Exercise and Nutritional Strategies to Optimize Weight Loss



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Disclosures: Receive industry sponsored research grants and serve as a scientific and legal consultant. Serve as scientific consultant to Nutrabolt Inc. (Bryan, TX)





















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Dedicated to evaluating the interaction between exercise and nutrition on health, disease, and human performance

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ESNL Research









- Endurance / Overtraining
- Ergogenic Aids
 - o Carbohydrate
 - o Inosine
 - Phosphate
 - o BCAA/glutamine
 - o Creatine
 - o HMB
 - o Calcium Pyruvate
 - o CLA
 - o Protein/EAA
 - o CHO Gels (Honey)
 - o Ribose
 - o Green Tea / Caffeine
 - Meal Timing
 - o Colostrums
 - o D-Pinitol
 - o Coleus Forskohlii
 - o ZMA

- o Methoxyisoflavones
- o Ecdysterones
- Sulfo-Polysaccharides "Myostatin Inhibitor"
- o Calcium
- o Glucosamine and Chondroitin
- o Aromatase Inhibitors
- o BCAA, CHO, Leucine Protein Synthesis
- o Melatonin
- o Arachidonic Acid
- o Novel Milk Peptides
- o CoQ10
- o Soy Protein
- Beta Alanine
- o Russian Tarragon
- o Creatine Forms
- Acai Juice
- o Tart Cherry Powder
- Pre-workout Supplements
- Weight Loss & Maintenance





Historical Perspective of Obesity



- Obesity has historically been thought to simply be related to an imbalance between energy intake and expenditure.
- Recommendations have focused on:
 - reducing energy intake;
 - maintaining a high CHO/low fat diet; and,
 - Increasing physical activity (e.g., walking).









Contemporary View of Obesity



- The prevention and management of obesity through implementation of different types of exercise, programs; macronutrient diets; behavioral interventions; and/or medical interventions are at the forefront of obesity research.
- Seeing a paradigm shift from traditional approaches to personalized diet and exercise strategies.







of obesity.



Weight Loss

Considerations







- Rapid weight loss associated with reductions in FFM and REE while altering hormonal regulation of appetite and metabolism which makes it difficult to maintain weight loss.
- Goal should be to promote weight loss through diet and exercise while preventing loss of FFM and REE
- Weight loss programs typically involve caloric restriction and endurance exercise
- Resistance training can help maintain FFM during weight loss
- Diet and/or nutritional strategies may have differential affects on weight loss
- Need to identify effective weight maintenance strategies





Women's Health & Fitness Initiative







http://www.exerciseandsportnutritionlab.com/curves

Established in 2002 to find ways to strengthen women through exercise and diet and provide researchbased programs for Curves members





Women's Health & Fitness Initiative

Completed and Current Studies







- Curves II
- Curves Extension
- Curves Biomechanics
- Curves Exercise Intensity
- Curves Calcium
- Curves Special Populations (hypertension, diabetes, thyroid conditions, metabolic syndrome, etc.)
- Curves Elderly I
- Curves Osteoarthritis
- Curves Resistance Training (new equipment comparison)
- Curves in Middle Schools (2 studies)
- Curves Metabolism
- Curves Fit "Highly Trained Subjects"
- Curves/General Mills RTE Meal Replacement
- Curves 30/30 Study
- Curves Web-Based Fitness Challenge Study
- Curves vs. WW
- Curves Complete vs. WW, JC, & NS
- Curves Elderly II Nutrient Timing
- Curves Inflammation/Gene Expression
- Curves with Online Coaching
- Curves CIQ
- Curves Epigenetics I & II

http://www.exerciseandsportnutritionlab.com/curves





Training Program





- Resistance exercises included:
 - Leg extension/curls
 - Shoulder Press/Lat Pull
 - Squat Push/Pull
 - Seated bench press/rows
 - Hip Adduction/Abduction
 - Abdominal Curl/Back Extension
 - Leg press
 - Arm curls/extensions
- Low impact calisthenics or Zumba[®] during recovery stations





Women's Health & Fitness Initiative



Exercise & Diet Approach

- Use of circuit-style resistance-exercise that promotes increases in energy expenditure and maintenance of FFM during weight loss
- Hypoenergetic higher protein/low fat meal plans
- Online monitoring and weekly coaching follow-up
- Social interaction and encouragement
- Scientifically tested and validated programs



http://www.exerciseandsportnutritionlab.com/curves





Does Curves training meet recommended exercise guidelines?







