

A brief overview

The Influence of Laser Therapy on Joint Syndrome in Rheumatoid Arthritis: A Review Article

[Olga Pokrashenko](#)^{1*}, [Dana Tayzhanova](#)², [Nailya Sheveleva](#)³

Received: 22 August 2025
Revised: 29 September 2025
Accepted: 18 October 2025
Published: 30 October 2025

¹ PhD student, Department of internal diseases, Karaganda Medical University, Karaganda, Kazakhstan

² Professor, Department of internal diseases, Karaganda Medical University, Karaganda, Kazakhstan

³ Professor, Department of Neurology, psychiatry and rehabilitology, Karaganda Medical University, Karaganda, Kazakhstan

Citation: Olga Pokrashenko, Dana Tayzhanova, Nailya Sheveleva. The Influence of Laser Therapy on Joint Syndrome in Rheumatoid Arthritis: A Review Article. Trauma & Ortho Kaz, 2025, 76 (5), jto022
<https://doi.org/10.52889/1684-9280-2025-76-5-jto022>

This work is licensed under a Creative Commons Attribution 4.0 International License



*Corresponding author: vasilchenko@qmu.kz

Abstract

The joint syndrome in rheumatoid arthritis is characterized by pain severity and duration, the presence of prolonged morning stiffness, and the underlying pain mechanisms, which often necessitate reconstructive surgery on the affected joint. Currently, the techniques of physiotherapeutic laser treatment in patients with rheumatoid arthritis are widespread, however, the authors' data in the effectiveness of treatment of joint syndrome are controversial, which requires study and search for effective techniques to improve the quality of life in patients. The aim of this work is to study the use of low-intensity laser therapy in patients with rheumatoid arthritis. International databases from 2015-2025 were analyzed. Original articles and systematic reviews were studied. A total of 37 articles were analyzed. Currently, numerous studies focus on the cellular and intracellular mechanisms of laser therapy, supporting its pathogenetic role in the treatment of joint apparatus damage. The key points mechanisms through which laser therapy influences the inflammatory process towards regression are reflected, which determines the use of laser therapy in patients with joint syndrome as an additional therapy. Along with the application of this physical factor can be used and combined methods (for example, the combined use of laser therapy and exercise, laser therapy and magnetotherapy), which also indicate a positive effect on the musculoskeletal system in the form of reducing the severity of pain syndrome, increasing the amplitude of movement in the joint. However, there are ambiguous data on the use of laser therapy in patients with rheumatoid arthritis and its effectiveness, as a result of which the effect on the severity of pain syndrome and duration of morning stiffness is controversial, which requires further research to develop standardized treatment parameters, taking into account individual aspects of the course of the disease.

Keywords: rheumatoid arthritis, osteoarthritis, low-intensity laser, laser acupuncture, photomagnetotherapy.

1. Introduction

Rheumatoid arthritis (RA) is a common autoimmune disabling disease, predominantly affecting women. On average, for 7 years after the debut of this disease in a person there is a tendency to

loss of ability to care for oneself and fulfill labor obligations, deterioration of the quality of life. Every year there is a tendency to the growth of this disease among the population not only in middle-aged and

elderly people, but also in young people. The incidence of RA is steadily increasing [1]. Thus, according to the Global Burden of Disease data, the incidence of RA in the world in the period from 1990-2020 increased by almost 2.5 million cases, and by 2050 will increase by 1.8 times, which indicates the need to study the mechanisms of the disease and approaches to treatment [2]. The causes include genetic predisposition, aggressive environmental factors, nutrition, smoking, obesity, inactive lifestyle, and uncontrolled use of medications [3]. In the Republic of Kazakhstan there is a high prevalence of morbidity of this pathology. Thus, for the period from 2013-2017 among the adult population there is a dynamics of increase in diseases of the musculoskeletal system by 33.1%, among RA patients by 69.1% [4]. In the period from 2019-2023 there is also an increase in the incidence of this nosology [5]. The need for timely and early diagnosis of RA has become especially critical following the COVID-19 pandemic.

The modern approach to RA treatment is typically divided into two categories: medication and non-medication. Non-medicamentous methods of treatment have a number of advantages, the main one being a reduction in the frequency of medication use. For example, a lifestyle program in RA, including a diet based on whole plant foods, physical exercise, vitamin therapy, and social support allows to achieve a decrease in disease activity and improve metabolic status (glycated hemoglobin and cholesterol) [6]. According to the world clinical guidelines, non-medication methods include physical exercise, occupational therapy, orthotics, physiotherapy, weight control, massage, acupuncture, dietary nutrition, cryotherapy [7-12]. Laser therapy is widely used among patients with joint pathology [12-17]. Laser therapy is a physical method based on optical

monochromatic, coherent, polarized radiation, which differs in wavelength and depth of penetration into tissues.

Laser therapy

The mechanism of laser optical action has a targeted effect on cellular structures of the cell, resulting in inhibition of inflammatory cytokine production, activation of redox reactions, increase in the content of adenosine triphosphate and nitric oxide, decrease in the number of circulating immune cell elements, and changes in intracellular processes, which play a key role in the process of inflammation [18-27].

