Chapter 1

THE DIET REVOLUTION

Books on low-carbohydrate, high-protein diets such as *Dr. Atkins' New Diet Revolution, Protein Power, The Zone,* and *The South Beach Diet* have ruled the best-selling book lists for at least the past 5 years. Millions of Americans have successfully lost weight with diets that fly directly in the face of conventional medical and nutritional wisdom. In July 2002, these issues attained national notoriety with Gary Taubes's inflammatory *New York Times* article, "What If It's All Been a Big Fat Lie?" pitting the diet doctors' advice against big government and medical skeptics. In May 2003, the improbable became reality with the publication of the first long-term, well-controlled scientific studies of low-carbohydrate, high-protein diets. The results of these experiments, which appeared in the prestigious *New England Journal of Medicine,* decisively demonstrated that low-carbohydrate, high-protein diets were more effective in promoting weight loss than time-honored, low-fat, high-carbohydrate diets advocated by the American Heart Association.

A similar revolution in dietary thinking is just beginning to make ripples in the sports world by a small group of athletes who happen to be privy to a brand-new way of eating that has dramatically improved their athletic performances. Their dietary

formula for success was not accidentally stumbled upon by trial and error but resulted from a chance conversation between two old friends, Loren Cordain and Joe Friel, in the spring of 1995.

Fast-forward 8 years. Joe has become a successful coach, written five best-selling books on athletic training, and is considered by many to be an authority on endurance training. Meanwhile, Loren, a university professor, has written more than two dozen scientific papers on Stone Age (Paleolithic) diets, as well as a popular diet book based upon his research findings, and has become an internationally recognized expert in the study of Paleolithic diets. Had they not had that conversation, the small ripple that promised to become a tidal wave concerning diet and athletic performance never would have surfaced.

LOREN'S CHALLENGE: THE PALEO DIET IN A NUTSHELL

In 1995, I challenged Joe to give the Paleo Diet a try. Joe had been a longtime adherent to the standard very high-carbohydrate diet for athletes and was skeptical of my claim that eating less starch would benefit performance. Nearly every successful endurance athlete that Joe had known ate as he did, with a heavy emphasis on cereals, bagels, bread, rice, pasta, pancakes, and potatoes. In fact, Joe had done quite well on this diet as an All-American duathlete (run-bike-run) in his age group, winning national races and finishing in the top 10 at World Championships. Joe had also coached many successful athletes, both professional and amateur, who ate the same way he did.

I suggested Joe try eating a diet more in line with the Paleo Diet for 1 month. Joe took the challenge, determined to show me that eating as he had for years was the way to go. He started by simply cutting back significantly on starches and dairy and replacing those lost calories with fruits, vegetables, and very lean meats. Although a simple formula, it wasn't easy at first.

For the first 2 weeks, Joe felt miserable. His recovery following workouts was slow, and his workouts were sluggish. He figured he was well on his way to proving that I was wrong. But in week 3, a curious thing happened. He noticed that he was not only feeling better but his recovery following workouts was speeding up significantly, and he decided to experiment to see how many hours he could train. Since his early forties (he was 51 at the time), he had not been able to train more than about 12 hours per week; whenever he exceeded that weekly volume, upper respiratory infections would soon set him back. In week 4, he trained 16 hours without a sign of a cold, sore throat, or ear infection. He was amazed—he hadn't done that many hours in nearly 15 years. He decided to keep the experiment going. That year Joe finished third at the US National Championship with an excellent race and qualified for the US team for the World Championships. He had a stellar season, one of his best in years.

Joe's little experiment proved to have far-reaching effects. After making certain refinements to my basic Paleo Diet, Joe found this way of eating to be "ergogenic," a term exercise physiologists use to describe nutritional supplements that can enhance athletic performance. By the late 1990s, Joe was recommending the Paleo Diet to the athletes he coached, including Ryan Bolton, a member of the US Olympic Triathlon team in the 2000 Sydney Olympics and a winner of the Ironman USA Triathlon. Increasingly, by word of mouth and the Internet, athletes worldwide were becoming aware of the competitive edge they could gain by adopting a diet based upon my dietary principles and fine-tuned by Joe's practical experience with it.

The Paleo Diet for Athletes is not just for world-class performers like Ryan Bolton and Gordo Bryn (an ardent devotee of the Paleo Diet and winner of the Ultraman Triathlon and the World's Toughest Half-Ironman Triathlon) but also for everyday fitness enthusiasts like Don Moffat. Here's Don's story.

