Dancing with MS: Benefits of Ballroom or Recreational Social Dance for Persons with MS

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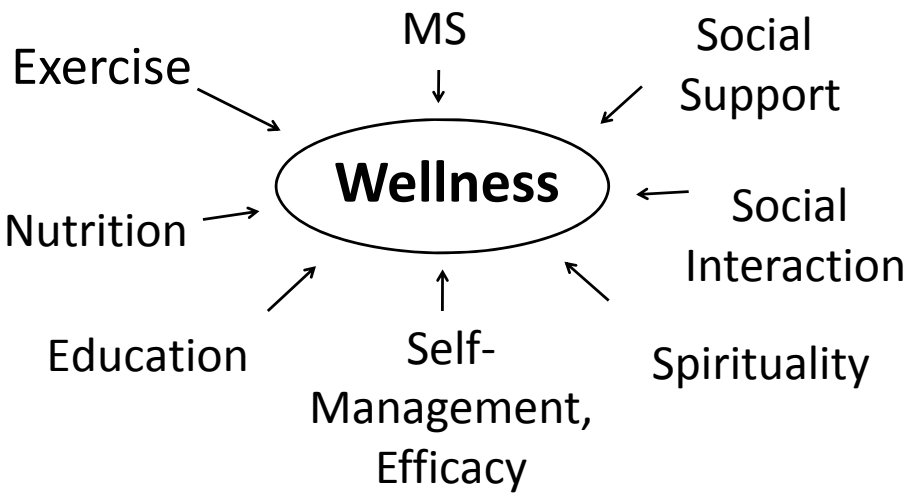
Lifestyle and MS

Goals

To understand the contribution ballroom dance, or partnered social dance can have towards an active lifestyle and wellness in persons with MS

To understand whether or not partnered social dance can provide symptom relief or otherwise contribute to quality of life in persons with MS

Wellness, Quality of Life, and Lifestyle



Exercise and MS

- Exercise and Physical Activity
  - Historical roots
  - Contemporary view
- Barriers
  - Disabilities?
  - Choices from Health Care Providers
    - Smith, C. et. al. *Disabil. Rehabil*., 2009
  - Advice from clinicians
    - Sommerset, M., et. al. *Health Expect*, 2001
  - Lack of community resources
- Non-traditional/"Complementary Medicine"
  - Yoga
    - E.g. Oken B.S. et. al. *Neurology*, 2004
  - Tai Chi
    - E.g. Mills, N. et. al. *J Bodywork Mov. Ther. 2000*
- Active Lifestyle
  - ↑ activity
  - ↓ sedentary behavior

Impact of Aerobic Training on Fitness and Quality of Life in Multiple Sclerosis

Jack H. Petajan, MD, PhD,* Eduard Gappmaier, PhD,† Andrea T. White, PhD,‡ Mark K. Spencer, PhD,§ Lizbeth Minor, MS,‡ and Richard W. Hicks, PhD†

Fifty-four multiple sclerosis (MS) patients were randomly assigned to exercise (EX) or nonexercise (NEX) groups. Before and after 15 weeks of aerobic training, aspects of fitness including maximal aerobic capacity (V_{O_2}max), isometric strength, body composition, and blood lipids were measured. Daily activities, mood, fatigue, and disease status were measured by the Profile of Mood States (POMS), Sickness Impact Profile (SIP), Fatigue Severity Scale (FSS), and neurological examination. Training consisted of 3 × 60-minute sessions per week of combined arm and leg ergometry. Expanded Disability Status Scale (EDSS) scores were unchanged, except for improved bowel and bladder function in the EX group. Compared with baseline, the EX group demonstrated significant increases in V_{O_2}max, upper and lower extremity strength, and significant decreases in skinfolds, triglyceride, and very-low-density lipoprotein (VLDL). For the EX group, POMS depression and anger scores were significantly reduced at weeks 5 and 10, and fatigue was reduced at week 10. The EX group improved significantly on all components of the physical dimension of the SIP and showed significant improvements for social interaction, emotional behavior, home management, total SIP score, and recreation and past times. No changes were observed for EX or NEX groups on the FSS. Exercise training resulted in improved fitness and had a positive impact on factors related to quality of life.

