

MR Acquisition protocol

The protocol used for MR data acquisition is described in the following.

Nr.	Step	Explanation
1	Questionnaire, information sheet and consent	Questionnaire, information sheet and consent form for subjects to participate in MRI studies at 3 Tesla
2	Positioning	Supine positioning of subject
3	MR Acquisition	Image data acquisition
3.1	haste_localizer	localizing the target organ in sagittal, coronal and axial directions
3.2	t2_haste_cor_p3	localizing the target organ in coronal direction
3.3	t1_starvibe_fs_tra_320	3D volume acquisition of liver for reference
3.4	t2_haste_sag_p3_mbh	localizing the target organ in sagittal direction
3.5	TRUFI Test Navigatorslice	localizing a good navigator slice with trackable vessels (multiple times until suitable slice found)
3.6	TRUFI Navigatorslice pur	Acquisition of first reference sequence
3.7	TRUFI_2D_sag_2SI_200Dyn Navigatorslice	Acquisition of interleaved sequence (multiple times for each data slice position)
3.8	TRUFI Navigatorslice pur	Acquisition of second reference sequence
3.8	t1_starvibe_fs_tra_320	3D volume acquisition of liver for reference

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Gulamhussene

Leber

4DMR-Studie

haste_localizer
t2_haste_cor_p3
t1_starvibe_fs_tra_320
t2_haste_sag_p3_mbh
TRUFI Test Navigatorslice
TRUFI Navigatorslice pur
TRUFI_2D_sag_2SI_200Dyn Navigatorslice

\\USER\Gulamhussene\Leber\4DMR-Studie\haste_localizer

TA: 0:15 PM: ISO Voxel size: 1.7×1.7×6.0 mmPAT: 2 Rel. SNR: 1.00 : h

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	On
Auto open inline display	On
Auto close inline display	On
Start measurement without further preparation	On
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	5
Dist. factor	150 %
Position	L0.0 P0.0 H50.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice group	2
Slices	3
Dist. factor	300 %
Position	L0.0 P30.0 H0.0 mm
Orientation	Coronal
Phase enc. dir.	R >> L
Slice group	3
Slices	7
Dist. factor	20 %
Position	Isocenter
Orientation	S > T3.0
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	30 %
FoV read	430 mm
FoV phase	100.0 %
Slice thickness	6.0 mm
TR	1000.0 ms
TE	84 ms
Averages	1
Concatenations	1
Filter	Distortion Corr.(2D), Prescan Normalize, Elliptical filter
Coil elements	SP1-3

Contrast - Common

TR	1000.0 ms
TE	84 ms
MTC	Off
Magn. preparation	None
Flip angle	130 deg
Fat suppr.	None
Water suppr.	None
Restore magn.	Off

Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1

Contrast - Dynamic

Multiple series	Each measurement
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Resolution - Common

FoV read	430 mm
FoV phase	100.0 %
Slice thickness	6.0 mm
Base resolution	256
Phase resolution	70 %
Phase partial Fourier	5/8
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	24
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	On
Mode	2D
Unfiltered images	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	On

Geometry - Common

Slice group	1
Slices	5
Dist. factor	150 %
Position	L0.0 P0.0 H50.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice group	2
Slices	3
Dist. factor	300 %
Position	L0.0 P30.0 H0.0 mm
Orientation	Coronal
Phase enc. dir.	R >> L
Slice group	3
Slices	7
Dist. factor	20 %
Position	Isocenter
Orientation	S > T3.0
Phase enc. dir.	A >> P
FoV read	430 mm
FoV phase	100.0 %
Slice thickness	6.0 mm
TR	1000.0 ms
Multi-slice mode	Single shot
Series	Descending
Concatenations	1

Geometry - AutoAlign

Slice group	1
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Geometry - AutoAlign

Position	L0.0 P0.0 H50.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice group	2
Position	L0.0 P30.0 H0.0 mm
Orientation	Coronal
Phase enc. dir.	R >> L
Slice group	3
Position	Isocenter
Orientation	S > T3.0
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	L0.0 P0.0 H50.0
Phase	0.0 mm
Read	0.0 mm
Shift	50.0 mm
Initial Rotation	0.00 deg
Initial Orientation	Transversal

