International Research Journal of Humanities, Language and Literature
ISSN: (2394-1642)
Impact Factor 5.401 Volume 5, Issue 6, June 2018
Association of Academic Researchers and Faculties (AARF)
Website-www.aarf.asia, Email : editor@aarf.asia , editoraarf@gmail.com

THE RESPONSES OF THE OVERWEIGHT INDIVIDUALS TO HIGH-INTENSITY INTERVAL TRAINING

Dr. Arvind kumar

H.O.D Physical Education

ABSTRACT

This dissertation begins with the observation that history and political science textbooks rarely explore the interaction between the Indian National Congress and the British colonial government in India. It then digs into the publishing archives of the Congress and examines how these materials were used in the future. I have contended that the establishment of this relationship was dependent on an ongoing discourse that was initiated by the Congress' textual culture, which was subsequently expanded upon, re-enacted, and integrated into the colonial state via its intra-departmental correspondence and, eventually, its incorporation into the colonial archive. A more in-depth understanding of this process would be beneficial to both of these fields of study because of the reciprocal dependence that they share on the narratives that are contained within them.

Keywords: *Obesity, Weight loss, Overweight, Metabolic adaptations*

INTRODUCTION

Over the course of the last several decades, there has been a consistent increasing trend in the prevalence of obesity, which is associated with an increased risk of developing type 2 diabetes as well as other health issues. Because it speeds up the body's metabolic rate, physical activity is an indispensable component of any weight loss regimen that is designed to be successful. The key factor that determines the amount of substrates (i.e., carbs and fat) that are utilised throughout a workout is the intensity of the exercise that is being performed. For the purpose of increasing fat oxidation, individuals who are overweight or obese should engage in physical activity at a low to moderate intensity. It is recommended that participants exercise at a low to moderate intensity in order to promote improvements in tolerance while simultaneously minimising injuries. Through the utilisation of this degree of exercise intensity, it is possible to ensure that individuals who were previously inactive and who are overweight or obese are able to complete their fitness regimens. The metabolic benefits of exercise, which are typically linked with low-intensity activities, may be better attained through high-intensity interval training (HIIT), according to certain research. HIIT is an acronym that stands for cardiovascular interval training. Skeletal muscle undergoes a number of changes, the most notable of which are a decrease in glucose intolerance and an increase in fat oxidation. Although some people who are overweight or obese have difficulty continuing high-

intensity exercise for extended periods of time, high-intensity interval training (HIIT) has been recommended as a feasible technique to elicit these adaptations among these individuals. The cardiorespiratory fitness of individuals who engage in high-intensity interval training (HIIT) is dramatically improved as compared to those who engage in continuous exercise during moderate intensity. In addition to being risk-free and gentle on the body, high-intensity interval training, also known as HIIT, offers a number of benefits. It would appear that high-intensity interval training is inherently more enjoyable than steady-state exercise performed at a moderate intensity. A meta-analysis and comprehensive review that was conducted not too long ago found that young people who are in good health may experience an increase in their aerobic capacity if they engage in high-intensity interval training (HIIT) or consistent moderate exercise. On the other hand, there is growing evidence that high-intensity interval training (HIIT) can be a time-efficient method of improving functional capacity and reducing the risk of death in individuals who are overweight or obese and who are not physically active. The effects of high-intensity interval training (HIIT) on fat loss and weight control have been the subject of a number of studies, and this article gives a succinct summary of the findings from those studies.

HIIT Protocols

You perform high-intensity interval training (HIIT) by working out vigorously for a brief period of time, exceeding your lactate threshold and coming close to your VO2max, and then taking shorter periods of rest in between. It is possible for individuals who are sedentary, overweight, or obese to reap the benefits of this format since it provides them with the opportunity to recuperate in between rigorous sessions. The workout begins with a warm-up that lasts between three and five minutes, and then it is followed by thirty seconds of maximal cycling against a load that is over the maximum attainable. High-intensity interval training (HIIT), which calls for a "all out" effort, was modelled after the Wingate test. Over the course of fifteen to thirty minutes, the conventional protocol for high-intensity interval training (HIIT) consists of four to six Wingate tests, each of which is followed by around four minutes of recovery. This ensures that a total of two to three minutes of maximal exertion is done. When compared to the Wingate protocol, high intensity interval training (HIIT) is a better option for individuals who are already engaged in physical activity and have a high level of motivation. This is because the Wingate protocol involves strenuous physical demands and is unpleasant. According to findings from recent studies, high-intensity interval training (HIIT) may be beneficial for individuals who are overweight or obese and lead a sedentary lifestyle at the same time.

