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# RAPID RESEARCH

July 2023

## Inside This Week: Chest Exercises & Activation Levels

- ✓ Push-up Variations and Shoulder Muscle Activation
- ✓ Bench Press: Muscle Activation Analyses
- ✓ 5 Incline Bench Press Variations & Muscle Effects

# PUSH-UP VARIATIONS AND SHOULDER MUSCLE ACTIVATION

[Click for Full Text  
\(Kowalski et al. 2022\)](#)

This review identified common Push-Up (PU) variations and described their muscle activation levels.



# KEY FINDINGS

**30 studies, 606 patient included:**

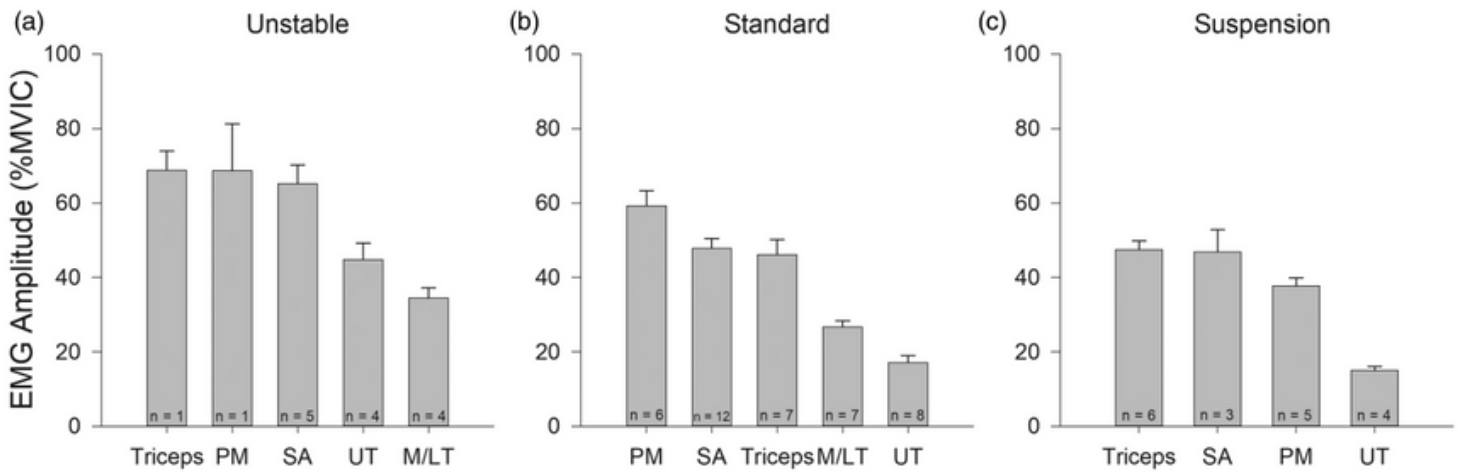
## **6 Variations of Push-ups Included:**

Standard, Suspension system, Unstable surface, Incline, Incline on Ex ball.

## **5 Muscles Tested:**

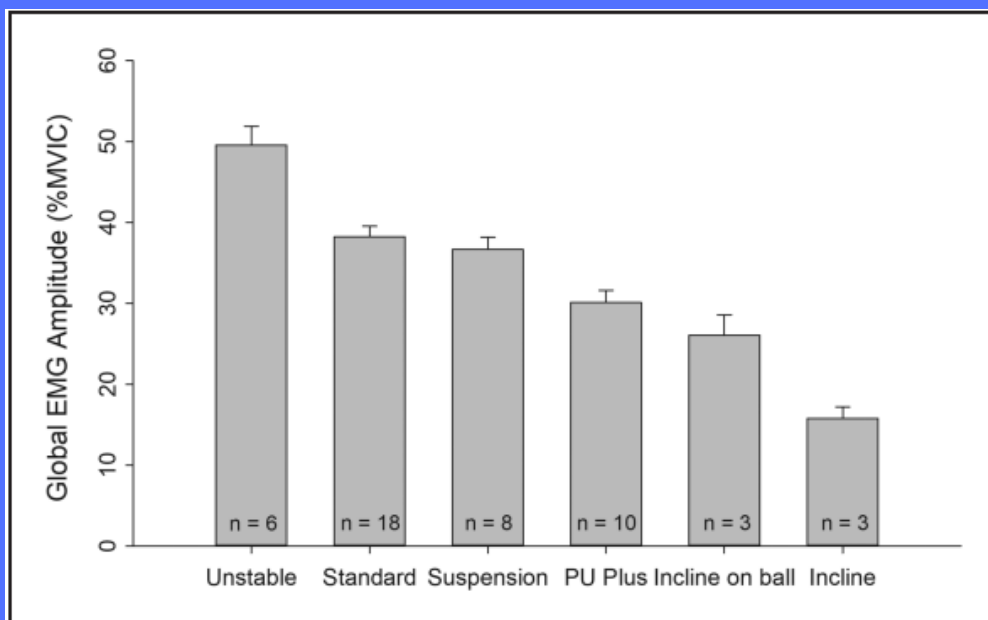
Serratus anterior (SA), Upper trapezius (UT), Pectoralis Major (PM)

