FEATURE ARTICLE

A RISK OF BIAS ASSESSMENT OF RANDOMIZED CONTROLLED TRIALS (RCTS) ON PERIODONTAL REGENERATION PUBLISHED IN 2013

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ABSTRACT

Objective
The objective of this assessment is to evaluate the degree of risk of bias in randomized controlled trials published in 2013 and focusing on periodontal regeneration.

Methods
Three reviewers searched and selected the trials based on pre-defined inclusion criteria. Predictor variables [number of authors, primary objective of the study, biomaterial employed, follow-up time periods, split mouth study (yes/no), journal, year of publication, country, scale (single/multi-center) and nature of funding] were extracted and risk of bias assessment using Cochrane risk of bias tool were performed independently by the three reviewers.

Results
Seventeen RCTs were included in this assessment. The risk of bias in RCTs published in 2013 with a focus in periodontal regeneration varied significantly with only in less than 30% of the included trials, the overall risk of bias was found to be low, while 41% of trials were designated to have a higher degree of bias. Specifically, when looking at the domains assessed, 70% of the included trials reported an accepted method of sequence generation, blinding (whenever possible), completeness of outcome data or avoided selective outcome reporting. Meanwhile, only 47% of the included trials reported some form of allocation concealment.

Conclusion
In this assessment, of the included 17 trials, slightly more than 40% of them had a high risk of bias, underscoring the importance of careful appraisal of trials before implementing the study interventions in clinical practice and the need for more detailed analyses.

INTRODUCTION

In the era of evidence-based health care, clinicians and policy makers rely heavily on the existing scientific evidence before making clinical and health policy decisions. A well-conducted and reported systematic review (SR) of high-quality randomized controlled trials (RCTs) remains at the top in the hierarchy of evidence, with the assumption that it gives the most objective clinically

useful information for a specific clinical question.[1] We know from several previous assessments that not all SRs in medicine and dentistry are conducted and reported with high standards. In periodontics, this inconsistency in the quality of reporting among SRs was noted in several areas including periodontal plastic procedures, periodontal regeneration, small dental implants, and a few others.[2-5]

Among the several clinical study designs, RCTs are supposed to provide information for a clinical question with a very low degree of bias.[6] Moreover, SRs rely on RCTs with low degree of bias in the topic of interest to come up with clinical recommendations.[1] When compared to other study designs, randomization, the key feature of RCTs, gives each study participant an equal chance of being assigned to the different study groups, which is known to minimize or completely nullify selection bias that exists in a non-randomized clinical study.[6] The other aspects of a well-conducted and reported RCT that will further minimize other sources of biases include allocation concealment (minimizes selection bias), blinding of participants (minimizes performance bias), accounting for participant attrition (minimizes attrition bias) and proper outcome reporting (minimizes reporting bias).[7]

Periodontal regeneration is an exciting area within periodontology with growing innovations in surgical technique and biomaterials. Since RCT is the gold standard to test novel interventions for a specific disease, the number of RCTs assessing the safety and efficacy of a novel technique or biomaterial in humans is expected to increase in the coming years.[8] The previous assessments clearly point to the inconsistency and the need for improvement in trial reporting in the fields of prosthodontics and implant dentistry.[9,10] The objective of this study is to evaluate the risk of bias in RCTs published in the area of periodontal regeneration in the year 2013 using the Cochrane Collaboration's tool for assessing risk of bias with the intent to guide authors in the proper reporting of future trials.

METHODS

Inclusion Criteria and Search Strategy

RCTs conducted in humans focusing on periodontal regeneration and published in the year 2013 were included in this assessment. Prospective trials without randomization were not included. To keep the evaluation topic homogenous, only surgical regenerative approaches were included and articles that evaluated periodontal regeneration following non-surgical periodontal therapy were excluded. Authors employed two online databases (Medline and Web of Knowledge) and identify trials published between 1/1/2013 to 12/31/2013. The search terms utilized included '*periodontal regeneration*,' '*intrabony defects*,' '*guided tissue regeneration*' and '*bone grafts periodontal*.' The search terms were used independently and were not combined and they were not searched as MeSH terms. In Medline, only articles conducted in humans and published in the English language were considered. In addition, when searching for articles in Medline, RCT was selected under articles type as an additional filter. In the Web of Knowledge, in addition to the above filters, dentistry oral surgery medicine was chosen as a research area. Additionally, clinicaltrials.gov was searched to thoroughly look for periodontal regeneration trials. Three authors (SE, SP, PG) performed the searches independently and any disagreement was resolved by open discussion. During the first search, title and abstract of the articles were read and irrelevant articles were excluded. Hand searching was not done to complement electronic searching. The articles selected during the first search were subsequently scrutinized by reading the full articles and articles that did not fit the inclusion criteria were excluded. The trials in which the authors explicitly stated them as randomized controlled trials in the published manuscript were termed as 'True RCTs.'

Data Extraction and Risk of Bias Assessment

Following article selection, three authors (SE, SP and PG) independently completed the data extraction and risk of bias assessment. The following data from each trial were extracted: number of authors, primary objective of the study, biomaterial employed, follow-up time periods, split mouth study (yes/no), journal, year of publication, country, scale (single/multi-center) and nature of funding. The risk of bias tool developed by Cochrane Collaboration was employed to assess bias in selected RCTs.[11] The items employed in this tool are listed in Table 1. The risk of bias instrument, description of the

Table 1. The five domains of Cochrane Collaboration's tool[11] for assessing risk of bias.

Domain	Review authors' judgment
Sequence generation	Was the allocation sequence adequately generated?
Allocation concealment	Was allocation adequately concealed?
Blinding of participants, personnel, and outcome assessors	Was knowledge of the allocated intervention adequately prevented during the study?
Incomplete outcome data	Were incomplete outcome data adequately addressed?
Selective outcome reporting	Are reports of the study free of suggestion of selective outcome reporting?