

Autologous platelet concentrates for treating periodontal infrabony defects

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A Commentary on

Del Fabbro M, Karanxha L, Panda S, Bucchi C, Nadathur Doraiswamy J, Sankari M, Ramamoorthi S, Varghese S, Taschieri S.

Autologous platelet concentrates for treating periodontal infrabony defects. *Cochrane Database of Systematic Reviews* 2018, **11**: CD011423. DOI: 10.1002/14651858.CD011423.pub2.

Cochrane Reviews are regularly updated as new evidence emerges and in response to feedback, the Cochrane Library (www.thecochranelibrary.com) should be consulted for the most recent version of the review.

Abstract

Data sources Medline, Embase, the Cochrane Central Register of Controlled Trials (CENTRAL), the Cochrane Oral Health's Trials Register, LILACS BIREME Virtual Health Library, the US National Institutes of Health Ongoing Trials Register (ClinicalTrials.gov) and the World Health Organization International Clinical Trials Registry Platform. Searches were conducted with no limitations on the language or date of publication.

Study selection Parallel and split-mouth randomised controlled trials (RCTs) conducted on patients with infrabony defects requiring surgical treatment were considered. Studies needed to compare a specific surgical technique with and without the use of with autologous platelet concentrates (APC).

Data extraction and synthesis Two reviewers independently extracted data and assessed risk of bias with data being analysed using standard Cochrane methodology. Changes in probing pocket depth (PD), clinical attachment level (CAL) and radiographic bone defect filling (RBF) were the primary outcomes assessed. Changes in PD and CAL were reported as mean difference (MD) millimeters and 95% confidence intervals with RBF as MD percentage change (5). Data was organised in four groups related to specific surgical techniques, 1. APC + Open Flap Debridement (OFD) versus OFD, 2. APC + OFD + Bone Grafting (BG) versus OFD + BG, 3. APC + Guided Tissue Regeneration (GTR) versus GTR, and 4. APC + Enamel Matrix Derivative (EMD) versus EMD.

Results Thirty eight RCTs evaluating 1402 defects were included. Twenty-two trials used a split-mouth design and sixteen a parallel approach. Most studies (36) had a high overall risk of bias with two having an unclear risk.

Twelve studies (510 infrabony defects) were included for the comparison between APC + OFD versus OFD alone providing evidence of an advantage in using APC globally from split-mouth and parallel studies for all three primary outcomes. PD (MD) = 1.29 mm (95%CI; 1.00 to 1.58 mm); CAL (MD) = 1.47 mm (95% CI; 1.11 to 1.82 mm); RBF (MD) = 34.26% (95% CI; 30.07% to 38.46%).

Seventeen studies (569 infrabony defects) were included for the comparison between APC + OFD + BG versus OFD + BG. When

Practice point

There are several ways to treat periodontal infrabony defects; the use of ABCs could be an excellent supporting for this treatment. However, the dental surgeon needs to apply the right technique/protocol for each case. At the present moment, the use of ABCs plus bone graft can be an excellent alternative to treat infrabony defects, improving probing pocket depth, the clinical attachment level, and radiographic bone defect filling outcomes.

all follow-ups, as well as 3 to 6 months and 9 to 12 months are considered, there is very low-quality evidence of an advantage in using APC from both split-mouth and parallel studies for all three primary outcomes; PD (MD) = 0.54mm (95% CI; 0.33 to 0.75 mm); CAL (MD) = 0.72 mm (95% CI; 0.43 to 1.00 mm); and RBF (MD) 8.10% (95% CI 5.26% to 10.94%)

For the comparison APC + GTR versus GTR alone seven studies (248 infrabony defects) were included. Considering all follow-ups, there is very low-quality evidence of a probable benefit for APC for both PD (MD) = 0.92 mm (95% CI; -0.02 to 1.86 mm) and CAL (MD) 0.42 mm (95% CI; -0.02 to 0.86 mm). As confidence intervals are wide there is a possibility of a slight benefit for the control. For 3 to 6 months and a 9 to 12 months follow-up no benefits were evidenced, except for CAL at 3 to 6 months MD = 0.54 mm (95% CI; 0.18 to 0.89 mm). No RBF data were available.

Only two studies (75 infrabony defects) were included in the comparison of APC + EMD versus EMD. There was insufficient evidence of an overall advantage of using APC for all three primary outcomes:

A survival rate of 100% for the treated teeth was reported in all studies for all groups, while no complete pocket closure was reported. It was not possible to perform a quantitative analysis regarding patients' quality of life.

Conclusions For two types of treatment, open flap debridement and open flap debridement with bone graft there is very low-quality evidence that the adjunct of APC when treating infrabony defects may improve probing pocket depth, clinical attachment level, and radiographic bone defect filling. There was insufficient evidence of an advantage in using APC for GTR or EMD.

Commentary

Nowadays, it is possible to find a vast number of scientific articles on the use of autologous blood concentrates (ABCs)/blood-derived growth factors in different areas of dentistry.

In the present study, although there was a large sample, the application was performed in different ways, which made it difficult to study the definition of an effective method for treating periodontal infrabony defects.

GRADE rating



As it is possible to find in the present study and other articles on the subject, the presence of the ABCs for the bone healing process is thought to be based on the growth factors stored in their granules and released upon activation. The main growth factors released from platelet aggregates are the following: basic fibroblast growth factor (bFGF), transforming growth factor-beta (TGF- β), insulin-like growth factor-1 (IGF-1), vascular endothelial growth factor (VEGF), and epithelial growth factor (EGF), as well as three blood proteins known to act as cell adhesion molecules for osteoconduction (fibrin, fibronectin and vitronectin). The presence of these products from the blood, are responsible for actions such as chemotaxis, differentiation, proliferation and cell maintenance.

This study aimed was to assess the effects of autologous platelet concentrates used as an adjunct to periodontal surgical therapies OFD, OFD combined with bone grafting, guided tissue regeneration, OFD combined with enamel matrix derivative for the treatment of infrabony defects.

It is possible to find several reports on the adjunctive use of ABCs to periodontal surgical procedures, but the efficacy remains controversial. As well as Del Fabbro et al. found in the present

study, it is possible to agree with the limitation to evaluate the effectiveness of this process because of the concerning methods, study design, protocols to produce the ABCs, participants selection criteria, etc. That is a significant limitation for all of the periodontal studies who involved the ABCs.

In the present study, all of the evaluated studies presented very low quality; with this, it is impossible to get confidence in these surgical procedures for treating periodontal infrabony defects.

Thus, further investigations, especially randomised clinical trials, are necessary to increase the quality of the evidence. Moreover, preferably these future studies should follow the CONSORT Statement.

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