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AUTOGENOUS PARTICULATED DENTIN FOR ALVEOLAR RIDGE PRESERVATION, A SYSTEMATIC REVIEW

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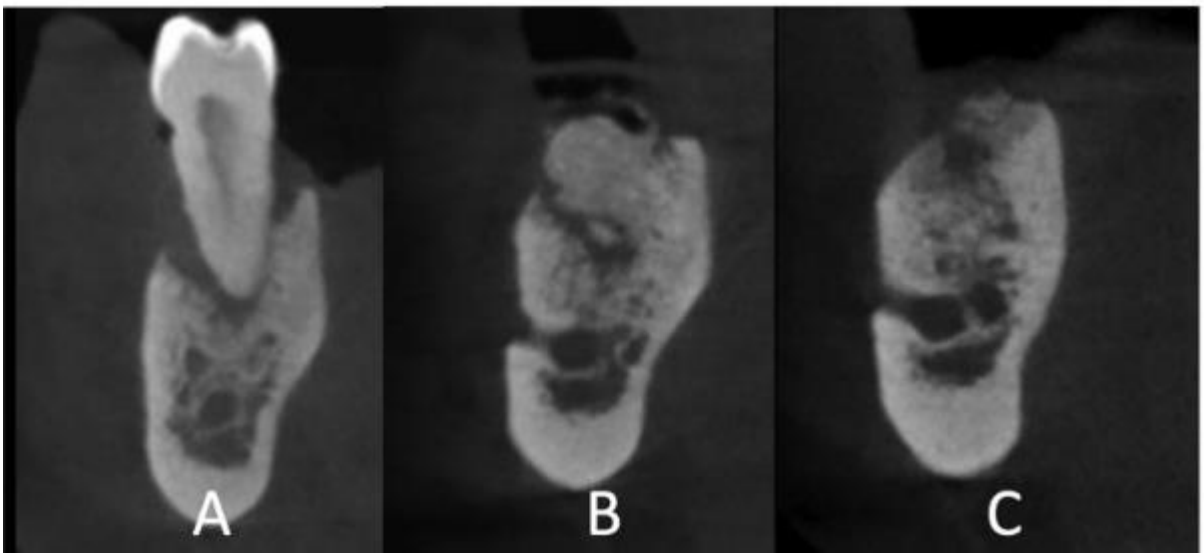
Introduction

Tooth extraction is one of the most widely performed dental procedures. But unless appropriate measures are taken, extraction will lead to unavoidable higher resorption of the alveolar ridge, as well as structural and compositional changes in the overlying soft tissue . The loss of volume during the first three months has been estimated to be approximately 1.67–2.03 mm in height and 5–7 mm in width within the first 12 months, corresponding to approximately 50 % of the original alveolar bone, this being more pronounced on the buccal than on the lingual aspect of the extraction socket In this way, following dental extraction, alveolar ridge morphology may present a discrepancy in bone height between the lingual and buccal plates, which can jeopardize the aesthetic outcome of any dental treatment involving tooth extraction especially in the anterior zone. In order to minimize or prevent this potential drawback, various surgical techniques have been proposed, including regenerative techniques for socket preservation, soft tissue augmentation procedures immediate implant placement, and even the socket shield technique. In this context, alveolar ridge preservation is defined as any procedure performed at the time of or following an extraction that is designed to minimize external resorption of the ridge and maximize bone formation within the socket, thereby maintaining the existing soft and hard tissue envelope and therefore simplifying further treatment procedures .It hasbeen observed that 20.8 % of non-preserved alveoli require treatment by an additional bone graft for subsequent implant rehabilitation, in contrast to only 9.9 % of preserved alveoli. So, given the obvious importance of ARP, different materials have been proposed for these procedures, including autogenous bone, demineralized freeze-dried bone allograft, mineralized freeze-dried bone allograft, deproteinized bovine bone, alloplastic polymers, bioactive glasses and composite ceramic materials. Recently, guided bone regeneration with autogenous particulated dentin has been investigated and has shown good preliminary results in both animal and human studies. It has also obtained encouraging results in sinus lifting and ARP procedures . Autogenous dentin provides a material with ideal physical (density,

