



EFFECTS OF THE CURVES™ FITNESS & WEIGHT LOSS PROGRAM I: BODY COMPOSITION



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Abstract

120 overweight and sedentary women were assigned to a control group (C), an exercise & no diet group (E+ND); an exercise & high calorie diet (HCD) group (2,600 kcals/d for 1 wk at 55% C, 15% P, 30% F; 9 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F); or, a low calorie high carbohydrate (HCHO), high protein (HP), or very high protein (VHP) diet. Diets consisted of 1,200 kcal/d for 1-wk, 1,600 kcal/d for 9 wks, and contained 30% fat, 40-55% CHO on the HCD and HCHO diets and 50-63% P on the HP and VHP diets. During the maintenance phase, subjects ingested 2,600 kcal/d (55% C, 15% P, 30% F) and dieted for 2-d (1,200 kcal/d) only if they gained 3 lbs. Subjects participated in a supervised Curves fitness program 3-d per wk. DEXA body composition measurements were obtained at 0, 10, and 14 weeks and were analyzed by repeated measures ANOVA. Data are presented as means \pm SD changes from baseline for the C, E+ND, HCD, HCHO, HP and VHP groups, respectively. After 10 weeks, subjects who dieted experienced a significantly greater ($p < 0.003$) loss in scanned body mass (0.6 ± 2.4 ; -1.6 ± 2.4 ; 0.5 ± 1.9 ; -3.1 ± 3.2 ; -3.2 ± 3.0 ; -4.0 ± 3.1 kg) and fat mass (0.0 ± 2.3 ; -1.1 ± 1.9 ; -0.5 ± 1.4 ; -2.4 ± 2.4 ; -2.9 ± 2.8 , -3.2 ± 2.3 kg). Intermittent dieting maintained losses in scanned mass (0.7 ± 2.9 ; -1.1 ± 2.7 -0.7 ± 1.3 ; -3.2 ± 3.6 ; -3.1 ± 3.2 ; -4.0 ± 3.8 kg) and fat mass (0.0 ± 2.8 ; -1.6 ± 2.4 ; -0.3 ± 1.5 ; -2.8 ± 2.9 ; -3.0 ± 3.0 , -3.3 ± 2.9 kg). Results indicate that the Curves program is effective to promote and maintain weight loss.

Supported in part by Curves International, Inc. (Waco, TX).

Rationale

The Curves fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and fitness. Although the program has been based on sound rationale, the effects of following this program have not been studied. The purpose of this study is to examine the acute and chronic effects of Curves International fitness and diet program on body composition changes in sedentary overweight females.

Experimental Design

Subjects

- 118 sedentary women (38.5 \pm 8.1 yr; 202.1 \pm 37.9 kg; 44.5 \pm 4.3 % body fat) participated in a 14-wk exercise and diet program.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subjects' guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were randomly assigned to one of the following groups:
 - an exercise and no diet group (E+ND);
 - an exercise and high calorie diet (2,600 kcals/d for 1 wk at 55% C, 15% P, 30% F; 9 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group (HCD);
 - a low calorie high carbohydrate (HCHO);
 - a high protein (HP)
 - a very high protein diet (VHP)
- The last three low calorie diets involved consuming 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks. Then during the maintenance phase subjects ingested a 2,600 kcal/d diet (55% C, 15% P, 30% F) unless 3 lbs. was gained at which time a diet of 1,200 kcal/d was ingested for 2-d in an attempt to maintain weight loss and improve body composition.
- Diets were standardized with 30% dietary fat, carbohydrate intake ranging from 40-55% on the HCD and HCHO diets, and protein intake ranging from 50-63% on the HP and VHP diets.

Training

- Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises 3-d per week for 14 weeks.

Methods & Procedures

- DEXA body composition measurements were obtained at 0, 10 & 14 weeks.
- DEXA scans were completed using a Hologic QDR-4500W using software version 4.0.
- Interpretations of total scanned body mass, fat mass, lean mass, and percent body fat were obtained from these measures.

Statistical Analysis

- Data were analyzed by repeated measures ANOVA analysis using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means \pm SD from baseline for the C, E+ND, HCD, HCHO, HP, and VHP groups, respectively.

Results

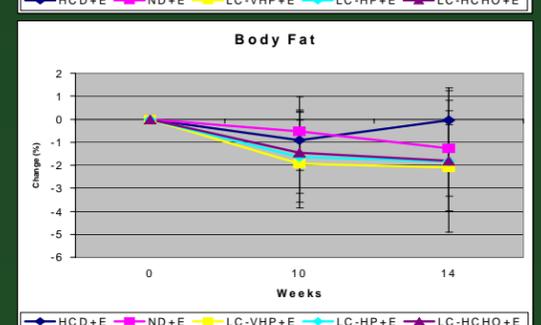
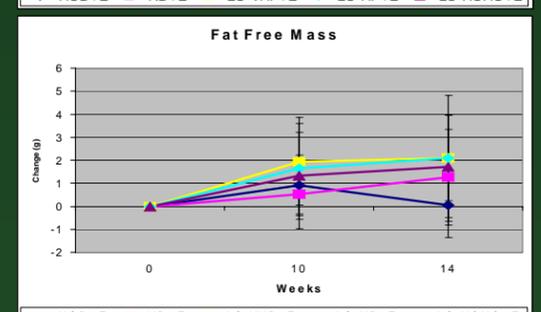
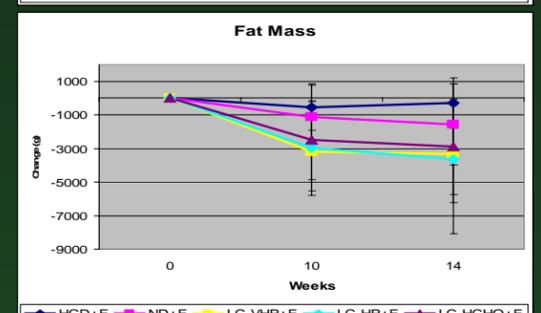
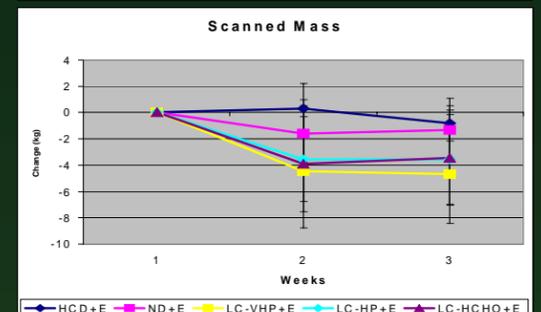
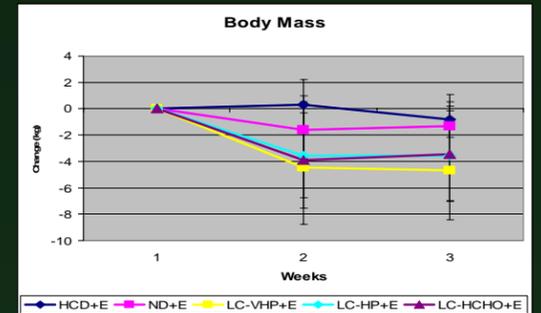
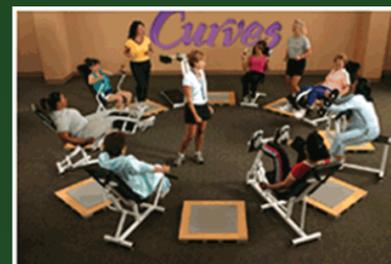
- After 10-weeks, subjects involved in dieting experienced a significantly greater loss in:
 - scanned mass (0.6 ± 2.4 ; -1.6 ± 2.4 ; 0.5 ± 1.9 ; -3.1 ± 3.2 ; -3.2 ± 3.0 ; -4.0 ± 3.1 kg) and,
 - fat mass (0.0 ± 2.3 ; -1.1 ± 1.9 ; -0.5 ± 1.4 ; -2.4 ± 2.4 , -2.9 ± 2.8 , -3.2 ± 2.3 kg)
- Intermittent dieting maintained:
 - scanned mass (0.7 ± 2.9 ; -1.1 ± 2.7 -0.7 ± 1.3 ; -3.2 ± 3.6 ; -3.1 ± 3.2 ; -4.0 ± 3.8 kg) and
 - fat mass (0.0 ± 2.8 ; -1.6 ± 2.4 ; -0.3 ± 1.5 ; -2.8 ± 2.9 ; -3.0 ± 3.0 , -3.3 ± 2.9 kg) indicating this approach appears to help maintain weight loss.

Conclusions

- The Curves fitness and weight loss program increases weight loss in all groups, especially those following a diet plan.
- Intermittent dieting following weight loss appears to be an effective way to maintain and/or further promote weight loss and improvements in body composition.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University and Curves International, Inc. (Waco, TX).





EFFECTS OF THE CURVES™ FITNESS AND WEIGHT LOSS PROGRAM II: RESTING ENERGY EXPENDITURE



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Abstract

Dieting typically decreases resting energy expenditure (REE) contributing to weight regain after weight loss. 115 sedentary women were assigned to a control group (C), an exercise & no diet group (E+ND); an exercise & high calorie diet (HCD) group (2,600 kcals/d for 1 wk at 55% C, 15% P, 30% F; 9 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F); or, a low calorie high carbohydrate (HCHO), high protein (HP), or very high protein (VHP) diet. Diets consisted of 1,200 kcal/d for 1 wk, 1,600 kcal/d for 9 wk and contained 30% F, 40-55% CHO on HCD and HCHO, and 50-63% P on the HP and VHP diets. During the maintenance phase, subjects ingested 2,600 kcal/d until they gained 3 lbs at which point they dieted with 1,200 kcal/d until they lost 3 lbs. Subjects participated in a supervised Curves fitness program 3-d per wk. Fasting REE measurements were obtained at 0, 1, 10, and 14 weeks. Data were analyzed by repeated measures ANOVA and are presented as means \pm SD changes from baseline for the C, E+ND, HCD, HCHO, HP and VHP groups, respectively. After 1 wk, REE generally decreased in all groups except the HCD group (-1.9 \pm 2.8; 0.1 \pm 1.9; 2.7 \pm 2.4; -0.7 \pm 2.1; -0.3 \pm 2.0; -0.7 \pm 2.0 kcal/d/kg). After 10 wks, REE increased (-0.4 \pm 2.7; 1.6 \pm 1.5; 2.6 \pm 2.9; 1.0 \pm 2.3; 0.3 \pm 1.7; 0.5 \pm 2.1 kcal/d/kg) with the greatest gain observed in the E+ND and HCD groups. REE further increased during the maintenance phase (-0.2 \pm 0.9; 2.0 \pm 2.1; 3.5 \pm 1.9; 1.1 \pm 1.7; 0.7 \pm 1.9; 1.4 \pm 2.0 kcal/d/kg). Results indicate that exercise and increasing caloric intake with exercise increases REE and that increases in REE can be achieved during weight loss if accompanied by interval resistance training.

