

Effect of Time Under Tension on Strength in Athletes: A Narrative Review

Vikas Kumar, Undergraduate Student, Department of Physiotherapy, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation, Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana, India.

Kanika Bhatia, Assistant Professor, Department of Physiotherapy, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation, Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Kanika Bhatia,

Assistant Professor, Department of Physiotherapy, Maharishi Markandeshwar Institute of Physiotherapy and Rehabilitation, Maharishi Markandeshwar (Deemed to be University), Mullana, Ambala, Haryana, India.

E-mail: kanika.bhatia@mmumullana.org

ABSTRACT

Time Under Tension (TUT) is the time duration in which the muscle is under strain while performing strength training. This study was performed to determine the muscular changes in athletes by training muscle under TUT. Previous evidence-based study shows that TUT affects the muscle protein subfractional synthetic response, hypertrophy, volume load, acute neuromuscular response, muscular activation, and blood lactate responses. The study was performed to determine the effect of different TUT durations on muscle strength in athletes. To explore, we further conducted a literature search in databases such as PubMed, Cochrane, Google Scholar, and Scopus focussing on publications from 2014 to 2024. This review entailed nine publications comprising randomised controlled trials, systematic reviews, cross-sectional surveys, observational studies and scoping reviews. Search terms included "Time Under Tension", "Muscle strength", "Hypertrophy", "Athlete", "muscular stress", and "resistance training". We analysed that the group trained with greater

Time Under Tension showed better results in terms of hypertrophy and strength than the group with lesser Time Under Tension from pre to post training. Additionally, results of hypertrophy and strength were more pronounced in athletes. The TUT training immediately enhances the synthesis of mitochondrial and sarcoplasmic protein, which further helps in improving the muscular endurance. In addition, it stimulates and activates myofibrillar protein synthesis, which occurred 24-30 hours after the workout, which ultimately supports strength development in long term. Overall, super-slow training along with TUT is an effective strategy for athletes to increase strength. Although additional studies are required for at-risk populations, it is essential to determine both repetition speed and the duration of muscle tension, when developing resistance training programmes.

Keywords: OMIT cross-sectional studies, Muscle strength, Resistance training OMIT.