



LIGHT AND COLOR THERAPIES: AN INTEGRATIVE REVIEW ON CHROMOTHERAPY, COLORPUNCTURE, LASERPUNCTURE AND PHOTOBIMODULATION

TERAPIAS COM LUZ E CORES: UMA REVISÃO INTEGRATIVA SOBRE CROMOTERAPIA, COLORPUNTURA, LASERPUNTURA E FOTOBIMODULAÇÃO

Leandro de Melo Duarte Franco¹, Daniel Maurício de Oliveira Rodrigues², Gisele Damian Antonio Gouveia³

ABSTRACT: Introduction: Integrative health practices, such as chromotherapy, colorpuncture, laserpuncture, and photobiomodulation, have gained recognition but still lack studies consolidating their efficacy. **Methods:** An integrative review was conducted from 1999 to 2019 using scientific databases and specific descriptors. **Results:** Out of 291 publications, 44 were analysed. Photobiomodulation showed the strongest scientific support, proving effective in tissue regeneration and pain relief. Chromotherapy demonstrated potential in emotional regulation, while colourpuncture and laserpuncture provided benefits in energy stimulation and analgesia but lacked standardisation. **Conclusion:** While photobiomodulation is scientifically validated, further studies are needed for other therapies. Standardising protocols and training qualified professionals are essential for their clinical application.

KEYWORDS: chromotherapy, colorpuncture, chromopuncture, laser therapy, laserpuncture, photobiomodulation, and integrative and complementary practices in health.

RESUMO: Introdução: As práticas integrativas em saúde, como cromoterapia, colorpuntura, laserpuntura e fotobiomodulação, vêm ganhando espaço, mas ainda carecem de estudos que consolidem sua eficácia. **Métodos:** Revisão integrativa realizada entre 1999 e 2019, utilizando bases de dados científicas e descritores específicos. **Resultados:** De 291 publicações, 44 foram analisadas. A fotobiomodulação demonstrou maior respaldo científico, sendo eficaz na regeneração tecidual e analgesia. A cromoterapia mostrou potencial na regulação emocional, enquanto colorpuntura e laserpuntura apresentaram benefícios na estimulação energética e alívio da dor, mas com menor padronização. **Conclusão:** A fotobiomodulação já possui validação científica, enquanto as demais terapias necessitam de mais estudos. A padronização de protocolos e a capacitação profissional são fundamentais para sua aplicação clínica.

PALAVRAS-CHAVE: cromoterapia, colorpuntura, cromopuntura, laserterapia, laserpuntura, fotobiomodulação e práticas integrativas e complementares em saúde.

¹ Specialist in Management and Family Health from Anhembi Morumbi University (UAM), São Paulo, SP, Brazil, and Bachelor in Naturology from Universidade Cidade de São Paulo (UNICID), São Paulo, SP, Brazil; ² Ph.D. in Medicine (Preventive Medicine) from the University of São Paulo (USP), São Paulo, SP, Brazil; ³ Ph.D. in Public Health from the Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil.

***Corresponding author:** Leandro de Melo Duarte Franco – Email: profmatduarte@gmail.com

Received: 24 July 2024

Accepted: 31 Jan. 2025

This is an open-access article distributed under the terms of the Creative Commons Attribution license (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



INTRODUCTION

Integrative and complementary health practices encompass procedures derived from complex medical systems with their theoretical foundations and vital integrative therapeutic resources. Although widely employed, these practices continue to face marginalization within the prevailing scientific context, which frequently privileges the Cartesian biomedical model - characterized by the separation of mind and body and an emphasis on disease at the expense of the patient as a whole. Conversely, integrative practices adopt a vitalistic perspective, regarding the individual as a physical, emotional, mental, and spiritual being, promoting a holistic approach to health¹.

These practices have undergone significant advances over recent decades, including institutionalization within health systems such as the Brazilian Unified Health System (SUS). The National Policy on Integrative and Complementary Practices (PNPIC) was established in 2006 and expanded access to these therapies and promoted their regulation. Subsequent updates have incorporated new practices, such as art therapy, yoga, chromotherapy, and aromatherapy, currently amounting to 29 modalities recognized within the SUS^{2,3}. This expansion reflects these therapies' growing acceptance and relevance in managing chronic and functional conditions, such as rheumatism, circulatory disorders, and diabetes, which frequently demand approaches beyond conventional biomedicine⁴.

Chromotherapy is the science that utilizes colors to create balance and harmony in the body, mind, and emotions⁵. It employs colors from the solar spectrum to restore bodily equilibrium in areas affected by specific dysfunctions. Although it does not aim to cure diseases directly, it seeks to intervene in the underlying causes by promoting the balance of organs and systems and enhancing patients' overall condition². It is an ancient technique that has been refined and systematized over the centuries, enabling practitioners to independently administer integrative treatments with a positive impact on patient's quality of life⁶.

Colorpuncture, or chromopuncture, is an integrative therapy that applies colored light to specific acupuncture points. This approach utilizes biophotonic principles to restore the original vital energy that was altered during illness⁷. Originating from chromotherapy, it is a non-invasive technique that combines the principles of traditional Chinese medicine with advances in Western medicine. Developed in Germany by Peter Mandel, chromopuncture employs photons – massless particles that travel at the speed of light – to apply colored light to specific skin areas⁷.

