

Evaluation of Methods to Assess Physiologic Tremor – A Pilot Study

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What is a tremor?

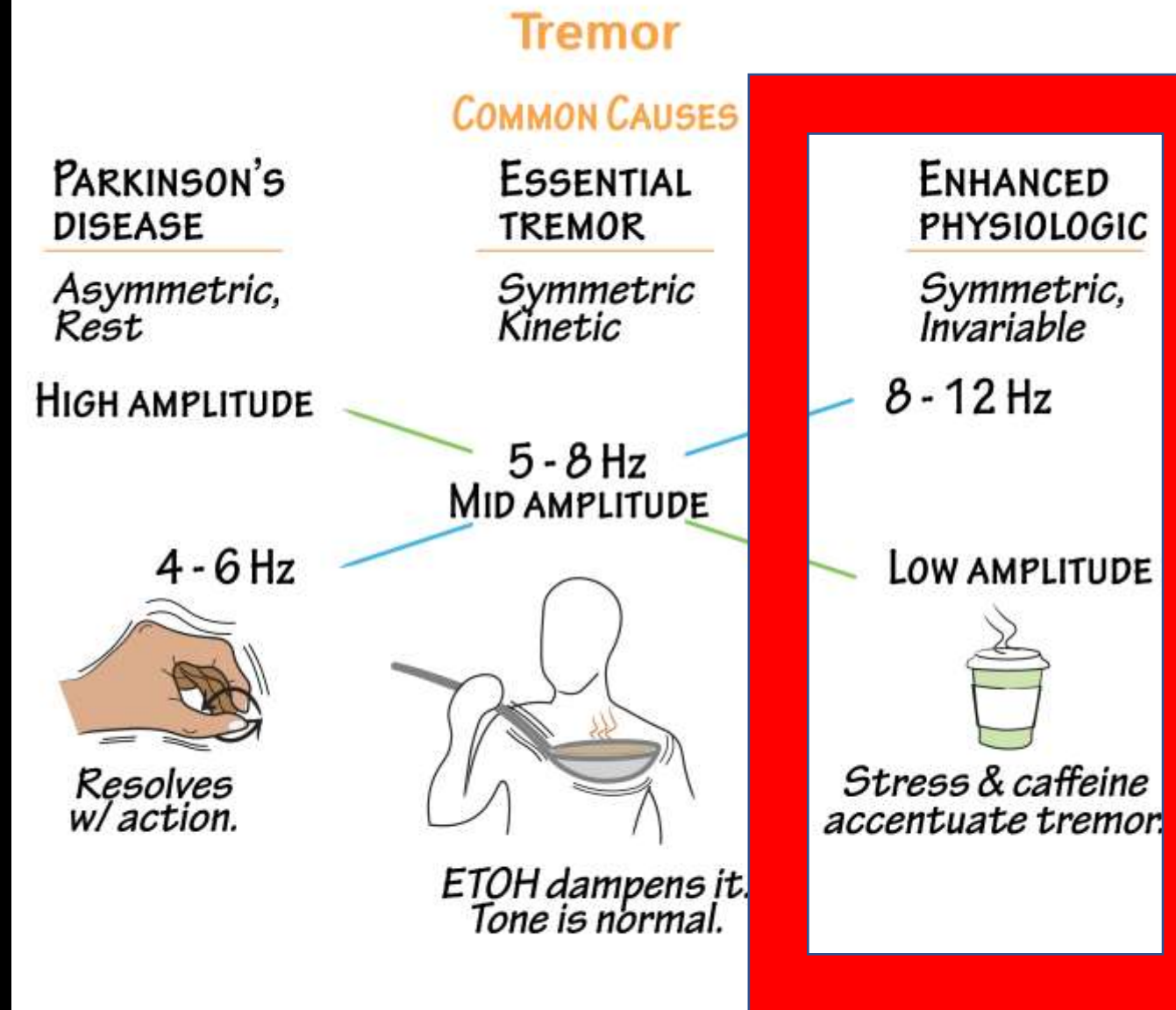
- Involuntary, rhythmic muscular contraction
- Extremely common
- Usually affect the hands

CATEGORIZATION OF TREMORS

REST TREMORS	ACTION TREMORS		
	POSTURAL	KINETIC	MISCELLANEOUS
<ul style="list-style-type: none">•Parkinsonian•ET variants•Midbrain lesions•Myorhythmia	<ul style="list-style-type: none">•Physiologic•Enhanced physiologic (stress, drugs, endocrine)•ET•Orthostatic•PD (reemergent)•Dystonic•Cerebellar•Neuropathic	<ul style="list-style-type: none">•Cerebellar lesions as in MS, stroke, wilson disease,•Midbrain•Task specific	<ul style="list-style-type: none">•Idiopathic•Psychogenic•Other involuntary movements like Myoclonus, Fasciculations, Asterixis, Clonus

Are physiologic tremors different?

- Occurs in all healthy individuals
 - > every person has a varying degree
- Not always visibly noticeable
- Usually increased with stress, anxiety, caffeine or fatigue



Why is a tremor important for periodontists?

- Interferes with fine motor tasks
- Decreases operative results
- Increases operative time

Wetzel, e tal. 2006

Subject A
First attempt

What Makes Tremors Worse? What can decrease stress?

Stress & Anxiety

Mindfulness



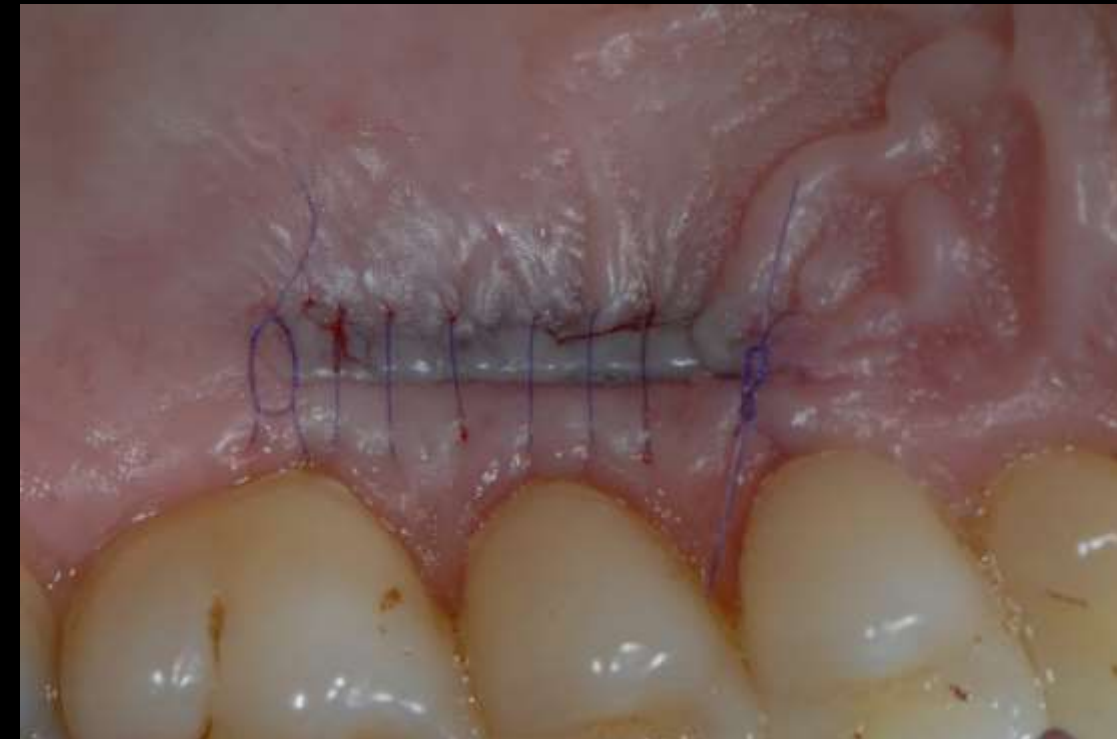
What is mindfulness?

- Present Moment Awareness
- Two main parts:
 - Attention
 - Acceptance



Why should we reduce tremor?