Exercise Intensity

- Heart Rate Analysis (n=80)
 - Mean HR 119±15 bpm
 - 79% max HR
 - 63% of HRR
- Biomechanical Analysis
 - 61% 73% of 1RM
 - Reliability (r=0.71 to r=0.87)
- Metabolic Analysis
 - 63% VO₂ max (post-menopausal)
 - RER of 0.98
- Exercise intensity meets ACSM & NSCA guidelines

La Bounty et al. & Farris et al., FASEB J. LB93-94, 2006 Kreider et al. JSCR, 22(6):A77-78, 2008 Lockard et al., JSCR, In press, 2012









Curves Smart II



Caloric Expenditure



n = 1,031; 49.3±14 yrs; 174±40 lbs; 64.3±3 in JSCR, 22(6):A69-70, 2008

- Average energy expenditure from first 10 workouts from 1,031 clients at 7 different clubs:
 - 310±91 kcals







Curves Smart Intensity



Rating of Perceived Exertion

HR Intensity



n=48, 41±9 yrs, 65±2 inches, 191±35 lbs, 32±6 BMI, 42.9±5% fat, 13.55±7 weeks of training





Does Curves work?











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6 p = 0.001n = 161 4 2 0 Change (kg) -2 -4 -6 -8 -10 Nutri Metabol. 6/1/23, 2009 -12 10 14 0 Weeks ■HED 📲■ND 💶 VLCHP 🛹 LCMP 🛖 HCLP 🛹 CON

Body Mass



VHP group slightly better







Fat loss in all exercise & diet groups Slightly better fat loss in VHP group



Fat Mass







REE increased in HED group

REE maintained after 2 wk diet phase

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Resting Energy Expenditure







Variable	Impact of Curves		
Maximal Aerobic Capacity	↑ (7%)		
Maximal Strength (BP & LP)	↑ (10%)		
Hip & Waist Circumference	↓ (1.5 - 2")		
Resting DBP	↓ (4%)		
Total Cholesterol	↓ (4% during diet)		
LDL Cholesterol	↓ (3% during diet)		
Triglycerides	↓ (12%)		
Leptin	\downarrow (18% during diet; 17% overall)		
Fasting Insulin	\downarrow (19% during diet; 15% overall)		
Insulin Sensitivity	19% Improvement		

Nutri J. 9:59. 2010





Long-Term Weight Loss

Body Mass







Sharp et al., FASEB J. 2007; 21:lb 234





	14 Weeks of Train	ning
	Testing Intervals	
1 - 2 wks 1,200 kcal/d	9 Wk 1,600 kcal/d	4 Wk 2,600 kcal/d
Exercise Only,	HC, or HP Diets At 0. 10. & 14 W: 	Intermittent 2d @ 1,200 kcal/d
=467 5±11 yrs 63±7 cm 93±17 kg 5±5% fat	 Dietary Records (4-d) Psychometric Tests Body Composition/Bone Density (DEXA) Total Body Water (BIA) Hip & waist measurement Resting HR & BP Fasting Blood Samples (12h) Resting Energy Expenditure (REE) 6 Minute Walk Test 	 At 0 & 14 wks: Maximal Stress Test 1RM Bench Press 80% of 1RM on Bench Press 1RM Leg Press 80% of 1RM on Leg Press Side effects were monitored by an RN on a weekly basis

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Scanned Mass









70 – 85% of weight loss was fat

VHP diet promotes greatest fat loss











78 kcal/d 548 kcal/wk 0.67 lbs/mo *8.1 lbs/year*

Resting Energy Expenditure







Variable	Impact of Curves		
Body Fat	↓ (1.5 – 2%)		
Waist & Hip	↓ (1 - 4%)		
Resting HR	↓ (2.6%)		
Resting SBP	↓ (3.0%)		
Resting DBP	↓ (3.5%)		
1 RM Bench Press	↑ (5.1%)		
1 RM Leg Press	↑ (13%)		
BP Endurance	↑ (21%)		
LP Endurance	↑ (36%)		

n=467 Statistically significant time effects (p<0.05).

