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MFit weight management program: Effects on anthropometric and cardiovascular measures

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MFit weight management program: Effects on anthropometric and cardiovascular measures

Abstract

Objective: Traditional approaches to address obesity typically entail severe caloric restriction and drastic alterations in activity pattern. The MFit Weight Management Program, a derivative of the University of Michigan Health System, takes a different approach to weight loss. The goal of the program is to stress the development of longterm lifestyle changes and it places less emphasis on rapid weight loss. It was the purpose of this study to determine whether the MFit Weight Management Program, a behavioral modification program, is successful for decreasing anthropometric and cardiovascular measurements of obesity. *Research Methods and Procedures:* This is an ongoing study with revolving subject recruitment; therefore, some data analysis is completed, while some is ongoing. The dataset will grow as additional MFit Programs are completed. To date, 72 subjects have completed the 12 week program and 21 subjects have completed the 6 month follow up. At the pre, mid, post, and 6 month follow up fractions of the weight management program, cardiovascular and anthropometric measurements of obesity were assessed. Data analysis was performed by running an analysis of variance. The ANOVA was run twice, first by comparing the data of the completed subjects over time by pre, mid, and post fractions. Secondly, by comparing the 6 month completed subject data by pre, mid, post, and 6 month fractions. All statistical procedures were performed using SPSS 12.0 for Windows. Statistical significance was defined by a probability of less than or equal to 0.05. *Results:* During the 12 week program significant results were obtained in total cholesterol (P = 0.000), NHDL cholesterol (P = 0.001), RHR (P = 0.030), percent initial body weight lost (P = 0.000), pounds lost (P = 0.000), neck circumference (P = 0.000), and waist circumference (P = 0.005). Significant results in the 6 month follow up participants included percent weight lost (P = 0.010), pounds lost (P = 0.016), neck circumference (P = 0.018), and BMI (P = 0.002). *Discussion:* Preliminary results of the study indicate significant change in anthropometric and cardiovascular measures over a course of 12 weeks and a 6 month time period. Therefore, the results provide support for the notion that a behavior modification program can decrease cardiovascular and anthropometric measures that are indicators of obesity and its associated health risks over both a short and long term time period.

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MFIT WEIGHT MANAGEMENT PROGRAM:
EFFECTS ON ANTHROPOMETRIC AND CARDIOVASCULAR MEASURES

BY

LINDSAY L. BOIK

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ABSTRACT

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EFFECTS ON ANTHROPOMETRIC AND CARDIOVASCULAR MEASURES

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Objective: Traditional approaches to address obesity typically entail severe caloric restriction and drastic alterations in activity pattern. The MFit Weight Management Program, a derivative of the University of Michigan Health System, takes a different approach to weight loss. The goal of the program is to stress the development of long-term lifestyle changes and it places less emphasis on rapid weight loss. It was the purpose of this study to determine whether the MFit Weight Management Program, a behavioral modification program, is successful for decreasing anthropometric and cardiovascular measurements of obesity. **Research Methods and Procedures:** This is an ongoing study with revolving subject recruitment; therefore, some data analysis is completed, while some is ongoing. The dataset will grow as additional MFit Programs are completed. To date, 72 subjects have completed the 12 week program and 21 subjects have completed the 6 month follow up. At the pre, mid, post, and 6 month follow up fractions of the weight management program, cardiovascular and anthropometric measurements of obesity were assessed. Data analysis was performed by running an analysis of variance. The ANOVA was run twice, first by comparing the data of the completed subjects over time by pre, mid, and post fractions. Secondly, by comparing the 6 month completed subject data by pre, mid, post, and 6 month fractions. All statistical procedures were performed using SPSS 12.0 for Windows. Statistical significance was defined by a probability of less than or equal to 0.05. **Results:** During the 12 week program significant results were obtained in total cholesterol ($P = 0.000$), NHDL cholesterol ($P = 0.001$), RHR ($P = 0.030$), percent initial body weight lost ($P = 0.000$), pounds lost ($P = 0.000$), neck circumference ($P = 0.000$), and waist circumference ($P = 0.005$). Significant results in the 6 month follow up participants included percent weight lost ($P = 0.010$), pounds lost ($P = 0.016$), neck circumference ($P = 0.018$), and BMI ($P = 0.002$). **Discussion:** Preliminary results of the study indicate significant change in anthropometric and cardiovascular measures over a course of 12 weeks and a 6 month time period. Therefore, the results provide support for the notion that a behavior modification program can decrease cardiovascular and anthropometric measures that are indicators of obesity and its associated health risks over both a short and long term time period.