Geometry - Saturation

Fat suppr.	None
Water suppr.	None
Restore magn.	Off
Special sat.	None

Geometry - Navigator**System - Miscellaneous**

Positioning mode	ISO
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	H >> F
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
Coil Focus	Flat
AutoAlign	---
Coil Select Mode	Default

System - Adjustments

B0 Shim mode	Tune up
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	Isocenter
Orientation	Transversal
Rotation	0.00 deg
A >> P	263 mm
R >> L	350 mm
F >> H	350 mm
Reset	Off

System - Tx/Rx

Frequency 1H	123.259893 MHz
Correction factor	1
Gain	High

System - Tx/Rx

Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	1000.0 ms
Concatenations	1

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	430 mm
FoV phase	100.0 %
Phase resolution	70 %

Physio - PACE

Resp. control	Breath-hold
Concatenations	1

Inline - Common

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	On
Mode	2D
Unfiltered images	Off

Sequence - Part 1

Introduction	Off
Dimension	2D
Contrasts	1
Flow comp.	No
Multi-slice mode	Single shot
Echo spacing	5.28 ms
Bandwidth	476 Hz/Px

Sequence - Part 2

RF pulse type	Normal
Gradient mode	Fast
Hyperecho	Off
Turbo factor	179

Sequence - Assistant

Mode	Min flip angle
Min flip angle	150 deg
Allowed delay	30 s

\\USER\Gulamhussene\Leber\4DMR-Studie\t2_haste_cor_p3

TA: 0:49 PM: ISO Voxel size: 1.6×1.6×5.0 mmPAT: 3 Rel. SNR: 1.00 : h

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	On
Auto open inline display	On
Auto close inline display	On
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	35
Dist. factor	15 %
Position	L0.0 P37.3 F45.5 mm
Orientation	Coronal
Phase enc. dir.	R >> L
AutoAlign	---
Phase oversampling	50 %
FoV read	400 mm
FoV phase	100.0 %
Slice thickness	5.0 mm
TR	1400.0 ms
TE	87 ms
Averages	1
Concatenations	2
Filter	Distortion Corr.(2D), Prescan Normalize
Coil elements	SP1-4

Contrast - Common

TR	1400.0 ms
TE	87 ms
MTC	Off
Magn. preparation	None
Flip angle	110 deg
Fat suppr.	None
Water suppr.	None
Restore magn.	Off

Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Multiple series	Off

Resolution - Common

FoV read	400 mm
FoV phase	100.0 %
Slice thickness	5.0 mm
Base resolution	256
Phase resolution	100 %
Phase partial Fourier	4/8
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	3
Ref. lines PE	42
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	On
Mode	2D
Unfiltered images	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slice group	1
Slices	35
Dist. factor	15 %
Position	L0.0 P37.3 F45.5 mm
Orientation	Coronal
Phase enc. dir.	R >> L
FoV read	400 mm
FoV phase	100.0 %
Slice thickness	5.0 mm
TR	1400.0 ms
Multi-slice mode	Single shot
Series	Interl. in B.-h.
Concatenations	2

Geometry - AutoAlign

Slice group	1
Position	L0.0 P37.3 F45.5 mm
Orientation	Coronal
Phase enc. dir.	R >> L
AutoAlign	---
Initial Position	L0.0 P37.3 F45.5
Phase	0.0 mm
Read	45.5 mm
Shift	37.3 mm
Initial Rotation	0.00 deg
Initial Orientation	Coronal

Geometry - Saturation

Fat suppr.	None
Water suppr.	None
Restore magn.	Off
Special sat.	None

Geometry - Navigator**System - Miscellaneous**

Positioning mode	ISO
Table position	F
Table position	45 mm
MSMA	S - C - T

System - Miscellaneous

Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
Coil Focus	Flat
AutoAlign	---
Coil Select Mode	On - AutoCoilSelect

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	On
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	L0.0 P37.3 F45.5 mm
Orientation	Coronal
Rotation	0.00 deg
R >> L	400 mm
F >> H	400 mm
A >> P	201 mm
Reset	Off