FASEB J. 2007 21:lb 227 & 229





Variable	Impact of Curves		
Maximal Aerobic Capacity (n=467)	↑ (8%)		
Total Cholesterol (n=335)	↓ (3-6%)		
Triglycerides (n=335)	↓ (2-7%)		
Glucose (n=335)	↓ (1-3%)		
Leptin (n=216)	↓ (17-21%)		
Fasting Insulin (n=216)	↓ (2-13%)		
Insulin Sensitivity (n=216)	↑ (9-23%)		

Statistically significant time effects (p<0.05).

FASEB J. 2007 21:lb 227, 229, 230





Variable	Impact of Curves	
Physical Functioning	↑ (24-29%)	
Social Functioning	↑ (11%)	
Vitality	↑ (23-26%)	
Mental Health	↑ (7-8%)	
Appearance Evaluation	↑ (19%)	
Body Area Satisfaction	↑ (14-15%)	
Overweight Preoccupation	↑ (16-18%)	
Self-Classified Weight	↓(3-7%)	

n=467 Statistically significant time effects (p<0.05).

FASEB J. 2007 21:lb 231 & 232





Is the program safe and effective for medically controlled or high risk populations?







Curves - Special Populations

	14 Weeks of Curves Train	ing	
	Testing Intervals	Ļ	
1 Wk 1,200 kcal/d	9 Wk 1,600 kcal/d		4 Wk 2,600 kcal/d
EX, MHP, VHP, or HCHO Diets			Intermittent 2d @ 1,200 kcal/d
(n=128) 50±10 yrs 95.3±21 kg 64±3 in 46.1±5 % BF 35.9±7 kg/m² BMI	 At 0, 2, 10, 10.4, & 14 W: Dietary Records (4-d) Psychometric Tests Body Composition/Bone Density (DEXA) Total Body Water (BIA) Hip & waist measurement Resting HR & BP Fasting Blood Samples (12h) 	 At <i>0</i>, . . Side e a wee 	10, & 14 wks: Maximal Stress Test 1RM Bench Press 80% of 1RM on Bench Press 1RM Leg Press 80% of 1RM on Leg Press effects were monitored by an RN on ekly basis





Curves - Special Populations



Weight loss greater in diet groups






Curves - Special Populations







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Curves - Special Populations

Resting Energy Expenditure

19 1700 18.5 1650 18 1600 kcals/kg/day 17.5 kcals/day 1550 17 16.5 1500 16 1450 15.5 1400 15 FASEB J. 2008: Ib pp 34. 14.5 1350 10 0 14 0 10 Weeks Weeks MHP VHP -CHO Exercise VHP -CHO

Resting Energy Expenditure

n = 137, T= 0.34; I = 0.002

n = 137, T= 0.58; I = 0.001



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Curves - Special Populations

Variable	Impact of Curves
Resting HR	↓ (3-4%)
Resting SBP & DBP	↓ (2-6 mmHg)
1 RM Bench Press	↑ (12%)
1 RM Leg Press	↑ (12%)
BP Endurance	↑ (14%)
LP Endurance	↑ (17%)
Maximal Aerobic Capacity	↑ (6%)
Total Cholesterol	↓ (5-10%)
Triglycerides	↓ (6-9%)
Glucose	↓ (4-7%)

Mean effects over time





	14 Weeks of Training	
	Testing Intervals	
1 Wk 1,200 kcal/d	9 Wk 1,600 kcal/d	4 Wk 2,100 kcal/d
Exercise Only, HCHO or H	P Diets	Intermittent 2d @ 1,200 kcal/d
• 55 Women: • 66 ±5 yrs (60 – 75) • 174 ±23 lbs • 63.4 ±2 in • 44 ±4 % BF	 At 0, 10, & 14 W: Dietary Records (4-d) Psychometric Tests Body Composition/Bone Density (DEXA) Total Body Water (BIA) Hip & waist measurement Resting HR & BP Fasting Blood Samples (12h) Resting Energy Expenditure (REE) 6 Minute Walk Test Balance (Eunstional Testing 	 At 0 & 14 wks: Maximal Stress Test 1RM Bench Press 80% of 1RM on Bench Press 1RM Leg Press 80% of 1RM on Leg Press Side effects were monitored by an RN on a weekly basis

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HP group lost more weight!





