



Elimination of the risks of falls in the elderly from the point of view of physiotherapy

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Background:

Abstract

Man is exposed to falls performing daily activities, their effects turn out to be more severe especially in the later decades of life. After 60 years, it appears to be a larger number of fractures resulting in the limitation of physical fitness, health complications and life threatening. Therefore, prevention efforts conducted in the form of an in-depth analysis of the falls' causes which already happened, control of health and proper treatment, conducting systematic, interesting and varied physical activities - in conjunction with education and mental change in a determined way they can and should reduce the risk of falls of the elderly.

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INTRODUCTION

For the whole life starting at first learning to take a vertical position, then performing daily activities a man is at risk of falls. The consequences of these incidents are becoming more dangerous for fitness and health later in life. This is the period in which the bone tissue reduces its strength and resistance to external forces, mainly fractures of limbs enforce limitation of physical activity through prolonged immobilization. The overlapping inevitable involution changes in conjunction with limited physical activity aggravate health deficits in elderly. As a result of repeated incidents likely to develop the after fall syndrome, which reveals a decrease in physical activity, depression and anxiety, and fear of another collapses. As a result of such situation leads to the loss of independence, restrictions on domestic and social functions, and dependence on third parties.

The causes of falls among the elderly should be sought in the hindered stability control and balance the body. They both occur in different everyday situations requiring a change in posture, staying in forced position and during walking. The sources of these disorders are not only age-related multi-system degenerative processes (nervous, muscular and osteo-articular), but also various types of diseases.

The injuries resulting from falls are one of the main causes of disability and disablement and even lead to premature death. Epidemiological data indicates that the sixth leading cause of death at the age of 65 years and the fifth in older than 75 years are the falls/collapses (Rubenstein 2006; WHO 2007). The data reported by Polish researchers suggests a significant risk of falls among the elderly, about 30% of people over 65 years old and 50% over 80 years falls during the year. The elderly are 5 times more often hospitalized as a result of sustained injuries than for any other reason (Kumorek et al. 2009). Falls are the cause and reason (are responsible) for 100% of fractures of the forearm, 90-95% of fractures of the proximal femur, and about 25% of vertebral fractures (Cummings, Melton 2002). As many as 60% of falls occur at home (Czerwinski et al. 2006), the vast majority of them are caused by slipping or tripping, 10% are caused by fainting and dizziness, while 30% of the effect of other imbalances (Czerwinski et al. 2008).

There are several causes that affect the growing threat of falls; eliminating them will reduce the risk of falls and thus, improve the quality of life of older people. The authors of this article also pointed to selected risks including excessive use of drugs, impaired vision, limited physical activity, cardiac health problems, diet, use of proper footwear and elimination of architectural barriers.

THE MOST COMMON CAUSES OF FALLS

Pharmacotherapy

Multidiseaseness, commonly seen in the elderly, enforces drug treatment and drugs used in the treatment of these diseases, for example psychotropic drugs, antidiabetic, or lowering the blood pressure may cause dizziness and be the cause of imbalances (Tinetti et al., 1988; Campbell et al. 1989; Leipzig et al. 1999). Therefore, a comprehensive therapeutic treatment should begin with the elimination of unnecessary drugs if the health status and needs of older people allow it, this task becomes a primary need. As indicated by the observations carried out reducing the usage of psychotropic drugs (Campbell et al. 1999), and other pharmaceuticals (Healer et al., 2004) resulted in a decrease in the number of falls. Reductions in usage of drugs is a difficult decision for both the medical team as well as the patients themselves, learned and accustomed to accept them in very large quantities. In order to achieve success and reduce the risk of falls the regime should be implemented to reduce the dose of pharmaceuticals for patients in whom it is possible immediately.

Impaired vision

Another important factor affecting the safety of the elderly is to improve the view. The simplest method with impaired vision becomes choosing the right quality and parameters of lenses for glasses, giving a guarantee of better visibility and confidence in movement. Correctly matched glasses reduce the number of falls (Cumming et al. 2007). Treatment of eye diseases is indispensability, immediately performing the necessary surgery for example cataracts increases the field of view, the quality of functioning and thus reduces the risk of falls, compared to people waiting a long time for the procedure in which more often injury occur (Harwood et al. 2005 ; Foss et al. 2006).

