RAPID RESEARCH

@physicaltherapyresearch

April 2023

Inside This Week:

Exercise Variables & Strength Gains

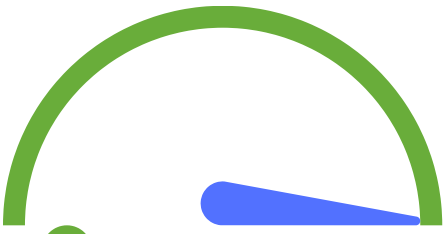
- Workouts to Failure vs. No-Failure For Strength & Hypertrophy
- Effect of Weekly Set Volume on Strength Gain
- Effect of Weekly Training Frequency on Strength Gain

WORKOUTS TO FAILURE VS. NO-FAILURE FOR STRENGTH & HYPERTROPHY

APRIL 2023

Click for Full Text (Grgic et al. 2022)

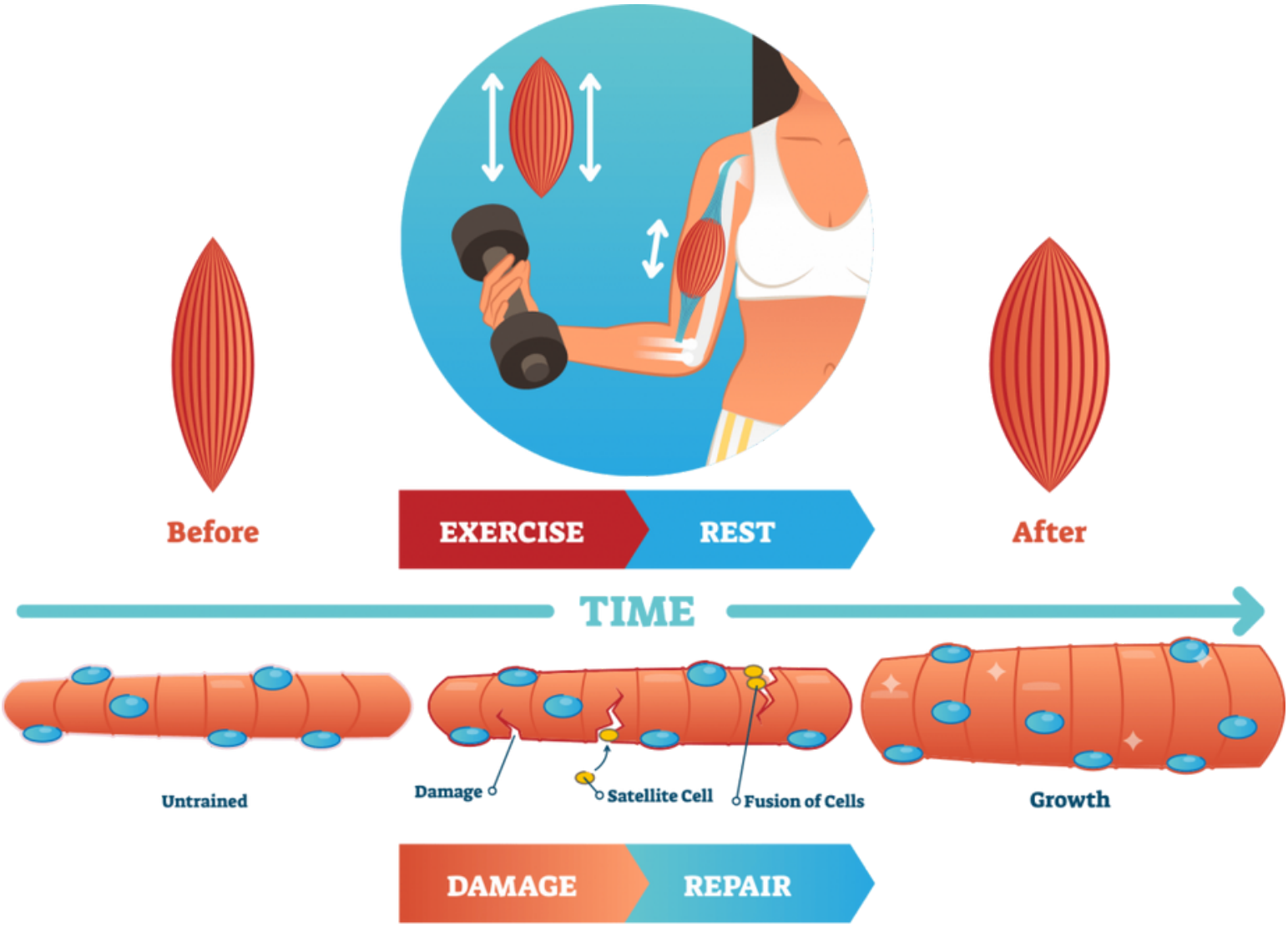
JBI 11/11 [100%]



