

## Meta Analysis Dental Implants

# Platform-switching implants and bone preservation: a systematic review and meta-analysis

J. F. Santiago Junior<sup>1</sup>,  
V. E. de Souza Batista<sup>2</sup>, F. R. Verri<sup>2</sup>,  
H. M. Honório<sup>3</sup>, C. C. de Mello<sup>2</sup>,  
D. A. dF.Almeida<sup>2</sup>, E. P. Pellizzer<sup>2</sup>

<sup>1</sup>Department of Health Sciences, Sacred Heart University, Bauru, São Paulo, Brazil;

<sup>2</sup>Department of Dental Materials and Prosthodontics, Dental School of Araçatuba, UNESP – Universidade Estadual Paulista, Araçatuba, São Paulo, Brazil; <sup>3</sup>Department of Scientific Methodology and Statistics, Bauru School of Dentistry, USP – University of São Paulo, São Paulo, Brazil

J. F. Santiago Junior, V. E. de Souza Batista, F. R. Verri, H. M. Honório, C. C. de Mello, D. A. dF. Almeida, E. P. Pellizzer: Platform-switching implants and bone preservation: a systematic review and meta-analysis. *Int. J. Oral Maxillofac. Surg.* 2016; 45: 332–345. © 2015 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

**Abstract.** The aim of this study was to perform a systematic review and meta-analysis to evaluate the possible benefits of platform-switching (PSW) implants when compared to regular platform (RP) implants in the categories of bone preservation and longevity. This systematic review and meta-analysis was performed in accordance with the PRISMA statement, PICO question, and Jadad scale. The relative risk (RR) of failure and the mean difference for marginal bone loss were calculated considering a confidence interval (CI) of 95%. Heterogeneity and subgroup analyses were performed, and funnel plots drawn. Twenty-five studies (17 randomized controlled trials (RCTs) and eight prospective studies) involving 1098 patients and 2310 implants were analysed. The meta-analysis revealed a significant reduction in crestal bone loss for PSW implants compared with RP implants ( $-0.41$  mm, 95% CI  $-0.52$  to  $-0.29$ ,  $P < 0.00001$ ). However, there was no statistically significant difference in implant failure (RR 1.10, 95% CI 0.6–2.02,  $P = 0.75$ ). A reduction in bone loss with PSW implants was observed for the following subgroups: RCTs only, implants in the maxilla, and implants in the mandible. PSW implants presented lower bone resorption compared with RP implants. RCTs should be done to explain the possible biases.

**Keywords:** dental implants; alveolar bone loss; dental implant platform switching; meta-analysis; review.

Accepted for publication 17 November 2015  
Available online 23 December 2015

The introduction of larger-diameter implants during a period when compatible prosthetic components were not accessible allowed for standard prosthetic components (4.1 mm) to be used with large-diameter implants (5 mm and 6 mm). This concept became known as ‘platform switching’.<sup>1</sup> The first clinical case studies<sup>2–4</sup> and retrospective studies<sup>1,5</sup> on

platform switching indicated a lower rate of bone loss around these dental implants when compared with implants that received prosthetic abutments of the same diameter platform (Fig. 1).

Several theories have emerged to explain the lower bone loss with this platform-switching treatment modality.<sup>1,6–9</sup> It has been suggested that positioning the

implant/abutment interface away from the bone crest allows the biological width to be determined horizontally, enabling the creation of an additional horizontal surface area for the attachment of soft tissue.<sup>7</sup> The peri-implant microbiota is another relevant factor, since the design of these implants can increase the distance between the inflammatory cell infiltrate

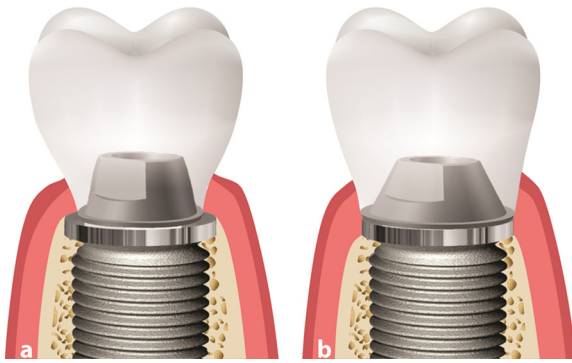


Fig. 1. Illustrative image of the platform-switching implant concept (A), showing a narrower prosthetic abutment and lower peri-implant bone loss when compared with the standard model of a regular platform implant (B).

and the bone crest, thereby minimizing the effects of inflammation on peri-implant marginal bone with platform-switching (PSW) implants.<sup>1,8</sup> Finally, there is a biomechanical theory that relates the possibility of centralization stress on the long axis of these implants, thus reducing tension in the peri-implant cortical bone.<sup>6,9</sup>

