

**Pilates Method Alliance  
13th Annual Meeting  
Research Platform Presentations  
Chair: Sherri R. Betz, PT, GCS, PMA®-CPT  
Thursday October 10, 2013  
4:00-6:00pm  
Fort Lauderdale, FL**

- 1. Karyn Staples, PT, PhD, OCS**  
*ProHealth Physical Therapy & Pilates, Atlanta, GA*
- 2. Anne Bishop, EdM, PMA®-CPT**  
*Masters Mind, Brain & Education, Petaluma, CA*
- 3. Jeanne Masterson, BA, PMA®-CPT**  
*Sport & Spine Therapy of Marin*
- 4. Bob Schroedter, PT, DPT, PMA®-CPT**  
*Movement Through Rehab, Miami, FL*
- 5. Virginia Cowen, PhD**  
*Rutgers University*
- 6. Sherri Betz, PT, GCS, PMA®-CPT**  
*TheraPilates® Physical Therapy, Santa Cruz, CA*
- 7. Lawrence P. Cahalin PhD, PT, CCS**  
*University of Miami, Miami, FL*
- 8. Brent Anderson, PhD, PT, OCS**  
*Polestar Pilates, Miami, FL*

## USE OF PILATES-BASED REHABILITATION AS EARLY INTERVENTION FOLLOWING TOTAL KNEE ARTHROPLASTY (CASE DESIGN)

**AUTHOR:** Karyn Staples, PT, PhD, OCS, PMA-CPT®; ProHealth Physical Therapy & Pilates, Peachtree City, GA [kstaples@phrehab.com](mailto:kstaples@phrehab.com)

**BACKGROUND AND PURPOSE:** This single-subject case design was utilized to present the benefits of using Pilates as the early intervention following total knee arthroplasty.

**CASE DESCRIPTION:** A 64 year old male with prior history of performing Pilates underwent a right total knee arthroplasty procedure. He began rehabilitation utilizing Pilates on day 3 post-operatively for 1 week of daily intervention followed by 3 times a week for 6 weeks. Progress was assessed using goniometric measurements, manual muscle testing, and WOMAC scores (Western Ontario and McMaster Universities Arthritis Index)

**OUTCOMES:** Achieved 5-120 degrees of right knee ROM at end of 1 week of therapy and 0-130 degrees upon discharge, WOMAC scores changed from 67 at first visit of physical therapy to 8 at discharge (MCID is a change of 15), MMT (manual muscle testing) improved from 3-/5 to 5/5 for the quadriceps and 3-/5 to 4+/5 for the hamstrings, no use of assistive device for ambulation, and Timed Up and Go improved by 8 seconds and moved away from fall risk category

**DISCUSSION:** The use of Pilates-based rehabilitation as early intervention following a total knee arthroplasty proved an effective treatment option for this particular patient.

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4. Bachmeier CJ, March LM, Cross MJ, et al. "A comparison of outcomes in osteoarthritis patients undergoing total hip and knee replacement surgery." *Osteoarthritis Cartilage*. 2001; 9(2):137-146.
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## USING VISUAL ENHANCEMENT OF TOUCH (VET) TO IMPROVE MOTOR SKILL LEARNING IN PILATES

**AUTHOR:** Anne Bishop, EdM, PMA®-CPT; Dominican University & Body Brain Connect  
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**PURPOSE:** The major reason for developing the visual enhancement of touch (VET) method is to begin applying brain science and evidence based techniques into movement teaching education including Pilates and Physical Therapy. The new method of utilizing (VET) pushes teachers and or clinicians to think beyond muscular skeletal imbalances and incorporate basic brain science principles to improve motor skill learning in Pilates.

**FOUNDATION:** The program is based on the idea of utilizing multiple sensory sources to improve motor skill learning, specifically vision and touch. Brain research suggests that utilizing VET activates the areas of the brain responsible for sensing and creating action (Serino & Haggard 2008 & 2009). Applying the VET method builds off brain science basics and brings it to practice. Specifically, VET utilizes self and teacher to student touch and while combining vision to piggyback on the biological strengths of the brain to improve motor skill learning.

