Mutiara
Jurnal Ilmiah Multidisiplin Indonesia
Vol. 2, No. 3, Juli 2024
e-ISSN 3025-1028
Available at: *https://jurnal.tiga-mutiara.com/index.php/jimi/index*

The Benefits of Ultrasonic Waves on Therapy: A Review of Literature

***Ahmad Mukhlis Shobari[1], Maimon Sumo[2], Rohmatul Aini[3], Ussisah Sulistiawati[4], Luaini[5]**
[1,2,3,4,5]Universitas Islam Madura
*Correspondence e-mail: ahmadmukhlisshobari@gmail.com

Abstract
Physical fitness is a very important part of everyday life and almost everything that's done depends on the physical member. In order to function properly, it is essential for us to maintain physical health so as not to cause problems and risk illness. In addition to the illness caused by physical activity, it can also be caused by age actors. In the field of health continues to undergo rapid development, one of the breakthroughs that has been used is the use of ultrasonic waves. Ultrasonic waves are the result of mechanical vibrations produced by the movement of isolated molecules in their diffusion media. If tissues receive ultrasound waves, the impact includes biological effects, mechanical effects and thermal effects. Some of the findings that have been established are the application of ultrasound waves to therapies in cases that appear on physical limbs. On this article aims to be able to contribute in the field of health so that it is easier to develop the use of ultrasonic therapy. This article is compiled using a literature review method taken from the references that have been collected. Of all the references collected, ultrasonic waves are used as therapies for some physical function problems. This therapy also collaborates with several paractic methods of health to address the existing problems. Therapy using ultrasonic modality has been shown to reduce pain, muscle cramps and minor injuries. It can be concluded that ultrasound therapy can help deal with patients suffering from disorders in their physical bodies, either to reduce pain or during the recovery process.

Keywords: Ultrasound; Therapy; Health.

Abstrak
Kebugaran fisik adalah bagian yang sangat penting dari kehidupan sehari-hari dan hampir semua yang dilakukan tergantung pada anggota fisik. Untuk berfungsi dengan baik, penting bagi kita untuk mempertahankan kesehatan fisik sehingga tidak menyebabkan masalah dan risiko penyakit. Selain penyakit yang disebabkan oleh aktivitas fisik, juga dapat disebabkan oleh aktor usia. Di bidang kesehatan terus mengalami perkembangan yang cepat, salah satu terobosan yang telah digunakan adalah penggunaan gelombang ultrasonik. Gelombang ultrasonik adalah hasil dari getaran mekanis yang dihasilkan oleh gerakan molekul terisolasi di media diffusi mereka. Jika jaringan menerima gelombang ultrasound, dampaknya termasuk efek biologis, efek mekanis dan efek termal. Beberapa temuan yang telah ditetapkan adalah penerapan gelombang ultrasound untuk terapi dalam kasus yang muncul pada ekstremitas fisik. Artikel ini bertujuan untuk dapat berkontribusi di bidang kesehatan sehingga lebih mudah untuk mengembangkan penggunaan terapi ultrasound.

Artikel ini disusun menggunakan metode review literatur yang diambil dari referensi yang telah dikumpulkan. Dari semua referensi yang dikumpulkan, gelombang ultrasonik digunakan sebagai terapi untuk beberapa masalah fungsi fisik. Terapi ini juga bekerja sama dengan beberapa metode kesehatan paraktik untuk mengatasi masalah yang ada. Terapi menggunakan modalitas ultrasonik telah terbukti mengurangi rasa sakit, kram otot dan cedera ringan. Dapat disimpulkan bahwa terapi ultrasound dapat membantu mengatasi pasien yang menderita gangguan dalam tubuh fisik mereka, baik untuk mengurangi rasa sakit atau selama proses pemulihan.

Kata-kata kunci: *Ultrasonik; Terapi; Kesehatan.*

INTRODUCTION

In everyday life we must not be without physical activity. The ability to function members of our bodies is called physical ability.[1] The member that includes the most frequently used on the top is the hand. One of the causes of dysfunction in the hands and arms is excessive activity on the hands, causing a problem and risk of disease.[2] In addition to the diseases caused by excessive physical activity, there are also joint diseases that are generally due to age factors. *Osteoarthritis* is one of the degenerative diseases that affect the joints often occur in older people and can also occur in those of middle age that can be caused by injury or excessive use of the joint.[3]

The voices we hear every day have the potential to detect a variety of diseases, monitor health conditions, and even play a role in the treatment process.[4] The field of medicine continues to undergo rapid development, and one of the surprising breakthroughs comes from the study of sound, which is part of the physics where sound waves are often used in physiotherapy.[5] These developments are done to improve the health of human life.

[1] Fahrie Almeyda dan Roy Januardi Irawan, "Efektivitas Penggunaan Terapi Ultrasound Sebagai Terapi Nyeri Doms Otot Quadriceps pada Atlet Bola Tangan Putra," *Jurnal Penjakora: Fakultas Olahraga dan Kesehatan* 10, no. 2 (2023): 110–117, https://ejournal.undiksha.ac.id/index.php/PENJAKORA/article/view/66076.

[2] Ratu Karel Lina, Abdurahman Berbudi B.L., dan Sri Parwati, "Pengaruh Intervensi Ultrasound terhadap Perubahan Nyeri Carpal Tunnel Syndrome di Klinik Fisioterapi Sayang Jatinangor Tahun 2022," *Jurnal Fisioterapi dan Kesehatan Indonesia* 2, no. 2 (2022): 1–10, https://ifi-bekasi.e-journal.id/jfki/article/view/152.

[3] Intan Marthaulina, Mira Asih Anggraeni, dan Ika Rahman, "Penatalaksanaan Fisioterapi pada Osteoarthritisgenu Bilateral dengan Modalitas Ultrasound, Tens, dan Terapi Latihan di RSUD Cililin Kabupaten Bandung Barat," *Jurnal Stikes Siti Hajar* 3, no. 3 (2021): 96–102, https://www.neliti.com/id/publications/423738/penatalaksanaan-fisioterapi-pada-osteoarthritisgenu-bilateral-dengan-modalitas-u.

[4] Chaimaa Zayer dan Abdelhay Benabdelhadi, "The Consequences of The Perceived Organizational Justice: A Holistic Overview," *IJAFAME: IInternational Journal of Accounting, Finance, Auditing, Management and Economics* 1, no. 3 (2020): 91–108, https://www.researchgate.net/publication/346084668_The_consequences_of_the_perceived_organizational_justice_a_holistic_overview.

[5] Nouval Ridani, Indah Permata Sari, dan Ririn Amisa, "Management of Physiotherapy in The Case of Trigger Finger Dextra with Ultrasound Modality, Exercise Therapy and Auto Streching," *JKiKT: Jurnal*

Health itself, according to the World Health Organization (WHO) within is a well-being that includes the optimal condition in the physical, mental, and social aspects, not just means the absence of disease or disability.[6]

Physiotherapy is an important aspect of a medical rehabilitation team that has a key role in developing health through physical therapy and rehabilitation.[7] Ultrasonic waves become one of the therapeutic tools in physiotherapy used to promote regeneration of injured tissues and relieve pain. Ultrasonic waves are the result of mechanical vibrations produced by the movement of isolated molecules in their diffusion medium. If the tissue receives ultrasound waves, the impact includes biological effects, mechanical effects and thermal effects.[8] Ultrasonic waves in the medical field have become one of the widely known therapies and are widely used in clinical practice. This therapy has shown many great benefits in the field of health, one of which in musculoskeletal conditions can help to relieve pain.[9] In addition, the use of ultrasound is also applied to *Delayed Onset Muscle Soreness* (DOMS) conditions to reduce pain against symptoms that usually arise after excessive physical activity.[10]

Increased use of ultrasound in health and clinical practice has become one of the topics of research in high demand. This is in line with other literature that suggests that ultrasound therapy has been shown to reduce pain, while exercise therapy is shown to significantly improve muscle strength, agility, active function, and improve the physiology of the knee.[11] In adhesive capsulitis, ultrasonic therapy also has a significant impact on enhancing functional abilities when combined with hold relax therapy and glenohumeral joint mobilization. There are many cases that cause pain in a person's joints and such a

---

Kajian Ilmiah dan Teknologi 4, no. 1 (2022): 27–32, https://jurnal.polanka.ac.id/index.php/JKIKT/article/view/61.