Body Fat





HP group lost twice as much body fat!





Resting Energy Expenditure







Variable	Impact of Program
Waist & Hip	↓ (2 cm)
Resting HR	↓ (2.3cm)
Resting SBP	↓ (4 mmHg @ 10 wk)
Resting DBP	↓ (5 mmHg @ 10 wk)
1 RM Bench Press	↑ (21%)
1 RM Leg Press	↑ (32%)
BP Endurance	↑ (29%)
LP Endurance	↑ (23%)
Maximal Oxygen Uptake	↑ (12%)
6 Minute Walk-Test	↑ (6%)

Statistically significant time effects (p<0.05).

Galbreath et al. FASEB J. 2008; lb 779.





Curves - Metabolic Syndrome







Metabolic Syndrome







Metabolic Syndrome







Retrospective Analysis of Protein- and Carbohydrate-Focused Diets Combined with Exercise on Metabolic Syndrome Prevalence in Overweight and Obese Women.



Lockard et al. Metab Syndr Relat Disord. 2015 Nov 10.

- We retrospectively analyzed effect of protein-focused (PRO, 1.14 g/kg/day) and carbohydrate-focused (CHO, ~2.2 g/kg/day) diets (~1600 kcals) combined with 10 weeks of circuit exercise training in sedentary overweight/obese women (*N* = 661, age 46 ± 11 years) on metabolic syndrome (MetS).
- Primary (MetS), secondary (MetS z-scores and individual MetS components), and tertiary outcomes [BMI by WHO cut points] were analyzed using chi-square, GLM, and McNemar's tests.
- Both groups experienced significant weight loss, improvements in fitness, and reductions in MetS prevalence from baseline to follow-up (PRO: 49% to 42%, CHO: 42% to 36%, both P < 0.01).
- MetS z-score improvement (~66.5%) was similar for both groups.
- No significant differences for waist circumference (-0.28 \pm 0.02 vs. -0.28 \pm 0.025 cm, P = 0.97), glucose (-0.07 \pm 0.03 vs. -0.08 \pm 0.04 mM, P = 0.87), triglycerides (-0.16 \pm 0.04 vs. -0.09 \pm 0.04 mM, P = 0.20), high-density lipoprotein cholesterol (-0.21 \pm 0.03 vs. -0.19 \pm 0.04 mM, P = 0.68), and systolic BP (-0.16 \pm 0.4 vs. -0.24 \pm 0.05 mmHg, P = 0.26).
- DBP showed a minor advantage for the PRO group (-0.14 \pm 0.05 vs. -0.30 \pm 0.05 mmHg P = 0.02).
- When stratified by BMI, those with morbid obesity did not show a significant improvement in MetS while following a PRO-focused diet.
- Low-moderate calorie diet partitioned for CHO and PRO is equally effective when combined with a structured exercise program for reducing the prevalence of MetS prevalence in overweight women.





A Carbohydrate-Restricted Diet During Resistance Training Promotes More Favorable Changes in Body Composition and Markers of Health in Obese Women with and Without Insulin Resistance

Kreider et al. Physician and Sportsmedicine. 32:2, May 2011.

- 221 obese women participated in a 10-wk weight loss and exercise program
- Subjects were prescribed low-fat (30%) isoenergetic diets that consisted of 1200 kcals per day for 1 week and 1600 kcals per day for 9 weeks with HC or HP.
- Subjects were retrospectively stratified into lower (LH) or higher (HH) than 3.5 HOMA groups.
- A HP diet promoted more favorable changes in weight loss, fat loss, and markers of health in obese women who initiated an exercise program compared with a HC diet.
- Subjects with HH levels, experienced greater reductions in BG on a HP diet









Effects of exercise and diet-induced weight loss on markers of inflammation II: impact on microRNA 21 and microRNA 146a expression and their regulatory role

Simbo et al., JISSN, 2013; 10(Suppl 1): P24..

