

# Muskuloskeletální MR protokoly

## 3 Tesla

FN Brno

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Philips

Ingenia 3T

**RAMENO 3T std**  
**Coil: dS Shoulder 8ch**

Sekvence	Rovina	Čas
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PD SPAIR	cor	4:05
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PD SPAIR	sag	5:08
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T1	cor	3:02
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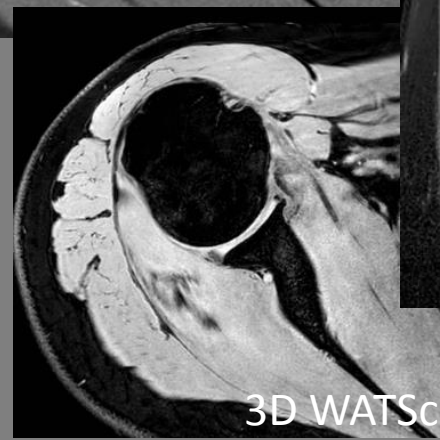
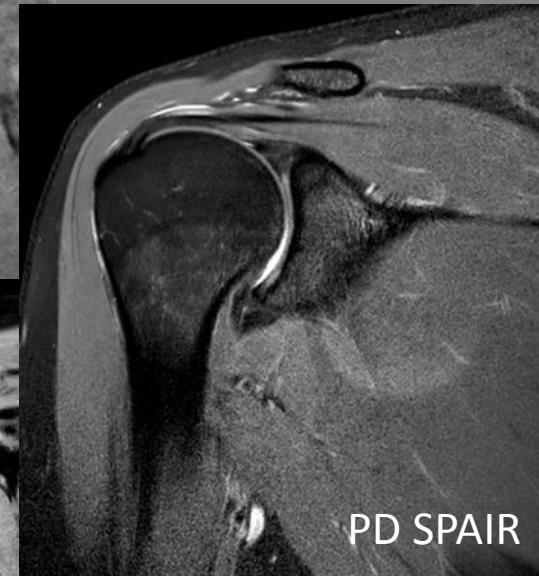
3D WATSc	tra	4:55
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PD mSPIR	tra	3:27
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**Celkem**

**20:37**

SPAIR, SPIR, ProSet – fat suppression  
WATSc – Water Selective cartilage scan  
WATSF – Water Selective fluid scan



**RAMENO 3T artrografie**  
**Coil: dS Shoulder 8ch**

<b>Sekvence</b>	<b>Rovina</b>	<b>Čas</b>
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<b>PD SPAIR</b>	<b>cor</b>	<b>4:05</b>
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<b>T1</b>	<b>cor</b>	<b>3:02</b>
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<b>3D WATSc</b>	<b>tra</b>	<b>4:55</b>
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<b>T1</b>	<b>sag</b>	<b>3:53</b>
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<b>T1 SPIR</b>	<b>cor</b>	<b>4:13</b>
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<b>T1 SPIR</b>	<b>tra</b>	<b>4:44</b>
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**Celkem**

