

Abstract

Previous studies demonstrated prolonged sitting impairs blood vessel function. However, these studies also demonstrated breaking up sitting time by exercise maintains endothelial function. No one has examined whether a continuous bout of exercise prior to sitting is as effective as breaks in sitting on maintaining endothelial function. **PURPOSE:** This study examines whether continuous versus intermittent bouts of exercise are more effective at maintaining vascular health while sitting. **METHODS:** 6 males and 1 female (age: 28±6, BMI: 22±5) participated in three randomized 3-hour sitting trials where popliteal endothelial function was measured via flow mediated dilation every hour. In the sedentary trial (SED), subjects sat for 3 continuous hours with their leg in a 90° bend. In the continuous exercise trial (CON), the subjects walked for 30-minutes at 2-mph on a treadmill before sitting for 3-hours. During the intermittent exercise trial (INT), subjects sat for 3 hours similar to the SED condition; however, every 30-minutes they walked at 2-mph for 5-minutes. Flow-mediated dilation (FMD) was performed at baseline (BL), 1-hr, 2-hr, and 3-hr in each trial. **RESULTS:** Percent change in FMD was elevated in the CON compared to SED or INT; however, no effect of time was shown. Further, baseline diameter during the 3-hr SED was significantly lower compared to SED-BL and 2-hr. Lastly, shear area under curve was unaltered across phases. (p>0.05). **CONCLUSIONS:** These results conclude that there is a change in %FMD between visits (p<0.05), but there is no significant change in time of measurement. This is an ongoing study and we are actively recruiting more individuals to increase the power of this study due to our low sample size.

Introduction

Previous studies demonstrated that 3 hours of sitting acutely impairs blood vessel health. Studies also demonstrated that breaks in sitting, via short bouts of walking, maintain vascular function and prevent acute impairment in blood vessel health. However, no studies have determined whether an exercise bout performed prior to sitting, will maintain endothelial function similar to breaks in sitting. Further, those studies assessed endothelial function in the lower leg while the foot was unsupported which is not applicable to real world scenarios.

Purpose: This study examined whether continuous versus intermittent bouts of exercise are more effective at maintaining vascular health while sitting.

Methods

Table 1. Subject Characteristics

	Age	BMI	Avg # of Steps
Subject characteristics	28 ± 6	22 ± 5	9,626 ± 3,387

Subjects sat in a chair with their leg at a 90 degree angle for a total of 3 hours for all three visits. While sitting, subjects were encouraged to refrain from moving.



