1. Motivation & Objective

- Current FMD: assumes vasodilation entirely induced by the increase in wall shear stress (WSS).
- Issue: there is evidence of vasodilation being affected by other confounding factors, such as arterial wall stiffness and blood pressure.
- Aim: to investigate the effects of arterial wall stiffness on the results of FMD using computational blood flow modelling.

2. Study Design

3. In-vivo Data

4. In-silico Simulation

- We have developed a novel numerical model to simulate the process of FMD.
- In-silico FMD results agree well with in-vivo data: the simulation can capture the surge in velocity right after cuff deflation, the diameter drop right after cuff deflation is followed by a diameter increase.
- For the same prescribed endothelial function (relating WSS to Young’s modulus variation) and decreased peripheral resistance, FMD increases with decreasing arterial stiffness.

5. Discussion & Conclusion

6. Future Plan

- Investigate other confounding factors that may affect the results of FMD using our novel numerical model developed in this study.
- Apply the numerical model to investigate endothelial-dysfunction related diseases (e.g. coronary artery disease).
- Obtain a new FMD index that is not affected by confounding factors.

References