Red laser has a wavelength (0.63 nm) and penetrates tissues to a depth of up to 3cm. The main mechanism of operation is the absorption of radiation by cytochrome oxidase chromophores, as a result of which redox reactions change, nitric oxide is released and singlet oxygen is formed. As a result, dilatation of microcirculatory vessels occurs, regeneration processes in tissues are accelerated. Infrared laser has a wavelength (0.89 nm, 0.93 nm, 1.02 nm), the depth of penetration is up to 7 cm.

Infrared laser irradiation stimulates macrophages and activates anti-inflammatory cytokines. Changes in the biochemical activity of cellular elements improve tissue nutrition and initiate reparative processes. Under the influence of infrared laser radiation, tactile sensitivity in the irradiated area is suppressed due to the activation of sodium channels [25]. However, this type of physical procedure should have clear parameters of application in each clinical situation individually for a favorable result. The main effects of laser therapy are summarized in Figure 1.

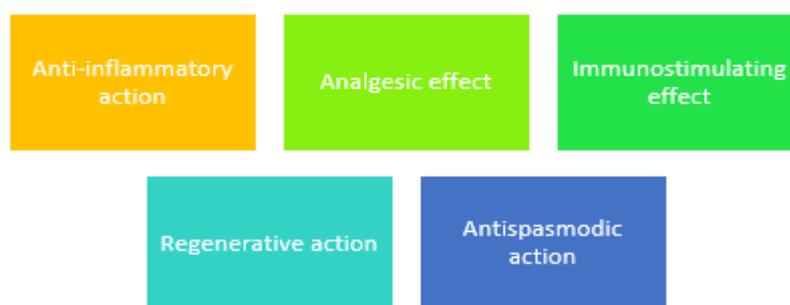


Figure 1 – Effects of laser therapy

2. Methodology

Data on the use of laser therapy in patients with RA were analyzed using international scientific databases, including Web of Science, PubMed, eLibrary, and Google Scholar, over the past 10 years. The aim was to conduct a detailed evaluation of the effectiveness of laser therapy in this patient population. Systematic reviews, original articles were considered to review the information. The following

inclusion criteria were applied: open access, full text, period 2015-2025, laser therapy and rheumatoid arthritis, RA and laser acupuncture, article type: clinical trial, randomized clinical trial, review articles. The main steps of the search were carried out according to the guidelines established by PRISMA, as shown in Figure 2 (Flowchart of Study Selection).

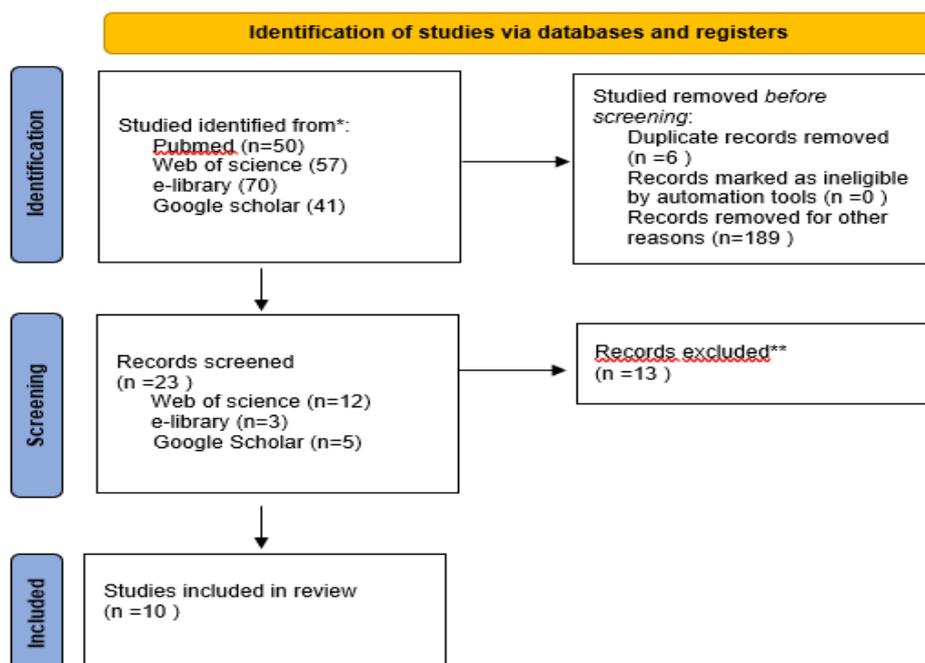


Figure 2 – Flowchart of Study Selection

Materials

Lightweight ABS plastic was selected for adjustable components, providing tensile strength between 30–50 MPa and impact resistance suitable for rehabilitation. Structural reinforcements and motor

supports were fabricated in steel to enhance stability. Additionally, it is planned to engrave a ruler on the surface and along the length of all steel guide pipes. Later, it is planned to use anodized aluminum profiles to build more precise and adjustable joints (Table 2).

