OCCUPATIONAL THERAPY IN FALL PREVENTION: CASE REPORT

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ABSTRACT

Introduction: Falling is not a disease or an injury by itself, but the consequences of the fall are severe, especially for the elderly. Numerous risk factors for the occurrence of falls are known, of which it is crucial to indicate and identify the changing risk factors, those that health professionals can influence. A fall usually occurs when there is a combined effect or the presence of multiple risk factors. Occupational therapy plays an essential role in assessing and reducing the risk of falls. Occupational therapists along with other members of the rehabilitation team, evaluate the risk of falls, design and implement therapy plan.

Method: We use case report to demonstrate the influence of rehabilitation on the risk of fall in older person after a stroke.

Case report: We present the case of a 73-year-old man after a stroke and with a diagnosis of Right hemiparesis-occupational therapy perspective. The patient was referred for rehabilitation three months after the stroke. Based on assessment, subjective and objective, he is categorized as high risk for fall. During his stay in a rehabilitation facility for four weeks, as a part of a rehabilitation program, he had physical and occupational therapy interventions. The physiotherapist applied occupational therapy approach in assessment and therapy, as there is no educated occupational therapist in Montenegro.

Conclusion: Physical and occupational therapy interventions aim to reduce the risk of falls and increase the elderly’s participation in essential activities. This helps people increase their level of independence and maintain dignity and satisfaction in every aspect of life.

KEYWORDS occupational therapy, prevention, falls, interventions, the elderly

Introduction

Fall

For most people, the ability to stand, walk, and move are daily activities that are performed without thinking. Fall is not a disease in itself. In older people, falls have dramatic consequences and are often indicative of some pathology. A fall is defined as an unintentional grounding or descent to lower level - not as a result of an intrinsic event such as syncope or stroke or because of an extrinsic environmental hazard. Falls are the leading cause of death for people over 75 in the United Kingdom. Tinetti et al. estimated that 30% of people aged 65 years and over 50% of people aged 80 years fall at least once a year. The incidence of falls in people with dementia is twice as high as in people with preserved cognition. Falls often go unreported and unregistered so this information is only indicative. It should also be noted that falls occur in the younger population but the consequences of the fall are far more severe in the elderly. The incidence of falls and the risk of fractures are increasing in institutionalised persons [1,2].

The consequences of the fall

The consequences of a fall in older people are devastating. Less than 10% of falls result in a fracture, and one in five falls requires medical treatment. Besides, there are several other consequences of a fall that significantly affect the duration and quality of life (fear of falling, restriction on movement, care facility). Conse-
Aging - progressive physiological changes in the body that lead to a decline in biological functions and a decline in the body’s ability to adapt to metabolic stress. Aging is a series of progressive changes in the body that increase the risk of disability, illness and death [8]. Physical skills and abilities that change under the influence of normal ageing are postural orientation, postural reactions, instability, rough and fine motor coordination, precision, strength and endurance, walking speed, stride length, stride height and time of response [9].

Changes that affect sensory structures and functions are problems with vision and hearing. Changes in mental function are sleep problems, cognition, memory, alcohol abuse, depression, anxiety, mental disorders and suicide. Musculoskeletal changes are osteopenia, osteoporosis, osteoarthritis, muscle atrophy. Cardiovascular changes are changes in blood pressure, pulse, atherosclerosis. In day-to-day activities, changes include incontinence, weight loss, bad teeth, swallowing, feeding, meal preparation, food procurement, personal hygiene, sexual activities, functional mobility, moving aids and falls. When it comes to changes in day-to-day instrumental activities, these include changes in caring for others, community mobility, safety, rest and sleep, work, leisure, community involvement, coping, care and wellness [10].

Numerous studies have pointed to various factors that contribute to healthy ageing: genetics, educational level, marital status, family status, work for a living, volunteering, healthy habits, social support, commitment to religion [9].

In 2017, the global population of people aged 65 and over numbered 962 million, more than double that of 1980 when there were 382 million senior citizens worldwide. The number of seniors is expected to double by 2050 when the population is projected to grow to 2.1 billion. Globally, the number of people over 80 years of age is estimated to have more than tripled from 2017 to 2050 from 137 million to 425 million [11].

As the elderly population grows, so does the need to provide health services in the form of treatment and care in acute and chronic health conditions. Such predictions are undoubtedly significant for healthcare professionals, especially occupational therapists. Maintaining functional performance in older people can have economic, social and personal benefits for all health care users, their families and society as a whole [9].

**Occupational therapy in fall prevention**

Occupational therapy is defined as the therapeutic application of activities of daily living ADL (occupation) in an individual or group to develop and enhance participation in roles, habits and routines at home, at school, in the workplace, in the community and other settings. Occupational therapy services are offered in habilitation, rehabilitation, health promotion and wellness, for the needs of people with disabilities and related needs. These services include the establishment and preservation of an occupying identity for those at risk of injury, illness, disorder, condition, impairment, activity limitation or participation restriction [12].

