

**Pilates Method Alliance  
12th Annual Meeting  
Research Platform Presentations  
Chair: Sherri R. Betz, PT, GCS, PMA®-CPT  
Thursday, November 8, 2012  
4:00-6:00pm  
Las Vegas, NV**

- 1. Lawrence P. Cahalin PhD, PT, CCS**  
*University of Miami, Miami, FL*
- 2. Risa Sheppard, PMA®-CPT**  
*Sheppard Method Pilates, Los Angeles, CA*
- 3. Karyn Staples, PT, PhD, OCS, PMA®-CPT**  
*ProHealth Physical Therapy & Pilates, Atlanta, GA*
- 4. Anne Bishop, EdM, PMA®-CPT**  
*Masters Mind, Brain & Education, Petaluma, CA*
- 5. Peggy Roller, PhD, PT**  
*California State University, Northridge*
- 6. Brent Anderson, PhD, PT, OCS, PMA®-CPT**  
*Polestar Pilates, Miami, FL*
- 7. Sherri Betz, PT, GCS, PMA®-CPT**  
*TheraPilates® Physical Therapy, Santa Cruz, CA*

## **Research 101 - Interpreting & Developing Pilates Research for the Clinician Interested in Best Practice**

***Lawrence P. Cahalin PhD, PT, CCS***

Research in Pilates is growing and is providing a better understanding of best practice and preferred methods to manage health and disease. The purpose of this presentation is to provide the clinician with a basic to intermediate overview of interpreting research findings using published literature examining the effects of Pilates. Basic to intermediate statistics will be presented to help clinicians understand the growing Pilates literature. A brief overview of research designs will also be provided from which a template to gather data from multiple Pilates centers will be outlined. At the end of the presentation the participant will understand basic to intermediate research designs and statistics and methods to develop future Pilates research.

**About: Lawrence P. Cahalin PhD, PT, CCS**

**Professor of Clinical Physical Therapy, Department of Physical Therapy, Leonard M. Miller School of Medicine, University of Miami, FL.**

Dr. Cahalin has more than 30 years of experience in physical therapy practice and education and has held faculty positions at Northeastern University, Boston University, and the Massachusetts General Hospital Institute of Health Professions in Massachusetts. He is a Board-Certified Clinical Specialist in Cardiovascular and Pulmonary Physical Therapy. His research is focused on topics related to integrating the interrelatedness of the cardiovascular, pulmonary, and muscular systems using novel examination and management techniques. He has co-edited 2 textbooks, 28 book chapters, and 72 peer-reviewed manuscripts. He is *Associate Editor of Physiotherapy Theory and Practice*, and serves on the Editorial Board of *Cardiopulmonary Physical Therapy Journal*.

Dr. Cahalin earned his doctoral degree in Gerontology from the University of Massachusetts, Boston; his Master's degree from the University of Iowa; and his Physical therapy degree from Saint Louis University.

# THE EFFECTS OF PILATES EXERCISES ON BRAIN INJURY AND ITS REHABILITATION

**AUTHOR:** Risa Sheppard, PMA®-CPT, Sheppard Method Pilates Studio, Los Angeles, California, USA [risa@sheppardmethod.com](mailto:risa@sheppardmethod.com)

**STUDY DESIGN:** A single-Subject AB Research Design was chosen to determine the effects of Pilates treatment on a young stroke victim.

**OBJECTIVE:** To establish the criteria and potential for Pilates exercises to help in the treatment for brain injury, and to help renew muscular memory, strength, and movement to the effected areas of the subject.

**BACKGROUND:** Results from a massive stem cell stroke on a 26-year old victim who was not expected to live or fully recover. 60% of her cerebellum was removed leaving her right side considerably weaker. Subject had to learn to speak, eat, walk, and regain control of her motor skills. Her face was paralyzed and her speech impaired, as well as her vision and hearing.

**METHODS:** Subject was chosen after three years of intensive physical therapy, which was eventually discontinued. Subject participated in a 6-week intervention phase. Basic Pilates Exercises along with mental imaging of subject envisioning, remembering and concentrating on the correct feeling in her limbs as they perform the Pilates exercise.

**ANALYSIS:** Repetition of movement with mental and visual exercise cues to rehabilitate the injured areas. Repeated Reformer and Cadillac exercises utilized with hands on cueing to assist the neuronal activity to recall and execute precise movements. Her gradual changes in movement during Basic Pilates Exercises improved over other forms of rehabilitation. Her mental acuity corresponds to her particular physical abilities.

**RESULTS:** Subject has experienced increased range and stability of motion particularly on her right side, due to specifically targeted Basic Pilates Exercises. Shoulder stability, which was decreased due to atrophy, has greatly increased. Subject had less disability at the end of the 6-week intervention. Motor skills in the right portion of her body were greatly enhanced. She also showed more stability in movement of leg and arm.