According to the findings of Whyte et al., two weeks of very high intensity sprint interval training (six sessions of four to six repetitions of a 30-second Wingate with a recovery period of four to five minutes) improved insulin sensitivity, increased resting fat oxidation, decreased waist circumference, and lowered systolic blood pressure in men who were overweight and obese and who maintained a sedentary lifestyle. Furthermore, Trilk et al. demonstrated that high-intensity interval training (HIIT) for a period of four weeks improved the circulatory function of overweight and obese women who led a sedentary lifestyle. This improvement was achieved by producing a 12% increase in VO2max, a 11.4% increase in stroke volume, and an 8.1% decrease in their resting heart rate. The HIIT programme consisted of four to seven rounds of thirty seconds each of "all out" sprints, followed by four minutes of recovery. One session of high-intensity interval

training is all that is required for obese men to experience a reduction in their risk of developing diabetes. One session of high intensity interval training (HIIT), which consisted of four 30-second sprints at "all out" speed followed by a four-minute rest period, was all that was required for obese men to experience an improvement in their glucose tolerance. It only took one session of high intensity interval training (HIIT) for sedentary males who were overweight or obese to see improvements in insulin sensitivity and fat burning. The HIIT session consisted of four sprints that were performed at "all out" for thirty seconds each, followed by 4.5 minutes of rest.

Due to the fact that the Wingate test requirements a specific kind of cycle ergometer and a significant amount of motivation on the side of the individual doing the test, the test does have some restrictions. In spite of the fact that these studies demonstrate that high-intensity interval training (HIIT) at "all out" may be an effective training approach for those who are overweight or obese, the Wingate test cannot be conducted to them. Therefore, a modified low-volume high-intensity interval training (HIIT) protocol has been utilised in a few investigations. This protocol is anticipated to be more practical than repeated Wingate tests for individuals who are inactive and overweight or obese. Insulin sensitivity was investigated by Hood et al., who employed a modified protocol that consisted of ten repetitions of sixty seconds each at a heart rate reserve of eighty-nine to ninety-five percent, followed by sixty seconds of rest. A total of six training sessions were completed over the course of two weeks. Approximately three days after the conclusion of the most recent training session, they saw a 35% improvement in insulin sensitivity. In a second study that was conducted not too long ago, it was discovered that women who were overweight or obese experienced changes in their body composition and skeletal muscle oxidative capacity after participating in a modified form of high-intensity interval training for a period of six weeks. The training consisted of ten sets of sixty seconds at a heart rate that was less than ninety percent of their maximum heart rate, followed by sixty seconds of recovery. High-intensity interval training (HIIT) was found to improve fat oxidation in overweight women who were sedentary during the course of a modified HIIT programme that lasted for twelve weeks (6-1060 seconds at 75-95% of their maximum heart rate, with 75 seconds of recovery). The high-intensity interval training (HIIT) did not have any effect on the women's weight or their body composition. According to the findings of these research, individuals who are inactive and who are overweight or obese may benefit from high-intensity interval training (HIIT) that is based on the Wingate test.

A modified high-intensity interval training (HIIT) plan that incorporates treadmill jogging has been utilised in a few trials to assist individuals who are overweight or obese in losing weight. The following sequence of events occurs: four sets of four minutes at 90% of HRmax are followed by three minutes at 70%, four sets of four minutes at 90% of VO2peak are followed by four minutes at 60%, and four sets of four minutes at 85-95% of HRmax are followed by three minutes at 50-60% of HRmax. In a short period of time, high-intensity interval training (HIIT) has the potential to enhance VO2max and lower very low-density lipoprotein, blood pressure, and fasting glucose levels in persons who are physically inactive and overweight or obese.

