




Effects of the Curves for Women® Fitness and Weight Loss Program on Body Composition, Metabolism, and Exercise Capacity in Sedentary Overweight Females

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Research Status Update




- Ongoing Studies
 - Effects of the Curves Fitness & Weight Loss program I (Nearly Complete)
 - Effects of the Curves Fitness & Weight Loss program II (In progress)
 - Effects of Calcium Supplementation on Weight Loss in Post-Menopausal Women (In progress)
 - Biomechanical / Energy Expenditure Analysis of Curves Equipment / Circuit (In progress)
 - Curves for Kids Program (Planned)

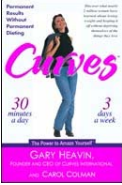







Rationale






- The Curves fitness and weight loss program has become a very popular means of promoting health and fitness among women
- Curves attracts women (30 – 55 yrs) who are typically sedentary, overweight, and do not feel comfortable exercising at typical health/fitness clubs.
- The program is non-intimidating, efficient, fun, and provides a strong social support structure to promote fitness and health among this population of women.


Rationale






- Although the exercise and dietary interventions have been based on a good scientific rationale and have been highly successful, the impact of women engaged in various aspects of this program has yet to be examined.


Purpose of Study






- To examine the acute and chronic effects of Curves fitness and diet program on weight loss, body composition, metabolic rate, exercise capacity, and markers of health in sedentary overweight females.






Subjects





- 245 apparently healthy, sedentary, and overweight women met entrance criteria and volunteered to participate in this study.
- Subjects signed informed consent statements in compliance with Baylor University's IRB and the American College of Sports Medicine.




Entrance Criteria

- Apparently healthy, untrained, and moderately overweight females (BMI > 27)
- 18-50 years old
- No current or recent participation in exercise program
- No recent weight loss of ≥ 20 lbs in last 6-months
- No current involvement in other weight loss programs or use of weight-loss products






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Subjects

- This analysis includes 160 women that completed the first 14-weeks of study.
- Subjects were:
 - 38.5 \pm 9 yr
 - 94.0 \pm 19 kg (207 \pm 42 lbs)
 - 64.2 \pm 3 in
 - 43.8 \pm 4.3 % body fat
 - BMI of 35.6 BMI (Very High Risk)


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Experimental Design



- 14 week study involving 2 familiarization sessions and 5 testing sessions (T1-T5) performed at 0, 2, 10, 10.4, and 14 weeks.
- Assigned to following groups based on baseline testing and responses to CHO tolerance questionnaire
 - **No Diet or Exercise** (Control)
 - **Exercise + No Diet** (ND+E)
 - **Exercise + High Calorie Diet** (HCD+E)
 - **Exercise + Very High Protein Diet** (LC-VHP+E)
 - **Exercise + High Protein Diet** (LC-HP+E)
 - **Exercise + High CHO Diet** (LC-HCHO+E)

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Dietary Intervention Goal


- To promote weight loss during the first 10 W of study and then to see if alternating higher and lower caloric intakes could help maintain and/or prevent weight regain after weight loss.
- To determine whether alterations in caloric and macronutrient intake during training affected weight loss and/or body composition changes during weight loss

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Dietary Intervention




- **Exercise + HCD (n=11) – High/Mod/High CHO Diet**
 - Women $\leq 90\%$ of estimated REE (Wang et al AJP. 279: E539-45, 2000)
 - Phase I – 2,600 kcal/d for 2 W (55% CHO, 15% PRO, 30% F)
 - Phase II – 2,600 kcal/d for 8 W (40% CHO 30% PRO, 30% F)
 - Phase III – 2,600 kcal/d for 4 W (55% CHO, 15% PRO, 30% F)
- **Exercise + LC-VHP (n=35) – Very High PRO/Low CHO Diet**
 - Women positive on CHO tolerance questionnaire
 - Phase I – 1,200 kcal/d for 2 W (7% CHO, 63% PRO, 30% F)
 - Phase II – 1,600 kcal/d for 8 W (15% CHO, 55% PRO, 30% F)
 - Phase III – 2,600 kcal/d (55% CHO, 15% PRO, 30% F) and 1,200 kcal/d (7% CHO, 63% PRO, 30% F) for 3/2, 3/2, 5/2, & 10/2 days

