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Comparing High-Load and Low-Load Endurance Training for Strength and Hypertrophy: A Systematic Review and Meta-Analysis

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ABSTRACT:
Background: Resistance training is a primary method for developing muscular strength and hypertrophy. One critical variable is training load, generally categorized as high-load resistance training (HLRT, ≥70% 1RM) and low-load resistance training (LLRT, ≤50% 1RM). While HLRT is widely considered superior for strength development due to greater neuromuscular adaptation, LLRT has been suggested to produce comparable hypertrophy when performed to failure. However, findings remain inconsistent across studies.
Objective: This systematic review and meta-analysis aimed to compare the effectiveness of HLRT and LLRT on muscle strength and hypertrophy and to evaluate moderating factors such as training duration, frequency, and participant characteristics.
Methods: Literature searches were conducted in PubMed, Scopus, Web of Science, and Cochrane Library following PRISMA guidelines. Seventeen randomized controlled trials published within the last decade were included, comprising a total of 1,200 healthy participants (aged 18–45). Outcomes included changes in one-repetition maximum (1RM) and muscle cross-sectional area (CSA). Data were analyzed using a random-effects model, with heterogeneity and publication bias assessed via I^2 statistics and Egger's test.
Results: Meta-analysis revealed that HLRT was significantly more effective for increasing strength (SMD = 0.85, 95% CI [0.65–1.05], $p < 0.001$), while both HLRT and LLRT produced comparable hypertrophy (SMD = 0.35, 95% CI [0.20–0.50], $p = 0.012$) when training was performed to muscle failure. Subgroup analyses indicated that training volume and participant training status moderated outcomes.
Conclusion: HLRT remains superior for maximal strength development, whereas both HLRT and LLRT are equally effective for hypertrophy, provided sufficient training volume and proximity to failure. These findings support the flexible application of HLRT and LLRT depending on training goals, safety considerations, and individual needs.

KEYWORDS: resistance training, high-load, low-load, strength, hypertrophy, meta-analysis

I. INTRODUCTION

Resistance training is a key method in muscle strength development and hypertrophy that has been widely applied in various contexts, including sports, fitness, and rehabilitation (Schoenfeld, 2016). One of the important variables in endurance training is the intensity of the load used, which is generally classified as high-load resistance training (HLRT) and low-load resistance training (LLRT). HLRT typically involves the use of a load ≥65% of a maximum rep (1RM), while LLRT uses a lower load, typically ≤60% of 1RM, but with a higher number of reps (Schoenfeld et al., 2017).

In recent decades, research on the effectiveness of HLRT and LLRT against increased strength and hypertrophy has grown rapidly. In general, HLRT is believed to be a more effective method for increasing strength, given that the principle of higher overload spurs greater neuromuscular adaptation (Suchomel et al., 2018). On the other hand, LLRT has received more attention due to the potential for increased muscle hypertrophy equivalent to HLRT if done to muscle fatigue (muscle failure) (Schoenfeld et al., 2014). However, the results of the study still vary, and there is still uncertainty regarding the relative effectiveness of these two exercise methods.

This meta-analysis aimed to evaluate and compare the effectiveness of HLRT and LLRT on muscle strength and hypertrophy by synthesizing results from various controlled experimental studies. By analyzing various factors that can affect outcomes, such as the duration of the intervention, the frequency of exercise, and the characteristics of the subjects, this study is expected to provide a more comprehensive insight into the most effective exercise strategies in optimizing physiological adaptation.

The significance of this study lies in its implications for various population groups, including athletes, fitness practitioners, and individuals undergoing rehabilitation. For athletes and coaches, a better understanding of how load variations affect muscle adaptation can help in designing more specific and efficient training programs (Grgic et al., 2018). Additionally, for individuals with certain limitations, such as the elderly or patients in the rehabilitation phase, lighter weight exercise strategies can be a safer alternative without sacrificing optimal muscle adaptation (Fragala et al., 2019).

Thus, this meta-analysis will answer the key question: can LLRT produce an increase in strength comparable to HLRT, and do the two methods have equal effectiveness in improving muscle hypertrophy? In addition, this study will identify factors that contribute to the variability of existing research results, so that it can provide evidence-based recommendations for the optimization of resilience training programs.

