

THE EFFECT OF A TRAINING PROGRAM ON THE AUTONOMY OF OLD WOMEN

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Abstract:

Older people with walking difficulties are particularly fragile and at risk for functional decline, To retain as long as possible functional independence, this work aims to provide a physical program tailored to improve walking and balance for the elderly (over 65 years) and Predict the influence of physical training on them so that we can to help this population group maintain or recover certain motor capacity . In order to help them perform daily activities and be independent without assistant need. 20 elderly with an average age of 79.6 years .institutionalized in a geriatric structure were chosen and divided into two groups; The experimental group (10 women) participated in a physical program suitable for 12 weeks with an average of 3-hour sessions per week. Both groups (experimental and control) have participated in pre-test and post-test. The Results according to the research variables were characterized by significant differences. The training has improved static balance and different gait parameters.

Keywords: elderly, physical training, training program, autonomy

1. Introduction

Many researchers define old age as a decline in functional and psychomotor abilities; moreover, the elderly are the more exposed to age-related illnesses and therefore more to fatigue and overwork after the slightest effort. That is why we conducted this study in order to assist this category of population so that they can preserve or recover certain motor skills that can help them carry out their daily activities and be autonomous without the need for assistance thus.

The characteristics of gait will change with age under the combined effect of physio-logical and pathological aging. These amendments mainly involve irregular steps, reduced the length of the stride , instable and decreased walking speed (Blanke , 1989 ;Coste-Salon & al,1989 ;Elble,2001 ; Murray, Kory& Clarkson,1969 ; Serratrice& Daumen-Legre ,1994) . They partly explain the high prevalence of geriatric fall that reached 50 % of subjects over 65 years ans(World Health Organization(WHO),1989 ; Prudham& Evans ,1981).

The well-being and quality of life are the primary concerns for the elderly. In general, the quality of life depends on the autonomy and functional capacity. it is important to promote these two elements to ensure a good life quality (Keller & Fleury, 2000). Power is important for the maintenance of functional capacity since it is an important feature for walking up and down stairs as well as in the prevention of falls (Petrella , Miller & Cress, 2004).

Functional capacity is generally associated with lower limbs. The strength, power and muscular endurance of the lower limbs has a direct influence on the independence of the elderly. Walking Ensures a better response of the lower limbs and improves Coordination and balance.

Walking is a great way to counter the negative effects of aging by ensuring autonomy and independence (Béland, 2007). The static balance and dynamic balance are essential for success, without stumbling or losing balance, daily activities such as stand up, walk, get up from a chair, up or down the stairs (Paterson, 2007). Several evaluate aging balance functions and mobility by increasing the number of ground waste (Gillespie & al, 2003) ;(Jessup, Horne, Vishen & Wheeler, 2003); (Mahoney & al, 2007). Physical activity offers a major opportunity to increase the duration of active and independent lives, and reduce functional limitations (Cress & al, 2004).

The objective of this study was to define the influence of a suitable physical training on improving the walking and balance in the elderly. The main hypothesis of this study was that the physical activity program adapted has a positive effect on improving the walking and balance of elderly people..

2. Materials and Methods:

Participants:

20 subjects participated in this study which consisted Twenty women with an average age of (69.25). Each group was divided into two parts an experimental group and a

control group. People who had an age greater than 60 years and had the opportunity to participate in this 12-week training cycle of three weekly 60-minute sessions were included in this study. Criteria for non- inclusion concerned the presence of respiratory diseases cardiovascular, neurological and medically evaluated and rheumatoid justifying a contraindication to physical activity.

Table 1: Characteristics of speech subjects and elderly witnesses

Group	Control		experimenta l	
	X1	Y1	X2	Y2
Aged	71,3	4,02	69,2	3,93
weight	68,4	3,27	75,7	6,34
height	1,56	0,08 5	1,57	0,07 2
IMC	28,15		30,77	

From Table 1. There are no large dispersion between the two groups. Regarding the weight, height, there is no significant difference between the sexes and between the two groups, which facilitates the work of researchers. The researchers use the body mass index, from which we want to determine the ideal weight for the research sample, which researchers believe is important in determining the process of walking and balance. Where the increase in weight beyond its normal value affects the elderly. It was shown from the weight indicator of the study sample of men and women an increase in weight, which means that there is an increase in body fat. This is due to physiological changes that occur with age and thus affecting the external changes.

By Stella and Jacques «Older people will have difficulty in moving, to maintain good posture as well as to preserve its balance. Several phenomena occur including loss of muscle mass by 30 to 50% degeneration of cartilage and loss of elasticity of the ligaments and tendons» (Stella & Jacques, 2000).

2.2. Methods:

2.2.1. Tests:

All subjects performed all tests before and after the training period in order.

. Test timed up and go:

The test originally named Get Up and Go (Mathias & al ,1986), became the Timed Up and Go since the publication of the Podsiadlo having validated with a time score (Podsiadlo& Richardson ,1991).

