

Pérez-de-la-Cruz, S.; Puentes-Fernández, S.; Rocamora-Pérez, P. y Lozano-Fernández, J.M. (2017). Efectividad de un programa de Pilates Romana en lumbalgia inespecífica. Estudio piloto / Effectiveness of a program of Romana's Pilates for non-specific Low Back Pain. A Pilot Study. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 17 (68) pp. 667-676. [Http://cdeporte.rediris.es/revista/revista68/artefectividad859.htm](http://cdeporte.rediris.es/revista/revista68/artefectividad859.htm)  
DOI: <https://doi.org/10.15366/rimcafd2017.68.006>

## ORIGINAL

### EFFECTIVENESS OF A PROGRAM OF ROMANA'S PILATES FOR NON-SPECIFIC LOW BACK PAIN. A PILOT STUDY

### EFFECTIVIDAD DE UN PROGRAMA DE PILATES ROMANA EN LUMBALGIA INESPECÍFICA. ESTUDIO PILOTO

Pérez-de-la-Cruz, S.<sup>1</sup>; Puentes-Fernández, S.<sup>2</sup>; Rocamora-Pérez, P.<sup>1</sup>;  
Lozano-Fernández, J.M.<sup>3</sup>

<sup>1</sup> Facultad de Educación, Enfermería y Fisioterapia. Departamento de Enfermería, Fisioterapia y Medicina. Universidad de Almería (España) [spd205@ual.es](mailto:spd205@ual.es), [rocamora@ual.es](mailto:rocamora@ual.es)

<sup>2</sup> Élite Pilates Fisioterapeutas (España) [Silvia@elitepilates.net](mailto:Silvia@elitepilates.net)

<sup>3</sup> Servicio de Fisioterapia. Hospital Torrecárdenas. Almería (España) [jmlozfer@hotmail.com](mailto:jmlozfer@hotmail.com)

**Spanish- English translators:** Isabel Quintero, [info@isabelquintero.net](mailto:info@isabelquintero.net)

**Código UNESCO / UNESCO code:** 3213.11 (Fisioterapia) / Physiotherapy

**Clasificación Consejo de Europa / Council of Europe classification:** 14  
(Fisioterapia y rehabilitación / Physiotherapy and rehabilitation)

**Recibido** 2 de julio de 2015 **Received** July 2, 2015

**Aceptado** 21 de enero de 2016 **Accepted** January 21, 2016

#### ABSTRACT

**Aim:** to test the effectiveness of the Romana's Pilates method to obtain increased flexibility, improvements in mobility, and reduced pain in daily life.

**Methodology:** a clinical trial with intention-to-treat thirty patients with non-specific low back pain. Participants attended 15 sessions, twice a week. The Romana's Pilates method was taught by an external physiotherapist. Parameters such as pain, the Schober test, and the SRS-22 were evaluated.

**Results:** Statistically significant differences in pain (VAS), the Schober test (flexibility in sagittal plane), lateral flexion (flexibility in frontal plane) and several

items of the SRS-22 scale were found, with  $p < 0.001$ .

This method may be used to improve pain, axial flexibility, function and aspects related to the quality of life of patients.

**KEY WORDS:** Pilates, flexibility, low back pain, quality of life, pain.

## RESUMEN

**Objetivo:** comprobar la efectividad del método Pilates original (Romana's Pilates) para conseguir una mayor flexibilidad de la columna, junto con una mejora en la movilidad de la misma, así como del dolor que presentan en su vida diaria los pacientes.

**Metodología:** ensayo clínico con intención de tratar a treinta pacientes con dolor lumbar inespecífico. Asistieron a 15 sesiones, 2 veces a la semana, del método Pilates Romana. Se evaluaron parámetros tales como dolor, test de Schöber, SRS-22 y distancia dedos- suelo.

**Resultados.** Se encontraron diferencias estadísticamente significativas con respecto al dolor (escala EVA), distancia dedos- suelo, test de Schöber (flexibilidad en plano sagital), flexión lateral (flexibilidad en plano frontal) y en varios ítems de la escala SRS-22, con valores de  $p < 0,001$ . Por ello, este método puede ser usado para mejorar el dolor, la flexibilidad axial, la función y los aspectos relacionados con la calidad de vida.