Petajan JH, Gappmaier E, White AT, Spencer MK, Minor L, Hicks RW. Impact of aerobic training on fitness and quality of life in multiple sclerosis. Ann Neurol 1996;39:432–441

Many factors associated with chronic diseases such as multiple sclerosis (MS) impact daily living and functioning negatively. These factors may be classified as direct medical consequences impacting functions such as the ability to walk or dress independently, or as secondary responses to the degree of impairment or disability. Many secondary responses to MS-related disabilities strongly affect quality of life components such as social interaction, leisure activities, and affective status. Thus, the costs of the disease are not restricted to the patients but also involve their families and society. Research has indicated that the MS population exhibits a number of life-altering problems, namely, a high prevalence of fatigue that interferes with performance of daily activities [1], a high prevalence of depressive mood disorder [2, 3], and low self-rated quality of life compared with individuals with other chronic conditions [4].

Excessive fatigue is one of the most common limitations of MS patients [1]. The perception of fatigue in MS patients varies widely from the common sense of lassitude and loss of motivation to increasing muscle weakness associated with neurologic disability. The inability to sustain physical activity and greater impairment often secondary to elevations of body temperature have also been reported [5–7]. Thus, it is critical for many MS patients to minimize exposure to conditions that lead to elevated body temperature. Frequently, MS patients limit physical activity to avoid elevated body temperature and to minimize symptoms of fatigue. This is often on the advice of health care professionals who may feel that energy must be spared for activities of daily living. Unfortunately, the result of limiting physical activity may be greater weakness, fatigue, and health risks inherent with the deconditioned state. It has been well documented that as physical activities are eliminated, one's ability to perform them becomes greatly diminished. In addition to the health consequences of inactivity, fatigue and physical limitations may result in less social interaction and pursuit of meaningful leisure activities. These losses in combination with other factors such as disease activity contribute to depressive mood disorder and detract from quality of life in general [8]. An intervention that facilitates healthy physical and/or social activities could greatly benefit this population. It has been well documented

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Petajan et. al. Ann Neurol 1996, 432-441

Why Dance and MS?

- "Not-Exercise"
  - Not therapy
  - Non-traditional
  - Captures imagination
- Low Impact
  - Can be graded
- Part of Active Lifestyle
- Community Programming

Dance and "Special Populations"

- Elderly/Older Adults
  - E.g. Kattenstroth J.C. et. al., *Frontiers Aging Neruosci*, 2013
- Mental Illness
  - E.g. Hackney M.E. and Earhart G.M., *J Nerv Ment Dis*, 2010
- Stroke and TBI
  - E.g. Berrol C.F. et. al., *Am J Dance Ther*, 1997
- Chronic Heart Failure
  - Belardinelli R. et. al., *Circ*. 2008
- MS
  - Salgado R. and de Paula Vasconcelos, *Am J Dance Ther* 2010

Partnered Dance and Parkinson Disease

- Parkinsons disease
  - E.g., Hackney M.E. and Earhart G.M. 2007 -
    - Balance and gait
    - Physical Function
    - Social support
  - Tango (Argentine)
  - Mark Morris

- Purported mechanisms
  - Altered central activation
  - Cueing strategies
  - Task – specificity
    - Dual or multitask
  - Aerobic conditioning

Earhart G.M. *Eur. J. Phys. Rehabil. Med.* 2009

Revisit: Dance for MS?

- Rationale from Neurologic populations
- Exercise is Medicine for everyone including PwMS
- Can dance as a form of physical activity be particularly useful for someone with MS?

A Case for Partnered Dance for PwMS

- Physical Activity
- Balance and Support
- Social Interaction
- Music
- Laughter
- Learning
- Two klutzes better than one

Feasibility and Fun!

- Help from local OtiMStics
- 1 day 1-2 hour workshop
- All comers
  - Wide range
- Professional instructor

…for the first time in years I was able to dance with my husband!"

"It was nice to connect and meet others who also have MS,but not focus on the MS, and just enjoy everyone!"

