

Features of 3D modelling in studying the structure of the tooth root canal

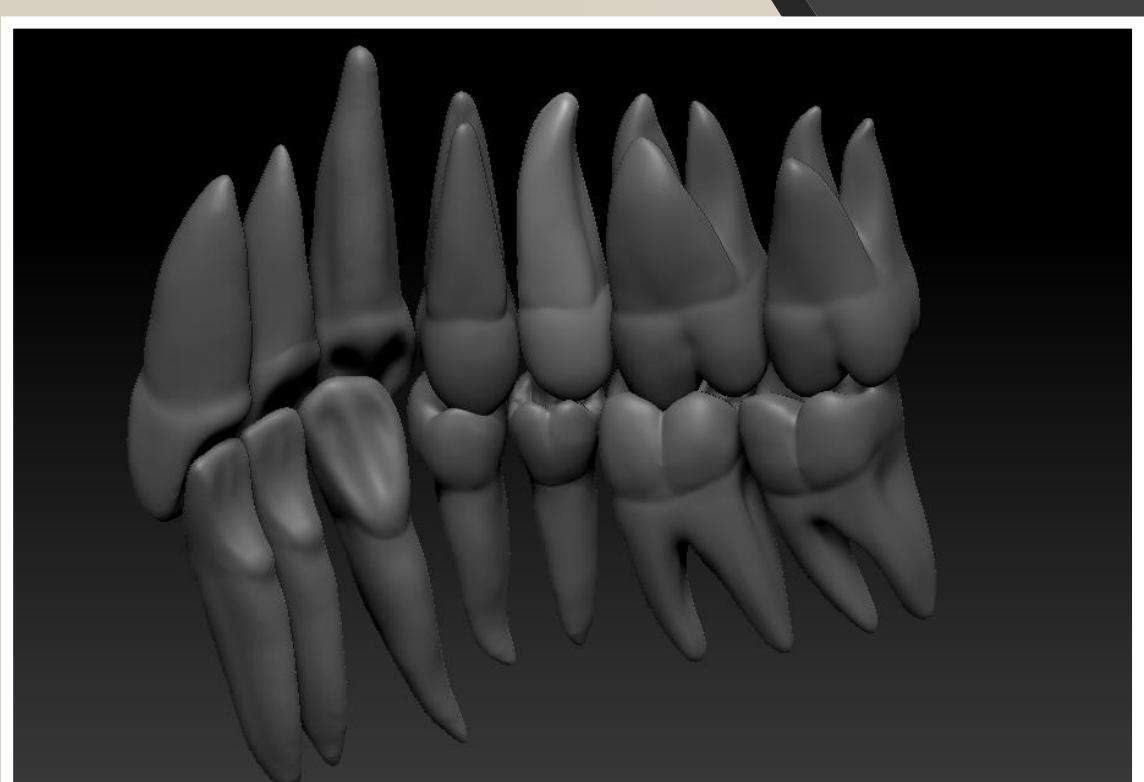
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Abstract

For endodontic education to be effective, clinical processes must be simulated using realistic models, especially when it comes to determining working length (WL) utilizing electronic apex locators (EALs). Conventional training techniques with removed or synthetic teeth are deficient in consistency, realism, and compatibility with EALs. This work sought to create and assess a 3D-printed tooth model with conducive characteristics that facilitates realistic and standardized

Introduction

Endodontic therapy is a crucial component of standard dental practice. Endodontic practice depended on thorough and efficient instruction of dental students at both preclinical and clinical stages. [1] An adequately trained endodontic professional can achieve superior performance and forecast treatment outcomes more accurately. The advancement of endodontic materials and techniques necessitates that both students and dentists engage in rigorous practical training prior to applying new methods on patients. Consequently, a simulation model to replicate clinical practice is essential. Several training systems have been implemented in educational environments. [2,3] For instance, the utilization of extracted human teeth in pre-clinical endodontic education is prevalent;[3] however, this practice presents numerous disadvantages and limitations, including challenges in availability, time-consuming selection of appropriate specimens, ethical concerns, and the presence of non-standardized anatomical features for testing scenarios[4]