Supported in part by Curves International, Inc., Waco, TX

Rationale

The Curves International fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and muscle mass. Additionally, the program claims to promote increases in resting metabolic rate through alterations in diet and caloric intake thereby helping promote and maintain weight loss. Although the program has been based on sound scientific rationale, the effects of women following this program have not been studied in detail. The purpose of this study is to examine the acute and chronic effects of Curves International fitness and diet program on weight loss and resting energy expenditure in sedentary overweight females.

Experimental Design

Subjects

- 115 sedentary women (38.5 \pm 8 yr; 91.9 \pm 17 kg; 44.5 \pm 4.3 % body fat) participated in a 14-wk exercise and diet program.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subject guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were randomly assigned to:
 - an exercise and no diet group (E+ND);
 - an exercise and high calorie mixed diet (2,600 kcal/d for 1 wk at 55% C, 15% P, 30% F; 9 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group (HCD);
 - a low calorie high carbohydrate group (HCHO);
 - a low calorie high protein (HP); or,
 - a low calorie very high protein (VHP) diet.
- The diets involved consuming 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks. During the maintenance phase, subjects ingested 2,600 kcal/d until they gained 3 lbs at which point they dieted with 1,200 kcal/d until they lost 3 lbs.
- Diets were standardized with 30% dietary fat with carbohydrate intake ranging from 40-55% on the HCD and HCHO diets and protein intake ranging from 50-63% on the HP and VHP.

Training Protocol

- Subjects participated in a supervised 30-min hydraulic resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week.

Methods & Procedures

- Body weight, DEXA body composition, and REE measurements were obtained at 0, 1, 10, 10.4 & 14 weeks.
- REE was measured via Parvo Medics TrueOne® 2400 Metabolic Measurement System Version 4.1 via standard procedures.



Statistical Analysis

- Data were analyzed by repeated measures ANOVA using SPSS for Windows version 11.5 software and are presented as means \pm SD changes from baseline for the C, E+ND, HCD, HCHO, HP and VHP groups, respectively.

Results

- Significant interactions ($p < 0.001$) were observed among groups in absolute and relative REE.
- After 1 wk, REE generally decreased in all groups except the HCD group (-1.9 \pm 2.8; 0.1 \pm 1.9; 2.7 \pm 2.4; -0.7 \pm 2.1; -0.3 \pm 2.0; -0.7 \pm 2.0 kcal/d/kg).
- After 10 wks, REE increased (-0.4 \pm 2.7; 1.6 \pm 1.5; 2.6 \pm 2.9; 1.0 \pm 2.3; 0.3 \pm 1.7; 0.5 \pm 2.1 kcal/d/kg) with the greatest gain observed in the E+ND and HCD groups.
- REE further increased during the maintenance phase (-0.2 \pm 0.9; 2.0 \pm 2.1; 3.5 \pm 1.9; 1.1 \pm 1.7; 0.7 \pm 1.9; 1.4 \pm 2.0 kcal/d/kg).

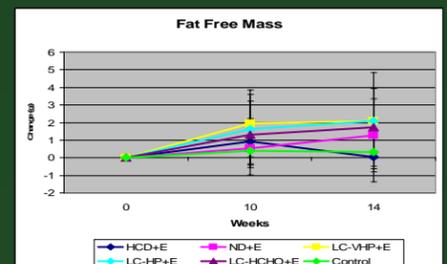
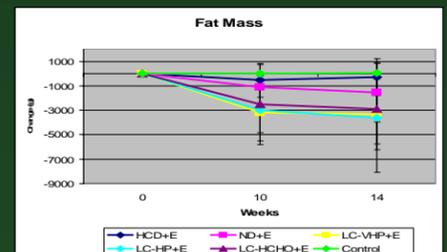
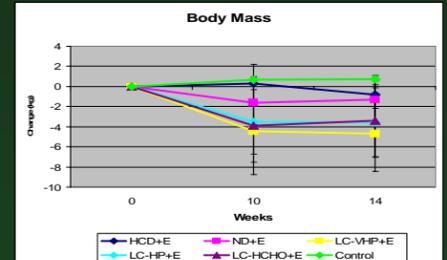
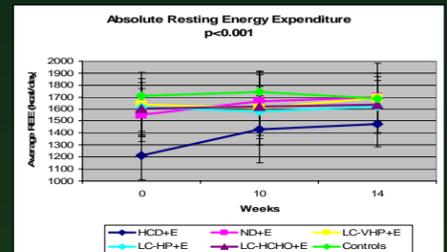
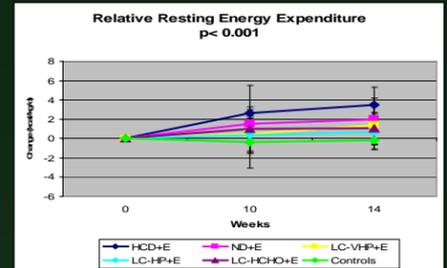
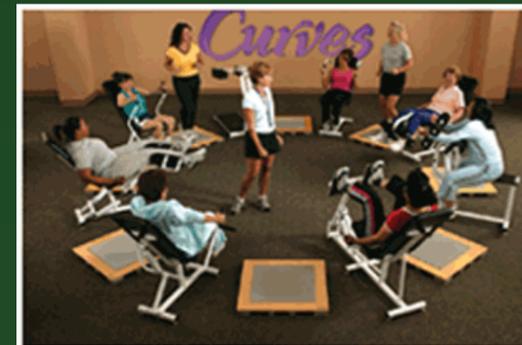
Conclusions

- Results indicate that exercise and increasing caloric intake with exercise increases REE and that increases in REE can be achieved during weight loss if accompanied by interval resistance training.
- These findings indicate that this program appears to be an effective and appropriate level exercise program for this population.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University and Curves International Inc., Waco, TX.

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EFFECTS OF THE CURVES™ FITNESS & WEIGHT LOSS PROGRAM III: TRAINING ADAPTATIONS



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Abstract

118 overweight and sedentary women were assigned to a control group, an exercise and no diet group (E+ND); an exercise and high calorie diet (E+HCD) group (2,600 kcals/day), or a low calorie high carbohydrate (HCHO), high protein (HP), or very high protein (VHP) diet. Diets consisted of 1,200 kcal/day for 1-week and 1,600 kcal/day for 9-weeks and contained 30% fat, 40-55% CHO on the HCD and HCHO diets and 50-63% protein on the HP and VHP diets. During the maintenance phase, participants ingested 2,600 kcals/day (55% C, 15% P, 30% F) until they gained 3 lbs., at which point they dieted with 1,200 kcals/day until they lost 3 lbs. Participants participated in a supervised Curves fitness program (30-min of circuit resistance training interspersed with callisthenic exercises) 3 days per week. Data were obtained at 0, 10, and 14 wks and were analyzed by repeated measures ANOVA. Data are presented as means \pm SD percentage changes from baseline. Training significantly increased relative 1RM bench press (12 \pm 18%); 1RM leg press (13 \pm 18%); bench press lifting volume (21 \pm 87%); leg press lifting volume (19 \pm 61%); and relative peak oxygen uptake (7 \pm 14%) compared to control group values of 5 \pm 14%, 9 \pm 20%, 10 \pm 34%, 8 \pm 32%, and 2 \pm 17% respectively. Resting heart rate (0.3 \pm 14%, $p = 0.97$) and systolic blood pressure (-2.3 \pm 10%, $p = 0.29$) were unchanged while diastolic blood pressure (-4.0 \pm 12%, $p < 0.03$) and mean arterial pressure (-3.4 \pm 10%, $p < 0.04$) were significantly decreased in response to training with no differences observed among groups. Results indicate that the Curves fitness program improves muscular strength, muscular endurance, aerobic capacity, and some general resting cardiovascular hemodynamics in this population of subjects.

Supported in part by Curves International, Inc. (Waco, TX).

Rationale

The Curves fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and fitness. Although the program has been based on sound rationale, the effects of following this program have not been studied extensively. The purpose of this study is to examine the acute and chronic effects of Curves International fitness and diet program on muscular strength, muscular endurance, aerobic capacity, and resting cardiovascular hemodynamic variables in sedentary overweight females.

Experimental Design

Subjects

- 118 sedentary women (38.5 \pm 8 yr; 91.7 \pm 17 kg; 44.5 \pm 4.3 % body fat) participated in a 14-wk exercise and diet program.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subjects guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were assigned to one of the following groups:
 - control group (no diet + no exercise)
 - no diet group + exercise (ND+E);
 - a high calorie mixed diet (2,600 kcals/d for 1 wk at 55% C, 15% P, 30% F; 9 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) + exercise group (HCD+E);
 - a low calorie high carbohydrate + exercise (LC-HCHO+E);
 - a high protein + exercise (LC-HP+E); or,
 - a very high protein + exercise (LC-VHP+E) diet.
- The last three low calorie diets involved consuming 1,200 kcal/d for 1-week and 1,600 kcal/d for 9 wks. Then during the maintenance phase subjects ingested a 2,600 kcal/d diet (55% C, 15% P, 30% F) unless 3 lbs. was gained at which time a diet of 1,200 kcal/d was ingested until the 3 lbs. was lost. This cyclic dieting was done in an attempt to maintain weight loss and improve body composition.
- Diets were standardized with 30% dietary fat with carbohydrate intake ranging from 40-55% on the HCD+E and LC-HCHO+E diets and protein intake ranging from 50-63% on the LC-HP+E and LC-VHP+E diets.