MS Ballroom Dance at the "Pabst Best Place" Milwaukee, WI

Pilot 1 Design

1 hr/session (graded instructional)

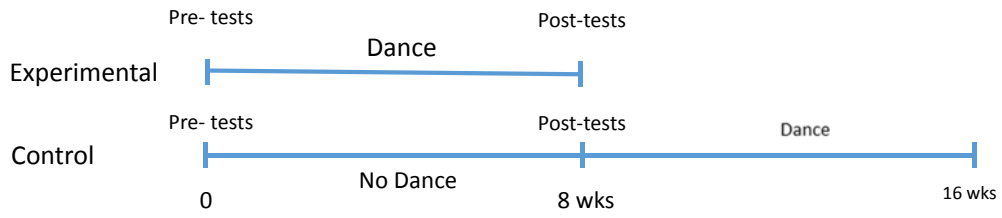
2 sessions/wk

6 of 8 wks

Partners or sig other encouraged

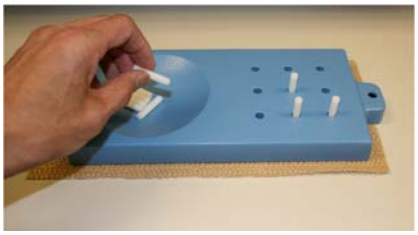
Aim 1: Characterize Activity

Aim 2: Preliminary Efficacy



Pre-Post Measurements

- Questionnaires
  - PROMIS Global Health
  - MS Self-Efficacy
  - Fatigue (FIS)
  - Depression (BDI)
- MS Functional Composite
  - 25 ft walk time
  - 9-Hole Peg Test
  - 3 s PASAT
- Balance (Clinical Measures)
  - Berg Balance
  - Dynamic Gait
- Heart Rate Variability
  - 10 min rest



Representative Dance Menu

- Push Pull
  - 126 (5) bpm, 118-132
  - Carwash
- Waltz
  - 82 (9) bpm, 59-89
  - Come Away with me
- Foxtrot
  - 121 (9) bpm, 109-142
  - Fly me to the Moon
- Rumba
  - 117 (3) bpm, 109-129
  - Kokomo

Subject Characteristics

	MS Dance	MS Control	p
N	7 (6F, 1M)	6 (6F)	
Age (yr)	46 (9)	49 (8)	0.53
Height (cm)	167 (10)	163 (9)	0.76
Weight (kg)	72.2 (23.3)	67.4 (19.0)	0.79
EDSS	2 (2)	3 (3)	0.56

