Preface

In the quest to provide children with optimal health, maternal exercise while in utero is sometimes not considered. Concerns have been raised that the physiologic effects of maternal exercise on thermal equilibrium, placental bed blood flow, and delivery of oxygen and nutrients to the fetus may compromise the growth and development of the fetus. However, collective findings have supported that acute cardiovascular, hormonal, nutritional, thermoregulatory, and biomechanical responses of exercise are not teratogenic, and do not compromise the pregnancy. Moreover, results of further studies revealed that physical exercise provides benefits for expectant mothers, such as an improved sense of well-being, diminished discomfort and pain associated with pregnancy, and maintenance of maternal cardiovascular health. Exercise during pregnancy also maintains and/or improves maternal fitness and physical capacity, significantly decreases risk of developing preeclampsia, hypertension, gestational diabetes mellitus, decreases weight gain, and improves attitude and mental state (Collings, Curet et al. 1983; Dye, Knox et al. 1997; Clapp, Kim et al. 2000; Pivarnik 2006). Placental adaptations have been discovered that indicate an increase in blood flow and nourishment to the fetus. Mothers who are well-conditioned and continue their exercise regimen throughout gestation show no increase in lack of conception, abortion, congenital abnormalities, or preterm labor, and have normal growth and development during the first year of life (Clapp 1991, 1998).

In light of the information that maternal exercise is not harmful to the fetus, while also being beneficial to mother and the placenta, our research has begun to examine pregnancy outcomes as they are related to exercise benefits of the fetus/infant. Throughout the Chap. 1 we will describe current findings of how maternal exercise throughout gestation influences fetal development of key organ systems. The Chap. 2 will explain how these effects influence the offspring during labor and delivery. This chapter will also examine the relationship between maternal activity level and perinatal cardiac autonomic control of the offspring. Chapter 3 will describe the longitudinal effect of maternal exercise on postnatal growth. These chapters will encompass the relationship between maternal activity level and fetal, birth, and neonatal effects.

Some scientists have collected data on offspring exposed to maternal exercise in utero. Although methods and models have differed, these findings in animal and human models are helpful as we further investigate this topic. To this point, all of this research has not been summarized. Therefore, the Chap. 4 will focus and summarize studies related to physical/health measurements of offspring exposed to maternal exercise throughout gestation.

The next part of the book will describe the most effective way to address barriers to women exercising during pregnancy, and maintaining a physical fitness program. Additionally, the most effective and safe exercises during pregnancy will be put forth (Smith 2008). Previous guidelines have become less conservative based on research studies. In order to optimize safety, while maximizing benefits, current guidelines based on federal, American College of Obstetrics and Gynecology (ACOG), and the Canadian Society of Exercise Physiology (CSEP) recommendations will be discussed in the Chap. 5. Various aspects of exercise which have been studied include frequency, time, intensity, type of exercise, and environment. These exercise factors will be described in relation to pregnancy outcomes.

By the end of the book, readers should better understand the newest research findings on how exercise influences the fetus in utero and beyond, the most effective ways to maintain an exercise protocol for pregnant women to exercise, and the specifics of an appropriate exercise routine. This information will help researchers and scientists better understand the effects of exercise during pregnancy on offspring development.