



## Grant Information Summary:

# The Accuracy of a Screening Echocardiogram in Detecting Idiopathic Hypertrophic Cardiomyopathy During the Athletic Pre-Participation Physical

### Practical Significance Statement

**If a relatively low-cost method can be employed to screen athletes for the detection of hypertrophic cardiomyopathy, then the sudden death of many individuals could potentially be avoided.**

### Study Background

Hypertrophic cardiomyopathy (HCM) is the abnormal thickening of the heart muscle. This thickening stiffens the heart wall so that it is less able to efficiently pump blood throughout the body. The prevalence of HCM is estimated at 1-2 / per 1,000 individuals.

Hypertrophic cardiomyopathy is a cardiac condition that can go virtually undetected among the athletic population and is the leading cardiac cause of sudden death among younger athletes.

Even with the most thorough clinical history and physical examination, this diagnosis can be missed. Several tests have been proposed including: chest x-ray, ECG, blood analysis, and echocardiography. Echocardiography has been the gold standard in the assessment and diagnosis of HCM, but the lengthy study time and expense have made it impractical to use in the pre-participation athletic physical.

Recently, a 2 minute screening echocardiogram has been proposed as an alternative to

solve these problems. Despite the potential advantages of the screening echocardiogram, the accuracy has never been determined in relationship to HCM, as to whether it can actually identify HCM in a mass screening setting.

### Objective

The purpose of this study was to investigate the potential usefulness of using a portable echocardiogram machine and a less than 2 minute screening protocol to detect HCM during the routine pre-participation physical.

## Design And Setting

A prospective, single-blind, study design was employed in this research. Annual pre-participation physicals were conducted for a local independent school district's middle schools and high schools.

## Subjects

A total of 671 student athletes with no history of HCM were tested in conjunction with 14 young patients with a documented history of HCM. The examiners and interpreting physician had no prior knowledge that any HCM subjects were in the pool of athletes being tested.

## Measurements

A screening echocardiogram protocol was designed to detect HCM specifically for this study. This protocol consisted of a cardiac examination using a hand-held portable ultrasound device (OptiGo, Philips Ultrasound, Andover, MA) that takes less than 2 minutes to conduct. A single parasternal long axis view of the heart was obtained to measure the thickness of the ventricular septum and posterior wall at end-diastole according to the established guidelines of the American Society of Echocardiography.

## Results

Of the 14 HCM patients blindly placed into the study, 6 were not cleared for athletic participation due to a suspicious heart murmur that required cardiology referral (42.9%). Eight of the 14 patients with HCM were missed by physical examination and cleared for athletic participation (57.1%).

Of the 14 HCM patients blindly placed into the study, 12 were identified with the screening cardiac echo (85.7%). Of the 2 patients missed with cardiac echo, one was identified by physical examination. The other missed HCM patient was not identified by either cardiac echo, or physical examination. Between physical examination and cardiac echo, 13 of the 14 patients with HCM were correctly identified (92.9%).

Fifty-eight of the 681 normal athletes failed their screening echo (8.5%). Of these, forty-two athletes returned for a full echo and cardiologist consultation and all were deemed normal (6.2% false positive rate).

## Conclusions

The 2 minute cardiac echo screening program used in this study out performed the physical examination in the detection of HCM. However, it still missed patients with HCM and resulted in the creation of false positive results. Performing a physical examination in conjunction with the cardiac echo screening program was more accurate than cardiac echo program alone.

## Principal Investigators:

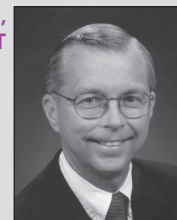
### **Shawn Bonsell, MD**

Dr. Bonsell received his MD, Oregon Health Sciences University, Portland, Oregon; completed his residency in orthopaedics at Duke University and an orthopaedic sports medicine fellowship at Baylor Medical Center in Dallas. Currently, Dr. Bonsell practices at the Sports Medicine Clinic of North Texas, specializing in all aspects of sports medicine. Dr. Bonsell also serves as the team physician for the FC Dallas-Professional Soccer Team, the Dallas Desperados Arena Football Team, and Mesquite High School Football Team in the Dallas Metroplex area. He also assists with sports medicine coverage for USA Swimming, Horn High School, North Mesquite High School, and Baylor Health Care sporting events. Dr. Bonsell remains active in many sports medicine and orthopaedics societies.



### **William F. (Bucky) Taylor, III, MEd, ATC, LAT**

Mr. Taylor graduated from Texas Tech University, Lubbock, TX and went on to receive his Masters degree from North Texas University. Mr. Taylor is a licensed athletic trainer in the state of Texas and has been a certified athletic trainer since 1975. He has served as Head Athletic Trainer of Mesquite High School, Mesquite, TX since 1974. He has been an active leader in the Southwest Athletic Trainers Association, and served as President in 2003-2004. Mr. Taylor continues to be active in many aspects of the sports medicine field and various associations.



## Publication & Presentation List

Bonsell SB, Pollo FE, Laird PW, Ikemba C, Franks BR, Baum BS, Taylor WF. The Accuracy Of Screening Echocardiography In Detecting Hypertrophic Cardiomyopathy In The Pre-Participation Athletic Physical. 2006. NATA Annual Meeting & Clinical Symposium. Atlanta, GA.

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