OBJECTIVES

1. To study overweight individuals to high-intensity interval training
2. To study High-Intensity Interval Training (HIIT)

The Effect of HIIT on Fat Oxidation

To achieve the greatest possible reduction in body fat, it is necessary to engage in physical activity at a level that activates primary oxidation. It is likely that humans gain excess weight because their skeletal muscles have difficulties metabolising free fatty acids. This is one of the plausible explanations for human obesity. It has been demonstrated through research that persons who are obese have a reduced capacity for skeletal muscle to utilise free fatty acid. Endurance exercise is a useful strategy in the fight against obesity and for weight loss because it causes an increase in the amount of lipolysis and fatty acid oxidation that occurs in skeletal muscle. It is evident that this boost is reliant on the degree of the exercise because the absolute rate of fat oxidation (g.min-1) increases from low to moderate intensity and then decreases as the intensity of the exercise increases subsequently. Following a period of six weeks of high-intensity interval training (HIIT), improvements were shown in endurance performance, metabolic regulation, and the oxidative capacity of skeletal muscle. Researchers investigated the impact of high-intensity interval training (HIIT) on fat burning in individuals who were not trained but were active for fun over the course of a period of six weeks. The exercise routine consisted of 104 minutes of strenuous activity at 90% of VO2peak, followed by two minutes of rest. The use of high intensity interval training (HIIT) for a period of six weeks caused a significant increase in fat oxidation while cycling at a VO2peak of sixty percent.

These kinds of data show that lifting weights at a high intensity can assist skeletal muscle in oxidising fat in a more efficient manner. An investigation was conducted in which eight women who were moderately active participated in order to investigate the impact that seven high-intensity interval training (HIIT) sessions spread out over a period of two weeks had on the rate of fat burning that occurred during exercise. Lipid oxidation was 36% higher than what had been observed in the past. Sedentary individuals who are overweight or obese have been the focus of a limited number of research that study the effect that high-intensity interval training (HIIT) has on fat oxidation. Whyte et al. found that a resting metabolic rate was increased in sedentary, overweight, or obese males after they participated in high-intensity interval training (HIIT) for a period of two weeks. This training consisted of six sessions of four to six repetitions of thirty seconds of Wingate, followed by four to five minutes of recovery. New research suggests that a high-intensity interval training (HIIT) programme that lasts for twelve weeks and consists of six to ten repetitions of sixty seconds each at a heart rate of seventy-five to ninety-five percent, with seventy-five seconds of rest, may boost the fat-burning potential of women who are overweight and sedentary.

For the purpose of assisting males who were either overweight or obese, a high-intensity interval training (HIIT) programme that lasted for forty minutes and would be performed three times per week was adopted. The participants would work up to 90 percent of their maximum oxygen consumption (VO2max) every thirty seconds, and then they would recuperate for another thirty seconds. After 30 minutes of high-intensity interval training (HIIT) at 45% of VO2max, a 31% increase in fat burning was found in comparison to the baseline. High-intensity interval training, also known as HIIT, looks to be a potential technique for improving fat burning in men who are overweight or obese. Every single participant made it to each and every physical training session, and not a single person had any injuries or voiced any complaints about how challenging the

exercises were.
Despite the fact that the precise mechanism by which high-intensity interval training (HIIT) boosts fat burning is yet unknown, there is some evidence to suggest that it may. Therefore, it is vital to study muscle biopsies in order to find out the possible molecular pathways and changes that are responsible for the increase in fat oxidation that occurs during high-intensity interval training (HIIT). In spite of this, it is not possible to undertake a complete examination of the molecular pathways that could explain the increased fat oxidation because it is outside the scope of this study. I would want to summarise by saying that it is noteworthy that fatty acid transport proteins have been linked to enhanced fat oxidation. There is a possibility that the increased rate of fat oxidation is the result of an increase in the rate of free fatty acid transfer between the mitochondrial membrane and the muscle membrane. Proteins known as fatty acid translocase (FAT/CD36) and plasma membrane fatty acid-binding protein (FABPpm) can be discovered in the sarcolemma of skeletal muscle, as well as in the mitochondrial membrane and the cytoplasmic pool.

Following six weeks of high intensity interval training, a total of ten females who had not previously engaged in any form of physical activity demonstrated an increase in the quantity of fatty acid transport proteins present in their muscle, sarcolemmal, and mitochondrial membranes. This exercise consisted of ten cycling sessions that lasted for four minutes each, with a VO2peak of ninety percent, followed by two minutes of recovery. The concept that high-intensity interval training (HIIT) can increase fatty acid oxidation in skeletal muscle is supported by our data. In addition to this, other studies have shown that enzymes play a role in the increased capacity of skeletal muscle to burn fat when high-intensity interval training is performed. High-intensity interval training was the subject of an investigation that was carried out by Talanian and colleagues to determine how it influences the rate at which fat is burned during physical activity. It was requested of the participants, who were eight women who participated in moderate-to-vigorous physical activity, that they finish the programme seven times over the course of two weeks. At a maximum oxygen consumption of 90%, the workout consisted of ten sets of four minutes each, with two minutes of rest in between each set. Fat oxidation rose by 36% after only two weeks of high-intensity interval training (HIIT), and mitochondrial enzyme activity reached its highest point.