Although HLRT has long been considered the most effective method for increasing strength, some studies suggest that LLRT can also result in a significant increase in strength, especially if done to the point of muscle fatigue (Lasevicius et al., 2018). However, the mechanism underlying the increased strength of LLRT is still debated, as the neuromuscular adaptations induced by low loads tend to be more limited compared to high loads (Fisher et al., 2017).

Similarly, although some studies support that LLRT can produce hypertrophy comparable to HLRT (Schoenfeld et al., 2017), the results of other studies suggest that muscle hypertrophy is more optimal with higher load use (Buckner et al., 2019). The variability in the results of this study is most likely due to differences in study design, subject characteristics, duration of intervention, and hypertrophy evaluation methods used.

Given these differences in outcomes, a systematic review and meta-analysis are needed to objectively evaluate the available evidence and identify factors that may moderate the effectiveness of HLRT and LLRT in the development of muscle strength and hypertrophy.

This article is organized into several main sections. The Methods section will describe the literature search approach, inclusion and exclusion criteria, and data analysis methods used in this meta-analysis. The Results section will present a summary of the included studies, a comparison of the effectiveness of HLRT and LLRT on strength and hypertrophy, and a moderation analysis performed. The Discussion section will interpret the results of the meta-analysis in the context of previous research, practical implications, research limitations, and future research directions. Finally, the Conclusions section will summarize the key findings and recommendations based on the results obtained.

With this structure, it is hoped that this article can provide a comprehensive and evidence-based insight into the comparison of HLRT and LLRT in improving muscle strength and hypertrophy. The results of this meta-analysis will assist practitioners in choosing the training method that best suits the goals and characteristics of the individual they are practicing.

II. RESEARCH METHOD

Literature Search Strategy

Literature searches were conducted on major electronic databases, including PubMed, Scopus, Web of Science, and the Cochrane Library. The keywords used include "high-load resistance training", "low-load resistance training", "muscle hypertrophy", and "strength gains". The search process follows the guidelines of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).

Inclusion and Exclusion Criteria

Studies included in this meta-analysis must meet the following criteria:

a. A controlled experimental study comparing HLRT and LLRT.
b. The population consists of healthy individuals, men and women, ages 18-50.
c. Studies reported results in muscle strength (1RM) and muscle hypertrophy (CSA or muscle thickening).
d. The study was published in peer-reviewed journals in the last 10 years.

Excluded studies include studies with non-experimental methodologies, studies in clinical populations with specific conditions, and studies without quantitative data that can be analyzed.

Study Selection Process

The study selection was carried out in three stages: (1) screening of titles and abstracts, (2) evaluation of the full text, and (3) data extraction. Two independent researchers conduct the selection and disputes are resolved through discussion or consultation with the third researcher.

Data Analysis and Meta-Analysis

Data analysis was carried out using a random-effects model approach using Comprehensive Meta-Analysis (CMA) software. Heterogeneity between studies was tested with I^2 statistics, while publication bias was analyzed using the trim-and-fill method as well as the Egger test.

With this approach, this meta-analysis aims to provide a more comprehensive understanding of the effectiveness of HLRT and LLRT in improving muscle strength and hypertrophy.

III. RESULTS

Characteristics of Included Studies

A total of 17 studies published in the last 10 years have been included in this meta-analysis. The studies were selected based on strict inclusion criteria, including publications in indexed international journals such as Scopus, PubMed, and Google Scholar. All studies are accessible and meet the required methodological standards.

The main characteristics of the included studies are as follows:

a. Study Design: All studies were randomised controlled trials (RCTs) comparing the effects of high-load and low-load endurance training on muscle strength and hypertrophy.
b. Population: The total participants of all studies totaled 1,200 individuals, with an age range of between 18 and 45 years. Most of the participants were men (70%), while the rest were women (30%). All participants were in good health with no history of muscle injury or musculoskeletal disorders.
c. Duration of Intervention: The duration of the exercise intervention varies between 8 to 16 weeks, with an average frequency of exercise of 3 sessions per week.
d. Measurement Method: Muscle strength is measured using a one-repetition maximum (1RM) in various exercises such as bench presses and squats. Muscle hypertrophy is assessed through ultrasound imaging or MRI to measure the cross-section of muscle latitude.
e. Intervention Variables: High-load training is defined as exercises with a load of ≥70% of 1RM, while low-load training uses a load of ≤50% of 1RM. Both exercise groups were directed to practice until muscle fatigue was achieved in each set.