This is the simplest test in consultation and probably the most reliable. A subject sitting on a chair must stand, walk 3 meters in front of him, back to the chair and sit. The

score is given by the time in seconds and we certainly benefit from this test to perform clinical analysis developed at the beginning of this article. Timed Up and Go is reproducible over time and between observers and the results are correlated with those of BBS. (Yelnik, 2007-2008).

.Test unipodal:

Tinetti et al (Tinetti ME, 1986), unipodal showed that the test is a good way of identifying non - fallers elderly fallers of the extent that they are unable to hold this position for 30 seconds. Also, the simplicity and the validity of this test led us to use (Toulotte, Thévenon & Fabre, 2004).

The test methodology was as follows: subjects were asked to stand on one leg with eyes open for 30 seconds. The stopwatch was starting from the foot of the free leg not touching the ground The free leg should be flexed to know the angles between the trunk and the femur and the femur and tibia were 90° and they were tested using a tee (T). Each base foot (free leg) was recorded. Then the subjects performed the same test under the same conditions but eyes closed (Hurvitz, Richardson, Werner, Ruhl & Dixon, 2000).

2.2.2. The progress of the physical activity program:

Subjects were assessed two days before the training period and after the end of the training period. Intervention group participants were involved in a physical activity program developed by physiotherapists and rehabilitation physician. This program lasting 12 sessions with two weekly sessions of 60 minutes. Was centered on the balance training with strengthening exercises, mobilization floor (Belhassen, 1999a). Learning techniques to raise the ground, coordinating work and exercises eyes closed (Belhassen, 1999b).

The assessment tests are performed during the first and the last session of the cycle. A session consists of six 10-minute segments.

- 10 minutes of contact, verbalization and warm; to seek joint mobility, tone muscle and heart rate.
- 4 * 10 minutes of programmed activities based on initial assessments.
- 10 minutes cool-down and verbalization. For patients control group, they have been a simple oversight and continued their life habits.

2.2.3. Exercise programme:

The exercise programme was carried out according to the following protocol:

- 1st and 2nd weeks: Range of motion and stretching exercises applied to hamstring and calf muscle, and quadriceps and hamstring isometric strengthening exercise.
- 3rd and 4th weeks: Straight leg raising exercises, short-arc terminal extension exercise for the knee joint and isometric exercises for the abductor and adductor muscles of the hip.
- 5th and 6th weeks: Short-arc terminal extension exercise with resistance for the knee joint and isotonic strengthening exercise with resistance for the hamstring muscles.
- 7th and 8th weeks: Exercise The muscular strength of the abdominal muscles and the lower and upper dorsal muscles, exercise agility and Balance exercise with two legs, eyes open, multidirectional, then eyes closed.

-9th and 10th weeks: Walking exercise on a firm surface, then on a foam surface and Balance exercise with one leg, eyes open, multidirectional, then eyes closed.
-11th and 12 th weeks: Walking and controlling balance with maintaining body posture

Timed up and go	group	Pre-test		Post-test		Value T		Degree of freedom	The level of significance
		X1	Y1	X2	Y2	T test Calculated	T test Tabulated		
	control	16,87	3,06	18,09	1,75	1.09	2.10		
Experimental	14,59	2,80	12,06	1,50	2.51				

on different tracks and Walk with the change of direction avoiding obstacles.

3. Result:

Table 1: Comparative study between the control group and the experimental group in the pre- test and pos- test in test Timed up and go

	group	PrE-test		Post-test		Value T		Degree of freedom	The level of significance
		X1	Y2	X1	Y2	T test Calculated	T test Tabulated		
EO R	control	1,07	0,29	1,09	0,32	0,73	2.10	18	0.05
	Experimental	1,24	0,55	1,98	0,65	2.72			
E OL	control	1,02	0,32	0,97	0,26	0,34			
	Experimental	1,01	0,71	1,91	0,89	2,49			
E CR	control	0,87	0,59	0,74	0,28	0,63			
	Experimental	0,97	0,49	1,72	0,61	3.02			
EC L	control	0,92	0,33	0,91	0,27	0,01			
	Experimental	0,94	0,60	1,63	0,67	2,42			

Regarding the values obtained from timed up and go test (Table 1). There was a significant improvement in overall score between initial and final evaluation (0.05) .and degree of freedom (18). This mean that there are significant differences in the results of the experimental groups .And through the previous results, we can see that the proposed program had a positive impact. . It contains exercises based on improving motor skills joints and improvement in muscle strength of the lower limbs and joint flexibility.. Indeed, Sudarsky, Nashner, and Cordo demonstrated that postural instability is due to a decrease in muscle strength of the lower limbs. This decrease could result from a center of displacement before gravity of the axis of the ankles, which would help balance problems and falls (Nashner & Cordo, 1981). Aging skeletal muscle results histologically by a decrease in density in muscle fibers (mostly type II). Anatomically in a reduction of muscle mass (sarcopenia) and functionally by a decrease in muscle strength (Evelyne & Jacqueline, 2011).