**DESCRIPTION:** Program methods included a research project conducted by Jeanne Masterson *The Role of Emotion, Vision and Touch in Movement Learning Neuroplasticity and the Mirror Neuron System* at Dominican University, CA. Since statistically significant findings were found in motor skill learning, the VET method has broadened its scope and is used in Pilates and physical therapy. Specifically, VET is used to teach motor skill learning utilized in Pilates such as: Neutral Spine, Transverse Abdominal Engagement, Hip Abductor Engagement, Shoulder Stability

Currently, the VET method is helpful for populations who may not sense his/her bodies including postnatal and post rehabilitation for hip replacements and other surgeries. Possible future applications may include populations with sensory deficits and or stroke populations.

**OBSERVATIONS:** Students or patients using the VET method display quicker motor skill learning. In addition, formal assessments and responses received from Pilates, Yoga, and Physical Therapists include validation of intuitive cuing techniques. Together these two observations demonstrate the strength of the VET method as evidence-based movement teaching and learning. Limitations of this work include patients or students who are unwilling to touch and/or look at their own bodies.

**CONCLUSIONS:** Significance for this work is threefold: greater professionalism in the Pilates industry, incorporation of evidence-based teaching like VET for Pilates, health and wellness education, and better motor skill learning outcomes.

**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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## THE ROLE OF EMOTION, VISION AND TOUCH IN MOVEMENT LEARNING

**AUTHOR:** Jeanne Masterson, BA, PMA®-CPT; Dominican University of California, Sport and Spine Therapy of Marin [Jeanne.Masterson@alumni.dominican.edu](mailto:Jeanne.Masterson@alumni.dominican.edu)

**BACKGROUND & PURPOSE:** Learning motor skills involve perception and action. Therefore with the enhancement of sensory input to the regions of the brain involved in motor processing, learning new motor skills are strengthened. This creates an improved environment for the motor learning process by increasing body awareness, greater potential for elevated physical self confidence, and positive emotional states. Visual enhancement of touch (VET) is one technique used to strengthen this sensory feedback loop. As reported by Cardelini, Longo, Driver and Haggard (2012) VET facilitates processing of tactile events on one's own body by increasing activation of the somatosensory regions of the brain, which are responsible for motor recognition and action. Along with positive emotion, enhancement of touch can play an integral role in effective motor learning. The purpose of the study is to examine whether positive emotional states and enhanced sensory input, may improve motor learning by stimulating the areas of the brain responsible for motor action.

**DESCRIPTION:** During the study three groups of participants were given pretreatment measures of self-efficacy and mood. One group was enrolled in a Pilates class that includes VET and positive emotional priming, the second group attend a regular Pilates class, the third group had no physical task to learn. The groups participating in the Pilates class were tested on their physical skill acquisition rated on a 5 point Likert scale. All participants were surveyed at the start and end of the study as to their physical self-efficacy and mood. It was hypothesized that the group who received both the positive emotional priming and VET will have improved skill acquisition of the Pilates techniques and improved mood and physical self efficacy scores.

**Discussion:** The main hypothesis was supported of improved skill acquisition in both Pilates groups with a significantly greater increase reported in the group who received both VET and positive emotional cuing. The main hypothesis also supported the group receiving VET and positive emotional cuing which demonstrated a significant increase in physical self presentation confidence (PSPC) scores. Together these findings show that VET combined with positive affect can positively influence movement learning.

**CONCLUSION:** Studies such as these are important as they may be applicable to a number of movement practices where improved motor learning is the goal. Environments such as Physical Therapy, sport specific training and general fitness for health may all benefit from utilizing VET and positive emotional priming.

# A PILOT STUDY TO APPLY THE FUNCTIONAL MOVEMENT SCREEN™ TO HIGH-LEVEL MOVEMENT SPECIALISTS

**AUTHOR:** Bob Schroedter, PT, DPT, PMA®-CPT, Movement Through Rehab, Miami Beach, FL, USA [bob@movethrurehab.com](mailto:bob@movethrurehab.com)

**PURPOSE:** The Functional Movement Screen™ (FMS) has been applied in prior research to a variety of other populations like professional, national-level, and collegiate athletes, firefighters and the military. To-date, no one has studied the four population groups outlined for this project. Therefore, the purpose of this pilot study is to:

- 1) Investigate the distribution of FMS scores across small samples of high-level movers defined as experienced Pilates, yoga and **GYROTONIC**® instructors and professional ballet company dancers;
- 2) Compare the per-population distribution of FMS scores to the literature-derived, injury risk cut-off of 14 points;
- 3) Investigate the associated distribution of movement pattern dysfunctions across these samples.

