Yoga in Parkinson Disease - What is the Evidence Telling Us?

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- South West PADRECC Director
- West Los Angeles VA Medical Center
Complementary/Alternative Medicine

“I have to say I had a different impression of what Reiki is all about.”
What is Yoga?
What is Yoga?

• Started being practiced 5000 years ago, part of the ayurvedic healing science

• 2016 yoga journal 36.7million Americans practicing yoga (16.8 billion $/year spent in this industry)

• Many studies on cancer, blood pressure, cholesterol reduction, mood, osteoporosis, pulmonary vital capacity

• Some evidence to support use in epilepsy, stroke prevention, cognitive state, multiple sclerosis

• Improvement in fatigue, seizure control, stress, mood, sleep, pain, mobility, problem solving
Can it be a lifelong practice?

YESS Study at UCLA Geriatrics-
George Salem PhD and Gail Greendale MD
Why Does Yoga Make Sense as Rx?
Why Yoga in Parkinson Disease?

• Breathing, meditative aspects sets it apart from other exercises and standard Physical Therapy

• Can use visual cues to help coordinate movement

• Can use props to get the experience of the full movement safely - can then take these supports away as we progress; really can modify

• Yoga teacher can give hands-on adjustment to help with proper alignment

• Focus on one aspect of a pose at a time to bring attention to the body in the present moment
PD-Hoehn & Yahr Stages

Stage I
Stage II
Stage III
Stage IV
Stage V
Non-motor symptoms

- Mood: anxiety, depression
- Cognition: memory
- Apathy: lack of motivation
- Sleep
- Autonomic Nervous System Dysfunction – blood pressure regulation, dizziness when standing up
- Constipation
Review of Yoga PD Studies 2014 - Roland

• 2014 review on evidence of yoga and PD
• 7 articles; 1 was a Randomized Control Trial (yoga vs waitlist control); 3 were group pretest/post-test; 3 were case studies
### Table 1: Literature search study characteristics

<table>
<thead>
<tr>
<th>Study</th>
<th>N (F:M)</th>
<th>Age, years</th>
<th>PD dur, years</th>
<th>Yoga style</th>
<th>Design</th>
<th>Duration, min</th>
<th>Freq/ week</th>
<th>Length, weeks</th>
<th>All outcomes measured</th>
<th>Significant improvements following yoga</th>
<th>DB/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colgrove et al.</td>
<td>13 (7)</td>
<td>68.1</td>
<td>3.56</td>
<td>Iyengar</td>
<td>RCT</td>
<td>60</td>
<td>2</td>
<td>12</td>
<td>UPDRS, BBS, ROM, maximum isometric force, posture, gait</td>
<td>UPDRS, BBS, ROM, maximum isometric force</td>
<td>1.65</td>
</tr>
<tr>
<td>Bougarrides et al.</td>
<td>10 (3)</td>
<td>65</td>
<td>n/a</td>
<td>Ananda, restorative hatha</td>
<td>Prepost</td>
<td>60</td>
<td>1</td>
<td>10</td>
<td>UPDRS, HADS, DGI, BBS, FRT, chair stand</td>
<td>HADS, FRT, chair stand</td>
<td>13</td>
</tr>
<tr>
<td>Lee</td>
<td>17 (7)</td>
<td>72</td>
<td>n/a</td>
<td>Iyengar</td>
<td>Prepost</td>
<td>60</td>
<td>2</td>
<td>10</td>
<td>Gait speed, SPPB, BBS, FES, BBS, FRT, tandem stance, single-leg stance, gait, chair stand, GDS, FOF, PDQ-39</td>
<td>Gait speed SPPB, BBS, FES FRT, chair stand, GDS</td>
<td>12.5</td>
</tr>
<tr>
<td>Scott et al.</td>
<td>9 (2)</td>
<td>67.8</td>
<td>4.67</td>
<td>Hatha</td>
<td>Prepost</td>
<td>75</td>
<td>2</td>
<td>12</td>
<td>ROM, BBS, TUG, PDQ-39</td>
<td>TUG, BBS</td>
<td>9.5</td>
</tr>
<tr>
<td>Hall et al.</td>
<td>1 (1)</td>
<td>69</td>
<td>8</td>
<td>Hatha</td>
<td>Case</td>
<td>60</td>
<td>1</td>
<td>8</td>
<td>Breath, vocal, face, gait, rest PDQ-39, HiMAT, flexibility, strength, posture, LOS</td>
<td>Breath, vocal, face, gait, rest PDQ-39, HiMAT, flexibility, strength</td>
<td>8</td>
</tr>
<tr>
<td>Taylor</td>
<td>1 (1)</td>
<td>59</td>
<td>10</td>
<td>Hatha</td>
<td>Case</td>
<td>n/a</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Moriello et al.</td>
<td>1 (0)</td>
<td>57</td>
<td>2</td>
<td>Hatha</td>
<td>Case</td>
<td>90</td>
<td>1</td>
<td>24</td>
<td></td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