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Dietary Intervention





- **Exercise + LC-HP (n=28) – High PRO/Low CHO Diet**
 - Phase I – 1,200 kcal/d for 2 W (20% CHO, 50% PRO, 30% F)
 - Phase II – 1,600 kcal/d for 8 W (15% CHO, 55% PRO, 30% F)
 - Phase III – 2,600 kcal/d (15% CHO, 55% PRO, 30% F) and 1,200 kcal/d (20% CHO, 50% PRO, 30% F) for 3/2, 3/2, 5/2, & 10/2 days
- **Exercise + LC-HCHO (n=32) – High CHO Diet**
 - Phase I – 1,200 kcal/d for 2 W (55% CHO, 15% PRO, 30% F)
 - Phase II – 1,600 kcal/d for 8 W (55% CHO, 15% PRO, 30% F)
 - Phase III – 2,600 kcal/d (55% CHO, 15% PRO, 30% F) and 1,200 kcal/d (55% CHO, 15% PRO, 30% F) for 3/2, 3/2, 5/2, & 10/2 days
- All subjects were provided a low-dose liquid multivitamin to take during the course of the study

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Dietary Intervention




- Subjects were given diets, meal plans, and food substitution lists to follow for each diet.
- Subjects watched a video prepared by a RD explaining how to follow the diet.
- Subjects had access to an RD to answer any questions about the diet throughout the study.
- All subjects were provided a low-dose liquid multivitamin during the course of the study.





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Training Program




- 30-minute circuit training program performed 3 days/week
- Workouts were monitored by Curves trained fitness instructors who encouraged proper technique, effort, and monitored attendance
- Women were required to make up missed workouts
- Women who did not complete at least 90% of training workouts were dropped from the study.
- Training compliance was ~98±1%





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Training Program



- Training involved performing 3 rotations of 30-sec of exercise (8-12 repetitions) on eight bidirectional hydraulic exercise machines interspersed with 30-sec of calisthenics exercises designed to maintain an elevated heart rate and increase energy expenditure.
- Training was performed to music that had timing interval notifications

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Training Program



- Resistance exercises included:
 - Leg extension/curls
 - Shoulder Press/Lat Pull
 - Squat Push/Pull
 - Seated bench press/rows
 - Hip Adduction/Abduction
 - Abdominal Curl/Back Extension
 - Leg press
 - Arm curls/extensions




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Training Program




- Calisthenic exercises included low impact:
 - Jogging in place (primary)
 - Jumping jacks
 - Boxing
 - Knee lifts
 - Kicks forward
 - Side kicks
 - Skiing
 - Heel kicks
 - Skipping
 - Torso twists






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Assessments



- At 0, 2, 10, 10.4, & 14 weeks subjects:
 - Dietary Records** (4-d)
 - Psychometric Tests** (SF-36 QOL Inventory, Impact of weight on QOL-Lite questionnaire, POMS, Beck Depression Inventory, Occupational Strain Questionnaire, Appetite/eating satisfaction questionnaire)
 - Body weight**
 - Hip & waist measurement**
 - Total Body Water** (BIA)
 - Body Composition/Bone Density** (DEXA)
 - Resting HR & BP**
 - Fasting Blood Samples** (12h)
 - Resting Energy Expenditure** (REE) (20 min)






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Assessments

- Subjects also completed the following tests at **0, 10, & 14 weeks** of training/dieting:
 - Maximal Cardiopulmonary/ECG Stress Test (Bruce Protocol)
 - 1RM Bench Press
 - 80% of 1RM on Bench Press
 - 1RM Leg Press
 - 80% of 1RM on Leg Press
- Medical safety/side effects were monitored by a registered nurse on a weekly basis






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Statistics

- Data were analyzed by SAS Version 8.3 software using repeated measures ANOVA with Tukey's adjusted multiple comparison post-hoc tests.
- Data were considered statistically significant when the probability of error was 0.05 or less.
- Data are presented as means \pm SD changes from baseline.








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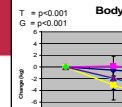


Preliminary Results

- DEXA Body Composition
- Resting Energy Expenditure
- Cardiopulmonary/Musculoskeletal Fitness
- Markers of Health

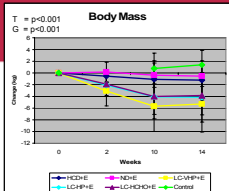
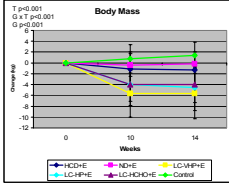





