INPLASY PROTOCOL

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Conflicts of interest:
None declared.

Effects of resistance exercise load on muscle fiber type hypertrophy in the untrained: a systematic review and meta-analysis

Laskin, GR[1]; Renteria, LI[2]; Gordon, BS[3].

Review question / Objective: **How does different resistance exercise loading parameters (% 1-rep-max) affect the degree of fiber type-specific muscle hypertrophy in an untrained population.**
Information sources: **PubMed, SportDISCUS (primary sources); Google scholar (secondary sources); Reference lists will be examined for additional reports; Study authors will be contacted if article and/or greater detail of data is needed for article inclusion.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 September 2022 and was last updated on 30 September 2022 (registration number INPLASY202290128).

INTRODUCTION

Review question / Objective: **How does different resistance exercise loading parameters (% 1-rep-max) affect the degree of fiber type-specific muscle hypertrophy in an untrained population.**

Condition being studied: **Low muscle mass.**

METHODS

Participant or population: **Untrained, healthy; any age or sex; not taking supplements, medications, ergogenic aids that could influence outcomes.**

Intervention: **Isoinertial resistance exercise with greater than or equal to 6 wks performed with traditional coupled**

concentric and eccentric contractions at a natural repetition tempo.

Comparator: pre-post changes in fiber-cross sectional area compared with sedentary control group.

Study designs to be included: Original randomized and non-randomized controlled experimental trials.

Eligibility criteria: Other inclusion: Must include myosin heavy chain IHC or ATPase histochemistry to measure changes in fiber type CSA; Other exclusion: No concurrent training, nutrition, passive performance (e.g. whole body vibration), or recovery intervention (e.g. cold water immersion); Low methodological quality (PEDro score less than 4); Includes only metabolic enzyme content as only measure to quantify fiber type changes.

Information sources: PubMed, SportDISCUS (primary sources); Google scholar (secondary sources); Reference lists will be examined for additional reports; Study authors will be contacted if article and/or greater detail of data is needed for article inclusion.

Main outcome(s): Pre to post changes in fiber type CSA.

Quality assessment / Risk of bias analysis: Physiotherapy Evidence Database (PEDro) scale will be used to determine methodological quality. Scores less than 4 will be deemed methodological poor and will be excluded.

Strategy of data synthesis: If data is adequate a random effects meta-analysis will be generated and effect sizes between degree of fiber type hypertrophy between loading zone will be compared.

Subgroup analysis: Moderators include age (under 60 and over 60); sex (males only, females only); studies that include failure vs ones that don't; duration of protocol.

Sensitivity analysis: A sensitivity analysis will be performed by removing one study at a time to investigate effects on pooled analysis. Funnel plots and Egger's test will be used to estimate publication bias.

Country(ies) involved: United States.

Keywords: fiber type; CSA; load; untrained; intensity.

Contributions of each author:
Author 1 - Grant Laskin.
Author 2 - Liliana Renteria.
Author 3 - Brad Gordon.