

Navigator acceptance window width does not affect accuracy and precision in free-breathing 2D cardiac MR fingerprinting at 3T

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BACKGROUND

- Cardiac magnetic resonance fingerprinting (**cMRF**) relies on varying the magnetization to extract multiple underlying parameters with a single scan.
- It has previously been applied for breath-held 2D and free-breathing 3D joint T_1 - T_2 mapping of the myocardium at 1.5T.
- Breath-holds can be challenging for certain patients.

METHODS

- Accuracy measured in the NIST phantom
- PARMA with four navigator acceptance window widths (**NAWW**) tested in N=6 healthy volunteers, accuracy and precision measured
- Compared to MOLLI and T_2 prep bSSFP

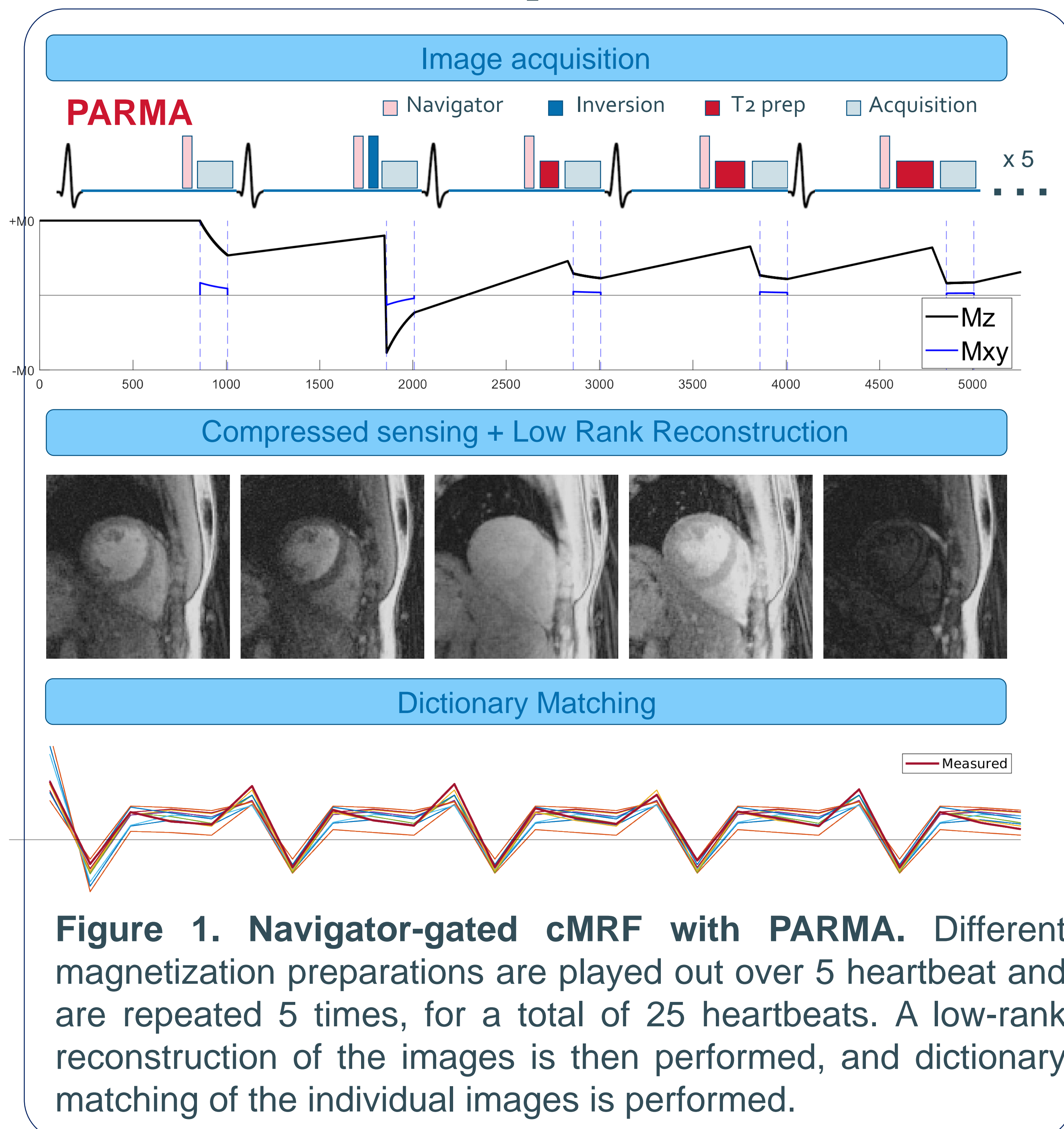


Figure 1. Navigator-gated cMRF with PARMA. Different magnetization preparations are played out over 5 heartbeat and are repeated 5 times, for a total of 25 heartbeats. A low-rank reconstruction of the images is then performed, and dictionary matching of the individual images is performed.

CONCLUSION

PARMA had high accuracy in the phantom and was successfully acquired in all healthy volunteers with all tested NAWW. We preliminarily demonstrated that navigator rejection does not affect the accuracy or precision of the mapped relaxation times. However, the visible thickness of the myocardium was often slightly reduced with larger NAWW.

AIMS

To implement a **navigator-gated free-breathing** 2D joint T_1 - T_2 cMRF of the myocardium at **3T** named **PARMA** (for PARAmeter Mapping) and to quantify the influence of the navigator acceptance window width (**NAWW**) on the T_1 and T_2 accuracy and precision in a phantom and the myocardium of healthy volunteers.