Figure 1. Experimental set-up

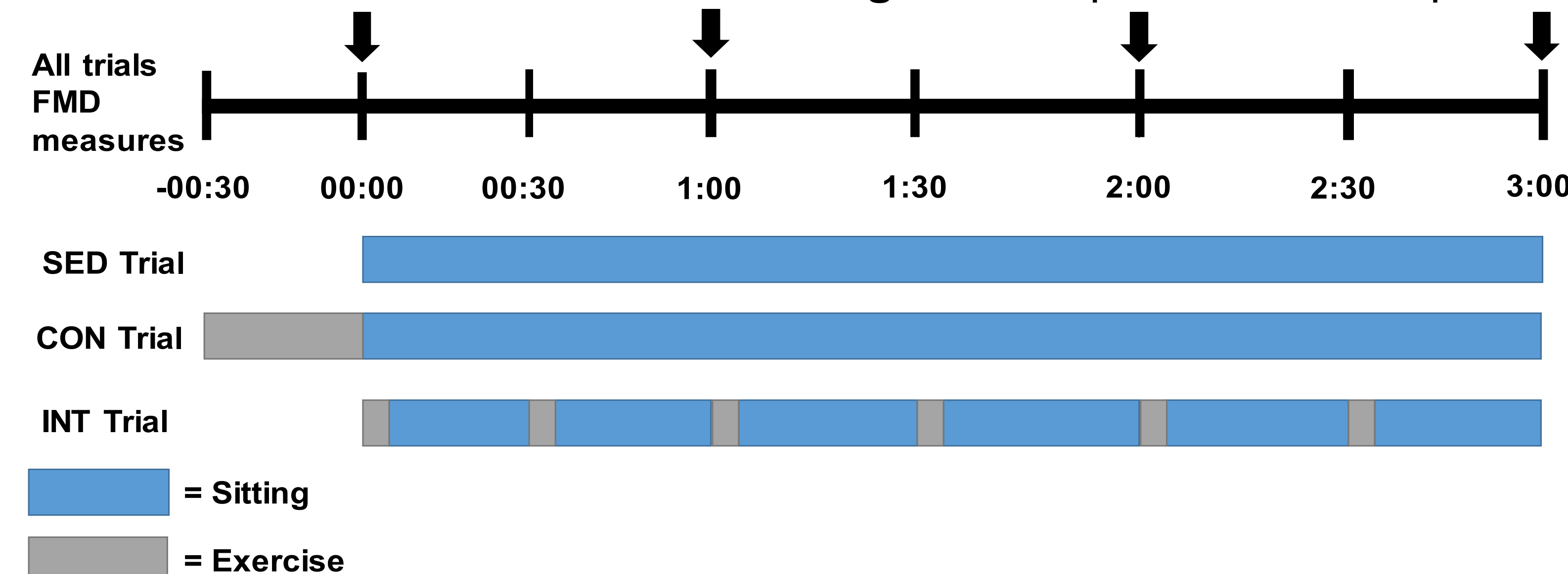


Figure 2. Experimental design of sedentary (SED), continuous (CON) and intermittent (INT) trials