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INTRODUCTION

It has long been established that obesity has reached epidemic proportions in the United States (approximately 65% of U.S. adults) and that health care costs associated with weight-related illnesses have escalated dramatically over the past 20 years (1). It has also been identified that weight loss is a key factor in the prevention and management of hypertension, dyslipidemia, coronary heart disease, type 2 diabetes, gallbladder disease, sleep apnea, osteoarthritis, and several forms of cancer (1, 3, 9). What is part of the ongoing debate, however, is the determination of which approach is the most successful for decreasing obesity over a prolonged period of time.

In 1958, obesity treatment was best articulated by Stunkard (5) when he said: “Most obese persons will not stay in treatment for obesity. Of those who stay in treatment, most will not lose weight, and of those who do lose weight, most will regain it.” However, in the last 50 years, significant changes have been taken in the treatment of obesity, and hold more promising results. Traditional approaches to the treatment of obesity typically entail severe caloric restriction and drastic alterations in activity pattern with a strict focus on weight loss. As a reflection of the statement made by Stunkard, multiple long-term studies have also confirmed that individuals who lost weight by enrolling in moderate (400-800 kcal/day) to severe caloric restriction (800-1200 kcal/day) diet programs regain the initial weight lost after completion of the program (5, 6). As an alternative to caloric restriction treatments, many lifestyle modification obesity treatment programs have been formed. The following (Table 1) is a compilation of data from randomized controlled trials published in the following journals: *Addictive Behaviors*, *Behavior Research and Therapy*, *Behavior Therapy*, and *Journal of Consulting and*

Clinical Psychology. The data summarizes the results of lifestyle modification behavioral treatments created between 1974 and 2002, and indicate that approximately 10% of initial weight was lost within 30 weeks of treatment. This notion of 10% initial weight lost was confirmed to be a successful form of treatment as indicated by the NIH/National Heart Lung and Blood Institute and the World Health Organization. Furthermore, the data is significant because upon comparison of the treatment program results from 1974 versus 2002, weight lost has tripled and weight lost at follow up has almost doubled, each in proportion to an increased duration of treatment (4, 5).

TABLE 1. LIFESTYLE MODIFICATION FOR OBESITY, 1974 TO 2002

COMPONENT	1974	1985 TO 1987	1991 TO 1995	1996 TO 2002
NUMBER OF STUDIES	15	13	5	9
SAMPLE SIZE	53.1	71.6	30.2	28.0
INITIAL WEIGHT (KG)	73.4	87.2	94.9	92.2
LENGTH OF TREATMENT (WEEKS)	8.4	15.6	22.2	31.4
WEIGHT LOSS (KG)	3.8	8.4	8.5	10.7
LOSS PER WEEK (KG)	0.5	0.5	0.4	0.4
ATTRITION	11.4	13.8	18.5	21.2
LENGTH OF FOLLOW-UP (WEEKS)	15.1	48.3	47.7	41.8
LOSS AT FOLLOW-UP (WEEKS)	4.0	5.3	5.9	7.2

The recent results of a 4-year study by the Diabetes Prevention Program provided further support of the notion that lifestyle modification programs are a successful form of obesity treatment. The purpose of the program was to reduce initial weight lost by 7% and increase physical activity by 150 minutes per week. The results indicated that the program was successful for reducing the risk of developing type 2 diabetes by 58% when

compared against a placebo and that lifestyle modification was more effective than pharmacological intervention of Metformin as seen in Figure 1 (4).

