

Apical Irrigant Extrusion during Laser-Activated Irrigation Compared to Conventional Endodontic Irrigation Regimens - Preliminary Study Results

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SUMMARY

Background: Endo-irrigation is essential to mechanical shaping during root canal therapy. The complexity of the endodontic system, as well as the limited efficiency of endo-files, led to demand for more efficient and secure means of chemical processing. The application of Er:YAG laser and its cavitation phenomena during Laser-Activated Irrigation (LAI) became a new standard in endodontics, but there is lack of studies regarding possible apical irrigant extrusion.

Methods: Human upper incisor root canals (N=20) were instrumented to ISO 40, taper 0.06. Four different endodontic irrigation needles, two notched open-end and two side-vented (each type at 27G and 30G diameter) were put 2 mm short of the working length (WL), and constant NaOCl 3% flow rates (FR) of 0.05 and 0.1 ml/s were supplied by precision syringe pump. A special setup was used to provide a fixed position of the irrigation system elements. Three different fiber tips (PIPS, Xpulse and Preciso) were also used, with the Er:YAG laser set at 10 mJ/15 Hz for LAI with 0.1 ml/s of irrigant supplied at the level of the pulp chamber. Each irrigation regimen was performed (N=10) for 60 s and the weight of apically extruded irrigant was measured.

Results: The notched open-end 27G needle at FR 0.1 ml/s showed the highest mass of extruded irrigant (MV 2.18 g) while LAI with PIPS showed the lowest (MV 0.16 g). All LAI regimens showed lower apical extrusion compared to conventional irrigation methods.

Conclusion: The low apical extrusion of LAI, measured in this pilot study, provides evidence which strongly supports the application of Er:YAG laser in endo-irrigation.

PIPS: a Breakthrough in Endodontics

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SUMMARY

Endodontics is one of the main topics in dentistry as well as a high specialized branch.

Over the past years, revolutionary technologies have changed root canal therapy: the introduction of the dental operating microscope in the 1980s has enabled dentists to closely view the endodontium; the development of NiTi shaping files has reduced the time for root canal shaping; the advent of CBCT has led to improved diagnostics in difficult-to-reach areas, promoting the maximum preservation of tooth structure.

The successful “triad” in endodontics today is represented by minimally invasive catheterization of the root canals, hermetic 3D root canal sealing, after an advanced method for 3D cleaning and disinfecting of the root canal system. PIPS is ready today for all general practitioners and endo-specialists who would like to use the most cutting edge technology and technique for root canal therapy. An update of the latest international research as well as a discussion of different LAI protocols will be discussed.

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