

Dental MRI

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Purpose: To systematically review the potential of magnetic resonance imaging in dentistry.

Outline of content:

Up to now, there are only few reports published on the application of MRI in dentistry. Besides typical radiologic applications such as the assessment of extracranial tumours, the application of MRI for dental question has been limited to the assessment of the morphology and function of the temporomandibular joint, for the planning of dental implantation procedures and for the assessment of impacted teeth. The main limitation of MRI for dental application results from its inability of assessing hard tissue structures and hence its very limited performance in delineation of the mineralized components of the tooth and the bone. With the recent progress in ultra-short echo time imaging approaches (UTE, ZTE, SWIFT, PETRA, ...), imaging of the hard tissue components renders feasible and MRI may become increasingly important for dental applications.

This educational e-poster will provide a comprehensive overview on dental MR imaging. An overview important imaging techniques such as ultra-short echo time imaging methods and their potential application to the different fields of dental imaging will be provided. The tuning of conventional imaging techniques for providing important diagnostic information e.g. for the assessment of inflammational processes, (apical)parodontitis and bone degradation will be discussed as well as the application of fast imaging methods for the analysis of disorders of the temperomandibular joint. Current limitations from dental filling materials and required technical modifications for dental imaging systems will be discussed.

For all presented applications, the MR derived information will be benchmarked to the current state-of-the-art diagnostic approaches and examples for the superiority of MRI over conventional imaging modalities will be presented.

Summary:

The application of MRI in the dental field appears to be a promising new field. With the introduction of ultra-short echo imaging technique, the missing link for a comprehensive dental imaging has been closed. With today's MRI imaging technology, the majority of imaging demands in dentistry can be answered radiation-free in a single MRI session.