

## International Journal of Research in Exercise Physiology

Original Research Article

# Effectiveness of the ACE Mover Method to Promote Healthy Eating

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### ABSTRACT

**Aim:** The purpose of this study was to examine the effectiveness of the ACE Mover Method educational model at modifying healthy eating. **Methods:** Participants were randomized to one of the following groups: 1. The treatment group (N=14) received a 10wk ACE Mover Method intervention consisting of weekly, client-centered educational sessions focused on healthy eating in addition to performing their 10wk personalized exercise program, and 2) The second group (N=14) performed their 10wk personalized exercise program and served as the controls. **Results:** After 10wk, cardiometabolic health improved ( $p < 0.05$ ) in both control and Mover Method groups. With the exception of waist circumference ( $p < 0.05$ ), the changes from baseline to 10wk across various cardiometabolic health variables were similar for both groups ( $p > 0.05$ ). Healthy eating scores were similar at baseline between groups. In the control group, there were no significant ( $p > 0.05$ ) changes between baseline and 10wk in any healthy eating category. In contrast, in the Mover Method group, there were significant improvements ( $p < 0.05$ ) from baseline to 10wk within all healthy eating categories (fruits, vegetables, fiber). **Conclusions:** This preliminary data supports the ACE Mover Method as an effective approach for professionals to address and modify behavior change as it pertains to diet in a community setting. This shows that the ACE Mover Method may be an effective approach for modifying behaviors that occur outside of the gym to make healthier lifestyle decisions that can be used to manage or prevent a wide variety of chronic diseases.

Keywords: Behavior Change, Cardiometabolic Health, Diet, Health Coaching, Personalized Exercise.

### Introduction

A key element of using the ACE Integrated Fitness Training (IFT) Model is to empower clients to make behavioral changes to improve their health, fitness, and overall quality of life

is the adoption of the ACE Mover Method<sup>1</sup>, which is founded on the following tenets:

- Each professional interaction is client-centered, with a

- recognition that clients are the foremost experts on themselves.
- Powerful open-ended questions and active listening are utilized in every session with clients.
  - Clients are genuinely viewed as resourceful and capable of change.

The way in which health and exercise professionals apply the ACE Mover Method is through the ACE ABC Approach:

- Ask open-ended questions
- Break down barriers
- Collaborate

Every client–personal trainer interaction offers an opportunity to utilize coaching skills to help build rapport while positioning the client as an active partner in his or her behavior-change journey. Asking questions leads to the identification of goals and options for breaking down barriers, which in turn leads to collaborating on next steps.

Preliminary research on the ACE Mover Method has been encouraging<sup>2</sup>. Our group randomized participants to one of the following groups: 1) the treatment group (N=14) received a 12wk ACE Mover Method intervention consisting of weekly, client-centered educational sessions in addition to performing their 12wk personalized IFT-guided exercise program, and 2) the second group (N=14) performed their 12wk personalized IFT-guided exercise

program and served as the controls. After 12wk, cardiometabolic health and cardiorespiratory fitness improved ( $p < 0.05$ ) in both control and Mover Method groups. With the exception of waist circumference ( $p < 0.05$ ), the changes from baseline to 12wk across various cardiometabolic health variables and cardiorespiratory fitness were similar for both groups ( $p > 0.05$ ). Healthy behavior and lifestyle scores were similar at baseline between groups. In the control group, there were no significant ( $p > 0.05$ ) changes between baseline and 12wk in any healthy behavior and lifestyle scores. In contrast, in the Mover Method group, there were significant improvements ( $p < 0.05$ ) from baseline to 12wk within all healthy behavior and lifestyle change categories.

Our previous findings provided preliminary evidence that exercise programming founded upon the ACE IFT model guidelines, *including the ACE Mover Method paradigm*, is effective at facilitating healthy lifestyle changes and improving cardiometabolic health. Nevertheless, further research is needed. We think it would be interesting to examine the results of the ACE ABC Approach when used to coach clients on behaviors that occur outside of the gym. Specifically, in this study, we seek to determine how effective the ACE Mover Method Approach is in supporting clients with healthy eating.

## Methods

### Participants

Nonsmoking men and women (N=24) were recruited from a local university and surrounding community via advertisement through the university website, local community newspaper, and word-of-mouth. This study was approved by the Human Research Committee at Western Colorado University. All participants provided informed consent in advance of their participation in the study.