roughness, homogeneity) and chemical (calcium/phosphate concentration similar to human bone) properties and has been found to stimulate bone tissue formation. Human dentin is composed of 70 % inorganic content with four types of calcium phosphate (hydroxyapatite, tricalcium phosphate, octacalcium phosphate, and amorphous calcium phosphate), which endow dentin with osteoconductive properties. The hydroxyapatite in dentin is in the form of calcium phosphate with low crystal content, which makes it easily degradable by osteoclast activity. It is composed of 20 % organic content, of which 90 % is a type I collagen network and 10 % non-collagenous proteins (osteocalcin, osteonectin, sialoprotein, and phosphoprotein, which participate in bone calcification) and growth factors (bone morphogenetic proteins: BMPs, and insulin-like growth factor, which give the tooth osteoinductive properties); the remaining 10 % is water Because of these properties and the inherent similarities between autogenous dentin and autologous bone grafts, various research teams have ventured to apply APD in ARP procedures But as far as the authors are aware, no published systematic review has eval uated the clinical outcomes of ARP with APD.Therefore, the objectives of this review were to assess the clinical performance of APD in ARP in comparison with other bone substitutes or spontaneous healing (blood clot formation) in terms of volumetric changes, associated complications, and histomorphometric data.



Material and methods

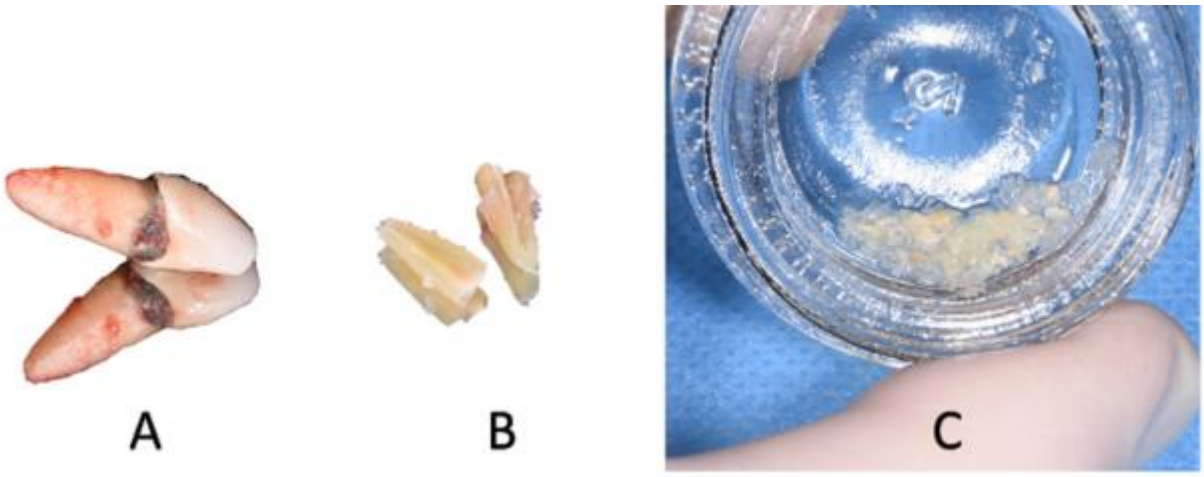
This systematic review followed guidelines established in the PRISMA (Preferred Reporting Items for Systematic Review and Meta- Analyses) statement and was registered in the International Prospective Register of Systematic Reviews

It set out to answer the following PICO question (Population, Intervention, Comparison and Outcome): "In patients scheduled for restoration with dental implants after dental extraction(s), is the use of APD appropriate for ARP, in comparison with spontaneous healing or the use of other bone substitutes, in order to maintain bone volume and so avoid structural and compositional changes in the overlying soft tissue?, whereby Population (P) was defined as pa tients needing dental extraction(s) and subsequent implant placement; Intervention (I) as ARP of the extracted teeth with APD;Comparison (C) as ARP with other bone substitutes or spontaneous healing; and the main primary outcome (O) was volumetric changes.

Data collection and items

The primary outcome was volumetric change (bone volume) between T0 (tooth extraction and ARP) and T1 (subsequent implant placement) Secondary outcomes were histologic/histomorphometric data, and any associated complications. In addition, various descriptive data were studied, such as the different procedures for dentin preparation, the different devices used, the re-entry time (time between ARP and dental implant placement) and the osseointegration time (time between dental implant placement and second stage surgery). The same two reviewers performed duplicate data extraction. When data was incomplete or missing from a study, the

authors were contacted. If agreement could not be reached, data was ex- cluded until further clarification was available. The data extracted were as follows: authors, year and journal of publication, study design, number of patients, mean age, number and location of alveoli, tooth preparation, and device used, barrier method, post-operative medication, re-entry time, vertical and horizontal socket measurement, osseointegration time, follow-up, implant survival or success rate, complications, histology and/or histo-morphometric data.



