



Original Contribution

**A PROGRAM ON KINESITHERAPY TO IMPROVE
BALANCE CONTROL AND COORDINATION IN
MULTIPLE SCLEROSIS PATIENTS**

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ABSTRACT

PURPOSE: To design and apply a program on kinesitherapy to improve balance and coordination in multiple sclerosis patients. **METHODS:** The program was applied on two female patients with cerebrosplinal multiple sclerosis, presenting with a chronic-remission course. The exercises were done in home conditions after periods of hospital stays. The exercises were performed with special devices, and were designed to train balance reactions and movement coordination. Exercises with SWISS BALL were a major part of the program. A specific order in learning and making the exercises was required. **RESULTS:** The methods applied to assess the patients showed improved balance control and motor coordination capacities in the two patients. **CONCLUSION:** Because of the small number of patients the conclusions cannot be considered undisputable. The results achieved, however, provide a substantial basis for further application of this program and observation.

Key Words: SWISS BALL, PHYSIO ROLL, Gymnik, exercises, starting positions.

INTRODUCTION

Coordination disturbances present an important handicap for multiple sclerosis (MS) patients. They can incur disturbance of movement and independence in everyday activities. Very often, these disturbances are neglected in the course of the kinesitherapy. The aim of the investigation is to prepare and apply a program to improve balance and coordination functions in MS patients.

MATERIALS AND METHODS

Two patients were included in the study, with cerebrosplinal MS with acute and remission episodes. The patients had been diagnosed with the condition 13 and 14 years before the study, and aged 45 and 49 years, respectively. As treatment of ataxic disturbances requires a long time, the exercises were designed for home conditions. They were started after stabilising the patients during hospital stays because of exacerbation. The patients were assessed before and after the program, using several criteria. The paper presents alterations

in indicators for balance, and static and kinetic coordination.

METHODS OF KINESITHERAPY

The methods applied were in compliance with the general principles of kinesitherapy applied in the treatment for MS. A key part of the program was devices used for training of balance and coordination functions. The aim of the program was to achieve an optimal improvement in balance stability and to lower the degree of ataxic disturbances.

Routine devices, used in attempts to bring back to normal the balance reactions of patients have proved too dull and monotonous for patients with such problems. In the program proposed, SWISS BALL exercises are in the centre of balance training activities. Such balls originate from Switzerland. Exercises with these big diameter balls were first applied for therapeutic purposes and systematised by Swiss physiotherapists, who worked with cerebral palsy children to help improve balance reactions (1). Exercises on the ball are accompanied by increased proprioceptor activity, combined with keeping balance on an unstable support. Performance of each exercise demands active

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participation of the whole body (visual perception, vestibular system, deeper perception, muscular reaction etc) (2).

The exercises included in the program were designed after leading authors in the field of SWISS BALL or FIT BALL remedial gymnastics – Enrico Ceron and Caroline Creager (3, 4). The experience of the author in applying SWISS BALL in exercises for treatment of patients with other conditions was also applied.

The program was divided into a primary and main period. The primary period included carrying out exercises with PHYSIO ROLL.

The specific peanut shape of the latter renders less mobility, and its large support area provides satisfactory stability during introduction exercises for persons with poor coordination (3). Attention was paid to the order in which the specific exercises were performed. With balance-training exercises, the size of the support area and the position of the upper extremities were of utmost importance. The series started with exercises in a position in which the lower extremities were propped on the saddle-like part of the ball (**Figure 1**). The following exercises started from a kneeling position (**Figure 2**), and knee-prop. These were elaborated by simultaneous raising of the opposite upper and lower extremities (**Figure 3**). Exercises continued from a sitting position. Initially, “riding” the ball was performed (**Figure 4**). The lower extremities were apart, with feet on the ground to provide good stability. To facilitate balance, arms were stretched aside at the beginning. Sitting on the ball, in turn, required better balance reactions. Raising one leg decreased stability and balance was more difficult to keep (1). With both legs raised, coordination of movement was trained (**Figure 5**). Then exercises followed starting from a position lying with the back against the ball (**Figure 6**), and then with the back of the head propped against the ball. These exercises are, as a rule, difficult for patients with coordination disturbances, and this made the presence of a therapist or a family member indispensable, so that rolling over from the ball was prevented. (**Figure 7**) The set ended up with walking in various ways, meant to improve balance functions. The length of primary activities varied between 15 and 20 minutes, and at the end they were extended to 25-30 minutes. The overall period of kinesitherapy took one-and-a-half months.