Training

- Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with callisthenic exercises and performed 3-d per week.

Methods & Procedures

- 1RM bench press, 1RM leg press, BP lifting volume, LP lifting volume, VO_{2max} , and resting hemodynamic variables were obtained at 0, 10, & 14 weeks using standard procedures.

Statistical Analysis

- Data were analyzed by repeated measures ANOVA analysis using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means \pm SD from baseline for each diet group.

Results

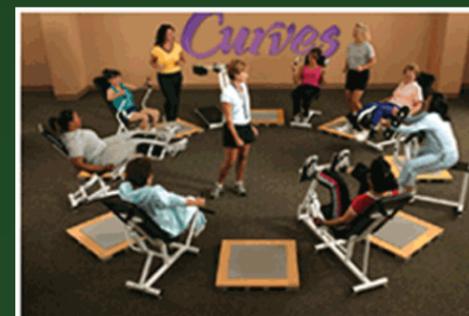
- After 14 weeks, subjects experienced significant ($p < 0.05$) increases in relative 1RM bench press (12 \pm 18%); 1RM leg press (13 \pm 18%), BP lifting volume (21 \pm 87%); and, LP lifting volume (19 \pm 61%) compared to control group values of 5 \pm 14%, 9 \pm 20%, 10 \pm 34%, and 8 \pm 32% respectively.
- No significant differences were observed among groups.
- Training also increased relative peak oxygen uptake (7 \pm 14%).
- Resting HR (0.3 \pm 14%, $p = 0.97$) and systolic blood pressure (-2.3 \pm 10%, $p = 0.29$) were unchanged while diastolic blood pressure (-4.0 \pm 12%, $p < 0.03$) and mean arterial pressure (-3.4 \pm 10%, $p < 0.04$) were significantly decreased in response to training with no differences observed among groups.

Conclusions

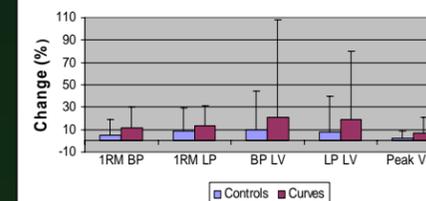
- The Curves fitness and weight loss program appears to increase muscular strength, muscular endurance, and aerobic capacity in this population of subjects.
- The Curves fitness and weight loss program appears to decrease resting cardiovascular hemodynamics.

Funding

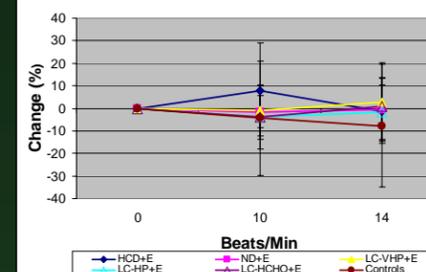
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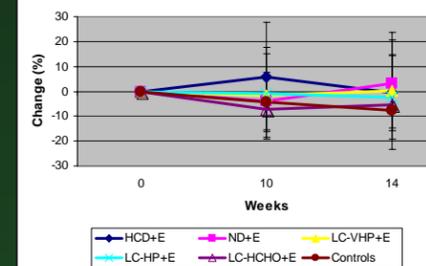
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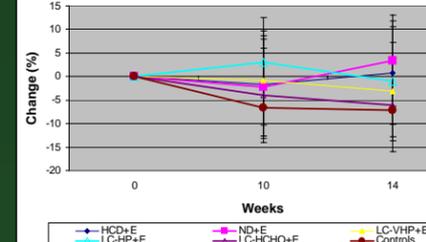
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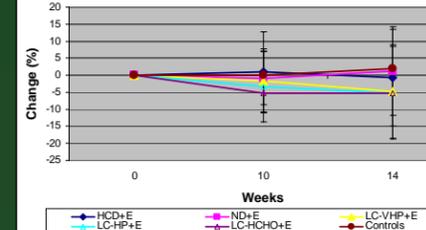
Resting Rate Pressure Product



Resting Systolic Blood Pressure



Resting Diastolic Blood Pressure





EFFECTS OF THE CURVES™ FITNESS & WEIGHT LOSS PROGRAM IV: HEALTH MARKERS



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Abstract

112 overweight and sedentary women were assigned to an exercise group or one of four diet groups described above for 14-wks (10 wk diet / 4-wk maintenance). Subjects participated in a supervised Curves fitness program 3-d per wk. At 0, 2, 10, and 14 weeks, subjects donated fasting blood samples and had waist and hip measurements determined. Subjects were also questioned about side effects on a weekly basis. Data were analyzed by repeated measures ANOVA and are presented as means \pm SD from baseline at weeks 2, 10, and 14, respectively. Total cholesterol (-5.2 \pm 12; -2.9 \pm 13; 1.5 \pm 15 %) and LDL-c (-3.7 \pm 20; -2.7 \pm 20; 4.8 \pm 24 %) levels were significantly decreased during diet phases and returned to baseline levels during the maintenance phase with no significant differences observed among groups. Subjects experienced significant decreases in waist (-2.3 \pm 5; -4.2 \pm 6; -4.9 \pm 7 cm) and hip (-1.7 \pm 3; -3.8 \pm 5; -3.7 \pm 5 cm) measurements with no differences observed among groups. Although some hematological variables decreased over time, there were no clinically significant interactions observed in a comprehensive panel of hematological markers evaluated. No clinically significant side effects or adverse events related to the study were reported. Results indicate that participation in the Curves program may improve some blood lipids during the diet phases and decreases hip and waist measurements without adversely affecting general markers of health status.

Supported in part by Curves International, Inc. (Waco, TX).

Rationale

The Curves fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and fitness. Although the program has been based on sound rationale, the effects of following this program have not been studied. The purpose of this study is to examine the acute and chronic effects of Curves International fitness and diet program on body composition changes in sedentary overweight females.

Experimental Design

Subjects

- 112 overweight and sedentary women (38.53 \pm 8.1 yr; 91.86 \pm 17.21 kg; 64.3 \pm 2.8 in; 44.5 \pm 4.3 % body fat) participated in a 14-wk exercise and diet program.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subjects' guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were randomly assigned to one of the following groups:
 - an exercise and no diet group (ND+E);
 - an exercise and high calorie mixed diet (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group (HCD+E);
 - an exercise and low calorie high carbohydrate (HCHO+E);
 - an exercise and low calorie high protein (HP+E); or,
 - an exercise and low calorie very high protein (VHP+E) diet.
- The last three low calorie diets involved consuming 1,200 kcal/d for 1-wks and 1,600 kcal/d for 9 wks. Subjects then ingested 2,600 kcal/d and 1,200 kcal/d diets at 3/2, 3/2, 5/2, & 10/0 day intervals in an attempt to maintain weight loss and improve body composition.
- Diets were standardized with 30% dietary fat with carbohydrate intake ranging from 40-55% on the HCD+E and HCHO+E diets and protein intake ranging from 50-63% on the HP+E and VHP+E diets.

Training

- Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises 3-d per week for 14 weeks.

Methods & Procedures

- At 0, 2, 10, 10.4 and 14 weeks, subjects donated fasting blood samples as well as had waist and hip measurements determined..
- Subjects reported any side effects associated with participating in the study to a research nurse on a weekly basis.
- Hematological variables were assayed by Quest Diagnostics, Inc. (Dallas, TX) for a comprehensive panel

of biochemical markers and the ratio of waist to hip measurements was calculated to assess general markers of clinical health status.

Statistical Analysis

- Data were analyzed by repeated measures ANOVA analysis using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means \pm SD from baseline for the C, ND+E, HCD+E, HCHO+E, HP+E and VHP+E groups, respectively.

Results

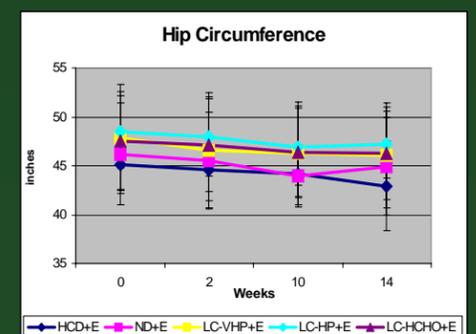
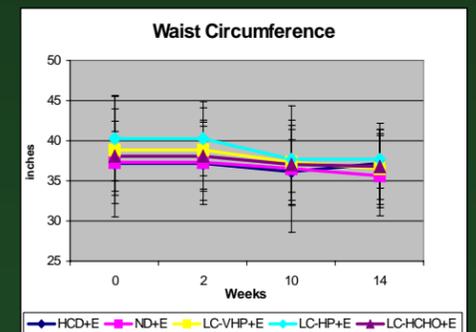
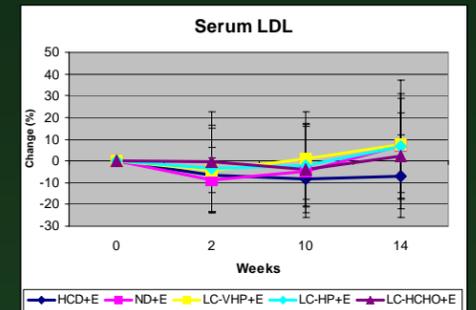
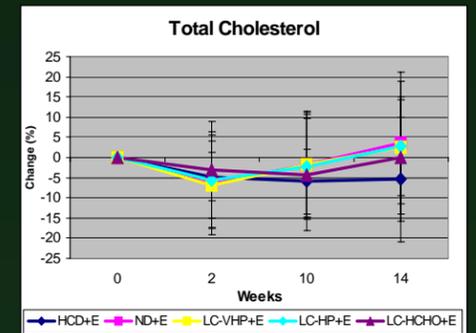
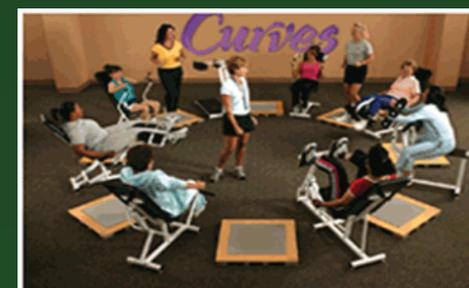
- After 10-weeks, subjects involved in dieting experienced a significantly greater loss in:
 - Total cholesterol (-5.2 \pm 12; -2.9 \pm 13; 1.5 \pm 15 %)
 - LDL-c (-3.7 \pm 20; -2.7 \pm 20; 4.8 \pm 24 %)
 - Waist circumference (-2.3 \pm 5.0; -4.2 \pm 6.0; -4.9 \pm 7.0 cm)
 - Hip Circumference (-1.7 \pm 3; -3.8 \pm 5; -3.7 \pm 5.0 cm)

Conclusions

- Results indicate that participation in the Curves program may improve some blood lipids during the diet phases and decreases hip and waist measurements without adversely affecting general markers of health status.
- Although some hematological variables decreased over time, there were no clinically significant interactions observed in a comprehensive panel of hematological markers evaluated. No clinically significant side effects or adverse events related to the study were reported.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University and Curves International, Inc. (Waco, TX).





