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ORIGINAL ARTICLE

Muscle function of the pelvic floor in healthy and puerperal women and with pelvic floor dysfunction☆

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KEYWORDS
Pelvic floor;
Muscle strength;
Muscle resistance;
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Postpartum

Abstract
Objectives: To understand the function of the pelvic floor muscles (PFM) at different ages in healthy women and in puerperal women with pelvic floor dysfunctions (PFD) and to ascertain whether there are differences among them.
Material and methods: A descriptive cross-sectional study was conducted between June 2014 and September 2016 and included 177 women, 70 of whom had no symptoms of PFD, 53 primiparous mothers in late postpartum and 54 with PFD. The function of the PFM was measured through vaginal palpation (quality of the contraction); manometry (force); dynamometer (tone, strength, and response to stretching), and surface electromyography (neuromuscular activity and resistance).
Results: The healthy women showed superior values for PFM tone, maximum strength, neuromuscular activity and resistance than the puerperal mothers and the women with PFD ($p < 0.01$). The puerperal women and those with PFD showed similar functional PFM values ($p > 0.05$). The muscle function of the healthy women did not vary significantly with age, except in the case of tone, which was lower in the women older than 46 years ($p = 0.004$).
Conclusions: Age and births decrease the baseline tone of the PFM in healthy women. Therefore, lower strength, resistance and neuromuscular activity appear to be the main difference between the PFM of women with PFD and the PFM of healthy women.

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PALABRAS CLAVE
Suelo pélvico;
Fuerza muscular;
Resistencia muscular;
Tono muscular;
Periodo posparto

Función muscular del suelo pélvico en mujeres sanas, puérperas y con disfunciones del suelo pélvico

Resumen

Objetivos: Conocer la función de la musculatura del suelo pélvico (MSP) en distintas edades de la mujer sana, así como en mujeres puérperas y con disfunciones de suelo pélvico (DSP), y averiguar si existen diferencias entre ellas.

Material y métodos: Estudio descriptivo transversal realizado entre junio de 2014 y septiembre de 2016 que incluyó 177 mujeres: 70 sin sintomatología de DSP; 53 primíparas en el puerperio tardío, y 54 con DSP. La función de la MSP se midió mediante palpación vaginal (calidad de la contracción); manometría (fuerza); dinamometría (tono, fuerza y respuesta al estiramiento) y electromiografía de superficie (actividad neuromuscular y resistencia).

Resultados: Las mujeres sanas mostraron valores superiores respecto al tono, la fuerza máxima, la actividad neuromuscular y la resistencia de la MSP que las puérperas y las mujeres con DSP ($p < 0,01$). Las mujeres puérperas y con DSP mostraron valores funcionales de la MSP similares ($p > 0,05$). La función muscular de las mujeres sanas no varió significativamente con la edad, excepto en el caso del tono, que fue menor en las mujeres mayores de 46 años ($p = 0,004$).

Conclusiones: La edad y los partos disminuyen el tono basal de la MSP en mujeres sanas, por lo que una menor fuerza, resistencia y actividad neuromuscular parece ser la principal diferencia entre la MSP de mujeres con DSP y la MSP de mujeres sanas.

Introduction

The female pelvic floor (PF) is a system of muscles, ligaments and fascia that intervene as a functional unit. The pelvic floor muscles (PFM), composed of a superficial layer and a deep layer, plays an important role in the control of continence and in the support of the pelvic organs.[1] Any deterioration of PFM can alter their function, resulting in different abnormalities commonly called pelvic floor dysfunctions (PFD), including urinary incontinence (UI), anal incontinence, pelvic organ prolapse, pelvic pain, or sexual dysfunctions.[1,2] Although PFDs pose no risk to life, they result in a significant reduction in the quality of life of at least one third of adult women, with a high health, social, and economic impact.[3–5] There are many factors related to the occurrence of PFD: female gender, age, pregnancy, childbirth, type of delivery, number of births, overweight, menopause, and other PFDs, among others.[5,6] There are different studies on the performance of PFMs in women with PFDs, especially with UI and pelvic organ prolapse; and in puerperal women, although some of them are not prospective,[7,8] or lack adequate sample size,[9,10] or use different measuring instruments, making it difficult to compare them,[9,11,12] or analyze the role of PFM in different PFDs in isolation,[7,12] and few compare the role of PFM of women with PFD or postpartum to women without PFD.[13] In this sense, there is a need for a better understanding of the function of PFM in women without PFD throughout the different reproductive stages of life, as well as the differences between PFM in healthy women, postpartum women, and women with PFD. Thus, the objective of this study is to know the functional changes of PFM (tone, strength, resistance, and neuromuscular activity) in different reproductive stages of the woman, as well as to know if the changes that can be found with age and after childbirth are similar to those found in women with PFD.

Subjects, material and methods

Descriptive cross-sectional study carried out in the Physiotherapy Research Group in the Health Processes of Women of the Teaching, Care, and Research Unit in Physiotherapy of the Physiotherapy Department of the University of Alcalá (Madrid) between June 2014 and September 2016. The study was approved by the Ethics Committee of Clinical Research of the Hospital Príncipe de Asturias. A total of 177 women participated in this study: 70 women without PFD symptoms, 53 primiparous women in the late postpartum period (6–7 postpartum weeks) and 54 women with PFD. They all voluntarily signed the informed consent.

Voluntary women with no PFD symptoms were selected conveniently. Women older than 20 were included, without PFD symptoms according to the Spanish version of the PFIQ-7 questionnaires on the impact of PFDs on quality of life, PFDI-20 on the symptoms of PFDs,[14,15] and FSFI on female sexual function.[16] Those women who had received prior pelviperineal physiotherapy treatment and whose PFM value, according to levator ani muscles test (LAT),[17] was equal to 0 or there was an inversion of the order, were excluded. Postpartum women, as well as women with PFD, were referred by the Gynecology and Obstetrics Department of the Hospital Príncipe de Asturias. In the group of postpartum women, primiparous women with a vaginal delivery, between the sixth and seventh week of delivery, were included. Those postpartum women with a medical diagnosis of PFD prior to pregnancy and delivery, and with a history of conservative treatment or PFD surgery were included. In the case of women with PFD, those with signs