Effects Of Using An Energy Efficient Brace On Gait, Function And Vocational Program Of An Adult High School Student With Chronic TBI: A Case Report

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Objectives: To assess the effectiveness of the ToeOFF! brace in enhancing independence in a school-based vocational program of an adult high school student with chronic TBI.

Method: Subject is a 20-year-old adult female high school student with chronic TBI sustained 18 years ago. Subject exhibited left knee hyperextension and foot drop which affected her stability in dynamic standing and gait. Subject presented with severe physical limitations including the need for handheld assistance when moving around the campus and difficulty in performing simple vocational tasks in standing and walking. The ToeOFF! brace (made of carbon fiber, kevlar and fiberglass) was recommended in supporting weak lower extremity during standing and gait.

The School Function Assessment (SFA) was used to track student's progress. Prior to wearing the brace, subject's SFA criterion score on the Travel section was 52 (95% CI: 48.08–55.92) and 42 (95% CI: 36.12–47.88) on Manipulation with Movement, both on a 0–100 scale.

Results: Three months after wearing the ToeOFF! brace, subject's change in scores were greater than change that could have been accounted for by errors of measurement. Subject's scores were 70 (95% CI: 64.12–75.88) on Travel and 65 (95% CI: 59.12–70.88) on Manipulation with Movement.

Subject is now able to travel in the campus mostly without handheld assistance. This includes delivering materials on campus as part of subject's vocational program. Subject is also now able to use her right upper extremity for functional activities (such as opening doors or grabbing materials in a work distribution line) without losing balance.

Conclusions: The ToeOFF! brace is an invaluable tool in supporting weak lower extremity and providing stability for dynamic standing and gait activities. Improved balance and gait can result in enhanced quality of life through greater independence.