



Does P90X Really Bring It?

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If you watch television, chances are you've seen the P90X infomercial. Since 2004, the now ubiquitous advertisement has inspired viewers with compelling before and after-P90X photos, moving testimonials from regular folks, and snippets of trainer Tony Horton's no-nonsense workouts, all of which has convinced legions of people to pick up the phone and plunk down \$120 for the 12-DVD set. In fact, as of November 2010 more than 3 million copies of P90X (a.k.a. Power 90 Extreme), which is dubbed "The Ultimate 90-day Home Fitness Boot Camp," have been sold, making it America's most popular home exercise program for the past seven years running.

Horton, the quirky yet motivating star and creator of P90X, first made a name for himself as a trainer for Hollywood's elite, including actors Sean Connery and Ewan McGregor, musicians Sheryl Crow, Usher and Bruce Springsteen, and '80s rocker Billy Idol. It was Idol who gave Horton the nickname "Muscle Confucius," a tip of the hat to Horton's favorite fitness concept, muscle confusion, which is at the heart of the P90X program. Exercise scientists call it daily

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HORTON-ISMS

Eleven phrases that trainer Tony Horton uses famously in the P90X workout videos:

“Bring it!”

*“The warm-up’s going to kill you.
That’s a beautiful thing!”*

“Let’s X it up.”

“I’m talking supersonic X-style fit.”

“Oh yeah, gonna burn off some goo today! Get rid of the goop because we don’t want it.”

“He makes Gumby look like the Tin Man!”

“Oh, Mommy!”

“Like a pterodactyl backing out of trouble.”

“Oh, dude, this is going to hurt so much.”

“Yes, I know it’s hard! It’s supposed to be!”

*“Keep your bucket nearby my friends,
because this routine is X City.”*

Have a hankering for more Horton-isms? The sequel, P90X2, will be on sale by late December 2011.

undulating periodization, which is the principle that by changing up workouts regularly, the body doesn’t have time to adapt and become efficient at the exercise. This, in turn, means the body burns more fat and builds more muscle, more quickly.

Those who stick with the very intense P90X program and “keep pressing play” (as P90X devotees say) six sessions per week for the full 90 days are a loyal group. And although there is plenty of anecdotal evidence that suggests the program is effective, no scientific studies have been published to determine the true energy cost and exercise intensity of P90X. Until now.

The Study

For this exclusive study, the American Council on Exercise enlisted a research team from the University of Wisconsin, La Crosse. Led by John Porcari, Ph.D., and Joel Woldt, M.S., the researchers from the University’s Exercise and Health Program recruited 16 healthy subjects, ages 19 to 26, all of whom exercised regularly and had experience either with P90X or similar circuit-style weight-training and aerobic workouts.

To first establish fitness baselines, researchers performed maximal exercise testing on each subject using a motorized treadmill to determine max heart rate and $\dot{V}O_2 \text{max}$. The subjects then completed up to three practice sessions with each of the four P90X workouts chosen for this study: Legs & Back, Plyometrics, Cardio X, and Chest, Shoulders & Triceps. Although P90X is comprised of a dozen different workouts that alternate from day to day over the 90-day training period, researchers chose to analyze these four because they best represent P90X as a whole.

Once each subject was proficient in the workouts as deemed by the research team, actual testing began. The subjects exercised to the best of their abilities (e.g., performing the maximum amount of repetitions possible using a weight of their choice) throughout the warm-up, conditioning phase and cool-down, as researchers kept tabs on subjects’ heart rates (HR) by taking recordings at one-minute intervals throughout the workout. At the end of each

workout, ratings of perceived exertion (RPE—basically how hard the subjects felt they were working) were recorded while the heart-rate data was plugged into HR/ $\dot{V}O_2$ regression equations that were created from the maximal exercise tests to determine the predicted $\dot{V}O_2$ that the subject exercised at during that session. Due to the intensity and wide range of motion required by P90X, subjects were unable to wear bulky metabolic testing equipment. Caloric expenditure was later calculated from the same $\dot{V}O_2$ data.

At least 48 hours of rest was given to subjects between each workout test.

The Results

After weeks of testing, the research team crunched the data (Table 1). Porcari and his team reported that the average heart rate for all four workouts was 67 percent to 83 percent of HRmax for the male subjects; 65 percent to 88 percent of HRmax for the females (Figure 1). Meanwhile, the calculated $\dot{V}O_2$ max values were between 45 percent and 70 percent of $\dot{V}O_2$ max for males and between 45 percent and 80 percent for the female subjects.

As for calorie burns, the male subjects burned between 10.5 to 16.2 kcals per minute, while the female subjects burned between 7.2 and 12.6 kcals per minute. Male subjects totaled between 441 and 699 kcals burned per workout. The females expended a total of between 302 and 544 kcals per workout. The Plyometrics workout proved to be the biggest calorie burner, while the Chest, Shoulders & Triceps routine burned the fewest number of calories.

