

Review article
Gait in the elderly

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Abstract

Walking is one of the most common of all human movements. It exists to transport the body safely and efficiently across ground level, uphill or downhill. Walking is learned during the first year of life and reaches maturity around 7 until 60 years. Elderly walking performance then starts to decline and the elderly slow down gradually. Falls are a major cause of morbidity in the elderly and in almost all incidences of falls, some aspects of locomotion have been implicated. With the increased life expectancy of the elderly and their more active lifestyle there is now an emphasis on determining any changes that occur in their gait patterns in order to reduce the frequency of falls, to identify diagnostic measures that are reliable predictors of fall-prone elderly and finally to develop programs for preventing such falls. This review addresses the gait related changes in the elderly in order to pinpoint the effect of normal aging for comparison with different gait deviations related to some pathologies. Spatio-temporal, kinematics, kinetics and EMG data will be reviewed as well as the physiological changes associated with gait and aging. Finally, the selection criteria will be reviewed and recommendation on the urgent need of a valid healthy elderly database will be addressed.   1997 Elsevier Science B.V.

Keywords: Elderly; Walking; Falls

1. Introduction

In Canada, like in other industrial countries, the elderly group (as defined as ≥ 65 years) represents a growing segment of our population. At the beginning of the 21st century, this group will represent about 21% of the total Canadian population, an increase of more than 12.3% with respect to 1976 [1]. Furthermore, it has been estimated that in the year 2006, more than 47% of the elderly will be aged over 75 years old and this reflects the aging process that affects the sub-segment of the elderly population [2].

Falls is a major cause of morbidity in the elderly and in almost all incidences of falls, some aspects of locomotion have been implicated [3–8]. According to Blake and collaborators [9], tripping has been responsible for

about 53% of falls. In their review on accidents involving older people, Lilley and collaborators [10] showed that falls are the leading cause of accidental death for people aged over 75. Retrospective studies showed that about one third of the elderly above 65 years are fall-prone elderly and will experience at least one fall per year [5,11,12] while for the elderly over 80 years, the proportion increases to one half [13]. Fallers tend to have a slower gait velocity [8,14] or impaired gait and are more likely to use a cane than non-fallers [15]. The consequence of falls range from a reduced mobility and independence to various injuries and sometimes to death [10,11,16].

During a fall, the body parts that most often contact the ground are the hands and the hips [17,18]. An important decrease in muscle mass and the associated decrease in the cushioning around the hips [19] is related to malnutrition [20,21] and can partially explain, the high incidence of hip fracture in the elderly

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