High Intensity Interval Training on Metabolic Health

By Corey Roberson and Eric Leslie

Introduction

Throughout our life, we have this mechanism in our body known as our metabolism. This mechanism in our body starts to slow down due to possible health issues or because we no longer exercise or are on specific diets. Starting exercise as an adolescent is a great way to promote healthy habits that hopefully continue later in an individual. An exercise known as High intensity Interval Training (HIIT) has not only been used for workouts throughout the years but has been seen in studies to show the impact the effects of our overall metabolic health. High intensity interval training is an exercise where an individual participates in high intensity exercise for short bursts that are interspersed with rest that can be anywhere to a few seconds to a couple of minutes. High-intensity interval training has gotten a lot of popularity because it does not take much time out of a person's day. High-intensity interval training may also be completed with various training modalities such as the treadmill, cycle ergometer, and resistance training which are beneficial for individuals. High Intensity Interval training has been deemed beneficial over the years and it continues to show promising results that this article will summarize in adolescents and adults.

High-Intensity Interval Training (HIIT)

As mentioned before, High intensity interval training is a good workout to participate in if you are on a limited schedule These workouts consist of short bouts of exercise that the individual gives 90 to 100% of maximal aerobic capacity, which is then followed by a rest period. Example workouts can be with or without weights, power lifting, plyometrics, sprints, and band workouts (Kravitz, 2014). The rest period can be recovery where you're just focusing on breathing or it can be an active recovery (e.g., jogging in place). High-intensity Interval training depletes your oxygen storage due to the individual pushing the body to its limit. This makes the heart rate significantly increase while sending all the oxygen to the muscles and it makes your body require more oxygen going into the recovery state. This oxygen shortage can be characterized as excess post-exercise oxygen consumption (EPOC). When an individual enters EPOC, this in turn speeds up the metabolic rate for up to 48 hours after completing a workout (Kravitz, 2014).. These workouts can also be completed in 30 minutes or less which is a benefit for most individuals because it doesn't take a lot of time out of an individual's day.

Benefits of High intensity interval training in adolescents

The benefits seen of High Intensity Interval Training for metabolic health in adolescents. With technology getting better as the years progress, adolescents are more prone to staying inside which has caused a 65% decrease in physical activity in adolescence, has promoted bad eating habits, low cardiorespiratory fitness, hypertension, and dyslipidemia (Logan et al, 2018). Unfortunately, with starting these types of habits off early, it then follows them into adulthood. This is because these individuals don't structure healthy habits at an early age and because of this, most individuals will have to figure this out either when it's too late or sometimes just in time. A study was conducted consisting of 551 individuals ranging from 11-16 years of age with sexual maturation and diet not being accounted for. From those participants, 503 were grouped into an intervention group and 48 people were in a passive control. A 10-week study where participants completed 1 workout a week consisting of 10-second repeated sprints at 100-120% of their aerobic speed. There was 10 second rest periods in between these bouts and followed by 3 minutes of rest after each set for a total of 1-hour sessions as well at HIIT (Logan et al, 2018). This study showed, for both genders, significant increases in BMI (2.0% Male .01% Female, and body fat percentage (2.5% Male; 3.7% Female) (Grieg et al, 2018). There were 2 other studies performed one of them wanting to focus on substrate utilization post exercise and the other wanting to build on enhanced fat oxidation in adolescents participating in HIIT. These studies both used the same protocol which consisted of two 30 second bouts all out followed by rest intervals of 4 minutes. These studies showed mostly the same results of increased oxygen uptake, fat oxidation, a decrease in RER, increase in VO2 max, and carbohydrate oxidation (Logan et al, 2018). There was a few more studies conducted, but they all managed to maintain the same type of outcome. The studies had different variety of adolescents and each study tested a specific aspect including hemodynamic values, one focused on cardiorespiratory fitness, and the other was even compared to intermediate intensity of training (Logan et al, 2018). At the end of all the studies done, individuals that participated in HIIT saw significant differences in BMI, cardiorespiratory fitness, mean arterial pressure, HDL, improvement with insulin sensitivity, and reduced fasting glucose in a shorter amount of time than individuals participating in intermediate training programs.