Laserpuncture refers to stimulating traditional acupuncture points using non-thermal, low-intensity light⁸. This modality utilizes luminous energy to induce photobiological effects with biochemical, analgesic, and cellular regenerative impacts⁹. The term “laser” is an acronym for Light Amplification of Stimulated Emission of Radiation and is characterized by electromagnetic waves with uniform frequencies, colors, and wavelengths¹⁰. Studies by Karu indicate that low-intensity lasers can elicit cellular responses without generating heat, thereby highlighting their biochemical, bioelectrical, and bioenergetic effects^{11,12}.

On the other hand, photobiomodulation uses light to stimulate biological systems, promoting photochemical processes – primarily in the mitochondria – and increasing the production of adenosine triphosphate (ATP)¹³. This process results in benefits such as analgesia¹⁴, tissue regeneration, wound healing¹⁵, and a reduction in muscle fatigue¹⁶. This approach employs low-intensity lasers and light-emitting diodes (LEDs) to modulate cellular and tissue physiology¹⁷.

Recent evidence suggests that neuromodulation via photobiomodulation, when applied to different areas of the nervous system, may enhance cerebral perfusion, thereby promoting improvements in cognition and behavior in neurological conditions such as dementia, trauma, and

Parkinson's disease. Furthermore, there are indications that this therapy may streamline cognitive abilities and contribute to the overall health of patients¹⁸.

Despite the aforementioned advances, the scientific literature has significant gaps regarding integrating and comparing these therapies, their specific applications, and therapeutic synergies. There is no consensus on the standardization of protocols or robust evidence to support their broad acceptance within the biomedical field.

Therefore, the present study aims to conduct an integrative literature review to identify and analyze the concepts, practices, and interrelationships among chromotherapy, colorpuncture, laserpuncture, and photobiomodulation. This will thereby contribute to the advancement of knowledge and foster evidence-based practice within the field of integrative and complementary health practices.

METHODOLOGY

This study is an integrative literature review aimed at identifying, analyzing, and understanding the concepts and practices related to chromotherapy, colorpuncture, laserpuncture, and photobiomodulation, also exploring the interrelationships among these therapeutic modalities. The review was conducted using a systematic method that comprised the formulation of the guiding research question, the definition of inclusion and exclusion criteria, database search, selection and analysis of studies, and the synthesis of findings.

The study's guiding question was, "What are the concepts of chromotherapy, colorpuncture, laserpuncture, and photobiomodulation, and their interrelationships?" Based on this question, inclusion and exclusion criteria were established. The inclusion criteria comprised publications discussing the concepts and practices of these therapies and articles showing comparative information or evidence on the topics. Original studies, systematic reviews, book chapters, and articles published in English, Portuguese, or Spanish indexed academic journals from 1999 to 2019 were considered. Conversely, duplicate publications, opinion pieces, technical manuals, and materials without peer review were excluded, as were articles that did not directly relate to the guiding question.

The search sessions were performed in the PubMed, SciELO, Google Scholar, BVS, and Google Books databases, selected for their relevance and breadth in topics related to integrative and complementary health practices. The keywords used included "chromotherapy", "colorpuncture", "chromo puncture", "laser therapy", "laserpuncture", "photobiomodulation," and "integrative and complementary health practices". Combinations of these descriptors were utilized with Boolean operators (AND and OR) under the specificities of each database in order to maximize the sensitivity and specificity of the search.

The data collection process initially yielded 291 publications. After removing duplicates, 174 studies remained and were then subjected to an initial screening based on the review of titles and abstracts. After this stage, 44 publications were selected for qualitative analysis, considering their pertinence to the guiding question and the established criteria. The selection process was documented in a flowchart adapted from the PRISMA model, which illustrates the stages of identification, screening, eligibility, and inclusion.

The selected studies were qualitatively analyzed, focusing on the concepts and therapeutic practices described. The analyses aimed to identify and categorize the principal themes addressed, compare the techniques, and explore the interrelationships among the therapeutic modalities.

Additionally, the evidence presented and the methodological quality of the included studies were assessed.

The results of this analysis were synthesized to answer the guiding question, highlighting the synergies and differences between the therapies studied. Furthermore, gaps in the literature and priority areas for future research were identified to contribute to advancing knowledge in integrative and complementary health practices.

RESULTS

The integrative review initially identified 291 publications across the selected databases. Following removing 117 duplicate publications and a relevance screening, 44 studies were included in the final analysis. The analyzed publications address various aspects of chromotherapy, colorpuncture, laserpuncture, and photobiomodulation, focusing on their mechanisms of action, clinical applications, and therapeutic benefits. Figure 1 shows a flowchart of the study selection process for this integrative review.

