# How can you possibly get a cardio workout in only 4 minutes per day?

## TIME REQUIREMENT FOR A CARDIO WORKOUT

The time required for an effective cardio-vascular exercise depends on the degree of oxygen consumption during the workout. The greater the amount of oxygen consumption during the workout, the shorter the required duration of a cardio workout. In other words, the quality of the workout determines the time required. More muscle cells involved means higher oxygen consumption means less time required. The ROM enables even totally out of shape people and seniors to achieve much higher oxygen consumption levels than with ANY OTHER FORM OF CONVENTIONAL EXERCISE and therefore they can shorten their exercise periods while getting superior results.

## THE MYTH OF 20 TO 45 MINUTES

Most everyone believes (incorrectly so) in the myth that a cardio workout requires at least 20 to 45 minutes per day. The truth is that the volume of oxygen consumption during the exercise determines the length of time required for a cardiovascular workout. The greater the amount of oxygen consumption during the exercise, the shorter the required workout time. Oxygen consumption is expressed in milliliters of oxygen per kilogram of body weight per minute (mlO2/kg/min). With conventional forms of exercise it is nearly impossible for the untrained general public to reach the high levels of oxygen consumption required for a short and effective cardio workout. With the ROM machine untrained individuals will easily reach the very high levels of oxygen consumption that require only minutes for an effective aerobic workout that yields the same or better cardiovascular benefits than the conventional 20 to 45 minute aerobic workouts practiced by the general public. To understand this, you need to read and understand the following lengthy technical explanation:

## TIME REQUIRED FOR OTHER WORKOUTS

Walking at a pace of 3 miles per hour consumes a low 7mlO2/kg/min and therefore requires about 85 minutes for significant benefits to the cardio-vascular system. Sprinting at a pace of 15 miles per hour consumes a high 50 to 60mlO2/kg/min (this is a 4 minute mile pace) and therefore requires only 3 minutes for significant benefits to the cardio-vascular system . Following is a table showing different activities walking, jogging, running and their oxygen consumption rates and number of minutes required for a good cardio-vascular result.

1. Walking at 3 miles per hour 7mlO2/kg/min 85 minutes

2. Jogging at 4miles per hour 14mlO2/kg/min 35 minutes

3. Running at 5.5 miles per hour 21mlO2/kg/min 18 minutes

4. Running at 6.5 miles per hour 28mlO2/kg/min 12 minutes

5. Running at 8 miles per hour 35mlO2/kg/min 8 minutes

6. Running at 9 miles per hour 42mlO2/kg/min 6.5 minutes

7. Running at 15 miles per hour 60mlO2/kg/min 3 minutes

The amount of oxygen consumed during any activity is determined by 4 factors:

1. Total muscle mass involved in the activity.

2. Range of motion of the muscles determines the percentage of muscle cells involved.

3. Number of repetitions of muscle movement per minute.

4. Resistance or workload worked against by the muscles.

## WALKING IS VERY TIME CONSUMING

Walking involves 25% of the body's muscles and those muscles are working only through an average of 15% of their full range of motion. This means that only 25%x15%=3.75%, less than 4% of the body's total muscle cells are involved in oxygen consumption during walking. These 3.75% of all the body's muscle cells will consume more oxygen if you walk faster (or jog or run) or if you walk uphill or if you carry two 50 pound suitcases while walking. To get a high amount of oxygen consumption out of only 3.75% of your body's muscle cells those few cells would have to be extremely highly trained, such as in top athletes. To get from A to B, walking is a very energy efficient activity and therefore does not consume large amounts of oxygen. For a cardio workout you would like to engage in an energy wasting activity, an activity that needs a lot of energy to accomplish the task. Problem is that most doctors keep recommending walking as their favorite exercise prescription and they mistakenly expect their patients to follow their advice of spending 45 to 90 minutes walking. People will not do things that require a lot of time and have marginal

results. If doctors were to prescribe exercise that takes only 4 minutes per day they would be vastly more successful in getting their patients to do daily exercise. Now the problem for the doctors would be to get the patients to spend $14,615 toward their health for a ROM machine instead of spending a multiple of that amount toward their illnesses.

