

# Does Yoga Really

# Do the

# Body Good?

By Mark Anders

This exclusive ACE-sponsored study evaluates the

modern-day body

benefits

of the

5,000-

year-old

practice of

Hatha yoga

**Y**oga may be all the rage at your local gym, but the truth is—it's old news. Experts can trace the origins of yoga all the way back to 2250 B.C. as the Harrapan civilization in Northern India began to develop postures and breath-control techniques that they hoped would enable them to enter an altered consciousness and access the spirit realm.

Today, exercise enthusiasts are flocking to yoga studios and fitness centers in the hopes of reaping more tangible body benefits like improved muscle tone and strength, better balance and, of course, pretzel-like flexibility. "Mind-body exercise" has been the fitness buzzword du jour for at least five years now and, according to recent stats from the Sporting Goods Manufacturers Association, more than 11 million Americans currently practice yoga.

Yet despite yoga's long history and the enormous number of faithful participants, very little real research has been conducted regarding its physical benefits. That's where the American Council on Exercise comes in. We know anecdotally, and from firsthand experience, that yoga is a valuable fitness activity, but we decided to tap the research experts at the University of Wisconsin, La Crosse, to find out just how effective it really is.

## THE STUDY

Led by Dawn Boehde and John Porcari, Ph.D., researchers from the University's Human Performance Laboratory recruited 34 healthy women (average age: 33) for the study. To guarantee an

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even playing field, all of the subjects were sedentary and could not have been involved in a regular exercise program or yoga training for the six months prior to the study.

The test subjects were then randomly divided into two groups: a yoga group and a non-yoga control group. In an effort to establish a baseline, all subjects were given the same battery of tests that evaluated their flexibility, muscular strength and endurance, balance, pulmonary function and fitness level (see "Testing Protocol").

Then the yoga group participated in 55-minute Hatha yoga classes, three days a week. During the eight-week study period each participant completed an average of about 21 classes. Though there are many forms of yoga, Hatha yoga was chosen because it's beginner-friendly and classes are widely available throughout the nation.

All of the yoga classes were taught by Boehde, a certified yoga instructor.

Each started with five minutes of relaxation and yoga breathing (pranayama), followed by 10 minutes of warm-up exercises including sun salutations, 35 minutes of yoga postures (asanas), and, finally, five minutes of relaxation and yoga breathing in the corpse pose (savasana).

Simultaneously, the non-yoga group was prohibited from participating in any form of exercise.

At the end of the eight weeks, both groups were given another battery of tests (the same as prior

to the study) to uncover any possible changes in their fitness levels.

## THE RESULTS

After analyzing the data, researchers found that the regular practice of Hatha yoga significantly improved the subjects' flexibility, muscular strength and endurance, and balance. After eight weeks, the average flexibility of the yoga group improved by 13 percent to 35 percent and the gains were significantly greater than the non-yoga group, especially in shoulder and trunk flexibility, and ankle range of motion (for complete data tables, visit [www.acefitness.org](http://www.acefitness.org)).

"Focusing on holding the yoga poses for 30 seconds helps increase your flexibility," says Boehde. "Some poses have you leaning forward so you're lengthening the back of your body, and the ones where you're arching back are stretching out the front of the body."

Similarly, the yoga group's muscular strength and endurance was also boosted by regular Hatha yoga. In particular, chest and abdominal strength and endurance was increased significantly, enabling the yoga group to perform an average of six more push-ups and 14 more curl-ups following the study period (see Tables 1 and 2). "Different yoga poses improve your muscle endurance because you can't just flop down and do a pose," Boehde says. "You have to have good posture and poise, and good core strength to hold yourself up in the poses." Poses such as the plank, half moon, boat, camel and

## TESTING PROTOCOL

Each subject was tested prior to and following the two-month study period using this standard battery of tests:

### FLEXIBILITY:

Back Scratch, Functional Reach Test, Trunk Rotation, Trunk Flexion and Extension, Trunk Lift, Shoulder Elevation, Ankle Plantar Flexion and Dorsi-flexion, Modified Sit-and-Reach

### BALANCE:

One-Legged Stand

### MUSCULAR ENDURANCE:

ACSM Modified Push-up Test and Curl-up Test

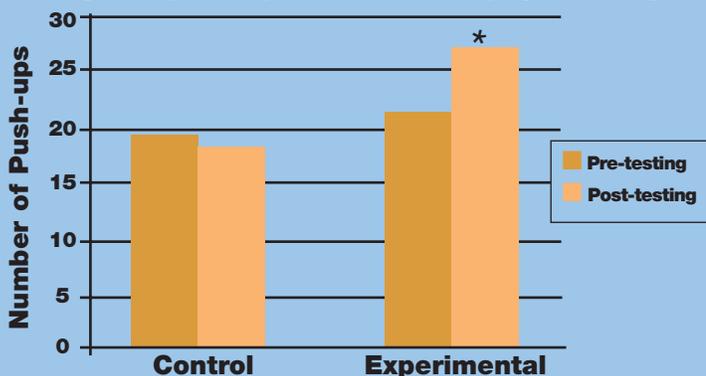
### PULMONARY FUNCTIONS:

Forced vital capacity (FVC), forced expiratory volume in the first second (FEV1)

### AEROBIC CAPACITY:

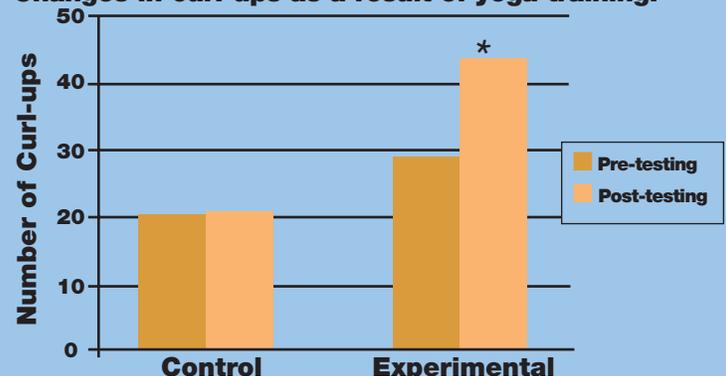
Maximal heart rate and  $\dot{V}O_2$  max.