Middle and lower fibers of the trapezius (M/LT), Triceps brachii (TB)



# MAIN TAKEAWAYS

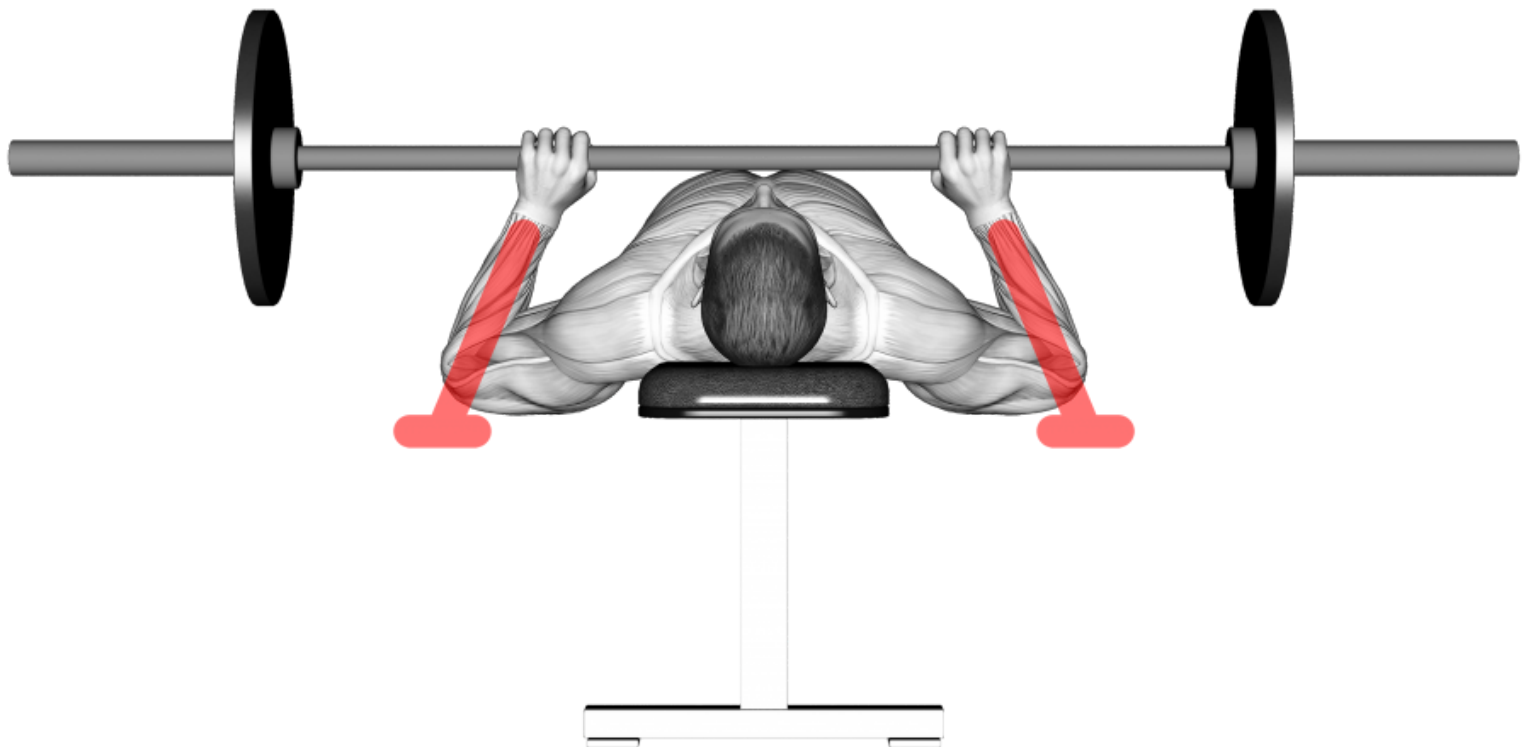
Unstable surfaces and standard push-ups have the highest global shoulder muscle activation. Triceps, Pec Major, and Serratus Anterior have high activation across most PU variations.



