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Retraction

Retracted: Effect of Sports Energy Drink on Fat Metabolism and Weight Loss of College Students

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] H. Chu, W. Zhou, and S. Wang, "Effect of Sports Energy Drink on Fat Metabolism and Weight Loss of College Students," *Journal of Food Quality*, vol. 2022, Article ID 3978964, 8 pages, 2022.

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Research Article

Effect of Sports Energy Drink on Fat Metabolism and Weight Loss of College Students

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In order to solve the problem of fat metabolism and weight loss of college students, this paper puts forward a problem of the influence of sports energy drinks. Energy drink is a combination of sports drinks, energy drinks, and other special functional drinks (such as nutrient drinks with added vitamins and minerals; herbal drinks with Chinese herbal ingredients), a general term for a large category of drinks that provide specific health and nutritional functions for special groups of people. With the continuous improvement of people's consumption level and their constant attention to their own health, the consumption of energy drinks is also increasing. Energy drinks have become a new generation of drinks after carbonated drinks, drinking water, fruit and vegetable juice, and tea. At present, the total annual output of beverages in the world exceeds 300 billion liters, and functional beverages have become the fastest growing beverage varieties. Fat is the main energy supply material for endurance sports. The catabolism of fat during sports is the key link for the body to obtain energy. For the general population, abnormal fat metabolism is the main cause of obesity. In this paper, 10 healthy male and female college students without training experience were used to determine the maximum fat metabolism intensity FAT_{max}. Based on this, the exercise prescription of maximum fat oxidation intensity for 8 weeks was formulated. The functional ability, maximum oxygen uptake, body fat percentage, quiet heart rate, blood pressure, and vital capacity before and after the experiment were measured to observe the exercise effect. The fitness effect of maximum fat metabolism intensity was studied to provide theoretical support for college students' fitness exercise. The study found that there was no significant difference between boys and girls in the maximum fat oxidation rate and FAT_{max}, and girls' E. C. and running speed corresponding to FAT_{max} were significantly lower than those of boys. After 8 weeks of exercise prescription exercise of maximum fat metabolism intensity, the E. C. and maximum oxygen uptake of boys and girls increased significantly; quiet heart rate, vital capacity index, and body fat percentage were significantly improved; and the changes in girls were more significant than boys. The results show that there is no gender difference in FAT_{max}. The corresponding exercise intensity (7.22 METs for boys and 5.25 METs for girls) and running speed (9.73 km/h for boys and 8.65 km/h for girls) can be used as a reference for formulating college students' fitness exercise prescriptions. The fitness exercise prescription based on FAT_{max} can improve cardiopulmonary function and body composition, especially for girls. FAT_{max} can be used as a reference standard for formulating fitness exercise prescriptions.

1. Introduction

From the perspective of energy supplementation, in addition to carbonated compounds and protein, a multifunctional functional fatty acid, medium chain triglyceride (MCT), can also be added to functional drinks to quickly replenish energy from the perspective of fat; together with carbohydrates, as MCT with significant performance in both absorption and digestion speed, it also has good effects in improving athletic performance, treating fat absorption disorders, and controlling body weight. Studies have shown that as an energy substance, the synergistic supply of MCT and carbohydrates can prolong the energy release time and effectively maintain the energy needs of athletes during long-term exercise. Energy is mainly stored in the form of fat. Therefore, fat metabolism plays a vital role in obesity. In-depth analysis of the mechanism of fat metabolism and identification of factors affecting fat metabolism are of

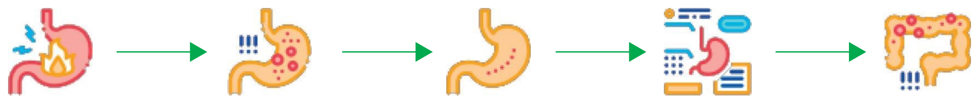

Figure 1: Promoting fat metabolism of college students.

guiding significance for reducing the occurrence of obesity, maintaining a healthy state, avoiding diseases caused by obesity, and improving aerobic exercise ability. Fat is the largest amount of energy material in the human body. Its reserves are far greater than those of glycogen. It is an indispensable energy supply material for quiet and exercise. The mobilization, utilization, and influencing factors of fat during exercise, as well as the effect of exercise on fat metabolism in the human body, have always been the research fields that people pay attention to as shown in Figure 1.

