

COMPARISON OF CORE MUSCLE ACTIVITY BETWEEN BACK SQUAT AND PUSH PRESS

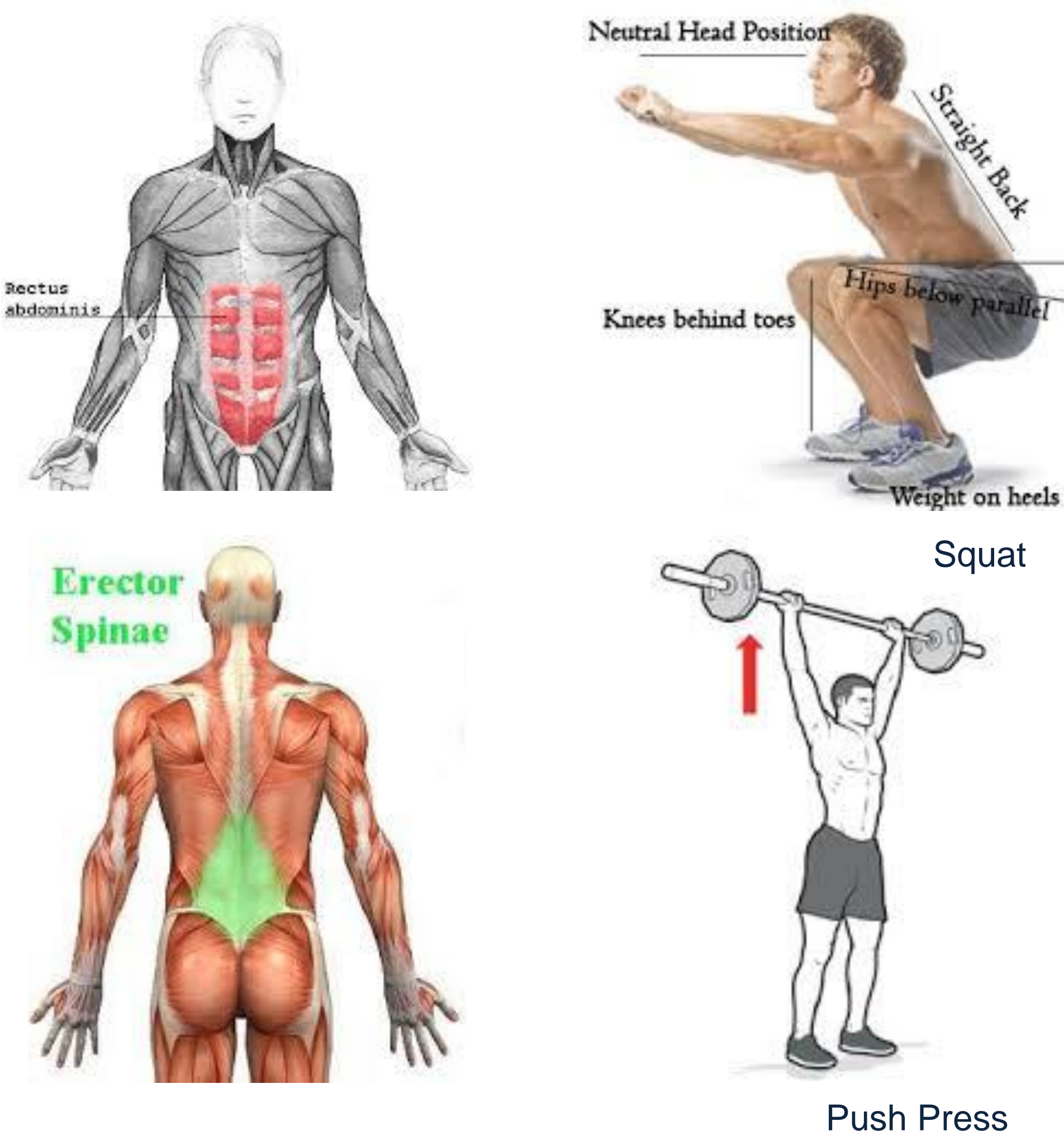
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Background

- Previous research has been done exhibiting the fact that core strengthening leads to performance enhancement, postural improvement, and decreased risk of low back pain (1).
 - There are a wide variety of exercises that aim to provide such training.
- Previous studies have looked at the activation of core trunk muscles while performing sit-ups using different abdominal devices (2).
- To date, no known studies have looked at the activation of core trunk muscles compared between the back squat and push press, two traditional weightlifting movements.