[6] Marthaulina, Mira Asih Anggraeni, dan Ika Rahman, "Penatalaksanaan Fisioterapi pada Osteoarthritisgenu Bilateral dengan Modalitas Ultrasound, Tens, dan Terapi Latihan di RSUD Cililin Kabupaten Bandung Barat."

[7] Miftahul Jannah, Lisa Agustina, dan Fauziah, "Pelaksanaan Ultrasound dan Terapi Latihan pada Kasus Tringger Finger," *JRR: Jurnal Real Riset* 4, no. 3 (2022): 366–373, https://journal.unigha.ac.id/index.php/JRR/article/view/839.

[8] Almeyda dan Roy Januardi Irawan, "Efektivitas Penggunaan Terapi Ultrasound Sebagai Terapi Nyeri Doms Otot Quadriceps pada Atlet Bola Tangan Putra."

[9] Fadhilah Az-Zahra, Ronal Lufitos, dan Faizah Abdullah Djawas, "Efektivitas Manual Therapy dan Ultrasound terhadap Peningkatan Fungsi Gerak Bahu pada Kasus Nyeri Bahu Et Causa Bursitis Subacromialis dengan Parameter SPADI di RSUD Muhammad Natsir," *Jurnal Fisioterapi Terapan Indonesia* 2, no. 1 (2023): 1–7, https://scholarhub.ui.ac.id/jfti/vol2/iss1/20/.

[10] Almeyda dan Roy Januardi Irawan, "Efektivitas Penggunaan Terapi Ultrasound Sebagai Terapi Nyeri Doms Otot Quadriceps pada Atlet Bola Tangan Putra."

[11] Laila Zahirah Sakinah dan Shelly Novianti Ismanda, "Penatalaksanaan Fisioterapi pada Tendinitis Supraspinatus Dekstra dengan Modalitas Ultrasound dan Terapi Latihan," *Jurnal Kesehatan Tambusai* 2, no. 4 (2021): 97–104, https://journal.universitaspahlawan.ac.id/index.php/jkt/article/view/2731.

solution can be obtained by performing physiotherapy with ultrasonic waves. One is adhesive capsulitis which is the most common cause of shoulder pain and restraint of movement, and a common condition in the finger is when the finger suddenly cannot be straightened after bent or called a *Tringer finger*.[12] It's caused by the thickening of the tendon cover in the same area. This condition can lead to functional problems such as pain, nodular formation, and *Limited Range Of Motion* (LGS), as well as to the condition of knee osteoarthritis which is a degenerative condition in the joints caused by various factors. This condition is characterized by the presence of damage to cartilage in the knee joints.[13]

From some studies, therapy with ultrasonic modality has proven to be beneficial. One of them is to increase the range of joint movement and decrease pain after physiotherapy with Ultrasound Diathermy and Hold Relax pad modalities for patients suffering from *Tennis Elbow*.[14] This was also proved in the case of *Trigger Finger*, in which ultrasonic wave administration in collaboration with Infra Red and Tranverse Friction was shown to reduce pain.[15] In another study of the same case also stated that there was a decrease in pain in the patient after having undergone ultrasonic therapy 6 times over 2 weeks.[16] Ultrasonic therapy is also applied to patients with plantar fasciitis, from several articles that have been reviewed suggesting that ultrasound therapy can also reduce pain in such cases.[17] In addition, the use of Elastis Bandage in a method that combines diathermia, US, and transverfriction massage has been shown to reduce pain sensations in individuals suffering from damage to the knee's medial collateral ligament.[18]

---

[12] Jannah, Lisa Agustina, dan Fauziah, "Pelaksanaan Ultrasound dan Terapi Latihan pada Kasus Tringger Finger."

[13] Isnani Taqina Iqomi dan Abdurrachman, "Gambaran Nyeri pada Osteoartritis Lutut Setelah Pemberian Intervensi dengan Modalitas Ultrasound: Literature Review," in *Strategi, Tantangan dan Peluang Tenaga Kesehatan di Era Society 5.0*, vol. 1 (Pekalongan: Universitas Muhammadiyah Pekajangan Pekalongan, 2021), 1558–1564, https://jurnal.umpp.ac.id/index.php/prosiding/article/view/623.

[14] Felicia Herliyana dan Ika Rahman, "Penatalaksanaan Fisioterapi pada Kasus Tennis Elbow Dextra dengan Modalitas Ultrasound dan Hold Relax di RS Pindad Kota Bandung," *Excellent Midwifery Journal* 4, no. 2 (2021): 37–43, https://jurnal.mitrahusada.ac.id/emj/article/view/168.

[15] Sahnaz Praramadani dan Ika Rahman, "Penatalaksanaan Fisioterapi pada Kasus Trigger Finger Dextra dengan Modalitas InfraRed, Ultrasound dan Transverse Friction," *Jurnal KeFis: Jurnal Kesehatan dan Fisioterapi* 1, no. 1 (2021): 49–53, https://ejournal.insightpower.org/index.php/KeFis/article/view/9.

[16] Ari Santoso dan Eko Budi Prasetyo, "Penatalaksanaan Fisioterapi pada Kondisi Trigger Finger dengan Intervensi Ultrasound (US), Infrared (IR) dan Transverse Friction di RSUD Bendan Pekalongan," *Jurnal Fisioterapi dan Rehabilitasi* 2, no. 2 (2018): 44–52, https://jurnal-d3fis.uwhs.ac.id/index.php/akfis/article/view/22.

[17] Nanda Alvi Saida dan Lia Dwi Prafitri, "Gambaran Penurunan Nyeri pada Penderita Plantar Fasciitis Sebelum dan Sesudah Pemberian Modalitas Ultrasound: Literature Review," in *Strategi, Tantangan dan Peluang Tenaga Kesehatan di Era Society 5.0*, vol. 1 (Pekalongan: Universitas Muhammadiyah Pekajangan Pekalongan, 2021), 1770–1776, https://jurnal.umpp.ac.id/index.php/prosiding/article/view/930.

[18] Ida Bagus Ketut Surya, "Penambahan Elastic Bandage pada Intervensi Diatermi, Ultrasonik dan Massage Transverfriction Dapat Menurunkan Nyeri Akibat Cedera Ligamen Kolateral Medial Lutut," *MIFI:*

Ultrasonic therapy is also applied to other cases that are commonly used to reduce pain and increase blood flow as well as repair damaged tissues.[19] The application of ultrasound therapy is often combined with therapy or other methods. For example, in the case of Sprain Ankle patients, ultrasound therapy is combined with exercise therapy.[20] Then in patients with post-elbow fractures, ultrasound therapy is combined with Active Passive Exercise to to lessen discomfort and broaden the range of motion in joints.[21] In the case of *Myofascial Syndrome*, ultrasound therapy is also used in collaboration with Miofascial Release.[22] This combination is done to maximize the effort made by adjusting to the existing case. According to in some cases ultrasound is better than infrared.[23]

This article's goal is to provide a summary of the most recent research on the advantages of ultrasonic wave therapy in the context of physical therapy and rehabilitation. It is anticipated that this article will advance the field of health by making it simpler to advance the application of ultrasonic therapy. By gathering some of these resources, the researchers also hope that readers and people in need about things related to this topic are more easily accessible so that they can be used as useful information and references.

RESEARCH METHODS

In this descriptive study, researchers apply a literature study approach as a way to gather data, analyze information, evaluate findings, and provide relevant interpretations of the research topics under investigation.[24] Studies of the use of ultrasonic waves in the context

Majalah Ilmiah Fisioterapi Indonesia 2, no. 1 (2014): 1–7, https://ojs.unud.ac.id/index.php/mifi/article/view/8425.

[19] Indra Juni Fransisko, Lucky Anggiat, dan Soeparman, "Terapi Konvensional dan Metode Mckenzie pada Lansia dengan Kondisi Low Back Pain karena Hernia Nukleus Pulposus Lumbal," *Jurnal Fisioterapi dan Rehabilitasi* 4, no. 2 (2020): 44–57, https://jurnal-d3fis.uwhs.ac.id/index.php/akfis/article/view/113.

[20] Irene Adriany Kacaribu dan Shelly Novianti Ismanda, "Penatalaksaan Fisioterapi pada Sprain Ankle Sinistra dengan Modalitas Ultrasound dan Terapi Latihan," *Jurnal Kesehatan Tambusai* 2, no. 4 (2021): 89–96, https://journal.universitaspahlawan.ac.id/index.php/jkt/article/view/2726.

