

# FactFile

## SmartLite Pro EndoActivator™ Endodontic Activation System

This Fact File focusses on the **SmartLite Pro EndoActivator™ Endodontic Activation System** as a new and enhanced disinfection concept.

### SmartLite Pro EndoActivator™ Endodontic Activation System and tips design

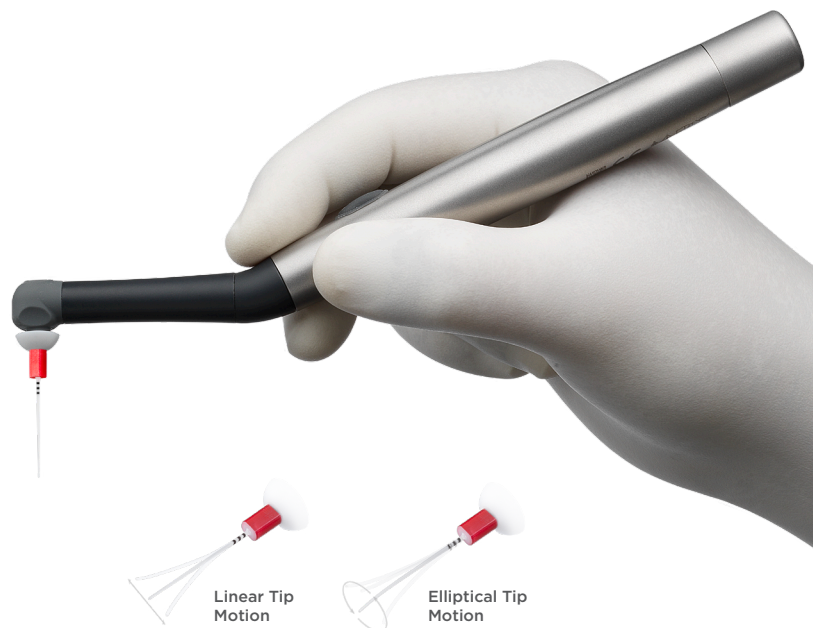
Successful endodontic therapy requires shaping, cleaning and obturation of the root canal [1]. Irrigation (also named “cleaning”) is one of its key steps as it aims to dissolve and to remove pulp tissue, dentinal debris, smear layer, microorganisms and their by-products from the root canal [2]. Moreover, 35 % or more of canal surface remains untouched after mechanical instrumentation, mainly due to the anatomical complexity of the root canal system, emphasizing again the importance of irrigation that is the only way to impact these inaccessible areas [3].

Sodium hypochlorite (NaOCl) is the main irrigating solution used to kill bacteria and to dissolve necrotic tissues, in concentration between 0.5 % and 6 %. Ethylenediaminetetraacetic acid (EDTA) (17 % or 15% solution) is also commonly used because of its chelating and smear layer removal properties [4]. It is well known that the process of delivery is as essential as the antibacterial characteristics of the irrigants. In this framework, a survey including more than 1100 endodontists based in the US, confirms that almost half of respondents are using some form of adjunct for the irrigation step, with 48 % using ultrasonic activation, 34% using sonic activation and 10% using a negative pressure system. These results highlight the desire of many practitioners to improve cleaning performance by using other means than classic needle irrigation to bring irrigants into contact with the root canal walls [5].

**SmartLite Pro EndoActivator™ Endodontic Activation System** falls within this effort.

### SmartLite Pro EndoActivator™ Endodontic Activation System

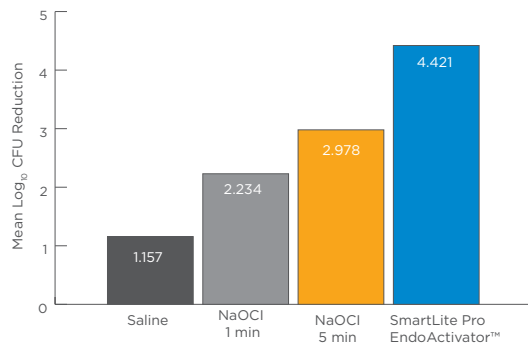
(Figure 1) is based on the **EndoActivator®** technology and its long history of clinical use. It offers numerous technical and clinical improvements, such as two speeds in the sonic frequency range (18'000 cycles per minute (cpm) and 3'000 cpm) and an elliptical motion in order to activate irrigation solutions (Figure 1). The tips have new parallelogram-shaped cross-section and are available in three sizes: small (yellow, 15/02, 22 mm in length) medium (red, 25/04, 22 mm in length), and medium long (red, 25/04, 28 mm in length). In terms of ergonomics, the **SmartLite Pro EndoActivator™** attachment is slimmer and 360° rotatable for an improved access to all teeth.



