



# Acupuncture in the Treatment of a Series of Patients with Chronic Pain Associated with Hip Osteoarthritis

## *Acupuntura no tratamento de uma série de pacientes com dor crônica associado à osteoartrite de quadril*

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### Abstract

**Objective** Hip osteoarthritis (HO) causes pain and deranges functioning. Surgical treatment is the preferred approach in severe cases, but clinical comorbidities, age and the long waiting list may compromise quality of life. This study aimed to describe the results of acupuncture for the control pain and improvement of functioning in subjects with HO. **Method** Twelve severe HO patients were treated with ten weekly sessions of a standardized acupuncture point protocol. Pain intensity was assessed with the Visual Analog Pain Scale (VAS) and quality of life with WOMAC Index.

### Keywords

- ▶ osteoarthritis
- ▶ hip
- ▶ acupuncture
- ▶ pain
- ▶ quality of life

**Results** Pain intensity (VAS) reduced from  $75.8 \pm 18.8$  mm to  $20.0 \pm 22.6$  mm after 10 acupuncture sessions and  $48.3 \pm 26.6$  mm in the follow-up (ANOVA  $F = 7.99$ ;  $p < 0.001$ ). WOMAC Index values reduced from  $74.7 \pm 12.7$  to  $45.7 \pm 22.1$  and  $54.6 \pm 22.9$  at the same timepoints.

**Conclusion** Acupuncture is an effective conservative rehabilitation strategy to reduce pain and improve quality of life in subjects with severe HO.

### Resumo

**Objetivo** A osteoartrite (OA) de quadril causa dor e perda da funcionalidade. O tratamento cirúrgico é a procedimento de escolha nos casos graves, mas as comorbidades clínicas, a idade e a longa lista de espera podem comprometer a qualidade de vida. Este estudo teve como objetivo descrever os resultados da acupuntura no controle da dor e melhora da funcionalidade em indivíduos com OA de quadril.

**Método** Doze pacientes com OA de quadril grave foram tratados com dez sessões semanais de um protocolo padronizado de pontos de acupuntura. A intensidade da dor

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**Palavras-chave**

- ▶ acupuntura
- ▶ dor
- ▶ qualidade de vida
- ▶ osteoartrite
- ▶ Quadril

foi avaliada pela Escala Visual Analógica de Dor (EVA) e a qualidade de vida pelo Índice WOMAC.

**Resultados** A intensidade da dor (EVA) reduziu de  $75,8 \pm 18,8$  mm para  $20,0 \pm 22,6$  mm após 10 sessões de acupuntura e  $48,3 \pm 26,6$  mm no período de seguimento (ANOVA  $F=7,99$ ;  $p < 0,001$ ). Os valores do Índice WOMAC reduziram de  $74,7 \pm 12,7$  para  $45,7 \pm 22,1$  e  $54,6 \pm 22,9$  nos mesmos momentos.

**Conclusão** A acupuntura é uma estratégia de reabilitação conservadora eficaz para reduzir a dor e melhorar a qualidade de vida em indivíduos com OA de quadril grave.

**Introduction**

Hip osteoarthritis (HO) is a prevalent joint disease which is characterized by pain both during rest or, most commonly, while standing, walking, and moving around. The treatment of HO aims to relieve pain and restore functioning and quality of life. Severe anatomic impairment of the joint is satisfactorily treated with hip replacement, but old age, comorbidities<sup>1</sup> and the long waiting lists for this procedure in the Brazilian public health system<sup>2</sup> demand conservative analgesic and rehabilitative interventions for these patients.

Acupuncture, used in China and other Asian countries over the last 3,000 years, represents a valuable complementary therapy for pain control,<sup>3</sup> in addition to representing lower health costs by reducing the number of prescription drugs and hospitalizations.<sup>4</sup>

A recent systematic review on the effects of acupuncture on HO concluded, however, that acupuncture has little or no effect in reducing pain or improving function relative to sham acupuncture.<sup>5</sup> However, many studies included in this review have methodologic limitation and comprise control groups with a weak acupuncture effect. Given this scenario, acupuncture should be tested as a conservative treatment to total hip replacement (THR).

This study aimed to describe the results of acupuncture treatment for analgesia and improved quality of life in a series of patients with severe HO in a waiting list for THR.

**Methods**

This study was approved by the Internal Review Board at the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto (HCRP) (Protocol 4,105,165 and CAAE 32396920.9.0000.5440) and the subjects signed an informed consent form.

