

# The Effects of Short-Term Removal of Exercise on Endothelial Function in Older Adults: Preliminary Data

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## INTRODUCTION

Endothelial function is negatively associated with decreased risk of cardiovascular disease. Previous studies demonstrate that endothelial function is improved through exercise, and that young, active adults experience impaired endothelial function following short-term physical inactivity interventions. Whether this occurs in older, active adults who may be more prone to bouts of inactivity is unknown.

**PURPOSE:** This study determined if endothelial function, as measured by flow-mediated dilation (FMD), was impaired in active, older adults following removal of exercise for 5 days compared to active, young adults.

## METHODS

**PARTICIPANTS:** This controlled, experimental trial included 8 participants (3 young, active participants and 5 older, active participants). Inclusionary criteria for the participants were: >55 years of age (old) or between 18-40 years of age (young), completing at least 30 minutes of moderate to vigorous exercise on 3 or more days per week during the past 3 months, and free from physical limitations that would interfere with daily physical activity. Subject characteristics are reported in **Table 1**.

### PROCEDURES:

- Participants were instructed to refrain from exercise for 5 days. Adherence was assessed with an accelerometer.
- Directly before (baseline) and on days 3 and 5 of removal of exercise, participants had brachial and popliteal artery flow mediated dilation (FMD) assessed, which is a measure of endothelial function. Briefly, a blood pressure cuff was positioned distal to the artery being imaged. Diameter was measured before and following 5 minutes of cuff occlusion at 220mmHg. Peak diameter was assessed following cuff occlusion.
- Results of the diameter measurements are reported in **Table 2-3**, while results of the FMD percentage are reported in **Figure 1A-B**.

## RESULTS

**Table 1. Subject Characteristics**

Characteristic	Young (N=3)	Old (N=5)	p-value
Age	22.3±0.7	64.0±3.6	<0.001
BMI	24.9±1.3	25.6±0.8	0.70
Body Weight (kg)	73.6±6.7	70.9±4.6	0.78
Body Fat Percent	21.7±4.7	29.1±2.4	0.23
Male/Female	2/1	2/3	-

**Table 2. Brachial Artery Vascular Measures at Baseline and during FMD**

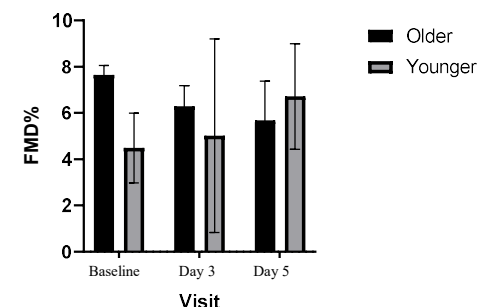
Measure	Baseline Young	Old	Day 5 Young	Old	p-value Time	Age	Time x Age
Baseline Diameter	0.43 ± 0.03	0.34 ± 0.01	0.43 ± 0.03	0.35 ± 0.02	0.46	0.25	0.27
Peak Diameter	0.45 ± 0.03	0.37 ± 0.02	0.46 ± 0.02	0.37 ± 0.01	0.45	0.17	0.13
Shear AUC	31050 ± 3219	34257 ± 11248	76063 ± 27084	32969 ± 11753	0.19	0.25	0.53
Minimum Diameter	4.02 ± 0.22	3.24 ± 0.14	3.69 ± 0.35	2.38 ± 0.60	0.22	0.06	0.46
FMD/AUC	0.14 ± 0.03	-0.10 ± 0.29	0.14 ± 0.06	0.92 ± 0.75	0.21	0.64	0.26

**Table 3. Popliteal Artery Vascular Measures at Baseline and during FMD**

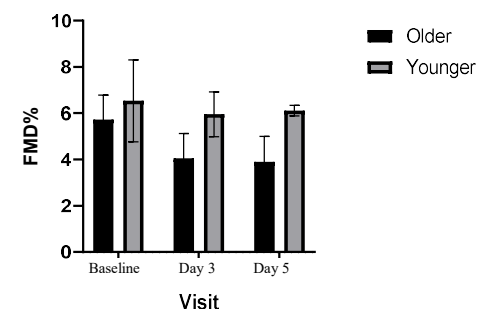
Measure	Baseline Young	Old	Day 5 Young	Old	p-value Time	Age	Time x Age
Baseline Diameter	0.60 ± 0.02	0.55 ± 0.06	0.61 ± 0.02	0.56 ± 0.07	0.60	0.65	0.34
Peak Diameter	0.64 ± 0.03	0.58 ± 0.06	0.64 ± 0.03	0.58 ± 0.07	0.08	0.83	0.81
Shear AUC	13149 ± 1796	8181 ± 4050	4083 ± 4403	7286 ± 4110	0.14	0.24	0.44
Minimum Diameter	5.80 ± 0.22	5.26 ± 0.69	3.49 ± 1.36	5.32 ± 0.68	0.45	0.51	0.29
FMD/AUC	0.57 ± 0.16	-5.35 ± 7.24	0.12 ± 0.40	-1.11 ± 2.15	0.54	0.55	0.46

## RESULTS (CONT.)

**Figure 1A. Brachial %FMD**



**Figure 1B. Popliteal %FMD**



**Figure 1.** % flow mediated dilation following removal of exercise in older and younger subjects in the brachial (A) and popliteal (B) arteries.

## CONCLUSION

No significant results were found thus far. However, the preliminary nature and the small sample size (n=8) of this project may have influenced the lack of significant results in the study; thus, we aim to continue data collection for this project to increase the sample size.

## Acknowledgements

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