**24:52**

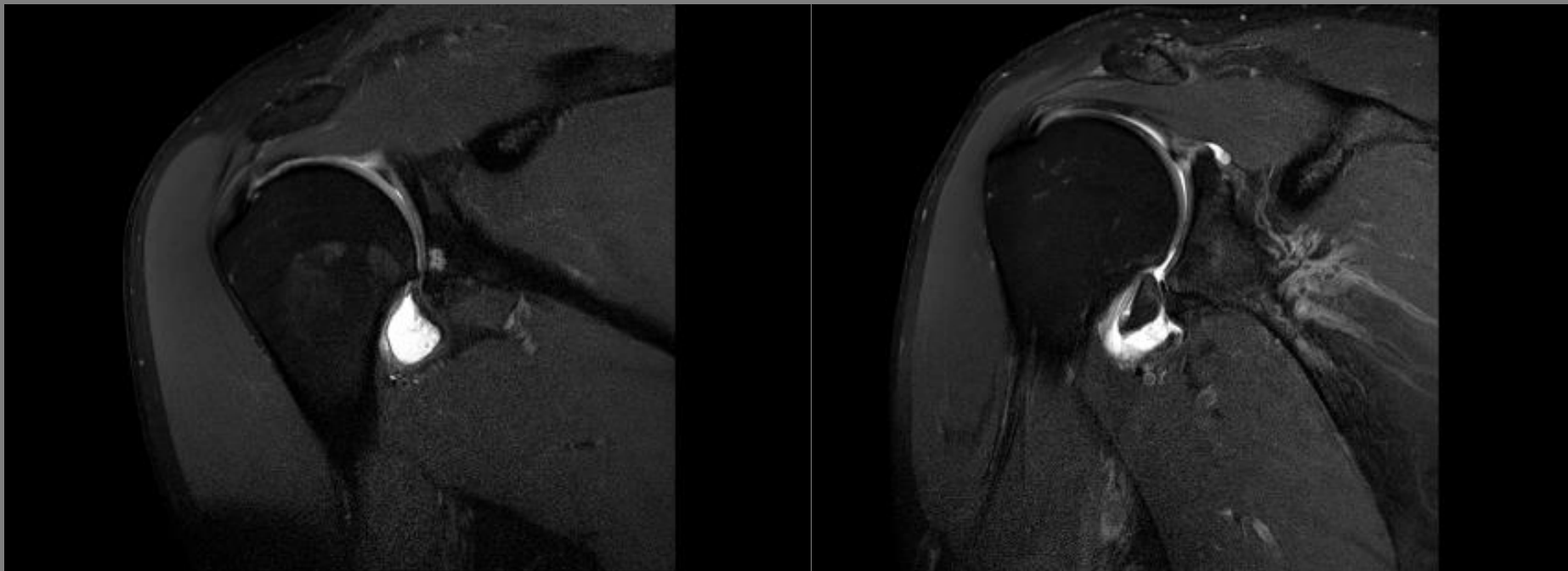




**PD SPAIR**

**cor**

RAMENO 3T std + **artro**

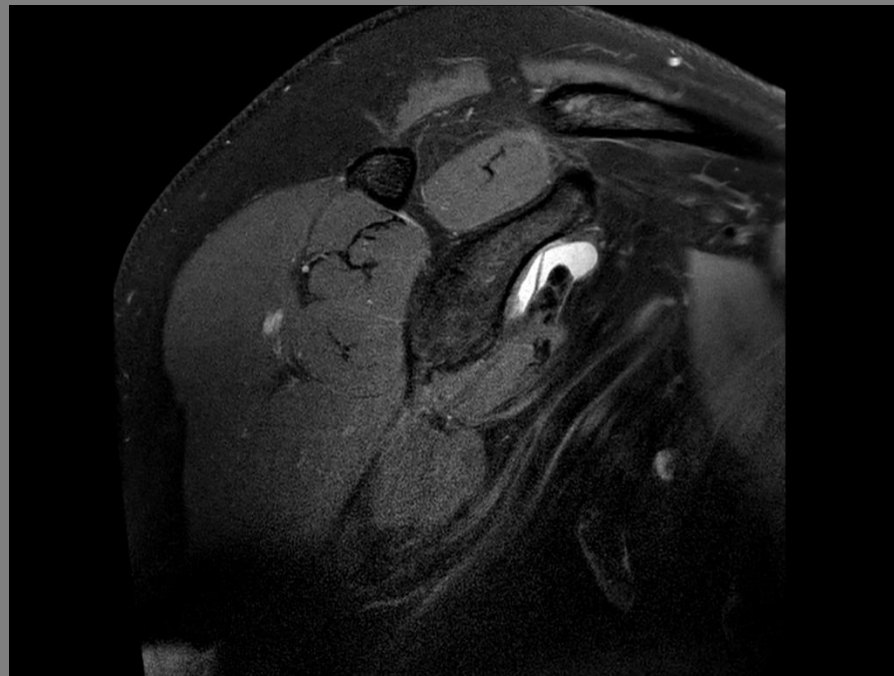


Typ:	<b>PD</b>	Matrix ACQ:	376 x 379	TR ms:	3307
Sekvence:	TSE	Voxel ACQ mm:	0,40 x 0,42 x 2,5	TE ms:	34
Rovina:	cor	Matrix REC:	672	Fáze:	FH
Vrstva mm:	2,5	Voxel REC mm:	0,23 x 0,23 x 2,5	PAT - SENSE:	2
FoV mm:	150 x 157	TSE factor:	17	<b>Čas:</b>	<b>4:05</b>
Různé:	BW(Hz): 302,2                      SPAIR				

**PD SPAIR**

sag

RAMENO 3T std



Typ:	<b>PD</b>	Matrix ACQ:	388 x 446	TR ms:	3141
Sekvence:	TSE	Voxel ACQ mm:	0,44 x 0,38 x 2,5	TE ms:	30
Rovina:	Sag	Matrix REC:	672	Fáze:	FH
Vrstva mm:	2,5	Voxel REC mm:	0,25 x 0,25 x 2,5	PAT - SENSE:	1,4
FoV mm:	170 x 170	TSE factor:	18	<b>Čas:</b>	<b>5:08</b>
Různé:	BW(Hz): 328,7 SPAIR				

