

## Publication

Dynamic MR imaging of the skeletal muscle in young and senior volunteers during synchronized minimal neuromuscular electrical stimulation.

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Neuromuscular electrical stimulation (NMES)-induced isometric contraction is feasible during MRI and can be combined with acquisition of volumetric dynamic MR data, in a synchronous and controlled way. Since NMES is a potent resource for rehabilitation, MRI synchronized with NMES presents a valuable validation tool. Our aim was to show how minimal NMES-induced muscle contraction characterization, as evaluated through phase-contrast MRI, differs between senior and young volunteers.; Simultaneous NMES of the quadriceps muscle and phase-contrast imaging were applied at 3T to 11 senior (75 ± 3 years) and 12 young volunteers (29 ± 7 years). A current sufficient to induce muscle twitch without knee extension was applied to both groups.; Strain vectors were extracted from the velocity fields and strain datasets were compared with non-parametric tests and descriptive statistics. Strain values were noticeably different between both groups at both current intensities and significant differences were observed for similar current level.; In conclusion, NMES-synchronized MRI could be successfully applied in senior volunteers with strain results clearly different from the younger volunteers. Also, differences within the senior group were detected both in the magnitude of strain and in the position of maximum strain pixels.

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