

Dr. Kallis has been practicing dentistry for over 25 years and has had an avid interest in laser dentistry for almost a decade. In 2006 he gained his MSc. Degree in Laser Dentistry from the AALZ Institute at the University of Aachen. Dr. Kallis is one of the pioneers of laser dentistry in Greece and is co-founder and Vice President of HELSOLA. He is also co-founder of the GSLD, a European division member of the WFLD.



Class I Cavity Preparation with the Er:YAG Laser

A 28-year old, young lady presented with a little pain sensation after eating sweets or chocolates; she did not have any further problems in her medical anamnesis. She had heard from other patients that our office uses a laser for treatments; without drills or needles for anesthesia. Although she was simply curious about the laser treatment, nevertheless still rather anxious about dental treatments. We started with the cavity class I on the 16 molar using less power than the preset parameters in the system in order absolutely avoid any pain sensation and gain the patient's confidence. This is usually quite possible in younger adults and children because the water content in the enamel is higher.

In our practice we have been using the Fotona Er:YAG laser since 2000. It has completely replaced the burr in cavity preparation and tooth restoration work. The introduction of the laser into our practice has benefited us in terms of needing anesthesia in fewer cases to perform treatments, which in turn has freed up more chair time and has increased our patient turn-over. We've also found being able to work more selectively and fine-tune the laser to the exact requirements of the tissue you are working in, that the quality of our work has improved in terms of being more conservative. This has reverberated throughout the patient community and brought in more patients through word-of-mouth.

The water content in enamel is lower than in dentin, which is why we use higher energy and frequency settings to remove carious enamel. It is easier to work conservatively with the laser than with the conventional burr. The water content in carious tissue is higher than healthy tissue, which means that for the same settings the laser ablation rate will be higher in carious tissue than healthy tissue. This is also clearly audible during laser ablation, the individual laser pulses in carious tissue are more muted and as you pass over healthy tissue the pulses make a sharper, more crisp or high pitched sound. As we move into the dentin we lower our energy and frequency settings since ablation is faster in dentin because of its higher water content. We use even lower energy and frequency parameters for the final modification to create a retentive surface for the filling material. The surface should be exposed to a few shots while the laser beam is continuously moved across the treatment area. Laser surface modification results in good adhesion of the filling material, eliminating the need for acid etching. After the modification, dry the surface with air and then apply the adhesive and composite material.

During all phases of the preparation we use water and air spray to avoid desiccation of the tissue and maintain ablation efficiency.

	Step 1: In enamel	Step 2: In dentin	Step 3: Final modification
Laser source:	Er:YAG		
VSP Mode:	MSP		
Energy:	300 mJ	200 mJ	120 mJ
Frequency:	20 Hz	15 Hz	10 Hz
Handpiece:	R02		
Water/Air Spray Setting:	Water 8 – Air 5		

The patient was surprised by the comfort and speed of the treatment. It took us approximately 4-5 minutes to prepare the cavity. If conventional means would have been used, we would have taken much longer in addition to having needed to anesthetize with an injection.



Before



Carious tissue removed and surface prepared for filling material



After treatment

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