



**Research Platform Presentations
16th Annual Meeting Phoenix, AZ
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2:30-4:00pm**

Research Committee Chair:

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PRESENTERS:

**1. Craig Ruby, PT, MPT, DEd, PMA®-CPT
(Ben Reuter, MS, PhD-presenting)**

PHI Pilates, Pittsburgh, PA

2. Rafael Humanes, PhD, PMA®-CPT

University of Leon; Leon, Spain

3. Melissa Mazzarino, BNurs, BMid, MClinMid

Victoria University; Melbourne, Australia

4. Enja Schenck, MS, PMA®-CPT

Classical Pilates NYC, New York, NY

5. Adriano Bittar, MA, PT, MSCPT, PhD, PMA®-CPT

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THE EFFECTIVENESS OF PILATES VERSUS STATIC STRETCHING ON HAMSTRING FLEXIBILITY

AUTHORS: Craig Ruby, PT, DEd, MPT, PMA@CPT, Christine Romani-Ruby PT, DEd, MPT, ATC, PMA@CPT, Alena Regelski, MEd, SPT, Sarah Lusby, SPT, Erin Strigenz, ATC, SPT email: craigruby@gmail.com

PURPOSE/HYPOTHESIS: The hamstring muscles are important contributors to the control of human movement through lumbo-pelvic stability and during functional activities such as gait and agility. Due to the significance of hamstring muscles, the purpose of this study was to examine whether core stability training in the form of Pilates exercises or static stretching was the better method to increase hamstring flexibility. It was hypothesized that participants performing the Pilates exercises would have greater improvement in the length of their hamstring muscles than the participants performing static stretching.

NUMBER OF SUBJECTS: 34 healthy Wheeling Jesuit University (WJU) Doctor of Physical Therapy (DPT) students ranging in age from 20 to 30 years. Participants were considered healthy based on their annual physical required for this DPT program. Participants were considered lightly to moderately active based on American College of Sports Medicine (ACSM) guidelines, lightly active: exercise 1-3 times per week and moderately active: 3-5 times per week. Total participants treated during the study was 32, as two participants dropped prior to the interventions.

MATERIALS/METHODS: After completion of initial paperwork and demographic questionnaire, participants were randomly assigned to one of two groups: the Pilates group or the static stretching group. Hamstring flexibility was measured supine (B) pre- (week 0) and post- (week 6) treatment protocol for both groups with a goniometer. The Pilates group met 2xW and performed 5 Pilates exercises (Straight Bridge, Leg Pull Front, Leg Pull Back, Table Top and Side Plank). The participants in the static stretching group stretched each leg 3x 30 seconds, 1x daily, 2xW. A Sportline stopwatch was used to track the holding time for the static hamstring stretch.

ANALYSIS: Raw data entered into SPSS. T-tests were calculated to determine statistical significant differences

RESULTS: Static stretching pretest combined mean of 73.5 ± 10 degrees. Pilates pretest combined mean of 79.2 ± 16 degrees. Static stretching posttest combined mean of 89.6 ± 8 degrees. Pilates posttest combined mean of 89.9 ± 15 degrees. Paired T-test for the static stretching and Pilates group indicates a significant difference in hamstring flexibility with a value of 0.003 and 0.005 respectively. The independent T-test suggested there was not a significant difference in hamstring flexibility between the static stretching and Pilates group with a value of 0.34.

CONCLUSION: Pilates and static stretching were found to be effective interventions that improved hamstring flexibility. It can be concluded that a Pilates intervention focused on core stability is equally as effective at significantly improving hamstring flexibility as a static stretching intervention. Rehabilitation specialists, including physical therapists, should consider implementing a Pilates program as an alternative to static stretching, which is considered the gold standard, to improve flexibility.

FUNDING SOURCE: None

DO HYPOPRESSIVE TECHNIQUE AND PILATES INCREASE THE ACTIVITY OF THE STABILIZING CORE MUSCLES?

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INTRODUCTION: Pilates (abdominal hollowing techniques) and hypopressive techniques are used for activating deep abdominal musculature and causing low compressive spine stress [1]. The aim of this study was to investigate surface electromyographic (EMG) activity of the rectus abdominus (RA) and internal oblique abdominus (OI) muscles during abdominal-hollowing (AH) and hypopressive technique (HT) exercises performed in a supine position with legs and knees bent to 90° [2].

METHODS: Ten healthy female participants, aged 31.4 ± 4.92 years, were recruited to the experiment. Participants performed a maximal voluntary contraction (MVC) of abdominal muscles (OI and RA) for 5s where muscle activity was recorded employing surface electromyography (EMG). EMG data of each muscle during the AH, HT were normalized as a percentage of the MVC.

RESULTS: The results showed significant differences in EMG activity between OI and RA for the two exercises ($p < 0.05$). The HT task produced lower activation of RA than AH ($p = 0.042$), on the other hand. The AH technique produced an increase around 20% of the MVC in OI EMG levels compared to HT.

DISCUSSION: The results suggest that the performance of AH and TH in the supine position with legs and knees bent to 90° can facilitate OI activity with minimal activity from RA. Similar results were obtained by Richardson et al. (1995) and Bjerkefors et al. (2010). These exercises can be used in lumbo-pelvic stability programs and for working with low superficial muscle activation [3].

