

Measurements of Arterial Occlusion Pressure Using Hand-held Devices

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ABSTRACT

Use of blood flow restriction (BFR) during training has become increasingly popular due to the benefits over a wide range of applications. An essential component to the safe and effective use of BFR is the measurement of arterial occlusion pressure (AOP). **PURPOSE:** This study compared measures of AOP of the brachial artery using three devices and two cuff inflation methods. **METHODS:** Brachial artery AOP was measured in 20 males and 21 females simultaneously using Doppler ultrasound (US), a handheld Doppler (HHDOP) and a pulse oximeter (PO) once when inflating the cuff with a clinical grade Hokanson (HOK) rapid cuff inflation system and twice manually (MAN) with a sphygmomanometer. **RESULTS:** A mixed model ANOVA revealed small but significant ($p < 0.05$) overall main effects between AOP measured using the HOK (120.4 ± 1.98) and MAN (122.2 ± 2.0) cuff inflation methods, between US (122.0 ± 1.97), HHDOP (121.6 ± 2.0) and PO (120.5 ± 2.0) measurements of AOP, and between males (127.6 ± 2.83) and females (115.2 ± 2.7). Further analyses indicated that the small overall difference between US and PO (1.56 ± 0.52) measures of AOP was significant ($p < 0.05$) but the overall differences between US and HHDOP (0.51 ± 0.52) measures of AOP was not significant ($p > 0.05$). Trial-to-trial variance in measures of AOP using US, HHDOP and PO were negligible. Bland-Altman plots revealed reasonable limits of agreement for both HHDOP (± 4.46 mmHg) and PO (± 5.47 mmHg) measures of AOP. **CONCLUSIONS:** The small differences in US, HHDOP and PO measures of AOP measurements using HOK and MAN cuff inflation methods are of little practical significance. Manual inflation of the pressure cuff provides comparable AOP values compared to when using a clinical grade cuff inflation system. Practitioners can be confident in measures of AOP using a quality hand-held doppler or pulse oximeter prior to blood flow restriction training.