Tremor affects clinical outcomes



Types of Mindfulness Training

- **Mindfulness meditation**
- Spiritual meditation
- Focused meditation
- Movement meditation
- Mantra meditation
- Progressive Relaxation
- Visualization Meditation



How We Did Mindfulness Training



https://www.calm.auckland.ac.nz/files/sitting_meditation_u_vansa.mp3



Can mindfulness training effectively decrease physiologic tremor?

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graph TD; A[Can mindfulness training effectively decrease physiologic tremor?] --> B[6 residents completed tremor measurements before mindfulness training]; B --> C[Audio file listened to daily for 8 weeks]; C --> D[Tremor measurements repeated after mindfulness training];
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6 residents completed tremor measurements before mindfulness training

Audio file listened to daily for 8 weeks

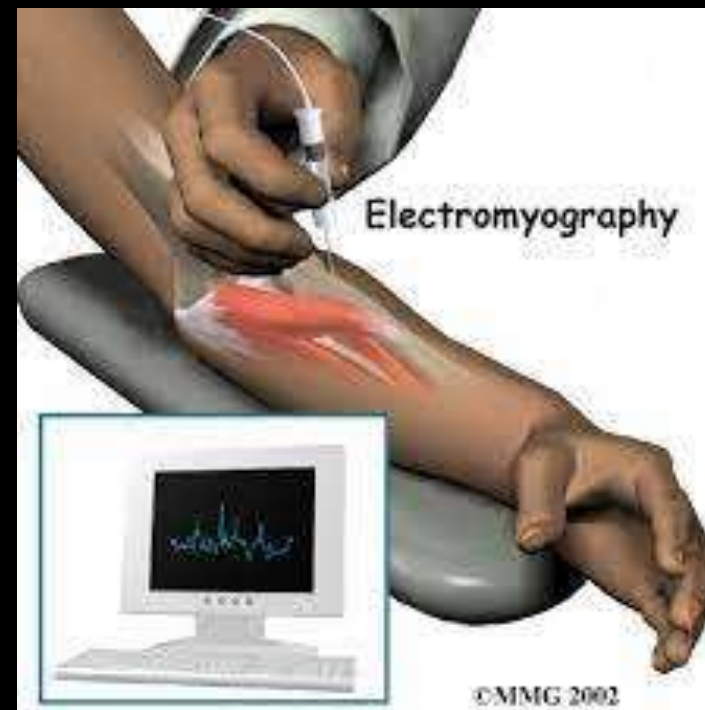
Tremor measurements repeated after mindfulness training

Most Common Methods to Measure Physiologic Tremor

Laser Interferometer
~\$15,000



Electromyography
~\$3,500



Periodontal Surgeries Can Be Done

With and Without Microscopes

Microscopes

- Enlarge Surgical Field
- Add Arm Supports
- Help to maintain better posture



Supporting the Wrist & Effect on Tremor

- During a microsurgical task, when the hand was stabilized by a wrist support, the tremor amplitude was smaller (Murbe et al., 2001).
- Supporting the wrists significantly decreases the amplitude of the tremor by a factor of 2.67 (Coulsonet al., 2010).

Can mindfulness training effectively decrease physiologic tremor?

MACROSCOPIC
Laser pointer technique

MACROSCOPIC
Pen tracing technique

MICROSCOPIC
Pen tracing technique

with Support

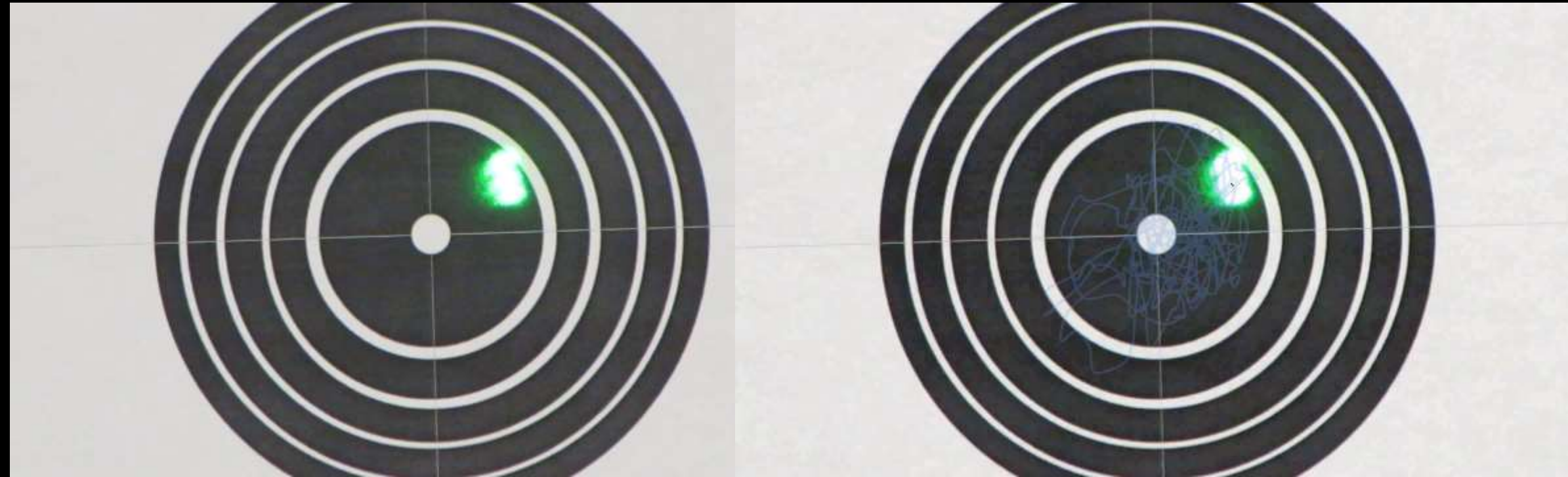
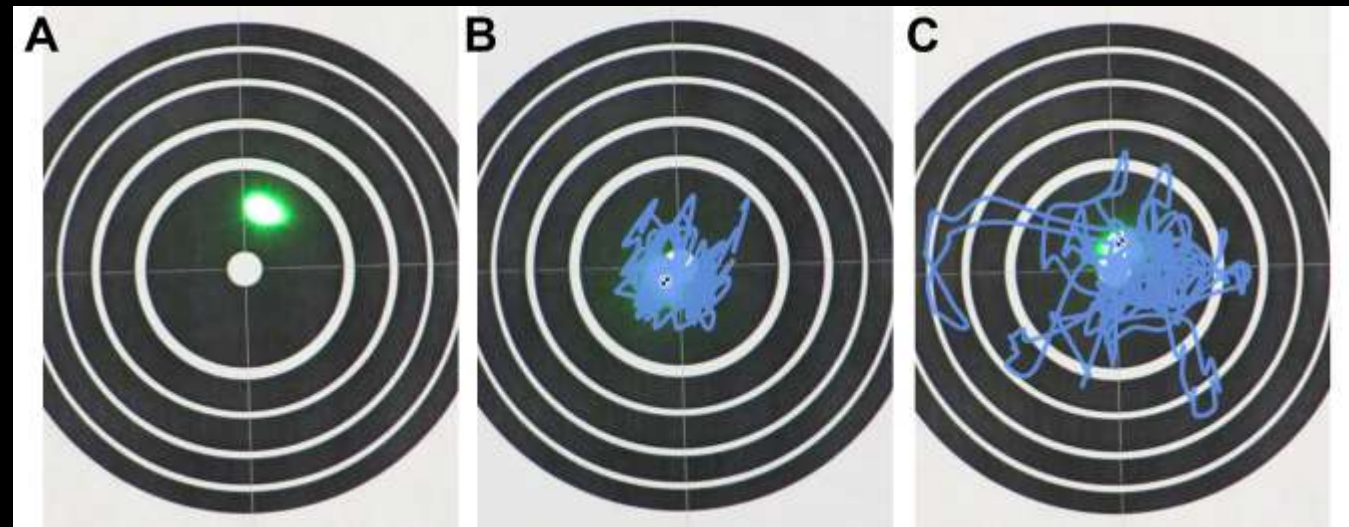
without
Support

