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Exercise snacks as a time-efficient approach to improving health and physical activity

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ABSTRACT

Background: Sedentary behavior and insufficient physical activity are common problems and are associated with an increased risk of obesity and cardiometabolic disease. Exercise snacks, consisting of short bouts of physical activity performed several times during the day, have been proposed as a practical way of increasing daily physical activity. *Methods*: This narrative review was based on studies identified in the PubMed database and published between 2021 and 2026. Clinical trials, systematic reviews, reviews, and meta-analyses concerning exercise snacks and their effects on human health were considered. Study protocols and studies without open access to full text were excluded. *Results*: Exercise snacks may provide several health benefits while requiring relatively little time. Available evidence suggests that regular exercise snacks can improve cardiorespiratory fitness, including maximal and peak oxygen uptake, and may positively affect body composition. Reductions in body fat, waist circumference, body mass index, and visceral and epicardial adipose tissue have been reported. Exercise snacks may also improve blood pressure and glucose metabolism. Acute studies suggest that short interruptions of prolonged sitting can reduce postprandial glucose and insulin responses. Some evidence also indicates favorable changes in selected lipid parameters. *Conclusions*: Exercise snacks appear to be a time-efficient form of physical activity that may help people who have difficulty incorporating longer exercise sessions into their daily routine. However, the available evidence is still developing, and further studies are needed to determine their long-term health effects and optimal frequency and intensity.

Keywords: exercise snacks, physical activity, sedentary behavior, cardiometabolic health

1. INTRODUCTION

Sedentary Sedentary behavior is one in which there is low energy expenditure during daily life. It consists of spending time in a seated, lying down, or reclining position while awake (Yin et al., 2025). Physical inactivity could be defined as an insufficient physical activity level to meet present physical activity recommendations (Bull et al., 2020). It results in a wide range of diseases, one of

which is obesity; this condition is currently one of the most serious public health problems and has now attained pandemic proportions (Fabin-Czepiel et al., 2023; Wan et al., 2025). A sedentary way of life also raises the chance of developing cardiovascular diseases (Liu et al., 2025), as well as that of muscle weakness, some gastrointestinal disorders, cancer, and depression (Fyfe et al., 2022; Wan et al., 2025). This increased risk can be attributed to both the direct effects of low levels of physical activity and to the occurrence of obesity resulting from a sedentary lifestyle. For this reason, physical activity may help in preventing the negative effects of a sedentary lifestyle and the onset of many non-communicable diseases (Bull et al., 2020).

An analysis carried out between 2000 and 2022 has revealed an increasing worldwide issue concerning inadequate levels of physical activity. In 2022, about one-third of adults (31.3 percent) failed to achieve the recommended level of physical activity, as compared with 23.4 percent in 2000 and 26.4 percent in 2010 (Strain et al., 2024). To reduce the risk of developing a wide range of diseases and improve quality of life, it is key to participate in regular physical activity and limit sedentary time (Ye et al., 2026).

The World Health Organization (WHO) recommends that adults should engage in 150 to 300 minutes of moderate-intensity aerobic physical activity each week or 75 to 150 minutes of vigorous-intensity activity. The more time someone spends being physically active, the greater the health benefits they will receive. Adults should also perform muscle-strengthening exercises that target all the major muscle groups at least twice a week. The WHO also stresses that even a small amount of physical activity is better than no activity at all. For those who are not used to being physically active, it is advisable to begin with a small amount of exercise and then gradually increase both the duration, frequency, and intensity as far as they are able (Bull et al., 2020).

Insufficient spare time is stated as one of the main obstacles to engaging in regular physical activity (Healy et al., 2024). As a response to this issue, exercise snacks are growing in popularity. The name ‘exercise snacks’ refers to brief and intense periods of physical activity that can be easily introduced into daily life. The purpose of this narrative review is to outline the concept of exercise snacks and to examine their effects on human health and on body function.