Dance Group 1 required walker for distance, 1 used cane

Partners

Abilities and Disabilities

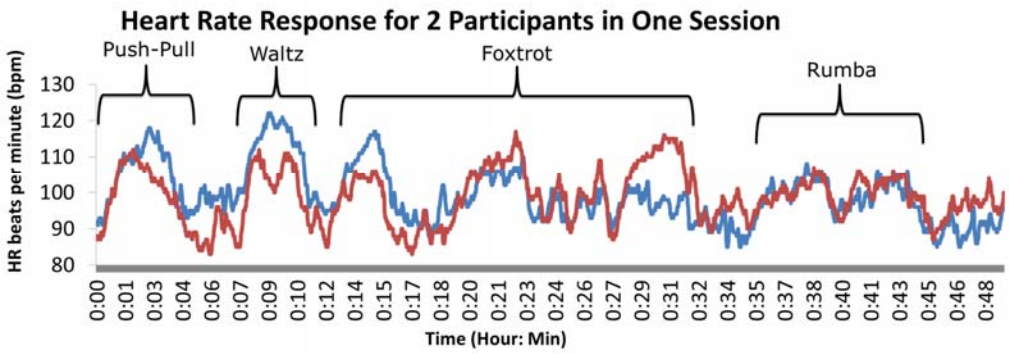
Fatigue

Temperature

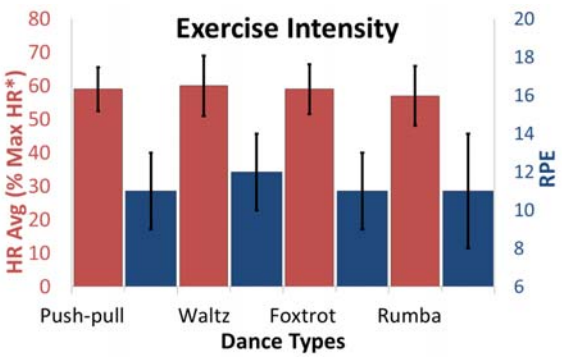
H_2O

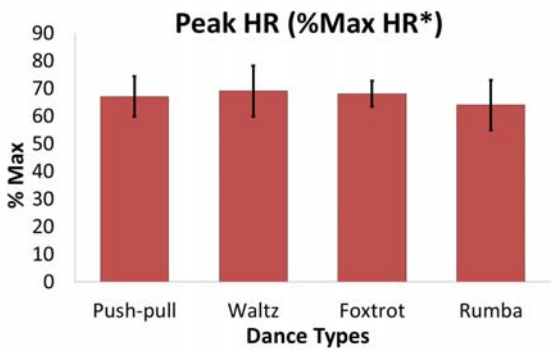
Access and Parking

Partnered Dance as Exercise



Partnered Social Dance as Exercise!





Low to mod intensity based on ACSM guidelines

Ng et. al. unpublished

*Maximal HR predicted using the Gellish equation: $HR_{max} = 207 - (0.7 \times age)$

Complete Data Set N=7

	Pre-Dance	Post-Dance	p
PROMIS Global Health	38 (29, 45)	42(27, 48)	0.24
MS Self Efficacy-Control	730 (430, 900)	730 (620,9 00)	0.74
MS Self Efficacy-Function	870 (600, 900)	860 (690, 900)	0.29
MS Exercise Self Efficacy	53 (29, 87)	66 (37,91)	0.11
Fatigue Impact Scale	35 (6, 109)	23 (2, 105)	0.50
Beck Depression Inventory	8 (0, 12)	2 (0, 20)	0.42

N = 7 Wilcoxon Signed Rank Md (range)

Ng et. al. unpublished

"Outlier" Removed N = 6

	Pre-Dance	Post-Dance	p
PROMIS Global Health	40 (29, 45)	42(34,48)	0.03
MS Self Efficacy-Control	770 (430, 900)	765 (620, 900)	0.46
MS Self Efficacy-Function	865 (600, 900)	865 (690,900)	0.18
MS Exercise Self Efficacy	65 (29, 87)	73 (37,91)	0.21
Fatigue Impact Scale	35 (6, 109)	21 (2,105)	0.07
Beck Depression Inventory	7 (0, 12)	1 (0 ,5)	0.07

Wilcoxon Signed Rank Md (range)

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No Change in Control Group

	Pre-Dance	Post-Dance	p
PROMIS Global Health	41 (36, 50)	39(35, 50)	0.41
MS Self Efficacy-Control	765 (510, 850)	745 (470, 890)	0.89
MS Self Efficacy-Function	855 (640, 900)	830 (690, 900)	0.34
MS Exercise Self Efficacy	67 (55, 98)	66 (49,95)	0.75
Fatigue Impact Scale	19 (0, 90)	26 (0, 91)	0.23
Beck Depression Inventory	4 (0, 8)	4 (0, 19)	0.18

N = 6 Control

Ng et. al. unpublished

Complete Data Set Physical/Cognitive Function

	Pre-Dance	Post-Dance	P
Berg Balance	55 (40, 56)	56 (45, 56)	0.10
Dynamic Gait Index	22 (13, 23)	22 (18, 24)	0.11
Timed Up and Go (s)	10.2 (8.6, 15.3)	9.8 (7.3, 13.0)	0.06
9 Hole Peg (s)	21.3 (17.8, 30.5)	20.2 (18.6, 29.2)	0.35
25 ft walk (s)	4.8 (4.1, 7.5)	5.1 (4.3,7.3)	0.87
PASAT	49 (31,55)	54 (45,60)	0.06
HR variability (ms)	42 (20,54)	42 (21, 57)	0.24

N = 7 Wilcoxon Signed Rank Md (range)

Ng et. al. unpublished

"Outlier" Removed - Physical/Cognitive Function

	Pre-Dance	Post-Dance	p
Berg Balance	55 (40, 56)	56 (45,56)	0.07
Dynamic Gait Index	20 (13, 23)	22 (18,24)	0.11
Timed Up and Go (s)	10.3 (8.9, 15.3)	10.1 (7.3, 13.0)	0.08
9 Hole Peg (s)	21.6 (17.8, 30.5)	20.8 (18.6, 29.0)	0.35
25 ft walk (s)	4.9 (4.0, 7.5)	4.9 (4.3,7.3)	0.53
PASAT	49 (31, 55)	55 (45,60)	0.03
HR variability (ms)	38 (20, 45)	45 (21, 57)	0.03

