Preface

Diabetes is a highly significant public health problem in the United States. Approximately 21 million children and adults (7% of the population) have diabetes, although only about 14.6 million have been diagnosed. The estimated number of persons with prediabetes is 54 million. The prevalence of diabetes is higher among persons of Hispanic, African American and Native American heritage than among persons of non-Hispanic white origins. Of persons with type 2 diabetes, two of three deaths are caused by cardiovascular disease, myocardial infarction, or stroke, which may in part be due to an increased prevalence of atherosclerosis risk factors such as hypertension and dyslipidemias. Prevalence of peripheral arterial disease is also greatly increased in persons with diabetes.

Type 1 and type 2 diabetes raise common and disparate issues when it comes to exercise, and these issues are discussed in Diabetes and Exercise. At present, more data are available about exercise in type 2 diabetes than type 1 diabetes. However, there is a regenerating interest more recently in type 1 diabetes and new studies should be forthcoming.

Though exercise is recognized by the American Diabetes Association and others as a cornerstone of diabetes treatment, most people with type 2 diabetes are not physically active. Persons with type 2 diabetes have reduced exercise capacity, including lower maximal oxygen consumption and impairments in the submaximal measures of cardiorespiratory exercise performance. These exercise abnormalities appear early and may be related to cardiac and hemodynamic abnormalities. Whatever the reason for decreased physical activity levels, being sedentary is linked to increased levels of morbidity and mortality, which are already high in diabetes. The purpose of Diabetes and Exercise is to give the researcher and practitioner in the area of diabetes, information that is both theoretical and clinically useful to further understanding of the importance for persons with diabetes to be physically active as part of the standard of care for treating this condition. In addition, exercise guidelines and precautions are provided to maximize the benefits of activity and to minimize risk in order to avoid adverse events.

We are proud of the quality of all of the chapters in this book, all written by experts in their respective areas and wish to recognize the substantial efforts of all of the authors. Section I sets the stage essentially for the rest of the book. Dr. Kenneth Cusi reviews the epidemiology of diabetes. Prevention of diabetes is discussed by Dr. Jonathan Shaw. Finally, the metabolic syndrome is examined by Dr. Christos Mantzoros. In this way, the reader can understand the magnitude of the problem posed by diabetes and understand the compelling rationale for the use of exercise and increased physical activity in persons with diabetes.

In Part II, the scientific evidence for the importance of exercise/physical activity is provided in five chapters. This mechanistic information makes it possible to understand the reasons why this type of treatment is especially important for people with diabetes and has specific benefits in these individuals. Thus, the concept of exercise as medicine has a strong scientific basis for prevention and treatment of diabetes. Dr. Irene Schauer’s chapter provides a thorough discussion of the abnormalities of exercise performance in type 2 diabetes and the benefit of exercise training for persons with type 2 diabetes. Dr. Sherita Hill Golden reviews the cardiovascular consequences of type 2 diabetes. Dr. John Doupis
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examines endothelial dysfunction, inflammation, and exercise. Dr. Kerry Stewart’s chapter covers exercise, adiposity, and regional fat distribution. Finally, Dr. Amy Huebschmann discusses diabetes mellitus and exercise physiology in the presence of diabetic co-morbidities. These chapters all provide a compelling rationale for exercise as a treatment in diabetes from a scientific standpoint.

Part III addresses practical issues that are essential in order to safely engage patients with diabetes in exercise-related research protocols and clinical programs. Dr. Dalynn Badenhop provides guidelines for prescription of exercise for patients with diabetes. Dr. Brent Van Dorsten considers the critical behavioral issues that must be addressed to sustain exercise adherence in patients accustomed to sedentary behavior. Dr. Nora Tomuta’s chapter provides information on diabetes and nutrition since this aspect of care is the other main behavioral cornerstone of diabetes treatment. Finally, Dr. Barry Franklin examines the medical evaluation and assessment that should be undertaken before beginning a program of exercise for persons with diabetes, including the value and limitations of exercise stress testing.

In Part IV, additional key issues concerning diabetes and exercise are discussed. Dr. Susan Herzlinger Botein addresses the difficult problem of conditions and co-morbidities that may interfere with exercise. Dr. David Maahs discusses type 1 diabetes and exercise and finally Dr. Kristen Nadeau examines the growing problem of type 2 diabetes in youth and the role of exercise.

We are proud to have been joined in this effort by the some leading authorities in this area, all of whom have made important contributions in the area of diabetes and exercise and whose collaboration made this book possible.

It is my hope that the reader will find the information in this book to be insightful and clinically useful. Furthermore, I hope that it will at the very least provoke more and perhaps different thinking about the important role of exercise in preventing diabetes and managing its consequences.

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