

## The Aerobic Myth

**Roger Schwab**

In the late 1960s and early 1970s, Dallas-based physician Dr. Kenneth Cooper pioneered the premise that aerobic training improves the functioning of the heart and lungs, and in so doing creates a more vibrant individual.

There is truth in that. Aerobic exercise elevates the heart rate to X level for Y period of time with Z results. When practised regularly, it improves cardio-respiratory efficiency. Though a lower resting heart rate doesn't guarantee longer life (although it seemingly might), it does mean that the body has more stamina however long it lasts.

The benefits of aerobics are obvious, and canny marketers have been quick to take advantage of its appeal: movement, music, a non-threatening way to shape up. But for all of its benefits, aerobics has limitations. It does not completely enhance the structural integrity of the connective tissues, the joints, and the bones themselves. (Indeed, it often tests them to the breaking point.) It does not appreciably strengthen the muscles. It does not and cannot make the body firmer.

Yet the message conveyed by hugely popular videotapes is just that. The suggestion, the implication -- even the claim -- is that the aerobic workout will transform you into a facsimile of the group leader. But aerobics alone will not make you look like Jane or Cindy or Cathy or whomever, no matter how much you step, hop, twist, and sweat.

The image, however, is seductive, and aerobics has become a buzzword for total fitness. Even the American College of Sports Medicine (a professional organization consisting of educators, physicians, and exercise physiologists) has until recently regarded aerobics as virtually a complete exercise program. An entire generation has been reared to the beat, puppets in thrall to the video masters. Exercisers impart strength-building qualities to stationary cycles, cross-country skiing machines, walking with hand weights, steppers, treadmills, and other aerobic equipment, but in reality, strength gains are insignificant.

Society has been bamboozled. The very nature of aerobic exercise makes it impossible to realize the meaningful strength gains necessary for a noticeable improvement in muscle tone. Burn calories, yes; strengthen muscle, no. When you are working aerobically (e.g., brisk walking), your muscles work against minimal or zero resistance and, therefore, can continue to function at the same level for a long period of time. This is not the route to building strength, and only strength creates muscular shape and stronger bones -- the aesthetics that are prized, and the foundation needed for the long haul. Aerobic exercise improves general functioning via a potentially lower heart rate (greater heart-lung efficiency), but it does not strengthen the muscles around the joint (thus enhancing joint stability) and it does not substantially strengthen or firm the body.

What is missing from the equation is serious strength training. Because the truth is you can work your heart/lungs and muscles/bones in the same safe, sound workout. Visualize a muscle as a mass of individual fibers. Aerobic muscle fibers contract over a long period of time. It takes an intense contraction of the muscle to utilize many more of its fibers and stimulate meaningful strength gain. This type of exercise, anaerobic exercise, induces fatigue in the muscle faster than the muscle can compensate. Working against sufficient resistance, the muscle fatigues quickly, and the individual soon is unable to perform the exercise at that level of resistance. This is the principle of working the muscle to the point of momentary muscular "failure" (the inability to complete another repetition in perfect form), and it is the ticket to gaining strength. Such exercise stimulates the overall system to respond. Rest permits that response.

It may sound grim, this whole notion of failure and resistance, as opposed to a high-decibel aerobics class. But is the one true way to strengthen the body.

Still, the allure of aerobics as a supposed full-body, all-purpose workout persists. After all, the arms and the legs are in motion, sweat is flying, calories are burning, fat is dissolving, the music is pulsating, and women figure, yes, this is the way to get in shape. And indeed, improved cardiovascular functioning is an important part of being in shape. But less body fat and improved wind do not mean a stronger, harder, more durable body. The only way to get stronger is to be progressive with your exercise. Aerobic exercise -- whether an open floor, a stair-climber, a bicycle, a treadmill, or a track -- does not provide the progressive resistance necessary to develop meaningful strength. It is not designed to work the muscles throughout their full range-of-motion. Yes, a strong heart and efficient lungs are an important part of what the body needs to function at an optimum level and ward off long-range debilitating conditions. However, aerobic exercise is not the whole story.

A woman who is out of shape and takes up aerobics may notice some physiological changes in her body initially, but this will quickly level off because she is not seriously challenging her starting strength level. The same phenomenon occurs if she begins a weightlifting program and uses extremely light dumbbells. Curling, say, a 2-pound weight 100 times may make her breathe hard, perspire handily, and ache, but it does not stimulate the biceps muscle to get measurably stronger and, thus, firmer. This becomes, essentially, an aerobic exercise.