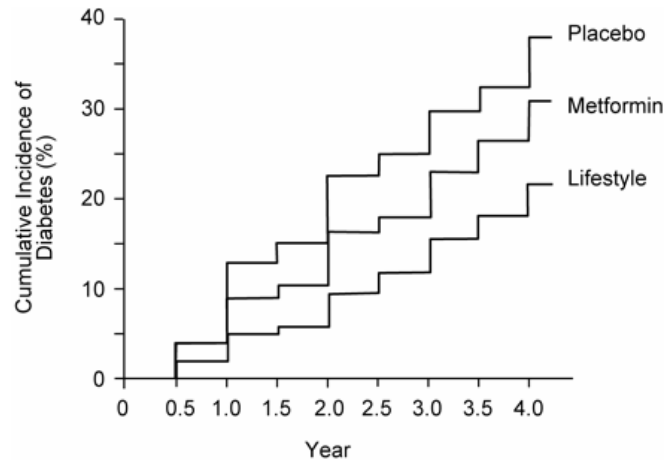


FIGURE 1: COMPARISON OF CUMULATIVE INCIDENCE OF DIABETES OVER A 4 YEAR TIME PERIOD VERSUS TREATMENT OF LIFESTYLE MODIFICATION, METFORMIN, AND PLACEBO (4).

Similarly, a study conducted in Finland found that individuals reduced their risk of type 2 diabetes by 58% solely through the intervention of diet and exercise. These studies confirm that the efficacy of lifestyle modification in facilitating long-term improvements in weight and health can no longer be overlooked. What is currently unavailable; however, is data specific to a dietary approach that is successful for long-term weight control through lifestyle modification (4). However, before the effects of a lifestyle modification program can be examined, it is first important to have a clear understanding of the characteristics that define behavioral treatments of obesity.

The principle of behavioral treatment is a derivation of classical conditioning, of which an event or cue stimulates an increase in food intake. The goal of behavioral treatment is to help individuals identify the events or cues that trigger inappropriate responses, such as overeating, and provides tools to overcome psychological barriers to

such inappropriate responses. It is also common for behavioral treatment programs to provide positive reinforcement for adoption of positive behavior changes. There are furthermore three characteristics that define a behavioral treatment program (7).

First, treatment is focused on obtaining goals that are clearly defined and measured, but do not necessarily put emphasis on weight loss. For example, goals can range from walking four times per week to decreasing the number of self-critical comments made in a given time period. Second, the program is process oriented, which means that after a goal has been attained, the individual is helped to identify how to change other behaviors (e.g. eating, activity, eating habits). Furthermore, individuals are encouraged to identify possible psychological barriers that would hinder goal achievement. A common mantra of this characteristic is that “skill power, not will power, is the key to success” (7). The final characteristic of behavioral treatment is the advocacy of small changes. The basis of this characteristic is that small changes provide individuals with the satisfaction and positive experience of obtaining a goal, as well as an approximation of steps taken and goals left to achieve in order to obtain a more prominent goal (7).

The MFit Weight Management Healthy Habits for Life Program, a derivative of the University of Michigan Health System, is a behavior modification program that provides tools for long-term weight control. The purpose of the program is to stress development of long-term lifestyle changes and provides less emphasis on rapid weight loss. The specific aims of the program are to change dietary intake and eating habits, decrease sedentary activity, increase physical activity, and provide tools for overcoming psychological barriers. The bulk of the program is based on the *LEARN Program for*

Weight Management (8) which contains a behavioral treatment program that encompasses multiple components. The first component, self-monitoring, includes keeping a daily record of diet and activity. The second component, stimulus control, is comprised of identifying and controlling the cues that stimulate overeating. The third component, cognitive therapy, provides education regarding nutrition, how to slow eating, physical activity, problem solving, and cognitive restructuring (7, 8).

The purpose of evaluating the data collected throughout the course of the weight management program was to assess two objectives. The first objective was to determine whether the MFit Weight Management Program, a behavioral modification program, is successful at decreasing anthropometric and cardiovascular measurements of obesity in a 12 week time period. The second objective was to determine whether the MFit program results in sustained weight loss over a prolonged period of time.

