

Caribbean Chub: Fish or Fat

by Gretchen M. Ashton, CFT, NBFEE

While diving on the wreck of the Oro Verde in Grand Cayman, several of us were bit by Caribbean Chub. Sneak attacks occurred on our hands and arms. Someone had probably been feeding the sizeable charcoal-gray fish. We were still nursing our wounds when we boarded the plane for home late the next day. As we settled into our seats my dive buddy commented on the vacation pounds he'd gained from abundant meals. It was quite obvious, we had **been "bit by the Chubb" in more ways than one**. A bruised knuckle heals in a day or two with little lasting affect. But, the extra padding around your waist can be difficult to lose and if allowed to accumulate over time compromises your health.

You were designed to both eat and enjoy food. The senses of taste and smell along with signals of hunger are built-in mechanisms for providing life-sustaining fuel. How much and what type of fuel, (nutrition) you require, primarily depends on your current metabolic state and the physical demands you place on your body.^{1,2,4,5,6}

Scuba Diving is a recreational activity with its own unique combination of physical energy demands. Standing up from a bench wearing 50-100 pounds of gear primarily requires an immediate source of energy from the body. Produced in your muscle fibers, it is used up quickly requiring little oxygen. The repeated exertion of your muscles while fin kick swimming, and the activities of shore diving primarily require medium-term or glycolytic energy which is stored in reserve in both your liver and muscles. Long-term endurance activities primarily require oxygen energy systems. Scuba diving is typically moderate exertion for no more than an hour, so not much oxidative energy is required.^{1,6}

Scuba diving expends approximately 50% immediate, 40% glycolytic and 10% oxidative energy. Each of these energy systems is fueled with specific macronutrient combinations. **The calories you consume each day when scuba diving should come from macronutrients of approximately 30% protein, 55% carbohydrates and 15% fat.** The caloric value of these macronutrient percentages for a 2,500-calorie per day nutrition plan when scuba diving is 750 calories from protein (188 grams), 1,375 calories from carbohydrates (344 grams), and 375 calories (42 grams) from fat. A food counts book is the best way to convert macronutrient percentages into food choices and portions.^{1,6}

General guidelines for nutrition suggest everyone needs high-quality protein throughout the day to repair muscle tissue and assist the body in recovery from daily physical demands. Scuba diving relies mainly on the immediate and glycolytic energy systems so fat intake should be low because it is not an efficient source of energy and calories need to be reserved for other nutrients. Since fat is not used for energy for scuba diving it is likely to be stored as body fat. Carbohydrates make up the primary fuel source providing for short-term activity, preserving muscle and preventing weight gain. Complex carbohydrates (those low on the glycemic index) are preferred because they refill your glycogen stores. Five or six meals or snacks spread throughout the day will provide both mental and physical energy, maintain your blood sugar and boost your metabolism, all of which contribute to health and productivity.^{1,2,4,5,6}

Ideal meals consist of lean sources of protein such as chicken and fish, unlimited quantities of raw or steamed vegetables and moderate portions and varieties of fruits. Northern Hemisphere fruits contain more fiber and less sugar than exotic tropical fruits. Try to consume 30 grams of fiber everyday, avoid starchy and processed carbohydrates and creamy sauces and dressings. Use butter moderately. Eat whole fresh foods whenever possible and drink a gallon of water every day. If you enjoy alcoholic beverages remember drinks such as pina coladas and mai tai's are high in sugar and calories, which metabolize more directly to stored body fat. Red wine is an example of a lower calorie beverage that is touted as having some healthy properties.^{1,6}

Whether you are dining at a restaurant or a dive resort there is almost always a variety of menu choices to meet your specific energy requirements. If you regularly eat the wrong amounts and types of food you will undermine any weight management program. For many, the first approach to losing weight is to diet. Cutting back calories may be appropriate, but if not done properly can lead to quickly regaining the weight and making it harder to lose the next time. Creating a formula of calories in - calories out to meet your individual goals by increasing physical activity in combination with a purposeful nutrition plan is a better approach. ^{1,2,4,5,6}