System - Tx/Rx

Frequency 1H	123.259893 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	1400.0 ms
Concatenations	2

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	400 mm
FoV phase	100.0 %
Phase resolution	100 %

Physio - PACE

Resp. control	Breath-hold
Concatenations	2

Inline - Common

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off

Inline - MIP

MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	On
Mode	2D
Unfiltered images	Off

Sequence - Part 1

Introduction	Off
Dimension	2D
Contrasts	1
Flow comp.	No
Multi-slice mode	Single shot
Echo spacing	3.96 ms
Bandwidth	698 Hz/Px

Sequence - Part 2

RF pulse type	Fast
Gradient mode	Fast
Hyperecho	Off
Turbo factor	256

Sequence - Assistant

Mode	Min flip angle
Min flip angle	150 deg
Allowed delay	30 s

\\USER\Gulamhussene\Leber4DMR-Studie\t1_starvibe_fs_tra_320

TA: 2:01 PM: REF Voxel size: 1.2x1.2x3.0 mmPAT: Off Rel. SNR: 1.00 : fl

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slab group	1
Slabs	1
Dist. factor	20 %
Position	L6.2 P0.0 H0.3 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
Slice oversampling	44.4 %
Slices per slab	72
FoV read	380 mm
FoV phase	100.0 %
Slice thickness	3.0 mm
TR	2.83 ms
TE	1.48 ms
Averages	1
Concatenations	1
Filter	Distortion Corr.(2D), Prescan Normalize
Coil elements	SP2,3

Contrast - Common

TR	2.83 ms
TE	1.48 ms
Flip angle	9.0 deg
Fat suppr.	Q-fat sat.
Lines Per Shot	56
Water suppr.	None
Dixon	Off

Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Multiple series	Each measurement

Resolution - Common

FoV read	380 mm
FoV phase	100.0 %
Slice thickness	3.0 mm
Base resolution	320
Radial views	680
Slice resolution	60 %
Slice partial Fourier	7/8
Trajectory	Radial

Resolution - Common

View sharing	Off
Interpolation	Off

Resolution - iPAT

PAT mode	None
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Resolution - Filter Image

Image Filter	Off
Distortion Corr.	On
Mode	2D
Unfiltered images	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
POCS	Off

Geometry - Common

Slab group	1
Slabs	1
Dist. factor	20 %
Position	L6.2 P0.0 H0.3 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice oversampling	44.4 %
Slices per slab	72
FoV read	380 mm
FoV phase	100.0 %
Slice thickness	3.0 mm
TR	2.83 ms
Multi-slice mode	Sequential
Series	Ascending
Concatenations	1

Geometry - AutoAlign

Slab group	1
Position	L6.2 P0.0 H0.3 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	L6.2 P0.0 H0.3
Phase	0.0 mm
Read	-6.2 mm
Shift	0.3 mm
Initial Rotation	0.00 deg
Initial Orientation	Transversal

Geometry - Saturation

Fat suppr.	Q-fat sat.
Water suppr.	None
Dixon	Off
Special sat.	None

System - Miscellaneous

Positioning mode	REF
Table position	H

System - Miscellaneous

Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	H >> F
Coil Combine Mode	Sum of Squares
Save uncombined	Off
Matrix Optimization	Off
Coil Focus	Flat
AutoAlign	---
Coil Select Mode	Default

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	L6.2 P0.0 H0.3 mm
Orientation	Transversal
Rotation	0.00 deg
A >> P	380 mm
R >> L	380 mm
F >> H	216 mm
Reset	Off

System - Tx/Rx

Frequency 1H	123.259893 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - PACE

Resp. control	Off
Concatenations	1

Inline - Common

View sharing	Off
Flip angle	9.0 deg
Measurements	1
Burn time-to-center	Off
Temporal interpolation	1
3D centric reordering	Off
Time to center	60.4 s

Inline - Inline

Subtract	Off
Measurements	1
StdDev	Off
Liver registration	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off

Inline - MIP

Save original images	On
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Inline - Soft Tissue

