

A circular food pyramid diagram with five colored segments representing different food groups. The segments are arranged in a circle around a central green circle. The segments are: a red segment (top) containing an apple, a tomato, a cucumber, a yellow bell pepper, and a broccoli; a light blue segment (top-right) containing a fried egg, a shrimp, a piece of meat, and two eggs; a dark blue segment (bottom-right) containing a bowl of rice, a walnut, and a piece of bread; a light green segment (bottom-left) containing a piece of butter, a piece of cheese, a piece of bread, and a piece of meat; and a dark green segment (top-left) containing a piece of cheese, a piece of bread, and a piece of meat. The background is a green gradient with a pattern of small white diamonds.

When trying to lose weight on any diet it is a good idea to exercise as well as watching what you eat. However, what works on a normal diet for working out and doing exercise can be slightly different when on the keto diet.

When you are on a keto diet, your body is using fat as its main source of energy. This process, called ketosis, is where the liver turns fatty acids into ketones. One of the side effects of this can be fatigue, which could be made worse when exercising. However, once your body has got used to using fat for energy it works really well alongside exercise to boost weight loss. (1)

The keto diet is great to fuel cardiovascular exercise like jogging, cross-training or rowing. When doing low intensity exercise, such as walking, the fatty acids in the blood are used for energy. As you start to work harder (up to 60% of your maximum heart rate) fat from the body is used. This is because there is time to take this fat, combine it with oxygen and use it to fuel the activity. However, working harder (like sprinting) means the body needs to access energy very fast. For this it uses up the glycogen (stored glucose) in the muscles, because it can be accessed easily and quickly.

The keto diet is not so good when you need power. For example when weight lifting or sprinting. (2)

When you do weight lifting or exercises that need power, the muscles get damaged. It is only a small amount of damage to the muscle cells. However, due to this damage glycogen is blocked from being able to re-enter the muscles. This is a complicated process but it means that recovery is slower.

When recovery is slower you will feel fatigued and less likely to want to do exercise again the next day. (3) Therefore, the best kind of exercise to burn fat when on the keto diet is steady cardiovascular exercise. This is good news for those over 40 who may not have the fitness or energy levels of their younger counterparts.

Besides boosting weight loss, exercise can help get the body into a state of ketosis. Ketosis is where the body is using ketones from fat for energy. This happens once all the glycogen has been used up. Glycogen is the body's emergency energy store in the liver and muscles. Normally glycogen would be used up during exercise. Afterwards it is restored from carbohydrates ready to be used the next time.

However, the body is very clever. If there is no carbohydrate to turn into glycogen it can use protein or fat. This is called gluconeogenesis. (4) It happens when glucose is desperately needed by the body and there is no glucose from carbs. In this case for recovery of the muscles.

The muscles need glycogen to recover but if they are damaged, the damage blocks the glycogen from entering the cells. This damage is caused by weight lifting or strength work. Due to the muscles sending messages (feedback), that they need glycogen, protein and fat keeps on being broken down into glucose. But it isn't being taken into the muscles. Therefore, despite not eating any carbohydrates, the body won't be in ketosis because of all the glucose that has been made by the protein and fat. This is the reason it is not a good idea to do weight lifting or strength work when on a keto diet.

On a regular diet you are advised to eat carbs before you start exercising. This is to fuel the workout.

When comparing runners who ate a normal diet with those on a keto diet, researchers found that there was no difference in the amount of stored glycogen after a long run (5). This is because the glycogen was being replaced from protein and fat. Therefore, it is not necessary to eat any carbs after a workout when eating a keto diet.

The part of fat that is used to make glycogen is glycerol. It is possible to buy this as a supplement. You may wish to take this before a workout to help recovery. Glycerol also draws water into muscles (6) which helps add bulk to them. Something worth bearing in mind if you are looking to build muscles and stick to keto and not eat any carbs.

Something else to bear in mind when eating a keto diet and exercising is what to do if you are going to be eating a big meal. The kind of meal you have for Thanksgiving or at Christmas. You don't want all your hard work to get undone.

Firstly, fast for at least 12 hours before the meal – preferably 15/16. On the morning of the day you are having the meal, do a full body workout. Resistance work with weights is the best. Do about 4 sets of 20 for each part of your body. In other words make sure you exercise your legs, arms, chest, shoulders and back.

When you start to eat, tackle the protein first. In other words, break your fast by eating the turkey. Try not to snack before the big meal. Most celebration meals are pretty high in calories anyway, so nibbling on snacks will cause even more damage. Even if they are keto snacks, eating more calories than you burn will cause weight gain.

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Next day get straight back on your keto diet.

Most important of all; don't fret about indulging- especially if it is a special occasion. The stress from worrying about it could do more damage than the few carbs that you might eat. Have fun, laugh and enjoy celebrating. The boost to your mental health is very important (8).

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