Five women and seven men with severe HO (mean age:  $57.9 \pm 10.6$  years) were prospectively recruited of rehabilitation outpatient clinic from June 2020 to January 2021. The sample size was calculated using the Sample Size Calculation tool from the MGH Biostatistic Center. Eleven participants were required for 80% power to detect difference of 25% in the pain VAS, assuming  $SD=25$  mm and significance level of 0.05. We started the study with fifteen participants to prevent dropout losses and ended the study with a total of twelve individuals. The COVID19 pandemic restricted sample size because of the health care interruption. Quantitative

variables were summarized by measures of central tendency and dispersion, while categorical variables were classified and summarized by percentages of categories. After verifying the normality of the distribution of variables, the ANOVA test for repeated measures was used to test the hypothesis that pain intensity and functioning would improve with treatment. The significance level was 0.05.

Subjects should be adults diagnosed with unilateral HO according to clinical criteria,<sup>6</sup> be classified as grade three or four in the Kellgren-Lawrence radiological classification,<sup>7</sup> present with pain intensity greater than four assessed by the Visual Analog Scale (VAS), failure in conservative treatment consisting of: exercises, pharmacological therapies such as analgesics or anti-inflammatory drugs, use of walking aids, or no improvement when performing trigger point blocks<sup>8</sup>; and not being previously treated with acupuncture were also required. Exclusion criteria included any limitation to understand the assessment or treatment, difficulty in clinical follow-up and attendance at reassessments for any reason, other diagnoses of hip or other lower limb painful condition.

The first assessment was performed immediately after recruitment and subjects pain intensity was assessed with VAS.<sup>9</sup> The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) considers three dimensions of functioning of HO: pain (range 0–20 points), stiffness (range 0–8 points) and physical function (range 0–68 points),<sup>10</sup> and the ten-meter walk test (performed on a flat, 14-meter straight surface for the highest possible walking speed).<sup>11</sup> The Medication Consumption Diary quantified the use of analgesics and anti-inflammatories to relieve pain.<sup>12</sup> Two other evaluations were performed immediately after treatment and five weeks after the end of treatment.

For ten acupuncture sessions, subjects were laterally positioned over the unaffected side. The treatment was performed by the same physician (RA – five years of acupuncture practice, board certified) with deep insertion of sterile acupuncture needles (0.30mm diameter, 70mm length) until the “de Qi” sensation for 20 minutes. Six points were used: GB29, GB30, GB34, GB36, BL62, SJ5<sup>13,14</sup> based on Traditional Chinese Medicine (TCM) techniques.<sup>15</sup>

All participants also received the standard treatment at the HCRP Rehabilitation Center, which includes physiotherapy at the institution and behavioral and exercise guidance at home, as well as the use of optimized medications.

**Table 1** Baseline biodemographic and clinical data of HO subjects

Baseline biodemographic and clinical data of HO subjects	
Variable	n (%)
<b>Gender</b>	
Male	7 (58.4%)
Female	5 (41.6%)
<b>Affected Side</b>	
Right	2 (16.7%)
Left	10 (83.3%)
Variable	Mean (SD)
Age (years)	57.9 (10.6)
Diagnosis Time (years)	19.5 (14.0)
VAS (mm)	75.8 (18.8)
WOMAC (points)	74.7 (12.7)
Ten-meter walk test (seconds)	17.4 (14.9)

## Results

All twelve patients remained until the end of the study. The biodemographic and baseline clinical data of HO subjects is illustrated in ►Table 1.

Pain intensity (VAS) reduced from  $75.8 \pm 18.8$  mm to  $20.0 \pm 22.6$  mm after 10 acupuncture sessions and  $48.3 \pm 26.6$  mm in the follow-up (►Fig. 1–ANOVA  $F = 7.99$ ;  $p < 0.001$ ). After treatment, there was a significant decrease in mean pain of  $55.8 \pm 28.4$  mm on the 100 mm VAS ( $p < 0.001$ ), which corresponded to a reduction of 73.6%. At the follow-up assessment, the VAS increased, but did not return to baseline levels.

Mean WOMAC scores decreased significantly from  $74.7 \pm 12.7$  (pre-treatment) to  $45.7 \pm 22.1$  (post-treatment;

$p = 0.003$ ) and  $54.6 \pm 22.9$  (five-weeks follow-up;  $p = 0.02$ ) (►Fig. 2), demonstrating a lasting effect for more than five weeks.

