

Benefits of Posture Training using Biofeedback

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Purpose

- ▶ To present the background and development of the Upright™ posture trainer
- ▶ To discuss the usage of the Upright™ posture trainer in different training programs, populations, and settings
- ▶ To present research using the Upright™ posture trainer in healthy populations
- ▶ To discuss how to overcome the challenges the Upright™ posture trainer presents

Importance of Posture

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Development of the Upright™



Training Programs

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Upright Training Programs

AGE	TP	TP
<18	2	4
18-35	1	3
35-50	2	4
50-65	3	5
65+	5	6
BMI 1 = normal = 18.5 < w < 24.9 BMI 2 = w < 18.5 & w > 24.9	BMI 1*	BMI 2**

Difficult	Easy		Medium	
	TP #1	TP #2	TP #3	TP #4
Session	Length (min)	Length (min)	Length (min)	Length (min)
1	5	5	5	5
2	10	10	5	5
3	10	10	10	10
4	15	15	10	10
5	15	15	15	15
6	25	20	20	15
7	25	20	25	20
8	35	25	30	20
9	35	25	30	20
10	45	30	35	25
11	45	35	35	25
12	55	35	40	30
13	55	40	40	30
14	60	45	45	35
15	60	55	45	35
16		55	50	40
17		60	50	40
18		60	55	45
19			55	45
20			60	45
21			60	55
22				55
23				60

Self-Esteem Study

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the slide, creating a modern, layered effect. The text 'Self-Esteem Study' is positioned on the left side of the slide in a clean, sans-serif font.

Research



Hypotheses

Spine Angles

- There will be a significant increase in the kyphosis index in the experimental group but not in the control group.
- There will be a significant decrease in kyphosis angle in the experimental group but not in the control group.
- There will be a decrease in the deviation from baseline of zero on the thoracic spine angles during seated computer use in the experimental group but not in the control group.

Self-Esteem

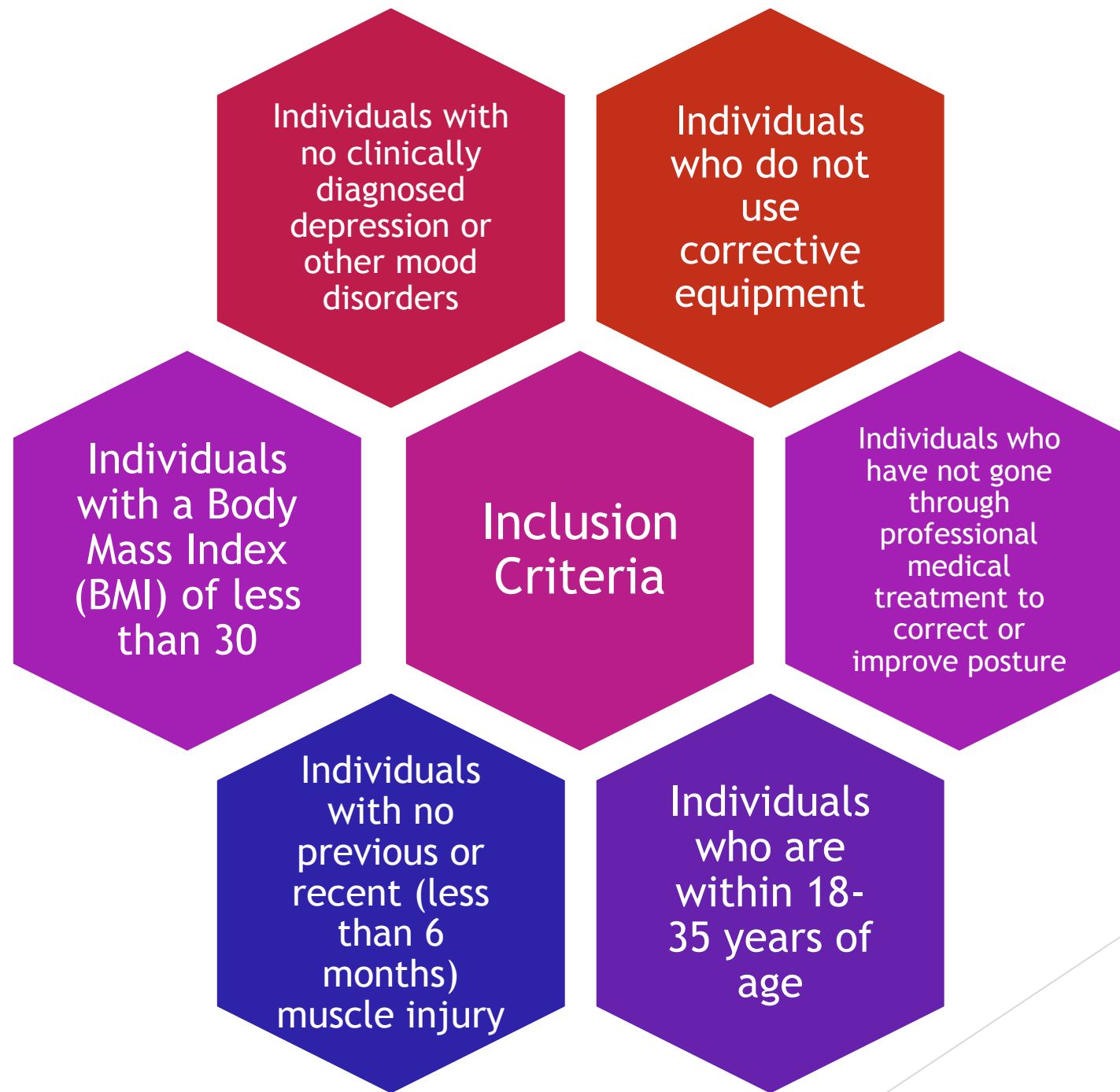
- There will be an increase in self-esteem and confidence in the experimental group but not in the control group.

