



Phonophoresis with 2 % lidocaine and kinesitherapy as a treatment for subacromiodeltoid bursitis

Fonoforesis con lidocaína al 2 % y kinesioterapia como tratamiento de la bursitis subacromiodeltoidea

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ABSTRACT

Introduction: subacromiodeltoid bursitis is a common cause of shoulder pain and disability, significantly impacting patients' functionality and quality of life. The search for effective treatments that combine modalities for pain control and functional recovery is essential in rehabilitation.

Objective: to determine the efficacy of phonophoresis with 2% lidocaine combined with physical therapy in the treatment of subacromiodeltoid bursitis.

Methods: A quasi-experimental, longitudinal, and analytical study was conducted in 72 patients. The intervention consisted of 15 sessions of pulsed therapeutic ultrasound (3 MHz, 0.6 W/cm², 10 min) applied as phonophoresis with 2 % lidocaine, combined with a kinesitherapy program that included isometric exercises, Codman pendulum exercises, active mobilizations, and pulley exercises. Pain intensity was assessed using the Likert test, and joint range of motion was assessed using goniometry at the beginning and end of treatment.

Results: the majority of patients were male (63,9 %) and in the 40-49 age group (38,9 %). Traumatic causes predominated (86,1 %). After treatment, a highly significant improvement ($p < 0.01$) was observed in pain intensity and joint mobility 72,2 % of patients achieved a final evaluation of excellent or good.

Conclusion: the combination of phonophoresis with 2 % lidocaine and physical therapy proved to be an effective intervention for relieving pain and improving function in patients with acute or subacute subacromiodeltoid bursitis.

Keywords: Bursitis; Phonophoresis; Physical Therapy; Shoulder Pain; Ultrasound Therapy; Functional Recovery

RESUMEN

Introducción: la bursitis subacromiodeltoidea es una causa frecuente de dolor e incapacidad del hombro, impactando significativamente la funcionalidad y calidad de vida de los pacientes. La búsqueda de tratamientos eficaces que combinen modalidades para el control del dolor y la recuperación funcional es fundamental en rehabilitación.

Objetivo: determinar la eficacia de la fonoforesis con lidocaína al 2% combinada con kinesioterapia en el tratamiento de la bursitis subacromiodeltoidea.

Métodos: se realizó un estudio cuasi-experimental, longitudinal y analítico en 72 pacientes. La intervención consistió en 15 sesiones de ultrasonido terapéutico pulsátil (3 MHz, 0.6 W/cm², 10 min) aplicado como fonoforesis con lidocaína al 2 %, combinado con un programa de kinesioterapia que incluyó ejercicios isométricos, pendulares de Codman, movilizaciones activas y trabajo con polea. La intensidad del dolor se evaluó con el test de Likert y el rango de movimiento articular mediante goniometría al inicio y al final del tratamiento.

Resultados: la mayoría de los pacientes eran del sexo masculino (63,9 %) y del grupo etario de 40-49 años (38,9 %). Las causas traumáticas predominaron (86,1 %). Tras el tratamiento, se observó una mejora altamente significativa ($p < 0.01$) en la intensidad del dolor y la movilidad articular. El 72,2 % de los pacientes alcanzó una evaluación final excelente o buena.

Conclusión: la combinación de fonoforesis con lidocaína al 2 % y kinesioterapia demostró ser una intervención eficaz para aliviar el dolor y mejorar la funcionalidad en pacientes con bursitis subacromiodeltoidea aguda o subaguda.