with Support

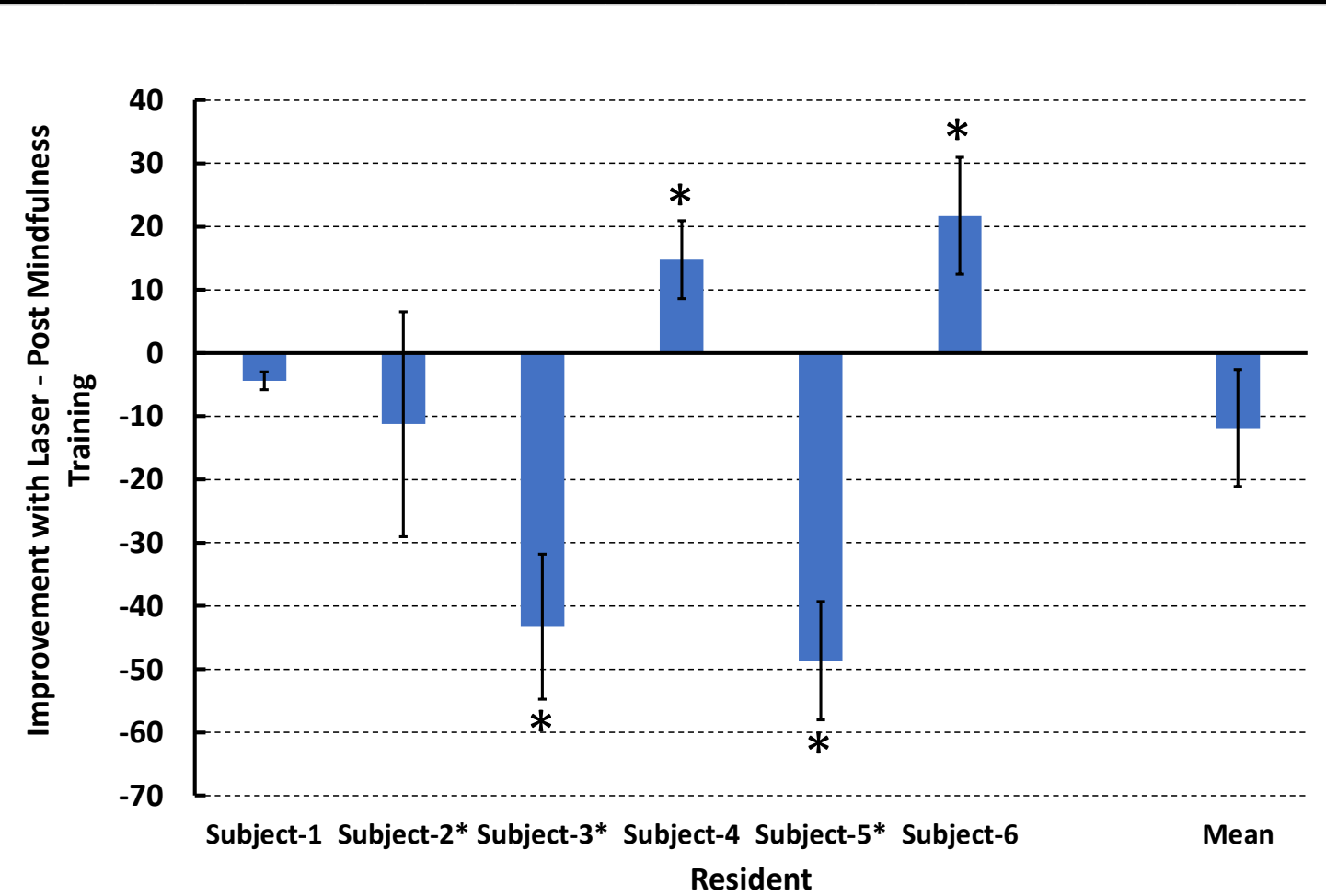
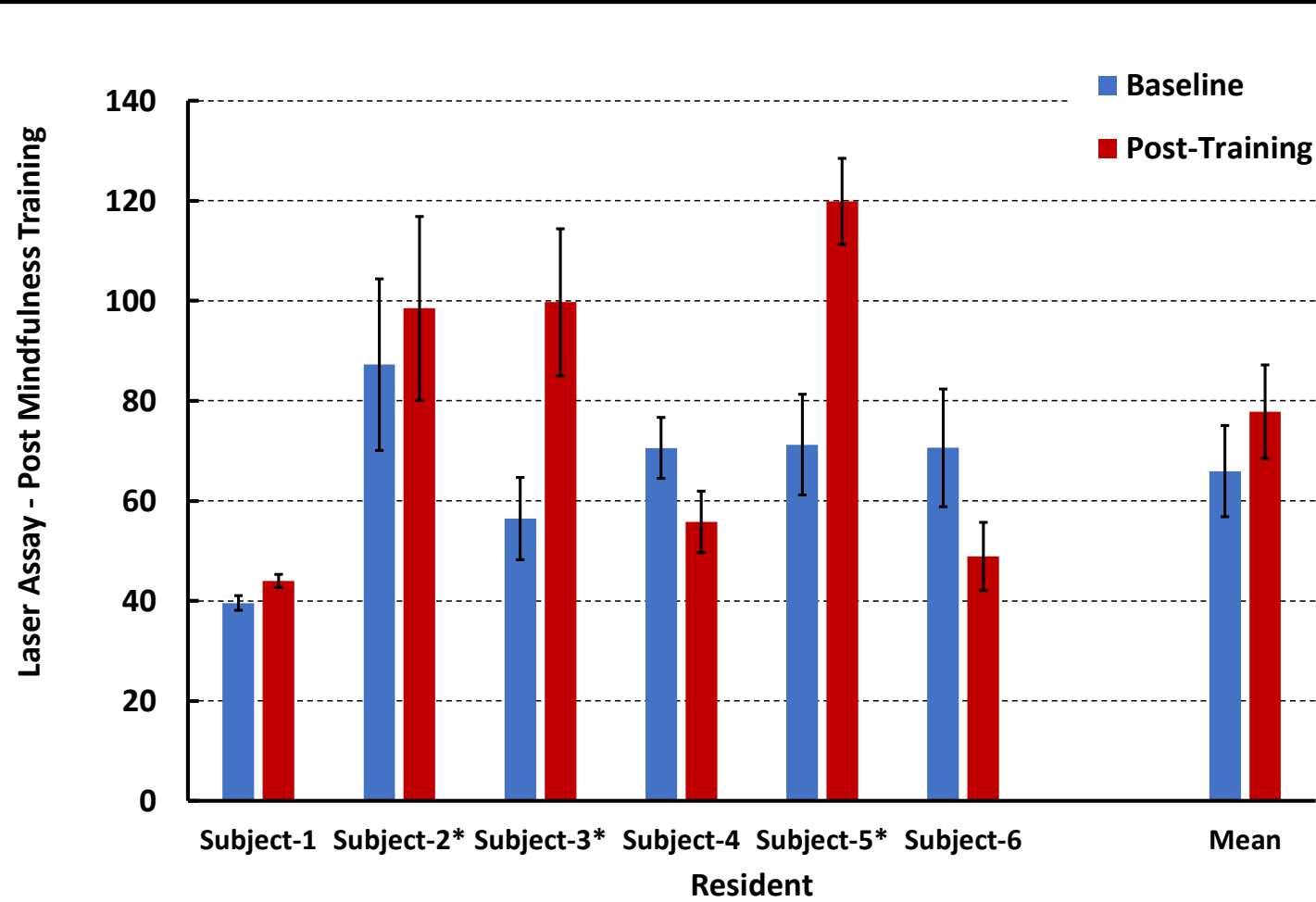
without
Support