Results

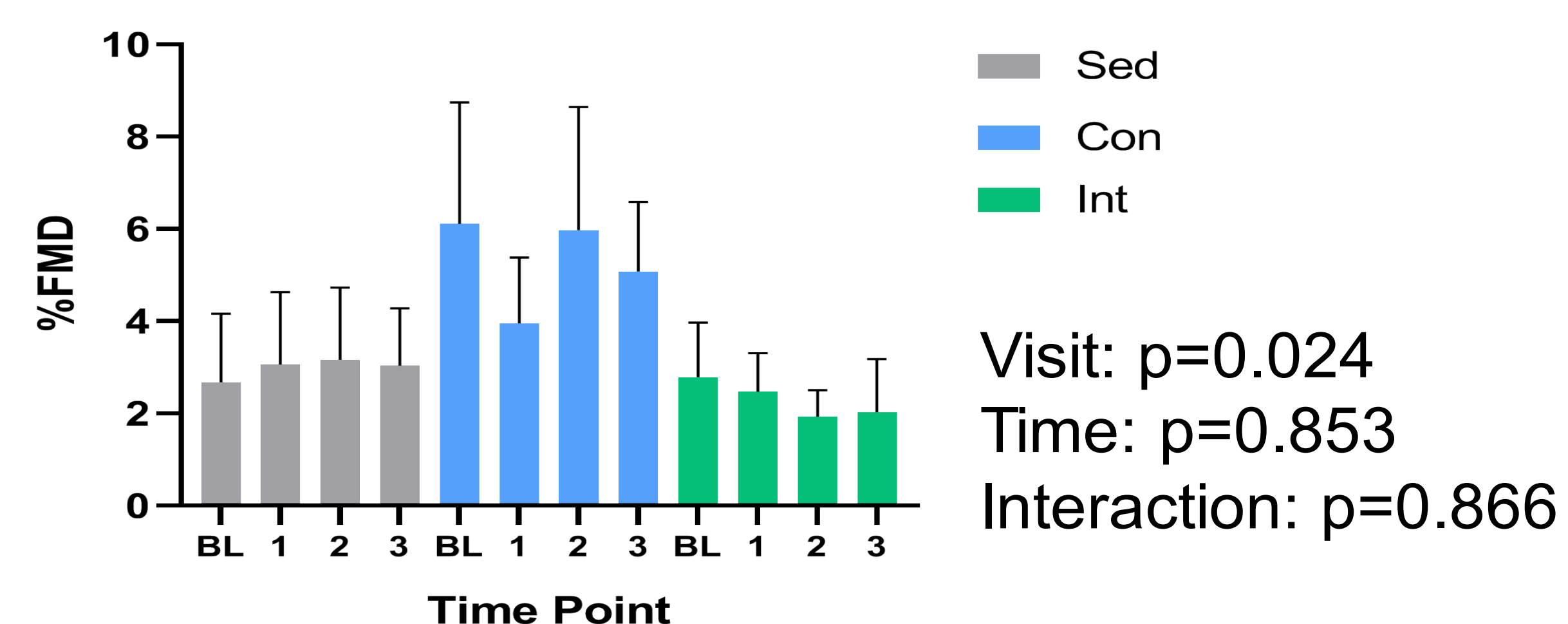


Figure 3. %FMD during the SED, CON and INT phases

Results

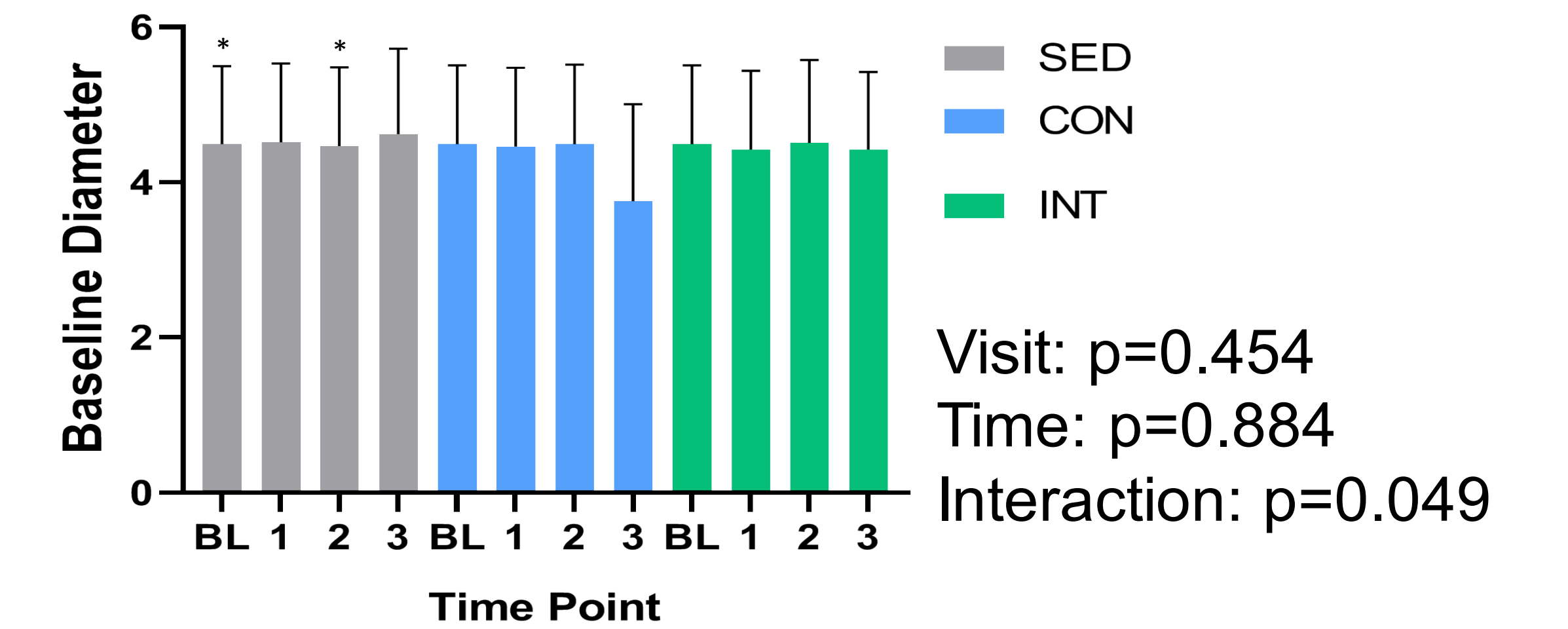


Figure 4. Baseline diameter during the SED, CON

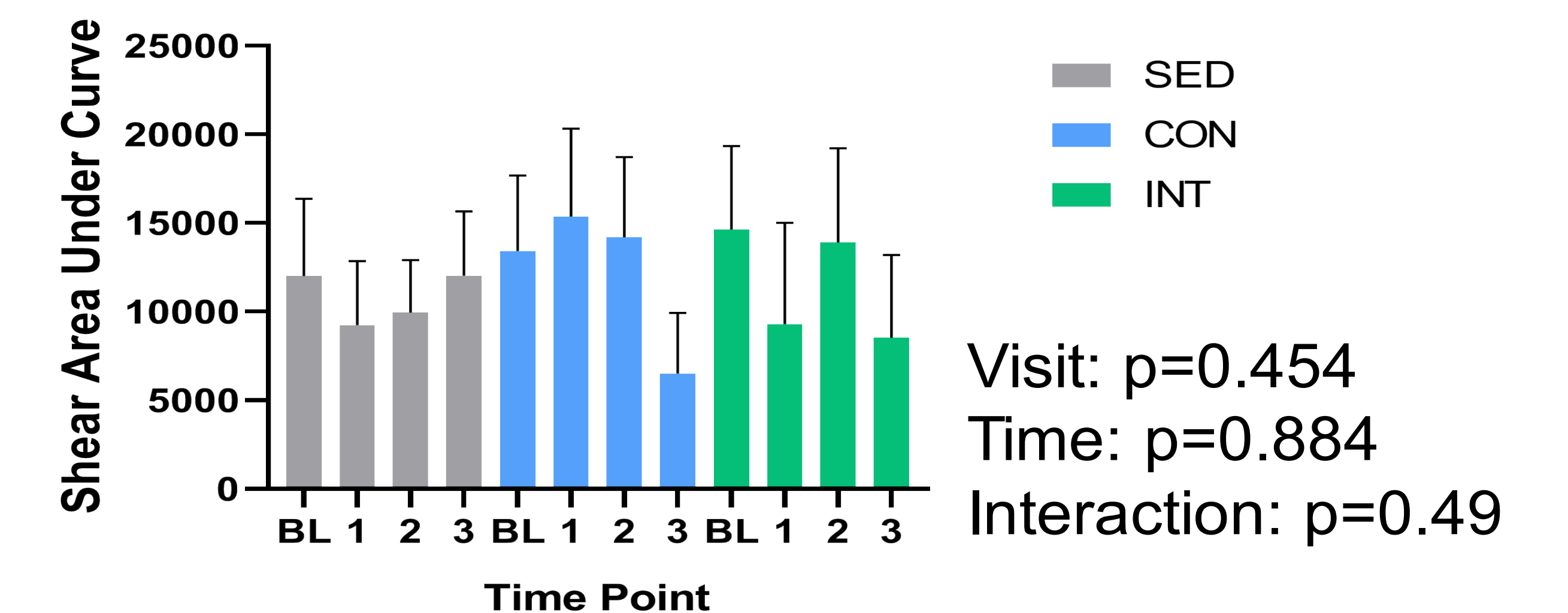


Figure 5. Shear Area Under Curve during the SED, CON and INT phases

Conclusions

These results conclude that there is a change in %FMD between visits (p<0.05), but there is no significant change in time of measurement. There is no significant difference between baseline diameter and visits. However, the SED 3-hr time point was different from SED BL and SED 2-hr diameter. There was no statistically significant relationship between the shear area under curve and visits or time between measurements.

Future Directions

Future studies will aim to recruit more subjects to increase the strength of this study as there is currently a low sample size.

Acknowledgements

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