However, if the same woman trains progressively and reaches a point where she can curl 50 pounds 10 times, she has been working deeper into her starting strength level and has given a wakeup call to all those muscle fibers that were lying dormant. She has gained strength, and the shape of her body will show it. Please be assured that our goal is not to heave heavy weights, and the results are not bulging muscles -- results that are beyond the reach of almost all women, anyway. Our goal is to develop a lean, strong, healthy, toned body. Building muscle size is extremely difficult for most men who have the potential to do so, let alone women who don't want them in the first place.

Now that you understand what aerobic exercise can and cannot accomplish, consider a potential problem that may arise for the enthusiastic runner, jogger, or aerobic dancer. When performed over a strength of an individual's lifetime, repetitive pounding movements may have a telling cost. Joint stress, you see, accumulates silently.

When I was younger, I competed in cross-country races and covered many rocky, hilly miles on a weekly basis. When I turned 40, though I had not done any serious running for years, I started experiencing pain in my lower back and down my legs. I did not equate that pain with running my heart out as a kid, yet it was the direct, if delayed, result of my excessive running 20 years earlier along with my serious misuse of a barbell.

Doctors call this the "overuse" syndrome, and it can take you by surprise. One day you get sudden aches and pains -- not traceable to what you did yesterday, but can be triggered the sins of your past. (Of course, the same symptoms can be triggered by a recent trauma and may, or may not, be linked to old habits.) What has occurred here is that the cumulative effect of impact force has exceeded the structural integrity of bone, muscle, and connective tissue. The certain result: injury. High impact exercises take their toll on vulnerable bones, joints and tissue. Pounding on hard surfaces and repetitive movement creates such an impact -- which problem is accelerated when there is not strong muscle surrounding the joints.

One lesson learned from all this is that, instead of a tremendous amount of exercise, we should seek the least amount to stimulate the maximum result. I have constantly searched for ways to shorten exercise periods -- without compromising the results -- in order to avoid overusing the muscles, exhausting the system, and overtaxing the joints. When the route to high cardiovascular fitness entails pounding the pavement for 10, 15, 20 miles a week, the risk of muscular injury, bone and joint damage, and strained tendons and ligaments rises. The most susceptible areas are the knee, foot, ankle, lower back, hip and cervical spine. Is this high level of conditioning worth the cost? When you find yourself on the shelf, you may not think so. Furthermore, your fine-tuned condition will slip as you sit on the sidelines for long extended periods, or during recurrent episodes of nagging injuries.

This fate can be avoided and top condition still attained via high-intensity circuit-type strength training, for this kind of program should involve no orthopedic cost, no damage to the skeleton.

Proper exercise should strengthen the muscles, connective tissues and bones. It should never damage the skeleton. Improving your cardiovascular condition at a high orthopedic risk does not make sense for most people. There is a safer, more sensible way to go about the quest for well-rounded fitness, a short direct route to improving your cardiovascular condition and strengthening your muscles and bones at the same time while minimizing the risk of injury.

Sometimes, aerobic enthusiasts who are fanatical about their workouts will eventually run right into problems. Some can't seem to get enough of the so-called "runners high" -- that feeling of well-being that arises when compounds known as endorphins are released in the body and interact with the brain. But in the quest of great mileage and realizing ultimate aerobic benefit -- it may be at an orthopedic cost.

I don't believe there is such a thing as super health. I do believe, however, in good health, and there is no question that efficient cardiovascular functioning promotes vitality. If for example, you like to run, fine -- not overdone, it can be good exercise. Just know why you are doing it, and don't overdo it, because the excessive pounding carries major joint injury. And realize that neither excessive running nor other popular forms of aerobic exercise will safely strengthen your muscles, safely strengthen your bones, or shape your body.

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The preceding was an excerpt from Roger Schwab's book *Strength of a Woman*. For ordering information, or to obtain the video, call toll free 1-888-97WOMAN. Roger Schwab, born in Philadelphia on April 6, 1945, resides in Bryn Mawr, the heart of Philadelphia's Main Line. An author, poet, teacher of sports/medicine, Schwab's many interests focus primarily on political science, music, and health and fitness related issues. A product of the 60s, Schwab's major influences include the writings of Gore Vidal, David Halberstam and Norman Mailer. His musical tastes are defined by the lyrics and music of Bob Dylan, Leonard Cohen, Joan Baez and the late Phil Ochs and Buddy Holly. Schwab's passionate involvement with meaningful exercise was cultivated to foundation through the writing and acquaintance of Arthur Jones.