Laser Technique

Physiologic tremor using a macroscopic technique



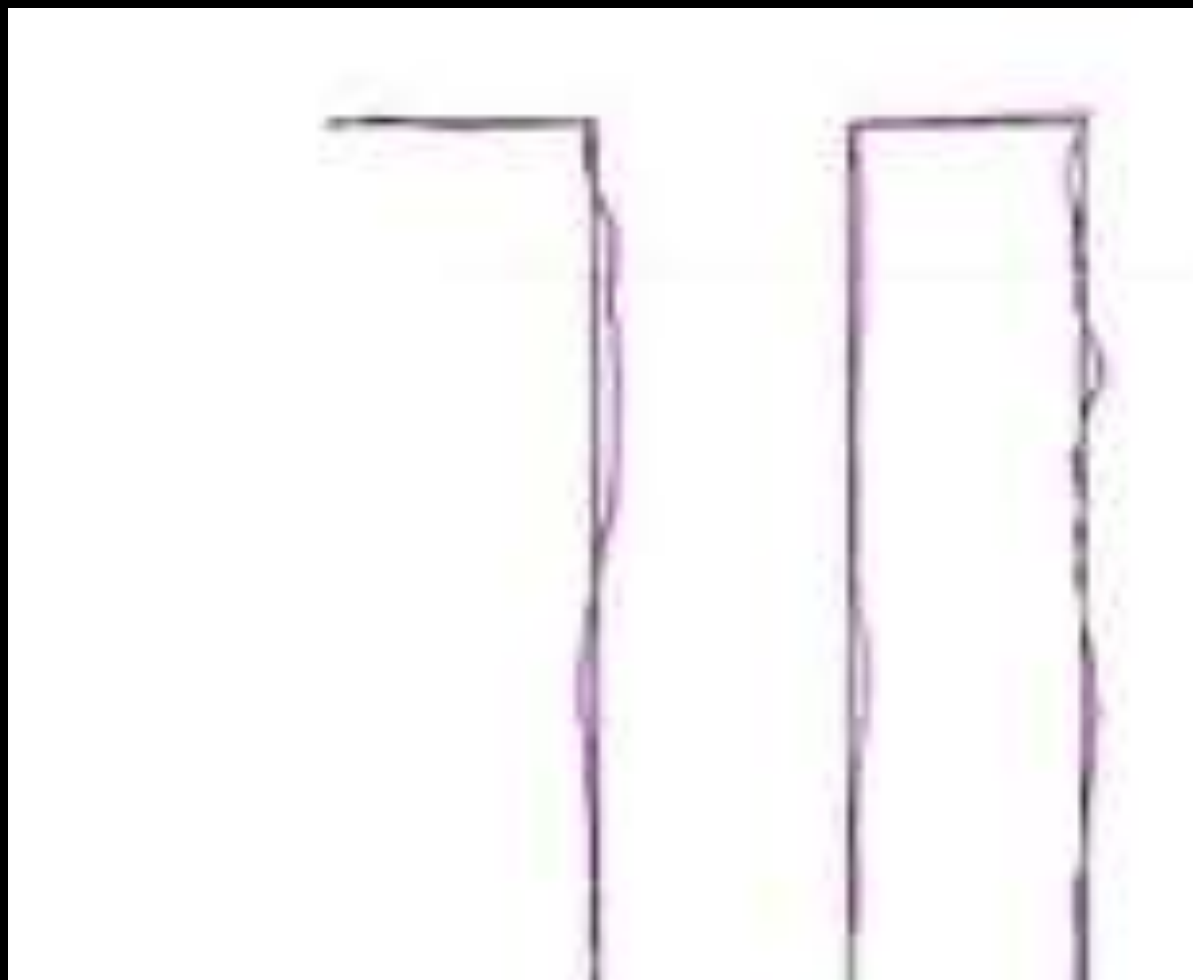
Laser Technique Pre and Post Mindfulness Training



Individual improvement with mindfulness training was highly variable

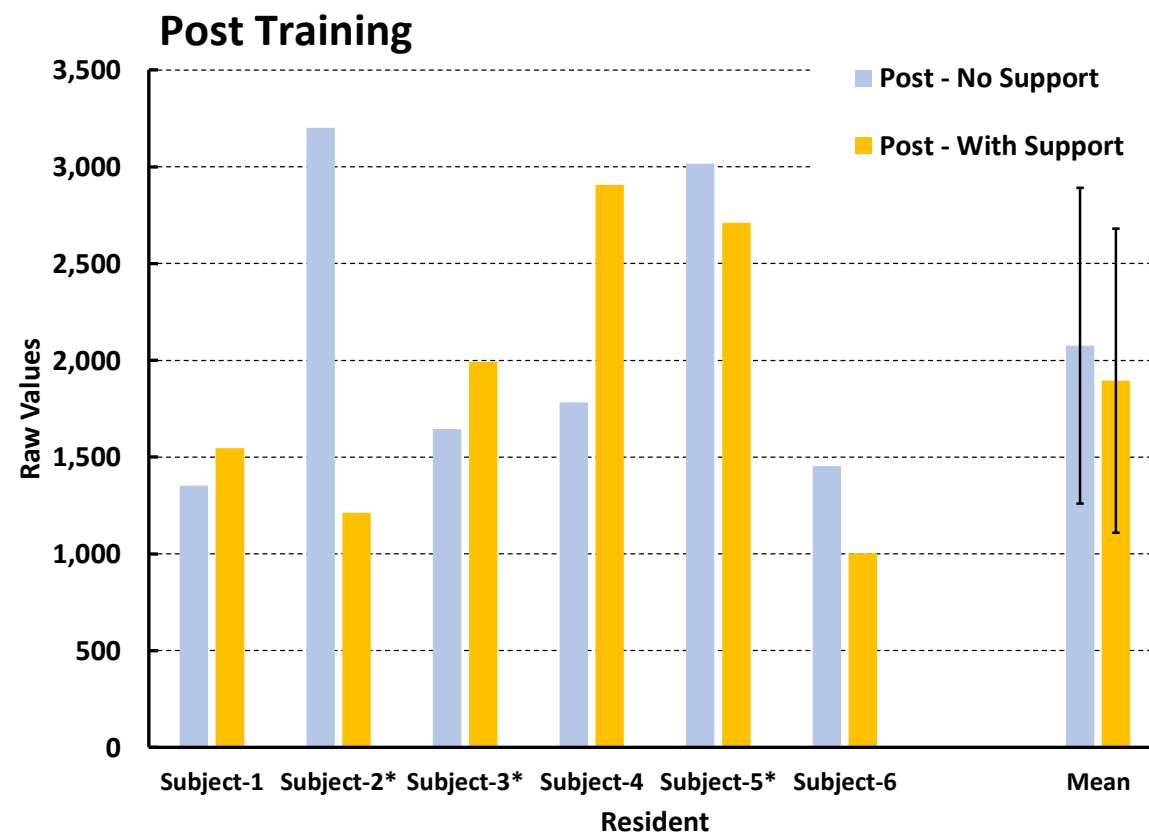
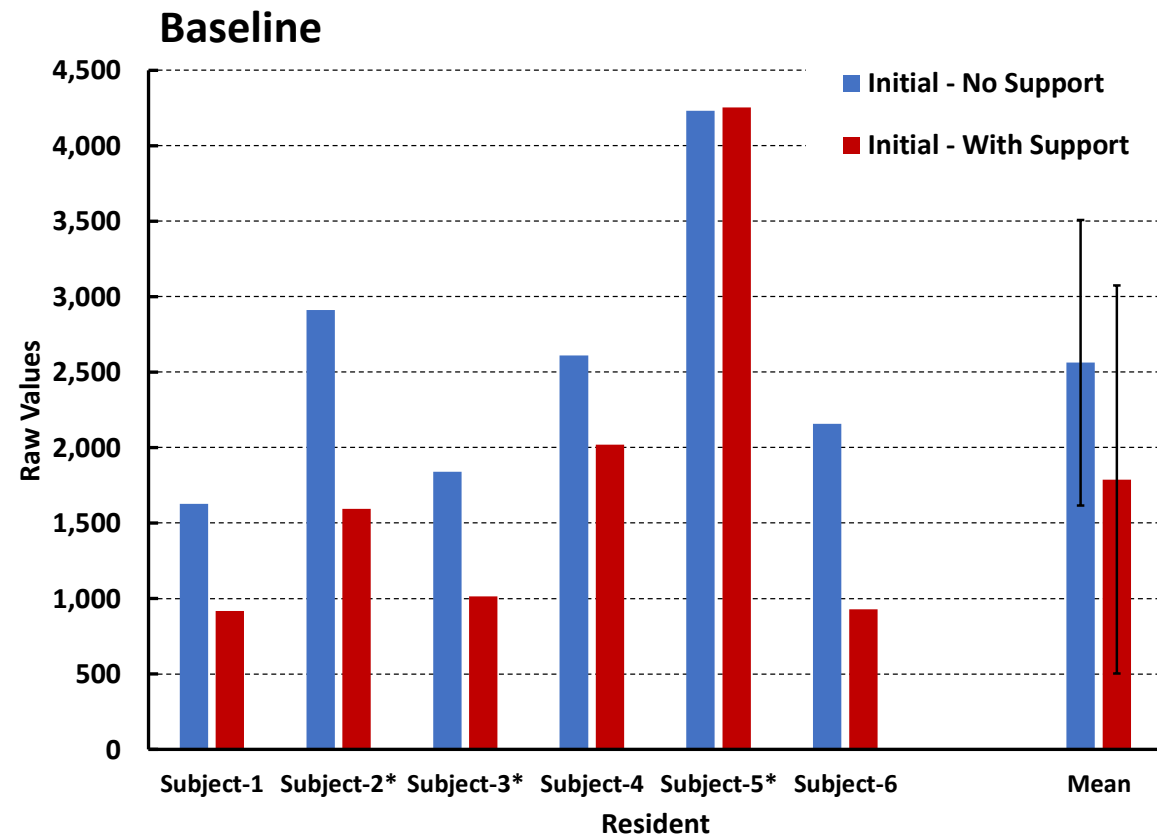
On average, residents displayed no significant improvement

