

SWACSM Abstract

Differences in Arterial Occlusion Pressure As Measured Using Ultrasound and a Hand-held Doppler Device

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ABSTRACT

In the research lab and clinical settings, expensive ultrasound machines are used to measure arterial occlusion pressure (AOP) prior to the use of blood flow restriction during exercise. Alternatively, inexpensive hand-held Doppler ultrasound devices may be used to measure AOP in various applications and settings.

PURPOSE: The purpose of this study was to compare the superficial femoral artery AOP as measured using ultrasound and a hand-held Doppler device. **METHODS:** Participants included 20 males and 20 females. An inflatable cuff was placed on the upper thigh. The superficial femoral artery was occluded by inflating the cuff to 50 mmHg then continuously inflating the cuff at a rate of 10 mmHg/10 s. A GE LOGIQ ultrasound was used to detect blood flow in the superficial femoral artery just below the cuff. A hand-held Doppler device was used simultaneously to detect blood flow (pulse waves) at the anterior medial malleolar artery of the ankle. The pressure at which blood flow could no longer be detected using the ultrasound and the hand-held Doppler were recorded as the AOP. The measurement of AOP using both devices simultaneously was performed on both legs in a random order. The data were analyzed with a mixed model analysis of variance while maintaining a family-wise p -value of 0.05. **RESULTS:** On the average, the AOP measured using the hand-held Doppler device was significantly ($p < 0.05$) lower than the AOP measured using the Ultrasound in both the dominant and non-dominant legs in both males and females and when combining male and female data. The average difference between the AOP measured using the hand-held Doppler and the Ultrasound ranged from 3.0 mmHg to 5.3 mmHg. Although the difference in AOP measured using the two devices was statistically greater than 0 mmHg, the difference was not statistically greater than 5 mmHg. **CONCLUSION:** Although the differences in the AOP measured using the Ultrasound and the hand-held Doppler in both legs in males and females was statistically significant, for all practical purposes, the small differences were of not practical importance. In settings in which blood flow restriction during exercise is employed, a hand-held Doppler device is a viable alternative to using expensive ultrasound machines to measure AOP.