RESEARCH METHODS AND PROCEDURES

Behavior modification intervention. The MFit Weight Management program consists of 12 interactive group educational sessions which present the latest research for developing strategies to make lifestyle changes, offers group support, and checks each individual's progress weekly. In addition, each participant has 3 consultations with a health and fitness specialist and a registered dietitian to first assess specific biometric measures, to develop a plan to increase physical activity, and to discuss specific dietary goals and needs. After completion of the program, each individual has the option to participate in a follow-up program that offers a support group and will receive motivational emails two times a month for a year. If additional assistance is requested,

each individual can be referred to other MFit programs such as personal training, membership at the fitness center, and informational cooking classes. At six month and 1 year post completion of the program, each individual has the option to return for evaluation of anthropometric and cardiovascular measures.

Time frame and subject numbers. The MFit Weight Management Program initially lasts for a 12 week time period, with the option to return for evaluation at 6 months and 1 year post completion of the program. To date, 72 participants have completed the 12 week program, and 21 have completed the 6 month follow up. The complete number of subjects consisted of 58 females and 14 males with an average age of 46.2 (1.33). Ethnicity for the completed subjects consisted of 83.3% Caucasian, 5.6% African American, 4.3% Hispanic, 2.8% Multi-racial, 1.4% Asian, and 2.8% did not designate their ethnicity. The complete number of subjects for the 6 month follow up consisted of 17 females and 5 males with an average age of 53.1 (4.56). Ethnicity for the 6 month follow up subjects was 95.2% Caucasian and 4.8% Hispanic.

Clinical treatment. At the start (week 1) and finish (week 12) of the weight management program, anthropometric measurements of obesity were evaluated. Anthropometric measures included circumferences of neck, waist, and upper arm, and subsequent calculation of BMI. Cardiovascular parameters included cholesterol (total, HDL, and NHDL), blood pressure, resting heart rate, weight, and percent initial weight lost. At the mid point of the program (week 6), the same anthropometric and cardiovascular measures were evaluated with the exception of cholesterol measurements. Upon induction of the September 2005 session, additional variables were added which

include: chest, hip, and thigh measurements, as well as a 3 minute maximum step test as an indicator of relative strength.

Statistical analyses. Descriptive information was collected for all participants in the weight management program and divided into two main groups: participants who had completed the program and participants who had completed the 6 month follow up session. To note, only the January and May 2005 session were offered the opportunity to complete the follow-up session, so the dataset is ~ 70% smaller than the completed subject dataset. The ANOVA was run twice, first by comparing the data of the completed participants over time by pre, mid, and post fractions. And secondly, by comparing the 6 month data by pre, mid, post, and follow up fractions. All statistical procedures were performed using SPSS 12.0 for Windows. Statistical significance was defined by a probability of less than or equal to 0.05.

RESULTS

The 12 week behavioral modification program produced statistically significant results (Table 2) in the cardiovascular parameters and anthropometric measures collected at the initial and post evaluation of the program. The following observations were made in the cardiovascular parameters collected: an approximate 15 point reduction in total cholesterol was observed ($P = 0.000$), 12 point reduction in NHDL cholesterol ($P = 0.001$), and a decrease of resting heart rate ($P = 0.030$) by 3 bpm. Similar observations were made in the anthropometric measures collected (Table 3). Total weight lost at post evaluation of the program was 2.96% of initial body weight ($P = 0.000$) with an average of 6.76 ($P = 0.000$) total pounds lost. Statistically significant results were also evident in circumferences of neck and waist with reductions of 0.21 inches ($P = 0.000$), and 1.57 inches ($P = 0.005$), respectively. Clinical significance ($P \leq 0.100$) was observed in the measurement of BMI ($P = 0.081$) and both values for resting systolic blood pressure and arm circumference indicate a trend for clinical significance.

TABLE 2. CARDIOVASCULAR PARAMETERS COLLECTED FOR ALL COMPLETED SUBJECTS.

COMPONENT	MID	POST	SIG. P (≤ 0.05)
Δ TOTAL CHOLESTEROL		14.76 (3.81)	*.000
Δ HDL		1.86 (1.94)	.599
Δ NHDL		11.53 (3.75)	*.001
Δ GLUCOSE		-3.33 (6.28)	.809
Δ RSBP	1.63 (1.49)	3.25 (1.69)	.189
Δ RDBP	0.86 (1.30)	1.00 (1.21)	.741
Δ RHR	2.47 (1.03)	2.83 (1.10)	*.030

*SIGNIFICANT VALUES

TABLE 3. ANTHROPOMETRIC PARAMETERS COLLECTED FOR ALL COMPLETED SUBJECTS.

