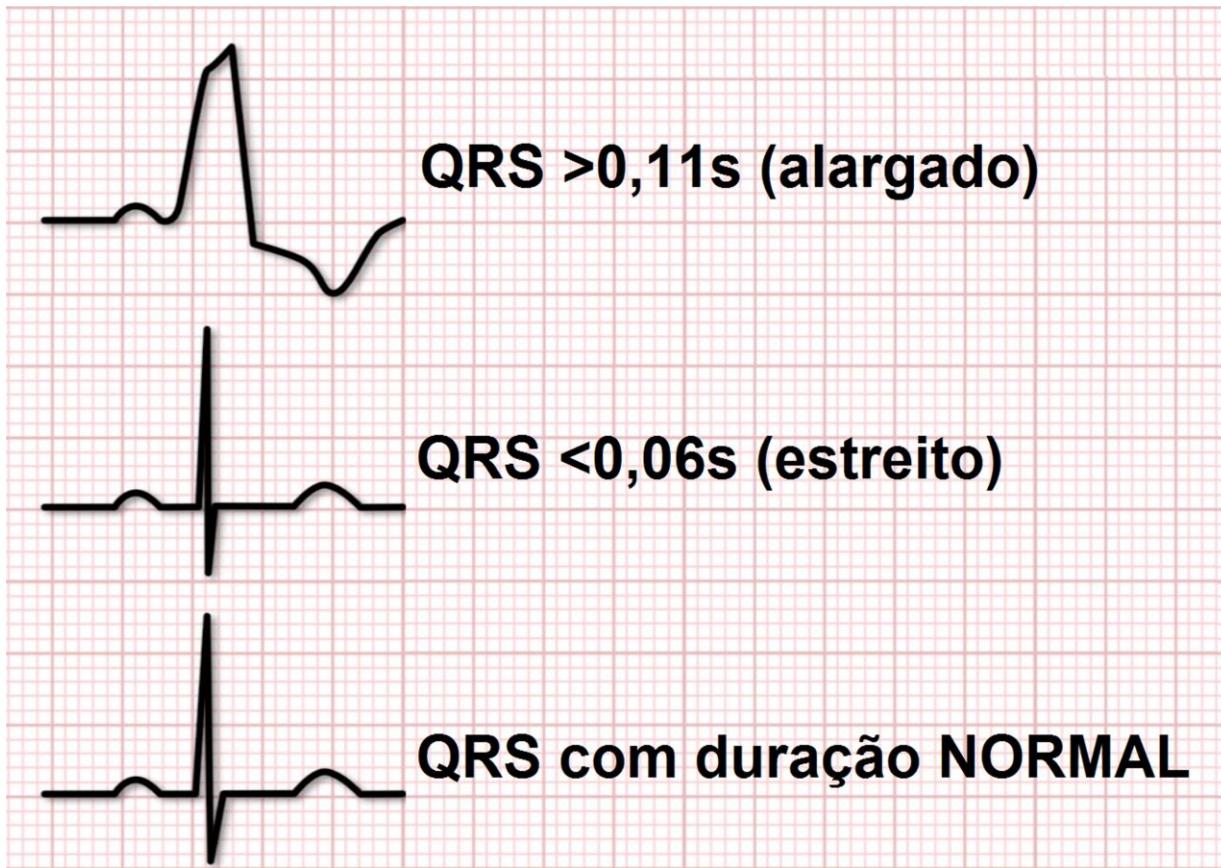
PR curto – Pré-excitacão ventricular



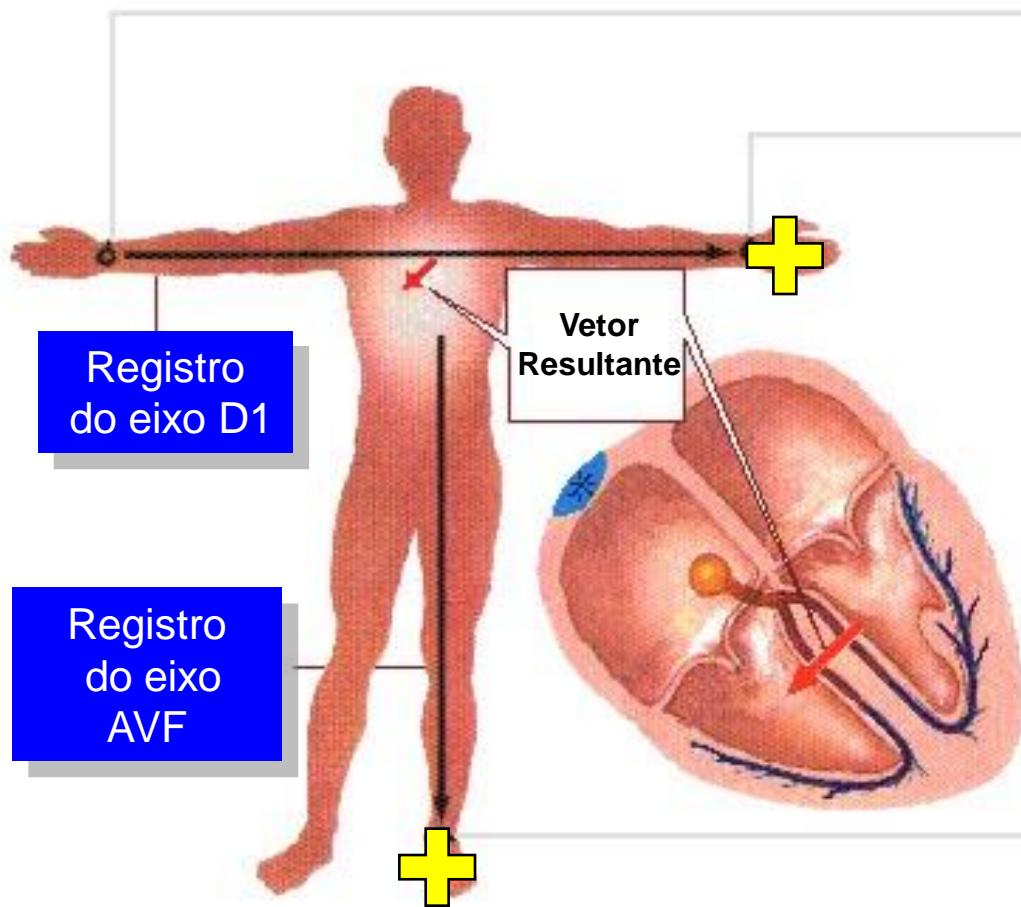
Bloqueio átrio-ventricular do 1º grau

5. Complexo QRS





QRS – Onda Q

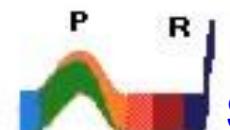


D1



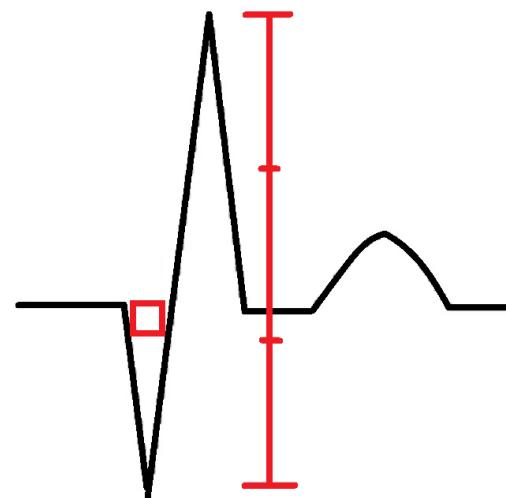
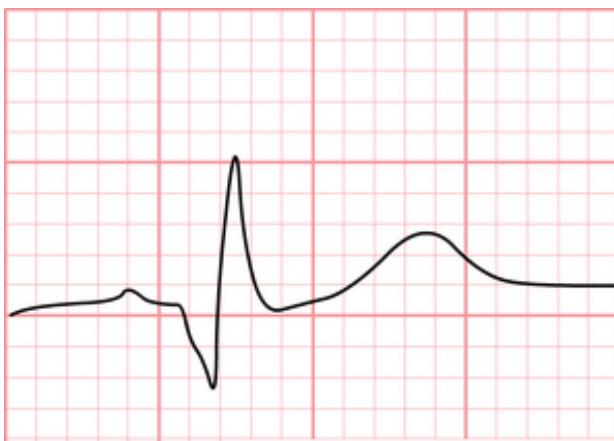
Onda Q