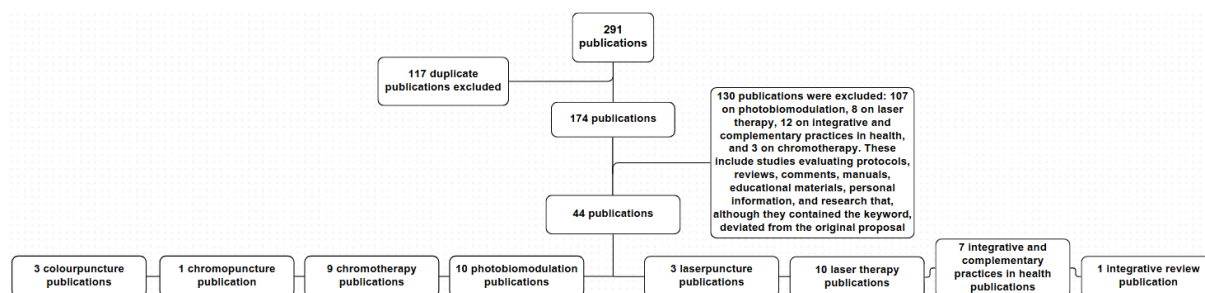


Figure 1. Publication Selection Process Flowchart.

Source: The authors.

The distribution of publications by theme reveals a higher concentration of studies on photobiomodulation (10 publications) and laser therapy (10 publications), suggesting that these practices have a more consolidated body of evidence. Chromotherapy, with 9 studies, also has a considerable volume of literature. In contrast, the approaches of colorpuncture (3 studies) and chromopuncture (1 study) are less represented in the scientific literature, indicating a gap in investigating these techniques. Figure 2 displays the distribution of studies by keyword alongside the total number of publications reviewed.

Database	References	Keyword
PubMed	Anders JJ, Arany PR, Baxter GD, Lanzafame RJ. Light-emitting diode therapy and low-level light therapy are photobiomodulation therapy. <i>Photomed Laser Surg.</i> 2019;37[2]:63-5.	Photobiomodulation
PubMed	Bjoridal JM, Johnson MI, Iversen V, Aimbire F, Lopes-Martins RAB. Low-level laser therapy in acute pain: a systematic review of possible mechanisms of action and clinical effects in randomized placebo-controlled trials. <i>Photomed Laser Surg.</i> 2006;24[2]:158-68.	Laser Therapy
PubMed	Ferraresi C, Kaippert B, Avci P, Huang YY, de Souza MV, Bagnato VS, et al. Low-level laser [light] therapy increases mitochondrial membrane potential and ATP synthesis in C2C12 myotubes with a peak response at 3-6 H. <i>Photochem Photobiol.</i> 2015;91[2]:411-6.	Laser Therapy

Database	References	Keyword
PubMed	Figueiredo ALP, et al. Laser terapia no controle da mucosite oral: um estudo de metanálise. Rev Assoc Med Bras. 2013;59[5]:467-74.	Laser Therapy
PubMed	Hennessy M, Hamblin MR. Photobiomodulation and the brain: a new paradigm. J Opt. 2017;19[1]:1-17.	Photobiomodulation
PubMed	Karu TI, et al. Cellular effects of low power laser therapy can be mediated by nitric oxide. Lasers Surg Med. 2005;38[4]:307-14.	Laser Therapy
PubMed	Nampo FK, Cavalheri V, Soares FS, Ramos SP, Camargo EA. Low-level phototherapy to improve exercise capacity and muscle performance: a systematic review and meta-analysis. Lasers Med Sci. 2016;31[9]:1957-70.	Laser Therapy
PubMed	Ojea AR, Madi O, Neto RML, Lima SE, Carvalho BT, Ojea MJR, et al. Beneficial effects of applying low-level laser therapy to surgical wounds after bariatric surgery. Photomed Laser Surg. 2016;34[11]:580-4.	Laser Therapy
PubMed	Scognamillo-Szabó MVR, Bechara GH. Acupuncture: scientific bases and applications. Ciência Rural. 2001;31[6]:1091-9.	Chromopuncture
PubMed	Simunovic Z, Ivankovich AD, Depolo A. Wound healing of animal and human body sport and traffic accident injuries using low-level laser therapy treatment: a randomized clinical study of seventy-four patients with control group. J Clin Laser Med Surg. 2000;18[2]:67-73.	Laser Therapy
PubMed	Silva VCR, et al. Photodynamic therapy for treatment of oral mucositis: Pilot study with pediatric patients undergoing chemotherapy. Photodiagnosis Photodyn Ther. 2018;21:115-20.	Laser Therapy
PubMed	Rocha Júnior, et al. Low-intensity laser in inflammatory and reparative processes. 2nd ed. São Paulo: Ed. Manole; 2006.	Photobiomodulation
SciELO	Andrade JTD, Costa LFAD. Complementary medicine in SUS: integrative practices under the light of medical anthropology. Saúde e Sociedade. 2015;19:497-508.	Integrative and Complementary Health Practices
SciELO	Silva EM, Gomes SP, Ulbrich LM, Giovanini AF. Histological evaluation of low-intensity laser therapy in the healing of epithelial, connective, and bone tissues: an experimental study in rats. Rev Sul-Bras Odontol. 2007;4:29-35.	Laser Therapy
SciELO	Hamblin, M. R. Photobiomodulation or low-level laser therapy. In: K. H. R. K. K. (ed.), Biological Effects of Light. Springer, 2019.	Photobiomodulation
Google Scholar	Abreu IPH. The vitalism of Integrative and Complementary Practices and the concept of the field in modern science. Vittalle – Journal of Health Sciences. 2018;30[1]:115-29.	Integrative and Complementary Health Practices
Google Scholar	Alves V, Furlan R, Motta A. Immediate Effects of Low-Intensity Laser Photobiomodulation on Muscle Performance: An Integrative Literature Review. 2019;7.	Photobiomodulation
Google Scholar	Arany PR. Craniofacial wound healing with photobiomodulation therapy: new insights and current challenges. J Dent Res. 2016;95:977-84.	Photobiomodulation
Google Scholar	Croke M, Bourne RD. A review of recent research studies on the efficacy of Esogetic Colorpuncture Therapy--A wholistic acu-light system. Am J Acupunct. 1999;27[1-2]:85-94.	Colorpuncture
Google Scholar	Erthal V, Hatsuko Baggio C. Acupuncture Analgesia/ Chapter Laserpuncture: A Study of Antinociceptive Effects. Curitiba: OMNIPAX; 2013.	Laserpuncture
Google Scholar	Pessoa DR, et al. Association of facial massage, dry needling, and laser therapy in Temporomandibular Disorder: case report. CoDAS. Sociedade Brasileira de Fonoaudiologia; 2018.	Laser Therapy
Google Scholar	Radeljak S, et al. Chromotherapy in the regulation of neurohormonal balance in human brain - complementary application in modern psychiatric treatment. Collegium Antropologicum. 2008;32[2]:185-8.	Chromotherapy
Google Scholar	Santana JÁ, Santana KSSC, Deodato LFF. Alternative and Complementary Practices: Pain Treatment in Sick Cell Anemia. Rev Cient FASETE. 2017;1:148-59.	Chromotherapy
Google Scholar	Schulka S, Souza AW. Chromotherapy Applied in the Harmonization of Emotions Enhancing Aesthetic Treatments. 2013.	Chromotherapy

