RESEARCH

Evaluating Root Canal Wall Dentin Structure in Uninstrumented but Cleaned Human Premolars via Scanning Electron Microscopy

Journal of Endodontics | March 2018 | Wang, Z., et al.

INTRODUCTION

With the canal of the tooth root being very complex anatomically, cleaning the canals can be difficult. Bacteria can easily get trapped in the complexity, resulting in the possibility of failed endodontic therapy. The traditional protocol in root canal therapy is often instrumenting the canals at #25/.06 or larger in some cases. As a result, the original canal wall anatomy is altered. Researchers in this study assessed cleaning premolar root canals using only a #10 K-file patency examination and the GentleWave® System.

MATERIALS & METHODS

Through achieving patency with a #10 K-file, 24 extracted human premolars were assessed in this study. Using 3% sodium hypochlorite (NaOCl), 17 of the premolars underwent the GentleWave Procedure and 7 of the teeth were negative controls. Scanning electron microscopy was utilized to assess the coronal, middle and apical aspects of the root canal after splitting of the tooth. A predefined scale system was established to evaluate the root canal wall structures:

- Calcospherites
- Surface irregularities
- Dentinal tubule openings
- Tissue debris

RESULTS

No organic tissue remnants or debris remained in the root canal system, and the isthmus areas between the two canals were made visible in the teeth.

Irregular dentin structure and previously unreported fingerlike projections were indicated in many areas in the uninstrumented root canals. There were only a few dentinal tubule openings indicated in the isthmus areas of the teeth. The test group's dentin structures were maintained, while the control group's dentin surfaces were covered with tissue debris.

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CONCLUSION

A non-instrumentation approach with the GentleWave System revealed an extensive structural range in the middle and apical region of the canals, along with no organic tissue remnants or dentin debris present on the surfaces.

Learn more about the GentleWave® System at **GentleWave.com/Doctor**

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