

The Fitness Effects of A Combined Aerobic/Strength Machine

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Research Summary

Exercisers have a need to utilize modalities that are time efficient, as the lack of time is a key in starting or maintaining exercise programs. Exercisers are more likely to maintain an exercise program if they can easily derive both strength and aerobic benefits.

The CardioGym (NSW, Australia) is a combination of a recumbent exercise bicycle with a cable-based resistance system. Subjects completed a 30-day program with the CardioGym comprised of 3 sessions per week of 30 minutes per session. A control group performed either treadmill walking or elliptical training for the same time period.

After comparing initial testing results pre and post for both groups, the CardioGym Training Group (CTG) significantly improved fitness over the Aerobic Training Group (ATG) in almost all categories for the same time spent in exercise. In this study, the CardioGym produced results that were not only aerobically superior, but also much better in terms of weight loss, body composition and strength improvement.

Study Methodology

Thirteen (n=13) subjects, (8= male, 5= female), ranging in age from 37=63 years of age were used. The criteria included a period of relative inactivity for the last 60 days, as defined by two or less workouts per week, and no orthopedic limitations. Eight (n=8) subjects were assigned to the CardioGym Training Group (CTG), with the remaining five (n=5), subjects being assigned to the Aerobic Training Group (ATG).

Before training, all subjects underwent testing to determine physiological changes from each training program. Subjects performed resting measurements for weight, skin folds for body composition, and three girth measurements.

Flexibility was assessed using a modified sit and reach test, supine hip flexion, and seated torso rotation. Muscular endurance and overall strength were assessed using isokinetic dynamometry, with 20 repetitions performed at a relatively fast speed, 180 degrees per second, to assess muscular endurance for chest press, row, shoulder press, lat pull down, leg extension and leg curl movements.



The total work performed for the 20 repetitions was recorded. The device was then set to the slowest speed, approximately 60 degrees per second, to assess peak force for each of the movements, a measure of overall strength. The best score for the movement from the five repetitions was recorded. Scores for both endurance and strength were totaled, and divided by body weight to derive a ratio of either endurance or strength to body weight.

VO2 peak and anaerobic threshold were measured using a portable metabolic system (Oxycon Mobile, Cardinal Healthcare). VO2 peak was determined by volitional fatigue combined with an R.E.R. of 1.10, while anaerobic threshold (AT) was determined with the V-slope method and correlated to R.E.R. The same tests, in the same order were administered in at the end of the 30 days training period.

Both groups trained for 30 minutes per session, three sessions per week for the 30 day period. The Aerobic Training Group (ATG) performed aerobic training on either a treadmill or total body elliptical. Three subjects performed elliptical training, while two subjects utilized the treadmill. Subjects were encouraged to work out at a 6 out of 10 rate of perceived exertion level, normally considered a good correlate with developing aerobic endurance. Subjects were encouraged to also try various programs within each machine for variety.

The CardioGym Training Group (CTG), performed 30-second bouts of aerobic exercise on the recumbent bicycle combined with resistance training using the cable system alternative with 30-second recovery periods with no activity. If the individual came in on day directly after this regimen, they were given a recovery modification where they cycled continuously at approximately 50% of interval resistance level, and used approximately 50% of normal resistance level with the weight system.

Results		
Component	CardioGym Training	Aerobic Training
VO2 Peak	+14%	+4%
Anaerobic Threshold	+17%	+2%
Weight Loss	-4.8 pounds	-1.2 pounds
Body Composition	-3% body fat	-.45% body fat
Strength Endurance	+15%	+2%
Overall Strength	+31%	+3%
Flexibility	+8.7%	+1%

In terms of aerobic fitness and body composition changes, these results are consistent with previous research that demonstrates interval-based and combined training can result in large changes per unit of time. The strength and endurance increases are sizeable for the time invested, and especially considering the exercise regime was a combination of energy system and strength components. This study indicates for exercisers with limited time, the CardioGym has can produce superior results to just aerobic training when looking to improve a wide variety of fitness variables.

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