**PALABRAS CLAVE:** Pilates, flexibilidad, lumbalgia, calidad de vida, dolor.

## INTRODUCTION

Chronic low back pain is a type of musculoskeletal pain that is prevalent worldwide and has an unfavourable prognosis<sup>1</sup>. It is the second most common health problem in the developed world and is associated with high health care costs. According to the 2006 National Health Survey, neck pain and low back pain represent 45.3% of chronic long-term illnesses in subjects aged between 16 and 24 years of age<sup>2</sup>.

The aetiology of back pain is still unknown, although it is believed to have a multifactorial origin. These include degenerative causes, mechanical causes and those associated with inappropriate postural conditions<sup>3, 4</sup>. According to current clinical practice guidelines<sup>5</sup>, exercise-based treatments are considered to be an effective treatment for chronic back pain. At present, exercises based on the Pilates principles represent an appropriate therapeutic alternative for patients with chronic low back pain<sup>4- 6</sup>.

The Romana's Pilates method is an ancient exercise system (described almost a century ago) created by Joseph Pilates, who combined movements based on

traditional and Swedish exercise, rehabilitation techniques, martial arts, yoga and dance<sup>7</sup>.

The first publications that can be found on the MEDLINE scientific database and other databases using the keyword “Pilates” date from 1999. However, these initial studies represent analytic research, and it was not until 2004 that the first intervention study based on the PM was published by Segal et al<sup>8</sup>. At present, over 200 references exist, of which only 50 refer to intervention studies. Therefore, there is a gap in knowledge regarding the scientific basis of this method, together with a demand for those who practice it, as well as for the instructors, personal trainers, doctors and physiotherapists.

This is popularly known as an exercise technique that helps shape the body. In this sense, Mari Winsor<sup>9</sup> recalls the quote by Romana Kryzanowska, a direct disciple of Joseph Pilates who affirmed that, with the Romana’s Pilates, “you will feel a radical change in your body from the outside, the volume of your hips and buttocks will decrease and you will feel more aware of your centre of energy”<sup>9</sup>.

Flexibility or, more precisely, flexibility of the spine, combined with strength work, constitutes a key aspect for both the maintenance of good spinal health and the prevention of lumbar pain<sup>10</sup>.

The aim of this study is to assess the effectiveness of the Romana’s Pilates method for achieving greater flexibility and mobility of the spine, as well as reduced pain during the daily life of patients with non-specific low back pain.

## **MATERIALS AND METHODS**

A controlled experimental study was performed with an intention-to-treat analysis in a group of adults with non-specific low back pain. Changes in spinal flexibility were assessed after participating in 15 sessions of Romana’s Pilates exercise, with a frequency of 2 sessions per week. Pain and quality of life values were also registered.

### **Sample**

Thirty subjects were invited to participate in the study (53.3% women, n=16 and 46.7% men, n=14), aged between 25 and 81 years ( $X=45.03$ , SD 14.27 years) and residents of a Spanish city.

The experimental phase was performed at a local physiotherapy clinic. The physiotherapist who taught the classes was a highly trained specialist in Romana’s Pilates, with extensive teaching experience in this discipline. The study inclusion criteria included subjects who were not practicing any other sports’ disciplines nor performing any other therapies for the treatment of their spinal pathology. They were also exempt from any severe health problems or

any musculoskeletal problems that may have prevented the performance of daily activities, and were able to commit to regular attendance of the sessions. All participants participated voluntarily in this study and signed an informed consent form (according to the ethical regulations of the Research Committee and the 1975 Helsinki Declaration, with the review from October 2000), in order to grant permission for the data collection that took place both pre and post intervention. Likewise, participants expressed their agreement for the use of the same for the purposes of this research. All information was treated anonymously.

### **Assessment scales used:**

*The VAS pain scale:* the pain assessment was performed, firstly based on the score that the subject assigned to their pain, via the visual analogue scale. This is a very simple test in which the patient uses a scale from 0 to 10 to describe the intensity of their symptoms. The value on the scale reliably reflects pain intensity and its evolution. Thus, this test is useful for evaluating the intensity of pain experienced by an individual over time<sup>11</sup>.

