

# EFFECTS OF THE CHIROPRACTIC TREATMENT IN PATIENTS WHO SUFFER FROM ESPONDILOARTHROSIS

**Adriana Sarmiento de Oliveira**<sup>1</sup> drisarmiento\_2006@hotmail.com

**Lorena Carneiro de Macêdo**<sup>1</sup> lorenacmacedo@gmail.com

**José Roberto da Silva Junior**<sup>1</sup> jr.roberto.jr@gmail.com

**Windsor Ramos da Silva Júnior**<sup>1</sup> windsor.jr@gmail.com

**Danilo de Almeida Vasconcelos**<sup>1</sup> davasconcelos@yahoo.com.br

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## ABSTRACT

**Introduction:** This study had the objective to verify the effects of the chiropractic treatment on the pain, the flexibility and the postural alterations in patients who suffer from espondiloarthrosis, and who were assisted at the Clinical School of Physiotherapy at UEPB. **Materials and Methods:** The sample was composed of 19 female patients, aged between 45 and 69 years old, who suffered from espondiloarthrosis, and who were submitted to a chiropractic treatment protocol, once a week, during ten weeks. The evaluation of the pain was accomplished through the Visual Analog Pain Scale. For the evaluation of the flexibility, the linear measurement was used. The postural evaluation was accomplished through the analysis of digital photograph, with the software AutoCAD 2007. All evaluations were accomplished before starting treatment and immediately after the 10<sup>th</sup> session. The Shapiro-Wilk Test was used to verify the normality of the sample, and the Student's "t" Test was used for the comparison of the paired data. **Results:** Significant differences in the reduction of the pain in the three regions of the vertebral column ( $p < 0.01$ ) were found, especially in the lumbar spine, with 100% of reduction. The body flexibility did not present significant changes. There was an improvement of body posture with significant equilibrium between the scapular and pelvic waists ( $p = 0.013$ ), a decrease in the upper limbs ( $p = 0.017$ ) and lower limbs' ( $p = 0.001$ ) asymmetries and reduction of the anterior posture of the head with significant increase of the craniovertebral angle ( $p = 0.02$ ). **Discussion:** The protocol used in this study was sufficient to promote the reduction of the pain symptoms and for the improvement of postural alterations in patients who suffered from espondiloarthrosis.

## KEYWORDS

Aged, Low Back Pain, Chiropractic, Spine, Manipulation, Orthopedic.

<sup>1</sup> Universidade Estadual da Paraíba - UEPB - Campina Grande - Brazil

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## EFECTOS DEL TRATAMIENTO DE QUIROPRAXIA SOBRE PACIENTES PORTADORAS DE ESPONDILOARTROSIS

## RESUMEN

**Introducción:** Este estudio visó verificar los efectos del tratamiento de quiropraxia sobre el dolor, la flexibilidad y las alteraciones posturales en pacientes portadores de espondiloartrosis, atendidos en la Clínica Escuela de Fisioterapia de la UEPB. **Materiales y Métodos:** La muestra fue compuesta por 19 pacientes del sexo femenino (45 a 69 años), portadoras de espondiloartrosis, que habían sido sometidas a un protocolo de tratamiento de quiropraxia, una vez a la semana, durante diez semanas. La evaluación del dolor fue realizada a través de la Escala Analógica Visual del Dolor. Para evaluación de la flexibilidad fue utilizada la medición lineal. La evaluación postural fue realizada a través de análisis de foto digital, con el software AutoCad 2007. Todas las evaluaciones habían sido realizadas antes de iniciar el tratamiento e inmediatamente tras la 10ª sesión. Fue utilizado el Test de Shapiro-Wilk para verificar la normalidad de la muestra, y el Test “t” de Student para comparación de los datos pareados. **Resultados:** Fueron encontradas diferencias significativas en la reducción del dolor en las tres regiones de la columna vertebral ( $p < 0,01$ ), sobre todo en la columna lumbar, con 100% de reducción. La flexibilidad corporal no presentó cambios significativos. Ocurrió mejora de la postura corporal, con significativo equilibrio entre las cinturas escapular y pélvica ( $p = 0,013$ ), disminución de las asimetrías de los miembros superiores ( $p = 0,017$ ) e inferiores ( $p = 0,001$ ) y reducción de la postura anterior de la cabeza con aumento significativo del ángulo craneovertebral ( $p = 0,02$ ). **Discusión:** El protocolo utilizado fue suficiente para promover reducción de la sintomatología dolorosa y para la mejora de las alteraciones posturales en pacientes portadoras de espondiloartrosis.