- Forty-five overweight and sedentary women (48.16±10.5 yr, 45.9±4.4% body fat, BMI 35.6±5.6 kg/m2) were randomized into a control group (C, n=18) or an exercise and diet-induced weight loss group (EX, n=27).
- Participants followed an energy-restricted diet (1,200 kcal/d for 1 week and 1,500 kcal/d for 11weeks; 30% CHO, 45% P, and 25% F) while participating in a circuit resistance-training (3d/wk) program.
- MicroRNA (21 and 146a) and mRNA of IL-6, TNF-a, (PTEN, TRAF6)/PI3k/AKT/NF-kB signaling pathway expression levels were measured in serum/WBC by real-time RT-PCR.
- Exercise and diet-induced weight loss affects molecular changes in circulating microRNAs, significantly affects microRNA 21 and its target gene PTEN, mRNA TNF-a, and mRNA IL-6 levels suggesting a anti-inflammatory response compared to a control group.









Is the program more effective than other popular weight loss programs?







Comparative Effectiveness Trial I

8.5 Months of C	urves Training		
	Testing Intervals	,	
1 Wk 1,200 kcal/d Curves/GM Pro	9 Wks 1,600 kcal/d ogram (HCHO) versus	6 Months 2,100 kcal/d Intermittent 2d @ 1,200 kca	ıl∕d if gain 3 lbs
Special K® We N=77 42.6±10 yrs 89±14 kg 33.5±5 kg/m2 44.1±4 % fat JADA. 111(6):828-43, 2011	 At 0, 2, 10, 14, 22, 34 Dietary Records (4-c) Psychometric Tests Body Composition/E (DEXA) Total Body Water (B) Hip & waist measure Resting HR & BP Fasting Blood Sample Resting Energy Expension 	4 W:) Bone Density IA) ement les (12h) enditure (REE)	 At 0, 10, 14, 22, 34 W : Maximal Stress Test 1RM Bench Press 80% of 1RM on Bench Press 1RM Leg Press 80% of 1RM on Leg Press Side effects were monitored by an RN on a weekly basis





Weight Loss













Physical Actvity

Physical Activity



JADA. 111(6):828-43, 2011





Comparative Effectiveness Trial II



Curves with Zumba (I & II 30:45:25; III 45:30:25) Weight Watchers Program & Counseling

- At 0, 4, 6, 10, 12, 16 W:
 - Dietary Records (4-d)
 - Psychometric Tests
 - IPAQ
 - Body Composition/Bone Density (DEXA)
 - Total Body Water (BIA)
 - Hip & waist measurement
 - Resting HR & BP
 - Fasting Blood Samples (12h)
 - Resting Energy Expenditure (REE)

- At O & 16W:
 - Maximal Stress Test
 - 1RM Bench Press
 - 80% of 1RM on Bench Press
 - 1RM Leg Press
 - 80% of 1RM on Leg Press
- Side effects were monitored by an RN on a weekly basis

Mardock, et al., JISSN, 8(Suppl 1):P4, 2011



N = 51

 35 ± 8 yrs

90±14 kg

47+7% fat

 $34 \pm 5 \text{ kg/m}^2$







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Mardock, et al., JISSN, 8(Suppl 1):P4, 2011



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Body Fat

REE

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Mardock, et al., JISSN, 8(Suppl 1):P4, 2011



Physical Activity





Mardock, et al., JISSN, 8(Suppl 1):P4, 2011



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Comparative Effectiveness Trial III

12 Weeks					
	Testing Intervals				

No Diet or Exercise Control; Curves Complete® 90-day Challenge (CC) with 30:45:25 C:P:F, Weight Watchers® Points Plus (WW), Jenny Craig® (JC), or Nutrisystem® Advance Select[™] (NS)

N=126 44±12 yr • IPAO 44.8±5% fat

- At *O*, *4*, *8*, *12 W*:
 - Dietary Records (4-d)
 - **Psychometric Tests**
 - Body Composition/Bone Density (DEXA)
 - Total Body Water (BIA)
 - Hip & waist measurement
 - Resting HR & BP
 - Fasting Blood Samples (12h)
 - **Resting Energy Expenditure** (REE)

• At O & 12W:

