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SCIENTIFIC OVERVIEW

12/2019

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MECHANICAL PROPERTIES	DEBRIS/SMEAR LAYER REMOVAL	CLINICAL TRIAL/CASE	BACTERIA REMOVAL	RETREATMENT	APICAL DEBRIS EXTRUSION	TESTED AT BODY TEMPERATURE	
							2019
			●			✓	(1) **Teves A, et al. JCED. 2019** **Compared with:** positive pressure irrigation (PPI). **Comments:** Biofilm (*Enterococcus faecalis, Eikenella Corrodens and Streptococcus anginosus*) removal was more efficient with NaOCl 4% than with chlorhexidine 2%. In addition, the use of XP-endo Finisher improved the biofilm removal efficiency further.
	●					✓	(2) **Marques-da-Silva B, et al. IEJ. 2019** **Compared with:** passive ultrasonic irrigation (PUI), EDDY and EndoActivator. **Comments:** XP-endo Shaper & Finisher and EDDY showed better results than the other groups in regards on calcium hydroxide removal.
	●					✓	(3) **De-Deus G, et al. COI. 2019** **Compared with:** passive ultrasonic irrigation (PUI). **Comments:** Overall, XP-endo Finisher and PUI were equally efficient in debris removal.
				●		✓	(4) **Aksel H, et al. IEJ. 2019** **Compared with:** none. **Comments:** The use of XP-endo Finisher significantly reduced the remaining volume of filling material after the initial retreatment procedure with Protaper Universal Retreatment.
			●			✓	(5) **Pacheco-Yanes J, et al. COI. 2019** **Compared with:** non-agitated irrigation and passive ultrasonic irrigation (PUI). **Comments:** The XP-endo Finisher instrument highlighted a significantly better distribution of the irrigant when compared to PUI and control.

● All comparisons are at least equal to XP-endo Finisher
● At least 1 comparison is negative for XP-endo Finisher
● All comparisons are negative for XP-endo Finisher

✓ Yes ✗ No

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				●		✓	(6) **De-Deus G, et al. IEJ. 2019** **Compared with:** passive ultrasonic irrigation (PUI). **Comments:** Significantly more root filling material was removed with XP-endo Finisher R (32%) than with PUI (12%).
	●					✗	(7) **Azimian S, et al. DRJ. 2019** **Compared with:** none. **Comments:** The authors claimed that XP-endo Finisher has no superiority compared to control group. However, XP-endo Finisher was not used in combination with irrigant nor were the tests performed at body temperature.
	●					✗	(8) **Jayakumaar A, et al. IJDR. 2019** **Compared with:** conventional irrigation. **Comments:** The debris and smear layer scores were significantly in favor of using XP-endo Finisher after instrumentation with Hyflex and Protaper Next.
				●		✓	(9) **Campello AF, et al. IEJ. 2019** **Compared with:** solvent. **Comments:** Solvent was not of additional help, but XP-endo Finisher R removed a significant amount of (additional) gutta percha after Mtwo instrumentation.
				●		✓	(10) **Machado AG, et al. IEJ. 2019** **Compared with:** none. **Comments:** As for the number of cases with total filling material removal, XP-endo Shaper was associated with better results than TRUShape. The supplementary approach with the XP-endo Finisher R instrument significantly improved removal of existing filling material.

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			●			✓	(11) **Zhao Y, et al. IEJ. 2019** **Compared with:** conventional irrigation and passive ultrasonic irrigation (PUI). **Comments:** The additional irrigation (after instrumentation with XP-endo Shaper or Reciproc Blue) showed significantly less remaining dentinal debris. Conventional irrigation showed less reduction than PUI and XP-endo Finisher when used after Reciproc Blue. PUI and Xp-endo Finisher showed no difference.
			●			✗	(12) **Sasanakul P, et al. JOE. 2019** **Compared with:** standard manual instrumentation (CF), minimal manual instrumentation (MI), Navitip FX needle (NFX), Non-agitated irrigation (NI), Passive ultrasonic irrigation (PUI) and SAF. **Comments:** The bacteria removal hierarchy was as follow: MI > NFX = XP-endo Finisher > CF = SAF = PUI > NI. The samples were not harmonized in instrumentation sizes/conditions prior the irrigation/disinfection. There is no indication in the article that the experiment was performed at body temperature.
			●			✓	(13) **Carvalho MC, et al. BOR. 2019** **Compared with:** none. **Comments:** XP-endo Finisher significantly reduced the bacterial load after instrumentation with XP-endo Shaper or Reciproc Blue.

