

## The current status of laser applications in dentistry

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### Abstract

A range of lasers is now available for use in dentistry. This paper summarizes key current and emerging applications for lasers in clinical practice. A major diagnostic application of low power lasers is the detection of caries, using fluorescence elicited from hydroxyapatite or from bacterial by-products. Laser fluorescence is an effective method for detecting and quantifying incipient occlusal and cervical carious lesions, and with further refinement could be used in the same manner for proximal lesions. Photoactivated dye techniques have been developed which use low power lasers to elicit a photochemical reaction. Photoactivated dye techniques can be used to disinfect root canals, periodontal pockets, cavity preparations and sites of peri-implantitis. Using similar principles, more powerful lasers can be used for photodynamic therapy in the treatment of malignancies of the oral mucosa. Laser-driven photochemical reactions can also be used for tooth whitening. In combination with fluoride, laser irradiation can improve the resistance of tooth structure to demineralization, and this application is of particular benefit for susceptible sites in high caries risk patients. Laser technology for caries removal, cavity preparation and soft tissue surgery is at a high state of refinement, having had several decades of development up to the present time. Used in conjunction with or as a replacement for traditional methods, it is expected that specific laser technologies will become an essential component of contemporary dental practice over the next decade.

**Key words:** Lasers, dental applications, débridement, photosensitization, resin curing.

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