*Figure 1: EndoActivator™ attachment and motion of the tip. On the left: linear tip motion of the EndoActivator® (predecessor device). On the right: new elliptical motion of the SmartLite Pro EndoActivator™ Endodontic Activation System*

## In vitro data [6]

**Intracanal bacteria reduction** in human extracted teeth was **more than 25 times higher** when using **SmartLite Pro EndoActivator™**, in comparison with soaking 5 min in 2% NaOCl; and bacteria reduction was **more than 150 times higher** when using **SmartLite Pro EndoActivator™** in comparison with manual activated irrigation with a ProRinse needle for 1 min in 2% NaOCl (see the graph below).



*Figure 3 : bacteria reduction (biofilm of enterococcus faecalis ATCC allowed to grow for 21 days in extracted human teeth) when using SmartLite Pro EndoActivator™ (for 60 seconds combined with manually activated irrigation for 30 seconds), manual activated irrigation for 1 min (i.e. up and down motion with a ProRinse needle for 1 min), soaking 5 min.*

Regarding **smear layer removal**, the canals of human extracted teeth were significantly cleaner after the use of **SmartLite Pro EndoActivator™** for 90 seconds in conjunction with 17% EDTA when compared to all other evaluated means, as illustrated by the SEM images below.

	Coronal Third	Middle Third	Apical Third
<b>SmartLite Pro EndoActivator</b> <b>3 min protocol</b> 2% NaOCl for 90 seconds + 17% EDTA for 90 seconds			
<b>EndoActivator</b> <b>3 min protocol</b> 2% NaOCl for 90 seconds + 17% EDTA for 90 seconds			
<b>ProRinse Needle</b> <b>6 min 30 seconds protocol</b> 2% NaOCl for 5 min + 17% EDTA for 90 seconds			
<b>ProRinse Needle -</b> <b>2 min 30 seconds protocol</b> 2% NaOCl for 1 min + 17% EDTA for 90 seconds			
<b>Control</b> Saline via ProRinse			

*Figure 4 : representative SEM images showing the smear layer removal in coronal, middle and apical thirds when using SmartLite Pro EndoActivator™, its predecessor EndoActivator™, soaking 5 min in NaOCl + 90 s in EDTA, soaking 1 min in NaOCl + 90 s in EDTA and control using saline solution.*

## Clinical Experience

A user study was conducted with 27 dentists who treated in total more than 550 patients, in their daily practices, with the **SmartLite Pro EndoActivator™ Endodontic Activation System** [7]. They followed the manufacturer's instructions, i.e. hydrodynamic agitation of intracanal solutions for 30-60 seconds with the system.

88% of the participants perceived the **SmartLite Pro EndoActivator™** as a premium device, performing better than its predecessor. Clinical factors and design features such as a more powerful and improved agitation, the ergonomics and the audible feedback every 30 seconds were identified as key benefits. Moreover, 75% of the dentists agreed that all areas of the mouth and teeth can be easily accessed and 92% of them were confident that root canals can be thoroughly cleaned enough to obturate in one single visit when using **SmartLite Pro EndoActivator™**.

## Conclusion

The **SmartLite Pro EndoActivator™ Endodontic Activation System** could be your system of choice to ensure a thorough root canal cleaning, thanks to its new motion, better ergonomics and more efficient smear layer removal when compared to its predecessor. The SmartLite Pro EndoActivator™ irrigation protocol provides a higher bacteria reduction compared to the tested manual irrigation protocols.

### References:

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2. Haapasalo, M., et al., Irrigation in endodontics. *Br Dent J*, 2014. 216(6): p. 299-303.
3. Peters, O.A., K. Schonenberger, and A. Laib, Effects of four Ni-Ti preparation techniques on root canal geometry assessed by micro computed tomography. *Int Endod J*, 2001. 34(3): p. 221-30.
4. Hargreaves, L.H.B.K.M., *Cohen's Pathways of the Pulp*. 12 ed. 2020: Elsevier Health Sciences (US).
5. Dutner, J., P. Mines, and A. Anderson, Irrigation trends among American Association of Endodontists members: a web-based survey. *J Endod*, 2012. 38(1): p. 37-40.
6. Data on file (Franklin R. Tay study)
7. Data on file (User Evaluation report)