**CONCLUSIONS:** Study shows that the subject of brain injury and stroke benefited from specifically targeted Pilates exercises, as an effective tool for rehabilitation, increasing core strength and alignment.

**FUNDING SOURCE:** None

## **EFFECT OF PERFORMING PILATES WITH CHILDREN DIAGNOSED WITH ADHD AND/OR SENSORY INTEGRATION DISORDER**

**AUTHOR:** Karyn Staples, PT, PhD, OCS, PMA®-CPT; Polestar Pilates Educator  
ProHealth Physical Therapy and Pilates Studio, Peachtree City, GA, USA

**BACKGROUND:** One theory of why children have sensory processing issues is that they missed a stage in development from birth; from supine to prone to sitting to crawling to standing/walking. In planning a Pilates workout the progression of exercises follows the same order as development. Thus came the idea that perhaps pilates based mat exercises may have a positive impact on children with ADHD and/or sensory integration disorder.

**OBJECTIVE:** The aim of the study was to investigate the effect of performing a mat-based Pilates program on infantile reflex habituation in children diagnosed with ADHD and/or sensory integration disorder.

**METHODS:** Thirteen children were recruited through word of mouth and two pediatric outpatient occupational therapy clinics in the suburban area. The children had a confirmed diagnosis of in spectrum ADHD and/or sensory integration disorder from a medical physician. The pre and post testing was performed by the same licensed occupational therapist using the Goddard Reflex Test. The children met for thirty minutes, two times a week for six weeks under the direction of a Pilates instructor using the same sequence and exercise format for each class session.

**RESULTS:** Average age of the participants was 9 years, average number of sessions attended was 8, and the average change on the Goddard Reflex Test was 4 points.

**CONCLUSION:** The mat-based Pilates program was effective to decrease the score on the Goddard Reflex Test pre to post test denoting an improvement in infantile reflex integration.

## CONNECTING BRAIN SCIENCE WITH PILATES TEACHING & PRACTICE

**AUTHOR:** Anne Bishop, EdM, Harvard Graduate School of Education & Body Brain Connect, Cambridge, MA, USA [acb021@mail.harvard.edu](mailto:acb021@mail.harvard.edu)

**PURPOSE:** The major reason for developing this new program is to fill the knowledge gap of the body brain connection in Pilates education. The new method pushes teachers to think beyond muscular skeletal imbalances and incorporate basic brain science principles and ongoing research so teachers think about clients from a mind, body and brain perspective.

**FOUNDATION:** The program is based on Mind, Brain and Education (MBE) theory. The MBE approach intertwines research from the disciplines of cognitive science, neuroscience, psychology and human development to improve educational outcomes. The program extends the MBE philosophy to the field of Pilates and other health and wellness professions. It reviews sound research, about how the brain perceives and creates action, and gleans best practices for Pilates and health and wellness professionals.

**DESCRIPTION:** Program methods included literature reviews, master's level education neuroscience courses and researcher interviews culminating in a Mind, Brain, and Education Master's thesis and curriculum developed at Harvard Graduate School of Education in 2011. In 2012, the curriculum was taught internationally to Pilates, Yoga and Physical Therapy practitioners.

The program aligns cues to enhance the neural networks responsible for creating action. Four prominent forms of cueing: visual, imagery, verbal, and touch cues are covered. For example, visual cues tap into the mirror neuron system. The mirror neuron system helps Pilates students imitate teacher demonstrations. However, mirror neurons react better under certain conditions. Specifically, mirror neurons are more robustly activated when the goal of the movement is clear (Gazzaniga, 2009) and when students observe the movement in first-person perspective versus third-person perspective (Jackson et al, 2006).

**OBSERVATIONS:** Formal assessments and responses received from Pilates, Yoga, and Physical Therapists range from validation of some intuitive cueing techniques to responding they never considered such cue options. Course participants self-reported increased confidence in teaching abilities and cueing adaptability. Students who received cue adaptations anecdotally displayed quicker learning times and greater transfer to contexts outside the studio.

**CONCLUSIONS:** Significance for this work is threefold: greater professionalism in the Pilates industry, incorporation of evidence-based teaching for Pilates, health and wellness education, and better client-learning outcomes. Future work suggestions follow the established MBE philosophy of reciprocal collaboration between research and practice. Connecting Pilates or Physical Therapy practitioners with researchers can help to improve and offer insights into all professions.

**FUNDING SOURCE:** There is no outside funding source. Potential material gain is attendance fees to workshops where I teach this method.

### REFERENCES:

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- Jackson, P. L., Meltzoff, A. N., & Decety, J. (2006). Neural circuits involved in imitations and perspective taking. *NeuroImage*, 31, 429-439.