I wish I had known about the Paleo Diet 5 years ago, when I was a sub-3-hour marathoner before my health started breaking down due to insulin-resistance-related issues. Following a high-protein, low-carb diet for the last 2 months has created startling results in my fitness. I've lost 3 inches from my waist (down to 32), and I can't believe how, at 38, I'm putting on muscle. My run times have dropped by 25 percent. (I'm still not fast again, but I'm seeing steady, week-to-week progress.) I find the increase in muscle strength particularly gratifying, as this was always a problem for me before, even in my early twenties. It's sort of like getting some youth back.

WHY IS THE PALEO DIET FOR ATHLETES ERGOGENIC?

There is indeed a method to this madness, and I have uncovered the scientific basis for the effectiveness of the modification of the original Paleo Diet. In a nutshell, there are four basic reasons the Paleo Diet enhances athletic performance.

1. Branched-chain amino acids. First, the diet is high in animal protein, which is the richest source of the branched-chain amino acids—valine, leucine, and isoleucine. Branched-chain amino acids (BCAA) are different from other amino acids that collectively make up protein in that they are potent stimulants for building and repairing muscle. This information is quite new and has been reported in the scientific literature only in the past few years. But the dig is this: These amino acids work best when consumed in the postexercise window.

Lean meats and fish are far and away the greatest source of BCAA. A 1,000-calorie serving of lean beef provides 33.7 grams of BCAA, whereas the same serving of whole grains supplies a paltry 6 grams. Because most endurance athletes focus on starches (breads, cereals, pasta, rice, and potatoes) and sugars at the expense of lean meats, particularly following a hard workout, they get pre-

cious little muscle-building BCAA in their diets. By consuming high amounts of lean protein (and hence BCAA), athletes can rapidly reverse the natural breakdown of muscle that occurs following a workout and thereby reduce recovery time and train at a greater intensity at the next session. Joe's advice for athletes to replace starches with lean meats now makes perfect sense and explains the athletes' near-universal report of improved recovery with these dietary recommendations.

2. Blood acidity versus alkalinity. In addition to stimulating muscle growth via BCAA, the Paleo Diet for Athletes simultaneously prevents muscle protein breakdown because it produces a net metabolic alkalosis. All foods, upon digestion, report to the kidney as either acid or alkali (base). The typical American diet is net acid producing because of its high reliance upon acid-yielding grains, cheeses, and salty processed foods at the expense of base-producing fruits and veggies. The athlete's body is even more prone to blood acidosis due to the by-products of exercise. One way the body neutralizes a net-acid-producing diet is by breaking down muscle tissue. Because the Paleo Diet for Athletes is rich in fruits and veggies, it reverses the metabolic acidosis produced from the typical grain- and starch-laden diet for athletes, thereby preventing muscle loss.

3. Trace nutrients. Fruits and vegetables are also rich sources of antioxidant vitamins, minerals, and phytochemicals and, together with lean meats (excellent sources of zinc and B vitamins), promote optimal immune-system functioning. The refined grains, oils, sugars, and processed foods that represent the typical staples for most athletes are nearly devoid of these trace nutrients. From examining the training logs of numerous people he has coached, Joe found that the frequency and duration of colds, flu, and upper respiratory illnesses are reduced when athletes adopt the Paleo Diet. A healthy athlete, free of colds and illness, can train more consistently and intensely and thereby improve performance.

4. Glycogen stores. One of the most important goals of any athletic diet is to maintain high muscle stores of glycogen, a body fuel absolutely essential for high-level performance. Dietary starches and sugars are the body's number one source for making muscle glycogen. Protein won't do, and neither will fat. Athletes and sports scientists have known this truth for decades. Regrettably, they took this concept to extremes; high-starch, cereal-based, carbohydrate-rich diets were followed with near-fanatical zeal 24 hours a day, 7 days a week.

It is a little known fact, but, similar to the situation with branched-chain amino acids, glycogen synthesis by muscles occurs most effectively in the immediate postexercise window. Muscles can build all the glycogen they need when they get starch and sugar in the narrow time frame following exercise. Eating carbs all day long is overkill and actually serves to displace the muscle-building lean proteins and alkalinity-enhancing, nutrient-dense fruits and veggies that are needed to promote muscle growth and boost the immune system. Perhaps the most important refinement made to my original Paleo Diet was Joe's recognition that consumption of starches and simple sugars was necessary and useful only during exercise and in the immediate postexercise period. Joe has also found that certain carbohydrates are more effective than others in restoring muscle glycogen, particularly specific types of sugar, such as glucose and net-alkaline-producing starches found in bananas, potatoes, sweet potatoes, and yams.

