

The Brookbush Institute Publishes Updates: Isometric Contraction, The Best Repetition Tempo, and Repetition Tempo Review

The Brookbush Institute continues to enhance education with a glossary that is more than just definitions. Examples, common questions, and so much more!

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-- - Excerpt from the term: [Isometric Contraction](#)

- Related Article: [The Best Weight Lifting Tempo: Maximum Velocity Concentrics](#)

- Related Course: Lesson 22:
Introduction to Movement Assessment and Analysis

DEFINITION

Isometric Muscle Contraction: A type of muscle contraction in which activation of motor units and the production of force does not result in joint motion or a change in muscle length. This occurs when the force produced by the muscle is equal to the external resistance. Functionally, isometric contractions can be thought of as actions that stabilize or maintain the position of a joint or body segment in opposition to an external load.

- Etymology: The word is formed from two parts: "iso" (equal) and "metric" (measure). That is, the force produced by the muscle is equal to the external load.

KEY CHARACTERISTICS

- Muscle fibers shorten while generating tension.
- Produces acceleration in opposition to the external resistance (e.g., lifting a weight).

CONTRACTION TYPES

- Shortening Contraction: Concentric contraction
- Same-length Contraction: Isometric contraction
- Lengthening Contraction: Eccentric contraction



The erector spinae are performing an isometric contraction during a seated row - <https://brookbushinstitute.com/glossary/isometric-contraction>



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Dr. Brent Brookbush, CEO of Brookbush Institute

EXAMPLES OF ISOMETRIC CONTRACTIONS

- Biceps Curl (Shoulder): When performing a bicep curl, if the arm remains still, the deltoid is performing an isometric contraction.
- Squat (Trunk): During a squat, the lower extremity moves, but the trunk muscles have to maintain an isometric contraction.
- Push-Up (Trunk): During a push-up, the upper extremity moves, but the trunk muscles have to maintain an isometric contraction.

- Seated Row (Erector Spinae): During a seated row, the arms and scapula move, but the erector spinae have to perform an isometric contraction to keep the torso upright.
- Core Exercises: Core exercises like planks, side-planks, quadrupeds, and chop patterns all challenge the core/trunk muscles to maintain an isometric contraction against resistance from various directions.

EXAMPLE OF USE IN PRACTICE

Tempo Notation and Recommendations:

Repetition (rep) tempos are generally notated in the following format "(3:1:2)". The numbers are seconds (sec.) unless otherwise indicated. Each number corresponds to a phase of contraction in the following order: "eccentric: isometric:..

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