

Temperature Effect on Speed of Sound Measurements at the Third Proximal Phalanx

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Introduction: Temperature changes can influence the velocity measured along the bone. This may be critical when measuring peripheral skeletal sites.

Objective: The aim of the study was to evaluate the effect of temperature changes on Speed of Sound (SOS) measurements at the Proximal Phalanx III (PP).

Method: Four different operators measured bone SOS at the PP by Axial Transmission Ultrasonography (Sunlight Omnisense™) for three different subjects. Measurements were performed in room temperature (RT, 25°C), immediately after soaking the hand for four minutes in cold water (17°C), in hot water (35°C). A total of 12 measurements were recorded at each temperature level.

Results: Using ANOVA procedure it was found that extreme temperature changes (heat or cold) didn't influence the results. No interaction between temperature/subject was found. The total RMSCV was 0.95%. No significant difference was found between RT and heat (total RMSCV= 0.8%).

Average SOS Results	17°C	25°C	35° C
Subject 1	4140	4040	4085
Subject 2	3785	3817	3805
Subject 3	4055	4033	4070

Conclusion: Considering the fact that heat transport by water is much more efficient than heat transport by ambient air, the temperature change of the PP, even after short period of four minutes, is expected to simulate much longer time of exposure in air. Therefore, we can conclude that a short period of exposure to temperature changes doesn't influence SOS measurement results at peripheral skeletal sites.

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