NOTHING NEW IN 30 YEARS

The standard dietary advice given to athletes by sports physiologists, nutritionists, and physicians hasn't changed an iota in 30 years. It is similar to the USDA's Food Pyramid—high in grain-based carbohydrates and low in fat—the same diet that many scientists believe is responsible for the obesity epidemic in this country. The world now is aware that an alternative exists to the

Food Pyramid. Low-carbohydrate, high-protein diets have proven to be more effective in promoting weight loss than are conventional high-carbohydrate, low-fat diets. Unfortunately, the athletic world is little aware that these same types of diets (higher in protein and lower in carbohydrate) can be extremely effective in enhancing performance. Except for the few athletes privy to my research and Joe's practical implementation of it, athletes in general are unaware that an alternative diet exists—a diet that can maximize performance in a range of sports, from body building and tennis to running and triathlon.

The Paleo Diet for Athletes is revolutionary and is creating an upheaval in the sports world, similar to the commotion set in play by the diet doctors with their high-protein, low-carbohydrate diets. The information contained in this book is thoroughly supported by scientific literature, to which Loren continues to make cutting-edge contributions. More important, Joe has shown that the Stone Age diet of our ancient ancestors, with slight modifications, works extremely well for recreational athletes all the way up to Olympians. The Paleo Diet for Athletes has passed the most important test by the most critical audience of all: the athletes themselves.

THE PALEO DIET FOR ATHLETES: NUTRITIONAL CHARACTERISTICS IN A NUTSHELL

The essential dietary principles for the Paleo Diet for Athletes are straightforward: You can eat as much lean meat, poultry, seafood, fresh fruit, and veggies as you like. Foods that are not part of the modern-day Paleolithic fare include cereal grains, dairy products, high-glycemic fruits and vegetables, legumes, alcohol, salty foods, fatty meats, refined sugars, and nearly all processed foods.

There are a number of crucial exceptions to these fundamental rules that will be completely explained in coming chapters. Case in point: Immediately before, during, and after a workout or

competition, certain non-Paleo foods should be eaten to promote a quick recovery. During all other times, meals that closely follow the 21st-century Paleolithic diet, described in Chapter 9, will encourage comprehensive long-term recovery and allow you to attain your maximal performance potential.

At first glance, you might think it counterproductive or even foolish to reduce or eliminate two entire food groups (cereal grains and dairy), along with most of the processed foods in your diet. One way of looking at our Paleo dietary recommendations is to compare them with the USDA Food Pyramid, the diet officially recommended by the US government and specifically designed to improve our health and reduce our risk of chronic disease. The USDA has published an extensive handbook called *Using the Food Guide Pyramid: A Resource for Nutrition Educators* (available on the Web at www.nal.usda.gov/fnic/Fpyr/guide.pdf), in which government dietitians have outlined sample 5-day menus that conform to Food Pyramid guidelines. The USDA has also been gracious enough to provide us with the vitamins, minerals, and nutrient values in their example menus. Consequently, it is a relatively simple exercise to compare modern-day Paleo diets with those officially sanctioned by the USDA.

Remember the ground rules of modern-day Stone Age diets: The diets contain no grains, dairy products, salt, processed foods, or fatty meats; they consist almost entirely of fresh fruits, veggies, lean meats, and seafood. Table 1.1 outlines a typical day for a 25-year-old woman whose daily caloric intake is 2,200 calories.

Now let's see how this representative day's worth of modern Paleo food stacks up against the USDA Food Pyramid. First, take a look at the major dietary components, which are listed in Table 1.2 on page 10. You immediately see that the Paleo Diet is much higher in protein and lower in carbohydrate than the Food Pyramid diet is. Even though more than half of the calories in our

TABLE 1.1

Sample 1-Day Menu from a Modern Diet Based on Paleolithic Food Groups for a Woman (25 years old; 2,200-calorie daily intake)

FOOD	QUANTITY (G)	ENERGY (KCAL)
Breakfast		
Cantaloupe	276	97
Atlantic salmon (broiled)	333	605
Lunch		
Vegetable salad with walnuts		
Shredded Romaine lettuce	68	10
Sliced carrot	61	26
Sliced cucumber	78	10
Quartered tomatoes	246	52
Lemon-juice dressing	31	8
Walnuts	11	70
Broiled lean pork loin	86	205
Dinner		
Vegetable avocado/almond salad		
Shredded mixed greens	112	16
Tomato	123	26
Avocado	85	150
Slivered almonds	45	260
Sliced red onion	29	11
Lemon-juice dressing	31	8
Steamed broccoli	468	131
Lean beef sirloin tip roast	235	400
Dessert		
Strawberries	130	39
Snacks		
Orange	66	30
Carrot sticks	81	35
Celery sticks	90	14

diet come from meat and seafood, the saturated fat content is quite low—even lower than recommended values (10 percent) known to reduce the risk for high blood cholesterol and heart disease. The fats you will be getting in this diet are just plain good for you! Notice that the good fats (monounsaturated and polyunsaturated fats) that lower blood cholesterol levels are considerably higher than what you would get by following the Food Pyramid diet.