MECHANICAL	DEBRIS/SMEAR LAYER	CLINICAL	BACTERIA	RETREATMENT	EXTRUSION	BODY TEMPERATURE	
2018							
		●				✓	(14) **Rodrigues E-A, et al. JCED. 2018** **Compared with:** none; case report. **Comments:** A 22-year-old patient was treated for a dens invaginatus type II. The chemo-mechanical treatment was achieved with XP-endo Finisher and NaOCl. At the 14 months follow-up, the patient was asymptomatic and osseous healing of the lesion was visible on the X-ray.
	●					✗	(15) **Keskin C, et al. JDRDCDP. 2018** **Compared with:** conventional irrigation and passive ultrasonic irrigation (PUI). **Comments:** XP-endo Finisher and PUI showed significantly better triple antibiotic paste (TAP) removal than conventional needle irrigation at all time points. At 7- and 21-days TAP incubation time, XP-endo Finisher and PUI presented similar results. Only at day 90, PUI removed significantly more TAP than XP-endo Finisher. There is no indication that the study was performed at body temperature.
	●					✗	(16) **Ulusoy Öİ, et al. IEJ. 2018** **Compared with:** non-agitated irrigation and passive ultrasonic irrigation (PUI). **Comments:** XP-endo Finisher was the most effective activation method to remove organic tissue. The irrigation solutions (NaOCl, NaOCl-EDTA, and NaOCl + HEBP) did not significantly influence the results.

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			●			✗	(17) **Bedier MM, et al. RDE. 2018** **Compared with:** conventional irrigation. **Comments:** Effectiveness of iRace or XP-endo Shaper + XP-endo Finisher to remove artificially grown E. faecalis from the middle part of the canal and tubules compared to the same initial files and conventional irrigation only. All groups showed superior results for XP-endo Finisher compared to conventional irrigation.
	●					✓	(18) **Kfir A, et al. AEJ. 2018** **Compared with:** conventional irrigation, passive ultrasonic irrigation (PUI) and SAF. **Comments:** XP-endo Finisher, PUI, and SAF removed similar amount of $Ca(OH)_2$ from artificial grooves. Conventional removed significantly less $Ca(OH)_2$ than the other groups.
●						✓	(19) **Vaz-Garcia ES, et al. BDJ. 2018** **Compared with:** XP-Clean. **Comments:** XP-endo Finisher instruments showed improved performance when compared with XP-Clean instruments, demonstrating higher cyclic fatigue resistance and lower roughness.
					●	✗	(20) **Azim AA, et al. COI. 2018** **Compared with:** conventional irrigation, EndoActivator, EndoVac and PIPS. **Comments:** Only negative pressure (EndoVac) had no extrusion. The amount of extruded debris, for the other methods, was similar. This experimental setup has low clinical significance since the pressure of the periapical tissues are not taken into account.

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					●	✓	(21) **Kfir A, et al. COI. 2018** **Compared with:** SAF. **Comments:** The complete SAF sequence extruded less than the combination of Proglider, Protaper Next, and XP-endo Finisher. No significant difference was observed between Proglider and XP-endo Finisher. No statistics between SAF and XP-endo Finisher was provided.
				●		✓	(22) **Silva EJNL, et al. IEJ. 2018** **Compared with:** none. **Comments:** XP-endo Finisher and XP-endo Finisher R significantly removed filling material after initial retreatment with round instruments. No significant difference was observed between XP-endo Finisher and XP-endo Finisher R.
2017							
	●					✓	(23) **Zand V, et al. JCED. 2017** **Compared with:** none. **Comments:** For smear layer removal, XP-endo Finisher with 17% EDTA for one minute was the most effective combination.
	●					✓	(24) **Turkaydin D, et al. JOE. 2017** **Compared with:** conventional irrigation and passive ultrasonic irrigation (PUI). **Comments:** XP-endo Finisher showed significantly lower amount of remaining triple antibiotic past (TAP) than needle irrigation and PUI.