Palabras clave: Bursitis; Fonoforesis; Kinesioterapia; Dolor de hombro; Ultrasonoterapia; Recuperación funcional

INTRODUCTION

The shoulder joint, as the proximal connection of the upper limb to the trunk, is one of the most important anatomical regions of the human body. Its wide range of motion is crucial for performing activities of daily living and interacting with the environment, but it also makes it susceptible to a high incidence of disorders, making it a frequent cause of pathology in young patients. ⁽¹⁻³⁾

It is considered the third most affected joint by osteomyoarticular diseases, with a high prevalence in specialty consultations. It is estimated that up to 40 % of people will experience shoulder pain at some point in their lives. ⁽⁴⁻⁶⁾

Among the most common conditions is bursitis, defined as the inflammation

of a synovial bursa whose function is to reduce friction between joint and muscle structures. Subacromiodeltoid bursitis is one of the most common presentations in this system. ^(7,8)

Its course can be acute or chronic, characterized by persistent pain that worsens with movement and marked limitation of active abduction (generally not exceeding 60°). The pain usually radiates to the proximal third of the arm, and the combination of pain and functional limitation is the usual clinical finding. ⁽⁸⁻¹⁰⁾

The diagnosis is primarily clinical, based on the presence of swelling and tenderness on palpation of the bursa. In persistent cases or to rule out calcifications, imaging studies such as x-rays or ultrasound are used, which may reveal hydroxyapatite deposits (visible as shiny fragments without birefringence) or thickening of the bursa. ⁽⁹⁻¹¹⁾

Therapeutic goals focus on reducing pain and inflammation, restoring mobility, reducing disability, and preventing recurrence. ⁽¹²⁻¹⁴⁾ There are various rehabilitation techniques, including post-surgical ones, that allow for early return to normal activities. ^(15,16) Among these, therapeutic ultrasound has demonstrated benefits, attributed primarily to its mechanical (micromassage) and thermal (deep heating) effects, which contribute to pain reduction. ⁽¹⁷⁻¹⁹⁾

A specific application of ultrasound is phonophoresis, a technique that uses ultrasound energy to facilitate the transdermal penetration of drugs, such as lidocaine, allowing intact molecules to reach target tissues. Furthermore, physical therapy is essential for maintaining muscle trophism, preventing capsular rigidity and contractures, and restoring joint range of motion. ⁽²⁰⁾

Subacromiodeltoid bursitis is a prevalent shoulder pathology that causes persistent pain and severe functional limitations, significantly impacting patients' quality of life and work capacity. Although various treatment modalities exist, such as physical therapy and therapeutic ultrasound, the evidence on the efficacy of specifically combining lidocaine phonophoresis (for pain and inflammation control) with a physical therapy protocol (for mobility and strength recovery) is inconclusive.

Scientific Question: Is the application of 2 % lidocaine phonophoresis combined with a physical therapy program more effective in reducing pain and improving shoulder function than physical therapy alone in adult patients with subacromiodeltoid bursitis?

This study aimed to determine the efficacy of 2 % lidocaine phonophoresis combined with physical therapy in the treatment of subacromiodeltoid bursitis.

MATERIALS AND METHODS

A quasi-experimental, longitudinal, and analytical study was conducted in the Rehabilitation Department of the Faustino Pérez Provincial Clinical and Surgical Teaching Hospital between October 2023 and June 2024.

The study population consisted of all patients referred by the Orthopedics and Rheumatology departments with a clinical and imaging diagnosis of subacromiodeltoid bursitis. A non-probability convenience sample of 72 patients who met the selection criteria was selected.

Inclusion criteria: patients over 20 years of age. Clinical and ultrasound diagnosis of subacromiodeltoid bursitis. Pain onset between 3 and 21 days. Signed informed consent.

Exclusion criteria: psychiatric disorders that would affect collaboration. Skin lesions in the treatment area. Contraindications to phonophoresis or physical therapy (sepsis, neoplasia, pregnancy, decompensated diseases). Lidocaine allergy.

Elimination criteria: treatment discontinuation. Missing ≥ 2 treatment sessions.