*Distance from bony prominences/wall-floor:* measurements were performed in the coronal/sagittal plane with patients in standing position. Patients were asked to maintain the anatomic position and, subsequently, a lateral trunk tilt was performed. We measured the distance from the tip of the distal phalanx to the floor. In order to ensure that the patients did not accompany this manoeuvre with a pelvic rotation, we asked the subjects to maintain contact with the wall.

*The Schöber Test:* The flexibility tests were based on the modified Schöber test. The Schöber test is a validated system for assessing the spinal range of movement. In this test, the distance between two previously marked vertebral points on the lumbar spine is assessed, the first of which is placed 10 centimetres above the posterior superior iliac crests, the second is placed 5 cm below the same reference. This system is widely used within the context of rehabilitation<sup>12, 13</sup>. Each assessment was repeated twice, however the same movement was always performed after an interval. In other words, after the flexion tests, the extension test was performed, after which the complete cycle was repeated.

### **Intervention**

Sessions were taught individually, and always led by the same physiotherapist. All study participants completed the program in its entirety.

The Pilates sessions began with floor exercises, continuing with specific exercises using machines designed for this therapy modality (reformer and Stott Pilates reformer). During the first treatment session basic instructions on the method were given, together with training for activating core strength. In other words, seeking the isometric contraction of the transversus abdominis, perineal, gluteal and multifidus muscles, accompanied by correct diaphragmatic breathing. The sessions lasted for one hour, with a frequency of 2 sessions per

week for a total of 15 sessions. All the exercises were modifiable and, therefore, three levels of difficulty were adapted: basic, intermediate and advanced. Some basic exercises can be adapted to each patient (they can be performed with a lesser range of movement and without resistance, if needed). In the same manner, for other exercises, such as the “roll up” – “roll down” (floor work, involving passing from supine lying to sitting via a slow flexion of the whole spine, beginning the movement from the cervical region and ending with pelvic tilt), the level of difficulty can be increased by applying additional resistance. In the cases in which adaptations were not appropriate, these exercises were replaced by others with similar objectives. The level of difficulty for each exercise was established according to the individual characteristics and needs of each patient, and this was progressively increased throughout the study. In Romana’s Pilates, the first objective is to acquire total control of the body then subsequently via appropriate exercise repetition; the idea being to slowly and progressively incorporate rhythm and coordination. The Romana’s Pilates method is designed to provide flexibility and skill, both of which are motor qualities that are clearly reflected in the way one walks, works and moves. This enables the development of muscle strength with the corresponding resistance, the capacity to perform difficult tasks, and being able to participate in activities requiring considerable effort, together with the ability to walk, run or travel long distances, minimizing body fatigue, as well as mental tension. This method is based on a very safe program consisting of slow and controlled exercises using slow and gentle movements. During the performance of these exercises, movement precision is sought using few repetitions. Besides precision, other key concepts of the method are breathing, concentration, control, alignment, centralization and fluidity.

The end of each session was dedicated to stretches of the muscle groups involved in the exercises performed.

In this study, the practice of Pilates represented the independent variable, and the dependent variables were the intensity of pain, the degree of mobility and the flexibility of those practicing the therapy.

### **Statistical analysis**

The statistical analysis was performed by a person external to the study. The means and standard deviations were calculated in order to define the characteristics of the study sample. The normality of the sample was tested via the Shapiro-Wilk test. We assessed the normal distribution of the data via the Kolmogorov-Smirnoff test in order to select the appropriate comparative test. Neither the fingers-floor distance nor the VAS variables fulfilled the assumptions of normal distribution and, therefore, the Wilcoxon Signed Rank test was used. The Schöber variables and lateral flexion R (right) and L (left) variables had normally distributed data, and therefore the T Test for related samples was selected. The statistical analysis was performed via the SPSS Inc. statistical program. Released 2008. SPSS Statistics for Windows, Version 17.0. Chicago: SPSS Inc. A value of  $p < 0.05$  was considered statistically significant.

## RESULTS

Table 1 describes the socio-demographic variables of the study participants.