[21] Dimas Arya Nugraha, Rizka Asna Rahmawati, dan Miftahul Jannah, "Efektivitas Ultrasound Theraphy dan Active Passive Exercise pada Pasien Post Fracture Elbow dalam Mengurangi Nyeri dan Menambah Lingkup Gerak Sendi," *Physiohs: Physiotherapy Health Science* 3, no. 1 (2021): 22–25, https://ejournal.umm.ac.id/index.php/physiohs/article/view/17158.

[22] Singgih Purnomo, Neti Eka Jayanti, dan Fitrianty, "Efektivitas Kombinasi Terapi Ultrasound dan Myofascial Release terhadap Perubahan Nyeri Myofascial Syndrome Upper Trapezius pada Karyawan Tambang Batubara di Sangatta Kutai Timur," *Jurnal Physio Research Center* 1 (2021), https://jurnal.itkeswhs.ac.id/index.php/Fisioterapi/article/view/758.

[23] Amelia Devi Putri Ariyanto, Chastine Fatichah, dan Agus Zainal Arifin, "Analisis Metode Representasi Teks untuk Deteksi Interelasi Kitab Hadis: Systematic Literature Review," *Jurnal Resti: Rekayasa Sistem dan Teknologi Informasi* 5, no. 5 (2021): 992–1000, https://jurnal.iaii.or.id/index.php/RESTI/article/view/3499.

[24] D. Hamilton et al., "Immersive Virtual Reality as a Pedagogical Tool in Education: A Systematic Literature Review of Quantitative Learning Outcomes and Experimental Design," *Journal of Computers in Education* 8, no. 1 (2020): 1–32, https://link.springer.com/article/10.1007/s40692-020-00169-2.

of health or therapy are compiled on the basis of information contained in various references, including relevant scientific journals. This approach uses several techniques in literary analysis, including the process of identification, analysis, interpretation, and evaluation of previous research in the field.[25] In addition to focusing on a given topic, the purpose of this research is to contribute in answering research questions. In addition, the research also seeks to provide additional learning material as well as identify gaps that are still open from previous researches. It is expected to make a valuable contribution to future research development.[26] In this study, as many as 25 articles obtained from various sources in the country have been investigated. The materials used are from journals and texts published between 2017 and 2024. The information collected by the researchers and the results of the qualitative research were concluded using the methodology of literary study as illustrated in Figure 1.

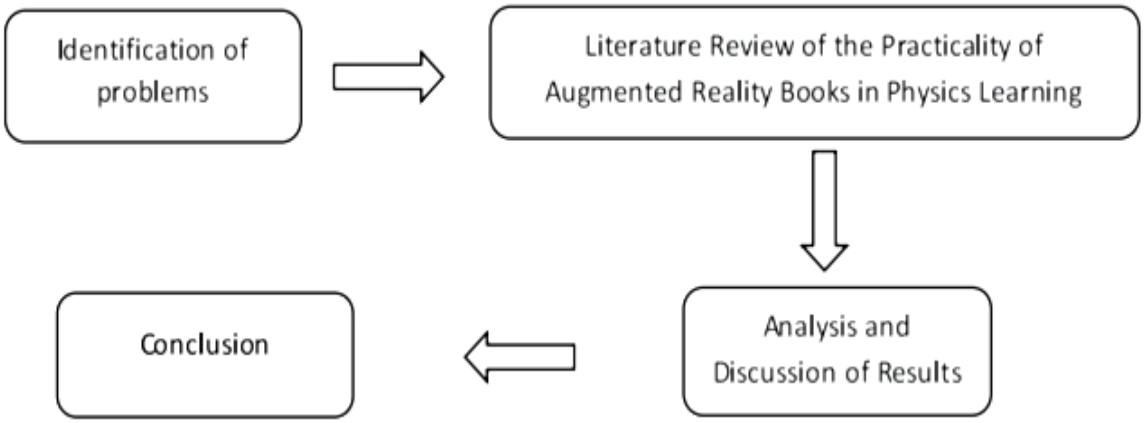

Figure 1. Research flow

The early part of this study focused on identifying emerging problems. The next stage involves a review of up to 25 publications related to the use of ultrasonic waves in the context of therapy, published between 2017 and 2024. The next step is analysis, conducted by researchers after referring to a number of relevant articles that have been published. The process then proceeded with a discussion of the outcome. The researchers then draw

[25] Khilda Nistrina, "Penerapan Augmented Reality dalam Media Pembelajaran," *J-Sika: Jurnal Sistem Informasi Karya Anak Bangsa* 3, no. 1 (2021): 1–5, https://ejournal.unibba.ac.id/index.php/j-sika/article/view/527.

[26] Ariyanto, Chastine Fatichah, dan Agus Zainal Arifin, "Analisis Metode Representasi Teks untuk Deteksi Interelasi Kitab Hadis: Systematic Literature Review."

conclusions based on findings and analysis carried out after referring to related articles and books.[27]

LITERATURE REVIEW

In this article entitled "The Benefits of Ultrasonic Waves on Therapy: A Review of Literature" we use some references that we found in various journals and articles and still relate to ultrasonic waves and therapies that utilize them. Below are references which we make as literature studies related to the recent topic:

Table 1. Literature Review

No.	Tahun	Judul artikel	Nama penulis	Nama jurnal/ Penerbit
1.	2022	Pengaruh Pemberian Ultrasound, Dan Nerve And Tendon Gliding Exercise Terhadap Penurunan Nyeri Penderita Carpal Tunnel Syndrom Di Klinik Fisioterapi H. Ds Hariyanto Dan Rekan Pekanbaru	*Kurniati Kandariah, Maryaningsih, Lagut Sutandra*	*Jurnal Kesehatan dan Fisioterapi*
2.	2019	Pemberian Ultrasound Lebih Baik Daripada Infrared Terhadap Penurunan Nyeri Pada Kasus Nyeri Punggung Bawah Miogenik	*Devi Sulistyawati K., I Nyoman Agus Pradnya Wiguna2, I Putu Kharismawan Aritama*	*Bali Health Journal*
3.	2021	Efektivitas Kombinasi Terapi Ultrasound Dan Myofascial Release Terhadap Perubahan Nyeri Myofascial Syndrome Upper Trapezius Pada Karyawan Tambang Batubara Di Sangatta Kutai Timur	*Neti Eka Jayanti, Fitrianty, Singgih Purnomo*	*Jurnal Physio Research Center*
4.	2021	Penatalaksaan Fisioterapi Pada Sprain Ankle Sinistra Dengan Modalitas Ultrasound Dan Terapi Latihan	*Irene Adriany Kacaribu, Shelly Novianti Ismanda*	*Jurnal Kesehatan Tanbusai*
5.	2022	Pengaruh Intervensi Ultrasound Terhadap Perubahan Nyeri Carpal Tunnel Syndrome Di Klinik Fisioterapi Sayang Jatinangor Tahun 2022	*Ratu Karel Lina, Abdurahman Berbudi B.L., Sri Parwati*	*Jurnal Fisioterapi dan Kesehatan Indonesia*

[27] Kirana Aureola Arzak dan Binar Kurnia Prahani, "Practicality of Augmented Reality Books in Physics Learning: A Literature Review," *JPPS: Jurnal Penelitian Pendidikan Sains* 12, no. 2 (2023): 138–154, https://journal.unesa.ac.id/index.php/jpps/article/view/22676.