Discussion

The objectives of the present systematic review were to assess the clinical performance of APD in ARP in comparison with other bone substitutes or spontaneous healing (blood clot formation) in terms of volumetric changes, associated complications, and histo- morphometric data. The search for relevant articles identified eligible clinical studies (six comparative studies and five without comparison groups), which applied various devices, forms of pre-paration, grafting materials, osseointegration times and/or reentry times. The placement of bone substitutes in the alveolus after dental extraction reduces the collapse of the alveolar bone ridge and fa-cilitates subsequent rehabilitation by means of a dental implant. Although this fact would appear evident and has been described in arecent meta-analysis, there is greater controversy and diversity of opinion regarding the filling material and/or technique (autografts, allografts, xenografts, alloplasts) that obtain the best outcomes. Autogenous bone is still considered the ‘gold standard' for bone regeneration due to its osteogenic, osteoconductive and os- teoinductive properties although this material suffers a series of draw backs: additional surgery to harvest bone from a second site, pro-longed surgical time, unpredictable resorption, risk to the donor site,risk of complications, and the limited availability of autologous bone

These disadvantages, as well as the fact that all biomedical special-ties are evolving toward minimally invasive therapies, have driven the search for alternative materials for bone regeneration.The primary objective of our review was to assess the volumetric changes that occur between T0 (tooth extraction and ARP) and T1(subsequent implant placement). The results of the studies reviewed are encouraging: in all the cases, both vertical and horizontal re- duction was less with ADP than in control groups. These results suggest that the technique is ideal for maintaining the existing soft and hard tissue envelope and so facilitates subsequent treatment procedures. Moreover, it should be noted that most of the studies included in this systematic review performed APR in anterior areas – the most critical area – where minimizing the resorptive process is of paramount importance. The results obtained are especially.

Conclusion

Within the limitations of this systematic review, it may be con cluded that APD appears a good option as a graft material in ARP procedures due to its osteoconductive and osteoinductive properties. The studies reviewed obtained encouraging results in terms of volume maintenance and histomorphometric data. Furthermore, the dentin graft is less costly in comparison with other bone substitutes and would appear to exhibit a low complication rate. However, these promising results should be treated with caution as the data re- ported was drawn from studies of the – as yet – early stages of a new clinical development and the studies performed to date are het erogeneous. Further studies – randomized clinical trials, ideally with adequate protocols, larger sample sizes, longer follow-up periods and comparisons with a wide range of bone substitutes are needed to broaden our understanding of this alternative biomaterial's clinical behavior.

References

1. Andrade, C., Camino, J., Nally, M., Quirynen, M., Martínez, B., Pinto, N., 2020.
2. Combining autologous particulate dentin, L-PRF, and fibrinogen to create a matrix for predictable ridge preservation: a pilot clinical study. Clin. Oral Investig. 24 (3), 1151–1160. Araújo, M.G., Da Silva, J., De Mendonça, A.F., Lindhe, J., 2015. Ridge alterations following grafting of fresh extraction sockets in man. A randomized clinical trial.
3. Clin. Oral Implant Res. 26 (4), 407–412Atieh, M.A., Alsabeeha, N.H., Payne, A.G., Duncan, W., Faggion, C.M., Esposito, M., 2015.

4. Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development. Cochrane Database Syst. Rev. 2015 (5), CD010176Atieh, M.A., Alsabeeha, N.H., Payne, A.G., Ali, S., Faggion, C.M.J., Esposito, M., 2021.
5. Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development. Cochrane Database Syst. Rev. 4 (4), CD010176Bazal-Bonelli, S., Sánchez-Labrador, L., Cortés-Bretón Brinkmann, J., Pérez-González, F., Méniz-García, C., Martínez-González, J.M., et al., 2021. Clinical performance of tooth root blocks for alveolar ridge reconstruction. Int J. Oral Maxillofac. Surg.
6. S0901–5027 (21). Cadenas-Vacas, G., Martínez-Rodríguez, N., Barona-Dorado, C., Sánchez-Labrador, L., Cortés-Bretón Brinkmann, J., Meniz-García, C., 2021. Calcium phosphate modified with silicon vs bovine hydroxyapatite for alveolar ridge preservation: densito- metric evaluation, morphological changes and histomorphometric study.
7. Materials 14 (4), 940Calin, C., Saiin, M., Moldovan, V.T., Coman, C., Stratul, S.I., Didilescu, A.C., 2021.
8. Immunohistochemical expression of non-collagenous extracellular matrix mole cules involved in tertiary dentinogenesis following direct pulp capping: a