**Abbreviations:** BBS, Berg Balance Scale; DB, Down and Black Checklist; DGI, Dynamic Gait Index; dur, duration; F, females; FES, Falls Efficacy Scale; FOF, fear of falling; freq, frequency; FRT, Functional Reach Test; GDS, Geriatric Depression Scale; HADS, Hospital Anxiety and Depression Scale; HiMAT, High Level Mobility Assessment Tool; LOS, limits of stability; min, minutes; n/a, not available; PD, Parkinson’s disease; PD dur, duration since PD diagnosis; PDQ-39, Parkinson’s Disease questionnaire-39; RCT, randomized controlled trial; pre-post, pretest-posttest design; ROM, range of motion; SPPB, Short Physical Performance Battery; TUG, Timed Up and Go; UPDRS, United Parkinson’s Disease Rating Scale.
Some evidence to show improvement in:

- Mobility (Sit to Stand test, UPDRS, Timed up and go)
- Balance (Berg BS, Falls efficacy scale)
- Strength
- Flexibility/Range of Motion
- Fear of falling
- Quality of Life
- Depression (GAD, HADS)
- Sleep
Yoga Versus Resistance Training in Mild to Moderate Severity Parkinson’s Disease: A 12-Week Pilot Study

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¹Department of Neurology, Northwestern University, Feinberg School of Medicine, Chicago, USA
²Department of Physical Therapy, Northwestern University, Feinberg School of Medicine, Chicago, USA
³Northwestern Institute for Public Health and Medicine, Northwestern University Feinberg School of Medicine, Chicago, USA

Abstract

Background: Yoga is a mind-body intervention which may address the motor and non-motor needs of patients with Parkinson’s disease (PD).

Objective: Explore the safety and feasibility of a 12-week biweekly course of iyengar yoga in patients with PD, and collect pilot data on efficacy compared to resistance exercise.

Method: Prospective randomized controlled single blinded study in patients with mild to moderate PD. Participants selected an urban or suburban site, and was randomized 1:1 to yoga or resistance classes.

Results: 17 participants were enrolled. Mean age 67.3 (SD 9.8) years, and mean UPDRS III score was 24.2 (SD 7.0). There were 3 withdrawals unrelated to the intervention. There were no major adverse events. 16% of yoga classes were missed compared to 8% of resistance classes (p=0.04). Significantly more classes were missed at the urban site (14.8% vs. 7.5%). Both groups improved on mean TUG time, UPDRS score, and PDQ-39 score compared to baseline, although the between-group differences were not statistically significant.