2. Literature Review

With the improvement of material living standards, people's intake of foods rich in fat, protein, and sugar (such as eggs, fish, and meat) is gradually increasing. The resulting obesity problem has attracted more and more attention. Obesity not only affects personal body shape but also causes a variety of diseases, such as diabetes, cardiovascular diseases, and some tumors, and leads to the decline of exercise ability. From the perspective of energy metabolism, it shows that energy intake is greater than energy consumption, and energy is mainly accumulated and stored in the form of fat. Therefore, effectively regulating all links of fat metabolism has positive significance for obese people [1].

The substrate cycle of fat synthesis and decomposition is often carried out in adipose tissue, and the direction of the cycle is regulated and controlled by whether the body needs fat energy [2]. When fat is needed for energy supply, the rate of fat mobilization is accelerated. On the contrary, the esterification process is accelerated after eating. The process of fat mobilization and esterification is affected by the following factors: (1) insulin and high concentration glucose can accelerate the re-esterification in adipocytes and reduce fat mobilization; (2) during exercise, the blood supply of adipose tissue is reduced due to blood redistribution, or a large amount of fat is mobilized, and the concentration ratio of plasma-free fatty acids to albumin is increased, which reduces the ability of blood to carry fatty acids, thus increasing esterification and inhibiting fat mobilization; And (3) lactic acid can inhibit the process of fat mobilization. It has been proved that the blood lactic acid concentration reaches the threshold at 5 mmol, and the inhibition of fat mobilization reaches about 70% at 10 mmol. It has no effect on the release of glycerol. It can be seen that its mechanism is to promote the re-esterification of adipocytes [3].

3. Research Methods

3.1. Development History of Functional Drinks. The development of functional beverages began in the 1930s. In 1938, the first generation of energy drinks appeared, "Lucozade" as the first generation of energy drink, which was supplemented by water and carbohydrates. Later, this drink was called the "Gatorade" drink. It contains three main functional nutrients ingredients: water, carbohydrates, and minerals. After that, isotonic drinks appeared in sports drinks in functional drinks. It first appeared in Europe, and "Tsostar" was one of the earliest brands representing isotonic drinks at that time. It has the same particle concentration as blood, and when consumed, the gut performs best in absorbing water, minerals, and energy. It is aimed at correcting body fluid volume, regulating electrolyte and acid-base balance in the body, replenishing energy in time, and improving body temperature regulation and metabolic processes in the body. In 1987, Red Bull came into being as a new drink (the first generation of energy drink). The main functional ingredients contained in it were caffeine, taurine, water, and carbohydrates. It aims to use caffeine as a stimulant and taurine to boost the body's immune system, and the two are combined to provide a boost in energy.

From the rise of functional beverages in 2002 to the development of functional beverages in 2003, to the climax of functional beverages in 2004, to the overall decline of functional beverages in 2005 and the disappearance of functional beverages in 2006, it can be seen from these phenomena that see the development history of energy drinks in China. Although functional beverages are no longer as popular as in previous years, functional beverages in China are currently only in the market-leading stage, and there is no market-leading brand, which is more suitable for new brands to enter. With the progress of Chinese society and the solution of the problem of food and clothing, people pay more and more attention to the health of their families and themselves and thus further realize the importance of functional beverages. Therefore, functional beverages that can scientifically adjust nutritional ingredients will continue to develop.

3.2. Fat Catabolism. The fat catabolic reaction is carried out in two steps outside the mitochondria according to the following equation:

Table 1: Influencing factors of fat energy supply during exercise.

Influence factor	Adjustment link	Effect
Hormonal changes of exercise stress	Fat athlete	Increase
Fatty acid	Fat athlete	Inhibition
Available sugar in the body	Fatty acid decomposition	Inhibition

$$\begin{aligned}&\text{Triglyceride} + 3H_2O\,(\text{lipolysis}) \longrightarrow \text{glycerol ten fatty acids},\\&\text{Fatty acid} + \text{ATP} + \text{coenzyme}A \longrightarrow \text{fatty acyl coenzyme A} + \text{AMP} + \text{PPi}\end{aligned} \tag{1}$$

The lipase is hormone-sensitive triglyceride lipase, which is the rate-limiting enzyme of lipolysis. When the sympathetic nerve is excited, the secretion of adrenaline, norepinephrine, and so on increases, acts on the receptors on the surface of the adipocyte membrane, activates adenylate cyclase, promotes the synthesis of cyclic adenosine monophosphate, activates protein kinase-dependent on cyclic adenosine monophosphate and phosphorylates, activates triglyceride lipase in the cytosol, and increases the rate of fatty acid production [4, 5].

