

## Effect of Overground Walking and Treadmill Exercise on Walking Speed and Walking Ability in Elderly

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### Abstract

**Objective:** To compare the effect of overground walking and treadmill exercise on walking speed and ability in elderly from week to week.

**Methods:** This study was conducted in 6 weeks to 18 elderly at Panti Wreda Karitas and Nazareth Bandung (September–December 2011). They were divided into two groups; overground walking exercise group and treadmill group. Walking speed and ability was measured using 10 meter walk test and 6 minute walk test consecutively.

**Results:** Both group walking speed was improved after 1 and 2 weeks exercise ( $p=0.019$  and  $p=0.050$ ), consecutively. Walking ability in the overground and treadmill group was improved after 1 and 3 weeks exercise ( $p=0.019$  and  $p=0.009$ ), consecutively. Overground walking group showed greater improvement in walking speed and ability after 3 weeks exercise ( $p=0.008$  and  $p=0.017$ ) consecutively.

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**Conclusions:** Three weeks overground walking exercise improves walking speed and ability better than treadmill exercise.

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### Introduction

There are two causal factors for the risk of falling in elderly: intrinsic factor (physical and neuropsychiatric conditions, decreased vision and hearing, neuromuscular changes, walking pattern, and postural reflect due to aging process) and extrinsic factor (medicines taken, walking-aid, and unsupportive/dangerous environment).<sup>1–3</sup> Poor balance and abnormality of walking pattern contribute to 10–15% of the risk of falling in elderly.

Normal walk parameters include velocity or speed, i.e. the walking speed in meter second; stride length or cycle length, i.e. the length from one heel strike to another heel strike of the same foot; stride time, i.e. distance between a heel strike of a foot and another heel strike of the other foot; and cadence or walking speed,

i.e. the walking speed in number of steps per minute.<sup>4</sup>

Walking quality is one of the factors that will determine the quality of life. However, in elderly, this function can be disrupted. Walking quality includes locomotor instability and walking ability. In general, the locomotor instability in elderly is caused by decreased muscle mass, strength, power, joint movement area scope, and flexibility. These result in changes in terms of elderly walking pattern (decreased stride length, stance phase and expanded double support, as well as decreased stride symmetry),<sup>5</sup> which leads to increased energy expenditure and decreased ability for long distance walk. The elderly muscle strength and endurance that are under the threshold will limit the elderly to ambulate outside the house. Therefore, the elderly will tend to stay home which less activities, causing further decrease in the functional capacity and higher risk for fall.<sup>2,3,6</sup>

The elderly stride length is shorter than that of adults but the elderly cadence is relatively similar to adults and even sometimes smaller than adults, making the elderly walking speed

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