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28 July (Day 1) Hall A 15:30 - 15:45

Ablation threshold for composite resins and amalgam irradiated with femtosecond laser pulses

Laser for caries removal and cavity preparation is already a reality in the dental clinic. The objective of the present study was to verify the efficacy of femtosecond laser (Ti:Sapphire) for dental restorative material removal. The laser pulses was centered at 830nm, with 50fs of pulse duration and 10KHz of repetition rate. The energy pulses in the samples ranged from 300 up to 770 micro Joules. The samples were prepared with three different restoring materials, resin Z-100 (3MUSA), resin Z-350 (3MUSA) and amalgam in capsules (OS-80, 80M Australia). The samples were irradiated using two different geometrical methods, a longitudinal scan and a diagonal scan, in these methods the fluency varies continually between two values, one below the threshold and another above the threshold ablation. The exact value of the fluency during the process is not important, what turns that methodology easy of being implemented. The shapes of the ablated surfaces were analyzed by optical coherence tomography, optical microscopy and scanning electron microscopy. The ablated volume was also determined with this method. The determined ablation threshold fluency was 0.35J/cm² for the composite resin Z-100 and Z-350, and 0.25J/cm² for the amalgam. Thermal damages were not observed in the image of all the samples. The ablation thresholds differences for different materials and tissues found in the buccal cavity, indicate

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