6.	2020	Terapi Ultrasound Dengan Latihan Hold Relax Dan Passive Stretching Sama Efektifnya Dalam Meningkatkan Fleksibilitas Otot Hamstring Pada Pasien Osteoarthritis Genu Di Rsup Sanglah Denpasar Bali	*Eka Oktafianti, Luh Putu Ratna Sundari, Muhammad Ali Imron, Ketut Tirtayasa, I Putu Adhiartha Griadhi, Luh Made. Indah Sri Handari Adiputra*	*Sport and Fitness Journal*
7.	2021	Literature Review: Pengaruh Pemberian Terapi Ultrasound Terhadap Nyeri Pada Pasien Osteoarthritis Lutut	*Nurfahira Arif, Bambang Dwi Putranto, Muhammad Siddik*	*Homeostasis*
8.	2021	Penatalaksanaan Fisioterapi Pada Osteoarthritisgenu Bilateral Dengan Modalitas Ultrasound, Tens, Dan Terapi Latihan Di Rsud Cililin Kabupaten Bandung Barat	*Intan Marthaulina, Mira Asih Anggraeni, Ika Rahman*	*Jurnal Stikes Siti Hajar*
9.	2021	Gambaran Nyeri Pada Osteoartritis Lutut Setelah Pemberian Intervensi Dengan Modalitas Ultrasound: Literature Review	*Isnani Taqina Iqomi, Abdurrachman*	*Seminar Nasional Kesehatan*
10.	2022	Pemberian Terapi Latihan, Ultrasound (Us) Serta Transcutaneous Electrical Nerve Stimulation (Tens) Pada Pasien Osteoarthritis Knee Bilateral	*Kunti Latifah*	*Jurnal Health Sains*
11.	2022	Studi Kasus : Penatalaksanaan Ultrasound Dan Terapi Latihan Pada Kasus Osteoarthritis Knee Bilateral	*Atik Swandari, Yulia Trisnawati , Ridho Syahid Efendi*	*PREPOTIF Jurnal Kesehatan Masyarakat*
12.	2023	Kombinasi Ultrasound Dan Retrowalking Meningkatan Kemampuan Fungsional Pasien Osteoarthritis Knee Di Rsud Gambiran Kota Kediri	*Indrati, Fransisca Xaveria Hargiani, Rachma Putri Kasimbara, Nurul Halimah*	*Kieraha Medical Journal*
13.	2021	Penatalaksanaan Fisioterapi Pada Kasus Trigger Finger Dextra Dengan Modalitas Infrared, Ultrasound Dan Transverse Friction	*Sahnaz Praramadani, Ika Rahman*	*Jurnal Kesehatan dan Fisioterapi*
14.	2022	Pelaksanaan Ultrasound Dan Terapi Latihan Pada Kasus Tringger Finger	*Miftahul Jannah, Lisa Agustina, Fauziah*	*Jurnal Real Riset*
15.	2023	Penatalaksanaan Fisioterapi Dengan Penerapan Kombinasi Ultrasound (Us) Dan	*Yose Rizal*	*Jurnal Ilmiah Fisioterapi*

		Neuromuscular Taping (Nmt) Dalam Menurunkan Skala Nyeri Pada Kondisi Trigger Finger		
16.	2022	Penatalaksanaan Fisioterapi Pada Kasus Trigger Finger Dextra Dengan Modalitas Ultrasound, Terapi Latihan Dan Auto Streching	*Nouval Ridani, Indah Permata Sari, Ririn Amisa*	*Jurnal Kajian Ilmiah Kesehatan dan Teknologi*
17.	2024	Peran Bunyi Dalam Bidang Kedokteran	*Wira Apriansyah, Erlian Adi Hayuningrum, Salisa Rizky Candra, Wahyu Kurniawati*	*Madani: Jurnal Ilmiah Multidisipline*
18.	2021	Penatalaksanaan Fisioterapi Pada Meniskus Knee Dekstra Dengan Modalitas Ultrasound Dan Terapi Latihan	*Sri Rahayu, Shelly Novianti Ismanda*	*Jurnal Kesehatan Tambusai*
19.	2021	Gambaran Penurunan Nyeri Pada Penderita Plantar Fasciitis Sebelum Dan Sesudah Pemberian Modalitas Ultrasound : Literature Review	*Nanda Alvi Saida, Lia Dwi Prafitri*	*Seminar Nasional Kesehatan*
20.	2021	Efektivitas Ultrasound Theraphy Dan Active Passive Exercise Pada Pasien Post Fracture Elbow Dalam Mengurangi Nyeri Dan Menambah Lingkup Gerak Sendi	*Dimas Arya Nugraha, Rizka Asna Rahmawati, Mifthahul Jannah*	*Physiotherapy Health Science (PhysioHS)*
21.	2023	Efektivitas Penggunaan Terapi Ultrasound Sebagai Terapi Nyeri Doms Otot Quadriceps Pada Atlet Bola Tangan Putra	*Fahrie Almeyda, Roy Januardi Irawan*	*Jurnal Penjakora*
22.	2022	Pengaruh Ultrasound Diathermy dan Terapi Latihan pada Tendinitis Bicipitalis Sinistra	*Budi Susanto*	*Jurnal Ilmiah Indonesia*
23.	2021	Penatalaksanaan Fisioterapi Pada Kasus Cedera Meniscus Dextra Dengan Modalitas Tens, Ultrasound, Dan Terapi Latihan Di Koni Jawa Barat	*Nadia Salsabila Sofwan, Ika Rahman*	*Jurnal Kesehatan Dan Masyarakat (Jurnal Kefis)*
24.	2020	Terapi Konvensional Dan Metode Mckenzie Pada Lansia Dengan Kondisi Low Back Pain Karena Hernia Nukleus Pulposus Lumbal : Studi Kasus	*Indra Juni Fransisko Sipayung, Lucky Anggiat, Soeparman*	*Jurnal Fisioterapi Dan Rehabilitasi (Jfr)*
25.	2021	Penatalaksanaan Fisioterapi Pada Kasus Tennis Elbow Dextra Dengan Modalitas Ultrasound Dan Hold Relax Di Rs Pindad Kota Bandung	*Felicia Herliyana, Ika Rahman*	*Excellent Midwifery Journal*

RESULTS

The effects of providing ultrasound and nerve and tendon glidding exercise on reducing *carpal tunnel syndrome* patients pain conditions were discussed in the first column, "Effects of Giving Ultrasound, And Nerve And Tendon Gliding Exercise On Reducing Pain of Carpal Tunnel Syndrome Patients at Clinic of Physiotherapy H. Ds Hariyanto And Kolekanbaru," written by Kurniati Kandariah and friends. Data at the time of the average pain reduction after the intervention show this. Prior to the therapy, 88.2% of respondents reported having severe pain, and 11.8% reported having moderate pain. In the third therapy, 29.4% reported having heavy pain, and 70.6% reported having moderate pain. In the sixth therapy, 100% reported having moderate pain, and in the ninth therapy, 64.7% reported having moderate pain and 35.3% reported having mild pain. In the second column entitled "Better Ultrasound Giving In Infrared Contents In Inferred Bading In Case Of Low Miogenic Pain" by Devi Sulistyawati K. stated the results of analysis of data measurement of pain before and already treated at the conclusion that ultrasound giving is better than infrared in reducing pain in case of myogenic lower back pain.

In the third column entitled "Effectiveness of Combined Ultrasound and Myofascial Release Therapies Against Mouth Changes in the Upper Trapesius Syndrome in Eastern Cape Collateral Employees" by Neti Eka Jayanti, Fitrianty, and Singgih Purnomo stated that the combination of ultrasound therapy and miofascial release has an influence and effect on the pain changes caused by the upper trapesius muscle syndrome in coal miners. Then column 4 with the title "Fysiotherapy Accessing In Synistra Ankle Sprains With Modality Of Ultrasound And Terapy Tested" by Irene Adriany Kacaribu, and Novi Shelly Ismanda stated After looking at the four case studies and the theoretical work of his last scientific writing, it can be concluded that to reduce pain in ankle sprain patients he was prescribed ultrasonic therapy. Then in column 5 titled "Influence of ultrasound intervention against pain changes in *carpal tunnel syndrome* at the Clinic of Physiotherapy Dear Jatinangor Year 2022" by Queen Karel Lina and friends obtained results of analysis Wilcoxon test obtains pain values are 0,000 and pain hypothesis values 0,000 which means there is a difference between VAS values of carpal tunnel pain syndrome before and after the intervention given ultrasounds.

Column 6 titled "Ultrasound therapy with relaxed hold and passive stretching exercises is equally effective in improving the flexibility of hamstring muscles in genuine Osteoarthritis patients in RSUP Sanglah Denpasar Bali" by Eka Oktavian and friends Ultrasounds therapy by relaxing hold can enhance the flexibility of Hamstring Muscles in

RSUP Sanglah Danpassar Bali. In column 7 titled "Literature Review: The Effect of Giving Ultrasonic Therapy Against Pain in Osteoarthritis Luthrut Patients" Nur Fahira Afif and his friends gave the ultrasonic therapy effective for reducing pain in OA knee patients. Then the 8th column entitled "Implementation of physiotherapy on *osteoarthritis genu bilateral* with the modality of ultrasound, tensions, and exercise therapy in RSUDCililin district of West Bandung" by Intan Mauthaurina and friends there is a very significant progress in the process of healing compared to before the physical therapy. And in column 9 the title is "The Painful Picture of Knee Osteoarthritis After Giving Ultrasound Modality Interventions: Literature Review" by Isnani Taqina Iqomi. These five articles show that there is a change in pain picture in *knee osteoarthritis* patients after given ultrasound intervention. The same is true of the article in column 10 entitled "Exercise Therapy, Ultrasound (Us) and Transcutaneous Electrical Nerve Stimulation (Tens) in Bilateral Knee Osteoarthritis Patients" Kunti Latifah stated that the increase in the range of joint movement was not too significant while muscle strength, pain and functional activity did not increase in patients with bilateral knee OA.

