Comparison of Spine and Lower Extremities Range of Motion Between in Elderly Fallers and Nonfallers

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Introduction

Falls in elderly extends far beyond minor injury to significant loss of functional independence and even death (Chandler and Duncun, 1993). Falling accounts for the majority of deaths related to injury, the sixth leading cause of death among the elderly. An estimated 30 percent to 50 percent of adult, 65 years of age and older and 40 percent of adults over the age of 80 experience one or more falls annually (Lord et al, 1991). The fall causes the admission to a nursing home for people who are 65 years old are about 45 percent for women and 28 percent for men.
A fall event occurs when the postural control system fails to maintain equilibrium. To achieve and maintain equilibrium, an individual must control and regulate specific postural output during voluntary, involuntary, or externally imposed movements of the center of gravity (O’Brien et al., 1997). Postural responses are executed through the musculoskeletal system and changes to any part of the musculoskeletal system may lead to increased difficulty in maintaining equilibrium (O’Brien et al., 1997). Adequate postural control requires keeping the center of gravity over the base of support during static and dynamic situations. The components of the postural control system are strength, range of motion, proprioception and central processing (Chandler and Duncan, 1993).

The fall in elderly is related to physiologic and biomechanic changes that are associated with aging. The potential ranges of joint motion vary throughout the life span because of age related changes in the mechanical properties and morphology of joint structures (James and Parker, 1989). Decrease in range of motion is associated with normal aging in both men and women. This decrease in joint movement exists even in the absence of pathology (Gajdosik et al., 1999). Loss of spinal and peripheral joint range of motion is associated with decreased postural control (O’Brien et al., 1997). Flexibility in joint movement is required for a person to accommodate various perturbations by allowing body to perform various postural control strategies.

There are no comprehensive analysis of joint range of motion other than lower extremities seem readily available and even then many of these previous studies only have examined the range of motion in anterior and posterior direction. For example, knee flexion and extension, ankle dorsiflexion and plantarflexion, and so forth. In normal adults, the anteroposterior and lateral stability is required to maintain balance. The objective of the present study is to determine and compare the difference of cervical, trunk and lower extremity range of motion in three dimensional directions between fallers and nonfallers. Physical therapists are involved in fall prevention and post fall rehabilitation in elderly population. Comparison of these data may be useful in understanding the joint flexibility differences between two groups and the relationship of joint flexibility at each joint to falls in elderly. This study may provide direction for intervention and area of range of motion assessment in elderly.

**Methods**

**Procedure**

Six males and 22 females, aged 65 to 88 years, independently residing in social service facilities and in the community, were classified into two groups as fallers or nonfallers. Fallers group consisted of 14 females with mean age of 77 and nonfallers group consisted of 6 males and 8 females with mean age of 73. The permission to participate in the study was obtained from each subject. In this study, a