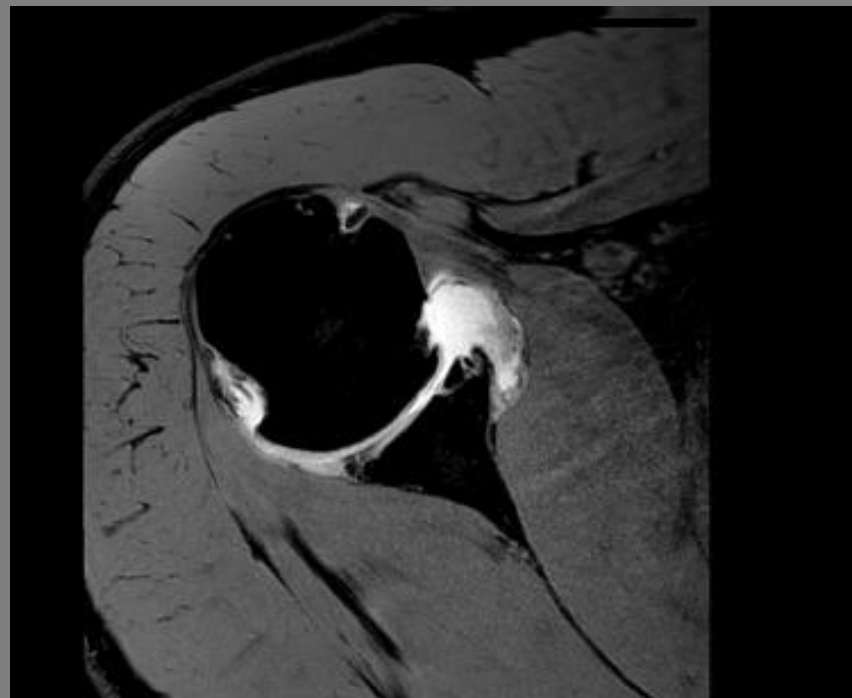
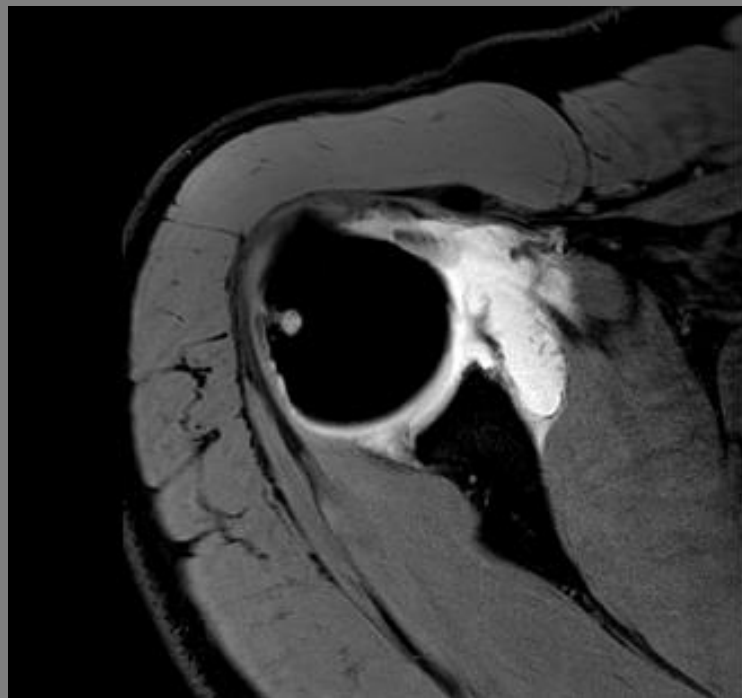
**T1****cor**RAMENO 3T std + **artro**

Typ:	<b>T1</b>	Matrix ACQ:	456 x 433	TR ms:	638
Sekvence:	TSE	Voxel ACQ mm:	0,33 x 0,36 x 2,5	TE ms:	20
Rovina:	Cor	Matrix REC:	704	Fáze:	FH
Vrstva mm:	2,5	Voxel REC mm:	0,22 x 0,22 x 2,5	PAT - SENSE:	2
FoV mm:	150 x 156	TSE factor:	6	<b>Čas:</b>	<b>3:02</b>
Různé:	BW(Hz): 291,6				

