

Intermittent Fasting for Athletic Performance

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ABSTRACT

In today's society we are focused on appearances and how to achieve the perfect body with the hottest new diet trend or workout routine. As a group, we wanted to look into intermittent fasting and see how the body reacts in regards to performance when it goes without food for a certain period of time. This paper includes information from multiple studies that looked into the process of intermittent fasting. In addition our group performed our own experiment to see if intermittent fasting can help the way the body performs. Over the course of two weeks the participants fasted for a minimum of ten hours and then performed their personal maximum amount of pushups. In comparison, the following two weeks participants ate prior to doing pushups at a different time of day. This was done to see if the body operated more efficiently in a full state, while intermittent fasting, or in a fasted state. As a group, we hypothesized that the body may work better when in a fasted state than in a full state. Our results support this hypothesis, however due to the looseness of experiment restrictions, we are only able to state that there seems to be a correlation between the sets of data.

INTRODUCTION

Intermittent fasting has become a more common practice for a wide arraignment of people including pro athletes, models, bodybuilders, and the everyday person trying to lose weight. Intermittent fasting can be conducted in a few different ways. Some fasting occurs for only a portion of the day while others include fasting for full days a couple times a week or every other day. Our experiment will be more closely related to

the 16/8 split (Gunnars, 2017). This means that participants would fast for sixteen hours every day, which would leave an eight-hour window to consume food. Although sixteen hours may seem like a long time, it is important to note that the time spent asleep also counts towards the sixteen hours of fasting.

Our group as a whole was interested in being active and the way muscles perform. We believed that it would be more informative to learn about intermittent fasting and how it can affect our muscles. Some of us like to lift weights and thought this could apply to our workouts and possibly introduce us to a new way of eating. Our hypothesis is that the body works more optimally in the morning after fasting for the night. This means that we will perform more total pushups after fasting rather than when we have eaten prior to completing the pushups.

Materials and Methods

We tested our hypothesis over a four-week period; the first two-weeks participants fasted for a minimum of 10 hours and then did their personal best amount of pushups in the morning, after fasting for the evening. The following two-weeks participants did their personal best amount of pushups on a full stomach, after eating, to see how the body performed differently.

The body's "fat oxidation increases for 24 hours following a fasted workout" (Nehr, 2019). Simply stated, this means that bodies become better at burning fat rather than depending on the carbohydrates the body would normally use in a non-fasted state. Exercising while fasting "forces the body to use its energy systems more efficiently since carbohydrate stores are nearly depleted after a 12-16 hour fast" (Nehr, 2019). Further, "fasting activates the sympathetic nervous system and when the

sympathetic nervous system is activated, heart rate increases, digestion slows, and muscle tension increases” (Nehr, 2019). This information from our research supports our hypothesis that we believe we are able to perform more pushups in a fasted state as well as possibly losing weight while doing so.