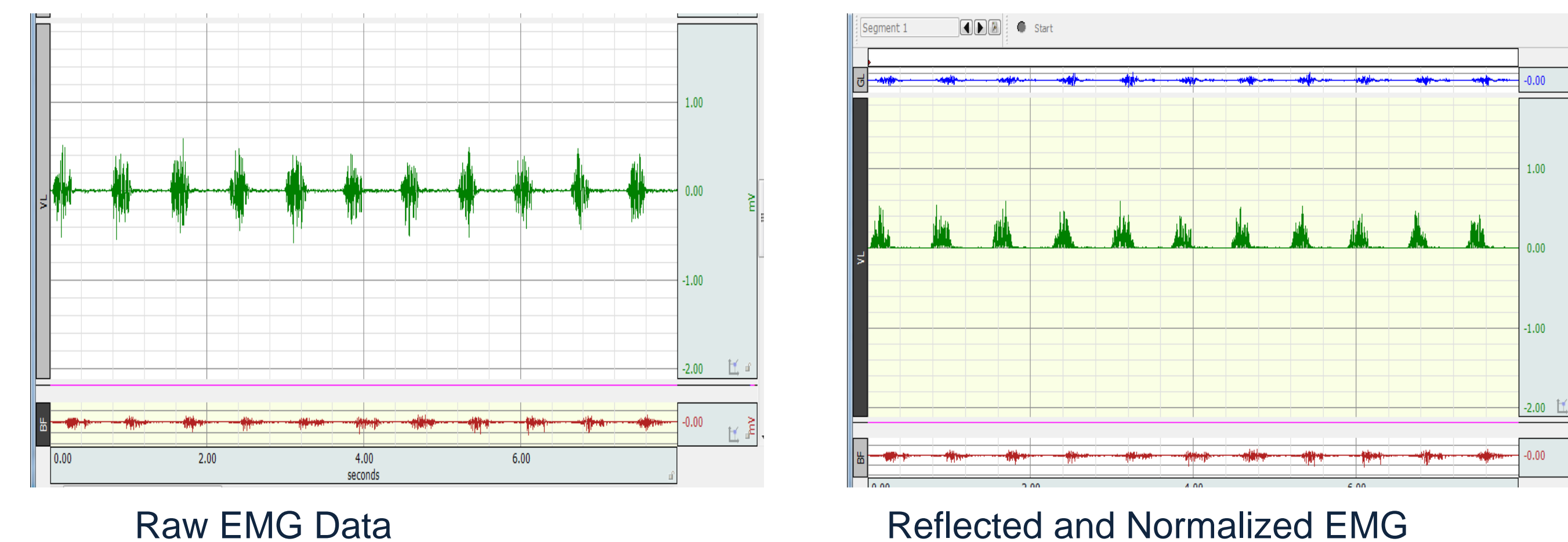
Purpose

- The purpose of this study was to determine if there is a difference in muscle activation when performing a push press versus a back squat.



Methods

- Male varsity athletes (n=10) who regularly trained with Olympic barbell performed seven to ten repetitions of a push press and a back squat set to a metronome at 50 cycles per minute for each repetition.
- Electrodes were placed on the Rectus Abdominis(RA), Erector Spinae(ES), and External Obliques(EO) muscles in order to monitor muscle activity through electromyography (EMG) with wireless transmitters (3).
- Subjects performed seven to ten repetitions of push press and back squat with the Olympic Barbell and in a randomize order at 30 % of their 1RM.
- After finishing, subjects performed a max voluntary contraction (MVC) of a squat.
- The squat and Push press lifts were normalized to the MVC voltage. Data were analyzed using paired T-test.



