IMPACT OF INCREASED ENERGY INTAKE AFTER ACUTE HYPO-ENERGETIC DIETING ON MARKERS OF ENERGY BALANCE, SATIETY AND FUEL UTILIZATION IN OBESE FEMALES

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Abstract

The consumption of diets with increasing caloric intakes after acute hypo-energetic dieting on serum weight management markers were examined. Sedentary, obese women (n=122) for 7d consumed either their normal diet (CON, n=14), a higher carbohydrate (%CHO: PRO: FAT= 46: 24: 30; n=52) or higher protein (%CHO: PRO: FAT= 24: 46: 30; n=56) hypocaloric (HYPO) diet (1,000 kcal•d^{-1}). Subjects then consumed for 7d either 1,600 (n=27), 2,100 (n=26), 2,600 (n=30), or 3,100 (n=25) kcal•d^{-1} consisting of (%CHO: PRO: FAT= 55: 15: 30) while CON maintained their normal diet. After 7 and 14d of dieting, participants provided fasting blood samples for determination of body mass, serum insulin, leptin, adiponectin and ghrelin levels. Data were analyzed by Pearson correlations and repeated measures ANOVA using an alpha level of 0.05. Adiponectin levels did not change ($p<0.05$) and no changes were reported relative to macronutrient intake through the first week of dieting. Significant but equal weight loss occurred in both HYPO groups, while leptin increased and insulin decreased in all groups. Ghrelin and leptin levels increased in all groups after increasing caloric intake. A significant interaction effect was found for leptin, with the 3,100 calories and CON group reporting higher levels of leptin in comparison to all other diet groups. Ghrelin in all groups was greater after dieting in comparison to baseline. Leptin was correlated to changes in body mass ($r=0.409$; $p<0.01$) and insulin ($r=0.369$;$p<0.01$). Initial HYPO dieting decreased body mass, insulin and leptin levels while adiponectin was unchanged. Increased caloric intake increased leptin levels in conjunction with caloric intake.

Supported by Curves International, Waco, TX

Rationale

Previous research suggests that sharp decreases in energy delivery reduces resting energy expenditure (REE) while also decreasing body mass, which consists primarily of lean tissue and body water. Circulating concentrations of leptin, adiponectin and ghrelin have been linked to changes in energy status as well as regulation of appetite. It is unclear, however, if differing proportions of energy and macronutrients alter the changes in body mass and circulating concentrations of these hormones. Such changes may help to sustain weight loss in overweight and obese populations.

Experimental Design

Subjects

- 122 sedentary, obese women completed all testing.
- Subjects were descriptively described as 42±11 yrs, 164±7 cm, 97.6±18.2 kg, 45.6±4.8%, 36.4±6.3 kg•m^{-2}.
- Subjects signed informed consent statements in compliance with IRB guidelines of Baylor University and the American College of Sports Medicine.
- All subjects were free of disease and not currently taking any prescription medications or nutritional supplements that would confound their metabolic response.

Diet Protocol

- Subjects were randomized for the first 7d to consume either a normal diet (control, n=14), a higher carbohydrate (46% CHO, 24% PRO, 30% FAT: n=52) or higher protein (46% PRO, 24% CHO, 30% FAT: n=56) hypo-caloric diet (1,000 kcal•d^{-1}).
- On days 8-14, subjects were randomized to consume either 1,600 (n=27), 2,100 (n=26), 2,600 (n=30), or 3,100 (n=25) kcal•d^{-1} consisting of (%CHO: PRO: FAT= 55: 15: 30) while CON maintained their normal diet.
- Subjects were given prescribed diets developed by a registered dietician in order to provide the desired macronutrient and caloric intakes.
- Compliance was monitored by daily interviews with all research participants and calculation of all energy and macronutrients consumed.

Baseline Testing

- After 7 and 14 days of dieting, participants were weighed and provided blood samples for determination of serum insulin, leptin, adiponectin and ghrelin.
- All testing sessions were completed in a fasted state at the exact time each morning of testing.

Methods & Procedures

- Body mass was determined using a self-calibrating digital scale (±0.05 kg).
- Serum concentrations of insulin, leptin, adiponectin and ghrelin were determined using ELISA techniques with intra-class correlations of 0.825, 0.777, 0.833, 0.979, respectively.

Statistical Analysis

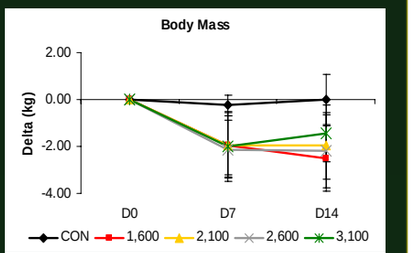
- A 3 x 3 (Group x Testing Session) repeated measures ANOVA was used to analyze all data.
- LSD post-hoc procedures were used for any significant interaction ($p<0.05$) to determine differences.
- SPSS for Windows version 11.5 (SPSS Inc., Chicago, IL) statistical package with an alpha-level of 0.05 was used for all statistical analysis.
- Data are presented as means ± SD and presented as delta values (post – pre values) from baseline for both hypocaloric (HYPO) diet groups and the non-dieting control group (CON).

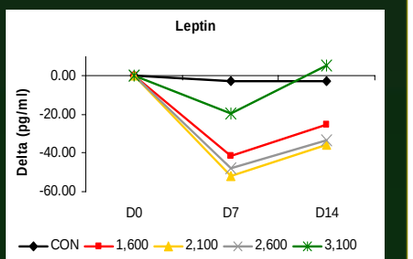
Results

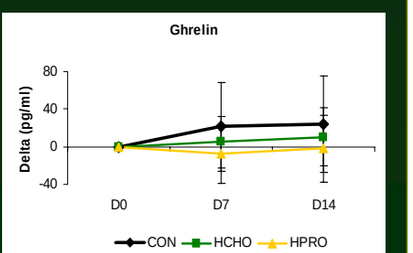
- Macronutrient intake during hypo-energetic dieting had no impact over changes in all measured variables.
- Adiponectin levels were independent ($p>0.05$) of either intervention period within this study.
- Significant weight loss occurred, but was not dependent on macronutrient intake during HYPO dieting, while leptin increased and insulin decreased in all groups.
- Ghrelin and leptin levels increased in a similar manner in all groups after increasing caloric intake.
- An interactive effect for leptin revealed those individuals in the 3,100 calorie diet and the CON group had higher levels of leptin in comparison to all other groups.
- In comparison to baseline levels, ghrelin increased similarly in all groups.
- Leptin was correlated to changes in body mass ($r=0.409$; $p<0.01$) and insulin ($r=0.369$;$p<0.01$).

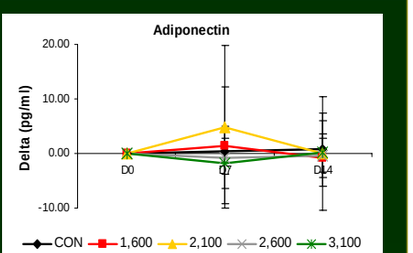
Conclusions

- Differences in macronutrient intake during HYPO dieting were not responsible for any interactive changes in body mass or measured hormones.
- Overall, HYPO dieting decreased body mass, insulin and leptin levels while adiponectin was unchanged.
- Dieting resulted in uniform increases in circulating ghrelin.
- After just 7 days of increasing energy delivery, leptin levels increased in conjunction with caloric intake.









EFFECTS OF CALCIUM SUPPLEMENTATION IN POST-MENOPAUSAL WOMEN PARTICIPATING IN THE CURVES FITNESS & WEIGHT LOSS PROGRAM

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ABSTRACT

149 post-menopausal women (53.5±6 yrs; 46.3± 5 % BF; 34.2±6 kg•m2) were randomly assigned to an exercise group (E) or an exercise and higher carbohydrate (HC) or higher protein (HP) diet group. Subjects participated in a 3d/wk exercise program and were randomly assigned in a double blind fashion to ingest a placebo (P), 800 mg/d of calcium as carbonate (CC); 800 mg/d of calcium as citrate and malate and 400 IU/d of Vitamin D (CM), or (H) containing 1,000 mg/d of calcium as citrate, 600 mg/d of green tea extract (50% EGCG), and 200 mg/d of 7-Keto DHEA. DEXA measurements were obtained at 0, 10, and 14 weeks and analyzed by repeated measures ANOVA. Data are presented as means ± SD changes from baseline. After 10 weeks, subjects who dieted experienced a greater ($p<0.05$) loss in body mass (E -0.4±1.6; HC -3.9±3.3; HP -4.0±3.8 kg), fat mass (E -0.7±2.0; HC -3.2±2.5; HP -3.2±2.8 kg), and percent body fat (E -0.8±2.0; HC -1.9±2.0; HP -1.8±2.0 %). Intermittent dieting maintained weight (E -0.4±2.2; HC -4.9±4.7; HP -4.1±4.3 kg), fat mass (E -1.2±2.1; HC -3.6±3.1; HP -3.5±3.5 kg), and percent body fat loss (E -1.2±2.2; HC -2.2±2.4; HP -2.0±2.2 %). Overall fat mass loss was greatest in the CM group (P -2.6±2.1; CC -3.2±2.8; CM -3.6±4.1; H -1.6±3.0 kg) particularly when on the HC (P -3.4±2.3; CC -3.9±3.5; CM -4.9±2.7; H -1.3±2.7 kg) and HP (P -2.6±1.8; CC -2.9±2.4; CM -4.8±5.6; H -4.0±2.5 kg) diets. Effective weight loss and maintenance was seen in all groups, while supplementation with CM promoted greater weight loss particularly when combining exercise with dieting.