Quality Check

*see appx

This systematic review explored the effects of training to failure on muscular strength and hypertrophy outcomes.



KEY FINDINGS

15 studies included; 394 participants

Reps to Failure vs. No-Failure

Meta-analysis indicated no significant difference between the training conditions for muscular strength or for hypertrophy.

Body region, exercise selection, or study design showed no significant differences between training conditions.

When training volume was not controlled significant findings favored non-failure training on strength gains.

For previously resistance-trained individuals, there was a significant effect of training to failure for muscle hypertrophy.

MAIN TAKEAWAYS

Training to or not to muscle failure may produce similar increases in muscular strength and muscle size.

This finding generally remained consistent in subgroup analyses according to body region, exercise selection, or study design.

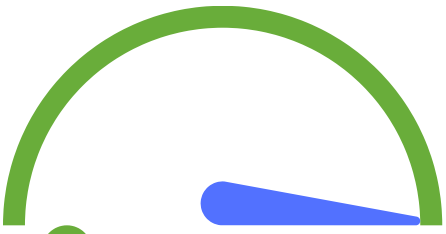
Still, when volume was not controlled for, there was favoring of non-failure training on strength gains, as well as favoring of training to failure for hypertrophy in resistance-trained individuals.

EFFECT OF WEEKLY SET VOLUME ON STRENGTH GAIN

APRIL 2023

Click for Full Text (Ralston et al. 2017)

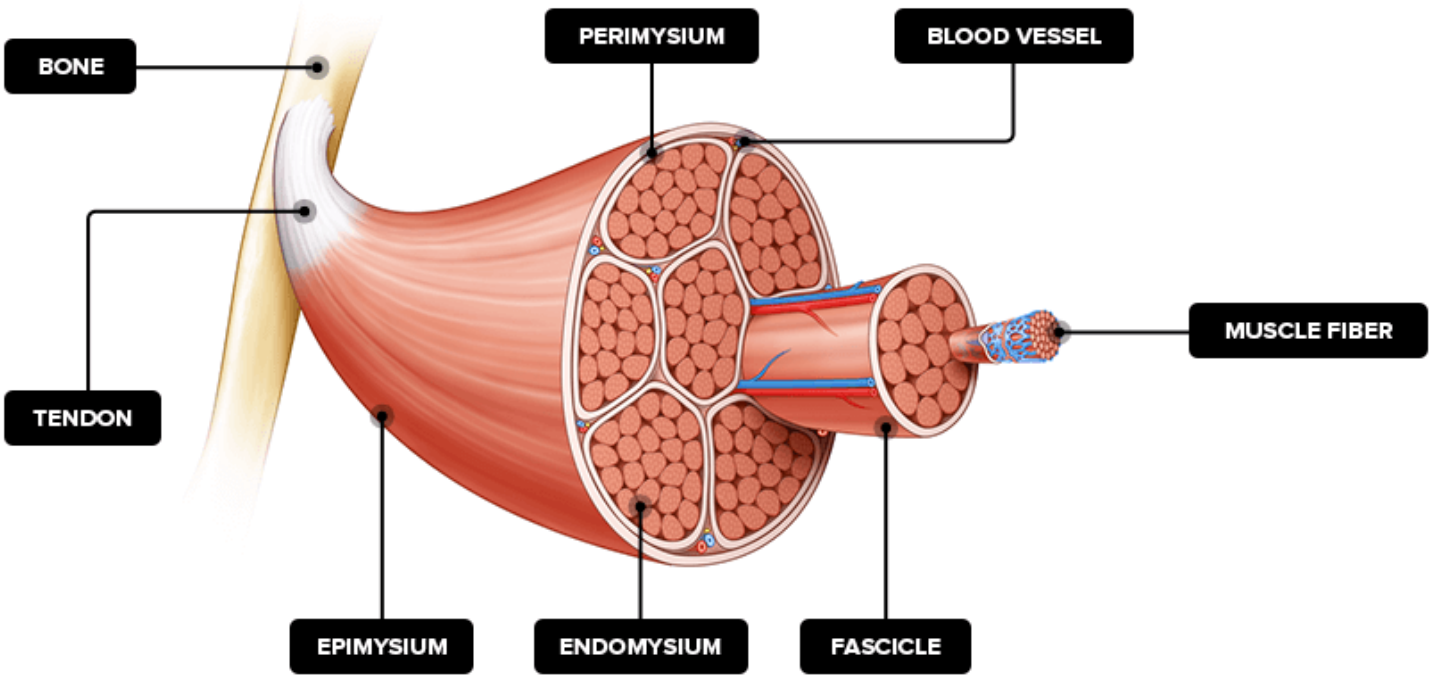
JBI 11/11 [100%]