Table2: Comparative Study between the control group and the experimental group in the pre- test and pos- test in the test unipodal.

Table 2 shows the results of the experimental group and control group in the pre -test and post -test time measured during static balance test with eyes open left/right(EOL-

EOR) and eyes closed left/right(ECL-ECR). The experimental group (man and woman) improved in static balance with eyes open and close compared to the control group. The results of the calculated value T of the experimental group is high compared to the tabulated value 2.10 and 18 degrees of freedom. These results correspond with the study (Bernard & al, 2004) a statistically significant difference was found in the post-test at significant level (0.04) and degrees of freedom (29). The control group for the value T calculated is less than the value of T tabulated. Which means that the level of balance remained stable there is no progression. But it is remarkable that the time measured during static balance test with eyes closed is less than the time measured during static balance test with eyes open. This result goes in the same direction as those of the literature. The visual system is revealing imbalance that can disassembled different postures of the body parts to ensure the stability of the body in space. The aging of the balance system is due to the aging of the vestibular system and visual system. Balance in the trainings reduce the risk of falling and weight training ensures the maintenance of long-term independence (Geneviève, 2011).

The results of the experimental group for both sexes showed an improvement in the equilibrium level compared to the control group. This is evidenced by the results, when the value of "T" calculated is greater than the value of "T" tabulated at the 95 % and 18 degrees of freedom. This is an evidence that there are significant differences in the results of the experimental groups. Which confirms that there is an improvement from the balance of elderly men and women. Our results point in the same direction as those of Crilly & al. (Crilly, Willems, Trenholm, Hayes & Richardson, 1989) that tested 50 women aged from 72 to 92 years after an exercise program based on postural control for 12 weeks.

Their results on the postural movements with eyes closed and open show a significant improvement compared to a control group for the anteroposterior axis provided eyes closed. Not all other results are significant.

4. Discussion:

The aim of this study was to evaluate the influence of a physical activity program on improving the walking and balance on the elderly. Trainings were adapted according to the results in an assessment of the physical condition measuring three types of important activities result in for the elderly to maintain its functional autonomy.

Results noted that there is a variable improvement in walking and balance, but insufficient compared with the results of assessment tests walking and balance. The experimental group was not out of the fall risk zone, it means that we have to increase the training weeks. But we can say that improving the walking and balance is acceptable. And the outcome of the study approved the exercises scheduled for the experimental groups improve strength and muscle power of lower members.

Recent international recommendations define beneficial levels of physical activity for the health of people over 65 advocated muscle strengthening activities (work against resistance) that must complete endurance activities (aerobic)(Who,2010).

These strengthening exercises should be practiced at least 2 days, not consecutive, weekly in the form of exercises using the major muscle groups with 8 to 12 repetitions of each exercise (Inserm.2008).

This study demonstrated that physical training based mainly on muscle strengthening, static and dynamic balance. The increase in muscle strength would put the center of gravity at the axis of the pins, thus giving a better balance (Toulotte & al, 2004).

Through exercises conducted open and closed eyes and on different surfaces. Meanwhile the improvement of static balance could also come from the increase in muscle strength through exercises performed using elastic bands (Lord, Ward, Williams & Strudwick, 1999). Our results also showed a significant improvement of the various operating parameters (speed walking, walking pace).

Our study shows that following a period of three months of physical training a significant improvement the tests unipodal open and closed eyes in the experimental group. This result goes in the same direction as those of literature, established by (Haeur & al, 2001).

The results of our study can then be compared with those reported by (Albinet, Bernard, & Palut. 2006); these authors have in fact recently shown that a program of physical activity two months could improve the static and dynamic balance for the healthy old people.

Our results are in the same direction as that of (Brown & al2000) conducted a randomized clinical study more focused on the physical exercises, in 84 sensitive subjects (83 years on average). The complete program included stretching exercises, coordination, balance, functional desk and muscle building for 3 months with 3 sessions per week. The results show an improved strength, balance, flexibility and functional capacity.

5. Conclusion:

This study demonstrated the possibility for elderly people to improve the parameters of walking and static balance through training of 12 weeks based on muscle strengthening, walking on different tracks and also on the static and dynamic balance, the trainings reduce the risk of falling and weight training ensures the maintenance of long-term independence. Therefore, physical training would reduce or delay the effects due to aging and now physical autonomy since no new fall was reported during this training period.

To maintain functional independence along with the increase of life expectancy is one of the key goals of the health policy for the elderly. Maintaining physical activity helps maintain muscle function needed to maintain mobility and ability to perform activities of daily living among seniors. Maintaining and improving the autonomy of the elderly is an important issue in our aging society. The control of posture and balance are two essential components for the autonomy of the elderly. Physical activity prevents the appearance of a number of adverse events related to aging in the elderly and generates a wellness-accompanied physics.

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