

Pelvic floor muscle strength in pilates practitioners

Fuerza muscular del piso pélvico en los practicantes de pilates

Força muscular do assoalho pélvico em praticantes de pilates

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ABSTRACT

Objective: to investigate the correlation between practicing Pilates and pelvic floor muscle strength. **Method:** cross-sectional study conducted with women that practiced the Pilates method for more than six months and sedentary women. Pelvic floor muscle strength was evaluated through the functional scale of the International Continence Society, between August and September 2017, in a clinic specialized in Pilates practice in the municipality of Poá, São Paulo, Brazil. **Results:** among the 41 women who participated in the study, 12 were Pilates practitioners. The Pilates group was, on average, ten years younger. The degrees of muscle strength of the pelvic floor in the Pilates group were higher than those in the control group ($p = 0.0001$). **Conclusion:** despite the small sample size and the age bias of the samples, it is possible that Pilates is in favor of a better pelvic floor function in women. One out of ten women is unable to contract the pelvic floor under verbal command, being part of a risk group for local dysfunctions in physical activities in general, which requires specific pelvic exercise. **Descriptors:** Physical Therapy Modalities; Pelvic Floor; Exercise Movement Techniques; Muscle Strength.

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RESUMEN

Objetivo: investigar la correlación entre la práctica de Pilates y la fuerza muscular del piso pélvico. **Método:** estudio transversal realizado con mujeres que practicaron el método Pilates durante más de seis meses y mujeres sedentarias. La fuerza muscular del piso pélvico se evaluó utilizando la escala funcional de la Sociedad Internacional de Continencia, entre agosto y septiembre de 2017, en una clínica especializada en la práctica de Pilates en la ciudad de Poá, São Paulo, Brasil. **Resultados:** entre las 41 mujeres que participaron en el estudio, 12 eran practicantes de Pilates. El grupo de Pilates era, en promedio, diez años más joven. Los grados de fuerza muscular del piso pélvico en el grupo de Pilates fueron más altos que los del grupo de control ($p = 0,0001$). **Conclusión:** a pesar del pequeño tamaño de la muestra y el sesgo de edad de las muestras, es posible que Pilates esté a favor de una mejor función del piso pélvico en las mujeres. Una de cada diez mujeres no puede contraer el piso pélvico bajo orden verbal, siendo parte de un grupo en riesgo de disfunciones locales en actividades físicas en general, lo que requiere un ejercicio pélvico específico.

Descriptor: Modalidades de Fisioterapia; Diafragma Pélvico; Técnicas de Ejercicio con Movimientos; Fuerza Muscular.

RESUMO

Objetivo: investigar a correlação entre a prática de Pilates e a força muscular do assoalho pélvico. **Método:** estudo transversal realizado com mulheres que praticaram o método Pilates por mais de seis meses e mulheres sedentárias. A força muscular do assoalho pélvico foi avaliada por meio da escala funcional da International Continence Society, entre agosto e setembro de 2017, em clínica especializada na prática de Pilates no município de Poá, São Paulo, Brasil. **Resultados:** entre as 41 mulheres que participaram do estudo, 12 eram praticantes de Pilates. O grupo Pilates era em média dez anos mais jovem. Os graus de força muscular do assoalho pélvico do grupo Pilates foram superiores aos do grupo controle ($p=0,0001$). **Conclusão:** apesar do pequeno tamanho amostral e do viés etário das amostras, é possível que o Pilates seja a favor de uma melhor função do assoalho pélvico nas mulheres. Uma em cada dez mulheres é incapaz de contrair o assoalho pélvico sob comando verbal, fazendo parte de um grupo de risco para disfunções locais nas atividades físicas em geral, o que exige exercício pélvico específico.

Descritores: Modalidades de Fisioterapia; Diafragma da Pelve; Técnicas de Exercício e de Movimento; Força Muscular.

INTRODUCTION

Pelvic floor dysfunctions are common among women, occurring in almost one in every four¹. The most common

dysfunctions among women are sexual dysfunctions, urinary incontinence (UI), fecal incontinence, genital prolapse and chronic pelvic pain²⁻⁷.

The urinary, sexual and fecal functions, as well as the support of pelvic organs, depend on the function of the pelvic floor muscles (PFM)⁸. Thus, training of this musculature has been studied in several dysfunctions⁹⁻¹¹.

Due to scientific advancements, pelvic floor muscle training (PFMT) became multivariate based on a structured evaluation that aims to objectively identify the functional origin of the dysfunction, be it 1) strength, 2) endurance, 3) power, 4) coordination and/or 5) reflex contraction – or pre-contraction, or, yet, their combination¹².

Together with other physiotherapy-specific techniques, the Pilates method comes as a therapeutic modality that makes globally strengthening and stretching exercises more accessible and playful, being considered a useful tool in prevention and rehabilitation¹³. It is considered an efficient way to strengthen the core muscles, providing postural balance and improvement of the quality of life¹⁴. Recent studies^{13,14} have

indicated both mental and physical health effects from this method.