Quality Check

*see appx

This systematic review examined the potential effects of low (LWS), medium (MWS) or high weekly set (HWS) strength training on muscular strength per exercise.



KEY FINDINGS

9 studies were included; 61 Groups

Multi-joint & Isolation Exercises:

Strength gains were greater with *HWS vs LWS*

Avg Effect Size for LWS 82%

Avg Effect Size for HWS 101%

Strength gains were slightly better for *MWS vs LWS*

Avg Effect Size for MWS 98%

Avg Effect Size for LWS 83%

One repetition maximum (1 RM):

Marginally greater strength gains with HWS vs LWS

Avg Effect Size for HWS 97%

Avg Effect Size for LWS 80%

MAIN TAKEAWAYS

There is still a gap in knowledge.

This research project analyzed a limited set of available data and cautiously advocates the use of MWS for beginners, novice trainers, or the time dependent trainer.

For well-trained individuals, the use of either MWS or HWS strength training may be appropriate.

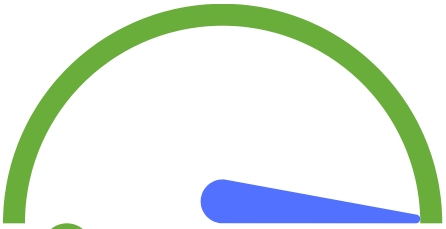
These more advanced trainees may benefit from additional time and training volume to reap the smaller increases in performance normally seen at this level of training progression.

EFFECT OF WEEKLY TRAINING FREQUENCY ON STRENGTH GAIN

APRIL 2023

Click for Full Text (Ralston et al. 2018)

