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Minimum recovery time required between reactive hyperaemia stimulus in the repeated measurement of brachial flow-mediated dilation (FMD)

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Endothelial dysfunction has been identified as a key factor in the development and progression of CVD⁽¹⁾. FMD is an effective non-invasive measure of endothelial dysfunction⁽²⁾ that is becoming widely used in both research and clinical applications.

There are a number of situations when it would be advantageous to be able to perform two FMD measurements in relatively quick succession, the most common being to enable improved accuracy through performing duplicates at a set time-point or to restart a measurement that has been compromised by volunteer movement or other methodological faults. The International Brachial Artery Reactivity Taskforce⁽³⁾ published guidelines that attempted to standardise the FMD technique. Their report stated that ‘at least 10 minutes rest is needed after reactive hyperaemia before another image is taken to reflect the re-established baseline conditions’. This period appears to be commonly accepted, but no studies could be found that have actually investigated the minimum period of time required between FMD measurements.

The present investigation aimed to quantify the minimum period of time required between FMD measurements for the same response to be obtained and to provide additional evidence that repeated FMD measurements over a 2 h period do not have a cumulative effect on subsequent FMD results. Twenty healthy volunteers attended the unit for two 2 h visits at the same time on two separate days. A total of four FMD measurements were taken per visit, with time periods between measurements of 5 min, 15 min and 30 min.

There was no significant difference in baseline or peak vessel diameter or percentage FMD between any two measurements. The mean difference in a single visit was 0.08 (SE 0.03) mm for both baseline and peak diameter and 1.39 (SE 0.49) % for FMD. These values increased slightly between days, with mean differences of 0.16 and 0.17 (SE 0.02) mm for baseline and peak diameter respectively and 2.74 (SE 0.26) % FMD.

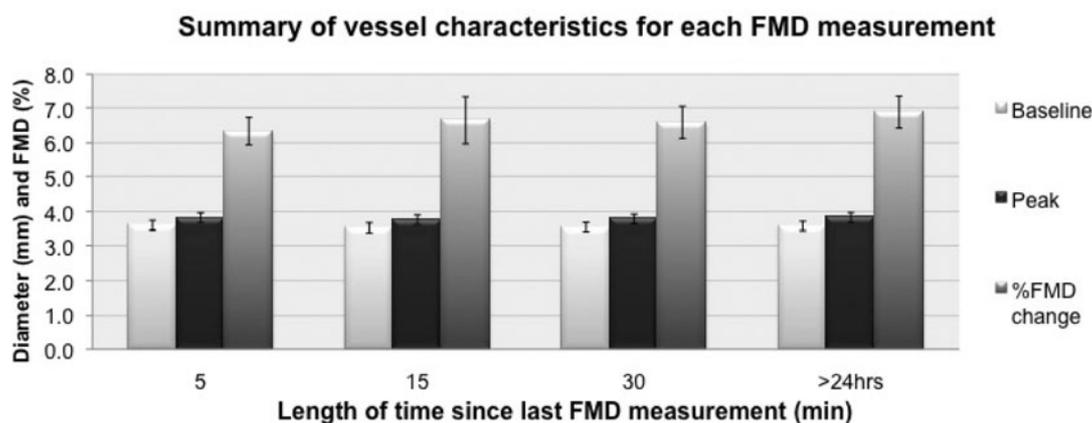


Figure. Vessel diameter (mm) at baseline and peak for each FMD measurement and the effective percentage FMD change, in order of shortest rest period to greatest rest period. Values are means with their standard errors represented by vertical bars.

These results suggest that FMD measurements could be repeated in as little as 5 min after the release of occlusion.

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