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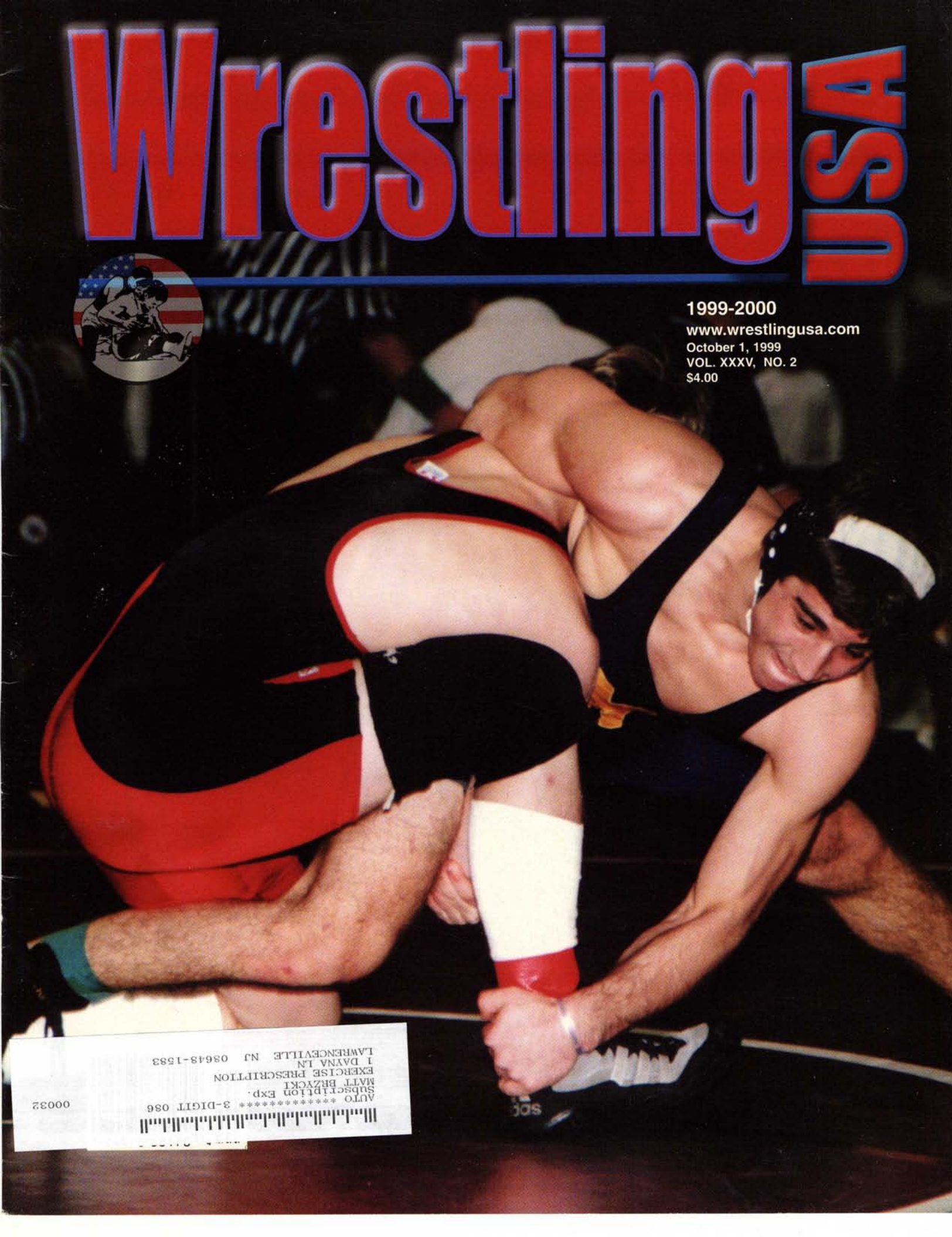

LOSING FAT: HIGH OR LOW INTENSITY?

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Which is the most effective method for losing fat: high-intensity exercise or low-intensity exercise? This question has lead to a notion that is well-meaning but not supported by scientific evidence.

ENERGY SOURCES

During activity, there are three possible sources of energy (or fuel) available for you to use: carbohydrate, fat and protein. Of these three energy sources, your body does not like to use protein as a fuel. In fact, protein is used as a last resort. Remember, protein is located in your muscles and if you are in a situation where you must rely on it as an energy source, then you are literally eating yourself to death. So, that leaves you with carbohydrate and fat as your main energy sources.