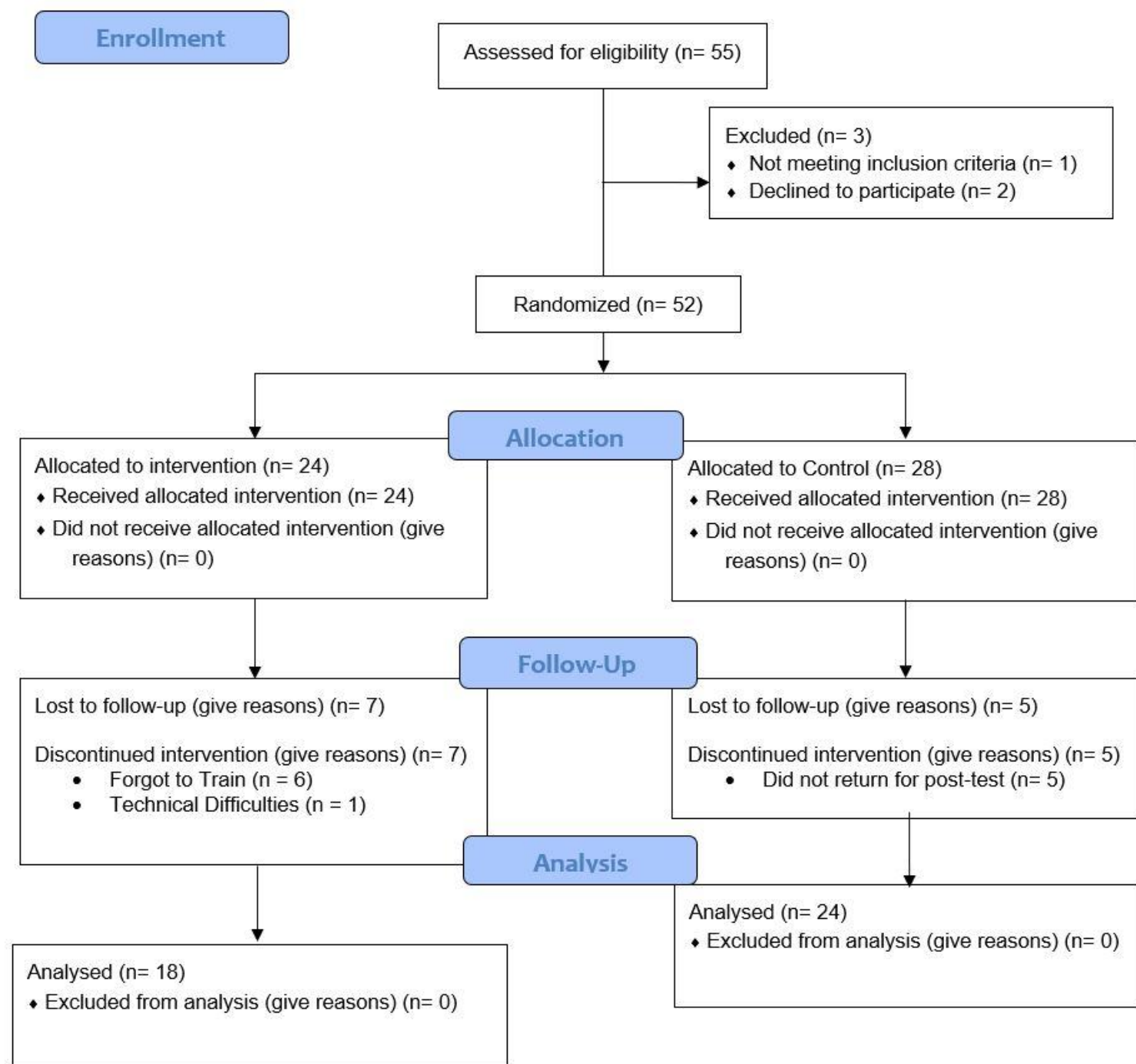
Muscle Fitness

- There will be a significant increase in muscular endurance in the lower back paraspinals from pre- to post-intervention in the experimental group but not the control group.
- There will be a significant decrease in muscular fatigue in the lower back paraspinals from pre- to post-intervention in the experimental group but not the control group.

Participants

- ▶ 52 healthy young adults
- ▶ Texas Tech University





Purpose of the Research

- ▶ The purpose of this study is to analyze the effect of The Upright training device on
 - ▶ (a) standing posture;
 - ▶ (b) seated posture while typing on a computer;
 - ▶ (c) self-esteem and confidence;
 - ▶ (d) muscle force; and
 - ▶ (e) muscle fatigue.

Significance of the research

- ▶ Technology is an increasing occurrence in day to day life and people are more at risk to develop neck and back pain at a younger age
- ▶ Posture improvements while using technology may help prevent these problems and improve daily comfort.
- ▶ Additionally, people who make the effort to improve their posture and become more confident and increase self-awareness may improve their overall well-being.