Wash - In	Off
Wash - Out	Off
TTP	Off
PEI	Off
MIP - time	Off
Measurements	1

Inline - Composing

Distortion Corr.	On
Mode	2D
Unfiltered images	Off

Sequence - Part 1

Introduction	Off
Dimension	3D
Elliptical scanning	Off
Reordering	Linear
Asymmetric echo	Off
Contrasts	1
Optimization	Min. TE
Multi-slice mode	Sequential
Bandwidth	820 Hz/Px

Sequence - Part 2

RF pulse type	Fast
Gradient mode	Fast
Excitation	Slab-sel.
RF spoiling	On
Incr. Gradient spoiling	Off

Sequence - Assistant

Mode	Off
Allowed delay	60 s

\\USER\Gulamhussene\Leber4DMR-Studie\t2_haste_sag_p3_mbh

TA: 0:56 PM: ISO Voxel size: 1.6×1.6×5.0 mmPAT: 3 Rel. SNR: 1.00 : h

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	On
Auto open inline display	On
Auto close inline display	On
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	40
Dist. factor	30 %
Position	R16.8 P33.9 F83.6 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	25 %
FoV read	400 mm
FoV phase	53.1 %
Slice thickness	5.0 mm
TR	1400.0 ms
TE	87 ms
Averages	1
Concatenations	2
Filter	Distortion Corr.(2D), Prescan Normalize
Coil elements	SP1-4

Contrast - Common

TR	1400.0 ms
TE	87 ms
MTC	Off
Magn. preparation	None
Flip angle	180 deg
Fat suppr.	None
Water suppr.	None
Restore magn.	Off

Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Multiple series	Off

Resolution - Common

FoV read	400 mm
FoV phase	53.1 %
Slice thickness	5.0 mm
Base resolution	256
Phase resolution	100 %
Phase partial Fourier	5/8
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	3
Ref. lines PE	42
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	Off
Distortion Corr.	On
Mode	2D
Unfiltered images	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

Geometry - Common

Slice group	1
Slices	40
Dist. factor	30 %
Position	R16.8 P33.9 F83.6 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
FoV read	400 mm
FoV phase	53.1 %
Slice thickness	5.0 mm
TR	1400.0 ms
Multi-slice mode	Single shot
Series	Interl. in B.-h.
Concatenations	2

Geometry - AutoAlign

Slice group	1
Position	R16.8 P33.9 F83.6 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R16.8 P33.9 F83.6
Phase	33.9 mm
Read	-83.6 mm
Shift	-16.8 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

Geometry - Saturation

Fat suppr.	None
Water suppr.	None
Restore magn.	Off
Special sat.	None

Geometry - Navigator**System - Miscellaneous**

Positioning mode	ISO
Table position	F
Table position	84 mm
MSMA	S - C - T

System - Miscellaneous

Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
Coil Focus	Flat
AutoAlign	---
Coil Select Mode	On - AutoCoilSelect

System - Adjustments

B0 Shim mode	Tune up
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	Isocenter
Orientation	Transversal
Rotation	0.00 deg
A >> P	263 mm
R >> L	350 mm
F >> H	350 mm
Reset	Off

System - Tx/Rx

Frequency 1H	123.259893 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	1400.0 ms
Concatenations	2

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	400 mm
FoV phase	53.1 %
Phase resolution	100 %

Physio - PACE

Resp. control	Breath-hold
Concatenations	2

Inline - Common

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off

Inline - MIP

MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	On
Mode	2D
Unfiltered images	Off

Sequence - Part 1

Introduction	Off
Dimension	2D
Contrasts	1
Flow comp.	No
Multi-slice mode	Single shot
Echo spacing	3.96 ms
Bandwidth	698 Hz/Px

Sequence - Part 2

RF pulse type	Fast
Gradient mode	Fast
Hypercho	Off
Turbo factor	136

Sequence - Assistant

Mode	Min flip angle
Min flip angle	150 deg
Allowed delay	30 s

\\USER\Gulamhussene\Leber\4DMR-Studie\TRUFI Test Navigatorslice

TA: 2.0 s PM: ISO Voxel size: 1.8x1.8x4.0 mmPAT: 3 Rel. SNR: 1.00 : tfi

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	1
Dist. factor	20 %
Position	R81.0 A2.0 H0.0 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
FoV read	320 mm
FoV phase	52.3 %
Slice thickness	4.0 mm
TR	39.96 ms
TE	1.49 ms
Averages	1
Concatenations	1
Filter	Distortion Corr.(2D), Prescan Normalize, Image Filter
Coil elements	SP2-5

