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# The Feasibility and Effect of a Kickboxing Training Program on the Balance, Gait, and Overall Quality of Life of Persons with Multiple Sclerosis: A Case Series

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## Abstract

The purpose of the case series is to examine the feasibility and effect of a 5-week kickboxing training program on the balance and gait of three individuals with MS. Participants were involved in a 5 week kickboxing training program taught by experienced instructors. They were tested through a variety of balance, gait, and quality of life measures before and after the training program. Results suggest that there is improvement in the balance confidence of participants. However, no improvements are found in measures of balance, gait, or quality of life.



## Background

Multiple sclerosis is a chronic progressive autoimmune disease of the central nervous system. Two of the most common and earliest onset symptoms are balance and gait deficits. Exercise may help decrease secondary symptoms and slow the progression of the disease. Because there is currently no cure for MS and medical treatment is needed for life, the disease is costly. Group exercise programs may be a cost-effective alternate therapy for MS. Kickboxing is a non-traditional exercise which utilizes fast movements of the whole body and develops speed, strength, endurance, balance, and coordination. The high intensity of exercise may lead to greater improvements.

## Methods

Five individuals with multiple sclerosis participated in the 5-week kickboxing study. Three participants completed all phases of testing and training. The program consisted of three training sessions per week, resulting in 15 total sessions. Outcome measures were tested on three separate occasions; baseline, pre-training, and post-training. Outcome measures included the Mini BESTest, Berg Balance Scale (BBS), Dynamic Gait Index (DGI), Timed Up and Go (TUG), walking speed, Activities Specific Balance Confidence Scale (ABC), and MS Quality of Life Survey (MSQOL).

Table 1. Participant Characteristics

	Participant 1	Participant 2	Participant 3
Age (yrs)	48	52	56
Sex	M	F	M
BMI (kg/m <sup>2</sup> )	28.4	31.6	27.3
MS Type	SP	RR	RR
EDSS	6.5	1	6
AD	TP	None	SPC

SP= Secondary Progressive MS  
 RR= Relapsing-remitting MS  
 TP= Trekking poles  
 SPC= Single point cane  
 AD= Assistive device



Kickboxing moves: Jab, hook, uppercut, knee, straight kick, and side kick

## Results

Table 2. Balance and Mobility Assessment Scores

Outcome Measures	Base	Pre-Train	Post-Train
<b>Gait Speed (m/s)</b>			
Participant 1	1.21	1.29	1.38
Participant 2	1.67	1.7	1.77
Participant 3	0.88	1.03	1.18
<b>Mini BESTest</b>			
Participant 1	13	20	19
Participant 2	27	29	28
Participant 3	14	18	21
<b>BBS (56 pts)</b>			
Participant 1	48	48	52
Participant 2	53	56	55
Participant 3	47	43	46
<b>DGI(24 pts)</b>			
Participant 1	14	16	16
Participant 2	24	24	24
Participant 3	10	13	16

Table 3. Balance Confidence and Quality of Life Measures

Outcome Measures	Base	Pre-Train	Post-Train
<b>ABC Scale (100%)</b>			
Participant 1	5.63	5.63	25.5
Participant 2	100	100	100
Participant 3	48.1	34	76.2
<b>MSQOL Physical</b>			
Participant 1	19.6	19.7	17.3
Participant 2	72.5	79.5	70.5
Participant 3	50.3	27.3	49.2
<b>MSQOL Mental</b>			
Participant 1	17.7	15.3	18.5
Participant 2	66.9	78.4	81.9
Participant 3	65.7	58.0	61.7

## Discussion

The only consistent improvement found was in balance confidence (77.9% and 55.4% increases), as measured by the ABC scale. There was no improvement found in the balance measures, gait speed and health related quality of life. The lack of change may be due to the high functioning of one participant and the resulting ceiling effect. There was also cerebellar damage displayed in 2 participants which may inhibit motor improvements.

## Conclusion

A kickboxing training program is feasible and safe for persons with multiple sclerosis. Further research may be needed with an increase in the number of participants and in the duration of the program in order to produce greater improvement of the outcome measures.