

# A COMPARISON OF THE PERFECT PUSH-UP™ TO TRADITIONAL PUSH-UP

Michael Bohne, Jason Slack, Tim Claybaugh, and Jeff Cowley

Utah Valley University, Orem, Utah, USA

**KEY WORDS:** push-ups, electromyography, biomechanics.

**INTRODUCTION:** The push-up has traditionally been used to help improve arm and shoulder girdle strength and endurance (ASGSE) (Baumgartner, Oh, Chung, and Hales, 2002). The Perfect Push-Up™ was designed to help improve the work-out that could be obtained while performing push-ups. While the claims from the manufacturer seem appealing there is little to no research to support their claims. The purpose of the current study is to examine the muscle activity and arm kinematics while using the Perfect Push-Up™ compared to traditional push-ups, thus addressing the claims of an improved work-out.

**METHODS:** Thirty-four healthy male volunteers (age 19-30) performed 10 push-ups in both, in a counter balanced order, the traditional method and using the Perfect Push-Ups™. Approval was obtained from University IRB. Surface electromyography (SEMG) was recorded for 7 muscles, 20 seconds per condition, using a Delsys Bagnoli 8-channel system (Boston, MA, USA). Those muscles include: Pectoralis Major (PM), Anterior Deltoid (AD), Rectus Abdominus (RA), Biceps Brachii (BB), Triceps Brachii (TB), Latisimus Dorsi (LD) and External Oblique (EO). Additionally, participants were videotaped at 60 Hz to examine the arm kinematics. Participants were given basic instructions on how to use the Perfect Push-Up™, additionally they were instructed to be consistent during both push-up conditions. SEMG data were analyzed using average rectified EMG amplitude (RMS). Kinematic data were analyzed using MaxTraQ motion analysis software (Ann Arbor, MI, USA). Correlational data for elbow range of motion were collected between conditions to ensure the same technique was employed between conditions. Statistical data were analyzed using a paired t-test ( $\alpha=0.05$ ) for each muscle and arm kinematics by SPSS 16.0 (Chicago, IL, USA)

**RESULTS:** There was a significant increase in the activity for five of the seven muscles while using the Perfect Push-Up™. A significant increase was observed for PM ( $p<0.01$ ), AD ( $p<0.05$ ), BB ( $p<0.01$ ), TB ( $p<0.05$ ) and EO ( $p<0.05$ ). Additionally, there is evidence of a significant increase in the elbow range of motion while using the Perfect Push-Up™ ( $p<0.01$ ). Also, there was strong correlation in the elbow range of motion ( $r=0.871$ ).

**DISCUSSION:** Examining the elbow range of motion during the push-up shows evidence that the participants were consistent in how they performed the push-up. An increase in the muscle activity should lead to greater gains in ASGSE. The increase in the ROM provides the possible explanation for these results. However, participants travel deeper than some previous research suggest is safe (Cooper Institute for Aerobics Research, 1992), which could lead to add to the increase in muscle activity.

**CONCLUSION:** Increases in muscle activity and elbow range of motion were observed while using the Perfect Push-Up™ possibly confirming manufacturer's claims. However further research is required to pinpoint the exact cause of these increases beyond range of motion.

## REFERENCES:

Baumgartner, T.A., Oh, S., Chung, H. and Hales, D. (2002) Objectivity, Reliability, and Validity for a Revised Push-Up Test Protocol. *Measurement in Physical Education and Exercise Science*, 6(4) 225-242.

Cooper Institute for Aerobics Research (1992) *The Prudential Fitnessgram: Test administration manual*. Dallas, TX.