Figure 1. Exercise in a position in which the lower extremities were propped on the saddle-like part of the ball



Figure 2. Exercise started from a kneeling position



Figure 3. Simultaneous raising of the opposite upper and lower extremities

The second main group of exercises was introduced after achieving good stability in performing special exercises. Training continued with GYMNIC. Elements in the exercises prepared were after “Classification of Exercises with SWISS Ball with low-back pain (2). The initial exercises in this main period were with the body in lying position on the floor and legs on the ball (2) (**Figure 8**). Then kneeling on the ball was introduced (**Figure 9**). Exercises followed, starting from a sitting on the ball (**Figure 10**). The support is unstable in this position, but visual control

is increased and allows for timely correction of posture. (2). Further exercises were performed, starting with lying on the ball (**Figure 11**), and then with the back of the head propped against the ball (**Figure 12**). The set ended with exercises to train balance reactions while sitting on the ball (**Figure 13**), and moving to a target with eyes closed. The set of exercises was performed for three months.



Figure 4. "Riding" the ball



Figure 5. Exercise for coordination of movement training



Figure 6. Exercise starting from a position lying with the back against the ball



Figure 7. The presence of a therapist or a family member indispensable, so that rolling over from the ball was prevented

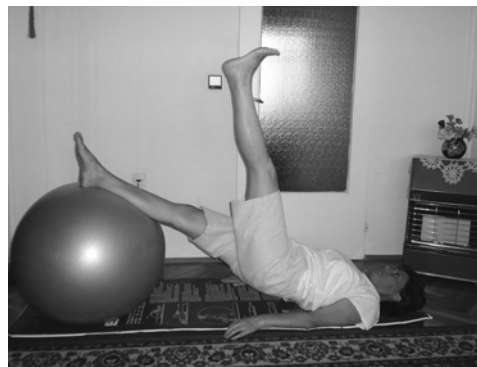


Figure 8. Exercise with the body in lying position on the floor and legs on the ball



Figure 9. Kneeling on the ball



Figure 10. Exercise starting from a sitting on the ball



Figure 11. Exercise starting with lying on the ball



Figure 13. Exercise to train balance reactions while sitting on the ball

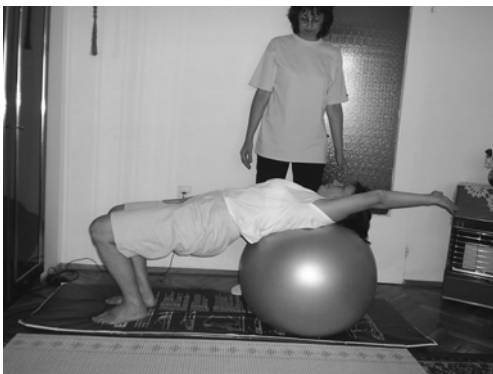


Figure 12. Exercise with the back of the head propped against the ball

Instructions given read that:

1. Exercises should be performed slowly.
2. A physical therapist or a family member should be present to control and help with stability.
3. Increase of difficulty should be gradual, after achieving stability on the ball.
4. After mastering a set, new exercises should be introduced to avoid boredom in patients.
5. That in the middle of each period the exercises should be performed without visual control.

Table 1. The test of Deshin

Measurement	Body position							
	I		II		III		IV	
Beginning	AB	15s	AB	0s	AB	0s	AB	0s
	VP	19s	VP	0s	VP	0s	VP	0s
End	AB	30s	AB	5s	AB	3s	AB	0s
	VP	30s	VP	9s	VP	6s	VP	0s

AB and VP - the patients' names initials.

RESULTS

The methods of follow-up and observation showed:

1. Test of Rohmberg (5) was positive at the beginning, and negligible at the end of the program.
2. Investigation of gait (6) showed it was atactic at the beginning, and more stable at the end of the program. Walking with eyes closed was till unstable.
3. The test of Deshin (6) is shown on

Table 1

The Table shows that the time of retaining the test positions had become longer, though by little, as compared to the initial values. There was no improvement in the 4th position tested – the person investigated has to retain the

position on a gym scale with eyes closed. This balance control had not been achieved by the patients.

DISCUSSION

The low level of achievement assessed after Deshin are probably attributable to severe coordination disturbances because of the prolonged disease course. The test of Rohmberg and gait assessment showed positive results from the kinesitherapy procedures with focus on special devices. SWISS BALL exercises can be performed in the home, which makes it possible to have them done on a daily basis – and this is essential as far as balance control exercises are concerned. Balance coordination exercises with SWISS BALL are enjoyable and

entertaining, which increase patient compliance with long-term therapy.

The improvement achieved provides grounds for further application of the program and observations on the problem.

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