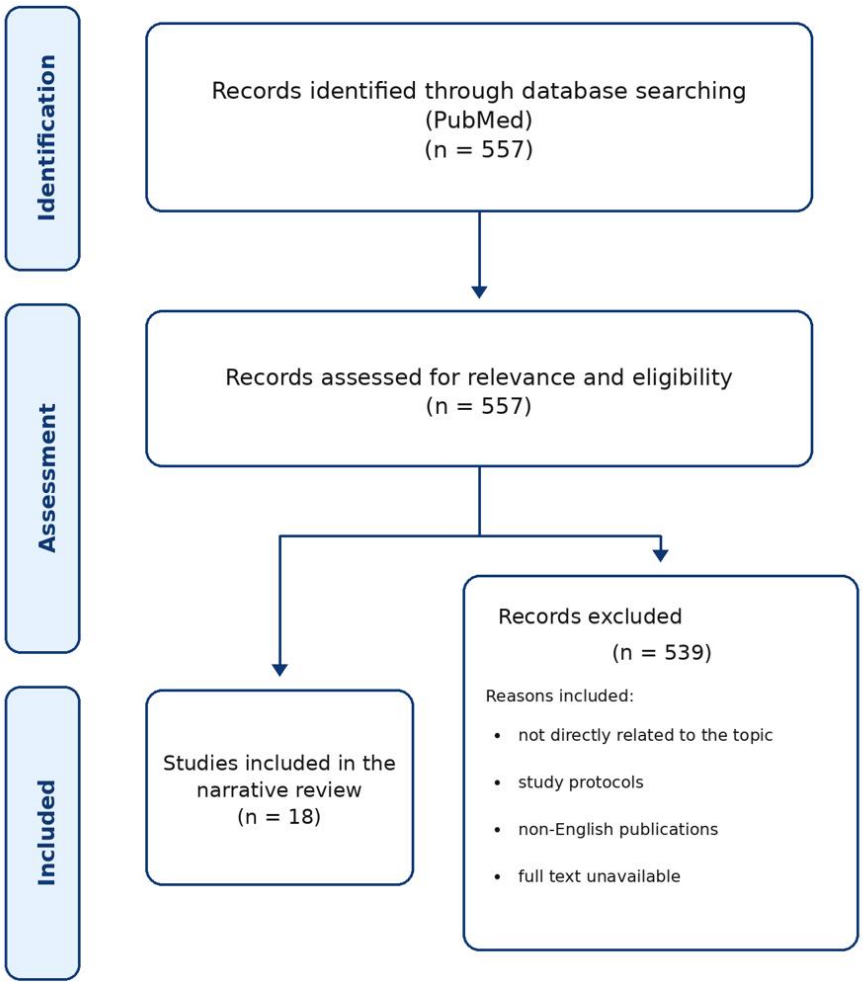

Figure 1. Flow diagram of the literature search and study selection process

2. REVIEW METHODS

The narrative review was carried out using the PubMed database and searched for studies published from 2021 to May 2026. The final literature search was conducted in May 2026. The following keywords were used to search for relevant articles: “exercise snacks”, “physical activity”, “sedentary behavior”, “cardiorespiratory fitness”, “body composition”, “blood pressure”, “glucose metabolism”, “lipid metabolism”, “muscle mass”, and “muscle strength”.Only clinical trials, systematic reviews, reviews, and meta-analyses that dealt with exercise snacks and their effects on human health were included. Study protocols were excluded, as well as any studies for which the full text was not available, those published in a language other than English, and studies that were not directly related to the subject. The serach strategy is shown in the flow diagram (Figure 1).

3. RESULTS AND DISCUSSION

Exercise Snacks: Definition and Characteristics

Exercise snacks involve carrying out short bursts of physical activity on several occasions throughout the day, the duration of which can range from a few seconds to around 10 minutes. These can take various forms, including aerobic exercises, resistance exercises, and bodyweight exercises, and generally do not require any special exercise equipment. They might thus serve as a possible means of reducing sedentary behavior while at the same time increasing total physical activity (Ye et al., 2026).