- Maximal Stress Test
- 1RM Bench Press
- 80% of 1RM on Bench Press
- 1RM Leg Press
- 80% of 1RM on Leg Press
- Side effects were monitored by an RN on a weekly basis

Baetge et al., FASEB J; LB, 2012

 35.4 ± 6 kg/m²





Diet Comparison

	Control	Weight Watchers	Nutrisystem	Jenny Craig	Curves
Diet	No	Point Plus Program	Advance Select Online Program	Online Program	Curves Complete
Food Provided	No	No	Yes	Yes	No
Counseling	No	Weekly Group Meetings	Online Support Available	Online Support Available	Weekly Individual Progress Checks
Exercise Program	No	Encouraged but not supervised	Encouraged but not supervised	Encouraged but not supervised	Curves Circuit Training with Zumba
Cost	None	~ \$135	~ \$1,200 - \$1,500	~ \$1,200 - \$1,500	\$199





Body Mass





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Fat Mass

Fat Free Mass

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Body Fat



Baetge et al., FASEB J; LB, 2012

Weeks



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Current Research

Are there markers that can predict weight loss success on different diets?







Variability of Body Composition Results

						95% Confidence Interval for Mean			
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Body Mass	HP	373	-4.28	3.56	.18	-4.64	-3.91	-16.56	6.01
	HC	293	-3.43	4.03	.23	-3.90	-2.97	-35.61	4.76
Fat Mass	HP	373	-3.23	3.72	.19	-3.61	-2.85	-50.39	10.65
	HC	293	-2.48	3.02	.17	-2.83	-2.13	-23.97	9.97
FFM	HP	373	78	2.03	.10	99	57	-9.89	5.78
	HC	293	60	2.08	.12	84	36	-12.97	7.31

Why is there so much variation in weight loss success when women adhere to the same exercise and diet intervention?





Effects of a Carbohydrate Restricted, High Protein, High Fat Diet on Weight Loss and Health Outcomes in Women Participating in the Curves Fitness & Weight Loss Program

- Recent research from Stanford suggests that stratification of participants to baseline genes (i.e., fatty acid binding protein 2 [FABP2] Ala54Thr; peroxisome proliferator-activated receptor-gamma [PPARG or γ] Pro12Ala; β2 adrenergic receptor (ADRB2) Arg16Gly and Gln27Glu; and β3 adrenergic receptor (ADRB3) Arg64Trp) better predicts success to weight loss programs.
- DNA methylation assessment has also been proposed to help predict weight loss success.



Dopler Nelson et al. AHA, 2010



Milagro et al. FASEB J. 25, 1378-1389, 2010





Effects of a Carbohydrate Restricted, High Protein, High Fat Diet on Weight Loss and Health Outcomes in Women Participating in the Curves Fitness & Weight Loss Program

- Purpose of the study is to determine:
 - whether a higher fat, more CHO restricted diet may be an effective alternative to our current HP curves diet;
 - whether baseline gene expression and/or DNA methylation correlate to success on different diets; and,
 - how these diets affect inflammatory gene expression and cytokines
- 100 overweight and sedentary women will participate in a 24-week weight loss study.
- Participants will be matched and randomly assigned to one of four groups including: 1.) a non-exercise, no diet intervention control group; 2.) an AHA recommended high carbohydrate, low protein, and low fat diet (55%, 15%, 30%) intervention group (HC-LF); 3.) the Curves Complete moderate carbohydrate, high protein, low fat diet (30%, 45%, 25%) (CC-I); or, 4.) the Curves Complete carbohydrate restricted, high protein, moderate fat diet (20%, 45%, 35%) and supervised resistance-based exercise program (CC-II).
- Dieting groups will consume 1,400 kcals/d for 1-week and 1,500 kcals/d at the prescribed macronutrient intakes for 23 weeks.