Exactly which energy source is preferred during activity is based upon the level of intensity (or effort) that is required. During exercise of relatively high intensity, a greater percentage of carbohydrate is used as an energy source; during exercise of relatively low intensity, a greater percentage of fat is used as an energy source. (Carbohydrate is a more efficient source of energy. However, fat is used as an energy source because your body doesn't need to be efficient at lower levels of intensity.)

This is not to say that carbohydrate and fat are the sole sources of energy during activities of high and low intensity. Rather, they are both used but to different degrees: During high-intensity activity, carbohydrate is the principal energy source but fat is also used; during low-intensity activity, fat is the principal energy source but carbohydrate is also used.

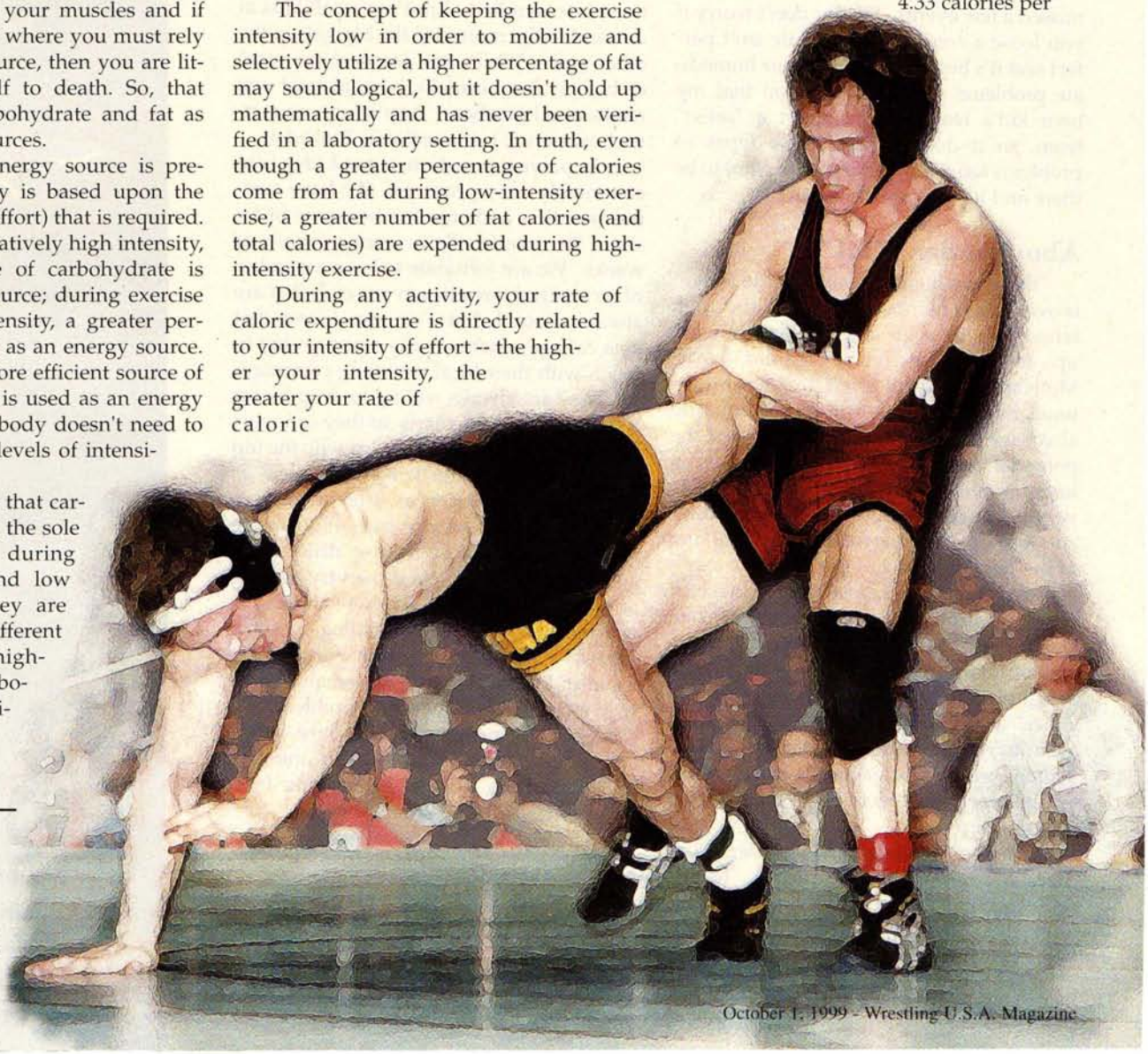
These physiological facts have led to the mistaken belief that low-intensity (or "fat-burning") exercise is better than high-intensity (or "carbohydrate-burning") exercise when it comes to "burning" fat as well as expending calories and losing weight. Furthermore, this misconception has spawned the hyped-up notion that people should exercise within their "fat-burning zones."

