Summary Review / Dental Implants

Title/Question

Which Type of Soft Tissue Augmentation at Dental Implant Sites is Best Supported By Evidence?

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A Commentary on

Cairo F, Barbato L, Selvaggi F, Baielli MG, Piattelli A, Chambrone L. Surgical procedures for soft tissue augmentation at implant sites. A systematic review and meta-analysis of randomized controlled trials. Clin Implant Dent Relat Res. 2019; 21(6):1262-1270.

Data sources: PubMed, The Cochrane Oral Health Group Trials Register and EMBASE.

Additionally, issues of the following journals between 2000-April 2019 were hand searched: Journal of Clinical Periodontology, Journal of Periodontology, International Journal of Periodontology and Restorative Dentistry, European Journal of Oral Implantology, Journal of Oral Maxillofacial Surgery, Clinical Implant Dentistry and Related Research, and Clinical Oral Implants Research

Study selection: Only randomised controlled trials (RCTs) involving soft tissue augmentation at dental implant sites were considered for inclusion. The selection was restricted to RCTs published in English language with at least 10 patients per group and a minimum follow-up period of 3 months. A PICO method was used to organise the inclusion criteria and soft tissue augmentations were clustered into three groups i.e., before prosthetic treatment, after prosthetic treatment and at immediate implant placement.

Data extraction and synthesis: The screening of titles and abstracts was carried out by two reviewers and disagreements were moderated by a third reviewer. Eligibility was determined using full texts and data were extracted using purposefully designed forms. The Cochrane Handbook of Systematic Reviews of Interventions toolkit was used to assess the risk of bias. The studies were grouped according to the type of intervention and subjected to quantitative data synthesis. Continuous outcome measures were assessed using random-effects meta-analyses and pooled estimates were expressed as weighted mean differences (MD) along with 95% confidence intervals (CI).

Results: Following initial electronic and hand searches, 2119 studies were screened for title and abstract and 32 studies were considered for full text screening. Only 14 RCTs met the inclusion criteria and the remaining 18 studies were excluded from the systematic review. The included studies described soft tissue augmentation for 538 implants placed in 475 patients. Three studies (68 patients; 78 implants) reported improved soft tissue thickness with xenogenic collagen matrix (XCM) augmentation compared to no augmentation at the implant sites before prosthetic treatment (high /unclear risk of bias). One study (28 patients; 41 implants) reported improved height of keratinised tissue (KT)) and marginal bone levels (MBL) with free gingival graft (FGG) compared to no augmentation at the implant sites after prosthetic treatment (unclear risk of bias). Three RCTs (126 patients; 126 implants) focused on connective tissue grafting (CTT) and bone grafting vs no grafting in conjunction with immediate implant placement after tooth extraction (unclear risk of bias). There was no difference in MBL in any of the studies while one study showed superior soft tissue thickness (STT). Four RCTs (129 patients; 133 implants) compared different augmentation techniques before prosthetic treatment. Only one study showed improved STT with CTG compared to XCM (low risk of bias). Finally, three RCTs (124 patients; 160 implants) compared different augmentation techniques after prosthetic treatment (High/ unclear risk of bias). FGG was observed to be superior to acellular dermal matrix (ADM) and vestibuloplasty to improve KT. Meta analyses showed did not favour CTT to improve MBL at extraction sites but CTT was superior to XCM to improve STT before prosthetic treatment.

Conclusions

Notwithstanding the limitations of the systematic review, soft tissue augmentation significantly enhances the amount of soft tissue at the implant site. CTG at the extraction site also improves subsequent bone level of the implants. Moreover, CTG prior to prosthetic treatment is superior to XCM to improve thickness of peri-implant soft tissues. However, these findings are based on short-term follow-up and future studies with improved methodology are required to establish the long-term benefits of soft tissue augmentation at the dental implant sites.

GRADE Rating: Medium

Commentary

The systematic review and meta-analysis by Cairo et al., 2019 presents a comprehensive review of the potential benefits of soft tissue augmentation at dental implant sites. Improved soft tissue thickness around dental implants has been shown to reduce the risk of peri-implantitis and may also contribute to improved aesthetics and patient satisfaction.

Peri-implantitis is a topical issue in modern dental implantology practice as it is one of the commonest and most recognised complication associated with dental implants.[1,2] Peri-implantitis is a plaque-associated pathological condition occurring in tissues around dental implants, characterized by inflammation in the peri-implant mucosa and subsequent progressive loss of supporting bone and implant failure.[3,4] Various conservative measures and surgical interventions are reported to aid in the management of established peri-implantitis.[5] However, primary prevention of this complication remains the ideal goal.[6] This systematic review underscores the emerging evidence to support the use of soft tissue augmentation at implant sites to facilitate gain of keratinised mucosa and thereby improve peri-implant health and aesthetics.

Although this systematic review strengthens the existing evidence to support the use of soft tissue augmentation for dental implants, heterogeneity in the design of RCTs and risk of bias were identified as major impediments to synthesis of results. Some minor

typographic errors were noted in the manuscript, but these did not appear to affect the accuracy of the review.

RCTs remain a primary source of evidence in clinical practice and are invariably resource-intensive, time consuming and expensive. Therefore, it seems sensible to develop tailored guidelines for conducting future RCTs on dental implants. These guidelines should be aimed at minimizing variations in measurement of outcomes (such as, implant stability, peri-implant soft tissue health) as well as reducing the risks of bias in implant studies. Lastly, patient-reported outcome measures (PROMs) are now recognised as an important component of clinical research.[7] However, it appears that PROMS are used less frequently in dental implant research. Future research on dental implants may benefit from incorporating PROMS in the research design more consistently to enhance informed decision-making in clinical practice.

Practice Points

1. Soft tissue augmentation improves the amount of keratinised mucosa around dental implants and may serve to improve aesthetics and reduce the risk of peri-implantitis

2. Consideration should be given to incorporate soft tissue augmentation of dental implant sites in the treatment planning of dental implants.

References:

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