Calculating your caloric needs for the day begins with establishing your basal metabolic rate (BMR). Metabolism is not how fast your body digests food. Metabolism specifically refers to the chemical changes that take place in the cells of your body. While genetics, environment, exercise and nutrition influence your metabolism by stimulating the responsiveness of all systems of your body, your body actually creates enzymes to direct your metabolism toward the activity and nutrition you choose. ^{1,3,4}

You can establish a rough estimate of your BMR in calories by inserting your body weight into the example below. You are converting your body weight to kilograms (kg), which provides a generic hourly caloric expenditure of **sedentary activity**, and then multiplying that number by 24 hours in the day. This may indicate a guideline for a minimum caloric intake to maintain a healthy metabolism.

An example for a 200-pound man is:

$$200 \times .45 = 90 \text{ kg} \times 1 \text{ (your hourly expenditure sitting on the couch)}$$

$$\times 24 \text{ hours in the day} = 2,160 \text{ calories.}$$

An example for a 130-pound woman is:

$$130 \times .45 = 58.5 \text{ kg} \times .9 = 52.65 \text{ (your hourly expenditure sitting on the couch)}$$

$$\times 24 \text{ hours in the day} = 1,264 \text{ calories.}$$

A woman multiplies by .9 because she usually has more body fat and less muscle than a man. ¹

People with a slow BMR have a tendency to store more fat than people with a fast BMR. Body composition is another indicator when calculating caloric energy requirements. If you know your current body fat percentage, find the corresponding multiplier on the chart below. Insert the multiplier along with your body weight into the sample formula to adjust your estimated BMR to your individual body fat percentage.

<u>Body Fat Percentage</u>		<u>Multiplier</u>
Males	Females	
10% - < 14%	14% - < 18%	100% (1.00)
14% - < 20%	18% - < 28%	95% (.95)
20% - < 28%	28% - < 38%	90% (.90)
28% and over	38% and over	85% (.85)

An example of a 185-pound man with a body fat percentage of 22% is:

$$185 \times .45 = 83.25 \text{ kg} \times .9 = 74.93 \times 24 = 1,798 \text{ calories.}$$

A reduction in sedentary hourly BMR is required because the body composition of this individual indicates a slower metabolism. ¹

Using your adjusted hourly BMR, you can now estimate how many calories you should consume to fuel a day of diving activities. Most scuba diving falls into the category of moderate activity. Moderate activity such as, gardening, bowling or walking, generally requires about four times more energy expenditure per hour for men and 3.6 times more for woman, than sitting on the couch reading a book as calculated above. This energy expenditure could be averaged throughout the day, but since you know how many dives you have planned for a day (three dives for this discussion), you can be more

specific. For the most part, the remainder of a dive day is spent without vigorous activity. Only the hours you are actually active or diving would be modified.^{1,7}

Using your adjusted hourly BMR subtract three hours of sedentary activity and add three hours of moderate activity BMR to your daily caloric estimate.

An example of a 185-pound man with a caloric adjustment of three hours of moderate activity:

$$\begin{aligned} &1,798 \text{ calories} - (3 \text{ hours at the sedentary BMR of } 74.93 = 225) = 1573 \\ &+ (3 \text{ hours at the active BMR of } 300 = 900) = 2,473. \end{aligned}$$

Dive activity on this day increased caloric nutritional requirements by 675 calories over that of the sedentary day for this individual. It is important to recognize, if this individual worked as a construction laborer, an activity requiring six times more energy per hour for an eight-hour day, a dive vacation of relaxation and three hours of diving per day would actually be a reduction of energy expenditure of about 2,097 calories.¹

Scuba diving is generally a moderate-intensity activity and typically does not require a significant increase in your caloric intake when compared with the energy demands of the normal activities of life. In fact, it may call for a reduction in your caloric intake to maintain a healthy body weight. The timing and frequency of meals, food selections that nourish your body, and exercise as a part of a healthy lifestyle will help you avoid extra vacation pounds. Eating with purpose for scuba diving is an excellent way to keep your body healthy and vital to enjoy life.^{1,5,6}

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