Exercise has long been recognized as an essential component of diabetes management. Elliot Joslin once referred to exercise as “the second steed in the diabetic’s three-horse chariot,” sharing equal billing with diet and insulin. Subsequent generations of diabetes practitioners have established exercise as one of the four cornerstones of care (along with diet, medication, and monitoring) and have come to learn a great deal more about the mechanisms by which exercise is able to provide such profound benefits for physical health.

Atherosclerotic vascular disease remains the number one killer of people with diabetes, and research has shown exercise to be of tremendous utility in its treatment. It is known that exercise ameliorates many of the known vascular disease risk factors, favorably influencing levels of blood pressure, LDL cholesterol, HDL cholesterol, triglycerides, and glycemia.

More recent research suggests that exercise may exert similarly favorable effects on emerging vascular disease risk factors as well, including thrombosis, endothelial function, and levels of C-reactive protein.

Exercise is perhaps the best therapy for the prevention of both type 2 diabetes and the metabolic syndrome. Exercise appears to aid in the loss of visceral fat, quite literally getting to the core of the metabolic syndrome. Results of the Diabetes Prevention Program demonstrated that as little as 150 minutes per week of moderate exercise as part of a lifestyle intervention significantly decreased the progression of type 2 diabetes in patients with preexisting impaired glucose tolerance. These findings were comparable to those of the Finnish Diabetes Prevention Study.

Exercise and Psychological Health

The magic bullet–like ability of exercise to counter much of the metabolic disruption and ensuing pathology occurring in diabetes is beyond remarkable and has understandably led to greater emphasis being placed on the physiological benefits of exercise. Lesser known, and far less celebrated, are the potential psychological benefits of exercise in the management of chronic diseases such as diabetes.

Although a potential link between exercise and emotional health had long been suspected, research into the area did not really begin until the late 1970s, with an early investigation made into running and depression. A tremendous amount of subsequent research has ensued in the decades since then. Aerobic exercise has received the most attention, but nearly every type of physical activity imaginable, from weight lifting to yoga, has been studied. Differing levels of exercise intensity have been examined as well.

Viewed collectively, there appears to be consistent association between physical activity, regardless of the type or intensity, and improvements in whatever aspect of psychological health is being studied. The current evidence demonstrates that exercise appears to foster psychological well-being through the provision of three main benefits: 1) antidepressant effects, 2) anxiolytic (anti-anxiety) effects, and 3) increased resilience to stress.

Though suggestive, studies supporting the benefits of exercise as a treatment for psychological disorders such as anxiety or depression have been plagued by methodological limitations. In the absence of grade-A evidence, definitive determinations regarding the effectiveness of exercise in treating such disorders cannot be made. It is hoped that future, better-designed trials will illuminate exactly how exercise might be used in the treatment of anxiety and depression.

But focusing on exercise as a treatment for psychological disorders and attempting to compare it to behavioral therapy or pharmacotherapy may be too narrow a stance. Perhaps there are broader clinical applications for the use of exercise in behavioral health and chronic disease.

Application

Chronic disease carries an increased prevalence of psychological problems and certain psychiatric disorders, and diabetes does not appear to be an exception. Our patients may experience significant anxiety over the short- and long-term complications of their disease. Additional burdens result from a daily regimen involving innumerable tedious self-care behaviors unique to diabetes. Feelings of guilt, shame, anger, and futility are typical. Even the most capable of patients can feel overwhelmed at times. Too often, these feelings culminate in the development of clinical depression, which is thought to be two to three times more prevalent in people with diabetes than in those without diabetes.

Emotional stress and depression have a decisively negative impact on both diabetes management and subsequent endpoints. Overwhelmed patients may neglect self-care behaviors and, in doing so, adversely affect...
their blood pressure, lipid, and glycemia levels. They may abandon preventive health measures, such as eye and foot exams, blood pressure screening, and routine lab work. This leads to a worsening of short- and long-term diabetes complications, thus creating more anxiety and additional burdens and making the management of the disease even more overwhelming. Attempts to intervene with behavioral or lifestyle changes at this point are often met with an understandable lack of enthusiasm on the part of patients.

Exercise and Stress Management
If exercise could play a protective role by increasing resilience to stress, it is easy to imagine the promise this would hold for patients with diabetes. Exercise has, in fact, been demonstrated to cause an attenuation of the body’s response to stress through a variety of mechanisms, both physiological and psychosocial. One such mechanism involves mitigating the release of counterregulatory hormones such as catecholamines and glucocorticoids. This, in turn, helps minimize the short-term disruption of blood pressure and glucose metabolism observed during periods of stress. Far more intriguing, however, are the potential benefits this attenuation of the stress response might have in the long-term management of the disease.