3. Results

The literature found was divided into three groups in view of highlighting the leading parameters. The groups morning stiffness and pain syndrome were identified as the primary manifestations of the joint syndrome in RA with specificity of manifestation. The group of laser therapy and osteoarthritis is allocated on the basis of available modern methods in the treatment of joint pathology, given that osteoarthritis according to the clinical classification is divided into primary and secondary. The latter can be triggered by joint diseases

such as rheumatoid arthritis, infectious arthritis and others [13].

The main criteria for the disease include the presence of pain syndrome, prolonged morning stiffness, joint swelling, joint dysfunction. In a randomized controlled trial (RCT), researchers investigated the use of laser acupuncture tele-therapy in patients with rheumatoid arthritis.

The study included 60 patients, 30 of whom were treated with laser acupuncture combined with aerobic exercise (3 times a week for 20 minutes for 4 weeks), parameters infrared laser system, 808 nm, a power density- 100 mW cm², energy density-7.5 J, acupuncture points Stomach, Ququan, Yinlingquan, Neiguan. Interleukin-6 (IL-6), MDA (malondialdehyde), ATP (adenosine triphosphate), CRP (C-reactive protein), RA Quality of Life (RAQoL) and Health Assessment Questionnaire (HAQ) were evaluated. As a result, 26 patients reported an improvement in quality of life based on HAQ and RAQoL scores. A decrease in C-reactive protein, interleukin-6, malondialdehyde, along with an increase in adenosine triphosphate, was noted in the laboratory [28-29].

Morning stiffness

RA is characterized by the presence of morning stiffness lasting more than 30 minutes, which significantly impairs patients' ability to perform self-care and fulfill occupational duties. In a review by Hossein-Khannazer N., 71 articles on the use of non-invasive low-intensity laser therapy (wavelength 635 nm-905 nm) in patients and in experimental animal models diagnosed with RA were studied. The authors concluded that this form of physical therapy has a beneficial effect on the severity of inflammation and pain and may serve as an adjunctive treatment modality [18]. In a randomized clinical trial, Muhamed J. A. Al-Saraj and co-authors, studying the effect of low-intensity laser therapy (LILT) found that patients receiving only LILT (830 nm and 632,8nm) showed improvement in functional and laboratory parameters in the form of a decrease in the number of painful and swollen joints, reduction of pain syndrome, decrease in erythrocyte sedimentation rate. Patients receiving placebo-laser+ naproxen (n=12) and naproxen alone (n=10) showed a decrease in the duration of morning stiffness [30].

The study by N. Zhuravleva included 114 patients diagnosed with RA aged 32-53 years. All patients received methotrexate and nonsteroidal anti-inflammatory drugs (NSAIDs), while 57 of them additionally underwent low-intensity laser therapy (LILT) in pulsed mode. The laser parameters included a wavelength of 0.89 nm, pulse frequency of 80-1500 Hz, pulse power of 5 W, field exposure time of 1-2 minutes, and a total irradiation time of no more than 10 minutes. The repeated course was repeated in 4 weeks. Control indicators were evaluated after 6

months. As a result, a decrease in the need for the use of nonsteroidal anti-inflammatory drugs and a decrease in the duration of morning stiffness in the laser therapy group was noted [31]. A systematic review by Amirali Salajegheh and co-authors, between 1980 and 2022 examined the efficacy of low-intensity laser in studies that looked at clinical parameters such as pain, muscle strength, and morning stiffness. It was observed that LILT could influence the duration of morning stiffness (394 subjects) and improved grip strength (317 subjects), $p < 0.01$, but the effect on pain severity was insignificant compared to the placebo group. $p > 0.97$ (123 individuals) [32]. In the review Karateev A.E. and coauthors considered various rehabilitation techniques in rheumatic diseases: cryotherapy, magnetotherapy, laser therapy, ultrasound therapy and others. It was found that the effect of laser therapy on the course of osteoarthritis is contradictory, there was no significant difference between the use of LILT and placebo group. However, the use of LILT in RA contributed to a decrease in the duration of morning stiffness. Given the different mechanism of action of physiotherapy equipment and the corresponding effects, combined use is recommended [33].

Pain syndrome

Pain syndrome has distinctive features, including symmetrical joint involvement and reduced grip strength. The beneficial effect of laser therapy on the course of joint syndrome in RA is evidenced by the data of Renlong Zhang, Junle Qu, where the effect of photobiomodulation (wavelength 633-905 nm) in patients with joint syndromes: osteoarthritis, pain syndrome in the lumbar spine, including 185 patients with rheumatoid arthritis. 81 patients with RA had a decrease in pain syndrome according to visual analog scale (VAS) [20]. According to Ingrid Lourinho, Tamara Sousa et al. the effects of laser therapy are controversial. This review evaluated the use of continuous low-intensity laser therapy in various combinations (wavelength 632.5-1060 nm) in patients with RA. A meta-analysis of 18 RCTs between 1980-2021 with 793 participants was performed 10 studies demonstrated limited efficacy of both infrared and red laser therapy compared to placebo in reducing pain, morning stiffness, and improving grip strength [34].

Kostro A.M., Dakowicz A. and co-authors compared the efficacy of laser therapy and magnetotherapy in patients with rheumatoid arthritis.

