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Convention ID: 49

Submitting author: Ms Cindy Wing Shan WONG

Post title: Occupational Therapist II, Alice Ho Miu Ling Nethersole Hospital

The Effect of A Hemiplegic Wheelchair Cushion to the Wheelchair Propulsion Speed and Seating Posture in Hemiplegics

WONG WS(1)

(1)Occupational Therapy Department, Cheshire Home Shatin

Keywords:

Hemiplegic

Stroke

Cushion

Seating Posture

Wheelchair Propulsion Speed

Pelvic tilt

Introduction

Some of stroke patients use their unaffected arm and leg to propel a manual wheelchair for convenient functional mobility. They tend to slide forward in the wheelchair to acquire a better floor contact, which would heighten their pelvic obliquity, resulting in posterior pelvic tilt and kyphotic postures. A solution to the problem is to remove the seating cushion or replace it with a thinner one, which may increase the risk of developing pressure sores.

A special seating cushion was designed for those patients to facilitate the propulsion. The cushion is made from foam, half side of the foam is tapered down to allow users to reach the ground without sliding forward. Nevertheless, it has been very rarely used by health care providers in Hong Kong. The investigation into its effects to the seating posture and wheelchair propulsion is also very limited.

Objectives

This study aims at investigating the effect of the special hemiplegic seating cushion to the wheelchair propulsion speed and pelvic alignment in patients with hemiplegia.

Methodology

12 patients with post stroke hemiplegia were recruited from Cheshire Home Shatin by convenience sampling. Participants were required to operate their wheelchairs in a designated course to make 2 round trips in a 5 meters straight route in their maximum speeds, with and without the hemiplegic cushion respectively. Time required to finish the route was recorded by timers. The pelvic alignment including degrees of pelvic tilt and obliquity were measured by a goniometer. Two selected pelvic items of the validated Seated Postural Control Measure for Adults (SPCMA) were also rated.

Result

The wheelchair propulsion speed with the hemiplegic cushion was significantly faster after applying the cushion ($p < 0.05$). The angles of posterior pelvic tilt ($p = 0.680$) and pelvic obliquity ($p = 0.194$) were smaller in stationary position with the cushion, but the difference was statistically insignificant. After wheelchair propulsion, the pelvic obliquity angle was statistically smaller with the cushion ($p < 0.05$), and the posterior pelvic tilt was also smaller, though the difference was not statistically significant ($p = 0.406$). The total scores of the two pelvic items in SPCMA were smaller both before ($p = 0.257$) and after ($p = 0.157$) wheelchair propulsion with the cushion, but no statistically significant differences were found.

The hemiplegic cushion allows patients with hemiplegia to propel wheelchair with smaller pelvic obliquity and faster speed. The hemiplegic cushion can be considered as a relatively low cost option for post stroke patients when prescribing cushions in clinical practice.