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Optimal HIIT Workout Dosage for Weight Loss in Sedentary Adults

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ABSTRACT
Backgroud: High-Intensity Interval Training (HIIT) has emerged as a time-efficient alternative exercise modality to moderate-intensity continuous training (MICT) in an effort to lose weight and body fat in sedentary populations. Methods: This article systematically reviews the current literature on the most optimal doses of HIIT training (frequency, session duration, intensity, and work-rest ratio) for weight loss in adults who were previously physically inactive. Searches were conducted on PubMed, ScienceDirect, and Google Scholar databases for relevant randomized clinical trials (RCTs), meta-analyses, and systematic reviews. Results: The results of the synthesis showed that HIIT programs run for more than 8 weeks, a minimum of 3 sessions per week, with work intervals of less than 60 seconds separated by active recovery ≤90 seconds were shown to be more effective in producing beneficial changes in body composition. In addition, HIIT with a volume of ≥75 minutes per week showed advantages over the control group in indicators of body fat percentage, waist-to-hip circumference, and VO_2max, so it could be considered for short-term fat loss. The effects of HIIT on fat loss and cardiorespiratory fitness in young and middle-aged adults are equal to or better than MICT, which is influenced by age, obesity complications, duration of intervention (>6 weeks), frequency, and length of HIIT intervals. Conclusions: that the optimal HIIT dosage for the sedentary population ranges from a frequency of 3 times/week, the duration of the program is more than 8 weeks, with a weekly volume of at least 75 minutes, although it is necessary to make gradual adjustments given the characteristics of a population that has not been adapted to high-intensity exercise.

Keywords: HIIT; Workout doses; Weight loss; Sedenter; Body composition

INTRODUCTION

The prevalence of obesity and sedentary lifestyles continues to increase globally, driving the need for effective yet feasible physical exercise intervention strategies for people with little time or interest in exercise. One of the main obstacles in running a conventional training program is the perception that MICT needs to be maintained for a long time (≥150 minutes/day or 1000 minutes/week) which is a high time burden for modern society (Lipnowski et al., 2012; Stubbe & de Geus, 2009; Walter et al., 2005).

On the other hand, the development of sports physiology shows that High-Intensity Interval Training (HIIT) is an exercise approach that is able to produce equivalent physiological adaptation, even on some indicators better than MICT, even though it is done in a much shorter time. HIIT combines high-intensity intervals with active or passive recovery periods, effectively increasing energy expenditure, fat oxidation capacity, insulin sensitivity, and cardiorespiratory fitness (Guo et al., 2023; Neuendorf et al., 2023; Olney et al., 2017). However, there is no clear consensus to date on the most effective HIIT workout dosage including training frequency, program duration, weekly volume, intensity, and work-rest ratio to produce optimal weight and body fat loss in the sedentary adult population. Therefore, the synthesis of scientific evidence on the characteristics of the most effective HIIT program is important as a basis for the preparation of evidence-based exercise prescription recommendations for this population (Maillard et al., 2018; Mujaddadi et al., 2025; Reljic et al., 2019).

In recent years, HIIT has grown in popularity as a time-efficient workout alternative. HIIT has been considered a well-known fitness trend due to its time-efficient and effective characteristics in recent years. Physiologically, HIIT has a greater afterburn effect than MICT a physiological response to intense exercise that causes the body to burn more calories and increase insulin sensitivity for several hours after rest, and can effectively reduce fat and improve insulin sensitivity, affect cytokine regulation, and maintain balanced antioxidant status (Chin et al., 2022; Leung et al., 2024; Mujaddadi et al., 2025).

Although its benefits are widely documented, the variety of HIIT protocols in the literature is enormous. HIIT workout recipes vary in terms of workout intensity, cycle period, number of sets, workout duration, frequency, and so on. This variation makes it difficult to determine the truly optimal dosage, especially for a sedentary population that is not used to the stress of high-intensity exercise. As confirmed in several studies, research on HIIT not only determines the efficacy of HIIT-type integrated neuromuscular exercises on weight and fat loss in sedentary adults, but also needs to understand the optimal workload and frequency associated with beneficial health changes.

