

Get the Facts: Working Out on an Empty Stomach

Myth:

You should never workout on an empty stomach.

Fact:

Like most myths, this one is not as black and white as some like to make it seem. There are quite a few variables to consider when answering the question of “should I work out without having eaten the day of?” Here I will touch on a few more relatable variables to guide you in creating the best workout program for you.

First let’s make sure everyone is on the same page. When we talk about eating before exercise we mean mainly carbohydrate consumption. When you consume carbs (starches, sugars, polysaccharides, etc.) they are broken down fairly quickly compared to fats and protein. Sugars are preferred by the cells due to their ability to be used completely for energy whereas fats and proteins do not have as much potential energy to use and must be changed from their original form to enter cell metabolism. Because of this, glucose is stored in a very easily accessible form in muscles and the liver called glycogen. Glycogen is the energy you use on a short moderate intensity run and it is what keeps you going initially. However, if you exercise too long, you can run out. Anyone who has gone for a moderate run or exercised longer/more intense than usual might have experienced the exhaustion or fatigue that sets in mid-way through the workout. This is the muscle switching from glycogen usage to fat and protein usage for energy. Based on that, we can safely say fasting (not eating anything greater than 4 hours prior) or feeding before a workout will alter the amount of glycogen a person has before their workout. Getting back to the original question, the first variable to look at is the goals of a person. If you are doing cardio or working out for an event such as a marathon, a mud/obstacle run, or any other endurance based activity, studies have shown training at the fasted state may be preferential. Stannard et al. investigated performance in the fed and fasted states. Individuals were split into fasted and fed groups and trained on stationary bikes 5 days per week for 4 weeks. Results showed that the fasted groups had a 52% greater capacity for glycogen storage than the fed group and the VO2 max (the maximum volume of oxygen a person can use for exercise) was increased in the fasted group as well. What we can take from this makes sense - if you train with little to no glycogen in your body, the muscles will adapt to be able to hold on to more so when you do eat, you store more for later (like a camel with water).

On the other hand, a study by Colombani et al. considered *performance* with carbs pre-workout versus water. The results showed a marked decrease in performance with the water group as compared to consuming carbohydrate rich meals beforehand. This fits well with our previous hypothesis. One might perform worse in the fasted state but this stress will yield adaptation to better utilize glucose and glycogen in the future. Now the fasting trained individual can carb load on marathon day and will have a larger reserve than anyone else allowing them to go longer.

A few other considerations for “should I eat before working out” is what type of workout you will be doing and what your goal is. If you are training for muscle strength, and trying to lift as much as possible, you probably do not want to run out of glycogen. There is little endurance required for this activity and explosive quick energy is needed so feeding beforehand is ideal. Also, if you plan on lifting weights right after a run, fasting before that run will surely deplete all glycogen storages and leave you weak and tired for the lift.

Lastly, I want to mention one other interesting study done by Proeyen et al. Proeyen’s team investigated insulin sensitivity in fed and fasted groups resulting in an increase in sensitivity in the fasted group. The proposed mechanism is that the glucose transporters in the muscle respond to increased glucose. These transporters then increase in number (because there is so little glucose available) causing a downstream effect in insulin sensitivity. Basically, anaerobic exercise in a fasted state may be able to increase the potency of insulin. This can be valuable for those in the medical field treating diabetic patients or patients encroaching diabetic territory (patients whose insulin is not potent enough to work fully). There is a lot of research in this field so let me know if you want more info.

Conclusion:

Eating before a workout can be beneficial or not depending on what the goal of the exercise is. When creating a workout plan, always keep the primary goal in mind. Preparing for an endurance event may indicate fasting before exercise, but power type training is the opposite. The day of or before the endurance event, carbo-loading still seems to work. And finally, fasting prior to anaerobic exercise may increase insulin sensitivity and increase the responsiveness of muscle/liver cells to sugar intake. Remember, always interpret research critically and question everything, even my statements. Make your own interpretations and draw your own conclusions even if they’re different from others and discuss them. As always, I’m happy to talk more about this topic and have more resources if you are interested.