

# Beneficial Effects Of Adapted Physical Activity On Physical And Cognitive Aspects Of Multiple Sclerosis: Results Of Preliminary Study Carried Out In Collaboration With The Italian Multiple Sclerosis Association- Perugia Section

M. Di Gregorio, L. Gaetani, A. Mancini, F. Tazza, M. Castellini, M. Di Filippo, P. Calabresi, P. Sarchielli

Clinica Neurologica, Università degli Studi di Perugia, Perugia, Italy



## INTRODUCTION

Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease characterized by heterogeneous clinical manifestations including motor, sensitive, autonomous and cognitive impairments. Some of them, like fatigue (80% of the patients), do not properly respond to the standard pharmacological therapies, with a negative impact on patients' quality of life. Non-pharmacological strategies, like adapted physical activity (APA), are now proposed as a validated approach in order to control those symptoms and to maintain a good performance status.

## AIM

To determine if adapted physical activity may have a positive impact on: motor functionality, cognitive status, quality of life and mood alteration in MS patients.

## PATIENTS AND METHODS

We performed a prospective study involving 20 MS patients (9 F, 11 M, mean age  $45.3 \pm 13.7$  years, mean duration of disease  $13.1 \pm 9.5$  years and mean EDSS  $2.9 \pm 1.9$ ) who attended APA for 6-month, organized in collaboration with the Italian MS Association – Perugia section. The course consisted of 1 lesson of gym activity per week and 1 lesson of swimming pool activity per week (1 hour each). The patients were evaluated at T0 (beginning), T1 (after 3 month) and T2 (after 6 month). Several tests were administered: BICAMS, Beck Anxiety Index, Beck depression scale, MFIS, FSS, SF-36, BERG, TUG, T25FT, BENDING.

## RESULTS

A general improvement was observed in all patients across the evaluations. After three months we found a significant decrease in anxiety (BAI:  $-7.3 \pm 2.7$ ,  $p=0.009$ ) and a trend toward an improvement of the other outcome variables. After six months a significant reduction in anxiety (BAI:  $-8.9 \pm 2.8$ ,  $p=0.003$ ) and fatigue (FSS:  $-7.9 \pm 3.9$ ,  $p=0.049$ ) emerged, as well as a significant increase in endurance (T25FWT:  $-3.7 \pm 1.7$ ,  $p=0.036$ ) and verbal memory scores (BICAMS-CVTL-II z-score:  $+1.2 \pm 0.5$ ,  $p=0.033$ ) (Fig. 1-2).