Impact of HIIT on Metabolic health

The lack of exercise is dangerous for any individual due to the increase of LDL, triacylglycerol, plasma concentrations and total cholesterol that puts an individual at risk of developing cardiovascular disease as well as metabolic disorders (Lira et al, 2019). A study was conducted with 20 eutrophic men between the ages of 18-35 years old and all these individuals got scanned by DEXA to give an insight on physical and physiological capabilities. After this initial stage was complete, participants underwent a 5-week program consisting of 3 sessions per week. Every session a 5K run was completed and then the individuals participated in one of these workouts per day which were HIIT consisting of 1 min of running at 100% of sVO2peak with 1 min of passive recovery, and moderate intensity continuous training at 70% sVO2 peak (Lira et al, 2019). During this training program, lipid profiles were taken before and after the 5-week training program as well as phase angle, and plasma volume determination. At the end of the 5 weeks, there was evidence of triacylglyceride, total cholesterol, HDL-c, and n-HDLc levels were all increased right after the training sessions. This study showed that both styles of training (Moderate-intensity continuous training and HIIT) were beneficial for lipid values and also, HIIT was seen to be more beneficial for HDL-c levels when fasting compared to MICT (Lira et al). Both training modalities were deemed beneficial for metabolic health.

High Intensity Interval Training on Obese Sedentary Men

A study involving 10 men aged between 18-40 years of age and were all overweight or obese individuals (BMI: 25-35kg m^-2), and they wanted to find out the benefits that hit provided. To begin the study, participants were taken through preliminary tests involving anthropometry, Wingate test, maximal ramp incremental exercise test, and a preliminary sprint interval training (SIT) session (Whyte et al, 2012). For the SIT trials, subjects were told to complete four all out sprints for 30 seconds, the Wingate tests were performed on a cycle ergometer with 4.5-minute rest intervals, did a single extended max cycle ergometer sprint, or participated in no exercise at all. Researchers looked at resting metabolic rate as well as substrate utilization using indirect calorimetry, and blood pressure as well as an oral glucose tolerance test was also conducted at the lab. After this study was completed, results showed that insulin sensitivity increased by almost half and homeostatic model assessment (HOMA) was decreased by a third in obese men. The SIT sessions were deemed not effective possibly since we may just need a longer study conducted since it was only three 2-day trials to see any significant changes. Other studies were conducted using the SIT protocol and they were able to see benefits for overall health in two

weeks but Whyte et al (2012) deemed the benefits to be short lasting. The study immediately saw results in fat oxidation by both SIT and Extended sprint by 63% and 38% as well as fat was oxidizing faster at rest after exercise for 24 hours (Whyte et al, 2012). Out of all the trials performed, SIT and ES were deemed to be the more beneficial than the no exercise group. The two exercises showed that the fat oxidation was about the same as if the individual performed exercise lasting 30-90 minutes as well as an increase in insulin sensitivity. The great thing about these findings is that HIIT is very beneficial for an individual with time constraints because it can complete the work for your body that some would see in a 30–90-minute exercise. The study that we just talked about would be a great target for men 40 years of age that are obese because this is a huge target population today, and it is not time constricting at all.

Conclusion

There are many benefits to HIIT that was discussed which involved acute adaptations that were immediately following exercise. The benefits include blood pressure, lipid profiles, insulin sensitivity, and more. There are different variations in which one can partake in a HIIT session which is also a benefit for an individual looking to have a mixture of workouts in their back pocket. As time has passed, we have entered a world of limited exposure to the outside, especially adolescents, due to society revolving and thriving off the internet. This puts them at risk for a decrease in physical activity which in general usually leads to several health problems. Therefore, HIIT is so important in today's world because it promotes good health in a short period of time throughout one's day. To conclude, HIIT is meant to be short and sweet while maintaining a challenging intensity for a person with limited availability, but, if we increase physical activity by the standards that WHO has presented us with, then we should see an increase in health problems being resolved.

Apply it:

- You will be able to incorporate HIIT into your workouts and would benefit individual's overall health in short periods of time because HIIT has acute benefits such as improving metabolic health, insulin sensitivity, lipid profiles, and more.
- A relationship will be built with your client with them knowing you aren't doing it just to do it but to benefit their well-being by doing workouts that are beneficial not only for her appearance, but for her overall health.

Bridging the gap:

High intensity interval training is known to provide acute benefits such as improving High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), cholesterol, and blood triglycerides for people that are involved in this type of training. This is a good workout regimen for individuals suffering from metabolic problems and individuals that are on a tight schedule. Overall, High intensity interval training brings a lot of benefits to the table.

Summary Statement:

High intensity interval training an enjoyable but intense workout that people should try out if they want to better their lifestyles without having to worry about it taking 1-2 hours of your day if they don't have the time.

Pulled Text:

Participating in exercise for 7 minutes of high intensity exercise that is 90%≥
of an individual's maximal aerobic capacity, and it showed benefits in metabolic health, insulin sensitivity, lipid profiles, and more (Eather et al., 2019).

Bio:

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