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/tone. The supplement was used to assess the effects of various calcium doses on bone mineral density during completion of an exercise program.

EXPERIMENTAL DESIGN

Participants

- 149 sedentary, obese women completed all testing.
- Participants were descriptively described as (53.5±6 yrs; 46.3± 5 % BF; 34.2±6 kg•m2).
- Participants signed informed consent statements in compliance with the Human Subjects Guidelines of Baylor University and the American College of Sports Medicine.
- All participants were free of disease, were not currently taking any prescription medications that would interfere with their metabolism and were not currently using any contraindicative nutritional supplements.

Diet Protocol

- All diets were developed by a registered dietician.
- Participants were randomly assigned into 1 of 4 diet groups:
  - No diet, plus exercise group
  - High Calorie Diet (40% CHO, 30% PRO, & 30% FAT)
  - Low Calorie Diet I (15% CHO, 55% PRO, & 30% FAT)
  - Low Calorie Diet II (55% CHO, 15% PRO, & 30% FAT)

Supplementation

- Participants were randomly assigned in a double blind fashion to one of four groups
  - Placebo (P)
  - 800 mg/d of calcium as citrate and malate and 400 IU/d of vitamin D (CM)
  - 800 mg/d of calcium as carbonate (CC)
  - 1000 mg/d of calcium as citrate, 600 mg/d of green tea extract (50% EGCG), and 200 mg/d of 7-Keto DHEA (H)

Training Protocol

- Subjects participated for 14 weeks 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.
- DEXA measurements were obtained at 0, 10, and 14 weeks.

STATISTICAL ANALYSIS

- Repeated measures ANOVA was used to analyze all data.
- LSD post-hoc procedures were used for any significant interaction ($p<0.05$) to determine differences.
- SPSS for Windows version 11.5 (SPSS Inc., Chicago, IL) statistical package with an alpha-level of 0.05 was used for all statistical analysis.
- Data are presented as means ± SD and presented as delta values (post – pre values) from baseline at 10 weeks.

RESULTS

- Participants who dieted experienced a greater loss in:
  - Lean body mass ((E -0.4±1.6; HC -3.9±3.3; HP -4.0±3.8 kg).
  - Fat mass (E -0.7±2.0; HC -3.2±2.5; HP -3.2±2.8 kg).
  - Percent body fat (E -0.8±2.0; HC -1.9±2.0; HP -1.8±2.0 %)
- Participants who dieted intermittently showed maintenance of:
  - Weight (E -0.4±2.2; HC -4.9±4.7; HP -4.1±4.3 kg)
  - Fat mass (E -1.2±2.1; HC -3.6±3.1; HP -3.5±3.5 kg)
  - Percent body fat (E -1.2±2.2; HC -2.2±2.4; HP -2.0±2.2 %)
- Overall fat mass loss was greatest in the CM group (P -2.6±2.1; CC -3.2±2.8; CM -3.6±4.1; H -1.6±3.0 kg) particularly when on the HC (P -3.4±2.3; CC -3.9±3.5; CM -4.9±2.7; H -1.3±2.7 kg) and HP (P -2.6±1.8; CC -2.9±2.4; CM -4.8±5.6; H -4.0±2.5 kg) diets.

CONCLUSIONS

- Participation in the Curves Program, dietary protocol, and supplementation of calcium improves weight loss, body fat loss, and maintenance of these variables.

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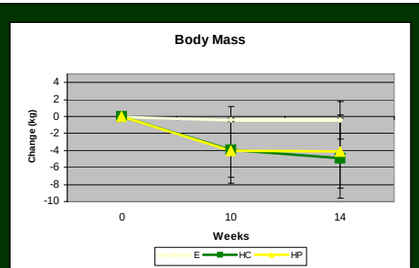

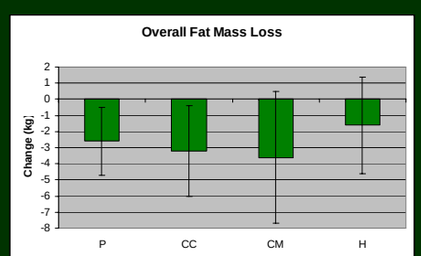

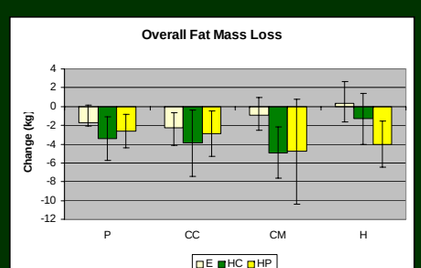

Effects of Glucosamine and Chondroitan Supplementation in Women with Knee Osteoarthritis Participating in a Fitness and Weight Loss Program

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Abstract

PURPOSE: The Curves fitness and diet program has become very popular among adult women with over 5 million women currently participating in the program. This study examined whether participation in the Curves fitness and weight loss program and/or ingesting a commercially available glucosamine and chondroitan joint support dietary supplement improved functional status and/or health outcomes in women with knee osteoarthritis (OA). **METHODS:** 30 overweight and sedentary women (54±9 yr; 163±7 cm; 89±13 kg; 46±3 % body fat) with knee OA participated in a 14-wk exercise and diet program and ingested either a supplement containing glucosamine (1,500 mg/d), chondroitan sulfate (1,200 mg/d), MSM (900 mg/d), and white willow bark (180 mg/d) or a placebo. Based on baseline testing, participants were randomly assigned to an exercise and isoenergenic high protein (HP: 63% protein, 7% carbohydrate, 30% fat) or a high carbohydrate (HC: 15% protein, 55% carbohydrate, 30% fat) diet. The diets involved consuming 1,200 kcals/d for 1-wk, 1,600 kcals/d for 9 wks, and 2,600 kcals/d for 4-wks. Subjects participated in a supervised 30-min resistance training circuit program that was interspersed with calisthenic exercises and performed 3-d per week. Participants were also questioned about side effects on a weekly basis. At 0, 2, 10, and 14 weeks, participants completed a battery of assessments evaluating general health, body composition, knee anthropometric, performance, psychometric, and blood variables. Data were analyzed by repeated measures ANOVA and are presented as means ± SD from baseline. Effect sizes were calculated using Cohen's d statistic to quantify the size and significance that may exist between groups independent of group size. **RESULTS:** Participants in both groups experienced statistically significant reductions in body mass (-3±4%), fat mass (-6±8%), body fat (-4±3%), knee pain (-112±317%), stiffness (-70±234%), and limitations in physical function (-96±1,356%) while 1RM muscular strength (+11±12%), muscular endurance (+13±12%), isokinetic strength (+10-25±4%), physical functioning (+37±52%), energy/fatigue (+55±69%), social functioning (+40±76%), mental health (+22%±84) and functional balance/stability markers significantly increased. Supplementation tended to decrease perceptions of pain, with no statistically significant improvement in strength or functional status. However, a strong effect size (d=1.1) was observed in VAS knee pain and moderate effect sizes were observed in WOMAC™ pain (d=0.4), left knee flexion (d=0.53), 1RM max (d=0.53), and total work (d=0.72). **CONCLUSIONS:** Results indicate that women with OA benefit from an exercise and weight loss program and that glucosamine and chondroitan supplementation may have therapeutic benefits.

Supported 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/tone. Although the program has been based on sound scientific rationale, the effects of women following this program and ingesting a commercially available glucosamine and chondroitan joint support dietary supplement to improve functional status and/or health outcomes in women with knee OA has not been examined.

Experimental Design

Participants

- 30 sedentary women (54±9 yrs, 163±7 cm; 89±13 kg; 46±3% body fat) with knee OA participated in this study.
- Participants 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, participants were randomly assigned to:
  - an exercise and isoenergenic high protein (63% protein, 7% carbohydrate, 30% fat) diet group (HP); or,
  - an exercise and isoenergenic high carbohydrate (15% protein, 55% carbohydrate, 30% fat) diet group (HC).
- The diets involved consuming 1,200 kcals/d for 1-wk, 1,600 kcals/d for 9 wks, and 2,600 kcals/d for 4-wks.
- Diets were standardized with 30% dietary fat.

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, participants were encouraged to continue training for 1-year.

Methods & Procedures

- At 0, 2, 10, and 14 weeks, participants completed a battery of assessments evaluating general health, body composition, knee anthropometric, performance, psychometric, and blood variables..
- Participants reported any side effects associated with participating in the study to a research nurse on a weekly basis.

Statistical Analysis

- Data were analyzed by repeated measures ANOVA using SPSS for Windows version 11.5 software (Chicago, IL) and are presented as means ± SD from baseline.
- Effect sizes were calculated using Cohen's d statistic to quantify the size and significance that may exist between groups independent of group size.

Results

- Results indicated that both groups experienced statistically significant reductions in body mass (-3±4%), fat mass (-6±8%), body fat (-4±3%), knee pain (-112 ±317%), stiffness (-70±234%), and limitations in physical function (-96±1,356%).
- Participants had statistically significant increases in 1RM muscular strength (+11±12%), muscular endurance (+13±12%), isokinetic strength (+10-25±4%), physical functioning (+37±52%), energy/fatigue (+55±69%), social functioning (+40±76%), mental health (+22%±84) and functional balance/stability markers.
- Supplementation tended to decrease perceptions of pain, with no statistically significant improvement in strength or functional status.
- A strong effect size (d=1.1) was observed in VAS knee pain and moderate effect sizes were observed in WOMAC™ pain (d=0.4), left knee flexion (d=0.53), 1RM max (d=0.53), and total work (d=0.72).
- No clinically significant side effects or adverse events were reported in weekly follow-up assessments.

