

# The Natural Mineral Water of Unhais da Serra as complementary therapy for lumbar spondylarthrosis

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## Abstract

**Introduction:** Lumbar spondylarthrosis represents an important factor in disabling chronic pain and poor quality of life in the adult population and a devastating problem of Public Health for his remarkable social and medical costs. Balneotherapy with sulphurous water shows up as a complementary therapy, less toxic and traumatic. The number of studies assessing the effect of natural mineral waters in the treatment of chronic low back pain is relatively small and this type of treatment is still viewed with some scepticism by the scientific community.

**Objective:** Determine whether treatments with Unhais da Serra natural mineral water are effective in low back pain for spondylarthrosis.

**Methodology:** A descriptive, longitudinal, observational, uncontrolled prospective study was conducted. The 51 study participants underwent 14 days of treatment with Unhais da Serra natural mineral water. Assessment criteria were: pain intensity (Visual Analogue Scale), quality of life (SF36v2), disability (ODIv2), absenteeism, acute outbreak, drug consumption. The evaluation was conducted in four distinct stages: the first day before, 14 days, 3 and 6 months after the spa treatment.

**Results:** The mean age of the sample was 60.53 years, 60.8% were female. The duration of illness was, on average, 7.35 years. There was a statistically significant improvement ( $p < 0.05$ ) in pain intensity, quality of life, disability, absenteeism and drug consumption, 14 days, 3 and 6 months after treatment compared to baseline. There was no effect on the number of acute outbreak.

**Conclusion:** Treatment with natural mineral water of Unhais da Serra Spa, proved to be effective in selected patients with lumbar spondylarthrosis to short and medium term.

**Key words:** mineral water, hydrotherapy, spine osteoarthritis

Las Aguas Mineromedicinales de Unhais da Serra como terapia  
complementaria en la espondiloartrosis lumbar

## Resumen

**Introducción:** La espondiloartrosis lumbar es una importante causa de dolor crónico en la población adulta, que incapacita a los enfermos y les disminuye la calidad de vida, constituyendo un grave problema de Salud Pública con gastos económicos e sociales elevados. La Balneoterapia con agua sulfurada es una terapia complementaria que presenta menores efectos tóxicos e traumáticos que las terapias convencionales, aunque haya aún dificultades en su aceptación por parte de la comunidad científica, ya que el número de estudios para determinar su potencial efecto en el tratamiento del lumbago sea muy limitado.

**Objetivo:** Determinar si la utilización de las aguas mineromedicinales de Unhais da Serra son efectivas en el tratamiento del lumbago debido a espondiloartrosis.

**Metodología:** Estudio descriptivo, longitudinal, observacional, no controlado, que incluyó 51 individuos en tratamiento con agua mineromedicinal de Unhais da Serra en un periodo de 14 días. Los criterios de inclusión fueron la intensidad del dolor (Escala Visual Analógica), la calidad de vida (SF6v2), la incapacidad (ODIv2), el absentismo laboral, las agudizaciones y el consumo de fármacos. La evaluación se realizó en 4 etapas: el día previo al inicio del tratamiento y el 14º día del mismo; a los 3 y a los 6 meses después de su finalización.

**Resultados:** La edad media de la muestra fue de 60,53 años y 60,8% eran mujeres. En media, la duración de la enfermedad era de 7,35 años. Se observó una mejoría de la intensidad del dolor, de la calidad de vida, de la incapacidad y absentismo laboral y de la toma de fármacos a los 14 días, a los 3 y a los 6 meses. Estas diferencias fueron estadísticamente significativas ( $p < 0,05$ ). Por otra parte, no se observó cualquier efecto sobre el número de agudizaciones de la enfermedad.

**Conclusión:** El tratamiento con el agua mineral natural de Unhais da Serra demostró eficacia en el tratamiento de los pacientes con espondiloartrosis lumbar a corto y a mediano plazo.

**Palabras clave:** agua mineral, hidroterapia, artrosis lumbar

## REFERENCIA NORMALIZADA

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## INTRODUCTION

### Hydrotherapy

Hydrotherapy is one of the basic methods of treatment widely used in the system of natural medicine, which is also called as water therapy, aquatic therapy, pool therapy, and balneotherapy. Use of water in various forms and in various temperatures can produce different effects on different system of the body<sup>1</sup>.

