



Development of a community-based golf and exercise program for people with Parkinson's disease

Megan F. Cash^{a,b,1}, Elizabeth Ulanowski^{b,*}, Megan Danzl^{b,1}

^a 4960 Norton Healthcare Blvd. Rehabilitation Services, Norton Healthcare, Louisville, KY, 40241, USA

^b 2001 Newburg Road, Nolen C. Allen Hall, Physical Therapy Program, School of Movement and Rehabilitation Sciences, College of Health Professions, Bellarmine University, Louisville, KY, 40205, USA



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ABSTRACT

Individuals with Parkinson's disease (PD) typically display symptoms of rigidity, bradykinesia, and postural instability that can limit participation in recreational activities. The purpose of this clinical report is to describe the development, implementation, and outcomes of a novel and innovative community-based golf and exercise program for individuals with PD. In response to community interest, the program was developed through a unique partnership that blended the expertise of physical therapists and golf professionals. The 6-week program consisted of golf instruction and task-specific exercises. Improvements were noted in seven of eight participants for golf performance (driving distance and club head speed) and quality of life (PD Questionnaire-39) outcome measures. This report describes the design and implementation of a golf and exercise program for people with PD based on community need, evidence, and clinical expertise. Considerations and recommendations for future programs are discussed, such as program length, staffing, volunteers, funding, location, and resources.

1. Introduction

Golf is one of the most popular sports worldwide and based on the most recent data (2009–2015) is the number one sport for people over the age of 55 in the United States [1]. There are over 14,500 courses available to golfers nationwide and up to 90% of golfers consider themselves “passionate” about the game [2]. Reasons for golf's popularity are numerous and include camaraderie, exercise, the opportunity to be outdoors, competition, and the ability to play golf into later decades of life compared to other sports, such as football and basketball [2]. For individuals with neurological disorders, however, the ability to continue to play golf can be challenging [3,4].

Parkinson's disease (PD) is a neurological disorder affecting an estimated one million people in the United States with 60,000 new cases reported every year [5]. Men are diagnosed approximately one and a half times more frequently than women [5]. Of those diagnosed, approximately 96% are above the age of 50 [5]. Symptoms of PD include bradykinesia, rigidity, tremor, postural instability, impaired gait and balance, and deficits in perception, attention, and cognition [6,7].

Beyond physical impairments, PD can cause a loss of social relationships and decreased leisure activities [8]. As the disease progresses and symptoms increase, the presence of cognitive dysfunction

and physical impairments can affect participation in activities and quality of life (QOL) by impacting a person's psychological, emotional, social, and economic standing [8]. All of these aspects of the disease can have a detrimental effect on the individual and prevent participation in recreational activities, such as golf. The disappointment of having to give up golf or the fear of an inability to play in the future due to PD-related symptoms and the physical and mental requirements of golf is described by contributors to PD websites, articles, and golf-based blogs [4,9].

Exercise improves both motor and non-motor symptoms of PD and slows the neurodegenerative process of the disease [10–13]. Task specific exercise further enhances these benefits for people with PD compared to general exercise [14]. Exercise also improves perceived QOL in people with PD [13,15–18]. Exercise programs improve golf performance, including club head speed, ball velocity, and driving distance for the general population [19–24].

To our knowledge, descriptions of the development, design, implementation, and outcomes of a program that combines golf and task-specific exercise for people with PD is not available in the literature. The purpose of this clinical report is to describe the development, design, and implementation of a novel and innovative community-based golf and exercise program aimed at addressing the issues that prevent

* Corresponding author. Bellarmine University, Physical Therapy Program, 2001 Newburg Road, Nolen C. Allen Hall #368, Louisville, KY, 40205, USA.

E-mail addresses: megan.cash@nortonhealthcare.org (M.F. Cash), eulanowski@bellarmine.edu (E. Ulanowski), mdanzl@bellarmine.edu (M. Danzl).

¹ Co-authors.

people with PD from continuing to participate in the game of golf. Outcomes regarding golf performance, QOL, and the perceived benefits by participants are presented.

2. Program design and implementation

2.1. Program development

According to reports from local neurologists specializing in movement disorders to physical therapists working in a movement disorders outpatient physical therapy clinic, individuals with PD were actively seeking a golf program designed for people with PD. This inspired a partnership between the physical therapists and a local golf professional to develop the program.

Ultimately, the evidence (regarding exercise for people with PD as well as golf in the general population as previously described) and clinical expertise (of board certified neurologic physical therapists and a golf professional) informed the design of the program. This program consisted of two equal components: golf instruction and exercise instruction.

