If the adhesion strength and quality is unsatisfactory, it may debilitate the composite restoration and decrease the mechanical and physical properties (Ruyter, 1981; Lastumäki et al., 2002).

Glass fibers can be evenly distributed throughout the matrix or can be located at one place. Both types of distribution have different properties. The former type increases the fatigue resistance while the later type enhances strength of GFRC (Khan et al., 2015). Moreover, the length of glass fibers also plays an important role in enhancing the properties. It is reported that short fibers increases flexural strength and compressive strength of GFRC (Fonseca et al., 2014).

When implanted in vivo, GFRC restorations absorb water from the surrounding media through resin matrix, which can leach out ions from the surface of glass fibers and causes corrosion (Ehrenstein et al., 1990). It is also reported that water sorption decreases the mechanical properties remarkably. To decrease water sorption by GFRC restorations, silanization of the fibers is important, which increases the bond between fiber and resin matrix and increases hydrolytic stability of GFRC (Khan et al., 2015; Pantano et al., 1992).

## 17.1.6 Properties of Glass Fibers

### *17.1.6.1 Mechanical Properties*

Mechanical properties of glass fibers behave differently at the macroscopic level and at the molecular composition level. The mechanical properties most commonly studied are compressive strength, flexural strength, fatigue resistance, and elastic modulus, which, however did not result in favor of glass fiber reinforced materials (Dutt et al., 1991). If the fiber-resin matrix interface is strong, it will enhance the static, impact, and fatigue strengths (Debnath et al., 2004). Different fiber orientations affect the efficiency of fiber reinforcement. The haphazard arrangement of short glass fibers gives poor results as compared to continuous unidirectional glass fiber arrangement (Tuusa et al., 2008). It was suggested that Krenchel's factor (value 0–1) decides the strength of FRCs. The reinforcing efficiency is 1 of unidirectional glass fibers, which indicates that the maximum reinforcement is obtained by unidirectional arrangement (Murphy, 1998). It is reported that the flexural strength of GFRC endo posts is greater than metal posts (Chieruzzi et al., 2012).

Continuous woven fibers that are bidirectional, increase toughness of polymer, stop crack propagation and are effectively used in places where unidirectional fibers find no space. Isotropic materials have glass fibers arranged in three dimensions and mechanical properties are same in each direction (Foo et al., 2001; Chong and Chai, 2003). In a study, the static and dynamic fracture loads of GFRC retained in tooth structure were evaluated and results were 195.80 and 190.57 N, respectively. Various studies have investigated the average forces during mastication, which is 14 N (Outhwaite et al., 1982), 45 N (Mizrahi and Smith, 1971), and 120 N (Nemman, 1965). The GFRC works sufficiently under normal masticatory load (Heravi et al., 2007).