**SUBJECTS:** There is currently a one-year open enrollment for all interested, qualified parties to participate in this pilot study. The inclusion criteria for participants are:

- Pilates, yoga or Gyrotonic instructor, or a professional ballet company dancer;
- Active experience in your respective field of movement for a minimum of 8 years;
- Active participation in your respective movement field for a minimum of 3 days/week.

The exclusion criteria are:

- Cannot currently participate as a patient in a rehabilitation program;
- Cannot have a recent injury (< 6 weeks) preventing you from participating in your respective field of movement.

**METHODS AND MATERIALS:** A convenience sample of participants will be recruited for the period of one year. Video recording of FMS testing will be taken for all participants. Statistical analyses will be performed on each group.

The FMS is a series of seven movement tests designed to rank a person's movement patterns along an ordinal scale (0-3). The FMS is not a diagnostic device and only seeks to capture movement dysfunction and asymmetry.

**ANALYSIS:** Descriptive statistical values will be computed for composite and single-item scores, along with inferential analyses of in-group and between-group differences. Comparisons between all population groups will also be made on a qualitative basis.

**RESULTS:** This is a prospective study, and no data has been collected.

**CONCLUSIONS:** The initial hypothesis is that all population groups will demonstrate a higher distribution of composite scores above the 14-point cut-off as compared to previously studied normative samples. Also, it is hypothesized that amongst all the groups movement pattern dysfunctions for ballet dancers will show the greatest asymmetries within the upright, weight-bearing pod of tests.

This study looks to begin a process of investigation and refinement for groups of movers who traditionally do not receive much attention in terms of functional testing and injury-preventative measures.

**FUNDING SOURCE:** None

# **A COMPARATIVE EFFECTIVENESS PILOT STUDY OF PILATES, YOGA, AND STRETCHING FOR CHRONIC, IDIOPATHIC BACK PAIN**

**AUTHOR:** Virginia Cowen, PhD; Rutgers University Institute for Complementary and Alternative Medicine [virginia.cowen@rutgers.edu](mailto:virginia.cowen@rutgers.edu)

**PURPOSE:** Idiopathic back pain is a complex issue. Abdominal muscle weakness and lack of flexibility of the trunk and hip musculature are often implicated as contributory factors. Standard care options for offer opportunity to address complex or specific needs to relieve pain. Pilates, yoga, and stretching are all routinely recommended. Yet it is unclear whether different benefits would be associated with one approach. The purpose of this pilot study was to compare Pilates matwork to a yoga or stretching protocol for chronic, idiopathic back pain.

**PARTICIPANTS:** A convenience sample of fire department personnel with chronic, idiopathic back pain were recruited for the study. 16 fire department personnel completed the intervention and all assessments in the 12-week study. The majority of the participants were male (81.2% n=13), but the sample included 3 females (18.8%). Participants ranged in age from 21 -58 (mean 43 years.)

**MATERIALS & METHODS:** The pilot study was a quasi-experimental comparative effectiveness study of Pilates, yoga, and stretching. Baseline and follow up assessments including tests for flexibility (trunk flexion), dynamic muscular strength and endurance (push-ups, partial curl-up), strength (back extension), and functional balance (walk test.) The Brief Pain inventory was used to back pain severity and interference with functioning. Participants were randomly assigned to one of three treatment groups: Pilates, yoga, and stretching. . Each was given a 30-minute DVD of an exercise program, a tracking log, and basic instruction on the program. All three videos included exercises in the supine, prone, and standing positions. Participants received instructions in the exercises along with a written instruction sheet. They were asked to use the DVD 4 or 5 times per week for 12 weeks and to keep an exercise diary during the study.

