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International MRI Accreditation Resources, LLC

ACR MRI Accreditation Clinical Data Report

SITE NAME:
MAGNET MANUFACTURER:
MODEL:
SERIAL NUMBER:
FIELD STRENGTH:
SOFTWARE VERSION:
DATE TESTED:
PERFORMED BY:

Clinical images produced on the MRI scanner described above were evaluated according to standards established by the American College of Radiology (ACR) MRI Accreditation Program. The following are the criteria for data evaluation:

- Anatomical coverage and imaging planes
- Pulse sequences and image contrast
- Spatial resolution
- Artifacts
- Exam identification (labeling)
- Filming technique

Required set of clinical images

Set of clinical images submitted for ACR evaluation should include:

Anatomy	Protocol	Submitted	Missing
Brain	Sagittal short TR/short TE with dark CSF	X	
	Axial or Coronal long TR/short TE (or FLAIR)	X	
	Axial or Coronal long TR/long TE	X	
C-Spine	Sagittal short TR/short TE with dark CSF	X	
	Sagittal long TR/long TE or T2*W with bright CSF	X	
	Axial long TR/long TE or T2*W with bright CSF	X	
L-Spine	Sagittal short TR/short TE with dark CSF	X	
	Sagittal long TR/long TE or T2*W with bright CSF	X	
	Axial short TR/short TE and/or long TR/long TE with bright CSF	X	
Knee	Sagittal or Coronal short TR/short TE or long TR/short TE with dark fluid	X	
	Sagittal or Coronal long TR/long TE with bright fluid	X	

1. Brain images:

The following brain protocols were submitted for evaluation:

S E Q U E N C E	Short TR/Short TE (dark CSF) Sagittal	Long TR/Short TE (or FLAIR) Axial/Coronal	Long TR/Long TE Axial/Coronal
Pulse Sequence			
Sequence Options			
Plane			
TR			
TE			
TI			
FA			
Number of Slices			
Slice Thickness			
Slice Gap			
PE Image Matrix			
RO Image Matrix			
PE Field of View			
RO Field of View			
PE Resolution			
RO Resolution			
In plane Pixel resolution			
Number of Acquisitions			
Number of Coverage			
Acquisition Time			

Brain images evaluation:

Sequence		Short TR/Short TE (dark CSF) Sagittal		Long TR/Short TE (or FLAIR) Axial/Coronal		Long TR/Long TE Axial/Coronal	
		Pass	Fail	Pass	Fail	Pass	Fail
Orientation		X		X		X	
Anatomical Coverage	Sagittal – *From mid-temporal lobe to mid-temporal lobe, from top of the brain to C2 level, mid-line through aqueduct*	X					
	Axial – *From convexity to foramen magnum* Coronal – *Entire brain, from anterior to posterior cranial vault*			X		X	
Image Contrast	Brain – CSF discrimination	X					
	Gray – White matter contrast			X		X	
	CSF is hypo- or iso-intense with white matter			X			
	CSF is hyper-intense relative to brain					X	
	Image graininess	X		X		X	
Slice thickness/gap (<=5/<=2)		X		X		X	
Resolution (<=1.2)		X		X		X	
Total Acquisition time (<45minutes)		X					

Artifact	Short TR/Short TE (dark CSF) Sagittal		Long TR/Short TE (or FLAIR) Axial/Coronal		Long TR/Long TE Axial/Coronal	
	Pass	Fail	Pass	Fail	Pass	Fail
Aliasing	X		X		X	
Excessive truncation artifacts	X		X		X	
Black boundary	X		X		X	
Excessive inhomogeneous bright.	X		X		X	
Excessive susceptibility	X		X		X	
Excessive chemical shift	X		X		X	
Excessive ghosting	X		X		X	
Geometric distortion	X		X		X	
Excessive filtering	X		X		X	

Description of the above mentioned artifacts can be found in Appendix A.

Filming Technique	Short TR/Short TE (dark CSF) Sagittal		Long TR/Short TE (or FLAIR) Axial/Coronal		Long TR/Long TE Axial/Coronal	
	Pass	Fail	Pass	Fail	Pass	Fail
Layout format and image size	X		X		X	
Film contrast	X		X		X	
Film density	X		X		X	
Film fogginess	X		X		X	

Appearance	Label	Short TR/Short TE (dark CSF) Sagittal		Long TR/Short TE (or FLAIR) Axial/Coronal		Long TR/Long TE Axial/Coronal	
		Pass	Fail	Pass	Fail	Pass	Fail
Each Sheet	Patient Name	X		X		X	
	Age/DOB	X		X		X	
	Patient ID	X		X		X	
	Date of Exam	X		X		X	
Each Sequence	Scan Plan/Locator	X		X		X	
	Type of Sequence	X		X		X	
	TR	X		X		X	
	TE	X		X		X	
	TI	X		X		X	
	Flip Angle	X		X		X	
	Slice Thickness	X		X		X	
	Slice Gap	X		X		X	
	Field of View	X		X		X	
	Matrix	X		X		X	
	Acquisition time	X		X		X	
	Scale	X		X		X	
Each Image	Location	X		X		X	
Each Exam	Facility Name	X		X		X	

