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Efficacy of the enamel matrix derivative in guided tissue regeneration with bone substitutes in intraosseous periodontal defects: a systematic review

Cotillo, L¹; Tello, A²; Horna, P³; Lopres, A⁴; Alarcon, M⁵.**ADMINISTRATIVE INFORMATION****Support** - The systematic review is self-funded.**Review Stage at time of this submission** - Preliminary searches.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202420008**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 02 February 2024 and was last updated on 02 February 2024.**INTRODUCTION**

Review question / Objective What is the effectiveness of the enamel matrix derivative in intrabony periodontal defects alone or in combination with bone substitutes? The primary objective of this systematic review was to determine the reduction of intrabony periodontal defects and gain in clinical attachment level using enamel matrix derivative alone or combined with bone substitutes.

The secondary objective was to determine the incidence of bleeding on probing, soft tissue recession, survival of affected teeth with intrabony defects using the enamel matrix derivative alone or combined with bone substitutes.

Rationale Because periodontal disease in an uncontrolled state can lead to loss of periodontal ligament, root cement, bone tissue with an angular defect with an intraosseous component and subsequently tooth loss. Due to this reason, we seek to study the regenerative effect of the enamel matrix derivative in combination with varieties of

bone substitutes, recover lost periodontal structures and tooth survival.

Condition being studied The enamel matrix derivative is composed of amelogenins that stimulate cell proliferation of the periodontal ligament and provides an advantage in the treatment of periodontal defects. Bone substitutes are natural biomaterials of human, animal or synthetic origin and in combination with those derived from the enamel matrix they result in great regeneration in contained and uncontained intraosseous periodontal defects.

METHODS

Search strategy MEDLINE (PubMed): (periodontitis OR periodontal disease OR periodontal defect OR angular defect OR intrabony defect OR guided tissue regeneration) AND (enamel matrix derivate OR emdogain or EMD) Cochrane/Web of Science: (periodontitis OR periodontal disease OR intrabony defect) AND (enamel matrix derivate OR emdogain or EMD)

Embase:
(periodontitis OR periodontal disease OR intrabony defect) AND (enamel matrix derivate OR emdogain or EMD).

Participant or population Patients diagnosed with periodontitis who require guided tissue regeneration treatment.

Intervention Guided tissue regeneration with the use of bone substitutes plus enamel-derived matrix (EMD).

Comparator Guided tissue regeneration with the use of enamel-derived matrix (EMD).

Study designs to be included Randomized controlled clinical trials.

Eligibility criteria RCTs with at least 6 months of follow-up in patients with periodontitis with probing depth \geq 6mm, an angular defect with an intraosseous component \geq 3mm. Patients without systemic diseases, teeth with dental mobility.

Information sources An exhaustive search was carried out in the MEDLINE database via (- PubMed-), also in the Cochrane library, Web of Science and EMBASE, until September 2023. Additionally, the following journals were examined that were searched manually until October 2023: Journal of Clinical Periodontology, Journal of Periodontology, Clinical Oral Implants Research, International Journal of oral & Maxillofacial Implants, European Journal of Oral Implantology, Implant Dentistry, International Journal of Periodontics and Restorative Dentistry. Likewise, this stage was completed by performing a search in the gray literature: <https://opengrey.eu/> and in Google scholar: <https://scholar.google.com/>.

Main outcome(s) Clinical parameters (bleeding on probing (SS), probing depth (PS), clinical attachment level (NIC).

Additional outcome(s) Gingival tissue recession and complications.

Quality assessment / Risk of bias analysis The risk of bias of the included RCTs was constructed following the Cochrane manual for systematic review interventions version 5.1.0. Six main quality criteria were evaluated: sequence generation, information concealment, blinding of patients and operators, blinding of outcome assessors, incomplete outcome data, selective outcome reporting. These criteria were rated as low risk of bias (green), unclear (yellow), high risk of bias (red).

Strategy of data synthesis This systematic review considers only randomized clinical trial studies. Parameters are included in the clinical evaluation in teeth with periodontally affected bone defects, all reported in human subjects.

The intention of this review will be to comply with the standards established in the PRISMA guidelines. Details of the article will be tabulated, based on study design, levels of evidence, patient data and outcomes, discussions, and final conclusions. Data will be collected and summarized.

Subgroup analysis We will evaluate whether the derivative of the enamel matrix with or without bone substitutes is effective in teeth with periodontally affected intrabony defects, considering that all the results were evaluated in randomized clinical trials, in turn we will be divided into two groups, control and experimental (using the enamel matrix derived alone in the control group or enamel matrix derived with bone substitutes (experimental group).

Sensitivity analysis Homogeneity of the results will be carried out to see if there is the possibility of conducting a meta-analysis.

Language restriction The present study will not be limited in the search language.

Country(ies) involved Country: Peru; Nationality of the authors: Peruvian; Affiliations: Universidad Privada de Tacna.

Keywords Periodontal Diseases; Aggressive Periodontitis; Periodontal regeneration; Bone substitutes; Autograft; Alveolar bone graft.

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