

ASSESSMENT OF FOOT CLEARANCE USING 2D MOTION ANALYSIS SYSTEM IN STROKE PATIENT



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ABSTRACT

The purpose of this study was to assess gait of normal adults and stroke patients using 2D motion analysis system and to present measurement variables for predicting fall risk of stroke patients This study was performed with 1 stroke patient and 1 normal adult. The forefoot and hindfoot were traced using Dartfish program during swing phase, and foot clearance was measured. The forefoot clearance from floor of stroke patient was lower than that of the normal adult. The results of this study demonstrate that the forefoot clearance using 2D motion analysis is an important parameter in assessing the abnormal gait of stroke patients and predicting the risk of falls.

INTRODUCTION

Stroke results in several problems such as changes in gait patterns, increased fall risk, and reduced independence of activities of daily living[1]. Most of stroke patients can not actively perform dorsiflexion during the swing phase on the gait. This is caused by atrophy of the dorsiflexors and spasticity of the plantarflexors, Foot drop causes abnormal gait such as toe catch and increases the risk of slipping or falling[2][3]. Thus, the aim of this study to investigate the foot drag of stroke patient and normal adult using 2D motion analysis system and to use this data to predict the risk of stroke.

METHODS

This study was performed with 1 stroke patient and 1 normal adult. The stroke patient is female, 68 years and 145cm. She diagnosed with stroke by ischemic brain injury, over 6 months from the onset. The normal adult is female and height, age is the same as the stroke patient. 2D motion analysis using Dartfish program was conducted in order to analyze foot drag during gait. Markers were attached to lateral side of calcaneal tuberosity to track the hindfoot movement path, and attached to lateral side of the 5th distal phalanx to track the forefoot movement path(figure 1). The 60Hz digital video camera was fixed on sagittal plane which was 3m away from the passage for the recording. Before recording, each subject walked 3 times to be familiarized with the direction of passage and then the gait of each subject was recorded(Figure 1).