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Body Composition

Body Mass

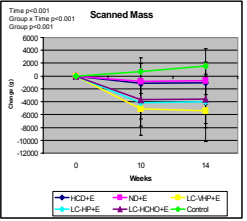
- Control** subjects gained **0.8 \pm 2.6 kg**
- ND+E** subjects lost/maintained weight (**-0.4 \pm 2.1 kg**)
- HCD** subjects lost **-1.1 \pm 3.1 kg**
- Subjects in the **HCHO** (**-4 \pm 3.8 kg**) and **HP** groups (**-3.7 \pm 3.0 kg**) lost significantly more weight than ND and HCD groups
- Subjects in the **VHP** group (**-5.7 \pm 4.3 kg**) observed greatest weight loss which was significantly greater than the HCHO and HP groups
- Subjects maintained weight loss during the maintenance phase

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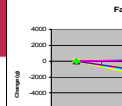
Body Composition

Scanned Mass



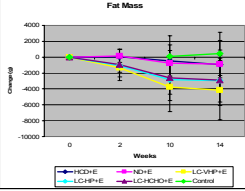
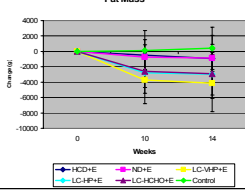
- After 10 weeks, changes in scanned mass were:
 - **Control** (0.2 \pm 3.2 kg)
 - **ND+E** (-0.8 \pm 1.9 kg)
 - **HCD** (-1.2 \pm 3.1 kg)
 - **HCHO** (-3.7 \pm 3.0 kg)
 - **HP** (-4.1 \pm 3.7 kg)
 - **VHP** (-5.2 \pm 4.1 kg)
- After 14 weeks, changes in scanned mass were:
 - **Control** (0.6 \pm 3.5 kg)
 - **ND+E** (-0.7 \pm 2.2 kg)
 - **HCD** (-1.1 \pm 3.3 kg)
 - **HCHO** (-3.6 \pm 3.8 kg)
 - **HP** (-4.0 \pm 4.0 kg)
 - **VHP** (-5.4 \pm 4.8 kg)
- Greatest loss in VHP group
- No evidence of weight regain during maintenance phase

Curves



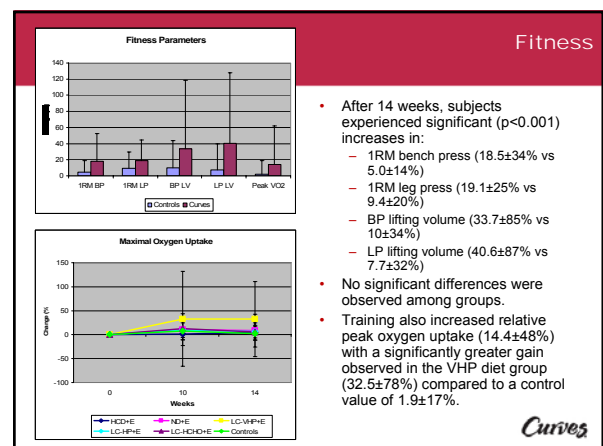
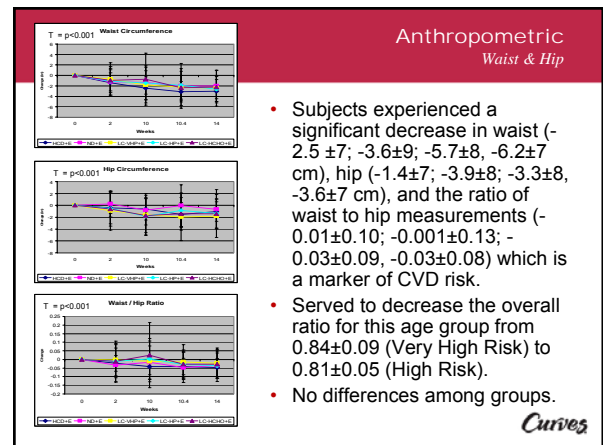
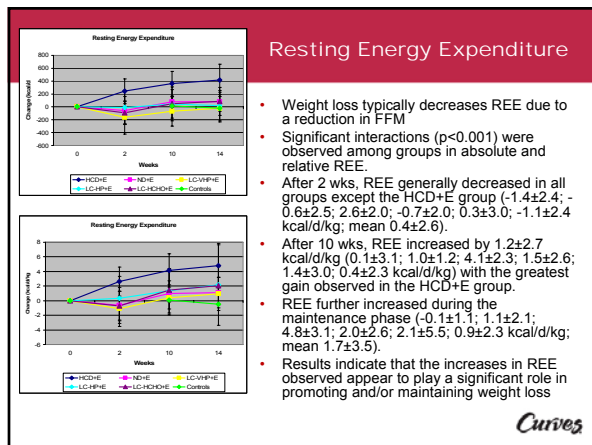
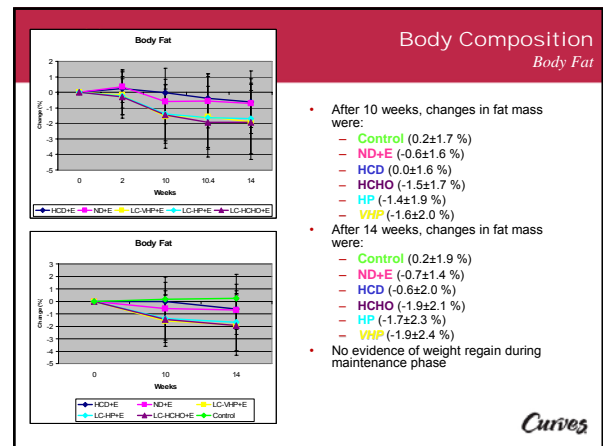
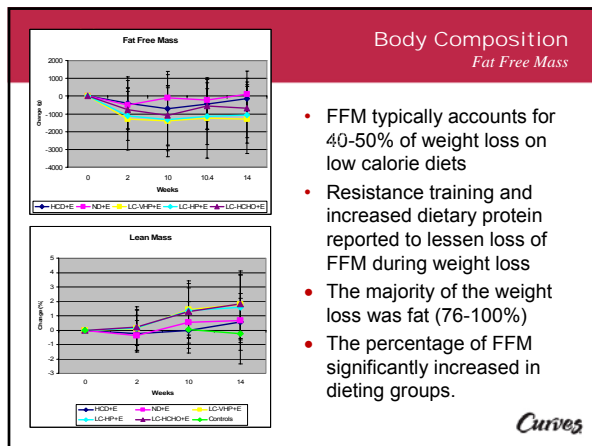
Body Composition