EFFECTS OF THE CURVES® FITNESS AND WEIGHT LOSS PROGRAM V: QUALITY OF LIFE



E Nassar, L Long, R Bowden, B Lanning, A Zimmerman, J Beckham, T Magrans, A Thomas, J Wismann, M Galbreath, B Campbell, T Harvey, C Kerksick, P LaBounty, B Marcello, C Moulton, M Roberts, C Wilborn, S Ounpraseuth, P Casey, C Rasmussen, D Fogt, M Greenwood, D Willoughby, R Wilson & R Kreider. Exercise & Sport Nutrition Lab, Baylor University, P.O. Box 97313, Waco, TX 76798-7313

Abstract

111 overweight and sedentary women were assigned to an exercise & no diet group, an exercise & high calorie diet group (2,600 kcal/d), or one of three isocaloric diet groups varied on macronutrient intake. Diets consisted of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks. Subjects then ingested 2,600 kcal/d and dieted for 2-d (1,200 kcal/d) only if they gained 3 lbs during a 4-wk maintenance phase. Subjects participated in a supervised Curves fitness program 3 d/wk that involved a circuit of resistance training and callisthenic exercises. The SF-36 Quality of Life (QOL) inventory was administered at 0, 10, and 14 wks. Data were analyzed by repeated measures ANOVA and are presented as means ± SD changes from baseline for 0, 10 and 14 wks, respectively. Results revealed that physical functioning (78±21, 87±15, 87±22), bodily pain (70±24, 82±16, 78±20), general health (65±19, 71±18, 69±21), vitality (51±14, 63±12, 61±16), and mental health (70±24, 82±16, 78±20) scores significantly increased while role physical (48±42, 34±38, 39±40) and role emotional scores (40±44, 29±38, 30±40) were decreased. Social functioning scores were unchanged. No differences were observed among groups. These findings indicate that the Curves fitness and weight loss program improves markers of QOL.

Supported by Curves International, Inc. (Waco, TX)

Introduction

Health-related quality of life (HRQOL) has recently been used as an outcome measure in clinical weight loss trials with some clinical studies using this measure as the primary outcome (Kolotkin and Crosby, 2002). The present study used the SF-36 as the HRQOL outcome measure. The SF-36 is a common measure of HRQOL that covers 40 concepts related to health and was developed and used in the Medical Outcomes Survey. The SF-36 is a generic instrument which measures HRQOL by assessing eight different dimensions: physical functioning (10 items), role limitations caused by physical health problems (4 items), bodily pain (2 items), general health perceptions (6 items), energy/fatigue (4 items), social function (2 items), role limitation caused by emotional problems (3 items), and emotional well-being (5 items). The items are scored, with the higher score representing better HRQOL. Validity and reliability has been demonstrated in weight loss studies.

Obesity is a serious public health issue in the United States which can lead to problems in physical functioning, psychosocial functioning and increases in healthcare expenditures. Little research has addressed the issue of weight loss and its corresponding impact on HRQOL. Additionally, HRQOL in overweight subjects is not as well documented as disease outcomes in these individuals (Hans et al., 1998).

Experimental Design

Subjects

- 111 sedentary women participated in a 14-wk exercise and diet program
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subjects guidelines with Baylor University

Diet Protocol

- Based on baseline testing, subjects were randomly assigned to:
 - An exercise and no diet group
 - An exercise and high calorie mixed diet (2,600 kcal/d for 1 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group
 - A low calorie high carbohydrate group
 - A low calorie high protein group
 - A low calorie very high protein diet
- The diet involved consuming 1200 kcal/d for 2 wks and 1600 kcal/d for 8 wks. Subjects then ingested 2600 kcal/d for 4-wks and dieted at 1200 kcal/d for 3-days only if they gained 3 lbs of body weight.

Training Protocol

- Subjects participated in a supervised 30-min hydraulic resistance training circuit program that was interspersed with callisthenic exercises and performed 3-d per week.

Brief Methods

Participants completed the SF-36 questionnaire at 0, 10, and 14 wks of the study

Statistical Analysis

Data was analyzed using group x time repeated measures analysis of variance (ANOVA) with SPSS for Windows Version 11 software (SPSS Inc., Chicago, IL).

Results

- SF-36 showed that the following variables increased significantly:
 - Physical functioning (78±21; 87±15; 87±15) scores
 - Bodily pain (70±24; 82±16; 78±20) scores
 - General health (65±19; 71±18; 69±21) scores
 - Vitality (51±14; 63±12; 61±16) scores
 - Mental health (70±24; 82±16; 78±20) scores
- Role emotional (40±44; 29±38; 30±40) scores decreased
- Social functioning scores were unchanged
- The changes observed were not significantly correlated with changes in body weight, body composition, strength, or aerobic fitness.

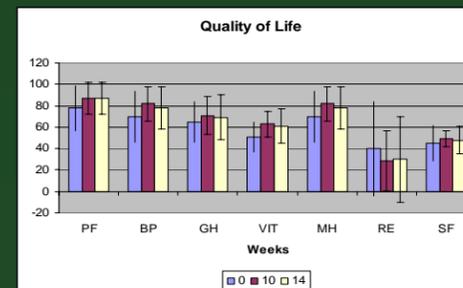
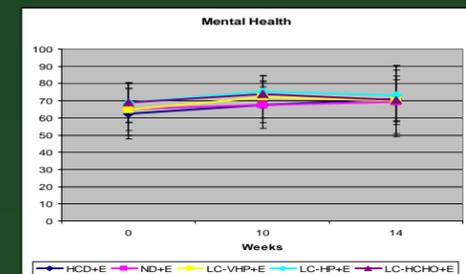
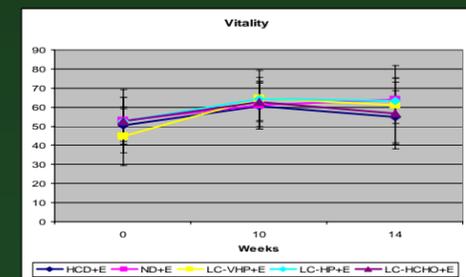
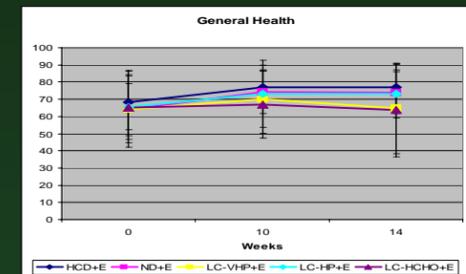
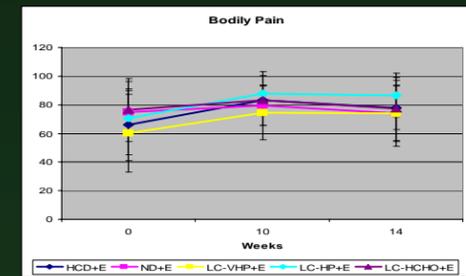
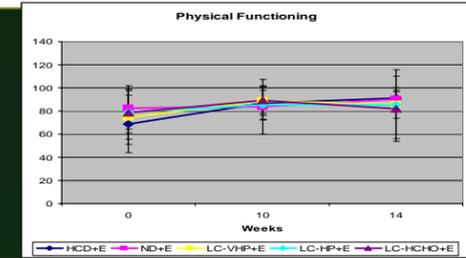
Conclusions

These findings indicate that the Curves fitness and weight loss program improves markers of QOL.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University, and Curves International Inc., Waco, TX

<http://www3.baylor.edu/HHPR/ESNL>





EFFECTS OF THE CURVES™ FITNESS AND WEIGHT LOSS PROGRAM VI: BODY IMAGE



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Abstract

111 overweight and sedentary women were assigned to an exercise & no diet group, an exercise & high calorie diet group (2,600 kcal/d), or one of three isocaloric diet groups varied on macronutrient intake. Diets consisted of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks. Subjects then ingested 2,600 kcal/d and dieted for 2-d (1,200 kcal/d) only if they gained 3 lbs during a 4-wk maintenance phase. Subjects participated in a supervised Curves fitness program 3 d/wk that involved a circuit of resistance training and callisthenic exercises. The Social Physique Anxiety (SPA) scale, a Rosenberg self-esteem scale (RSE), and a Cash Body Image Questionnaire were obtained at 0, 10, and 14 wks. Data were analyzed by repeated measures ANOVA. Data are presented as means ± SD changes for 0, 10 and 14 wks, respectively. Results from body image scores revealed that appearance evaluation (2.3±0.7; 2.7±0.8, 2.7±0.8), body area satisfaction (2.2±0.7; 2.6±0.8, 2.6±0.9), and overweight preoccupation (2.8±0.8; 3.1±0.8, 3.1±0.9) significantly increased with no differences among groups. Self-Classified-Weight scores (4.2±0.9; 4.1±0.8, 3.9±1.0) significantly decreased with no differences among groups. Appearance orientation (3.8±0.8; 3.8±0.8, 3.8±0.8), total RSE (26.8±6; 28.0±5, 27.0±7), and SPA (30.5±7; 31.4±5, 30.4±7) scores were unchanged. Results indicate that participation in the Curves fitness and weight loss program improves some aspects of body image.