COMPONENT	MID	POST	SIG. P (≤ 0.05)
Δ % WEIGHT LOST	1.61% (0.29%)	2.96% (0.44%)	*.000
Δ WEIGHT LOST	3.82 (0.66)	6.76 (1.05)	*.000
Δ ARM	0.76 (0.37)	0.76 (0.41)	.120
Δ NECK	0.21 (0.042)	0.21 (0.050)	*.000
Δ WAIST	0.73 (0.38)	1.57 (0.47)	*.005
Δ BMI	0.018 (0.67)	1.17 (0.17)	.081

*SIGNIFICANT VALUES

Upon initiation of the September 2005 session, additional anthropometric parameters of obesity (Table 4), cardiovascular, and strength parameters (Table 5) were included in the evaluation. Anthropometric parameters included circumferences of hip, thigh, and chest; cardiovascular measurements included a 3 minute maximum step test, and a strength parameter of total number of push-ups was included. Even though statistical significance was not observed in any of these measures, the results for hip circumference ($P = 0.059$) and step test time ($P = 0.066$) were clinically significant and heart rate post completion of the step test ($P = 0.194$) is trending toward clinical significance.

TABLE 4. ANTHROPOMETRIC PARAMETERS COLLECTED UPON INDUCTION OF THE SEPTEMBER 2005 SESSION.

COMPONENT	MID	POST	SIG. P (≤ 0.05)
Δ HIP	1.16 (0.56)	1.08 (2.08)	.059
Δ THIGH	4.37 (4.57)	-0.97 (0.82)	.362
Δ CHEST	-0.27 (0.78)	0.20 (0.70)	.839

*SIGNIFICANT VALUES

TABLE 5. CARDIOVASCULAR AND STRENGTH PARAMETERS COLLECTED UPON INDUCTION OF THE SEPTEMBER 2005 SESSION.

COMPONENT	POST	SIG. P (≤ 0.05)
Δ STEP TEST	-0.15 (0.11)	.066
Δ POST HR	-5.73 (6.20)	.194
Δ PUSH UPS	7.11 (7.80)	.370

*SIGNIFICANT VALUES

The data collected at 6 months post completion of the behavioral modification program produced results that were statistically significant in the anthropometric parameters collected (Table 7). The percentage of weight lost continued to increase from post completion of the program with an overall loss of 3.36% ($P = 0.010$), with a proportional increase in average loss of 6.96 pounds lost ($P = 0.016$). Significant results were also observed in neck circumference ($P = 0.018$) and BMI ($P = 0.002$). From the initiation of the program, neck circumference was reduced by 0.31 inches and the value for BMI was reduced by 1.34 points. Statistically significant results were not seen in the

cardiovascular measures evaluated at 6 month follow up (Table 6); however, resting systolic blood pressure is trending toward clinical significance.

TABLE 6. CARDIOVASCULAR PARAMETERS COLLECTED FOR 6 MONTH FOLLOW-UP PARTICIPANTS.

COMPONENT	MID	POST	6 MONTH	SIG. P (≤ 0.05)
Δ RSBP	2.14 (4.60)	7.14 (4.11)	4.42 (4.32)	.184
Δ RDBP	-2.00 (2.34)	4.86 (2.78)	1.07 (2.38)	.491
Δ RHR	1.64 (2.52)	3.79 (3.08)	3.34 (3.17)	.273

*SIGNIFICANT VALUES

TABLE 7. ANTHROPOMETRIC PARAMETERS COLLECTED FOR 6 MONTH FOLLOW UP PARTICIPANTS.

