P18

Cyclic fatigue test on different rotary NiTi files and handling methods

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I. Objectives

Endodontic rotary NiTi(Nickel-Titanium) files have several advantages, but they also have some problems. Fracture of instrument is the one of the problems. Cyclic fatigue fracture may not give a previous sign(ex, bending or distortion of the files) before it happen. It is affected by various factors. This study investigated time which takes for cyclic fatigue fracture to happen and fracture patterns with regard to different NiTi files and pecking motion.

II. Materials and Methods

Sloped metal block that had 15-degree horizontal angle was fabricated. It had guiding path of 2mm radius. With this metal block, NiTi files could be located in original path. After locating followinig files in the path, it was rotated at 300 rpm until it was separated.

(1) Profile .06 #30
(2) ProTaper F3
(3) Hero 642 .06 #30
(4) Hero Shaper .06 #30
(5) K3 .06 #30

Static group(Non-pecking group) was located in ① 3mm, ② 6mm distance from contact and rotated standstill which simulated apical curvature of 3mm & 6mm starting at from the apex. Dynamic group(Pecking group) was repeated down and up in ③ 3mm, ④ 6mm distance at 1mm/s speed. The device for control the rpm, pecking distance automatically was fabricated. The time took for seperation was measured and the pattern of the fractured was observed with SEM cross-sectionally.

III. Results

Results will be presented in the presentation.