## PALABRAS CLAVE

Anciano, Dolor de la Región Lumbar, Quiropráctica, Columna Vertebral, Manipulación Ortopédica.

## EFEITOS DO TRATAMENTO DE QUIROPRAXIA SOBRE PACIENTES PORTADORAS DE ESPONDILOARTROSE

## RESUMO

**Introdução:** Este estudo visou verificar os efeitos do tratamento de quiropraxia sobre a dor, a flexibilidade e as alterações posturais em pacientes portadores de espondiloartrose atendidos na Clínica Escola de Fisioterapia da UEPB. **Materiais e Métodos:** A amostra foi composta por 19 pacientes do sexo feminino (entre 45 e 69 anos), portadoras de espondiloartrose, que foram submetidas a um protocolo de tratamento de quiropraxia, uma vez por semana, durante dez semanas. A avaliação da dor foi realizada através da Escala Analógica Visual da Dor. Para avaliação da flexibilidade foi utilizada a medição linear. A avaliação postural foi realizada por análise de foto digital, através do software AutoCad 2007. Todas as avaliações foram realizadas antes do início do tratamento e imediatamente após a 10ª sessão. Foi utilizado o Teste de Shapiro-Wilk, para verificar a normalidade da amostra e o Teste “t” de Student para comparação dos dados pareados. **Resultados:** Foram encontradas diferenças significativas na redução da dor nas três regiões da coluna vertebral ( $p < 0,01$ ), principalmente na coluna lombar, com 100% de redução. A flexibilidade corporal não apresentou mudanças significativas. Ocorreu melhora da postura corporal, com significativo equilíbrio entre as cinturas escapular e pélvica ( $p = 0,013$ ), diminuição das assimetrias dos membros superiores ( $p = 0,017$ ) e inferiores ( $p = 0,001$ ), além da redução da postura anterior da cabeça, com aumento significativo do ângulo craniovertebral ( $p = 0,02$ ). **Discussão:** O protocolo utilizado foi suficiente para promover redução da sintomatologia dolorosa e para a melhora das alterações posturais em pacientes portadoras de espondiloartrose.

## PALAVRAS-CHAVE

Idoso, Dor Lombar, Quiroprática, Coluna Vertebral, Manipulação Ortopédica.

## INTRODUCTION

The vertebral degenerative disease, or espondiloarthrosis (EA), is the destructive alteration of the cartilages and of the capsuloligamentar apparel of the backbone, due to a non-inflammatory degenerative process, basically in interfacetary osteoarthrosis and degenerative disk disease, occurring mainly as one of the results of the aging process. Of these degenerative alterations in the

intervertebral disks and cartilages turn possible the osteófitos formation and involvement of structures of adjacent soft tissues<sup>1,2,3</sup>.

EA is the most frequent pathology in people above 60 years and rare in people with less than 40 years. The etiology of EA involves loss of balance, among the factors that cause articular disarrangement and wear and the capacity of the interarticular tissues to react<sup>4</sup>.

Clinically, EA is characterized: for the gradual development of articular pain and rigidity, in general of short life and of morning emergence; parestesia; spasms of the paravertebral musculature; limitation of the amplitude movement and deformity, related with osteophyte proliferation and/or secondary synovitis; and postural alterations, frequently installed due to those factors<sup>5</sup>.

The postural deviation of EA promotes a change of position of the corporal segments, implicating in the displacement of the body's center of gravity, for its time that will be responsible for the appearance of rotational moments of the own body to maintain the balance in the biped position, generating like this the perpetuation of the articular, muscular and ligamentous dysfunctions.

According to Alexandre & Moraes<sup>6</sup>, the affections of the muscle-skeleton system, particularly in vertebral pains, constitute a serious problem in the modern society. In Brazil, the muscle-skeleton diseases, with prevalence of the illnesses of the spine, are the first cause of governmental illness-support and the third cause for disability retirement<sup>7</sup>. Epidemic studies relate that 80% of the population will suffer of pains in the spine in some day of their lives<sup>8</sup>.

Pain originating from the several structures of the spine are the main cause of chronic pains<sup>9</sup>. Linton *et al.*<sup>10</sup> esteemed the prevalence of spine pains in the general population in 66%, with 44% of the patients relating pains in the cervical region, 56% in the lumbar region, and 15% in the thoracic region.