Supported by Curves International, Inc. (Waco, TX)

Introduction

Body image can be defined as “an individual’s appraisal of and feelings about the body and its function” (Cornwell & Schmitt, 1990). It is a standard that influences the way people feel about themselves, the activities they engage in, and their perception about the future (O’Brien, 1980). While body image can affect people in daily life, it is not static—it changes as a result of age, behavioral experiences, physical appearance, societal norms and the reactions of other people (Pruzinsky & Cash, 1990; O’Brien, 1980). Social physique anxiety (SPA), closely associated with body image, has been identified as the anxiety individuals experience in response to others’ evaluation of their physique (Hart, Leary, & Rejeski, 1989). Both body image perception and SPA have been shown to be associated with self-esteem in some populations.

With the rise of obesity in the United States, many individuals are facing issues related to body image and choosing to engage in weight loss programs in order to reduce body size. The Curves Program for Women is one such program designed to promote health and fitness through weight loss. Although the program has been based on sound scientific rationale, the effects on psychological constructs in women have not been studied. The purpose of this study was to evaluate the effects of the Curves program on body image, social physique anxiety and self-esteem in women.

Experimental Design

Subjects

- 111 sedentary women participated in a 14-wk exercise and diet program
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subjects guidelines with Baylor University

Diet Protocol

- Based on baseline testing, subjects were randomly assigned to:
 - An exercise and no diet group
 - An exercise and high calorie mixed diet (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40 % C, 30% P, 30% F; 4 wks at 55%C, 15% P, 30% F) group
 - A low calorie high carbohydrate group
 - A low calorie high protein group
 - A low calorie very high protein diet
- The diet involved consuming 1200 kcal/d for 2 wks and 1600 kcal/d for 8 wks. Subjects then ingested 2600 kcal/d and 1200 kcal/d at 3/2, 3/2, 5/2, & 10/0 day intervals in an attempt to maintain weight loss and resting energy expenditure (REE)

Training Protocol

- Subjects participated in a supervised 30-min hydraulic resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week.

Brief Methods

Participants completed three questionnaires: the Cash Multidimensional Body-Self Relations Questionnaire (MBSRQ-AS), the Social Physique Anxiety Scale (SPAS) and the Rosenberg Self-Esteem Scale (RSES) week 0, 10 14 of the program.

Statistical Analysis

Data were analyzed by repeated measures ANOVA and Pearson product correlation analysis using the SPSS statistical program. Data are presented as means ± SD changes from baseline for 10 and 14 wks, respectively.

Results

- The MBSRQ-AS is divided into five subscales: appearance evaluation (AE), appearance orientation (AO), body area satisfaction (BAS), overweight preoccupation (OP), and self-classified weight (SCW).
- The following variables significantly improved:
 - AE (2.3±0.7; 2.7±0.8; 2.7±0.8)
 - BAS (2.2±0.7; 2.6±0.8; 2.6±0.9)
 - OP (2.8±0.8; 3.1±0.8; 3.1±0.9)
- Changes in fat weight positively correlated with SCW
- Changes in fat negatively correlated with BAS
- Changes in percent body fat positively correlated with SPA and SCW
- Changes in percent body fat negatively correlating with AE and BAS
- AO, RSE, Self-Classified-Weight (SCW), and SPA scores were unchanged.

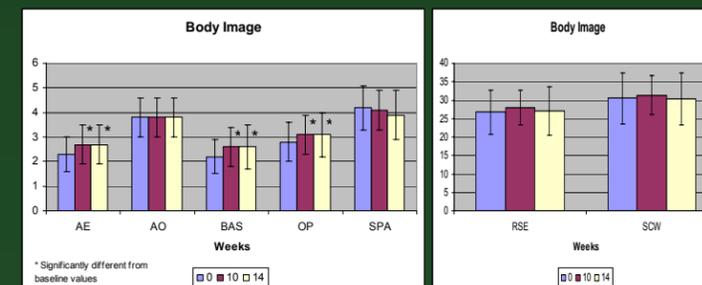
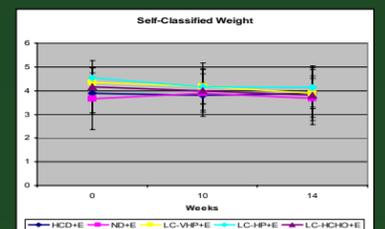
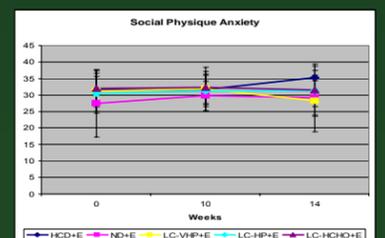
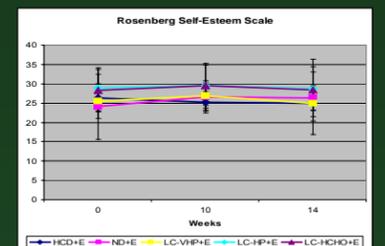
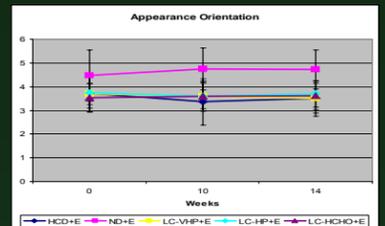
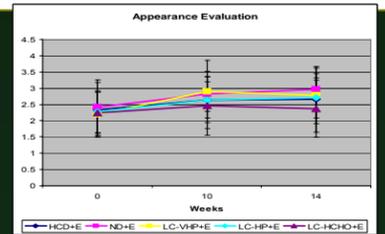
Conclusions

- The findings from this study indicate that the Curves health and fitness program has a positive effect on appearance evaluation (feelings of physical attractiveness), body area satisfaction (satisfaction with discrete aspects of one’s appearance) and overweight preoccupation (weight vigilance, dieting) of women who participate in the program.
- Further studies should be conducted to examine the reasons for lack of significant changes in SPA and self-esteem.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University, and Curves International Inc., Waco, TX

<http://www3.baylor.edu/HHPR/ESNL>



Effects of the Curves fitness & weight loss program: Relationship of Changes in Energy Expenditure to Thyroid Status

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Abstract

Thyroid hormones and REE have been suggested to play a role in obesity. This study examined whether weight loss induced by diet and/or exercise influences thyroid hormones levels and REE. 156 overweight and sedentary women were assigned to a control group (C), an exercise & no diet group (E+ND); an exercise & high calorie diet (HCD) group (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F); or, a low calorie high carbohydrate (HCHO), high protein (HP), or very high protein (VHP) diet. Diets consisted of 1,200 kcal/d for 2-wks and 1,600 kcal/d for 8 wks and contained 30% fat, 40-55% CHO on the HCD and HCHO diets and 50-63% P on the HP and VHP diets. During the maintenance phase, subjects ingested 2,600 kcal/d and 1,200 kcal/d diets at 3/2, 3/2, 5/2, & 10/2 day intervals. Fasting blood samples and REE measurements were obtained at 0, 10, and 14 weeks. Data were analyzed by repeated measures ANOVA and are presented as means \pm SD changes from baseline for the C, E+ND, HCD, HCHO, HP and VHP groups, respectively. Exercise and dietary interventions increased REE (0.1 \pm 3.1; 0.9 \pm 1.2; 4.1 \pm 2.3; 1.5 \pm 2.6; 1.4 \pm 3.0; 0.4 \pm 2.3 kcal/kg/d mean 1.2 \pm 2.7) with the greatest gain observed in the HCD group. REE further increased during the maintenance phase (-0.1 \pm 1.1; 1.1 \pm 2.0; 4.8 \pm 3.1; 2.0 \pm 2.6; 2.1 \pm 5.5; 1.1 \pm 2.3 kcal/d/kg; mean 1.8 \pm 3.5). Although some trends were observed, no significant differences were seen in thyroxine, thyronine uptake, free thyroxine index, or TSH. Additionally, changes in REE did not correlate with thyroid makers. Results indicate that the increases in REE observed were independent from alterations in thyroid levels.

Supported in part by Curves International, Inc., Waco, TX

Rationale

The Curves International fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and muscle mass. Thyroid hormones and REE have been suggested to play a role in obesity. This study examined whether weight loss induced by the Curves diet and exercise program influences thyroid hormone levels and REE in sedentary overweight females.

Experimental Design

Subjects

- 156 sedentary women participated in a 14-wk exercise and diet program.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subject guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were randomly assigned to:
 - an exercise and no diet group (ND+E);
 - an exercise and high calorie mixed diet (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group (HCD+E+E);
 - a low calorie high carbohydrate group (LC-HCHO+E);
 - a low calorie high protein (LC-HP+E); or,
 - a low calorie very high protein (LC-VHP+E) diet.
- The diets involved consuming 1,200 kcal/d for 2-wks and 1,600 kcal/d for 8 wks. Subjects then ingested 2,600 kcal/d and 1,200 kcal diet at 3/2, 3/2, 5/2, & 10/0 day intervals in an attempt to maintain weight loss and REE.
- Diets were standardized with 30% dietary fat with carbohydrate intake ranging from 40-55% on the HCD+E+E and LC-HCHO+E diets and protein intake ranging from 50-63% on the LC-HP+E and LC-VHP+E.

Training Protocol

- Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week.

Methods & Procedures

- At 0, 2, 10, 10.4, and 14-weeks, subjects donated fasting blood samples.
- Plasma samples were analyzed for T4, TU, and TSH via a Dade Dimension RXL clinical chemistry analyzer at Baylor University in the Exercise Biochemistry and Nutrition Laboratory.

Statistical Analysis

Data were analyzed by repeated measures ANOVA and Pearson correlation analysis using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means \pm SD from baseline for each group.

Results

- Exercise and dietary interventions increased REE (0.1 \pm 3.1; 0.9 \pm 1.2; 4.1 \pm 2.3; 1.5 \pm 2.6; 1.4 \pm 3.0; 0.4 \pm 2.3 kcal/kg/d mean 1.2 \pm 2.7) with the greatest gain observed in the HCD group.
- REE further increased during the maintenance phase (-0.1 \pm 1.1; 1.1 \pm 2.0; 4.8 \pm 3.1; 2.0 \pm 2.6; 2.1 \pm 5.5; 1.1 \pm 2.3 kcal/d/kg; mean 1.8 \pm 3.5).

