Multi-layered materials in Dentistry: current state

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Abstract

Hard and soft tissues in the human body are composed of natural graded composite or polymeric materials. In dentistry, synthetic materials have been developed to replace layered dental tissues or to repair maxillary bone and soft tissues. The purpose of this study was to report the current state of functionally graded materials (FGM) to replace dental tissues. An electronic Medline search was carried out to obtain the most relevant aspects of multi-layered dental materials in dentistry. The search items included layered materials based on metal-ceramic, all-ceramic and composite dental materials. A significant variety of commercial layered dental materials are used in dentistry. However, the chemical composition and properties of synthetic materials are quite different from those of natural dental tissues. Also, some factors have been related to failures in the oral cavity such as: porosity; shrinkage; poor mechanical properties; low bond strength to tooth tissues; and fracture at interfaces.

Keywords: multi-layered material; dental materials; dental restorations; prostheses; dental implants