Conclusion: Attendance for yoga classes was inferior to resistance classes. Improvements in both motor and non-motor outcome measures need to be replicated with a larger study. Feasibility data will need to be taken into account in designing such a study.
Controlled pilot study of the effects of power yoga in Parkinson’s disease

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\textsuperscript{a} Laboratory of Neuromuscular Research and Active Aging, University of Miami, Coral Gables, FL, United States
\textsuperscript{b} Green Monkey Yoga, Miami, FL, United States

\textbf{A B S T R A C T}

Objectives: To evaluate the effects of a specially designed power yoga program (YOGA) on bradykinesia, rigidity, muscular performance and quality of life in older patients with PD.

Design: Randomized controlled trial.

Setting: University laboratory, US.

Intervention: Twenty-six patients with mild to moderate PD were randomly assigned to a YOGA or control group (CON). The YOGA program was three months, incorporating two sessions/week of yoga classes.

Main outcome measures: Upper and lower limb bradykinesia and rigidity scores from the Unified Parkinson's Disease Rating Scale, one repetition maximums (1RM) and peak powers on biceps curl, chest press, leg press, hip abduction and seated calf, and quality of life (PDQ-39).

Results: The YOGA group produced significant improvement in both upper and lower limbs bradykinesia scores, rigidity score, 1RM for all 5 machines and leg press power (p < 0.05). Significant improvements were seen in the PDQ-39 overall score, mobility and activities of daily living domain for the YOGA group.

Conclusion: The 3-month YOGA program significantly reduced bradykinesia and rigidity, and increased muscle strength and power in older patients with PD. Power training is an effective training modality to improve physical function and quality of life for PD.
Table 1
Participant characteristics. Data was presented as mean (SD).

<table>
<thead>
<tr>
<th>Variable</th>
<th>YOGA (n = 15)</th>
<th>CON (n = 12)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>71.2 (6.5)</td>
<td>74.9 (8.3)</td>
<td>.25</td>
</tr>
<tr>
<td>Gender (male/female)</td>
<td>11/4</td>
<td>6/6</td>
<td>.071</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.73 (0.08)</td>
<td>1.64 (0.10)</td>
<td>.029</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>75.1 (11.9)</td>
<td>71.5 (13.4)</td>
<td>.51</td>
</tr>
<tr>
<td>Disease duration (y)</td>
<td>6.9 (6.3)</td>
<td>5.9 (6.2)</td>
<td>.71</td>
</tr>
<tr>
<td>H &amp; Y stage</td>
<td>2.2 (7)</td>
<td>2.1 (7)</td>
<td>.67</td>
</tr>
<tr>
<td>Exercise (h/week)</td>
<td>3.6 (2.8)</td>
<td>3.3 (3.2)</td>
<td>.81</td>
</tr>
<tr>
<td>Taking sinemet as a single mediation</td>
<td>5</td>
<td>4</td>
<td>.89</td>
</tr>
<tr>
<td>Taking sinemet with other PD medications</td>
<td>10</td>
<td>8</td>
<td>.74</td>
</tr>
</tbody>
</table>

Baseline differences were analyzed using t-test for independent samples. H & Y = Hoehn & Yahr.
* Significant different from the CON group.