2.2. Length of program

The length of program was determined by the goals set for the program, a subsequent review of the literature, and input from all those involved. A systematic review examining strength and conditioning programs to improve fitness in golfers in the general population describes program durations of five to 11 weeks [22]. In other research, club head speed improved as early as five weeks [25], but improvements in distance, both carry (flight distance) and roll (ground distance), occurred only with longer programs of eight weeks or more [19,20,22].

Eight to ten weeks were required to demonstrate improvements in quality of life for people with PD [15,18]. No research was found that specifically examined the appropriate length of time to elicit both golf related changes and QOL related changes in the PD population following a golf and exercise program. Program facilitators elected for six weeks based on feedback from participants, the resource center funding, input from the head golf professional, and concerns with extending time due to weather and daylight. Each weekly session lasted 90 minutes.

2.3. Participants

The program was open to ambulatory males and females with the diagnosis of PD, who could follow instructions, and were over the age of 18. Participants were recruited through referrals from neurologists and physical therapists affiliated with a local movement disorder clinic. This allowed for participants to be pre-screened for physical or cognitive limitations that may prevent them from participating for health and safety reasons. Participants were asked to complete a pre-program questionnaire (Appendix A) that served as a needs assessment to determine previous golf experience and participant goals as well as identify potential safety issues to address. Past medical history, comorbidities, and history of falls were included in the intake assessments.

Our program included varying numbers of participants each week, ranging from eight to twelve, throughout the six weeks of the program. All participants were male and ranged in age from 55 to 83 years. Informed consent was obtained from each participant in accordance with the protocol approved by the Institutional Review Board of Bellarmine University (#453).

2.4. Exercise prescription

The exercise portion of the program design was informed by a physical therapist with neurologic specialization and was formatted to be appropriate for participants of varying functional levels. The program was implemented and directed by a physical therapist completing a neurological residency. There was always at least one other licensed physical therapist present to assist participants with movements, for additional safety, and for demonstration of alternative exercises to address all levels of need. Examples of alternate exercises include using a chair for upper extremity support during standing exercises and completing seated exercises in place of standing exercises with the same upper extremity and/or lower extremity movements. Furthermore, volunteers were recruited from a local Doctor of Physical Therapy program to assist in guarding and cueing participants, as needed, based on each participant's level of function and mobility.

Participants were divided into two groups, to allow for more individualized attention, and each group's time was divided equally between golf instruction and exercise instruction. Before participants were divided into groups each week by the lead physical therapist, all participants completed a warm-up. This consisted of movements to target key underlying physiological restrictions to mobility and emphasized transitional movements, weight shifting, extension, rotation, and amplitude [26,27].

Participants in each exercise group then completed a variety of seated and standing exercises incorporating movements that were specific to the different aspects of swinging a golf club for task specificity and were provided auditory and visual cues throughout. Task specific training with cues is an effective strategy when working with individuals with PD to train a skill [14]. There is no current literature looking at the best exercises for carryover to improve a golf swing, however, these seated and standing exercises were adapted to reinforce amplitude and golf skills that were introduced each week. These exercises were divided into two circuits with rest breaks as determined appropriate by the lead physical therapist. Intensity was emphasized with the circuit format as well as within each movement while cues were given by the instructor and volunteers to complete the movement with maximal effort. The list of exercises is in Table 1. Upon completion of both the exercise and golf components, the groups reconvened and concluded with a cool down period. The stretches in this cool down period included seated ankle rotations, hamstring stretches, trunk rotations, scapular stretches, and neck stretches.

2.5. Golf instruction

The golf portion of the program involved instruction in the use of different types of clubs (drivers, irons, and wedges) and golf swings. In week one, participants used their driver to complete the golf outcome measures described below. For weeks 2–5, the head golf professional instructed participants in the use of wedges, short distance irons, long distance irons, and their driver.

During golf instruction each week, the head golf professional spent at least 5 min with each participant providing specific analysis and insight into their swing. To enhance the golf professional's ability to tailor the golf instruction to individuals with PD, the lead physical therapist provided education about typical impairments associated with PD. Additionally, the physical therapist provided consultation to the golf professional about the purpose of the exercises (to improve rotation, extension, weight shifting and amplitude of dynamic movements) as they related to improving golf performance.

Participants practiced as a small group in addition to the individualized instruction. The assistant golf professional was present to

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