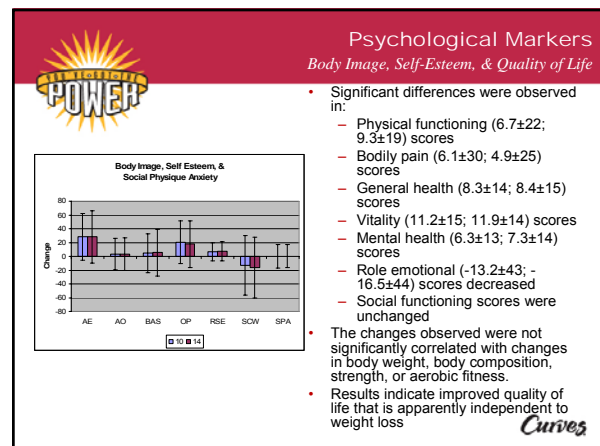
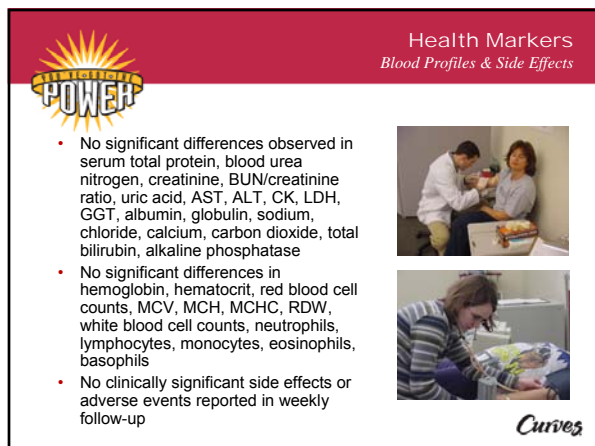
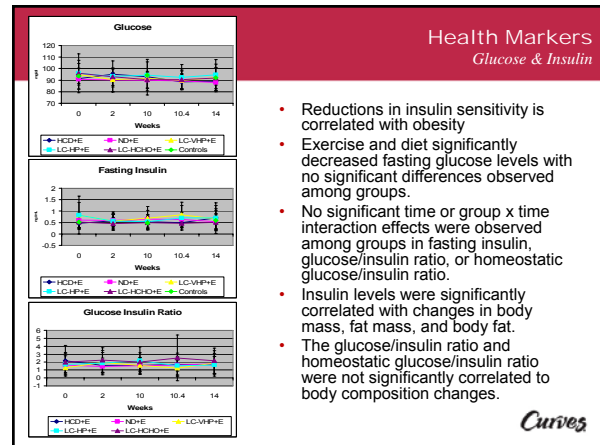
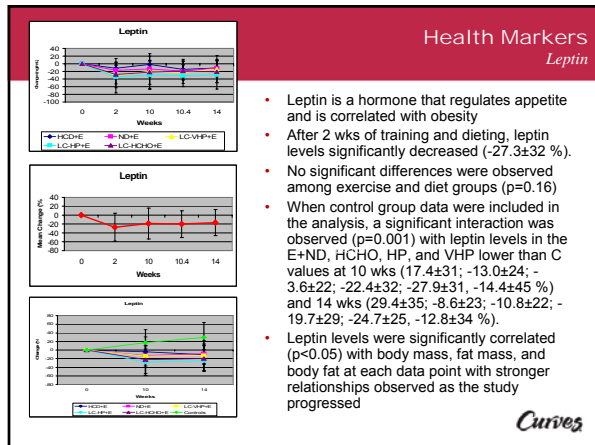
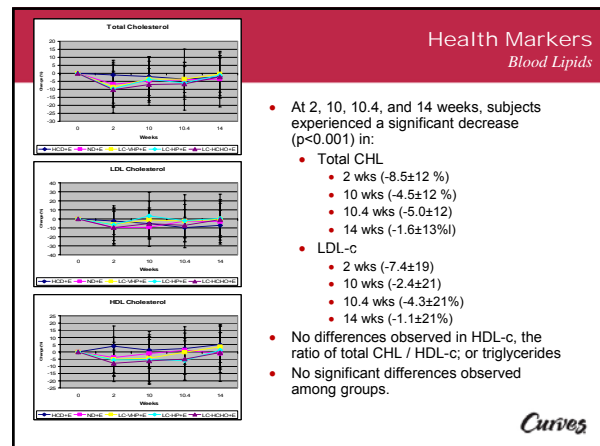
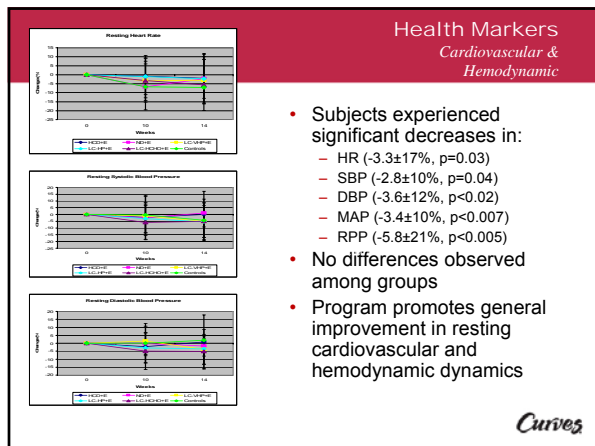
Fat Mass