## **Maximizing Aerobic Potential**

**Arthur Jones**

Founder and retired Chairman of Nautilus Sports/Medicine Industries, Inc., now Chairman of MedX Corporation

Most of the scientists who have been involved in the field of exercise physiology during the last thirty years have devoted the vast majority of their attention to research related to the results of aerobic exercises, exercises performed for the purpose of improving cardiovascular condition. Very similar exercise and testing procedures have been performed literally thousands of times in hundreds of schools all over this country, and the supposedly scientific journals have devoted most of their attention to such studies.

Why? Primarily, I believe, because the people who performed all of this research were attempting to limit their efforts to things that they could measure, attempts to determine the direction and magnitude of any physiological changes that resulted from such exercises. Improvements in cardiovascular condition certainly have value, but, in general, the most commonly used exercises that have been utilized in attempts to produce such cardiovascular improvement also produce physiological changes that are not desirable; if you are attempting to increase your muscular size or strength, or both, then you should avoid most of the aerobic exercises that are now being used like the plague, because, almost inevitably, they will lead to overtraining for your muscles, on the one hand not being hard enough to stimulate muscular growth, and on the other hand overworking your muscles to such a degree that overuse atrophy, a loss of muscular size and strength, will result.

If there is a successful bodybuilder in the world who ever performed much, if literally any, aerobic exercise then he has not come to my attention; yet it does follow that such people have poor cardiovascular ability; in fact, many of them have far better cardiovascular ability than the level shown by a typical hardcore jogger.

Having preached the gospel that "more is better," that if running fifty miles a week is good then running two-hundred miles a week is better, for nearly thirty years, even the "Father of aerobic exercise," Dr. Kenneth Cooper finally seems to be coming to his senses. But, then, like most fanatics, having gone overboard in one direction initially, Cooper now appears to have gone overboard in another direction. Fairly recently, Cooper said, or words to that effect, that people who perform more than one hour of exercise weekly are not doing it for physiological reasons; but, even more recently, he has started to believe that exercise may cause cancer if overdone.

Personally, knowing him quite well, I would suggest that Cooper concern himself with things that he understands, which might limit him to things like tying his own shoes, if he is ever capable of that.

Almost since day one, and still very much in evidence almost anywhere you look, there has been an almost universally accepted myth about exercise that might be best described as an "either/or" belief; in effect, you must train "this way" for increasing muscular size and strength and "that way" for improving cardiovascular condition, must lift weights to build strength and must jog to increase cardiovascular condition. Half of which belief is true, since jogging will do very little or nothing to build strength and will, in fact, if overdone, as it usually is, do quite a bit in the way of reducing both muscular size and strength. But it is not true that proper strength-building exercise will do nothing for cardiovascular condition.

Properly performed, which they seldom are, strength building exercises are not a "good" way to improve cardiovascular condition, they are, instead, by far the best way to improve cardiovascular condition. Strength building exercises require a level of resistance that is high enough to lead to momentary muscular failure after a few repetitions while exercises for improving cardiovascular condition involve a very low level of resistance which will not lead to muscular failure after a few repetitions. Anaerobic (heavy) exercise or aerobic (light) exercise.

If, as usually happens, you perform a set of heavy exercise for strength building purposes, and then sit on your ass or shoot the shit with a friend for five minutes before performing the next exercise, then you probably will increase both your muscular size and strength, will do little or nothing in the way of improving your cardiovascular condition. But if, instead, you move almost immediately from the end of the first exercise to the start of the second exercise, with almost no rest between the two exercises, then you will increase both strength and cardiovascular condition; in fact, that style of training, properly performed, will lead to a level of cardiovascular condition that is far higher than you could ever produce by any amount of jogging or any other cardiovascular exercise. Such a style of exercise simultaneously provides anaerobic exercise for strength building and aerobic exercise for improving cardiovascular condition.

**BUT, A STRONG WORD OF CAUTION:** do not jump feet first into such a style of training with no preparation; doing so without a careful period of preparation will, at best, make you as sick as a poisoned dog, and might literally kill you. So devote at least two weeks, and maybe as much as four weeks, to a gradual "break in" to such training; start with a three minute rest between exercises, and then gradually reduce the rest periods until you are moving from one exercise to the next as fast as possible. Once you reach the target rate of exercise you will find that your pulse rate remains at a very high rate throughout the workout, far higher than you could ever maintain with any sort of aerobic exercise; yet your muscles are being worked anaerobically, as they must for strength-building purposes.

