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Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development

M A Atieh[1,2]
N HM Alsabeeha[3]
A GT Payne[4]
S Ali[1]
CM Jr Faggion[5]
M Esposito[6]

1 | Mohammed bin Rashid University of Medicine and Health Sciences, Hamdan bin Mohammed College of Dental Medicine, Dubai, United Arab Emirates
2 | Sir John Walsh Research Institute, School of Dentistry, University of Otago, Dunedin, New Zealand
3 | RAK Dental Centre, Ministry of Health and Prevention, Ras Al-Khaimah, United Arab Emirates
4 | Private practice, Northland Prosthodontics Ltd, c/o NorthShore Oral and Maxillofacial Surgeons, Auckland, New Zealand
5 | Department of Periodontology, University Hospital Münster, Münster, Germany
6 | Cochrane Oral Health, Division of Dentistry, School of Medical Sciences, Faculty of Biology, Medicine and Health, The University of Manchester, Manchester, UK

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ABSTRACT

After a tooth extraction, the occurring alveolar bone changes can interfere with the success of the implant supported rehabilitation. In order to limit bone loss, it is possible to perform an alveolar ridge preservation (ARP) procedure, limiting bone changes and improving prosthodontic and aesthetic outcomes. ARP techniques include the use of grafting materials of human, animal, or synthetic origin, with or without the use of barrier membranes, to further optimise the functional and aesthetic restoration of dental implants.

The grafting materials include: particulate autogenous chips, allografts, xenografts, and alloplasts. Growth factors were also used for ARP including recombinant human bone morphogenetic protein-2 and platelet-rich fibrin. In order to find out if ARP works to preserve jaw bone after tooth extraction, the authors reviewed the evidence from research studies present in literature.

This is an update of the Cochrane Review first published in 2015. From a total of 113 trials potentially eligible for inclusion, the authors selected 16 randomised controlled trials (RCTs) on the use of ARP techniques with at least six months of follow-up. The follow-up was regarded as the period from tooth extraction until the final measurements of the alveolar ridge prior to or at the time of implant placement. The aim was to assess the clinical effects of various materials (including grafting materials, biologics, and growth factors) and techniques (including GBR and socket seal) for ARP after tooth extraction, compared with extraction alone or other methods of ARP, in patients requiring dental implant placement following healing of extraction sockets. Outcome measures were: changes in the bucco-lingual/palatal width of alveolar ridge, changes in the vertical height of the alveolar ridge, complications, the need for additional augmentation prior to implant placement, aesthetic outcomes, implant failure rates, peri-implant marginal bone level changes, changes in probing depths and clinical attachment levels at teeth adjacent to the extraction site, and complications of future prosthodontic rehabilitation.

CONCLUSIONS

The review of the selected studies evidenced that alveolar ridge preservation (ARP) techniques may minimise the loss of ridge width and height under ideal conditions in non-molar four-wall sockets, following extraction, but the evidence is very uncertain. There is a general agreement that implants can be placed six months after ARP, following a delayed placement procedure, but there is lack of evidence of any differences in the need for additional augmentation at the time of implant placement. There are more trials to suggest that xenografts (one of the most studied materials) showed successful in terms of minimising loss of ridge width and height, but as the certainty of the evidence remains low, clinicians should interpret the findings of this review with caution. Further long-term RCTs that follow CONSORT guidelines are necessary.