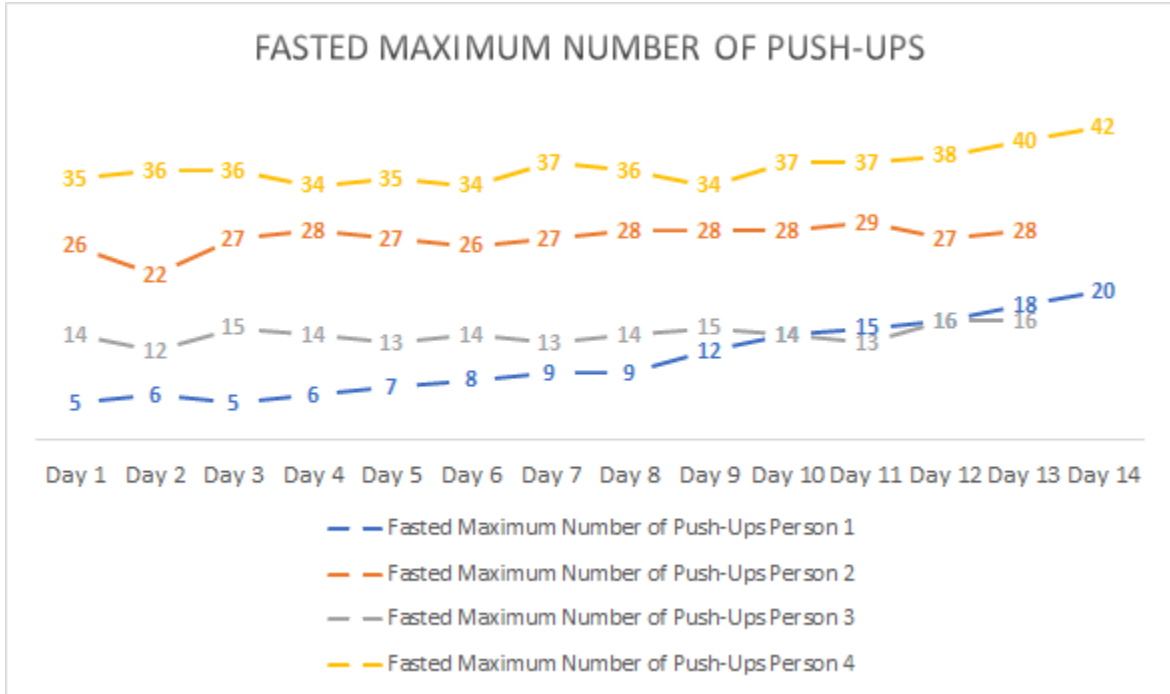
Some research suggests that intermittent fasting also helps you live longer and also protects you from certain diseases like heart disease, cancer, and type 2 diabetes (Gunnars, 2017). Intermittent fasting helps to reduce body weight by lowering your body’s insulin. The body breaks carbohydrates into glucose which is used by our cells as a form of energy or stored as fat (glycogen) for later use. When we fast, our insulin level will decrease, which causes burning of fats meaning glycogen will breakdown into glucose which is used as energy by the cells (Kandola, 2018). So, intermittent fasting helps reduce weight through consumption of less calories. In 2015 a systematic review in the journal *Molecular and Cellular Endocrinology* examined data from 40 different studies on intermittent fasting. The researchers conclude that it is useful for reducing body weight. A trial from 2017 compared the impact of intermittent fasting and a typical calorie restriction diet on weight loss over 1 year. Both forms of dieting were similarly effective for weight loss. There were no significant differences between the two groups for other markers of health, such as blood pressure or heart rate. Most current research suggests that intermittent fasting may be an effective weight management strategy (Kandola, 2018).

As a bonus experiment we also tracked our weight to see if fasting helped us to lose weight or not. For this we recorded our initial weight and fasted for 12-16 hours a day for a period of four weeks. As we fasted our body needed to find an alternative fuel

