Effects of Combined exergame and conventional exercise to reduce and prevent fall risk among elderly people: A Hypothesis

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ABSTRACT:

Background: Falling among old individuals has provoked ceaseless discussion among gerontologists and physical therapists and it is still one of the greatest issues among this population. Loss of the balance and functional mobility is the main reason of falling. There have been numerous studies conducting the effect of the conventional balance exercise and exergame independently on balance and functional mobility of elderly. Previous studies lacked dealing with the effect of combined exergame and conventional exercise on the balance and functional mobility. Combined exercises are enjoyable and may have more effective to improve balance and performance to reduce risk of fall among elderly people. This package would be preferable for older people. Objective: We hypothesize that while conventional balance exercise and exergame improve balance and functional mobility, combined both types of exercise would superior improvements in elderly performance. Conclusion: Ultimately we expect that this hypothesis will provide a useful framework for facilitating combined exergame and conventional balance intervention in older people.

Keywords: Video Games, Circuit-Based Exercise, Balance, Accidental Falls,
1. Introduction

Falling of the elderly as a noteworthy issues and chief health issues among the ageing population has raised extensive discussion among gerontologists and physical therapists [1]. Annually, falls influence a third of the grownups being above 65 years old and 50% of the adults over the age of 80. Moreover, it is admitted that two-thirds of falls in the older person can be theoretically prevented [2]. Losing balance and reduced functional mobility are major factors leading to falling. Balance has an essential effect on stability and keeping the body posture and helps the older people to perform better movements during daily activities [3]. Balance, functional and mobility deficit are recognized as the main reasons of falling among elderlies. Aging with traumatic damage affects the skeletal muscle and central nervous system [4], sensory feedback [5], and the ability to sense the joint motion and movement, especially in lower-body segment (e.g. knee, ankle and hip joint movement) [6].

1.1 Role of conventional balance exercise on elderly performance

Traditional or conventional balance exercise is a type of exercise which consists of dynamic and static balance exercises focusing on the ability to maintain the body posture, improve coordination, proprioception and enhance daily activities for falls prevention among elderly [7, 8]. Conventional balance exercises consist of tandem walking, standing on one leg with eye opened and eye closed, sideways, forward, and backward walking, weight shifts on legs and figure of eight waling [9]. Numerous studies have established that conventional balance exercise improves the elderlies’ balance and reduces their falls [10, 11]. Additionally, the balance training impacts on the falling risk have to be appraised prudently since the efficiency of such an intervention is revealed just once it is mixed with other constituents of the physical fitness which might include the strength and endurance training [12]. The conventional balance exercises were adopted from balance training exercises recommended by Seidler and Martin (1997). The progressive exercises entailed the equivalent exercises done with an amplified speed, standing with eyes closed and standing with eyes open on foam [8].

1.2 Role of exergame on elderly performance

A video game that also functions as an exercise using the technology to track the body movement and actions [13]. However, game exercise as a new intervention program has a key role in improving the balance and performance among the elderly people [14, 15]. Active video game or exergame is a new enjoyment interventions to improve cognition, attention, intelligence, balance, physical mobility, strength, which also affects pain improvement [13, 16]. This genre of games is referred to as exercise games, or exergames as they need the player to use their body movements to play. In addition, in compare to conventional balance exercise exergame is more effective [17]. The Xbox Kinect system is a sensor based active video game system, which requires body movements to control the game [18]. Recently, investigators have examined the effects of Xbox Kinect intervention on reduction of fall among the elderly person [15, 19]. The Xbox Kinect based on balance training which is more enjoyable and easier than the traditional training and incorporated competitiveness and goal achievements.

There are some major deterrants to conventional balance exercise programs for the older person residing in the society such as the lack of public availability, costly and transportation barricades for the elderlies [20]. Previous researchers have only established conventional balance exercise
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[21] and Xbox Kinect exercise [19] independently to improve balance, somatosensory system deficit, and prevent fall in the older adults. Nevertheless, based on searching on Google Scholar, PubMed, Science Direct, and Psycho Info websites from 2000 to 2016, there was no studies considering concurrent Xbox Kinect exercise and conventional balance exercise to improve the balance and functional mobility among older person. However we hypothesis that combined of exergame and conventional balance exercise improve balance and functional mobility of elderly people.

2. Conclusion
The main differences between our method and previous ones are: 1. This package does not require any special apparatus and is cheap; 2. The package focuses on the lower extremity to increase balance and functional mobility. 3. The package is suitable for male and female 60 years old and above; 4. The duration of the exercises is short and they can be performed at home, day care center, and office. This package is including 8 weeks and three times per week. The duration of exercise are 40 minutes with 5 min warming up and 5 min cool down. All exercise frequency and intensity are according the guideline from the American College of Sports Medicine [22]. The conventional balance exercises which assist in keeping the balance are including; standing on one leg, walking forward, backwards and sideways, single leg swing, heel–toe standing and walking, line walking, multi-directional weight lifts, tandem foot standing, changing the base of support, weight transfers (from one leg to the other), and traditional balance program in Tai Chi exercise. In regarding to exergame, all types of exercises are dependent on the system used in the exergame and the games related to lower body to improve the balance and the dynamic activity of the elderly people. The Xbox Kinect exercises are including the Your Shape, Light Race, Dance, bowling, carnival games, and skiing games for the physical activity. Health centers and elderly care center can use the concurrent exercise to improve the static balance and functional mobility.
REFERENCES