Conclusions

- Results indicate that women with OA benefit from an exercise and weight loss program and that glucosamine and chondroitan supplementation may have therapeutic benefits.

Funding

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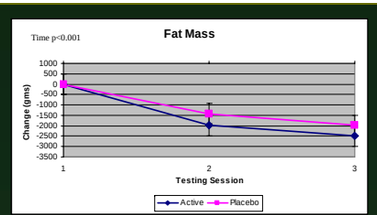

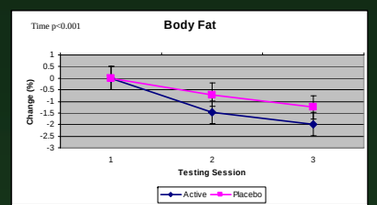

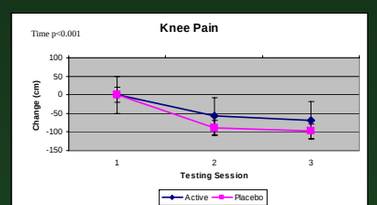

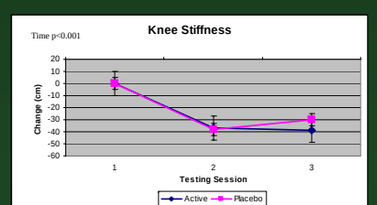

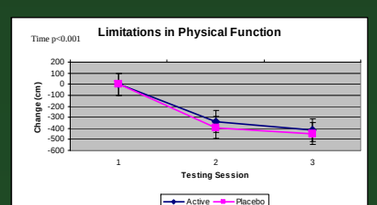

EFFECTS OF THE CURVES™ FITNESS AND WEIGHT LOSS PROGRAM I: BODY COMPOSITION

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Abstract

467 sedentary women (45±11 yrs, 163±7 cm; 93±17 kg; 45±5% body fat) were assigned to a control group (C), an exercise & no diet group (E); 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), moderately high protein (HP), or very high protein (VHP) diet. Diets consisted of 1,200 kcal/d for 1-wk and 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 and dieted for 3-d (1,200 kcal/d) only if they gained weight (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 ± SD changes from baseline for the C, E, HCD, HCHO, HP and VHP groups, respectively. After 10 weeks, subjects who dieted experienced a significantly greater ($p<0.001$) loss in total scanned mass (0.8±2.3; -0.5±2.0; -1.6±3.9; -3.6±3.1; -3.3±5.1; -4.8±4.6 kg) and fat mass (0.0±2.1; -0.8±1.9; -1.1±2.7; -2.8±2.3, -2.6±3.8, -3.8±3.6 kg). Intermittent dieting maintained losses in scanned mass (0.6±2.7; -0.5±2.4 -2.2±5.0; -3.8±4.2; -3.8±4.6; -4.7±2.4 kg) and fat mass (0.0±2.6; - 1.1±2.1; -1.1±2.1; -3.1±3.1; -3.3±4.0, -3.9±3.3 kg). Scanned fat mass loss was greatest in the VHP group. Results indicate that the Curves program is effective to promote and maintain weight loss particularly when following a VHP diet.

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/tone.

Researchers in the Exercise & Sport Nutrition Laboratory at Baylor University have conducted an extensive study on the effectiveness and safety of the Curves fitness and diet program. Results of this initial study have shown that the program promotes weight loss, improves markers of health, and improves fitness. However, we feel that the program may be even more effective with some additional nutritional interventions. The purpose of this study is to examine the effects of Curves exercise and diet program on weight loss in sedentary overweight women

Experimental Design

Subjects

- 467 overweight and sedentary women (45±11 yr; 93±17 kg; 163±7 cm; 45±5 % 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);
  - an exercise and high calorie diet group (HCD) (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);
  - a low calorie high carbohydrate (HCHO);
  - a high protein diet (HP) (50% protein)
  - a very high protein diet (VHP) (63% protein)
- 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.
- Subjects were required to maintain the diet for the duration 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

- DEXA measurements were obtained at 0, 10 and 14 weeks.
- 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 for each diet group (C, E, HCD, HCHO, HP and VHP) at week 10 and 14 of the study.

Results

- After 10 weeks, subjects who dieted experienced a significantly greater ($p<0.001$) loss in total scanned mass (0.8±2.3; -0.5±2.0; -1.6±3.9; -3.6±3.1; -3.3±5.1; -4.8±4.6 kg) and fat mass (0.0±2.1; -0.8±1.9; -1.1±2.7; -2.8±2.3, -2.6±3.8, -3.8±3.6 kg).
- Intermittent dieting maintained losses in scanned mass (0.6±2.7; -0.5±2.4 -2.2±5.0; -3.8±4.2; -3.8±4.6; -4.7±2.4 kg) and fat mass (0.0±2.6; - 1.1±2.1; -1.1±2.1; -3.1±3.1; -3.3±4.0, -3.9±3.3 kg) after 10-wks.

Conclusions

- The Curves fitness and weight loss program promotes weight loss in post-menopausal women.
- The VHP diet was most effective in promoting and maintaining weight loss.

Funding

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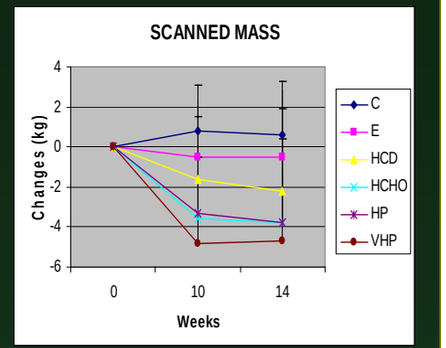

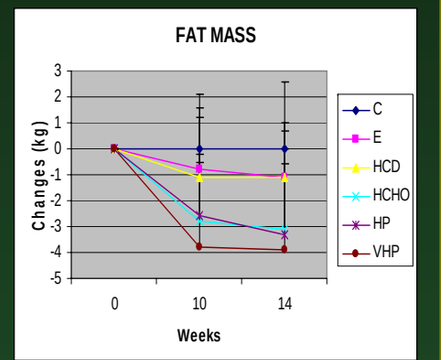

EFFECTS OF THE CURVES® FITNESS & WEIGHT LOSS PROGRAM II: RESTING ENERGY EXPENDITURE

R Li, C Kerksick, B Campbell, C Wilborn, B Marcello, M Ferreira, J Wismann, J Beckham-Dove, M Galbreath, T Harvey,
P La Bounty, K Sharp, A Parker, E Nassar, M Iosia, M Cooke, C Rasmussen, M Greenwood, R Kreider.
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Abstract

Weight loss is often accompanied by reductions in REE leading to weight regain. Resistance-exercise has been suggested to counteract this effect. 466 sedentary women (45±11 yrs, 163±7 cm; 93±17 kg; 45±5% body fat) were assigned to a control group (C), an exercise & no diet group (E); 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 and 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 and dieted for 3-d (1,200 kcal/d) only if they gained weight (3 lbs). Subjects participated in a supervised Curves fitness program 3-d per wk. Body weight and fasting REE measurements were obtained at 0, 10, and 14 weeks. Data were analyzed by repeated measures ANOVA and are presented as means ± SD changes from baseline for the C, E, HCD, HCHO, HP and VHP groups, respectively. After 10 wks, subjects significantly lost weight (-0.7±2.3; -0.5±1.9; -1.7±4.2; -4.0±3.6; -3.9±3.4; -4.9±3.8 kg) while REE was maintained or increased (-0.3±3.3; 0.4±2.0; 2.4±3.1; 0.5±2.5; 0.8±2.7; 0.0±2.1 kcal/d/kg). Weight loss (0.5±2.9; -0.4±2.3; -2.4±5.2; -4.1±3.8; -4.2±3.8; -5.0±4.3 kg) and REE were maintained during the maintenance phase (-0.8±1.8; -0.2±2.7; 3.1±3.5; 0.8±2.5; 1.4±4.1; 0.5±2.4 kcal/kg/d). Results indicate that it is possible to experience significant weight loss without reducing REE.

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/tone.

Researchers in the Exercise & Sport Nutrition Laboratory at Baylor University have conducted an extensive study on the effectiveness and safety of the Curves fitness and diet program. Results of this initial study have shown that the program promotes weight loss, improves markers of health, and improves fitness. Most diets which limit the amount of energy intake from food would induce REE decrease concomitant with weight loss. Resistance-exercise has been suggested to counteract this effect. The purpose of this study is to examine the effect of different dietary regimes on weight and to determine the REE maintenance/change in women participating in the Curves exercise and diet program.

Experimental Design

Subjects

- 466 overweight and sedentary women (45±11 yrs; 93.4±17 kg; 163±7 cm; 45.5±5% 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 & no diet group (E);
  - an exercise & high calorie diet (HCD) group (2600 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);
  - an exercise and high carbohydrate (HCHO) diet group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (40-55% C, 15-30% P, 30% F);
  - an exercise and high protein (HP) diet group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (7-15% C, 55-63% P, 30% F);
  - an exercise and very high protein (VHP) diet group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (7-15% C, 55-63% P, 30% F);
- In the following 4 wks, 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 were required to maintain the diet for the duration 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

- Fasting REE measurements were obtained at 0, 10 and 14 weeks. .
- 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 for each diet group at week 10 and 14 of the study.

