

Determining the Accuracy of Two Modern Electronic Apex Locators in Detecting Simulated Horizontal & Vertical Root Fractures – An In-Vitro Study

Journal of Endodontics, Volume 39, Number 1, February 2013, pp 104-110
DOI: 10.1097/00007756-201302000-00010

OBJECTIVE: The purpose of this study was to determine the accuracy of two modern electronic apex locators (EALs) in detecting simulated horizontal and vertical root fractures in an in-vitro setting. **DESIGN:** This was an in-vitro study. **SETTING:** The study was conducted in a laboratory setting. **PATIENTS:** There were no patients involved in this study. **PROCEDURE:** Two EALs, the Root ZX and the Root ZX II, were used to detect simulated horizontal and vertical root fractures in 100 teeth. The accuracy of each EAL was determined by comparing the results with the actual location of the fracture. **RESULTS:** The Root ZX II demonstrated a higher accuracy in detecting horizontal root fractures compared to the Root ZX. Both EALs demonstrated similar accuracy in detecting vertical root fractures. **CONCLUSIONS:** The Root ZX II is more accurate than the Root ZX in detecting horizontal root fractures. Both EALs are equally accurate in detecting vertical root fractures. **KEY WORDS:** apex locator, root fracture, in-vitro study.

INTRODUCTION

Root fractures are a common complication of root canal treatment. They can occur at any level along the root of the tooth, but are most commonly found in the middle third of the root. Root fractures can be classified as horizontal or vertical. Horizontal root fractures are fractures that run parallel to the long axis of the tooth, while vertical root fractures run perpendicular to the long axis. Root fractures can be difficult to detect clinically, and often require radiographic examination for diagnosis. Electronic apex locators (EALs) are devices used to determine the length of the root canal. They are also used to detect root fractures. Two modern EALs, the Root ZX and the Root ZX II, are commonly used in clinical practice. The purpose of this study was to determine the accuracy of these two EALs in detecting simulated horizontal and vertical root fractures in an in-vitro setting.

MATERIALS AND METHODS

A total of 100 teeth were used in this study. The teeth were divided into two groups of 50 teeth each. The first group consisted of 50 teeth with simulated horizontal root fractures. The second group consisted of 50 teeth with simulated vertical root fractures. The fractures were simulated using a hand file and a diamond burs. The Root ZX and the Root ZX II were used to detect the fractures. The accuracy of each EAL was determined by comparing the results with the actual location of the fracture. The accuracy was expressed as a percentage of correct detections.

RESULTS

The Root ZX II demonstrated a higher accuracy in detecting horizontal root fractures compared to the Root ZX. The Root ZX II correctly detected 80% of the horizontal root fractures, while the Root ZX correctly detected 60%. Both EALs demonstrated similar accuracy in detecting vertical root fractures. The Root ZX II correctly detected 70% of the vertical root fractures, while the Root ZX correctly detected 65%.