The study involved 30 patients who were divided into 2 groups: one group was treated with laserotherapy (power 450 mW, intensity 300 J), the other group received low-frequency magnetotherapy. According to the study results, magnetotherapy demonstrated superior outcomes in terms of improving joint functional status. However, both methods were effective in reducing the severity of pain syndrome [35].

Thus, in a study consisting of 72 patients (43 patients in the main group, 29 in the control group), the efficacy of photomagnetotherapy was analyzed in patients of the main group. Exposure was performed on the area of the affected joints and projection of large blood vessels daily: magnetic field induction 12.5-25 mTl, power flux density of the combination of infrared (920-960 nm) and red (610-680 nm) optical radiation 3.5 ± 0.5 mW/cm². Duration of exposure to one field was up to 10 minutes, with the total procedure time being up to 30 minutes. As a result of the study, it was found that the use of photomagnetotherapy in patients with RA leads to a decrease in pain syndrome on the VAS scale by 57.3%, contributes to a decrease in the duration of morning stiffness in the joints by 58.0% [10].

Laser therapy and osteoarthritis

Khumaidi MA, Paturusi I et al. reviewed the use of laser therapy in patients with knee osteoarthritis. As a result, it was observed that wavelengths in the range of 785-904 nm NILT can be used as a non-pharmaceutical and non-surgical treatment method for patients with knee osteoarthritis, combining it with exercises that lead to improvements in WOMAC scores, pain, range of motion and functional status in patients [16]. In a study by Fakhari S. et. al. studied the use of intra-articular ozone therapy and laser therapy in patients with knee osteoarthritis. The characteristics used for the laser therapy procedure were: 980 nm with

an intensity of 6 J, duration of 2.5 minutes per point. A total of 7 points were irradiated, treatment course of 12 sessions. The results demonstrated that these alternative therapies effectively reduce the severity of pain syndrome [17]. A study by Chen, JL Chen, Jean-Lon et al. examined the effect of intra-articular laser therapy in patients with knee osteoarthritis. Nineteen patients over 65 years of age participated in the study. A fiber optic wire was introduced through a catheter into the joint cavity, where a combined technique of infrared (810 nm) and red laser (658 nm) was applied for 30 minutes under the control of ultrasound examination (USG) of the knee joint. As a result, an improvement in the functional status of the joint was observed as a result of the combined technique [19].

A 2022 systematic review evaluating the efficacy of low-intensity (25 mW-800 mW, wavelength 775-905 nm) and high-intensity (power 1.6-25 W, wavelength 808-1064 nm) laser therapy in patients (n=704) with joint pathology (knee osteoarthritis, tennis elbow, carpal tunnel syndrome, et al.) reported positive outcomes such as increased grip strength following treatment. Importantly, no adverse side effects were observed in association with these therapies [36].

However, in a study by Mohammad Muhibbur Rahman et al, the effect of LILT with articular pathology of the carpal tunnel joint of the thumb was studied, where along with conservative treatment (paracetamol, night splint and joint protection techniques) 50 patients were given laser treatment with parameters: wavelength 830 nm, maximum pulse power output 50 mW. Frequency 300 Hz for 4 weeks (3 courses per week). After treatment, no treatment advantage was observed in the NILT group (p-value: >0.05), which suggests the need for further study of the use of laser therapy in patients with joint syndrome [37].

4. Discussion

The provided literature review on the use of laser therapy in patients with RA reflects the data on the use of physical factor in patients with this nosology, which indicates the relevance of the search for alternative approaches to the treatment of patients. Pain syndrome is one of the leading symptoms in patients with rheumatoid arthritis, which is accompanied by morning stiffness and as a consequence, the functional status of the joint apparatus deteriorates. Therefore, one of the parameters of the effectiveness of laser therapy application was positive dynamics in the

severity of pain and duration of morning stiffness in patients, as evidenced by the results of studies [16-18,20,30,31,35]. There is also evidence of a positive result of combined treatment in patients on the course of pain and duration of morning stiffness [10]. In the treatment of osteoarthritis, laser therapy has also shown some positive results [17,19,36]. However, there are also data that indicate the controversial nature of the use of laser therapy [34,37].

5. Conclusions

Currently, numerous studies focus on the cellular and intracellular mechanisms of laser therapy, supporting its pathogenetic role in the treatment of joint apparatus damage. The key points of the impact of the physical method, which help to restructure the inflammatory process towards regression are reflected, which determines the use of laser therapy in patients with joint syndrome as an adjunctive therapy. Along with the application of this physical factor can be used and combined methods (for example, the combined use of laser therapy and exercise, laser therapy and magnetotherapy), which also indicate a positive effect on the musculoskeletal system in the form of reducing the severity of pain syndrome, increasing the amplitude of movement in the joint. However, there are conflicting data on the use of laser therapy in

patients with RA and its effectiveness, as a result of which the effect on the severity of pain syndrome and duration of morning stiffness is controversial, which requires further research to develop standardized treatment parameters, taking into account individual aspects of the course of the disease.

Conflicts of Interest. The authors declare no conflicts of interest.

Funding. None.

Author contributions: Conceptualization, D.T. and O.P.; methodology, O.P.; formal analysis, D.T. and N.Sh.; writing—original draft preparation, O.P.; writing—review and editing, O.P., D.T., and N.Sh.; visualization, O.P. All authors have read and agreed to the published version of the manuscript.