Results

- After 10 wks, subjects who dieted experienced a significantly greater loss in body mass 0.7±2.3; -0.5±1.9; -1.7±4.2; -4.0±3.6; -3.9±3.4; -4.9±3.8 kg).
- After 10 wks, REE was maintained or increased (-0.3±3.3; 0.4±2.0; 2.4±3.1; 0.5±2.5; 0.8±2.7; 0.0±2.1 kcal/d/kg).
- Weight loss (0.5±2.9; -0.4±2.3; -2.4±5.2; -4.1±3.8; -4.2±3.8; -5.0±4.3 kg) and REE were maintained during the maintenance phase (-0.8±1.8; -0.2±2.7; 3.1±3.5; 0.8±2.5; 1.4±4.1; 0.5±2.4 kcal/kg/d).

Conclusions

- The Curves fitness and weight loss program promotes weight loss in post-menopausal women.
- It is possible to experience significant weight loss without reducing REE.

Funding

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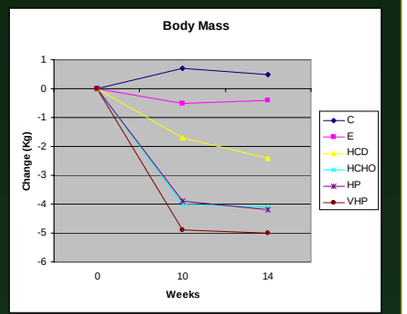

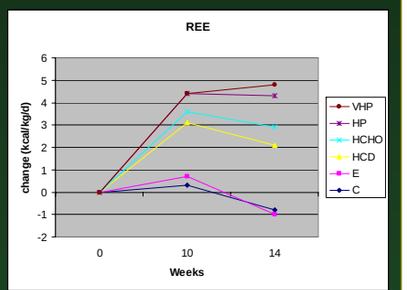

EFFECTS OF CURVES™ FITNESS AND WEIGHT LOSS PROGRAM III: TRAINING ADAPTATIONS

M Iosia, B Campbell, C Wilborn, J Wismann, K Sharp, E Nassar, J Beckham-Dove, M Galbreath, A Parker, T Harvey, C Kerksick, P La Bounty, B Marcello, M Cooke, M Ferreira, R Li, C Rasmussen, M Greenwood, & R Kreider.
Exercise & Sport Nutrition Laboratory, Baylor University, P.O. Box 97313, Waco, TX 76798-7313

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Abstract

467 sedentary women (45±11 yrs, 163±7 cm; 93±17 kg; 45±5% body fat) were assigned to an exercise & no diet group (E); an exercise & high calorie diet (HCD) group (2,600 kcals/d), 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 and 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. Data were obtained at 0, 10, and 14 wks and were analyzed by repeated measures ANOVA. Data are presented as means ± SD changes from baseline. After 14-weeks, subjects lost an average of 3.7±4.2 kg. Training significantly increased overall 1RM bench press (5.1±8%, p=0.001); 1RM leg press (13.2±20%, p=0.001); BP lifting volume (21.4±104%, p=0.001); LP lifting volume (36.4±306%, p=0.047); and relative peak oxygen uptake (8.1±21%, p=0.001). Resting HR (-2.6±14 %,p=0.03 at 10-wks), SBP (-3.0±11 %, p=0.001), and DBP (-3.5±12 %, p=0.001) were significantly decreased at 10 and/or 14 weeks. No significant interactions were observed among diet groups. Results indicate that the Curves fitness program improves muscular strength, muscular endurance, aerobic capacity, and general resting cardiovascular hemodynamics.

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/tone.

Researchers in the Exercise & Sport Nutrition Laboratory at Baylor University have conducted an extensive study on the effectiveness and safety of the Curves fitness and diet program. Results of this initial study have shown that the program promotes weight loss, improves markers of health, and improves fitness. Researchers in the Exercise & Sport Nutrition Laboratory at Baylor University have conducted an extensive study on the effectiveness and safety of the Curves fitness and diet program. Results of this initial study have shown that the program promotes weight loss, improves markers of health, and improves fitness. However, we feel that the program may be even more effective with some additional nutritional interventions. The purpose of this study is to examine the effects of Curves exercise and diet program on training adaptations in sedentary overweight women

Experimental Design

Subjects

- 467 overweight and sedentary women (45±11 yr; 93±17 kg; 163±7 cm; 45±5 % 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);
  - an exercise and high calorie diet group (HCD) (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);
  - a low calorie high carbohydrate (HCHO);
  - a high protein diet (HP) (50% protein)
  - a very high protein diet (VHP) (63% protein)
- 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.
- Subjects were required to maintain the diet for the duration 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

- Subjects were tested at five time points over the course of the 14 week study. T1 (Week 0), T3 (Week 7), and T5 (Week 14)
- 1 RM strength tests on Nebula (*Versailles, OH)* Olympic Power Station bench press and 45° leg press hip sled. Pre-measured Olympic weights and an Olympic style bar will be used.
- Following a 2 minute rest subjects were asked to perform a repetition maximum using 80% of their 1RM
- Blood pressure and heart rate were measured using standard procedures.
- VO_{2peak} was identified using Bruce Treadmill protocol. Expiratory gases were analyzed using open-circuit spirometry system (Parvomedics, Sandy, UT)
- Subjects exercised until volitional exhaustion.

Statistical Analysis

- Data were 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 (C, E, HCD, HCHO, HP and VHP) at week 10 and 14 of the study.

Results

- After 14-weeks, subjects lost an average of 3.7±4.2 kg.
- Training significantly increased overall 1RM bench press (5.1±8%, p=0.001); 1RM leg press (13.2±20%, p=0.001); BP lifting volume (21.4±104%, p=0.001); LP lifting volume (36.4±306%, p=0.047); and relative peak oxygen uptake (8.1±21%, p=0.001).
- Resting HR (-2.6±14 %, p=0.03 at 10-wks), SBP (-3.0±11 %, p=0.001), and DBP (-3.5±12 %, p=0.001) were significantly decreased at 10 and/or 14 weeks.
- No significant interactions were observed among diet groups

Conclusions

- The Curves fitness program improves muscular strength, muscular endurance, aerobic capacity, and general resting cardiovascular hemodynamics.

Funding

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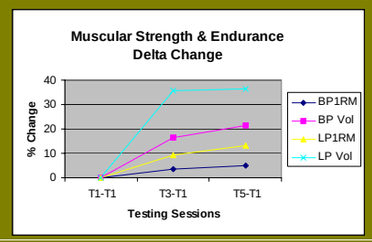
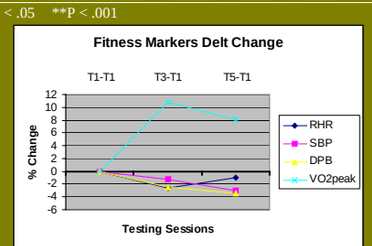


Group	T1	T3 - T1	SD	T5-T1	SD
BP1RM	0	3.4	7.0	5.1**	7.9
BP Vol	0	16.3	71.1	21.4**	103.9
LP1RM	0	9.4	16.5	13.2**	19.9
LPVol	0	35.9	289	36.4*	306.0

*P < .05 **P < .001



Variable	T1	T3 - T1	SD	T5-T1	SD
VO2peak	0	10.8	52.1	8.1**	21.2
RHR	0	-2.6	14.4	-1.0*	16.3
SBP	0	-1.3	11.5	-3.0**	11.2
DBP	0	-2.5	11.4	-3.5**	12.2

*P < .05 **P < .001

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

J Wismann, M Galbreath, C Wilborn, L Taylor, B Campbell, E Nassar, J Beckham-Dove, T Harvey, C Kerksick, P La Bounty, A Parker, M Ferreira, M Cooke, M Iosia, R Chandran, C Rasmussen, M Greenwood, R Kreider. Exercise and Sport Nutrition Laboratory, Baylor University, Waco, Texas 76798-7313

ABSTRACT

335 sedentary women (45±10 yrs, 164±7 cm; 92±16 kg; 45±5% body fat) 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 were weighed, 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 ± SD from baseline at weeks 2, 10, and 14, respectively. Significant time and/or interaction effects were observed in total cholesterol (-6.6±14; -3.4±15;-2.0±15 %), LDL-c (-6.4±19; -2.8±20; -1.8±21 %), triglycerides (-7.1±35; -1.5±37; 0.2±40 %), and glucose (-1.6±13; -1.0±14; -2.9±15 %) with the greatest impact during the diet phases. No significant differences were observed in the cholesterol to HDL ratio. Subjects experienced significant decreases in waist (-1.9±6; -3.4±8; -4.5±7 %) and hip (-1.0±5; -2.3±5; -2.7±5 %) measurements (n=444) with diet groups experiencing greater effects. Although some hematological variables changed over time, there were no clinically significant findings 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 improves some health-related blood profiles and decreases hip and waist measurements without adversely affecting general markers of health status.

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/tone.

EXPERIMENTAL DESIGN

Participants

- 335 sedentary, obese women completed all testing.
- Participants were descriptively described as (45±10 yrs, 164±7 cm; 92±16 kg; 45±5% body fat)
- Participants signed informed consent statements in compliance with the Human Subjects Guidelines of Baylor University and the American College of Sports Medicine.
- All participants were free of disease, were not currently taking any prescription medications that would interfere with their metabolism and were not currently using any contraindicative nutritional supplements.