Physical activity

An indication of the need for greater physical activity and to propose adequate physical training is associated with preferred by the elderly more hypodynamic lifestyle. The specific restriction of movement is characteristic for people in residential homes, the cause of such situation should be explained with two reasons. The first is health problem, for institutions providing round the clock support get people sick and disabled. The second reason is help and services given by the personnel, almost in all daily activities, this situation does not enforce any additional physical activities. Therefore, regardless of the place of residence, individually adjusted set of exercise must encourage older people to be active. The range of exercise is very wide, selected according to the needs and includes equivalent classes, cardiovascular and resistance. The class must contain elements of balance exercise, strength and flexibility of muscles, fitness

training, improvement of walking on different surfaces and stairs as well as training coordination (Gillespie et al., 2003; Chang et al., 2004; Kao et al. 2010). The introducing motion exercise should be preceded by an eligible medical examination and initially led very carefully, because not all participants of the course are prepared to exercise. The lack of consideration may result in deterioration of health, which translates into a lower functional efficiency and increased likelihood of falls. With time, conducted training and activity program should be gradually modified, increasing load and diversifying them. The permanent control in the course of physical activities by a physiotherapist is necessary since the independent exercising by an elderly person may be less accurate (Gusi et al. 2012) and causes unnecessary errors.

The effects of particular group exercises mutually penetrate, but one can attempt to present the potential benefits (Rottermund et al. 2013). The balance training is an effective therapy in reducing the fear of falling. Moreover, it improves dynamic balance and isometric strength in elderly (John et al. 2010). The gradual reduction of response time and improving locomotion occurs. The fear of collapsing has a negative effect on posture control during gait, therefore physiotherapists should take this element into consideration when planning classes and during rehabilitation (Province et al. 1995). General streamlining - cardiovascular - exercises reduce the risk of falls by 10%, and balance exercises 17% (Muhlberg, Sieber 2004). Key benefits of these exercises are the improvement of the respiratory and circulatory efficiency, improvement of mood and sleep, weight control. The Researchers point to the efficacy of resistance training of older people, under its influence the increase of muscle strength and overall physical fitness, and sarcopenia prophylaxis are made (Latham et al., 2003; Rottermund 2012). In addition, a major benefit of resistance exercise is the improvement of the bone under load calcification (Parry 2005). A valuable addition to the proposed exercise are other physical activities eg. the dances that improve balance, coordination and correct posture, water activities or popular methods - yoga, tai chi, Pilates, as well as fashionable in the most recent period of time - Nordic Walking. There is a significant number of proposed physical activities, having regard for the needs and preferences of a patient one can choose an interesting set of exercises, which will be executed with enthusiasm giving satisfaction and safety. The most preferably for the elderly will be conducting exercises in similar conditions that exist in the environment, in the place of functioning, which provides a sense of safety and reliability during daily activities. For the elderly such load is recommended: 30 minutes of moderate intense exercise for 5 days or more a week or 20 minute of intense workout at least 3 times a week (Nelson 2007).

People with threatened balance or moving with difficulties should use aid equipment - crutches,

walking sticks, walking frames, which increases the bearing plane and guarantees greater stability.

The circulatory system

Approximately 70% of falls are associated with cardiovascular and heart disorders (arrhythmia, pressure spikes) (Kenny et al., 2001), usually without the patient awareness. Therefore, the correct medical diagnosis and specialized causal treatment become necessary. The observation of older people treated for one year after cardiac incidents (conduction disorder, tachycardia, bradycardia) indicates a significant reduction in number of falls (Bromboszcz, Dendura 2009). The above training also improve cardiac dynamics (Prusiński 2012), giving a chance for a better tolerance of physical effort and thus changing the quality of life. There is a need to mention the orthostatic hypotension, which is not a separate disease entity, but it is a symptom defined as a decrease in systolic blood pressure of 30 mm Hg or more, and diastolic blood pressure of 10 mm Hg - when changing position from lying down to standing. It causes discomfort, security risks and can cause falls. It is the result of impaired cardiovascular adaptation to sudden changes in body position. For the elderly, the most important is an insufficient adaptation due to long-term immobilization and old age. Typical are the disturbances when attempting to upright after prolonged (eg. a night) rest in supine position or after heavy meal. In symptomatic proceedings, in addition to getting up slowly in phases, pharmacological treatment is recommended (fluktokortyzon, mododryna, erythropoietin) (Smolińska, Kiczorowska 2014).

Diet

Every fall is a threat to the continuity of bone tissue. The old age is associated with bone decalcification processes - osteopenia or osteoporosis. In addition to the presented physical activities a diet containing sufficient amount of calcium and vitamin D plays an important role in keeping as long as possible the maximum peak bone mass parameters. Daily meals provide 900mg of calcium, the elderly at risk of osteoporosis or already affected by this disease need 1000-1200mg of calcium per day. Therefore, it is mandatory to attach a slice of cheese, skim milk, yogurt, vegetables (spinach, beets, beans, soybeans) to menu (Włodarek, Głębika 2014). Maintaining the adequate levels of Vitamin D protects the body against diseases: infectious including viral, cardiovascular, skeletal, autoimmune, nervous system providing a proper nerve conduction, depression, and cancer of the breast, prostate and colon. Presented health problems caused by low levels of vitamin D, show clearly the necessity of the proper body functioning. Providing vitamin D or its supplements (affordable and safe) in the diet indirectly reduce the risk of falls. The research investigating the level of knowledge about proper diet are not satisfactory so education including dietary adjustment becomes required (Tinetti et al., 1988;

Peterson, 2009; Szczepańska et al. 2013; Tańska et al. 2013; Siemianowicz, Szpendowski 2014).

