VIRTUAL ENDODONTICS: THREE-DIMENSIONAL TEETH VOLUME REPRESENTATIONS AND THEIR PULP CAVITY ACCESS

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The purpose of this study was the application of both digital threedimensional image processing and virtual reality techniques in Endodontics. Three-dimensional volume representations of two teeth from each tooth category, sixteen teeth in total, have been constructed. All these teeth were embedded in polyester resin and serial cross sections 0.75mm thick were taken from each tooth, by using a special microtome. Each section was studied under a stereoscopic microscope, and its microscopic image was directly digitized using a video-camera. The surfaces of hard dental tissues were segmented from each section. Semiautomatic alignment and frame interpolation were performed on the sequence of each tooth sections, using appropriate image processing techniques. Three-dimensional volume representations were achieved in this project in order to produce the final 3D teeth models, on which virtual accesses of pulp cavities have been performed. In conclusion, 3D teeth volume representations enable the detailed study of the external tooth morphology from different viewpoints. Furthermore, virtual tooth "drilling" could serve as a perfect educational tool for undergraduate and postgraduate students, under certain circumstances.