Furthermore, the outcomes of this study add support to the hypothesis that high-intensity interval training (HIIT) increases the lipid oxidation capacity of skeletal muscle and produces metabolic adaptation in individuals who have excess body fat. The implications of this could be quite far-reaching, particularly with regard to the prevention and treatment of health problems that are related with obesity. The effects of high-intensity interval training (HIIT) on fat oxidation in obese persons are in comparison to those of steady-state exercise training; however, additional research is required to completely appreciate these benefits. One of the most frequent approaches to getting in shape is high intensity interval training, also known as HIIT.

The Effect of HIIT on Weight Loss

Exercise is a crucial intervention for weight loss because, in addition to reducing body mass and increasing fat-free mass, it may also assist maintain or enhance resting metabolic rate. This makes exercise a necessary intervention for weight loss. High-intensity interval training, often known as

HIIT, has been demonstrated in a number of studies to be effective in assisting those who are overweight or obese and engaged in inactivity to achieve weight loss. An illustration of this would be the significant reduction in waist circumference and subcutaneous adipose tissue that was seen in sedentary individuals who were overweight and obese after just two weeks of high-intensity interval training (HIIT). Following the completion of a high-intensity interval training (HIIT) programme that lasted for a period of twelve weeks, young men who were overweight had a substantial reduction in their visceral, total abdominal, and trunk fat. A different study confirmed that individuals with metabolic syndrome who were overweight and inactive lost 3% of their body weight and 5% of their waist circumference after participating in high-intensity interval training (HIIT; four sets of four minutes at a heart rate of at least 90% of its maximum, followed by three sets of three minutes at 70% of its maximum). This training was performed for a period of sixteen weeks.

The findings of the study conducted by Tjonna et al. revealed that the individuals saw a reduction of 0.9 kilogrammes of total body fat after three months of high-intensity interval training and 2.4 kilogrammes of fat after twelve months of training. Following a six-week low-volume high-intensity interval training programme with women who were overweight or obese, changes in body composition were seen. The training consisted of ten repetitions of sixty seconds at a maximum heart rate of ninety seconds, followed by sixty seconds of rest. Not only did the DEXA demonstrate a decrease in total body fat and belly fat, but it also revealed a rise in the amount of lean body mass in the legs.

In contrast, two recent studies on high-intensity interval training (HIIT) found that sedentary individuals who were overweight or obese did not see a significant change in their weight or body composition. Skleryk et al. carried out an experimental research and used high-intensity interval training (HIIT) as the approach. It is possible that cycling at "all out" for ten seconds would not have been sufficient to change body composition if the longer workout that lasted thirty seconds that was included in this plan had been more successful. Although the participants were given more time to exercise (60 seconds at 75-95% of HRmax followed by 75 seconds of rest), the high-intensity interval training (HIIT) programme that was conducted by Astorino et al. over a period of twelve weeks did not result in any weight reduction. One possible explanation for this is that physical exercise has the ability to increase hunger, which is why fitness regimes may not always result in weight reduction. One potential remedy would be to lower NEAT, which would act as a counterweight to the increase in EIE that arises from physical activity.

The lack of research that have been conducted to investigate the effects of high-intensity interval training (HIIT) on the composition of the body and weight in sedentary individuals who are overweight or obese is likely to be the reason for the limited impact that HIIT has on weight loss. High-intensity interval training (HIIT) may be beneficial for this population, according to a number of the studies that were examined in this article; however, further research with a longer time frame is necessary to substantiate this hypothesis.

One of the possible explanations for the fat- and weight-loss benefits of high-intensity interval training (HIIT) is that it causes an increase in metabolism after exercise; however, the specific mechanism behind these effects is not yet understood. Intense high-intensity interval training (HIIT) induces a rush in catecholamine release, which may lead to increased fat burning after a workout (HIIT). A "post-exercise oxygen deficit" (EPOC) is the term that scientists use to describe the elevated levels of oxygen consumption that occur after exercise. The researchers Bracken et al. discovered that high-intensity interval training (HIIT) boosted catecholamine

