

Publication

The morphology of amputated human teeth and its relation to mechanical properties after restoration treatment

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The increased susceptibility to fracture of root canal-and post-treated teeth is less affected by alterations of the dentin structure, but seems to crucially depend on the loss of coronal tooth substance. The surface, available for adhesion of the composite material in the root canal and in the coronal part of the tooth, is assumed to be of key importance for the fracture resistance. Thus, an appropriate three-dimensional method should be identified to determine the adhesive surface with necessary precision. For this purpose, severely decayed teeth were simulated decapitating clinical crowns. After root canal filling and post space preparation, impressions of the root canal and the amputation surface were obtained using silicone. Micro computed tomography scans of these impressions were acquired. For one selected specimen, an additional high-resolution scan was recorded at a synchrotron radiation source. Software of ImageLab served for the extraction of the amputation interface, the post surface and the post volume from the tomography data, which have been finally correlated with the Young's modulus and the maximal load derived from mechanical tests. The morphological parameters show a realistic relationship to the mechanical tests performed after the restoration treatments and are consequently important for improving the dental skills.

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