Frequently, for the handling of the several problems of the muscle-skeleton system, particularly in vertebral pains, the articular manipulation and mobilization procedures have been used by chiropractors, osteopaths and physiotherapists, owed mainly to their beneficial effects on the restoration of the normal biomechanics and of the physiology of the spinal column.

In this sense, some studies were conducted with the intent of verifying the effects of these procedures in the dysfunctions of the backbone<sup>11,12,13,14</sup>. However, we verified a shortage of studies about the effects of the articular mobilization and manipulation on EA, so much in national as international level.

The present work aimed to verify the effects of the chiropractic handling on the painful symptomatology, the flexibility and the postural alterations in patients who suffers EA, assisted at the Clinical School of Physiotherapy of UEPB.

## MATERIALS AND METHODS

### Approval of the study

This study was approved by the Committee of Ethics and Research of the State University of Paraíba (UEPB) by the Protocol 0113.0.133.000-07.

The present study assisted the Norms for the accomplishing of Research in Human beings. All the volunteers of the research were previously informed about the objectives of the study and they subscribed the term of free and known consent, agreeing in participating in the research. The researchers agreed in assuming the responsibility of execute the emanated regulating guidelines of the Resolution n°. 196/96 of National Council of Health / HM and their Complementary ones, granted by the Decree no. 93833 of January 24, 1987, seeking to assure the rights and duties that concern the scientific community, to the subject of the research and to the State, and the Resolution UEPB/CONSEPE/10/2001 of 10/10/2001.

### Sample

The sample was composed by 19 female patients, espondiloarthrosis (EA) bearers, clinic and radiologically troubleshot, with ages between 45 and 69 years, assisted at the Clinical School of Physiotherapy of UEPB in the period between May and October of 2007. The exclusion criteria were: to present deposits of acute inflammatory lesions; parestesias; osteoporosis; hernia of cervical and/or lumbar disk; neoplasias; osteomyelitis; and age inferior to 40 years or superior to 75 years.

### Procedures for data collection

**Evaluation of the movement amplitude and of the flexibility** - Using the lineal method, with the patient in the biped position, it was made the verification of the flexing, extension, right lateral inclination and left of the cervical and thorax-lumbar spine movements, according to Frisch<sup>15</sup>, before the start of the handling and after 10 services.

**Evaluation of the pain** - Accomplished before and after the 10 services, through the Visual Analog Scale of the Pain (VAS) of 100mm, for the cervical, thoracic and lumbar regions.

**Evaluation postural** - Analysis of the digital picture, known as photoposturogram. Each volunteer of the research was photographed before the first service and after the tenth service, in the ventral, number and profile views. Adhesive markers were used to evidence specific anatomical structures of the body that could suffer visually alterations and be registered through the pictures. The ventral and dorsal views turns possible to study the scales of the scapular and pelvic waists, and the view in profile to analyze the craniovertebral angle in biped position and the tibiotarsus angle in flexing position previous of the trunk.

The marked anatomical structures were: right acromion; left acromion; right antero-superior iliac spine (ASIS); left ASIS; right superior angle of the scapula (SAS);

Left SAS; right inferior angle of the scapula (IAS); Left IAS; right posterior-superior iliac spine (PSIS); left PSIS; tragus, thorny of C7; lateral maleolus; and articular axis of the knee. During these sessions of photos, the patients wore shorts and top or bra, in agreement with the desire and welfare of the patient.

A Sony model Cybershot DSC-W7 7.2 Megapixels photographic camera was used, for register of the location of the marked points, following the protocol: distance of 4m between the chamber and the subject; height of the camera in the mark of the umbilical scar; and the expiratory standard. The tripod, Vanguard VT-518 model, served as support for the camera during the photo sessions. The software used for analysis of the measures was AutoDESK AutoCAD 2007® for Windows.

### Intervention

For the patients' handling, we used the set of mobilization and manipulation chiropractic techniques, denominated Basic Protocol proposed by Souza<sup>16</sup>. This protocol consists of articular mobilizations of the ankles, knees, hips and pelvis, and global manipulations of the lumbar, thoracic and cervical spines. In the work it was made the change of the articular manipulation of the cervical spine of the original protocol for the articular mobilization in flexing, extension, lateral inclination and rotation. Each service spent around 45min, being accomplished a single time a week, always in the same weekly day and in the same schedule, in order to avoid the seasonal effects of the intervening variables. For accomplishing of the protocol a specific stretcher was used for chiropractice.

