Prevalence and Patterns of Early Repolarization
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Background
ST elevation (STE) occurs in otherwise normal resting ECGs of athletes and the general population, as part of benign patterns of early repolarization (ER), which includes slurring or J waves on the down slope of the R wave.

Traditionally, ER and the associated STE have been worrisome because of associations with myocardial ischemia or damage and pericarditis, but recently, slurring or J waves have been observed often in those with idiopathic VT/VF and cardiac mortality with or without STE.

While the STE of ER occurs in the lateral and inferior ECG leads, STE in the anterior leads can be due to the Brugada Syndrome which is another potential cause of cardiovascular death.

To date, nobody has reported an analysis of the patterns, prevalence and prognostic value of computer measured ST elevation as part of the pattern of early repolarization in athletes or a large ambulatory clinical population.

Purpose of this study: To demonstrate the prevalence and patterns of ST elevation in apparently healthy individuals and athletes in order to help discriminate normal ECG variants of ST elevation from cardiac pathology.

Methods
45,829 ECGs were obtained from March 1987 to December 1999 at the Palo Alto Veterans Affairs Health Care Center and 658 ECGs of athletes were obtained during the Stanford 2007 Pre-Participation Exam (PPE), or “sports physical.” We excluded inpatients and those with ECG abnormalities, leaving 20,901 patients and 641 athletes.

For the non-athlete population, survival and cause of death were determined as of December 2002; 4,086 died (963, 17% of cardiovascular causes) after eight years.

Computer analysis of the ECGs was completed with human confirmation.

STE was defined ≥ 0.1 or 0.2 mV at the end of the QRS complex. Coding for STE was performed using both criteria, requiring its presence in 2 adjacent leads or only in a single lead.

Unadjusted and adjusted Cox Hazard regression analysis was used to determine an association between the patterns of STE and time to cardiovascular death.

Results Summary
Characteristics consistent with STE being due to the benign pattern of Early Repolarization rather than Pathological causes of ST Elevation include the following:

- Heart rate (low, not high)
- Age (young, not old)
- Gender (male, not female)
- ST level inferiorly and laterally (less than 0.2 mV, not greater)
- Ethnicity (African American, not other)
- Athletic status (yes, not sedentary)

Conclusions
- Stable, resting STE in apparently healthy person is not associated with cardiac death and has patterns that help distinguish it from STE due to cardiac conditions, such as ischemia and injury or pericarditis
- STE in the anterior leads is not a practical screening criteria for Brugada Syndrome since ≥ 0.2 mV occurs in a third of male athletes.
- These findings facilitate adding the ECG to the Pre-Participation Exam of Athletes and ECG screening in general.