Database	References	Keyword
Google Scholar	Wright T, Schiffman R. Low-Intensity Lasers and Their Applications. New York: Springer; 1995.	Integrative and Complementary Health Practices
Google Scholar	Valchinov P, Pallikarakis N. Design and development of a multi-channel electromyography measurement system. J Biomech. 2005;38[3]:509-17.	Integrative and Complementary Health Practices
BVS	Brazil. National Policy on Integrative and Complementary Practices in SUS: PNPIC: Attitude of Expanding Access. Department of Primary Health Care. Ministry of Health; Brasília: 2006.	Integrative and Complementary Health Practices
BVS	Brazil. Ordinance No. 702 of March 21, 2018. Includes New Practices in the National Policy on Integrative and Complementary Practices. Official Gazette of the Union; March 21, 2018.	Integrative and Complementary Health Practices
Google Books	Balzano O, Guimarães OM, Guimarães CB. Chromotherapy: Treatment of Children and Pregnant Women. São Paulo: Lebooks; 2013.	Chromotherapy
Google Books	Baxter GD. Therapeutic lasers: Theory and practice. Livingstone; 1994. p. 89-138.	Photobiomodulation
Google Books	Breiling B. Light Years Ahead: The Illustrated Guide to Full Spectrum and Colored Light in Mindbody Healing. Berkeley, CA: Celestial Arts; 1996.	Chromotherapy
Google Books	Gaspar DE. Chromotherapy. 2nd ed. Rio de Janeiro. ISBN: 85-347-0335-3; 2002. 1-242 p.	Chromotherapy
Google Books	Guirro E, Guirro RF. Dermato-Functional Physical Therapy: Fundamentals, Resources, Pathologies. 3rd ed. São Paulo: Manole; 2004.	Photobiomodulation
Google Books	Kitchen S, Ribeiro LB. Electrotherapy: Evidence-Based Practice. São Paulo: Manole; 2003.	Laserpuntura
Google Books	Luz MT. New Knowledge and Practices in Public Health: A Study on Medical Rationalities and Body Activities. 2nd ed. São Paulo: Hucitec; 2005.	Integrative and Complementary Health Practices
Google Books	Mandel P. Practical Compendium of Colorpuncture. Madrid: Apostrofe Ediciones; 2000.	Colorpuncture
Google Books	Nunes R. Chromotherapy: Healing Through Color: Applied Chromotherapy, Chromotherapy Technique, Chromotherapy Dynamics Course, Fundamental Concepts of Chromotherapy. Brasília; 1995. 1-378 p.	Chromotherapy
Google Books	Pagnamenta NF. Chromotherapy for Children. São Paulo: Madras; 1998.	Chromotherapy
Google Books	Sophia M. Chromotherapy - Quality of Colors and Application Technique. São Paulo: Roca; 2006.	Chromotherapy
Periódicos	Cabrera EB, Perón JMR, Alfonso LEA. Helium-Neon Laserpuncture in the Treatment of Traumatized Patients. Rev Cubana Med Milit. 2002;31[1]:5-12.	Laserpuncture
Periódicos	Campbell SS, Murphy PJ. Extraocular Circadian Phototransduction in Humans. Science. 1998;279:396-9.	Photobiomodulation
Periódicos	Boccanera NB, Boccanera SF, Barbosa MA. Colors in the Intensive Care Environment: Perceptions of Patients and Professionals. Rev Esc Enferm USP. 2005;40[3]:343-9.	Photobiomodulation
Periódicos	Souza MT, Silva MD, Carvalho R. Integrative Review: What It Is and How to Do It. Einstein. 2010;8[1]:102-6.	Integrative Review
Periódicos	Pankratov S. Meridians conduct light. Raum und Zeit. 1991;35[88]:16-8.	Colorpuncture

Figure 2. Distribution of Studies by Keyword and Database.