Balneotherapy has been defined recently as the use of natural mineral waters, natural peloids and mud, and natural sources of different gases for medical purposes such as prevention, treatment, and rehabilitation<sup>2</sup>. It can be administered at spas with a special resort environment and atmosphere or elsewhere<sup>3</sup>. It is an ancient, traditional treatment modality used in Europe and in other parts of the world<sup>4-5</sup> for musculoskeletal<sup>6</sup>, and many other disorders, usually chronic and often disabling, in addition to the usual pharmacological treatment.

During the last 30 years, a number of controlled trials have demonstrated the efficacy of balneotherapy in treating certain diseases. The number of studies evaluating the effect of natural mineral water in the treatment of chronic low back pain is relatively small. However, the results are consistent and demonstrate its effectiveness, pointing to an improvement in the health status of patients<sup>7-14</sup>. Although the mechanism of the action of balneotherapy is still unclear, its efficacy appears confirmed by recent reviews<sup>15-16</sup>.

### Spa in Portugal and Unhais da Serra

Portugal is rich in natural mineral water throughout the country, with highest incidence in the north and center. The earliest records of activity in Portugal date back to the city of Braga and the history of development of spa and the use of mineral water is associated with the Roman culture<sup>17</sup>. Unhais da Serra is a portuguese parish of the county Covilhã in the countryside (Figure 1). The use of

**Figure 1** – Localization of Unhais da Serra in Portugal



natural mineral water of Unhais da Serra for therapeutic purposes dates back to the century XVII. This is a very deep water circulation, originating in the highest mountain in Portugal, Serra da Estrela, classified as "weakly mineralized water, sweet, with alkaline reaction and from the point of view ionic, sodium bicarbonated, carbonated, fluoridated, with a "structure type" of sulphurous waters."<sup>18</sup>. The therapeutic indications attributed to Unhais da Serra mineral water are: rheumatic and musculoskeletal, respiratory, circulatory and digestive system.<sup>18</sup>. Unhais da Serra Spa is open all year and is integrated into a hotel, the H2otel.

### **Lumbar Spondylarthrosis**

Lumbar spondylarthrosis is a type of degenerative disease of the spine whose prevalence is around 80% in the general population<sup>19</sup>. Usually originates from a lesion, presenting as an acute episode, of which 70-90% of cases resolve within 2-4 weeks, followed by pain and various factors that lead to chronic state.

Chronic low back pain has a remarkable social and economic impact with very high direct and indirect costs<sup>19-20</sup>. Reaching a part of the working-age population, chronic low back pain appears as one of the leading causes of absenteeism and significant productivity break, especially in industrialized countries<sup>19</sup>. In Portugal is 20-25% of consultations in general practice<sup>22</sup>.

The quality of live (QoL) of an individual with chronic low back pain can be seriously affected<sup>19</sup>. One study found that 80% of all patients with osteoarthritis have shown limitations in their daily activities in the small tasks of daily routine, laser activities and work<sup>21</sup>.

Conservative treatment is based on the adapted regular exercise, postural advice, acquisition of ideal weight and drugs. They are used primarily analgesics and nonsteroidal anti-inflammatory drug (NSAID) and long-term muscle relaxants in case of muscular contracture<sup>19-23</sup>.

Thus, lumbar spondylarthrosis is an important factor in disabling chronic pain and lower QoL in the adult population, and a devastating public health problem for its remarkable social impact and medical costs. The balneotherapy with sulphurous water shows up as a complementary therapy less toxic and traumatic that improves the clinical condition of the patient.

The main purpose of this investigation is to determine whether treatment with natural mineral water of Unhais da Serra is effective in lumbar spondylarthrosis.

## **METHODOLOGY**

### **Patients**

This study was carried out in the Spa of Unhais da Serra, Portugal. It was a descriptive, longitudinal, observational, uncontrolled prospective study. Population

was the patients who attended Unhais da Serra Spa in 2010 and the data collection was done from January to July of the same year.

Adult patients were included in both sexes and any age, with lumbar osteoarthritis diagnosed by x-rays, with localized pain in the lower back region with or without sciatica, with at least 3 months of evolution. Exclusion criteria were: contraindication (immune deficiency, evolving cardiovascular conditions, cancer, infection) or intolerance to any aspect of spa treatment; spa treatment within the previous 6 months and those who do not accept participate in the study. A total of 51 patients complete the study, outpatients or hosted.

### **Intervention**

It was requested collaboration of physicians working on Spa towards the identification of patients for the study and accessed the clinical files of patients.

