Basic Study on Diagnosis of Root Fracture by DIAGNOdent®

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Abstract: It has been reported that nowadays, to diagnose root fracture by the naked eyes correctly, dyes such as iodine, methylene blue or caries detector solution, measurement of electric impedance, transillumination, fiberoptic endoscope, microscope, bite test and ultrasonic devices have been used. However, these methods have not been widely used for diagnosis because they are not subjective and correct in cases of imperfect fracture or cracks. The purpose of this study was to examine the possibility of diagnosis of root fracture by DIAGNOdent®. As a basic study, human roots of teeth without fracture were used to examine the relationship between the values by DIAGNOdent® (D values) and the dependence on time and concentration of methylene blue dye solution. Artificial grooves to simulate root fractures were made on the root surfaces and the relationships between D values and the widths or depths of grooves with or without dye solution were examined. Next, artificial root fractures were made on the roots of teeth, and the relationship between D values and presence or absence of dye solution and the effect of ethanol concentration on D values were also examined. Statistical analyses were performed by the Mann-Whitney U test. D values were time-dependent up to 5 minutes without changes after 5 minutes, and concentration-dependent with dye solution. D values were also dependent on the width and depth of grooves with dye solution. D values increased significantly after root fracture, especially using dye solution or dye solution including 20% or 40% ethanol concentration. These results suggest that root fracture could be diagnosed by DIAGNOdent® with methylene blue dye solution.

Key words: Root fracture, DIAGNOdent®, Diagnosis