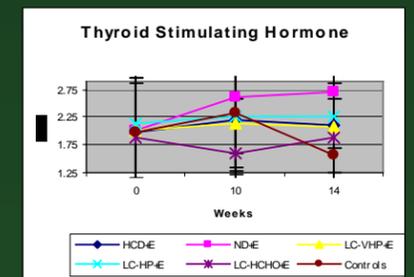
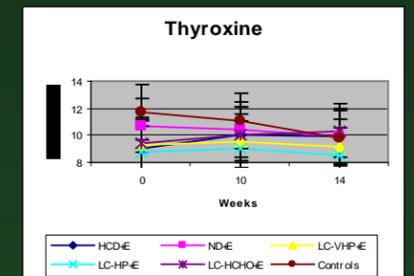
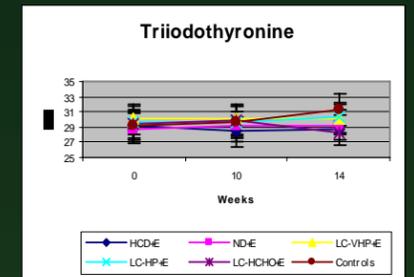
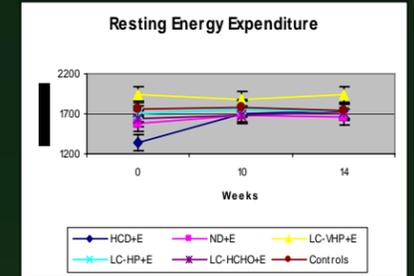
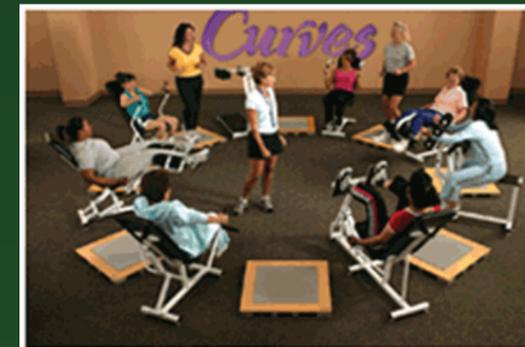
Conclusions

Although some trends were observed, no significant differences were seen in thyroxine, thyronine uptake, free thyroxine index, or TSH. Additionally, changes in REE did not correlate with thyroid makers. Results indicate that the increases in REE observed were independent from alterations in thyroid levels.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University and Curves International Inc., Waco, TX

www3.baylor.edu/HHPR/ESNL





LONG-TERM EFFECTS OF THE CURVES™ FITNESS AND WEIGHT LOSS PROGRAM: BODY COMPOSITION AND RESTING ENERGY EXPENDITURE



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Abstract

PURPOSE: The Curves fitness and diet program has become very popular among adult women with over 2 million women currently participating in the program. However, the efficacy of this program has yet to be examined. This study examined the long-term effects of the Curves fitness and diet program on body composition and resting energy expenditure. **METHODS:** 33 overweight and sedentary women (41.64±6.9 yr; 89.64±19.51 kg; 163.37±7.03 cm; 43.50±4.17 % body fat) participated in an initial 14-wk exercise and diet program. Based on baseline testing, subjects were randomly assigned to an exercise and no diet group (ND+E); an exercise and high calorie mixed diet (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group (HCD+E); or, a low calorie high carbohydrate (LC-HCHO+E), high protein (LC-HP+E), or very high protein (LC-VHP+E) diet. The diets involved consuming 1,200 kcal/d for 2-wks and 1,600 kcal/d for 8 wks. Subjects then ingested 2,600 kcal/d and 1,200 kcal/d diet at 3/2, 3/2, 5/2, & 10/0 day intervals in an attempt to maintain weight loss and REE. Diets were standardized with 30% dietary fat with carbohydrate intake ranging from 40-55% on the HCD+E and LC-HCHO+E diets and protein intake ranging from 50-63% on the LC-HP+E and LC-VHP+E diets. Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week. Subjects were also questioned about side effects on a weekly basis. DEXA body composition and REE measurements were obtained at 0, 10, and 14 wks. After the study, subjects were encouraged to continue training for 1-year and diet for 2-days (1,200 kcal/d) once a month if necessary. Data were collected at 3, 6, 9, and 12 m after completion of the initial study. Data were analyzed by repeated measures ANOVA and are presented as means ± SD from baseline at 10w, 14w, 3m, 6m, 9m, and 12m, respectively. **RESULTS:** Subjects successfully maintained their weight loss (-5.0±4; -5.6±5; -6.1±6; -4.6±6; -4.6±6; -3.4±6 kg), fat loss (-3.5±3; -3.8±4; -4.4±5; -3.6±5; -2.8±5; -2.1±5 kg), and elevated REE (0.8±2; 1.5±3; 0.3±3; 0.3±3; 0.3±3; -1.6±3 kcal/kg/d) until the last 3m of the follow-up period as adherence to exercise declined. Changes in REE were negatively correlated with fat loss. **CONCLUSIONS:** Results indicate that subjects can maintain weight loss as long as they maintain a consistent training program and elevations in REE are an important component to maintain weight loss.

Supported in part by Curves International, Inc., Waco, TX

Rationale

The Curves International fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and muscle mass/ton. Although the program has been based on sound scientific rationale, the effects of women

following this program have not been studied in detail. The purpose of this study is to examine the long-term effects of the Curves fitness and weight loss program on body composition and resting energy expenditure in sedentary overweight females.

Experimental Design

Subjects

- 33 overweight and sedentary women (41.64±6.9 yr; 89.64±19.51 kg; 163.37±7.03 cm; 43.50±4.17 % body fat) participated in this study.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subject guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were randomly assigned to:
 - an exercise and no diet group (ND+E);
 - an exercise and high calorie mixed diet (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group (HCD+E);
 - a low calorie high carbohydrate diet group (LC-HCHO+E);
 - a low calorie high protein diet group (LC-HP+E); or,
 - a low calorie very high protein (LC-VHP+E) diet group.
- The diets involved consuming 1,200 kcal/d for 2-wks and 1,600 kcal/d for 8 wks. Subjects then ingested 2,600 kcal/d and 1,200 kcal diet at 3/2, 3/2, 5/2, & 10/0 day intervals in an attempt to maintain weight loss and REE.
- Diets were standardized with 30% dietary fat with carbohydrate intake ranging from 40-55% on the HCD+E and LC-HCHO+E diets and protein intake ranging from 50-63% on the LC-HP+E and LC-VHP+E.
- After the initial study, subjects were encouraged to diet for 2-days (1,200 kcal/d) once a month if necessary.

Training Protocol

- Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week.
- After the initial study, subjects were encouraged to continue training for 1-year.

Methods & Procedures

- DEXA body composition and REE measurements were obtained at 0, 10, and 14 wks.
- Subjects reported any side effects associated with participating in the study to a research nurse on a weekly basis.

Statistical Analysis

- Data was analyzed by repeated measures ANOVA using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means ± SD from baseline at 10w, 14w, 3m, 6m, 9m, and 12m, respectively.

Results

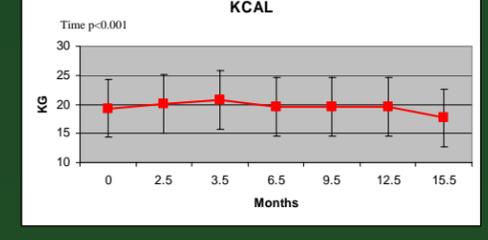
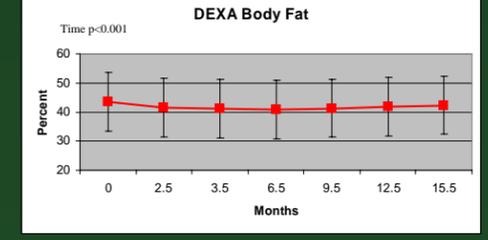
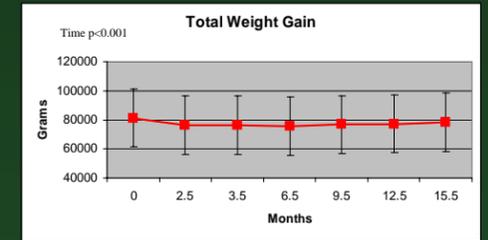
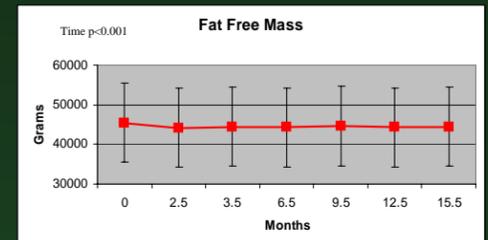
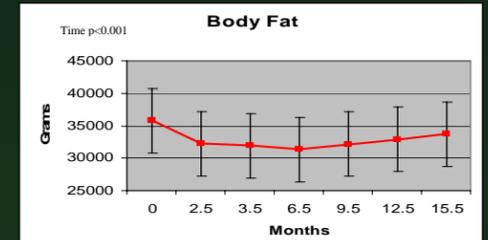
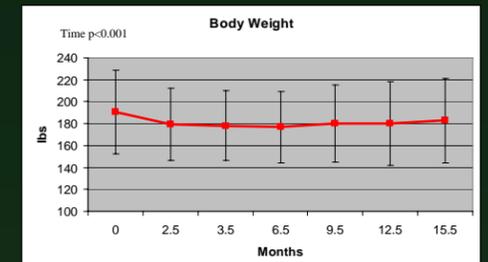
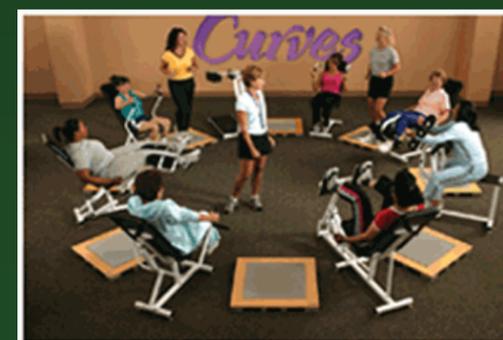
- Subjects successfully maintained their weight loss (-5.0±4; -5.6±5; -6.1±6; -4.6±6; -4.6±6; -3.4±6 kg).
- Subjects successfully maintained their fat loss (-3.5±3; -3.8±4; -4.4±5; -3.6±5; -2.8±5; -2.1±5 kg).
- Subjects elevated REE (0.8±2; 1.5±3; 0.3±3; 0.3±3; 0.3±3; -1.6±3 kcal/kg/d) until the last 3m of the follow-up period as adherence to exercise declined.
- Changes in REE were negatively correlated with fat loss.
- No clinically significant side effects or adverse events were reported in weekly follow-up assessments.