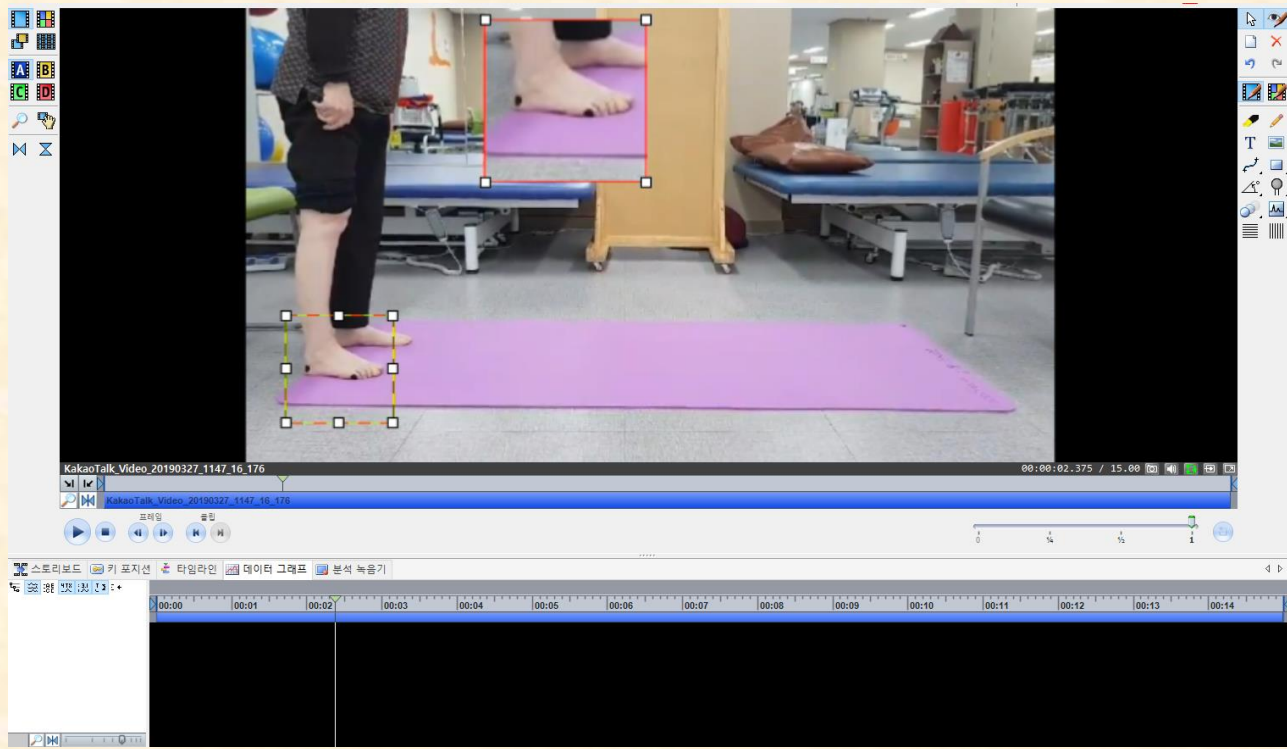


Figure 1. . 2D motion analysis for gait analysis

RESULTS

Analysis of the forefoot and hindfoot trajectory revealed that the forefoot clearance from floor of stroke patient was lower than that of the normal adult during swing phase(Figure 2, Figure 3). This indicates that the dorsiflexion impairment of a stroke patient interferes with the clearance of the forefoot from floor, and forefoot clearance is an important measure of abnormal walking in stroke patients.

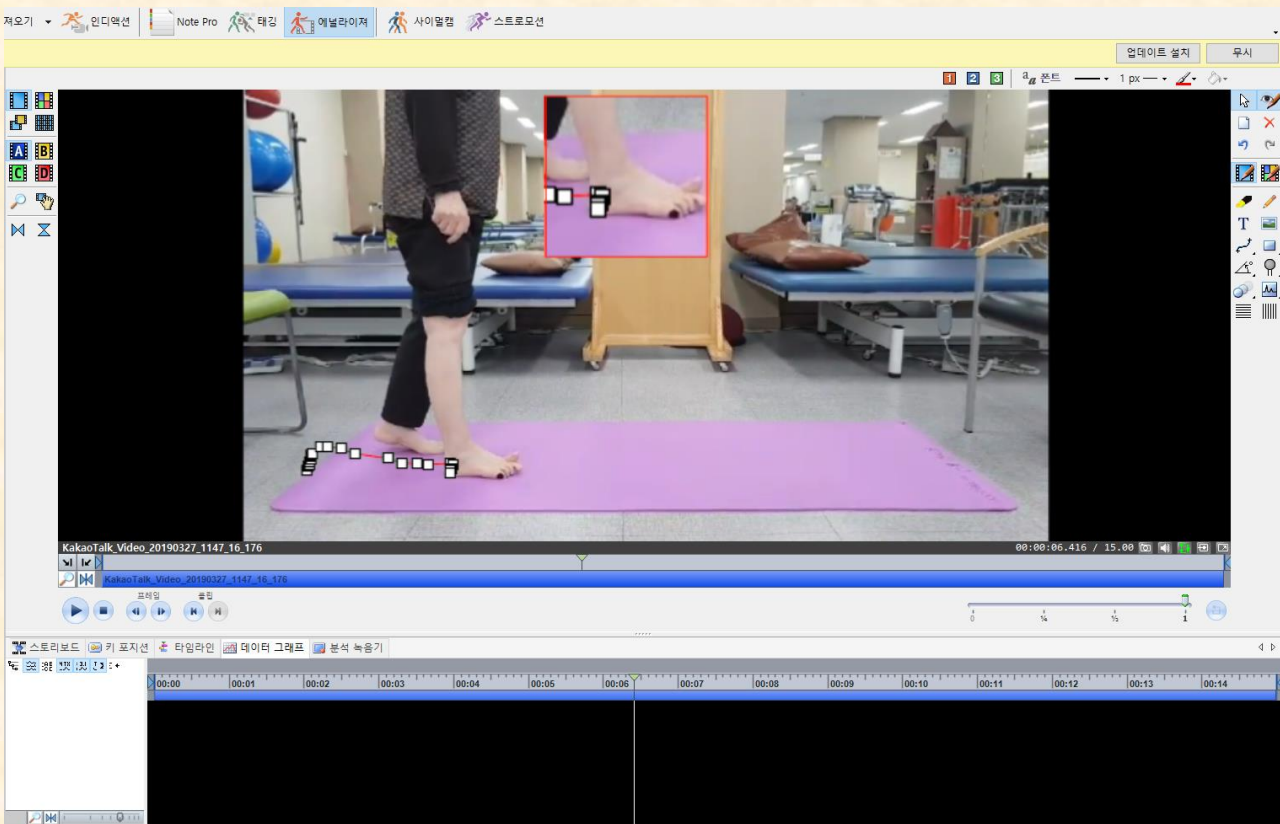


Figure 2. Hindfoot trajectory



Figure 3. forefoot trajectory

CONCLUSIONS

The results of this study demonstrate that the forefoot clearance using 2D motion analysis is an important parameter in analyzing the abnormal gait of stroke patients and predicting the risk of falls.

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