

# HKU Faculty of Dentistry reports benefits of adding two laser therapies to deep-cleaning for advanced gum disease

Giving two types of laser therapy after professional teeth-cleaning has short-term benefits in the treatment of chronic periodontitis (a form of advanced gum disease), three researchers at the HKU Faculty of Dentistry have found.

Compared with patients who received teeth-cleaning alone, patients who also received treatment using low-energy laser and a laser-activated disinfectant had healthier gums after 1 month. However, the advantage disappeared at 3 months after treatment, when gum health was similar for both patient groups.

Dr Jonathan WH Lui, [Professor Esmonde Corbet](#), and [Professor Li-jian Jin](#) assessed the effectiveness of laser therapy as part of treatment for gum disease, as a possible solution to the growing problem of bacterial resistance to antimicrobial drugs. They studied 24 non-smoking adults (10 men and 14 women) who had chronic periodontitis – a long-term condition in which bacteria on teeth cause gum inflammation and bleeding, as well as a gradual loss of gum tissue and supporting bone. None of the patients had received any gum treatment in the previous 6 months, and all were otherwise healthy.

For each patient, the researchers looked at two single-rooted teeth that were diseased – one on the left side of the mouth and one on the right side. One of the two teeth was randomly chosen as the “test” tooth and the other was the comparison (“control”) tooth. When the surrounding gum was tested with a gum-probing instrument, at least one place around each tooth showed a gap between the gum and tooth that had a probing depth of 5 mm or more.

All patients underwent thorough dental cleaning (scaling and root debridement) but did not receive any surgery. The assigned test tooth in each patient underwent the following additional laser treatment: first, a low-level diode laser of 940-nm wavelength was shone to promote gum healing; then, 1 day later, a disinfectant (1% methylene blue solution) was applied and activated by laser – a procedure known as “photodynamic therapy”; finally, 3 days later, the first laser step was repeated. All patients were given advice on maintaining oral hygiene at home, and they were instructed to return to the clinic after 1 week, 1 month, and 3 months.

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A total of 96 teeth and 576 gum sites were assessed for gum health before and after treatment. No cases of pain, discomfort, or complications were reported throughout the study. Statistical analyses that compared the test teeth (those that had been cleaned and laser-treated) with the control teeth (those that had been cleaned only) revealed no differences in gum health at the start of the study.

After 1 month, the gums of the test teeth were healthier than those of the control teeth. The test teeth showed a 1.4-mm reduction in the average depth of the gap between the gum and tooth (decreasing from a probing depth of 4.7 to 3.3 mm). The reduction in probing depth was significantly less for the control teeth, at 1.1 mm (decreasing from 4.5 to 3.4 mm). Furthermore, at 1 month, the proportion of gum sites that bled during probing fell significantly more for the test teeth (decreasing from 94% to 40%; a difference of 54% points) than for the control teeth (decreasing from 92% to 49%; a difference of 43% points).

Although the probing depth and the proportion of gum sites that bled during probing again fell significantly from 1 month to 3 months, the reductions were similar for both test and control teeth. The final probing depth was 3.1 mm for the test teeth and 3.2 mm for the control teeth; the final proportion of sites that bled during probing was 39% and 43%, respectively.

The researchers also measured the concentration of an inflammation marker (interleukin-1-beta) in the fluid from the gap between the tooth and gum. They found that the concentration of this protein dropped more for the test teeth than for the control teeth at 1 week after treatment. At 1 month, however, the concentration fell significantly for the control teeth but not for the test teeth. From these findings, the researchers suggest that an early effect of the dual laser therapy is to reduce gum inflammation and promote gum healing.

The researchers conclude that one treatment session of professional teeth-cleaning followed by dual laser therapy has benefits for advanced gum disease “on a short-term basis”, but comment that “further studies are required to assess the long-term effectiveness of the combination of photodynamic therapy with low-level laser therapy as an adjunct in nonsurgical treatment of periodontitis”.

The study was recently published in the *Journal of Periodontal Research*.

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**Media contact:**

Prof Li-jian Jin, Professor in Periodontology, HKU Faculty of Dentistry; E-mail: [ljjin@hkucc.hku.hk](mailto:ljjin@hkucc.hku.hk)

Ms Melody Tang, Communications and Development Officer, HKU Faculty of Dentistry; Tel: 2859 0210; E-mail: [meltang@hkucc.hku.hk](mailto:meltang@hkucc.hku.hk)

Prepared by Dr Trevor Lane, Knowledge Transfer Unit, HKU Faculty of Dentistry. Although every care has been taken to ensure the accuracy of the contents of this news release, they do not necessarily reflect the official policies of the Faculty or University and are intended for informational or educational use only; the copyright owner accepts no responsibility for errors or omissions.



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