Source: The authors.

The results indicate that photobiomodulation is the most studied and documented practice, with well-established clinical applications, particularly in treating chronic pain, tissue regeneration, and inflammation modulation. The analyzed studies provide robust evidence of the efficacy of this technique in several health conditions, such as musculoskeletal injuries, neurological disorders, and inflammatory processes. Figure 3 illustrates the count of references associated with each searched term.

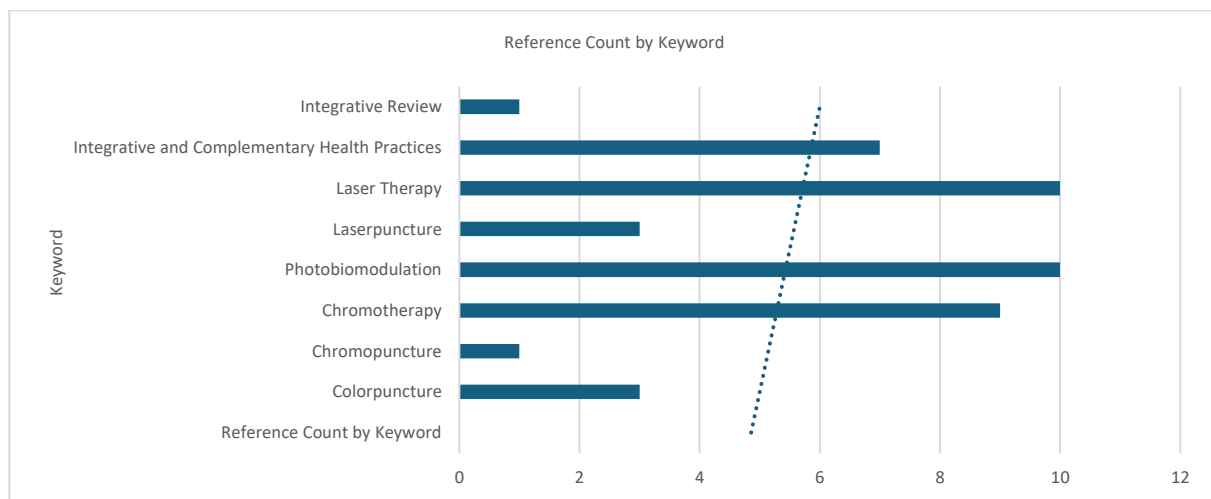


Figure 3. Reference Count by Keyword.
Source: The authors.

Chromotherapy has shown significant therapeutic potential, particularly in the management of emotional disorders. The reviewed studies indicate that blue and green play a central role in reducing anxiety, stress, and insomnia, promoting a calming and stabilizing effect. Also, chromotherapy has been employed as a complementary resource in treating muscle pain and tension-type headaches.

Laserpuncture has shown positive effects in pain control, reducing inflammation, and accelerating recovery in injured tissues. Although the precise mechanisms remain under investigation, studies suggest that the light stimulation of acupuncture points may enhance biological responses similar to those elicited by traditional acupuncture, yet without the need for needles.

The qualitative analysis of the publications revealed that although promising evidence exists for all the therapeutic modalities studied, the most significant methodological robustness is associated with photobiomodulation and laserpuncture. Colorpuncture and chromopuncture, by contrast, lack broader scientific validation. They are frequently based on theoretical foundations or case reports, with few studies of high methodological quality.

Another noteworthy aspect identified in this review was the participants' high adherence and acceptance of the analyzed therapies. Most studies reported that individuals receiving these treatments found them pleasant and expressed interest in continuing the sessions, suggesting good tolerability and potential for adherence in clinical and therapeutic contexts.

Finally, the literature analysis highlighted a significant gap in the standardization of therapeutic protocols, particularly concerning chromotherapy and colorpuncture. The absence of well-defined clinical guidelines hinders studies' replicability and results' comparability across different investigations. Consequently, future research should aim to standardize the application parameters of these therapies and evaluate their efficacy in controlled clinical trials.

DISCUSSION

The findings of this review indicate an impressive growth in academic interest in photobiomodulation, as evidenced by the more significant number of studies available on this therapeutic modality. This scenario reflects the progress of scientific research that has evidenced photobiomodulation's efficacy in several clinical applications, such as tissue regeneration, wound

healing, and pain modulation. Studies suggest that mitochondrial stimulation and the increased production of adenosine triphosphate (ATP) are the main mechanisms responsible for the therapeutic benefits of photobiomodulation, directly impacting cellular metabolism and promoting rapid and effective tissue recovery^{1,19}. This consolidated scientific basis may explain its broader acceptance in the biomedical field, in contrast to the other practices analyzed in this review.