Column 11 entitled "Case Study of Ultrasound Implementation and Exercise Therapy in Bilateral Knee Osteoarthritis" by Atik Swandari and friends stated that physiotherapy such as ultrasound and exercise therapy can reduce pain and improve functional activity ability in *bilateral knee osteoartritis*. Then column 12 titled "The Combination of Ultrasound and Retrowalking Improves the Functional Abilities of Knee Osteoarthritis Patients in the City View" Sensations and friends-After giving treatment, tracking data and conducting hypothesis testing, it can be concluded that of 30 respondents with knee osteoarthrite found a decreasing score of the Womac scale, meaning the lower the score, the higher the functional ability. The administration of diathermy ultrasound and retrowalking has significant implications in improving the functional ability of the patient significantly.

Column 13 entitled "Implementation of Physiotherapy in the Case of Trigger Finger Dextra with Modality Infrared, Ultrasound and Transverse Friction" Sahnaz Praramadani dam Ika Rahman stated that the presence of pain reduction with ultrasound intervention, increased Muscle Strength and tenderness Lingku After performing physiotherapeutic action in the case of trigger finger adjusted a significant evaluation. In the 14th column titled "Implementation of Ultrasound and Exercise Therapy on Tringger Finger Cases" by Miftahul Jannah and colleagues giving ultrasound modality and exercise therapy can reduce pain, and increase the range of joint movement. Then in column 15 entitled "The Implementation of Physiotherapy with the Application of a Combination of Ultrasound (US) and Neuromuscular Taping (Nmt) in Reducing the Scale of Pain in the Condition of Trigger

Finger" by Yose Rizal that the action of physiotherapy is a combination of ultrasound and neuromuscular taping given as much as 6 times in 2 weeks can reduce pain in patients with Triggers Finger.

Column 16 entitled "Implementation of Physiotherapy in the Case of Trigger Finger Dextra with Ultrasound Modality, Exercise Therapy and Auto Streching" by Naufal Ridani obtained the results of the evaluation of the implementation of physiotherapy carried out that is the presence of pain reduction with ultrasound intervention such as increased muscle strength and discomfort of the range of joint movement and the Presence of reduction in pain with VAS. The 17th column, entitled "The Role of Sound in the Field of Medicine" by Hero Apriansyah states that sound has waves that are beneficial to the human body. Sound itself has benefits such as measuring ocean depth, ultrasound and capturing image signals on TV or radio. Sound has many important roles in the world of medicine or health. The waves generated by sound are used for ultrasound. These waves were originally used only for media therapy, but the evolving era of ultrasonic waves is being used for diagnosis. These waves are non-invasive or radiation-free. Behind the advantages of this wave, there are many shortcomings. Later, in column 18 entitled "Implementation of Physiotherapy on Meniscus Knee Dekstra with Ultrasound Modality and Exercise Therapy" by Sri Rahayu stated that ultrasound administration has an effect on pain reduction and exercise therapy giving significant effects on increased muscle strength, increased LGS, enhanced an fusngsional activity as well as improvement to physiology in the knee. In column 19 entitling "Image of Pain Reduction in Plantar Fasciitis Sufferers Before and After Ultrasonication Modality : Literature Review" by Nanda Alvi Saida, Lia Dwi Prafitri stated the female gender dominates among plantar fasciitis sufferers and the average age of 50 years above and stated there is a decrease in pain after US therapy.

In the column 20 entitled "The Effectiveness of Ultrasound Theraphy and Active Passive Exercise in Post-Elbow Fracture Patients in Reducing Pain and Increasing Movement Scope" by Dimas Arya Nugraha and friends stated that ultrasound therapy can reduce pain and trigger blood circulation and Active & Passive exercises can enhance joint movement scope. Then column 21 entitled "Effectiveness of Using Ultrasound Therapy as Pain Therapy of Quadriceps Muscle Doms in Handball Athletes Son" by Fahrie Almeyda and Roy Januar in Irawan that based on the results of studies already conducted by researchers, there is evidence that the use of ultrasound used after eccentric exercise can reduce the level of pain in the anterior hip muscles. The researchers have a limitation on the number of subjects studied, it takes longer time to use ultrasound for maximum results,

namely 48 to 72 hours after eccentric exercise. It can therefore be concluded that the results of the study are in line with the hypothesis that there is a significant influence of the use of ultrasound on the reduction of DOMS pain in the quadriceps muscle.

Column 22 entitled "Effects of Ultrasound Diathermy and Exercise Therapy on Left Bicipitalis Tendinitis" by Budi Santoso says that Left Bipitalis tendinitis, which has problems of pain, sensitivity of the range of joint movements and decreased muscle strength, was given therapy as many as 4 times with the administration of ultrasound diathermy modalities to reduce pain and exercise therapy free active exercises to enhance the scope of the joint movement and Active Resisted Exercises to increase the strength of the muscles. Then in column 23 entitled "Implementation of Physiotherapy Therapy on Meniscus Injury Cases Dextra with Modality TENS, Ultrasound, and Exercise Therapy in Koni Java West" by Nadia Salsabila Sofwan and Ika Rahman stated after the administration of Ultrasonic and TENS achieved pain reduction after examination and evaluation using VAS.

In column 24 entitled "Conventional Terapy And Methods Mckenzie At Lansia With Low Back Pain Conditions Because Hernia Nucleus Pulposus Lumbal : Cases Study" by Indra June Fransisko Sipayung said elderly condition with LBP because HNP caused the presence of pressure pain and active movement pain in the lumbar region. Besides, it also reduces the functional abilities of the elderly. The results of this study concluded that conventional TENS and US therapies as well as exercises with McKenzie methods can provide good results in reducing pain and enhancing functional abilities in the elderly with LBP due to HNP. And in column 25 of the title " Implementing of physiotherapy on the case of Elbow Tennis with Modality" by Felicia Herliyana and Ica Rahman said that after performing the physiotherapeutic action in the event of Tennis Elbows, the evaluation was significant. The patient feels much better than before being given physiotherapy.

DISCUSSION

A sound in the field of physics is defined as a longitudinal wave that moves through a medium. The existence of sound is caused by the vibration that produces a sound system, allowing human hearing to hear it through the sense of hearing. Sound analysis can be done through different physics approaches. There have been many researchers studying the psychological, health, and other significance of sound phenomena. For example, in the world of medicine, sounds like music and sounds of nature are often used as means of relaxation and therapy.

The use of sound is increasingly widespread, one of which is the use of ultrasonic waves in the medical world. Ultrasonic therapy has been proven in the recovery process in specific medical cases such as muscle inflammation problems and to reduce pain.[28] On the next occasion we will comment on the use of ultrasonic therapy to the most commonly used cases based on the references already collected.

Trigger Finger

Trigger finger also known as stenosing tenosynovitis, is a common condition that significantly affects hand function and daily activities. It involves a flexor tendon cover, in particular affecting the A1 cylinder on the metakarpal head of the index finger. However, this condition can affect all fingers, including the thumb. The *trigger finger* is caused by a stenotic A1 cushion that loses its smooth lining surface, causing friction and nodular changes in the tendon. This causes pain and pressure pain when swallowing the A1 bushion and can develop into a locked sensation on the affected finger. The *trigger finger* diagnosis is established based on medical history and clinical examination. The primary clinical findings were temporary blockage of the finger when bent, followed by pain when straightened. This trigger phenomenon can start with pain and stiffness of the joints.[29]

Treatment with physiotherapeutic action can be an effective option to deal with the trigger finger condition. Physiotherapy has a variety of modalities that can help reduce the problems experienced by patients. One commonly used modality is ultrasound, which can reduce pain, muscle spasms, and tissue injuries. In addition, exercise therapy is also an important physiotherapy modality, which aims to prevent further implications, restore and improve physical abilities, as well as reduce health-related risk factors. By using both active and passive body movements, exercise therapy helps to strengthen muscles and improve joint flexibility, thereby helping to restore normal function in trigger finger conditions.[30] The effects of ultrasound are divided into mechanical effects and heat effects. Ultrasound waves cause stretching inside tissues that can cause the effect of micromassage, thereby boosting blood flow and smoothing circulation. This results in the dissolving of the pain substances in the blood and reducing the pain in the treated area. Meanwhile, exercise therapy is a physiotherapy modality that uses both active and passive motion exercises to maintain and

[28] Zayer dan Abdelhay Benabdelhadi, "The Consequences of The Perceived Organizational Justice: A Holistic Overview."

