

# Femtosecond laser dentistry

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### Background

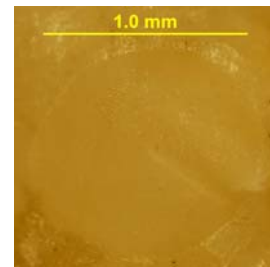
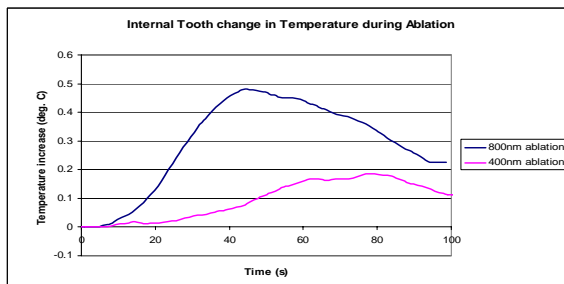
We are investigating the use of femtosecond-pulsed lasers in the near IR and blue for ablation of hard dental tissue, eg for caries removal or for preparation for crown or similar treatment. This is a desirable treatment for patients, as it offers the prospect of efficient, pain-free dental treatment, while also offering dentists the advantages of highly selective and precise laser ablation treatments for teeth.

### Outcomes

- Optimised laser parameters and delivery system for selective and precise tooth preparation for caries or laser ablation
- Laser treatment efficiency comparable with that of dental drill, but with better patient acceptance
- Clinical trials of the laser and fibre delivery system in human patients

### Progress to date

- Parametric study of tooth ablation and pulp temperature for a range of fs laser parameters including average power, spotsize, wavelength, number of pulses, leading to identification of optimal parameters for treatment
- Initial characterisation of specialist optical fibre for light delivery



a) Tooth pulp temperature measured during irradiation by 800 nm and 400 nm light. b) Laser-ablated surface on tooth, showing precision achievable

### Funding and collaboration is sought to

- develop high-repetition-rate pulsed fs lasers to improve efficiency
- optimise laser power delivery using specialist optical fibre, with handpiece
- conduct clinical trials of the optimised treatment regimes

### Contact

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