Contrast - Common

TR	39.96 ms
TE	1.49 ms
Magn. preparation	None
Flip angle	35 deg
Fat suppr.	None
Wrap-up Magn.	None

Contrast - Dynamic

Averages	1
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	15
Pause after meas. 1	0.0 s
Pause after meas. 2	0.0 s
Pause after meas. 3	0.0 s
Pause after meas. 4	0.0 s
Pause after meas. 5	0.0 s
Pause after meas. 6	0.0 s
Pause after meas. 7	0.0 s
Pause after meas. 8	0.0 s
Pause after meas. 9	0.0 s
Pause after meas. 10	0.0 s
Pause after meas. 11	0.0 s
Pause after meas. 12	0.0 s
Pause after meas. 13	0.0 s
Pause after meas. 14	0.0 s

Contrast - Dynamic

Multiple series	Off
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Resolution - Common

FoV read	320 mm
FoV phase	52.3 %
Slice thickness	4.0 mm
Base resolution	176
Phase resolution	80 %
Phase partial Fourier	5/8
Trajectory	Cartesian
View sharing	Off
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	3
Ref. lines PE	24
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	On
! Intensity	Medium
Edge Enhancement	1
Smoothing	3
Unfiltered images	Off
Distortion Corr.	On
Mode	2D
Unfiltered images	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
POCS	Off

Geometry - Common

Slice group	1
Slices	1
Dist. factor	20 %
Position	R81.0 A2.0 H0.0 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
FoV read	320 mm
FoV phase	52.3 %
Slice thickness	4.0 mm
TR	39.96 ms
Multi-slice mode	Sequential
Series	Interleaved
Concatenations	1

Geometry - AutoAlign

Slice group	1
Position	R81.0 A2.0 H0.0 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R81.0 A2.0 H0.0

Geometry - AutoAlign

Phase	-2.0 mm
Read	0.0 mm
Shift	-81.0 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

Geometry - Saturation

Fat suppr.	None
Wrap-up Magn.	None
Special sat.	None

Geometry - Navigator**System - Miscellaneous**

Positioning mode	ISO
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Save uncombined	Off
Matrix Optimization	Off
Coil Focus	Flat
AutoAlign	---
Coil Select Mode	Default

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	On
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R81.0 A2.0 H0.0 mm
Orientation	Sagittal
Rotation	0.00 deg
A >> P	168 mm
F >> H	320 mm
R >> L	4 mm
Reset	Off

System - Tx/Rx

Frequency 1H	123.259893 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	39.96 ms
Concatenations	1
Segments	12

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None

Physio - Cardiac

Dark blood	Off
FoV read	320 mm
FoV phase	52.3 %
Phase resolution	80 %
Cine	On
Trajectory	Cartesian
View sharing	Off
Dummy heartbeats	0

Physio - PACE

Resp. control	Off
Concatenations	1

Inline - Common

Subtract	Off
Measurements	15
StdDev	Off
Save original images	On

Inline - Cardiac

Inline Evaluation	Off
Magn. preparation	None
Contrasts	1
TE	1.49 ms
TR	39.96 ms
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	On
Mode	2D
Unfiltered images	Off

Sequence - Part 1

Introduction	Off
Dimension	2D
Reordering	Linear
Asymmetric echo	Weak
Contrasts	1
Optimization	Min. TE TR
Multi-slice mode	Sequential
Echo spacing	3.3 ms
Sequence type	Trufi
Bandwidth	676 Hz/Px

Sequence - Part 2

Define	Segments
Segments	12
Trufi delta freq.	0 Hz
RF pulse type	Fast
Gradient mode	Fast
Excitation	Slice-sel.
Flip angle mode	Constant
Cine	On

