

Supplementary Material

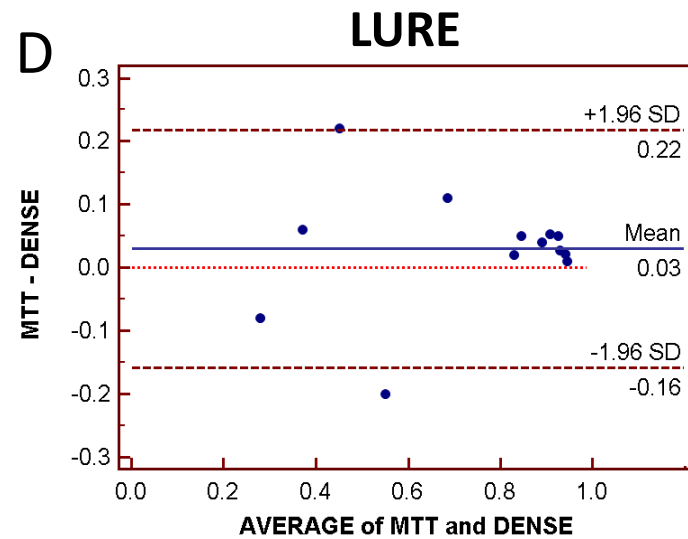
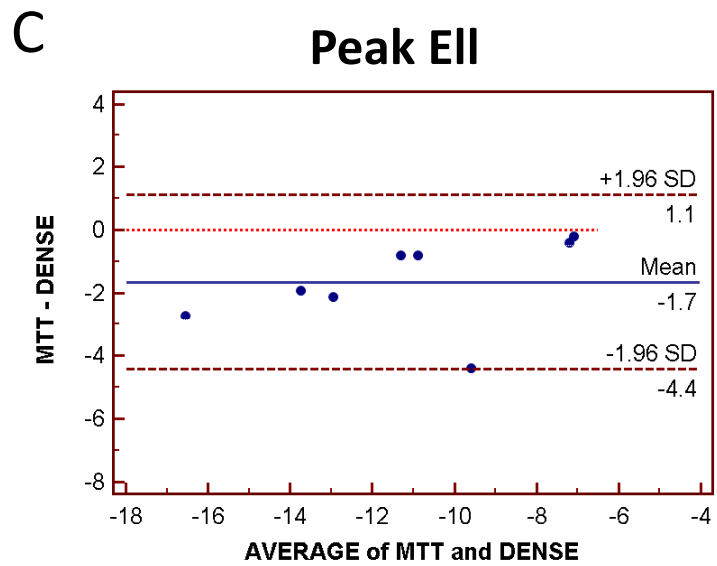
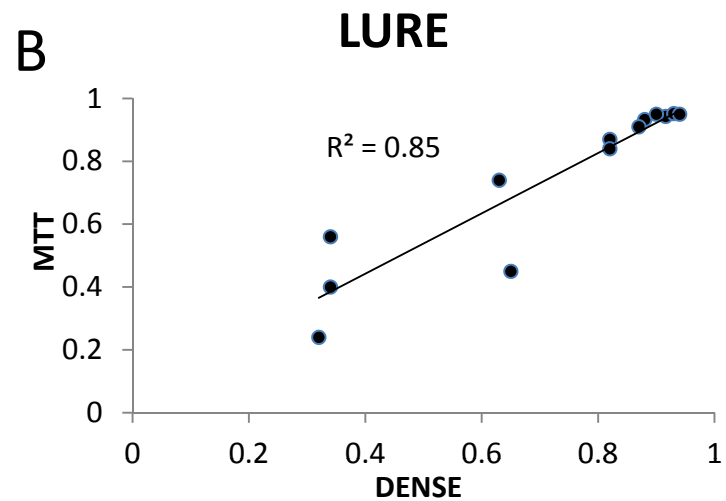
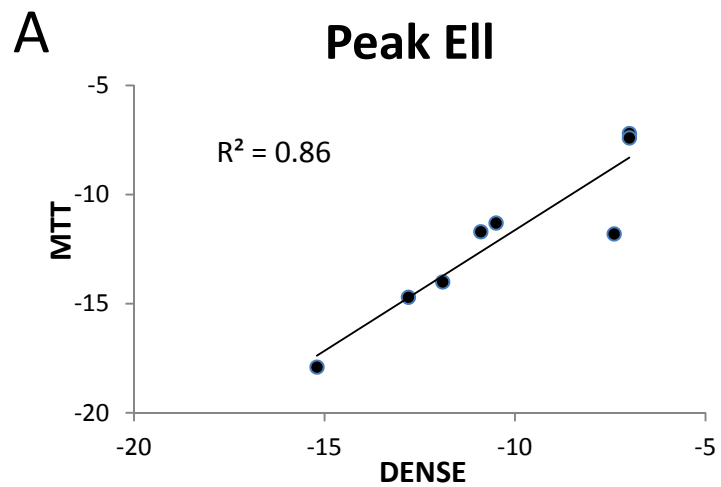
Magnetic Resonance Cine DENSE Dyssynchrony Parameters for the Evaluation of Heart Failure: Comparison to Myocardial Tissue Tagging