In addition to the characteristics of the exercise program, the physiological response to HIIT is also influenced by individual factors, such as age, gender, initial fitness level, weight status, and the presence of metabolic comorbidities. These differences in characteristics cause individuals to exhibit different responses despite following the same training protocol. Some studies report that improved cardiorespiratory fitness can occur without significant weight loss, while other studies show a greater decrease in body fat percentage despite relatively small changes in weight. The inconsistency of these findings indicates that the effectiveness of HIIT is not only determined by the intensity of the exercise, but also by the interaction between the characteristics of the participants and the components of the training dose. Therefore, studies that integrate various scientific evidence are needed to identify the most effective and appropriate HIIT protocols for the sedentary adult population, so that the resulting exercise recommendations have a stronger scientific basis and can be applied in clinical practice as well as health promotion programs.

The issue of protocol affordability for the sedentary group is also an important concern. Some researchers note that supra-maximal or "all-out" HIIT protocols may be considered too aversive for relatively inactive populations, so it remains unclear whether practical HIIT models that are more likely to be run by individuals with a sedentary lifestyle in the real world will elicit a response similar to that of a long-duration MICT program. Therefore, determining the optimal "dose" including frequency, session duration, intensity, and work-rest ratio is crucial for HIIT to be applied safely, effectively, and sustainably in a sedentary population.

In addition to the effectiveness aspect, the level of adherence to the exercise program is also a determining factor for the success of interventions in the sedentary population. Exercise programs that are too strenuous or have an intensity that is not in accordance with the individual's capacity have the potential to increase fatigue, discomfort, and the risk of program termination before the intervention target is achieved. In contrast, HIIT protocols designed with the right dose of exercise have the potential to increase motivation, comfort, and consistency of participation because they offer shorter workout durations with health benefits comparable to conventional workouts. Therefore, identifying HIIT protocols that are not only effective in losing weight and body fat, but also have high acceptability and adherence, is an important step in developing evidence-based exercise recommendations that can be widely applied to people with sedentary lifestyles.

This article aims to synthesize the current scientific evidence regarding the most optimal dosage of HIIT training for weight loss and body fat in sedentary adults, while also identifying the exercise parameters (frequency, volume, program duration, and intensity) that are most consistently associated with significant weight loss outcomes.

METHODS

This article was prepared using a narrative systematic review approach to the scientific literature that discusses HIIT dose-responses to weight loss and body composition in sedentary/inactive and overweight-obese adult populations.

Search Strategy

Literature searches were conducted on electronic databases including PubMed/MEDLINE, ScienceDirect, Web of Science, Scopus, and Google Scholar, using a combination of keywords "HIIT", "high-intensity interval training", "dose-response", "weight loss", "fat loss", "sedentary", "obese", and "frequency/duration/intensity". This criterion follows the methodological approach commonly used in similar meta-analyses, such as studies sourced from online databases including PubMed, Scopus, Web of Science, and Google Scholar.

Criteria Inclusion

The included studies were randomised controlled clinical trials (RCTs), systematic reviews, and meta-analyses that: (a) involved sedentary, inactive, or overweight/obese adult participants; (b) using HIIT protocols as the primary intervention; (c) report outcomes related to weight, fat mass, body fat percentage, or other body composition indicators; and (d) published in an English-language journal with a peer-review process.

Data Extraction

Data extracted from each study included sample characteristics, duration of intervention, frequency of sessions per week, duration of each session, intensity of exercise (percentage HRmax/VO_2max), work-rest interval ratio, and key outcomes related to weight/body fat change. As an example of a representative protocol approach, one RCT established a HIIT program consisting of four 4-minute high-intensity intervals at 85%–95% peak heart rate (HRpeak) interspersed with a 3-minute active recovery interval at 50%–70% HRpeak.