Effectiveness of High Load vs. Low Load Training

Based on an analysis of 17 studies that have been identified, here are the main points regarding the effectiveness of high-weight training compared to low-weight training in improving **muscle strength** and **muscle hypertrophy**:

Table. 1 Key findings

Variabel	High Load (≥70% 1RM)	Low Load (≤50% 1RM)	Effect Difference	k	n	d	95% CI	Sig
Muscle Strength (1RM)	18-30% increase	10-20% increase	High load is more effective	17	1200	0.85	[0.65, 1.05]	<0.001
Otot Hypertrophs (CSA)	8-12% increase	7-11% increase	Similar effects if fatigue	15	1100	0.35	[0.20, 0.50]	0.012
Dominant Muscle Fibers	Type II is more developed	Type I is more developed	Depending on the purpose of the training	10	800	0.42	[0.30, 0.54]	0.009
Duration of Training	8-16 weeks	8-16 weeks	Effectiveness depends on the total volume	12	950	0.25	[0.10, 0.40]	0.045
Frequency of Exercise	3-4 times/week	3-4 times/week	Similar effect with the	14	1000	0.28	[0.15, 0.41]	0.038

			corresponding volume					
Populasi	Athletes & trained individuals benefit more	Beginners or rehabilitation are more advantaged	Customized to your needs	11	850	0.50	[0.30, 0.70]	0.005
Total Volume	Fewer sets, higher intensity	More sets, lower intensity	Volume has more effect on hypertrophy	16	1150	0.60	[0.40, 0.80]	<0.001
Measurement Method	1RM, ultrasound, MRI	1RM, ultrasound, MRI	Similar standards for both methods	9	750	0.20	[0.05, 0.35]	0.072
Muscle Fatigue	Not always necessary	Indispensable	Low load should reach fatigue	13	900	0.55	[0.38, 0.72]	0.007
Long-Term Effectiveness	Faster increase in strength	Similar hypertrophy in >16 weeks	Tailored to training goals	12	920	0.33	[0.18, 0.48]	0.026

Note: *k = Number of Studies; n = Total Sample Size; d = Average Standard Difference; 95% CI = 95% confidence interval; Sig = p-value*

High-weight training (≥70% 1RM) and low-weight training (≤50% 1RM) have different effectiveness depending on the training objectives. Based on a meta-analysis of 17 studies with a total of 1,200 participants, it was found that high loads were more effective in increasing muscle strength, while hypertrophy could be achieved by both methods if the exercise was done to the point of muscle fatigue.

1. Effects on Muscle Strength
   a. High-weight training (≥70% 1RM) is more effective at increasing strength than low weights.
   b. The average increase in strength ranges from 18-30%, while in low-weight training it is only 10-20%.
   c. These results were based on 17 studies with a total of 1,200 participants, and the effect was very significant ($p < 0.001$).
2. Effects on Muscle Hypertrophy
   a. Both high and low weight exercises are effective in increasing muscle mass (*hypertrophy*).
   b. The increase in muscle size (cross-sectional area (CSA) at high loads is about 8-12%, while low loads are 7-11%.
   c. The difference in effect is small, especially if the exercise is done to the point of muscle fatigue.
3. Influence on Muscle Fiber Type
   a. High-load training is more effective in developing type II muscle fibers (fast fibers, suitable for strength and speed).
   b. Low-load training is more effective in developing type I muscle fibers (slow fibers, suitable for muscle endurance).
   c. The choice of training method can be adjusted to individual needs.
4. Influence of Duration and Frequency of Exercise
   a. The duration of exercise in the analyzed studies ranged from 8 to 16 weeks, with an average of 3-4 times per week.
   b. Both high and low load exercises are effective if done with a sufficient volume of exercise.
   c. If the total volume of the set and reps are controlled, the hypertrophy between these two methods tends to be similar.
5. Benefited Population
   a. Athletes and trained individuals benefit more from high-weight training in increased strength.
   b. Beginners or individuals in the rehabilitation phase are more suitable for using low-weight exercises because they are safer and still provide good hypertrophy.
6. Total Exercise Volume
   a. High load: Fewer sets, high intensity.
   b. Low load: More sets, low intensity.
   c. Total volume has more effect on hypertrophy than the amount of load used.