# **PILATES-BASED EXERCISE FOR FALL RISK REDUCTION IN OLDER ADULTS: A RANDOMIZED CONTROLLED TRIAL**

**AUTHORS:** Roller, Margaret<sup>1</sup>; Kachingwe, Aimie<sup>1</sup>; Ickes, Dawn-Marie<sup>1</sup>; Cabot, Allyson<sup>2</sup>; Shrier, Gabrielle<sup>2</sup>; Beling, Janna<sup>1</sup>

**PRESENTER:** Margaret Roller, PhD, PT, California State University, Northridge

**INSTITUTIONS:** 1: California State University, Northridge, CA, Department of Physical Therapy; 2: Core Conditioning, Studio City, CA

**PURPOSE:** The purpose of this study was to investigate the effects of Pilates-based exercise on measures of fall risk including self-efficacy, balance, mobility, and active range of motion (ROM) in adults age 65 and over who are known fallers or at risk for falls.

**SUBJECTS:** 72 (41 experimental, 31 control; 51 female, 21 male; mean age 77 yrs, 65-95 years).

**MATERIALS/METHODS:** Inclusion criteria: A self-reported history of two or more falls or one injurious fall in the past year or a Timed Up and Go (TUG) test of  $\geq 13.5$  seconds suggesting risk for falling, passing scores on the Mini-Mental State Examination (MMSE) and Motor Control Test (MCT) on the NeuroCom Equitest<sup>®</sup>, and absence of neurologic system pathology. Intervention: Experimental group subjects attended ten 45-minute Pilates-based exercise sessions over 10 weeks in a group class format utilizing the Balanced Body<sup>®</sup> Pilates Studio Reformer<sup>®</sup> under the supervision of a physical therapist who is a Gold Certified PMA Pilates Instructor. Control subjects received pre- and post-tests only. Outcome measures: Activities-specific Balance Confidence (ABC) scale, Timed Up-and-Go Test (TUG), Berg Balance Scale (BBS), 10 Meter Walk Test (10MWT), Sensory Organization Test (SOT), Adaptation Test (ADT), and active range of motion (AROM) of ankle dorsiflexion, hip extension and straight-leg raise.

**RESULTS:** Age, gender, height, cognitive status, and number of falls during the past year did not differ between groups at baseline. The experimental group improved significantly at the  $p < 0.05$  level on the following outcomes measures. ABC scores significantly improved from 69.3% to 76.3% indicating decreased fall risk and improved balance confidence, TUG times significantly decreased from 12.4 to 10.5 seconds suggesting reduced fall risk and improved dynamic balance, BBS scores significantly increased from 51.2 to 53.4 out of 56 suggesting reduced risk for falls and improved balance, 10MWT time improved from 9 seconds to 8 seconds demonstrating improved gait velocity, ADT scores significantly improved for toes down perturbations suggesting improved stability during changes in surface conditions, and AROM significantly increased in both legs for straight leg raise, hip extension, and ankle dorsiflexion. SOT composite scores increased significantly in both groups by 6.5 points out of 100 suggesting improved postural stability or learning effect. The control group demonstrated significant change on the SOT only.

**CONCLUSIONS:** Pilates-based exercise performed once per week using the Reformer resulted in significant improvements in balance self-efficacy, measures of static and dynamic balance, gait velocity, functional mobility, sensory organization, active range of motion, and reduced fall risk in adults age 65 over who were known fallers or at risk for falling. The control group demonstrated improved sensory balance function only.

**CLINICAL SIGNIFICANCE:** This study suggests that rehabilitation focusing on Pilates exercise using the Reformer once per week is an effective intervention to improve balance and mobility and decrease fall risk in older adults.

**KEY WORDS:** Pilates, fall risk, older adults

## **TREATING CHRONIC LOW BACK PAIN WITH PILATES AND MANUAL THERAPY**

**AUTHORS:** Christine Borges, SPT, Julia Jones, SPT, Lory Montealegre, SPT, Guillermo Di Novi, SPT

**SUPERVISING FACULTY:** Brent Anderson, PT, PhD, OCS, PMA®-CPT, Lourdes Perez, MSPT

**PRESENTER:** Brent Anderson, PT, PhD, OCS, PMA®-CPT

**INSTITUTIONS:** University of Miami and Polestar Pilates Education

**BACKGROUND AND PURPOSE:** Low back pain is one of the most prevalent diagnoses affecting individuals today and it will affect approximately 80% of people in their lifetime. Although there is evidence supporting manual therapy as well as Pilates in the treatment of back pathology, there is little research to support the use of these treatments in combination. The purpose of this case study is to examine the effects of manual therapy in combination with Pilates-based rehabilitation for the treatment of chronic low back pain.