### Experimental Design

Participants were randomized to one of the following groups:

1. The treatment group (N=12) received a 10wk ACE Mover Method intervention consisting of weekly, client-centered educational sessions focused on healthy eating in addition to performing their 10wk personalized exercise program.
2. The second group (N=12) performed their 10wk personalized exercise program and served as the controls.

Participants in both groups completed a 10wk personalized exercise training program based on the American Council on Exercise (ACE) Integrated Fitness Training (IFT) model guidelines<sup>3</sup>. The personalized exercises training program was comparable to that we have used previously and details can be found elsewhere<sup>4</sup>. Each participant consulted

with a team of health and fitness professionals and was assigned a Western Colorado University undergraduate or graduate student who served as their personal trainer. The student personal trainers worked directly under the supervision of qualified MSc- and PhD-trained exercise physiologists. The exercise team designed and progressed an appropriate and safe personalized exercise program using the evidence-based ACE IFT model guidelines for both Cardiorespiratory and Muscular Training. The student personal trainers coached members during their exercise sessions, provided motivational support, engaged in spotting, and corrected exercise technique.

Participants within both groups completed baseline and post-program testing. Assessments of anthropometric measures and cardiometabolic risk factors were obtained at baseline and 10wk. At baseline, the talk test<sup>5</sup> was performed to identify ventilatory thresholds (VT1 and VT2) for Cardiorespiratory Training. The procedures for all our assessments were consistent with our previous research and detailed elsewhere<sup>4</sup>. Additionally, at baseline and post-program, participants also performed an assessment for healthy eating habits using the Simple Lifestyle Indicator Questionnaire.

### ACE Mover Method Intervention

The ACE Mover Method intervention paralleled the exercise training program and lasted 10 weeks. Participants received once weekly ~10min ACE Coach Approach educational sessions that were embedded within their normal exercise routine. The specific ACE Coach Approach sessions were individualized to each participant's unique goals and needs. Researchers were provided with examples of ACE Mover Method and Coach Approach scenarios as part of their training. Every participant–researcher interaction was a collaboration aimed at positive lifestyle change (i.e., healthy eating habits) and consisted of the following steps:

- **Step 1** of this process involved asking powerful questions to identify what the participant hoped to accomplish by working with the researcher. Open-ended questions were posed to spark the discussion.
- **Step 2** involved asking more questions to discover what potential obstacles may get in the way of the participant reaching his or her specific goals. Questions like “What do you need to *start* doing now to move closer to your goals?” and “What do you need to *stop* doing that will enable you to reach your goals?” were posed to participants.
- **Step 3** focused on collaboration as the participant and researcher worked together to set SMART goals and establish specific steps to take action toward those goals. The participant was permitted to lead the discussion of how to monitor and measure progress in order to empower him or her to take ownership of their personal behavior-change journey.

### Statistical Analysis

All analyses were performed using SPSS Version 30.0 (IBM, Armonk, NY) and GraphPad Prism 10.1 (San Diego, CA). Measures of centrality and spread are presented as mean  $\pm$  standard deviation (SD). Primary outcome measures included cardiometabolic risk factors and dietary habits as assessed at baseline and 10wk. Paired and independent t-tests were used to compare within-group and between-group changes from baseline to 10wk for all primary outcome measures. Wilcoxon Signed Rank Test and the Mann-Whitney U Test were used with ordinal data. The probability of making a Type I error was set at  $p < 0.05$ .

### Results

The physical and physiological characteristics at baseline and 10wk for participants who completed the study are presented in Table 1. After 10wk, cardiometabolic health improved ( $p <$

0.05) in both control and Mover Method groups. With the exception of waist circumference ( $p < 0.05$ ), the changes

from baseline to 10wk across various cardiometabolic health variables were similar for both groups ( $p > 0.05$ ).

**Table 1.** Physical and physiological characteristics at baseline and 10wk for control and Mover Method groups (values are mean  $\pm$  SD).

