



## Apicoectomy – Chronic apical periodontitis treatment

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Introduction:

A 46-year old female patient was referred to our clinic for the treatment of chronic apical periodontitis on tooth 15. The tooth had been endodontically treated approximately 5-6 years ago and was not vital. The tooth was tender to percussion as well as to palpation adjacent to the apex of the tooth. The mobility of the tooth was not increased. The gingiva was healthy in color and the probing depth was not larger than 3 mm. An X-ray showed an occlusal filling reaching all the way to the pulp chamber. One root could be observed, which was apically slightly curved distally. The root filling deviated from the canal trajectory and a root perforation could be seen in the apical part. The periodontal ligament was normal in width. The periapical bone showed a small circular resorption indicating chronic apical periodontitis.

Laser	LightWalker		
	Osteotomy	Root resection	Granulation tissue removal
Wavelength	Er:YAG (2940 nm)	Er:YAG (2940 nm)	Er:YAG (2940 nm)
Handpiece	HC14-N	HC14-N	HC14-N
Fibertip	cylindrical	cylindrical	Flat SWEEPS 400/9
Energy	300 mJ	400 mJ	20 mJ
Power	6 W	8 W	0.3 W
Mode	MSP	MSP/SP	AutoSWEEPS
Frequency	20 Hz	20 Hz	15 Hz
Water	6	6	0
Air	2	2	0