References

1. Plakhova, A. O., Sorotskaya, V. N., Vaisman, D. Sh., & Balabanova, R. M. (2025). Revmatoidnyi artrit: rasprostranennost' i zaboлеваemost' v raznykh stranakh (Rheumatoid arthritis: prevalence and incidence in different countries) [in Russian]. *Sovremennaya Revmatologiya*, 19(1), 7–11. <https://doi.org/10.14412/1996-7012-2025-1-7-11>
2. Global, regional, and national burden of rheumatoid arthritis, 1990–2020, and projections to 2050: A systematic analysis of the Global Burden of Disease Study 2021. (2023). *The Lancet Rheumatology*, 5(10), e594–e610. [https://doi.org/10.1016/S2665-9913\(23\)00211-4](https://doi.org/10.1016/S2665-9913(23)00211-4)
3. Nasonov, E. L., Avdeeva, A. S., & Dibrov, D. A. (2023). Revmatoidnyi artrit kak kliniko-immunologicheskii sindrom: fokus na seronegativnyi subtip zabolevaniya (Rheumatoid arthritis as a clinical and immunological syndrome: focus on the seronegative subtype of the disease) [in Russian]. *Nauchno-Prakticheskaya Revmatologiya*, 61(3), 276–291. <https://doi.org/10.47360/1995-4484-2023-276-291>
4. Nogaeva, M. G., Amanzholova, A. S., & Tuleutayeva, S. A. (2019). Rasprostranennost' revmatoidnogo artrita v Respublike Kazakhstan za 2013–2017 gody (Prevalence of rheumatoid arthritis in the Republic of Kazakhstan for 2013–2017)[in Russian]. *Medicine (Almaty)*, 3(201), 77–82. <https://doi.org/10.31082/1728-452X-2019-201-3-77-82>
5. Sagyndykova, K. E., & Shopabayeva, A. R. (2024). Sravnitel'nyi analiz farmatsevticheskogo rynka lekarstvennykh sredstv dlya otdel'nykh kategorii grazhdan Respubliki Kazakhstan, naznachaemykh pri revmatoidnom artrite (Comparative analysis of the pharmaceutical market of medicines for certain categories of citizens of the Republic of Kazakhstan, prescribed for rheumatoid arthritis) [in Russian]. *Klinicheskaya Meditsina i Farmakologiya*, 6(257), 174–182. <https://doi.org/10.53511/pharmkaz.2025.35.81.022>
6. Walrabenstein, W., Wagenaar, C. A., van der Leeden, M., Turkstra, F., Twisk, J. W. R., Boers, M., van Middendorp, H., Weijs, P. J. M., & van Schaardenburg, D. (2023). *Rheumatology (Oxford)*, 62(8), 2683–2691. <https://doi.org/10.1093/rheumatology/keac693>
7. Koshukova, G. N. (2019). Rol' fizioterapevticheskikh faktorov v uluchshenii perifericheskoi gemodinamiki u bol'nykh revmatoidnym artritom (The role of physiotherapeutic factors in improving peripheral hemodynamics in patients with rheumatoid arthritis) [in Russian]. *Meditsinskiy Alfavit*, 1(18), 44–48. [https://doi.org/10.33667/2078-5631-2019-1-18\(393\)-44-48](https://doi.org/10.33667/2078-5631-2019-1-18(393)-44-48)
8. Zwolinska, J., Kasprzak, M., Kielar, A., & Prokop, M. (2024). Positive and negative effects of administering a magnetic field to patients with rheumatoid arthritis (RA). *Journal of Clinical Medicine*, 13(6), 1619. <https://doi.org/10.3390/jcm13061619>
9. Segal, N. A., Toda, Y., Huston, J., Saeki, Y., Shimizu, M., Fuchs, H., Holcomb, R., & McLean, M. J. (2001). Two configurations of static magnetic fields for treating rheumatoid arthritis of the knee: A double-blind clinical trial. *Archives of Physical Medicine and Rehabilitation*, 82(10), 1453–1460. <https://doi.org/10.1053/apmr.2001.24309>
10. Voychenko, N. V., Volotovskaya, A. V., Yuraga, T. M., & Ivanchik, G. I. (2020). Effektivnost' primeneniya fotomagnitoterapii pri revmatoidnom artrite (The effectiveness of photomagnetic therapy in rheumatoid arthritis) [in Russian]. *Zhurnal Grodnenskogo Gosudarstvennogo Meditsinskogo Universiteta*, 18(3), 282–287. <https://doi.org/10.25298/2221-8785-2020-18-3-282-287>

