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LETTER TO THE EDITOR

PEKK: A New Chapter in Dentistry

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Materials used in dentistry are generally categorized into 3 major groups namely metals, ceramics and polymers. Out of these, Polymers play a paramount role in dentistry particularly the restorative dentistry. Polymers are quite commonly known to exhibit superior physical, mechanical and biological properties. Due to these properties, they are generally used in impression materials (as elastomeric impression materials), restorations (composites), cements, pit and fissure sealants, soft liners and even for the prosthetic rehabilitation using removable partial or complete dentures involving acrylic resin/other polymers as the major component [1].

A major group of the polymers belong to the family of PAEK (Polyaryletherketone). Polyaryletherketone are thermoplastic polymers semi-crystalline in nature with high-temperature stability and mechanical strength as their superior property. The molecular backbone contains alternately ketone (R-CO-R) and ether groups (R-O-R). The PAEK family, due to their superior mechanical and chemical properties i.e. ultra-high performance (a combination of superior mechanical + chemical properties) have been in the engineering field since the 1980s. PAEK family has been a benchmark for the other polymer family groups [2].

The two most renowned sub groups of the polyaryletherketone (PAEK) family include: polyetherketoneketone (PEKK) and polyetheretherketone (PEEK).

Polyetherketoneketone (PEKK) is an innovative novel polymer subgroup of the PAEK family which has gained a lot of attention amongst the researchers because of its superior properties and furthermore it's applications in various fields of dentistry. The PEKK is free of methacrylate group thereby improving its biocompatibility and solving answers to the queries related to the monomer (methyl methacrylate) issues. PEKK, being a sub group of PAEK family is known for its superior mechanical properties [3].

Bonner in 1962 introduced the PEKK and with its inception, it had been and still being for various industrial and military purposes. However, its use keeping in view its superior properties is not only limited to the field of engineering, but also in the field of medicine and dental sciences. PEKK has been a wonder material in both the medical as well as the dental sectors. A plethora of applications pertaining to this wonder material has led to significant contribution in the field of dentistry. The PEKK can be used majorly as a restorative, prosthetic, and dental implant biomaterial. Furthermore, the use of PEKK in the field of implantology is not limited. It can be used as

orthopaedic and cranial implant. This is only possible because of the 2nd ketone group in the chemical structure of PEKK which allows it for further improving the already excellent mechanical strength and other associated properties.

In the late 1990s, PEEK (Polyetheretherketone) emerged as a 2nd member of the PAEK family after the wonder material PEKK. It is also a thermoplastic polymer with semi-crystalline nature and is known to exhibit superior physical, mechanical and biological properties. The various applications of PEEK biomaterial again similar to that of the PEKK group. After significant contribution of both the PEEK & PEKK sub groups in the emerging disciplines in dentistry, various researchers have plunged into the field of polymer sciences to study the other subgroups of PAEK family [4].

The PEKK materials with the superior physical, chemical, mechanical and biological properties a have gained a lot of respect in the field of dentistry. The clinical applications generally involve the use of PEKK as prosthetic material for restorative purposes, prosthetic crowns and bridges fabricated through CAD CAM approach in fixed prosthodontics, endodontic post cores & crowns, fabrication of removable partial & complete dentures, removable partial frameworks and attachments, dental implant biomaterial, dental implant abutment, implant framework material for implant fixed dental prosthesis, as cranial, spinal & orthopaedic implant. However, further studies and evaluations are needed to prove the long term use of PEKK in the field of dental sciences. To conclude, it is wise to say that "The PEKK is a new chapter in dentistry" [5].

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