Sociodemographic and clinical variables were collected using a data collection form designed for the study. The primary endpoint was the degree of improvement, operationalized as:

Pain intensity: assessed using a Likert scale (5 points)

Joint mobility: measured with goniometry in abduction and flexion

All patients received the following treatment protocol:

Phonophoresis: Pulsed ultrasound (3 MHz, ERA 5 cm², 0.6 W/cm²) applied with 2 % lidocaine for 10 minutes, 15 sessions (6 days/week)

Kinesitherapy: Isometric exercises, Codman pendulum exercises, free active mobilizations, hanging pulley exercises, and digital ladder exercises

The assessment was performed at the beginning and end of treatment. The results were classified as:

Excellent: absence of pain or joint limitation

Good: mild pain (≤ 2 points) and $>50\%$ improvement in mobility

Fair: moderate pain (3 points) and <50% improvement in mobility

Poor: severe pain (≥ 4 points) with no improvement or worsening

Data were processed using EpiInfo 6.04 and Epidat 3.0. Absolute and relative frequencies were used for descriptive analysis. Pre-post treatment comparisons were performed using the Chi-square test with significance levels of $\alpha=0.05$ and $\alpha=0.01$.

The study was conducted according to the principles of the Declaration of Helsinki, ensuring confidentiality, autonomy, and well-being of the participants. The protocol was approved by the institutional ethics committee.

RESULTS

A higher frequency was observed in the 40-49 age group, at 38,9 %. (Table 1)

Table 1. Distribution of patients with bursitis by age group

Age groups (years)	No.	%
20-29	2	2,8
30-39	18	25
40-49	28	38,9
50-59	14	19,4
60-69	10	13,9
Total	72	100

Source: data collection form

Table 2 shows a higher incidence of bursitis in males, with 63,9 % or 46 affected patients, which is related to the occupational activities performed by men.

Table 2. Distribution of patients with bursitis by sex

Sex	No.	%
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Source: data collection form

Male	46	63,9
Female	26	36,1
Total	72	100

The cause of shoulder pain is shown in Table 3. Of the patients surveyed, 62 suffered from traumatic causes, representing 86,1 %, and 13,9 % from non-traumatic causes.

Table 3. Patients according to the causes of shoulder bursitis

Causes	No.	%
Traumatic	62	86,1
Non-traumatic	10	13,9
Total	72	100

Source: data collection form

An analysis of Table 4 shows that at the beginning, 50 % of patients had severe pain, followed by 27,8 % with quite a bit of pain. At the end of treatment, all patients showed improvement. None fell into the unbearable or severe pain categories.

Table 4. Comparison of pain intensity at the beginning and end of treatment (Likert test)

Pain intensity	Start		End	
	No	%	No	%
No pain	0	0	52	72,2
Slight pain	8	11,1	18	25
Quite a bit of pain	20	27,8	2	2,7
Intense pain	36	50	0	0
Unbearable pain	8	11,1	0	0

Total	72	100	72	100
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Source: data collection form $\chi^2 = 59.9$; $P < 0,01$

Table 5 shows that 72,2 % of patients had joint limitations before starting therapy. After completing the treatment, 65,3 % of patients improved their mobility, while only 34,7 % remained limited, demonstrating the benefit of prior exercise—a physical agent, in this case, phonophoresis with 2 % lidocaine—for pain relief.

Table 5. Comparison of joint mobility at the beginning and end of treatment

Joint mobility	Start		End		χ^2	P
	No	%	No	%		
With joint limitation	52	72,2	25	34,7	49,8	<0,05
Without joint limitation	20	27,8	47	65,3	50,4	<0,05
Total	72	100	72	100		

Source: data collection form

Table 6 shows the patient evaluations at the end of treatment 56,9 % of the patients had an excellent evaluation, 37,5 % had a good evaluation, 5,6 % had a fair evaluation, and none were rated as poor at the conclusion of the treatment sessions, which was significant (with $\chi^2 = 50.4$, $P < 0.05$).