Daily treatment included: mineral hydrojet sessions at 37°C for 15 minutes, jet shower (unless in a crisis) at 39°C for 4 minutes or vicky massage shower at 39°C for 15 minutes and bertolhet's technique at 42 °C for 12 minutes, daily.

Assessments were carried out in four occasions: at the beginning (evaluation 0) and at the end of the treatment (evaluation 1), and 3 (evaluation 2) and 6 months (evaluation 3) after the treatment.

Assessment criteria were:

- Pain intensity: by Visual Analogue Scale (VAS)<sup>24</sup> where 0 means complete absence of pain and 10 the maximum tolerable level of pain.
- Quality of life: by Medical Outcomes Study 36 - Item Short Form v2 (SF36v2). The SF36 is a generic tool developed by Ware et al<sup>25</sup>, built as a generic indicator of health status. It allows to evaluate the state QoL in general, not specifically focusing on an age group, disease or treatment. It is a questionnaire easy to administer and understand, self-report type. This questionnaire consists of 36 items grouped into 8 subscales or dimensions that assess different areas of health. It was used the Portuguese version of the scale<sup>26-27</sup>. Higher values represent better QoL.
- Disability: by Disability Assessment by Oswestry Disability Index (ODIv2), developed to measure disability in people with back pain. It is a self-administered questionnaire, taking about 5 minutes to complete. It includes 10 sections that evaluate various daily activities and the patient should answer the question in relation to the same day ("today"). Higher values represent worst function.
- Labor Absenteeism: was asked which the number of days that broke their labor activity or daily routine activity (eg. home or student) for reasons associated with the disease under study.
- Numbers of acute outbreaks: was defined as acute attack the need for doctor visits.

- Drug consumption: participants were asked about the number of units taken per week, on average, of the following drug classes: analgesics, NSAIDs, muscle relaxants. There has been no restriction on taking drugs during treatment or during follow-up period.

Relatively to absenteeism, acute outbreaks and drug consumption, at the first evaluation it was asked about the period of 6 months before, and in follow up period about preliminary assessment.

### **Follow-up and data collection**

At each visit, the patients filled in self-assessment. Before and after the treatment, tolerance and proper performance of the various treatments were checked by an independent physician. At 3 and 6 months these forms were completed at home and returned to the Spa by post.

### **Statistical methods**

A descriptive and inferential analysis was performed. We use parametric tests when the normal conditions and homogeneity of variances have occurred. To evaluate the effect of spa treatment at different times we appealed to the Student t parametric test for paired samples. Alternatively, we used non-parametric Wilcoxon test. For all tests concludes by rejecting the null hypothesis when the significance probability is less than or equal to 0.05.

The missing values corresponded to <20% of the data and were replaced by the mean of the variable.

The whole procedure of data was performed using the 18.0 version of SPSS (Statistical Package for Social Sciences).

This study took account of the ethical principles relating to voluntary participation, anonymity and confidentiality of responses. All participants completed the free and informed consent.

## **RESULTS**

### **Statistical Sample characterization**

Of participants, 31 were female and 20 male. Age was between 41 and 79 years and the mean age was 60.5 years with a standard deviation of 9.88. Predominated individuals of the 5th and 6th decades of life corresponding to 64.7% of the population. Disease duration ranged from 1 to 22 years and the average duration of 7.35.

### **Pain intensity**

Table 1 presents statistics of scale assessment of pain intensity in the different stages of evaluation. Immediately before the treatment, participants had a mean

pain intensity of 6, with standard deviation of 1.81. It is noted that the intensity of pain perceived by patients decreased significantly ( $p < 0.05$ ) after the treatment, keeping for 6 months (the greatest decrease was observed at this point).

**Table 1** - Visual Analogue Scale

Evaluation	Mean	SD	$\Delta$	p value
0	6	1,81		
1	4,78	1,78	-1,22	0,00#
2	4,63	1,68	-1,37	0,00#
3	4,39	1,4	-1,61	0,00#

# Wilcoxon test,  $\Delta$  - varying means

### Quality of Life

The health status perceived by patients varied in the different moments of evaluation. For the analysis of Table 2, there was an improvement in QoL over time. In fact, it is found that the patients had at the first evaluation an average of QoL 43.15 and 55.49 of evaluation 3. The change was positive at all times and higher gain QoL was found after 6 months (+12.34) of treatment. The results suggest that the increase in QoL perceived by patients is statistically significant when compared evaluation 0 with 1, 2 and 3 (for  $p < 0.05$ ).