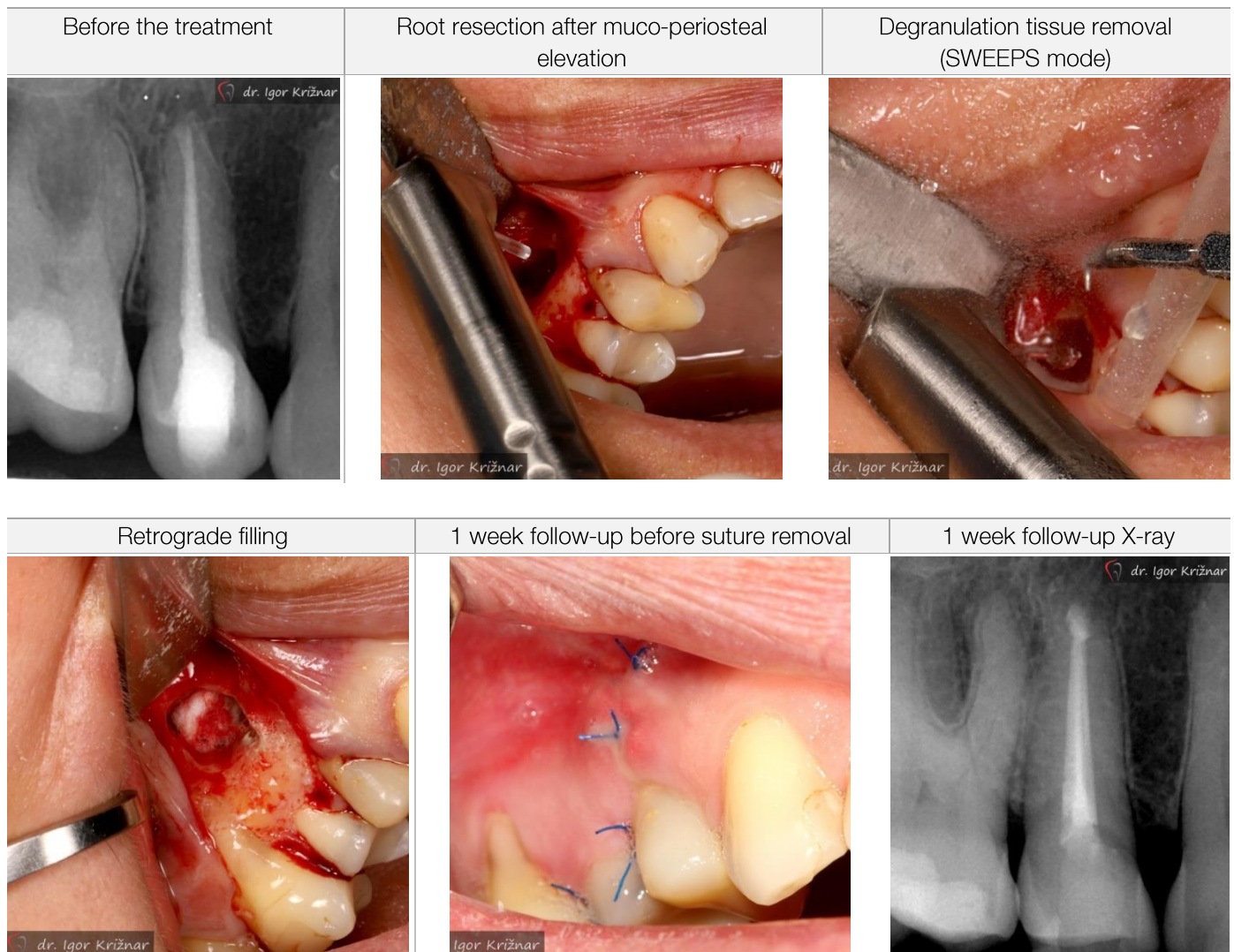


*Dr. Igor Križnar graduated in 2006 from the Faculty of Medicine in Ljubljana, Slovenia and began working as an Assistant at the Faculty of Medicine, Department of Endodontics and Operative Dentistry. He acquired the professional title of Dental Specialist in Endodontics in 2014. Until the end of 2015 he worked as an Assistant at the Faculty of Medicine with students of dentistry in clinical and pre-clinical practice. At the same time he worked as a Dental Specialist at the University Medical Center in Ljubljana. He was also engaged in research work and earned his PhD in Endodontics from the Faculty of Medicine in Ljubljana in 2016. In December 2015 he entered into full-time private clinical practice focusing mainly on endodontics. In 2019 he completed the LA&HA Master in Laser Dentistry. Dr. Križnar has published numerous scientific papers in various journals and has actively participated in many international and local conferences and symposia.*

## CLINICAL CASE:

Apicoectomy was performed, with the purpose of eliminating the bacterial infection in the root canal system as well as removing the inflammation tissue and excess root filling material from the periapical tissues, thus promoting healing. After infiltration of anesthetic, a marginal incision was performed along tooth 15 and a vertical incision at tooth 14. A muco-periosteal flap was elevated to reveal the apical region of tooth 15.

The osteotomy was performed using the Er:YAG laser wavelength with a cylindrical tip. When the osteotomy window was large enough, the granulation tissue was removed using an excavator. For the root resection a cylindrical tip was used and the energy was raised to 400 mJ. The surface of the resected root was inspected under an operative microscope and a retrograde preparation was made. For complete removal of the granulation tissue as well as excess root filling material from the bone lacunae, the SWEEPS irrigation protocol using saline can be adopted from endodontics, with the purpose to promote faster healing. For this reason, after the retrograde preparation, the AutoSWEEPS mode was used, performing two 30-sec cycles of irrigation with saline solution in the bone lacunae. After local hemostasis the retrograde preparation was filled and tightly condensed using MTA cement and the wound was sutured. Curasept rinsing solution (0.05% chlorhexidine) was prescribed for one week. On the follow-up appointment after 1 week, the patient had minimal pain. The healing of the wound was satisfactory; slight swelling persisted for only 2 days after surgery. On the X-ray a resected root and a tight retrograde filling could be seen. The sutures were removed and the patient was scheduled for a follow-up appointment after 1-year. Our clinical case shows that Er:YAG laser light can also be used in endodontic microsurgery cases, the main benefits being less vibration, trauma and anxiety for the patient, increased decontamination of the apical part of the root, as well as quicker healing and fewer postoperative complications compared to the conventional therapy. All steps of apicoectomy can be performed using Er:YAG laser light, including incision and granulation tissue removal. The latest protocols involve also the use of biomodulation (LLLT) with Nd:YAG laser to stimulate the healing process.



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