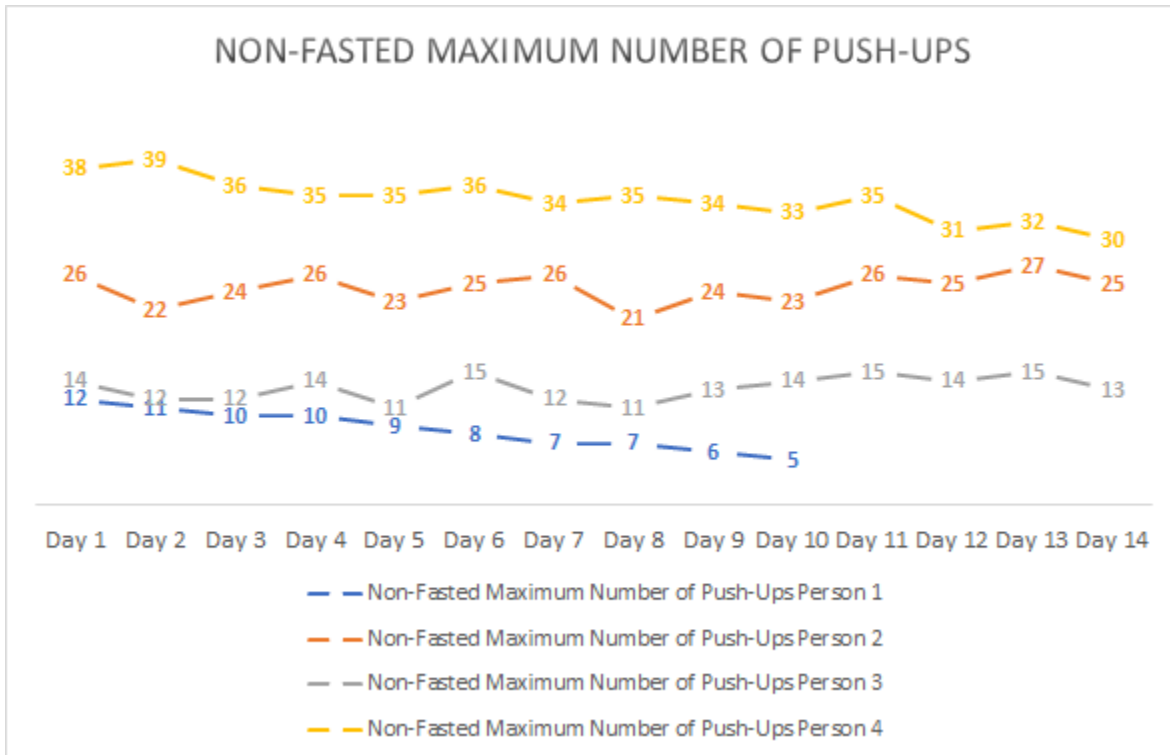
and it began burning stored stored glucagen which resulted in fuel and also produced ketones.

Fasting actually stimulates fat during burning hormones such as human growth hormone(HGH) and norepinephrine that keep your metabolic rate optimized. A study done at Intermountain Medical Center found that men who fasted for 24 hours had 2000% increase in HGH from baseline and women had a 1300% increase from baseline after fasting for 24 hours. HGH helps improve cellular healing and stimulates fat burning, lean muscle and bone development and help to modulate the immune system in such a way that it reduces inflammation. HGH has also been found to improve the quality of collagen tissue in our joints, skin and nails (Jockers, n.d).

