

# Effects of Supervised Core Muscle Training on Dynamic Stability and Stair Negotiation of Young Healthy Male and Female Participants

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### Introduction

The effect of core muscle training has been recognized as an important asset for injury prevention and improving the human athletic performance which has been determined through testing postural stability under challenging balance situations, force generations, and the time needed to perform specific tasks. However, there is a lack of perception of the effect of core muscle training on the type, duration of the training, and the nature of assessment methods.

### Objective

The aim of this study was to explore the effect of core muscles training on dynamic stability and stair negotiation in young healthy participants.

### Methodology

#### • Study Design:

Quantitative, quasi experimental, before and after study.

#### • Sampling:

- Convenience sampling, 14 females and 14 males (n=28) age of 18 to 25 years (mean 20.18± 1.56) and a BMI between 16 to 25 ( mean 21.17±1.83).

#### • Inclusion criteria:

- Healthy participants who are not regularly active physically.  
- Ages between 18-25 years old.  
- Participants with a BMI between 16 to 25.

#### • Exclusion Criteria:

- Participants with musculoskeletal or neurological disorders.  
- Physically active individuals with regular athletic/body building training.

#### • Instrumentation:

- Measurement tape, masking tape, chair, timer, mat.

#### • Procedure:

- Location:- Center for Human Motion and Performance (M23-039/41).  
- College of Health Sciences, UOS.

• Information sheets & consent forms were signed by the subjects.

• The participant were tested for dynamic stability by Star Excursion Balance Test (SEBT), Timed Get Up and Go (TUG), 10 Meter test, Functional Reach Test (FRT), Single Leg Squat (SLS) and for speed and Rate of Perceived Exertion for Stair Negotiation.

• Each subject went through observed core training program of 6 weeks (18 sessions) and the test were re-administered after the completion of core training.