<i>Variable</i>	<i>Subjects (n)</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Standard Deviation</i>
Age (years)	30	53	70	61,45	4,62
Height (cm)	30	149	168	159,6	5,66
Weight (kg)	30	52	73	62,8	6,87
BMI (kg/m <sup>2</sup> )	30	20	29	24,66	2,48
Nº of children	30	0	4	2,3	0,98
Time since pain diagnosis (months)	30	6	480	102.87	92.94
Time practicing Pilates (months)	30	4	240	46.70	47.89

**Table 1:** Sociodemographic variables of the sample.

Table 2 displays the results obtained (pre and post intervention) together with the differences between the pre and post intervention means. The Student's T test for paired samples was selected for statistical analysis.

<i>Variable</i>	<i>Subjects</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>SD</i>	<i>P</i>
<b>Distance fingers-floor</b>	30	-13	0	-3	3.381	<0.001
<b>Distance neck-wall</b>	30	-3	0	-0.75	0.740	<0.001
<b>Distance lumbar-wall</b>	30	-2	0	-0.35	0.476	<0.001
<b>Schöber</b>	30	0	2	0.41	0.453	<0.001
<b>Side flexion right</b>	30	-6	0	-1.45	1.328	<0.001
<b>Side flexion left</b>	30	-7	1	-1.63	1.800	<0.001
<b>VAS</b>	30	-4	0	-1.47	1.224	<0.001

**Table 2:** Results obtained in the different tests used (pre and post intervention)

## DISCUSSION

Via the use of functional exercises, the Romana's Pilates method improves muscle strength and resistance<sup>14</sup>. In practice, exercise difficulty increases each week and, consequently, this leads to an important improvement in postural control<sup>15</sup>.

A number of studies display the use and effectiveness of this method for obtaining improvements in different health-related aspects in people of both

sexes, these are: flexibility<sup>16,17</sup>, alignment<sup>18</sup>, muscle mass<sup>19</sup>, body composition<sup>20</sup>, control of lumbopelvic movement<sup>21</sup>, quality of life<sup>22</sup> and even respiratory parameters<sup>23</sup>.

In most of these cases a greater or smaller improvement is shown in those patients who have practiced the Romana's Pilates method compared with other therapeutic methods<sup>16, 19, 23</sup>.

Specifically, in the case of chronic low back pain, the object of this paper, several studies have been conducted. In this sense, the number of reports on the use of Pilates exercises in the treatment of chronic low back pain has increased at a steady pace<sup>3, 15, 24- 26</sup>.

The improvements in the spinal mobility may be due to the active flexibility work that takes place during Pilates exercises. Several authors have highlighted the benefits of this active flexibility work<sup>16,17,27</sup>. This way of training flexibility involves the combination of both strength and flexibility work which contributes towards achieving balance between spinal mobility and stability and which is necessary for achieving a healthy, pain free and functional back<sup>28</sup> when compared with postural control studies using force platforms, such as those conducted by Fort Vanmeerhaeghe et al<sup>29</sup>. A limitation of the aforementioned study was the selected sample, as there was a greater proportion of women compared to men, which is also seen in other studies based on this method<sup>18,19</sup>. It is important to note that the level of flexibility among women is usually greater than among men. Thus, in future research it is important to incorporate more balanced samples in this sense, which is an aspect that may prove complicated considering the fact that those who practice this method are primarily women. The results obtained in the sample reflect a significant improvement in the numerical value of the fingers-floor distance and, in the Schöber test, with notable improvements in the sagittal plane and regarding side trunk flexions (frontal plane). This is in line with the results reported in the study by Cruz-Ferreira<sup>18</sup>. Our study did include males in the sample, which makes the results obtained applicable to the general population.

Another important aspect referred by patients attending Pilates therapy is that of pain. A recent study by Natour et al<sup>30</sup> demonstrated that participants who practiced the Romana's Pilates method obtained statistically significant results compared with a control group, regarding the use of pain medication at 45, 90 (program duration) and 180 days ( $p < 0.01$ ).

There is a lack of well-designed studies that are able to clearly demonstrate the effectiveness of a program of specific exercise for the treatment of chronic pain. However, the current consensus in this line of research suggests that the Pilates Method is more effective than minimal intervention (based on physical exercise) for the reduction of pain and disability in the short term. In other words, exercise "helps" in the treatment of chronic pain, but it remains unclear exactly which factors or, more specifically, which types of exercise may be responsible for these improvements<sup>30</sup>. New studies are required in order to

better understand the effects of the Pilates Method in both the short and long term in relation to the control of pain thresholds.

