



## EDITORIAL COMMENT

# Use of the electrocardiogram in pre-participation screening of athletes: For or against? ☆



## A utilização do eletrocardiograma na avaliação pré-competitiva dos atletas: pró ou contra?

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The use of the 12-lead electrocardiogram (ECG) in the pre-participation screening of athletes is still not universally accepted. In 2014 the American Heart Association decided for the third time not to support mandatory national athlete screening throughout the US, particularly with routine use of ECGs.<sup>1</sup> Among the reasons for this repeated decision are the low incidence of events and the substantial number of false-negative and false-positive results (in the range of 5% to 20% depending on the specific ECG criteria used). Other reasons include the influence of observer variability and the impact of ethnicity/race on the interpretation of ECGs, which have a significant effect on the definition of a 'normal' ECG.

In Europe, the European Society of Cardiology (ESC) first published guidelines on the interpretation of the ECG in athletes in 2005,<sup>2</sup> which were updated in 2010,<sup>3</sup> and which distinguish common training-related findings from rarer non-training-related changes. The 2010 criteria improved specificity from 83% to 89.5% and reduced false positives from 16.9% to 10% while preserving sensitivity. The Seattle criteria, published in 2013, introduced stricter and less ambiguous thresholds, especially those related to T-wave inversion, ST-segment depression and pathological Q

waves.<sup>4</sup> Advances in knowledge have led to certain alterations (including left or right axis deviation, left or right atrial dilatation, right ventricular hypertrophy, and T-wave inversion accompanied by ST-segment elevation in V1-V4 in black athletes) now being classified as borderline, i.e. in isolation they are probably not pathological, but the presence of two or more of these findings may warrant additional investigation. Application of the 'refined criteria' has further reduced the false-positive rate to 4.9%.<sup>5</sup> If prospective studies confirm that the use of these criteria not only reduces the number of ECGs considered abnormal, but also continues to detect all genuine abnormalities and thereby reduces the incidence of sudden deaths in athletes, interpretation of the ECG in athletes will be more unequivocal – and hence less variable.

These questions are the subject of the interesting article by Dores et al. published in this issue of the *Journal*.<sup>6</sup> Variability in the interpretation of athletes' ECGs has only recently attracted the attention of investigators,<sup>7,8</sup> and the present study analyzes one of the largest numbers of experts (58 physicians, 72% of them cardiologists). Curiously, the proportion of correctly interpreted ECGs was no greater among cardiologists than among cardiology residents, nor in those who regularly assessed athletes than in those who did not. Only the use of specific criteria showed a tendency to improve the rate of correct interpretation, which highlights the usefulness of these criteria for reducing variability in reading ECGs for screening of athletes.

In view of data from Italy, which show that including the ECG in pre-participation screening of athletes has reduced

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the incidence of sudden death in sports by 90% over a period of 26 years by identifying athletes with potentially fatal heart disease, it is difficult to accept the American decision not to include the ECG, even given the psychological impact of being required to undergo additional exams, and even though including the ECG cannot completely avoid the unnecessary exclusion of some athletes from competitive sport or prevent all sudden deaths in sport.<sup>9,10</sup>

### Conflicts of interest

The author has no conflicts of interest to declare.

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