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1. Richardson C, Jull G. Therapeutic exercise for spinal segmental stabilization in low back pain. Edinburgh, Scotland: Churchill Livingstone; 1999.
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PILATES METHOD FOR WOMEN'S HEALTH: SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS

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PURPOSE: Systematically evaluate the benefits of Pilates on health outcomes in women.

METHODS: Databases (CINAHL, MEDLINE, PubMed, Science Direct, SPORTDiscus, Physiotherapy Evidence Database (PEDro), Cochrane Central Register of Controlled Trials, and Web of Science) were searched using the terms Pilates and Pilates Method. Publications which met the following criteria were included: Randomized controlled trials (RCTs), English language, peer-reviewed journal from 1980 to July 2014, Pilates as an intervention, and measurement of a health outcome in female participants with a health condition.

DATA EXTRACTION: Two authors independently applied the inclusion criteria to potential studies. Methodological quality was assessed using the PEDro scale. Strength of evidence was measured using the best-evidence grading system.

RESULTS: Thirteen RCTs met the inclusion criteria. A relatively low quality was found overall with PEDro scale values ranging from 3 to 7 (mean, 4.5; median, 4.0). The most often trialled women's health condition was breast cancer (n=2). The most frequent health outcomes investigated were pain (n=4), quality of life (n=4), and lower extremity endurance (n=2). Emerging evidence was found for Pilates improving quality of life and lower extremity endurance and reduction in reporting pain.

CONCLUSIONS: There is a paucity of evidence on Pilates for improving women's health during pregnancy and for health conditions such as breast cancer, obesity, or low back pain. Further high-quality RCTs are needed to determine the benefits of Pilates on women's health outcomes.

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2. Bo K, Herbert RD. There is not yet strong evidence that exercise regimens other than pelvic floor muscle training can reduce stress urinary incontinence in women: a systematic review. *J of Physiotherapy*. 2013;59(3):159-68.
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EFFECTIVENESS OF THE PILATES METHOD OF EXERCISE IN THE TREATMENT OF LOW BACK PAIN – A COMPARATIVE REVIEW

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PURPOSE: The goal of this review study was to assess the effectiveness of the Pilates method in the treatment of chronic low back pain. In addition to assessing the effectiveness of the Pilates method, a critical look was also taken at the types of exercises used. The results of mat versus Pilates on the equipment are compared, as well as classical Pilates versus contemporary Pilates.

METHODS: Inclusion criteria: the studies were required to meet scholarly standards, be peer reviewed and randomized and controlled trials. A Boolean search for randomized controlled and clinical trials using (Pilates) AND "low back pain" on PubMed (including MEDLINE) returned 24 results; 11 studies were selected.

RESULTS: There is evidence that Pilates-based exercise in the rehabilitation of low back pain is effective.

CONCLUSION: Additional peer-reviewed and randomized, controlled research is needed to produce scientifically reliable meta-analyses, preferably utilizing similar measurements, intervention durations, frequencies and equipment.

For further scientific evaluation and in order to achieve reproducible exercise protocols and results, a standardization of contemporary Pilates exercises is desirable.

There is also need for further analysis comparing Mat Pilates and equipment-based Pilates in order to establish if one is superior to the other.

Classical Pilates has not been scientifically analyzed. Such analysis would be of benefit as the method is highly regarded in the treatment of low back pain.

FUNDING SOURCE: None

THE EFFECTS OF FLETCHER TOWELWORK® IN WOMEN WITH BREAST CANCER: CLINICAL TRIAL

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PURPOSE: to investigate the effects of Fletcher Towelwork® in women with breast cancer.

SUBJECTS: 11 women, mean age 37, from 21 to 57 years.

METHODS AND MATERIALS: Inclusion criteria - women (21 to 65 years); breast cancer without reoccurrence or progression; unilateral mastectomy or quadrantectomy; radiation treatment over + 20 days; no cognitive impairment; AULROM + 90° of shoulder FLE and ABD. **Excl criteria** - severe III/IV linphoedema; uncontrolled HBP; COPD; uncontrolled diabetes; mental illness; AWS; severe musculoskeletal disorder; participation in regular exercise program (last 6 months). Subjects volunteered to participate in 2x/week 30 minutes Fletcher Towelwork® classes for 4 weeks.

Pre-tests and post-tests at 4 weeks:

Breath: Exhale time and coordination, (Breath-a-Cizer), Chest Expansion(Circometry)

AROM and PROM Shoulder: (Flex, Ext, Abd, IR, ER)

MMT: Shoulder (Flex, Ext, Abd, IR, ER)

Quality of Life: Disabilities of the Arm Shoulder and Hand Questionnaire (DASH)

Posture: Fletcher Pilates® Standing Postural Assessment

ANALYSIS: Descriptive and inferential statistics with normality test Shapiro-Wilk and Kolmogorov-Smirnov test to identify the standardization of data. Parametric or non-parametric tests for linear correlation, nonlinear and analysis of variance test in BioEstat program with a significance level of $p < 0.05$.

RESULTS: 40% of the sample data has being analysed so far. Breath, AROM, PROM and strength for all shoulder movements have improved. Quality of life has changed significantly. Posture has not significantly being affected.

CONCLUSIONS: Fletcher Towelwork® seems to be effective for helping women with breast cancer. More studies are needed.

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