As most falls occur in and around the home, it is necessary to examine the environmental hazards of both inside and outside the home. The three most common dangers of falling into a home are slippery floors, poor lighting, and obstacles to movement. It should be emphasized that the mere presence of danger in the environment is not enough to cause a fall. The interaction between the elderly’s physical abilities and environmental hazards is more important. It is, therefore, necessary to take into account the older person’s ability to judge what activities he or she can perform. Also, it is essential to consider the history of a person with a previously reported fall as a positive history increases the risk of a fall [6]. Fall prevention activities are implemented through a range of health disciplines including occupational therapy, physiotherapy, general practice, patient care, geriatrics, gerontological health and social care [13].

**Risk of fall assessment-occupational perspective**

Fall prevention guidelines emphasize the need for careful evaluation of individual risks and disadvantages. It is also essential to consider the synergistic effect of the associated risk factors. The PEO (Person-Environment-Occupation) model is a useful guidance framework when assessing fall risks [14].

Postural control assessment tests are recommended for the evaluation of fall risk: Timed Up and test, Functional reach, Berg Balance Scale, Tinetti Balance and Gait Evaluation [15].

Effectiveness in falls assesses the degree of confidence, confidence a person has while performing the activities of daily living without falling. The FES-I (The Falls Efficacy Scale-International) is an assessment instrument consisting of 16 elements for assessing the intensity of concerns about falls while performing more
comfortable and more demanding physical and social activities [16].

FaB (The Falls Behavioral Scale for Older People) evaluates everyday behaviour, both accidental and deliberate, that provides the elderly with protection from falls [6].

**Occupational therapy interventions**

There are two strategies that occupational therapists use the most: skills improvement interventions and environmental interventions. Balance, transfer and gait interventions are at the heart of fall prevention programs. The occupational therapist interventions encourage individuals to incorporate exercise into their daily routine. Group exercises can be especially helpful for seniors. By observing their peers when performing the exercises, they can achieve improvement in their reactions and behaviour [17].

A multi-segment intervention should include the following components: exercises, especially balance exercises, strengthening and walking exercises, modifying the home environment, reducing medication - especially psychoactive substances, treating postural hypotension and treating foot problems and appropriate footwear. Fall prevention, and more importantly, injury and death prevention is possible [18]. Today it is 3D technology and video games are increasingly recognized as a potential means of increasing patient participation in the exercise program. Education is usually part of a multi-segment prevention program and leads to a positive outcome in the form of behavioural change, reduced fear of falling, and increased mobility [13]. Long-term exercise training of 1 year or longer in duration is associated with a reduction in falls, injurious falls and fractures in older adults [19].

Prevention and intervention strategies must take into account the elderly’s health and behaviour in the environment. Home modification refers to the converting or adapting of environments to make everyday tasks easier, increase comfort, reduce the number of accidents, and support independent living. The range of home modification is wide, and expensive for such modifications ranges from low-cost adaptations to more expensive renovations. Home modifications may include removing hazards (clutter and throw rugs); adding special features or assistive devices (grab bars and ramps); moving furnishings to create clear pathways; changing places where activities occur (sleeping on the first instead of the second floor), and renovating rooms to accommodate disabilities [20].

**Case report**

Hamdo, the 73 years old male, retired economist. Date of admission 08.04.2019. Medical diagnosis: Hemiparesis Ldex, St.post AIM aa II, Dysarthria Medical prescription: Manual massage of the right arm and leg, every day. Occupational therapy every day. Individual kinesitherapy: Exercises for strengthening the muscles of the right extremities, walking exercises, coordination exercises, every day.

**History**

The patient suffered a stroke three months ago. He spent ten days in the hospital. Left hospital unable to walk, in an orthopaedic wheelchair. At home, he spontaneously recovered and started walking with a cane and another person a month ago. The patient has previously had cardiac problems. In 2004, he underwent three catheterizations and three bypasses. He regularly takes prescribed cardiac therapy. The patient complains of instability, gait, difficult speech, inability to write.

**Subjective assessment**

Due to instability, the patient is restricted in movement. He uses a cane when moving around the house. He can’t walk the stairs. He doesn’t go out alone because he feels insecure. In the presence of another person walks to the front of the house - a few meters. In self-care activities – independent except for bath. The help of another person is required when bathing. Family supported. FES I Score: 44

**Objective review:**

**Observation:** He walks without assistance, somewhat insecure, in slippers, with too-long pants, holding the cane in his left hand, too short cane (full elbow extension). **Mental status:** Cognition and attention - satisfactory. **Communication difficult:** patient can hear poorly, difficult to pronounce words. Occasionally slurred. **Ability to write:** He can hold the pen but he can’t write-agraphy. **Mobility:** Active and passive ROM-in functional framework. **Musculoskeletal examination:** GMS of the left half of the body is satisfactory. Antigravity muscles of the R leg with grade 4 while the musculature of the R arm and L half body are rated 4+ by MMT. Muscle endurance-insufficient, weakness after 5-6 reps. Muscle elasticity - responds to the patient’s age. **Motion Coordination:** coordination tests that do not require balance, precise movements, diadochokinesis - correct performance. **Postural control:** The patient is verticalized slowly and independently. He uses a stick when standing up from a sitting position. **Static balance:** Romberg +, a discrete postural swing present, maintains a balance for the 30s. Tandem with left foot back +, unable to maintain. **Dynamic balance:** TUG 16 s (with stick). **Gait analysis:** Slightly unsteady gait with moments of instability when turning, changing direction, opening and closing doors. All stages of walking are complete. During the walk, slippers fall out. Pants too long. When trying to walk up the stairs, unsure and clumsy, he holds handrail with his left hand. He walks slowly, stepping front left foot up the stairs and his right foot down the stairs — required presence of another person.