**3D WATSc**

tra

RAMENO 3T std + artro



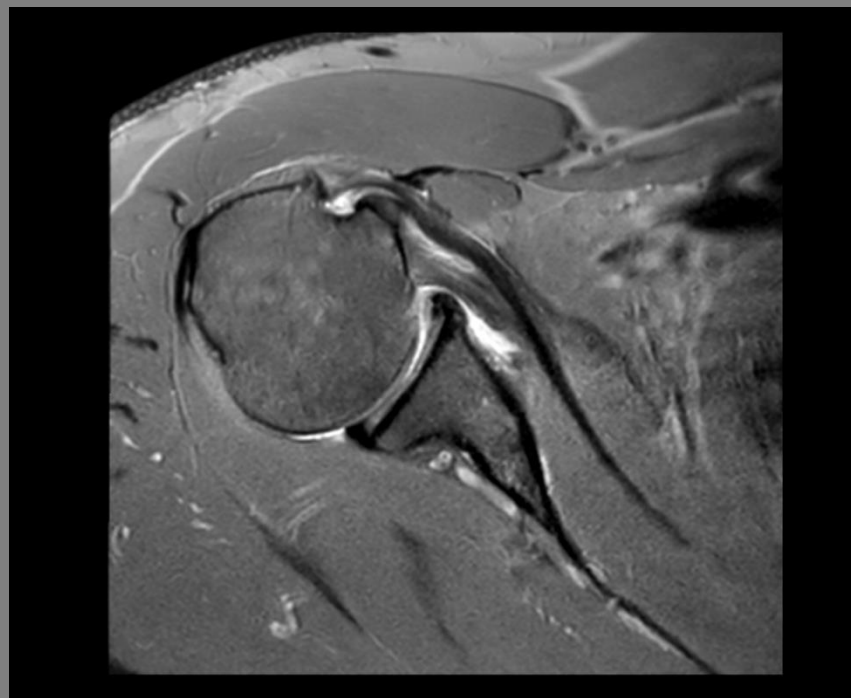
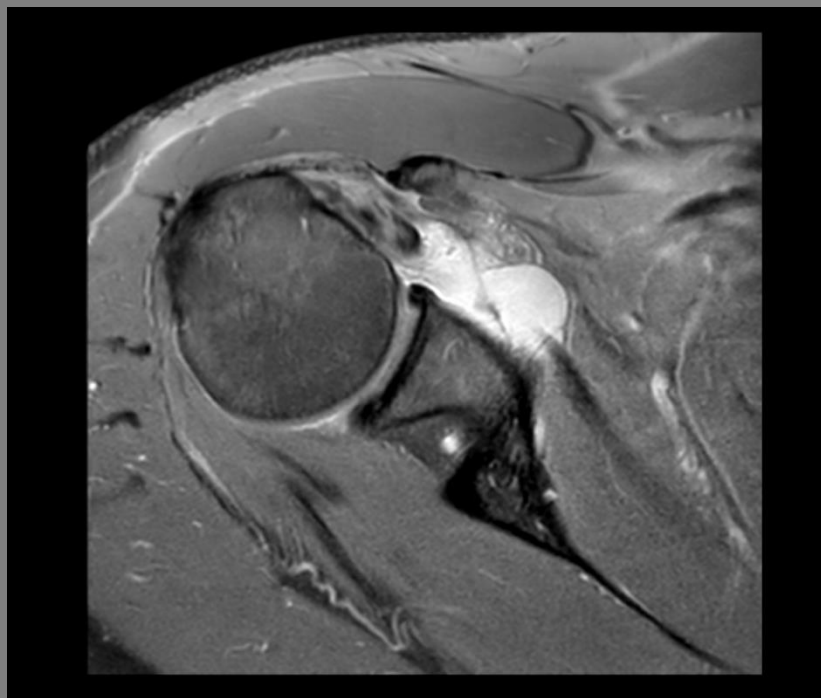
Typ:	<b>3D FFE</b>	Matrix ACQ:	320 x 340	TR ms:	20
Sekvence:	GE	Voxel ACQ mm:	0,41 x 0,43 x 2	TE ms:	6,9
Rovina:	Tra	Matrix REC:	512	Fáze:	AP
Vrstva mm:	2	Voxel REC mm:	0,28 x 0,28 x 1	PAT - SENSE:	1,5
FoV mm:	130 x 145	TSE factor:	-	Čas:	<b>4:55</b>
Různé:	BW(Hz): 217      ProSet				