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- **Supplementary Table: Correlations Among MR Dyssynchrony Parameters**
- **Supplementary Figure 1: Peak Longitudinal Strains and Longitudinal Dyssynchrony from Cine DENSE versus Myocardial Tissue Tagging** – Correlation between cine DENSE and myocardial tissue tagging is shown for **(A)** longitudinal strain (E_{LL}) and **(B)** the longitudinal dyssynchrony measure LURE. Agreement between the methods is also shown in the form of Bland Altman plots for **(C)** E_{LL} and **(D)** LURE.
- **Supplementary Figure 2: Circumferential, Longitudinal, and Radial Strain Curves** – Strain-versus-time curves based on a six-segment model are shown for the normal (**Top**), NQRS-HF (**Middle**), and LBBB-HF groups (**Bottom**). Circumferential (**Left**), longitudinal (**Middle**), and radial strain curves (**Right**) are shown for each group. For the circumferential and longitudinal parameters, negative strain indicates contraction, and positive strain indicates stretch. For radial strain, positive strain indicates contraction, and negative strain indicates stretch.
- **Online Videos**
 - **Video 1:** Cardiac Magnetic Resonance LBBB-HF Cine – An SSFP cine loop is shown for a LBBB-HF case. Note the delay in mechanical activation between the septum and free wall, as well as the associated late septal stretch.
 - **Video 2:** Cardiac Magnetic Resonance NQRS-HF Cine – An SSFP cine loop is shown for a NQRS-HF case.
 - **Video 3:** Lagrangian LBBB-HF Movie– The corresponding LBBB-HF Lagrangian displacement movie is shown.
 - **Video 4:** Lagrangian NQRS-HF Movie– The corresponding NQRS-HF Lagrangian displacement movie is shown.

Supplementary Table: Correlations Among MR Dyssynchrony Parameters

Strain Vector	Parameter 1	Parameter 2	r	p-value
Circumferential	CURE	SD12- E_{CC}	-0.62	0.03
	CURE	E_{CC} -Delay	-0.62	0.02
	SD12- E_{CC}	E_{CC} -Delay	0.95	<0.001
Longitudinal	LURE	SD12- E_{LL}	-0.76	0.005
	LURE	E_{LL} -Delay	-0.57	0.05
	SD12- E_{LL}	E_{LL} -Delay	0.91	<0.001
Radial	RURE	SD12- E_{RR}	-0.42	0.15
	RURE	E_{RR} -Delay	-0.38	0.20
	SD12- E_{RR}	E_{RR} -Delay	0.89	<0.001

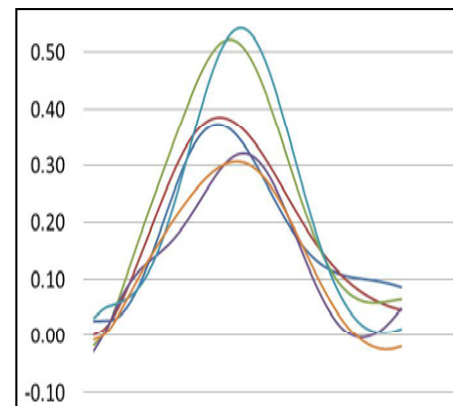
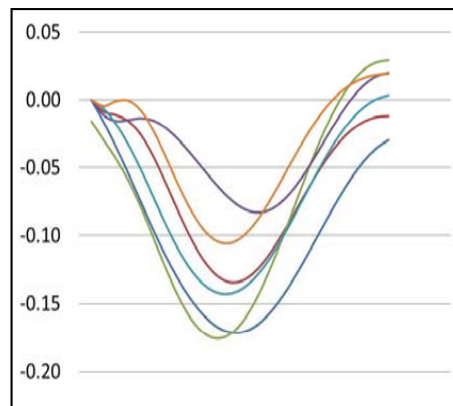
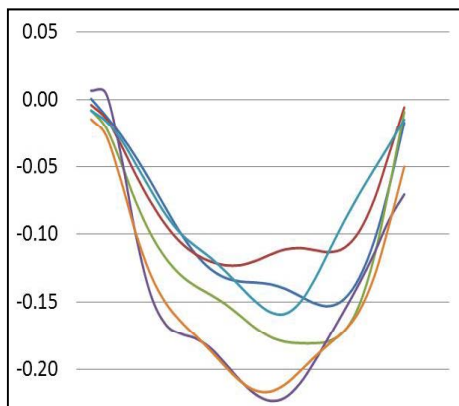