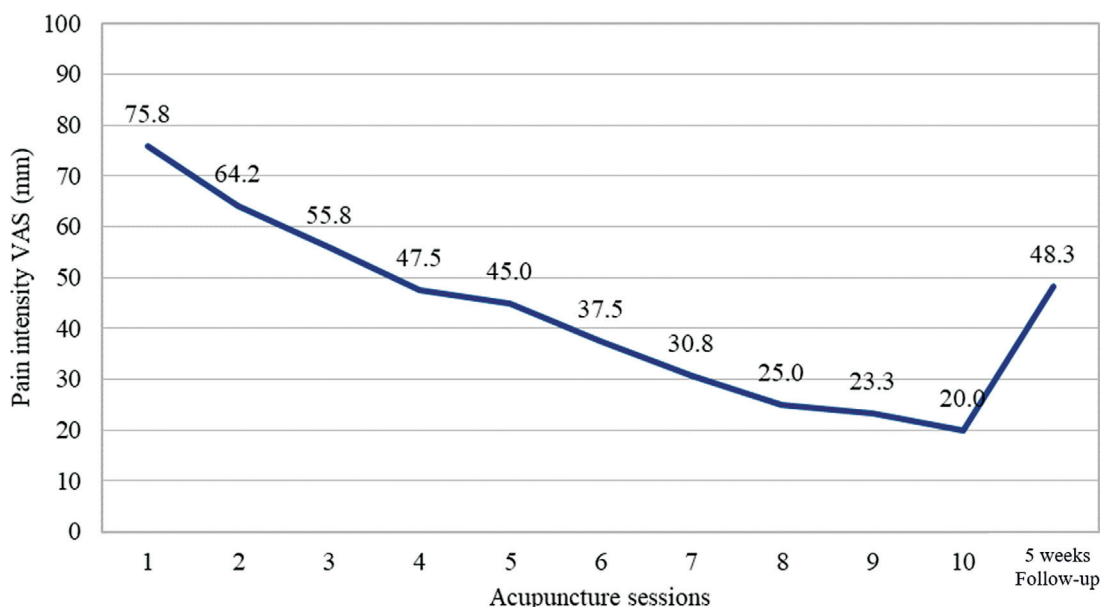
Significant changes were not observed in mean ten-meter walk tests scores. Subjectively, all patients reported improvement in pain, and quality of life, and reduced pain killing drugs consumption. Eight participants did not use medication in the last week of treatment; and the four participant who needed daily medication reduced its consumption by 70%. No serious adverse effects of acupuncture treatment were observed; some patients felt pain or slight bleeding at the needle insertion sites, with spontaneous resolution within a few seconds.

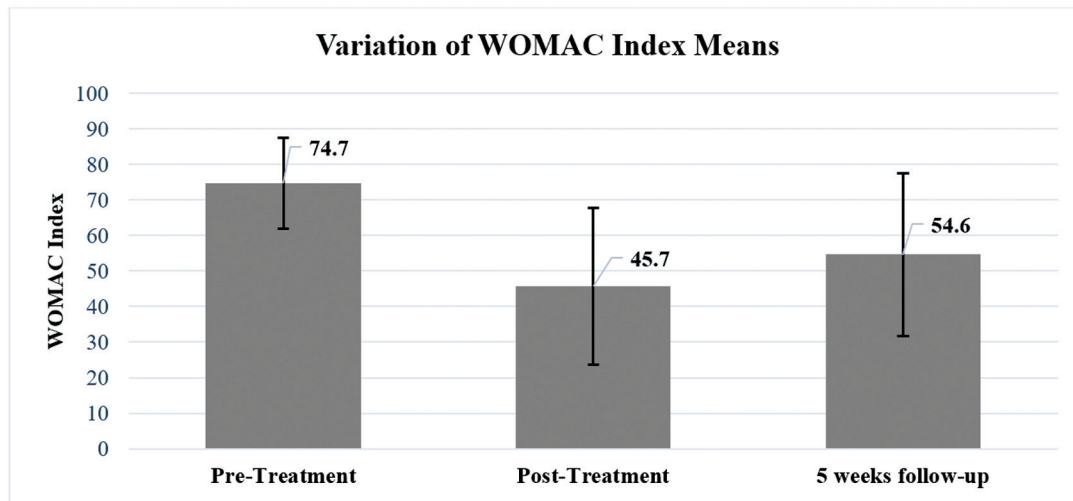
## Discussion

This case series confirmed our initial hypothesis of the potential therapeutic use of acupuncture in subjects with a severe HO indicated for THR, because of substantial improvement pain, functioning, and quality of life summed to reduction in analgesics and anti-inflammatory drugs consumption, but not in terms of walking speed.

