This article presents fracture mechanics approach in interfacial failure study of dental materials. Using basic modes of linear elastic fracture mechanics (LEFM), researchers manage to investigate mechanical properties of dental implants, adhesion or fracture resistance between bi-material interfaces of different elastic properties. Crack initiation and growth analysis can be conducted using either energy analysis or stress analysis. In order to demonstrate fracture toughness experimentally, several ASTM standards were introduced using various specimens of three-point bend, compact tension, arc-shaped, disk-shaped compact, chevron notched short rod (CNSR) or bar (CNSB) and notchless triangular prism. To date, fracture mechanics have been important to study fracture resistance of tooth composite interfaces, composite dental restorations and to determine critical stress intensity of various dental materials.