[29] Santoso dan Eko Budi Prasetyo, "Penatalaksanaan Fisioterapi pada Kondisi Trigger Finger dengan Intervensi Ultrasound (US), Infrared (IR) dan Transverse Friction di RSUD Bendan Pekalongan."

[30] Jannah, Lisa Agustina, dan Fauziah, "Pelaksanaan Ultrasound dan Terapi Latihan pada Kasus Tringger Finger."

improve strength, mobility, flexibility, stability, relaxation, coordination, balance, and functional abilities. The goal of exercise therapy is to improve the patient's activity as well as their ability to perform functional and purpose-specific movements, so that they can return to normal daily activities. With a combination of ultrasound and exercise therapy, patients with *trigger fingers* are expected to optimal improvement in their condition.[31]

Osteoartritis

Osteoarthritis is a disease in the joints caused by several factors, one of the characteristics of which is the occurrence of damage to cartilage in the knee joints. The symptoms are progressive in which the complaint usually develops slowly and can worsen with age. Examination by a physiotherapist suggests it can lead to a variety of problems, including impairment. Restrictions on the range of joint movement, pain, muscle spasms and disability. Knee osteoarthritis management often involves a variety of approaches including physical therapy to improve muscle strength and flexibility. Use of drugs to reduce pain and inflammation, as well as lifestyle modifications to reduce pressure on the knee joints. In more severe cases, surgical interventions such as knee arthroplasty may be necessary to repair joint damage and reduce associated symptoms.[32]

Another condition in this case is known as *knee osteoarthritis* and *osteoartritis genu*, in which the knee is a degenerative condition located on the kneecap which is marked by damage to the cartilage inside the joint. *Osteoarthritis* of the knee often develops with age and is one of the main causes of knee pain in adults. In addition to pain, joint squirming can also increase disruption of functional activity. It can make it difficult for the victim to do the activity.[33] According to Indrati et al., *knee osteoarthritis* is characterized by characteristic cartilage degradation and is usually associated with age factors.[34] Although age factors are often the leading cause of knee osteoarthritis, other risk factors include obesity, joint injuries, inheritance, and other factors that can affect joint health. According to the Kunti Latifah, *knee osteoarthritis* is a degenerative disease that occurs in the movable knee joints, obvious damage occurring in the joints with characteristics such as the formation of new bones

[31] Ridani, Indah Permata Sari, dan Ririn Amisa, "Management of Physiotherapy in The Case of Trigger Finger Dextra with Ultrasound Modality, Exercise Therapy and Auto Streching."

[32] Iqomi dan Abdurrachman, "Gambaran Nyeri pada Osteoartritis Lutut Setelah Pemberian Intervensi dengan Modalitas Ultrasound: Literature Review."

[33] Atik Swandari, Yulia Trisnawati, dan Ridho Syahid Efendi, "Penatalaksanaan Ultrasound dan Terapi Latihan pada Kasus Osteoarthritis Knee Bilateral: Studi Kasus," *Prepotif: Jurnal Kesehatan Masyarakat* 6, no. 2 (2022): 1950–1955, https://journal.universitaspahlawan.ac.id/index.php/prepotif/article/view/5580.

[34] Indrati et al., "Kombinasi Ultrasound dan Retrowalking Meningkatkan Kemampuan Fungsional Pasien Osteoarthritis Knee di RSUD Gambiran Kota Kediri," *Kieraha Medical Journal* 5, no. 2 (2023): 84–91, https://ejournal.unkhair.ac.id/index.php/kmj/article/view/7022.

around the edges of the joint, known as osteophytes.[35] In addition to severe pain and functional impairment, knee osteoarthritis also often causes swelling of the knee and stiffness of the joints, which can affect the quality of life of the patient. *Osteoarthritis genu* is a fragility of the hamstring muscle. This condition often causes functional and motion restrictions in the patient, it can be caused by the length of the muscle condition undergoing it, or restricted patterns of movement in patients with osteoarthritis that can cause shrinkage of the hamstring muscle which usually has abnormal curvature in the knee. The hamstring muscle plays an important role in controlling the movement of the body involved in a variety of activities, from running and jumping to bending when sitting or standing, as well asining balance. A good flexibility of the hamstring muscles is essential toining optimal function of these muscles. A good muscle flexibility can be observed from this muscle's ability to contract extensively and concentrically to the maximum. However, if the hamstring muscle is shortened or stiffened it can affect body balance and muscle stiffness and cause lumbar dysfunction.[36]

Intensive treatment is needed to give a positive effect, such as the use of ultrasound therapy. Ultrasound therapy (US) is a non-pharmacological treatment method commonly used to treat *osteoarthritis* (OA). (PUS). Continuous ultrasound: a mode using a continuous ultrasonic wave that produces a dominant thermal effect. These thermal effects include an increase in tissue temperature that can increase local blood flow, reduce muscle spasms and increase enzymatic activity. Pulsed ultrasounds use ultrasonic wavelengths with intermittent or pulses that produce a mechanical effect without causing a significant temperature increase in the tissue. This method is preferred for the treatment of acute and subacute cases. The mechanical effects of PUS include micromassage and increased fluid flow in the grid that can give an analgesic effect. Both CUS and PUS have beneficial biological effects including increased blood flow, enzymatic activity, and reduced pain. Using ultrasound can help reduce osteoarthritis symptoms.[37]

---

[35] Kunti Latifah, "Pemberian Terapi Latihan, Ultrasound (US) serta Transcutaneous Electrical Nerve Stimulation (TENS) pada Pasien Osteoarthritis Knee Bilateral," *Jurnal Health Sains* 3, no. 3 (2022): 420–429, https://jurnal.healthsains.co.id/index.php/jhs/article/view/441.

[36] Eka Oktafianti et al., "Terapi Ultrasound dengan Latihan Hold Relax dan Passive Stretching Sama Efektifnya dalam Meningkatkan Fleksibilitas Otot Hamstring pada Pasien Osteoarthritis Genu di RSUP Sanglah Denpasar Bali," *Sport and Fitness Journal* 8, no. 3 (2020): 133–142, https://ojs.unud.ac.id/index.php/sport/article/view/64718.

[37] Nurfahira Arif, Bambang Dwi Putranto, dan Muhammad Siddik, "Literature Review: Pengaruh Pemberian Terapi Ultrasound terhadap Nyeri pada Pasien Osteoarthritis Lutut," *Homeostasis: Jurnal Mahasiswa Pendidikan Dokter* 4, no. 1 (2021): 49–58, https://ppjp.ulm.ac.id/journals/index.php/hms/article/view/3322.

In the state of *knee osteoarthritis*, exercise therapy is performed to increase muscle strength so that the knee joints can function optimally and US therapy to give a warm effect to the affected area, thereby causing vasodilatation and increased blood flow to the area experiencing inflammation. It can improve vascularization and provide sufficient nitrition as well as oxygenation to the inflamed tissue, thus helping to reduce pain and enhance the healing process. Using ultrasound and exercise therapy such as quadriceps exercise, is an effective approach to reducing pain and enhancing functional activity in bilateral knee osteoarthritis conditions.[38] In the case of osteoarthritis, the selected physiotherapy modality includes TENS, US, and exercise therapy. Ultrasound (US) is used to improve blood circulation, which can speed up the healing process in inflammation or inflammations, as well as reduce pain. TENS is used as a form of peripheral nerve stimulation through the skin. TENS aims to obtain electronalgesia that can help reduce pain, provide a sedative effect, and relieve pain that persists over a long period of time. Both of these physiotherapy modalities, US and TENS, are an important part of physiotherapeutic treatment for patients with bilateral gene osteoarthritis, as they can help reduce pain and enhance the healing process.[39]

Carpal Tunnel Syndrome

Carpal tunnel syndrome is a common condition of the medianus nerve in the wrist. The medianus nerve runs through the carpal tunnel of the wrist and gives inervation to the palm skin as well as several fingers, including the thumb, index, middle finger, and half-sided radial thumbs of the sweet finger. This condition is a type of stress neuropathy or trap, which means that the medianus nerve is under pressure as it passes through the carpal tunnel. This pressure can cause symptoms such as pain, numbness, and weakness in the area that is inerved by the medium nerve. This condition is known as carpal tunnel syndrome. Symptoms usually occur at night or during activities involving wrists and can affect a person's ability to perform daily tasks involving the use of hands.[40] Based on data from various sources, the CTS prevalence varies from country to country. And from the data obtained Indonesia occupies the incidence rate of neuropathy including CTS quite high. The neuropathy study group of the indonesian association of neurospecialists (PRDOSSI) that 43% of the 16,800 respondents were at risk of developing neuropathies. More than 50% of Indonesians engage

[38] Swandari, Yulia Trisnawati, dan Ridho Syahid Efendi, "Penatalaksanaan Ultrasound dan Terapi Latihan pada Kasus Osteoarthritis Knee Bilateral: Studi Kasus."