Conclusions

- Results indicate that subjects can maintain weight loss as long as they maintain a consistent training program.
- Elevations in REE are an important component to maintain weight loss.

Funding

Supported by the Exercise & Sport Nutrition Laboratory, Baylor University and Curves International Inc., Waco, TX
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Long-Term Effects of the Curves Fitness & Weight Loss Program: Training Adaptations



C. Wilborn, T Harvey, P LaBounty, B Marcello, B Campbell, A Thomas, J Wismann, C. Moulton, M. Roberts, D Rohle, L. Taylor, A. Vacanti, J Beckham, M Galbreath, D Fogt, C Kerksick, T Magrans, S Ounpraseuth, P Casey, C Rasmussen, M. Greenwood, R Wilson & R Kreider (Sponsor: D Willoughby).
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Abstract

33 overweight and sedentary women were assigned to an exercise & no diet group (E+ND); an exercise & high calorie diet (HCD) group (2,600 kcals/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F); or, a low calorie high carbohydrate (HCHO), high protein (HP), or very high protein (VHP) diet. Diets consisted of 1,200 kcal/d for 2-wks and 1,600 kcal/d for 8 wks containing 30% fat, 40-55% CHO on the HCD and HCHO diets and 50-63% P on the HP and VHP diets. During the maintenance phase, subjects ingested 2,600 kcal/d and 1,200 kcal/d diets at 3/2, 3/2, 5/2, & 10/2 day intervals. Strength and aerobic capacity tests were obtained at 0, 10, and 14 w. After the study, subjects were encouraged to continue training for 1-year with data were collected at 3, 6, 9, and 12 m. Data were analyzed by repeated measures ANOVA and are presented as means ± SD changes from baseline at 10w, 14w, 3m, 6m, 9m and 12m, respectively. Subjects maintained improvements in upper body 1RM strength (6±11; 8±11; 12±15; 12±16; 10±16; 11±17 %), lower body 1RM strength (8±13; 11±18; 11±21; 15±35; 10±28; 11±22 %), and peak aerobic capacity (12±14; 4±16; 12±15; 15±15; 10±19; 10±16 %) while observing increases in upper (14±57; 27±61; 34±80; 39±69; 53±70; 48±77 %) and lower body (33±85; 44±91; 17±82; 55±98; 42±121; 57±86 %) muscle endurance. Results indicate that long-term participating in the Curves program promotes favorable training adaptations.

Supported by Curves International, Inc. (Waco, TX)

Rationale

The Curves fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and fitness. Research has clearly identified that the Curves International fitness and diet program followed for 14 weeks significantly increases fitness and strength variables. However currently there is no research on the effects of long term adherence to the Curves program with no diet restriction. The purpose of this study is to examine the effects of Curves International fitness and diet program on long term (1 year) maintenance of muscular strength, muscular endurance, and aerobic capacity.

Experimental Design

Subjects

- 33 sedentary women (42±7 yrs; 64±3 in; 197±43 lbs; 44 ± 4 bf%) participated in a 1 year extension to a 14-wk exercise and diet program.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subject's guidelines of Baylor University.

Diet Protocol

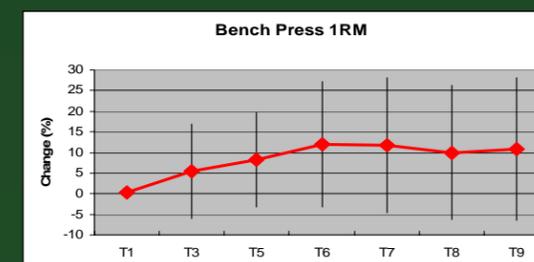
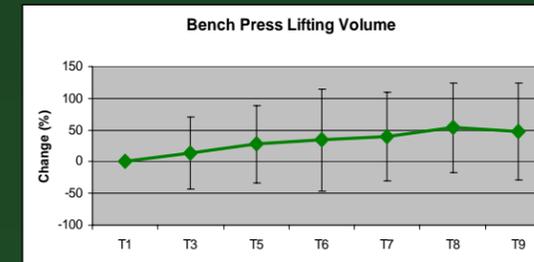
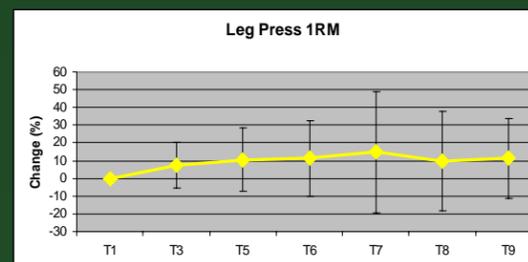
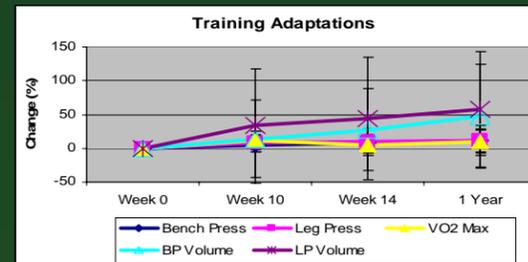
- Subjects were not assigned to a diet group in the extension phase of the study. However subjects were required to keep a 4-day dietary recall prior to each testing session.

Training

- Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week. Exercises include: chest press, shoulder press, leg press, squat, hamstring press, oblique twist, abdominal crunch, bicep curl, and tricep press down.

Methods & Procedures

- 1RM bench press, 1RM leg press, BP lifting volume, LP lifting volume, and VO_{2max}, were obtained at 3 months, 6 months, 9 months, and 12 months after completion of their original 14 weeks of study.



Statistical Analysis

- Data were analyzed by repeated measures ANOVA analysis using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means ± SD from baseline for each diet group.

Results

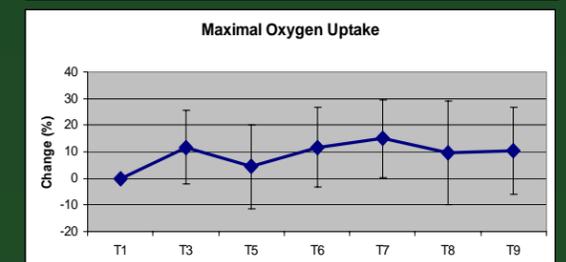
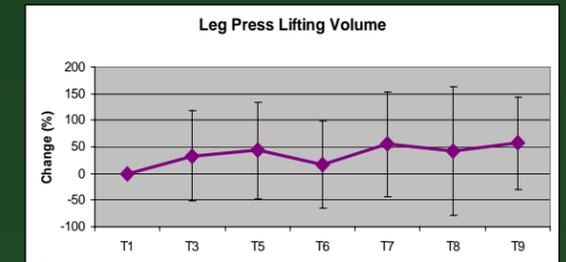
- Subjects maintained improvements in upper body 1RM strength (6±11; 8±11; 12±15; 12±16; 10±16; 11±17 %), lower body 1RM strength (8±13; 11±18; 11±21; 15±35; 10±28; 11±22 %), and peak aerobic capacity (12±14; 4±16; 12±15; 15±15; 10±19; 10±16 %).
- Subjects increased in upper (14±57; 27±61; 34±80; 39±69; 53±70; 48±77 %) and lower body (33±85; 44±91; 17±82; 55±98; 42±121; 57±86 %) muscle endurance.

Conclusions

- The Curves fitness and weight loss program appears to increase muscular strength, muscular endurance, and aerobic capacity in this population of subjects.
- Long Term participation in the Curves fitness and weight loss program appears to maintain and/or increase favorable training adaptations.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University and Curves International, Inc.





LONG-TERM EFFECTS OF THE CURVES™ FITNESS AND WEIGHT LOSS PROGRAM : HEALTH OUTCOMES



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Abstract

33 overweight and sedentary women were assigned to an exercise & no diet group (E+ND); an exercise & high calorie diet (HCD) group (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F); or, a low calorie high carbohydrate (HCHO), high protein (HP), or very high protein (VHP) diet. Diets consisted of 1,200 kcal/d for 2-wks and 1,600 kcal/d for 8 wks containing 30% fat, 40-55% CHO on the HCD and HCHO diets and 50-63% P on the HP and VHP diets. During the maintenance phase, subjects ingested 2,600 kcal/d and 1,200 kcal/d diets at 3/2, 3/2, 5/2, & 10/2 day intervals. Fasting blood and resting HR and BP were obtained at 0, 10, and 14 wks. After the study, subjects were encouraged to continue training for 1-year with data were collected at 3, 6, 9, and 12 m. A comprehensive panel of blood health markers was analyzed by repeated measures ANOVA. Results revealed significant reductions in RHR with no differences observed in resting SBP, DBP, or MAP. HDL levels significantly increased, TG's tended to decrease, with no differences seen in total CHL or LDL. No differences were seen in muscle or liver enzymes, BUN, or uric acid. Favorable changes were seen in a number of red and white cell markers. Remaining variables were either not significantly affected or had clinically insignificant changes over time. No clinically significant side effects or adverse events related to the study were reported. Results indicate that long-term participation in the Curves program promotes favorable changes in a number of markers of health and does not adversely affect health status.

Supported in part by Curves International Inc. Waco, TX

Rationale

The Curves International fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit training program and a weight management program involving periods of moderate caloric restriction (1,200 to 1,600 calories per day) followed by short periods of higher caloric intake (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing strength and muscle mass/tonne. Although the program has been based on sound scientific rationale, the effects of women following this program have not been studied in detail. The purpose of this follow-up study is to examine the effects of several modifications in the Curves International fitness program to see if they promote additional benefits on weight loss, body composition, metabolism, general markers of health, and exercise capacity in sedentary overweight females.

