

Survival and testing parameters of zirconia-based crowns under cyclic loading in an aqueous environment: A systematic review

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Abstract: Aim To study the hypothesis that in vitro fatigue testing variables in an aqueous environment affect the survival results of zirconia-based restorations, and evaluate the level of agreement between in vitro and previous in vivo data. Methods An electronic search of literature was conducted in PubMed and Scopus to identify in vitro studies testing zirconia-based crowns using cyclic loading in an aqueous environment. Only studies that complied with the inclusion criteria were included. Data extracted were used for survival analysis and assessment of in vitro parameters for fatigue testing of implant and tooth-supported crowns. Using ?Assessing the Methodological Quality of Systematic Reviews? (AMSTAR), recent in vivo systematic review studies were assessed prior to consideration for comparison with the current in vitro data. Results After applying the inclusion criteria only 25 articles were included. Five-year cumulative survival rate of zirconia-based implant-supported crowns was lower than tooth-supported crowns (84% and 88.8% respectively). Tooth-supported crowns subjected to wet fatigue showed a lower 5-year cumulative survival rate compared to thermocycling (62.8% and 92.6% respectively). Monolithic crowns showed higher fracture resistance compared to bi-layered structure (pressed or hand-layered). Only in vivo systematic reviews, which complied with AMSTAR assessment criteria, were used for comparison to the in vitro data. As for fatigue testing parameters, differences in the experimental setting were evident and affected the outcomes. Conclusion Crown survivals depend on type of support, type of fatigue test conducted, crown structure, and veneering method. In vitro fatigue testing protocols are highly variable, which introduces a need for international standardization to allow for more valid comparability of data.