metabolism by boosting the activity of catechol-O-methyl transferase.
After high-intensity interval training (HIIT), there is a possibility that increased levels of adrenaline and norepinephrine in the blood stimulate lipolysis and the availability of free fatty acids, which in turn leads to an increase in the rate of fat burning both during and after exercise. Beta-hydroxyacyl-CoA dehydrogenase, an enzyme that has the potential to assist in the reduction of fat, is shown to be greatly elevated in muscle tissue after high-intensity interval training. There is a possibility that high-intensity interval training (HIIT) might speed up the process of fat loss. This is because it increases the pace at which the metabolism recovers after exercise. Fat seems to be the primary source of endogenous fatty acid (EPOC) while the body is at rest. Both before and after the workout, high-intensity interval training (HIIT) promotes fat oxidation. This allows the body to resynthesize glycogen and get rid of lactate and hydrogen ions. Some people believe that high-intensity interval training (HIIT) is responsible for weight reduction, although this might be due to an increase in lipolytic enzyme activity and a negative energy balance brought on by EPOC.

It is possible that high intensity interval training might help reduce fat by, among other things, reducing the amount of hunger that one has after exercising. Although it is common knowledge that engaging in strenuous physical activity, even for a single session, may reduce feelings of hunger in the minutes that follow, there have been no studies that have investigated the impact that high-intensity interval training (HIIT) has on the suppression of appetite in individuals who are overweight or obese. Recent research has investigated the effects of two distinct forms of physical activity on hunger: high-intensity interval training (HIIT; six sets of thirty seconds on the Wingate test) and endurance exercise (one hour at 68.1% of VO2max). After their high-intensity interval training (HIIT) sessions, the males reported feeling much more hungry than they did after their endurance workouts.

Many people claim that after a strenuous exercise, they feel less hungry than they normally would, but the reason for this phenomenon is unknown. On the other hand, there is evidence from instances of exercise-induced anorexia that suggests that engaging in strenuous physical activity for a lengthy period of time may alter ways in which you experience feelings of hunger. A significant amount of blood is being diverted from the splanchnic circulation to the muscles that are actively exercising, which might be the reason for this phenomenon. Exercise training that is performed on a regular basis has the ability to develop further adaptations, which may lead to a reduction in appetite and more stable levels of metabolic fuels throughout the body. A pang of hunger may be the result of a fast depletion of glycogen reserves in the liver and muscles that occurs after severe activity. It is likely that more significant changes take place as a consequence of consistent, long-term exercise training as opposed to working out more often and for shorter periods of time.

Exercise is vital for weight loss because it has the ability to reduce body mass, increase fat-free mass, and either maintain or enhance resting metabolic rate. All of these effects may be achieved via exercise. This is due to the fact that previous research has shown that participating in physical activity may lead to a reduction in total body fat. Exercise on a consistent basis has been shown to considerably reduce insulin resistance, skeletal muscle lipids, total fat, and visceral fat in obese individuals. This effect is independent of the amount of weight that a person loses. There is no alteration in the scenario regardless of whether or not the person loses weight; the situation stays the same. People who have high levels of postprandial blood triglycerides have a higher chance of developing cardiovascular disease, while people who participate in regular physical activity have a

decreased risk of developing cardiovascular disease. There is a growing body of research suggesting that high-intensity interval training (HIIT) is superior than moderate-intensity exercise in terms of reducing postprandial levels of triacylglycerol.

However, the fact remains that doing exercise of a moderate intensity does, in fact, lower the levels of triacylglycerol in the blood after a meal. When it came to lowering postprandial triglyceride levels, the researchers discovered that acute high-intensity endurance training was more beneficial than moderate-intensity exercise. The results of research add credibility to this claim. A decrease in post-meal cholesterol levels may be achieved with high-intensity interval training (HIIT), which works by causing an energy deficit. The authors of the comprehensive review, Freese et al., investigate the relationship between exercise and postprandial lipemia. In conclusion, it is important to emphasise that the influence of high-intensity interval training (HIIT) on postprandial triacylglycerol is considerable, despite the fact that it is only temporary. It is possible that a single session of high-intensity interval training (HIIT) done 48 hours after exercise might lower postprandial triacylglycerol; however, any advantage would be lost by the third day.

