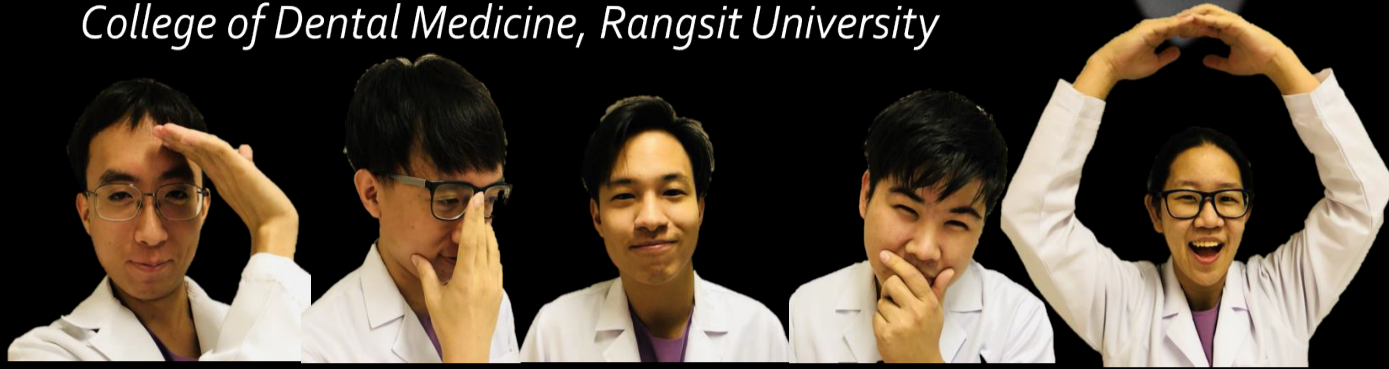




# Clinical accuracy of electronic apex locator in primary teeth

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**Background:** Accurate root canal length measurement means adequate bacterial removal, and less trauma to periapical tissues or permanent tooth buds. Electronic apex locators (EAL) are known to give accurate measurement in permanent teeth, but this may be different in primary teeth where the apical foramens are wide and located much shorter from the root apex. The evaluation of the EAL accuracy in primary teeth may exist, but more precise data regarding *in vivo* clinical research is still needed.

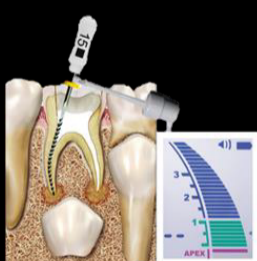
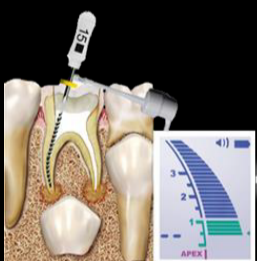
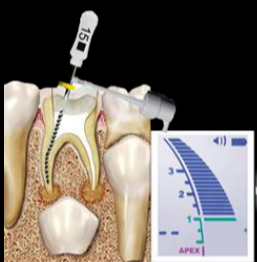
**Objective:** To evaluate the clinical accuracy of an EAL in the root canal length determination of the primary teeth at different display-bar readings.

## Materials & Methods:

Thirty-three roots were collected from twenty primary teeth of pediatric patients who came to Pediatric Dental Clinic, Rangsit University. Every root canal length was measured *in vivo* with EAL (Root ZX<sup>®</sup>) at the display bar 1.0, 0.5, and 0.0. Afterward, each tooth was extracted and measured again under the stereo microscope for the actual root canal length.

## Data analysis:

All EAL measurements were compared with actual root canal length using paired *t*-test analysis at 95% confidence level.



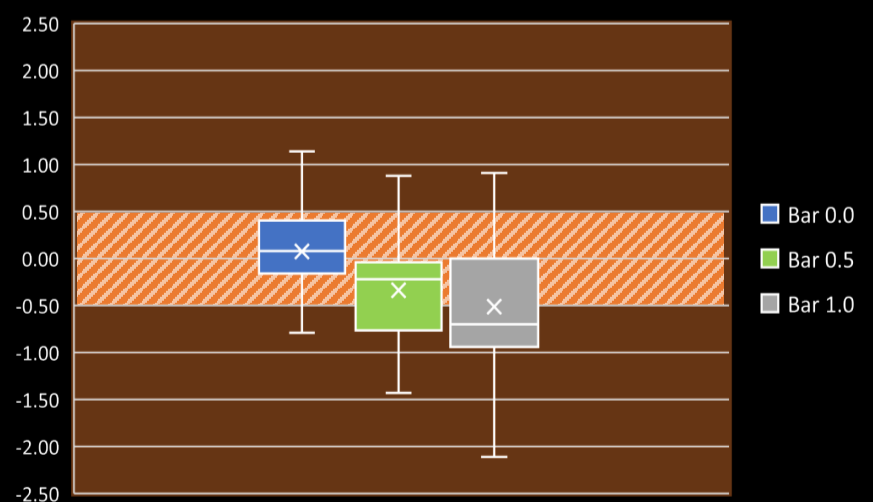
**Result:** The EAL measurement at display bar 0.0 demonstrated the best accuracy at 63.63% and 90.90% accuracy within  $\pm 0.5$  and  $\pm 1$  mm, respectively. The EAL measurement at display bar 0.5 and 1.0 showed less accuracy, respectively. There was no significant difference between the actual root canal length and the EAL measurement at display bar 0.0 ( $P=0.428$ ).

Table 1: Overall accuracy of EAL when compare to the actual root canal length

EAL	Accuracy within		Difference: Mean $\pm$ SD (mm)	Difference: Outbound (mm)		P-value <sup>a</sup> (2-tailed)
	$\pm 0.5$ mm	$\pm 1.0$ mm		Under	Over	
Bar 0.0	63.63%	90.90%	0.07 $\pm$ 0.53	-1.08	1.14	0.428
Bar 0.5	51.61%	83.87%	-0.36 $\pm$ 0.60	-1.43	0.88	0.002
Bar 1.0	36.67%	76.67%	-0.56 $\pm$ 0.71	-2.11	0.91	0.000

\* Minus sign indicates measurements shorter than the actual root canal length.  
<sup>a</sup> Paired t test analysis (SPSS version 24)

Figure 1: The relation of each EAL measurement to the working length



**Conclusion:** The EAL root canal measurement at display bar 0.0 is the most accurate representative of the actual root canal length in primary dentition.

**Keywords:** Electric apex locators, Open apex, Primary teeth, Root ZX mini.

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