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Evaluation of cyclic fatigue of four endodontics files

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Abstract

Introduction In root canal therapy file breakage is one of the most complex problems to any dentist; if dentists are not able to pull out the remained broken piece of metal out of the root canal, probably it would result in bad consequences. The Cyclic fatigue is one the most important factors for such phenomena; clearly using files with better manufacturing quality would lessen this dangerous threat. In this experimental study 4 group of sample Endo files each of them from a well-known brand have been compared to each other from their strength point of view.

Method and Material In this experiment 120 Stainless steel K-Files with the following Mani, Micromega, maillefer, Dentsply, Thomas trademarks have been studied. The mentioned files have a tapering of 0.02 and managed to be in three group sizes of 20, 25 and 30. In order to study the torsional fatigue properties of these k-files, the files are put in a special fatigue meter designed by Dr. Behrooz Eftekhar. While the profile head is being twisted within known angular amplitude and at the same time the other head is fixed, the total number of angular twists is counted until the profile failure happens. Then this number goes to records. After all, comparison study have been done using Statistical SPSS Calculator Environment and also two statistical tests of ANOVA and TUKEY.

Results Based on the results those k-files of Dentsply/Maillefer shows to be the most enduring files (1100.53 turns), after that Thomas (614.16 turns), Mani (400.16 turns) and MicroMega (189.93 turns) respectively sit in the next places with respect to their torsional strength. Regarding the achieved results, increasing file size and diameter makes a decrease in the capacity of file torsional strength.

Conclusion According to all gained results, Dentsply/Maillefer between all other brands were the strongest files to tolerate the torsional fatigue and after Thomas, Mani and MicroMega were in the next places. Also this experiment shows that, there exist other kind of moments (torsional moment or torque) except those bending momentums in curved metal canals (Tensile-compressive stresses), they finally result in file breakage too.

Keywords Stainless Steel K_File,Torsional Fatigue