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Correlation of Two Primary Implant Stability Assessment Techniques: a Meta-Analysis

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Objectives The conflicting evidence regarding the correlation between Maximum insertion torque (MIT) and implant stability quotient (ISQ) values of dental implant primary stability underscores the need for further assessment. This study aimed to evaluate the association between MIT and ISQ values at implant placement by synthesizing previous research findings.

Methods A bibliographical search was conducted on PubMed, Cochrane Library, Embase, and Scopus databases up to July 2023 without publication date restrictions. All clinical studies reporting the correlation coefficient (r) between ISQ and MIT values at the time of implant placement were included. Meta-analysis was carried out using the Fisher r-to-z transformed correlation coefficient as the outcome measure. A Random effect model was fitted to combine the r value between MIT and ISQ values. Statistical analyses were performed using Jamovi software (Version 2.3).

Results Initial searches yielded 2307 studies, of which 109 articles underwent full-text evaluation after title and abstract screening. Ultimately, 53 studies were included in the review and meta-analysis. Sample sizes were cluster-adjusted using the Cochrane method for clustering analyses. The overall estimated correlation coefficient between MIT and ISQ values was 0.56 (95% CI: 0.46 to 0.66, p value < .001), but with considerable heterogeneity (Tau² = 0.148, I² = 92.49%). Subgroup analyses were performed based on jaw type (maxilla/mandible), implant characteristics (design, diameter, and length), and bone density, with no important differences between subgroups.

Conclusions The meta-analysis indicated a significant moderate positive correlation between MIT and ISQ values at implant placement. Further research is warranted to explore additional factors influencing this correlation and to optimize its clinical application.