Conversely, chromotherapy, colorpuncture, and laserpuncture still face challenges related to scientific validation. Although they have well-established theoretical foundations and are widely adopted within integrative and complementary practices, the reviewed literature shows a lack of robust experimental studies confirming their efficacy using standardized and replicable methodologies. Chromotherapy, for example, employs colors from the visible spectrum to promote balance and harmony within the organism and is widely adopted to alleviate emotional symptoms such as anxiety and insomnia^{20,21}. However, the subjectivity inherent in individual responses to colors and the absence of standardized therapeutic protocols hampers its acceptance in academic and biomedical circles²².

Colorpuncture, which combines the principles of acupuncture with the application of colored light, emerges as a promising field, particularly from the perspective of biophotonics. This technique is based on the premise that light interacts with the body's energetic points, modulating physiological responses and promoting systemic balance¹⁹. Despite its growing adoption in therapeutic contexts, the reviewed literature reveals a scarcity of comparative studies evaluating its efficacy relative to traditional acupuncture or other therapeutic approaches²³. A similar challenge applies to laser acupuncture, integrating acupuncture with low-power laser stimulation. However, evidence indicates positive effects in pain reduction and accelerated tissue recovery^{24,25}, rigorous clinical trials are still needed to validate its clinical applicability and to establish optimized treatment parameters.

Another relevant aspect this review identifies is the potential synergy between the analyzed therapeutic modalities. The combination of chromotherapy with acupuncture in colorpuncture or laser therapy with acupuncture in laserpuncture may potentiate the therapeutic effects of these practices. This integrative approach suggests that combining therapies based on the electromagnetic spectrum could yield enhanced benefits, such as increased analgesia and optimized tissue repair processes^{26,27}. However, this possibility remains underexplored in the scientific literature, representing a promising area for future research.

The analysis also revealed a high rate of adherence to the reviewed therapies. Most studies reported that participants enjoyed the therapeutic sessions and expressed interest in continuing the treatments. This favorable acceptance suggests that these approaches could be successfully integrated into clinical and wellness settings, particularly for populations seeking non-invasive alternatives with a lower risk of adverse effects²⁸. Nevertheless, one of the challenges to incorporating these therapies into conventional health systems is the lack of standardized clinical guidelines, which hinders their regulation and structured application²⁹.

Integrating these modalities into public health systems could offer significant benefits, such as cost reduction and greater treatment accessibility for populations facing barriers to conventional medicine³⁰. Preventive health strategies that include chromotherapy and photobiomodulation can accelerate recovery processes, reduce the use of pharmaceuticals, and promote comprehensive well-being. However, for these therapies to be widely accepted and implemented at a population level, further randomized clinical trials and longitudinal studies must be conducted to validate their efficacy and safety³¹.

Thus, the data from this review reinforce that photobiomodulation has a more advanced level of scientific validation and clinical application, whereas chromotherapy, colorpuncture, and

laserpuncture still require further experimental support. Developing well-defined therapeutic protocols and more rigorous research methodologies is essential for consolidating these approaches within integrative and complementary practices. Moreover, future investigations should focus on exploring the interactions among the different therapies to optimize their benefits and broaden their clinical indications.

Thus, the present review contributes to the discussion on the therapeutic potential of light- and color-based therapies, underscoring the importance of translational research in validating and implementing these practices. Encouraging international scientific collaboration and investing in rigorous clinical trials are fundamental for these therapies to be widely recognized and accepted in conventional medicine, fostering a more holistic and patient-centered approach.

IMPLICATIONS AND FUTURE DIRECTIONS

Light- and color-based therapies, such as photobiomodulation, chromotherapy, colorpuncture, and laserpuncture, show potential as complementary approaches to conventional treatments, benefitting physical and emotional health. However, their full integration into conventional medicine requires further scientific evidence, mainly through robust clinical trials that validate their efficacy and safety. Moreover, the lack of standardization in therapeutic protocols hinders studies' replicability and clinical application, underscoring the necessity for developing evidence-based guidelines.

Training healthcare professionals is also fundamental to expanding the use of these therapies. Integrating content on integrative practices into the curricula of medicine, physiotherapy, and naturopathy – and in specialized postgraduate programs – can ensure a more qualified and safe application. Furthermore, appropriate public policies and regulations may facilitate their incorporation into health systems, promoting accessible and cost-effective preventive and rehabilitative strategies.

Technological advancements offer further opportunities to refine these therapies. Developing more precise and personalized devices, combined with artificial intelligence and data analysis, may streamline therapeutic effects and enable individualized treatment. Encouraging interdisciplinary research that combines neuroscience, biophysics, and integrative medicine is required for an in-depth understanding of the mechanisms of action of light and color within the organism and broadening their clinical applications.

LIMITATIONS AND STRENGTHS

This study has some limitations inherent to the integrative review methodology, including the heterogeneity of the analyzed studies, the lack of standardized therapeutic protocols, and predominant observational studies and case reports, which may compromise the reproducibility of the findings. Additionally, the lack of randomized clinical trials and the varying employed methodologies hinder direct comparisons among the therapeutic modalities. Another relevant limitation is the exclusion of articles published after 2019, which may have impacted the inclusion of more recent evidence regarding these therapies.