HK is a seventy-year-old man diagnosed with Hemiparesis lat dex and the following problems: discrete weakness of the right leg muscle, instability in standing and walking (using a cane). He depends on help in self-care-bathing activities. In ADL - limited in all balance-challenging activities: yard cleaning and gardening activities, walking outside the house. Limited community participation. Supported by the family.

**Therapeutic goals:**

**Medium-term goals:**

- Adjusted cane length.
- Stable when getting up from a sitting position.
- Improve stability when standing.
- Stable walking upstairs with holding on to the handrail.
- Stable outdoor walking with a cane, without the presence of another person, for up to 10 minutes.
- Bath independent.
- Able to write 3-4 letters words.

**Long-term (functional) goals**

- Independent in ADL, meaningful for the patient (for example, gardening)

- Stable in walking with a cane, without restriction.

**Therapeutic interventions:**

**Muscle-strengthening exercises:**


**Balancing exercises:**

Before interventions, the patient changes slippers for sports shoes with laces, they are tightly tied, we pull his pants into socks - as he did not bring a tracksuit. Cane change — Proper cane length with a wide base of support.

1. Static Balance - Tandem position (L and R leg alternately positioned forward) and Romberg position, maintain the position for the 30s. In the progression, we introduce perturbations in the form of active hand movements, active trunk rotation, throwing and catching the ball from different angles, application of the PNF technique "Stabilizing reversal" and, Rhythmic stabilization."

2. Dynamic Balance - Walk exercises in a safe environment (parallel bars). Walking forward, backward, turning, sideways. In progression, we practiced straight-line walking, tandem walking, "marching". In progression, we practiced walking out of the parallel bars. We introduced the addition of the ball tossing in lateral walking. Walk "bridging" with the use of the command "left" and "right" before step. In progression, the walk is faster and the steps are longer. We introduced obstacles in walking. A brisk walk with sudden start and stop. Walking beyond parallel bars. Walks up and down the stairs withholding on the handrail, in progression step alternately L and R leg.

**Control evaluation:**

The patient is stable when walking. There are no episodes of instability. Stand up from sitting in one attempt, stable, without the cane, no need for hand support, high seat. Romberg - (negative), no postural sway. Lower limb muscle strength symmetrical. After one week, the patient walks outside the rehabilitation facility for a walk of up to 15 minutes. Another person present. After 15 days, with the consent of the supervising physician, he goes out of the institution for a short walk alone. He can sign. He cannot write words by dictation.

**Final evaluation date:** 25/04/2019.

Rises from one attempt, stable, unattached, low seat. Tandem test negative - (patient stable). TUG test: 10 s without the cane. Tandem walking is possible, ten steps. It can write short words of up to three to four letters.

**Evaluation by the patient**

The patient feels stable while walking. He goes out for a daily walk alone. He often forgets the cane when leaving the room. He is much more on the move than when he came to rehab. He can shower alone. FES I Score: 18.

**Recommendation**

Recommendations regarding activating, engaging in backyard activities, gardening at home. Handrails at stairs, slippery approaches covered with sand. In the home, remove mobile rugs, keep the night light on, adjust the furniture layout. Practice crosswords and enigmatic. A regularly daily walk for at least 30 minutes. Once a week Balance exercises in the home environment. Required holder (one or more) in the bathroom. Rubber liner on the tub floor.

**Conclusion**

Falls are the leading cause of morbidity and disability in the elderly. Globally, the population aged 65 and over is growing and the prevention of falls is being imposed as national interest in a large number of countries. Occupational therapy plays a huge role in fall prevention. Occupational therapists use a range of evidence-based strategies to identify the risk of falls and to create an individually-tailored, multi-segmented intervention plan. In the absence of available occupational therapists, physiotherapists may undertake assessment and treatment of the risk of falls. This paper shows how four weeks of rehabilitation after stroke can improve balance and reduce risk of falls. The interventions aim to reduce the risk of falls and improve the participation of the elderly in essential activities. This helps people increase their independence and maintain dignity and satisfaction in every aspect of life.

**Disclosure Statement**

There were no financial support or relationships between the authors and any organization or professional bodies that could pose any conflict of interests.

**Competing Interests**

Written informed consent obtained from the patient for publication of this case report and any accompanying images.

**References**


