NEUROGYMTECH

Improving Resident Mobility in Long Term Care: The Why and How

Why is maintaining and improving the function and mobility of residents in Long Term Care (LTC) recently under focus? There are several driving factors, but quite simply, it is because improved mobility translates into health care cost savings.

Mobility is a key not only to improved function and quality of life, but it is a critical predictor of health in general. The sciences of rehabilitation and kinesiology have evolved and we now understand that, with the proper support, elderly individuals can maintain greater fitness and mobility than previously thought. As important, though, is that we finally have practical tools to help make this possible and practical to implement.

The **keys to improved mobility and function** in an elderly population that may exhibit considerable de-conditioning along with co-morbidities such as Stroke, Parkinson's Disease and/or Dementia, are:

1. safely enabling mobility practice and;
2. ensuring sufficient intensity of training.

The viability of instituting practical mobility training that would adhere to these principles has been tested in a LTC setting in Ottawa, Ontario.

The study[1] looked at residents' ability to stand from a sitting position. The ability to rise out of a chair independently is fundamental to functional mobility and Activities of Daily Living (ADL's), and it is a major factor in the level of dependence and health complications for people in long term care. In the study, a 12-week training program, consisting of enabled standing and squatting and games-based biofeedback training, was given to 11 long term care residents (average age of 87.4 years) each of whom required assistance for the sit-to-stand movement in their ADLs. Eleven residents of the facility who had lost various degrees of their standing function participated in the 12-week study. The selection criteria included: 1) resident able to transfer with supervision or assistance from one person and 2) resident able to understand and follow instructions.

At the start of the training program each of the residents required some assistance to perform 5 consecutive sit-to-stand movements. The most common co-morbidities included Parkinson's Disease, Multiple Sclerosis, Osteoarthritis and Dementia. The hypothesis of the study was that a combination of enabling functional movement and intensifying movement training during regular weekly exercise sessions would result in significant improvement of residents' standing ability. Two exercise tools were chosen for the task: the NeuroGym Sit-to-Stand Trainer and NeuroGym TIM Trainer. The Sit-to-Stand Trainer is a tool designed to enable standing training, even in very weak individuals, by making use of an adjustable counter-weight system that allows for active assistance of the standing and sitting motions. The TIM Trainer provides visual biofeedback in the form of a simple video game so that training can be made more speed-sensitive and entertaining, thus increasing both the effectiveness of and the adherence to the training.

Figure 1: Sit-to-Stand Trainer

Figure 2: TimTrainer

Training sessions consisted of 3 weekly 25-30 minute sessions of assisted standing with the Sit-to-Stand Trainer. The training methodology included up to 50 repetitions in a session and progressive reductions in counter-weight assistance.

The games-based biofeedback training was introduced after 5 weeks of Sit-to-Stand training with progressive increase in game speed.

[1] *E. Heiden Toronto Rehab 2013 Complex Continuing Care Conference 2013*

As demonstrated in ***Figure 3***, the average time for 3 and 5 times Sit-to-Stand stance progressively improved through the 12-week program: from 21secs to 5secs and from 35secs to 10secs, for the 3 and 5 times standing tasks respectively.

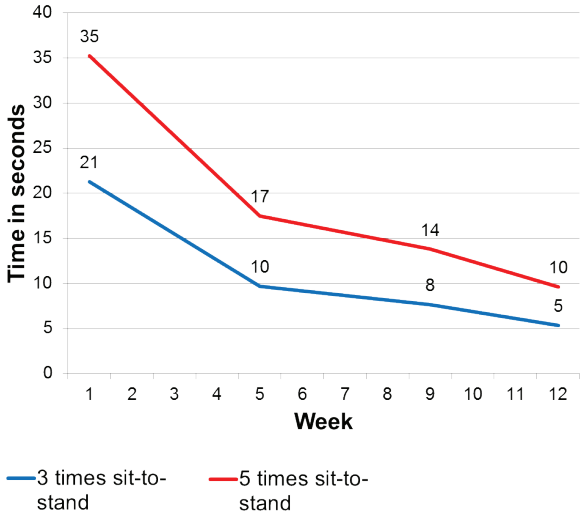

Figure 3.Time to Complete Repeated Sit-to-Stands

As well, the counter-weight and hand assist was progressively reduced for all participants as shown in ***Figure 4.***

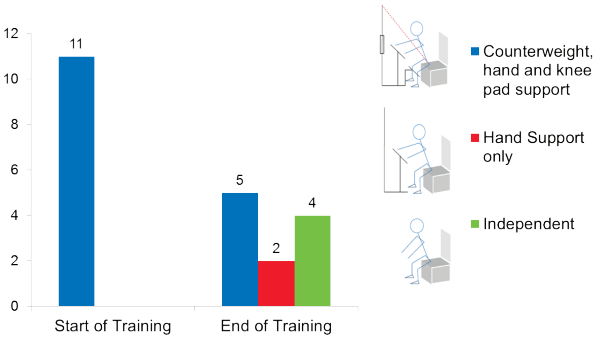

Figure 4. Support/Assistance Required for 5x Sit-to-Stand

Finally, the study also looked at if and how the demonstrated improvements were associated with changes in the independently recorded RAI MDS scores of the participants. As illustrated in ***Figure 5***, the training with body weight support and speed sensitive biofeedback not only improved participants'ability to stand from a chair, these improvements appear to be associated with positive outcomes on the RAI MDS 2.0.

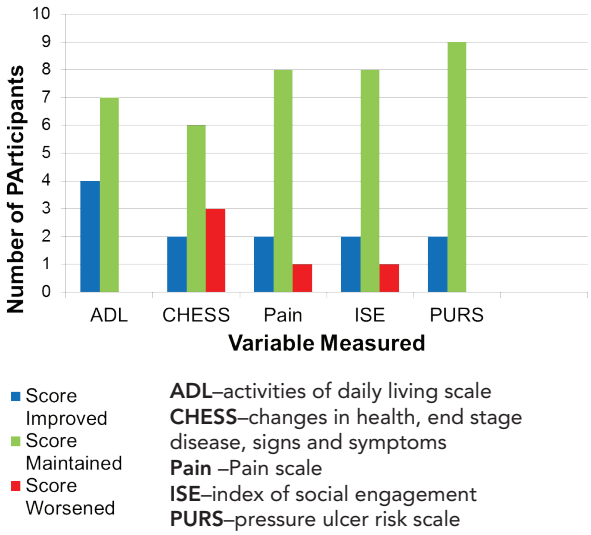

Figure 5. Changes in RAI MDS 2.0 Scores After Training with NeuroGym equipment

In conclusion, the study using the NeuroGym Sit-to-Stand and TIM Trainers showed:

- Enabled movement training with progressively reduced body weight support and biofeedback training with progressively increased speed improved the ability to perform repeated sit-to-stand movements measured by time to complete 3 and 5 consecutive sit-to-stands
- 4 of 11 participants were able to perform 5 consecutive sit-to-stands without assistance at the end of the training program
- 4 of 11 participants (not the same 4 as above) improved their ADL scores (measured by RAI MDS 2.0) after the training program
- Training with body weight support and speed sensitive biofeedback improved the ability to stand from a chair, these improvements appear to be associated with positive outcomes on the RAI MDS 2.0

This basic study demonstrates the principle that by safely enabling effective mobility training and ensuring that the associated practice is of sufficient intensity, a facility can institute measurable improvement in resident mobility. Such improvements not only improve resident health and quality of life, they translate into cost savings for the facility and the health system.

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