Pen-Tracing Technique – Macroscopic



Performed
with and
without wrist
support

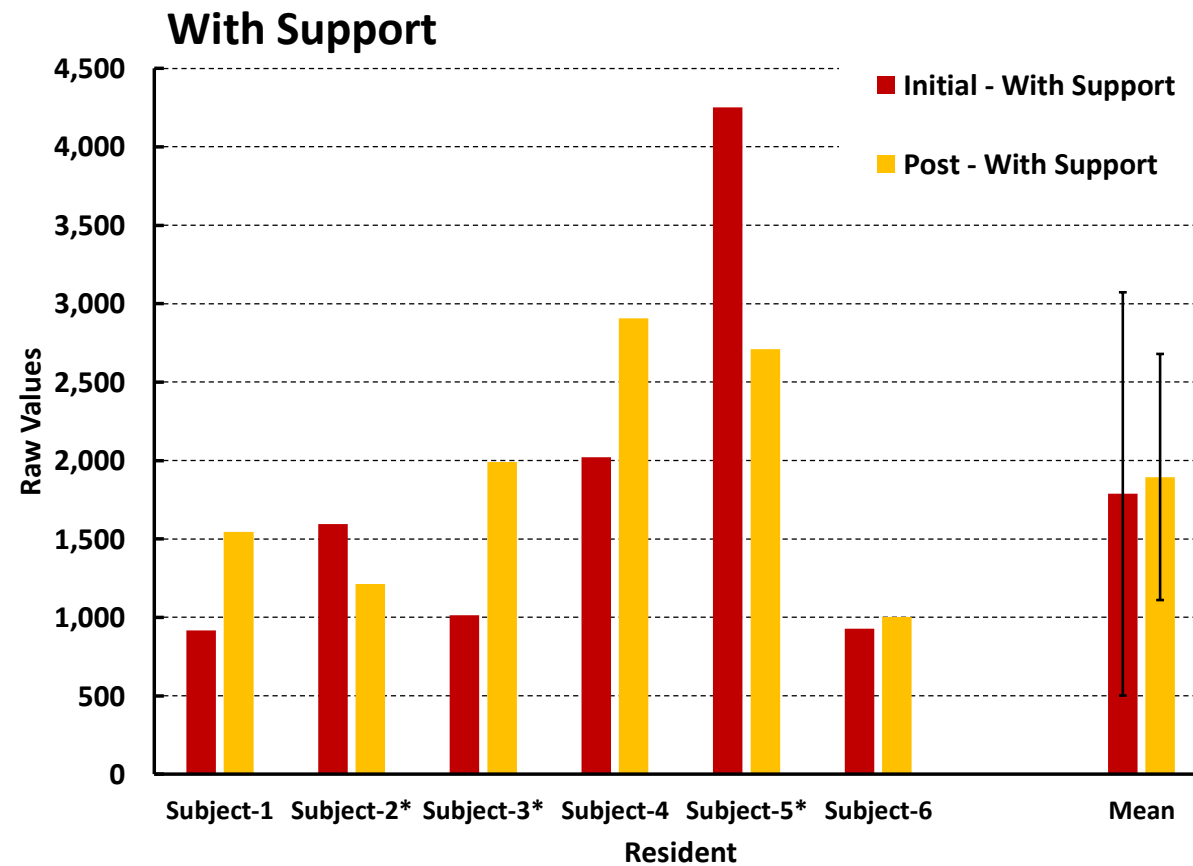
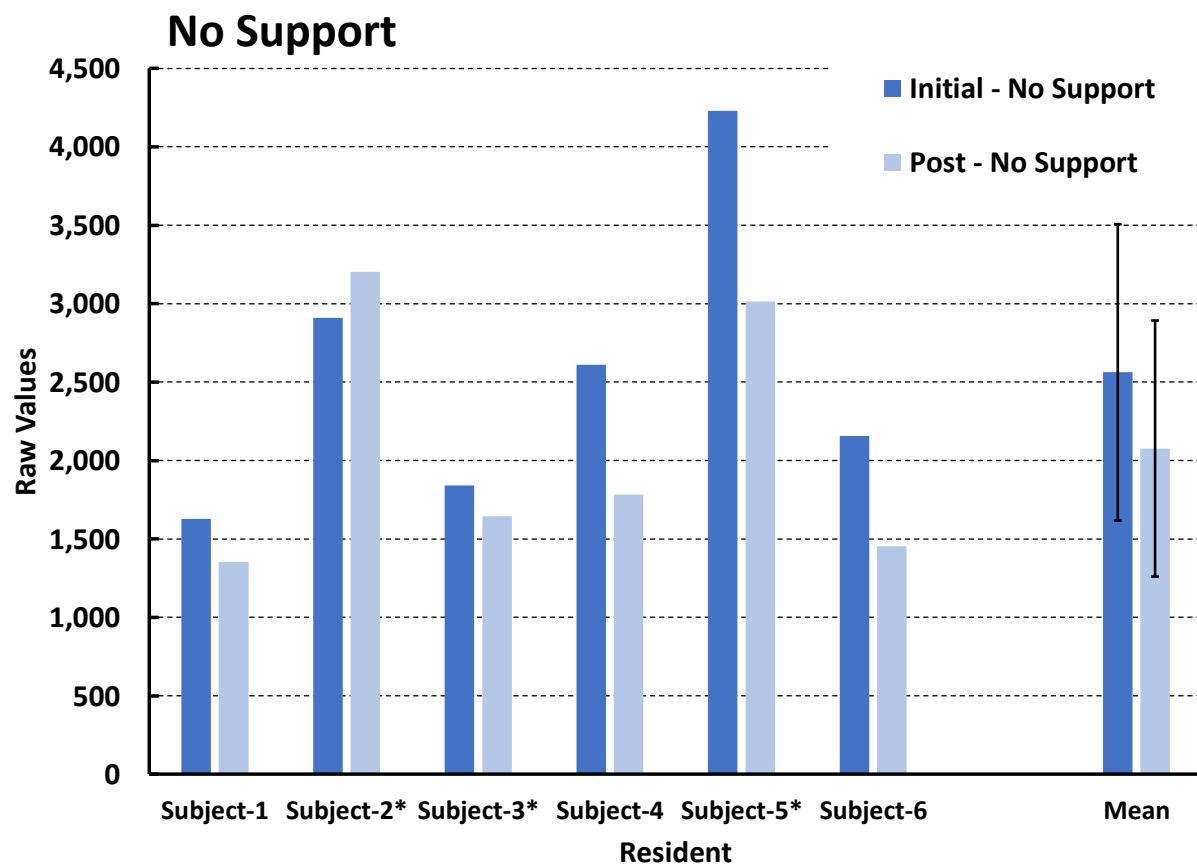
Macroscopic Pen Tracing – Effects of Support



At baseline, there was a trend for improvement with support but was not statistically significant

After mindfulness training, there was no difference with or without support.