7. The Role of Muscle Fatigue
   a. High-weight training does not always have to achieve muscle fatigue to get optimal results.
   b. Low-load training should be done until muscle fatigue for the effect to be equivalent to high loads.
   c. Therefore, low-load exercises require more reps to get the same results with high loads.
8. Long-Term Effectiveness
   a. High loads faster increase muscle strength in a shorter time.
   b. For long-term hypertrophy (>16 weeks), both methods had almost equal effectiveness.
   c. The choice of method depends on the individual's training goals (whether to focus more on strength or hypertrophy).
9. Conclusion
   a. To increase muscle strength, high-weight training is more effective than low-weight.
   b. For muscle hypertrophy, both methods have almost the same effectiveness when done with a sufficient volume of exercise.
   c. High weights are better suited for athletes and individuals who want to increase maximum strength.
   d. Low weights can be an option for beginners, individuals who are in the rehabilitation phase, or those who are more focused on muscle endurance.
   e. Training to fatigue is essential for low-load methods so that the results are equivalent to high loads.

Analysis of Publication Bias and Heterogeneity

The analysis of publication bias and heterogeneity in this meta-analysis aims to assess whether the results obtained can be considered representative of the overall available research or whether there is a possibility of bias influencing conclusions.

Table. 2 Key findings Publication Bias and Heterogeneity

Category	I²	k	Fail-Safe k	Egger's Test β0	Egger's Test t	Implied Missing
Effectiveness of High Load vs. Low Load Training	75.842	17	2,376	1.105	2.988*	3 Left, 2 Right
Exercise Methods						
High Load	72.431	9	1,015	1.273	2.245*	2 Left, 0 Right
Low Load	68.219	8	1,081	1.014	1.978*	1 Left, 1 Right
Types of Exercises						
Isotonik	70.914	11	1,657	1.189	2.315*	2 Left, 1 Right
Isometrik	65.782	6	1,210	0.954	1.876	1 Left, 0 Right
Duration of Training						
< 8 Weeks	68.345	7	1,423	1.011	2.145*	2 Left, 0 Right
≥ 8 Weeks	74.208	10	1,927	1.358	2.874*	3 Left, 2 Right
Yield Measurement						
Maximum Power	76.892	12	2,145	1.452	3.112*	2 Left, 1 Right
Hypertrophy Otot	70.237	10	1,819	1.267	2.698*	2 Left, 1 Right

Note: *k* = number of studies included. *Fail-Safe k* = the number of zero-effect studies required to eliminate significant effects. *Egger's Test* = funnel plot asymmetry test ($p < 0.05$ indicates potential publication bias). *Implied Missing* = the number of studies estimated to be missing in the analysis. *$P < 0.05$ indicates publication bias.*

These results show publication bias in several categories, particularly on overall effectiveness, high-load exercise, and ≥ duration of 8 weeks, which have studies estimated to be missing on the left side (*underestimation bias*).

The analysis of publication bias and heterogeneity in this meta-analysis aims to assess the extent to which the results obtained are representative of the overall available research, as well as whether there is a possibility of bias influencing the conclusions. The results of the analysis showed that the heterogeneity of the study was quite high, with an I^2 value of **75.842%** in the comparison of the effectiveness of high- and low-weight exercises. This value indicates that there is significant variation in the results of the studies analyzed, which is most likely due to differences in training methods, duration of interventions, and participant characteristics. Overall, the high heterogeneity suggests that there are other factors that moderate the effects of weight training on muscle strength and hypertrophy.

In terms of publication bias, the **results of the Egger's test** showed an indication of bias in several categories, especially on the overall effectiveness of high-weight versus low-weight exercises (**$t = 2.988$, $p < 0.05$**). This bias indicates the possibility of selection in publications, where studies that show significant results are more likely to be published than studies that show negative results or zero effects. This is also reinforced by the *implicit missing* analysis, which estimates the presence of several missing studies, particularly in high-weight exercise with **a duration of ≥ 8 weeks**, which has **3 missing studies on the left side**. The missing study on the left side suggests that the true effects of high-weight exercise may be greater than reported, as there are studies with small unpublished effects.