N = 6 Wilcoxon Signed Rank Md (range)

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No Change in Control Group

	Pre-Dance	Post-Dance	p
Berg Balance	55 (26, 56)	56 (27, 56)	0.32
Dynamic Gait Index	21 (0, 24)	23 (22, 24)	0.18
Timed Up and Go (s)	9.3 (8.0, 15.2)	9.4 (7.1, 15.1)	0.35
9 Hole Peg (s)	21.8 (17.8, 30.5)	16.5 (18.6, 36.0)	0.10
25 ft walk (s)	4.4 (3.2, 8.1)	4.5 (3.9, 7.4)	0.89
PASAT	57 (10,59)	49 (5,59)	0.47
HR variability (ms)	35 (24,66)	39 (38, 67)	0.69

N = 6

Ng et. al. unpublished

Conclusions

- Safe and fun form of physical activity/exercise
- Promising psychological/emotional efficacy
  - Some may improve
- Promising physical efficacy
  - Some may improve
- Nobody became worse

"I don't know how I would have gotten through this time in my life without this program"

Partnerships: Danceworks and NMSS-WI

- 8 of 10 weeks
  - Hourly sessions
  - 2x/week
  - Different locations
- Similar design
- Purpose:
  - Increase community involvement
  - Increase statistical power
  - Endurance
  - Balance/Stability
  - Mediators
    - HR var
    - Cortisol
  - Focus Groups (qualitative)

Courtesy of Danceworks.
Photograph by Stephanie Sanchez.

Representative Dance Menu

• Push Pull	Wings
• Waltz	Nocturne (Celtic Woman)
• Foxtrot	Cheek to cheek
• Rumba	Need you now
• Swing (including triple time)	Hit the Road Jack, Club Savoy, Rockin' Louie
• Salsa	Guantanamera
• Tango (American or ballroom)	Hernando's Hideaway, Grand Guignol
• Merengue	Suavamente

Additional Pre- Post-Measurements

- 6 minute walk test (6MWT)
- Force Platform Measurements
  - Postural stability
- Cortisol Awakening Response
  - "Stress reactivity"

Select Preliminary Results-Dance

	Pre	Post	p
Berg Balance (score)	54 (35-56)	54 (39-56)	0.41
Dynamic Gain Index (score)	20 (1-24)	23 (9-24)	0.02
6 min walk test (m)	456 (124)	492 (126)	0.002
Timed Up and Go (s)	10.4 (3.8)	8.9 (4.4)	0.003
25 ft walk test (s)	6.1 (2.5)	5.8 (2.6)	0.08
9 Hole Peg (s)	23 (2)	21 (2)	0.04
PASAT	43 (13)	48 (11)	0.05
HR variability (ms)	0.032 (.018)	0.037 (.003)	0.036

Wilcoxon Signed Rank are Median (Range)
Paired T Tests are Mean (SD)

To date N = 12

Ng et. al. unpublished

Select Preliminary Results-Control

	Pre	Post	p
Berg Balance (score)	51 (42-56)	50 (50-56)	0.71
Dynamic Gain Index (score)	19 (2-23)	19 (2-24)	1.00
6 min walk test (m)	471 (99)	489 (97)	0.16
Timed Up and Go (s)	7.9 (1.8)	7.6 (2.1)	0.73
25 ft walk test (s)	4.9 (0.8)	4.8 (0.7)	0.86
9 Hole Peg (s)	23 (6)	21 (4)	0.22
PASAT	42 (10)	42 (21)	0.93

Wilcoxon Signed Rank are Median (Range)
Paired T Tests are Mean (SD)

To date N = 7

Ng et. al. unpublished

Summary and Limitations

- Initial pilot results seem to be largely confirmed.
- Baseline effects or bimodal disability distributions can affect interpretation.
- Power remains an issue.
- Only low to moderate exercise intensities investigated.

Conclusions

- Partnered social dance (aka ballroom) can be a fun physical activity that contributes to a active wellness promoting lifestyle for persons with MS.
- In addition it may secondarily provide therapeutic symptom relief to those with MS.

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  - MS OptiMStics

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