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Systematic Review
Dental Implants

Quality assessment of systematic reviews of the significance of keratinized mucosa on implant health

V. Moraschini[1], D. Luz[1], G. Velloso[2], E. dS. P.Barboza[1]
[1]Department of Periodontology, School of Dentistry, Fluminense Federal University, Niterói, Rio de Janeiro, Brazil; [2]São Leopoldo Mandic College, Niterói, Rio de Janeiro, Brazil

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Abstract. The aim of this overview was to assess the methods, quality, and outcomes of systematic reviews conducted to evaluate the importance of keratinized mucosa (KM) for the maintenance of peri-implant tissue health in humans. An electronic search was conducted without date or language restriction using the MEDLINE/PubMed, Cochrane Library, Web of Science, and Embase databases up to December 2015. The eligibility criteria included systematic reviews with/without meta-analysis and with a focus on the influence of KM on peri-implant health around implants. Two independent authors performed the quality analysis of the reviews with the AMSTAR guidelines and another checklist proposed in 2003. After screening, four systematic reviews were selected. The present study demonstrated the existence of structural and methodological variability among the systematic reviews with/without meta-analysis. None of the systematic reviews that were included in the study obtained the maximum score in the two quality analyses performed. All systematic reviews included reported a positive association between an adequate KM width (≥2 mm) and peri-implant health. There is still insufficient data on the long-term survival and success rates of dental implants. Prospective studies evaluating the importance of KM for the long-term maintenance of dental implants are needed.

Key words: evidence-based dentistry; evidence-based medicine; keratinized mucosa; meta-analysis; systematic review.

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Decision-making in health care should preferably be supported by scientific evidence[1]. In this context, systematic reviews and randomized clinical trials (RCTs) are the most reliable sources of scientific evidence for health interventions[2–4], with systematic reviews that include solely RCTs being at the top of the scientific hierarchy[4]. A systematic review can be defined as a review that makes use of systematic and explicit methods to critically identify, select, and evaluate studies in order to answer a clearly formulated question. Statistical methods, such as meta-analysis, may or may not be used to analyze and summarize the results of clinical studies[5].

Despite the increase in the number of publications, evidence suggests that the quality of scientific information in the field of health is questionable[6], including systematic reviews in dentistry[7–9]. In recent years, several guidelines have been proposed with the aim of increasing the quality and transparency of research[10]. Some

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of these guidelines can be found at the EQUATOR Network website (Enhancing the QUAlity and Transparency Of health Research; http://www.equator-network.org)[11,12]. In 2009, a checklist called the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was proposed[13]; this introduced conceptual and practical components for systematic reviews with or without a meta-analysis.

The use of tools for the evaluation and quality control of systematic reviews, such as the Assessment of Multiple Systematic Reviews (AMSTAR)[14], allows investigators to critically analyze the methodological quality of systematic reviews in the biomedical sciences field. Currently, over 50 systematic reviews that present different methodologies are published each month[15]. These systematic reviews can deliver different interpretations/discussions to health professionals and consequently influence their clinical decisions.

In periodontics, it has been suggested that the presence of an attached keratinized gingiva with a width of 2 mm or more is an important factor for periodontal health[16]. In implant dentistry, the term mucosa, instead of gingiva, has more often been used. However, the terms 'fixed mucosa' or 'attached mucosa', or 'keratinized mucosa', are still used interchangeably by the authors of studies on the importance of peri-implant health[17,18]. The term keratinized mucosa (KM) is used in the present review. This term reflects the clinical and histological properties of the tissue surrounding dental implants, which is anatomically and structurally different from the periodontal tissue[19]. The question regarding the ideal width of keratinized mucosa and its relationship with peri-implant health remains open. In addition, data are sparse regarding the influence of a lack of KM around dental implants (which results in greater plaque accumulation, inflammation, tissue recession, and attachment loss) on the survival and/or the success rate of dental implants.

The aim of this study was to assess the methods, quality, and outcomes of systematic reviews conducted to evaluate the importance of KM for the maintenance of peri-implant tissue health in humans.

