INPLASY PROTOCOL

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Review Stage at time of this submission: Preliminary searches.

Conflicts of interest:
None declared.

The Effect of Strength Training on Neuromuscular Adaptations Among Athletes : A Systematic Review

Rong, WC[1]; Zhao, Y[2]; Jing, LX[3]; Wang, XZ[4].

Review question / Objective: p: Athletes (male/female); I: Strength training; c: Two or more groups and single-group trials; o: Relevant indicators of neuromuscular adaptation; s:Two-group controlled trials (randomized/non-randomized).

Condition being studied: Long-term training of athletes can adapt the function of their functional system to the special requirements of the sport they are engaged in . According to Sale, stimulation of strength training prompts two main functional adaptations: neural adaptation and muscular adaptation Moreover, he believes that in the early stage of training, it is mainly neuroadaptation, the middle and late stages of neuroadaptation are reduced, muscle adaptation begins to appear, muscle hypertrophy is produced, and finally strength training alone can no longer or is difficult to produce muscle hypertrophy, strength no longer increases. Therefore, changes in strength produced by exercise training are not immediately accompanied by changes in muscle size , but depend on the adaptive capacity of the nervous system

INTRODUCTION

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Rationale: At the beginning of strength training or when training movements change, the nervous system undergoes adaptive changes to complete optimal

muscle control. The increase in muscle strength at this time is mainly due to changes in nervous system adaptation. However, there is no systematic demonstration of what neuromuscular adaptations will occur in different forms and means of muscle strength training in different forms and means of muscle contraction, and the timing of changes in muscle size.

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METHODS

Search strategy: ("Strength training" OR "strength" OR "resistance training" OR "strengthening programs" OR "progressive strength training" OR "resistance exercise" OR "weight lifting" OR "weight exercise" OR "strength exercise" OR "weight training" OR "intensive strength training") AND ("Neuroadaptation" OR "Neuromuscular adaptations" OR "neuromuscular function")The literature search was undertaken in four international databases: the SCOUPS, PubMed, EBSCOhost (SPORTDiscus), and CINAHL Plus. The search was conducted on the 2th April, 2023. In each database, a search was conducted by title, taking a predefined combination of keywords.

Participant or population: Athletes (male/female).

Intervention: Strength training.

Comparator: Two or more groups and single-group trials.

Study designs to be included: Two-group controlled trials (randomized/non-randomized).

Eligibility criteria: Studies that met the following exclusion criteria were excluded: (1) studies that combined strength training with non-exercise training (such as transcranial electrical stimulation interventions) and interventions including unsupervised training sessions were excluded from this study; (2) exclusion of meeting summaries, case reports, short newsletters, lack of full text; (3) The test subject is an injured athlete.

Information sources: The literature search was undertaken in four international databases: the SCOUPS, PubMed, EBSCOhost (SPORTDiscus), and CINAHL Plus. The search was conducted on the 2th April, 2023. In each database, a search was conducted by title, taking a predefined combination of keywords.

Main outcome(s): Training variables: The results of this study involve analyzing the effects of training variables (e.g., training intensity, frequency, duration, and pattern) on athletes' neuromuscular adaptation to determine the optimal training regimen.

Quality assessment / Risk of bias analysis: The PEDro scale contains 11 items that include questions about randomization in studies, blinding of investigators and participants, completeness, outcome measures, and more. Each item can get 1 point for a total of 11 points.

Strategy of data synthesis: Eligible articles are first extracted PICO, then the articles are evaluated for quality, and after the evaluation is completed, all articles are analyzed.

Subgroup analysis: None.

Sensitivity analysis: None.

Language restriction: None.

Country(ies) involved: Malaysia.

Keywords: Strength Training; Neuromuscular Adaptations; Athletes; Systematic Review.

Contributions of each author:
Author 1 - Rong Wenchao - The manuscript was drafted.
Email: c943514032@gmail.com
Author 2 - Zhao Yue - Checking of keywords and secondary scoring of included documents.
Author 3 - Jing Lanxiang - Checking of keywords and secondary scoring of included documents.
Author 4 - Wang Xinzhi - Make tables and check formatting.