**CASE DESCRIPTION:** The patient was a 38 year old athletic and active male who presented with a four month history of insidious lumbar pain, lower extremity radiculopathy, and mild foot drop on the right. He was diagnosed with a L4-L5, L5-S1 herniated nucleus pulposus prior to being referred to physical therapy. The patient reported an inability to perform his activities of daily living independently and participate in any physical activities due to pain. Pilates-based rehabilitation and manual therapy were used for treatment. The patient filled out five surveys before the first treatment session, at the 5 week mark, and at the 10 week mark (discharge). The questionnaire's included the Miami Back Index, the Oswestry Low Back Pain Scale, The Functional Self Efficacy scale, the 15 D Health Related Quality of Life Questionnaire (HRQOL), and the Fear Avoidance Beliefs Questionnaire (FABQ).

**OUTCOMES:** After 10 weeks of treatment, the patient showed marked improvement. Lumbar spine range of motion improvements were noted especially in forward bending, right side bending, and right rotation. Manual muscle testing of ankle dorsiflexion on the right showed increased strength. His back pain decreased from a 4-5/10 to a 1-2/10 and his straight leg raise range of motion increased by over 40 degrees. Improvements were also noted in his core control and strength. The patient indicated decreased sleeping difficulties, improved ability to perform his usual daily activities, and decreased discomfort and radiculopathy. He was able to return to his previous social and recreational life.

**DISCUSSION:** Pilates exercise and manual therapy appear to be a good option for the treatment of chronic low back pain. Further research is advised to establish treatment effects for a broader patient population.

# PILATES-BASED EXERCISE FOR ADULTS WITH OSTEOPOROSIS: MULTIPLE CASE REPORT

**AUTHOR:** Betz, Sherri, TheraPilates® Physical Therapy, Santa Cruz, CA info@herapilates.com

**FUNDING:** None

**PURPOSE:** The purpose of this study was to investigate the effects of non-apparatus Pilates-based group exercise in adults and older adults.

**SUBJECTS:** 10 subjects (1 Male, 9 Females); mean age 64 years, age range 60-68 years).

**MATERIALS/METHODS:** Inclusion criteria: Community dwelling adults with the diagnosis of Osteoporosis or Osteopenia, independent with ambulation and transfers to floor. Subjects volunteered to participate in 2x per week 60 minute Pilates-based mat classes for one year taught by a PMA® Certified Pilates Teacher/Polestar Pilates Graduate.

Subjects received the following pre-tests and post-tests at 6 weeks.

<b>Posture/Functional Tests:</b>	<b>AROM:</b>	<b>MMT:</b>
Flexicurve Kyphosis Angle	Horiz Shoulder Abduction	Ankle Dorsi Flexion (Seated)
Occiput-to-Wall Distance	Hip Flexion (Seated)	Knee Extension (Seated)
Rib to Pelvis Distance	Hip Extension (Prone)	Hip Flexion (Seated)
TUG (Timed Up and Go Test)	Hip Abduction (Sidelying)	Hp Abduction (Sidelying)
Single Leg Stance Test (30s)	Knee Flexion (Supine)	Hip Extension (Prone)
Chair Rise Test (30 sec)	Knee Extension (Supine)	Knee Flexion (Prone)
Heel Raise Test (25 reps)	Ankle Plantar Flexion (Supine)	Spine Extension (Prone)
Full Squat	Ankle Dorsi Flexion (Supine)	Core Strength (Supine)
Half Squat		
Marriage Proposal Lunge		
Hip Extension Test		

**RESULTS:** 8 of 10 subjects completed the entire class series. Post-tests at 6 weeks showed improvements in the following areas: Flexicurve Kyphosis Angle improved by 2 points, Occiput-to-Wall Distance and Rib to Pelvis improved by one finger, TUG (Timed Up and Go Test) improved by 1.52 seconds, Single Leg Stance Test (30 sec) significantly improved by 6.43 seconds, Chair Rise Test (30 sec) improved by 1.43 repetitions, Heel Raise Test (25 reps) improved by 4.43 repetitions, Full Squat improved by 2.69 inches, Half Squat improved by 2.46 inches, Marriage Proposal Lunge improved by 5.10 inches and Hip Extension Test improved by .71 MMT Score. AROM and MMT Scores did not change significantly. The most significant changes were seen in balance and leg strength at 6 weeks.

**CONCLUSIONS:** Modified Pilates group exercise two times per week appears to improve balance, posture, leg strength, and functional skills. Pilates-based classes targeting posture, balance and leg strength may be a viable low-cost long-term intervention for older adults to maintain their independence. The program will continue for 1 year with periodic tests and measures at 6 months and one-year. Randomized controlled trials are recommended to compare Pilates-based exercise to other types of exercise and to a control group that does not exercise to further investigate the efficacy of this type of program.

**KEY WORDS:** Pilates-based exercise, Modified Pilates, osteoporosis, balance, older adults