Diet Protocol

- All diets were developed by a registered dietician.
- Participants were randomly assigned into 1 of 4 diet groups:
  - High calorie diet (55% CHO, 15% PRO, 30% FAT)
  - Very low calorie diet I (7% CHO, 63% PRO & 30% FAT)
  - Very low calorie diet II (20% CHO, 50% PRO, 30% FAT)
  - Very low calorie diet III (55% CHO, 15% PRO, 30% FAT)

Serum Analysis

- Participants reported each morning in a fasted state at week 0, 2, 10, and 14 and provided a blood sample for determination of health markers.
- Health markers measured included: total cholesterol, triglycerides, glucose, HDL, LDL-c, waist girth, hip girth, heart rate, blood pressure, and side effects or adverse events.
- All serum samples were analyzed by a Dade Dimension RXL Chemistry Analyzer.
- All girth measurements and hematological variables were measured by a skilled technician.

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.

STATISTICAL ANALYSIS

- Repeated measures ANOVA was used to analyze all data.
- LSD post-hoc procedures were used for any significant interaction ($p<0.05$) to determine differences.
- SPSS for Windows version 11.5 (SPSS Inc., Chicago, IL) statistical package with an alpha-level of 0.05 was used for all statistical analysis.
- Data are presented as means ± SD and presented as delta values (post – pre values) from baseline at weeks 2, 10, and 14 respectively.

RESULTS

- Significant time and/or interaction effects were observed in:
  - Total cholesterol (-6.6±14; -3.4±15;-2.0±15 %)
  - LDL-c c (-6.4±19; -2.8±20; -1.8±21 %)
  - Triglycerides (-7.1±35; -1.5±37; 0.2±40 %)
  - Glucose (-1.6±13; -1.0±14; -2.9±15 %)
- Subjects experienced significant decreases in waist (-1.9±6; -3.4±8; -4.5±7 %) and hip (-1.0±5; -2.3±5; -2.7±5 %) measurements
- No significant differences were observed in cholesterol to HDL ratio.
- No clinically significant findings were observed in a comprehensive panel of hematological variables.
- No clinically significant side effects or adverse related to the study were reported.

CONCLUSIONS

- Participation in the Curves Program improves some health-related blood profiles and decreases hip and waist measurements without adversely affecting general markers of health status.

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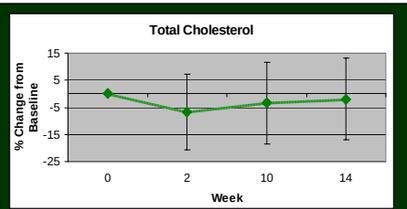

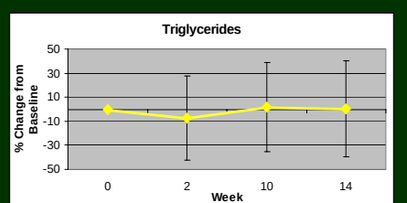

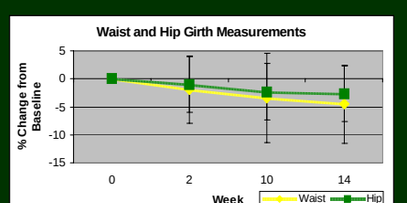

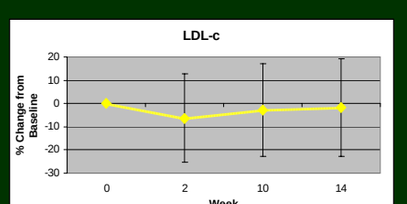

EFFECTS OF THE CURVES® FITNESS AND WEIGHT LOSS PROGRAM V: LEPTIN & INSULIN

E Nassar, L Taylor, C Kerksick, B Campbell, C Wilborn, T Buford, G Hudson, T Harvey, M Cooke, C Rasmussen, D Willoughby, & R Kreider.
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Abstract

216 sedentary women were assigned to an exercise & no diet group (E); 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 (HC), high protein (HP), or very high protein (VHP) diet. Diets were 1,200 kcal/d for 1 wk and 1,600 kcal/d for 9 wks and contained 30% fat, 40-55% CHO on the HCD and HC diets and 50-63% P on the HP and VHP diets. Subjects participated in a supervised Curves fitness program 3-d/wk. Fasting blood samples were obtained at 0, 2, & 10 weeks. Data were analyzed by repeated measures ANOVA and are presented as means ± SD changes from baseline for the E, HCD, HC, HP and VHP groups after 2 and 10 wks, respectively. After 2 and 10 weeks, leptin levels significantly decreased (-21.5±31; -17±36 %, p=0.001) with leptin tending to decrease to a greater degree in the diet groups (-9.0±21, -18±26; -7.6±19, -1.4±24; -23.1±27, -18.2±33; -22.2±29, -15.3±38; -26.4±39, -20.9±42 %, p=0.07). Changes in insulin levels tended to decrease after the first 2wk (-12.7±55; -1.5±93 %, p=0.10) with no differences among groups (2.8±43, 17.2±46; 13.1±59, 17.1±76; -9.8±71, 3.6±113; -15.2±53, -16.9±40; -24.1±32, -4.1±112 %, p=0.56). The glucose to insulin ratio significantly increased (41.6±71; 50.2±156 %, p=0.004) with no differences among groups (15.5±58, -0.8±38; 7.2±42, 27.8±95; 38.0±61, 70.4±250; 53.8±95, 56.1±104; 51.1±61, 42.3±63 %, p=0.24). No differences were observed among groups in homeostatic insulin sensitivity although it generally decreased in the diet groups (9.4±45, 15.5±55; 21.2±73, 26.1±85; -11.7±73, 2.2±107; -14.4±60, -15.0±44; -23.3±35, -1.4±119 %, p=0.39). Results indicate that the Curves fitness & weight loss program may help modulate leptin and insulin levels.

Supported 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/tone.

Both insulin and leptin have been found to have a tremendous role in obesity. This study examined whether weight loss induced by the Curves diet and exercise program influences insulin and leptin levels in sedentary overweight females.

Experimental Design

Subjects

- 216 overweight and sedentary women (51.6±7 yr; 91.4±10 kg; 162±6 cm; 41.7±2.8 % 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 normal diet group (E);
  - an exercise and high calorie diet (HCD) group consisting of 2,600 kcal/d for 1 wk at 55% C, 15% P, 30% F; 9 wks at 40% C, 30% P, 30% F; and 4 wks at 55% C, 15% P, 30% F;
  - an exercise and low calorie high carbohydrate (HC) diet group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (40-55% C, 30% F);
  - an exercise and high protein (HP) group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (55-63% P, 30% F);
  - an exercise and very high protein (HP) group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (55-63% P, 30% F);
- Subjects were required to maintain the diet for the duration 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, 2, 10, 10.4, and 14-weeks, subjects donated fasting blood samples.
- Plasma samples were analyzed for insulin and leptin via Enzyme-Linked Immunosorbent Assay from Diagnostic Systems Laboratories, Inc. (Webster, TX) on a Wallac Victor^2 1420 Multilabel Counter manufactured by PerkinElmer Life Sciences (Wellesley, MA).
- Fasting glucose samples were analyzed by the DADE Behring Diminsion ® clinical chemistry system.
- Insulin sensitivity was calculated as the ratio of fasting glucose / insulin as well as calculating the homeostatic glucose insulin ratio (Fasting Insulin x Fasting Glucose / 405).

Statistical Analysis

Data was analyzed by repeated measures ANOVA using SPSS for Windows version 14.0 software (Chicago, IL) and are presented as means ± SD from baseline for the E, HCD, HC, HP, and VHP groups after 2 and 10 weeks.

Results

- After 2 and 10 weeks leptin levels significantly decreased (-21.5 ±31; -17 ±36%, p=0.001) with leptin tending to decrease more in the diet groups (-9.0 ±21, -18±26; -7.6±19, -1.4 ±24; -23.1 ±27, -18.2 ±33; -22.2 ±29, -15.3 ±38; -26.4 ±39, -20.9 ±42%, p=0.-07).
- Insulin levels decreased after the first 2 weeks (-12.7 ±55; -1.5 ±93%, p=0.10) without differences among groups.
- Glucose to insulin ratio significantly increased (41.6 ±71; 50.2 ±156%, p=0.004) without difference among groups.
- No differences observed among groups in homeostatic insulin sensitivity.

Conclusions

These findings indicate that the Curves fitness and weight loss program may help regulate levels of leptin and insulin.