[39] Marthaulina, Mira Asih Anggraeni, dan Ika Rahman, "Penatalaksanaan Fisioterapi pada Osteoarthritisgenu Bilateral dengan Modalitas Ultrasound, Tens, dan Terapi Latihan di RSUD Cililin Kabupaten Bandung Barat."

[40] Ridani, Indah Permata Sari, dan Ririn Amisa, "Management of Physiotherapy in The Case of Trigger Finger Dextra with Ultrasound Modality, Exercise Therapy and Auto Streching."

in daily activities and lifestyles that are at risk of causing neuropathy. The prevalence of musculoskeletal diseases in Indonesia, including CTS, is also quite high, especially among informal workers. This data shows the importance of awareness of the risks and prevention of CTS in Indonesia as well as the need for the active role of physiotherapists in managing these conditions. *Carpal tunnel syndrome* can cause a variety of symptoms including pain, dizziness, and numbness along the medianus nerve spread in the hand. A study in workers at high risk of wrist injury suffering from CTS showed that the prevalence of CTS symptoms was as follows: 75% of subjects experienced pain complaints 19% experienced dizziness, and 6% experienced numbness. This suggests that pain is the dominant symptom of CTS, so it is important to identify and manage these symptoms properly to improve the quality of life of patients with CTS.[41]

Ultrasound use on CTS is done by applying it to the area with inflammation in the wrist. The sound waves are converted into heat, thus increasing the temperature in the tissue, causing vascular dilation and increased amount of oxygen sent to the affected tissue as well as accelerating tissue healing processes. Through ultrasound therapy there is stimulation of nerve repair and inflammatory effects that can facilitate recovery from medianus nerve compression. This means that ultrasonic therapy can help reduce inflammation, improve blood circulation, and accelerate tight median nerve healing, thereby helping to reduce symptoms and improve hand function in patients with CTS.[42]

CONCLUSION

Ultrasonic waves are longitudinal waves that move through a medium that we often call sound. It's a vibration that produces a sound system. With progress in the medical world, ultrasonic waves have become one of the therapeutic instruments used in some medical problems. Among them, ultrasonic waves are used to treat the symptoms of *Trigger Finger, Osteoarthritis, Carpal Tunnel Syndrome, Tennis Elbow, Delayed Onset Muscle Soreness (DOMS), Plantar Fasciitis*, and others. In these cases, ultrasound therapy is also collaborated with other therapies such as exercise therapy. Therapy with ultrasonic modality has been shown to reduce pain, muscle spasms, and tissue injury. The primary purpose of the use of

[41] Kurniati Kandariah, Maryaningsih, dan Lagut Sutandra, "Pengaruh Pemberian Ultrasound, dan Nerve and Tendon Gliding Exercise terhadap Penurunan Nyeri Penderita Carpal Tunnel Syndrom di Klinik Fisioterapi H. DS. Hariyanto dan Rekan Pekanbaru," *Jurnal KeFis: Jurnal Kesehatan dan Fisioterapi* 2, no. 5 (2022): 52–58, https://ejournal.insightpower.org/index.php/KeFis/article/view/183.

[42] Lina, Abdurahman Berbudi B.L., dan Sri Parwati, "Pengaruh Intervensi Ultrasound terhadap Perubahan Nyeri Carpal Tunnel Syndrome di Klinik Fisioterapi Sayang Jatinangor Tahun 2022."

ultrasound in physiotherapy is to induce certain therapeutic effects such as increased blood circulation, muscle relaxation, increased membrane permeability, accelerated healing processes, and pain reduction. The effects of ultrasound administration are mainly divided into mechanical effects and heat effects. Ultrasound waves cause stretching inside tissues that can cause the effect of micromassage, thereby boosting blood flow and smoothing circulation. This results in the dissolving of the pain substances in the blood and reducing the pain in the treated area.

RECOMMENDATION

We would like to express our deep appreciation to all individuals who have contributed to the creation of this article. Thank you to our friends for their support and inspiration. Our special appreciation goes to the lecturers who have been patient with us and have provided valuable guidance and input. The collaboration we have not only enriches the content of the article, but also strengthens our spirit to a common goal.

REFERENCES

Almeyda, Fahrie, dan Roy Januardi Irawan. "Efektivitas Penggunaan Terapi Ultrasound Sebagai Terapi Nyeri Doms Otot Quadriceps pada Atlet Bola Tangan Putra." *Jurnal Penjakora: Fakultas Olahraga dan Kesehatan* 10, no. 2 (2023): 110–117. https://ejournal.undiksha.ac.id/index.php/PENJAKORA/article/view/66076.

Arif, Nurfahira, Bambang Dwi Putranto, dan Muhammad Siddik. "Literature Review: Pengaruh Pemberian Terapi Ultrasound terhadap Nyeri pada Pasien Osteoarthritis Lutut." *Homeostasis: Jurnal Mahasiswa Pendidikan Dokter* 4, no. 1 (2021): 49–58. https://ppjp.ulm.ac.id/journals/index.php/hms/article/view/3322.

Ariyanto, Amelia Devi Putri, Chastine Fatichah, dan Agus Zainal Arifin. "Analisis Metode Representasi Teks untuk Deteksi Interelasi Kitab Hadis: Systematic Literature Review." *Jurnal Resti: Rekayasa Sistem dan Teknologi Informasi* 5, no. 5 (2021): 992–1000. https://jurnal.iaii.or.id/index.php/RESTI/article/view/3499.

Arzak, Kirana Aureola, dan Binar Kurnia Prahani. "Practicality of Augmented Reality Books in Physics Learning: A Literature Review." *JPPS: Jurnal Penelitian Pendidikan Sains* 12, no. 2 (2023): 138–154. https://journal.unesa.ac.id/index.php/jpps/article/view/22676.

Az-Zahra, Fadhilah, Ronal Lufitos, dan Faizah Abdullah Djawas. "Efektivitas Manual Therapy dan Ultrasound terhadap Peningkatan Fungsi Gerak Bahu pada Kasus Nyeri Bahu Et Causa Bursitis Subacromialis dengan Parameter SPADI di RSUD Muhammad Natsir." *Jurnal Fisioterapi Terapan Indonesia* 2, no. 1 (2023): 1–7. https://scholarhub.ui.ac.id/jfti/vol2/iss1/20/.

Fransisko, Indra Juni, Lucky Anggiat, dan Soeparman. "Terapi Konvensional dan Metode Mckenzie pada Lansia dengan Kondisi Low Back Pain karena Hernia Nukleus

Pulposus Lumbal." *Jurnal Fisioterapi dan Rehabilitasi* 4, no. 2 (2020): 44–57. https://jurnal-d3fis.uwhs.ac.id/index.php/akfis/article/view/113.

Hamilton, D., J. McKechnie, E. Edgerton, dan C. Wilson. "Immersive Virtual Reality as a Pedagogical Tool in Education: A Systematic Literature Review of Quantitative Learning Outcomes and Experimental Design." *Journal of Computers in Education* 8, no. 1 (2020): 1–32. https://link.springer.com/article/10.1007/s40692-020-00169-2.

Herliyana, Felicia, dan Ika Rahman. "Penatalaksanaan Fisioterapi pada Kasus Tennis Elbow Dextra dengan Modalitas Ultrasound dan Hold Relax di RS Pindad Kota Bandung." *Excellent Midwifery Journal* 4, no. 2 (2021): 37–43. https://jurnal.mitrahusada.ac.id/emj/article/view/168.

Indrati, Fransisca Xaveria Hargiani, Rachma Putri Kasimbara, dan Nurul Halimah. "Kombinasi Ultrasound dan Retrowalking Meningkatkan Kemampuan Fungsional Pasien Osteoarthritis Knee di RSUD Gambiran Kota Kediri." *Kieraha Medical Journal* 5, no. 2 (2023): 84–91. https://ejournal.unkhair.ac.id/index.php/kmj/article/view/7022.

