CT SCAN EVALUATION FOR ENDODONTIC SURGERY PLANNING

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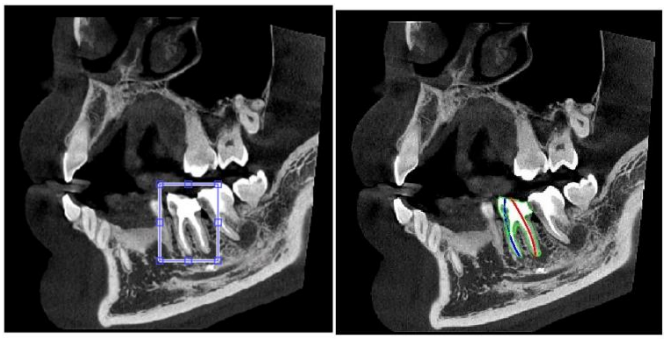
Utilization of computer tomography (CT) in dentistry represents a pivotal advancement, particularly in endodontic practice, where meticulous treatment planning is paramount. CT scans provide detailed three-dimensional representations of dental structures, facilitating comprehensive preoperative assessment.

A fundamental application of CT in endodontics lies in the precise determination of root canal length, a critical factor influencing treatment outcomes. To achieve this, sophisticated image processing methodologies are employed, including the approximation of mean line coordinates of the segmented root canal structure[1].

The process involves segmentation of the root canal from CT images, followed by the approximation of mean line coordinates. This approach covers a mathematical representation of the canal's trajectory and length within the three-dimensional space. By integrating CT imaging with this computational technique, clinicians can attain a highly accurate assessment of root canal morphology and length[2].

The scientific precision of this methodology ensures meticulous treatment planning tailored to the unique anatomical characteristics of each patient. Consequently, it minimizes procedural errors and optimizes treatment efficacy, ultimately enhancing patient care standards in endodontic practice. An example is shown in Figure 1.



a b

Figure 1 – Example of endodontic treatment planning via CT scan evaluation method: a-working area selection; b-endodontic instrument modeling

References:

1. Perepelytsia, O. and Avrunin, O. (2022) 'Comparison of the method of electrometric determination of root canal parameters and the method of threshold segmentation of Radiographs', Innovative Technologies and Scientific Solutions for Industries, (4 (22)), pp. 48–57. doi:10.30837/itssi.2022.21.049.

2. Perepelytsia, O. M. (2021). Segmentation of dental X-ray in endodontic treatment. Biophysical Bulletin, (45), 21-31. https://doi.org/10.26565/2075-3810-2021-45-02