11. Koshukova, G. N. (2017). Rol' fizicheskikh faktorov kak komponenta programmy reabilitatsii v kompleksnoy terapii revmatoidnogo artrita (The role of physical factors as a component of the rehabilitation program in the complex therapy of rheumatoid arthritis) [in Russian]. *Vestnik Fizioterapii i Kurortologii*, 23(1), 65–69.
12. Zhang, M., Ma, Z., Suguro, R., Zhu, M., Chen, E. X., Dong, X., Chen, M., Cheng, L., Su, B., & Zhu, Y. (2024). Assessment of clinical analgesic levels and serum biomarkers in patients with rheumatoid arthritis: A randomized controlled trial comparing the efficacy of diclofenac and methotrexate combined therapy with extracorporeal shockwave therapy. *Pain Research and Management*, 2024(1), 6687987. <https://doi.org/10.1155/2024/6687987>
13. Alekseeva, L. I., Taskina, E. A., & Kashevarova, N. G. (2019). Osteoartrit: epidemiologiya, klassifikatsiya, faktory riska i progressirovaniya, klinika, diagnostika, lechenie (Osteoarthritis: epidemiology, classification, risk factors and progression, clinical features, diagnosis, treatment)[in Russian]. *Sovremennaya Revmatologiya*, 13(2), 9–21. <https://doi.org/10.14412/1996-7012-2019-2-9-21>
14. Karateev, D. E., Luchikhina, L. V., Luchikhina, E. L., & Golukhov, G. N. (2022). Current management strategy for osteoarthritis patients: A review. *Bulletin of Rehabilitation Medicine*, 21(6), 30–41. <https://doi.org/10.38025/2078-1962-2022-21-6-30-41>
15. Radaikina, O. G., Vlasov, A. P., Polozova, E. I., Radaikina, E. V., & Shepeleva, O. I. (2019). Ispol'zovanie fizioterapevticheskikh metodov v lechenii zabolevaniy s sustavnym sindromom (The use of physiotherapeutic methods in the treatment of diseases with joint syndrome (literature review)) [in Russian]. *Meditssinskie Nauki. Vnutrennie Bolezni*, 4(52), 15–29. <https://doi.org/10.21685/2072-3032-2019-4-2>
16. Khumaidi, M. A., Paturusi, I., Nusdwinuringtyas, N., Islam, A. A., Gunawan, W. B., Nurkolis, F., & Taslim, N. A. (2022). Is low-level laser therapy effective for patients with knee joint osteoarthritis? Implications and strategies to promote laser therapy usage. *Frontiers in Bioengineering and Biotechnology*, 10, 1089035. <https://doi.org/10.3389/fbioe.2022.1089035>
17. Fakhari, S., Pishghahi, A., Pourfathi, H., Farzin, H., & Bilehjani, E. (2021). A comparison between low-level laser therapy and intra-articular ozone injection in knee osteoarthritis treatment: A randomized clinical trial. *Journal of Lasers in Medical Sciences*, 12, e44. <https://doi.org/10.34172/jlms.2021.44>
18. Hossein-Khannazer, N., Kazem Arki, M., Keramatnia, A., & Rezaei-Tavirani, M. (2022). Low-level laser therapy for rheumatoid arthritis: A review of experimental approaches. *Journal of Lasers in Medical Sciences*, 13, e62. <https://doi.org/10.34172/jlms.2022.62>
19. Chen, J.-L., Hsu, C.-C., Chen, W. C. C., Peng, Y.-N., Chen, C. P. C., & Suputtitada, A. (2022). Intra-articular laser therapy may be a feasible option in treating knee osteoarthritis in elderly patients. *BioMed Research International*, 2022(1), 3683514. <https://doi.org/10.1155/2022/3683514>
20. Zhang, R., & Qu, J. (2023). The mechanisms and efficacy of photobiomodulation therapy for arthritis: A comprehensive review. *International Journal of Molecular Sciences*, 24, 14293. <https://doi.org/10.3390/ijms241814293>
21. Ryu, J. H., Park, J., Kim, B.-Y., Kim, Y., Kim, N. G., & Shin, Y.-I. (2023). Photobiomodulation ameliorates inflammatory parameters in fibroblast-like synoviocytes and experimental animal models of rheumatoid arthritis. *Frontiers in Immunology*, 14, 1122581. <https://doi.org/10.3389/fimmu.2023.1122581>
22. Lazareva, E. N., Makashova, V. V., & Osipova, E. G. (2023). Primenenie lazernoy terapii pri osteoartrite (obzor literatury) (Laser therapy for osteoarthritis (literature review)) [in Russian]. *Lazernaya Meditsina*, 27(1), 46–52. <https://doi.org/10.37895/2071-8004-2023-27-1-46-52>
23. Poddubnaya, O. A. (2020). Nizkointensivnaya lazeroterapiya v klinicheskoy praktike (Chast' 1) (Low-Intensity Laser Therapy in Clinical Practice (Part 1)) [in Russian]. *Vestnik Vosstanovitel'noy Meditsiny*, 6(100), 92–99. <https://doi.org/10.38025/2078-1962-2020-100-6-92-99>
24. Ailioaie, L. M., & Litscher, G. (2020). Molecular and cellular mechanisms of arthritis in children and adults: New perspectives on applied photobiomodulation. *International Journal of Molecular Sciences*, 21(18), 6565. <https://doi.org/10.3390/ijms21186565>
25. Ponomarenko, G. N. (2014). *Lazeroterapiya. Obshchaya fizioterapiya (General physiotherapy)* [in Russian] (pp. 103–106). GEOTAR-Media. <http://www.studentlibrary.ru/book/ISBN9785970431672.html>
26. Samosyuk, I. Z., Samosyuk, N. I., Fedorov, S. N., & Zalesskiy, V. N. (2012). 50 let lazernoy meditsiny: gorizonty lazeropunktury – sovremennoy tekhnologii refleksoterapii (50 years of laser medicine: Horizons of laserpuncture – modern reflexotherapy technology) [in Russian]. Kiev: ZAO "Vipal"
27. Ponomarenko, G. N. (2023). Vysokointensivnaya lazeroterapiya v klinicheskoy meditsine: naukometricheskiy analiz dokazatel'stv effektivnosti (High-intensity laser therapy in clinical medicine: a scientometric analysis of evidence of effectiveness) [in Russian]. *Voprosy Kurortologii, Fizioterapii i Lechebnoy Fizicheskoy Kultury*, 100(1), 18–26. <https://doi.org/10.17116/kurort202310001118>
28. Adly, A. S., Adly, A. S., & Adly, M. S. (2022). Effects of laser acupuncture tele-therapy for rheumatoid arthritis elderly patients. *Lasers in Medical Science*, 37(1), 499–504. <https://doi.org/10.1007/s10103-021-03287-0>
29. Adly, A. S., Adly, A. S., & Adly, M. S. (2022). Correction to: Effects of laser acupuncture tele-therapy for rheumatoid arthritis elderly patients. *Lasers in Medical Science*, 37(2), 1373. <https://doi.org/10.1007/s10103-022-03522-2>

