ABSTRACT

Aim: The aim of this study was to find and critically analyze publications about orthodontic brackets based on zirconium dioxide (OBZ).

Materials and Methods: Literature searches were performed in the databases PubMed™, The Cochrane Library™ and ScienceDirect™ for relevant studies published before year 2013. Selection criteria were applied on various levels to found publications and selected reference lists. Studies which fulfilled the selection criteria were summarized and discussed.

Results: The literature searches identified 3,064 titles. Five in vitro studies were included. Tested brackets were based on (products in italic): zirconium dioxide (Toray, Harmony, Elipse and 3 unspecified), zirconium oxide (Torayceram Hi-Brace), alumina (Transcend, Transcend 2000, Intrigue, Allure and two unspecified) and metal (Solitaire and one unspecified). Bonded OBZ contributed to relatively high dislodging shearing forces, but relatively low tensile/peel bond strengths. No fractures of OBZ or enamel occurred during debonding. Less tooth movement was accomplished with OBZ in comparison to alumina and metal brackets. The OBZ-archwire couples demonstrated both lower and higher frictional forces and coefficients than those including alumina brackets, depending on archwire and bracket product.

Conclusion: According to the included in vitro studies, OBZ can demonstrate promising results in debonding and friction tests, depending on bracket product and the interfaces they interact with. Future studies could compare them with currently commercial brackets in the same niche, considering more in vivo variables including their aesthetic value. A detailed description of bracket products in original studies is essential for expansion of the field.

Key Words

Ceramics, Dental Debonding, Friction, Orthodontic Brackets, Tooth Movement, Zirconium