AVF

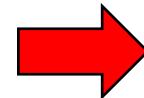


Sem Onda Q

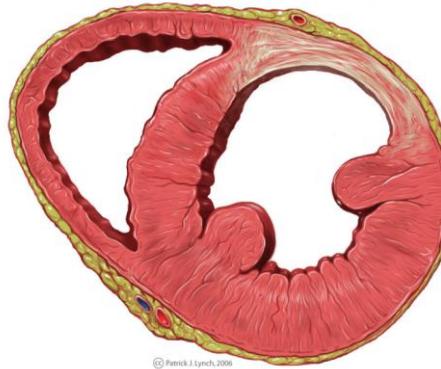
QRS – Onda Q



Onda Q patológica

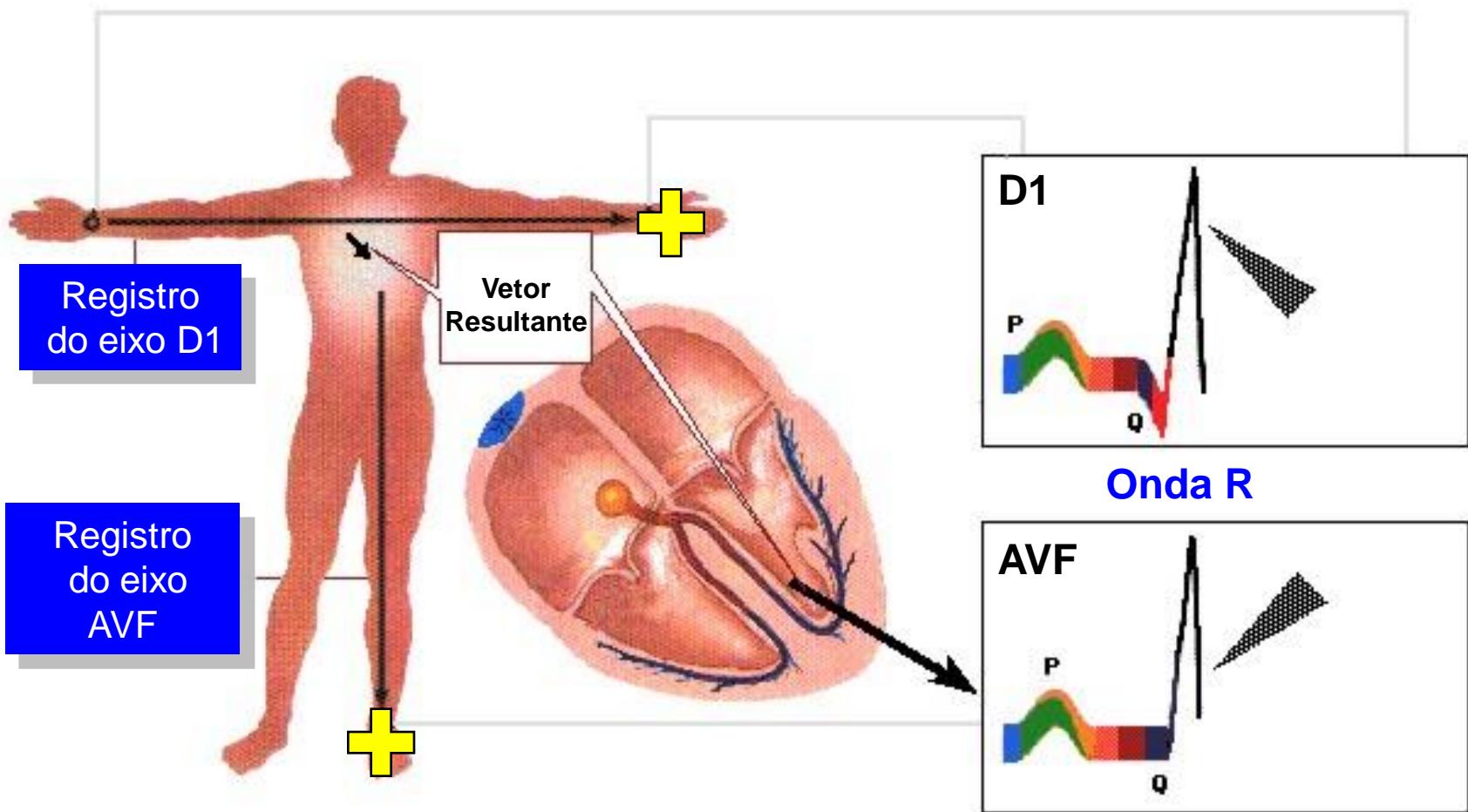


Zona Eléctrica Inativa

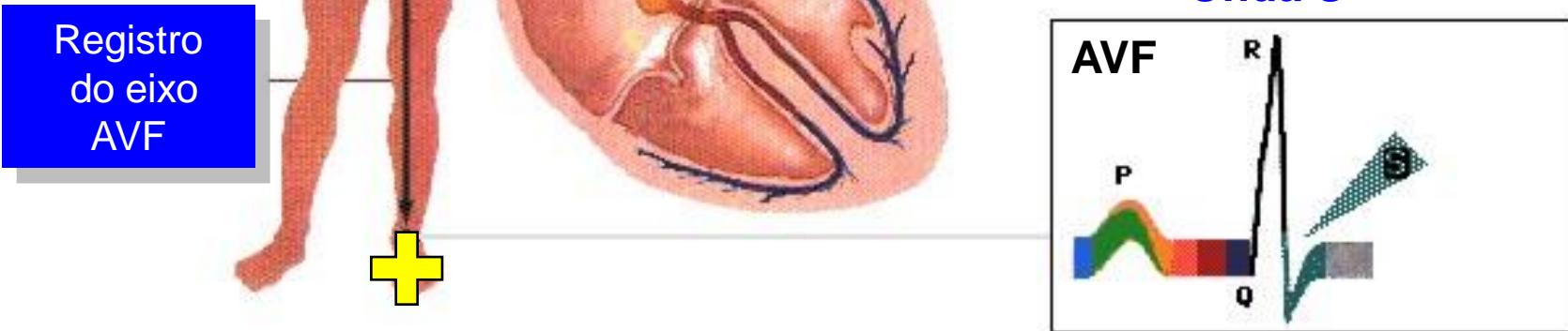
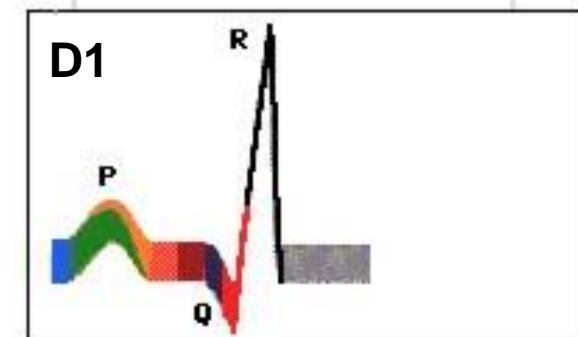
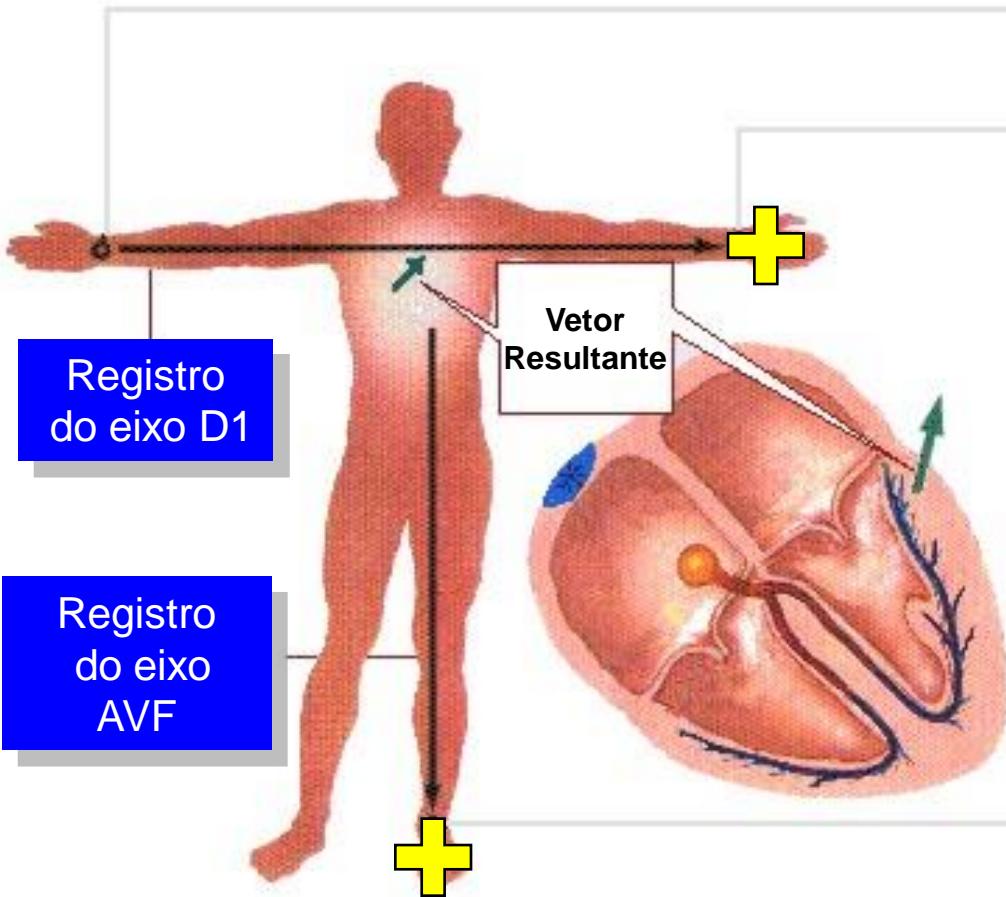


Necrose

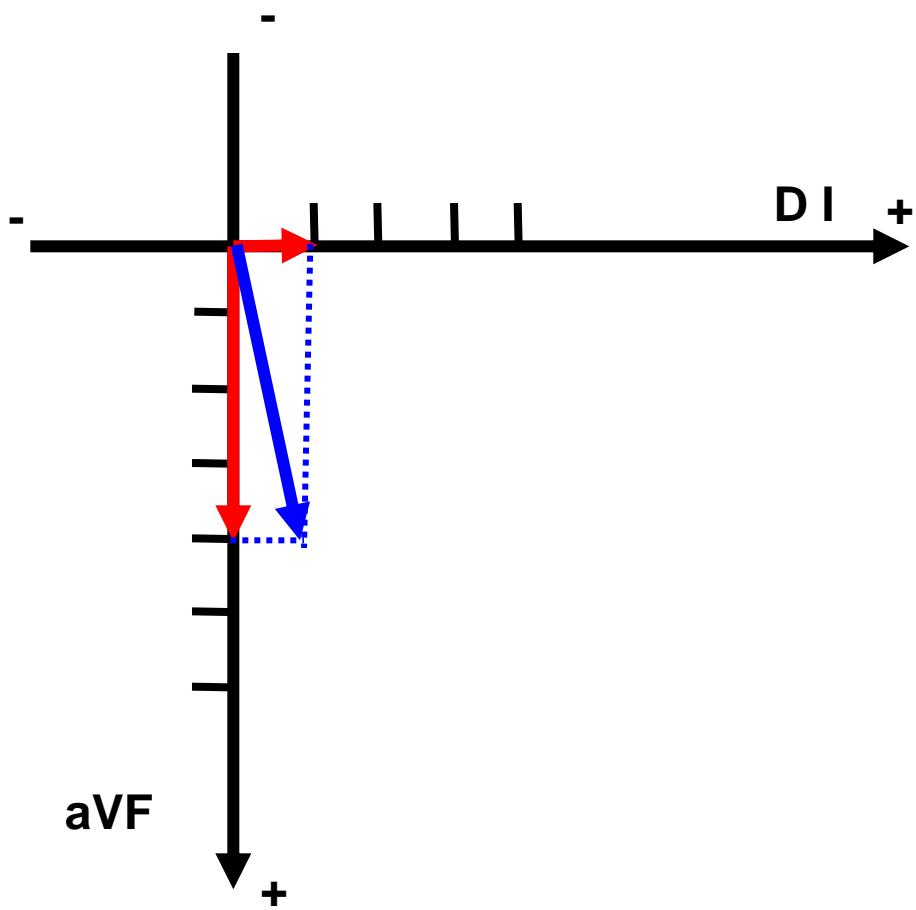
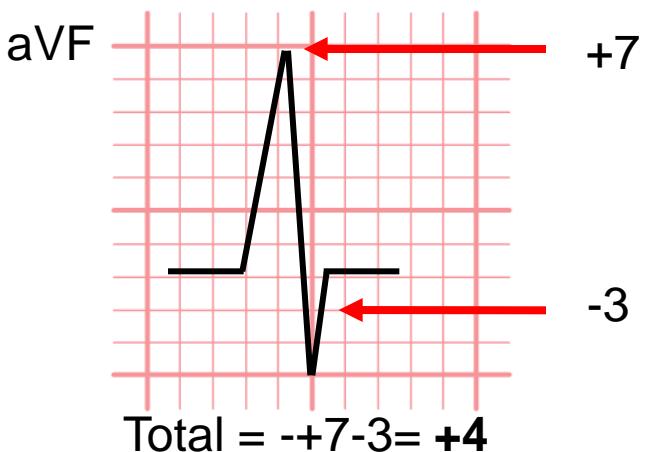
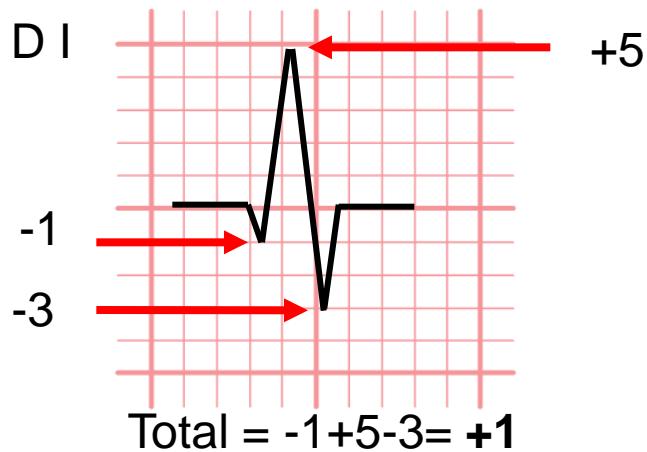
QRS – Onda R