RESULTS

1 Phantom

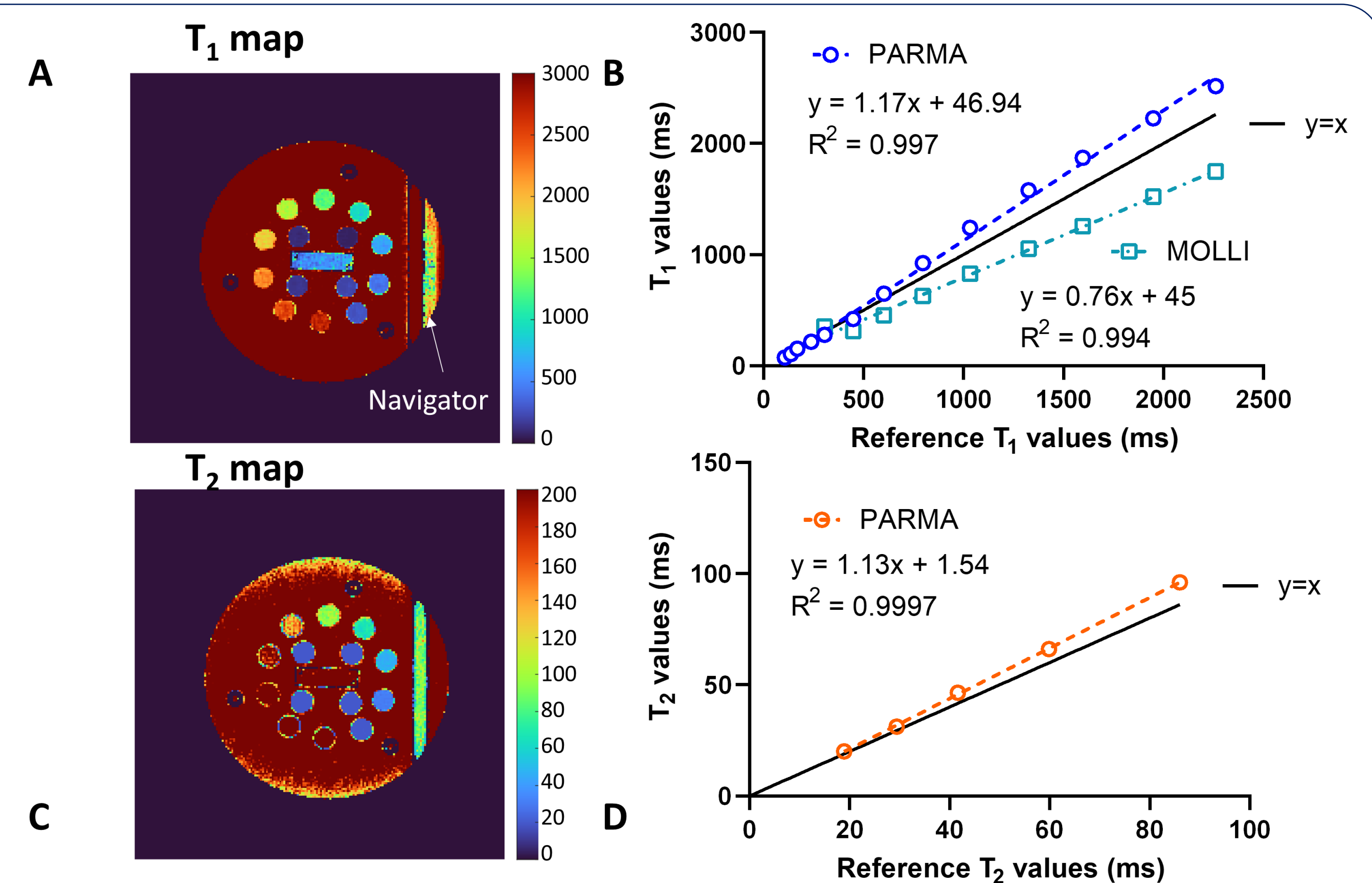


Figure 2. Phantom results. High accuracy is observed for both the T_1 and T_2 relaxation times.

