

## EDITORIAL

### **Is Polyether Ether Ketone (PEEK) the future material of choice in implant dentistry and prosthodontics.**

The goal for a successful Dental implant is to decrease the loss of marginal bone after functional loading. If you see at the material use in our day-to-day implant practise is mostly titanium and zirconium. But we all know That both these materials have a higher modulus of elasticity than our bone. Due to this difference a lot of stress is generated at the implant bone interface which leads to its failure in future. The existing materials have good properties but also have some short falls like attrition of the opposite natural teeth and discomfort due to bulk which leads to decrease in the retention of the prosthesis and a clinical failure. PEEK on the other hand claims to be a material to fix these problems.<sup>[1]</sup>

Due to its high-end mechanical properties, it has the potential to become a substitute for the existing metals like titanium and zirconium. It is rigid and radiolucent. Having a white colour makes it clinically acceptable. PEEK can withstand temperatures as high as 335.8°C. The thermal conductivity of PEEK is 0.29 W/mK. Adhesion of plaque is rarely seen. PEEK is non-allergic and biocompatible. It has a density of 1300 kg/m<sup>3</sup>. The mechanical properties are neither altered nor influenced by sterilization protocols like wet heat, gamma radiation and chemical methods like ethylene oxide. Young's modulus (3-4 GPa) and tensile properties (flexural modulus 140-170 MPa) are close to enamel, dentin and bone. In vitro research concluded that PEEK has the lower water absorption and solubility values compared to regularly used materials like poly methyl methacrylate (PMMA) and composite resin.<sup>[2]</sup>

PEEK material is modified by incorporating carbon fibre or glass. At times it is used with nanomaterials to increase the properties of PEEK. As an implant material the goal to achieve for PEEK is to increase its bioactivity without altering its mechanical properties. PEEK can also be used in digital dentistry as it supports CAD/CAM and fast prototyping. Carbon fibre reinforcement improves the mechanical properties of PEEK. Due these improved properties the applications of PEEK are not just limited to implant and abutment materials only but also in different other aspects of dental practice like orthodontics, fixed and removable prosthesis.<sup>[3]</sup>

PEEK has become a regular material in other fields like spine, orthopaedic and sports medicine. Its usage in dentistry is yet to gain popularity. This may be due to lack of evidence-based studies, researches and clinical trials in dental practice. Hence more research is needed on PEEK polymer as an alternative dental material to be used in daily clinical practice.

## References

1. Bathala L, Majeti V, Rachuri N, Singh N, Gedela S. The Role of Polyether Ether Ketone (Peek) in Dentistry - A Review. J Med Life. 2019 Jan-Mar;12(1):5-9.
2. Skirbutis G, Dzingutė A, Masiliūnaitė V, Šulcaitė G, Žilinskas J. A review of PEEK polymer's properties and its use in prosthodontics. Stomatologija. 2017;19(1):19-23.
3. Parate KP, Naranje N, Vishnani R, Paul P. Polyetheretherketone Material in Dentistry. Cureus. 2023 Oct 4;15(10):e46485.



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