International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

Scoping review of Dosimetry and treatment protocols of photobiomodulation in knee osteoarthritis

INPLASY202540043
doi: 10.37766/inplasy2025.4.0043
Received: 14 April 2025
Published: 14 April 2025

Thakur, R; Tiwari, M; Shinde, BV; Saharan, A.

Corresponding author:
Rutika Thakur

rutikathakur11@gmail.com

Author Affiliation:
NIMS University Rajasthan, Jaipur.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202540043

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 April 2025 and was last updated on 14 April 2025.

INTRODUCTION

Review question / Objective To systematically map and analyse the evidence available on dosimetry(including wavelength, power, energy and duration) and treatment protocols including both Class IV Laser and Low Level Laser therapy (LLLT) in the management of knee osteoarthritis.

Background Knee osteoarthritis is a common and leading cause for disability and chronic pain in adults in the aging population. According to Kanadsammy. S (2024) prevalence of Knee osteoarthritis is 34.6% in India leading to increased disability and reduced quality of life. While the increased risk is closely associated with age, factors such as gender, education level, and occupation do not show a statistically significant impact on the likelihood of developing knee OA. This underscores the importance of age as a primary risk factor, while also highlighting the need for targeted education and preventive measures to manage the condition effectively.

Knee osteoarthritis is a common and leading cause for disability and chronic pain in adults in the aging population. According to Kanadsammy. S (2024) prevalence of Knee osteoarthritis is 34.6% in India leading to increased disability and reduced quality of life. Limited access to Imaging, pharmacological and non-pharmacological treatment options leads to chronic pain and disability.

Rationale Among the non-pharmacological interventions available, low-Level Laser Therapy (LLLT) and Class IV laser therapy have gained traction as a safe, non-invasive modality for pain relief and functional restoration. The efficacy of photobiomodulation has been demonstrated by numerous clinical trials and systemic reviews, still there is significant variability in the dosimetry and duration of the studies.
This scoping review aims to investigate, categorize and synthesize available evidence on how photobiomodulation is applied in terms of treatment parameters to help future researchers and clinicians involved in the management of knee osteoarthritis.

METHODS

Strategy of data synthesis A comprehensive search will be conducted across the following electronic databases: PubMed, Scopus, MEDLINE, PEDro, Web Of Science, CINHAL Google Scholar. All RCT's, non-randomised trials, cohort studies, case series and systemic reviews will be included published in English language. A search stratergy will be created using keywords and Boolean operators like ("knee osteoarthritis" or "knee OA") AND ("photobiomodulation" or "Class IV Laser" or 'Low level Laser therapy" or LLLT) AND ("dosimetry" or "Wavelength" or "power" or "treatment parameters" or "session duration" or "Frequency").

Eligibility criteria The studies will be included based on the inclusion criteria studies involving adults with osteoarthritis with the use of photobiomodulation therapy. The studies must include the dosimetric parameters and treatment duration and studies carried out in all healthcare settings including hospitals, physiotherapy clinics and rehabilitation centres will be included in the study. Studies conducted on animals or invitro, those who do not report treatment parameters and studies with combined with other treatment techniques along with laser therapy will be excluded.

Source of evidence screening and selection Two independent reviewers will screen all the titles and abstracts and studies that do not meet the inclusion criteria will be excluded from the review. After that the eligible full text articles will be identified and assessed for the final inclusion. Discrepancies between the two reviewers if any, will be resolved by consensus or by a third reviewer.

Data management Data extraction A standardized data extraction form will be used to chart all the following:

- Study Characteristics (the author, country, year, study design)
- population details(age range, sample size),
- intervention details
- type of Laser LLLT or Class IV LASER
- Dosimetric parameters (wavelength, power, energy density)
- Protocols (session duration, frequency, no of sessions, total duration)
- Outcome Measures (pain, function, stiffness, range of motion)
- Key findings and conclusions

Data Management: All the results will be exported to reference management system like (Mendley or Zotero). The reviewer will screen the all the titles and abstracts for relevance to topic and then the full texts of the eligible studies. A PRISMA Flow chart will be used to document the selection process.

Language restriction Only studies published in English language.

Country(ies) involved India.

Other relevant information None

Keywords knee osteoarthritis; Knee OA; degenerative joint disease; photobiomodulation; low-level laser therapy; LLLT; Class IV Laser therapy; high intensity Laser; dosimetry.

Contributions of each author

Author 1 - Rutika Thakur - conceived and designed the scoping review, performed the literature search and drafted the protocol and drafted the manuscript.
Email: rutikathakur11@gmail.com
Author 2 - Mukesh Tiwari - participated in the study and reviewed and edited the protocol and provided mentorship.
Email: wakeuptum@gmail.com
Author 3 - Bhagwat Shinde - provided guidance on methodology and review process.
Email: shinde.bhagwat71@gmail.com
Author 4 - Ajeet Saharan - provided guidance and mentorship and expert advice throughout the process.