



# A Preliminary Study: The Effects of 12-week BioDensity Training on Lower Body Isometric Peak Torque in Young Women

Maurice Cruz, Auguste Torres, Carolina Garcia, Braulio Cazarez,  
Nicole C. Dabbs, Ph.D., FNCSA, Zhaojing Chen, Ph.D.

Department of Kinesiology, California State University, San Bernardino



Kinesiology

## INTRODUCTION

- BioDensity training is a safe, weight-free, and self-induced machine using 4 isometric exercises (Smith et al. 2014).
  - Chest Press, Leg Press, Core Pull, Vertical Lift
- BioDensity has been declared to manage osteopenia and osteoporosis through training for 5 seconds each exercise, once a week (Smith et al. 2014).
- The purpose of this study is to examine the effects of 12 weeks of supervised bioDensity training on lower body peak torque in young women.

## METHODS

### Participants

- 8 physically inactive, female participants ages 18 – 30 yrs

### Study Design

- Visit 1: HHQ, anthropometrics, baseline isometric torque
- Visit 2: BioDensity familiarization
- Visit 3-14: 5-minute warm-up, bioDensity training
- Visit 15: Post isometric torque assessment

### BioDensity Training

- Chest Press - Hands shoulder width apart, arms bent at 120°.
- Leg Press - Place toes shoulder width apart, heels down with legs bent at 120°.
- Core Pull - Strap belt around the waist, grip narrow on the handles while leaning forearms on the bar. Bring knees and arms together.



Figure 1. bioDensity

- Vertical Lift – Stand shoulder width apart with arms relaxed, grip side handles with a slight knee bend and looking up to lift.
- Biodex Isokinetic Dynamometer**
- Isometric Peak Torque (3 trials) of knee flexion and extension were measured at 60° for both legs.



Figure 2. Biodex Isokinetic Dynamometer

### Data Analysis

- SPSS 28 was used for statistical analysis.
- Repeated measures ANOVA was utilized to compare isometric muscular torque at baseline, midpoint and post-training.

## RESULTS

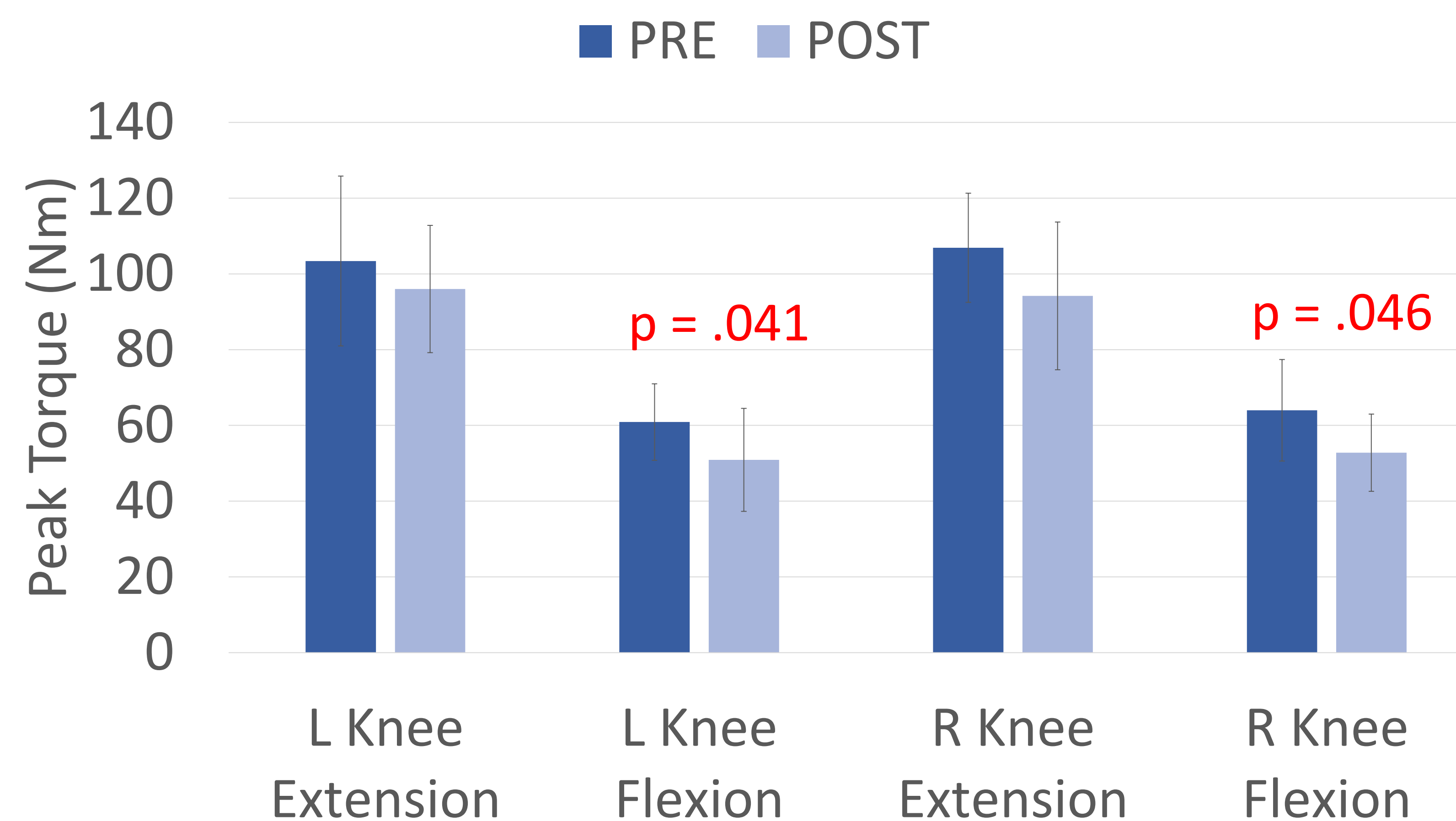


Figure 3. Changes of Peak Torque Over 12-Week of BioDensity

Table 1. Participants Characteristics (n=8, Mean ± SD)

Age (years)	21.5 ± 3.0
Height (cm)	163.2 ± 3.5
Weight (kg)	71.1 ± 20.5
% Body Fat	40.3 ± 9.4
Lean Mass (kg)	19.20 ± 3.92
Ethnicity	75% Hispanics (n=6)

## CONCLUSION

- After 12-weeks of bioDensity training, there were no significant changes in strength in a young female population.
- However, a decline in peak torque knee flexion was observed for both legs post testing.
  - Drust et al. (2005) investigated the circadian rhythm of strength and suggests that strength values peak in the afternoon.
  - Future implementation for the study will include controlling time of the day for pre, mid and post tests.
- An increase in repetition of training will be considered to observe for significant adaptations.

## PRACTICAL APPLICATIONS

- Strength and conditioning coaches can adjust the frequency, repetition and duration of bioDensity training.
- Coaches may also implement bioDensity for recovery in athletes that are unable to participate in traditional resistance exercise.

## REFERENCES

- Drust, B., Waterhouse, J., Atkinson, G., Edwards, B., & Reilly, T. (2005). Circadian rhythms in sports performance—an update *Chronobiology international*, 22(1), 21-44 <https://doi.org/10.1081/CBI-200041039>
- Smith, D. T., Moynes, R. A., Rockey, S. S., Conviser, J., & Skinner, J. S. (2014). BioDensity™: A Novel Resistance Training Approach and Learning Effects in, 685 Males and 2,689 Females. *J Nov Physiother*, 4(3), <http://dx.doi.org/10.4172/2165-7025.1000215>