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E – Glass Fibre: The Ferrari of Dentistry

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COLUMN ARTICLE

Fibre reinforced composites (FRC) are more widely accepted in dentistry to substitute metallic restoration, periodontal splints, fixed partial dentures, endodontic post, orthodontic retainers and some other indirect restorations. Fibre reinforced composite structure comprises of a binder phase and a fibre reinforcing phase which have been employed in various engineering applications like body material of Ferrari and aeroplanes because of their very high strength-to-weight ratio i.e. they are light weighted. Typical fibre reinforcement can include carbon fibres, boron fibre, aromatic amide fibres, asbestos fibres, glass fibres and fibres of silica, silica alumina, potassium nitrate, silicon carbide, boron nitride and boron. However carbon and glass fibres being the most preferred. Latest E-Glass fibre has comparable mechanical properties to other fibres such as polymers and carbon fibre. Although not as strong or as rigid as carbon fibre, but they are much cheaper and significantly less brittle when used with composites. Glass fibres are therefore used as a reinforcing agent for many polymer products to form a very strong and relatively light weight fiber -reinforced polymer (FRP) composite material called glass-reinforced plastic (GRP), also popularly known as "fiber glass". This material has excellent fatigue life, good hydrolytic resistance property, excessive chemical abrasion resistance and retention of properties over a broad temperature range, e.g., -40°C to 100°C. These biomechanical properties of E- Glass fibre are of high importance in dentistry and there is an increased scientific interest to develop E-glass fibre reinforced composite systems. These materials are also very useful in repair of veneers. Fibres are light weight but have a very high loading capacity. A single fibre of glass is flexible and soft, but when they are a bunch of fibres or a matt embedded in a synthetic resin matrix, they become extremely resilient and weigh almost nothing. Moreover, glass fibres are transparent therefore well suited for aesthetic dentistry. Fibres are silanized as well as bonded and embedded into composite material and after light curing they form a solid laminate without a separate layer. This guarantees the best physical properties under exposure and good resistance in the oral micro flora because of their excellent adaptation and super fine polish. Glass fibres are used in modern aesthetic dentistry for both direct and indirect applications. Fibre reinforced composites are generally biocompatible and non toxic which makes their use in feasible in all specialities of dentistry.

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