Results

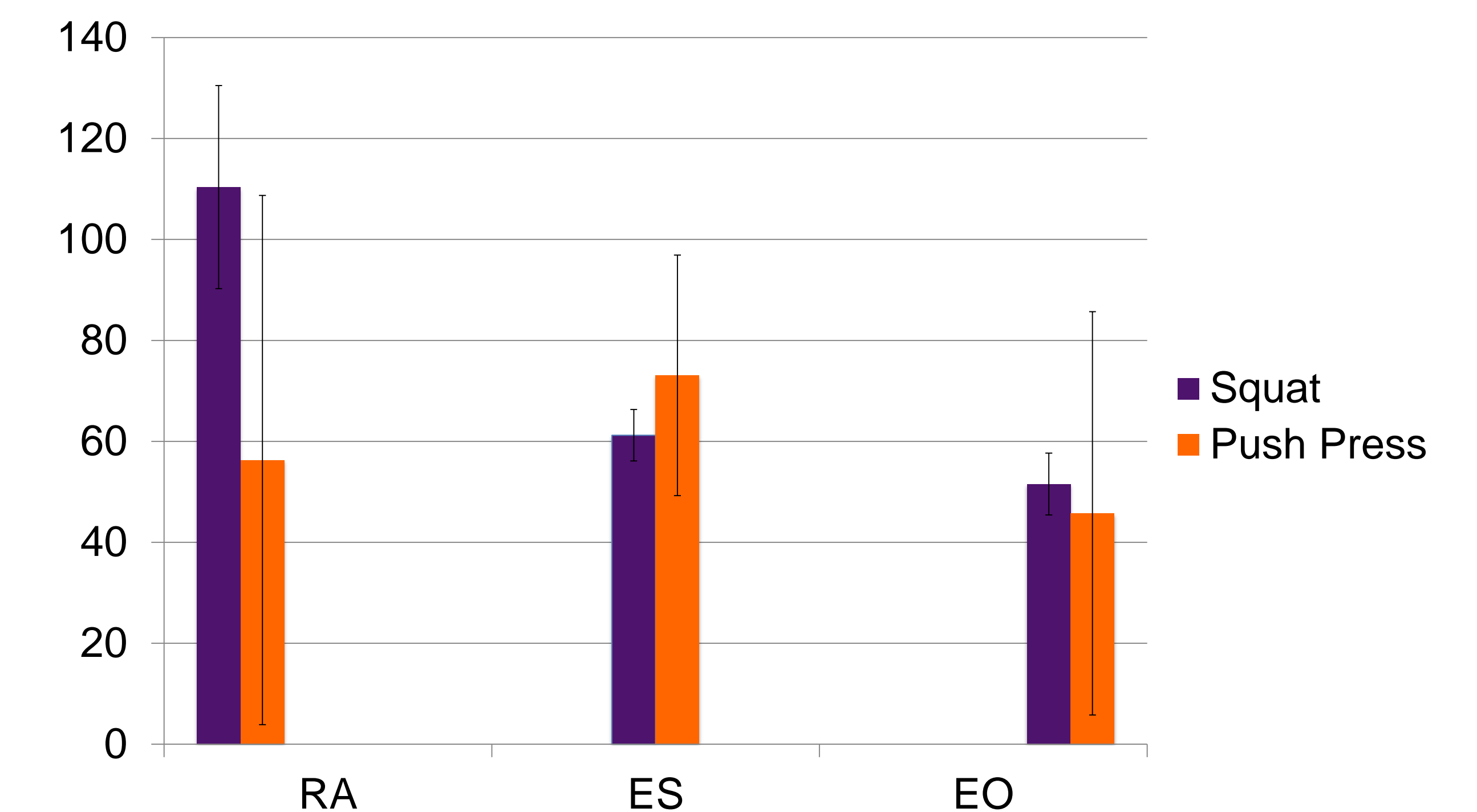
- The results presented in the following table are expressed means +/- standard deviations as a percent of MVC.

	RA	ES	EO
Squat	110.37±20.13*	61.22±5.1	51.55±6.13
Push Press	56.32±52.41*	73.07±23.83	45.73±39.93

- Significant differences were observed for RA tested relative to %MVC for each when comparing the Squat to PP. *denotes significance at $p < 0.014$

Conclusion

- The results of this study suggest that muscle activity in the muscle group Rectus Abdominis may be greater when performing a Squat vs. PP.



Future and Current Studies

- Comparison of Muscle Activity Between the Tsunami Barbell and an Olympic Barbell
- Comparison of Core Muscle Activity between Tsunami Barbell and Olympic Barbell for Squat and Push Press

References

1. Hibbs A.E., & Thompson K.G. Optimizing performance by improving core stability and core strength. *J. Sports Med. Res.* 38(12): 995-1008, 2008.
2. Monfort-Pañego, M., Vera-García, F., Sánchez-Zuriaga, D., & Sarti-Martínez, M.. Electromyographic Studies in Abdominal Exercises: A Literature Synthesis. *Journal of Manipulative and Physiological Therapeutics*, 232-244..
3. Hermens, Hermie, and Bart Freriks. The State of the Art on Sensors and Sensor Placement Procedures for Surface Electromyography: A Proposal for Sensor Placement Procedures. Enschede: Roessingh Research and Development, 1997. Print.

ACKNOWLEDGEMENTS:

Funding: Furman Advantage

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