Orders of Beitrags:
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Titel des Beitrags:
Visualizing the root-PDL-bone interface using high-resolution microtomography

Abstract:
The root/periodontal ligament/bone (RPB) interface is important for a correct understanding of the load transfer mechanism of masticatory forces and orthodontic loads. It is the aim of this study to assess the three-dimensional structure of the RPB interface using high-resolution microtomography. A human posterior jaw segment, obtained at autopsy from a 22-year old male donor was first scanned using a tomograph at the HASYLAB/DESY synchrotron facility (Hamburg, Germany) at 31μm resolution. Afterwards the first molar and its surrounding bone were removed with a 10mm hollow core drill. From this cylindrical sample smaller samples were drilled out in the buccolingual direction with a 1.5mm hollow core drill. These samples were scanned at 4μm resolution. The scans of the entire segment showed alveolar bone with a thin lamina dura, supported by an intricate trabecular network. Although featuring numerous openings between the PDL and the bone marrow on the other side to allow blood vessels to transverse, the lamina dura seems smooth at this resolution. First at high resolution, however, it becomes evident that it is irregular with bony spiculae and pitted surfaces. Therefore the stresses in the bone during physiological or orthodontic loading are much higher than expected from a smooth continuous alveolus.

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