2 Healthy Volunteers

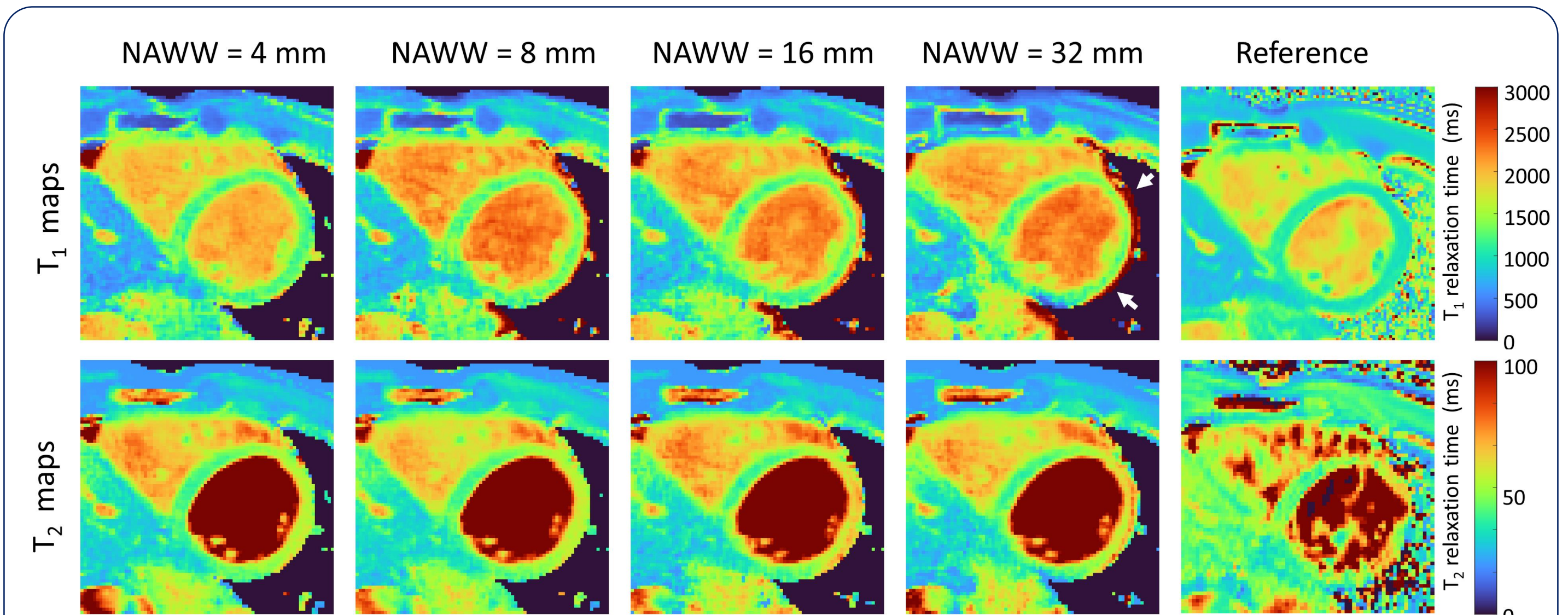


Figure 3. PARMA T_1 and T_2 maps for the different NAWW compared to the reference techniques.