Delimitations

- ▶ Conclusions of the study are generalized to individuals who have not been diagnosed or treated for postural impairments.
- ▶ Conclusions of the study are generalized self-reported individuals with self-reported diagnosed depression or other mood disorders.
- ▶ Conclusions of the study are only generalized to young adults (ages 18-35).

Procedures

- ▶ Participants completed pre-testing on days one and two
 - ▶ Day one consisted of the consent form, medical questionnaire, participant identification form, 2 self-esteem surveys, and familiarization testing
 - ▶ On this day, they were randomly assigned to the experimental group or the control group
 - ▶ Day two consisted of the spinal angle measurements (flexicurve and bubble inclinometer) and the modified Biering-Sorenson test.

Measurements

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Flexicurve Ruler

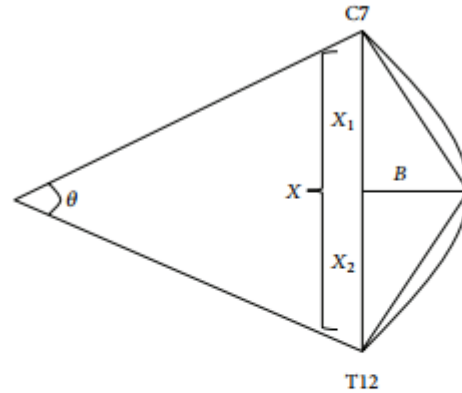


FIGURE 2: The flexicurve kyphosis index and angle are computed using measurements taken from the flexicurve tracing, represented here by the curve from C7 to T12. To calculate the flexicurve kyphosis index, the apex kyphosis height (B) is divided by the length of the entire thoracic curve (X) and then multiplied by 100 ($B/X \times 100$). The flexicurve angle or theta (θ) is calculated using lines drawn perpendicular to the short sides of the triangle inscribed by the thoracic curve. Theta equals $\text{arc tan}(B/X_1) + \text{arc tan}(B/X_2)$ [23].

Barrett, E., McCreesh, K., & Lewis, J. (2013). Intrarater and interrater reliability of the flexicurve index, flexicurve angle, and manual inclinometer for the measurement of thoracic kyphosis. *Rehabilitation Research And Practice*, 2013475870. doi:10.1155/2013/475870

Bubble Inclinator

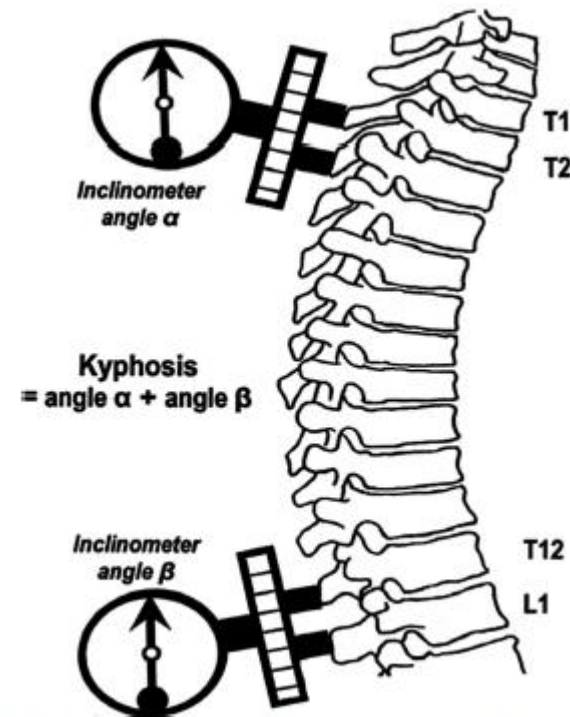


Fig. (2). Angle for measuring thoracic and lumbar spine angles.

Van Blommestein, A. S., MacCrae, S., Lewis, J. S., & Morrissey, M. C. (2012). Reliability of measuring thoracic kyphosis angle, lumbar lordosis angle and straight leg raise with an inclinometer. *Open Spine Journal*.