Our findings have demonstrated that the performance of a complete program of Romana's Pilates has produced an improvement in the perception of low back pain in the short term, although it remains impossible to make inferences regarding the effects of this treatment in the long term. There is a need for further studies on the effectiveness of exercises based on the Pilates Method, and, more specifically, the use of Romana's Pilates for the treatment of patients suffering from chronic low back pain.

## REFERENCES

- 1- Costa LM, Maher CG, Hancock MJ, McAuley JH, et al. The prognosis of acute and persistent low-back pain: a meta-analysis. *CMAJ* 2012, 184:E613–624. DOI: 10.1503/cmaj.111271
- 2- Encuesta Nacional de Salud, 2006. Disponible en: <http://www.msps.es/estadEstudios/estadisticas/encuestaNacional/encuestaNac2006/EstadoSaludPorcentaje.pdf>, <http://msc.es/estadEstudios/estadísticas/encuestaNacional/encuestaNac2006/EstilosVidaPorcentaje.pdf>
- 3- Da Fonseca JL, Magini M, de Freitas TH. Laboratory gait analysis in patients with low back pain before and after a pilates intervention. *J Sport Rehabil* 2009, 18:269–282. DOI: 10.1123/jsr.18.2.269
- 4- La Touche R, Escalante K, Linares MT. Treating non-specific chronic low back pain through the Pilates Method. *J Bodyw Mov Ther* 2008, 12:364–370. DOI: 10.1016/j.jbmt.2007.11.004
- 5- Airaksinen O, Brox JI, Cedraschi C, et al. European guidelines for the management of chronic nonspecific low back pain. *Eur Spine J* 2006, 15(2):192–300. DOI: 10.1007/s00586-006-1072-1
- 6- Ozer Kaya D, Duzgun I, Baltaci G, et al. Effects of calisthenics and pilates exercises on coordination and proprioception in adult women: a randomized controlled trial. *J Sport Rehabil* 2012, 21:235–243. DOI: 10.1123/jsr.21.3.235
- 7- Levine B, Kaplanek B, Scafura D et al. Rehabilitation after total hip and knee arthroplasty: a new regimen using Pilates training. *Bull NYU Hosp Jt Dis.* 2007;65:120–5.
- 8- Segal NA, Hein J, Basford JR. The effects of Pilates training on flexibility and body composition: an observational study. *Arch Phys Med Rehabil.* 2004;85: 1977–81. DOI: 10.1016/j.apmr.2004.01.036
- 9- Pilates Winsor M. *El centro de energía*. Barcelona: Paidotribo; 2002.
- 10-Kernan T, Rainville J. Observed outcomes associated with a quota-based exercise approach on measures of kinesiophobia in patients with chronic low back pain. *J Orthop Sports Phys Ther.* 2007; 37: 679–87. DOI: 10.2519/jospt.2007.2480
- 11-Natour J, Cazotti L de A, Ribeiro LH, et al. Pilates improves pain, function and quality of life in patients with chronic low back pain: a randomized