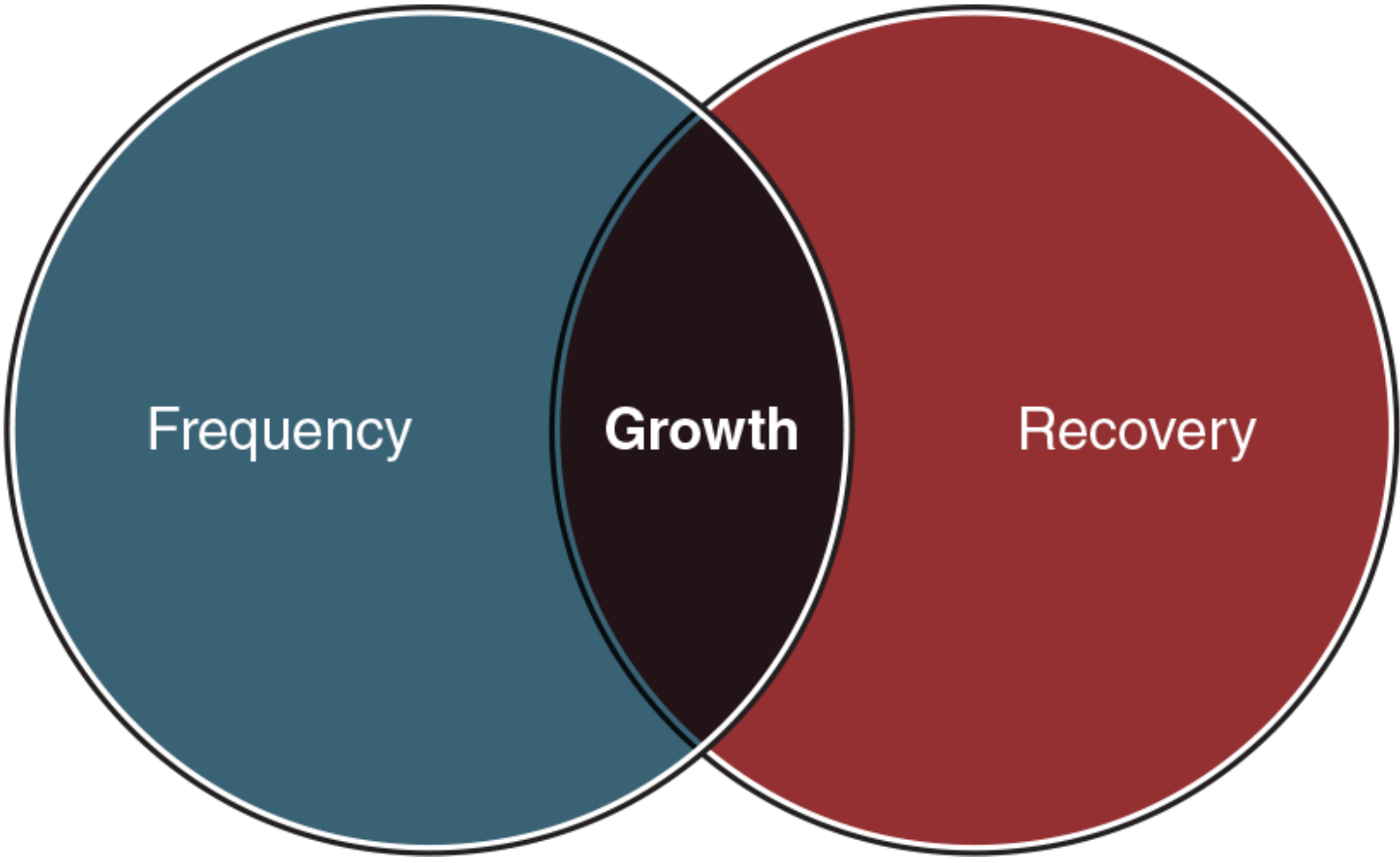
JBI 11/11 [100%]



Quality Check

*see appx

This systematic review assessed low (LF; 1 day week), medium (MF; 2 days week), or high (HF; ≥ 3 days week) training frequency on muscular strength per exercise and on one repetition maximum (1RM)



KEY FINDINGS

12 studies included; 74 groups

Combined Multi-joint and Isolation Exercises:
Trend towards higher RT frequency compared with lower frequency.

Volume-equated strength gain was similar for LF vs HF.

Upper body strength gain was greater for HF vs. LF.

Upper body Strength gain was similar for MF vs. LF

No significant difference in lower body strength for HF vs LF

MAIN TAKEAWAYS

Low frequency and high frequency produce similar strength gains in combined multi-joint strength and isolation exercises.