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	●					✗	(25) **Uygun AD, et al. AEJ. 2017** **Compared with:** conventional irrigation, passive ultrasonic irrigation (PUI), and TRUShape. **Comments:** Conventional irrigation had the poorest scores in terms of $Ca(OH)_2$ removal. XP-endo Finisher, TRUShape, and PUI groups had similar results in removing calcium hydroxide.
	●					✗	(26) **Wigler R, et al. IEJ. 2017** **Compared with:** conventional irrigation and passive ultrasonic irrigation (PUI). **Comments:** XP-endo Finisher and PUI removed significantly more $Ca(OH)_2$ from artificial grooves than conventional irrigation. There is no indication in the article that the experiment was performed at body temperature.
	●					✓	(27) **Hamdan R, et al. JCED. 2017** **Compared with:** passive ultrasonic irrigation (PUI). **Comments:** XP-endo Finisher showed a significant superiority over PUI in removing $Ca(OH)_2$ from the apical third after 3 minutes of activation.
	●					✗	(28) **Gokturk H, et al. JAOSR. 2017** **Compared with:** CanalBrush, conventional irrigation, double side vented needle, laser-activated irrigation (LAI), passive ultrasonic irrigation (PUI), and Vibringe. **Comments:** LAI and PUI showed the highest mean rate of $Ca(OH)_2$ removal from artificial grooves. However, there is no indication that the experiments were performed at body temperature.

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	●					✗	(29) **Leoni GB, et al. IEJ. 2017** **Compared with:** apical positive pressure (APP), passive ultrasonic irrigation (PUI), and SAF. **Comments:** XP-endo finisher and PUI was equally effective overall. However, XP-endo Finisher was best in the apical area that is the most challenging area for debris removal and disinfection.
				●		✗	(30) **Karamifar K, et al. IranEJ. 2017** **Compared with:** manual instrumentation and RACE. **Comments:** The use of XP-endo Finisher file resulted in cleaner canal walls and was more effective in removing gutta-percha from the coronal toward the apical part of the canal. Emphasizes the advantage of the XP-endo Finisher in the apical part of the canal especially.
	●					✗	(31) **Elnaghy AM, et al. Odont. 2017** **Compared with:** conventional irrigation, EndoActivator, and non-agitated irrigation. **Comments:** XP-endo Finisher and EndoActivator were superior to the other methods tested. There is no indication that the experiment was performed at body temperature.
			●			✓	(32) **Bao P, et al. JOE. 2017** **Compared with:** conventional irrigation (CNI) and passive ultrasonic irrigation (PUI). **Comments:** The best biofilm removal – inside and outside of artificial grooves – was achieved by XP-endo Finisher. PUI and CNI followed.

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	●					✗	(33) **Keskin C, et al. JOE. 2017** **Compared with:** CanalBrush, conventional irrigation (SI), EndoActivator (EA), and passive ultrasonic irrigation (PUI). **Comments:** XP-endo Finisher and PUI removed similar amount of Calcium Hydroxide. Both removed significantly more Calcium Hydroxide than SI, EA, and Canal.
2016							
	●					✗	(34) **Gokturk H, et al. JAOSR. 2016** **Compared with:** CanalBrush, conventional irrigation, double side vented needle, laser-activated irrigation (LAI), passive ultrasonic irrigation (PUI), and Vibringe. **Comments:** The removal of double antibiotic paste from artificial grooves was investigated for various irrigation protocols. Depending on the location into the canal, the significance levels between the protocols differed. There is no indication that the study was performed at body temperature.
			●			✓	(35) **Alves FRF, et al. JOE. 2016** **Compared with:** passive ultrasonic irrigation (PUI). **Comments:** Both XP-endo Finisher and PUI exhibited antibacterial effectiveness, but only the XP-endo Finisher caused a significant reduction in the bacterial counts after chemomechanical preparation.
				●		✓	(36) **Alves FRF, et al. JOE. 2016** **Compared with:** none. **Comments:** XP-endo Finisher removed significantly more debris after initial retreatment with round files.

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			●			✕	(37) **Azim AA, et al. JOE. 2016** **Compared with:** conventional irrigation, EndoActivator, and PIPS. **Comments:** XP-endo Finisher showed significantly more bacterial reduction (from canal wall to 50 µm inside dentinal tubule) than all other activation methods. Deeper into the tubules, PIPS killed significantly more bacteria.

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