Exercise snacks can be either vigorous or moderate intermittent exercise. The vigorous type involves carrying out short bursts of activity three to eight times a day, for example by sprinting or climbing the stairs. Moderate intermittent exercise is mainly aimed at increasing muscle mass and strength and typically includes doing two sessions of resistance exercises each day, each session lasting approximately 10 minutes; this sort of exercise may be more suitable for older adults. The two kinds of exercise can be adjusted according to an individual's needs and capabilities (Wang et al., 2024).

Potential Mechanism of action

A summary of the potential mechanisms of action of exercise snacks is presented in Table 1.

Table 1. Potential mechanisms of exercise snacks

Area	Mechanism
Cardiovascular system	Increased heart rate, cardiac output and blood flow
Vascular function	Increased shear stress and eNOS activity; reduced endothelin-1
Glucose metabolism	Increased insulin sensitivity and glucose uptake
GLUT-4 signaling	Activation of AMPK, MAPK and CaMKII pathways
Lipid metabolism	Increased lipoprotein lipase activity
Skeletal muscle	Increased protein synthesis and activation of type II muscle fibers
Cardiorespiratory fitness	Increased mitochondrial content and oxygen utilization

Cardiovascular Mechanisms

It is possible that the benefit of exercise snacks to the cardiovascular system is linked to the intensity of the exercise. Since short bursts of high-intensity exercise cause the heart rate to rise rapidly, cardiac output increases. If people break up long periods of sitting by doing exercise snacks, the muscle pump mechanism is activated, and as a result, venous return, blood flow in the lower limbs, and vascular shear stress all improve. The higher venous return causes an increased cardiac preload. At the same time, both the contractility of the myocardium and the efficiency of the heart's pumping action are enhanced. This type of physical activity may also phosphorulate endothelial nitric oxide synthase (eNOS). These changes could contribute to cardiovascular remodeling and aid the cardiovascular system in adapting to exercise (Zhang et al., 2026). Exercise snack interventions can improve cardiorespiratory fitness; one possible explanation for this is an increased amount of mitochondria in skeletal muscles. Since these mitochondria are important for the use of substrates during intense exercise, a greater mitochondrial content might lead to increased fat oxidation and better oxygen uptake in the peripheral tissues. Such adaptations could be shown by an increase in VO_2max (Chen et al., 2025; Wang et al., 2024).

Glucose Metabolism and Insulin Sensitivity

Physical inactivity may result in metabolic disturbances, higher blood glucose levels, and insulin resistance. Such factors can play a role in the development of type 2 diabetes.

High-intensity exercise makes use of the glycogen stored in skeletal muscle and increases the muscles' sensitivity to insulin; when the muscles contract as a result of exercise, they are able to take in more glucose even in the absence of insulin. The AMP-activated protein kinase (AMPK) and calcium/calmodulin signaling pathways play a role in this process. Moreover, short periods of exercise, which are sometimes referred to as exercise snacks, can affect glucose transporter 4 (GLUT-4) via mitogen-activated protein kinase (MAPK), AMPK, and calcium/calmodulin-dependent protein kinase II (CaMKII). Exercise can also enhance blood flow in skeletal muscle, thus helping to bring glucose into the muscles and reducing blood sugar levels (Wang et al., 2024).

Lipid Metabolism

Carrying out high-intensity exercise on a regular basis could improve lipid metabolism by increasing the activity of lipoprotein lipase. This enzyme plays a role in the breakdown of triglycerides, and since exercise may help to reduce insulin resistance, this too could have a positive effect on lipid metabolism (Wan et al., 2025).

