

ACE-sponsored Study:

# Can Pilates Do It All?

Check out the floor of any fitness tradeshow or the group fitness schedule at most health clubs and it's clear that Pilates is still one of the hottest trends in fitness. And no wonder—its long list of benefits includes improved body mechanics, balance, coordination, strength and flexibility.

But is it enough to keep you aerobically fit? In other words, does Pilates provide enough of an cardiovascular training stimulus to offer cardiovascular benefits as well? To date, very few studies have examined whether Pilates could be categorized as having an aerobic component. So, as we often do, we turned to the researchers at the University of Wisconsin, La Crosse, to help answer that question for us.

## The Study

Lead researchers Stefanie Spilde and John Porcari, Ph.D., recruited 15 healthy women, ages 18 to 26, with at least an intermediate level of Pilates experience (see Table 1 for a more details about the subjects). After a preliminary  $\dot{V}O_2$  max test, each subject participated in two 50-minute Pilates mat-training sessions (one beginner, one advanced), following a videotaped routine for consistency. All participants were given the opportunity to practice their assigned routines prior to data collection.

Each subject first followed a beginner mat Pilates routine, which consisted of five minutes of breath-linked alignment exercises, followed by 40 minutes of basic Pilates exercises that followed the original Method of sequencing. The session ended with five minutes of stretching and realignment. The advanced routine was similar to the beginner routine except that it utilized advanced techniques of positioning and pacing for each exercise.\*

During each session, heart rates and oxygen consumption were measured and recorded, and subjects rated their perceived effort using the 6–20 Borg scale.

### Average Caloric Expenditure of Two 50-minute Pilates Workouts\*

Beginner Routine: 175 calories  
Advanced Routine: 254 calories

*\*See Table 1 for physical characteristics of subjects.*

Exercises such as the side bend (this page) required higher energy costs, while exercises such as the hundred (above, next page) required less energy to perform.



## The Results

An analysis of the data showed that the intensity of the beginning Pilates routine was lower than the recommended guidelines for improving cardiorespiratory fitness. The average percentage of maximal heart rate was 54 percent, which is below the ACSM recommendation of 64 percent to 94 percent. Similarly,  $\dot{V}O_2$  max was measured at 28 percent, which is below the recommended range of 50 percent to 85 percent.

The average reported rating of perceived exertion (RPE) of the workout portion of the routine, however, was 14.2, which is moderately hard. This indicates that the high muscular effort of Pilates makes participants feel as though they're working harder than their oxygen consumption values would indicate. In fact, heart rates corresponding to 54 percent of maximal heart rate would normally correspond to 40 percent of  $\dot{V}O_2$  max (higher than the 28 percent observed in these subjects). This means that, while Pilates has a low aerobic benefit—equivalent to walking at about 2 miles per hour—the perceived effort required to complete the exercises is much higher.


The advanced Pilates routine elicited a higher aerobic response, with 62 percent of maximal heart rate and 43 percent of  $\dot{V}O_2$  max. This would be the equivalent to the energy requirements of walking 3.5 to 4 miles per hour. Not surprisingly, RPE was also higher: 16.5, which corresponds to hard or very hard on the Borg scale. Spilde suggests that this high rating may reflect the muscular endurance required to sustain some of the advanced moves rather than the aerobic requirements of the exercise.

Another recent study by Michele Olson, Ph.D., professor of exercise physiology at Auburn University in Alabama, also suggests that more advanced Pilates exercises required higher energy requirements. Her team found that exercises such as the side bend, jack knife and the boomerang could be considered high-energy movements, while the hundred and leg circle positions required less energy.

## The Bottom Line

There's no question that Pilates exercise is beneficial, particularly for building a strong core and increasing flexibility. "Pilates is a great form of exercise for most populations," says Spilde, "especially those looking for some toning and flexibility help. It can be modified somewhat or scaled down to fit everyone's needs."

Its cardiovascular benefits, however, appear to be limited. Even though participants feel as though they're working hard—and from a muscular standpoint, they are—they are not achieving significant aerobic or calorie-burning benefits from their efforts.

Yet despite its limited aerobic conditioning effect, Pilates remains one of the most challenging and effective means of building core strength and stability. As this study indicates, there is a significant difference between beginning and advanced Pilates workouts. The key is to find both a qualified instructor and a class geared toward your fitness level. 

*\*For more detailed information on Pilates techniques, see Pilates Mat Training, by Shirley Archer, available at [www.acefitness.org](http://www.acefitness.org).*

**Table 1.**  
Descriptive Characteristics of Pilates Subjects

	AVERAGE	RANGE
Age (years)	21.0±2.6	18–26
Height (in)	66.2±3.3	61–71
Weight (lb)	138.5±12.7	120–159
HR max (bpm)	188±6.8	172–198
$\dot{V}O_2$ max (ml/kg/min)	40.7±4.1	34.8–47.4

**Table 2.**  
Average Physiological Responses to Pilates

	BEGINNER LEVEL	ADVANCED LEVEL
<b>Warm-up</b>		
HR (bpm)	93±3.9	105±9.3
% HR max	49±2.8	56±5.4
$\dot{V}O_2$ (ml/kg/min)	9.4±1.3	10.9±2.0
% $\dot{V}O_2$ max	23±3.7	27±4.9
RPE	8.1±1.2	10.5±2.1
Kcal/min	3.0±0.73	3.4±0.99
<b>Workout</b>		
HR (bpm)	102±6.0	117±7.2
% HR max	54±3.6	62±4.0
$\dot{V}O_2$ (ml/kg/min)	11.5±1.6	17.3±1.4
% $\dot{V}O_2$ max	28±4.3	43±5.3
RPE	14.2±2.3	16.5±3.5
Kcal/min	3.6±0.87	5.6±0.97
<b>Cool-down</b>		
HR (bpm)	92±3.7	107±6.2
% HR max	49±2.6	56.79±3.97
$\dot{V}O_2$ (ml/kg/min)	10.0±1.8	12.0±1.3
% $\dot{V}O_2$ max	25±4.9	29.5±3.1
RPE	10.7±1.6	10.2±0.84
Kcal/min	3.1±1.0	3.8±0.80

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