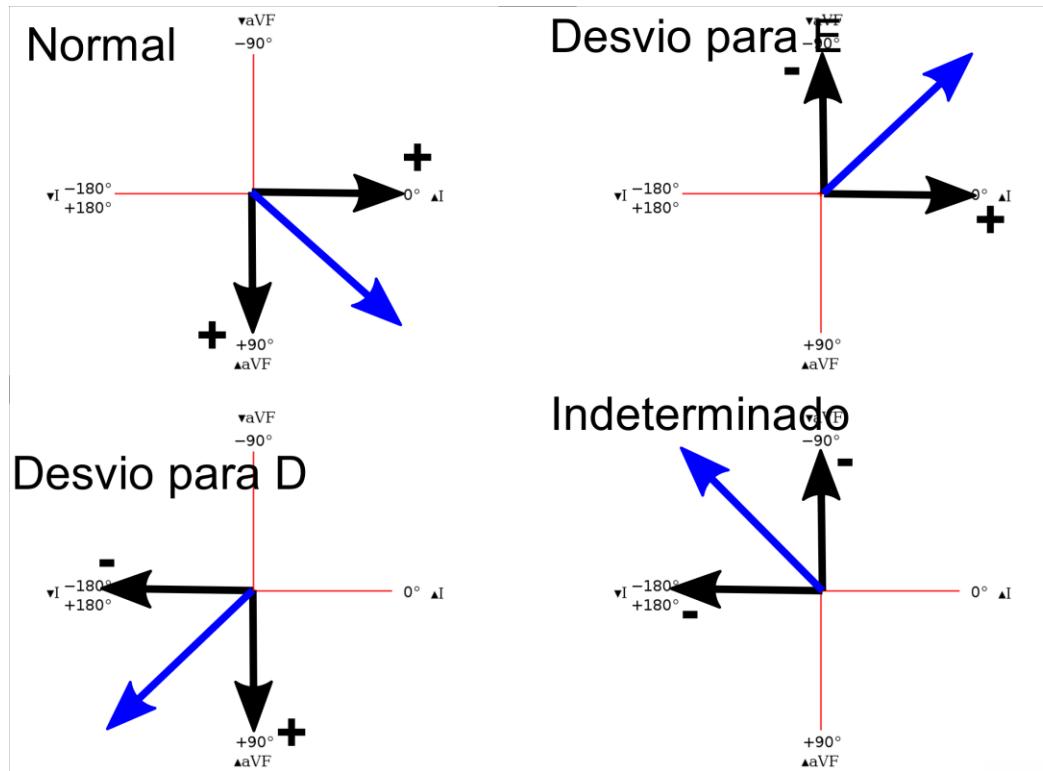
QRS – Onda S



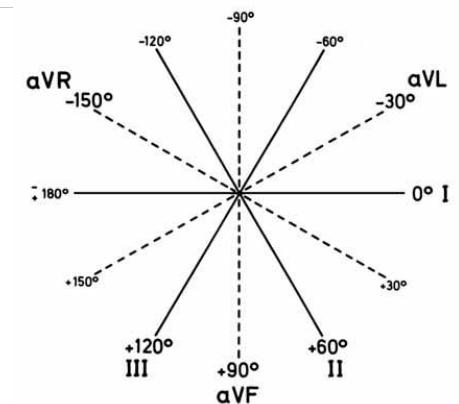
QRS – Vetor Resultante



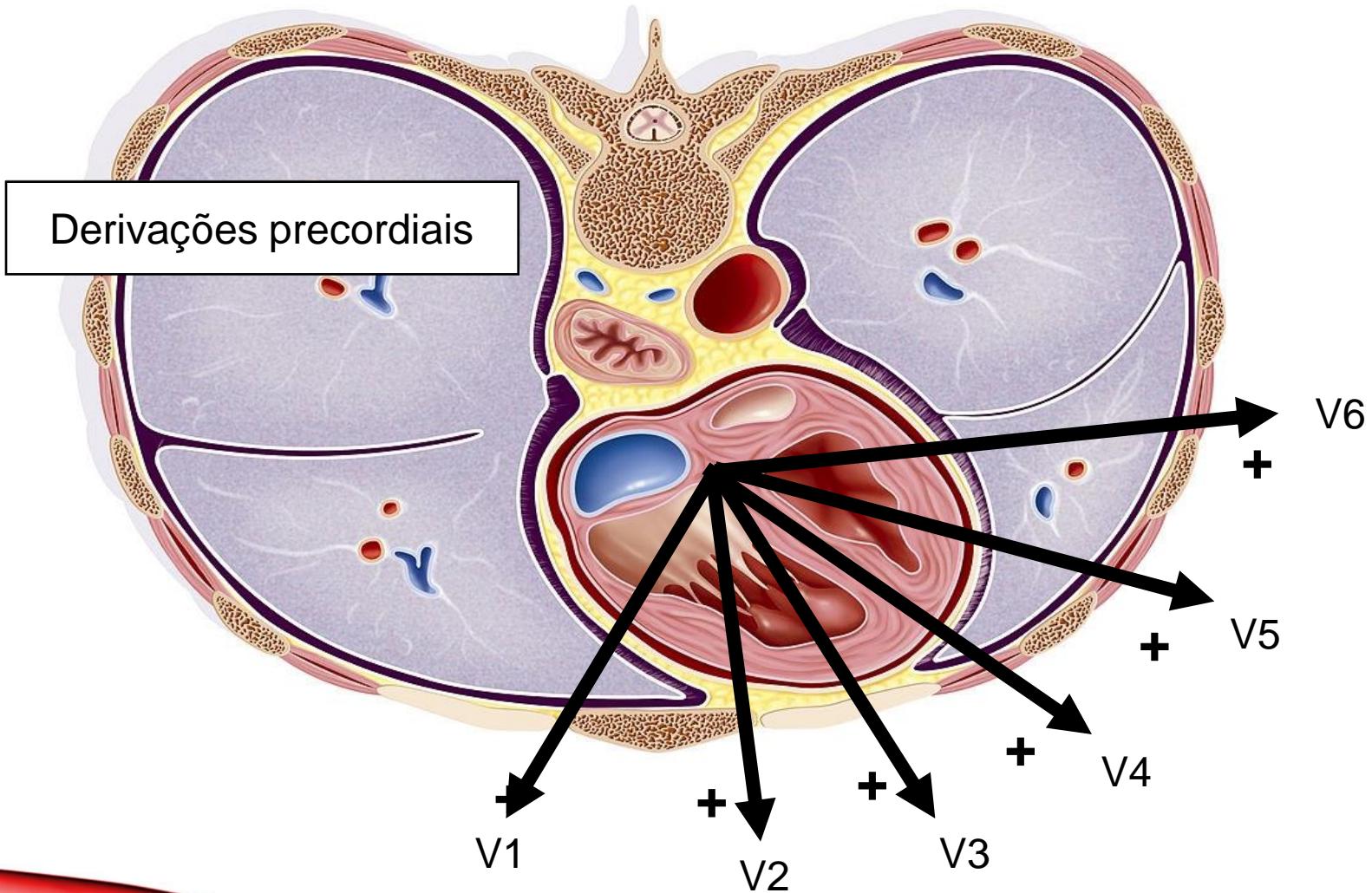
Eixos – QRS



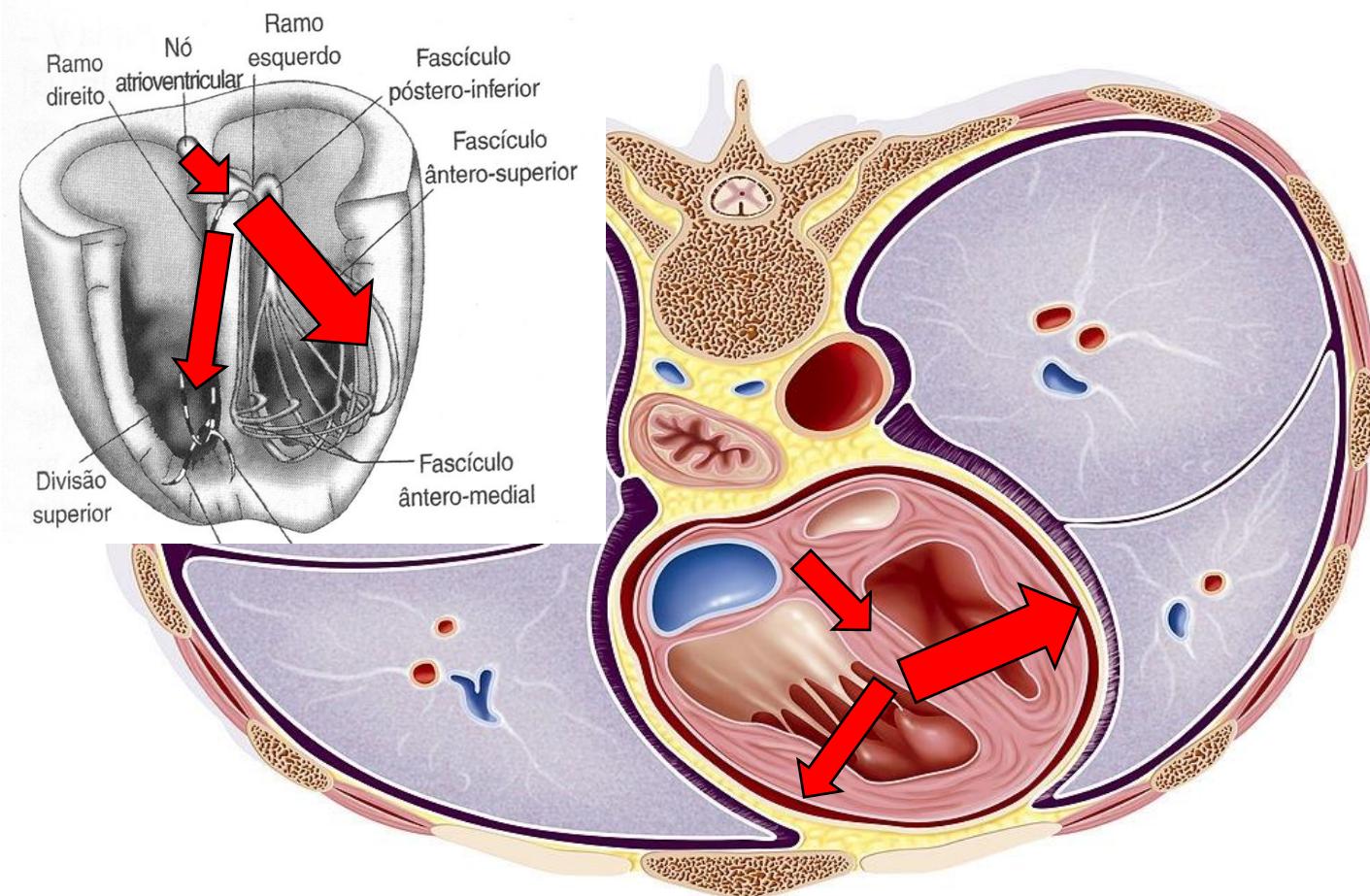
Muita atenção!



