Ultrasonography in the Detection of Tooth Roots and Inter-Radicular Spaces for Mini-Implant Site Selection in Porcine Mandibles

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Abstract

Introduction: Ultrasonography (US) has long been used in various capacities in the medical and dental field. Diagnostic US in medicine has been primarily used for soft tissues but there is reason to believe it may also be useful in hard tissues. US is a safe, non-invasive, convenient diagnostic method with the potential to aid in orthodontic mini-implant placement through the detection of dental roots and inter-radicular spaces in alveolar bone.

Purpose: To validate the use of a novel US methodology for the detection of tooth roots and in the measurement of inter-radicular distances in porcine mandible specimens.

Materials and Methods: Five porcine mandibles sectioned at the midline (ten jaw specimens total) were analyzed using a multi-channel ultrasound imaging system and acoustic microscope. Images were reconstructed and the closest inter-radicular distance between the roots at a level eight mm apical to the interdental papilla were measured between all molars and premolars, resulting in six inter-radicular sites per specimen (n = 60). Gold-standard Micro-CT (µ-CT) scans were conducted on the same specimens and 3D slicer software was utilized to again measure the inter-radicular distances between molars and premolars. Statistical analysis to compare US and µ-CT scan measurements was conducted with SPSS.

Results: TBD

Conclusion: TBD

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