Novel Physiotherapies

Hondzinski, J Nov Physiother 2012, 2:6
http://dx.doi.org/10.4172/2165-7025.1000e119

Editorial Open Access

Specificity of Training, Not the Only Therapy Option for Parkinson's Patients

Jan M. Hondzinski*

Department of Kinesiology, 112 HP Long Fieldhouse, Baton Rouge, Louisiana 70803, USA

Editorial

The main symptoms of Parkinson's disease (PD) include tremors, rigidity, bradykinesia, and imbalance, making many daily functional activities for this population difficult to perform. Medications used to alleviate some of the movement deficits become less effective as the neural degeneration progresses with disease advancement. However, various exercises and training protocols can alleviate some of the motor symptoms and/or improve functional skills, making physical activity beneficial for this population [1]. Moreover, participation in relatively higher intensity exercises leads to greater functional improvements for those with PD [2]. Some researchers suggest that successful therapy for those with PD utilizes task- and context-specific training protocols [3]. Others report that various training protocols which progress in intensity can help individuals with PD improve not only the trained task but also tasks not specifically trained (e.g. [4]). The most successful training protocols for those with PD should incorporate exercises that challenge different aspects of physical function and can, but do not need to, integrate specific tasks effected by the disorder.

The specificity of learning (training) hypothesis states that practicing a particular task helps improve performance in that task. People with mobility problems due to injury or disease can practice walking with a cane/walker, a safety harness system over a treadmill, or assistance from someone such as a therapist to improve walking ability. One can also practice climbing stairs to improve stair climbing skills and practice navigating through obstacles to improve their navigation mobility until the individual can learn/relearn the skill and perform it safely without assistance. However, instances exist where training in one task exclusively may not be ideal. In fact, one indication of motor skill learning involves the capacity to transfer performance learning from one situation to another.

Five years ago, Kwakkel and colleagues reported that successful therapy for Parkinson's patients was "task- and context-specific," offering support for training specificity in people with PD [3]. More recent studies confirm success in task-specific training protocols for this population. In one study 50 robot-assisted lateral pulls at the hip during step initiation practice improved step initiation without robot assistance by shortening step duration [5]. In another study gait training with cognitive loading (including word recall, serial subtraction by 3, and simple math) three times per week for four weeks resulted in gait speed increases and stride time variability decreases with and without cognitive loads [6]. Finally, 18 sessions of treadmill walking while avoiding virtual obstacles over a six week training period resulted in faster gait speed and longer step length when walking on an overground path with and without obstacles [7]. In this case gait speed of patients also increased for dual-task gait (walking while performing serial subtractions by 3) and endurance gait (six minute walk test) after training. In each of these studies people with PD were able to alter task performances after participation in training that involved the specific task. Interestingly, the task improvements did not always occur in the same context as the training.

Recent research also reveals that persons with PD can transfer skill learning of one task to another. Skill learning transfer occurred after six weeks of progressive treadmill training while avoiding virtual obstacles [7]. Improvements and four-week retention of improvements were observed on the Four Square Step Test (stepping in right, left, forward, and backward directions) and in PD motor symptoms. Elsewhere, PD patients who pedaled a stationary tandem bicycle three times a week for eight weeks with assistance, which allowed them to pedal 30% faster than a self-selected cycling speed, experienced improvements in motor symptoms and bimanual dexterity and maintained improvements four weeks after training ended [2]. These specific improvements were not observed in patients who performed the same protocol without assistance. Improvements in functional gait and balance occurred in PD patients after training which involved stepping in multiple directions out and back from a central position at three different speeds three times a week for six weeks [4]. Interestingly, the patients who practiced stepping with rhythmic auditory stimulation maintained these improvements longer after training termination than those stepping without such cues. PD patients participating in 24 months of progressive resistance exercise twice a week reduced motor symptoms associated with the disorder [8]. The significant and clinically meaningful transfer effects in motor symptom reductions [9] from this randomized control clinical trial did not exist in the control group who exercised with non-progressive stretching, strength, and aerobic exercises over the same training time frame [8]. Although training tasks and context differed, training intensity progressed in each of these studies. These findings indicate benefits for people with PD undergoing progressive exercise training.