Exercise “provides a way to ameliorate effects of stressors yet to occur.” As a result, patients may be better able to cope with the daily struggles of their diabetes management, enabling them to stay on track in spite of the many obstacles life presents. Exercise can also serve as an outlet for releasing negative emotions, such as anger, frustration, and irritability. In addition to improvements in mood, exercise has also been associated with increased levels of self-esteem and self-efficacy. In certain instances, exercise performs a social function, increasing levels of engagement and coherence.

All told, these benefits of exercise could result in a lifetime of better self-care behaviors and improved long-term adherence to all aspects of diabetes care. Equally compelling, these benefits of exercise might help to increase patients’ happiness and quality of life.

Action
Health care providers should never underestimate the considerable impact they can have on patients’ behavior. Research in the field of patient compliance supports the positive influence of health care providers discussing and recommending specific strategies to patients. If exercise is important to a provider or provider organization, that attitude will permeate the patient population. Providers should make it a priority to clearly and positively communicate the benefits of exercise. Delivering that message with emphatic conviction will go a long way in making a lasting impression on patients.

Unfortunately, regardless of the level of enthusiasm, it is not enough to simply extol the benefits of exercise. Patients are often unfamiliar and uncomfortable with the idea of exercise and will need concrete assistance in taking the next step. Many patients have had horrible experiences with exercise in the past. Use this opportunity to dispel outdated myths and erroneous beliefs that patients may have towards exercise and physical activity.

Dietitians, nurses, and health educators familiar with behavior change theory can be of obvious assistance in facilitating lifestyle changes. Educators can present patients with a list of physical activity options and alternatives, providing them with choices based on their own preferences and circumstances. Educators can assist in setting specific goals based on where patients are on the readiness-to-change continuum, and they can provide much-needed follow-up.

For patients who are ready to change, providers need to have a comprehensive list of resources in their organization or the larger community for referral. This is a time-intensive process, and those not especially proficient in the exercise realm may want to delegate this task to a colleague who understands both the patient population and the exercise community.

A comprehensive list can be developed by scouring the community, health clubs, personal training studios, recreation complexes, mall walking programs, senior centers, and other organizations for information. Explore options for people with special circumstances, such as patients with low incomes, orthopedic challenges, or transportation issues. Have a list of resources available for patients who elect to exercise at home, as well.

Patients often have both psychosocial and physical barriers to exercise. The more options presented, the more likely patients find one that appeals to them or accommodates their needs.

Many community exercise facilities have staff qualified to work with special populations. Often, such facilities will go out of their way to build a relationship with health care providers interested in encouraging patients to exercise. Many will offer free trial memberships and training sessions to use as further incentives for patients. Some will offer free training to providers themselves, to help them learn about the programs they are recommending to patients. These are good places to start.

Summary
Exercise remains firmly rooted as one of the cornerstones of diabetes care. Research continues to shed light on new ways in which exercise accomplishes its benefits on the physical health of patients with diabetes. In addition to the physiological benefits, exercise appears to offer psychological benefits. Although they receive less attention, these psychological benefits of exercise may have far-reaching potential in the long-term management of diabetes.

Nearly every treatment used in diabetes care shares a final common pathway of sorts: adherence on the part of patients. Any therapy prescribed will only work if patients are committed to the necessary self-care behaviors. Further, patients are required to sustain that level of commitment for an indefinite duration. This sort of long-term adherence is, of course, exceedingly difficult to carry out. Most providers who work in diabetes can attest to the existence of “diabetes burn out,” even if they are not familiar with Polonsky’s book of the same name.

Stress management and behavioral health, although not listed among the cornerstones of diabetes care, appear essential to effectively manage dia-
betes in the long term.\textsuperscript{20} Through its provision of psychological benefits, exercise appears to have great potential in helping patients manage stress and improve adherence.

The inclusion of exercise in the management of diabetes can significantly contribute to a virtuous cycle of improved control, fewer complications, improved mood, and better self-care behaviors. Both the physiological benefits and the psychological benefits of exercise contribute to such a cycle, underscoring again how exceptionally well suited exercise is in helping to manage diabetes.

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Ronald J. Zacker, PA-S, RD, CDE, CPT, is a diabetes educator at Froedtert Lutheran Memorial Hospital, a personal trainer, and a student in the Graduate Physician Assistant Studies Program at Marquette University in Milwaukee, Wisc.