Sequence - Assistant

Mode	Min flip angle
------	----------------

Sequence - Assistant

Min flip angle	50 deg
Allowed delay	0 s

\\USER\Gulamhussene\Leber4DMR-Studie\TRUFI Navigatorslice pur

TA: 1:26 PM: FIX Voxel size: 1.8×1.8×4.0 mmPAT: 3 Rel. SNR: 1.00 : tfi

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	1
Dist. factor	20 %
Position	R73.4 P30.0 F16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
FoV read	320 mm
FoV phase	79.5 %
Slice thickness	4.0 mm
TR	39.96 ms
TE	1.49 ms
Averages	1
Concatenations	1
Filter	Distortion Corr.(2D), Prescan Normalize, Image Filter
Coil elements	SP1-3

Contrast - Common

TR	39.96 ms
TE	1.49 ms
Magn. preparation	None
Flip angle	30 deg
Fat suppr.	None
Wrap-up Magn.	None

Contrast - Dynamic

Averages	1
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	513
Pause after meas.	0.0 s
Multiple series	Off

Resolution - Common

FoV read	320 mm
FoV phase	79.5 %
Slice thickness	4.0 mm
Base resolution	176
Phase resolution	80 %
Phase partial Fourier	5/8
Trajectory	Cartesian
View sharing	Off
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	3
Ref. lines PE	24
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	On
! Intensity	Medium
Edge Enhancement	1
Smoothing	3
Unfiltered images	Off
Distortion Corr.	On
Mode	2D
Unfiltered images	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
POCS	Off

Geometry - Common

Slice group	1
Slices	1
Dist. factor	20 %
Position	R73.4 P30.0 F16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
FoV read	320 mm
FoV phase	79.5 %
Slice thickness	4.0 mm
TR	39.96 ms
Multi-slice mode	Sequential
Series	Interleaved
Concatenations	1

Geometry - AutoAlign

Slice group	1
Position	R73.4 P30.0 F16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R73.4 P30.0 F0.2
Phase	30.0 mm
Read	-0.2 mm
Shift	-73.4 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

Geometry - Saturation

Fat suppr.	None
Wrap-up Magn.	None
Special sat.	None

Geometry - Navigator

System - Miscellaneous

Positioning mode	FIX
Table position	F
Table position	16 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Save uncombined	Off
Matrix Optimization	Off
Coil Focus	Flat
AutoAlign	---
Coil Select Mode	On - AutoCoilSelect

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

! Position	R25.1 P32.7 F47.3 mm
! Orientation	Sagittal
! Rotation	0.00 deg
! A >> P	170 mm
! F >> H	170 mm
! R >> L	250 mm
Reset	Off

System - Tx/Rx

Frequency 1H	123.259893 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	39.96 ms
Concatenations	1
Segments	12

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	320 mm
FoV phase	79.5 %
Phase resolution	80 %
Cine	On
Trajectory	Cartesian
View sharing	Off
Dummy heartbeats	0

Physio - PACE

Resp. control	Off
Concatenations	1

Inline - Common

Subtract	Off
Measurements	513
StdDev	Off
Save original images	On

Inline - Cardiac

Inline Evaluation	Off
Magn. preparation	None
Contrasts	1
TE	1.49 ms
TR	39.96 ms
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	On
Mode	2D
Unfiltered images	Off

Sequence - Part 1

Introduction	Off
Dimension	2D
Reordering	Linear
Asymmetric echo	Weak
Contrasts	1
Optimization	Min. TE TR
Multi-slice mode	Sequential
Echo spacing	3.3 ms
Sequence type	Trufi
Bandwidth	676 Hz/Px

Sequence - Part 2

Define	Segments
Segments	12
Trufi delta freq.	0 Hz
RF pulse type	Fast
Gradient mode	Fast
Excitation	Slice-sel.
Flip angle mode	Constant
Cine	On

Sequence - Assistant

Mode	Min flip angle
Min flip angle	50 deg
Allowed delay	0 s

\\USER\Gulamhussene\Leber4DMR-Studie\TRUFI_2D_sag_2SI_200Dyn Navigatorslice

TA: 1:00 PM: ISO Voxel size: 1.8×1.8×4.0 mmPAT: 3 Rel. SNR: 1.00 : tti

Properties

Prio recon	Off
Load images to viewer	On
Inline movie	On
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	On
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