**RESULTS:** Participants performed the exercise DVDs an average of 3.4 times per week over the study period. Significant improvements were observed in trunk flexion, partial curl-up, and back extension for the whole sample, but differences between the three groups were not statistically significant. Improvements were also reported for pain, but none of the pain measures was associated with significant differences between the treatment groups.

**CONCLUSIONS:** While there were overall benefits to the intervention, the lack of significance may have been impacted by random-assignment to treatment group. Assignment of subjects to research groups based on outcomes of the pre-intervention assessments would likely yield more favorable results. Future research should explore patient-centered approach in larger samples.

**FUNDING SOURCE:** PSC-CUNY Research Foundation Grant

## **FUNCTIONAL MOVEMENT ANALYSIS CHANGES FOLLOWING AN 8-WEEK PILATES TRAINING INTERVENTION: CASE REPORTS**

**AUTHORS/INSTITUTIONS:** Sherri Betz PT, GCS, CEEAA, PMA®-CPT, TheraPilates® Physical Therapy, Santa Cruz, CA, Brent D. Anderson PhD, PT, OCS,PMA®-CPT: Polestar Pilates Education, Miami, FL

**PRESENTER:** Sherri Betz PT, GCS, CEEAA, PMA®-CPT, TheraPilates® Physical Therapy, Santa Cruz, CA, [info@therapilates.com](mailto:info@therapilates.com)

**BACKGROUND & PURPOSE:** Pilates has gained momentum in the literature as a viable method of rehabilitation. Functional movement and quality of movement analysis tools are reported in the literature and are being developed and tested. This case is designed to test both the effectiveness of the Pilates method and a new instrument; Polestar Functional Movement Outcome Measure (FMOM). Changes in function and quality of movement using the FMOM will be analyzed and discussed.

**CASE DESCRIPTION:** Two subjects were evaluated using the Polestar Functional Movement Outcome Measure (FMOM) with a diverse representation of activity and fitness levels. Subjects included the following: 1) Athletic male, age 35; 2) Deconditioned male, age 38;. The filmed evaluation was conducted by an expert Pilates teacher and physical therapist. Following the initial evaluations, subjects began a Pilates apparatus conditioning program two times a week for eight weeks with skilled Pilates teachers at appropriate levels for each subject. A post measurement using the FMOM was conducted at the end of the eight-week period and results were analyzed.

**OUTCOMES:** One subject (Deconditioned male, age 38) showed significant improvement in FMOM scores and noted a reduction in the original complaint of (L) heel pain and general improvement in quality of life. The second subject (Athletic male, age 35) experienced an injury in the middle of the eight-week training program and did not show changes in the FMOM scores. This case may show that the FMOM is sensitive enough to show changes in function and quality of movement. It may also show that Pilates may be an acceptable modality for improving movement and function based on the significantly improved scores of the deconditioned male.

**DISCUSSION:** Following these two cases, it is evident that a more substantial study be conducted to evaluate the sensitivity and specificity of the FMOM as it pertains to the analysis of functional movement and its reliability and validity.

**KEYWORDS:** Qualitative movement, Functional Movement Analysis, Pilates

## **INSPIRATORY MUSCLE PERFORMANCE OF FEMALE PILATES INSTRUCTORS**

**AUTHORS:** Sherri Betz PT, GCS, CEEAA, PMA®-CPT, TheraPilates® Physical Therapy, Santa Cruz, CA; [info@therapilates.com](mailto:info@therapilates.com), Lawrence P. Cahalin PhD, PT, CCS: University of Miami Miller School of Medicine, Department of Physical Therapy, Coral Gables, FL

**PRESENTER:** Lawrence P. Cahalin PhD, PT, CCS: University of Miami Miller School of Medicine, Department of Physical Therapy, Coral Gables, FL

**PURPOSE:** A major component of most Pilates styles is a focus on breathing. Numerous claims have been made suggesting that Pilates improves breathing, but no published study examining breathing could be found in the literature. Therefore, the purposes of this study were to examine the inspiratory performance of Pilates instructors and compare the observed results to predicted values and to compare the inspiratory performance of Pilates instructors performing Pilates with a breathing emphasis (BE) to those without a BE.

