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

2015 Annual Meeting of the Consortium of Multiple Sclerosis Centers

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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

Wellness

Exercise
Nutrition
Education
Self-Management, Efficacy
Social Support
Social Interaction
Spirituality

MS

↑

↓
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

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

• Stroke and TBI

• 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

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

<table>
<thead>
<tr>
<th>Subject Characteristics</th>
<th>MS Dance</th>
<th>MS Control</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>7 (6F, 1M)</td>
<td>6 (6F)</td>
<td></td>
</tr>
<tr>
<td>Age (yr)</td>
<td>46 (9)</td>
<td>49 (8)</td>
<td>0.53</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>167 (10)</td>
<td>163 (9)</td>
<td>0.76</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>72.2 (23.3)</td>
<td>67.4 (19.0)</td>
<td>0.79</td>
</tr>
<tr>
<td>EDSS</td>
<td>2 (2)</td>
<td>3 (3)</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Dance Group  1 required walker for distance, 1 used cane

Partners
Abilities and Disabilities
Fatigue
Temperature
H₂O
Access and Parking
Partnered Dance as Exercise

Partnered Social Dance as Exercise!

Low to mod intensity based on ACSM guidelines

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

Ng et. al. unpublished
Complete Data Set N=7

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

\(N = 7\) Wilcoxon Signed Rank \(Md\) (range) Ng et. al. unpublished

“Outlier” Removed \(N = 6\)

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

Wilcoxon Signed Rank \(Md\) (range) Ng et. al. unpublished
No Change in Control Group

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre-Dance</th>
<th>Post-Dance</th>
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</tr>
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<tbody>
<tr>
<td>PROMIS Global Health</td>
<td>41 (36, 50)</td>
<td>39 (35, 50)</td>
<td>0.41</td>
</tr>
<tr>
<td>MS Self Efficacy-Control</td>
<td>765 (510, 850)</td>
<td>745 (470, 890)</td>
<td>0.89</td>
</tr>
<tr>
<td>MS Self Efficacy-Function</td>
<td>855 (640, 900)</td>
<td>830 (690, 900)</td>
<td>0.34</td>
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<tr>
<td>MS Exercise Self Efficacy</td>
<td>67 (55, 98)</td>
<td>66 (49,95)</td>
<td>0.75</td>
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<tr>
<td>Fatigue Impact Scale</td>
<td>19 (0, 90)</td>
<td>26 (0, 91)</td>
<td>0.23</td>
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<tr>
<td>Beck Depression Inventory</td>
<td>4 (0, 8)</td>
<td>4 (0, 19)</td>
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N = 6   Control

Ng et. al. unpublished
**Complete Data Set**

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

N = 7 Wilcoxon Signed Rank Md (range)

Ng et. al. unpublished

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**“Outlier” Removed**

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<td>20 (13, 23)</td>
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<td>0.11</td>
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<td>Timed Up and Go (s)</td>
<td>10.3 (8.9, 15.3)</td>
<td>10.1 (7.3, 13.0)</td>
<td>0.08</td>
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<tr>
<td>9 Hole Peg (s)</td>
<td>21.6 (17.8, 30.5)</td>
<td>20.8 (18.6, 29.0)</td>
<td>0.35</td>
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<td>25 ft walk (s)</td>
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<td>4.9 (4.3, 7.3)</td>
<td>0.53</td>
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<td>49 (31, 55)</td>
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<td>0.03</td>
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<td>HR variability (ms)</td>
<td>38 (20, 45)</td>
<td>45 (21, 57)</td>
<td>0.03</td>
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No Change in Control Group

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

\( N = 6 \) 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)

Representative Dance Menu

• Push Pull
• Waltz
• Foxtrot
• Rumba
• Swing (including triple time)
• Salsa
• Tango (American or ballroom)
• Merengue

Wings
Nocturne (Celtic Woman)
Cheek to cheek
Need you now
Hit the Road Jack, Club Savoy, Rockin’ Louie
Guantanamera
Hernando’s Hideaway, Grand Guignol
Suavamente
Additional Pre- Post-Measurements

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

Select Preliminary Results-Dance

<table>
<thead>
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<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berg Balance (score)</td>
<td>54 (35-56)</td>
<td>54 (39-56)</td>
<td>0.41</td>
</tr>
<tr>
<td>Dynamic Gain Index (score)</td>
<td>20 (1-24)</td>
<td>23 (9-24)</td>
<td>0.02</td>
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<tr>
<td>6 min walk test (m)</td>
<td>456 (124)</td>
<td>492 (126)</td>
<td>0.002</td>
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<tr>
<td>Timed Up and Go (s)</td>
<td>10.4 (3.8)</td>
<td>8.9 (4.4)</td>
<td>0.003</td>
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<tr>
<td>25 ft walk test (s)</td>
<td>6.1 (2.5)</td>
<td>5.8 (2.6)</td>
<td>0.08</td>
</tr>
<tr>
<td>9 Hole Peg (s)</td>
<td>23 (2)</td>
<td>21 (2)</td>
<td>0.04</td>
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<tr>
<td>PASAT</td>
<td>43 (13)</td>
<td>48 (11)</td>
<td>0.05</td>
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<tr>
<td>HR variability (ms)</td>
<td>0.032 (.018)</td>
<td>0.037 (.003)</td>
<td>0.036</td>
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Wilcoxon Signed Rank are Median (Range)
Paired T Tests are Mean (SD)
To date N = 12

Ng et. al. unpublished
## Select Preliminary Results - Control

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Berg Balance (score)</td>
<td>51 (42-56)</td>
<td>50 (50-56)</td>
<td>0.71</td>
</tr>
<tr>
<td>Dynamic Gain Index (score)</td>
<td>19 (2-23)</td>
<td>19 (2-24)</td>
<td>1.00</td>
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<tr>
<td>6 min walk test (m)</td>
<td>471 (99)</td>
<td>489 (97)</td>
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<tr>
<td>Timed Up and Go (s)</td>
<td>7.9 (1.8)</td>
<td>7.6 (2.1)</td>
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<tr>
<td>25 ft walk test (s)</td>
<td>4.9 (0.8)</td>
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<td>9 Hole Peg (s)</td>
<td>23 (6)</td>
<td>21 (4)</td>
<td>0.22</td>
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<tr>
<td>PASAT</td>
<td>42 (10)</td>
<td>42 (21)</td>
<td>0.93</td>
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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.

Acknowledgements

• Marquette University
  • Pamela Landin, MS
  • Jimin Suh
  • Tyler Gregory
  • Sheri Bunyan, PT
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