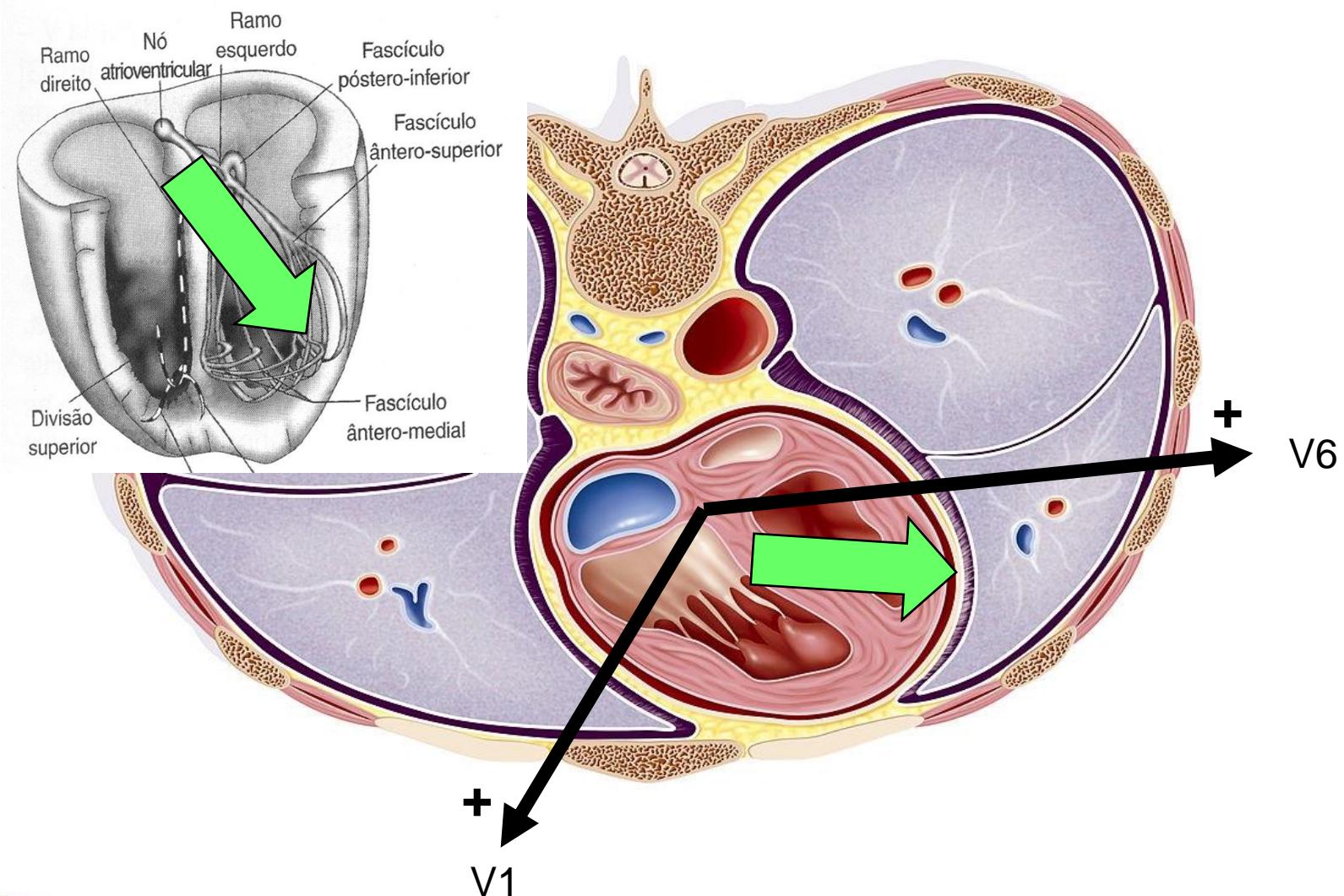
6. Plano Frontal

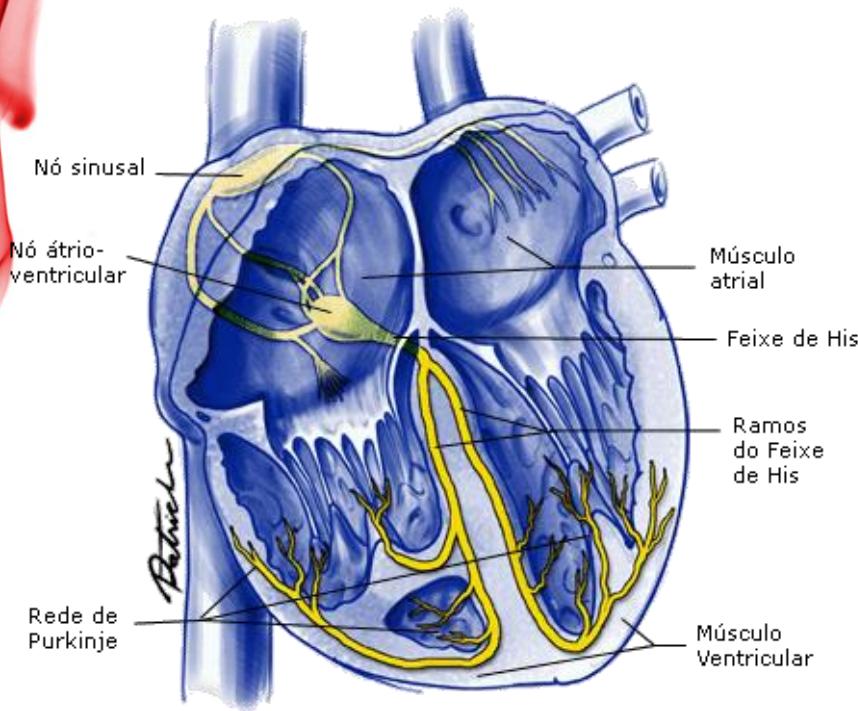


Condução Normal



Condução Normal

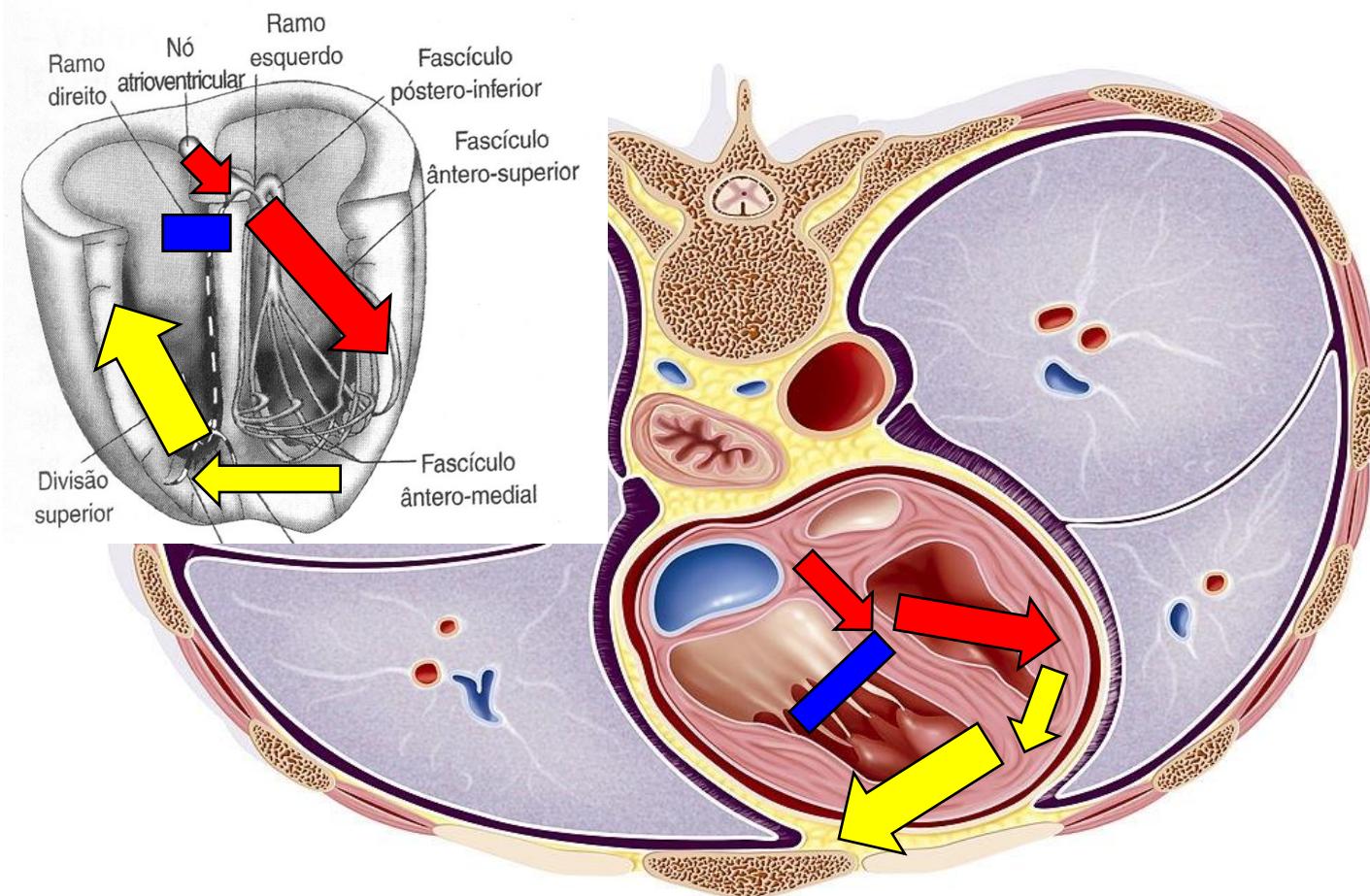




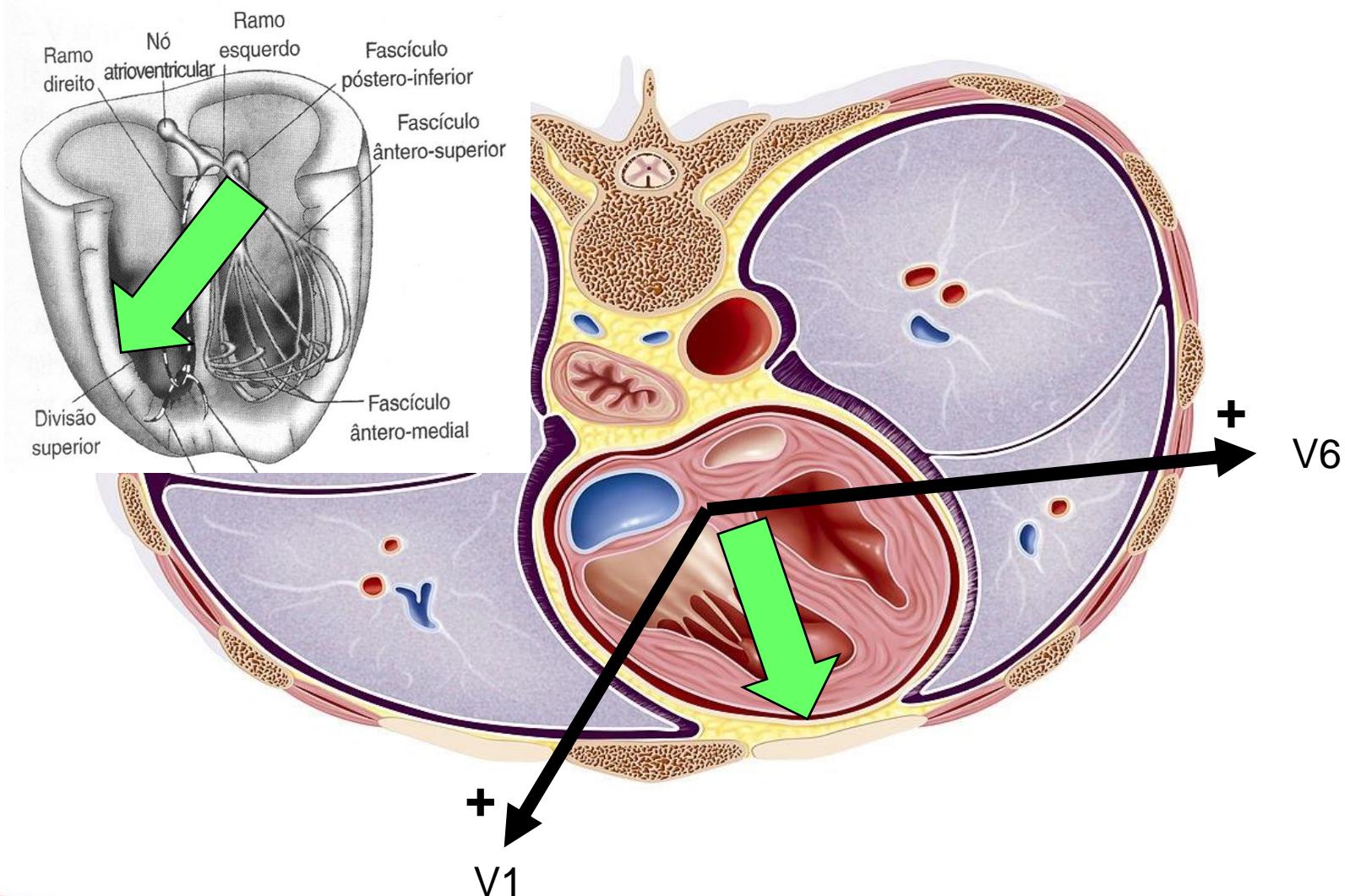
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6	