A comparative evaluation of lasers and photodynamic therapy in the non-surgical treatment of peri-implant diseases: A Bayesian network meta-analysis

Lin, Y¹; He, J²; Chen, L³; Chen, X⁴; Liao, S⁵; Yang, S⁶; Lin, Y⁷; Bai, S⁸; Huang, C⁹.

Review question / Objective: How do PDT and lasers affect the clinical results of non-surgical treatment in patients with peri-implant diseases? Does PDT and lasers, when used as an adjunctive treatment, provide superior clinical and patient-preferred outcomes compared with non-surgical mechanical debridement in patients with peri-implant diseases? What was the rankings on the effect of PDTs and different lasers as an non-surgical treatment and which one is more suitable for patients with peri-implant diseases?

Information sources: A literature search was conducted independently and in duplicate (YL and HJ) for relevant articles in the following electronic databases: the Cochrane Library, Web of Science and PubMed up to January 2022.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 05 January 2022 and was last updated on 05 January 2022 (registration number INPLASY202210020).
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**Condition being studied:** A literature search and analysis was conducted independently.

**METHODS**

**Search strategy:** A literature search was conducted independently and in duplicate (YL and HJ) for relevant articles in the following electronic databases: the Cochrane Library, Web of Science and PubMed up to January 2022. The detailed search strategy is reported in Supplementary file, with a combination of MeSH terms, keywords and other free text words terms, such as “peri-implantitis”, “photodynamic therapy” and “laser,” to identify papers. In addition, grey literature were also sought by searching a database listing unpublished studies (OpenGray [http://www.opengrey.eu/], formerly OpenSIGLE). Furthermore, references of related papers and reviews were cross-checked by hand search to make a supplement.

**Participant or population:** RCT in patients diagnosed with peri-implant diseases.

**Intervention:** Lasers and photodynamic therapy.

**Comparator:** Conventional mechanical debridement.

**Study designs to be included:** randomized controlled trials.

**Eligibility criteria:** Inclusion criteria were defined as: i) RCT in patients diagnosed with PD; ii) PD treated by any type of laser or CMD non-surgically; iii) Studies describing outcomes of one of the clinical parameters (PPD, CAL, or MBL) to assess the effects of PDT or different lasers on PD.

**Information sources:** A literature search was conducted independently and in duplicate (YL and HJ) for relevant articles in the following electronic databases: the Cochrane Library, Web of Science and PubMed up to January 2022.

**Main outcome(s):** The primary outcomes were the changes in PPD.

**Additional outcome(s):** The secondary outcomes were the changes in MBL and CAL.

**Quality assessment / Risk of bias analysis:** Quality assessment of the studies was performed using the Cochrane Collaboration tool’s in Review Manager software (version 5.0 for Windows; the Cochrane Collaboration, Oxford, UK).

**Strategy of data synthesis:** Traditional pairwise meta-analysis was performed using DerSimonian-Laird random effects model. Pooled estimates were expressed as weighted mean differences with their associated 95% confidence intervals (CIs). Statistical heterogeneity was measured with the I² statistic and a value greater than 50% was considered to show moderate to high heterogeneity [28]. Bayesian NMA was performed with ADDIS software v1.16.5.

**Subgroup analysis:** We conducted subgroup analysis when needed.

**Sensitivity analysis:** Node-split analysis was utilized to check whether each node has local inconsistency, and p < 0.05 was set as significant inconsistency.

**Language:** No language restriction was used.

**Country(ies) involved:** China.

**Keywords:** photodynamic therapy, lasers, peri-implant diseases.

**Contributions of each author:**

Author 1 - Yao Lin.
Author 2 - Junbing He.
Author 3 - Liangping Chen.
Author 4 - Xiaozhu Chen.
Author 5 - Shuanglin Liao.
Author 6 - Shuai Yang.
Author 7 - Yingying Lin.
Author 8 - Shuncheng Bai.
Author 9 - Chuhui Huang.