Funding

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

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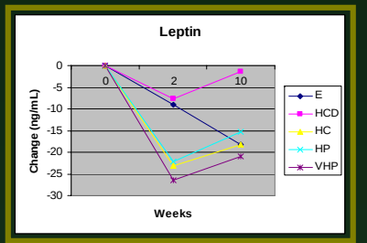
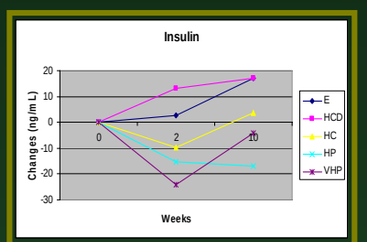
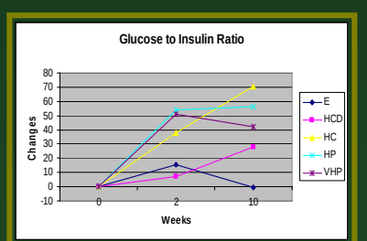






EFFECTS OF THE CURVES® FITNESS & WEIGHT LOSS PROGRAM VI: QUALITY OF LIFE

T. Harvey, E Nassar, R Bowden, M Davis, L Long, J Opusunju, B Lanning, J Beckham-Dove, J Wismann, M Galbreath, B Campbell, C Kerksick, P La Bounty, M Ferreira, C Wilborn, J Crixell, M Iosia, M Cooke, C Rasmussen, & R. Kreider.
Exercise & Sport Nutrition Laboratory, Baylor University, P.O. Box 97313, Waco, TX 76798-7313

Abstract

287 sedentary women (48±10 yrs, 164±7 cm; 91±16 kg; 45±4% body fat) were assigned to an exercise & no diet group (E); 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 and 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. 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 circuit training program 3 d/wk. 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 after 10 and 14 wks, respectively. Results revealed that physical functioning (29.6±141, 24.4±122 %, p=0.002), social functioning (11.1±56, 11.1±69 %, p=0.005), vitality (25.5±88, 23.0±91 %, p=0.001), and mental health (8.5±27, 7.3±28 %, p=0.001) scores significantly increased over time in all groups. Bodily pain (32.2±296, 28.6±297 %, p=0.23), general health (3.0±163, -21.7±271 %, p=0.58), role physical (-4.1±56, -0.2±58 %, p=0.12), and role emotional scores (0.9±59, 3.0±60 %, p=0.79) were not significantly changed over time. No significant interactions were observed among groups with the exception that role physical scores decreased to a greater degree in the HP group. These findings indicate that the Curves fitness and weight loss program improves select markers of QOL.

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 measurable quality of life variables in sedentary overweight females.

Experimental Design

Subjects

- 287 sedentary women (48±1 yr; 164 ± 7cm; 91±16kg; 45 ± 4% 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);
  - an exercise and high calorie diet group (HCD) (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);
  - a low calorie high carbohydrate (HCHO);
  - a high protein diet (HP) (50% protein)
  - a very high protein diet (VHP) (63% protein)
- 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.

Questionnaire

- The 36-Item Health Survey taps eight health concepts: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being (mental health), social functioning, vitality, and general health perceptions.

Methods & Procedures

- Subjects completed the SF-36 Quality of Life (QOL) inventory at 0, 10 & 14 weeks.
- Interpretations of strength, lifting volume, circumferences, relative peak oxygen uptake, and hemodynamic were obtained from these measures.

Statistical Analysis

- Data were analyzed by repeated measures ANOVA analysis using SPSS for Windows version 14 software *(Chicago, IL)* and are presented as means ± SD from baseline for all participants.

Results

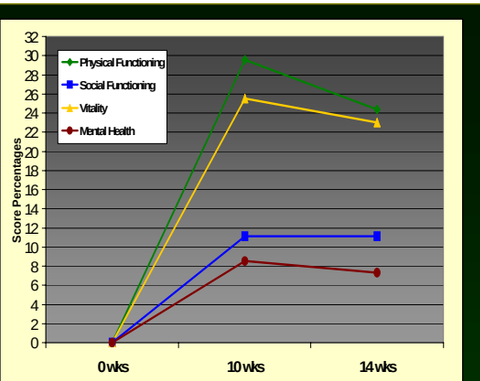
- After 14-weeks, subjects involved in training experienced a significantly greater increase in:
  - Physical Functioning (29.6±141, 24.4±122 %, p=0.002),
  - Social Functioning (11.1 ± 56, 11.1 ± 69 %, p=0.005),
  - Vitality (25.5 ± 88, 23.0 ± 91 %, p=0.001), and
  - Mental health (8.5 ± 27, 7.3 ± 28 %, p=0.001)
- Unchanged QOL Scores:
  - Bodily Pain (32.2±296, 28.6±297 %, p=0.23),
  - General Health (3.0±163, -21.7±271 %, p=0.58),
  - Role Physical (-4.1±56, -0.2±58 %, p=0.12), and
  - Role Emotional (0.9±59, 3.0±60 %, p=0.79)

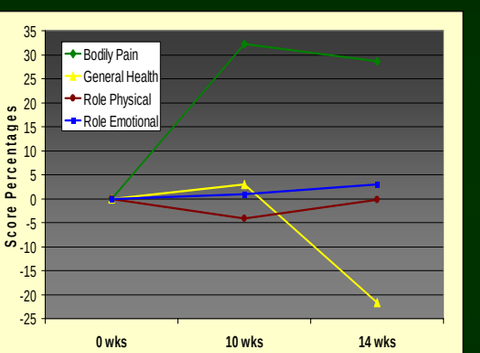
Conclusions

- The Curves fitness and weight loss program increases specific quality of life variables after 14 weeks of training.

Funding

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





EFFECTS OF THE CURVES® FITNESS & WEIGHT LOSS PROGRAM VII: BODY IMAGE & SELF ESTEEM

M Davis, B Lanning, E Nassar, L Long, J Opusunju, R Bowden, J Beckham-Dove, J Wismann, M Galbreath, B Campbell, T Harvey, C Kerksick, P La Bounty, M Ferreira, C Wilborn, J Crixell, M Iosia, M Cooke, C Rasmussen, R Kreider
Exercise & Sport Nutrition Laboratory, Baylor University, P.O. Box 97313, Waco, TX 76798-7313

Abstract

287 sedentary women (48±10 yrs, 164±7 cm; 91±16 kg; 45±4% body fat) were assigned to an exercise & no diet group (E); 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 and 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. 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 circuit training program 3 d/wk. 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 and are presented as means ± SD changes after 10 and 14 wks, respectively. Results revealed that appearance evaluation (18.9±39, 19.5±34 %, p=0.001), body area satisfaction (13.9±29, 15.8±31 %, p=0.001), and overweight preoccupation (18.6±67, 15.8±74 %, p=0.005) significantly increased with no differences among groups. Self-Classified-Weight scores (-2.5±36, -7.3±27 %, p=0.001) significantly decreased with no differences among groups. Appearance orientation (-0.5±18, 0.6±16 %, p=0.63), total RSE (7.4±24, 6.1±59 %, p=0.20), and SPA (1.5±26, -0.7±25 %, p=0.68) scores were unchanged. Results indicate that participation in the Curves fitness and weight loss program improves some aspects of body image and self-esteem.

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/tone. Researchers in the Exercise & Sport Nutrition Laboratory at Baylor University have conducted an extensive study on the effectiveness and safety of the Curves fitness and diet program. Results of this initial study have shown that the program promotes weight loss, improves markers of health, and improves fitness. However, we feel that the program may be effective in promoting positive body image and self-esteem. The purpose of this study is to examine the effects of the Curves fitness and diet program on body image and self esteem variables in sedentary overweight females.

Experimental Design

Subjects

- 287 sedentary women (48±10 yrs, 164±7 cm; 91±16 kg; 45±4% 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 one of the following groups:
  - an exercise and no diet group (E);
  - an exercise and high calorie diet group (HCD) (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);
  - a low calorie high carbohydrate (HCHO);
  - a high protein diet (HP) (50% protein)
  - a very high protein diet (VHP) (63% protein)
- 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.

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.

Questionnaires

- The Social Physique Anxiety (SPA) scale, a Rosenberg self-esteem scale (RSE), and a Cash Body Image Questionnaires were used in this study.

Methods & Procedures

- 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.
- 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 for each diet group at week 10 and 14 of the study.

Results

- Appearance evaluation (18.9±39, 19.5±34 %, p=0.001), body area satisfaction (13.9±29, 15.8±31 %, p=0.001), and overweight preoccupation (18.6±67, 15.8±74 %, p=0.005) significantly increased with no differences among groups.
- Self-Classified-Weight scores (-2.5±36, -7.3±27 %, p=0.001) significantly decreased with no differences among groups.
- Appearance orientation (-0.5±18, 0.6±16 %, p=0.63), total RSE (7.4±24, 6.1±59 %, p=0.20), and SPA (1.5±26, -0.7±25 %, p=0.68) scores were unchanged.

Conclusions

- The Curves fitness and weight loss program improves some aspects of body image and self-esteem.