Rede de Purkinje	2,0-4,0	25-40
7	Miocárdio ventricular	0,3-1,0	-



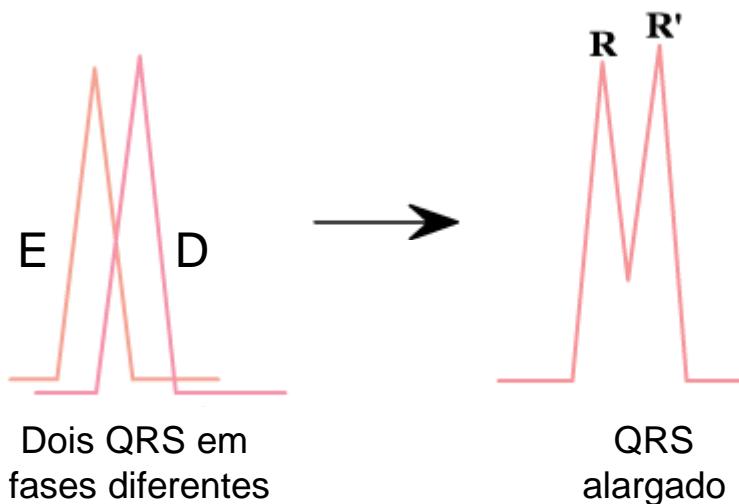
Bloqueio de Ramo Direito

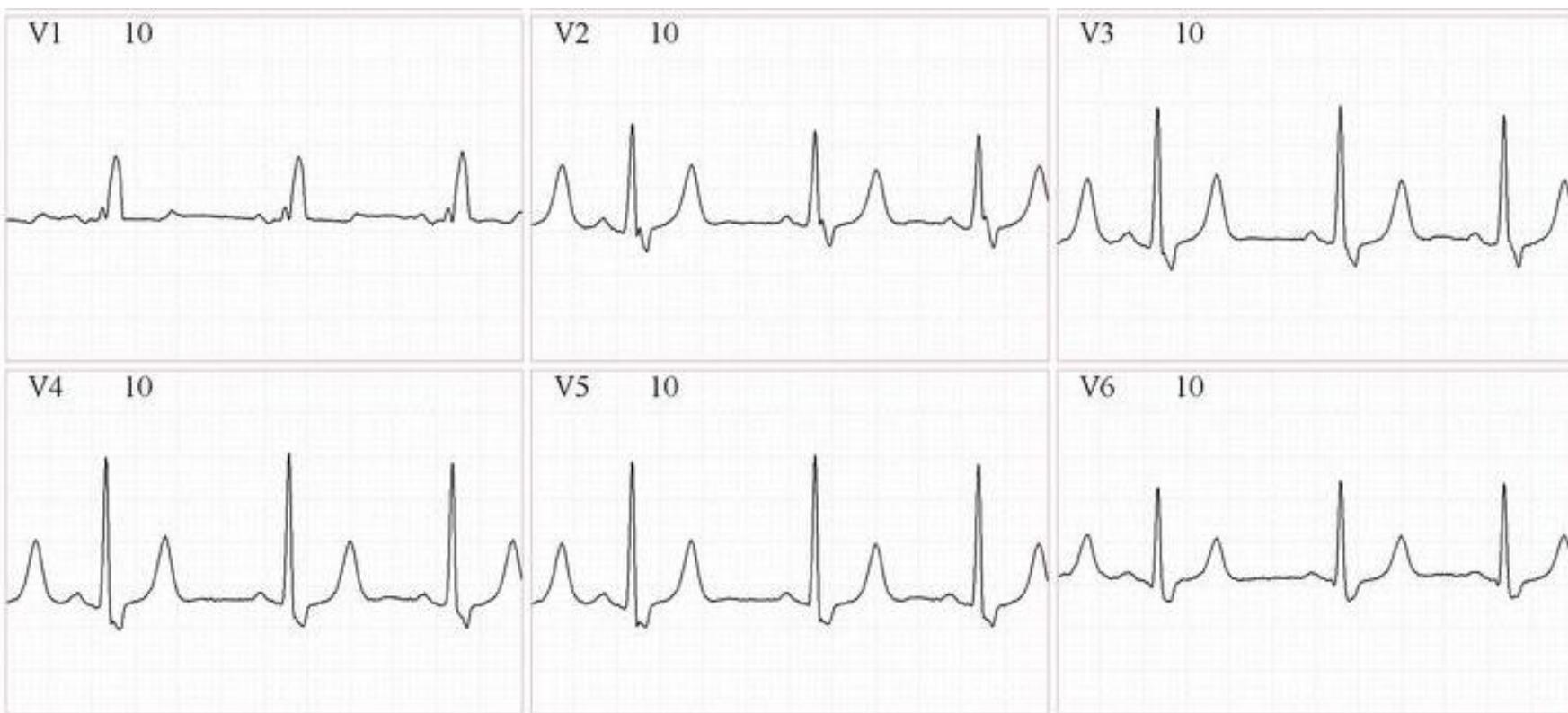
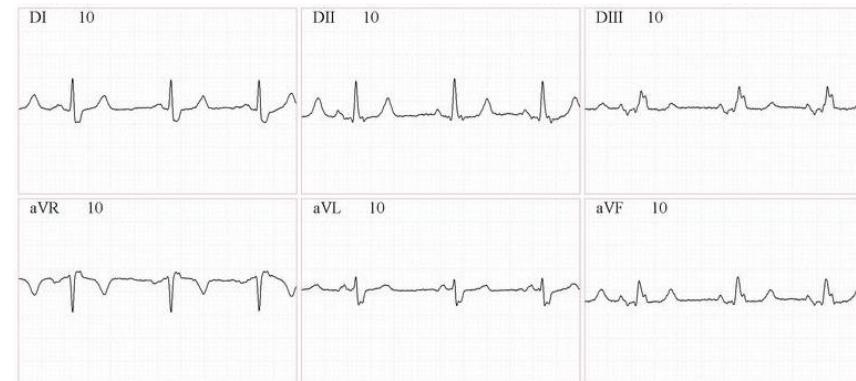
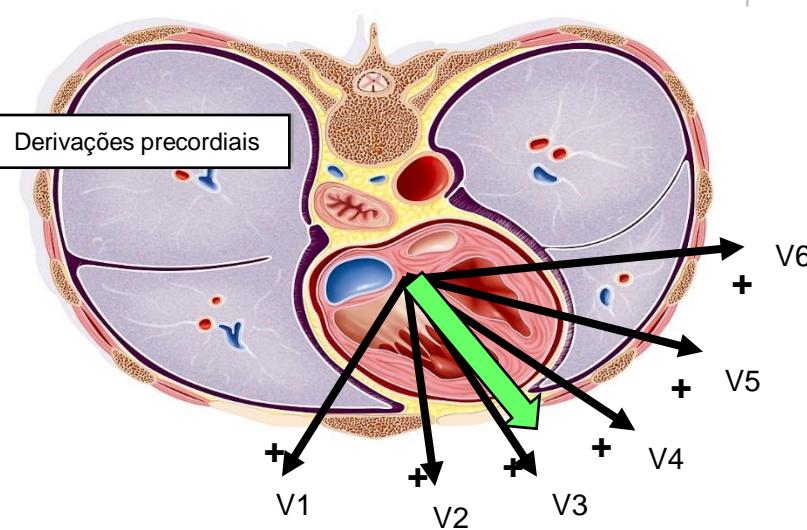