Outcome variable	Control group (N=12)		Mover Method group (N=12)	
	Baseline	Post-Program	Baseline	Post-Program
Age (yr)	52.3 $\pm$ 15.6	-----	52.0 $\pm$ 17.0	-----
Body mass (kg)	78.2 $\pm$ 22.7	77.7 $\pm$ 22.4*	84.9 $\pm$ 17.3	84.4 $\pm$ 17.0
Waist circumference (cm)	84.0 $\pm$ 15.4	84.2 $\pm$ 14.9	88.6 $\pm$ 10.2	86.3 $\pm$ 9.4*†
Systolic BP (mm Hg)	126.3 $\pm$ 14.4	121.7 $\pm$ 13.8*	126.8 $\pm$ 16.3	121.0 $\pm$ 15.8*
Diastolic BP (mm Hg)	85.1 $\pm$ 5.9	81.3 $\pm$ 6.4*	81.8 $\pm$ 9.7	78.0 $\pm$ 7.7*
Total cholesterol (mg·dL <sup>-1</sup> )	176.0 $\pm$ 50.1	184.6 $\pm$ 50.3	196.4 $\pm$ 31.8	192.8 $\pm$ 29.8
HDL cholesterol (mg·dL <sup>-1</sup> )	57.8 $\pm$ 22.3	62.6 $\pm$ 20.5*	55.9 $\pm$ 14.2	58.9 $\pm$ 12.5*
LDL cholesterol (mg·dL <sup>-1</sup> )	98.0 $\pm$ 31.7	96.8 $\pm$ 35.2	116.0 $\pm$ 30.2	109.4 $\pm$ 25.9*
Triglycerides (mg·dL <sup>-1</sup> )	108.4 $\pm$ 44.8	100.3 $\pm$ 30.9	92.0 $\pm$ 26.8	90.7 $\pm$ 21.6
Blood glucose (mg·dL <sup>-1</sup> )	90.9 $\pm$ 10.2	88.0 $\pm$ 9.1	89.8 $\pm$ 5.3	87.7 $\pm$ 4.3*
MetS z-score	-2.17 $\pm$ 3.09	-2.71 $\pm$ 2.80	-2.38 $\pm$ 1.43	-3.33 $\pm$ 1.24*

\* Within-group change is significantly different from baseline,  $p < 0.05$ ; † Change from baseline is significantly different from control group,  $p < 0.05$ .

*Changes in healthy eating habits*

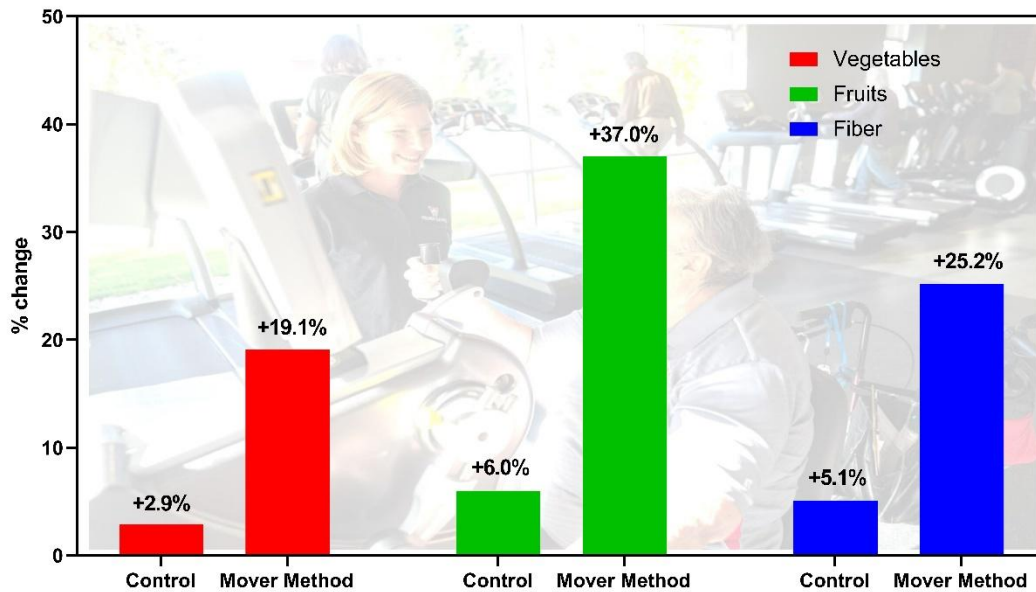
The healthy eating habit scores at baseline and 10wk for participants who completed the study are presented in Table 2. Healthy eating scores were similar at baseline between groups. In the control group, there were no significant ( $p > 0.05$ ) changes between baseline and 10wk in any healthy eating

category. In contrast, in the Mover Method group, there were significant improvements ( $p < 0.05$ ) from baseline to 10wk within all healthy eating categories. The % change from baseline to 10wk across all healthy eating categories in both control and Mover Method groups are presented in Figure 1.