**PD mSPIR**

**tra**

RAMENO 3T std



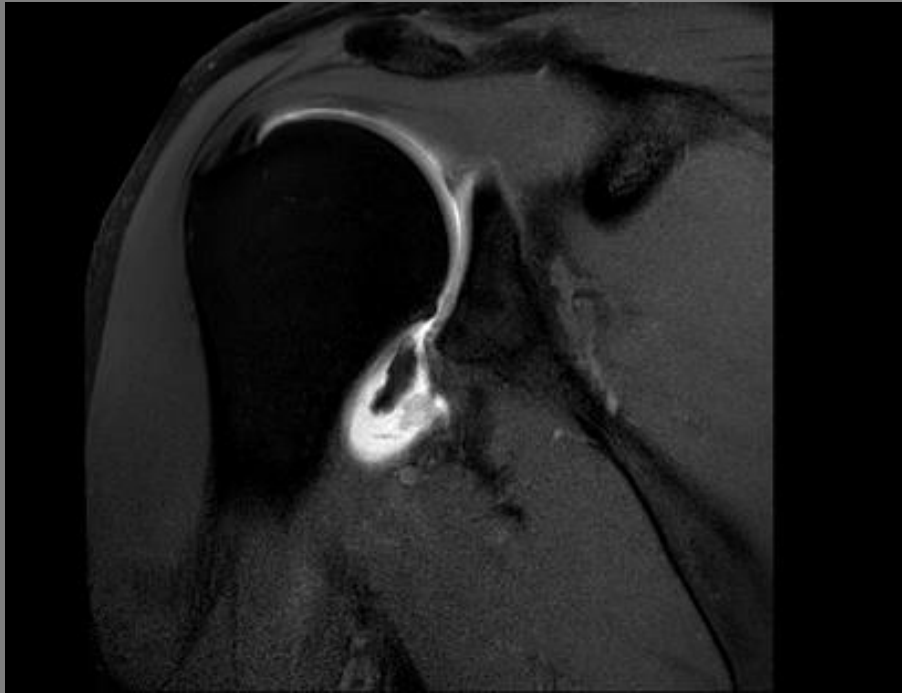
Typ:	<b>PD</b>	Matrix ACQ:	216 x 231	TR ms:	2800
Sekvence:	TSE	Voxel ACQ mm:	0,6 x 0,52 x 2,5	TE ms:	30
Rovina:	Tra	Matrix REC:	432	Fáze:	AP
Vrstva mm:	2,5	Voxel REC mm:	0,3 x 0,3 x 2,5	PAT - SENSE:	1,2
FoV mm:	130 x 120	TSE factor:	18	<b>Čas:</b>	<b>3:27</b>
Různé:	BW(Hz): 321,5      SPIR				



