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### Original Research

## The Use of a Tuning Fork and Stethoscope to Identify Fractures

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### Abstract

**Context:** Nonradiographic tests to identify fractures rely on a patient's report of increased pain at the site of injury. These tests can be misleading and produce false-positive or false-negative results because of differences in pain tolerance. A painless technique using a tuning fork and stethoscope to detect fractures has undergone limited review in the athletic training literature.

**Objective:** To determine if the use of a 128-Hz vibrating tuning fork and stethoscope were effective in identifying fractures.

**Design:** Cross-sectional study.

**Setting:** University athletic training room or local orthopaedic center when fractures were suspected.

**Patients or Other Participants:** A total of 37 patients (19 males, 18 females) volunteered.

**Main Outcome Measure(s):** A diminished or absent sound arising from the injured bone as compared with the uninjured bone represented a positive sign for a fracture. Radiographs interpreted by the attending orthopaedic physician provided the standard for comparison of diagnostic findings.

**Results:** Sensitivity was 0.83 (10 : 12), specificity was 0.80 (20 : 25), positive likelihood ratio was 4.2, negative likelihood ratio was 0.21, and diagnostic accuracy was 81% (30 : 37).

**Conclusions:** The tuning fork and stethoscope technique was an effective screening method for a variety of fractures.

**Keywords:** [false-negative results](#), [false-positive results](#), [assessment](#), [auscultation](#)

Michael Bryan Moore, PhD, VATL, ATC, provided conception and design; acquisition and analysis and interpretation of the data; and drafting, critical

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