Bloqueio de Ramo Direito

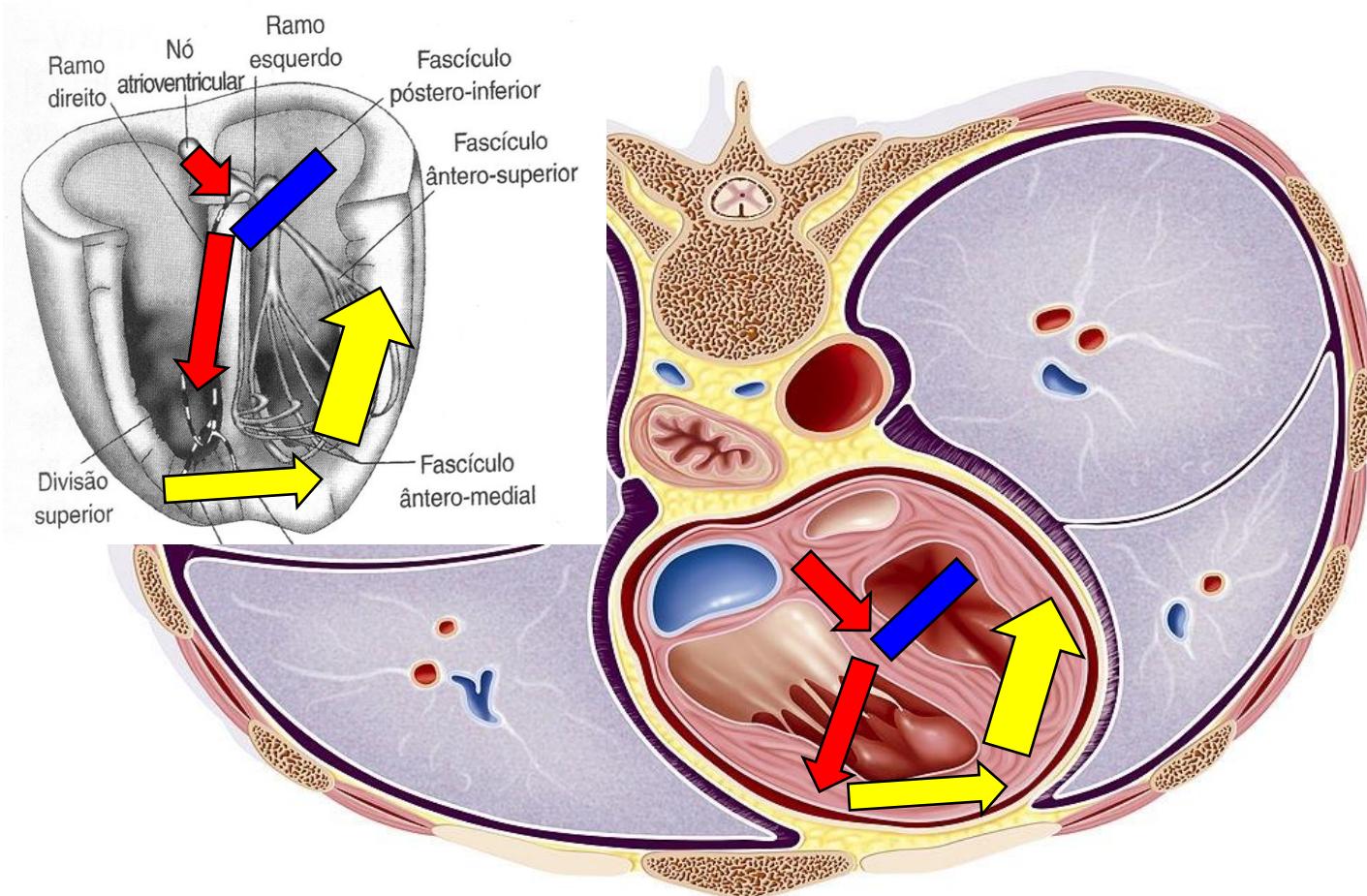


Bloqueio de Ramo Direito

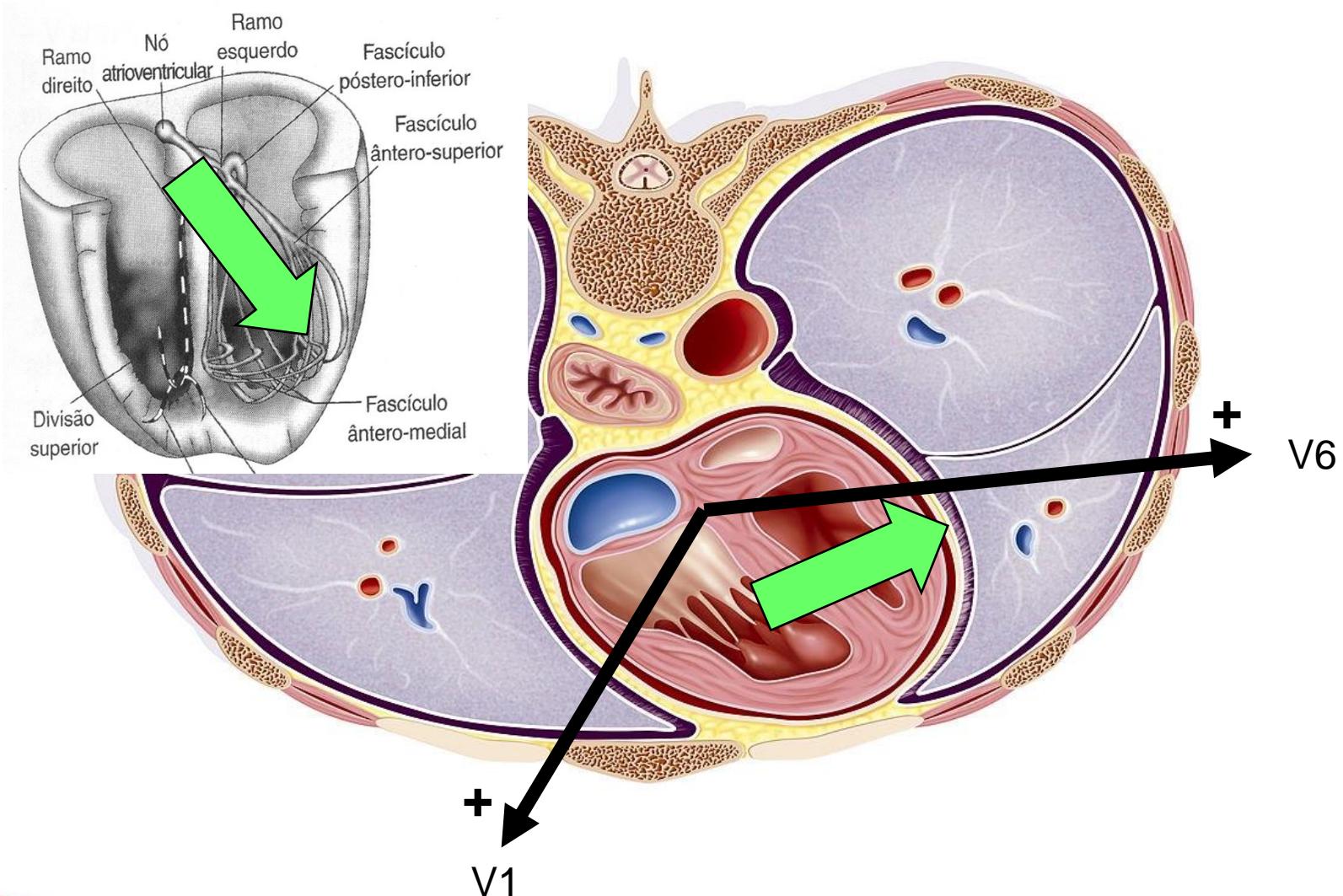




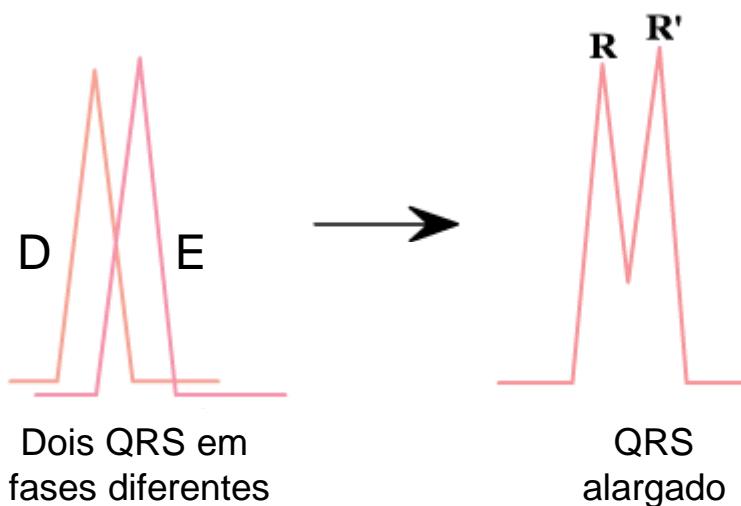
Bloqueio de Ramo Esquerdo

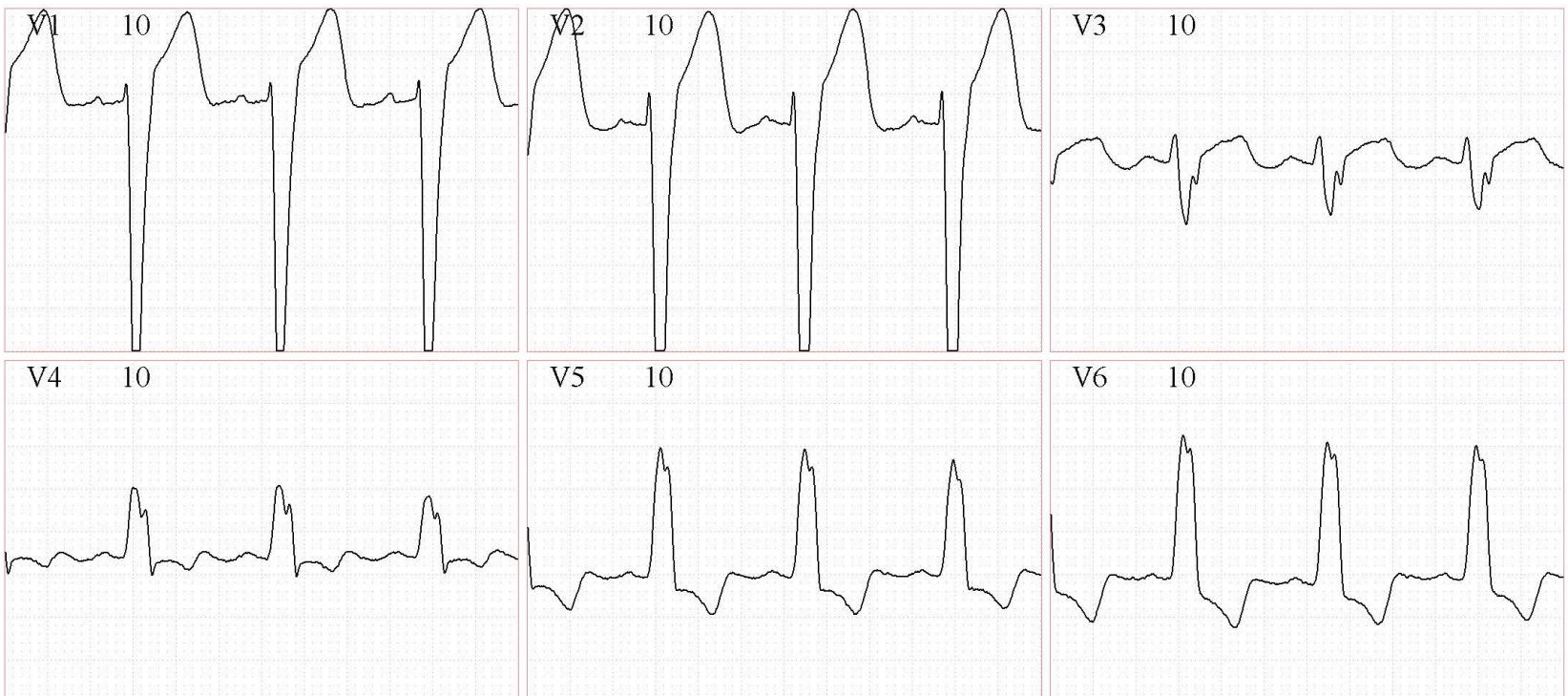
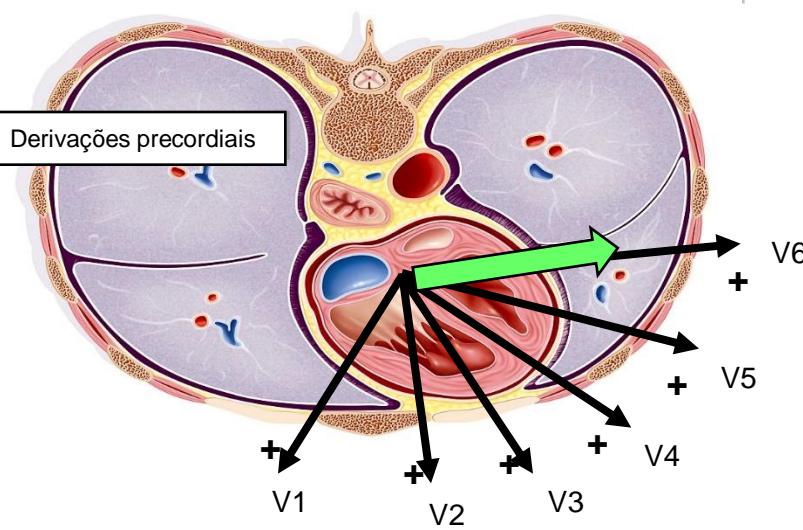


