FIRST CLINICAL STUDIES WITH FFC-MRI: EARLY RESULTS

L. M. Broche,[a*] P. J. Ross,[a] G. R. Davies,[a] M. J. MacLeod,[a] Y. Masannat,[b] S. Leslie,[b] P. Bhatt,[b] F. Berger,[c] H. Lahrech,[c] D. J. Lurie [a]

[a] University of Aberdeen, Aberdeen, United Kingdom
[b] NHS Grampian, Aberdeen, United Kingdom
[c] BrainTech Lab INSERM U1205, Grenoble, France

*E-mail: l.broche@abdn.ac.uk

Our lab has recently commissionned a resistive whole-body FFC-MRI scanner operating between 200 mT and 20 µT, opening the way to *in-vivo* application of FFC methods. Several clinical pilot studies are under way and early results in stroke and cancer show great potential for clinical applications.
The PUFFINS study (Potential Use of Fast Field cycling IN Stroke) led by Dr Mary-Joan Macleod shows large contrast in brain stroke from 0.2 T to 200 µT, opening the way to ultra-low field stroke imaging devices (see Fig. 1).
Previous results on breast cancer ressections showed biomarkers of tumour aggressiveness [1], which have been linked to water exchange through the membrane [2,3]. Similar results are also seen in colorectal cancer, including in the peritumoural area. Brain glioma also showed a variety of patterns, which are still to be understood. We have started breast and brain scans and obtained the first *in vivo* dispersion images of volunteers, showing excellent ability for image segmentation (see Fig 2).
These studies should continue for 1 to 2 years but early results demonstrate the capabilities of FFC-MRI for image processing and data extraction. This presentation will expose the methods used for image analysis in our labs and how the data collected has been exploited to date.

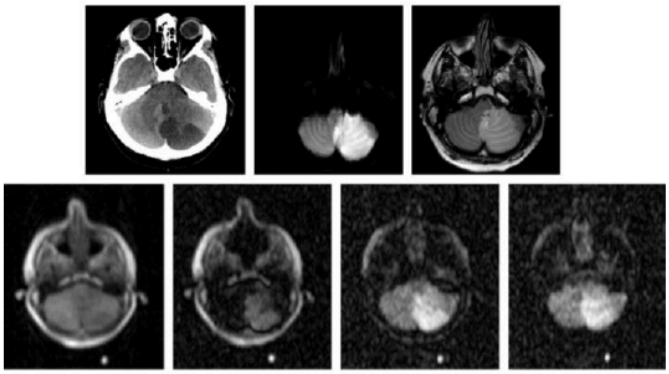

Fig. 1. Images of brain stroke from CT (top left), DWI at 3 T (top middle) and T2 at 3T (top right), as well as FFC-MRI at 200, 20, 2 and 0.2 mT (bottom line). A contrast is clearly visible down to the lowest attainable field.

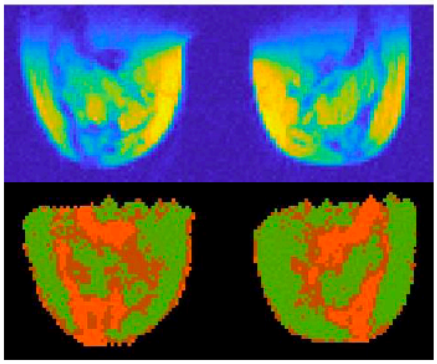

Fig. 2. Top: magnitude images of an FFC-MRI scan at 200 mT from a healthy volunteer. Bottom: composite image using dispersion data at low and high field as well as quadrupolar peak amplitude.

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References

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