**T1 SPIR**

cor

RAMENO 3T artro

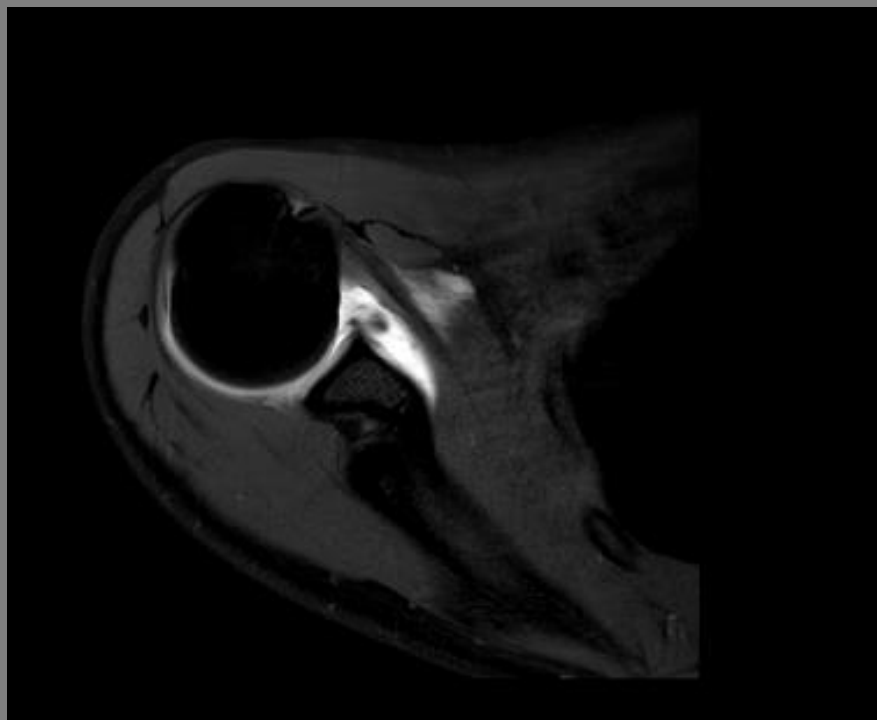


Typ:	<b>T1</b>	Matrix ACQ:	312 x 277	TR ms:	590
Sekvence:	TSE	Voxel ACQ mm:	0,45 x 0,51 x 3	TE ms:	10
Rovina:	Cor	Matrix REC:	448	Fáze:	FH
Vrstva mm:	3	Voxel REC mm:	0,31 x 0,31 x 3	PAT - SENSE:	1,2
FoV mm:	140 x 140	TSE factor:	3	Čas:	<b>4:13</b>
Různé:	BW(Hz): 252      SPIR				

**T1 SPIR**

tra

RAMENO 3T artro



Typ:	<b>T1</b>	Matrix ACQ:	356 x 267	TR ms:	704
Sekvence:	TSE	Voxel ACQ mm:	0,45 x 0,52 x 3	TE ms:	10
Rovina:	Tra	Matrix REC:	512	Fáze:	AP
Vrstva mm:	3	Voxel REC mm:	0,31 x 0,31 x 3	PAT - SENSE:	1,2
FoV mm:	160 x 140	TSE factor:	4	<b>Čas:</b>	<b>4:44</b>
Různé:	BW(Hz): 276,5      SPIR				

**T1**

sag

RAMENO 3T artro



Typ:	<b>T1</b>	Matrix ACQ:	380 x 277	TR ms:	694
Sekvence:	TSE	Voxel ACQ mm:	0,42 x 0,51 x 3	TE ms:	10
Rovina:	Sag	Matrix REC:	768	Fáze:	FH
Vrstva mm:	3	Voxel REC mm:	0,21 x 0,21 x 3	PAT - SENSE:	1,4
FoV mm:	160 x 140	TSE factor:	5	<b>Čas:</b>	<b>3:53</b>
Různé:	BW(Hz): 365,5				

**KOLENO 3T std**  
**Coil: dS Knee 8ch**

Sekvence	Rovina	Čas
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PD SPAIR	sag	3:47
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PD SPAIR	cor	4:17
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T1	cor	2:49
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PD HR	sag	3:02
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3D WATSf	tra	7:18
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**Celkem**

**21:13**



**PD HR**

sag

KOLENO 3T std



Typ:	<b>PD</b>	Matrix ACQ:	640 x 450	TR ms:	3633
Sekvence:	TSE	Voxel ACQ mm:	0,25 x 0,38 x 2,5	TE ms:	30
Rovina:	sag	Matrix REC:	880	Fáze:	AP
Vrstva mm:	2,5	Voxel REC mm:	0,19 x 0,19 x 2,5	PAT - SENSE:	2,5
FoV mm:	160 x 170	TSE factor:	15	<b>Čas:</b>	<b>3:02</b>
Různé:	BW(Hz): 228,4				



**PD SPAIR**

**cor**

KOLENO 3T std



Typ:	<b>PD</b>	Matrix ACQ:	296 x 351	TR ms:	4432
Sekvence:	TSE	Voxel ACQ mm:	0,54 x 0,51 x 2,5	TE ms:	30
Rovina:	cor	Matrix REC:	960	Fáze:	RL
Vrstva mm:	2,5	Voxel REC mm:	0,19 x 0,19 x 2,5	PAT - SENSE:	1,4
FoV mm:	160 x 179	TSE factor:	18	<b>Čas:</b>	<b>4:17</b>
Různé:	BW(Hz): 265,6      SPAIR				