The fatty acyl coenzyme A produced after fatty acid activation depends on the carnitine transport mechanism on the inner mitochondrial membrane. Carnitine entering the inner mitochondrial membrane is the most effective transport factor for fat transport to mitochondria for energy supply. Fatty acids need to be oxidized in mitochondria. However, neither long-chain fatty acids nor fatty acyl coenzyme A can penetrate directly into mitochondria. Instead, carnitine needs to carry carnitine palmitoyl transferase I, which exists inside the outer membrane of mitochondria, to convert long-chain fatty acyl coenzyme A into fatty acylcarnitine. The carnitine fatty acyltransferase II contained in the inner side of the inner membrane of the mitochondrial inner membrane can make the entered fatty acylcarnitine release fatty acyl groups to restore fatty acyl coenzyme A. Carnitine returns to the outer side of the inner membrane for fatty acyltransferase reaction. In addition, carnitine acetyltransferase exists in the mitochondria for transmembrane exchange between short chain acyl coenzyme A and carnitine. Carnitine has two main functions in fat energy metabolism. One is to transport long-chain fatty acyl coenzyme A into mitochondria, and the other is to regulate the ratio of fatty acyl coenzyme A to free coenzyme A in mitochondria. The latter is mainly because it removes the excess short chain and medium chain fatty acyl-CoA from mitochondria to maintain sufficient free carnitine to support mitochondrial energy metabolism. In the process of carnitine transport, when sugar is underutilized, carnitine fatty acyl transferase activity increases. Proper supplementation of L-carnitine during exercise can increase the utilization of fatty acids [6].

3.3. Relationship between Fat Metabolism and Exercise Ability. In the long-term moderate- and low-intensity exercise with exercise intensity lower than 70% of the maximum oxygen uptake, the storage of body fat is very sufficient. Theoretically, it can maintain a long exercise time, but the human body cannot maintain this exercise for an infinite time. The limiting factors are as follows (Table 1):

(1) When triglycerides are used in the fat bank, they are first hydrolyzed into glycerol and fatty acids by lipase. Lipase activity is an important factor. The higher the lipase activity, the faster the fat mobilization. Fatty acids bind to plasma albumin during transport. During long-term exercise, the mobilization rate of F plasma fatty acids increases significantly, and the formation of plasma lipoprotein complexes increases. When it exceeds 2 mmol, the plasma lipoprotein complex forms microclusters, inhibits the activities of many enzymes, and leads to the uncoupling of mitochondrial oxidative phosphate. At the same time, it increases the blood viscosity, slows down the blood flow, increases the platelet aggregation rate, and leads to insufficient oxygen supply and decreased exercise ability [7].

(2) There are two sources of fatty acids used by muscle tissue in vivo during exercise: triglycerides in muscle cells and free fatty acids in plasma. During long-term exercise, triglyceride energy supply in muscle tissue accounted for 25% of the total energy consumption, and plasma-free fatty acid energy supply accounted for 75%. Therefore, when the transport capacity of plasma fatty acids decreases, the energy required during exercise is limited. If the reduction of exercise capacity can increase the concentration of plasma-free fatty acids, the proportion of fat energy supply will increase, so as to improve the aerobic exercise capacity.

(3) During long-term exercise, the amount of perspiration increases, and many metal ions, including Zn^{2+}, Mn^{2+}, Mg^{2+}, and Se^{2+}, are lost with perspiration, which reduces the activity of metal-dependent enzymes and then affects the metabolic energy supply. Excessive sweating also leads to dehydration of the body, destruction of homeostasis, imbalance of inorganic salts in cells, and decline of aerobic metabolism.