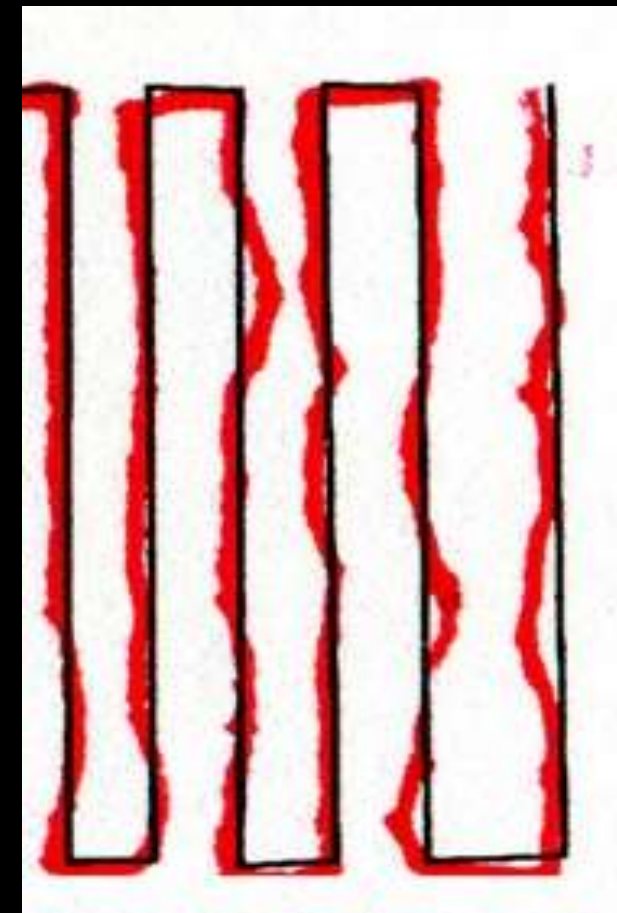
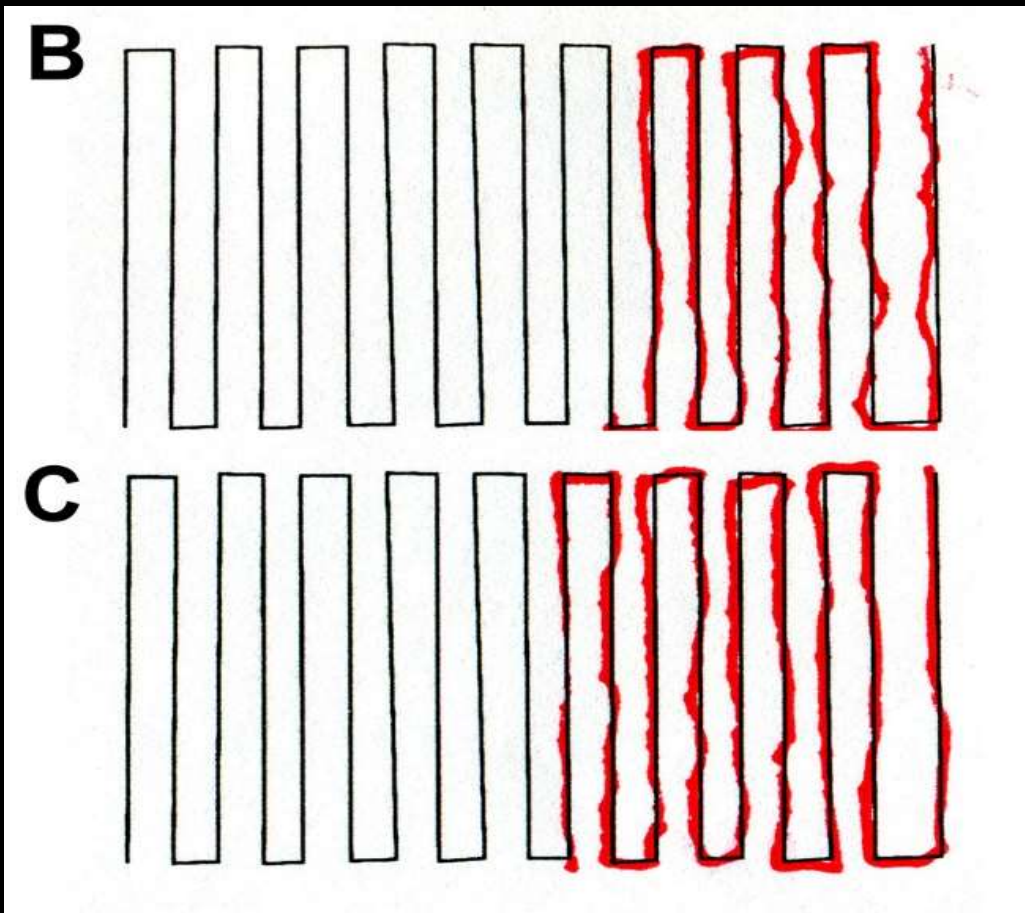
Macroscopic Pen Tracing - Effects of Mindfulness Training



Without support, there was a slight trend for a decrease in tremor post-mindfulness training but not statistically significant.