Overview

Familiarization	Baseline (T1)	4 Weeks (T2)	8 Weeks (T3)	12 Weeks (T4)	16 Weeks (T5)	20 Weeks (T6)	24 Weeks (T7)	
Familiarization Session	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review	
Complete Paperwork	IPAQ ^a	IPAQ	IPAQ Dodu Mainht	IPAQ	IPAQ Body Maisht	IPAQ Dodu Mainht	IPAQ Dadu Maisht	
Review Medical history Physical Exam	Body Weight Hip and Waist Measurements Resting Energy	Body Weight Hip and Waist Measurements Resting Energy	Body Weight Hip and Waist Measurements Resting Energy	Body Weight Hip and Waist Measurements Resting Energy	Body Weight Hip and Waist Measurements Resting Energy	Body Weight Hip and Waist Measurements Resting Energy	Body Weight Hip and Waist Measurements Resting Energy	
Fasting Blood	Expenditure	Expenditure	Expenditure	Expenditure	Expenditure	Expenditure	Expenditure	
Determination of Qualifications to	Resting BP^{b} and HR^{c}	Resting BP ^a and HR ^b	Resting BP^{a} and HR^{b}	Resting BP^{a} and HR^{b}	Resting BP ^a and HR ^b	Resting BP^{a} and HR^{b}	Resting BP ^a and HR ^b	
Participate	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA	
Randomized Group Assignment (n=100):	Fasting Blood Fat-related Genes DNA Methylation Inflammatory Gene	Fasting Blood Survey Completion ^f	Fasting Blood Survey Completion ^f	Fasting Blood Gene Expression DNA Methylation	Fasting Blood Survey Completion ^f	Fasting Blood Gene expression & Cytokines	Fasting Blood Gene Expression DNA Methylation	
1. Control 2. AHA 3. CC-I 4. CC-II	expression & Cytokines Maximal Cardiopulmonary Exercise Test			Maximal Cardiopulmonary Exercise Test 1RM ^e and 80% 1RM		Survey Completion ^f	Maximal Cardiopulmonary Exercise Test 1RM ^e and 80% 1RM	
Phase I – 1,400 kcals/d for 1 week Phase II – 1,500 kcals/d for 23 weeks	1RM ^e and 80% 1RM Isotonic Leg Press and Bench Press			Isotonic Leg Press and Bench Press Measures			Isotonic Leg Press and Bench Press Measures	
	Measures Survey Completion ^f			Survey Completion			Survey Completion	
^a International Physical Activity Questionnaire; ^b Blood Pressure; ^c Heart Rate; ^d Dual Energy X-ray Absorptiometry; ^e Repetition Maximum ^f Standardized quality of life (SF-36), body image, self-esteem, and eating satisfaction inventories Control – No diet or exercise group AHA – American Heart Association Recommended Diet (Phase I 1,400 kcals/d, Phase II 1,500 kcals/d at 55% C, 15% P, 30% F) and Exercise Program CC-I - Curves Complete Diet I (Phase I 1,400 kcals/d, Phase II 1,500 kcals/d at 30% C, 45% P, 25% F) and Exercise Program								

CC-II - Curves Complete Diet II (Phase I 1,400 kcals/d, Phase II 1,500 kcals/d 20% C, 45% P, 35% F) and Exercise Program





INFLUENCE OF METABOLIC GENOTYPING ON WEIGHT LOSS AND BODY COMPOSITION IN WOMEN PARTICIPATING IN A 6 MONTH DIET AND EXERCISE PROGRAM: PRELIMINARY FINDINGS

Sanchez et al., The FASEB Journal. vol. 29 no. 1 Supplement LB240







Effects of Diet Type Selection Based on Response to a Carbohydrate Intolerance Questionnaire and Genetic Screening on Success to a Weight Loss and Exercise Program

- Purpose is to determine whether assignment of participants to Curves diets based on baseline responses to the INS-CIQ and ILG genetic screening promotes greater adaptations to the Curves exercise and diet interventions.
- 80 sedentary and overweight women will undergo preparticipation screening and gene assessment.
- Participants will be assigned to the following groups based on baseline testing:1.
 - +CIQ , GEN-HC
 - +CIQ, GEN-HP
 - -CIQ, GEN-HC
 - –CIQ, GEN-HP
- Diets will be 1,400 kcal/d (1-wk) and 1,500 kcals/d (23 wks) on CC-I (30%C, 45%P, 25%F) or CC-II (20%C, 45%P, 35%F)