**T1**

cor

KOLENO 3T std



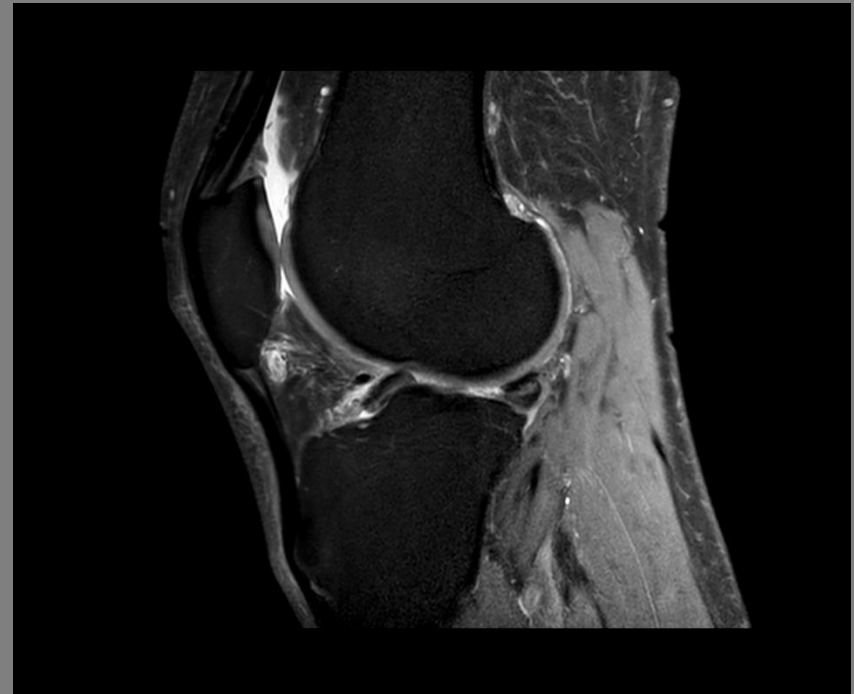
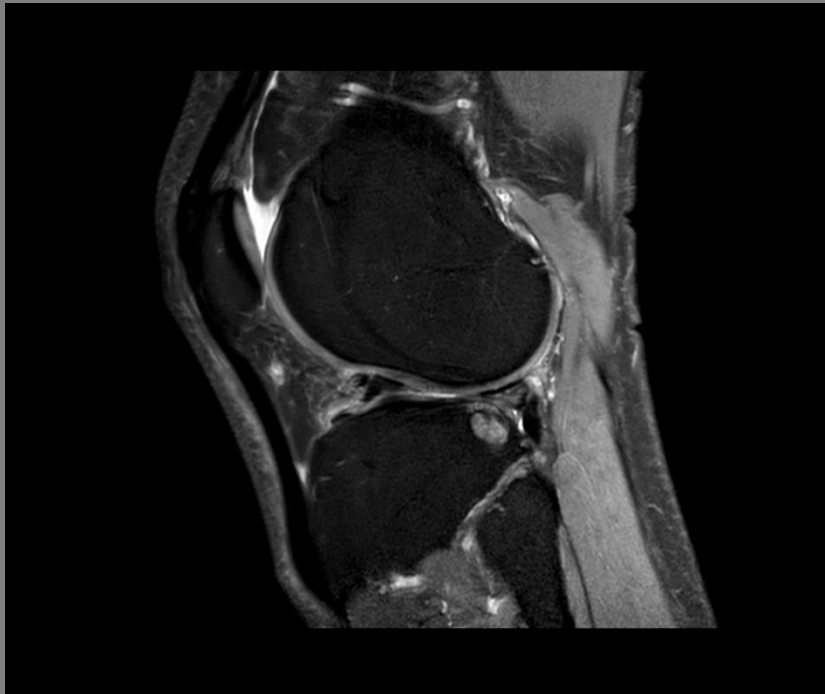
Typ:	<b>T1</b>	Matrix ACQ:	384 x 359	TR ms:	669
Sekvence:	TSE	Voxel ACQ mm:	0,42 x 0,5 x 2,5	TE ms:	20
Rovina:	cor	Matrix REC:	672	Fáze:	RL
Vrstva mm:	2,5	Voxel REC mm:	0,27 x 0,27 x 2,5	PAT - SENSE:	2
FoV mm:	160 x 180	TSE factor:	6	<b>Čas:</b>	<b>2:49</b>
Různé:	BW(Hz): 290,6				