Skeletal Muscle Adaptations

Resistance exercise consists of muscle contractions performed against external resistance, leading to an increase in the number of satellite cells and promoting greater myofibrillar protein synthesis. These processes could result in an increase in muscle mass by causing the cross-sectional area of the muscle fibers to become larger and might also lead to improved muscle strength. The exact mechanisms that are responsible for the increase in muscle strength and mass that results from exercise snacks have not yet been completely understood. It has been proposed that short, high-intensity workouts are more effective than usual aerobic training at increasing the speed of nerve conduction in muscle fibers. Furthermore, a greater exercise intensity might also lead to a greater activation of type II muscle fibers, which could then contribute to greater hypertrophy of the muscle fibers (Wan et al., 2025).

Health Effects of Exercise Snacks

A summary of the main health outcomes associated with exercise snacks in the reviewed literature is presented in Table 2.

Table 2. Summary of the main effects of exercise snacks

Health outcome	Effects reported in the reviewed studiem
Cardiorespiratory fitness	↑ VO_2max and VO_2peak ↑ peak power output
Body composition	↓ body fat percentage ↓ waist circumference ↓ BMI ↓ visceral and epicardial adipose tissue
Blood pressure	↓ systolic and diastolic blood pressure
Glucose metabolism	↓ fasting glucose ↓ acute postprandial glucose and insulin responses
Lipid profile	↓ triglycerides, total cholesterol and LDL-C reported in some studies effects on HDL-C were inconsistent
Muscle mass	↑ muscle mass
Muscle strength	Tendency toward improvement, but between-group differences were not statistically significant

Cardiorespiratory Fitness

Cardiorespiratory fitness refers to the body's aerobic capacity. It is defined as the maximum amount of oxygen that the body is able to take in, transport, and use when engaged in strenuous physical activity. It can be evaluated by means of maximal oxygen uptake (VO_2max) or peak oxygen uptake (VO_2peak) (Wang et al., 2024).

Studies have been carried out regarding the effect of exercise snack interventions on cardiorespiratory fitness, VO_2max, and peak power output (PPO); a systematic review and meta-analysis published in 2025 found that regular exercise snacks could have a positive effect on cardiorespiratory fitness. In those people who carried out this type of training on a regular basis, both VO_2max and PPO increased (Wan et al., 2025). After 12 weeks, VO_2peak increased in older cancer survivors performing exercise snacks (Zhou et al., 2025b).

Body Composition

Research shows that exercise snack interventions may have a positive impact on body weight and body composition. A systematic review and meta-analysis, which was published in 2025, found that individuals who carried out this kind of physical activity saw a decrease in their body fat percentage and in their waist circumference (Chen et al., 2025).

A randomized clinical trial was carried out in 2025 and examined the effects of a 12-week exercise snack program in adults with sedentary behavior. The participants did exercise snacks four days a week, six times a day, with more than one hour between each session. Each session involved a 60-second sprint on the stairs. As a result of the intervention, decreases in both visceral and epicardial adipose tissue were noted (Zhou et al., 2025a).

Blood Pressure

A systematic review and meta-analysis published in 2025 indicated that exercise snacks could have beneficial effects on lowering both systolic and diastolic blood pressure when compared to a group that did not exercise. For this analysis, the exercise interventions had to last at least two weeks (Chen et al., 2025).

Glucose and Lipid Metabolism

A study involving older individuals following cancer treatment shows that a 12-week program of exercise snacks could have some positive effects on metabolic factors. The intervention compared the effectiveness of exercise snacks and aerobic exercise. Reductions in fasting glucose and triglyceride levels were observed in both groups. However, the decrease in triglyceride levels was greater in the group that did traditional aerobic training than in those who did exercise snacks. The group that carried out exercise snacks experienced a greater increase in high-density lipoprotein cholesterol (HDL-C). There was no significant decrease in low-density lipoprotein cholesterol (LDL-C) or in total cholesterol (TC) (Zhou et al., 2025b). A systematic review and meta-analysis carried out in 2026 examined the effects of moderate and low-intensity exercise snacks on glucose and lipid metabolism in adults who spend a lot of time being sedentary. The analysis showed positive effects in respect to a number of metabolic parameters, with a decrease in fasting plasma glucose, total cholesterol, triglycerides, and low-density lipoprotein cholesterol being noted. However, it did not find any significant changes in either fasting insulin or high-density lipoprotein cholesterol levels (Peng et al., 2026).

