



Vitality Preservation in Teeth with Extensive Carious Lesions

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Introduction:

One of challenges that we still have today in dentistry is to accurately evaluate if the pulp is irreversibly inflamed or not. Performing an endodontic treatment is not desirable unless there is no hope for pulpal vitality preservation. At a certain point the use of the term “irreversible“ has been questioned because it seems there is evidence that in teeth with symptoms of irreversible pulpitis, preserving the pulp was indeed possible after treatment. It is important to remember that most of the time with extremely deep cavities, a stepwise carious lesion removal is more successful than if we remove it all at once and open the pulpal chamber. Another aspect is that visually we cannot distinguish between the contaminated, irreversibly damaged layer of dentin and the layer underneath that is not contaminated and is able to remineralize. We don't want to eliminate that remineralizable underlying layer of dentin. This is where using the Er:YAG laser offers a huge advantage.

Laser	Fotona EBD			
	Ablation	Decontamination	Coagulation of pulp	Superficial melting of dentine
Wavelength	Er:YAG 2940 nm	Er:YAG 2940 nm	Er:YAG 2940 nm	Er:YAG 2940 nm
Handpiece	H14	H14	H14	H02
Fiber tip	Cylindrical	Cylindrical	Cylindrical	N/A
Energy	160 mJ > 75 mJ	75 mJ	10 mJ	25 mJ
Mode	SSP	SSP	SP	SSP
Frequency	10 Hz	15 Hz	15 Hz	10 Hz
Water / Air	6 / 4 + air syringe	6 / 5	0 / 5	0 / 2 + air syringe



Dr. Cristian Parascan earned his first DMD in Europe from the University of Medicine and Pharmacy Carol Davila, Bucharest, in 1998. After relocating to Canada, he obtained another DMD Diploma in 2010 after graduating from the Faculty of Dentistry at the University of Laval, Québec.

Dr. Parascan started his career as a dental technician. He became a Master Dental Technician and continued to successfully fulfill both functions, focused on high-aesthetic restorative dentistry. He later established a successful dental clinic in New Brunswick, Canada, with a focus on restorative dentistry, endodontic and prosthodontic treatments. He was the first dentist to introduce the Fotona LightWalker AT S laser in the province of N.B. in 2018.