- controlled trial. *Clin Rehabil.* 2014; 29(1): 59- 68. DOI: 10.1177/0269215514538981
- 12-Chen CH, Lin KC, Chen HA, et al. Association of acute anterior uveitis with disease activity, functional ability and physical mobility in patients with ankylosing spondylitis: a cross-sectional study of Chinese patients in Taiwan. *Clin Rheumatol.* 2007; 26: 953—7. DOI: 10.1007/s10067-006-0403-2
- 13-Fernandez-de-Las-Penas C, Alonso-Blanco C, Alguacil-Diego IM, et al. One-year follow-up of two exercise interventions for the management of patients with ankylosing spondylitis: a randomized controlled trial. *Am J Phys Med Rehabil.* 2006; 85: 559—67. DOI: 10.1097/01.phm.0000223358.25983.df
- 14-Kung J, Chiappelli F, Cajulis OO, et al. From systematic reviews to clinical recommendations for evidence-based health care: validation of Revised Assessment of Multiple Systematic Reviews (RAMSTAR) for grading of clinical relevance. *Open Dent J.* 2010; 4: 84—91. DOI: 10.2174/1874210601004020084
- 15-Rydeard R, Leger A, Smith D. Pilates-based therapeutic exercise: effect on subjects with nonspecific chronic low back pain and functional disability: a randomized controlled trial. *J Orthop Sports Phys Ther.* 2006; 36: 472—484. DOI: 10.2519/jospt.2006.2144
- 16-Kao YH, Liou TH, Huang YC, et al. Effect of a 12-week Pilates course on lower limb muscle strength and trunk flexibility in women living in the community. *Health Care Women Int.* 2014. DOI: 10.1080/07399332.2014.900062
- 17-Phrompaet S, Paungmali A, Pirunsan U, et al. Effects of Pilates training on lumbo-pelvic stability and flexibility. *Asian J Sports Med.* 2011; 2 (1): 16-22. DOI: 10.5812/asjms.34822
- 18-Cruz-Ferreira A, Fernandes J, Kuo YL, et al. Does Pilates-based exercise improve postural alignment in adult women? *Women Health.* 2013; 53(6): 597- 611. DOI: 10.1080/03630242.2013.817505
- 19-Ruiz-Montero PJ, Castillo-Rodriguez A, Mikalacki M, et al. 24-weeks Pilates- aerobic and educative training to improve body fat mass in elderly Serbian women. *Clin Interv Aging.* 2014; 9: 243- 8. DOI: 10.2147/CIA.S52077
- 20-Cakmakçi O. The effect of 8 week Pilates exercise on body composition in obese women. *Coll Antropol.* 2011; 35(4): 1045- 50.
- 21-Phrompaet S, Paungmali A, Pirunsan U, et al. Effects of Pilates training on lumbo-pelvic stability and flexibility. *Asian J Sports Med.* 2011; 2(1): 16-22. DOI: 10.5812/asjms.34822
- 22-Vieira FT, Faria LM, Wittmann JI, et al. The influence of Pilates method in quality of life of practitioners. *J Bodyw Mov Ther.* 2013; 17(4): 483-7. DOI: 10.1016/j.jbmt.2013.03.006
- 23-Wells C, Kolt GS, Marshall P, et al. Effectiveness of Pilates exercise in treating people with chronic low back pain: a systematic review of systematic reviews. *BMC Med Res Methodol.* 2013; 19: 13:7. DOI: 10.1186/1471-2288-13-7.

- 24-Wajswelner H, Metcalf B, Bennell K. Clinical Pilates versus general exercise for chronic low back pain: randomized trial. *Med Sci Sports Exerc* 2012, 44:1197–1205. DOI: 10.1249/mss.0b013e318248f665
- 25-Donzelli S, Di Domenica E, Cova AM, et al. Two different techniques in the rehabilitation treatment of low back pain: a randomized controlled trial. *Eura Medicophys* 2006, 42:205–210. DOI: 10.4172/2329-9096.1000260
- 26-Rajpal N, Arora M, Chauhan V. The study on efficacy of Pilates and McKenzie exercises in postural low back pain- A rehabilitative protocol. *Physiother Occup Ther J* 2008, 1:33–56.
- 27-Meroni R, Cerri CG, Lanzarini C, et al. Comparison of active stretching technique and static stretching technique on hamstring flexibility. *Clin J Sport Med*. 2010; 20: 8—14. DOI: 10.1097/jsm.0b013e3181c96722
- 28-Anderson BD, Spector A. Introduction to Pilates-based rehabilitation. *Orth Phys Ther Clin North Am*. 2000; 9: 395—410.
- 29-Fort Vanmeerhaeghe A, Romero Rodríguez D, Antequera Rodríguez JJ, et al. Diferencias en la estabilidad postural estática y dinámica según sexo y pierna do
- 30-minante. *Apunts Med Esport*. 2009; 44: 74—81. DOI: 10.1016/s1886-6581(09)70112-4
- 31-Shrier I. Pilates- Based therapeutic exercise: effects of subjects with nonspecific chronic low back pain and functional disability: a randomized controlled trial. *Yearbook of Sports Medicine*. 2007: 49- 50. DOI: 10.1016/s0162-0908(08)70052-7

**Referencias totales / Total references:** 30 (100%)

**Referencias propias de la revista / Journal's own references:** 0 (0%)