CHAPTER I

INTRODUCTION

Energy cost of various types of activities, such as rowing, swimming, running and bicycling has been analyzed in detail in a laboratory (Astrand, 1977). However, for sports such as Sepak Takraw (ST), that involve almost all muscle groups with complex movements, laboratory evaluation is unreliable, and proper ergometers cannot be constructed. Therefore, only the actual activity in the field can be used for physiological studies.

In the past, the physiology of ST has been studied in some detail (Kerdjantuk, 1996). Besides the pioneering studies of Chaiyong (Chaiyong, 1996) were both dedicated more to morphological and anthropometric analysis than to the energetics of ST.

Energy expenditure during ST match play may be direct means using portable telemetric devices such as Cosmed K2 or Metamax. Both methods have limitated simulation of match-play and they inhibit full involvement in the game. In circumstances like this where gas analysis is precluded the use of heart rate (HR) is probably the most viable method for measuring energy expenditure (Astrand and Rodahl, 1987).

In recent years, the use of HR to estimate energy expenditure has become increasingly popular in studies. Energy expenditure is typically estimated from HR through the use of a heart rate - oxygen uptake regression line (HR-VO_2 regression line)(Astrand and Saltin, 1961; Karvonen and Vuorimaa, 1988). Having the subject exercise in the laboratory at different work rates while HR and VO_2 are simultaneously recorded develops the HR-VO_2 line. This relationship is generally nonlinear, as reported by Dauncey and James (Dauncey and James, 1979), Acheson and co-worker (Acheson et al., 1980) and Washburn and Montoye (Washburn and Montoye, 1986). Regression analysis is then applied to develop an equation that predicts VO_2 from HR. This equation is then used to convert HR recorded in the field to VO_2 (Murase, Kamei and Hoshikawa, 1989; Meir, Lowden and Davie, 1991).

In order to examine the energy expenditure during competitive matches it is necessary to measure physiologic variables such as HR or VO_2. It is not often feasible to measure VO_2 during activities such as ST, therefore monitoring of HR is typically used to quantify the exercise response.

Objectives

Studies on energy demands in Thai National female Sepak Takraw athletes have not been performed yet. The aim of this study was, therefore, to establish energy cost during competition in ST. It is designed to achieve the following objectives:

1. To study the heart rates responses and estimated energy expenditure during competition.
2. To study the energy system contributions (Anaerobic and

Aerobic systems) during match-play.

3. To study the exercise intensity (%VO_2max) during match-play.
4. To study the energy expenditure (kJ and kcal) during match-play.
5. To study the type of exercise during match-play.