

INPLASY2023120109

doi: 10.37766/inplasy2023.12.0109

Received: 28 December 2023

Published: 28 December 2023

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Sengupta, K⁵; Razdan, A⁶; Hanna, K⁷; Hariyani, N⁸.**ADMINISTRATIVE INFORMATION****Support** - Faculty of Dental Medicine, Universitas Airlangga, Surabaya, East Java, Indonesia.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY2023120109**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 December 2023 and was last updated on 28 December 2023.**INTRODUCTION**

Review question / Objective A focused question was formulated in accordance with the Participants, Intervention, Control, and Outcomes (PICO) principle (Participants: humans; Intervention: dentin-derived ABG with or without modification and combination; Controls: xenograft, autograft, allograft, left without treatment, or other regenerative materials; Outcomes: alveolar bone augmentation or socket preservation). The focused question was: "What is the effectiveness of dentin-derived alveolar bone graft (ABG) as bone substitute material used for alveolar augmentation by radiograph examination and histomorphometric analyses?"

Rationale During the first year following tooth extraction, the alveolar ridge undergoes a series of healing processes that results in a noticeable

alteration for its dimension, possibly causing the decrease in its width and height. There are various techniques and methods have been proposed to overcome these obstacles in order to preserve and maintain the alveolar ridge volume which is including but not limited to alveolar augmentation by the application of alveolar bone graft. The use of autogenous dentin-derived alveolar bone graft (ABG) from extracted teeth in alveolar augmentation procedure have been reported in recent years. Several previous studies, both in vivo and human clinical trials, have demonstrated that dentin-derived ABG is well-tolerated when used to fill the ridge defects and to preserve the post-extraction socket sites, thus this material is expected to be promising and helpful for clinical results in alveolar augmentation procedure.

Condition being studied This systematic review aims to evaluate the currently existing clinical

evidence on the efficacy of dentin-derived ABG for alveolar augmentation of post-extraction socket sites or other alveolar bone defects.

METHODS

Search strategy A systematic review protocol based on PRISMA 2020 was drafted.²¹ In addition, reporting was based on the PRISMA 2020 checklist. The following electronic databases were used as search engine: MEDLINE/PubMed (<https://pubmed.ncbi.nlm.nih.gov> accessed on September 15, 2023), Scopus (<https://www.scopus.com> accessed on September 22, 2023), Web of Science (<https://www.webofscience.com> accessed on September 22, 2023), and Embase (<https://www.embase.com> accessed on September 28, 2023). The search process to get the results according to the purpose using the keywords dentin, bone graft, and alveolar augmentation and its synonym using the Boolean "AND". Modification of the search on the database was done to get more relevant results. Manual searches were undertaken to support the accuracy of completed searches. The literature search process was carried out from September 2023 until October 2023.

Participant or population Patients.

Intervention Dentin-derived ABG with or without modification and combination.

Comparator Xenograft, autograft, allograft, left without treatment, or other regenerative materials.

Study designs to be included Clinical trials on patient.

Eligibility criteria The following criteria was made as an inclusion for this study: full-text original articles that focused on the methodology of using dentin-derived ABG as bone substitute material for alveolar augmentation on human socket or alveolar bone defects, all types of experimental and observational studies in English, adults of any gender or age are considered an acceptable study subject. Autologous/autogenous, mineralized/demineralized/unmineralized dentin graft, with or without combinations, as well as any additional therapies involving tissue engineering and guided bone regeneration using dentin-derived materials, were included in the research as study factors or exposures. Bone volume using gross examination radiographic and histomorphometric analyses were among the outcomes of the research examined. Articles in language other than English, type of reviews, short communications, processes,

editorial notes, expert opinions or recommendations were not considered and excluded. Animals and in vitro or ex vivo studies were excluded as well. Nevertheless, no duplicate studies were included in the analysis. There were no restrictions on the year of publication.

Information sources The following electronic databases were used as search engine: MEDLINE/PubMed (<https://pubmed.ncbi.nlm.nih.gov> accessed on September 15, 2023), Scopus (<https://www.scopus.com> accessed on September 22, 2023), Web of Science (<https://www.webofscience.com> accessed on September 22, 2023), and Embase (<https://www.embase.com> accessed on September 28, 2023).

Main outcome(s) To evaluate the currently existing clinical evidence on the efficacy of dentin-derived ABG for alveolar augmentation of post-extraction socket sites or other alveolar bone defects.

Additional outcome(s) To answer the focused question of: "What is the effectiveness of dentin-derived alveolar bone graft (ABG) as bone substitute material used for alveolar augmentation by radiograph examination and histomorphometric analyses?"

Data management The two reviewers (D.A.M, K.B) conducted the electronic literature searches and selected the studies independently. Any disagreements were resolved by discussion with second reviewers (N.H, A.P.N). The reviewers (D.A.M, K.B) worked to duplicate screening, extract, and recapitulate data using Mendeley Reference Manager. The data extraction process was taken from articles with titles and abstracts that matched the topic and its keywords, primarily using the PICO protocol (Participants: humans; Intervention: dentin-derived ABG with or without modification and combination; Controls: xenograft, autograft, allograft, left without treatment, or other regenerative materials; Outcomes: alveolar bone augmentation or socket preservation). Data relevant to methodology, sample size, duration of the studies, and the investigations carried out were further extracted from each study.

Quality assessment / Risk of bias analysis Depending on the type, each study was assessed individually and independently by investigators. It was decided that for the quality assessment of any randomized clinical trials, the Consolidated Standards of Reporting Trials (CONSORT) were used. Any disagreements were solved by discussion between investigators.

The risk of bias assessment was conducted using a method that adapted from previous systematic reviews. This assessment evaluated the description of several quality assessment criteria, such as a well-defined dentin-derived as an ABG process, standardized sample or subject preparation, randomization of samples or subjects, tests carried out by blinded method, a clear test method specification, and comprehensive reporting of results. The article was labeled “Y” for a given parameter if the authors reported it and “N” if the information could not be seen. Depending on how many “Y” elements were present (1-2, 3-4, or 5-6), the articles were categorized as having a high, medium, or low risk of bias.

Strategy of data synthesis The keyword generated a total of 298 papers, with 73 articles from PubMed, 81 articles from Scopus, 70 articles from Web of Science, and 74 articles from Embase. Among them, 256 articles were removed due to the process of duplicate screening as well as title and abstract reading. The number of articles assessed for eligibility at the full text are 42 articles. The reviewers read the complete texts of those articles and eventually chose 22 articles that matched the eligibility criteria.

Subgroup analysis Nil.

Sensitivity analysis Descriptive statistics were used on this study using Microsoft Excel (2021, Microsoft, Chicago, IL, USA) that had been validated prior to use.

Language restriction English.

Country(ies) involved Indonesia, Malaysia, Denmark, Australia.

Keywords dentin; bone graft; tissue engineering; alveolar augmentation; alveolar bone defects; medicine.

Contributions of each author

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