Why does progressive training help improve motor function in those with PD? Progressive training employs successful motor learning strategies such as repetitive practice (e.g. [10]) and increasing difficulty [11]. These strategies promote successful performances early in training which potentially lead to better adherence [12] and advance to greater intensity later in training which contributes to better functional improvements in those with PD [2,13]. Thus progressive training involves basic principles used often for skill learning during development and for skill enhancement during high level performance training alike. Progressive training protocols remain useful when learning a new task, improving performance of a trained task, and improving performance of an untrained task (i.e. during transfer of performance training) in people with PD.

***Corresponding author:** Jan M. Hondzinski, Department of Kinesiology, 112 HP Long Fieldhouse, Baton Rouge, Louisiana 70803,USA, Tel: 1-225-578-9144; Fax: 1-225-578-3680; E-mail: jhondz1@lsu.edu

Received April 17, 2012; **Accepted** April 17, 2012; **Published** April 20, 2012

Citation: Hondzinski JM (2012) Specificity of Training, Not the Only Therapy Option for Parkinson's Patients. J Nov Physiother 2:e119. doi:10.4172/2165-7025.1000e119

Moreover, novel physiotherapies could and possibly should make use of such basic training strategies to enhance the probability of success.

While useful, task specific training is not the only option for improving physical function in people with PD. This population can improve various functional abilities and in some cases motor symptoms by participating in various training exercises that progress in intensity, thus continue to physically challenge the individual.

References

1. Robichaud JA, Corcos DM (2005) Motor deficits, exercise, and Parkinson's disease 57: 85-107.
2. Ridgel AL, Vitek JL, Alberts JL (2009) Forced, not voluntary, exercise improves motor function in Parkinson's disease patients. Neurorehabil Neural Repair 23: 600-608.
3. Kwakkel G, de Goede CJ, van Wegen EE (2007) Impact of physical therapy for Parkinson's disease: a critical review of the literature. Parkinsonism Relat Disord 13: S478-S487.
4. Kadivar Z, Corcos DM, Foto J, Hondzinski JM (2011) Effect of step training and rhythmic auditory stimulation on functional performance in Parkinson patients. Neurorehabil Neural Repair 25: 626-635.
5. Mille ML, Hilliard MJ, Martinez KM, Simuni T, Zhang Y, et al. (2009) Short-term effects of posture-assisted step training on rapid step initiation in Parkinson's disease. J Neurol Phys Ther 33: 88-95.
6. Yogev-Seligmann G, Giladi N, Brozgol M, Hausdorff JM (2012) A training program to improve gait while dual tasking in patients with Parkinson's disease: a pilot study. Arch Phys Med Rehabil 93: 176-181.
7. Mirelman A, Maidan I, Herman T, Deutsch JE, Giladi N, et al. (2011) Virtual reality for gait training: can it induce motor learning to enhance complex walking and reduce fall risk in patients with Parkinson's disease? J Gerontol A Biol Sci Med Sci 66: 234-240.
8. Corcos D, Robichaud J, David F, Vaillancourt D, Poon C, et al. (2012) 24 Months of Exercise Improves the Motor Symptoms in Parkinson's Disease. Proceedings of the 64th Annual Meeting of the American Academy of Neurology.
9. Schrag A, Sampaio C, Counsell N, Poewe W (2006) Minimal clinically important change on the unified Parkinson's disease rating scale. Mov Disord 21: 1200-1207.
10. Jessop RT, Horowicz C, Dibble LE (2006) Motor learning and Parkinson disease: Refinement of movement velocity and endpoint excursion in a limits of stability balance task. Neurorehabil Neural Repair 20: 459-467.
11. Iansek R (1999) Interdisciplinary rehabilitation in Parkinson's disease. Adv Neurol 80: 555-559.
12. Bandura A (1997) Self-efficacy: The exercise of control. W.H. Freeman and Company, New York.
13. Farley BG, Koshland GF (2005) Training BIG to move faster: the application of the speed-amplitude relation as a rehabilitation strategy for people with Parkinson's disease. Exp Brain Res 167: 462-467.