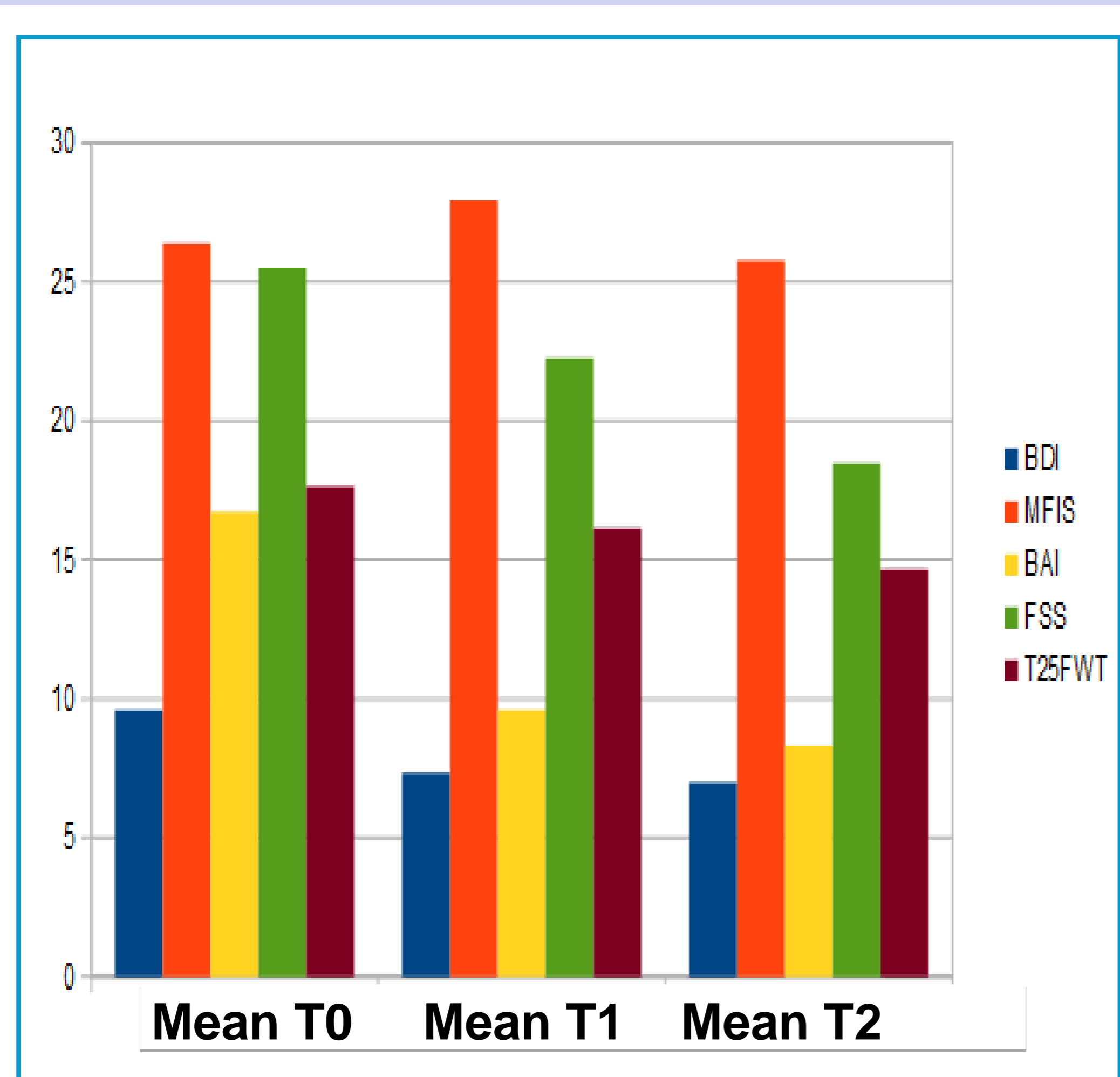


Fig. 1 and 2 show improvement in all tests at T1 (after 3 months) and at T2 (after 6 months) and the beneficial effects of APA on physical and cognitive symptoms.