**Table 2** - Quality of Life

Evaluation	Mean	SD	$\Delta$	p value
0	43,15	17,55		
1	52,06	13,85	+8,91	0,00‡
2	53,72	13,48	+10,69	0,00‡
3	55,49	12,00	+12,34	0,00‡

‡ Student t test for paired samples,  $\Delta$  - varying means

### Oswestry Disability Index

According to Table 3, there was a statistically significant reduction in disability after the treatment keeping for 6 months. The greatest reduction was observed after 3 months of treatment.

**Table 3** - Visual Analogue Scale

<b>Evaluation</b>	<b>Mean</b>	<b>SD</b>	<b>Δ</b>	<b>p value</b>
0	41,59	19.58		
1	29.51	18.90	-12,08	0.00#
2	28.24	18.34	-13,35	0.00#
3	28.93	18.71	-12,66	0.00#

# Wilcoxon test, Δ - varying means

### Absenteeism Labor and acute outbreaks

In the 6 months before the treatment, patients missed an average of 4.22 days to their professional activities, and the maximum recorded was 15 days. There was a statistically significant decrease ( $p < 0.05$ ) within 6 months after the treatment (Table 4).

**Table 4** - Absenteeism

<b>Evaluation</b>	<b>Mean</b>	<b>SD</b>	<b>Δ</b>	<b>p value</b>
- 6 months	4,22	3,78		0,02#
+ 6 months	3,46	3,41	-0,76	

# Wilcoxon test, Δ - varying means

For acute outbreaks, there is a slight non-significant increase ( $p = 0.74$ ) after treatment (Table 5).



**Table 5** - Acute outbreaks

<b>Evaluation</b>	<b>Mean</b>	<b>SD</b>	<b>Δ</b>	<b>p value</b>
- 6 months	1,53	1,25		0,74#
+ 6 months	1,59	1,66	0,06	

# Wilcoxon test, Δ - varying means

**Drug consumption**

The class of drugs most consumed among patients was NSAIDs followed by analgesics. The weekly consumption of the three classes of drugs studied decreased significantly ( $p < 0.05$ ) when comparing the evaluation 1, 2, 3 with evaluation 0. Therefore, this decrease continued until 6 months after treatment (Table 6). The greatest reduction occurred up to 14 days for analgesics and at 3 months to NSAIDs (Table 7) and muscle relaxants (Table 8).

**Table 6** - Analgesics weekly consumption

<b>Evaluation</b>	<b>Mean</b>	<b>SD</b>	<b>Δ</b>	<b>p value</b>
0	4,34	2,90		
1	2,10	1,69	-2,24	0,00#
2	2,14	1,77	-2,20	0,00#
3	2,41	1,63	1,93	0,00#

# Wilcoxon test, Δ - varying means

**CONCLUSION**

In carrying out this research we are faced with some limitations. The sample was obtained for reasons of convenience and economic constraints of time and the questionnaire proved to be a bit long. The existence of a control group would have been ideal and perhaps this has been the main limitation of this investigation, together with the sample size.

**Table 7** - NSAIDs weekly consumption

<b>Evaluation</b>	<b>Mean</b>	<b>SD</b>	<b>Δ</b>	<b>p value</b>
0	4,69	3,35		
1	1,96	1,93	-2,73	0,00#
2	1,90	1,91	-2,79	0,00#
3	2,29	2,05	-2,40	0,00#

# Wilcoxon test, Δ - varying means

**Table 8** - Muscle relaxants weekly consumption

<b>Evaluation</b>	<b>Mean</b>	<b>SD</b>	<b>Δ</b>	<b>p value</b>
0	2,98	2,25		
1	1,62	1,43	1,36	0,00#
2	1,47	1,27	-1,51	0,00#
3	1,53	1,46	-1,45	0,00#

# Wilcoxon test, Δ - varying means

This investigation showed that 14 days of treatment with the natural mineral water of Unhais da Serra reduced the pain, disability and drug consumption, improved QOL, not influencing the number of acute episodes presented by patients with. All the beneficial effects observed in the short and medium term (6 months). Thus, treatment with this mineral water appeared to be an effective additional therapeutic modality in lumbar spondylarthrosis patients.

By the huge socio-economic impact of the disease under study and other musculoskeletal disorders, acquaint patients and their physicians with this treatment seems justified and useful. Additionally the spa is the ideal place to allow the patient position yourself as co-actor of his health. This preventive approach calls for therapeutic patient education, practice going to be defended in modern times.

This was another modest contribution showing some of the potential of mineral water of Unhais da Serra Spa.

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