

Publication

Combined Nd:YAG and Er:YAG lasers for real-time closed-loop tissue-specific laser osteotomy

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A novel real-time and non-destructive method for differentiating soft from hard tissue in laser osteotomy has been introduced and tested in a closed-loop fashion. Two laser beams were combined: a low energy frequency-doubled nanosecond Nd:YAG for detecting the type of tissue, and a high energy microsecond Er:YAG for ablating bone. The working principle is based on adjusting the energy of the Nd:YAG laser until it is low enough to create a microplasma in the hard tissue only (different energies are required to create plasma in different tissue types). Analyzing the light emitted from the generated microplasma enables real-time feedback to a shutter that prevents the Er:YAG laser from ablating the soft tissue.

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