**Table 1 - Characteristic of the participants**

	age (years)	weight (kg)	stature (cm)	BMI (kg.m <sup>2</sup> )
average	60	75.3	159	29.8
standard deviation	8.9	12.3	0.69	4.5
variance coefficient	14.8	16.3	0.43	15.1

BMI: body mass index

**Table 2 - Postural evaluation in the anterior view**

	Right AGD	Left AGD	Right ISASGD	Left ISASGD
before-service	130.2±6.6	120.0±5.8	92.1±4.3	91.0±4.7
after-service	130.1±7.1	122.6±5.9	91.7±4.0	92.1±4.5

AGD: acromion-ground distance; ISASGD: iliac spine anterior-superior-ground distance

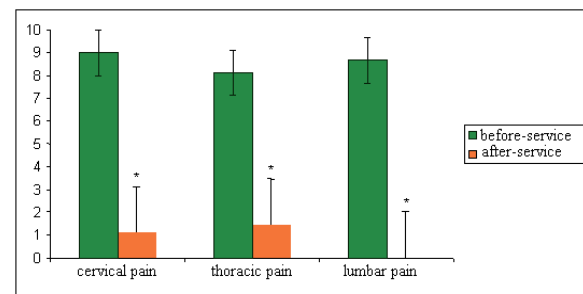
**Table 3 - Postural evaluation of the scales in the anterior view**

	Right-left AGD Difference	Right-left ISASGD Difference	Difference of SLM	Difference of ILM
before-service	0.8±0.6	1.1±0.4	1.1±0.5	1.1±0.4
after-service	0.5±0.9	0.4±0.5 <sup>a</sup>	0.5±0.5 <sup>b</sup>	0.3±0.4 <sup>c</sup>

AGD: acromion-ground distance; ISASGD: iliac spine anterior-superior-ground distance; SLM: superior members; ILM: inferior members

\* significant difference for  $p < 0.05$  (ap = 0.013; bp = 0.017; cp = 0.001)

**Picture 1 - Reduction of the pain for VAS post-protocol service**



\* significant difference for  $p < 0.01$  ( $p = 0.001$ ) (before and after service)

### Statistical analysis

The analysis of the data adopted the descriptive and inferential statistics, through the statistical packet SPSS 16.0 for Windows, initially being used the Test of Shapiro-Wilk to verify the normality of the sample and, later, the Test "t" of Student for data in pair. Was adopted value of  $p < 0.05$  for statistical significance and rejection of the nullity hypothesis.

### RESULTS

The Table 1 presents the characteristic data of the sample. The group was shown homogeneous, with variance coefficient below 25% for the studied variables, as Shikamura<sup>17</sup>, with larger homogeneity in the age and in the stature.

The Picture 1 brings the data regarding the pain reduction in each region of the backbone. In all the three regions there was statistical reduction of the pain levels presented at the end of the 10 services ( $p < 0.01$ ). The

largest reduction happened in the lumbar region that, initially, presented before-value of  $8.67 \pm 1.76$  for VAS. After the service none of the patients reported pain in this region.

The Tables 2, 3, 4 and 5 bring the results of the patients' postural evaluation in the anterior, posterior and profile view. For the data presented in the Tables 2 and 3, we verified significant alteration in the scales of the scapular and pelvic waists, with the impairment of the differences of the right and left ASIS-ground distances, of the differences of the measures of the superior members (SLM) and inferior members (ILM) to the ground. The Table 4 display the statistical improvement in relation to the plan of the scapulas.

The Table 5 display the results on the points related to the postural improvement in profile view, where we verified that all the patients presented, in the first evaluation, an anterior position of head (APH). After the handling, all the patients presented improvement of APH, with the statistical increase of the craniovertebral angle ( $p=0.02$ ). Regarding the global flexibility of the posterior muscular string, there was an indirect improvement of the flexibility, with an impairment of the tibiotarsus angle. However, this improvement did not come in a statistical way.

## DISCUSSION

The average of age and sex of the sample are in agreement with the study made by Peter & Jennifer<sup>18</sup>, which highlight that EA predominantly affects in the feminine sex in the adult age, between the fourth and the fifth decade and in the menopause period, in agreement with the Table 1. The obesity constitutes a risk factor for EA and it increases the pain symptomatology in this situation. The transition of the non-symptomatic apprenticeship for the symptomatic apprenticeship of EA it can result of the interaction of the articular overload, above all for the surplus of corporal weight<sup>19</sup>.