It is common for Pilates instructors to target the contraction of the PFM during the exercises, which is based on the popularly widespread idea that this method can lead to a significant improvement of the pelvic floor resistance, and that this improvement is prone to remain over time so that this method could provide a new and more attractive alternative for the prevention and treatment of pelvic floor dysfunctions.

However, there are no studies indicating whether the Pilates method is indeed able to activate and promote changes in the functions of the PFM either in the strength, resistance and coordination parameters or in the motor reflex activity. By considering strength as one of the parameters that indicate pelvic floor function, this study aimed to investigate the correlation between practicing Pilates and pelvic floor muscle strength.

METHOD

This is a cross-sectional study approved by the Research Ethics Committee Universidade Metodista de São Paulo-Umesp (number 1.204.065, CAAE 48260015.0.0000.5508) and conducted in a clinic specialized in Pilates practice in the municipality of Poá, São Paulo, Brazil, between August and September 2017, city of residence of the researchers.

We included women aged 18 to 45 that practiced the Pilates method for a period longer than six months and without complaints about pelvic floor dysfunction. We excluded pregnant women and women with pelvic floor dysfunctions.

Sampling occurred by convenience. Women were recruited from the general population through posters in public spaces and social networks.

For data collection, we first divided the participants into two groups: GP, consisting of women that performed exercises using the Pilates method, and GC, formed by sedentary women. Posteriorly, the researcher PHP, trained by the research advisor GFSL, conducted the evaluation of

the functional kinesiology of the pelvic floor musculature (PFM), in a private office at the clinic of the study site. In this assessment, PHP did not know which group each participant belonged to. The evaluation occurred within the standards defined by the International Continence Society and Brazilian Pelvic Physiotherapy Association¹² by vaginal inspection and palpation with two fingers in lithotomy position.

Initially, all participants were instructed about the PFM, their anatomy and function and how they should contract, receiving the command to “arrest the pee”, then, the participants were asked to perform a maximum voluntary contraction and the pelvic floor was inspected for cranial movement, as well as for the use or not of accessory musculature and/or respiratory apnea. Following, vaginal palpation with two fingers was performed and the strength of the contraction was graded as absent (without any contraction), weak (contraction of the closure type without elevation of the vaginal walls), normal

(closure with elevation) and strong (closure with resisted elevation)¹².

Forty five women were recruited, 13 in the GP and 32 in the CG, however, one participant in the GP and 3 in the CG gave up on the study, which ended with 41 women.

Data were stored in the program Excel 5.0 and analyzed by descriptive and inferential statistics using the Mann-Whitney test due to the non-normal distribution of the sample.

A total of 41 women participated in the study, 12 of the GP group and 29 of the GC group. The mean age of the GP was 34.5 ± 10.8 and of the CG 46.7 ± 14 . It is observed that the muscular strength of the pelvic floor was greater in women who practice the Pilates Method compared to the sedentary ones. The results of this by-group evaluation are described in Table 1.

RESULTS

Table 1 - Characteristics of the groups of Pilates practitioners and non-practitioners according to age and PFM function.

	GP n=12		GC n=29	
	n	%	n	%
Age (years)	$34.5 \pm 10,8$		46.7 ± 14	
PFM* function				
1 [Absent]	-	-	-	-
2 [Weak]	-	-	11	37.9
3 [Normal]	3	25	15	51.7
4 [Strong]	9	75	3	10.3

*Pelvic Floor Muscles.

The Mann-Whitney test indicated that the distribution of the strength parameters between the groups was not the same and was statistically significant

($p=0.0001$). The group of Pilates practitioners showed higher grades of contraction strength of the pelvic floor musculature (Figure 1).

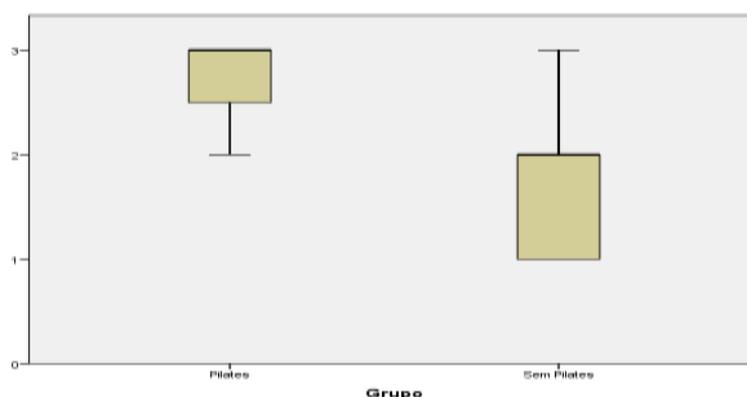


Figure 1 - Distribution of women in the GP and GC groups according to the four grades of muscle contraction of the Pelvic Floor Functional Scale of the International Continence Society¹².

DISCUSSION

A pelvic floor with impaired or inadequate function is an etiological factor for UI and other urinary, genital and fecal dysfunctions¹⁵, conditions that are, therefore, treatable by pelvic physiotherapy based on techniques focused on the functional improvement of this musculature by increasing either strength, power, endurance, proprioception, motor skills or other functional issues¹².