Despite these limitations, the strengths of this study lie in its comprehensive approach, which has allowed for the mapping and synthesis of the available knowledge on chromotherapy, colorpuncture, laserpuncture, and photobiomodulation. The review highlights scientific literature gaps and suggests future research directions, promoting greater rigor in validating these practices. Moreover, by gathering and comparing different approaches within the spectrum of light- and color-based

therapies, this study contributes to a broader understanding of their clinical applications and potential, thus encouraging their integration into evidence-based healthcare contexts.

CONCLUSION

The findings of this review indicate that photobiomodulation is the most consolidated modality among light- and color-based therapies, with robust scientific evidence supporting its clinical application in several conditions. In contrast, chromotherapy, colorpuncture, and laserpuncture still require further scientific validation, necessitating rigorous experimental studies to strengthen their theoretical and methodological foundations. Despite these limitations, the evidence suggests that these therapies hold significant potential in promoting health and complementing the treatment of physical and emotional conditions.

The potential synergy between these therapeutic modalities represents a promising perspective for future research, which may lead to more effective and integrated approaches within complementary practices. Investing in studies exploring the interaction between light and color therapies could broaden their clinical applications and streamline therapeutic protocols, enhancing their acceptance in conventional medical practice. Furthermore, it is crucial to standardize clinical guidelines and train professionals to ensure the safety and efficacy of these approaches, facilitating their incorporation into public and private healthcare programs.

Therefore, there is an urgent need to promote research and international collaboration to expand the knowledge base on these therapies. Conducting randomized clinical trials and implementing standardized protocols are fundamental steps towards consolidating these practices as an integral component of healthcare provision. Valuing holistic approaches – which consider the individual holistically (body, mind, and spirit) – reinforces the importance of integrative therapies in developing a more humane and comprehensive care model.

REFERENCES

1. Abreu IPH. O vitalismo das Práticas Integrativas e Complementares e o conceito de campo da ciência moderna. *Vittalle – Revista de Ciências da Saúde*. 2018;30(1):115-29. <https://doi.org/10.14295/vittalle.v30i1.7843>
2. Brasil. Política Nacional de Práticas Integrativas e Complementares no SUS: PNPIC: atitude de ampliação de acesso. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Ministério da Saúde; Brasília: 2006. Disponível em: <https://www.saude.gov.br/images/pdf/2016/outubro/06/PNPIC-2016.pdf>
3. Brasil. Portaria nº 702 de 21 de março de 2018. Inclui novas práticas na Política Nacional de Práticas Integrativas e Complementares. *Diário Oficial da União*; 21 mar. 2018. Disponível em: <https://www.in.gov.br/en/web/dou/-/portaria-n-702-de-21-de-marco-de-2018-157569418>
4. Luz MT. *Novos Saberes e Práticas em Saúde Coletiva: Estudo Sobre Racionalidades Médicas e Atividades Corporais*. 2ª ed. São Paulo: Hucitec; 2005. Disponível em: <https://www.scielo.br/j/csc/a/6S6gCdYVbyMJzRY8cq7JL7G/?format=pdf&lang=pt>
5. Boccanera NB, Boccanera SF, Barbosa MA. As cores no ambiente de terapia intensiva: percepções de pacientes e profissionais. *Rev Esc Enferm USP*. 2005;40(3):343-9. <https://doi.org/10.1590/S0080-62342006000300005>
6. Balzano O, Guimarães OM, Guimarães CB. *Cromoterapia: tratamento de crianças e gestantes*. São Paulo: Lebooks; 2013. Disponível em:

