

# AADE POSITION STATEMENT

## Diabetes and Exercise

**A** growing body of evidence supports that regular physical activity leads to multiple physiological and psychological benefits that can improve glycemic control, overall health, and quality of life.<sup>1</sup> Furthermore, recent evidence points to the crucial role of physical activity in the prevention of type 2 diabetes.<sup>2,3</sup> Despite these benefits, many individuals do not engage in enough regular activity to achieve general and diabetes-specific health benefits. More than 50% of American adults do not get the 30 minutes per day of activity that is recommended by the US Surgeon General.<sup>4</sup> Among individuals with type 2 diabetes in the Third National Health and Nutrition Examination Survey, 31% reported no regular physical activity participation and another 38% reported performing less than recommended levels of physical activity.<sup>5</sup>

It is the position of the American Association of Diabetes Educators that diabetes educators play a unique and influential role in advising and motivating individuals with diabetes to integrate physical activity/exercise into a lifestyle that supports optimal diabetes management and health.

### Background

#### Health Benefits of Exercise

Physical activity is defined as bodily movement produced by skeletal muscles that requires energy expenditure and produces overall health benefits.<sup>6</sup> Exercise, a subset of physical activity, is planned, structured, and repetitive bodily movement done to improve or maintain 1 or more components of physical fitness.<sup>6</sup> Regular physical activity or routine exercise can offer general as well as diabetes-specific health benefits. Habitual participation in activity can reduce the risk of cardiovascular disease by lowering blood pressure, improving lipid profile,

This is an official position statement of the American Association of Diabetes Educators (AADE). AADE is a multidisciplinary professional membership organization of health care professionals dedicated to integrating successful self-management as a key outcome in care of people with diabetes and related conditions.

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reducing body weight and percentage of body fat, and favorably affecting the prothrombic state.<sup>7,8</sup> The risk of cardiovascular disease can be reduced by an estimated 35% to 55% through adoption and maintenance of an active lifestyle.<sup>9</sup> This is an important consideration given the 2- to 4-fold increased risk of mortality resulting from cardiovascular complications associated with diabetes.<sup>10</sup>

In addition, physical activity can reduce feelings of stress and anxiety, heighten sense of well-being,<sup>11</sup> reduce risk of other chronic diseases such as certain forms of cancer and osteoporosis,<sup>1</sup> and decrease functional declines that occur with aging.<sup>12</sup> Regular physical activity affects overall glycemic control through improved insulin sensitivity, lowered insulin requirements, and improved glucose tolerance.<sup>8,13,14</sup> Collectively, these health benefits may contribute to a reduction in the risk for long-term diabetes complications, slow the progression of existing complications, and enhance quality of life.<sup>10</sup>

Multiple metabolic adaptations that occur in response to physical activity participation can improve glycemic control for individuals with type 2 diabetes.<sup>14</sup> However, these same adaptations have not been consistently shown to improve glycemic control in people with type 1 diabetes.<sup>8</sup> Acute exercise can lead to significant blood glucose fluctuations and a resultant management challenge for those who require insulin. However, self-management training can mitigate the potential for excessive blood glucose excursions related to exercise. Given the many health benefits of physical activity, participation in a regular activity routine is of primary importance and should be encouraged for individuals with type 1 and type 2 diabetes as well as for those with prediabetes.

### **The Role of Exercise in Diabetes Prevention**

The costs and burden of diabetes in the United States have risen exponentially as the prevalence of the disease has reached epidemic proportions. Individuals with prediabetes, defined by the presence of either impaired glucose tolerance or impaired fasting glucose, have a significantly increased risk for developing type 2 diabetes and are at high risk for developing cardiovascular disease.<sup>15</sup> Lifestyle interventions, specifically weight loss produced by calorie control via reduced dietary fat intake and increased physical activity, have been shown to significantly delay or prevent the onset of type 2 diabetes among persons with prediabetes.<sup>2,3</sup> These same interventions may provide other important health benefits,

notably, a reduction in cardiovascular risk factors.<sup>2,3,15</sup> Thus, interventions that promote adoption of a healthy lifestyle that includes physical activity, dietary modification, and a focus on maintenance of a healthy weight should be considered early interventions for populations at risk for type 2 diabetes.