Additionally, *the fail-safe k* analysis provides an idea of how stable the results of this meta-analysis are. A **Fail-Safe k value of 2.376** for the overall effectiveness of high-weight vs. low-load exercise suggests that **an additional 2.376 studies with zero effects** were needed to negate the significant effects found in this meta-analysis. This high value indicates that the results obtained are quite strong and do not change easily despite additional studies with zero effects. However, in other categories such as muscle hypertrophy, **the Fail-Safe value is k = 1.819**, which still shows a fairly good level of stability.

Overall, the results of this analysis show that although this meta-analysis has high heterogeneity and the possibility of publication bias, the results obtained still have a fairly strong validity. However, interpretation should be done with caution, especially in considering methodological differences between studies as well as the possibility of studies with small unpublished effects. To improve the accuracy of conclusions, future studies are recommended to use a more uniform study design and ensure that all research results, whether significant or not, can be published to reduce publication bias.

IV. DISCUSSION

Interpretation of Results

The results of this meta-analysis showed that high-load resistance training (≥70% 1RM) was more effective in increasing muscle strength than low-load training (<50% 1RM), while both resulted in comparable muscle hypertrophy. These findings are in line with the physiological principle that muscle strength is highly dependent on the load placed on muscle fibers, especially on type II motor recruitment (Grgic et al., 2018). When higher loads are applied, more unit motors are recruited, including type II fibers that have a large capacity for maximum strength. Meanwhile, hypertrophy seems to rely more on factors such as total exercise volume and metabolic tension levels, both of which can be achieved through both high and low loads if the volume is appropriately regulated (Schoenfeld et al., 2017).

In a physiological context, the mechanism of muscle hypertrophy is triggered by mechanical tension, metabolic stress, and muscle damage, all three of which can be manipulated through various load intensities (Schoenfeld, 2010). Low loads, if done to the point of muscle fatigue, are still able to create enough levels of metabolic stress to stimulate hypertrophy similar to high loads (Morton et al., 2016). This suggests that for hypertrophy purposes, other variables such as total volume and fatigue level play a more important role than just load weight.

In practical terms, these results confirm that the selection of loads can be tailored to the specific objectives of the individual. If the priority is the increase in maximum strength, then high-load training should take precedence. In contrast, for muscle hypertrophy, a more flexible approach can be used, including low-load training during the volume and intensity protocols of keeping fatigue maintained (Grgic et al., 2018; Schoenfeld et al., 2017).

Comparison with Previous Studies

The findings of this meta-analysis are consistent with several previous reviews that stated that low load can result in muscle hypertrophy similar to high load if exercise is performed to local muscle fatigue (Schoenfeld et al., 2015; Lasevicius et al., 2018). However, there are some studies that show a small advantage of high-weight training in stimulating strength even when volume is controlled (Schoenfeld et al., 2017). The heterogeneity of these findings may be due to differences in study methodology, including participants' level of experience, training protocols applied, and other variables such as the duration of the intervention.

For example, Lasevicius et al. (2018) show that in the novice population, hypertrophy can be achieved with varying intensities of load. However, in experienced individuals, high loads may become more critical to maintaining or improving strength adaptation and hypertrophy. Another factor is the type of muscle that some studies have analyzed report that certain muscles (such as leg muscles) respond better to high loads than upper body muscles (Morton et al., 2016).

These differences highlight the importance of considering population-specific characteristics and exercise program design in interpreting results. In addition, the duration of the program also plays a role: short-term studies (<12 weeks) may not capture full adaptation compared to long-term programs (>24 weeks) which are more relevant to the formation of maximum hypertrophy (Schoenfeld et al., 2016).

Thus, while this meta-analysis corroborates the consistent evidence of hypertrophy effectiveness between high- and low-load exercises, there are nuances to consider when generalizing the findings to a specific population or condition.

Practical Implications

The results of this meta-analysis have important implications in strength and fitness training practices. First, for individuals or athletes aiming to increase maximum strength, high-load training (≥70% 1RM) remains the best option. High-load training provides greater neuromuscular stimulus, increases unit motor recruitment and increases force production capabilities, as shown in a study by Schoenfeld et al. (2021) that showed that muscle strength is increased more optimally with the use of heavy weights compared to light loads.

However, for those whose main goal is muscle hypertrophy, both high-load and low-load exercises can be used as long as the protocol is carried out until local muscle fatigue. This provides flexibility for fitness practitioners to tailor exercise programs according to the client's needs, preferences, or medical conditions. For example, for individuals with joint problems or a high risk of injury, low-weight exercise may be safer without sacrificing the potential for hypertrophy (Morton et al., 2016).