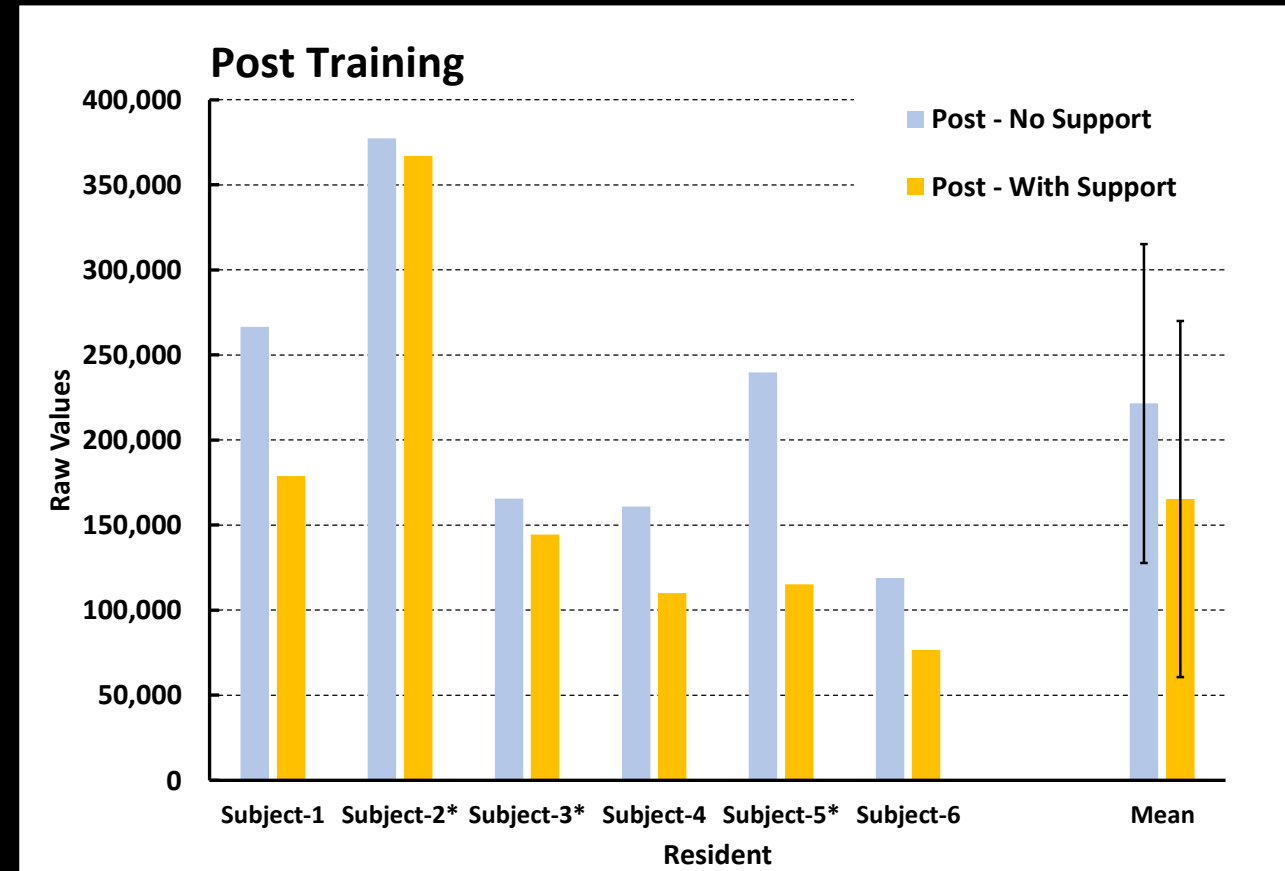
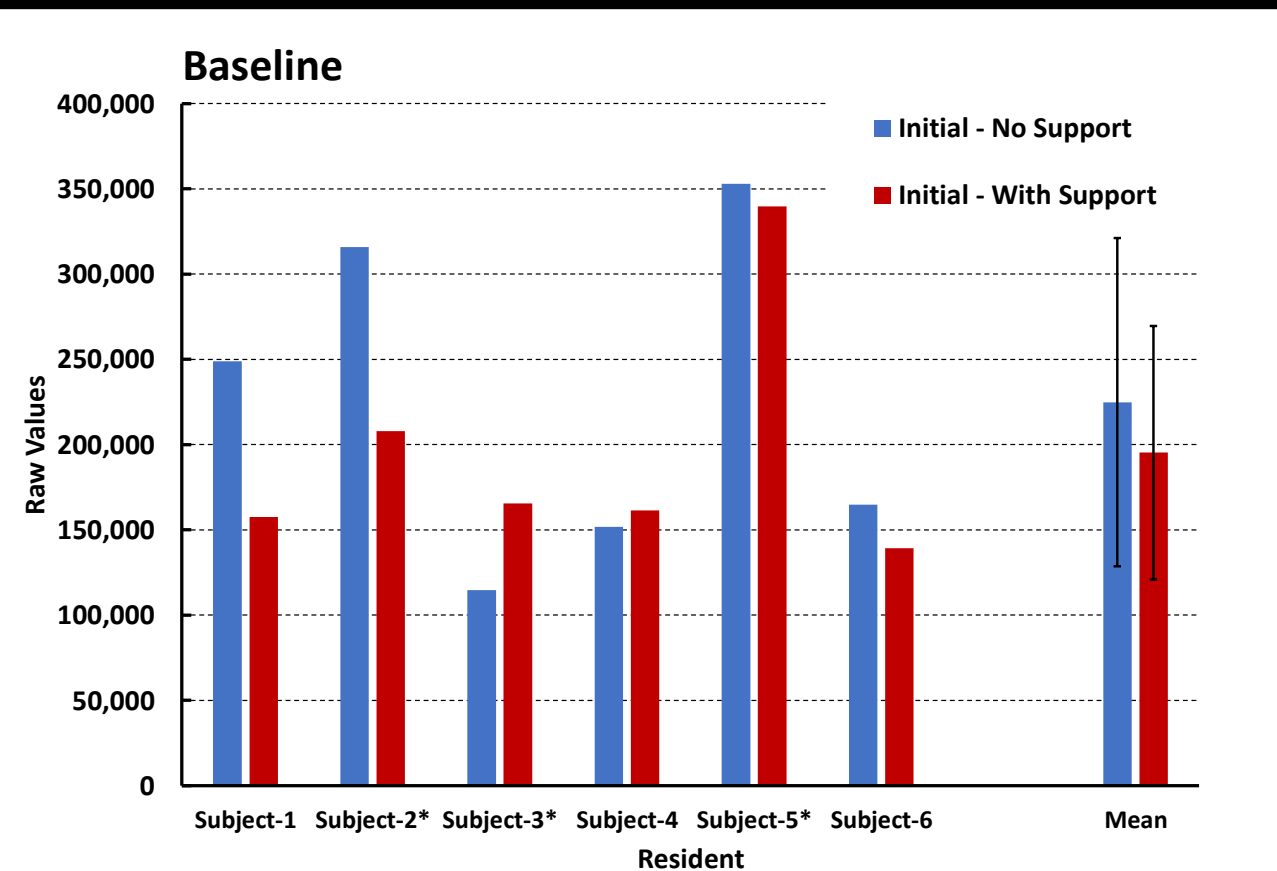
With support, there was no effect of mindfulness training.

Pen-Tracing Technique - Microscopic



Performed
with and
without wrist
support

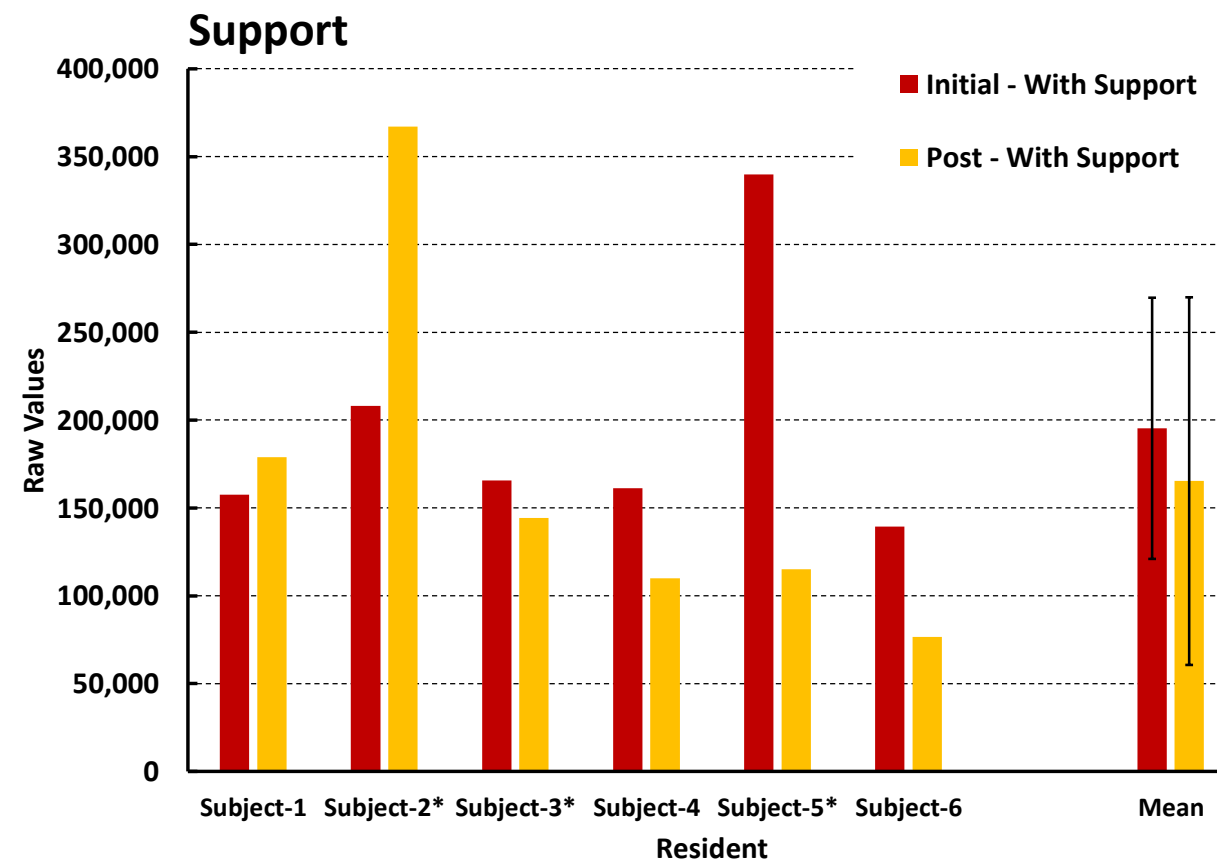
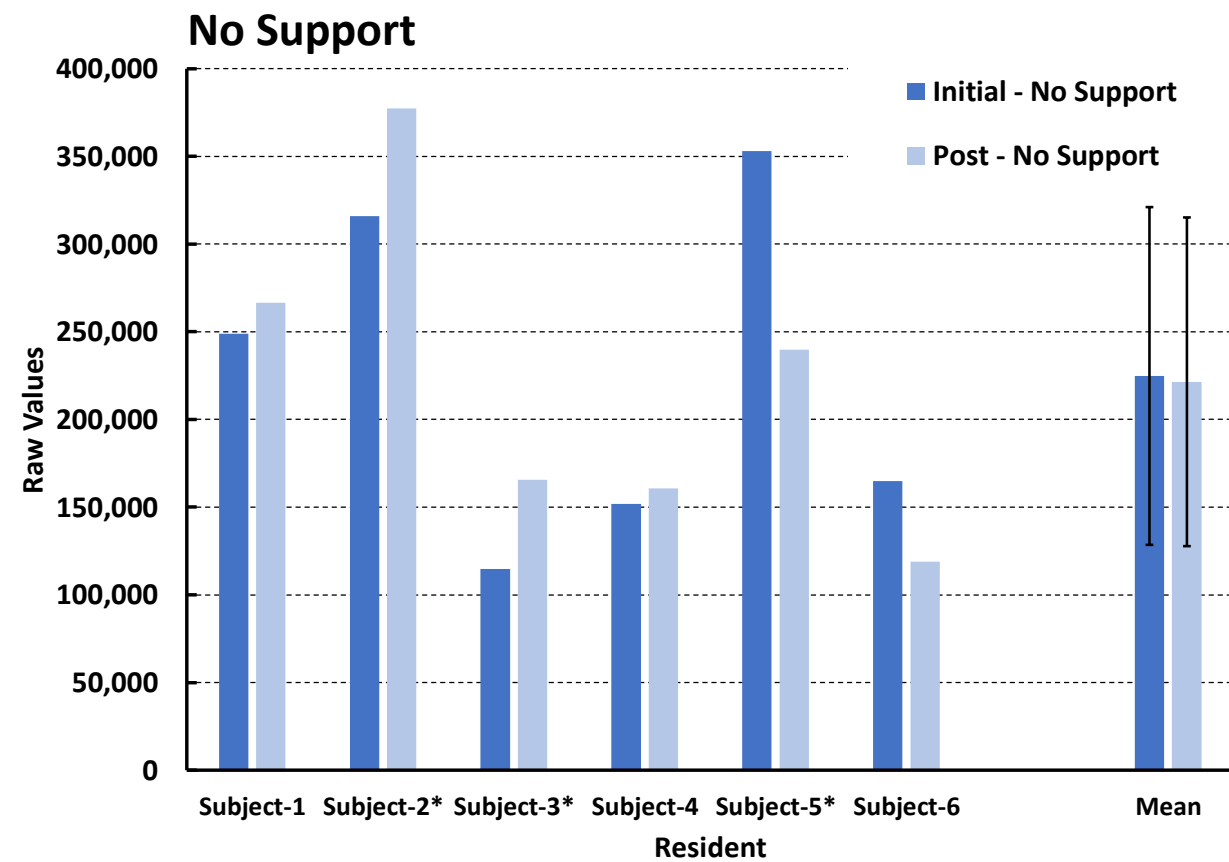
Microscopic Pen Tracing - Effects of Support