This is not an "easy" style of exercise nor is it "pain free," but it will produce very good results that can be produced in no other fashion. We used this style of training during research conducted at the United States Military Academy, West Point, twenty-two years ago, and the results were so outstanding that Dr. Kenneth Cooper refused to believe them, refused even though his own people performed all of the pre and post testing. Average strength for the test group increased by 60 percent in six weeks, while their cardiovascular

condition reached a level so high that Cooper refused to believe it, a level he could not reach in six years of aerobic exercise.

When we first started using this style of training, in 1970, we quickly learned two things about it: ONE, such training must be started gradually, as mentioned above, and if not then it will literally make people sick, immediately sick, sick to the point of vomiting and then passing out; and, TWO, even after such training is being performed, following the essential "break in" period outlined above, producing the best possible results requires such a style of training no more than once a week. During the research at West Point, we trained the cadet subjects three times each week but used this "no rest" style of training only once each week.

Prior to the West Point research, we had been working on the development of strength-testing tools for more than three years, but no such tools were available to us for testing purposes, the prototype testing tools that we did have simply did not work. So evaluating the increases in strength that were produced required us to judge these strength increases by comparing the starting level of resistance and number of repetitions performed to the same two factors at the end of the training period for six weeks; which requirement, unavoidable, introduced some unknown degree of error; nevertheless, the strength increases were so dramatic that any unknown degree of error in the testing procedures were relatively unimportant.

Basing their results upon almost identical testing procedures, most of the literally hundreds of research projects that have been conducted and reported by scientists all over the world during the last thirty years the published results have usually indicated strength increases of about 20 percent following 12 weeks of exercise using 9 sets of each exercise during each week of the training period. In contrast, we produced 60 percent strength increases, three times as much as those reported by most other people, and these results were produced in only 6 weeks of training rather than 12 weeks, so our "elapsed time" was only half as long as usual, and, finally, our results were produced by only 3 sets of each exercise weekly rather than the usual 9 sets of each exercise, which means that our weekly exercise was only a third of the usual training schedule. So our overall, six-week program consisted of a total of only 18 sets of each exercise, rather than the usual total of 108 sets used by other researchers, yet our results were three times as good as theirs were; and, of course, our program produced literally enormous improvements in cardiovascular condition while the other programs, conducted in a usual manner with a lot of rest between exercises, produced little or nothing in the way of cardiovascular improvements.

A detailed report of this research program was published in The Athletic Journal in 1975, and has been ignored by almost everybody ever since.

And it should be noted that all of the pre and post ("before" and "after") testing was conducted, in the case of cardiovascular results, by doctors from Dr. Kenneth Cooper's Aerobic Institute in Dallas, and, in the case of strength increases, by doctors on the staff of West Point; neither I nor anybody associated with me had anything to do with the testing, this being a requirement imposed by me in an attempt to avoid a later charge that the published results had been overstated.

And just what, you might ask, did anybody in the scientific community learn from this study? Not a damned thing, of course, what would you expect? What few, if any, scientists who even bothered to read it apparently either did not believe it or failed to understand the significance of the results.

And remember: these are the same people who, in general, swallow the lies published by Cybex hook, line and sinker.

During that research at West Point all of the cadet subjects were closely supervised during every exercise in order to make sure that the exercises were performed properly and in order to provide us with accurate records of their progress from workout to workout. Conducting research in that manner is both very time-consuming and very expensive; my total costs related to that study were in excess of \$1,000,000.00, a large part of which expenses resulted from the fact that the entire program was recorded on 16mm professional

motion-picture film that was filmed using more than a dozen professional cameras. Altogether, we used more than 500,000 feet of film. All of these cameras being synchronous, meaning that the film was exposed at an exact rate of 24 frames per second, thereby providing us an exact record of the time involved in each exercise, speed-of-movement used during the exercise as well as elapsed time.

Nobody else in the history of the world ever came anywhere close to conducting research with such precision, or devoted so much time and money to their research. Years later, after the only testing tools capable of conducting meaningful and accurate testing of muscular strength were available to us, the MedX machines, we invested many millions of dollars in research with tens-of-thousands of subjects. Altogether, more than sixty such research programs have now been conducted, and many of these studies have been published in several scientific journals; yet, in general, they are still being ignored by the scientific community.

If and when the scientific community every comes to its senses, which I doubt, they could learn a lot of things that they need to know but do not now even suspect.