- After 10 weeks, changes in fat mass were:
 - **Control** (0.1 \pm 2.6 kg)
 - **ND+E** (-0.8 \pm 1.6 kg)
 - **HCD** (-0.5 \pm 2.0 kg)
 - **HCHO** (-2.6 \pm 2.1 kg)
 - **HP** (-2.8 \pm 2.7 kg)
 - **VHP** (-3.7 \pm 3.1 kg)
- After 14 weeks, changes in fat mass were:
 - **Control** (0.4 \pm 2.7 kg)
 - **ND+E** (-0.9 \pm 1.8 kg)
 - **HCD** (-0.9 \pm 3.0 kg)
 - **HCHO** (-2.9 \pm 2.8 kg)
 - **HP** (-2.9 \pm 3.2 kg)
 - **VHP** (-4.1 \pm 3.7 kg)
- No evidence of weight regain during maintenance phase

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Research Findings *Bottom Line*

- Program is highly effective in promoting weight loss and improving general health & fitness in this population
- Improvements appear to be due to combination of exercise training and diet interventions which increase REE during weight loss
- Intermittent dieting appears effective to maintain and/or promote additional weight loss by increasing REE



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Research Findings *Bottom Line*

- Program also promotes improvements in body image, self-esteem, and quality of life that appears to be independent to weight loss
- Additional research is ongoing to examine the short and long-term effects of this program as well as to identify optimal ways of maintaining weight loss



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nutrition, and preventive health research!*

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