At baseline, there was no difference with or without support.

After mindfulness training, there was a trend for improvement with support but was not statistically significant

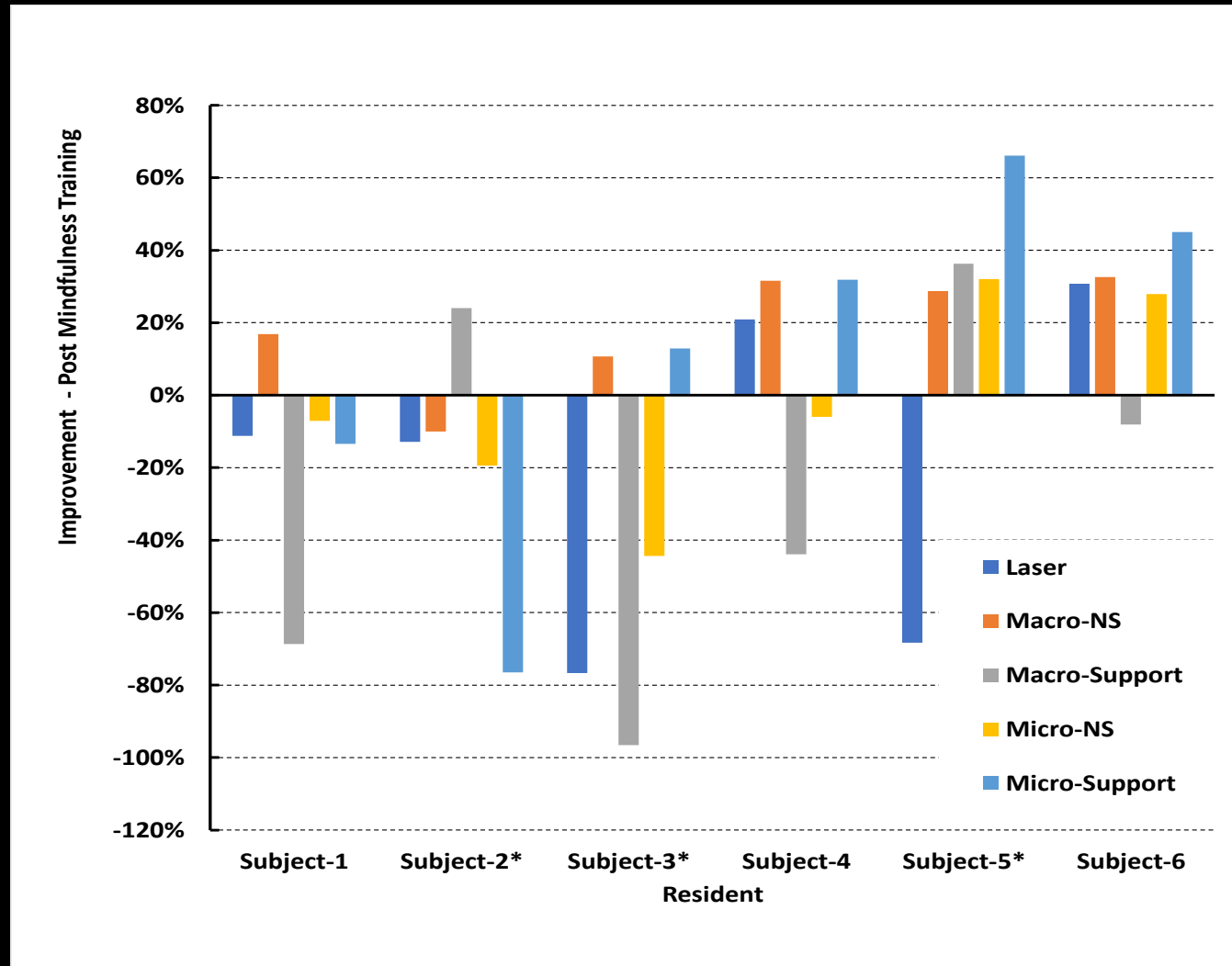
Microscopic Pen Tracing - Effects of Mindfulness Training



Without support, there was no effect after mindfulness training.

With support, there was no effect after mindfulness training.

Technique Correlation



Correlation	Laser	Macro-NS	Macro-Support	Micro-NS	Micro-Support
Laser	1.000	0.269	0.098	0.301	-0.091
Macro-NS	0.269	1.000	-0.035	0.653	0.919
Macro-Support	0.098	-0.035	1.000	0.665	0.015
Micro-NS	0.301	0.653	0.665	1.000	0.596
Micro-Support	-0.091	0.919	0.015	0.596	1.000

Key Findings

We are not convinced that the laser or pen technique are appropriate for measuring physiologic tremor.

Pen tracing allowed comparison between macroscopic and microscopic technique.

Laser measured both amplitude and frequency.
Pen tracing only showed amplitude.

Majority of participants displayed no significant improvement post-mindfulness training.

Complications Needed to be Addressed by Future Research

- Repeated measurements on individuals
- Control for other variables that could increase tremor:
gender, dominant hand, stress/fatigue, experience using a microscope, mental/physical fatigue/stress
- Larger sample size

Thank you!

Dr. Lallier

Dr. Maney

All my co-residents 😊

The Department of Periodontics



References

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