The results presented in the Picture 1 corroborate the conclusion that the chiropractic procedures promote a significantly improvement of the painful symptomatology.

Our results are going to the encounter to the study of Peterson & Bergmann<sup>20</sup>, when they affirm that the procedures that use global articular manipulations promote a general reduction of the muscular spasm, mainly in the spinal column region, and, consequently, of the pain. Linton *et al.*<sup>10</sup> esteemed the prevalence of spine pains in the general population in 66%, with 44% of the patients relating pains in the cervical region, 56% in the lumbar region, and 15% in the thoracic region, being the proportion of symptomatic places in disagreement with our sample.

Cherkin *et al.*<sup>21</sup> affirm that the spine pain is the most common reason than takes patients to use complementary and alternative therapies, as chiropractic (40%), massage (20%) and acupuncture (14%).

Giles & Muller<sup>22</sup> treated 120 patients divided in three groups in agreement with the type of accomplished handling: acupuncture, inflammatory medicine and chiropractic. Each therapy was applied in eight sessions. Just the group treated with chiropractic got statistically significant results, obtaining reduction of cervical pain in 33%, of thoracic pain in 46% and of lumbar pain in 50%, similar to our results.

Lehman *et al.*<sup>23</sup> evaluated the efficacy in other handling ways in the lumbar pain reduction, as trunk exercises to prevent and to treat the lumbar pain. The boardings that use mobilizations and manipulations significantly reduced the lumbar pain<sup>24</sup>.

The modification in the patients' posture can be due to the impairment of the asymmetry, as much of SLM as of ILM. The examination to verify the asymmetry of length of SLM is usually a clinical test used by chiropractors, and its causes can be multiple, as contractures in the lumbosacral junction due to the scoliosis, post-traumatic deformities and hip contractures. All this drives to a muscle-skeleton disequilibrium in the whole body, carting alterations, as much postural as in the standard of the march<sup>25</sup>.

Keller *et al.*<sup>26</sup> showed that the vertebral manipulation can improve the articular mobility and restore the movements in all the anatomical plans, serving, therefore, for

**Table 4 - Results of the postural evaluation in the posterior view**

	Right IASGD	Left IASGD	Right IPSGD	Left IPSGD
before-service	120.0±5.8	120.3±5.9	94.5±4.0	94.0±4.0
after-service	122.6±5.9*	122.5±5.6	94.9±4.4	94.8±4.3

DAIEC: inferior angle of the scapula-ground distance; DEIPSC: iliac spine posterior-superior-ground distance

\* significant difference for  $p < 0.05$  ( $p = 0.048$ )

**Table 5 - Results of the postural evaluation in the profile view**

	craniovertebral angle	tibiotarsus angle
before-service	40.6±5.6	97.7±4.1
after-service	45.7±4.5*	96.4±3.9

\* significant difference for  $p < 0.05$  ( $p = 0.02$ )

the elimination of the kinetic pathological component of the subdislocation complex.

According to Morningstar *et al.*<sup>27</sup>, the contributions of the visual, vestibular and of the articular mechanoreceptors of the skin and of the muscles are the main factors regulators of the static posture. Our research restricted to eliminate the incorrect proprioception originating from the joints, through the reflex effects of the articular manipulations<sup>28,29</sup>. Therefore, any alteration of the other components can continue being responsible for the genesis and permanence of the alterations in the posture.

The usage of the photographic register is capable to mark subtle transformations and to interrelate different parts of the body that are difficult to measure. The photogrammetry allows to accomplish the postural evaluation and to quantify the found alterations. According to Sacco *et al.*<sup>30</sup>, the biomechanical analysis of posture seeking to identify alterations, run by picture, it was shown valid. According to Lunes *et al.*<sup>31</sup>, the photogrammetry for the quantification of the postural asymmetries presented acceptable reliability. For our data, we can infer that the postural development for digital picture, analyzed through AutoDESK AutoCAD 2007® for Windows software, reference can be considered to measure asymmetries, deviations and unevenness of the posture.

We can affirm with this study that the seniors who suffers EA, after the accomplishing of the chiropractic handling protocol, obtained improvements with the reduction of the painful symptomatology and impairment of the current postural alterations of this pathology. We suggested new studies in this area, being used a larger sampling number, seeking to minimize the beta error. We also suggested that other techniques and chiropractic protocols are used, as well as a larger number of weekly sessions, to explore the effects in other age groups and in male patients.

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