

**UNIVERSITI TEKNOLOGI MARA**

**DIAGNOSTIC ACCURACY OF  
PERIAPICAL RADIOGRAPH,  
CONE BEAM  
COMPUTED TOMOGRAPHY,  
AND INTRASURGICAL  
MEASUREMENT TECHNIQUES  
FOR ASSESSING  
FURCATION DEFECTS**

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**PhD**

**August 2020**

## AUTHOR'S DECLARATION

I declare that the works in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been applied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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## ABSTRACT

The periapical radiograph (PA), which conventionally used as an adjunct in the diagnosis of molar with furcation involvement (FI) may lead to inaccuracy in furcation analysis. Cone beam computed tomography (CBCT) is increasingly used in the periodontology field to overcome the limitations of conventional radiographs. However, the difference in the accuracy of the measurement of furcation defects between PA and CBCT remains unclear. Hence, this study aims to evaluate the accuracy of CBCT, PA, and intrasurgical measurement techniques in the assessment of molars with furcation defects. This parallel, single-blinded, randomised controlled trial (RCT) consisted of 22 periodontitis patients who had molar with advanced FI. All patients followed the same inclusion criteria and were treated following the same protocol, except for radiographic taking (CBCT vs. PA). This study proposed and evaluated five parameters that represent the extent and severity of furcation defects in molars teeth, including CAL (clinical attachment loss), BL-H (bone loss in horizontal direction), BL-V (bone loss in vertical direction), RT (root trunk), and FW (width of the furcation defect). Intrasurgical measurements of furcation defects were compared with CBCT and PA-based data measurement. The results showed there were no statistically significant differences between the CBCT and intrasurgical measurements for any clinical parameter ( $p > 0.05$ ). However, there were statistically significant differences in all measurements ( $p < 0.05$ ) except for the RT parameter between PA and intrasurgical measurements. The majority of the measurements from CBCT and PA were underestimated when compared to the intrasurgical measurements. Meanwhile, the sensitivity were 62.8% and 56.9% for CBCT and periapical, respectively. In conclusion, when compared to the intrasurgical measurements, CBCT provided better diagnostic, sensitivity, and quantitative information on CAL, height, depth, and width of the furcation defects than PA.

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