30. Al-Saraj, M. J. A., Al-Ethary, Z. Y., & Al-Attar, Z. I. (2021). The effect of low-level laser therapy on early onset rheumatoid arthritis patients. *Iraqi Journal of Medical Sciences*, 19(1), 126–133. <https://doi.org/10.22578/IJMS.19.1.16>
31. Zhuravleva, N., Karzakova, L., Kudryashov, S., & Petrova, E. (2021). AB0713 Evaluation of the effectiveness of laser therapy in the treatment of rheumatoid arthritis. *Annals of the Rheumatic Diseases*, 80, 1388.1–1388. <https://doi.org/10.1136/annrheumdis-2021-eular.238>
32. Salajegheh, A., Yahyaabadi, F. Y., & Yazdi, F. (2024). Low-level laser therapy and rheumatoid arthritis: A systematic review and meta-analysis study. *European Journal of Translational Myology*, 34(1), 13107. <https://doi.org/10.4081/ejtm.2024.13107>
33. Karateev, A. E., Sukhareva, M. V., & Lila, A. M. (2019). Meditsinskaya reabilitatsiya v kompleksnom lechenii revmaticheskikh zabolovaniy: obzor dannyx literatury (Medical rehabilitation in the complex treatment of rheumatic diseases: a review of the literature)[in Russian]. *Nauchno-Prakticheskaya Revmatologiya*, 57(5), 584–596. <https://doi.org/10.14412/1995-4484-2019-584-596>
34. Lourinho, I., Sousa, T., Jardim, R., Pinto, A. C., & Iosimuta, N. (2023). Effects of low-level laser therapy in adults with rheumatoid arthritis: A systematic review and meta-analysis of controlled trials. *PLoS ONE*, 18(9), e0291345. <https://doi.org/10.1371/journal.pone.0291345>
35. Kostro, A. M., Dakowicz, A., Moskal-Jasinska, D., & Kurylczyn-Moskal, A. (2020). The influence of laser therapy and magnetotherapy on the function and quality of life of patients with rheumatoid arthritis of hand joints. *Acta Balneologica*, 62(3), 149–153. <https://doi.org/10.36740/ABAL202003103>
36. Saleh, M. S., Shahien, M., Mortada, H., Elaraby, A., Hammad, Y. S., & Elshennawy, S. (2024). High-intensity versus low-level laser in musculoskeletal disorders. *Lasers in Medical Science*, 39, 179. <https://doi.org/10.1007/s10103-024-04111-1>
37. Rahman, M. M., Shakoор, M. A., Ferdous, N., Alam, M. O., Farhad, S., Mehedi, A. B. M., Sarker, S., & Moyeenuzzaman, M. (2024). Low-level laser therapy for thumb carpometacarpal joint osteoarthritis: A randomized controlled trial. *Cureus*, 16(4), e57883. <https://doi.org/10.7759/cureus.57883>

Ревматоидты артрит кезінде буындар синдромының ағымына лазерлік терапияның әсері: Әдебиетке шолу

[Покрашенко О.А](#)¹, [Тайжанова Д.Ж](#)², [Шевелева Н.И](#)³

¹ PhD-докторант, Ішкі аурулар кафедрасы, Қарағанды медицина университеті, Қарағанды, Қазақстан

² Профессор, Ішкі аурулар кафедрасы, Қарағанды медицина университеті, Қарағанды, Қазақстан

³ Профессор, Неврология, психиатрия және реабилитология кафедрасы, Қарағанды медицина университеті, Қарағанды, Қазақстан