Overview

Familiarization	Baseline	4 Weeks	8 Weeks	12 Weeks	16 Weeks	20 Weeks	24 Weeks
	(11)	(12)	(15)	(14)	(15)	(10)	(17)
Familiarization Session	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review	Diet Record Review
Complete Paperwork	IPAQª	IPAQ	IPAQ	IPAQ	IPAQ	IPAQ	IPAQ
Review Medical history	Body Weight	Body Weight	Body Weight	Body Weight	Body Weight	Body Weight	Body Weight
Physical Exam							
Fasting Blood	Hip and Waist Measurements	Hip and Waist Measurements	Measurements	Hip and Waist Measurements	Hip and Waist Measurements	Hip and Waist Measurements	Hip and Waist Measurements
Genetic Screening	Resting Energy Expenditure	Resting Energy Expenditure	Resting Energy Expenditure	Resting Energy Expenditure	Resting Energy Expenditure	Resting Energy Expenditure	Resting Energy Expenditure
Determination of							
Qualifications to Participate	Resting BP ^D and HR ^c	Resting BP ^a and HR ^b	Resting BP ^a and HR ^b	Resting BP ^a and HR ^b	Resting BP ^a and HR ^b	Resting BP ^a and HR ^b	Resting BP ^a and HR ^b
Group Assignment	DEXA ^c Scan/BIA	DEXA: Scan/BIA	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA	DEXA ^c Scan/BIA		DEXA ^c Scan/BIA
Group Assignment.	Fasting Blood		Fasting Blood	Fasting Blood	Fasting Blood		Fasting Blood
1. +CIQ, GEN-HC	ILG Gene Assessment DNA Methylation	Fasting Blood	Survey Completion ^f	Gene Expression DNA Methylation	Survey Completion ^f	Fasting Blood	Inflammatory Gene Expression &
3. –CIQ, GEN-HC	Inflammatory Gene	Survey				Survey Completion ^f	Cytokines
4. –CIQ, GEN-HPI	Expression & Cytokines	Completion		Maximal Cardiopulmonary			Maximal
Randomized Diet	Maximal			Exercise Test			Cardiopulmonary
Assignment	Exercise Test			1RM ^e and 80% 1RM			LXEICISE TEST
CC-I (30%C, 45%P, 25%F)	1RM ^e and 80% 1RM			Isotonic Leg Press and Bench Press			1RM ^e and 80% 1RM Isotonic Leg Press
CC-II (20%C, 45%P, 35%F)	Isotonic Leg Press and			Measures			and Bench Press
Phase I – 1,400 kcals/d for 1 week	Measures			Survey Completion ^f			ivieasures
Phase II – 1,500 kcals/d for	_						Survey Completion ^f
23 weeks	Survey Completion ^f						
^a International Physical Activity Questionnaire; ^b Blood Pressure; ^c Heart Rate; ^d Dual Energy X-ray Absorptiometry; ^e Repetition Maximum;							
Standardized quality of life (SF-36), body image, self-esteem, and eating satisfaction inventories							
CIQ – Carbonydrate Intolerance Questionnaire (+ or – for carbonydrate Intolerance)							
CI – Curves Complete Diet I (Phase I 1,400 kcals/d, Phase II 1,500 kcals/d at 30% C, 45% P, 25% F)							

CII – Curves Complete Diet II (Phase I 1,400 kcals/d, Phase II 1,500 kcals/d at 20% C, 45% P, 35% F)





Effects of matching diet type to obesity-related genotype on body composition changes in women during a sixmonth resistance exercise training and walking program

Coletta et al., JISSN2015, 12(Suppl 1):P16 doi:10.1186/1550-2783-12-S1-P16







Summary





http://www.exerciseandsportnutritionlab.com/curves





- Incorporating resistance exercise and higher protein / low fat diets can be an effective way to promote fat loss without loss in FFM or REE
- Program is safe and effective for healthy women, women at higher risk for chronic disease, elderly, and women with controlled medical conditions.
- Those initiating program with MS may experience greater benefit
- Women with MS or IR following a HP / low fat diet may have greater results on TG and BG.
- Weight loss can effectively be maintained with consistent exercise and modest dietary modification.

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Exercise and Nutritional Strategies to Optimize Weight Loss



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