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The Effect Of The Ketogenic Diet On Muscle Strength And Exercise Performance

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ABSTRACT:

BY RESPECTING THE FUNCTION OF YOUR BODY YOU CAN DO MIRACLES FOR YOUR HEALTH & ENERGY.

The basis of the ketogenic diet is based on low carbohydrate and high fat content. Ketogenic diets differ according to their carbohydrate content. Fats are used as an alternative energy source in the ketogenic diet. The most common use of ketogenic diets is to provide rapid weight loss. The most obvious effect of the ketogenic diet on athletes is to reduce muscle fatigue. The results obtained in the laboratory environment cannot be generalized to various sports branches. There is no definite information that the ketogenic diet increases muscle strength and exercise performance. Therefore, ketogenic diet and ketogenic products should be used carefully in athletes. As a result of the review, more and longer clinical studies are needed.

Key Words*: Ketogenic diet, Muscle strength, Exercise performance*

INTRODUCTION

One of the most important health problems in the world is obesity. Obesity brings along serious health problems. For this reason, nutrition programs are developed to lose weight quickly. One of the most effective fast weight loss methods is the ketogenic diet application [1]. Ketogenic diets may vary according to the energy and nutrient needs of individuals. However, the basic logic is based on low carbohydrate and high fat in the diet [2].

The ketogenic diet causes significant changes in the metabolism. Lack or reduction of dietary carbohydrates reduces plasma insulin and increases glucagon; This promotes lipolysis of adipose tissue through the increase of HSL (hormone sensitive lipase) as well as hepatic glycogenolysis and gluconeogenesis. Therefore, after carbohydrate restriction, ingested carbohydrate is not sufficient for glycogenolysis and increased levels of free fatty acids and acetyl CoA levels (via mitochondrial beta oxidation) lead to ketogenesis. Ketone bodies, the final products of this process, are formed [3].

Glycogen is an essential component of muscle mass. It has been reported that ketosis reduces glaucogen breakdown in ketogenic diet applications [4]. It is known that lactate, which comes out as a result of the depletion of glycogen stores, causes fatigue. It has been reported that ketogenic diet improves the lactate threshold [5]

In this study, studies on the effect of the ketogenic diet on muscle strength and exercise performance in athletes are included.

Ketogenic Diet Model

There are ketogenic diets with various carbohydrate content for the individual's needs and purpose. New ketogenic diet models are tried to be developed according to countries. It is possible to divide ketogenic diets into four main groups [6].

Classical ketogenic diet; The amount of carbohydrate is adjusted according to the need. It is generally used for medical treatment in hospitals for infants and children. Fat and protein content of the diet is increased according to carbohydrate restriction [7].

Medium chain triglyceride (MCT) ketogenic diet; It is a diet in which most of the fat in the diet is made up of medium-chain fatty acids. It has been reported to be more ketogenic than ketogenic diets using long-chain fatty acids. However, it has been reported to have side effects such as diarrhea, vomiting and swelling. It has been reported to reduce the frequency of seizures in patients with epilepsy[8].

Modified Atkins diet (MAD); Daily carbohydrate intake is 10-15 grams. There is a high fat intake in the diet. It has been reported that it can be easily applied at home and is effective in the long term [9].

The low glycemic index treatment (LGIT); Daily carbohydrate intake is limited to 40-60 grams. Low glycemic index food consumption is at the forefront [10]

The health benefits of the ketogenic diet

It is said that the proper use of ketogenic diets in the short term might avail. It creates an alternative energy source [11]. Low carbohydrate intake in diets makes the human body use keton bodies, which are an alternative energy source, instead of glucose, which provides the required energy for the brain[12].

Ketogenic diet affects the release of hunger and satiety hormone which are ghrelin and leptin [13]. Ketogenic diet induces ketosis affecting the regulation of ghrelin and leptin. In a study, it was determined that long-term ketogenic diet application affects leptin and ghrelin levels [14].

Ketogenic diet provides rapid weight loss. The use of fats as a primary energy source increases the use of fats in body metabolism.[11]. Lean body mass affects sports performance. For this reason, it has been reported that sports use the ketogenic diet to reduce body fat mass [15].