CALORIC EXPENDITURE

The concept of keeping the exercise intensity low in order to mobilize and selectively utilize a higher percentage of fat may sound logical, but it doesn't hold up mathematically and has never been verified in a laboratory setting. In truth, even though a greater percentage of calories come from fat during low-intensity exercise, a greater number of fat calories (and total calories) are expended during high-intensity exercise.

During any activity, your rate of caloric expenditure is directly related to your intensity of effort -- the higher your intensity, the greater your rate of caloric expenditure. In the case of running, for example, your intensity is directly associated with your speed -- the faster you run, the greater the rate of caloric expenditure. The time of your activity is also a factor -- the longer that you perform a given activity, the greater the total caloric expenditure.

The American College of Sports Medicine offers equations for determining oxygen consumption and caloric expenditure during walking (an activity of relatively low intensity) and running (an activity of relatively high intensity). Based upon these equations, a 165-pound man who walks 3 miles in 60 minutes will utilize roughly 4.33 calories per



1999 NCAA Division I Wrestling Championships - 141 lb. finals. Doug Schwab, Iowa, decisioned Michael Lightner, Oklahoma, 4-2. Photo by Jack Stanbro.

minute (cal/min). Over the course of his 60-minute walk, his total caloric usage would be about 260 calories [4.33 cal/min x 60 min]. If that same individual ran those 3 miles in 30 minutes, he would use about 13.38 cal/min. (Note the higher rate of caloric expenditure.) During his 30-minute effort, he would have used about 401 total calories [13.38 cal/min x 30 min]. So, exercising at a higher level of intensity utilized significantly more calories than exercising at a lower level of intensity [401 cal compared to 260 cal]. This is true despite the fact that the activity of lower intensity was performed for twice as long as the activity of higher intensity [60 min compared to 30 min].

These calculations have been corroborated by research performed in the laboratory. In one study, a group of subjects walked on a treadmill at an average speed of 3.8 miles per hour (mph) for 30 minutes.

In this instance, the subjects used an average of about 8 cal/min for a total caloric expenditure of 240 calories [8 cal/min x 30 min]. Of these 240 calories, 59% [144 cal] were from carbohydrate and 41% [96 cal] were from fat. As part of the study, the same group also ran on a treadmill at an average speed of 6.5 mph for 30 minutes. At this relatively higher level of intensity, the subjects used an average of about 15 cal/min for a total caloric expenditure of 450 calories [15 cal/min x 30 min]. Of these 450 calories, 76% [342 cal] were from carbohydrate and 24% [108 cal] were from fat. In other words, exercising at a higher level of intensity resulted in a greater total caloric expenditure than exercising at a lower level of intensity [450 cal versus 240 cal] and also used a greater number of calories from fats in the same length of time [108 cal compared to 96 cal]. Additional studies have also demonstrated that more calories are expended when running a given distance than walking the same distance.

THE BOTTOM LINE

The intent behind advocating low-intensity exercise of long duration is to enhance safety and improve compliance in the non-athletic population. However, low-intensity exercise is not more effective for fat loss -- or weight loss -- than high-intensity exercise. However, suppose that low-intensity activity was better for losing fat and weight. Since activities of lowest intensity require the greatest percentage of fat as the energy source, this would suggest that the best activity for fat/weight loss would be sleeping.

In terms of losing weight, more calories must be expended than consumed in order to produce a caloric deficit. Whether carbohydrate or fat is used to produce this caloric shortfall is immaterial. A caloric deficit created by the selective use of fat as an energy source doesn't necessarily translate into greater fat loss compared to an equal caloric deficit created by the use of carbohydrate as an energy source.

Researchers who perform studies and review the scientific literature in the area of exercise and weight management generally agree that it probably doesn't matter whether you use fat or carbohydrate while exercising in order to lose weight. Finally, it should also be noted that low-intensity exercise usually doesn't elevate the heart rate enough to improve your level of aerobic fitness.

So, whether you are strength training, conditioning or drilling, you should use the highest possible level of effort. Make hard work a standard part of your athletic lifestyle. And that's the bottom line.