Iqomi, Isnani Taqina, dan Abdurrachman. "Gambaran Nyeri pada Osteoartritis Lutut Setelah Pemberian Intervensi dengan Modalitas Ultrasound: Literature Review." In *Strategi, Tantangan dan Peluang Tenaga Kesehatan di Era Society 5.0*, 1:1558–1564. Pekalongan: Universitas Muhammadiyah Pekajangan Pekalongan, 2021. https://jurnal.umpp.ac.id/index.php/prosiding/article/view/623.

Jannah, Miftahul, Lisa Agustina, dan Fauziah. "Pelaksanaan Ultrasound dan Terapi Latihan pada Kasus Tringger Finger." *JRR: Jurnal Real Riset* 4, no. 3 (2022): 366–373. https://journal.unigha.ac.id/index.php/JRR/article/view/839.

Kacaribu, Irene Adriany, dan Shelly Novianti Ismanda. "Penatalaksaan Fisioterapi pada Sprain Ankle Sinistra dengan Modalitas Ultrasound dan Terapi Latihan." *Jurnal Kesehatan Tambusai* 2, no. 4 (2021): 89–96. https://journal.universitaspahlawan.ac.id/index.php/jkt/article/view/2726.

Kandariah, Kurniati, Maryaningsih, dan Lagut Sutandra. "Pengaruh Pemberian Ultrasound, dan Nerve and Tendon Gliding Exercise terhadap Penurunan Nyeri Penderita Carpal Tunnel Syndrom di Klinik Fisioterapi H. DS. Hariyanto dan Rekan Pekanbaru." *Jurnal KeFis: Jurnal Kesehatan dan Fisioterapi* 2, no. 5 (2022): 52–58. https://ejournal.insightpower.org/index.php/KeFis/article/view/183.

Latifah, Kunti. "Pemberian Terapi Latihan, Ultrasound (US) serta Transcutaneous Electrical Nerve Stimulation (TENS) pada Pasien Osteoarthritis Knee Bilateral." *Jurnal Health Sains* 3, no. 3 (2022): 420–429. https://jurnal.healthsains.co.id/index.php/jhs/article/view/441.

Lina, Ratu Karel, Abdurahman Berbudi B.L., dan Sri Parwati. "Pengaruh Intervensi Ultrasound terhadap Perubahan Nyeri Carpal Tunnel Syndrome di Klinik Fisioterapi Sayang Jatinangor Tahun 2022." *Jurnal Fisioterapi dan Kesehatan Indonesia* 2, no. 2 (2022): 1–10. https://ifi-bekasi.e-journal.id/jfki/article/view/152.

Marthaulina, Intan, Mira Asih Anggraeni, dan Ika Rahman. "Penatalaksanaan Fisioterapi pada Osteoarthritisgenu Bilateral dengan Modalitas Ultrasound, Tens, dan Terapi Latihan di RSUD Cililin Kabupaten Bandung Barat." *Jurnal Stikes Siti Hajar* 3, no.

3 (2021): 96–102. https://www.neliti.com/id/publications/423738/penatalaksanaan-fisioterapi-pada-osteoarthritisgenu-bilateral-dengan-modalitas-u.

Nistrina, Khilda. "Penerapan Augmented Reality dalam Media Pembelajaran." *J-Sika: Jurnal Sistem Informasi Karya Anak Bangsa* 3, no. 1 (2021): 1–5. https://ejournal.unibba.ac.id/index.php/j-sika/article/view/527.

Nugraha, Dimas Arya, Rizka Asna Rahmawati, dan Miftahul Jannah. "Efektivitas Ultrasound Theraphy dan Active Passive Exercise pada Pasien Post Fracture Elbow dalam Mengurangi Nyeri dan Menambah Lingkup Gerak Sendi." *Physiohs: Physiotherapy Health Science* 3, no. 1 (2021): 22–25. https://ejournal.umm.ac.id/index.php/physiohs/article/view/17158.

Oktafianti, Eka, Luh Putu Ratna Sundari, Muhammad Ali Imron, Ketut Tirtayasa, I Putu Adhiartha Griadhi, dan Luh Made Indah Sri Handari Adiputra. "Terapi Ultrasound dengan Latihan Hold Relax dan Passive Stretching Sama Efektifnya dalam Meningkatkan Fleksibilitas Otot Hamstring pada Pasien Osteoarthritis Genu di RSUP Sanglah Denpasar Bali." *Sport and Fitness Journal* 8, no. 3 (2020): 133–142. https://ojs.unud.ac.id/index.php/sport/article/view/64718.

Praramadani, Sahnaz, dan Ika Rahman. "Penatalaksanaan Fisioterapi pada Kasus Trigger Finger Dextra dengan Modalitas InfraRed, Ultrasound dan Transverse Friction." *Jurnal KeFis: Jurnal Kesehatan dan Fisioterapi* 1, no. 1 (2021): 49–53. https://ejournal.insightpower.org/index.php/KeFis/article/view/9.

Purnomo, Singgih, Neti Eka Jayanti, dan Fitrianty. "Efektivitas Kombinasi Terapi Ultrasound dan Myofascial Release terhadap Perubahan Nyeri Myofascial Syndrome Upper Trapezius pada Karyawan Tambang Batubara di Sangatta Kutai Timur." *Jurnal Physio Research Center* 1 (2021). https://jurnal.itkeswhs.ac.id/index.php/Fisioterapi/article/view/758.

Ridani, Nouval, Indah Permata Sari, dan Ririn Amisa. "Management of Physiotherapy in The Case of Trigger Finger Dextra with Ultrasound Modality, Exercise Therapy and Auto Streching." *JKiKT: Jurnal Kajian Ilmiah dan Teknologi* 4, no. 1 (2022): 27–32. https://jurnal.polanka.ac.id/index.php/JKIKT/article/view/61.

Saida, Nanda Alvi, dan Lia Dwi Prafitri. "Gambaran Penurunan Nyeri pada Penderita Plantar Fasciitis Sebelum dan Sesudah Pemberian Modalitas Ultrasound: Literature Review." In *Strategi, Tantangan dan Peluang Tenaga Kesehatan di Era Society 5.0*, 1:1770–1776. Pekalongan: Universitas Muhammadiyah Pekajangan Pekalongan, 2021. https://jurnal.umpp.ac.id/index.php/prosiding/article/view/930.

Sakinah, Laila Zahirah, dan Shelly Novianti Ismanda. "Penatalaksanaan Fisioterapi pada Tendinitis Supraspinatus Dekstra dengan Modalitas Ultrasound dan Terapi Latihan." *Jurnal Kesehatan Tambusai* 2, no. 4 (2021): 97–104. https://journal.universitaspahlawan.ac.id/index.php/jkt/article/view/2731.

Santoso, Ari, dan Eko Budi Prasetyo. "Penatalaksanaan Fisioterapi pada Kondisi Trigger Finger dengan Intervensi Ultrasound (US), Infrared (IR) dan Transverse Friction di RSUD Bendan Pekalongan." *Jurnal Fisioterapi dan Rehabilitasi* 2, no. 2 (2018): 44–52. https://jurnal-d3fis.uwhs.ac.id/index.php/akfis/article/view/22.

Surya, Ida Bagus Ketut. "Penambahan Elastic Bandage pada Intervensi Diatermi, Ultrasonik dan Massage Transverfriction Dapat Menurunkan Nyeri Akibat Cedera Ligamen

Kolateral Medial Lutut." *MIFI: Majalah Ilmiah Fisioterapi Indonesia* 2, no. 1 (2014): 1–7. https://ojs.unud.ac.id/index.php/mifi/article/view/8425.

Swandari, Atik, Yulia Trisnawati, dan Ridho Syahid Efendi. "Penatalaksanaan Ultrasound dan Terapi Latihan pada Kasus Osteoarthritis Knee Bilateral: Studi Kasus." *Prepotif: Jurnal Kesehatan Masyarakat* 6, no. 2 (2022): 1950–1955. https://journal.universitaspahlawan.ac.id/index.php/prepotif/article/view/5580.

Zayer, Chaimaa, dan Abdelhay Benabdelhadi. "The Consequences of The Perceived Organizational Justice: A Holistic Overview." *IJAFAME: IInternational Journal of Accounting, Finance, Auditing, Management and Economics* 1, no. 3 (2020): 91–108. https://www.researchgate.net/publication/346084668_The_consequences_of_the_perceived_organizational_justice_a_holistic_overview.