Oklahoma State University/Athletic Training Are Electrocardiograms accurate in detecting cardiac pathologies in athletes ages 13-25: **A Critically Appraised Topic**

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INTRODUCTION

Electrocardiograms (ECGs) are used regularly in Pre-Participation exams for most athletes in all settings. They are useful when used properly and interpreted accurately for the right information. ECGs have the potential to positively affect the sports medicine world by accurately detecting athletes who possibly have underlying cardiac pathologies. The aim of this review is to identify if ECGs can accurately detect cardiac pathologies in those athletes who are between the ages of 13-25. Challenges and positive experiences are interpretated and highlighted throughout the review.

OBJECTIVES

The purpose of this study was to determine is Electrocardiograms (ECG) were accurate in detecting cardiac pathologies in athletes ages 23-25.

METHODS

Search Strategy

- athletes ages 13-25 OR "young athletes"
- "electrocardiogram", "ECG"
- "ECG accuracy", "ECG detecting cardiac pathologies", ECG accuracy AND detecting cardiac pathologies"

Databases searched

- Google Scholar
- PubMed
- Science Direct

Inclusion Criteria

- Young athletes (ages 13-25)
- Athletes participating in sport
- The use of electrocardiograms
- The accuracy of electrocardiograms - Study must be published within the past 10
- years (2012 to current) - Study must include the assessment of cardiac pathologies

Exclusion criteria

- Include the general public
- Include those older than 25 or younger than 13.
- Studies that did not utilize ECG's.
- Studies that assessed other pathologies besides those involving the cardiac system.