3.4. Related Regulatory Factors of Fat Metabolism

3.4.1. Fat Metabolism and Carnitine. The role of carnitine in fat metabolism has been confirmed, that is, triacylglycerol decomposes long-chain fatty acids of more than 10 carbon. For oxidative energy supply, coenzyme A (COA) must be activated in muscle cytoplasm with the participation of ATP to produce fatty COA. The latter can only be oxidized and decomposed by transferring into mitochondria, but fatty acyl-CoA cannot pass through the inner membrane of mitochondria, while carnitine can be used as a long-chain fatty acid carrier to supply energy through the inner membrane of mitochondria. Its function is that the 3-hydroxy group of carnitine accepts the acyl group of fatty acyl-CoA and transfers it into the inner membrane of mitochondria. Then carnitine fatty acyltransferase II catalyzes the separation of carnitine and fatty acyl-CoA and then forms fatty acyl-CoA again. The latter carries out continuous β-oxidation in the mitochondrial interstitium. The acetyl-CoA generated is decomposed into H_2O and CO_2 through the tricarboxylic acid cycle. At the same time, a large amount of energy is released. The oxidation sites of lipids and acids are in the mitochondria. The fatty acyl-CoA cannot enter the mitochondria, but carnitine can carry acyl groups into the mitochondria to complete fatty acid metabolism. Therefore, if the concentration of carnitine increases, it can promote the transport of fatty acyl groups, thus promoting fatty acid and fat metabolism [8].

3.4.2. Fat Metabolism and Calcium Regulation. After a number of studies, there are scholars proposed a preliminary mechanism for calcium to regulate fat metabolism, that is, a low calcium diet leads to the increase of 1,25 (OH)2D level and the increase of ca^{2+} influx in adipocytes, thus stimulating insulin release, promoting fat production, inhibiting fat decomposition, reducing body heat production, and finally leading to fat accumulation and weight gain. The effect of high calcium diet is just the opposite. As a calmodulin, 1,25 (OH)2D promotes the activation of fat synthase (FAS) and inhibits lipolysis by stimulating Ca^{2+} influx in adipocytes, and to a certain extent, it shows a dose effect increasing relationship. Later, some scholars found a membrane binding protein with high affinity with 1,25 (OH)2D in obesity research. When it specifically binds with 1,25 (OH) 2D, it can mediate the regulation of intracellular Ca^{2+} concentration and then affect the synthesis and decomposition of lipids. This shows that the level of 1,25 (OH)2D in the body increases automatically when the diet is low in calcium. Combining with the membrane vitamin *D* receptor (mVDR), it stimulates the massive influx of Ca^{2+} and eventually leads to the increase of triglycerides in adipocytes. In addition, the effect of dietary calcium on energy metabolism is also related to the change in metabolic rate. Experiments have proved that the central temperature of rats fed high calcium diet increases, the expression of uncoupling protein UCP-2 increases, and the energy utilization efficiency decreases [9].

3.5. Effect of Endurance Training on Fat Metabolism. Endurance training has the most obvious and direct effect on body fat metabolism. The effect of endurance training on human fat metabolism can be manifested in many aspects, which not only can directly affect the volume and metabolic characteristics of adipocytes in adipose tissue but also can affect the oxidative utilization of fatty acids by skeletal muscle and reduce the concentration of plasma triglycerides. Research in this field plays an important role in sports theory and practice and rehabilitation medicine [10].

Table 2: Basic data of research object.

Gender	Age	Height	Weight	Body mass index
Boys	20	170	64	23
Girls	20	160	56	21

3.6. Effect of Endurance Training on the Ability of Skeletal Muscle to Oxidize and Utilize Fat. The result of endurance training enables athletes to use fat for energy supply during endurance exercise, which is about 10% more than that of nonendurance athletes, thus helping to save sugar reserves in the body and improve endurance [11]. In addition to the above-mentioned factors, such as the improvement of fat hydrolysis and fat mobilization ability, the increase of cardiac output, the increase of local capillary density of skeletal muscle, and the increase of blood supply during exercise, endurance training causes the oxidation of skeletal muscle itself, and the adaptability of fatty acids is manifested as various oxidase in muscle cells. For example, the activity of tricarboxylic acid cyclase and the content of cytokines in the respiratory chain have increased significantly, and the activity of specific enzymes directly related to fatty acid oxidation has also increased significantly, which promotes skeletal muscle cells to better oxidize and utilize fatty acid energy during exercise. Endurance training can also increase the number of lipid droplets in the cytoplasm of skeletal muscle cells, so the results of endurance training also increase the content of triglycerides stored in skeletal muscle cells, which is convenient for nearby use during exercise [12].