Researchers noted that given these results, the P90X workouts that were tested (and, therefore, most likely all of the P90X workouts) meet or exceed established fitness industry standards for losing weight and improving cardiorespiratory fitness.

The Bottom Line

“There’s no doubt that if people want to get into shape, the best way to do it is with high-intensity, interval-training like you’re seeing here

Table 1. Average Responses to the Four P90X Workouts

	Men (n=9)	Women (n=7)	All (N=16)
	X ± SD	X ± SD	X ± SD
Plyometrics (43 minutes)			
Heart rate (bpm)	159 ± 12.8	170 ± 14.0	164 ± 14.0
% HRmax	83 ± 5.9	88 ± 5.7	85 ± 6.3
$\dot{V}O_2$ (ml/kg/min)	39 ± 6.1	37 ± 2.3	38 ± 4.8
% $\dot{V}O_2$ max	70 ± 8.8	80 ± 8.5	74 ± 9.8
METs	11.1 ± 1.73	10.5 ± 0.66	10.8 ± 1.26
Kcal/min	16.2 ± 3.30	12.6 ± 1.84	14.7 ± 3.25
Kcal total	699 ± 14.0	544 ± 79.1	631 ± 139.8
RPE	15.3 ± 0.71	15.0 ± 1.62	15.2 ± 1.15
Legs & Back (43 minutes)			
Heart rate (bpm)	146 ± 10.0	153 ± 10.3	149 ± 10.4
% HRmax	76 ± 5.1	79 ± 5.4	77 ± 5.3
$\dot{V}O_2$ (ml/kg/min)	33 ± 5.0	31 ± 3.7	32 ± 4.6
% $\dot{V}O_2$ max	60 ± 6.4	66 ± 7.9	63 ± 7.6
METs	9.5 ± 1.43	8.7 ± 1.06	9.2 ± 1.27
Kcal/min	14.0 ± 3.15	10.4 ± 1.37	12.4 ± 3.04
Kcal total	600 ± 135.3	449 ± 58.9	534 ± 130.9
RPE	14.7 ± 1.00	15.4 ± 1.51	15.0 ± 1.26
Chest, Shoulders & Triceps (42 minutes)			
Heart rate (bpm)	129 ± 8.6	126 ± 14.4	128 ± 11.2
% HRmax	67 ± 4.5	65 ± 6.3	66 ± 5.2
$\dot{V}O_2$ (ml/kg/min)	25 ± 3.2	21 ± 3.1	23 ± 3.8
% $\dot{V}O_2$ max	45 ± 5.4	45 ± 7.5	45 ± 6.1
METs	7.2 ± 0.91	6 ± 0.90	6.7 ± 0.91
Kcal/min	10.5 ± 1.82	7.2 ± 0.94	9.0 ± 2.28
Kcal total	441 ± 77.4	302 ± 39.3	378 ± 96.7
RPE	15.2 ± 0.97	15.1 ± 1.57	15.2 ± 1.22
CardioX (33 minutes)			
Heart rate (bpm)	143 ± 15.5	152 ± 11.7	147 ± 14.3
% HRmax	74 ± 7.6	79 ± 4.8	76 ± 6.7
$\dot{V}O_2$ (ml/kg/min)	32 ± 6.8	30 ± 3.4	31 ± 5.5
% $\dot{V}O_2$ max	57 ± 10.3	65 ± 8.6	61 ± 10.2
METs	9.1 ± 1.93	8.6 ± 0.98	8.9 ± 1.51
Kcal/min	13.4 ± 3.67	10.3 ± 1.65	12.0 ± 3.27
Kcal total	441 ± 121.0	341 ± 54.5	397 ± 107.9
RPE	13.3 ± 0.71	14.7 ± 0.76	13.9 ± 1.00