Modified Biering-Sorenson Test

<https://youtu.be/dRXR1h-KQog>

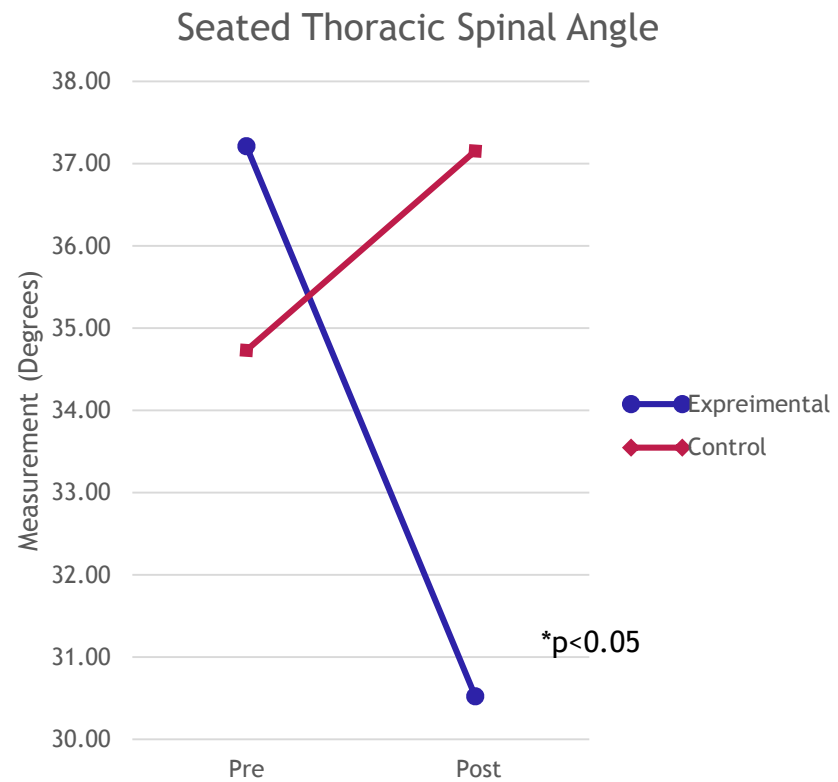
MicroFET-2



Results

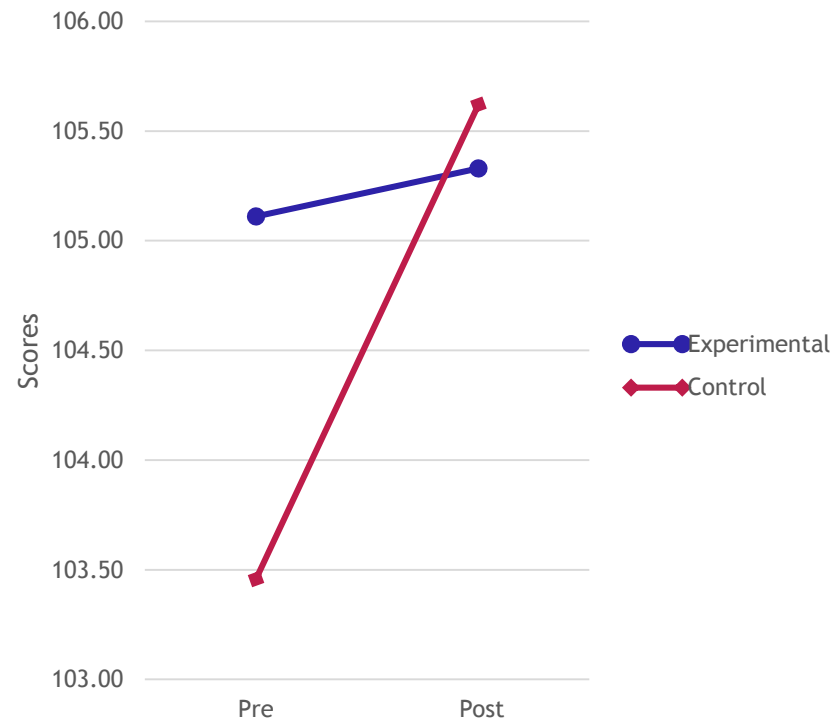
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Posture Variables