Most people have heard that omega-3 fatty acids found in fish like salmon are healthful, but few are aware that a family of fats called omega-6 fatty acids, found in vegetable oils, margarine, and processed foods, can be harmful when consumed at the expense

TABLE 1.2

Dietary Characteristics in a Contemporary Diet Based on Paleolithic Food Groups and in a Recommended USDA Food Pyramid Diet for a Woman (25 years old; 2,200-calorie daily intake)

NUTRIENT	FOOD PYRAMID	MODERN PALEO DIET
Protein (g)	113	217
Protein (% energy)	20	38
Carbohydrate (g)	302	129
Carbohydrate (% energy)	53	23
Total sugars (g)	96.6	76.5
Fiber (g)	30	42.5
Fat (grams)	67	100.3
Fat (% total energy)	27	39
Saturated fat (g)	19.6	18
Saturated fat (% total energy)	7	6.4
Monounsaturated fat (g)	22.8	44.3
Polyunsaturated fat (g)	19	26.7
Omega-3 fatty acids (g)	1	9.6
Omega-6 fatty acids (g)	14.3	14.2
Cholesterol (mg)	219	461
Sodium (mg)	2,626	726
Potassium (mg)	3,450	9,062

of omega-3s. In the standard American diet, the ratio of omega-6 to omega-3 fatty acids is an unhealthy 10:1. Contrast this ratio to the wholesome 1:1 to 3:1 in the native human diet. Now take a look at the Food Pyramid: The recommendation is an appalling 14:1 and is actually worse than what the average American is currently eating! The Food Pyramid was originally conceived and thrust upon a trusting US public in 1992, prior to the widespread knowledge that an imbalance in omega-6 and omega-3 fatty acids had so much to do with health and well-being. Unfortunately, we are still saddled with this botched bit of advice.

But just wait—there are troubles with the Pyramid beyond its improper fat balance. In 1992, the concept of a glycemic load and its impact on health was unknown to the dietitians who designed the Pyramid. Should we be concerned about the glycemic load of a food? Absolutely! Does the Food Pyramid differentiate between high and low glycemic foods? Absolutely not! There is little doubt that even the recently revised Food Pyramid is badly in need of repair. It's high time that nutritionists consider the evolutionary basis for the optimal human diet rather than relying upon human foibles and biases in developing healthful, performance-enhancing diets.

As an athlete, you want to maximize your performance by maximizing your diet. This includes the amount of vitamins and minerals that you get from your food. Let's contrast the nutrient density of our sample Paleo Diet to the USDA Food Pyramid. Take a quick look at the values in Table 1-3 on page 12, and you will see that there is really no comparison. Except for calcium, the Paleo Diet simply blows away the Food Pyramid. In Chapters 5 and 9, we fully explain why a reduced calcium intake does not represent a problem, particularly if you eat ample fruits and vegetables.

An essential part of making this diet work for endurance athletes like you is to maintain an adequate carbohydrate intake so

TABLE 1.3

Trace Nutrients in a Modern Diet Based on Paleolithic Food Groups and in a Recommended USDA Food Pyramid Diet for Women (25 years old; 2,200-calorie daily intake)

	FOOD PYRAMID		MODERN PALEOLITHIC DIET	
Nutrient	**Amount**	**% RDA**	**Amount**	**% RDA**
Vitamin A	1,659 RE	207	6,386 RE	798
Vitamin B_1	2.3 mg	209	3.4 mg	309
Vitamin B_2	2.6 mg	236	4.2 mg	355
Vitamin B_3	30 mg	214	60 mg	428
Vitamin B_6	2.6 mg	200	6.7 mg	515
Folate	453 µg	113	891 µg	223
Vitamin B_{12}	4.7 µg	196	17.6 µg	733
Vitamin C	233 mg	388	748 mg	1,247
Vitamin E	10 IU	125	19.5 IU	244
Calcium	1,215 mg	122	691 mg	69
Phosphorus	808 mg	258	2,546 mg	364
Magnesium	427 mg	138	643 mg	207
Iron	19 mg	127	24.3 mg	162
Zinc	14 mg	116	27.4 mg	228

that your muscle glycogen levels will be fully restored before your next workout. Consequently, you will need to include additional carbohydrates in your diet, particularly during and following long workouts. In Chapters 2, 3, and 4, we fully explain the ins and outs of carbohydrate ingestion relative to your workout, your training schedule, and your personal needs.