

Previously Sedentary Patients Should Walk 3 Miles Daily

Type 2 diabetic patients with peripheral neuropathy may cycle, swim or perform water aerobics instead of walking to reach target energy expenditure.

BY PIERPAOLO DE FEO, MD

There is a widespread belief that regular physical activity improves quality of life, and that the benefits of this activity may be more pronounced in individuals with impaired glucose tolerance or type 2 diabetes.

It has not been previously determined, however, at what increment of energy expenditure type 2 diabetic patients receive the full benefits of physical activity. To locate this level, my colleagues and I prepared a 2-year study that calculated the impact of exercise at six separate metabolic equivalents (METs) per hour per week: no activity; 6.8 ±0.3 METs; 17.1 ±0.4 METs; 27.0 ±0.5 METs; 37.5 ±0.5 METs; and 58.3 ±1.8 METs.

As a whole, patients obtained a 26 ±2 MET increase in energy expenditure. Although physical activity >10 METs per hour per week produced healthy outcomes in this population, the level of full benefit was seen at an energy expenditure >20 METs per hour per week. We reported our findings in *Diabetes Care*.¹

Scientific organizations like the American Diabetes Association, the North American Association for the Study of Obesity, the Centers for Disease Control and Prevention, the American College of Sports Medicine and the Task Force on Community Preventive Services have proposed that regular activity helps prevent and fight type 2 diabetes. The recommendation from such groups is to have individuals participate in ≥30 minutes of moderate-intense physical activity on most or all days of the week. Because physical activity is no longer an essential part of day-to-day activity, this is necessary to defer the increasing incidence of obesity and diabetes. If weight loss is to be maintained, increasing physical activity to 60 to 75 minutes each day may spark long-term weight control.

Previously sedentary individuals should perform physical activity at 27 METs per hour per week.

It is now our recommendation that to achieve the maximum benefit, previously sedentary individuals should perform physical activity at 27 METs per hour per week. This is an acceptable target for type 2 diabetic patients.

ACHIEVE MAXIMUM BENEFIT

One way to achieve this goal is for patients to walk 3 miles a day at a pace of 3 to 4 mph. This should take approximately 45 to 60 minutes, depending on the patient's speed. If the preferred brisk walk is not easily performed, patients – like those with peripheral neuropathy or complications of the lower-limb – may instead cycle, swim or perform water aerobics. It should be stressed to diabetic patients that if they walk more than 3 miles per day or perform an equivalent exercise, they will achieve additional health benefits that are strictly related with the amount of energy expenditure.

The six groups of type 2 diabetic patients that were tracked during our study had similar levels of energy expenditure at baseline. All 179 patients, mean age 62 ±1 years, received physical activity counseling consisting of an initial 30-minute counseling session by a physician, and seven 15-minute counseling sessions, once every 3 months. We controlled the difference in calorie intake and energy expenditure by requiring overweight and obese patients to consume -300 kcals daily. Through the study, patients per-

formed routine activity based on their MET category and recorded the type, duration and intensity of the exercise.

SIGNIFICANT LONG-TERM EFFECTS

After 2 years, we analyzed the data in a post hoc analysis and determined that if patients expend energy at 27 METs per hour per week, they can decrease their body weight by 2.4 kg, their waist circumference by 4.8 cm and their body mass index by 0.9 kg/m² (*P*<.0001). Their fasting plasma glucose can decrease by 0.9 mmol/L and HbA1c by 1.5%. Therefore, the long-term effects of such an intervention will be significant.

Except for patients in the two lowest MET groups, individuals maintained energy expenditures >10 METs per hour per week. Health outcomes such as body weight, BMI, waist circumference, fasting plasma glucose, HbA1c, blood pressure, total cholesterol, triglycerides and risk of chronic heart failure at 10 years improved, however, the level of improvement varied depending on the energy expenditure group. The best results were seen in patients who maintained a MET of 27 per hour per week.

Costs associated with diabetes also decreased as energy expenditure increased. Overall, if a 3-mile walk is taken every day over 2 years, there is potential to save \$2,000 in total costs. This includes \$1,100 in indirect social costs, \$550 in drug costs, such as insulin, and \$700 in medical costs. There is a probable increase of \$400 for direct social costs.

We have concluded that increasing energy expenditure



Figure 1. Dr. De Feo (center) and his research team participate with their patients during physical activity sessions.

and creating a goal of 27 METs per hour per week will not only improve long-term diabetic patient care, but it will also decrease the costs associated with diabetes care. This is consistent with the recommendations from various scientific organizations.

In an accompanying editorial,² James O. Hill, PhD, supported the results of our study. By encouraging patients to increase their energy expenditure through moderate physical activity, health care costs will decrease and the impact from increased activity could make a dramatic change in overall patient health, he wrote. Dr. Hill is from the University of Colorado at Denver and Health Sciences Center.

