

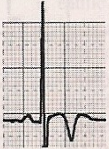
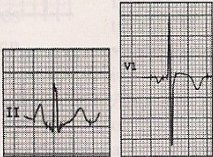


# Right Ventricular Hypertrophy

Until careful studies are made of the voltage measurements in the involved leads of normals and athletes according to age, we do not recommend that traditional voltage criteria violations trigger further evaluation in athletes <30 years of age. We recommend that voltage-only criteria for right ventricular hypertrophy are, in general, not applicable to young athletes and that additional findings such as right atrial abnormalities, T-wave inversion in V2/3, and /or right-axis deviation are necessary to elicit further evaluation before participating in sports.

ECG Abnormality	Criteria for further evaluation	Example
Q waves	>3 mm in depth or >40 ms duration in any lead except III, aVR, aVL and V1	
ST depression	>0.5 mm below PR isoelectric line between J-junction and beginning of T waves in V4, V5, V6, I, aVL  >1 mm in any lead	
T wave inversion	>1 mm in leads other than III, aVR and V1 (except V2 and V3 in women <25 years)	
Atrial abnormalities	Right: P wave amplitude >2.5 mm Left: i) Negative portion of P wave in V1, V2 of >40 ms duration and 1 mm in depth; or ii) total P wave duration >120 ms	
Right ventricular hypertrophy	>30 years: i) R wave >7 mm in V1; or ii) R/S ratio >1 in V1; or iii) sum of R wave in V1 and S wave in V5 or V6 >10.5 mm  <30 years: above plus right atrial enlargement, T wave inversion in V2, V3, or right axis deviation >115°	