The use LF training may be an appropriate intersession frequency dose to produce strength gains for untrained or older individuals.

For muscular strength progression, the use of HF training can be used as an effective method of increasing weekly training volume that may contribute to an increase in strength.

GIVE US YOUR FEEDBACK!

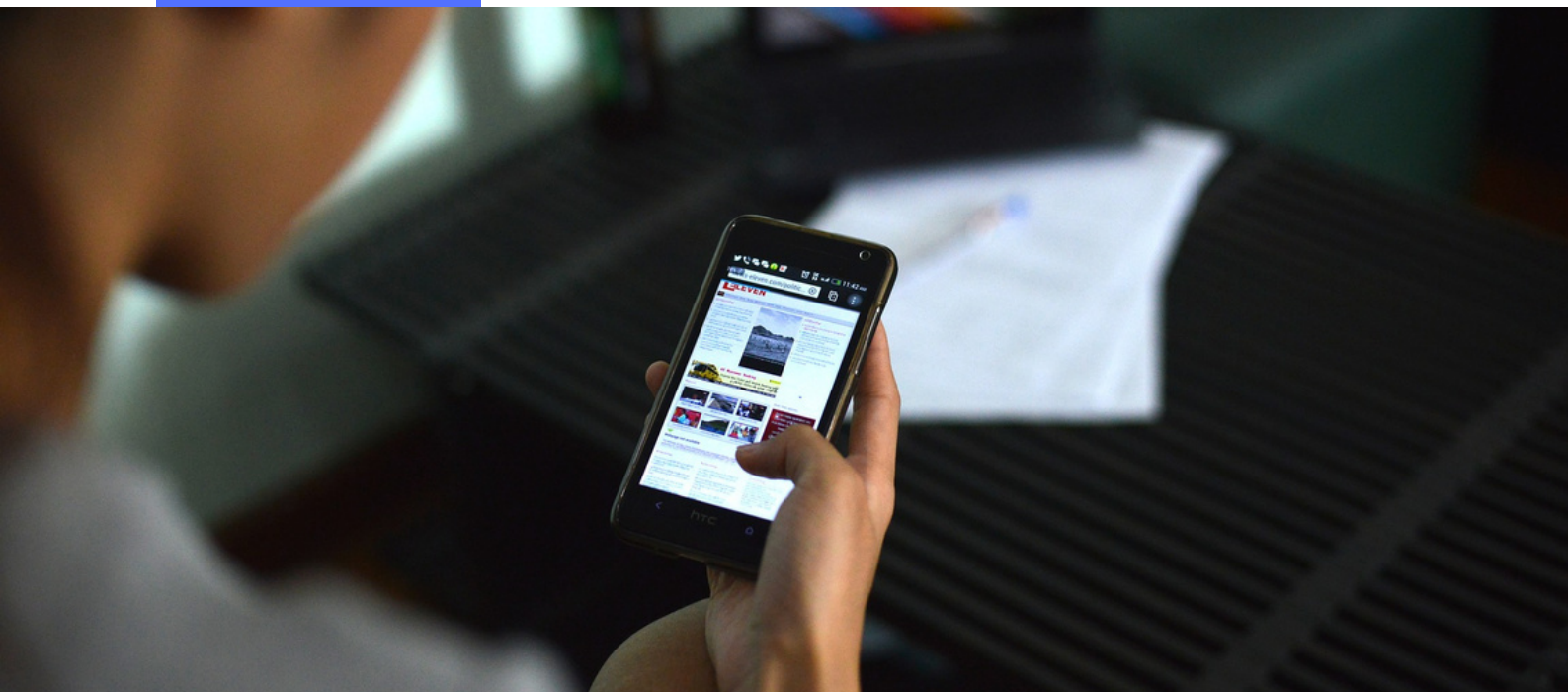
MEMBERS

We are on a mission to make research more accessible, easier to interpret, and quicker to implement.

Help us by giving 1 minute of your time to leave feedback for us.

