



## Nutrition

# Periodized Nutrition for Strength and Power Athletic Performance

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**P**eriodization is the division of training cycles throughout the course of the year, where volume, frequency, intensity, time, and type of training are manipulated to meet the demands of the sport. As the training variables in a sport change, the nutritional considerations should also change. Training is often broken into microcycles (one day to one week), mesocycles (one week to three months), and macrocycles (year planning). Training will occur primarily through four phases: an off-season, preseason, in competition phase, and transition/recovery phase. As each phase requires manipulation of training variables, nutrition should be aligned with the changes in performance requirements during the various phases of periodization.

The first step in setting up a year round nutrition program is to gather assessment information. It is important to align caloric intake, macronutrient, and micronutrient considerations with the

physical assessments and training goals. In an organized setting you would first complete a medical history, informed consent form, and physician clearance. It would be important to get a blood analysis, because this may indicate any deficiencies in micronutrients such as iron, potassium, or calcium. The trainer would assess the following before physician approval: personal and athletic goals, detailed three day diet recall, height, weight, body fat analysis, and girth measurements. After physician approval and screening you would be tested on performance measures, such as 40 yard dash, 100 meters, 1.5 mile run, upper and lower body strength, power, agility, and quickness.

Body fat analysis is essential for the structure of one's diet. Other considerations before structuring the diet are what season is the athlete in and whether the athlete is in his/her ideal body composition ranges. An athlete can never have enough strength and muscle, but excess

body fat for the demands of a particular sport can be a hindrance. An athlete's caloric requirements should be based on lean body mass relative weight instead of total bodyweight. This is different than the traditional calculation of calories. After assessing body fat, we will develop caloric and nutrient requirements off of the lean body mass. For example, if Jennifer weighs 130lbs with 15% body fat what would her caloric needs be? If she has 15% body fat, she is carrying approximately 19.5 lbs of body fat. We must take in considerations that essential fat needed for an athlete. This is an important gauge for athletes with goals to lose weight. Going back to Jennifer, she has approximately 111.5 lbs of lean body mass. We will develop her caloric requirements and nutrition calories off of this number. Other considerations for nutritional planning will be the time of year, goals, and whether there is a needs to lose or gain body fat.

Some major considerations in structuring a nutrition plan will be needed caloric, carbohydrate, fat, and protein requirements. These will vary depending on the time of year and body composition. Recommended goals for caloric requirements will vary between 1.3 – 1.5 times the Basal Metabolic Rate (BMR) (3). The Basal Metabolic Rate is an estimate of the energy requirements of the many different cellular and tissue processes that are necessary to continue physiological activities in a resting, post absorptive state throughout most of the day. In order to calculate caloric requirements, you first convert the bodyweight into kilograms by multiplying by .45 or dividing the bodyweight by 2.2. After converting the weight into kilograms you multiply bodyweight in kilogram times 24, and this calculates your Basal metabolic rate (BMR).

We now must consider energy expenditure throughout the course of the day. This will vary according to the goals and what periodization phase training is in. The BMR can be multiplied by three estimates to calculate energy needs: 1.3 for low activity or weight loss, 1.4 for moderately active and maintenance, and/or 1.5 for highly active along with weight gain. Going back to Jennifer who weighs 130lbs with 15% body fat, we would use 111.5lbs as her bodyweight as we do not want to support fat calories. We first convert her lean body mass to kilograms by multiply by .45. Her bodyweight in kilograms is equal to 50.2. We multiply 50.4 times 24 and her estimated BMR will equal 1204.2 calories. Let us say we consider Jennifer to be moderately active, we would multiply the 1204.2 calories times 1.4, and her caloric needs for maintenance would

be 1685.88 Calories. With our weekly assessments of bodyweight we can tell if this is not enough needs to meet her goals. Bodyweight should be done weekly, and body fat should be done at the end of each month.

We know that 1 gram of carbohydrate is equivalent to 4 Calories, 1 gram of protein is equivalent to 4 Calories, and 1 gram of fat is equivalent to 9 Calories. An athlete's diet should consist of 55 – 60% carbohydrates, 15 – 20% protein, and 20 – 25% fat (1). The American Dietetics Association makes the other recommendations for athletes: protein 1.4 – 1.7 grams/kg, carbohydrates 6-10grams/kg, and fats at 20 – 25% of calories (2). It is recommended that the athlete analyze micronutrients as well, and increasing the micronutrients during certain phases of periodization may also be essential to enhance athletic performance. If we looked at the upper end of carbohydrate needs for Jennifer, she would need 500 grams of carbohydrates a day or 50 kilograms times 10 grams/kg. Her protein needs would be 85 grams/day or (50 kilograms x 1.7). We already have 2,340 Calories before considering fat intake. We will add fat needs of 20% of calories needed, and Jennifer will need to consume 468 calories in fat or 52 grams of fat (2)

The first periodized phase we will consider is the off-season. The off-season is the longest period of time and this is a great time for an athlete to put on muscle mass, improve areas of weakness, and recover from any injuries. During this phase training volume is high in resistance training, and cardiovascular training is minimized. The off-season usually range four to six months in

length, depending on the sport. We will consider first whether you are at the ideal weight for your sport. If you need to lose weight, then weight loss should be done slowly over the four to six months of off-season, and the same holds true if looking to gain weight.

How do we periodize nutrition to correlate with the goals of strength training? If Jennifer wants to gain 10lbs by the next season, we could spread this over the 6 months of off-season. In order to gain weight we need to eat more Calories than needed, so we would need an increase in Calories. For weight gain her Calories would need to be adjusted to 1.5 times her lean body weight in kilograms (50kg) which would be a minimum 1800 Calories. If she does not gain weight in the first week, then we add 250 – 500 additional Calories a week until we notice the weight needed. Since her goal is weight gain in the off-season she would need to consume  $50 \times 6\text{g/kg}$ , which is 300 grams of carbohydrates a day. Her protein needs in the off-season would be started at 1.4grams/kg, which is 70 grams. Her fat needs may be able to run higher since she is looking to gain lean mass in the off-season. At 20% of 1800 Calories, her fat needs would be 40 grams.

After 20 – 26 long weeks of strength and conditioning, it is time to get ready for another competitive season. We now move into the precompetition phase. This would be a good time to do an evaluation. How effective was the off-season nutrition plan? If bodyweight has gone up, then half of the goal has been reached. It is important to recheck body fat to see how much of the weight gain is fat and how much is muscle.

Our calories should be adjusted up to an activity level of 1.5, since you will be busy with practice, school, work, and training. If carrying excess body fat, then we would start at a 1.3 activity level. Carbohydrates should be at 8grams/kg, protein at 1.5 – 1.7, and fat calories about the same. It is important to pay closer attention to fluids and micronutrients. A multivitamin supplement may also be recommended.

In season training requires more detail. Depending on when competition or events are, your diet will need to be set to peak for a game or competition. If you have followed the periodized nutrition plan and assessments, you should be at an optimal fuel level and body composition. It is detrimental to be on a low calorie diet during the in season, and you should be at the highest level of carbohydrates and Caloric requirements. It is important that meals are structured before and after practice. It is also important that meals are structured before and after competitive events. Carbohydrates are the key during in season along with adequate Calories.

Transition or recovery is that time immediate after the season is over. It can last two weeks to a month. During this time you should rest, and have little to no structure to diet and training. Use this time to reflect on the past season and recover from the stress on proper dieting and training. I would still set some goals, where bodyweight is not allowed to drift 5 – 10 lbs from playing weight. I would also recommend that you continue to stay active doing things other than your chosen sport.

### References

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