Changes at the post-test

<table>
<thead>
<tr>
<th>Variable</th>
<th>YOGA (n = 13)</th>
<th>CON (n = 10)</th>
<th>Treatment effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility (10)</td>
<td>-5.6 (-10.0, -1.2)*</td>
<td>1.1 (-3.0, 5.1)</td>
<td>-6.7 (-12.5, -9)</td>
</tr>
<tr>
<td>ADL (6)</td>
<td>-1.4 (-3.5, -0.7)</td>
<td>1.2 (-3.2, 2.1)</td>
<td>-2.6 (-5.0, -2)</td>
</tr>
<tr>
<td>Emotional well-being (6)</td>
<td>-1.2 (-3.2, 2.9)</td>
<td>0.6 (-7.1, 1.8)</td>
<td>-1.8 (-4.3, 0.8)</td>
</tr>
<tr>
<td>Stigma (4)</td>
<td>-1.3 (-2.9, 2.2)</td>
<td>0.5 (-3.1, 3.1)</td>
<td>-1.8 (-3.6, 0.2)</td>
</tr>
<tr>
<td>Social support (3)</td>
<td>0.1 (-8.9)</td>
<td>-1 (-9.9)</td>
<td>-0.5 (-18.7)</td>
</tr>
<tr>
<td>Cognitive impairment (4)</td>
<td>-0.5 (-3.4, 1.0)</td>
<td>0.1 (-9.1, 1.0)</td>
<td>-5 (-17, -7)</td>
</tr>
<tr>
<td>Communication (3)</td>
<td>1.0 (-2.2, 2.2)</td>
<td>0.1 (-12.1, 1.0)</td>
<td>-5 (-17, -7)</td>
</tr>
<tr>
<td>Bodily discomfort (3)</td>
<td>-0.7 (-2.2, 1.8)</td>
<td>0.7 (-7.2, 1.8)</td>
<td>-1.4 (-3.4, 0.6)</td>
</tr>
<tr>
<td>Sum</td>
<td>-11.5 (-22.7, -4.4)*</td>
<td>5.2 (-1.3, 11.7)</td>
<td>-16.7 (-29.1, -4.4)</td>
</tr>
</tbody>
</table>

Treatment effects, Effect sizes, P

<table>
<thead>
<tr>
<th>Mean (95% CI)</th>
<th>g (95% CI)</th>
<th>Adjusted P</th>
</tr>
</thead>
<tbody>
<tr>
<td>-6.7 (-12.5, -9)</td>
<td>-0.82 (-1.65, -0.01)</td>
<td>.025*</td>
</tr>
<tr>
<td>-1.8 (-4.3, 0.8)</td>
<td>-0.46 (-1.17, -0.34)</td>
<td>.035*</td>
</tr>
<tr>
<td>-1.8 (-3.6, 0.2)</td>
<td>-0.57 (-1.18, -0.24)</td>
<td>.052</td>
</tr>
<tr>
<td>0.1 (-8.9)</td>
<td>-0.0 (-8, 0)</td>
<td>.385</td>
</tr>
<tr>
<td>-0.5 (-18.7)</td>
<td>-0.18 (-0.98, 0.62)</td>
<td>.431</td>
</tr>
<tr>
<td>-0.5 (-17, -7)</td>
<td>-0.35 (-1.15, 0.46)</td>
<td>.257</td>
</tr>
<tr>
<td>-1.4 (-3.4, 0.6)</td>
<td>-0.46 (-1.17, -0.34)</td>
<td>.161</td>
</tr>
<tr>
<td>-16.7 (-29.1, -4.4)</td>
<td>-0.70 (-1.52, 0.013)</td>
<td>.016*</td>
</tr>
</tbody>
</table>

* P < .05, are adjusted for baseline values based on ANCOVA.

Therapeutic yoga improves balance and balance confidence in Parkinson’s disease

F. Revilla, K. Woschkolup, A.A. Walter, B.L. Hawkins, E. Urrea-Mendoza, A.A. Schmid, J. Park, J. Sharp, M. VanPuyymbroeck (Greenville, SC, USA)

Meeting: 20th International Congress

Abstract Number: 1950
Methods: To be included in this randomized controlled trial, individuals had to have a diagnosis of PD with a rating of 1.5-4 on the Modified Hoehn and Yahr Scale; endorsement of FoF, able to stand and walk 10 meters with or without an assistive device; >18 years old; able to speak English; score >4 out of 6 on the short Mini Mental Status Exam. Individuals were randomized into the experimental group or the wait list control (WLC). The intervention was an 8-week progressively difficult therapeutic yoga intervention, developed by yoga therapist for this population to focus on improving balance and reducing fear of falling. The UPDRS-motor was used to measure motor function. The Mini-BESTest measured four balance control systems, and the Functional Gait Assessment assessed postural stability. Fear of falling was measured with the Activity Balance Confidence (ABC) questionnaire.