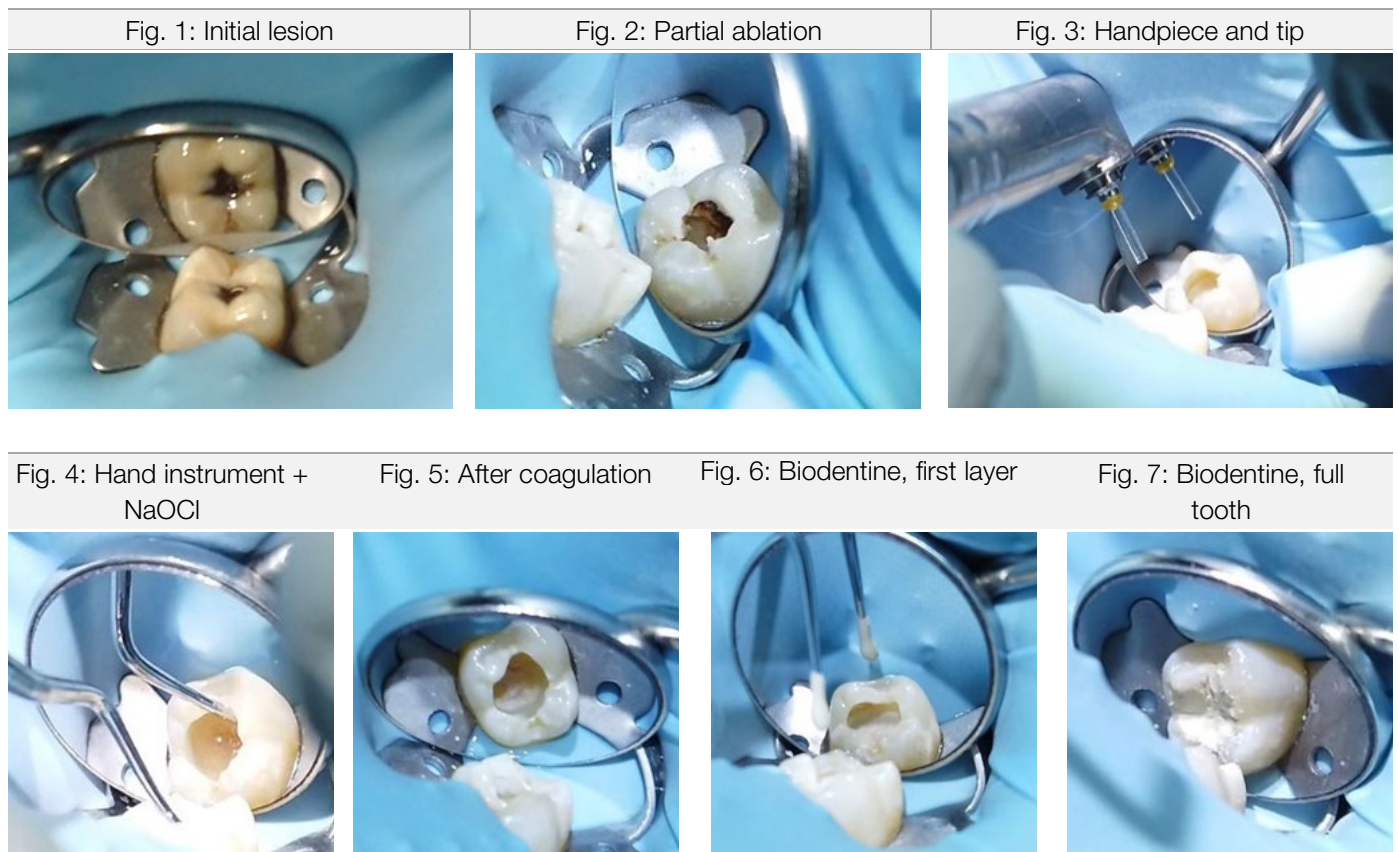
Dr. Parascan is an active member of the Academy of Laser Dentistry and the American Academy of Cosmetic Dentistry, and is also serving in the Public Education Committee of the NB Dental Society.

CLINICAL CASE:

A young patient came to our clinic for a second opinion because she was referred by another dentist to have a root canal treatment on tooth 3.7. The patient wanted to save the tooth vitality. The 16-year-old patient reported pain to cold and hot, but also sometimes spontaneous pain.

Vitality tests were performed: the cold test revealed a violent response with moderate lingering; the test to hot was positive. The electric vitality test showed a faster response compared to the homologous tooth. The percussion test was negative. The tooth seemed to be still in a chronical pulpitis stage (reversible pulpitis) but was showing signs of shifting towards irreversible pulpitis. The X-ray confirmed an extensive carious lesion with possible carious pulp exposure. After inferior alveolar nerve block with Lidocaine 2% 1:100.000, 1.6 cc, a rubber dam was placed. The carious lesion was removed until the proximity of the pulpal chamber. An H-14 handpiece with cylindrical 0.8 mm fiber tip was used. Irrigation with NaOCl approx. 4% and hand instrument (excavator) was used to remove dentinal flakes and denatured layers of dentinal tissue. As anticipated, at a certain area, removing the carious lesion would open the pulpal chamber. Decontamination was performed carefully, using a brushing movement, controlling the tip away from the target (approx. 6 mm). The exposed pulp horn was ablated by firing the laser at a sharp angle compared to the pulp chamber roof. Next, we performed a coagulation procedure, in a defocused way, far from the target to a distance where minimal blanching was visible. After obtaining a stabile coagulation, the peripheral dentinal tubuli, away from the pulp chamber roof, were sealed (dental surface melting) using an H02 handpiece. Laser settings were changed for each procedure.

Biodentine was placed over the lesion in 2 steps. The first layer, of lesser consistency, was placed without pressure, under mild vibration, above the exposed pulp only. The second layer, more consistent, was added to fill the rest of the tooth while avoiding pressure on the pulp chamber roof. At the 48-hour follow-up, the patient reported no more pain to cold or hot stimuli. An electric vitality test was performed after 6 and 12 weeks, indicating pulpal stability. A layer of Biodentine was removed from the occlusal surface and a composite restoration was placed.



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