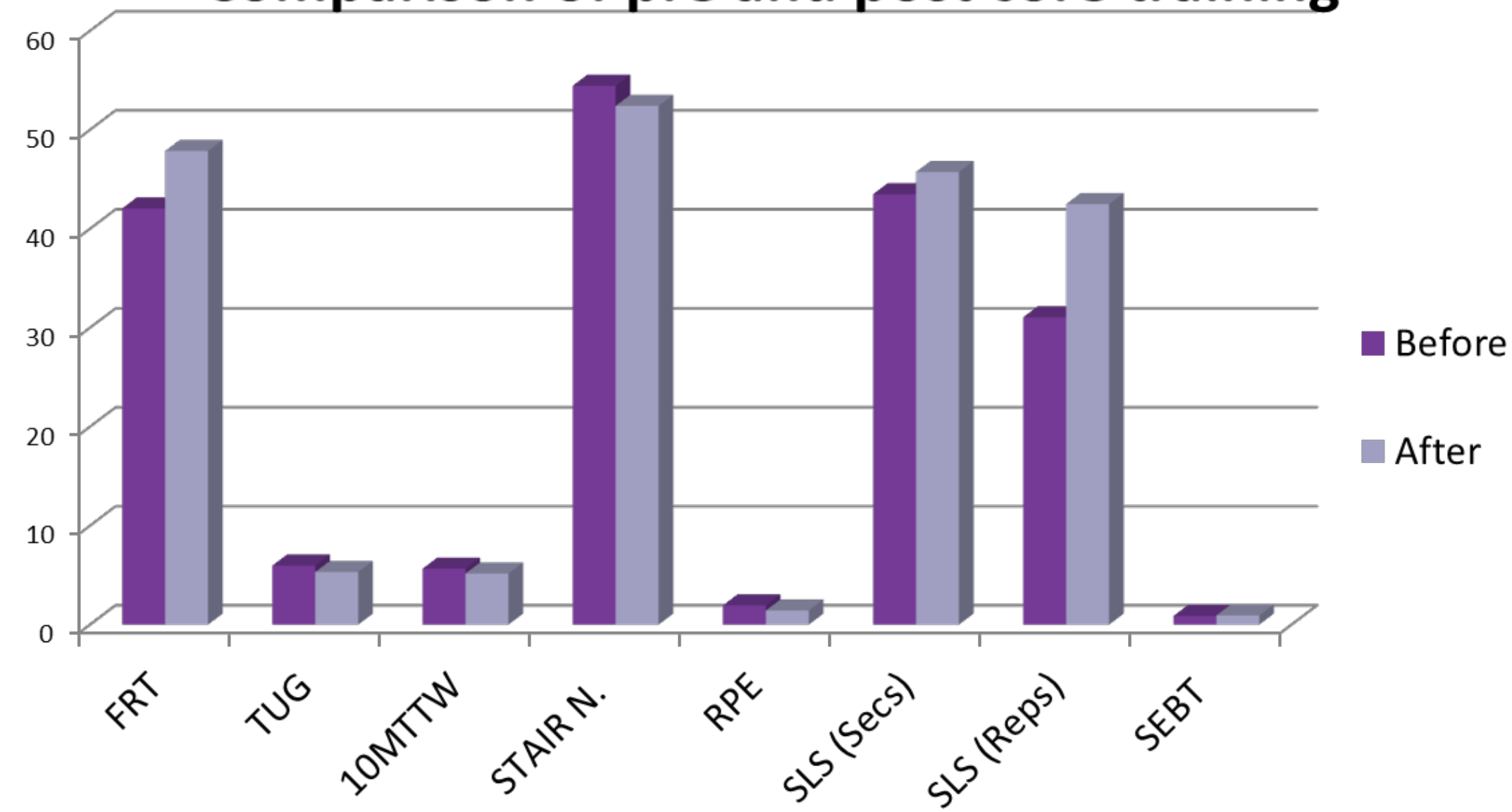
### Results

- There was significant improvement in dynamic stability of the participants after core training.
- There was significant improvement in normal tandem walking speed after core muscle training.
- There was significant improvement in Time Up and Go test after core muscle training.
- There was significant improvement in Single Leg Squat (Reps) after core muscle training.
- There was significant change in speed of stair ascending and descending after core muscle training.
- There was no significant change in the Rate of Perceived Exertion (RPE) while ascending and descending stairs after core muscle training.
- There was significant difference between the genders.
- While both genders made significant improvement, male participant had significantly higher improvements.