Funding

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

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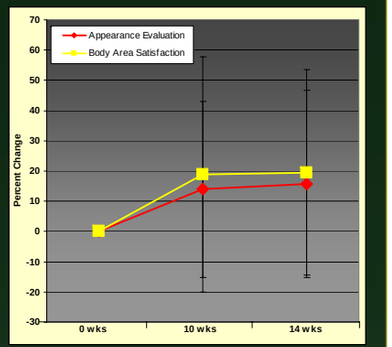

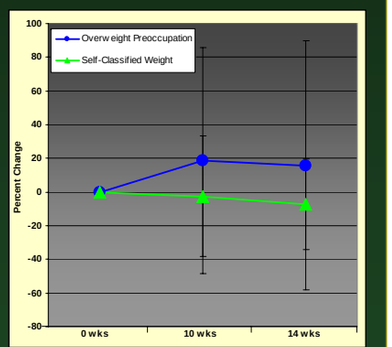

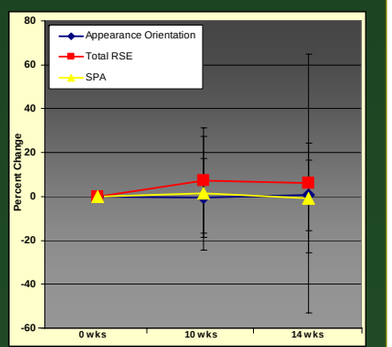

LONG-TERM EFFECT OF THE CURVES® FITNESS AND WEIGHT LOSS PROGRAM ON WEIGHT & FAT LOSS

K Sharp, C Kerksick, C Wilborn, B Campbell, J Wismann, M Galbreath, E Nassar, J Beckham-Dove, T Harvey, P La Bounty, A Parker, M Ferreira, M Cooke, M Iosia, C Rasmussen, M Greenwood, & R Kreider

Exercise & Sport Nutrition Laboratory, Baylor University, P.O. Box 97313, Waco, TX 76798-7313

Abstract

472 sedentary women (45±11 yrs, 163±7 cm; 93±17 kg; 45±5% body fat) participated in the Curves fitness and weight loss program described above and lost an average of 3.7±4.2 kg. After completing the 14-wk study, subjects were invited to continue to exercise for another year and asked to diet for 3-d (1,200 kcal/d) only if they gained weight (3 lbs). Body mass and DEXA body composition data were collected at 0, 10, 14 weeks as well as at 3 (n=105), 6 (n=68), 9 (n=52), and 12 (n=40) months. Data for the exercise only (E), high carbohydrate diet (HCHO), and high protein diets (HP) were analyzed by repeated measures ANOVA and are presented as means ± SD changes from baseline for the E, HCHO, and HP diets, respectively. Results revealed that subjects maintained a significant amount of weight loss after 3 m (-1.1±3, -4.7±5, -7.5±11 kg), 6 m (-1.2±4.3, -4.0±6, -5.7±7 kg), 9 m (-2.1±5, -3.1±6, -3.5±6, kg), and 12 m (-3.4±5, -3.8±6, -1.9±5 kg) as well as fat mass loss after 3 m (-0.7±3, -3.8±4, -4.6±4 kg), 6 m (-1.1±4, -4.1±4, -4.5±4 kg), 9 m (-0.6±4, -4.1±4, -2.9±4 kg), and 12 m (-1.4±5, -4.2±3, -1.9±3 kg). Weight and fat loss were maintained better in the HP group until 6 m and in the HCHO group after 6 m. Results indicate that subjects following the Curves program can maintain weight loss by maintaining a consistent training program and adhering to intermittent diet strategies.

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/tone.

Researchers in the Exercise & Sport Nutrition Laboratory at Baylor University have conducted an extensive study on the effectiveness and safety of the Curves fitness and diet. Results of this initial study have shown that the program promotes weight loss, improves markers of health, and improves fitness. The purpose of this study is to examine the effect of both an intermittent dietary intervention and Curves exercise protocol on weight maintenance and markers of health and fitness in women participating in the Curves exercise and diet program.

Experimental Design

Subjects

- 472 sedentary women (45±11 yrs, 163±7 cm; 93±17 kg; 45±5% body fat) participated in the Curves fitness and weight loss 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 final testing, subjects were asked to continue for an additional year if they experienced weight loss of 3lbs or more.
- Groups remained the same as initial testing:
  - an exercise and normal diet group (E);
  - an exercise and high carbohydrate (HC) diet group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (55% C, 15% P, 30% F);
  - an exercise and high protein (HP) diet group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (7-15% C, 55-63% P, 30% F);
- After the initial 14-weeks the participants were not required to follow the assigned diet
- Groups were required to exercise 3-d per week.

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

- DEXA measurements were obtained at 0, 10 and 14 weeks as well as 3, 6 and 12 months.
- 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 for the exercise only (E), high carbohydrate diet (HCHO), and high protein diets (HP) diets.

Results

- Significant amount of weight loss was maintained after 3 m (-1.1±3, -4.7±5, -7.5±11 kg), 6 m (-1.2±4.3, -4.0±6, -5.7±7 kg), 9 m (-2.1±5, -3.1±6, -3.5±6, kg), and 12 m (-3.4±5, -3.8±6, -1.9±5 kg).
- Significant fat mass loss was maintained after 3 m (-0.7±3, -3.8±4, -4.6±4 kg), 6 m (-1.1±4, -4.1±4, -4.5±4 kg), 9 m (-0.6±4, -4.1±4, -2.9±4 kg), and 12 m (-1.4±5, -4.2±3, -1.9±3 kg).
- Weight and fat loss were maintained better in the HP group until 6 m and in the HCHO group after 6 m.
- Weight loss (-0.7±1.9; -4.9±4.7; -4.4±5.3kg) and fat mass loss (-1.1±2.2; -3.5±3.1; -3.9±5.0kg) was continued during the maintenance phase.

Conclusions

- Results indicate that subjects following the Curves program can maintain weight loss by maintaining a consistent training program and adhering to intermittent diet strategies.

Funding

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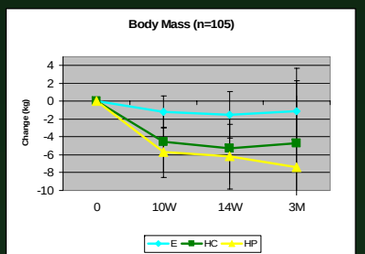
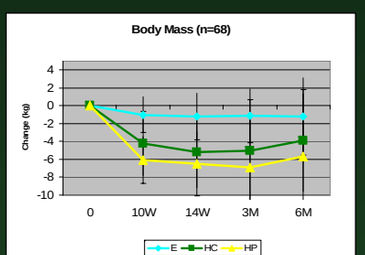
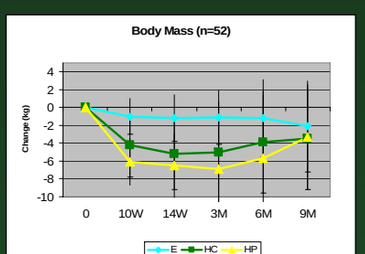
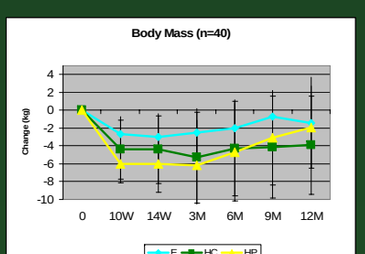








EFFECTS OF ISONERGETIC HIGH CARBOHYDRATE AND HIGH PROTEIN DIETS ON HEALTH OUTCOMES IN WOMEN WITH METABOLIC SYNDROME (MS) PARTICIPATING IN THE CURVES® FITNESS PROGRAM

R Chandran, J Jitomir, B Shelmadine, K Beavers, C Kerksick, C Wilborn, J Wismann, E Nassar, J Beckham-Dove, M Galbreath, T Harvey, P La Bounty, M Ferreira, M Cooke, M Iosia, C Rasmussen, M Greenwood, R Kreider.
Exercise & Sport Nutrition Lab, Baylor University, One Bear Place, Waco, TX, 76798-7313

Abstract

166 sedentary women (48±10 yrs, 163±7 cm; 96±17 kg; 46±4% body fat) with Metabolic syndrome were assigned to an exercise group (E) or isoenergetic high carbohydrate (HC) or high protein (HP) diets while participating in the Curves fitness program 3-d per wk. Diets were 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks as described above. Data were obtained at 0, 2, and 10 wks and were analyzed by repeated measures ANOVA and are presented as means ± SD changes from baseline at 2 and 10 wks, respectively. Subjects dieting lost more DEXA scanned mass (E 0.6±1.0, -0.2±2.2; HC -1.7±1.4, -4.1±5.0; HP -2.1±1.9, -4.6±4.2 kg, p=0.001) and fat mass (E 0.5±1.4, -1.0±1.8; HC -0.9±1.4, -3.1±3.5; HP -1.4±1.5, -3.6±3.0 kg, p=0.001). Waist circumference decreased more in the HP group (E -0.4±4.8, -0.4±4.9; HC -2.2±5.3, -2.4±10; HP -2.3±6.6, -5.0±7.0 cm, p=0.02) while hip circumference decreased in both groups (E -0.6±4.1, -1.0±8.3; HC -2.1±4.3, -3.8±5.6; HP -2.13±4.3, -3.5±5.3 cm, p=0.001). SBP decreased in all groups (E -3.9±16, -2.4±20; HC -5.0±16, -7.6±18; HP -8.5±15, -5.5±17 mmHg, p=0.001). Glucose tended to decrease (p=0.10) with no differences between groups (E 1.2±17, -0.2±18; HC -6.0±14, -4.6±11; HP -3.1±12, -1.7±14 %, p=0.37). Cholesterol (E -0.5±18, -0.5±15; HC -5.8±12, -1.1±14; HP -8.8±13, -2.7±15 %, p=0.07) and triglycerides (E 9.8±34, 9.8±35; HC -5.1±38, -3.4±26; HP -21.1±25, -12.5±31 %, p=0.01) decreased more in the HP group. No differences were seen in HDL (E -2.2±21, 2.0±23; HC -4.2±15, -2.9±17; HP -4.1±18, 2.5±22 %, p=0.33). These results indicate that following a HP diet during training may promote more favorable changes in body composition and lipid profiles.

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. It involves a thirty-minute circuit training and weight management program with periods of moderate caloric restriction (1200 to 1600 Kcal/day) followed by short periods of higher caloric intake (2600 kcal/day). This program is designed to promote a gradual reduction in body fat while improving strength and fitness.