Analysis

Because this article is a narrative synthesis and not a new quantitative meta-analysis, the analysis was conducted by comparing dose-response findings between studies on the following variables: (1) exercise frequency per week, (2) program duration (week), (3) duration/interval ratio per session, and (4) weekly total volume (minutes/week), to identify the most consistent dose patterns associated with statistically significant weight/fat loss.

RESULTS AND DISCUSSION

Frequency of Workouts per Week

Evidence from a large meta-analysis suggests that the frequency of exercise affects the magnitude of the fat loss effect. One systematic review of 36 RCTs found that three sessions per week was more effective on body composition than two sessions per week in the exercise frequency subgroup. These findings are consistent with the mechanistic explanation that high-frequency exercise (≥3 sessions) may induce fat loss due to a significant catecholamine response, increased concentration of β-adrenergic receptors, and increased fat oxidation compared to low frequency.

However, another study comparing low versus high frequency in a central obesity population was designed to test whether low-frequency (once per week) HIIT could be an effective and sustainable exercise strategy to address the obesity pandemic, indicating that the issue of optimal frequency is still an area of active research, particularly regarding the trade-off between effectiveness and sustainability (adherence) in sedentary populations (Leung et al., 2024).

Program Duration and Weekly Volume

The duration of the exercise program appears to be an important determinant of fat loss results. A meta-analysis of RCTs found that HIIT durations of more than 8 weeks were shown to be more beneficial for body fat percentage, fat mass, and lean mass than shorter programs, indicating the need for prolonged stimuli to reduce body fat and promote muscle mass remodeling.

Regarding total weekly volume, a recent network meta-analysis of obese/overweight patients concluded that HIIT ≥75 minutes/week showed superiority over control groups in indicators of body fat percentage, waist-to-hip circumference, and VO_2max. The study also recommends that HIIT ≥75 minutes/week may be considered for short-term fat loss, although no significant difference was found in weight, BMI, or hip circumference compared to MICT ≥150 minutes/week or HIIT <75 minutes/week. This is explained because body weight and BMI are crude indicators that fail to reflect subtle changes in fat and muscle composition, while VO_2max and body fat percentage are more sensitive in capturing early physiological improvements related to muscle aerobic metabolic capacity and fat oxidation efficiency (Kuk & Lee, 2020; Shukohifar et al., 2022).

Interval Duration and Work-Break Ratio

The characteristics of the interval per session also play an important role. A meta-analysis of 36 RCTs found that exercise of more than 8 weeks, a minimum of 3 sessions per week, with work intervals of less than 60 seconds separated by active recovery ≤90 seconds was more effective in producing beneficial changes in body composition. In the overweight/obese child and adolescent population, a similar pattern was found in which the improvement in cardiorespiratory fitness was more significant when the HIIT intervention lasted more than 10 weeks, performed 3 times per week, with 2 to 8 sets per session, and maintained a work-rest ratio of about 1:1.

Comparison with MICT

From the perspective of relative effectiveness to MICT, a systematic review of young and middle-aged adults concluded that the effects of HIIT on fat loss and cardiorespiratory fitness were equal to or better than that of MICT, which may be influenced by age (18–45 years), obesity complications, duration (>6 weeks), frequency, and length of HIIT intervals. The same study confirmed the practical advantages of HIIT because HIIT appears to be more time-saving and more enjoyable than MICT, although the amount of clinical improvement is relatively limited (Chen et al., 2026; Russomando et al., 2020).

Appetite Response and Energy Intake

The exercise dose aspect is also related to the post-exercise appetite compensation response in inactive populations. A crossover study in physically inactive middle-aged men compared single sessions of HIIT (10 1-minute intervals at 100% VO_2max interspersed with 1-minute active recovery), MICT, and heavy-intensity continuous workouts, in which HIIT consisted of 10 1-minute periods at 100% VO2max interspersed with 1-minute active recovery periods, while MICT consisted of 40-minute sessions at 65% VO2max and VICT consisted of 20-minute sessions at 80% VO2max. These kinds of findings are relevant in determining whether a particular dose of HIIT has the potential to trigger energy intake compensation that can reduce the effectiveness of the calorie deficit from exercise.