4. Experiment and Research

The maximum fat metabolism intensity (FAT_{max}) refers to the exercise intensity corresponding to the peak fat oxidation rate, which is called the maximum fat oxidation rate (FAT_{max} rate). The maximum fat metabolism intensity is usually expressed as the percentage of maximum oxygen uptake, and there is a wide range (33%~65%), which is mainly affected by factors such as exercise intensity, training level, body composition, gender, exercise style, and dietary supplement [13].

At present, the research on the effect of maximum fat metabolic intensity is mostly seen in the rehabilitation exercise prescription for metabolic syndromes such as hypertension and diabetes. The fitness effect of College Students' fitness exercise prescription based on maximum fat metabolic intensity has not been reported. Next, take ordinary male and female college students as the research objects, measure their FAT_{max}, formulate the exercise prescription of maximum fat metabolism intensity, study their fitness effect, and provide theoretical support for college students' fitness exercise [13].

4.1. Research Object. Taking 10 healthy male and female college students with good living habits and no training experience as the research objects, cardiovascular risk assessment, a/b personality test, and PAR-Q questionnaire were conducted. The basic information of the research object is shown in Table 2.

4.2. Research Scheme. The formulation and implementation of the exercise prescription for maximum fat metabolism intensity introduced the test process and precautions to the subjects, obtained their consent, and got the informed consent signed on the basis that the subjects had some knowledge [14]. Before the formal experiment, the height, weight, heart rate, blood pressure, and vital capacity of the subjects were tested to understand the basic physical conditions of the subjects. Then the functional ability test was carried out to understand the exercise ability of the subjects. Finally, the maximum fat oxidation intensity was measured, with FAT_{max} as E. C.%, and the heart rate corresponding to Fatmax is the bull's-eye rate. All test data were input into the Ogilvy road exercise prescription system software, and a personalized maximum fat oxidation intensity exercise prescription was formulated for each subject, 5 times a week. The exercise mode is running, all of which are carried out on the treadmill. During the exercise, wear polar r400 for heart rate monitoring to ensure that the exercise center rate is within the target heart rate. It lasts for 8 weeks [15].

4.3. Determination and Judgment of Maximum Fat Oxidation Strength. After 48 h of rest, the subjects walked to the laboratory. The Technogym treadmill and Max II cardiopulmonary function instrument were used to complete the gas metabolism index test of incremental load exercise and determine the maximum fat oxidation intensity. The experiment is scheduled to be completed in the morning. The indoor temperature is 25°C, and the relative humidity is 40%. The test scheme starts from 5 km/h for male and female students, with an increasing range of 1 km/3.5 min, keeping the horizontal slope unchanged until the respiratory quotient reaches more than 1.00. The gas metabolism data of 30 s after each level of load is substituted into the following formula to calculate the fat oxidation rate. The fat oxidation dynamic curve is determined through the fitting curve of three-order polynomial. The oxygen uptake corresponding to the maximum value of fat oxidation rate is fat max.

4.4. Data Processing. All data were processed by SPSS 13.0 software. All data are expressed by $X \pm S$. before and after the experiment, independent sample t-test is conducted for the data. The significance level of all statistical analyses is set as $p < 0.05$, and the very significant difference is $p < 0.01$ [16].

4.5. Research Results. According to the test results of exercise prescription for maximum fat metabolism intensity, the fat oxidation rate is calculated by using the gas metabolism data 30 s after each level of load. Considering the application in practice, the fat oxidation power curve and FAT_{max} are determined by fitting the mean value with a three-order polynomial curve. The results are shown in Figure 2 and Table 3. The results in Figure 2 show that the fat oxidation rate of boys and girls increases first and then decreases, showing a "clock" change, with the maximum fat metabolism intensity [17]. The results in Table 3 show that the absolute value of fat oxidation rate of boys is higher than that of girls, but the relative value of fat oxidation rate is lower than that of girls due to their higher body weight. However, no matter the absolute value, relative value, or FAT_{max} of fat oxidation rate, there was no significant difference between boys and girls ($p > 0.05$). The metabolic equivalent and running speed corresponding to FAT_{max} were higher in boys than in girls, with significant difference ($p < 0.05$) [18].