Experimental Design

Subjects

- 33 overweight and sedentary women (41.6±7 yr; 89.6±20 kg; 163.3±7 cm; 43.5±4.2 % body fat) participated in this study.
- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subject guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were assigned to:
 - an exercise and no diet group (E+ND);
 - an exercise and high calorie mixed diet (2,600 kcal/d for 2 wks at 55% C, 15% P, 30% F; 8 wks at 40% C, 30% P, 30% F; 4 wks at 55% C, 15% P, 30% F) group (HCD);
 - a low calorie high carbohydrate group (HCHO);
 - a low calorie high protein (HP); or,
 - a low calorie very high protein (VHP) diet.
- The diets involved consuming 1,200 kcals/d for 2-wks and 1,600 kcals/d for 8 wks. Subjects then ingested 2,600 kcal/d and 1,200 kcal diet at 3/2, 3/2, 5/2, & 10/0 day intervals in an attempt to maintain weight loss and REE.
- Diets were standardized with 30% dietary fat with carbohydrate intake ranging from 40-55% on the HCD and HCHO diets and protein intake ranging from 50-63% on the HP and VHP.
- Subjects were required to maintain the diet for only the first 14 weeks of the study.

Training Protocol

- Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week for the entire duration of the study.

Methods & Procedures

- At 0, 10, 14, 26, 38, 50, and 62 weeks, subjects donated fasting blood samples as well as had waist and hip measurements determined.
- Subjects reported any side effects associated with participating in the study to a research nurse on a weekly basis.
- Hematological variables were assayed by Quest Diagnostics, Inc. (Dallas, TX) for a comprehensive panel of biochemical markers and the ratio of waist to hip measurements was calculated to assess general markers of clinical health status.

Statistical Analysis

- Data was analyzed by repeated measures ANOVA using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means ± SD from baseline for each diet group at week 10, 14, 26, 38, 50, and 62 of the study, respectively.

Results

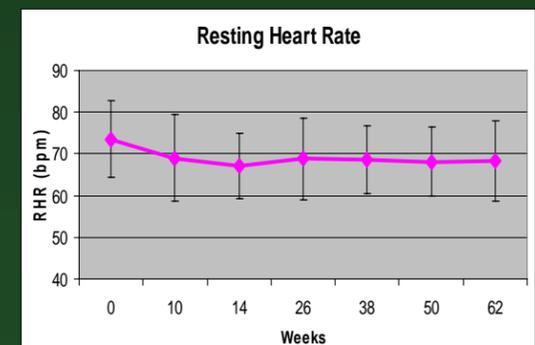
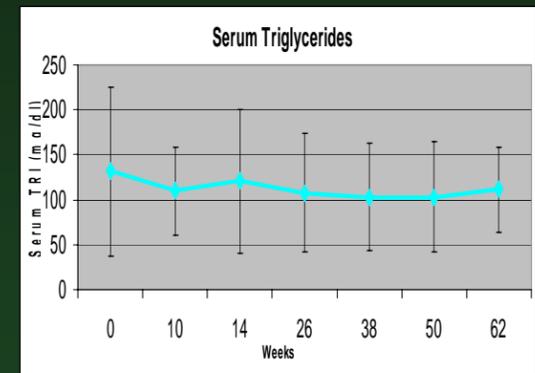
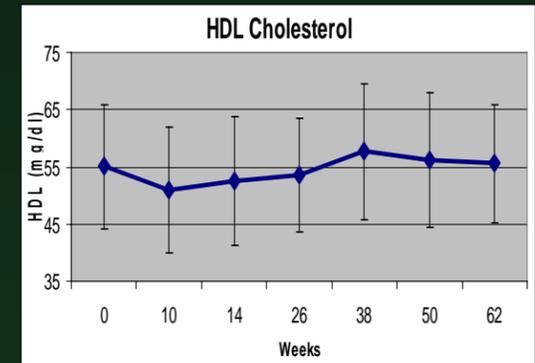
- HDL levels (55.0±10.9; 50.9±11; 52.5±11.3; 53.5±9.9; 57.6±11.8; 53.2±11.8; 55.6±10.3 mg/dl) significantly increased during the study.
- Serum triglyceride values (131.2±93; 109.5±49; 120.7±80; 107.9±65; 107.9±60; 103.1±62; 111.5±47 mg/dl) tended to decrease over the course of the study.
- The subjects experienced a significant reduction in resting heart rate (73.8±9.1; 69.0±10.4; 67.0±7.8; 68.8±9.9; 68.6±8.1; 68.3±9.7) with no differences observed in resting SBP, DBP, or MAP.
- No differences were seen in muscle or liver enzymes, BUN, or uric acid.
- Favorable changes were seen in a number of red and white cell markers.
- No clinically significant side effects or adverse events related to the study were reported.

Conclusions

- The long-term participation in the Curves fitness and weight loss program promotes favorable changes in a number of markers of health.
- Participation in this program does not appear to adversely affect general markers of clinical health status.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University and Curves International Inc., Waco, TX
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Prediction of Resting Energy Expenditure in Sedentary, Moderately Overweight, Healthy Females



C. Kerksick, A Thomas, B Campbell, C Wilborn, M Roberts, P LaBounty, L Taylor, T Magrans, S Ounpraseuth, P Casey, C Rasmussen, M Greenwood & R Kreider (Sponsor: D Willoughby)
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Abstract

To assess the efficacy of predicting resting energy expenditure (REE), 561 sedentary, moderately overweight, healthy women (39.3±9.8 y, 163.8±6.6 cm, 93.1±17.7 kg, 34.7±6.1 BMI kg/m²) completed baseline testing prior to beginning a 14-week controlled diet and exercise program. Baseline testing was completed prior to 9:00 am after a 10 h fast and included determination of height, weight, REE by indirect calorimetry and body composition using DEXA technology. A large sub-sample of participants (n=496) was randomly selected to develop a prediction equation: REE = 773.190 - (3.747*Age [y]) + (2.902*Height [cm]) + (4.145*Weight [kg]) that was significantly correlated with REE (r=0.625, p<0.001) and allowed accurate prediction of REE (SEE= ±13% or 190 kcals/day). The remaining 65 participants served as a cross-validation sample that produced a significant correlation of 0.578 (p<0.000) and a non-significant difference (t=0.276, p=0.783) between their predicted and actual REE. In the cross-validation sample, 63% of selected samples were able to have REE predicted within 175 kcals/day. In conclusion, it appears that REE can be accurately predicted from age, height and weight in a large sample of previously sedentary, moderately overweight, healthy females.

Supported in part by Curves International, Inc. (Waco, TX).

Rationale

At the current time, rates of weight gain and obesity are increasing throughout our society. Middle-aged sedentary women is a population, in addition to many others, that has been shown to experience increases in body mass, especially body fat. Many factors are present which influence changes in weight or body composition. An accurate assessment of energy expenditure is one of the most important components of any weight loss program. While many methods such as doubly-labeled water and indirect calorimetry are the preferred methods for research purposes to assess energy expenditure, their practicality is limited due to associated costs and expertise required. As a result, substantial interest is present in being able to predict energy expenditure using equations developed through regression analysis. While many equations have been published in the literature using younger, older and diseased female populations, few equations have been completed using a large cohort of sedentary, moderately overweight but healthy females. The purpose of this study was to develop a practical regression equation that could accurately predict energy expenditure in sedentary, moderately overweight, healthy women.

Experimental Design

Subjects

- 561 sedentary and moderately overweight females (39.3±9.8 y, 163.8±6.6 cm, 93.1±17.7 kg, 34.7±6.1 BMI kg/m²) completed baseline testing.
- Subjects were classified as low risk using ACSM risk stratification criteria.
- All subjects were informed as to the experimental procedures and signed informed consent statements in adherence with the human subjects' guidelines of Baylor University.

Baseline Testing

- All subjects completed all testing after observing a 10h fast.
- Following standard guidelines, all subjects completed testing prior to 9:00 am to ensure an accurate estimation of resting energy expenditure.

Methods & Procedures

- Height and weight were determined using standard procedures.
- REE was determined using indirect calorimetry after observing a 10 h fast prior to 9:00am to control for normal fluctuation in resting metabolic level.
- Lean and fat-free mass were determined using a Hologic QDR-4500W DEXA.

Statistical Analysis

- Stepwise multivariate regression analysis was used to develop a prediction equation of resting energy expenditure.
- The follow variables (age, height, weight, DEXA lean mass, DEXA FFM) were chosen a priori to determine which variables would most accurately predict energy expenditure.
- All regression analysis was completed using SPSS for Windows 11.5 software (Chicago, IL).

Results

- Predicted REE was highly correlated with measured REE in both the random sample (r=0.625, p<0.01) and cross-validation sample.
- Paired sample t-test revealed no significant difference between predicted REE and actual REE (t= -0.104, p=0.917, r=0.915, p<0.001).
- Paired sample t-tests comparing the predicted REE of the random sample to the cross-validation sample revealed no differences (t=-0.014, P=0.917).
- Paired sample t-tests between predicted REE and the commonly used Harris-Benedict predicted REE with the random sample (t= -0.815, p>0.05).

Conclusions

- Prediction of energy expenditure can be completed accurately (±190 kcals) in a large population of sedentary, overweight females using standard anthropometric measures using the following formula:
REE = 773.190 - (3.747*Age [y]) + (2.902*Height [cm]) + (4.145*Weight [kg])
R² = 0.314, p<0.001 (±190 kcals)
- An alternative prediction formula is provided below that incorporated DEXA lean mass. However, the primary focus of this research was to develop an equation that utilized highly practical forms of assessment:
REE = 502.944 + 25.256*DEXALM [kg]
R² = 0.419, p<0.001 (±58 kcals)
- Cross-validation and paired t-tests ensured robustness of the formula and accuracy in its determination.

Funding

Supported by the Exercise & Sports Nutrition Laboratory, Baylor University and Curves International, Inc. (Waco, TX).

