Abstract: To review the literature on high-performance polymeric (HPP) materials used as medical and oral implants and make comparisons with the commonly used titanium.

METHODS (MATERIAL AND METHODS): Original scientific articles published in English in MEDLINE (PubMed-NCBI) and Picarta literature databases between January 01, 1995 and June 01, 2013 were included in this review. Additional information was derived from scientific reports, medical and chemical textbooks, handbooks, product information, manufacturers’ instructions, and Internet web sites of the manufacturers.

RESULTS: Based on the 7 animal studies and 1 clinical study, HPP polyetheretherketone (PEEK) consisting of a single monomer and featuring a low Young modulus may be advantageous. PEEK seems to lead to less osteolyses and healing problems and no scattering in radiation was observed. Some animal studies showed direct contact between PEEK and the bone with high biocompatibility and no evidence for cytotoxicity, mutagenicity, carcinogenicity, and immunogenicity to the present day.

CONCLUSIONS: The HPPs (ie, PEEK) may carry some potential to be an alternative material for titanium as medical and dental implants. Yet, clinical and animal studies are limited in the field of implantology with such materials.