**Table 2.** Healthy eating scores at baseline and 10wk for control and Mover Method groups (values are mean  $\pm$  SD).

Outcome variable	Control group (N=12)		Mover Method group (N=12)	
	Baseline	Post-Program	Baseline	Post-Program
Nutrition #1 (vegetables)	3.08 $\pm$ 1.08	3.17 $\pm$ 0.94	3.50 $\pm$ 1.17	4.17 $\pm$ 0.83*†
Nutrition #2 (fruits)	2.83 $\pm$ 0.83	3.00 $\pm$ 0.43	2.92 $\pm$ 0.79	4.00 $\pm$ 0.74*†
Nutrition #3 (fiber)	3.33 $\pm$ 0.78	3.50 $\pm$ 0.80	3.33 $\pm$ 1.07	4.17 $\pm$ 0.58*†

\* Within-group change is significantly different from baseline,  $p < 0.05$ ; † Change from baseline is significantly different from control group,  $p < 0.05$ .



**Figure 1.** The % change in healthy eating categories from baseline to 10wk in control and Mover Method groups.

### Discussion

The ACE Mover Method™ and the associated ACE ABC Approach™ are featured in ACE’s most recent textbook, *The Exercise Professional’s Guide to Personal Training*<sup>3</sup>. The underlying philosophy behind the development of these tools is that the job of an exercise professional entails far more than an understanding of cardiorespiratory and muscular fitness exercise programming. Critically, every client–exercise professional interaction offers a unique opportunity to utilize coaching skills to help build rapport while positioning the client as an active partner in his or her behavior-change journey. Asking questions leads to the identification of goals and options for breaking down barriers, which in turn leads to collaborating on next steps.

Given that the primary mission of the American Council on Exercise is to get people moving, it is paramount that health and fitness professionals have evidence-based programming options available to implement on the individual and community levels. Our current findings provide critical translational evidence demonstrating personalized exercise programming based upon the ACE IFT model guidelines, including the ACE Mover Method paradigm, can be successfully implemented with clientele to improve cardiometabolic health and facilitate healthy eating changes. Indeed, participants in the Mover Method group had a 5-fold greater % change across different healthy eating categories, includes vegetables, fruits, and fiber.

*Prevention, Diet, and Chronic Disease*

It is estimated that roughly 48.6% (127.9 million) of Americans over the age of 20 have some form of cardiovascular disease (CVD) including coronary heart disease, heart failure, stroke, or hypertension<sup>6</sup>. CVD is also responsible for more deaths over the age of 85 than cancer. It is also estimated that over 71% of the adult American population is classified as either overweight or obese by means of BMI. These chronic diseases, along with several risk factors are very prevalent within the adult population of the United States.

Due to the existing chronic diseases or ailments within the overall U.S. population, both treatment and prevention strategies are necessary to promote overall health and well-being. Prevention and treatment approaches fall into one of three levels of prevention<sup>7</sup>. The first level of prevention is primordial intervention which involves the prevention of risk factors. The second level is called primary prevention. This level involves the treatment of risk factors. The final level of prevention is secondary prevention, which is the prevention of recurrent cardiovascular events. A large aspect of all types of prevention is diet. Poor diet has been shown to increase risk factors for several diseases including CVD, coronary heart disease, cancer, and Type 2 diabetes<sup>8</sup>.

There have been numerous studies<sup>9</sup> examining the effects of diet on several different chronic diseases and it is very evident that diet plays a large role in the formation of risk factors as well as disease management. Many adults in the U.S. also do not meet several categories of dietary guidelines. Although there are many differences between sex and race, it is estimated that less than 10% of the adult population meets the dietary guideline of consuming greater than 3 servings of whole grains per day. The same is true for fruit consumption, which also estimates that less than 10% of adults meet the guideline of eating 2 or more cups of fruit per day. Again, less than 10% of the population is meeting the dietary guidelines set forth for non-starchy vegetable consumption. Another statistic shows that yet again, less than 10% of the adult population consumes less than 2.3 grams of sodium per day with the average sodium consumption per day for all Americans above the age of 1 is greater than 3.4 grams. This large intake is due to the large popularity of foods high in added sodium. This large consumption of sodium also contributes to roughly 87% of the population being above the chronic disease risk reduction level which contributes to an increased risk at developing CVD.