### **Potential Exercise Risks**

Although physical activity and exercise offer numerous health benefits, they also carry potential risks for individuals with diabetes. Acute complications, hyperglycemia and hypoglycemia, and severe microvascular and macrovascular complications can be exacerbated by physical activity. To minimize risk, a thorough medical evaluation should be performed before a physical activity or exercise program is initiated.

A safe and effective exercise prescription for the individual with diabetes depends on the careful weighing of multiple factors and sound clinical judgment. An assessment of the individual's medical history and physical examination will help determine the degree of risk and identify the most appropriate physical activity/exercise interventions.<sup>7</sup> In addition, a psychosocial evaluation should be done to determine barriers that might prevent success with physical activity participation.

### **Exercise Recommendations and Guidelines**

In recent years, exercise recommendations have shifted away from a rather narrow focus on structured aerobic exercise toward recommendations that incorporate a broader construct emphasizing the benefits of moderate, unstructured lifestyle physical activity.<sup>1,16</sup> This broadened approach offers options for physical activity that are feasible for even the most deconditioned and sedentary population.

Previously inactive individuals can attain significant health benefits by taking steps to incorporate unstructured lifestyle activities into their daily routine. By performing at least 30 minutes per day of moderate activities such as brisk walking and vigorously doing household chores, gardening, and yard work, those who have been inactive can make initial progress toward improving their health and level of fitness.<sup>1,17,18</sup> Furthermore, those who strive to participate in a moderate-to-vigorous, structured exercise routine can achieve even greater health benefits and higher levels of fitness.

Exercise and physical activity recommendations should focus on the general health benefits of an active lifestyle, the specific reasons that exercise is being prescribed, and the unique goals and outcomes that the individual with diabetes wishes to achieve. A lifestyle physical activity approach with or without structured exercise can be very effective if applied when establishing an individualized physical activity routine.

Diabetes educators play a vitally important role in overcoming barriers to regular exercise participation. Educators must be prepared to apply counseling strategies that will enhance adoption and long-term maintenance of a physical activity habit. These include assisting in a plan to introduce exercise in a safe and progressive manner, emphasizing proper selection of goals and rates of progression.<sup>19</sup>

### Outcomes Expectations

The measurement of exercise outcomes is vitally important to the long-term success and viability of exercise programs. Individual expectations of outcomes from physical activity participation significantly influence the motivation to adopt physical activity and/or structured exercise into lifestyle and diabetes management regimes.<sup>20</sup> Outcome measures can provide diabetes educators with indicators of effectiveness of an exercise program as well as valuable information about strategies that can enhance the success of future exercise interventions. Outcome measures can also be used to inform payers of the value and effectiveness of exercise programs.<sup>21</sup>

The information from the preexercise medical history, physical examination, and assessment of readiness to initiate exercise provides valuable baseline data for physical activity programs and may be used to establish individual-level outcomes to track. Outcomes should be measured and evaluated periodically during and after the implementation of exercise interventions.<sup>21</sup>

### Conclusion

The important role that both lifestyle physical activity and structured exercise play in the management of type 1 and type 2 diabetes and in the prevention of type 2 diabetes is vital. Of particular importance is a reduction of cardiovascular risk factors. Exercise improves glycemic control in individuals with type 2 diabetes and improves glucose tolerance in those with prediabetes.

Although exercise carries potential risks for individuals with diabetes, with careful planning, its numerous health benefits far outweigh these risks. By using established, sound exercise guidelines and resources established by the US Surgeon General,<sup>1</sup> American College of Sports Medicine,<sup>11,12,22,23</sup> and the American Diabetes Association<sup>8,24</sup> and tailoring exercise recommendations to thorough preexercise assessment, diabetes educators can suggest safe and effective physical activity interventions that will enhance the health and well-being of all individuals with diabetes.

Despite its many associated benefits, physical activity remains an underutilized therapeutic modality in diabetes management. It is a duty of the diabetes educators to promote and support interventions that will substantiate the integral role that physical activity and exercise training play in diabetes self-management programs. Educators should take advantage of their unique position to advocate the important role of physical activity and exercise in diabetes care to their patients and assist them in integrating regular physical activity as part of a healthy lifestyle.<sup>25</sup>

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