Despite the recognition of specific functional exercises for PFM, the possibility that global techniques based on less focused or more encompassing exercises may have a positive influence on pelvic

floor function has been suggested¹⁶.

The strength gain of the Map stems from the muscle's ability to generate strength. It is usually expressed as maximum voluntary measures of contraction and as maximum of one repetition (1RM). In the case of MAP, the strength gain results from the correct contraction of MAP, defined as a a constriction and inward (ventrocephalad) movement of the pelvic openings. Normal, well-functioning pelvic floor muscles may demonstrate some (controlled or limited) downward dorsal perineal movement in response to increased intra-abdominal pressure in the absence

of incontinence or prolapse of organ pelvic¹⁷.

One of the principles of the Pilates method is centralization (Powerhouse), that is, the center of body strength, composed of the abdominal, transversus abdominis, multifidus and pelvic floor muscles¹⁸. Thus, when the Powerhouse is activated, there will be contraction of the lower abdominal muscles added to the co-activation of the pelvic floor, applying between 20 to 30% of the voluntary contraction of the muscles involved¹⁹.

This study of 41 women showed that the GFP of Pilates practitioners was higher than the average strength of women who did not use this method.

In this segment, Bertoldi et al²⁰, studied the influence of the Pilates method exercises on the force of contraction of the pelvic floor muscles and on the quality of life of women in the climacteric, observing that Breathing is one of the fundamental principles of the Pilates method and linked to the correct activation of the Powerhouse, requires the contraction of several muscles,

including MAP. This contraction occurs during all expirations performed during the exercise and this is able to promote a significant strength gain in women who are in the climacteric period.

Likewise, Correa et al²¹, in a systematic review, concluded that the Pilates method exercises performed in the analyzed studies demonstrate a greater strength gain in AP, increased flexibility and considerable improvement of the pathology, as well as promoting the improvement of the quality of life. patient's life, reducing the volume of urine lost to exertion.

Supporting these observations, Diniz et al²² evaluated pelvic floor muscle strength using a perineometer in six women that practiced the Pilates method twice a week. The evaluation occurred before and after eight classes of the method and the results showed that all participants gained muscle strength in both types of fibers, with 84% having more gain in type II fibers. For the authors, the Pilates method influences the function of PFM and could be used as a

prevention method for pelvic floor dysfunctions.

In fact, Andrezza and Serra²³, in a pilot study, observed 12 women allocated into three groups: Pilates practitioners, practitioners of other physical activity and sedentary women, and showed that physical activity was the main factor. The strength grades of the PFM were assessed using a pressure biofeedback unit, and the authors reported significant differences in the parameters of women that practice Pilates and those that practice some other type of physical activity in contrast with the group of sedentary women so that physical activity, in general, seems to have a positive influence on pelvic floor strength since inactive women had lower results compared to the ones that practiced physical activities.

However, Nóbrega et al²⁴ studied 60 women, 30 Pilates practitioners and 30 sedentary women, evaluated through anamnesis, Perfect scale and perineometer, and did not find a significant difference in any of the analyzed variables.

It is important to consider the fact that one third of the women cannot properly contract their pelvic floor²⁵, and that, even after the correct instruction, one in every ten women still cannot make the appropriate contraction²⁶. This is a worrisome factor for those women that do not know how to contract their pelvic floor and that, by practicing the Pilates method, or other physical activity, receive this instruction. The pelvic floor will not contract and, therefore, will not play its role to resist the increase of intra-abdominal pressure during the exercises, a situation which, especially when associated with the impairment of the involuntary contraction of the pelvic floor, will cause the ligament overload described by DeLancey and Ashton-Miller²⁷. These women became one of the important risk groups for genital prolapse and urinary incontinence as described by Slieker-ten Hove et al²⁸.

As limitations of this study, we cite the sample size, the age difference between the sample groups, considering that age is an important prognostic factor of

pelvic floor dysfunction^{12,15}, and although there is no consensus about that only the muscular strength serves, in isolation, as a sufficiently sensitive parameter to describe the function of the pelvic floor musculature.

CONCLUSION

This study verified that the Pilates method may be related to better pelvic floor muscle strength, with high statistical significance despite the reduced sample size, although a sample bias was present, as the Pilates group was on average 10 years younger.

There is still no literature consensus on this conclusion. There is evidence that physical activity in general, and not necessarily Pilates, may be responsible for the improved pelvic floor muscle function and, to clarify this question, studies comparing pelvic floor function in Pilates practitioners and practitioners of other physical activities is urgently necessary.

Nevertheless, there is increasing evidence suggesting that physical activity, including specific

methods such as Pilates, may favor the pelvic floor muscle function. This fact would lead to a vast range of therapies, especially regarding the prevention of pelvic floor dysfunctions, but without forgetting that one in every ten women is unable to contract their pelvic floor under verbal command, needing, for this purpose, specific local pelvic physiotherapy.

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