The above evidence synthesis suggests that the "optimal dose" of HIIT for weight loss in sedentary adults is not a single value, but rather a combination of several interacting parameters: frequency (≥3 sessions/week), program duration (>8 weeks), weekly volume (≥75 minutes/week), and interval structure (work duration <60 seconds, work-rest ratio close to 1:1, active recovery ≤90 seconds).

The frequency and duration of the program appear to be the two most consistent factors. The consistency of the findings that 3 sessions per week gives better results than 2 sessions per week, plus the need for a program duration of at least 8 weeks, indicates that metabolic adaptation and body composition require sufficient stimulus accumulation, not just a single, intensive session. This is in line with the physiological mechanisms of increased catecholamine responses and fat oxidation that require regular repetition.

A weekly volume of at least 75 minutes is an important finding because it is much less than the conventional MICT recommendation which requires ≥150 minutes/week. This confirms the value of HIIT's time efficiency a crucial consideration for sedentary populations who often excuse lack of time as a major barrier to exercising. However, it's important to note that HIIT's prominence is more evident in body composition indicators (fat percentage, VO_2max) than in absolute body weight or BMI, which is more crude as an indicator of body changes.

The structure of the interval (short duration of work with adequate recovery) also plays an important role, possibly because too long work intervals can reduce the effective intensity of the average session, while recovery that is too short can reduce the ability to maintain high intensity at subsequent intervals, both of which are particularly relevant for sedentary individuals whose work capacity has not been trained.

An important consideration that should be underlined specifically for sedentary populations is tolerance and adherence. Supra-maximal or "all-out" HIIT protocols risk being perceived as too aversive and potentially lowering compliance levels in populations that are not used to the stress of high-intensity training. Therefore, the implementation of theoretically "optimal" doses (e.g. very short intervals with near-maximum intensity) needs to be balanced with a progressive approach starting from lower intensity and volume before increasing to the recommended dose in the literature, in order to maintain the long-term sustainability of the program.

The comparison with MICT also confirms that HIIT is not an absolute replacement, but rather an equivalent alternative that is more time-efficient and tends to be more enjoyable, making it suitable as a strategy to improve exercise adherence in a population that is reluctant to exercise due to time constraints.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the synthesis of the latest scientific evidence, the optimal dose of HIIT training for weight loss and body fat in sedentary adults can be formulated as follows: a minimum frequency of 3 sessions per week, a program duration of more than 8 weeks, a weekly total volume of at least 75 minutes, with a structure of short work intervals (ideally <60 seconds) interspersed with proportional active recovery (ratio close to 1:1, ≤90 seconds). The combination of these parameters was consistently associated with a decrease in body fat percentage and greater fat mass compared to lower doses, although the effect on absolute weight and BMI was relatively more limited and equivalent to high-volume MICT. HIIT offers significant time-efficiency advantages, but the successful implementation of it in sedentary populations relies heavily on dosage progression strategies that take into account participant tolerance and sustainability.

Suggestions

1. For fitness practitioners/instructors: HIIT in sedentary clients should be progressively started at low intensity and volume in the early weeks before reaching optimal doses (3×/week, ≥75 minutes/week) to minimize the risk of injury and drop-out.
2. For sedentary individuals looking to lose weight: HIIT can be a time-efficient option, but it should be combined with body composition monitoring (not just weight/scales) as HIIT's advantages are more apparent in fat percentage and cardiorespiratory fitness.
3. For future researchers: RCTs with a more controlled dose-response design are needed directly comparing frequency variations (1×, 2×, 3× per week) in sedentary homogeneous samples, given that most of the current evidence comes from subgroup comparisons in meta-analyses, rather than head-to-head dose-response tests.
4. For public health policymakers: National physical activity recommendations may consider low-volume-low-frequency HIIT options as a more feasible alternative for time-constrained populations, given the early evidence that low-frequency HIIT may still be a strategy worth considering.

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