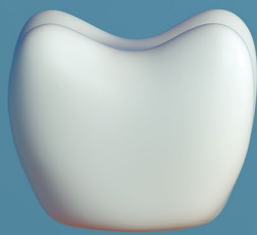


EBD spotlight:

An evaluation of short dental implants



Author information

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Manas Dave¹ discusses a topic featured in our sister journal *Evidence-Based Dentistry*.

‘Comparing short implants to standard dental implants: a systematic review and meta-analysis of randomised control trials with extended follow-up’ was published in *Evidence-Based Dentistry* in 2023.¹

Background

Short dental implants have been introduced as an alternative to conventional implants for the rehabilitation of atrophic edentulous areas. Some reports suggested lower bone quality in patients with edentulous areas and its association with higher implant failure levels however implant designs, systems etc can affect marginal bone loss and be linked to success.²

The aim of this systematic review and meta-analysis was to evaluate the difference in marginal bone levels between short implants (4–8 mm) and standard implants (more than 8 mm).

Methods

An electronic database search of PubMed, Web of Science, EMBASE, Scopus, Cochrane Central Register of Controlled Trials and ClinicalTrials.gov were conducted for studies until March 2020. The grey literature was searched through conference papers in EMBASE, Web of Science and Scopus, manual search of journals (*European Journal of Oral Implantology*, *Clinical Oral Implants Research* and *Clinical Implant Dentistry and Related Research*). In addition, the reference lists of included studies manually searched. Only randomised control trials (RCTs) in which a parallel or paired design comparing short and standard dental implants were included. Risk of bias was assessed through a modified Cochrane collaboration tool. In addition, the Egger test and funnel plot were used to assess publication bias.

Results

- Twenty-four RCTs were included in this review comprising 1,247 patients receiving 2,865 implants (1,457 standard implants and 1,408 short implants)
- Nine studies assessed marginal bone loss (MBL) of the maxilla, four studies assessed MBL of the mandible and 11 studies reported on both. Five RCTs did not define the results of a single jaw
- Overall analysis: For both jaws combined, short implants showed significantly less MBL than standard implants, which is advantageous. This is supported by a Weighted Mean Difference (WMD) of -0.357 (Confidence Interval [CI]: -0.528, -0.186), indicating lower MBL for short implants, with a high heterogeneity (I²: 70.5%) and a significant interaction test (P = 0.001). The Standardised Mean Difference (SMD) also favoured short implants with a value of -0.660 (CI: -1.039, -0.281), however this had even higher heterogeneity (I²: 77.5%)
- Subgroup analysis by jaw:
 - ◆ Maxilla: Short implants showed significantly less MBL with a WMD of -0.331 (CI: -0.498, -0.163) and moderate heterogeneity (I²: 44.0%). However, the interaction test's P-value for SMD was not significant (P = 0.646), suggesting that whilst the mean difference is statistically significant, the variability between studies might not be solely due to the difference in implant length
 - ◆ Mandible: The benefit of short implants was even more pronounced with a WMD of -0.629 (CI: -0.780, -0.478), no heterogeneity (I²: 0.0%), and a highly significant interaction test (P = 0.000). The SMD also strongly favoured short implants (-1.362, CI: -1.740, -0.983) with minimal heterogeneity (I²: 3.3%)
- Augmented bone subgroup: Within the augmented bone subgroup (after five years of follow-up), the advantage of short implants was described with a WMD of -0.386 (CI: -0.579, -0.192) and a SMD of -0.703 (CI: -1.095, -0.311), indicating less MBL compared to standard implants. The heterogeneity was moderate to high (I² for WMD: 63.3%, I² for SMD: 67.9%), with

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significant interaction tests (P-value for WMD: 0.006 and SMD: 0.023)

- Implant failure and prosthesis failure: There were no significant differences in the risk of implant failure between the short and standard implant groups in both jaws
- Biological complications: Analysis from 23 studies indicated that standard implants in both jaws have a significantly higher rate of biological complications compared to short implants, with a Risk Difference (RD) of -0.071, suggesting fewer complications with short implants. The heterogeneity among studies was high (I²: 82.9%)
 - ◆ Augmented bone: Short implants (SH) showed significantly fewer biological complications than standard implants (ST), with an RD of -0.132. The heterogeneity was very high (I²: 86.3%), and the difference was statistically significant (P = 0.000)
 - ◆ Native bone: No significant difference in biological complications were found between short and standard implants, with an RD of 0.002 and no heterogeneity (I²: 0.0%)
- Prosthetic complications: The difference in prosthetic complications between short and standard implants were not statistically significant in both the augmented and native bone subgroups, with an RD of 0.00 and no heterogeneity (I²: 0.0%)
- Publication bias and sensitivity analysis: The funnel plot for the Weighted Mean Difference (WMD) of Marginal Bone Loss (MBL) showed a pattern of heterogeneous points, but the publication bias was considered

negligible based on Egger's test (Z: -1.49, P = 0.150).

Conclusions

The authors stated:

'...short and standard had comparable outcomes. However, short implants had less marginal bone loss and a lower risk of biological complications.'

Commentary

This is a well conducted systematic review and meta-analysis which showed that short implants, particularly in the mandible, exhibited significantly less marginal bone loss and a lower risk of biological complications, suggesting their viability as an option in certain clinical scenarios. However, there are limitations when interpreting these results. There are high levels of reported heterogeneity in some outcomes, alongside influences of confounding factors such as implant design, connection, type, occlusal loading etc. which will affect the generalisability of the findings.

References

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2. Annibaldi S, Cristalli M P, Dell'Aquila D, Bignozzi I, La Monaca G, Pilloni A. Short dental implants: a systematic review. *J Dent Res* 2012; **91**: 25–32.

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