Research at the Exercise and Sports Nutrition lab conducted on sedentary overweight females has shown promising results in markers of weight loss, health and fitness. Metabolic syndrome is a constellation of clinical and laboratory parameters that confers an increased risk of cardiovascular mortality. Presence of any three of the five criteria constitutes metabolic syndrome. These include waist circumference greater than 35 inches in women (greater than 40 in men), systolic blood pressure greater than or equal to 130 or diastolic Bp > or equal to 85mm Hg (or current treatment for hypertension), HDL cholesterol less than 50 mg %, fasting blood glucose greater than or equal to 100 mg % (or treatment for diabetes) and serum triglycerides greater than or equal to 150 mg %. The purpose of this study was to examine the specific effects of the Curves diet and exercise program on markers of metabolic syndrome.

Experimental Design

Subjects

- 166 sedentary women (48±10 yrs, 163±7 cm; 96±17 kg; 46±4% body fat) with metabolic syndrome participated in a 14-week diet and exercise program (10 wk diet, 4 wk maintenance).
- 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);
  - A low calorie high carbohydrate (HCHO);
  - A high protein diet (HP) (50% protein)

- The 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 2600 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.

Methods & Procedures

- Subjects were tested at baseline, 2wks and 10 wks.
- Waist and hip circumference, DXA measurements of fat mass and fat free mass, blood glucose and fasting lipid panel were done.

Statistical Analysis

- Data were analyzed by repeated measures ANOVA analysis using SPSS for Windows version 14 software *(Chicago, IL)* and are presented as means ± SD from baseline for all participants.

Results

- After 10-weeks, subjects involved in training and consuming a high protein diet experienced a significantly greater:
  - Loss in Fat mass (-1.4±1.5, -3.6±3.0 kg, p=0.001)
  - Total DXA scanned mass reduction (-2.1±1.9, -4.6±4.2 kg, p=0.001)
  - Reduction in waist circumference(-2.3±6.6, -5.0±7.0 cm, p=0.02)
  - Reduction in cholesterol (-8.8±13, -2.7±15 %, p=0.07)
  - Reduction in triglyceride (-21.1±25, -12.5±31 %, p=0.01)

- Beneficial effects that were noted in all the groups:
  - Decreased Fasting Glucose (E 1.2±17, -0.2±18; HC -6.0±14, -4.6±11; HP -3.1±12, -1.7±14 %, p=0.37)
  - Systolic blood pressure reduction(E -3.9±16, -2.4±20; HC -5.0±16, -7.6±18; HP -8.5±15, -5.5±17 mmHg, p=0.001)
  - Hip circumference reduction

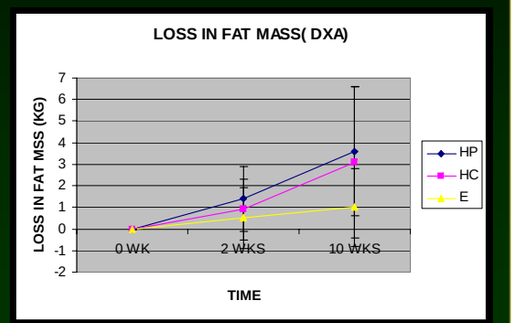
- No changes were noted in any group in:
  - HDL cholesterol(E -2.2±21, 2.0±23; HC -4.2±15, -2.9±17; HP -4.1±18, 2.5±22 %, p=0.33)

Conclusions

- High protein diet during Curves fitness program creates more favorable changes in body composition, total cholesterol and triglycerides in women with metabolic syndrome.

Funding

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



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EFFECTS OF DIET AND EXERCISE INTERVENTIONS ON HEALTH OUTCOMES IN WOMEN WITH AND WITHOUT METABOLIC SYNDROME (MS)

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Abstract

355 sedentary women (46±11 yrs, 163±7 cm; 92±16 kg; 45±4% body fat) were assigned to a control group (C); an exercise group (E); an exercise & high calorie diet (HCD) group (2,600 kcals/d); or, isoenergetic high carbohydrate (HC) or high protein (HP) diets. Diets consisted of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks during the weight loss phase. During the maintenance phase, participants ingested 2,600 kcal/d and dieted for 2-d (1,200 kcal/d) only if they gained 3 lbs. Participants followed the Curves fitness program 3 days per week. Participants were retrospectively divided into those with less than (n=196) or more than (n=159) 3 criteria for MS. Data were collected at 0, 10, and 14 weeks and analyzed by repeated measures ANOVA and are presented as changes from baseline after 10 and 14 wks for the no MS and MS groups, respectively. Subjects who had MS had greater loss of DEXA fat mass (-2.29±2.6, -2.44±3.4; -2.78±4.2; -3.1±3.0 kg, p=0.046) and SBP (-1.3±13, -2.3±14; -5.6±18; -8.4±15 mmHg, p=0.01) with no significant differences between groups in reductions in waist circumference (-2.8±6.6, -3.8±7.3; -3.2±8.3; -4.2±6.9 cm, p=0.42), glucose (-0.4±15, -2.1±15; -2.6±14; -4.1±14 %, p=0.85), triglycerides (5.6±42, 2.4±42; -5.5±33; 0.2±41%, p=0.67) or HDL (-3.9±19, -2.9±17; -0.1±19; -0.9±19 %, p=0.86). Analysis of group interactions revealed that MS subjects following the HCD lost significantly more weight than the non-MS group with results comparable to those observed in the HC and HP diet groups. Also, results in the HP group were generally better than remaining groups. Results indicate that subjects with MS may experience differential effects from adhering to various types of diets during training.

Supported in part by Curves International Inc. Waco, TX

Rationale

The Curves International fitness and weight loss facilities, located in 42 countries around the world, are dedicated to providing affordable and convenient exercise and nutrition programs for women. The Curves program is based upon a 30-minute hydraulic circuit training program and diet options of moderate caloric restriction (1,200 to 1,600 calories per day) followed by a maintenance phase (2,600 calories per day). The program is designed to promote a gradual reduction in body fat while increasing muscle strength and mass.

Researchers in the Exercise & Sport Nutrition Laboratory at Baylor University conducted a study investigating the effectiveness and safety of the Curves fitness and diet program. The initial studies demonstrated that the Curves program promotes weight loss, improves biochemical profiles related to chronic diseases and increases fitness levels. Since each individual in the program has a unique genetic and environmental profile, the Baylor research team questioned whether the Curves nutrition plans could be assigned to participants with specific chronic disease profiles to improve outcomes. The purpose of this investigation was to determine if various dietary energy levels and macronutrient percentages may affect Curves participants with MS differentially in terms of the fat mass lost and the diagnostic MS criteria, namely: blood pressure, waist circumference, blood glucose, triglycerides and HDL..

Experimental Design

Participants

- 355 overweight/obese and sedentary women (46±11 yrs, 163±7 cm; 92±16 kg; 45±4% body fat)
- Participants signed informed consent statements, which detailed the experimental procedures, in adherence with the human subject guidelines of Baylor University.

Diet Protocol

- Based on baseline testing, subjects were assigned to:
  - An exercise and normal diet group (E);
  - An exercise & high calorie diet (HCD) group (2,600 kcal/d)
  - An exercise and HP diet group consisting of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks (7-15% CHO, 55-63% PRO, 30% FAT)
  - An exercise & HCD diet group consisting of 1,200 kcal./d for 1-wk and 1,600 kcal/d for 9 wks (55% CHO, 15% PRO, and 30% FAT)
- From weeks 10 through14, participants ingested 2,600 kcal/d (55% C, 15% P, 30% F) and returned to the week 1 plan (1,200 kcal), as described above, after three pounds of weight gain
- Diets contained 30% dietary fat with carbohydrate intake ranging from 7-15% on the HC and HE diets and protein intake ranging from 50-63% on the HP diet.

Training Protocol

- Subjects participated in a supervised 30-min hydraulic resistance training circuit program, with cardiovascular recovery stations, performed 3 days per week for 14 weeks.

Methods & Procedures

- DEXA measurements were obtained at 0, 10 and 14 weeks.
- Participants 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 14 software (Chicago, IL) and are presented as means ± SD from baseline for each diet group at week 10 and 14 of the study.

Results

- After 14 wks, participants who had MS had greater loss of DEXA fat mass (-2.29±2.6, -2.44±3.4; -2.78±4.2; -3.1±3.0 kg, p=0.046) and SBP (-1.3±13, -2.3±14; -5.6±18; -8.4±15 mmHg, p=0.01)
- No significant differences between groups in reductions in waist circumference (-2.8±6.6, -3.8±7.3; -3.2±8.3; -4.2±6.9 cm, p=0.42), glucose (-0.4±15, -2.1±15; -2.6±14; -4.1±14 %, p=0.85), triglycerides (5.6±42, 2.4±42; -5.5±33; 0.2±41%, p=0.67) or HDL (-3.9±19, -2.9±17; -0.1±19; -0.9±19 %, p=0.86)
- Analysis of group interactions revealed that MS subjects following the HCD lost significantly more weight than the non-MS group with results comparable to those observed in the HC and HP diet groups
- HP group showed more trends toward reduced chronic disease risk in general

Conclusions

- The Curves fitness and weight loss program promotes weight loss in post-menopausal women.
- Participants with MS may experience differential diet effects, depending on the macronutrient and calorie composition, in conjunction with a weight training program.

Funding

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