Түйіндеме

Ревматоидты артрит кезіндегі буын синдромы ауырсынудың сипаты мен ұзақтығымен, таңертеңгі ұзаққа созылатын сіресу сезімімен, сондай-ақ ауырсынудың пайда болу механизмдерімен ерекшеленеді. Бұл жиі зақымдалған буынға реконструктивті операциялар жасау қажеттілігіне әкеледі. Қазіргі уақытта ревматоидты артриті бар науқастар арасында лазерлік физиотерапия әдістері кеңінен қолданылуда. Алайда, буын синдромын емдеудегі тиімділігіне қатысты авторлардың мәліметтері әртүрлі. Сондықтан бұл мәселе қосымша зерттеулерді және науқастардың өмір сүру сапасын жақсарту мақсатында тиімді әдістерді іздеуді талап етеді. Шолудың мақсаты: ревматоидты артриті бар науқастарда төмен қарқынды лазерлік терапияны қолдануды талдау. 2015–2025 жылдар аралығындағы халықаралық дерекқорлар талданды. Ғылыми мақалалар мен жүйелі шолулар зерттелді. Барлығы 37 мақала қарастырылды.

Қазіргі уақытта жасушаішілік деңгейде лазерлік терапияның әсерін зерттеуге бағытталған көптеген ғылыми еңбектер бар, бұл әдістің буын құрылымдарының зақымдалуындағы патогенездік негізделуін дәлелдейді. Физикалық әдістің негізгі әсер ету нүктелері анықталған, олар қабыну үдерісін регрессия бағытына қайта бағыттауға көмектеседі, бұл лазерлік терапияны буын синдромы бар науқастарға қосымша ем ретінде қолдануға мүмкіндік береді. Сонымен қатар, физикалық әдіспен қатар қолданылатын (мысалы, лазерлік терапия мен дене жаттығуларының, лазерлік терапия мен магниттік терапияның үйлесімі) кешенді әдістер де оң әсер береді. Атап айтқанда, ауырсыну синдромының айқындылығының төмендеуі және буындағы қозғалыс

ауқымының артуы байқалады. Алайда, ревматоидты артриті бар науқастарда лазерлік терапияны қолдану мен оның тиімділігі бойынша деректер біркәнді емес. Ауырсыну синдромының айқындылығы мен таңертеңгі құрысудың ұзақтығына әсері жөніндегі нәтижелер даулы болып қала береді. Осыған байланысты, ауру ағымының жеке ерекшеліктерін ескере отырып, емдеудің стандартталған параметрлерін әзірлеу үшін қосымша зерттеулер қажет.

Түйін сөздер: ревматоидты артрит, остеоартрит, төмен қарқынды лазер, лазерлік акупунктура, фотомагниттік терапия.

Влияние лазеротерапии на течение суставного синдрома при ревматоидном артрите: Обзорная статья

[Покрашенко О.А](#)¹, [Тайжанова Д.Ж](#)², [Шевелева Н.И](#)³

¹ PhD-докторант, кафедра внутренних болезней, Карагандинский медицинский университет, Караганда, Казахстан

² Профессор, кафедра внутренних болезней, Карагандинский медицинский университет, Караганда, Казахстан

³ Профессор, кафедра неврологии, психиатрии и реабилитологии, Карагандинский медицинский университет, Караганда, Казахстан

Резюме

Суставной синдром при ревматоидном артрите отличается характером боли и ее продолжительностью, наличием длительной утренней скованности, а также механизмами возникновения боли, что нередко приводит к восстановительным операциям на пораженный сустав. В настоящее время распространены методики физиотерапевтического воздействия лазером у пациентов с ревматоидным артритом. Однако, данные авторов в эффективности лечения суставного синдрома спорны, что требует изучения и поиска эффективных методик для улучшения качества жизни пациентов. Целью данной работы является изучение применения низкоинтенсивной лазеротерапии у пациентов с ревматоидным артритом. Были проанализированы международные базы данных в период с 2015-2025 год. Изучались оригинальные статьи и систематические обзоры. Всего было проанализировано 37 статей.

В настоящее время имеется большое количество исследований, направленных на изучение лазеротерапии на внутриклеточном уровне, что подтверждает его патогенетическое применение при повреждении суставного аппарата. Отражены ключевые точки воздействия физического метода, которые помогают перестроить воспалительный процесс в сторону регресса, что определяет применение лазеротерапии у пациентов с суставным синдромом в качестве дополнительной терапии. Наряду с применением данного физического фактора могут быть использованы и комбинированные методики (например, сочетание применения лазеротерапии и физических упражнений, лазеротерапии и магнитотерапии), которые также указывают на положительное влияние на костно-мышечный аппарат в виде уменьшения выраженности болевого синдрома, увеличения амплитуды движений в суставе. Однако, имеются неоднозначные данные применения лазеротерапии у пациентов с ревматоидным артритом и его эффективности, в результате которого влияние на выраженность болевого синдрома и продолжительность утренней скованности спорны, что требует дальнейших исследований для разработки стандартизированных параметров лечения, учитывая индивидуальные аспекты течения заболевания.

Ключевые слова: ревматоидный артрит, остеоартрит, низкоинтенсивный лазер, лазерная акупунктура, фотомагнитотерапия.