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Factors associated with loosening of implant abutment screws in implant supported prosthesis: a systematic review and meta-analysis

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ABSTRACT

Aim: To assess the effect of factors associated with loosening of implant abutment screws and the success rate of implants for implant supported prosthesis.

Settings and Design: Systematic Review and Meta-analysis.

Materials and Methods: An electronic search was conducted for articles in English, listed with PubMed, Medline, Embase, Cochrane from January 1997 to October 2019 assessing the abutment screw loosening episodes according to PRISMA Guidelines. The review evaluated twenty-one articles related to abutment screw loosening and the factors associated with the same. Factors taken into consideration were the type of implant abutment connections, type of screw materials, type of prosthesis and dental implants success rate.

Statistical Analysis Used: The results of all the three factors related to abutment screw loosening were having statistically significant heterogeneities i.e. Q = 78.8422, df = 20, and P < 0.0001 for Implant Abutment Connections, Q = 69.7472, df = 15, and P < 0.0001 for Screw Materials and Q = 67.3359, df = 16 and P < 0.0001 for the Type of Prosthesis. The statistics of fixed-effect model reported an MD of −0.0970(95% CI = −0.1391, −0.0549).

Result: The review evaluated the twenty-one articles that met with the inclusion and search criteria. The studies were the combination of all the factors like implant abutment connections, type of screw materials and the type of prosthesis and its co-relation with screw loosening episodes. The meta-analysis of combined twenty-one studies reported acceptable heterogeneity among twenty-one studies (I^2 = 96.45%) and reported to be statistically significant (P < 0.01).

Conclusion: The mean success rate of implants pertaining to all the factors were compared with respect to the episodes of abutment screw loosening The mean success rate of implants with internal connection (97%) is more when compared to the implants with external connection (91.89%). The mean success rate of titanium alloy screws is 95.36% which is more than the success rate of gold screw which is 93.00%. The mean success rate of implants with screw-retained prosthesis (96.13%) is more when compared to the implants with cement-retained prosthesis (94.5%). Thus the episodes of screw loosening were seen lesser with internal connection, titanium alloy screws and with screw retained prosthesis according to this systematic review.

Key-words: Abutment screw loosening, Dental implant complications, Dental implant geometry, Screw Materials, Technical implant complications, Dental implants success rate

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