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EFFECTS OF ORTHODONTIC APPLIANCES ON DIAGNOSTIC QUALITY OF MR IMAGES OF THE HEAD

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We aimed to study in-vivo the influence of commonly used fixed appliances on the diagnostic quality of 3 Tesla head MRI to determine which appliances should be removed for MRI of specific head regions.

Methods: Head MRI were acquired for 10 adults wearing Essix trays with embedded 4 common fixed appliances: ceramic brackets, steel brackets, combination of ceramic brackets and steel molar tubes, steel mandibular lingual retainer. 6 sequences were included for each appliance: sagittal T1, axial T2, axial gradient-recalled (GRE), axial diffusion-weighted (DWI), axial magnetic resonance angiography (MRA) and axial fluid attenuated inversion recovery (FLAIR). The final sample included 13860 MR images analyzed by 2 neuroradiologists with regard to the extent of distortion in 9 regions of the head.

Results: Interrater($\kappa=0.842$) and intrarater agreements were high (reviewer 1: $\kappa=0.717$, 2: $\kappa=0.768$). Wilcoxon signed rank test showed a statistically significant difference between the distortion scores of all appliances compared to each other ($p<0.0001$). For 3T brain MRI; none of the appliances need to be removed for MRA, FLAIR, and T2 sequences; steel brackets and tubes need to be removed for T1, GRE, and DWI; ceramic brackets do not need to be removed; steel molar tubes need to be removed for GRE and DWI; steel lingual retainer does not need to be removed.

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