# BENCH PRESS: MUSCLE ACTIVATION ANALYSES

[Click for Full Text  
\(Stastny et al. 2017\)](#)

This systematic review assessed EMG studies performed on the barbell BP exercise to determine which muscles show the greatest activity.





**14 studies, 150+ participants were included**

## **Most Active Muscles During Bench Press:**

The triceps brachii (TB) and pectoralis major (PM) muscles were found to have similar activity during the BP, which was significantly higher than the activity of the anterior deltoid (AD)

During the BP movement, muscle activity changes with exercise intensity, velocity of movement, fatigue, mental focus, movement phase and stability conditions, such as bar vibration or unstable surfaces.

Under these circumstances, TB is the most common object of activity change.

## **MAIN TAKEAWAYS**

**Exercise intensity is the key factor that can change muscle activity, where the intensity interacts with other exercise conditions during the BP.**

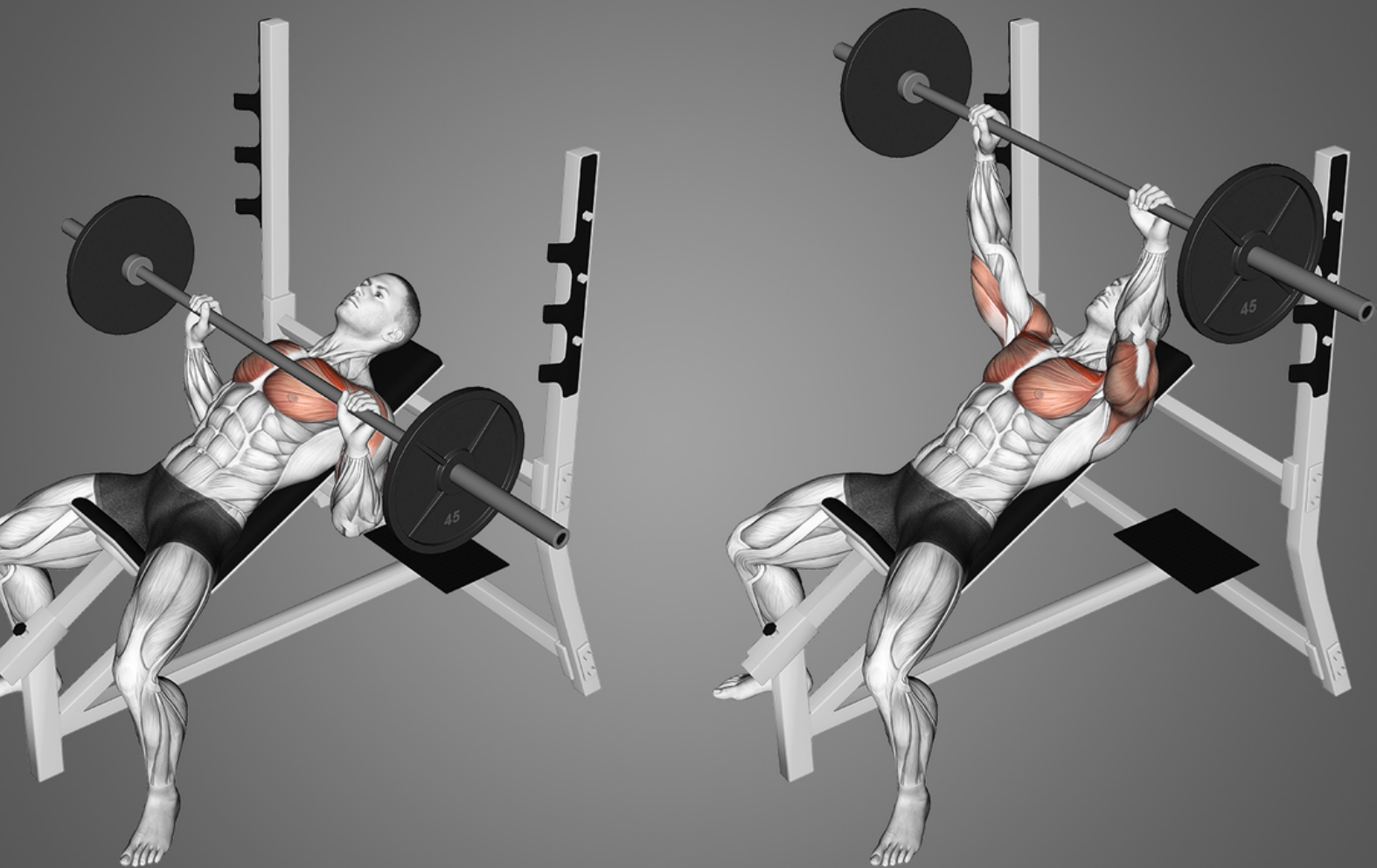
**The PM and TB have higher EMG amplitudes and more dominant roles than the AD, where the TB EMG is most often the subject of change.**