CONCLUSION

Inactive individuals who are overweight or obese who want to enhance their cardio-respiratory fitness, reduce their metabolic risk factors, and maximise their fat-burning and weight-loss potential have been shown to benefit from high-intensity interval training (HIIT), which has been found to be an effective and well-tolerated exercise approach. Increasing fat oxidation is one of the various ways to achieve the goal of a successful weight loss plan, which must begin with a negative energy balance and conclude with a reduction in body fat before it can be considered effective. As a result of studies that demonstrates that boosting fat oxidation may lead to a negative energy balance and a reduction in body fat, the implications for public health measures that combat obesity are considerable.

REFERENCES

1. Steinberger J, Daniels SR (2016) Obesity, insulin resistance, diabetes, and cardiovascular risk in children: an American Heart Association Scientific Statement from the Atherosclerosis, Hypertension, and Obesity in the Young Committee (Council on Cardiovascular Disease in the Young) and the Diabetes Committee (Council on Nutrition, Physical Activity, and Metabolism). Circulation 107: 1448- 1453.

2. Haslam DW, James WP (2015) Obesity. Lancet 366: 1197-1209.

3. Epstein LH, Goldfield GS (2016) Physical activity in the treatment of childhood overweight and obesity: current evidence and research issues. Med Sci Sports Exerc 31: S553-559.

4. Lazzer S, Lafortuna C, Busti C, Galli R, Tinozzi T, et al. (2015) Fat oxidation rate during and after a low- or high-intensity exercise in severely obese Caucasian adolescents. Eur J ApplPhysiol 108: 383-391.

5. Warburton DE, Nicol CW, Bredin SS (2016) Prescribing exercise as preventive therapy. CMAJ 174: 961-974.

6. Venables MC, Jeukendrup AE (2013) Endurance training and obesity: effect on substrate metabolism and insulin sensitivity. Med Sci Sports Exerc 40: 495-502.

7. Boutcher SH (2017) High-intensity intermittent exercised fat loss. J Obes 2011: 868305.

8. Weston KS, Wisløff U, Coombes JS (2013) High-intensity interval training in patients with lifestyle-induced cardiometabolic disease: a systematic review and metaanalysis. Br J Sports Med.

9. Bartlett JD, Close GL, MacLaren DP, Gregson W, Drust B, et al. (2015) Highintensity interval running is perceived to be more enjoyable than moderate-intensity continuous exercise: implications for exercise adherence. J Sports Sci 29: 547-553.

10. Gist NH, Fedewa MV, Dishman RK, Cureton KJ (2014) Sprint interval training effects on aerobic capacity: a systematic review and meta-analysis. Sports Med 44: 269-279.

11. Trilk JL, Singhal A, Bigelman KA, Cureton KJ (2014) Effect of sprint interval training on circulatory function during exercise in sedentary, overweight/obese women. Eur J ApplPhysiol 111: 1591-1597.

12. Tjonna AE, Leinan IM, Bartnes AT, Jenssen BM, Gibala MJ, et al. (2013) Low- and high-volume of intensive endurance training significantly improves maximal oxygen uptake after 10-weeks of training in healthy men. PLoS One 8: e65382.

13. 21. Gibala MJ (2017) High-intensity interval training: a time-efficient strategy for health promotion? Curr Sports Med Rep. 6: 211-213.

14. Gibala MJ, Little JP, Macdonald MJ, Hawley JA (2013) Physiological adaptations low-volume, high-intensity interval training in health and disease. J Physiol 590: 1077-1084.

15. Gillen JB, Gibala MJ (2014) Is high-intensity interval training a timeefficient exercise strategy to improve health and fitness? Appl Physiol Nutr Metab 39: 409-412.

16. Astorino TA, Schubert MM, Palumbo E, Stirling D, McMillan DW, et al. (2013) Effect of two doses of interval training on maximal fat oxidation in sedentary women. Med Sci Sports Exerc 45: 1878-1886.

17. Tjønna AE, Stølen TO, Bye A, Volden M, Slørdahl SA, et al. (2015) Aerobic interval training reduces cardiovascular risk factors more than a multitreatment approach in overweight adolescents. Clin Sci (Lond) 116: 317-326.

18. Tsekouras YE, Magkos F, Kellas Y, Basioukas KN, Kavouras SA, et al. (2016) High-intensity interval aerobic training reduces hepatic very lowdensity lipoprotein-triglyceride secretion rate in men. Am J Physiol Endocrinol Metab 295: E851-858.

19. Schjerve IE, Tyldum GA, Tjønna AE, Stølen T, Loennechen JP, et al. (2013) Both aerobic endurance and strength training programmes improve cardiovascular health in obese adults. Clin Sci (Lond) 115: 283-293.