A systematic review and meta-analysis that was published in 2025 looked at the acute effects of exercise snacks on postprandial glucose and insulin responses in obese adults. They found that taking short exercise breaks during long periods of sitting did have a significant effect in reducing both glucose and insulin responses. More frequent breaks and exercise sessions lasting three minutes or less seemed to offer greater metabolic benefits (Chang et al., 2025).

Muscle Mass and Strength

A study from 2024 looked at the effects of resistance exercises carried out as exercise snacks on muscle mass. The women in the intervention group did 10-minute training sessions on weekdays for a period of 12 weeks. After the intervention, the exercise snack group had an average gain in muscle mass of 0.42 kg, whereas the muscle mass in the control group declined on average by 0.16 kg. There was a tendency for greater improvements in muscular strength after the resistance exercise snacks, but the differences between the groups did not achieve statistical significance (Brandt et al., 2024).

Discussion

Exercise snacks seem to offer a possible solution to the problem of not getting enough physical activity due to a lack of time (Alexe et al., 2025). A clear benefit of them is that each exercise session is of short duration, which makes it easy to include them in a daily routine. They could be especially useful for people who have a lot of responsibilities, since it can be difficult for them to carry out longer exercise sessions regularly. The short length of exercise snack sessions might also be an advantage when compared with traditional workouts, since it is easier to maintain regular participation. A study from 2022 looked at the feasibility and acceptability of a resistance exercise snacking intervention that was delivered remotely and carried out at home among community-dwelling older adults. The study found a 100% participant retention and high adherence to the intervention, with an average adherence rate of 87%. Furthermore, 75% of the participants said that the exercise program was highly enjoyable, and 79% stated that they would carry on doing similar exercises at home after the intervention (Fyfe et al., 2022).

Another argument in favor of exercise snacks is that most exercises do not require specialized equipment. Training can be effectively performed using body weight alone. This makes it possible to avoid having to attend sports facilities and allows exercise to be performed in the same place where daily activities and responsibilities are carried out. Exercise snacks can also be altered in various ways. People can change the intensity and kind of physical activity according to their own fitness level and health condition.

The various effects of exercise snack interventions on the human body, as shown in this review, indicate that the positive impact of such snacks on glucose metabolism could play a role in the prevention of type 2 diabetes. Available evidence mainly concerns the acute effects of exercise snacks on glucose and insulin responses. Further long-term studies are needed to determine whether these short-term improvements in postprandial glucose lead to lasting metabolic benefits (Chang et al., 2025).

The evidence as to the effect of exercise snacks on lipid profiles is still very limited and inconsistent. Further research should be carried out to find out if these interventions can lead to clinically significant improvements in lipid metabolism. It must be pointed out that exercise snacks do not always amount to the quantity of physical activity that the WHO recommends. Yet the WHO stresses that even some physical activity is better than none and that benefits to health can result from small amounts of physical activity.

4. CONCLUSION

Interventions based on exercise snacks seem to be a good solution for people who do not have enough time for traditional training. They provide several benefits for the cardiovascular and muscular systems and have a positive effect on metabolism. Further studies are needed to assess the long-term effects of exercise snacks and to determine the optimal intensity and frequency of these exercises.

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Informed consent

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Ethical approval

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Conflict of interest

The authors declare that they have no conflicts of interest, competing financial interest or personal relationship that could have influenced the work reported in this paper.

Data and materials availability

No new data were created or analyzed in this study. Data sharing is not applicable to this article.

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