Summary of the results of the project between the DSHS (Deutsche Sporthochschule), Institute for Rehabilitation and Sports for disabled persons and the RECK Company concerning the subject: Aparatus-assisted training with patients suffering from Multiple Sclerosis

7. Summary

The goal of the present study was to investigate the effects of MOTOmed-training on the extent of mobility, in particular the passive mobility of the lower extremities of persons affected by Multiple Sclerosis. With 22 patients suffering from Multiple Sclerosis four tests (first test/final test and two further intermediate tests) have been carried out during a training period of 4 months (September 2001 until January 2002). The examinations regarding the extent of movement also took place during these four months and were carried out by means of a standard protractor according to the neutral-zero-method. The joints examined were the ankle joint, the knee joint and the hip joint of both lower extremities, the physiological movements of those extremities were carried out actively and passively in the sagital, frontal and transverse plane.

The results of these examinations showed a broad tendency towards a positive change of the extent of movements of the joints examined. The tests mainly concerned passive flexibility, because the mobility of the joints, which is necessary for a test of the active mobility, can turn out very differently in quantity. That is to be understood with the following explanation: due to Multiple Sclerosis most of the affected persons are suffering from contractures or paralysis. These symptoms greatly influence the mobility of the joints, which in turn can partly cause great differences in quality and quantity of the measurement of active mobility. These facts were also true for the test persons of the present study.

The extent of movement of the patients suffering from Multiple Sclerosis was smaller as expected in comparison with the standard values of healthy persons. A possible reason for this can be the handicap due to Multiple Sclerosis.

After conclusion of the 2 months training, more than 50 % of all examined persons showed a clear improvement regarding the extent of mobility, comparing the first test with the final test. Analyzing the data gathered during the first test and the final test, the quantitatively high mobility of the hip joint in the final test is remarkable. The *Ex.* and *Flex.* of the final test came to an average value of 140° (first test 131°), the measurement of the IR (inside rotation) and the AR (outside rotation) came to an average value of 100 ° in the final test (93 ° in the first test).

A further distinct tendency towards an improvement of flexibility could be seen in connection with the training experience of those tested persons who have had their own MOTOmed for quite some time. Due to the 2 months training an even larger increase in the extent of mobility could be observed in comparison with the more "inexperienced persons tested ".

An increased improvement of mobility was registered as well in those patients suffering from Multiple Sclerosis with intermittent attacks as opposed to those with a chronically progressive course. Patients with intermittent attacks improved by + 13,9° on the average, whereas the test persons with a chronically progressive course could only improve by + 3,7°. The reason for this is the connection between the decrease of the extent of movement and the progression of the disease. A comparison with other studies on the mobility of patients suffering from Multiple Sclerosis is not possible due to lack of literature. However, a similar connection could be observed in a study of isometric measurement of maximal strength of the upper extremity of patients suffering from Multiple Sclerosis by VAN DREGT (2000). In this case decreasing strength values indicated a progression of the disease.

Due to the result of the whole trial one may conclude that this special movement training of the lower extremities at moderate doses has a positive effect on the mobility of the joints, which were examined. All test persons could achieve an improvement of their extent of mobility independent of the level of disability of the patients. This finding supports the hypothesis that adequate mobility training is important for patients affected by Multiple Sclerosis. Not only could there be found improvements in mobility but also improvements regarding secondary complications, such as functional disturbance of the bladder, circulatory problems in the legs or general circulatory problems. These could be compensated or even completely eliminated by the training. In the literature, only the necessity of coordination training in relation to clumsiness and balance problems (PETERS/RAABE-OETKER, 1997) are being emphasized. Since mobility, however, is a prerequisite for coordination, gait and balance training, movement therapy should start at this point.

Daily training is suitable in order to continuously gain extent of mobility or respectively to maintain a high level of mobility. Intensity and the extent of a training session is dependent of the individual starting level of the patient. According to the experiences of this study, the following recommendation is valid in principle: a short passive warm up for a period of approximately 5 minutes, followed by an active training phase of 10 minutes for example, which is finished by a passive cool-down phase again.

This way it might be possible not only to delay the patient's need of care, but also to maintain a high level of quality of life as long as possible.