



Torsional and Cyclic Fatigue Resistance of a New Nickel-Titanium Instrument Manufactured by Electrical Discharge Machining

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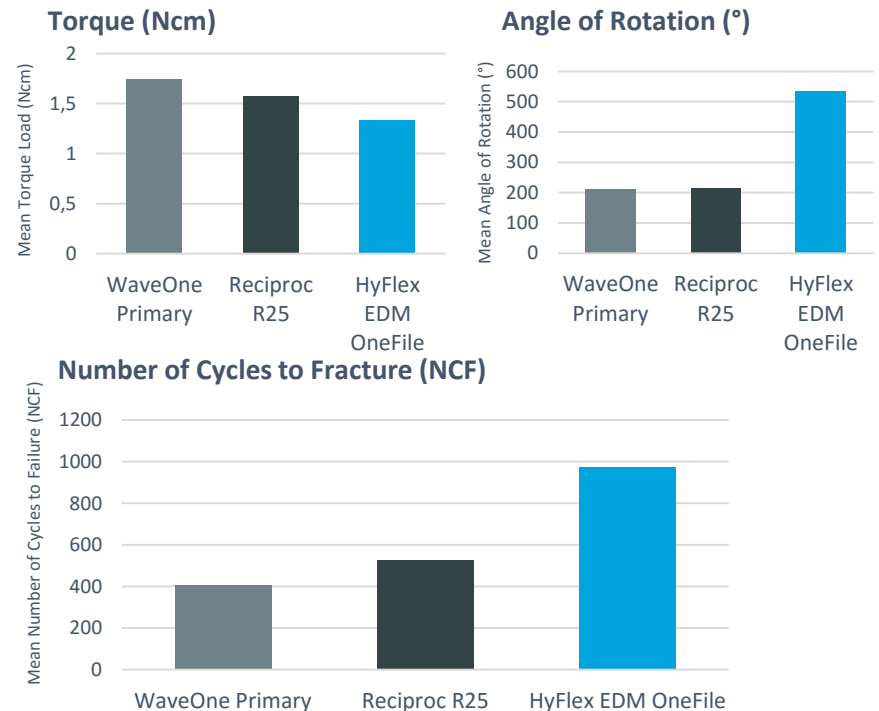
STUDY AIM

Comparison of the torsional and cyclic fatigue resistance of **HyFlex EDM OneFile** (Coltene/Whaledent AG, Altstätten, Switzerland), a CM-wire, manufactured by electric discharge machining with **Reciproc R25** (VDW, Munich, Germany) and **WaveOne Primary** (Dentsply Maillefer, Ballaigues, Switzerland), both M-wires.

EXPERIMENTAL SETUP

- Material: 120 new Hyflex EDM OneFile, Reciproc R25 and WaveOne Primary files (all files were 25mm long and 0.08 taper, pre-checked for defects or deformations under a stereomicroscope).
- Torsional resistance testing: Instruments (n=20 each) were tested for torsional resistance and angular rotation to fracture following the ISO 3630-1 guidelines by using a torsionmeter.
- Cyclic fatigue testing: Instruments (n=20 each) operating until fracture inside an artificial canal (60° angle and 3 mm radius of curvature) in continuous rotation at 500 RPM for HyFlex EDM and in the reciprocating motion for the Reciproc R25 (at 300 RPM) and WaveOne Primary files (at 350 RPM). Determination of the number of cycles to fracture (NCF) by measuring time to fracture.
- Data evaluation was done with analysis of variance test and the Student-Newman-Keuls test for multiple comparisons.

RESULT



CONCLUSION

HyFlex EDM OneFiles (CM-wire) showed a significant higher cyclic fatigue resistance and higher angular rotation to fracture, but a lower torque to failure than Reciproc R25 and WaveOne Primary files (M-wires).