Foot and Footwear

The problem of foot should be considered during the functional study. The elderly have weakened muscle strength, often limited joint mobility of the foot. Deformations of toes occurring with aging, flat feet and valgus, ulcers, fungal changes and deformed nails predispose to falls (Arnadottir, Mercer 2000; Tencer et al. 2004). In addition, reducing control of putting the feet on the ground increases the risk of falls. Essential for the safety is footwear used, elevated heel, not fitting and loose footwear (slippers), the lack of buckles and ornaments, slippery sole substantially increase the risk of falls. Therefore, the useage of shoes and slippers fastened, with a well holding the heel, matched by size and flat soles reduce the risks and hazards of falls (Huang, Acton 2004; La Grow et al. 2006; Menz 2008).

Architectural Barriers

The falls hazard identification and their elimination from the living environment must be a deliberate part of the prevention program (Lord et al., 2005; Rucker et al. 2006), performed by experienced people knowing the elderly behaviour, institution administrators or family. At the stage of designing buildings and their adaptation to serve a specific purpose it is necessary to eliminate all obstacles and barriers. Mounting the railing on the stairs and along the corridors, the handles in the bathroom and toilets, lighting adapted to the elderly requirements, particularly in sensitive areas are the basis for efforts to stay safe (Kalina, Barczyński 2008; Kalina et al. 2013). Furniture and how it is set are important in the place of people residence so as not to clutter the rooms and do not hinder communication. The floor of the rooms should be in light colors, slippery structures, thresholds and carpets (sidewalks), which are another threat, should be eliminated. The bed itself, its height must be adapted to the growth of the patient to facilitate getting up and sitting down, which is especially important in weak legs. An important role in prevention of falls plays raising awareness regarding the potential hazards in the environment in which they live.

SUMMARY

There is no guarantee of elimination 100% of falls among the elderly, after following all the instructions and reducing risk factors. In the literature dealing with falls the learning of falling with the most advantageous position to prevent damage and injury of the body is very often recommended. This raises our doubts, working with the elderly, the sick, the accompanying multiple disabilities there is no way to learn the correct way to fall. Security and assurance during learning and improvement of falling may not be sufficient, what the final result will be injuries or fractures. The vast

majority of people in the course of the fall are not aware of the incident, records the event after the fact, this statement refers mainly to the elderly. Therefore, in geriatrics it is crucial to focus on gaining skills of proper getting up. Not every fall ends up with fracture, so in the course of physical activities a therapist should teach the patient's safe lifting up - getting up from a lying position. There are two basic methods of teaching (Rottermund et al. 2013). First, a kind of natural order, is to adopt the position of lying ahead, then go to the kneeling supported and continue to kneeling with both legs, then one leg in order to achieve a standing position using their own legs or walking stick, ball or equipment (eg. a chair) located next door. Secondly, in the reverse order, divided into phases of movement, first from a standing position the patient goes to the kneeling one leg with the help of sticks and again to stand, practicing the item until it mastered, then start learning the next phase until lie ahead and back to standing.

Introducing prevention classes, however, first we need to focus on the balance training and general streamlining considering the possibility of a real assessment of the situation, functional and motor conditions and personal motivations for engaging in activities for the elderly (Taylor 2011; Lamothe et al. 2012). Conventional training process can be successfully combined with new technologies such as console games and devices effectively improving postural control of the body and at the same time presenting an excellent prevention of falls (Rendon et al., 2012; Jorgensen et al. 2013; Van Diest et al., 2013).

An essential part of the work with patients for all members of the rehabilitation team is education. Awareness of potential threats, learning how to deal with difficult situations and what to do in the time of deteriorating the health status is a selection of the most important points implemented during classes, particularly in the elderly. Teaching should change the wrong habits in movement, adopting a standing position from lying or sitting, moreover, to remind a senior threat in the course of daily activities in the kitchen, bathroom, toilet. One should not forget about education in the area of nutrition and a healthy lifestyle. The scope of lectures conducted for group and during individual meetings must take into account all the needs of the elderly in order to reliably prevent falls. It seems important to introduce through education changes in the mentality of looking at old age, not everything in the later decades of life can be completed as quickly as in the past, a series of actions should be given more time and do not get upset when failures. Elderly by joining activities should consider a comprehensive solving of their problems and individual physical, environmental, social and psychological needs.

The risk of falls in the elderly cannot be fully eliminated. There are unpredictable and difficult situations where you lose your balance and fall over. Therefore, prevention conducted in the form of an in-

depth analysis of the causes of falls which already happened, control of health and proper treatment, conducting systematic interesting and varied physical

activities combined with education in a determined way can reduce the risk of falls.

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