COMPONENT	MID	POST	6 MONTH	SIG. P (≤ 0.05)
Δ % WEIGHT LOST	0.53% (0.67%)	1.98% (0.95%)	3.36% (1.70%)	* .010
Δ WEIGHT LOST	1.59 (1.41)	4.43 (2.09)	6.96 (3.85)	* .016
Δ ARM	2.37 (2.03)	2.58 (2.01)	2.52 (2.09)	.670
Δ NECK	0.26 (0.084)	0.29 (0.098)	0.31 (0.13)	* .018
Δ WAIST	0.71 (0.23)	-0.26 (2.01)	-0.15 (1.79)	.936
Δ BMI	0.46 (0.18)	0.89 (0.31)	1.34 (0.57)	*.002

*SIGNIFICANT VALUES

DISCUSSION

Significant changes have been made in the treatment of obesity in the 48 years since Stunkard's last statement regarding obesity therapy (5). Moreover, numerous research trials on the effects of behavior modification therapy for the treatment of obesity have confirmed that a modest weight loss of 5% can in fact have a positive effect on the elimination or prevention of disorders associated with obesity (9). What is not abundantly available; however, is data specific to a dietary approach that is successful for long-term weight control through lifestyle modification. It was therefore, the purpose of this study to determine first whether the MFit Weight Management Healthy Habits for Life Program is successful for decreasing anthropometric and cardiovascular measures of obesity in a 12 week time period. A secondary purpose was to determine whether the MFit Weight Management Program results in a sustained weight loss over a prolonged period of time.

The results observed after completion of the 12 week behavioral modification program were consistent with recent studies in which statistically significant changes were observed in anthropometric and cardiovascular measures of obesity. Perhaps the most significant observation determined from the effects of the program, however, was that an approximate 3% reduction in initial weight lost (~ 7 lbs) was enough to have a positive impact on measurements of total cholesterol, non-HDL cholesterol, resting heart rate, and circumferences of neck and waist. This observation is similar to the positive effects of the 5% reduction cited by Pasanisi et. al. (2001), however, the current study was not a randomized clinical trial. Although not randomized, the current study was clinically relevant based on individuals enrolled in a practical program with the intention

of improving their overall health and well being. It is crucial to ask if this program was part of a randomized clinical trial, would the changes seen be more significant if the outside influence of everyday life were eliminated or reduced? It is furthermore important to identify that the value for BMI, hip circumference, and step test time were all clinically significant, while the values for resting systolic blood pressure, arm circumference, and heart rate post step test all showed positive trends toward clinical significance. This is an indication that supports the notion that when more subjects are added to the growing dataset the modest trends established in the 12 week time period may become more substantial.

The results obtained at the 6 month follow up evaluation support the results observed in the first 12 weeks of the program. The percent weight lost continued to increase (~ 3.5%) and significant changes were observed in BMI and neck circumference, while positive trends toward clinical significance were observed in resting systolic blood pressure. Again, it is important to realize that this dataset is ~70% smaller than the completed subject dataset for the initial 12 weeks of treatment. Therefore, similarly to the results of the initial 12 weeks, when more subjects complete the 6 month follow up, a more significant trend in the evaluated anthropometric and cardiovascular parameters may become more apparent.

There were a few limitations to this report. First, the completion rate was ~ 70% per each program and therefore it is possible that the subjects who completed the program had more significant reductions in anthropometric and cardiovascular measures than the subjects who chose to abort participation in the program. Similarly, because approximately ~ 50 % of the subjects (who had the opportunity available) elected to

complete the 6 month follow-up it is possible that the results are slightly biased due to self-selection. Third, it has been reported that the majority of behavioral modification obesity trials have been conducted on middle-aged, overweight to moderately obese women (10), which is similar to the subject population (~ 75% women) of this study. Therefore, because evaluation of behavioral modification trials lie heavily within this population, it is possible that the results obtained cannot be generalized to the more severely obese population ($BMI > 35 \text{ kg/m}^2$) or to the male population (10). Nonetheless, despite these limitations, positive results were seen in the participants who completed the program.

As a final note, even though the majority of subjects in this study did not achieve a substantial weight loss, which is one of the most significant challenges in the management of obesity, it is imperative to appreciate that the subjects did learn the importance of behavioral change and the positive effects on health and quality of life that may result. Moreover, the patients were taught that their self-worth is not measured on a scale, which has been found to be one of the most powerful intervention therapies available for an obese individual (7). Again, Stunkard (7) best articulated this concept when he said: “As with any chronic illness, we rarely have an opportunity to cure, but we do have an opportunity to treat the patient with respect. Such an experience may be the greatest gift that [we] can give an obese patient.”

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