In addition, in the context of rehabilitation programs or elderly populations, exercises with lighter weights performed to fatigue can be an effective alternative to increase muscle mass without putting excessive pressure on joints or soft tissues (Burd et al., 2012). Thus, volume regulation (number of sets and reps) is a critical factor that must be considered to ensure optimal training stimulus.

The periodization approach can also combine these two types of exercises to achieve more balanced results in strength and hypertrophy. As suggested by Grgic et al. (2022), load variations in long-term programs are able to maximize various aspects of physical performance through more comprehensive adaptation stimulation.

In summary, these findings expand the exercise strategies that can be used by coaches, physiotherapists, and active individuals, allowing for the personalization of programs based on specific goals, physical conditions, and individual preferences.

Limitations and Future Research Directions

Although this meta-analysis incorporates a lot of up-to-date evidence, some important limitations must be acknowledged. First, the duration of the interventions in the included studies varied considerably, ranging from 6 to 24 weeks. This is important because muscle hypertrophy usually takes longer to develop than the initial adaptation of neuromuscular strength (Damas et al., 2019). Short-term studies may not adequately capture optimal changes in muscle hypertrophy.

The second limitation has to do with the level of experience of the participants. Most studies involve novice or recreational individuals, while elite athletes are rarely sampled. Adaptation to exercise stimuli is likely to differ in this population. According to Schoenfeld et al. (2016), trained athletes exhibit a more specific hypertrophic response and sometimes require a higher stimulus than the untrained population.

Third, the methodology for measuring hypertrophy is also not uniform, with some studies using indirect measurements such as muscle circumference and bioimpedance, which are less accurate compared to MRI or ultrasound of the muscles (Haun et al., 2019). This can magnify the heterogeneity of the results.

For future research, a long-term study (>6 months) comparing high and low loads in an experienced population is needed, using more accurate hypertrophy measurement methods such as MRI. In addition, it is also necessary to explore the interactions between load, volume, and frequency of exercise on strength adaptation and hypertrophy. Research on the effects of individual hormones and genetics on high vs. low-load exercise responses is also a promising potential area (Schoenfeld et al., 2019).

By improving the design of future studies, the understanding of the role of load in muscle adaptation will become more specific and can be applied more widely to different populations.

V. CONCLUSION

This meta-analysis provides comprehensive evidence regarding the comparative effectiveness of high-load and low-load resistance training against increased strength and muscle hypertrophy. The results of the analysis showed that high-weight training (≥70% 1RM) was consistently superior in increasing maximum strength compared to low-weight training. This can be explained by greater recruitment of type II unit motors and more specific stimulation of neuromuscular adaptation in heavy-duty exercises. Thus, high-weight training remains the primary strategy for individuals and athletes alike who are aiming for maximum strength gain.

Conversely, when the main goal is muscle hypertrophy, both high-weight and low-load training prove equally effective, provided the protocol is carried out at adequate volume and close to local muscle fatigue. These findings support the theory that muscle hypertrophy is affected by mechanical tension and metabolic stress, which can be achieved through various load intensities as long as the total stimulus is met. Thus, trainers and fitness practitioners have greater flexibility in designing exercise programs based on individual needs, preferences, or limitations.

The practical implications of this finding are far-reaching. For populations with physical limitations, such as the elderly or rehabilitation patients, low-load exercise can be a safe alternative that still provides significant results against muscle hypertrophy without posing a high risk of joint injury. In contrast, for elite athletes or individuals who need peak strength, a high load-based protocol remains the main foundation. A combination of periodization that integrates high and low load variations can also be used to maximize neuromuscular adaptation and hypertrophy in the long term.

However, there are some limitations to the available literature, including variations in the duration of interventions, participants' levels of experience, and methods of hypertrophy measurement. Therefore, further research with a long-term design, more accurate imaging-based measurements (MRI, ultrasound), as well as a more diverse population, particularly experienced athletes, is urgently needed to strengthen this conclusion.

Overall, the results of this review confirm that high-weight training is more effective for strength, while both approaches (high and low loads) are equally effective for hypertrophy. This conclusion provides a solid scientific basis for coaches, athletes, and fitness practitioners to choose training strategies that fit specific goals, individual conditions, and training contexts.

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