**METHODS:** 61 female Pilates instructors underwent the Test of Incremental Respiratory Endurance (TIRE) from which maximal inspiratory pressure (MIP), sustained maximal inspiratory pressure (SMIP), and SMIP duration were obtained. The obtained MIP was compared to the predicted MIP based on age, weight, and height using the Baltimore Longitudinal Study of Aging reference equation for women. The obtained MIP of Pilates instructors performing Pilates with and without BE was compared via independent t-tests. Correlation and linear regression analyses were performed to examine relationships and predictors of inspiratory performance.

**RESULTS:** Pilates instructors have significantly greater MIP values compared to predicted MIP values. Also, Pilates with BE or yoga combined with Pilates is associated with greater inspiratory performance. However, aerobic exercise combined with Pilates was not associated with greater inspiratory performance. Age was a near significant predictor of SMIP and was a significant predictor of SMIP duration with both relationships being negative. Lifetime Pilates minutes was a significant negative predictor of MIP which may be due to the manner Pilates instructors breathe while performing Pilates (typically through the nose with less force) and warrants future measurement of inspiratory performance via the nose.

**CONCLUSIONS:** Female Pilates instructors have significantly greater MIP than predicted values and Pilates instructors who performed Pilates with a BE or yoga had significantly greater inspiratory performance. Thus, if improvement in inspiratory performance is a goal of Pilates it should be performed with BE.

# **AVOIDING SURGERY FOR LUMBAR STENOSIS THROUGH POSTURAL AND MOVEMENT RE-EDUCATION**

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**INTRODUCTION:** This case study is about a 70-year old male patient with advanced DJD and spinal stenosis at L5-S1 resulting in moderate to severe radiculopathy into bilateral buttocks and Lower Extremities. Patient consulted three local surgeons all of which strongly suggested surgery after radiological confirmation. Through postural and movement re-education utilizing the Polestar Pilates Methodology patient was able to return to full activity and beyond without surgical intervention.

**PURPOSE/AIM:** This case study considers the possibility that through proper postural education in patients even with moderate to severe lumbar stenosis will benefit and possibly avoid complicated surgical intervention.

**METHODS:** The case involves a 70-year old male with moderate to advanced lumbar stenosis. Subject was evaluated by a physical therapist and treated for Lumbar Stenosis. Treatment focused on increasing thoracic extension and mobility; and hip extension and mobility without perturbing the lumbar stenosis and respecting extension limitations in the lumbar spine. Pilates combined with manual therapies to the thoracic spine, hips and their surrounding tissues was the primary therapeutic intervention in the clinic. Home exercises were incorporated to reinforce optimal posture and mobility goals of the treatment.

**RESULTS:** Pre-therapy measures of functional limitations as follows: unable to stand or walk greater than 10 minutes without severe pain. Subject perceived he would never participate in his normal work and recreational activities again. Subject had significant limitation in ranges of motion in hip extension and thoracic extension. Following 4 sessions of physical therapy and 3 months of Pilates two times per week and HEP, patient was able to return to ADL, work and recreational activity.

**RELEVANCE:** Many patients with moderate to severe lumbar stenosis receive surgery that might be premature, when they could be returned to normal activities without surgery. We suggest that potential surgical candidates are provided with conservative Pilates intervention focused on increasing mobility, improving postural patterns, and changing movement strategies to distribute extension forces in the lumbar spine, they could avoid surgery.

**CONCLUSIONS:** The above subject had a successful outcome avoiding surgery and was able to return to an acceptable quality of life and continues with that quality of life two years later.

**DISCUSSION:** Though this is a case study it warrants further investigation to evaluate the benefits of movement re-education to reduce cost and risk of surgical intervention with patients that are diagnosed by radiology with lumbar stenosis.

**IMPLICATIONS:** Qualitative movement education through Pilates and other movement strategy methods should be further investigated to determine if they can significantly reduce the number of surgeries performed on patients with lumbar stenosis.

**KEYWORDS:** Pilates, Movement Re-education, Lumbar Stenosis, Surgery