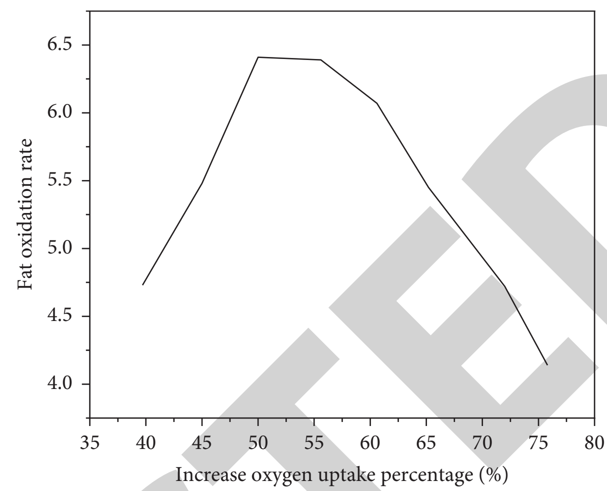

Figure 2: Change curve of the fat oxidation rate of male and female college students.

4.6. Effect of Exercise Prescription with Maximum Fat Metabolism Intensity on Cardiopulmonary Endurance. Table 4 shows that after 8 weeks of FAT_{max} exercise, the F.C. and maximal oxygen uptake of boys and girls are higher than those before training, with significant differences ($p < 0.05$), and the change range of girls is greater than that of boys. After 8 weeks of exercise prescription with maximum fat metabolism intensity, the exercise ability of male and female college students has been significantly improved, and the training effect of female students is better than that of male students [19].

4.7. Analysis and Discussion

4.7.1. Formulation and Implementation of Maximum Fat Metabolism Intensity in Exercise Prescription. Long-term, periodic, and continuous aerobic exercise is the main exercise mode of fitness exercise prescription, which can effectively improve cardiopulmonary endurance, burn fat, and maintain good body shape. Due to the improper selection of

Table 3: Test results of maximum fat oxidation exercise intensity.

	Absolute value of maximum fat oxidation rate	Relative value of fat oxidation rate	Percentage of maximum oxygen uptake corresponding to fat max (%)	Metabolic equivalent corresponding to FAT_{max}	FAT_{max} speed
Boys	0.43	6.20	54	7.36	10
Girls	0.36	6.8	55	6.21	9.63

Table 4: Effect of 8-week maximum fat metabolism intensity exercise prescription on college students' cardiopulmonary endurance.

	F.C. (METs)		V_{o2nx} (ml.(min.kg))	
Gender	Before experiment	After experiment	Before experiment	After test
Boys	13	16	49	53
Girls	9.6	11.36	31	38

exercise intensity in the fitness exercise prescription, the fitness effect is often poor, making many people give up halfway. For college students with high academic pressure and little time, they should choose a scientific and reasonable exercise prescription to achieve the purpose of scientific fitness [20].

Since some scholars proposed the FAT_{max} test method in 2020, it has been recognized by many researchers, and the test method is constantly being improved. The theoretical basis of the FAT_{max} test is that the energy supply ratio of fat in skeletal muscle decreases with the increase of exercise intensity and increases with the extension of exercise time. In the middle- and low-intensity exercise, with the extension of exercise time (more than 30 min), the proportion of fat energy supply gradually exceeded that of sugar. During high-intensity exercise, skeletal muscle relies more on anaerobic metabolism for energy supply. Therefore, the oxidation rate of fat will change with the change of exercise intensity, showing a "clock" pattern that gradually rises to the peak and then decreases. The exercise intensity corresponding to the peak of fat oxidation rate is fat max.