Kethogenic diet has been reported to have an effect on blood lipids and reduce the risk of cardiovascular disease. In a study, it was found that the ketogenic diet increased high-density lipoprotein (HDL) cholesterol, decreased blood glucose, triglyceride and low-density lipoprotein (LDL) cholesterol, and significantly improved the glycemic and lipid profiles of the patients [16].

Ketogenic diet is used in the treatment of neurodegenerative diseases. It provides an effective energy source for the treatment of certain neurodegenerative diseases characterized by focal brain hypometabolism such as Parkinson's and Alzheimer's diseases. Neuronal cells are able

to metabolize ketone bodies in a glucose deficiency. However, the long-term effects of the ketogenic diet to these diseases are unknown[17].

The ketogenic diet of damage to health

Ketogenic diets have harmful effects on long term. From the beginning of the ketogenic diet, it has been reported that conditions such as fatigue and loss of strength lasting 4-5 days have been observed. The reason for this is the lack of vitamins and minerals in the body due to nutrition. It is predicted that it may cause diseases in the long term due to vitamin and mineral deficiency [18].

Visceral fat content has been correlated with bone mineral density. It has been reported that insufficient mineral intake in the ketogenic diet can negatively affect bone health and cause bone fractures (Paoli, 2014). Another published study found that 22 weeks of ketogenic diet administration in mice caused dyslipidemia, a proinflammatory state, hepatic steatosis symptoms, glucose intolerance and a decrease in beta and alpha cell mass in mice without weight loss [19].

There are no long-term clinical studies on the ketogenic diet. Therefore, the information of the possible side effects of the ketogenic diet is insufficient.

Ketogenic Nutrition in Athletes

Glycogen stores in the muscles are important in endurance exercises. It has been reported that the depletion of glycogen stores in the muscles decreases performance and increases fatigue [20]. Ketogenic diets reveal a sustainable energy source by inducing ketosis in the body. It is thought that this energy released during exercise can increase exercise performance [21].

Ketogenic diet can cause ketosis. Over time, the body starts using ketone bodies as primary fuel to achieve keto-adaptation. Keto-adaptation can provide a consistent and rapid source of energy, thus increasing exercise performance and capacity. With its anti-inflammatory and anti-oxidative properties, a ketogenic diet can contribute to muscle health, thus preventing exercise-induced fatigue and damage. Thus, it can reduce muscle fatigue by improving exercise capacity [22]

During Crossfit studies, as a result of the 4 weeks of ketogenic diet applied to men and women, it was determined that men use fat more in energy metabolism than women [23]. As a result of the study investigating the effect of 31-day ketogenic diet on submaximal exercise capacity and efficiency; It has been reported that submaximal exercise capacity is preserved, but recovery time after exercise may be prolonged[24].

It has been reported that as a result of the ketogenic diet applied to American soldiers without calorie limitation, serious body fat loss was observed in soldiers, while aerobic capacity and maximum power increase were not observed [25]. However, it has been reported that endurance capacity increases in endurance sports after keto-adaptation is achieved [26]. It is also thought that ketogenic products can be used as an ergogenic supplement [27].

It has been reported that the results obtained in laboratory environments cannot be generalized for sports that require cognitive performance such as football and the ketogenic diet should be applied carefully[15].

Conclusions

Ketogenic diet has become popular by athletes recently. It is predicted that the long-term use of ketogenic diets will lead to vitamin and mineral deficiency and accordingly, the nutrition of individuals who will follow a ketogenic diet should be supported in terms of sufficient vitamins and minerals. As a result of this review, there is no definite information that the ketogenic diet increases muscle strength and the performance of athletes. As a result of the review, more studies are needed.

Biography

Nezihe SENGUN, I am a PhD student at Fırat University, Faculty of Health Sciences, Department of Physical Education and Sports. I'm 27 years old. I'm a nutritionist. I follow vocational training and developments closely. I have made oral and written poster presentations before. I wrote a chapter. My academic studies continue.

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