*What individual lessons did we learn from our ACE-supported research?*

The challenge of designing this study was to combine a research approach with how the ACE Mover Method would be implemented in a real-world setting, considering the client-centered and personalized approach at its heart. These sessions were embedded within the normal exercise routine and personalized to each participant's unique goals and needs. More specifically, these conversations were collaborations aimed at positive lifestyle change in terms of improving healthy eating habits. Here are some of the key individual lessons learned:

*Scope of practice*

The ACE Mover Method provides the foundational skills for communicating effectively with clients, but it is not the equivalent of a health coaching certification. It is critical that exercise professionals work in concert with other qualified allied health professionals, such as health coaches and registered dietitians, whenever appropriate, to take a team approach to improving their clients' health and wellness. This issue came up regularly as we asked numerous open-ended questions surrounding healthy eating patterns. To ensure we avoided violating our scope of practice as exercise professionals, we strictly refrained from providing specific non-exercise related recommendations. In instances, where participants were

seeking specific recommendations, we referred them to the relevant allied health professional (e.g., registered dietitians, diabetes educators, and general physicians).

*Individualized approach*

As has been highlighted previously with successful training outcomes following the ACE IFT model and its individualized approach<sup>10</sup>, similarly we realized an individualized approach was required for the ACE Mover Method intervention. Our general approach was to for the ACE Mover Method group to receive an intervention consisting of weekly client-centered sessions featuring the principles of the ACE Mover Method philosophy and ACE ABC Approach in addition to performing the personalized exercise program. However, there was considerable variability in the time required of these client-centered sessions. For example, for some participants the entire weekly Mover Method session was completed in a single 5-10 minute conversation. In other instances, the sessions were more in-depth and lasted closer to 30 minutes. Despite being longer we always strived to ensure that the Mover Method intervention overlapped with exercise to ensure there was a time-efficient component. In a few other scenarios the ABC components spanned different exercise sessions. For example, when asking about barriers to achieving goals, some participants needed to

think about those barriers prior to the next exercise training session. The key takeaway here is it's critical to personalize behavior change strategies to the same extent as exercise programming to carefully align with client goals.

*Group settings are ideal for common messaging and peer support*

Despite the personalized nature of the ACE Mover Method intervention we also at times utilized group settings to communicate and/or reinforce consistent messages. For instance, group balance classes (Figure 2) were great for sharing quick tips with participants on how to cook and grocery

shop in a heart healthy, yet simple manner. Additionally, during group exercise classes, we reminded participants to continue identifying individual barriers to their personalized healthy eating goals. This platform proved quite effective as participants were able to share and provide each other with great suggestions on barriers and various approaches to breaking those down. Another healthy by-product to the group messaging is it enhanced peer support as participants realized their behavior change journey, while unique, also had company as participants frequently had comparable goals and challenges.



**Figure 2.** Applying the ACE Mover Method to facilitate behavior change is personalized to each client and their unique goals and needs. However, group settings can be effective for common messaging and building peer support.

### Variability in healthy eating goals

We observed considerable variability in the focus of healthy eating goals across participants. For example, we found some participants needed just a single session devoted to discussion of strategies for eating a healthier breakfast. In contrast, other participants felt that was higher priority and wanted to spend multiple weeks (and even months) focused on that specific goal. Another interesting consideration was that in some weekly sessions, a few participants wanted to discuss multiple healthy eating goals at the same time. Initially, this proved to be somewhat of a dilemma as we didn't want to overwhelm participants with trying to positively modify too many goals simultaneously. In these scenarios our tactics were two-fold:

1. When our impression was that participants needed to focus on only one healthy eating goal at a time, we gently encouraged them to set one goal aside for a brief time until adequate progress had been made on the initial goal, but then at the same time assured them in due course we would return to the second objective.
2. When our impression was that participants could reasonably balance working on multiple healthy eating goals at the same time, we definitely tried to adjust the Mover Method intervention accordingly to accomplish this.

### **Conclusion**

This preliminary data supports the ACE Mover Method as an effective approach for professionals to address and modify behavior change as it pertains to diet in a community setting. This shows that the ACE Mover Method may be an effective approach for modifying behaviors that occur outside of the gym to make healthier lifestyle decisions that can be used to manage or prevent a wide variety of chronic diseases.

### **Competing interests**

This investigation was supported financially by the American Council on Exercise (ACE). The American Council on Exercise (ACE) was not involved in development of the study design, data collection and analysis, or preparation of the manuscript. There are no other potential conflicts of interest related to this article.

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