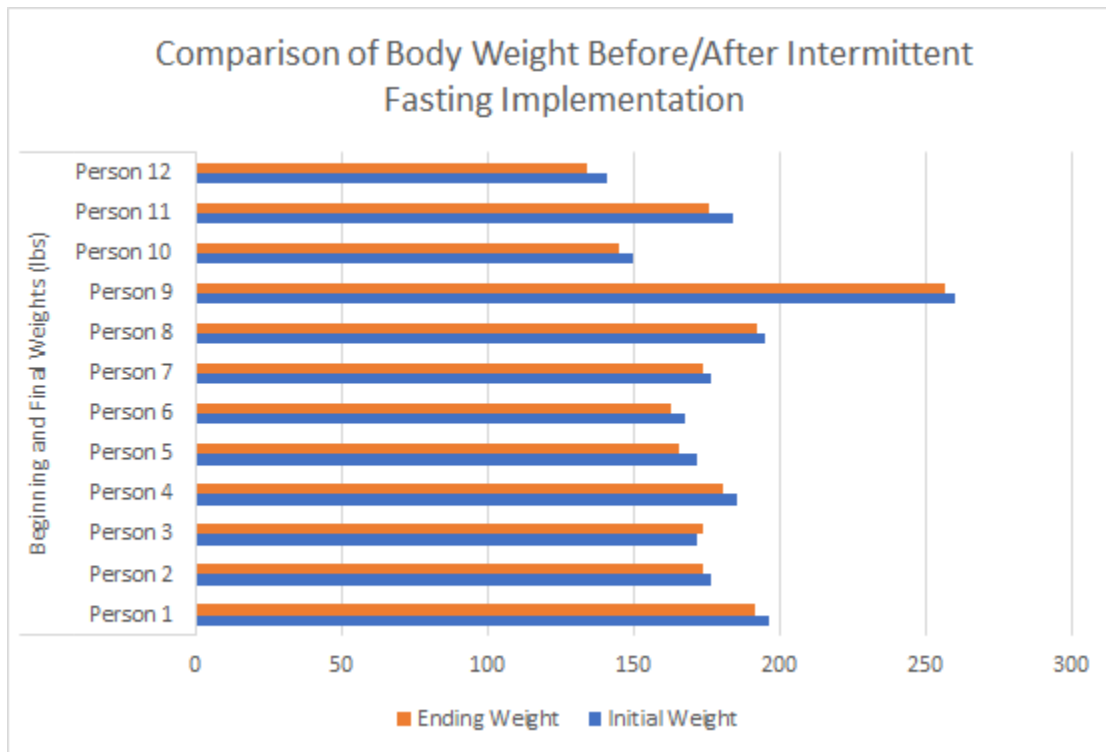
Results: 1. Fasted Maximum Number of Pushups Over 2 Weeks



Results: 2. Non-Fasted Maximum Number of Pushups Over 2 Weeks



Results : 3. Comparison of body weight before Intermittent fasting and after 4 weeks



Discussion and Conclusion

As displayed by our graphs and data, we conclude that our hypothesis may be correct, that our body performs more efficiently in a fasted state. When comparing a participants initial amount of pushups, and their maximum amount of push ups completed in the morning while in a fasted state, participants increased their maximum by an average of 6.75 push ups. Conversely, participants displayed a downward trend when completing pushups in a non-fasted state. Two participants exhibited this trend more obviously than our other two participants. We attribute this result to the fact that the parameters of our experiment were very loose. No diet, supplement, or intake restrictions were placed on participants in the experiment; the only parameters in place

were that participants would fast for at least ten hours prior to completing pushups in the first half of the experiment, and that participants would complete pushups in the second half of the experiment after a meal. No parameters were set on when participants would complete the push ups after eating, either (i.e. immediately after eating, 30 minutes after eating, etc.).

With our bonus experiment tracked the weight of participants to see if the fasting aids in weight loss. For this portion of the experiment, participants recorded their initial weight at the start of the experiment, and again after four weeks. Participants lost, on average, 4.02 lbs over the course of the experiment. These results support our initial hypothesis, that implementing intermittent fasting would result in weight loss for participants in the experiment. We had one participant gain two pounds during the experiment, which would challenge the validity of the experiment. We attribute this anomaly, as stated before, to the looseness of parameters and/or restrictions on the experiment. Additionally, aside from relying on participant honesty, we have no record to prove participants followed the parameters outlined for the experiment to the letter; because of this, our experiment is not able to prove that fasting causes weight loss, only that we found a correlation between weight loss and fasting.

We submit that intermittent fasting *may* cause weight loss and increased endurance in participants. As stated before, due to the lack of restrictions in place to nullify additional variables, we are unable to soundly state that intermittent fasting directly causes the weight loss. In a future experiment, it would be advisable to require participants to record their food intake, sleep times, fast lengths, and implement restrictions and parameters on when exercise should be completed. That said, there

does appear to be a strong correlation between fasting and muscle endurance, as well as weight loss. Participants in this experiment also reported increased confidence, reduced anxiety, in addition to just weight loss and increased energy despite fasting. While this experiment may not prove that intermittent fasting is the answer to increasing muscle endurance and weight loss, it at least proves that it is worth a try.

References

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Credit

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