- https://books.google.com.br/books/about/Cromoterapia_vol_I.html?id=T3CnBQAAQBAJ&redir_esc=y
7. Pagnamenta NF. Cromoterapia para crianças. São Paulo: Madras; 1998. Disponível em: <https://www3.livrariacultura.com.br/cromoterapia-para-criancas-248344/p>
 8. Erthal V, Hatsuko Baggio C. Analgesia por acupuntura: Laserpuntura: um estudo de efeitos antinociceptivos. Curitiba: OMNIPAX; 2013. Disponível em: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0138-65572004000100007&lng=es&nrm=iso
 9. Cabrera EB, Perón JMR, Alfonso LEA. Laserpuntura con helio-neón en el tratamiento de pacientes traumatizados. Rev Cubana Med Milit. 2002;31(1):5-12. Disponível em: <https://www.redalyc.org/articulo.oa?id=1800111>
 10. Kitchen S, Ribeiro LB. Eletroterapia: prática baseada em evidências. São Paulo: Manole; 2003. Disponível em: <https://buscaintegrada.ufrj.br/Record/aleph-UFR01-000638561>
 11. Karu, T. Mitochondrial Mechanisms of Photobiomodulation in Context of New Data about Multiple Roles of ATP. Journal of Photochemistry and Photobiology B: Biology; 2008. <https://doi.org/10.1089/pho.2010.2789>
 12. Simunovic Z, Ivankovich AD, Depolo A. Wound healing of animal and human body sport and traffic accident injuries using low-level laser therapy treatment: a randomized clinical study of seventy-four patients with control group. J Clin Laser Med Surg. 2000;18(2):67-73. <https://doi.org/10.1089/clm.2000.18.67>
 13. Ferraresi C, Kaippert B, Avci P, Huang YY, de Souza MV, Bagnato VS, et al. Low-level laser (light) therapy increases mitochondrial membrane potential and ATP synthesis in C2C12 myotubes with a peak response at 3-6 h. Photochem Photobiol. 2015;91(2):411-6. <https://doi.org/10.1111/php.12397>
 14. Bjordal JM, Johnson MI, Iversen V, Aimbire F, Lopes-Martins RAB. Low-level laser therapy in acute pain: a systematic review of possible mechanisms of action and clinical effects in randomized placebo-controlled trials. Photomed Laser Surg. 2006;24(2):158-68. <https://doi.org/10.1089/pho.2006.24.158>
 15. Ojea AR, Madi O, Neto RML, Lima SE, Carvalho BT, Ojea MJR, et al. Beneficial effects of applying low-level laser therapy to surgical wounds after bariatric surgery. Photomed Laser Surg. 2016;34(11):580-4. <https://doi.org/10.1089/pho.2016.4149>
 16. Nampo FK, Cavalheri V, Soares FS, Ramos SP, Camargo EA. Low-level phototherapy to improve exercise capacity and muscle performance: a systematic review and meta-analysis. Lasers Med Sci. 2016;31(9):1957-70. <https://doi.org/10.1007/s10103-016-1977-9>
 17. Anders JJ, Arany PR, Baxter GD, Lanzafame RJ. Light-emitting diode therapy and low-level light therapy are photobiomodulation therapy. Photobiomodul Photomed Laser Surg. 2019;37(2):63-5. <https://doi.org/10.1089/photob.2018.4600>
 18. Hennessy M, Hamblin MR. Photobiomodulation and the brain: a new paradigm. J Opt. 2017;19(1):1-17. DOI: <https://doi.org/10.1088/2040-8986/19/1/013003>
 19. Mandel P. Compendio Practico de Colorpuntura. Madrid: Apostrofe Ediciones; 2000. Disponível em: https://openlibrary.org/books/OL13268492M/Compendio_Practico_de_Colorpuntura_-_Tomo_1?utm_source=chatgpt.com
 20. Sophia M. Cromoterapia - Qualidade das cores e técnica de aplicação. São Paulo: Roca; 2006. Disponível em: <https://www.estantevirtual.com.br/busca/cromoterapia---qualidade-das-cores-e-t%C3%A9cnica-de-aplica%C3%A7%C3%A3o>
 21. Radeljak S, et al. Chromotherapy in the regulation of neurohormonal balance in human brain - complementary application in modern psychiatric treatment. Collegium Antropologicum. 2008;32(2):185-8. Disponível em: https://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=61984

22. Schulka S, Souza AW. Cromoterapia Aplicada na Harmonização do Emocional Intensificando os Tratamentos Estéticos. 2013. Disponível em: <https://tcconline.utp.br/cromoterapia-aplicada-na-harmonizacao-do-emocional-intensificando-os-tratamentos-esteticos>.
23. Pankratov S. Meridians conduct light. *Raum und Zeit*. 1991;35(88):16-8. Disponível em: <http://www.photonstimulator.com/Article%20Russian.htm>.
24. Silva EM, Gomes SP, Ulbrich LM, Giovanini AF. Avaliação histológica da laserterapia de baixa intensidade na cicatrização de tecidos epitelial, conjuntivo e ósseo: estudo experimental em ratos. *Rev Sul-Bras Odontol*. 2007;4:29-35. Disponível em: <https://revistas.unisinus.br/index.php/sul-bras-odontologia/article/view/4461>.
25. Rocha Júnior, et al. Laser de baixa intensidade em processos inflamatórios e reparativos. 2ª ed. São Paulo: Ed. Manole; 2006. <https://doi.org/10.1590/S0365-05962010000600011>
26. Guirro E, Guirro RF. Fisioterapia dermato-funcional: fundamentos, recursos, patologias. 3ª ed. São Paulo: Manole; 2004. Disponível em: <https://pt.scribd.com/document/687252873/Fisioterapia-Dermato-Funcional>.
27. Baxter GD. Therapeutic lasers: Theory and practice. Livingstone; 1994. p. 89-138. Disponível em: <https://archive.org/details/therapeuticlaser0000baxt>
28. Valchinov P, Pallikarakis N. Design and development of a multi-channel electromyography measurement system. *J Biomech*. 2005;38(3):509-17. <https://doi.org/10.5194/ms-12-69-2021>
29. Scognamillo-Szabó MVR, Bechara GH. Acupuntura: bases científicas e aplicações. *Ciência Rural*. 2001;31(6):1091-9. <https://doi.org/10.1590/S0103-84782001000600029>
30. Figueiredo ALP, et al. Laser terapia no controle da mucosite oral: um estudo de metanálise. *Rev Assoc Med Bras*. 2013;59(5):467-74. <https://doi.org/10.1016/j.ramb.2013.08.003>
31. Karu TI, et al. Cellular effects of low power laser therapy can be mediated by nitric oxide. *Lasers Surg Med*. 2005;38(4):307-14. <https://doi.org/10.1002/lsm.20148>