

# DENTAL STRESS, MECHANICAL NOT PSYCHOLOGICAL, EVEN SOME RESIDUAL STRESS

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Stresses abound in the dental office. Most first think of the psychological stress brought on by the fear of “a shot” or “the drill.” Of greater interest to the materials scientist are the significant mechanical stresses our teeth and fillings must endure when we eat or grind our teeth. This paper will discuss the various sources of mechanical stress that occur in the oral cavity.

Mechanical stress results from the function of teeth (biting and grinding), polymerization shrinkage of resins and the mismatch of elastic modulus or coefficient of thermal expansion of layered materials. Residual stresses in dental materials have been studied with x-ray diffraction, relaxation and computational modeling techniques.

Several very interesting dental materials exhibit stress induced phase transformations. Yttrium stabilized zirconium oxide also called “ceramic steel” is used to produce high strength ceramic crowns. Nickel-titanium wires are commonly used in orthodontics to straightened teeth.

In addition, a theory of stress corrosion of teeth will also be presented.