## THE CLEVERLY ENGINEERED ROM MACHINE

Through clever engineering the ROM machine enables even totally out of shape people and seniors to get significant aerobic benefits from a 4 minute workout, because the ROM engages 44% of all your muscle cells in work performance. Those 44% muscle cells are 12 times as many as the 3.75% in walking or jogging. Even if those 44% are untrained cells of 90 year old or totally out of shape people, they will far exceed the oxygen consumption those people could otherwise reach. Highly trained athletes on our ROM machine always want to quit on our ROM machine after only 2 minutes because their highly trained muscle cells consume so much oxygen that it maxes out their cardio capacity. They are so overwhelmed that they believe that it is impossible for them to go another two minutes and finish the total 4 minutes if they are already exhausted at 2 minutes. The ROM however will automatically reduce the workload when these athletes have reached their limit cardio capacity. In fact the ROM will automatically adjust the workload every second during the 4 minute workout, exactly matching the user's ability at every moment during the workout. Its 85 pound flywheel has a centrifugal brake that applies more resistance to the flywheel the faster the flywheel spins. The exercises done on the ROM make the flywheel spin, but elderly and unconditioned people cannot make the flywheel spin very fast before they meet the braking force that matches their low level of work capacity. Highly trained athletes have enough strength to spin the flywheel very much faster before they also meet the braking force that matches their own ability to perform physical work. When the highly trained athlete runs out of steam he will no longer have the strength to overcome the resistance of the centrifugal brake at high revolutions and the braking action will automatically slow him down to lower revolutions at which the centrifugal brake will reduce the resistance to exactly match the diminished strength of the then drained athlete so he can finish the 4 minutes as well. Weak people can finish the 4 minutes with much more ease than highly trained individuals but they get a much lower performance score at the end of the 4 minutes. The Rom gives you a score at the end of the 4 minutes based on the average RPM (revolutions per minute) of the flywheel during the 4 minutes. That score will gradually increase over time and the increase in the score reflects the improvement in your total physical condition. The score reflects the improvement of the condition of the combination of your cardio system, your muscle strength and your flexibility. When your total conditioning improves, the ROM 4 minute workout never gets easier. It actually gets harder the more your total condition improves because you will be able to spin the flywheel faster and the centrifugal brake makes you work against higher resistance.

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## THE ROM INVOLVES 12 TIMES THE MUSCLE FIBERS

The ROM involves 12 times as many muscle cells as does walking or running. Even very out of shape and weak people can get to very high oxygen consumption rates with the ROM because so very much more muscle cells are involved in oxygen metabolism while using the ROM. It engages 55% of all your muscles through an average of 80% of their full range of motion. This means that 55% of 80% or 44% of all your muscle cells are involved in consuming oxygen. That is 12 times as many muscle cells as the percentage of muscle cells involved in walking or running. On the ROM the number of repetitions and the resistance/workload are always maximum for the user's ability to perform work because the centrifugal brake on the ROMs flywheel regulates the resistance automatically to match the user's diminishing strength during the workout. The user's strength determines how fast the flywheel spins, which in turn determines the number of repetitions per minute and the resistance/workload applied by the centrifugal brake.

## TRAINED ATHLETES GET A TOUGHER ROM WORKOUT

Highly trained athletes can of course spin the flywheel extremely fast and therefore in 4 minutes will get cardio benefits that far exceed those of conventional aerobic workout routines (except sprinters and competitive short distance runners who will get very high cardio benefit from their high intensity short distance activities). Trained athletes will get a much higher performance score on the ROM and they will be more exhausted than totally out of shape people who get a low performance score. The better shape people are in, the harder the 4 minute ROM workout is for them and the higher their performance score is at the end of the 4 minutes.

## AEROBIC CAPACITY

A person's maximum aerobic capacity is measured as VO2max. This measurement expresses the maximum oxygen consumption a person is capable of during a maximum work demand. This measurement expresses the combined effectiveness of function of the several individual components of the body's cardio-vascular system comprising the following:

1. The effectiveness of oxygen transfer by the lungs into the blood.

2. The condition of the muscles that operate the lung breathing function.

3. The effectiveness to transfer CO2 out of the blood and to exhale it.

4. The ability of the heart to pump maximum volume of blood.

5. The condition of the blood vessels to transport the blood

6. The effectiveness to transfer oxygen and carbohydrates from the blood to the muscles

7. The effectiveness of transfer of CO2 from the muscles back into the blood.

## PERFORMANCE SCORE

The ROM machine gives a performance score at the end of the 4 minute workout and that score is a composite evaluation of the total work performed and therefore is a reflection of the average VO2 measurement over the 4 minute period. When the ROM score increases, it is evidence that the combination of the 6 cardio-vascular performance components listed above plus muscle strength and flexibility have improved. You can see the gradual improvement of your health reflected in the gradual improvement of the ROM scores.

## HOW AEROBIC CAPACITY IS MEASURED

The testing for this VO2max measurement is done in exercise physiology labs with a person hooked up with a facemask that allows the test subject to inhale a measured amount of fresh air while the exhaled air is captured and sent through a device that measures the amount of CO2 exhaled. From the amount of CO2 exhaled the maximum oxygen consumption can be calculated during the activity. The ROM does not measure VO2max, but it does create a score that reflects an increase of VO2max when the ROM-score increases. The ROM simply measures the total work performed during the 4 minute workout and expresses that into a score that reflects the ability of your body to perform work, which in turn is a direct reflection of the condition of your cardio-vascular system.

## THE MERITS OF H.I.T. EXERCISE

The merits of short duration and high intensity training and high oxygen consuming exercise are being more and more recognized by trainers of sports teams everywhere. Our time has not yet come with the ROM because as yet too many so called "exercise experts" are enduring with their mistaken beliefs. have been recognized in several scientific studies. One of these studies was conducted with our ROM machines at the Department of Exercise Sciences at USC (University of Southern California). USC was amazed at the unique capabilities of the ROM.

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