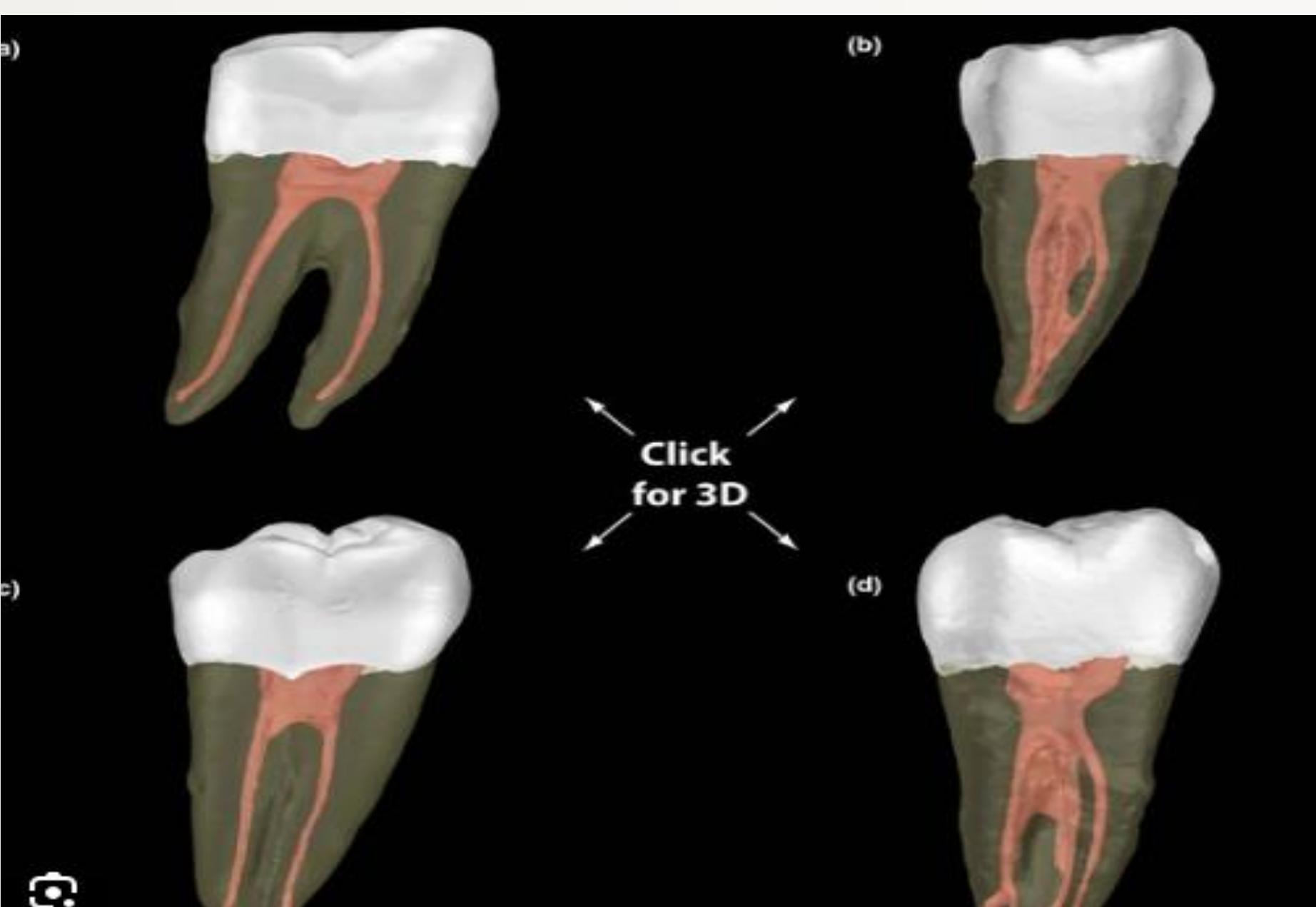


Materials and Methods

To study the morphology of tooth root canals, it was necessary to create a 3D model. For this work, we used cone beam computed tomography scans from Kavo, Planmeca, and Genoray; a Longer Cube2 3D printer and Phrozen Shuffler XL Lite; Side Effects Houdini, Maya, and 3ds Max software for creating three-dimensional graphics; and polymer materials for 3D printing.