Results: Twenty-three individuals completed the study. The UPDRS-motor scores improved significantly for individuals in the experimental group (t=2.727, p<.05), as did the Mini BESTest (t=-7.201, p=.000), the FGA (t=-9.699, p=.000), and the ABC (t=-2.983, p=.007). For the WLC, there were not significant changes in the UPDRS, FGA, or the ABC; however, there was a significant improvement in the Mini BESTest (t=-4.83, p=.001).

Conclusions: An 8-week therapeutic yoga intervention was successful in improvement balance and balance confidence for individuals with PD. Yoga is a viable tool to improve motor function and well-being in this population.
Goals of future studies

• Get a better sense of which poses would benefit PD
• Educate yoga teachers about PD to help them empower patients to exercise and stay motivated safely
• Develop a sense of the disease symptoms/stages and who to include in classes—many studies have included H+Y stg 1-4—too easy for some and often the teacher teaches to the most disabled person in the room
• Identify better ways to blind studies/what controls should be used? (social aspects of the class are tremendous)
• Improve portability of yoga to places easier to reach by PD patients (suburban, remote areas); prevent dropout rates seen in many studies
For yogis, over the last 6 months, PD symptoms have:

- Improved: 54.55%
- Been stable: 30.14%
- Worsened: 15.31%

For non-exercisers, over the last 6 months, PD symptoms have:

- Improved: 6.383%
- Been stable: 46.81%
- Worsened: 46.81%
Objective – To develop and test a biweekly, 12-week yoga program and determine its safety and feasibility for people with Parkinson’s Disease (PD).

Methods – Yoga for PD literature reviews were performed by the lead yoga teacher who designed and developed a draft of a yoga for PD intervention program. The program was reviewed by a group of yoga experts (n = 6) that was made up of physical therapists, registered/certified yoga teachers, a yoga therapist, a yoga researcher, and a PD patient. The yoga expert panel meeting was held at a community center that lasted for 1.5 hours. At the meeting, certain precautions were discussed such as avoiding sequences of poses that would trigger orthostatic hypotension or retropulsion episodes and the importance of teaching careful transitions to and from the poses. The therapeutic value of balancing and standing postures, poses to correct slumped forward posture, and poses encouraging thoracic and hip mobility were also emphasized by the panel.

The intervention program was implemented to 10 individuals with PD, mean age 63 ± 8 (49 – 75).
Results – Through this comprehensive development process, a series of 24 individual hour-long yoga sequences were created. The initial classes focused on foundational yoga postures, basic breathing techniques, and yogic principles of mindfulness, body awareness, and self-compassion. Each class built upon the previous, adding 1-4 new poses each session. The yoga postures gradually increased in difficulty from week to week, progressing to balancing postures, advanced breathing techniques, and poses that encourage thoracic extension and rotation, deep relaxation, and fluidity of movement. The specific yoga postures were chosen in order to address concerns unique to the PD population, such as thorax/spine/hip flexibility, balance, movement initiation, respiratory capacity, relaxation, etc. The sequence encouraged the use of yoga props (bolsters, blankets, blocks, chairs, etc.) to help improve stability, safety, and comfort within the poses. To accommodate a wide variety of physical abilities within the subject pool, modifications to the traditional yoga postures (such as seated versions of standing poses) were also included in order to address the specific needs of each individual student. The yoga for PD intervention program began in April, 2016, results on safety and feasibility will be analyzed in June, 2016.
Focus on Four main aspects of PD

• 1. Upper body - bent neck, shoulders, stooping
• 2. Lower body - stiff upper legs/hips
• 3. Balance
• 4. Anxiety/Depression
Focus on 3 stages of disease for these 4 symptom groups