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exclusion criteria arctingsting in any gort, electrocardiogram, Accuracy of ECGs. ECGs. accuracy of ECGs. ECGs. accuracy of ECGs. Comparison intervention 12-point ECG vs. Evaluation Monograph 4 th none ECG vs. Evaluation Monograph 4 th ECGs. accuracy of ECGs. Comparison intervention 12-point ECG vs. Evaluation Monograph 4 th none ECG vs. Evaluation ECG vs. Evaluation Outcomes measure Detection of abnormal rates and rhythm of the hearts electrical waves indicating cardiac pathologies. Detection of abnormal ites van interpretation and use of CCG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. The ECG should be used over the 14-point eval. Sk(1) (rr2). The mass common of the hearts (ECG should be used over the 14-point eval. Sk(1) (rr2). The mass common of the point eval. The ECG should be used over the 14-point eval. Sk(1) (rr2). The mass common of the PCH eval. Sk(1) (rr2). The mass common of the PCH eval. Sk(1) (rr2). The mass common of the PCH eval. Sk(1) (rr2). The mass common of the PCH eval. Sk(1) (rr2). The mass common of the PCH eval. Sk(1) (rr2). The mass common of the PCH eval. Sk(1) (rr2). The mass common of the PCH eval. Sk(1) (rr2). The PCH eval. Sk(1) (rr2			ECG use in high school screenings	ECG vs 14-point evaluation in high school athletes
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Findings/Results ECG has less false positive rates (5%) compared to the 30% false-positive rates (5%) compared to the 14-point eval. The ECG should be used over the 14-point eval. The ECG to the 3.517 participants, 103 (2.8%) were found to the advertised in the PPE-4 this study revealed allow ECG false-positive rate coult supermatities were to were inversions (15%), waves (0.8%), left axis deviation (0.8%), rights sprimary outcomes were measured and identified by terminular hypertrophy (0.8%), and ventricular pre-excitation (6.4%), 15%, and ventricular pre-excitation (6.4%), 16%, and ventricular pre-excitation (6.4%), 16%, and ventricular pre-excitation (6.4%), 16% and ventricular pre-excitation (6.4%). 16% and ventricular pre-excitation (6.4%), 16% and ventricular pre-excitation (6.4%), 16% and ventricular pre-excitation (6.4%), 16% and ventricular pre-excitation (6.4%). 16% and 16% and 16% pre-excitation 14% and 14% and 16% and 16% pre-excitation 14% and 14% and 16% pre-excitation 14% and 14% and 16% and 14% and 16% pre-excitation 14% and 16% and 14% and 16% pre-excitation 14% and 16% and 14% and 16% pre-excitation	•		none	ECG vs 14-point evaluation
Level of Evidence CEBM level 4 to the 30% false-positive rate in the PFE-4 questionare. ¹ Detection of abnormalities using ECG in the test group was in 5.4% (n=72): The most common abnormalities using ECG in the test group was in 5.4% (n=72): The most common abnormalities using ECG in the test group was in 5.4% (n=72): The most common abnormalities were T wave inversions (1.5%), or gits were found to 0.8%), if gits were found to 0.8%, if gits were found to 0.8%, if gits werticular hypertrophy (0.6%), and ventricular pre-excitation (0.6%), if gits were also detected. Bicuspid aortic valve (n=1), aortic are arrythmia (n=4), left axis deviation (n=9), right article or the rescaled a low pre-tension (n=1). ² Student non-athietes are more likely than student athietes to report signs and symptoms of cardiac pathologies (p<0.001) ¹ Level of Evidence CEBM level 4	Outcomes measure	hearts electrical waves indicating cardiac	electrical waves indicating cardiovascular	
		to the 30% false-positive rate in the PPE-4 questionare. ¹ Detection of abnormalities using ECG in the test group was in 5.4% (n=72). ¹ The most common abnormalities were T wave inversions (1.5%), Q waves (0.8%), left axis deviation (0.8%), rights ventricular hypertrophy (0.6%), and ventricular pre-excitation (0.4%). ¹ Student non-athletes are more likely than student athletes to report signs and symptoms	used to help detect cardiac pathologies. ² This study revealed a low ECG false- positive rate (2.8%) compared to physical examination (14.5%) ² 5 primary outcomes were measured and identified by ECG. Hypertrophic cardiomyopathy (n=1), Wolff- Parkinson-White (WPW) (n=4). 4 secondary outcomes were also detected. Bicuspid aortic valve (n=1), aortic root dilation (n=2), and left ventricular hypertrophy secondary to hypertension (n=1). ²	reveals less false-positive rates compared to the 14-point eval. ³ Of the 3,517 participants, 103 (2.8%) were found to have abnormal ECGs. ³ T- wave inversion (n-20), ST-segments depression (n-5), Pathogenic Q waves (n=25), Complete Right bundle Branch Block (RBBB) (n=2), Left atrial enlargement (n=4), left axis deviation (n=9), right atrial enlargement (n=2), right ventricular hypertrophy (n=2), ventricular pre execution/WPW (n=9), Prolonged QT(n=7), ventricular arrythmia (n=1), premature ventricular contractions (n=11), sinus tachycardia (n=2), other (n=4) ³ Sensitivity rates of the ECG vs the 14 point questionnaire (87.5% vs 18.8%) ³ Specificity rates of the ECG vs the 14 point questionnaire (97.5% vs 75.1%) ³ Positive predictive value of ECG and 14 point questionnaire (13.6% vs 0.3%) ³ Negative predictive value of ECG vs 14-point questionnaire (99.9% vs 99.5%) Accuracy between the ECG and 14 point= 97.5% vs
Score (PEDro) Yes Support for the Yes	Evidence Quality	CEBM level 4 PEDro ³ : 6/10		CEBM level 4 PEDro ³ : 6/10





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RECOMMENDATION

Based on the evidence presented, and using the SORT scale², the grade of B, or moderate quality of information is assigned to to this review.

CONCLUSION

ECG's proved very accurate in detecting cardiac pathologies. In the following review, there are studies that used comparison groups. Compared to those groups, the ECG performed better and assisted physicians in diagnosing cardiac pathologies or referring athletes for further evaluation. It must be noted that using ECGs is helpful to detect cardiac pathologies and not solely to diagnose cardiac pathologies. More research is needed to conclude if ECGs can be used to diagnose cardiac pathologies without the use of other modalities or examinations.

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