

## Data article

**Title:** *Assessing the perceived quality of brachial artery Flow Mediated Dilation studies for inclusion in meta-analyses and systematic reviews: description of data employed in the development of a scoring tool based on currently accepted guidelines.*

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### Keywords

Cardiovascular disease; Atherosclerosis; Endothelial function; Reproducibility; Methodology

## Abstract

Brachial artery flow mediated dilation (FMD) is widely used as a non-invasive measure of endothelial function. Adherence to expert consensus guidelines on FMD measurement has been found to be of vital importance to obtain reproducible data. This article lists the literature data which was considered in the development of a tool to aid in the objective judgement of the extent to which published studies adhered to expert guidelines for FMD measurement. Application of this tool in a systematic review of FMD studies (<http://dx.doi.org/10.1016/j.atherosclerosis.2016.03.011>)<sup>1</sup> indicated that adherence to expert consensus guidelines is strongly correlated to the reproducibility of FMD data.

### Specifications Table

Subject area	<i>Medicine</i>
More specific subject area	<i>Vascular Physiology</i>
Type of data	<i>Table</i>
How data was acquired	<i>Systematic literature survey and expert consensus</i>
Data format	<i>Processed</i>
Experimental factors	<i>Methodological parameters related to valid measurement FMD</i>
Experimental features	<i>Assessment tool based on 33 studies pertaining to the most appropriate methods to assess FMD in humans identified from literature and expert guidelines for FMD measurement</i>
Data source location	<i>Nijmegen, The Netherlands</i>
Data accessibility	<i>Data is within this article</i>

### Value of the data

- The literature data provided here establishes an evidence base and a physiological background rationale for the individual components included in the Adherence Score, aiding in the improvement of the practical guidance and technical approaches to FMD measurement and analysis.
- This “Adherence Score” which ranges between 0 (i.e. no adherence) and 10 (i.e. full adherence) can conceivably be employed to evaluate the perceived quality of studies reporting FMD data, with a higher outcome of this measure being strongly related to better reproducibility of the FMD data.
- This tool may prove useful additional information when pooling, contrasting and comparing different studies, e.g. for the purpose of meta-analyses or systematic reviews.

## **Data**

A tool to enable objective assessment of the level adherence to the FMD guidelines was developed.

Table 1 presents the 19 different factors that make up the “*Adherence Score*” tool along with citations to the literature data which justify the inclusion of each factor in question.

**Table 1.** Scoring tool based on currently accepted guidelines for the assessment of the perceived quality of FMD studies

Characteristic	Score	Reference
<b>Subject preparation</b>		
Fasting state (>6h)	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	2-4
No smoking or any tobacco consumption prior to measurement (>6h)	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	5-7
No habitual exercise prior to measurement (>48h)	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	8-10
No food/beverages that contain alcohol and/or caffeine for >12 h	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	11, 12
No food/beverages that are rich in polyphenols (cocoa, tea, fruit juices) for >18 h	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	13
No vitamins for at least 72h	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	14-16
Vasoactive medications withheld on the morning of the study if possible for single measurements; Careful noting of the use and timing of any drugs in the case repeated measurements	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	17, 18
Supine position; Rest for at least 15 min prior to measurements in a quiet, temperature controlled room	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	19-21
In female subjects, repetitive measurement should be made at the same time of the menstrual cycle (ideally on days 1–7)	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	22, 23

Characteristic	Score	Reference
Repeated measurements done in fixed time windows (same time of day)	Yes <input type="checkbox"/> 0.2; No <input type="checkbox"/> 0	24-26
<b>Image acquisition</b>		
Diameter measurements recorded continuously + over the heart cycle OR;	Yes <input type="checkbox"/> 2; No <input type="checkbox"/> 0	27, 28
Diameter measurements obtained during end diastole only	Yes <input type="checkbox"/> 1; No <input type="checkbox"/> 0	
Simultaneous acquisition of pulse-wave Doppler velocity signal for quantification of shear stimulus	Yes & insonation angle $\leq 60^\circ$ <input type="checkbox"/> 2; Yes & insonation angle $> 60^\circ$ /not reported <input type="checkbox"/> 1; No <input type="checkbox"/> 0	29-31
<b>Image analysis</b>		
Analysis using automated edge detection and wall tracking software	Yes & continuous (i.e. time bins of $\leq 5$ seconds) <input type="checkbox"/> 2; Yes & fixed time points <input type="checkbox"/> 1; No <input type="checkbox"/> 0	32-34
<b>Laboratory information</b>		
Use of experienced sonographers reported	Yes <input type="checkbox"/> 1; No <input type="checkbox"/> 0	
Same sonographers paired to same subjects for repeated measurements	Yes <input type="checkbox"/> 1; No <input type="checkbox"/> 0	

## **Experimental Design, Materials and Methods**

Based on previous expert-consensus guidelines,<sup>35</sup> we devised a scoring system reliant on the reporting of 19 different methodological factors related to FMD measurement. These factors were identified after critical review and appraisal of published physiological studies pertaining to the most appropriate methods to assess FMD in humans. Values were assigned to each component proportional to its perceived importance for valid assessment of the FMD. This was done through expert consensus discussion within the Working Group (AG, LG and DHJT). The “*Adherence Score*” that any given study can be assigned ranges from 0 to 10 points depending on how many of the 19 different factors that are reported or referred to in the text of the paper in question.

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