Bloqueio de Ramo Esquerdo



Bloqueio de Ramo Esquerdo



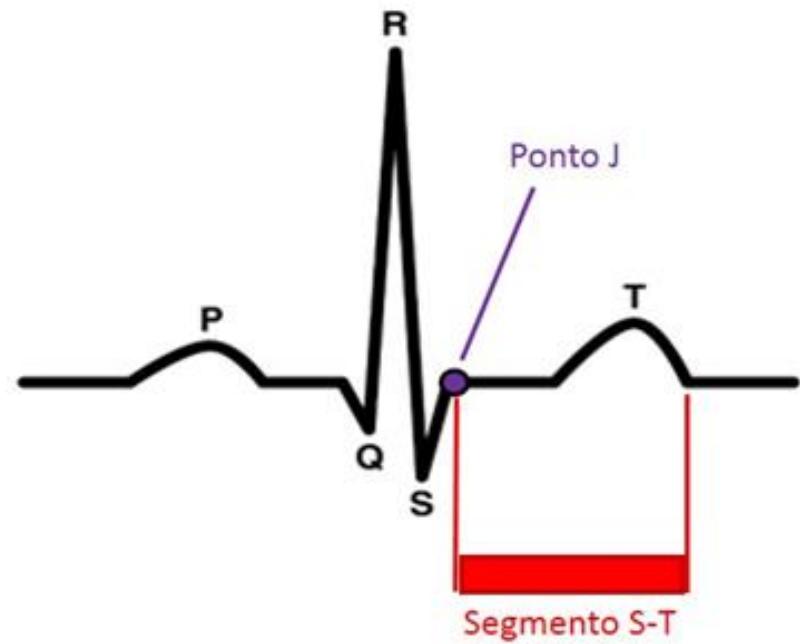
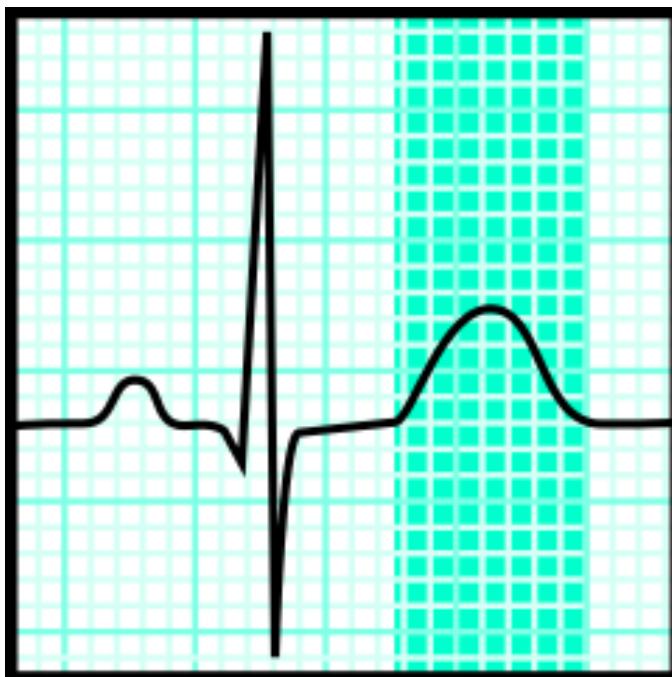


Sobrecarga Ventricular Esquerda

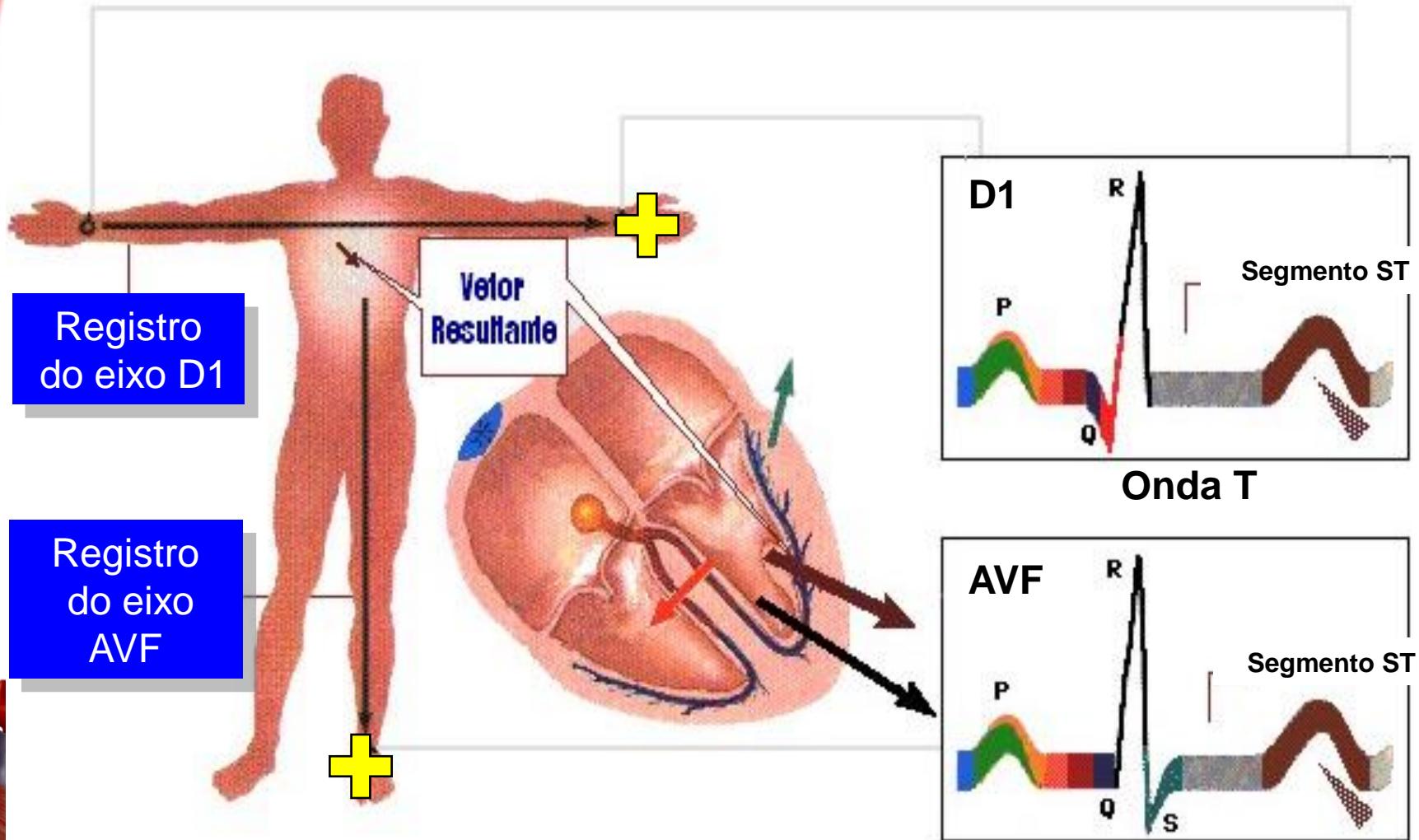


S de V1 + R de V5 ou V6 > 35mm = SVE

7. Onda T e Segmento ST



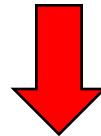
Onda T e Segmento ST



Alterações de Onda T e Segmento ST



Lesão Subepicárdica



Supradesnível de ST

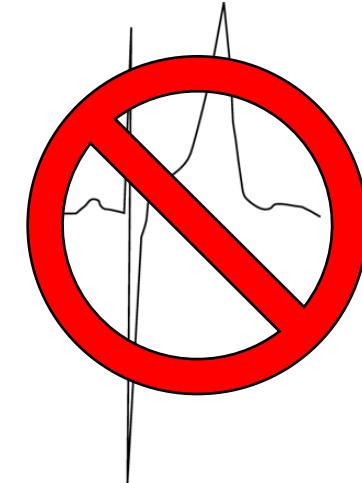
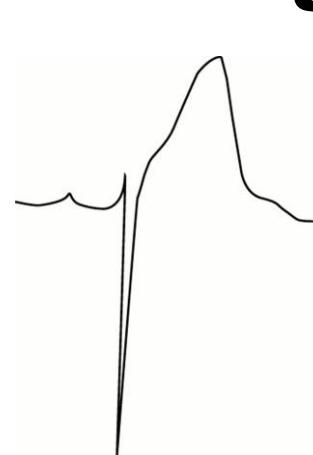
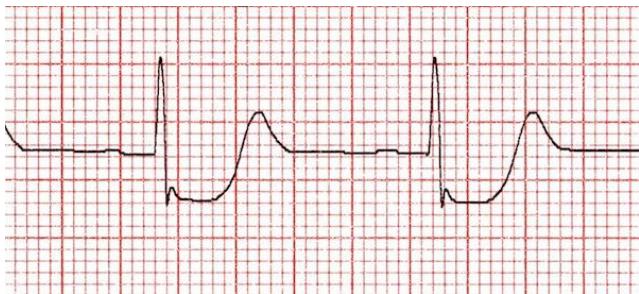
Isquemia Subepicárdica