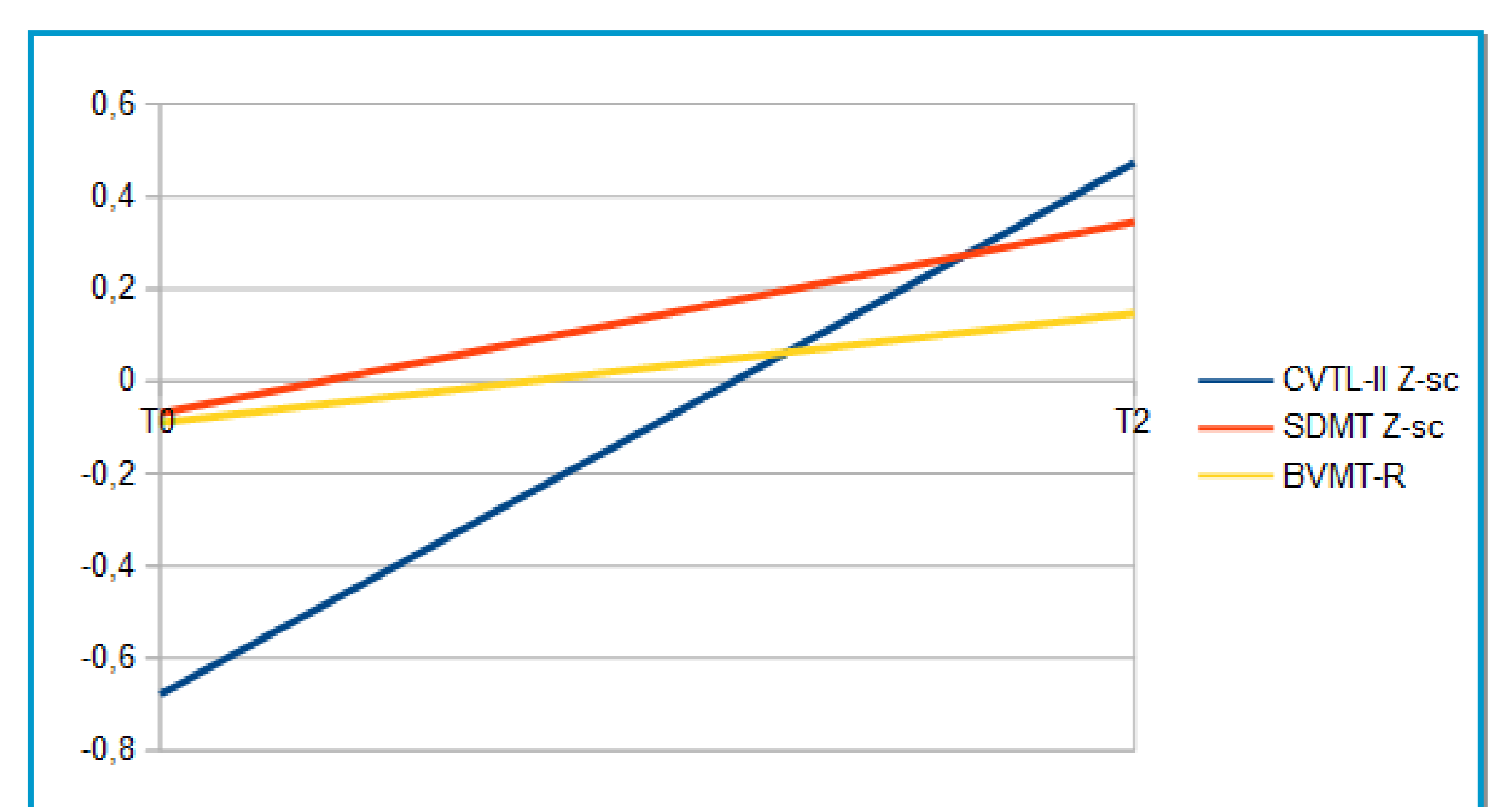
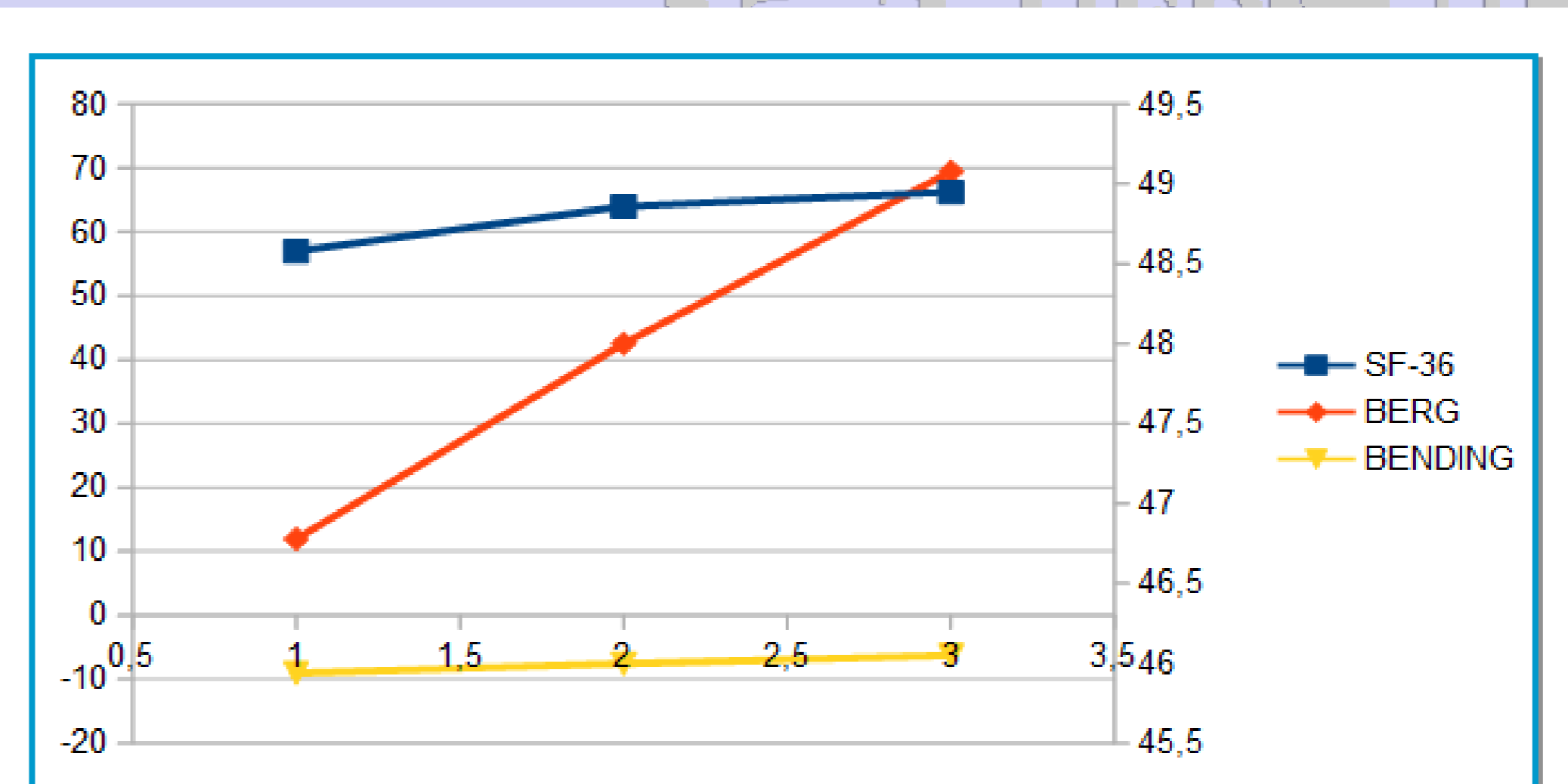


Fig. 2

## DISCUSSION AND CONCLUSIONS

Despite the limited sample size, our findings suggest a positive impact on key aspects of MS such as anxiety, fatigue, endurance and verbal memory. Based on these preliminary results, APA could be proposed as a useful non-pharmacological strategy for MS patients in order to ameliorate their clinical status and quality of daily life.

**REFERENCES:** (1) Systematic, evidence-based review of exercise, physical activity and physical fitness on cognition in persons with MS Brian M. Sandroff – Robert W. Motl – Mark R. Scudder – John DeLuca *Neuropsychol Rev.* 2016 Sep;26(3):271-294 (2) Potential pathophysiological pathways that can explain the positive effects of exercise on fatigue in multiple sclerosis: A scoping review. Langestov-Christensen M, Bisson EJ, Finlayson ML, Dalgas U. *J. Neurol Sci.* 2017 Feb 15;373:307-320. (3) Exercise in multiple sclerosis – an integral component of disease management. Doring A, Pfueller CF, Paul F, Dorr J. *EPMA J.* 2011 Dec 24;3(1):2.