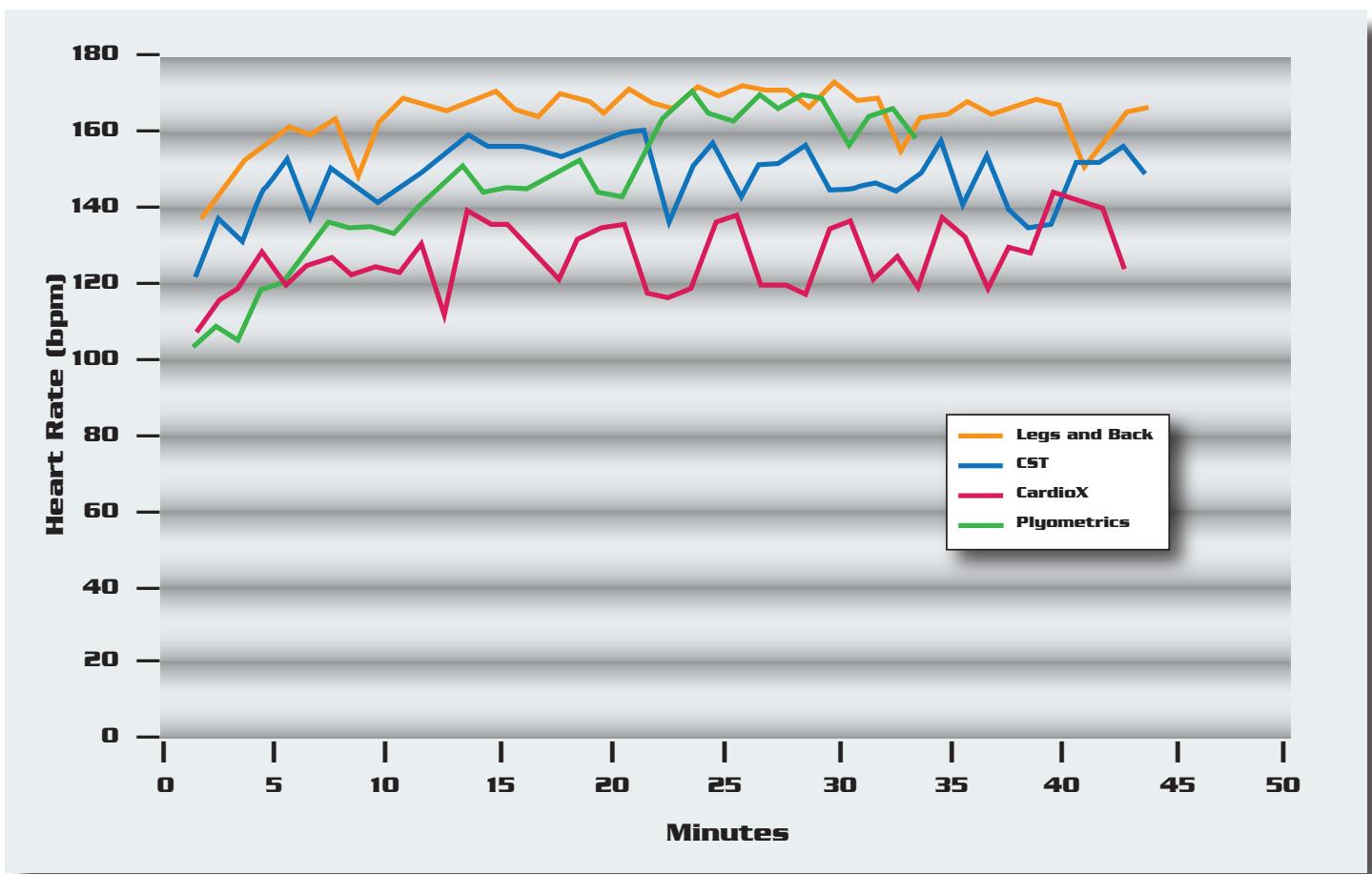


Figure 1. Minute-by-minute HR responses to the four P90X workouts

with P90X,” says Dr. Porcari. “The muscle confusion—that’s one of the biggest draws because you don’t get bored, you’re doing a lot of different workouts in a different sequence and your body never gets a chance to plateau.”

“When it comes to your muscles and your cardiovascular system, if you break them down, they bounce back stronger,” continues Porcari. “But they kind of get used to any chronic stimulus, so by doing things differently you’re just constantly challenging the muscles and cardiovascular system to respond and improve.”

Porcari’s fellow researcher, Joel Woldt, M.S., agrees. “If you do P90X, at least the four workouts I’ve tested, and if you do it to the best of your ability,” he says, “there’s no way you’re not going to get results.”

Still, there are a couple more things to keep in mind. First, it’s important to realize that to achieve the type of excellent results you see from programs like P90X, a healthy diet is essential. If you don’t lose the weight, there’s no way you’ll be able to see your newfound

muscle. Porcari also cautions against putting too much faith in the calorie-burn numbers typically advertised with programs similar to P90X. Though the P90X Web site does not promise specific calorie-burn numbers, postings on online message boards and Web sites suggest that P90X can burn over 1,000 calories per hour. Porcari warns would-be exercisers to “take those calorie-burn claims with a grain of salt,” he says. “When you look at the average caloric expenditure for P90X, it’s actually very comparable to jogging.”

That said, this research shows that P90X is a valuable way to burn calories, build muscle and improve your overall fitness level. “The data provides a lot of evidence to say that P90X does work,” says Woldt.



MARK ANDERS is an award-winning journalist who has covered a wide range of topics from rock star profiles to surfing river waves in Africa. His work has been published in more than 20 different magazines and books