Circumferential (E_{CC})

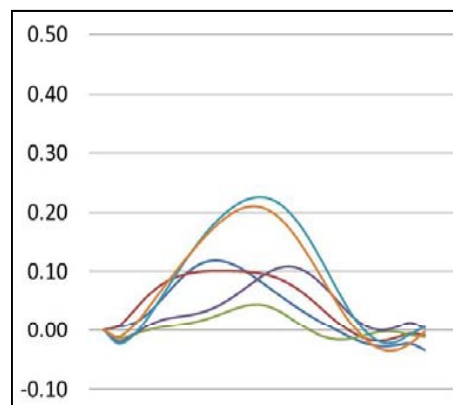
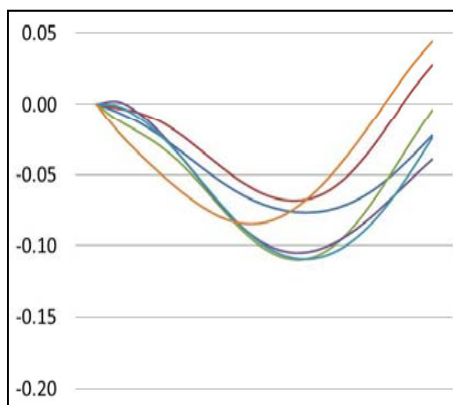
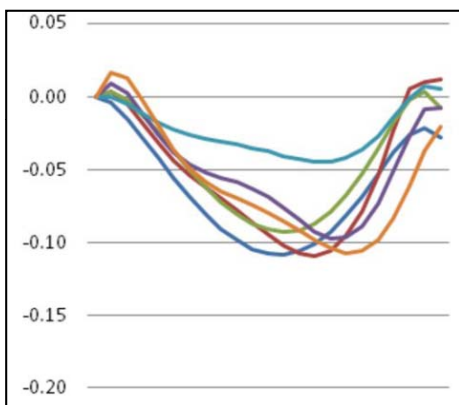
Longitudinal (E_{LL})

Radial (E_{RR})

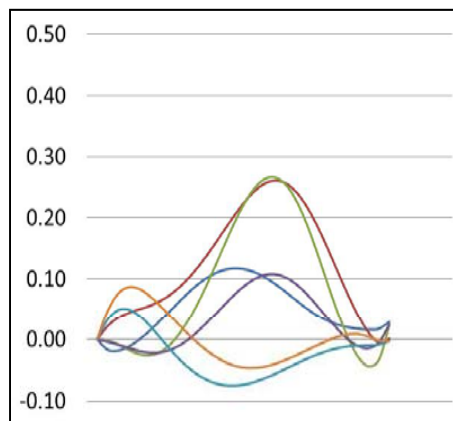
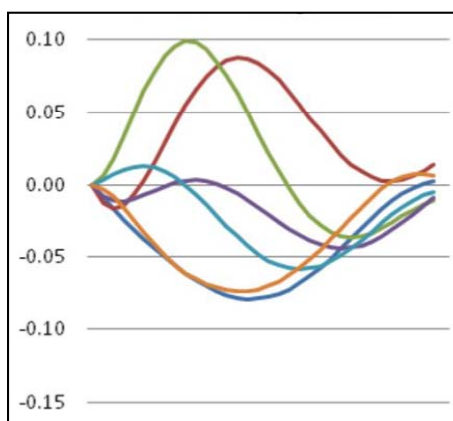
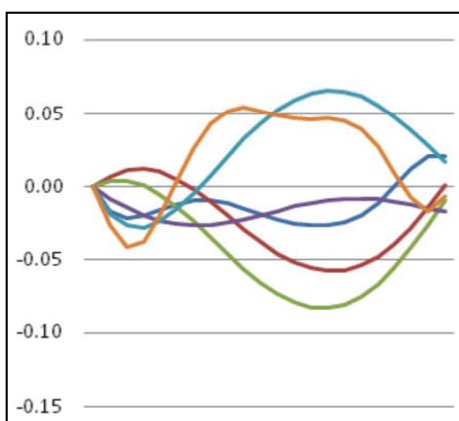
Normal



NQRS-HF



LBBB-HF



— Anterior free wall — Lateral free wall — Posterior free wall — Inferior — Inferior septum — Anterior septum