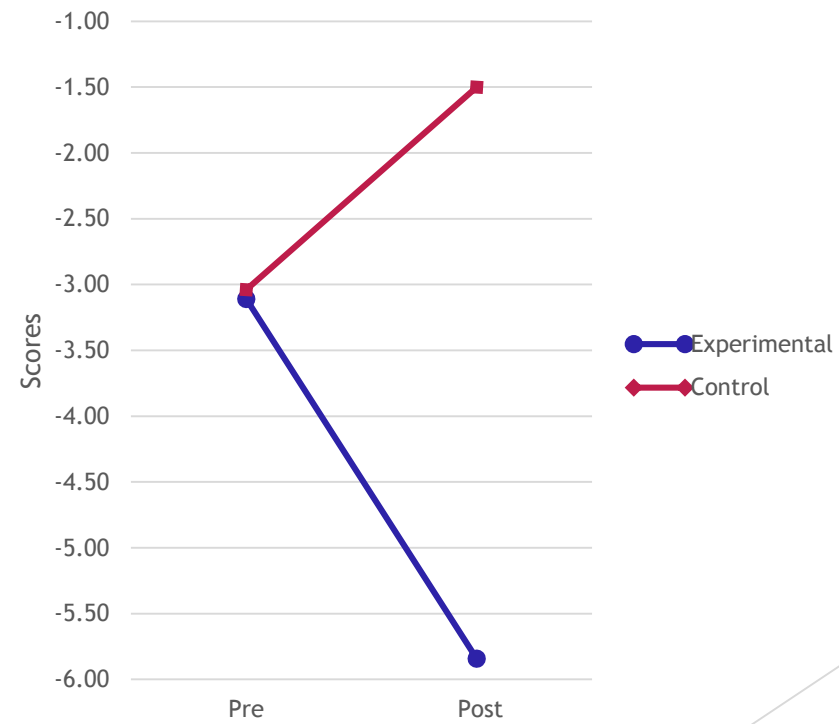


Self-Esteem

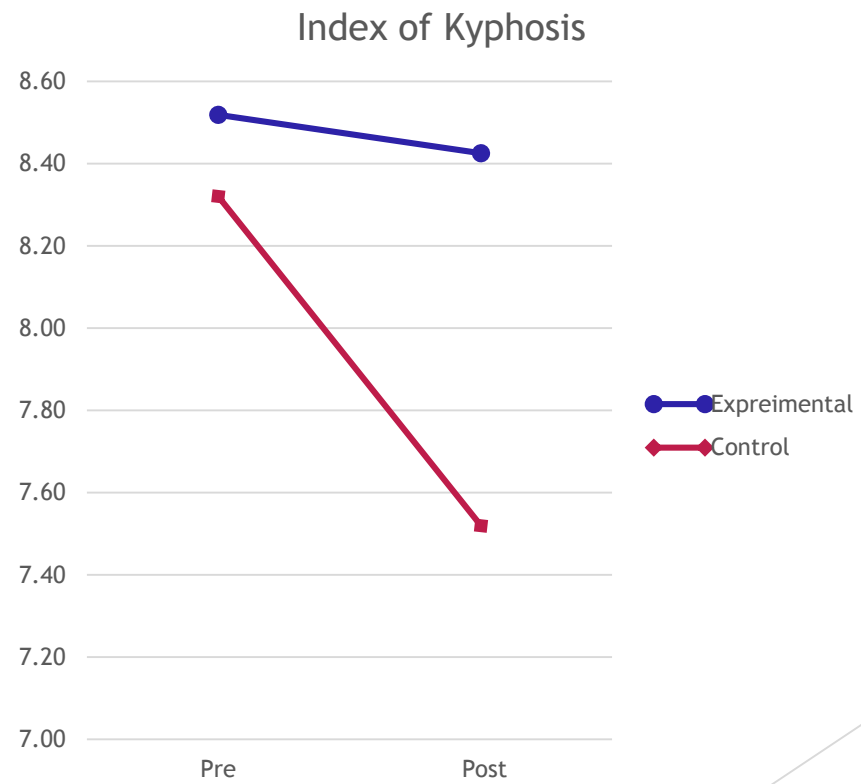
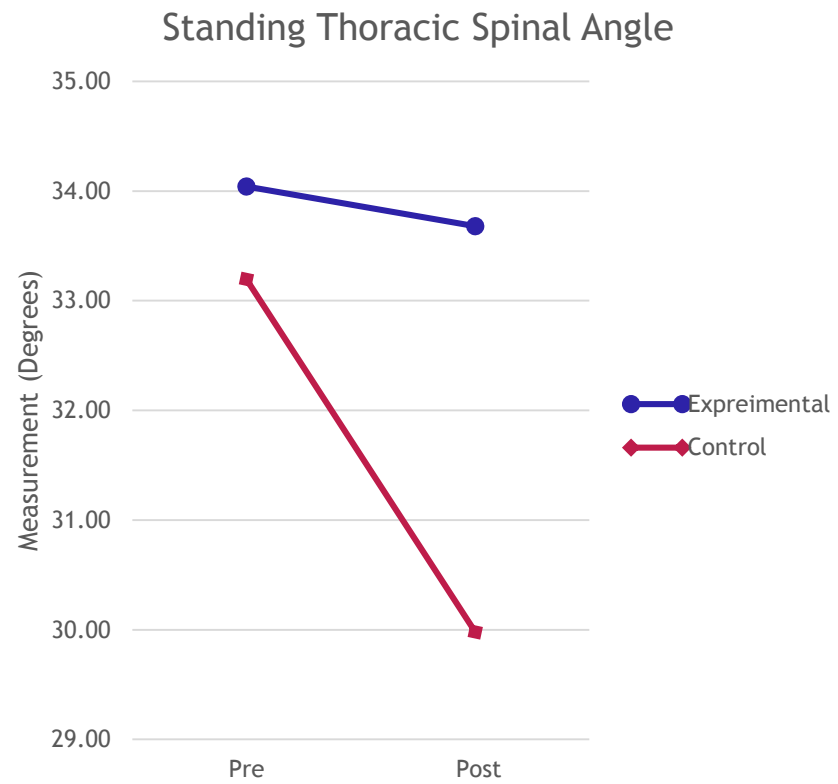
Texas Social Behavior Inventory