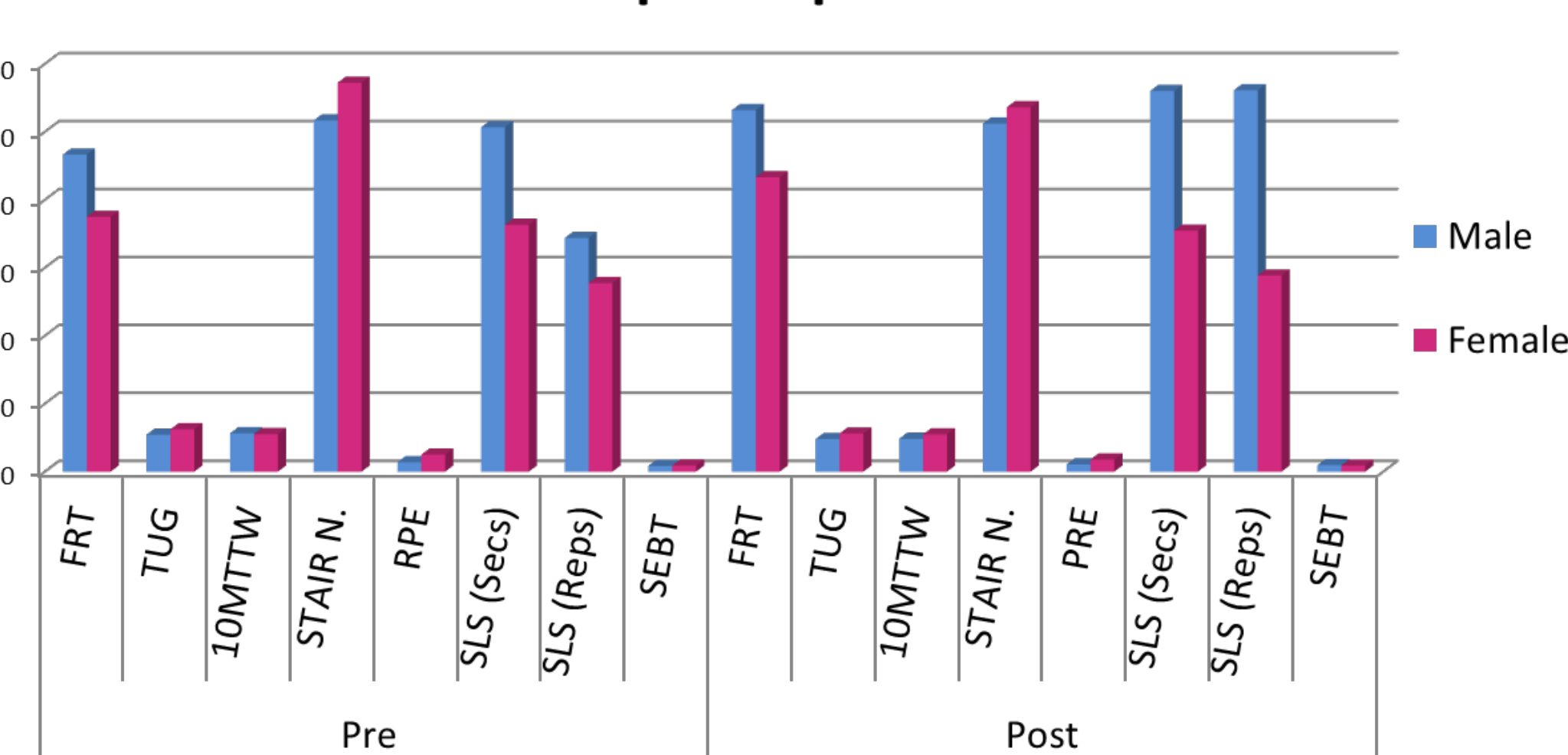
### Statistical Analysis

- Microsoft Excel 2010 and SPSS Statistics 21
  - Paired T-Test.
  - Independent T-Test

Comparison of pre and post core training



Comparison between male and female participants



- FRT: Functional Reach Test
- TUG: Timed Get up and Go
- 10MTTW: 10-meter tandem walk test
- Stair N.: Stair Negotiation
- RPE: Rate of Perceived Exertion
- SLS: Single Leg Squat
- SEBT: Star excursion Balance Test

### References

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### Discussion

- The results of the current study show improvement in dynamic balance and stair negotiation after a program of core training. Dynamic balance improvement has been reported by many authors including Sadeghi et al. (2013) and Kahle et al. (2009), that confirmed the validity and reliability of Star Excursion Balance Test (SEBT).
- Participants of the current study demonstrated significant improvement in Functional Reach Test. This is in agreement with the study of Granacher et al. (2012) who showed that the participants improved significantly after core muscle training.
- Willy et al. (2011) have reported improvement in the parameters of Single Leg Squat (SLS) due to core muscle training which are similar to the findings of the present study. In this current study, there was a marked improvement during post assessment in repetitions and timing of the SLS.
- The results of the timed up and go (TUG) showed a significant improvement after core training. This was different from the study that Herman et al. (2010), reported that there was not a significant difference in healthy older adults.
- A research for 10-meter tandem walk test was conducted by Lark et al. (2009), their result did not show any significant change that is similar to the results of the current study.
- The results of a research conducted by Bonnyaud et al. (2013) for stair negotiation, showed no significant difference. Though, in their study, core muscle training was not introduced to their participants, which in turn, did not cause any change. However, after training current study there wasn't any significant change except that, in perceived exertion there was a noticeable difference after training. Lastly, it can be simply explained that dynamic stability and stair negotiation did improve not only in strength in over all but in endurance when ascending and descending stairs. Additionally, it can be a result of better neuromuscular coordination and learning effect of the participant.

### Conclusion

From the results obtained from this study, it can be concluded that core muscle training has a significant effect in both dynamic stability and stair negotiation. Core muscle training should be promoted for rehabilitation of patients with low back pain and training of athletes.

### Recommendations

Larger samples and longer intervention is needed to get a better and precise measurement to properly evaluate the actual function of core muscle training. Moreover, in such an intervention it is best to evaluate neurologically and physically impaired to properly assess the true capabilities of muscle function.