

CHAPTER I

INTRODUCTION

Rationale

Idiopathic scoliosis is commonly found in female adolescence, so called adolescent idiopathic scoliosis (AIS) (1-4). The progressive vertebral deviation and rotation involving thoracic spine and ribs affects the thoracic cage (5-7). Thus, the AIS functional capacity and eventually quality of life may be compromised.

The thoracic deformity causes the reduction of ventilatory pump in individuals with AIS (6, 8-10). The ventilator pump impairment seems to be associated with the degree of severity especially in severe group, but in mild and moderate group, the results were not conclusive due to the different variables used (8). The AIS is known as a restrictive lung; however, airway obstruction can also cause the pump impairment (6, 8, 9, 11). These conflicting results are due to the different operational definitions for restrictive and obstructive lung disease used.

Sedentary lifestyle in AIS has been reported (2, 7). The functional limitation in severe AIS was found and improved after aerobic exercise training in severe AIS (12). This implies the existing of cardiovascular impairment and deconditioning in this population. Unfortunately, studies on cardiovascular impairment and functional limitation in mild and moderate AIS have been limited. Also the relationship among the musculoskeletal, cardiovascular, and pulmonary system, and the functional capacity indicated by 6 minute walk test (6 MWT) have never been reported.

Purpose of the study and hypothesis

Purpose:

This study aimed: 1) to compare the ventilatory pump capacity, cardiovascular capacity, and functional capacity in adolescent females with mild, moderate, and severe scoliosis and 2) to determine the causal relationship between systemic impairments (musculoskeletal, cardiovascular, and pulmonary system) and functional capacity indicated by 6 minute walk distance (6 MWD) in these subjects.

Hypothesis:

1. Among mild, moderate, and severe scoliosis, the lowest cardiopulmonary capacity would be found in the AIS with severe scoliosis.
2. Among mild, moderate, and severe scoliosis, the shortest 6 MWD would be found in the AIS with severe scoliosis.
3. The 6 MWD would be correlated with the Cobb angle, with the cardiovascular variables, and with the pulmonary variables.
4. The 6 MWD would be predicted by the Cobb angle, the cardiovascular, and the pulmonary variables.

Advantages of the study

Clinically, spinal alignment correction is the main treatment for individuals with AIS. It may not be an appropriate approach since AIS is a progressive spinal deformity and affects other bodily systems. The results of this study may provide the effects of scoliosis on the cardiopulmonary impairment and functional limitation in this population. These pieces of evidence may encourage how physical therapists evaluate and treat including health promotion in the individuals with AIS. Thus, better care which based on sound scientific can be provided to the patients.

Operational definitions

1. Idiopathic scoliosis means a structural spinal curvature for which no cause is established.
2. Adolescent scoliosis is a spinal curvature presenting at or about the onset of puberty and before maturity approximately aged 11 to 18 year.
3. The Cobb method is the method measuring the spinal curvature defined as the Cobb angle which is used to categorize the severity of scoliosis.
4. Severity of scoliosis is divided into three groups: mild scoliosis (Cobb angle from 10° to less than 30°), moderate scoliosis (Cobb angle from 30° to 45°), and severe scoliosis (Cobb angle greater than 45°)
5. Functional capacity means the ability of a person to perform aerobic works or ability to achieve the necessary tasks or activities in daily living.
6. Functional limitation means the decreasing or inability of a person to perform aerobic works or to achieve the necessary tasks or activity in daily living.