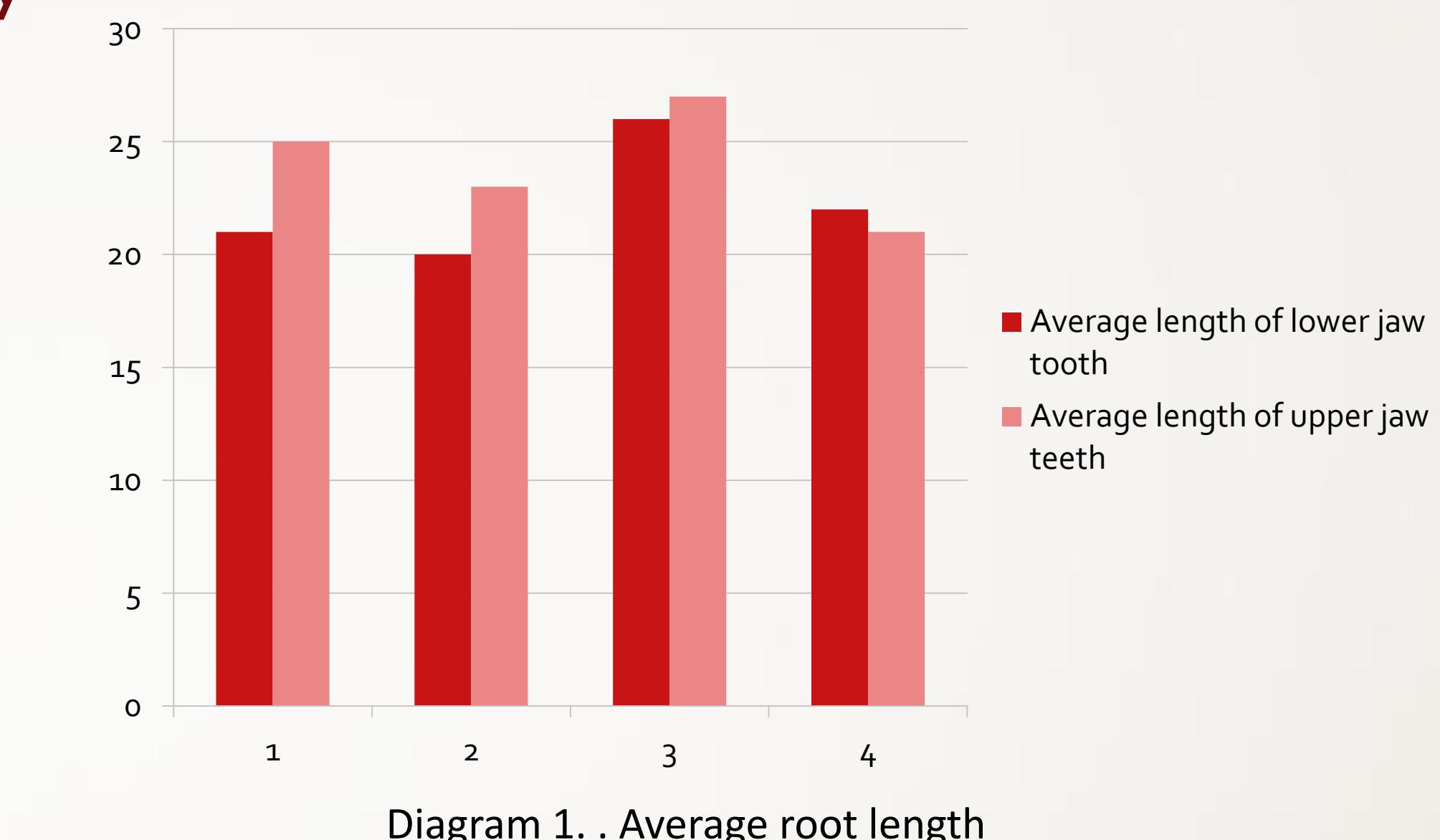
Results of the research

The teeth of the upper and lower jaws differ in root length. This difference also varies between older and younger people. The table and diagram below describe the results of this examination.



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Conclusion

In order to gain a good understanding of the structure of the root and root canals, the characteristics of their age-related changes, and to study the degree of curvature of the root canals, a 3D model of the tooth was obtained. This is important for a more accurate understanding of the structure of the tooth.

Reference:

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