Routine

Slice group	1
Slices	1
Dist. factor	0 %
Position	R73.4 P30.0 H16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Slices	1
Dist. factor	0 %
Position	L4.0 P30.0 F16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
FoV read	320 mm
FoV phase	79.5 %
Slice thickness	4.0 mm
TR	39.96 ms
TE	1.49 ms
Averages	1
Concatenations	2
Filter	Distortion Corr.(2D), Prescan Normalize, Image Filter
Coil elements	SP1-3

Contrast - Common

TR	39.96 ms
TE	1.49 ms
TD	0 ms
Magn. preparation	None
Flip angle	30 deg
Fat suppr.	None
Wrap-up Magn.	None

Contrast - Dynamic

Averages	1
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	180
Pause after meas.	0.0 s
Multiple series	Off

Resolution - Common

FoV read	320 mm
FoV phase	79.5 %
Slice thickness	4.0 mm

Resolution - Common

Base resolution	176
Phase resolution	80 %
Phase partial Fourier	5/8
Trajectory	Cartesian
View sharing	Off
Interpolation	Off

Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	3
Ref. lines PE	24
Reference scan mode	Integrated

Resolution - Filter Image

Image Filter	On
! Intensity	Medium
Edge Enhancement	1
Smoothing	3
Unfiltered images	Off
Distortion Corr.	On
Mode	2D
Unfiltered images	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
POCS	Off

Geometry - Common

Slice group	1
Slices	1
Dist. factor	0 %
Position	R73.4 P30.0 H16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Slices	1
Dist. factor	0 %
Position	L4.0 P30.0 F16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
FoV read	320 mm
FoV phase	79.5 %
Slice thickness	4.0 mm
TR	39.96 ms
Multi-slice mode	Sequential
Series	Interleaved
Concatenations	2

Geometry - AutoAlign

Slice group	1
Position	R73.4 P30.0 H16.2 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Position	L4.0 P30.0 F16.2 mm

Geometry - AutoAlign

Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	R73.4 P30.0 H16.2
Phase	30.0 mm
Read	16.2 mm
Shift	-73.4 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

Geometry - Saturation

Fat suppr.	None
Wrap-up Magn.	None
Special sat.	None

Geometry - Navigator**System - Miscellaneous**

Positioning mode	ISO
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Save uncombined	Off
Matrix Optimization	Off
Coil Focus	Flat
AutoAlign	---
Coil Select Mode	On - AutoCoilSelect

System - Adjustments

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

System - Adjust Volume

Position	R34.7 P30.0 H0.0 mm
Orientation	Sagittal
Rotation	0.00 deg
A >> P	255 mm
F >> H	353 mm
R >> L	82 mm
Reset	Off

System - Tx/Rx

Frequency 1H	123.259893 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

Physio - Signal1

1st Signal/Mode	None
TR	39.96 ms
Concatenations	2
Segments	12

Physio - Cardiac

Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	320 mm
FoV phase	79.5 %
Phase resolution	80 %
Cine	On
Trajectory	Cartesian
View sharing	Off
Dummy heartbeats	0

Physio - PACE

Resp. control	Off
Concatenations	2

Inline - Common

Subtract	Off
Measurements	180
StdDev	Off
Save original images	On

Inline - Cardiac

Inline Evaluation	Off
Magn. preparation	None
Contrasts	1
TE	1.49 ms
TR	39.96 ms
Save original images	On

Inline - MIP

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

Inline - Composing

Distortion Corr.	On
Mode	2D
Unfiltered images	Off

Sequence - Part 1

Introduction	Off
Dimension	2D
Reordering	Linear
Asymmetric echo	Weak
Contrasts	1
Optimization	Min. TE TR
Multi-slice mode	Sequential
Echo spacing	3.3 ms
Sequence type	Trufi
Bandwidth	676 Hz/Px

Sequence - Part 2

Define	Segments
Segments	12
Trufi delta freq.	0 Hz
RF pulse type	Fast
Gradient mode	Fast
Excitation	Slice-sel.
Flip angle mode	Constant
Cine	On

Sequence - Assistant

Mode	Min flip angle
Min flip angle	50 deg
Allowed delay	0 s