Two randomized clinical trials compared real acupuncture with a control group. Fink et al.<sup>13</sup> and White et al.<sup>16</sup> demonstrated a reduction in mean EVA of 18 mm and 17 mm, respectively, after treatment with acupuncture, which was much less than 55.8 mm as we observed. Wider improvement in pain control is explained by the selection subjects with more intense pain (VAS =  $75.8 \pm 18.8$  mm; while Fink had mean baseline of  $54.6 \pm 18.9$  mm and White,  $60.5 \pm 14.2$  mm), although total number and duration of sessions was similar.

Also, the choice of more effective acupuncture points may explain the more intense results. While Fink used a protocol of local and distant points for all patients (Ashi points on the hip, GB30, GB31, GB34, E40, B37, and B54), White let the therapist free to choose acupuncture points of his preference. Out of the

**Fig. 1** Evolution of Mean Pain VAS throughout the acupuncture sessions and follow-up.



**Fig. 2** Variation of WOMAC Index means before treatment with acupuncture, after the treatment, and five weeks after the end of the treatment.

TCM theories of energy harmonization, the cumulative and lasting effect of acupuncture can be explained by the reduction of nociceptive input, which may lead to improved mobilization of joints and lower limbs, which result in less limitation and progressive pain control. Additional acupuncture sessions may strengthen the initial analgesic effect and enhance a virtuous therapeutic cycle.

Functioning improvement assessed by WOMAC was documented in studies with anti-inflammatory<sup>17</sup> or analgesic drugs or pain controlling procedures like obturator nerve block,<sup>18</sup> which are therapeutic interventions in which the anatomic deformities of HO are not modified. For patients undergoing THR, mean WOMAC reduction ranges from 50 to 70 points after surgery.<sup>19</sup> This study demonstrated that acupuncture decreased WOMAC scores by 29 points.

Insertion of the acupuncture needle stimulates a wide peripheral neural network and reaches the central nervous system, promoting a phenomenon of neuromodulation at three levels - local, spinal, and supraspinal - resulting in the release of various substances, mainly neurotransmitters such as opioid peptides (enkephalin, dynorphin, and beta endorphin) and monoamines (serotonin, norepinephrine, histamine, dopamine), modulating motor, sensory, autonomic, neuroendocrine, and emotional functions.<sup>20</sup> For this, we use local hip points and distant points that act indirectly on the hip region or musculoskeletal structures. Points GB29 and GB30, are closely related to local neuromuscular structures: GB29 is superficially related to the tensor fasciae latae muscle, the lateral cutaneous nerve of the thigh; and deeply related to the muscular branches of the femoral nerve.<sup>15</sup> GB30 is superficially related to the gluteus maximus muscle and the inferior margin of the piriformis muscle, as well as with the middle cluneal nerves; and deeply related to the inferior gluteal and sciatic nerves.<sup>15</sup> Riberto et al.<sup>21</sup> described the presence of trigger points associated with myofascial pain syndrome and the symptom of persistent pain and disability in patients with HO, and later described the result of treating this syndrome with 1% lidocaine blockade for

reduced pain and increased pressure pain measurement.<sup>22</sup> The muscles in which trigger points were most frequently identified in these studies were: piriformis (20%), iliopsoas (18%), long adductor (18%), gluteus medius (12%), gluteus minimus (12%), which are penetrated while needling of points GB29 and GB30.

The benefits demonstrated in this article are the result of ten acupuncture sessions, performed during five weeks, however, acupuncture can be maintained indefinitely, further prolonging its effect. Furthermore, this therapeutic modality has no absolute contraindications<sup>23</sup> and reports of serious adverse effects are rare.<sup>24</sup>

Given that this is a pilot project, this series of cases has limitations regarding its sample size and lack of comparison with control groups. The clinical follow-up period of patients was relatively short: only ten weeks; but for patients with such intense and prolonged complaints, the intensity and duration of the results were clinically significant. We suggest a randomized controlled trial to confirm the therapeutic superiority of real acupuncture over sham acupuncture or conventional treatment.

## Conclusion

Acupuncture is an effective conservative rehabilitation strategy to reduce pain and improve quality of life in subjects with severe HO, and these benefits can last for at least five weeks post-treatment.

### Authors' Contributions

RA wrote the manuscript, performed data collection and intervention. MR supervised the research, performed the statistical analysis of the data and revised the manuscript. All authors read and approved the final manuscript.

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**Conflict of Interests**

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