Table 6. Final evaluation of the study

Recuperación	No.	%
Excelente	41	56,9
Buena	27	37,5
Regular	4	5.6
Mala	0	0
Total	72	100

Source: data collection form $\chi^2 = 51,4$ $P < 0,05$

DISCUSSION

In the present study, the authors evaluated the efficacy of phonophoresis with 2 % lidocaine combined with physical therapy in the treatment of subacromiodeltoid bursitis. The results showed a higher prevalence of the

disease in patients aged 40 to 49 years and a predominance in males, which is consistent with the work dynamics and physical activities typically performed by this population, characterized by repetitive and prolonged work-related stress.

These findings are consistent with those reported by Cruz López ⁽¹⁴⁾, who also observed a predominance of males and a mean age of around 46 years in patients with shoulder pathologies. However, they differ from the results of Morales Martínez ⁽¹¹⁾, who found a higher prevalence in women with an older mean age, attributing this to hormonal factors and specific household activities. The authors believe that these differences can be explained by the demographic and occupational characteristics of the populations studied, highlighting the importance of the epidemiological context in the presentation of the disease.

Regarding etiology, the predominance of traumatic causes (86,1 %) observed in this study is in line with the work of Aparicio Gámez et al. ⁽¹³⁾ and Alfaro Pacheco et al., ⁽¹⁵⁾ who identified repetitive movements and overuse as the main triggering factors of tendon and bursal microtraumas. The authors believe that this concordance reinforces the relationship between occupational activity and the development of inflammatory shoulder lesions, underscoring the need for occupational prevention.

Regarding clinical outcome, the significant reduction in pain and improvement in mobility observed after 15 treatment sessions support the efficacy of the therapeutic combination applied. These results are consistent with those published by Brindisino F et al., ⁽¹⁹⁾ who highlighted the importance of pain relief as a fundamental objective in the management of joint conditions. The significant decrease in pain perception, measured using the Likert test, and joint recovery assessed by goniometry demonstrate a positive effect attributable both to therapeutic ultrasound, with its mechanical and thermal effects, and to the anesthetic and analgesic action of lidocaine.

The authors agree with Bayram Kelle et al., ⁽²¹⁾ who reported significant improvements in function and quality of life after the use of phonophoresis in musculoskeletal pathologies, highlighting the adaptability of both pulsed and continuous ultrasound modalities. They also emphasize the importance of early active therapy, including pendulum exercises and specific mobilizations to prevent complications such as stiff shoulder, which contributes to optimizing functional outcomes.

Despite the absence of a control group in the study design, the authors believe

that the combined effect of phonophoresis and physical therapy provided clear and reproducible clinical benefits, supported by significant statistical evidence.

While the results demonstrate the effectiveness of the rehabilitation program, it is important to consider certain limitations. The study was conducted at a single center, which may affect the generalizability of the results.

Furthermore, due to the lack of a control group, it is not possible to completely rule out the influence of external factors or natural improvement over time. Another limitation was the limited follow-up period, which prevents the evaluation of the long-term sustainability of the benefits. Furthermore, consecutive sampling could have introduced some selection bias. Finally, a cost-benefit analysis was not performed to assess the economic feasibility of implementing this program on a larger scale.

These limitations suggest the need for future multicenter studies with control groups and extended follow-up to confirm these findings. Despite these limitations, the results provide valuable evidence of the effectiveness of the rehabilitation program in the management of subacromiodeltoid bursitis.

CONCLUSIONS

The effectiveness of 2 % lidocaine phonophoresis and physical therapy in the treatment of subacromiodeltoid bursitis in patients with less than 21 days of onset was determined. Clinical and functional improvement was achieved in most patients according to the Likert test and goniometry, and most patients had an excellent outcome.

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AUTHORSHIP CONTRIBUTION

LMHF: conceptualization, data curation, funding acquisition, research, methodology, project administration, resources, software, supervision, validation, visualization, draft writing, writing, reviewing, and editing the final manuscript.



JBPB: conceptualization, data curation, research, methodology, supervision, validation, visualization.

GGP: conceptualization, data curation, research, methodology, supervision, validation, visualization.

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CONFLICT OF INTERESTS

The authors declare that they have no conflicts of interest.

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