**However, the muscle model of prime movers during the BP is not sufficiently established in terms of which muscle subdivisions should be measured as a standard procedure or during special circumstances such as unstable surfaces.**

# 5 INCLINE BENCH PRESS VARIATIONS & MUSCLE EFFECTS

[Click for Full Text  
\(Rodríguez-Ridao et al.  
2020\)](#)

This research evaluated the electromyographic (EMG) activity levels of the Pectoralis major (PM), Anterior deltoid (AD), and the Triceps brachii (TB) at five bench angles: (0°, 15°, 30°, 45°, and 60°).



# KEY FINDINGS

30 participants; EMG activity recorded at 60% (1RM).

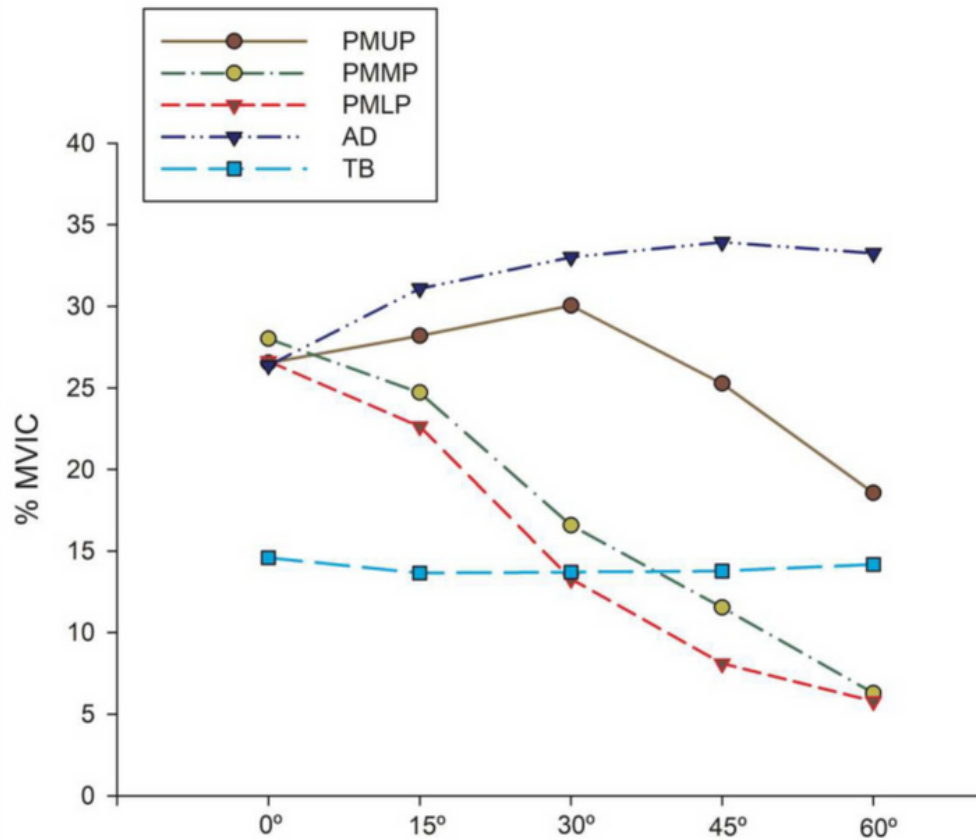
## Max EMG Activity Levels:

PM at 30°

Mid and Lower PM at 0°.

AD at 60°.

TB similar all inclinations.



# MAIN TAKEAWAYS

Horizontal bench press produces similar electromyographic activities for the pectoralis major and the anterior deltoid.

An inclination of 30° produces greater activation of the upper portion of the pectoralis major.

Inclinations greater than 45° produce significantly higher activation of the anterior deltoid and decrease the muscular performance of the pectoralis major.

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