We would greatly appreciate any feedback you have, as it helps us continually improve!

Leave Review



JBI Critical Appraisal Checklist for systematic reviews and research syntheses

Author: Grgic et al. Year: 2022

		Yes	No	Unclear	Not applicable
1.	Is the review question clearly and explicitly stated?	+	☐	☐	☐
2.	Were the inclusion criteria appropriate for the review question?	+	☐	☐	☐
3.	Was the search strategy appropriate?	+	☐	☐	☐
4.	Were the sources and resources used to search for studies adequate?	+	☐	☐	☐
5.	Were the criteria for appraising studies appropriate?	+	☐	☐	☐
6.	Was critical appraisal conducted by two or more reviewers independently?	+	☐	☐	☐
7.	Were there methods to minimize errors in data extraction?	+	☐	☐	☐
8.	Were the methods used to combine studies appropriate?	+	☐	☐	☐
9.	Was the likelihood of publication bias assessed?	+	☐	☐	☐
10.	Were recommendations for policy and/or practice supported by the reported data?	+	☐	☐	☐
11.	Were the specific directives for new research appropriate?	+	☐	☐	☐

Overall appraisal: 11/11 (100%)

LIMITATIONS:

5 studies did not report participants' adherence to the training programs.

Included studies with independent groups as well as those with dependent groups.

JBI Critical Appraisal Checklist for systematic reviews and research syntheses

Author: Ralston et al. Year: 2017

		Yes	No	Unclear	Not applicable
1.	Is the review question clearly and explicitly stated?	+	☐	☐	☐
2.	Were the inclusion criteria appropriate for the review question?	+	☐	☐	☐
3.	Was the search strategy appropriate?	+	☐	☐	☐
4.	Were the sources and resources used to search for studies adequate?	+	☐	☐	☐
5.	Were the criteria for appraising studies appropriate?	+	☐	☐	☐
6.	Was critical appraisal conducted by two or more reviewers independently?	+	☐	☐	☐
7.	Were there methods to minimize errors in data extraction?	+	☐	☐	☐
8.	Were the methods used to combine studies appropriate?	+	☐	☐	☐
9.	Was the likelihood of publication bias assessed?	+	☐	☐	☐
10.	Were recommendations for policy and/or practice supported by the reported data?	+	☐	☐	☐
11.	Were the specific directives for new research appropriate?	+	☐	☐	☐

Overall appraisal: 11/11 (100%)

LIMITATIONS:

1/9 included research papers used a randomized control design.

The strength increases my be from repeated 1RM testing rather than other physiological adaptations.

Several sets of tested exercises versus nonspecific exercise can impact on an individual's 1RM due to the 'learning' effect of the specifically tested exercise.

JBI Critical Appraisal Checklist for systematic reviews and research syntheses

Author: Ralston et al. Year: 2018

		Yes	No	Unclear	Not applicable
1.	Is the review question clearly and explicitly stated?	+	☐	☐	☐
2.	Were the inclusion criteria appropriate for the review question?	+	☐	☐	☐
3.	Was the search strategy appropriate?	+	☐	☐	☐
4.	Were the sources and resources used to search for studies adequate?	+	☐	☐	☐
5.	Were the criteria for appraising studies appropriate?	+	☐	☐	☐
6.	Was critical appraisal conducted by two or more reviewers independently?	+	☐	☐	☐
7.	Were there methods to minimize errors in data extraction?	+	☐	☐	☐
8.	Were the methods used to combine studies appropriate?	+	☐	☐	☐
9.	Was the likelihood of publication bias assessed?	+	☐	☐	☐
10.	Were recommendations for policy and/or practice supported by the reported data?	+	☐	☐	☐
11.	Were the specific directives for new research appropriate?	+	☐	☐	☐

Overall appraisal: 11/11 (100%)

LIMITATIONS:

Number of studies was small, and variation existed in the design and control of the included studies.

Inclusion of combined subject's characteristics (for example, male-female or trained-untrained).