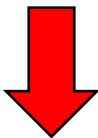
Inversão de T (simétrica)



Alterações de Onda T e Segmento ST

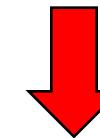


Lesão Subendocárdica

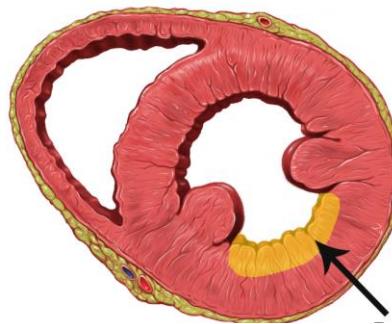


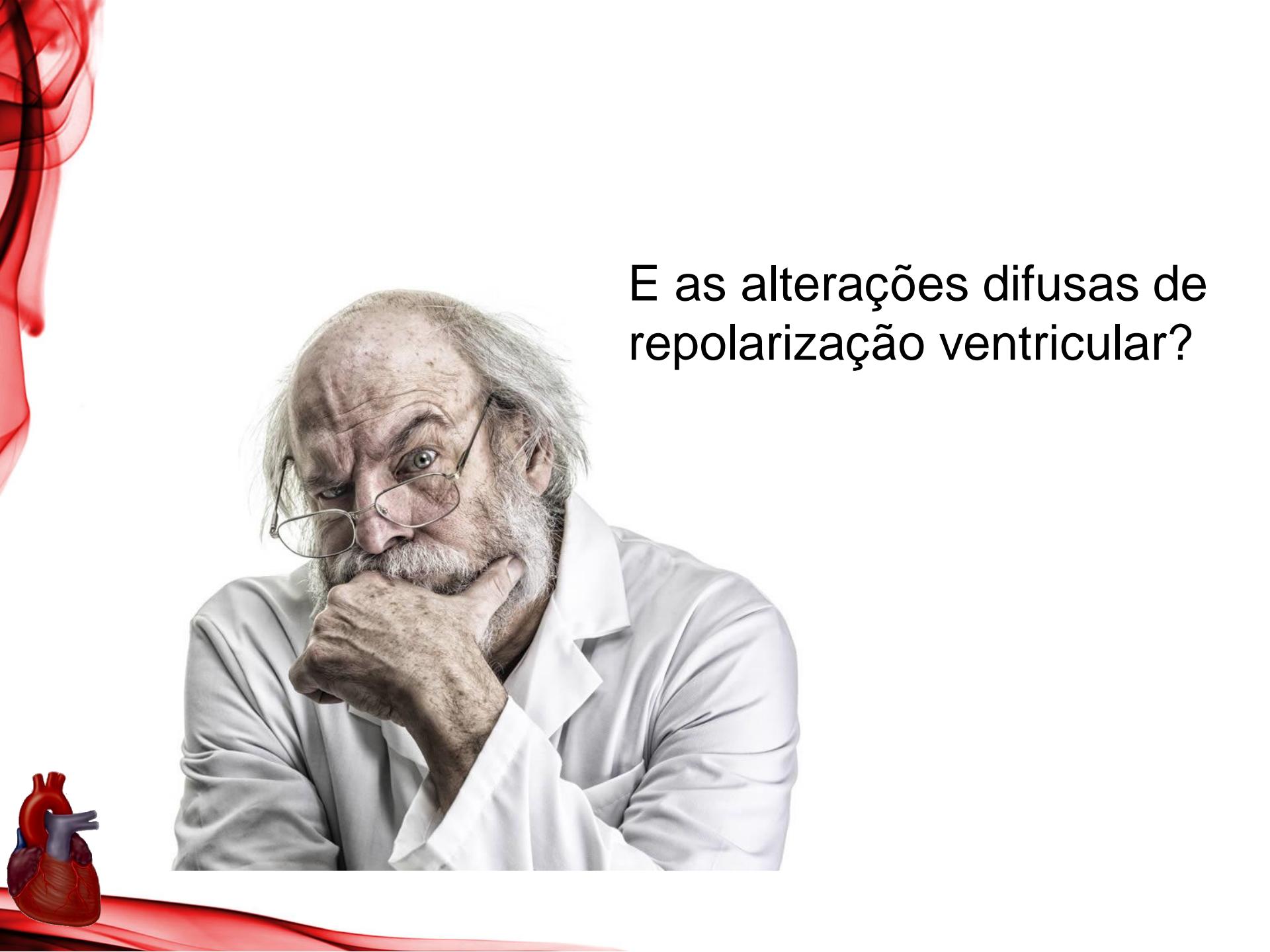
Infradesnível de ST

Isquemia Subendocárdica



T apiculada (não pontiaguda)



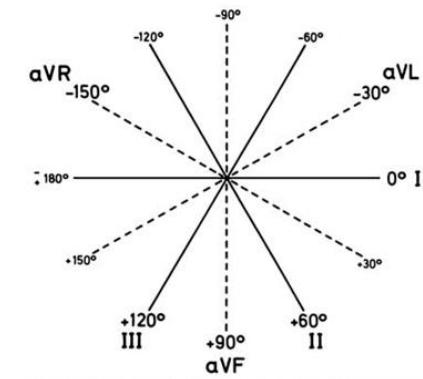
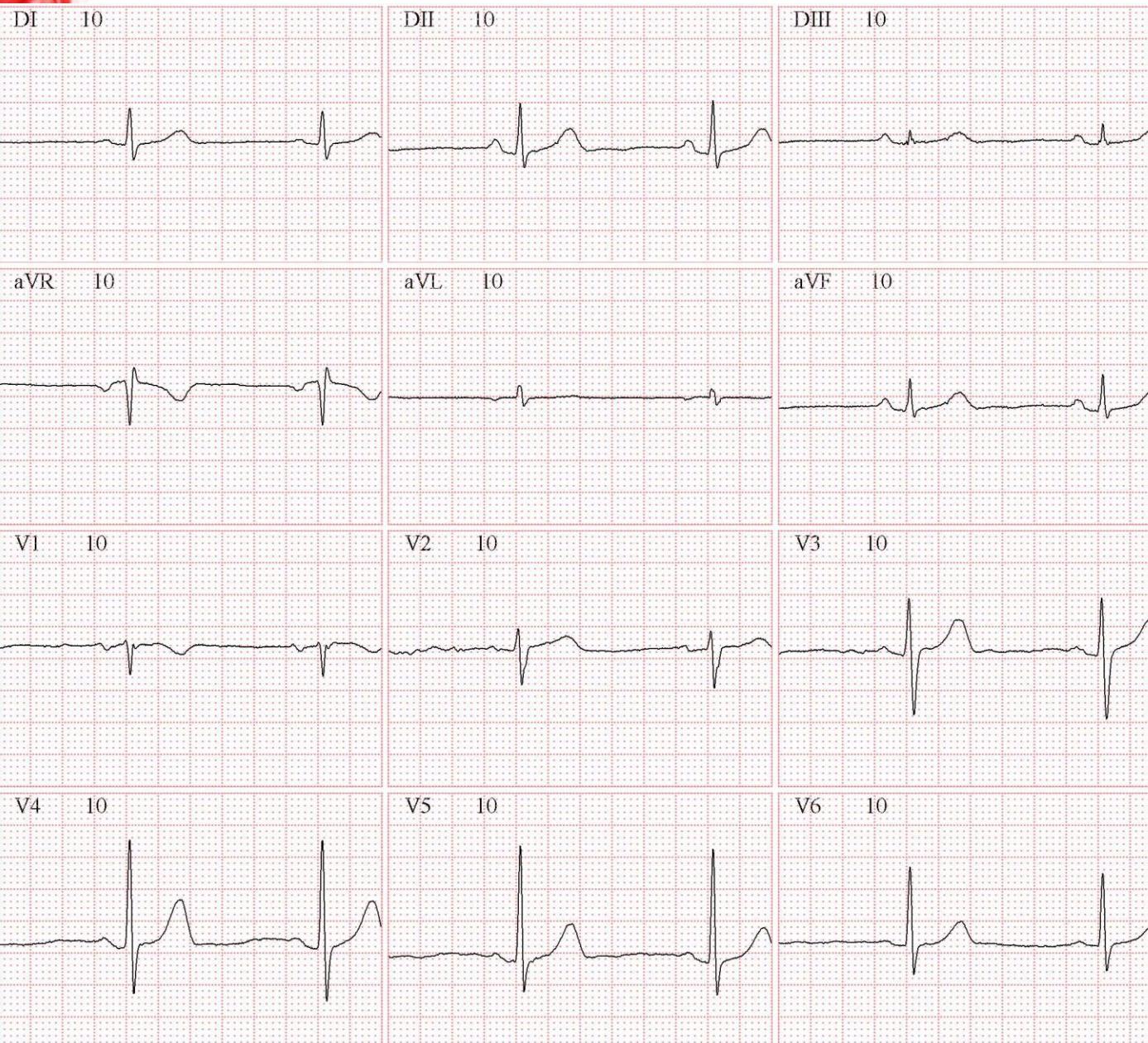


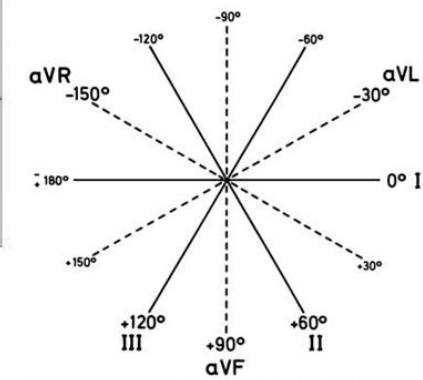
E as alterações difusas de repolarização ventricular?

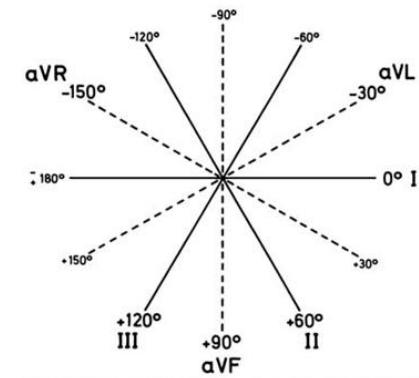


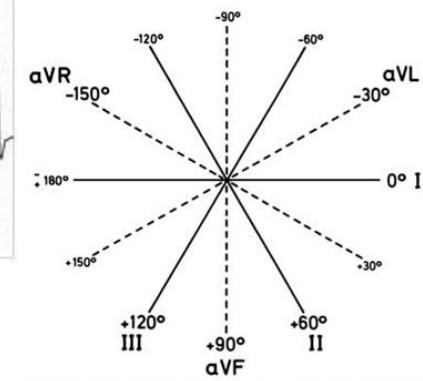
Exemplos Práticos













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