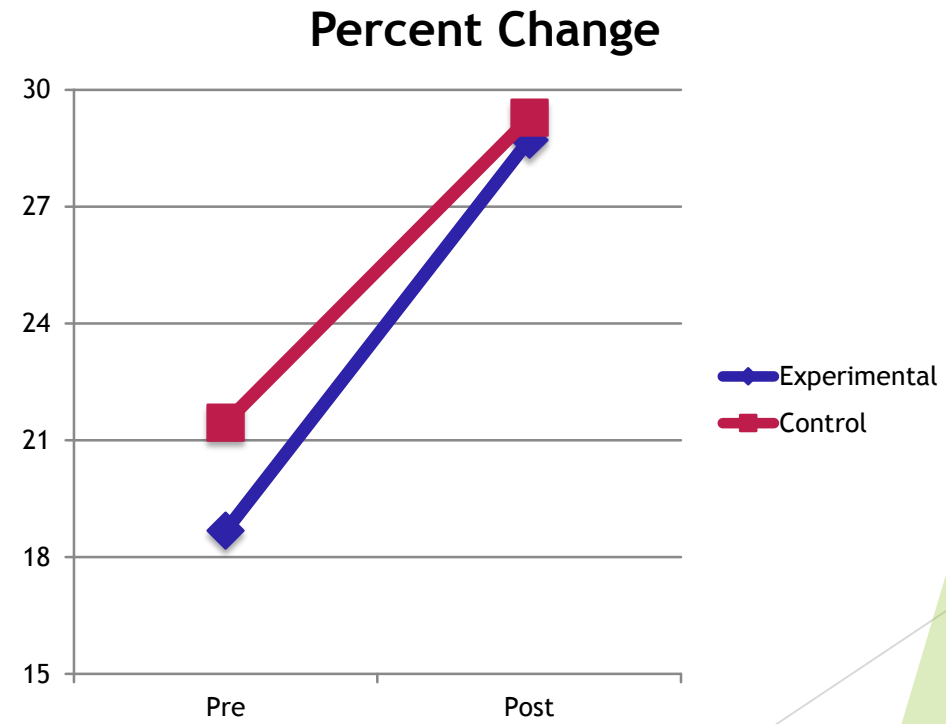
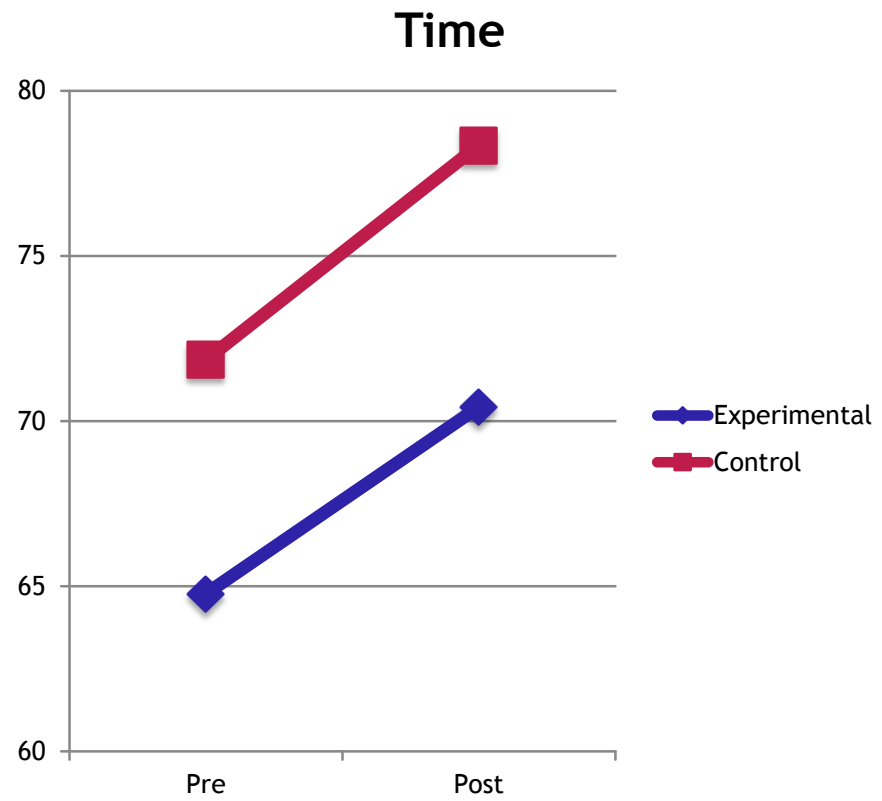
Judgmental Self-Doubt Scale