After the phenomenon of bone preservation was confirmed, clinical studies evaluating the platform-switching concept began to appear. However, several case reports presented a sample of 10 patients or fewer.<sup>3,4,10–13</sup> Randomized controlled trials (RCTs) with the aim of comparing the effects of PSW implants and regular platform (RP) implants in patients have emerged in the last 5 years,<sup>14–27</sup> allowing the preparation of literature reviews addressing the topic of bone preservation around these implants.<sup>28–32</sup> However, there remains a need to clarify the effects of PSW implants in relation to marginal bone loss, as indicated by previous systematic reviews.<sup>7,33,34</sup>

Recently, RCTs have been published addressing the issue of PSW implants,<sup>16–18,23–27</sup> leading to the need for an updated analysis of published studies. Moreover, biomechanical studies have been published that may provide further insight into the proposed subject.<sup>9,35</sup> Thus, the aim of this study was to conduct a systematic review and meta-analysis of the proposed topic. The null hypothesis was that PSW implants show a rate of bone remodelling similar to RP implants.

## Materials and methods

This study was conducted in accordance with the criteria put forward in the PRISMA-2009 guidelines.<sup>36</sup> The PICO question was formulated. This study was

also performed with reference to other previous systematic reviews<sup>37,38</sup> and meta-analyses.<sup>39,40</sup>

## Protocol and registration

This systematic review was registered in the PROSPERO database, an international prospective register of systematic reviews in health and social care (National Institute for Health Research, UK; pre-protocol CRD 42013005728).

## Eligibility criteria

The studies selected for this analysis met the criteria established by the index PICO: (1) population: patients undergoing dental implant surgery; (2) intervention: patients receiving implants with a platform-switching geometry; (3) comparison: patients receiving implants with a regular abutment; (4) outcome: the main outcomes were the comparison of bone loss and implant survival rates (platform-switching and regular platform).

Inclusion criteria were the following: articles published in the English language; studies with at least 12 months of follow-up (clinical studies in humans); RCTs and prospective studies with at least five implants (titanium implants) placed in the control group (RP) and in the study group (PSW).

## Sources of information

The MEDLINE/PubMed, Cochrane Central Register of Controlled Trials, and EMBASE databases were searched. These searches were conducted for articles published up until 1 July 2015. All studies identified by the inclusion criteria were analysed. Authors were contacted when necessary to obtain possible additional information.<sup>16,19,41–43</sup>

## Search

Key words available in medical subject headings (MeSH, PubMed) related to PSW implants and RP implants were selected. The Boolean search operators used were ‘Dental Implant Platform Switching’ and ‘Platform Switching, Dental Implant,’ and the key words were ‘dental implant–abutment design’ [MeSH Terms] OR (‘dental’ [All Fields] AND ‘implant–abutment’ [All Fields] AND ‘design’ [All Fields]) OR ‘dental implant–abutment design’ [All Fields] OR (‘dental’ [All Fields] AND ‘implant’ [All Fields] AND ‘platform’ [All Fields] AND ‘switching’ [All Fields]).

A manual search of journals published over the last 6 months was also done: *Clinical Implant Dentistry and Related Research*, *Clinical Oral Implant Research*, *Implant Dentistry*, *International Journal of Oral and Maxillofacial Surgery*, *Journal of Clinical Periodontology*, *Journal of Dental Research*, *Journal of Maxillofacial and Oral Surgery*, *Journal of Oral Implantology*, *Journal of Periodontology*, *Journal of Prosthetic Dentistry*, *Journal of Prosthodontics*, *Journal of Oral Rehabilitation*, *Oral Medicine*, *Oral Pathology*, *Oral Radiology*, and *Endodontics*, *Periodontology 2000*, *International Journal of Oral and Maxillofacial Implants*, and *International Journal of Periodontics and Restorative Dentistry*.

## Process of data collection

Study selection was organized independently by two calibrated examiners (J.F.S. and V.E.S.B.) and by a third reviewer (E.P.P.). Inter-examiner (kappa) tests were conducted to evaluate the selection of titles and abstracts, and complete reading with interpretation of the article, resulting in concordance test values of  $\kappa = 0.88$ , 1, 1 for MEDLINE/PubMed,  $\kappa = 1$ , 1, 1 for Cochrane Central Register of Controlled Trials, and  $\kappa = 1$ , 1, 1 for EMBASE. For the MEDLINE/PubMed database search, a meeting was required to reach consensus, in which all the discrepancies were discussed and resolved by the third reviewer (E.P.P.). All titles and abstracts evaluated as eligible were separated and analysed completely. A manual search of the journals was conducted by one reviewer (J.F.S.) and independently by another reviewer (V.E.S.B.), adding six articles to the original sample.<sup>19,27,41–44</sup>

The selection of studies for the systematic review and meta-analysis is shown in detail in Fig. 2, as recommended in the literature.<sup>36</sup>

Download English Version:

<https://daneshyari.com/en/article/3131863>

Download Persian Version:

<https://daneshyari.com/article/3131863>

[Daneshyari.com](https://daneshyari.com)