Summary of brain images evaluation:

	Short TR/Short TE (dark CSF) Sagittal		Long TR/Short TE (or FLAIR) Axial/Coronal		Long TR/Long TE Axial/Coronal	
	Pass	**Fail**	**Pass**	**Fail**	**Pass**	**Fail**
Anatomical coverage / imaging planes	x		x		x	
Pulse sequence and image contrast	x		x		x	
Spatial resolution	x		x		x	
Artifacts	x		x		x	
Exam identification	x		x		x	
Filming technique	x		x		x	

The final result of brain images evaluation is: **PASS**

Comments/Recommendations:

2. Cervical Spine images:

The following cervical spine protocols were submitted for evaluation:

S E Q U E N C E	Short TR/Short TE (dark CSF) Sagittal	Long TR/Long TE Or T2*W (bright CSF) Sagittal	Long TR/Long TE Or T2*W (bright CSF) Axial
Pulse Sequence			
Sequence Options			
Plane			
TR			
TE			
TI			
FA			
Number of Slices			
Slice Thickness			
Slice Gap			
PE Image Matrix			
RO Image Matrix			
PE Field of View			
RO Field of View			
PE Resolution			
RO Resolution			
In plane Pixel resolution			
Number of Acquisitions			
Number of Coverage			
Acquisition Time			

Cervical Spine images evaluation:

Sequence		Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Axial	
		Pass	Fail	Pass	Fail	Pass	Fail
Orientation		X		X		X	
Anatomical Coverage	Sagittal – *From foramen magnum to T1 and laterally through the neural foramina*	X		X			
	Axial – *From C3 to T1 , including at least one slice through each disk space*					X	
Image Contrast	Homogeneous signal intensity of cord	X					
	Cord/nerve roots are clearly defined	X		X		X	
	Good contrast between disk and CSF	X		X		X	
	Fat does not mask anatomical structures	X					
	Image graininess	X		X		X	
Slice thickness/gap (<=3/<=1)		X		X		X	
Resolution (<=1)		X		X		X	
Total Acquisition time (<45minutes)		X					

Artifact	Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Axial	
	Pass	Fail	Pass	Fail	Pass	Fail
Aliasing	X		X		X	
Excessive truncation artifacts	X		X		X	
Black boundary	X		X		X	
Excessive inhomogeneous bright.	X		X		X	
Excessive susceptibility	X		X		X	
Excessive chemical shift	X		X		X	
Excessive ghosting	X		X		X	
Geometric distortion	X		X		X	
Excessive filtering	X		X		X	

Description of the above mentioned artifacts can be found in Appendix A.

Filming Technique	Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Axial	
	Pass	Fail	Pass	Fail	Pass	Fail
Layout format and image size	X		X		X	
Film contrast	X		X		X	
Film density	X		X		X	
Film fogginess	X		X		X	

Appearance	Label	Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Axial	
		Pass	Fail	Pass	Fail	Pass	Fail
Each Sheet	Patient Name	X		X		X	
	Age/DOB	X		X		X	
	Patient ID	X		X		X	
	Date of Exam	X		X		X	
Each Sequence	Scan Plan/Locator	X		X		X	
	Type of Sequence	X		X		X	
	TR	X		X		X	
	TE	X		X		X	
	TI	X		X		X	
	Flip Angle	X		X		X	
	Slice Thickness	X		X		X	
	Slice Gap	X		X		X	
	Field of View	X		X		X	
	Matrix	X		X		X	
	Acquisition time	X		X		X	
	Scale	X		X		X	
Each Image	Location	X		X		X	
Each Exam	Facility Name	X		X		X	

Summary of cervical spine images evaluation:

	hort TR/Short TE (dark CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Sagittal		Long TR/Long TE Or T2*W (bright CSF) Axial	
	Pass	**Fail**	**Pass**	**Fail**	**Pass**	**Fail**
Anatomical coverage / imaging planes	x		x		x	
Pulse sequence and image contrast	x		x		x	
Spatial resolution	x		x		x	
Artifacts	x		x		x	
Exam identification	x		x		x	
Filming technique	x		x		x	

The final result of cervical spine images evaluation is: **PASS**

Comments/Recommendations:

3. Lumbar Spine images:

The following lumbar spine protocols were submitted for evaluation:

S E Q U E N C E	Short TR/Short TE (dark CSF) Sagittal	Long TR/Long TE or T2*W (bright CSF) Sagittal	Short TR/Short TE (dark CSF) and/or Long TR/Long TE (bright CSF) Axial
Pulse Sequence			
Sequence Options			
Plane			
TR			
TE			
TI			
FA			
Number of Slices			
Slice Thickness			
Slice Gap			
PE Image Matrix			
RO Image Matrix			
PE Field of View			
RO Field of View			
PE Resolution			
RO Resolution			
In plane Pixel resolution			
Number of Acquisitions			
Number of Coverage			
Acquisition Time			

Lumbar Spine images evaluation:

Sequence		Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE or T2*W (bright CSF) Sagittal		Short TR/Short TE (dark CSF) and/or Long TR/Long TE (bright CSF) Axial	
		Pass	Fail	Pass	Fail	Pass	Fail
Orientation		X		X		X	
Anatomical Coverage	Sagittal – *Extends from T1 to S2 inclusive. Extends from and through one pedicle. All the way through to the contra-lateral pedicle inclusive*	X					
	Axial – *Include coverage of the L3-L4, L4-L5, and L5-S1 levels, including each disk and contiguous endplates*			X		X	
Image Contrast	Homogeneous signal intensity cord	X					
	Nerve roots and cord margins are clearly defined	X		X		X	
	Good contrast between disk and CSF	X		X		X	
	Fat does mask fat/muscle planes	X				X	
	Image graininess	X		X		X	
Sag. Slice thickness/gap (<=5/<=1.5)		X		X		X	
Axial slice thickness/gap (<=4/<=1)		X		X		X	
Resolution (<=1.5)		X		X		X	
Total Acquisition time (<45minutes)		X					

Artifact	Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE or T2*W (bright CSF) Sagittal		Short TR/Short TE (dark CSF) and/or Long TR/Long TE (bright CSF) Axial	
	Pass	Fail	Pass	Fail	Pass	Fail
Aliasing	X		X		X	
Excessive truncation artifacts	X		X		X	
Black boundary	X		X		X	
Excessive inhomogeneous bright.	X		X		X	
Excessive susceptibility	X		X		X	
Excessive chemical shift	X		X		X	
Excessive ghosting	X		X		X	
Geometric distortion	X		X		X	
Excessive filtering	X		X		X	

Description of the above mentioned artifacts can be found in Appendix A.

Filming Technique	Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE or T2*W (bright CSF) Sagittal		Short TR/Short TE (dark CSF) and/or Long TR/Long TE (bright CSF) Axial	
	Pass	Fail	Pass	Fail	Pass	Fail
Layout format and image size	X		X		X	
Film contrast	X		X		X	
Film density	X		X		X	
Film fogginess	X		X		X	

Appearance	Label	Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE or T2*W (bright CSF) Sagittal		Short TR/Short TE (dark CSF) and/or Long TR/Long TE (bright CSF) Axial	
		Pass	Fail	Pass	Fail	Pass	Fail
Each Sheet	Patient Name	X		X		X	
	Age/DOB	X		X		X	
	Patient ID	X		X		X	
	Date of Exam	X		X		X	
Each Sequence	Scan Plan/Locator	X		X		X	
	Type of Sequence	X		X		X	
	TR	X		X		X	
	TE	X		X		X	
	TI	X		X		X	
	Flip Angle	X		X		X	
	Slice Thickness	X		X		X	
	Slice Gap	X		X		X	
	Field of View	X		X		X	
	Matrix	X		X		X	
	Acquisition time	X		X		X	
	Scale	X		X		X	
Each Image	Location	X		X		X	
Each Exam	Facility Name	X		X		X	

Summary of Lumbar Spine images evaluation:

	Short TR/Short TE (dark CSF) Sagittal		Long TR/Long TE or T2*W (bright CSF) Sagittal		Short TR/Short TE (dark CSF) and/or Long TR/Long TE (bright CSF) Axial	
	Pass	**Fail**	**Pass**	**Fail**	**Pass**	**Fail**
Anatomical coverage / imaging planes	x		x		x	
Pulse sequence and image contrast	x		x		x	
Spatial resolution	x		x		x	
Artifacts	x		x		x	
Exam identification	x		x		x	
Filming technique	x		x		x	

The final result of lumbar spine images evaluation is: **PASS**

Comments/Recommendations:

4. Knee images:

The following knee protocols were submitted for evaluation:

S E Q U E N C E	Short TR/Short TE or Long TR/Short TE (dark fluid) Sagittal or Coronal	Long TR/Long TE (bright fluid) Sagittal or Coronal
Pulse Sequence		
Sequence Options		
Plane		
TR		
TE		
TI		
FA		
Number of Slices		
Slice Thickness		
Slice Gap		
PE Image Matrix		
RO Image Matrix		
PE Field of View		
RO Field of View		
PE Resolution		
RO Resolution		
In plane Pixel resolution		
Number of Acquisitions		
Number of Coverage		
Acquisition Time		