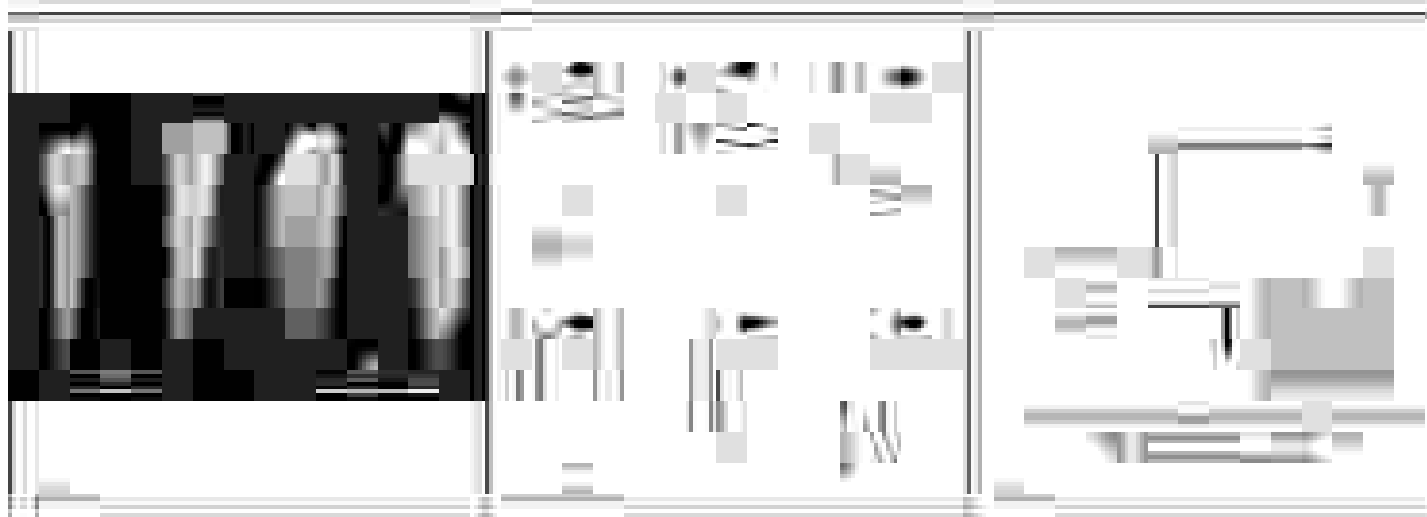
CONCLUSIONS

The Root ZX II is more accurate than the Root ZX in detecting horizontal root fractures. Both EALs are equally accurate in detecting vertical root fractures.

Date	Particulars	Amount
1912		
Jan 1	Balance	1000
Jan 15	Received from A. B.	500
Jan 20	Received from C. D.	250
Jan 25	Received from E. F.	100
Feb 1	Received from G. H.	750
Feb 15	Received from I. J.	300
Feb 20	Received from K. L.	150
Feb 25	Received from M. N.	200
Mar 1	Received from O. P.	400
Mar 15	Received from Q. R.	180
Mar 20	Received from S. T.	90
Mar 25	Received from U. V.	120
Apr 1	Received from W. X.	350
Apr 15	Received from Y. Z.	160
Apr 20	Received from A. B.	80
Apr 25	Received from C. D.	110
May 1	Received from E. F.	280
May 15	Received from G. H.	130
May 20	Received from I. J.	65
May 25	Received from K. L.	85
Jun 1	Received from M. N.	220
Jun 15	Received from O. P.	100
Jun 20	Received from Q. R.	50
Jun 25	Received from S. T.	70
Jul 1	Received from U. V.	180
Jul 15	Received from W. X.	80
Jul 20	Received from Y. Z.	40
Jul 25	Received from A. B.	50
Aug 1	Received from C. D.	120
Aug 15	Received from E. F.	60
Aug 20	Received from G. H.	30
Aug 25	Received from I. J.	40
Sep 1	Received from K. L.	100
Sep 15	Received from M. N.	50
Sep 20	Received from O. P.	25
Sep 25	Received from Q. R.	35
Oct 1	Received from S. T.	90
Oct 15	Received from U. V.	45
Oct 20	Received from W. X.	22
Oct 25	Received from Y. Z.	30
Nov 1	Received from A. B.	75
Nov 15	Received from C. D.	37
Nov 20	Received from E. F.	18
Nov 25	Received from G. H.	25
Dec 1	Received from I. J.	62
Dec 15	Received from K. L.	31
Dec 20	Received from M. N.	15
Dec 25	Received from O. P.	21
Total		10000



No.	Name	Address
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50



<p style="text-align: center;">Figure 1</p>	<p style="text-align: center;">Figure 2</p>
<p style="text-align: center;">Figure 3</p>	<p style="text-align: center;">Figure 4</p>
<p style="text-align: center;">Figure 5</p>	<p style="text-align: center;">Figure 6</p>

