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## EVALUATION OF HIP POSITIONING CONTROL IN WOMEN PRACTITIONERS OF PILATES METHOD

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### SUMMARY

Pilates has been appointed as an effective method of physical activity for strengthening abdominal musculature and consequently to improve the balance between agonist and antagonist muscles, and prevention chronic low back pain. The aim of this study was to compare abdominal strength of women practitioners of Pilates with equipment and fitness training practitioners. The sample consisted of 28 women aged 20 to 40, while 15 were fitness training practitioners and 13 practitioners of Pilates. The test used to check abdominal strength was the lowering of the extended leg test, which consists in increasing the angle of lower limbs on pelvis and

lumbar spine, putting the abdomen biomechanically unfavorable to comfort, so it can be seen the strength of abdomen through the pressure imposed on lumbar spine on an inflatable bag attached to a manometer. Test results showed that the average obtained by Pilates group (group 1) was  $146.4 \pm 13.6$  degrees, whereas in the fitness training practitioners group (group 2) was  $113.6 \pm 8.9$  degrees. Student t test for independent samples indicated that results of group 1 were significantly higher than group 2 ( $p = 0.000$ ). These data indicate that Pilates method can be an excellent exercise for strengthening abdominal musculature. It is suggested further studies, evaluation of abdominal strength with larger samples and by other kind of abdominal tests.

### INTRODUCTION

Muscle tone and flexibility of central body (core/powerhouse) is essential for maintaining muscular balance of hip and consequently the region lombar [1]. Pilates Method has been appointed as an effective method of physical activity for strengthening abdominal region and consequently to improve the balance between agonist and antagonist muscles, and prevention of chronic low back pain. All exercises in Pilates have one characteristic in common which is the correct alignment of pelvic position, using what is called "neutral pelvis" which can be defined as a position that maintains an imaginary line connecting the iliac spine above the tubercle of pubis [2]. This pelvis positioning during many exercises in Pilates make them recruit different types of muscle contractions and flexibility, promoting greater control over core [3]. Some studies indicate that weakening of the deep abdominal muscles (transversus abdominis, pelvic floor, multifidus and

diaphragm) can be strongly linked to low back pain [4]. The strengthening of core has been shown in some studies as an important component in balance of the spine, such as maintaining posture and prevention of chronic low back pain. Strengthening core muscles has been touted as a way to prevent and rehabilitate lumbar spine and various musculoskeletal disorders, and improve athletic performance [5]. In a conventional Pilates class, on the ground or with accessories and equipment, various muscle chains are exercised in parallel with the work of core. Pilates exercises emphasize mainly transversus abdominis and internal oblique muscles recruitment and contribute to normalize spinal motor control and balance of the spine [6]. The aim of this study was to compare abdominal strength between women practitioners of Pilates equipment and Fitness training practitioners.

### METHODS

The sample consisted of 28 women aged from 20 to 40 years old, while 13 were practitioners of Pilates and 15 were fitness training practitioners. We used a brand Premium aneroid sphygmomanometer, goniometer 20cm (Fisiomed Pro) and a mat. The test used due to its reliability for evaluating abdominal strength when dealing with a neutral position of pelvis and lumbar spine, was the test of lowering the extended leg, which aims to evaluate the central force [7]. The test consists of keeping the subject in supine position with legs flexed under lumbar spine, approximately vertebrae L4 and L5, positioning the cuff of sphygmomanometer with an initial pressure of 40 mmHg, inflated by the evaluator. Then examiner asked the subject to flex hips and knees to 90 degrees with a retroversion of lumbar spine, so the pressure was increased in sphygmomanometer. When the subject was asked to extend the legs and increase the angle of the hip, abdomen was recruited to keep the pressure greater than or equal to the start of the test. The test was terminated with the subject achieving an angle of about 180 degrees or cuff pressure reaching 40 mmHg. In the latter case, the evaluator wrote down the angle that was being controlled by a goniometer, taking as reference points the greater trochanter in the center of the instrument, fixed arm parallel to the floor and movable arm on the lateral malleolus and is considered knee flexion during testing. Sample inclusion criteria were developed with the following considerations: the subjects should be practicing Pilates or fitness training. The subjects

should be practicing those activities for at least twice a week and have completed six months of this modality until the time of data collection. The results were compared using a Student T test for independent samples with a significance level of 95%.

## RESULTS AND DISCUSSION

Test results are shown in Table 1. As can be seen, Pilates practitioners had an average of 146.5°, which is 32.9° larger than the values found for fitness training practitioners, 113.6°, thus demonstrating greater acquisition of abdominal strength by practitioners of Pilates method ( $p < 0.000$ ).

**Table 1:** Values in degrees of the lowering extended test and Student t test for independent samples

	<b>Fitness</b>	<b>Pilates</b>	<b>p</b>
<b>Angle</b>	113,6°	146,5°	0,000

Pilates exercises emphasize mainly the recruitment of transversus abdominis and internal obliques muscles, and it helps normalize spinal motor control and balance of the spine [6]. In addition to this evidence was evaluated [8] the contraction of transversus abdominis of Pilates practitioners, traditional abdominal classes practitioners (abdominal curl-up - partial shrinkage of the trunk) and not practitioners of any kind of abdominal exercises. The contraction of transversus abdominis was examined using a stabilizer pressure biofeedback unit and, as a result, nearly 90% of practitioners of Pilates got values above required in test, while less than half of participants in the other groups managed to take the test. This seems to be related to the fact that Pilates practitioners may be better able to recruit and utilize the deep abdominal muscles and stabilize the pelvis in relation to non-practicing the method.

Some authors [9], found that abdominal strength of women 25 to 40 years undergoing an intervention by the Pilates Method. The test used for evaluation was trunk flexion [10], which consists in realize the greatest number of repetitions in a minute. The test result was significant difference between pre and post test, demonstrating the effectiveness of the method to gain abdominal strength.

## CONCLUSIONS

The results of this study reinforce the findings from the literature that Pilates seems to be an effective method for improving abdominal strength for the purpose of keeping pelvis neutral and physiological curvature of lumbar spine. These data are relevant considering the importance of increasing and/or maintaining muscle activation and force production capacity of abdominal muscles to the health of individuals.

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