

THE CALORIC NEEDS OF SWIMMERS IN TRAINING

All of our daily activities require energy. Simply living requires energy. That energy is measured in calories. A calorie refers to the quantity of heat required to raise the temperature of 1kg (1 liter) of water 1 degree centigrade. For this reason, it is more accurate to refer to calories as kilocalories (kcal). I will refer to these units as calories in this book because that term is used more commonly.

The number of calories we need each day to stay alive, even if we never got out of bed, is known as our Basal Metabolic Rate (BMR). It differs from person to person depending on their size and composition of their bodies. Large athletes and athletes whose bodies have more muscle require a larger number of calories for maintenance than the bodies of smaller athletes, or those whose bodies have greater amounts of fat tissue. Average basal metabolic values for teenage and young adult males and females are 2100 and 1800 calories per day respectively. Children actually burn more calories than adults in a basal state but their bodies are smaller so, their BMR's are less. They are in the range of 1600 to 1700 calories per day with no differences between boys and girls. These values are listed in figure 1.

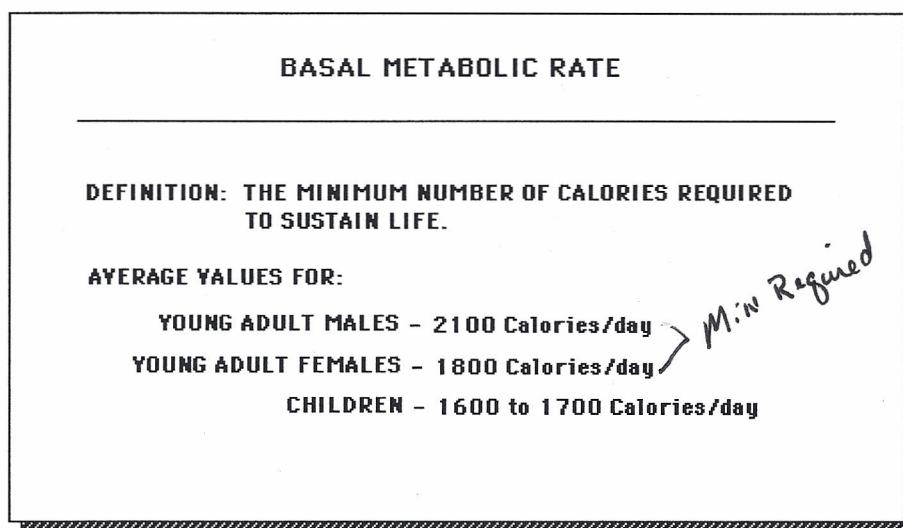


Figure 1. Average BMR values for adult males, adult females and children.

Daily activities such as running, walking, cycling, swim training, and even eating require energy. Therefore, they will increase the daily Caloric expenditure above the BMR. The amount of increase depends on the intensity and duration of those activities. For most persons, the increased energy requirement from normal activity is in the neighborhood of 800 to 1000 calories per day. On the other hand, the energy cost of training will be considerably higher than this. For example, the energy required for swim training has been calculated at between 6 and 10 calories per minute. So, competitive swimmers can add another 300 to 500 calories per hour to this total. Estimated caloric expenditures for male and female swimmers from various age groups have been listed in Table 1.

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Table 1. Estimated daily caloric expenditures for children, teenage and adult swimmers.

					Sex and age
Pretraining range	Estimated increase with training				
	daily caloric requirement in Calories per day	in Calories per day			
		1 hr/d	2 hr/d	4 hr/d	
Males					
10 & Under	1,800-2,000	2,000-2,300			
11 - 12	2,000-2,200	2,200-2,500	2,500-2,800		
13 - 14	2,200-2,400	2,500-2700	3,000-3,400	3,300-3,700	
15 - 18	2,600-3,000	2,900-3,300	3,200-3,700	3,400-4,000	
18 - 25	2,700-3,200	3,000-3,400	3,300-3,800	3,800-4,600	
30 - 40	2,400-2,600	2,500-3,000	2,800-3,300		
40 - 50	2,300-2,500	2,400-2,800	2,700-3,000		
50 - 70	2,200-2,400	2,300-2,700	2,600-2,900		
Females					
10 & Under	2,100-2,300	2,300-2,500			
11 - 12	2,200-2,400	2,400-2,700	2,600-2,800		
13 - 14	2,300-2,500	2,500-2,800	2,700-2,900	3,200-3,500	
15 - 18	2,300-2,500	2,500-2,800	2,700-2,900	3,200-3,500	
18 - 25	2,200-2,400	2,400-2,700	2,600-2,800	3,100-3,400	
26 - 40	2,100-2,300	2,300-2,600	2,500-2,700		
40 - 50	2,000-2,200	2,100-2,500	2,400-2,600		
50 - 70	1,900-2,100	2,000-2,400	2,300-2,500		

*The suggested daily caloric intake for athletes has been estimated at 38 to 40 calories per kilogram of body weight, or 20 to 22 calories per pound. This may yield figures that are 300 to 500 calories low for swimmers who are training 4 hours per day.

The caloric expenditures listed in Table 1 are only estimates for average sized persons in each of the various age groups. Children who are much larger or smaller than average may have somewhat different caloric expenditures as will those children with anxious versus placid temperaments and those with greater or less muscle tissue. Nevertheless, these values provide a starting point for estimating the caloric expenditures of male and female swimmers from the various age groups.

Another way to estimate the caloric needs of athletes in training is that they should be taking in between 40 to 50 calories per kilogram of body weight, or between 20 and 23 calories per pound of body weight (Georgia Tech Sports Medicine & Performance, 1999b). This formula would indicate a daily intake of 2,760 calories for a female swimmer weighing 55 kilograms (120 lbs). In reality, however, these swimmers are training much longer than the usual two hours daily. Therefore, a swimmer who is training for four hours of hard training may actually require a caloric output between 3300 and 3500 calories per day. It

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might be better to use a value of 60 calories per kilogram, or 27 calories per pound of body weight to estimate their daily caloric output.

Most male athletes and many female athletes consume enough calories every day to replace the energy they use in training because their natural hunger mechanisms take care of replacing the energy they need. There is an alarming tendency for more and more female athletes, and some male athletes, to use training as a form of weight control, however. They purposely take in fewer calories than they use each day so they can lose weight or prevent weight gains. When athletes take in fewer calories than they use, they must rely on storage depots in their bodies to supply the additional energy. These storage depots are made up of fat and muscle protein. The use of either, or both, in large amounts will reduce their ability to train so much that they will not be able to maintain their aerobic and anaerobic training adaptations, nor produce new ones. Athletes should never diet while they are training. They should eat when they are hungry, so they can maintain an adequate energy supply and train with sufficient intensity from day to day.