Dr. Hill suggested that as physicians, we should consider incorporating counseling programs in to practice to

TABLE 1. EFFECTS OF PHYSICAL ACTIVITY COUNSELING ON ENERGY EXPENDITURE (METS PER HOUR PER WEEK), IN 179 TYPE 2 DIABETIC SUBJECTS

	Basal	Change
Energy expenditure (METs per hour per week)	0.6 ±0.2	26.0 ±1.7 (21 to 28)*
Weight (kg)	81.6 ±0.8	-1.3 ±0.2 (-1.6 to -0.8)*
BMI (kg/m ²)	29.3 ±0.2	-0.4 (-0.6 to -0.3)*
Waist (cm)	99.8 ±0.8	-2.7 (-3.4 to -2.1)*
FPG (mmol/L)	9.1 ±0.1 [†]	-0.8 (-1.0 to -0.7)*
HbA1c (%)	7.6 ±0.1	-0.6 ±0.1 (-0.7 to -0.5)*
Maximum blood pressure (mm/Hg)	144 ±1	-5.4 ±0.6 (-6.7 to -4.0)*
Minimum blood pressure (mm/Hg)	87 ±1	-4.6 ±1.0 (-5.7 to -3.5)*
Heart rate (bpm)	79 ±2	-2.8 ±0.5 (-3.5 to -2.2)*
Total cholesterol (mmol/L)	5.6 ±0.1	-0.2 ±0.1 (-0.3 to -0.1)*
LDL cholesterol (mmol/L)	3.5 ±0.1	-0.2 ±0.1 (-0.3 to -0.1)*
HDL cholesterol (mmol/L)	1.0 ±0.1	-0.1 ±0.1 (0.2 to 0.1)*
Triglycerides (mmol/L)	2.3 ±0.1	0.4 ±0.1 (-0.5 to -0.4)*
10-year CHD risk (%)	22.8 ±0.7	-2.7 ±1.0 (-3.4 to -2.1) [†]

Data are means ±SE and means (95% CI). **P*<.01, †*P*<.05 versus basal.

PATIENTS MORE LIKELY TO BE ACTIVE WITH PHYSICIAN'S INPUT

Getting enough exercise is a problem in diabetic patients, and it can be especially challenging for those in rural communities.

By Conni Bergmann Koury, Editor-in-Chief

Researchers from St Louis University in Missouri found that patients with diabetes were almost three times more likely to adhere to an exercise program if it was created with their doctor's help.

Reporting in *Diabetes Care*, Ajali D. Deshpande, PhD, MPH, and colleagues said that physical inactivity is a significant problem in rural diabetic populations. "Understanding the role of the environment may result in increased physical activity for individuals with diabetes," they wrote.

The investigators obtained cross-sectional telephone survey data from rural communities in southeastern Missouri, Tennessee and Arkansas. They identified 278 respondents with diabetes. Their results were achieved by logistic regression and the calculation of crude and adjusted prevalence odds ratios (PORs) with 95% CIs.

Close to 37% of the group reported participating in no leisure physical activity. People who had diabetes and said they participated in regular physical activity were also more likely to report better general health status, normal body mass index (BMI) and no physical impairment. The investigators defined regular activity as 30 minutes at least 5 days per week, according to the report.

Dr. Deshpande and colleagues wrote that, after adjustment, regular activity was positively associated with use of three or more neighborhood facilities (POR 14.3, 95% CI 3.0 - 67.3) in the past 30 days, the availability of many nearby places to walk (2.3, 1.1 - 4.8), the availability of shoulders on streets (2.4, 1.3 - 4.5), often walking to nearby places (4.1, 2.0 - 8.3), and rating the community for physical activity as generally pleasant (2.3, 1.1 - 4.8). Notably, the group who participated in regular activity was more likely to report that their physician helped make a plan to increase physical activity (2.8, 1.3 - 5.8) and followed up on their plan (2.2, 1.1 - 4.4). ■

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Deshpande AJ, Baker EA, Lovegreen SL, Brownson RC. Environmental Correlates of Physical Activity Among Individuals With Diabetes in the Rural Midwest. *Diabetes Care*. 2005;28:1012-1018.

increase the number of patients participating in physical activity. Such a program would entail little effort and time, he wrote. Use the MET system to calculate the proper duration and intensity of physical activity: This will ensure that patients will be placed on the appropriate exercise regimen.

If patients are already participating in physical activity, suggest that they increase their intensity or time of workouts. For instance, a patient may start to jog instead of walk. They may also want to increase their mileage by 1.2 miles per day, steps by 2,400 per day or time by 30 minutes per day, Dr. Hill wrote. Any method of increasing activity will help patients to achieve an accelerated MET, and additional increases of activity will spur better results.

If motivating patients is an issue, set individualized goals for them. One example is by asking patients to take a certain number of steps per day. The average person takes 2,000 steps for every mile walked. Tracking the number of steps can be done with a pedometer, a device worn on the waist to monitor the number of steps a person takes. Pedometers cost between \$10 and \$20. Another motivational tool is to practice physical activity with your patients. My research team and I participate in physical activity sessions with our patients regularly (Figure 1).

A 400-step increase may be a good place to start, Dr. Hill wrote. "If you start slow, increase gradually, and celebrate the success of your patients achieving each goal, many of them can reach optimal levels of an additional 6,400 or more steps/day."

America on the Move (www.americaonthemove.org) is a program that implements many of these initiatives. By encouraging patients to make small changes to their daily physical activity, this national weight-gain prevention program offers tips for patients to increase physical activity. It also allows them to track their progression. Getting patients to increase energy expenditure through physical activity is effective and will help shape the change of diabetes care. ■

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1. Di Loreto C, Fanelli C, Lucidi C, et al. Make Your Diabetic Patients Walk. *Diabetes Care*. 2005;28:1295-1302.

2. Hill J O. Walking and Type 2 Diabetes. *Diabetes Care*. 2005;28:1524-1525.