Materials and methods

Clinical relevance

A critical analysis of published systematic reviews and meta-analyses may help to assess their strengths and weaknesses and identify areas that need future improvement.

Selection criteria

Only systematic reviews with or without a meta-analysis that focused on the influence of KM on peri-implant tissue were included in this study. Descriptive and narrative reviews, in vitro studies, and animal studies were excluded.

Search strategy and screening process

An electronic search for papers published up until December 2015 was performed using the MEDLINE/PubMed, Cochrane Library, Web of Science, and Embase databases; no date or language restriction was applied. Additionally, manual searches of the following journals were performed: *Journal of Periodontology*, *Journal of Clinical Periodontology*, *Journal of Periodontal Research*, *International Journal of Periodontics and Restorative Dentistry*, *Clinical Oral Implants Research*, *Clinical Implant Dentistry and Related Research*, *The International Journal of Oral and Maxillofacial Implants*, *International Journal of Oral and Maxillofacial Surgery*, and *Implant Dentistry*. Unpublished studies ('grey literature') were identified by searching the OpenGrey database, and references in the included studies were also searched to obtain new studies (cross-referencing).

The searching and sorting process for the selection of articles was performed by two authors/reviewers (VM and EB) who started by analyzing titles and abstracts. In the second stage, full articles were selected for careful reading and were analyzed according to the eligibility criteria (inclusion/exclusion) for future data extraction. Disagreement between the reviewers was resolved through detailed discussion. Cohen's kappa (κ) test was used to measure the concordance between the two authors/reviewers in the search. When necessary, the authors of studies were contacted by e-mail for the clarification of possible doubts. The following key words were used for the search process in all of the databases: (1) ''dental implant" [MeSH]; (2) ''mucosa"; (3) ''gingiva"; (4) ''keratinized"; (5) ''keratinized mucosa implant"; (6) ''keratinized mucosa implant health"; (7) ''keratinized mucosa width"; (8) ''systematic review"; and (9) ''meta-analyses".

Data extraction and quality assessment

The following data were extracted from each systematic review that was included in this study: authors, year of publication, research question/objective, number of studies included, outcome measures, journal of publication, AMSTAR score[14], score for the checklist of Glenny et al.[8], and the authors' conclusions. The data extraction was performed in duplicate by two authors/reviewers (VM and EB). All of the journals were exported into a text-editing tool to remove information, such as the authors' names and journal of publication, in order to reduce bias in the data extraction and checklist scoring.

To increase the precision and reduce the possibility of bias, a quality analysis of the included studies was performed using two analysis tools: AMSTAR[14] and the checklist proposed by Glenny et al.[8]. The first includes 11 items with four possible response options: 1, yes; 2, no; 3, can't answer; 4, not applicable. Only items with a response of 1 (yes) are scored. Thus, each article is given a score from 0 (none of the criteria) to 11 (all of the criteria). There is no consensus regarding the score cut-off values to define the quality of the studies with the AMSTAR tool (low, medium, or high quality). However, it has been suggested that a score of less than 3 points indicates a low quality study[20]. The second checklist, proposed by Glenny et al.[8], is composed of 14 items, each with four possible response options: 1, yes; 2, no; 3, can't answer; 4, not applicable. As with AMSTAR, only items with a response of 1 (yes) are scored.

Statistical analysis

The data collected using the two quality assessment tools were analyzed using descriptive statistics. The mean, standard deviation, and median of the two analyses were calculated. In addition, a correlation analysis between the scores from the two tools was performed using Spearman's correlation coefficient with a 95% confidence interval (CI). The level of statistical significance was set at $P < 0.05$. All statistical analyses were performed using Excel for Mac version 14.0.0, 2011 (Microsoft, Redmond, WA, USA) and StatPlus:mac LE 2009 (AnalystSoft Inc., Walnut, CA, USA).

Results

Literature search

The initial search retrieved 559 titles from MEDLINE/PubMed, 15 titles from the Cochrane Library database, 36 from Web of Science, and 220 from Embase. No additional studies were found in the grey literature or in the references of

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