During the implementation of exercise prescription, E. C.% is taken as the standard for exercise, and the bull's-eye rate is monitored. Therefore, E. C.% is the key point to determining whether the exercise prescription is effective. According to the ACSM standard, E. C.% is determined through F.C. table lookup. However, the standard is formulated based on the European and American populations, which may not be applicable to Chinese people. Moreover, it is still a range, and the exercise prescription based on this standard is not scientific enough. Since FAT_{max} can be measured, use FAT_{max} to determine E. C.%, the maximum fat metabolism intensity exercise prescription is more scientific and personalized.

4.7.2. Effect of Maximum Fat Metabolism Exercise Prescription on Body Function and Body Composition. The material composition of the human organs and tissues is called body composition, including the content of fat, muscle, and water. Generally speaking, the lean weight (muscle, moisture, etc.) of healthy adults is relatively stable. The change in fat content is the main reason for the change in body composition. Reducing fat and shaping the body is also an important purpose for people participating in fitness exercises. The research shows that after 8 weeks of FAT_{max} exercise prescription exercise, the body fat percentage of boys and girls has decreased compared with that before exercise. There is a significant difference between girls and boys before and after exercise, but there is a downward trend. It shows that FAT_{max} exercise prescription exercise can accelerate fat oxidation, can improve body composition, and is conducive to fat reduction and body shaping, especially for women. This difference is related to the enhancement of fat oxidation and utilization. Studies have shown that long-term aerobic exercise can increase the activity of hormone-sensitive lipase and triglyceride in skeletal muscle and reduce the content of triglyceride and total cholesterol. From the perspective of women, the triglyceride content of women's muscle is higher than that of men; the activity of fat metabolism-related enzymes is stronger than that of men; and they are more dependent on fatty acid energy supply than men in long-term endurance exercise. Therefore, the effect of exercise prescription based on FAT_{max} on women's body composition is better than that of men.

After 8 weeks of FAT_{max} exercise prescription exercise, the quiet heart rate of boys and girls decreased significantly compared with that before exercise, indicating that FAT_{max} intensive exercise can effectively reduce the quiet heart rate. Studies have shown that the decrease in resting heart rate is related to the decrease in the excitability of the sympathetic nerve dominating the heart and the increase of the excitability of the vagus nerve. Low quiet heart rate leads to a large cardiac reserve, which can improve the working efficiency of the heart and save energy, and the body can better adapt to high-intensity exercise. The vital capacity index is an objective index reflecting pulmonary ventilation function. The larger the index is, the better the ventilator can be. Eight-week FAT_{max} exercise prescription exercise can improve the vital capacity index of college students. There is a significant difference between male and female students before and after the experiment. The reason may be that long-term aerobic exercise enhances the strength of respiratory muscles, consumes body fat, reduces body weight, and then improves the vital capacity index.

5. Conclusion

Now, sports drinks should not only meet the needs of professional athletes but also meet the needs of some ordinary sports people. While meeting the needs of ordinary consumers, it is even more necessary to adjust the formula for factors such as different age groups. Therefore, the sports drink market needs to be further subdivided. Targeted sports drinks should be developed for the drinking population of sports drinks, and the nutritional characteristics and functional evaluation methods of sports drinks should be further elaborated. Fat metabolism is a series of chemical reactions caused by many complex biochemical factors. The mechanism of this process is still under further study. However, compared with a certain organism, both theory and practice show that we can improve the activity of aerobic metabolic enzymes, especially the activity of fat metabolic enzymes, through aerobic endurance training. By controlling the exercise intensity below 70% of the maximum oxygen uptake and the duration should not be less than 40 min, the hormone level can be appropriately increased and the utilization of sugar is more reasonable. It can also increase energy supply for fat decomposition by supplementing L-carnitine and trace elements, which not only can reduce fat accumulation in the body but also can improve aerobic exercise ability.

There is no gender difference in FAT_{max} among college students. The corresponding exercise intensity (7.22 METs for boys and 5.25 METs for girls) and running speed (9.73 km/h for boys and 8.65 km/h for girls) can be used as a reference for formulating college students' fitness exercise prescriptions. The fitness exercise prescription based on FAT_{max} can improve cardiopulmonary function and body composition, especially for girls. FAT_{max} can be used as the strength reference standard for formulating fitness exercise prescriptions. FAT_{max} has a wide range of applications in sports prescription, which can be used as an important reference for different people to formulate fitness or rehabilitation exercise prescription exercise intensity and is worthy of further research.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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