Knee images evaluation:

Sequence		Short TR/Short TE or Long TR/Short TE (dark fluid) Sagittal or Coronal		Long TR/Long TE (bright fluid) Sagittal or Coronal	
		Pass	Fail	Pass	Fail
Orientation		X		X	
Anatomical Coverage	Sagittal – *Entire knee from above patella to tibial mataphysis, and through entire menisci*	X		X	
	Coronal – *Entire knee from above patella to tibial metaphysis and through entire menisci*	X		X	
Image Contrast	Trabeculae and cortex are well defined	X		X	
	Menisci, cruciate ligaments, and collateral ligaments are well defined	X		X	
	Good definition of surrounding tissues	X		X	
	Fluid is not bright on at least one sequence	X		X	
	Image graininess	X		X	
Slice thickness/gap (<=4/<=1)		X		X	
Resolution (<=0.75)		X		X	
Total Acquisition time (<45minutes)					

Artifact	Short TR/Short TE or Long TR/Short TE (dark fluid) Sagittal or Coronal		Long TR/Long TE (bright fluid) Sagittal or Coronal	
	Pass	Fail	Pass	Fail
Aliasing	X		X	
Excessive truncation artifacts	X		X	
Black boundary	X		X	
Excessive inhomogeneous bright.	X		X	
Excessive susceptibility	X		X	
Excessive chemical shift	X		X	
Excessive ghosting	X		X	
Geometric distortion	X		X	
Excessive filtering	X		X	

Description of the above mentioned artifacts can be found in Appendix A.

Filming Technique	Short TR/Short TE or ong TR/Short TE (dark fluid) Sagittal or Coronal		Long TR/Long TE (bright fluid) Sagittal or Coronal	
	Pass	Fail	Pass	Fail
Layout format and image size	x		x	
Film contrast	x		x	
Film density	x		x	
Film fogginess	x		x	

Appearance	Label	hort TR/Short TE or ong TR/Short TE (dark fluid) agittal or Coronal		Long TR/Long TE (bright fluid) Sagittal or Coronal	
		Pass	Fail	Pass	Fail
Each Sheet	Patient Name	x		x	
	Age/DOB	x		x	
	Patient ID	x		x	
	Date of Exam	x		x	
Each Sequence	Scan Plan/Locator	x		x	
	Type of Sequence	x		x	
	TR	x		x	
	TE	x		x	
	TI	x		x	
	Flip Angle	x		x	
	Slice Thickness	x		x	
	Slice Gap	x		x	
	Field of View	x		x	
	Matrix	x		x	
	Acquisition time	x		x	
	Scale	x		x	
Each Image	Location	x		x	
Each Exam	Facility Name	x		x	

Summary of Knee images evaluation:

	Short TR/Short TE or Long TR/Short TE (dark fluid) Sagittal or Coronal		Long TR/Long TE (bright fluid) Sagittal or Coronal	
	Pass	**Fail**	**Pass**	**Fail**
Anatomical coverage / imaging planes	X		X	
Pulse sequence and image contrast	X		X	
Spatial resolution	X		X	
Artifacts	X		X	
Exam identification	X		X	
Filming technique	X		X	

The final result of knee images evaluation is: **PASS**

Comments/Recommendations:

Clinical Evaluation Summary

	Pass	Fail
Brain	**x**	
Cervical Spine	**x**	
Lumbar Spine	**x**	
Knee	**x**	
Entire Clinical Set	**x**	

In our opinion, according to submitted clinical films, your MRI facility met the acceptance criteria established for clinical imaging by ACR MRI Accreditation Program.

Performed by:

APPENDIX A.

Artifacts

- *Aliasing*

The image appears wrapped around to onto itself. This is due to too large a body part included in too small a FOV.

- *Excessive truncation artifacts (edge ringing)*

Periodic parallel lines or ringing adjacent to borders or tissue discontinuity in either the phase or frequency encoding direction. This is due to too small a matrix

- *Black boundary (India ink)*

Well-defined black contours outlining regions of MR anatomy, without corresponding anatomical structure.

- *Excessive inhomogeneous brightness (shading)*

This is due to RF inhomogeneity, improper patient positioning, or metal in the magnet or on the patient.

- *Excessive susceptibility*

Localized field distortion or non-uniformity produced by differing tissue magnetic susceptibility.

- *Excessive chemical shift*

Occurs along the frequency-encoding axis at fat/water soft tissue interfaces as a thin intense band of high signal or low signal.

- *Excessive ghosting (including motion)*

Periodic replication or partial copies of images of the original structure along the phase-encoding axis due to motion.

- *Geometric distortion*

Size, orientation, or shapes are not accurately represented on the image.

- *Excessive filtering*