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Commentary

Accuracy and Temperature Change on the Root Surface when Preparing a Root Canal with Guided Endodontics

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ABOUT THE STUDY

The first but most important step in nonsurgical root canal therapy is to get access to the pulp chamber and gain direct, unhindered access to the Root Canal System (RCT). A well prepared cavity can result in a smooth, direct path to the apical foramen without changing the root canal's original orientation. Additionally, the way access cavities are designed affects how well endodontic files plane the walls of root canals. Therefore, if the access cavity is not correctly prepared, it will be challenging to accomplish the best outcome of adequate enlarging, shape, cleaning, disinfection, and obturation of all pulpal areas.

The occlusal anatomy has traditionally been used to prepare access cavities. The crown morphology can alter due to wear, caries, or poor restorations, and the roots may not be perpendicular to the occlusal surface of the teeth, which will result in certain procedural errors. Therefore, it is erroneous to just rely on the occlusal anatomy. In addition, pulpal degeneration and the ensuing narrowing of the root canal systems are frequently brought on by age-related processes, trauma, chronic inflammation, orthodontic therapy, and trauma. Significant calcifications in the pulpal spaces may make it difficult to find, access, and navigate the chambers and root canals. The traditional access requires removing enough tooth structure so that tools can easily access each canal orifice without being hindered by canal walls.

However, these procedures go against the principles of minimally invasive endodontic preparation, which support maintaining the structural integrity of the tooth and immune functioning. Magnification, transillumination, and ultrasonic tips can be used in a clinical setting to locate and navigate canals. However, with the use of radiographs recorded at various angles, the direction of the ultrasonic instruments should be adjusted promptly to prevent perforations or fracture owing to excessive loss of tooth structure. The majority of these instances call for prolonged operations, which provide difficulties for both patients and medical professionals.

The guided burs with lower diameter might have less deviation, preventing excessive dentin tissue cutting. Additionally, the guided bur generates a lot of heat as a result of constant rotating and rubbing against the root canal wall; however, it is unknown if this level of temperature rise may cause harm to the alveolar bone and periodontal ligaments. Therefore, this study's objectives were to assess the precision and temperature change on the root surface of cavity preparation for guided access.

It was crucial to emphasize that all experimental equipment operated continuously in the absence of any heat dissipation simulation in this study. This type of continuous operation without coolant can be used in a few clinical practices, such as utilizing an ultrasonic tip to remove dentin from around separated instruments in order to maintain eyesight. Alveolar bone is shielded from heat damage by periodontal blood flow during thermoplasticized root canal obturation. Therefore, it is reasonable to assume that intermittent cutting, cooling using root canal irrigating solutions, and periodontal blood flow can all help to better dissipate the heat produced by access cavity preparation under guided endodontics.

It may conclude that guided endodontic access cavity preparation has excellent reliability and safety in clinical applications because to its practicable accuracy and low temperature rise on the root surfaces.

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