• 1. Early/new diagnosis - mild symptoms; may have some denial, anxiety around new diagnosis, but can physically do a lot of poses, Range of motion

• 2. Mid stage - may start to need some modifications around increasing stiffness/slowness, decreasing range of motion, starting to get balance issues

• 3. Advanced stage - increased balance issues to the point where largely in a chair, need help to get up and down, off the floor, out of chair etc.
Short-term Goal

• Build sequences that are very precisely taught, safe, very clear use of props for all 12 categories

• Make these sequences reproducible across teachers

• Produce an illustrated yoga manual that can be used to train teachers in a systematic way who are interested in working with PD patients

• Use drawings, photographs of muscles involved, props and videos of poses and how to teach them using clear instructions
RESTORATIVE POSES

VIPARITA KARANI  LEGS-UP-THE-WALL POSE

Relax the body in Viparita Karani. This pose gently extends the back to balance the muscles that were stretched in the forward bends. It is also a mild inversion, with beneficial effects on the cardiovascular system, including a temporary lowering of heart rate and blood pressure.

Place a block between the wall and the bolster and then tilt the pelvis onto the block, with the small of the back draped over the bolster. Use a blanket under the head to keep the neck slightly flexed. Let the arms fall out to the sides with the palms facing up.

You can also use a chair variation for this pose, placing the knees slightly higher than the pelvis. Placing the hips release the hamstrings. Flexing the hips releases the lower back and the shoulders stay in the pose for five minutes or more to prepare for Savasana.

SAVASANA  CORPSE POSE

Alternatively place a block in the region of the shoulder blades to passively stretch the intercostal muscles and expand the chest. Avoid extending the neck as this tightens the throat and can harm the cervical spine region. Instead use a block under the head to gently flex the neck.

This image illustrates the interaction of the blocks and proper placement under the body.

Allow the feet to fall out to the sides and the palms to turn upward. Close the eyes and rest in Savasana for five to ten minutes to complete your practice.

#WPC2016 @worldpdcongress
Teacher Trainings

• A weekend session that would use the manual to teach yoga teachers about our method of yoga for PD

• Instruction would include Disease state background, overview of medications, current treatments

• Yoga from the perspective of PD patient

• Precise instruction on the 12 categories and how to teach and modify poses for advancing disease safely

• Recruitment of students for this training would be near larger PD medical clinics and may include physical therapists also trained in yoga
Yoga is highlighted in April/May. Yoga combines physical postures with breathing practices to improve the mind-body-breath connection. Through this practice, people living with Parkinson's may experience benefits in mobility, balance, strength, flexibility, mood and sleep. Yoga may also improve the thinking patterns and processes in our brains to make our movements more efficient and effective.

**WATCH**

An introduction to this month's main exercise and concepts.

**INTERVIEW WITH RICHARD ROSEN**

**INTERVIEW WITH INDU SUBRAMANIAN**

**INTERVIEW WITH VICKIE BELL**
Yoga Videos

**LEARN**
Follow instructional videos to learn the proper movements and prevent injury.

- **PRANAYAMA**
  - Count the Length of Exhalations and try to Extend It

- **YOGA SEQUENCE FOR NECK AND SH...**

- **YOGA SEQUENCE FOR HIP AND LEG ...**

**READ**
Experts deliver substance behind the exercise.

- **YOGA IN PARKINSON'S DISEASE**
- **MEET OUR YOGA TEAM**
Hip/Leg Stiffness

Follow instructional videos to learn the proper movements and prevent injury.

Yoga Sequence for Hip Leg Stiffness

Modified Triangle Pose

Watch on www.youtube.com

Yoga in Parkinson's Disease

Meet Our Yoga Team

#WPC2016 @worldpdcongress
Neck/Shoulder Tightness

Follow instructional videos to learn the proper movements and prevent injury.

YOGA IN PARKINSON'S DISEASE

MEET OUR YOGA TEAM
Modified Corpse Pose - opens shoulders