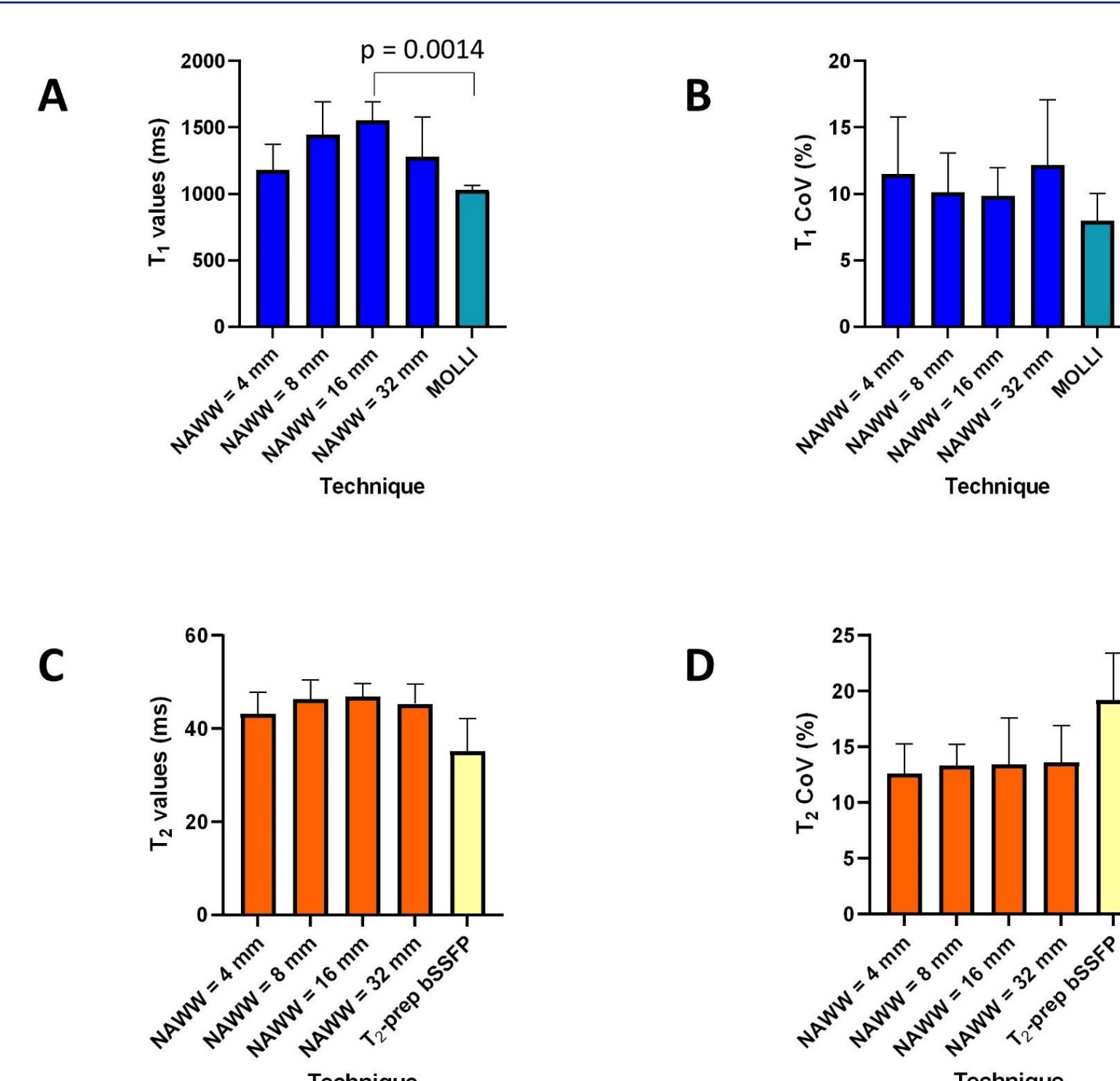


Figure 4. Impact of the navigator acceptance windows width (NAWW) on the myocardial T_1 and T_2 values. of the compared with reference techniques in 6 healthy volunteers.