**Table 1.**  
Changes in push-ups as a result of yoga training.



\* Significantly different from pretesting ( $p < .05$ )

**Table 2.**  
Changes in curl-ups as a result of yoga training.



\* Significantly different from pretesting ( $p < .05$ )

revolved triangle may be among the best for improving strength because they require one to support his or her upper body.

As for balance, the yoga group experienced a 17-second increase in their one-legged stand time and a modest boost in their functional reach scores. Besides the obvious improvements yielded by simply practicing the variety of one-legged moves that are common in Hatha yoga, researchers point to increased proprioception and strengthening of the muscle in the ankles and legs as part of the reason for the better balance scores.

However, with regards to aerobic fitness improvements, there were no significant changes in  $\dot{V}O_2$  max or maximal heart rate in the yoga group over the course of the study (see Table 3). “You get changes in strength and muscular endurance, flexibility, balance—all those types of things—but in order to improve aerobic capacity you really have to be working in the aerobic training zone,” says Porcari. “Based on what we found, the intensity just wasn’t there.” (For more details, see Yoga Intensity sidebar.)

## THE BOTTOM LINE

“For the average person off-the-street who doesn’t have a fitness program, this study shows what would happen if you did eight weeks of Hatha yoga,” explains Boehde. And good things would happen indeed—including increased strength and endurance, improved balance, and of course, better flexibility.

“We saw very nice changes in flexibility of the entire body, the shoulder girdle, twisting, bending, reaching, good low-back flexibility—all those types of flexibility improved,” says Porcari. “And those

improvements should have very good carryover to everyday life.”

But Porcari advises exercisers to assess their fitness goals and make sure that yoga can indeed help them meet those goals, especially if they’re looking to lose weight, build significant strength or get a good cardiovascular workout.

“People’s expected benefits need to be in-line with reality,” suggests Porcari. “People often try to make yoga into this all-encompassing thing. Americans have changed yoga and tried to morph it into programs that will hit every aspect of fitness but it was never designed that way.”

Sure, Hatha yoga will improve your strength, but you’ll get much stronger, more quickly, by simply lifting weights, he says. As for a cardiovascular workout, yoga isn’t the answer for that either. In fact, you’d have to jog or cycle to the yoga studio if you’re looking to improve your cardio fitness level.

That said, the researchers stress that Hatha yoga is still an excellent addition to any fitness routine, particularly because it targets those aspects of fitness—flexibility, balance and relaxation—that are most often skipped or overlooked. 

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## YOGA INTENSITY

*ACE study analyzes calorie-burn and aerobic benefits of Hatha and Power yogas*

As a companion to the Hatha yoga study, Porcari and Stefanie Spilde analyzed the exercise intensity and caloric expenditure of two types of yoga. For this study, researchers recruited 15 participants, with at least an intermediate level of yoga experience, and monitored their exercise intensity as they participated in two 50-minute yoga sessions (one Hatha yoga, one Power yoga) following a videotaped routine for consistency.

Researchers found that a 50-minute session of Hatha yoga burns 144 calories, equivalent to a slow walk, and provides no substantial aerobic benefit (see Table 4). As for Power yoga, it burns about 237 calories in 50 minutes and boosts heart rates to 62 percent of heartrate max (HRmax), providing just a mild aerobic workout. “It’s a great muscular workout and you certainly sweat, but it’s not an aerobic workout,” says Porcari.

Beyond that, researchers warn that efforts to boost the cardio benefits of yoga will only result in reduced flexibility and balance benefits. “It’s always a trade-off,” says Porcari. “Yoga was designed for relaxation, primarily. The more aerobic you make yoga, the less improvements you’ll see in those other areas.”

**Table 3.**  
Changes in aerobic capacity and maximal heart rate as a result of yoga training.

Variable	Pre-testing X ± SD	Post-testing X ± SD
$\dot{V}O_2$ max (ml/kg/min)		
Experimental	32.8 ± 7.1	35.5 ± 7.2
Control	33.4 ± 7.2	35.4 ± 8.3
Maximal heart rate (bpm)		
Experimental	178.6 ± 11.3	179.7 ± 14.4
Control	182.5 ± 11.9	181.3 ± 12.9

**Table 4.**  
Average physiological responses to Hatha and Power yoga.

	Hatha Yoga	Power Yoga
HR (bpm)	89±5.8	115±8.0
% HRmax	48±3.4	62±5.4
$\dot{V}O_2$ (ml/kg/min)	9.8±1.3	18.7±1.3
% $\dot{V}O_2$ max	24±4.1	46±4.8
RPE	10.6±0.79	14.3±1.8
Kcal/min	3.1±0.78	5.9±1.0