Posture Variables

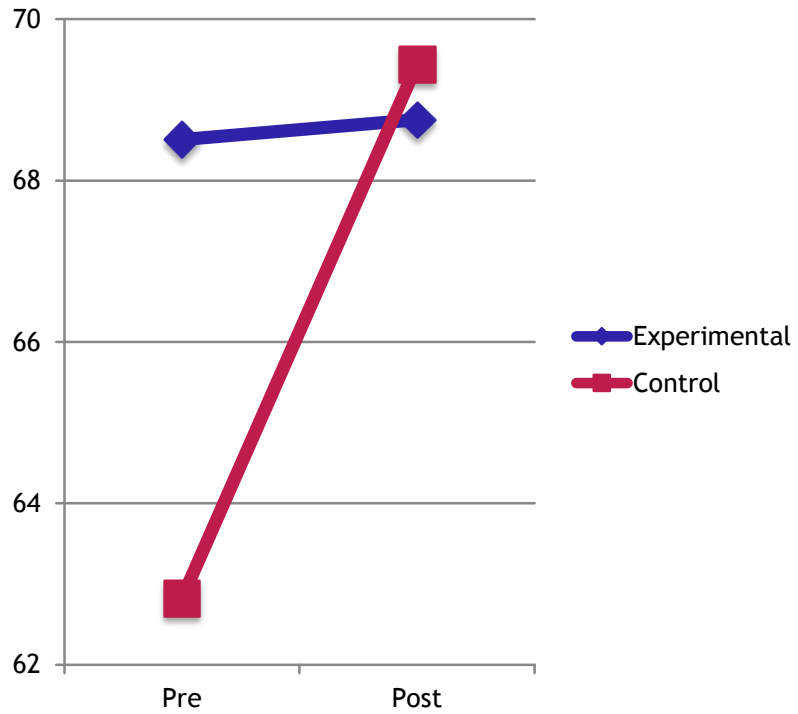


Muscle Characteristics

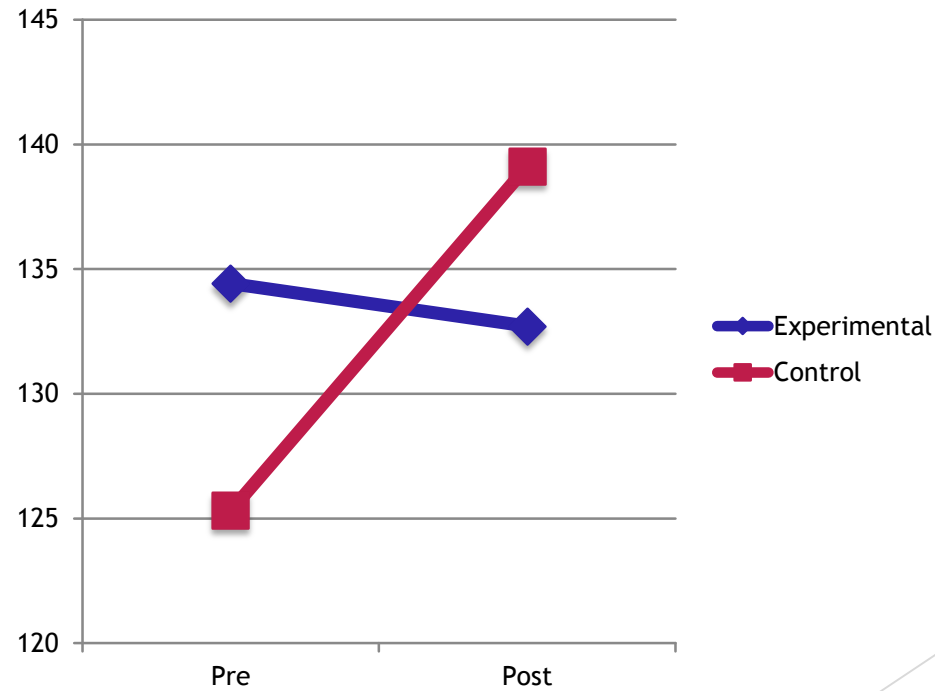


Muscle Characteristics

Left L5 Median Frequency

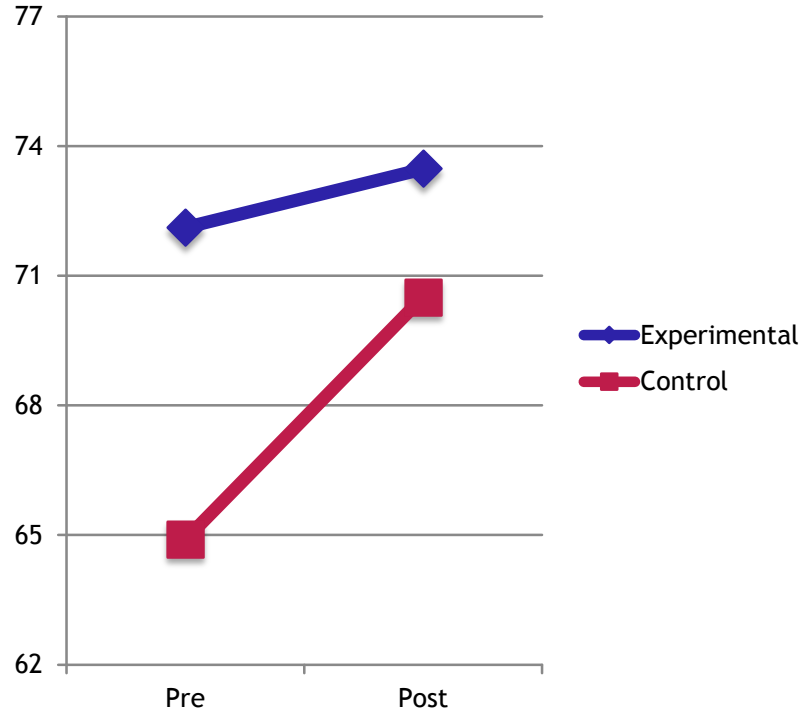


Left L5 Mean Frequency

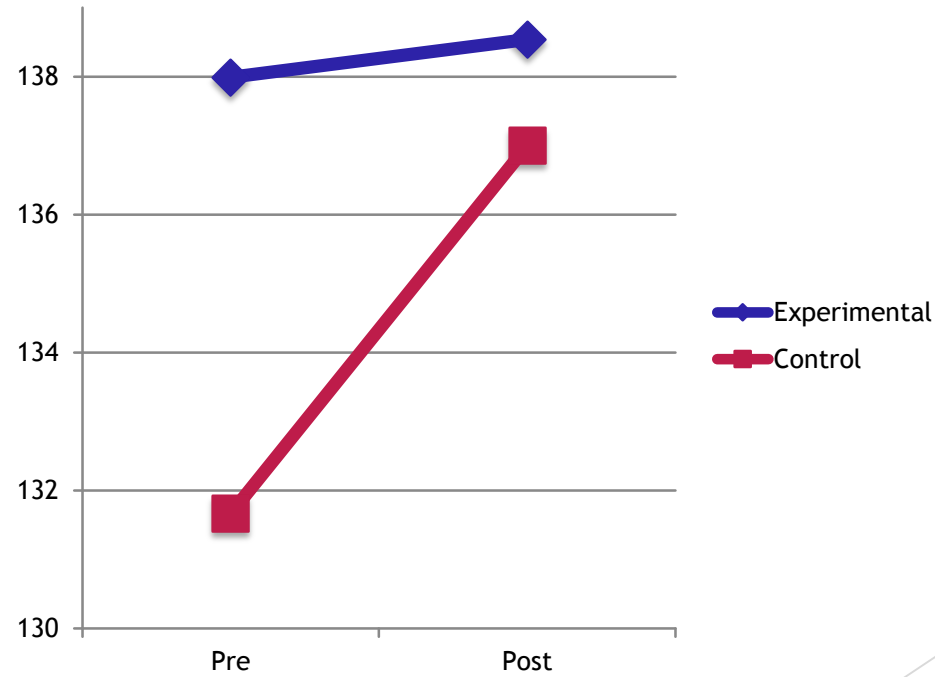


Muscle Characteristics

Right L5 Median Frequency

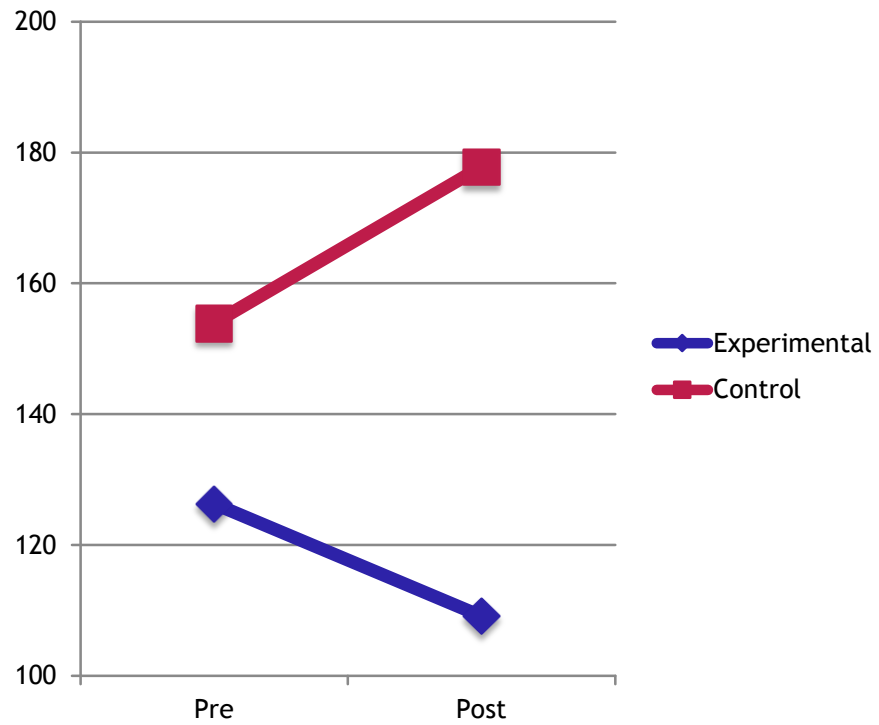


Right L5 Mean Frequency

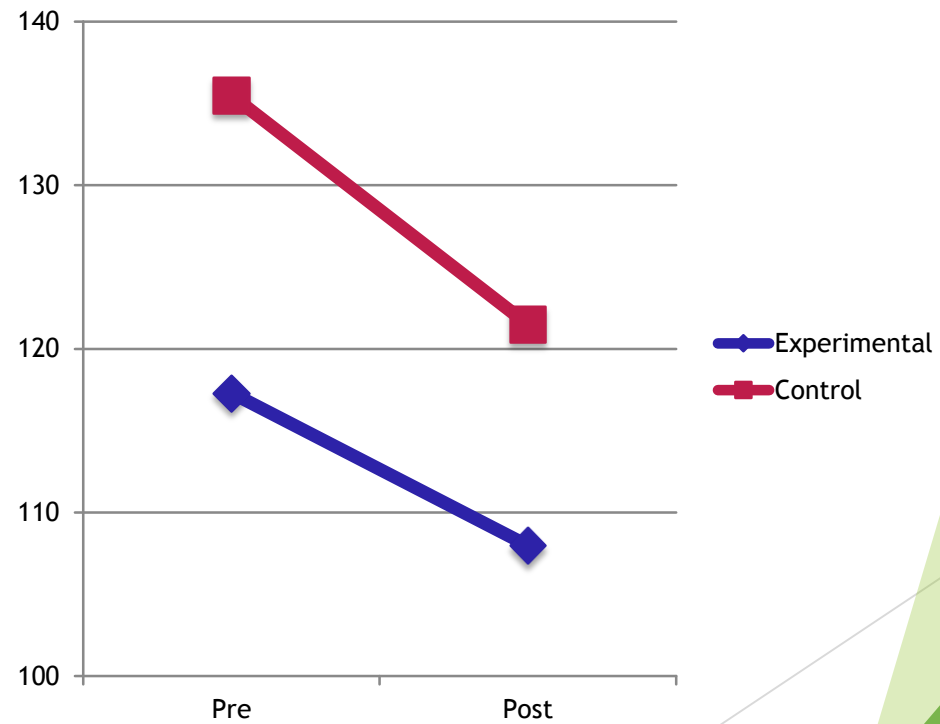


Muscle Characteristics

Left L5 Amplitude



Right L5 Amplitude



What did we learn?

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Challenges

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Limitations

- ▶ The findings are dependent on whether participants will adhere to the training schedule set by the upright training program.
- ▶ The findings may only be generalized to college-aged individuals of 18-25 years of age.
- ▶ Participants could assume an abnormally perfect posture.
- ▶ Participants may assume a better posture than normal in the presence of the researchers.

Challenges

- ▶ Technical Difficulties
 - ▶ Bluetooth
 - ▶ Updates
- ▶ Motivation
- ▶ Coaching

Clinical Populations/Settings

- ▶ Patient Response
- ▶ Prescribing
- ▶ Challenges

Take Home Message

Awareness

Questions?