**PD SPAIR**

sag

KOLENO 3T std



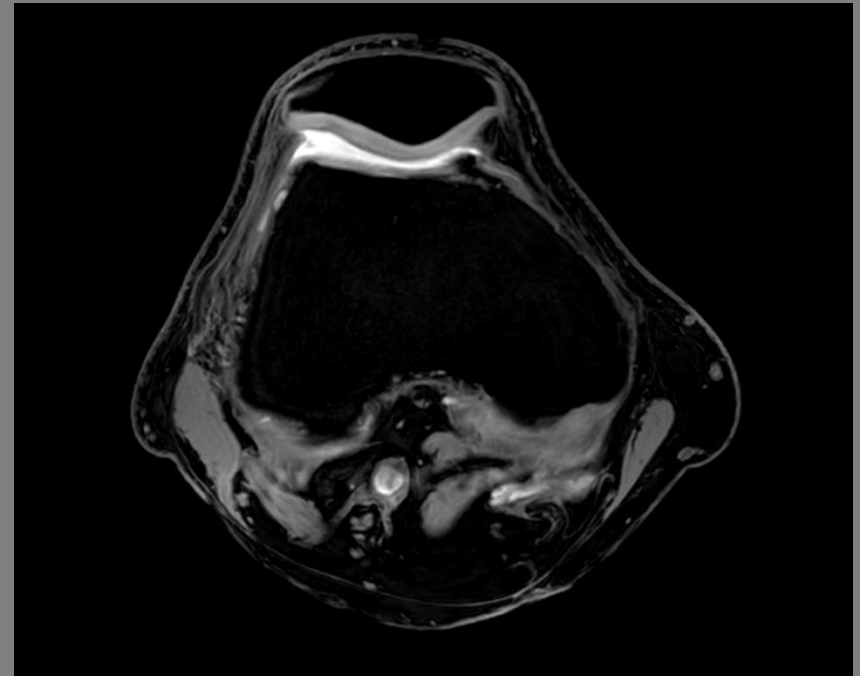
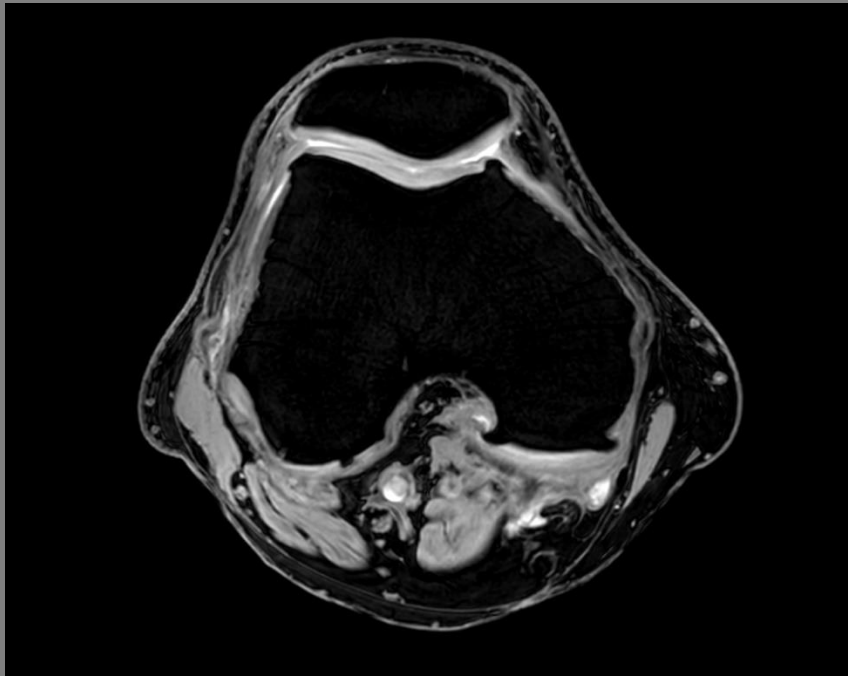
Typ:	<b>PD</b>	Matrix ACQ:	260 x 352	TR ms:	3912
Sekvence:	TSE	Voxel ACQ mm:	0,54 x 0,49 x 2,5	TE ms:	30
Rovina:	sag	Matrix REC:	880	Fáze:	AP
Vrstva mm:	2,5	Voxel REC mm:	0,20 x 0,20 x 2,5	PAT - SENSE:	1,4
FoV mm:	140 x 174	TSE factor:	18	<b>Čas:</b>	<b>3:47</b>
Různé:	BW(Hz): 273,2    SPAIR				



**3D WATsf**

tra

KOLENO 3T std



Typ:	<b>3D FFE</b>	Matrix ACQ:	304 x 304	TR ms:	20
Sekvence:	GE	Voxel ACQ mm:	0,49 x 0,49 x 3	TE ms:	5,2
Rovina:	tra	Matrix REC:	512	Fáze:	RL
Vrstva mm:	3	Voxel REC mm:	0,29 x 0,29 x 1,5	PAT - SENSE:	-
FoV mm:	150 x 150	TSE factor:	-	<b>Čas:</b>	<b>7:18</b>
Různé:	BW(Hz): 432,8 ProSet				

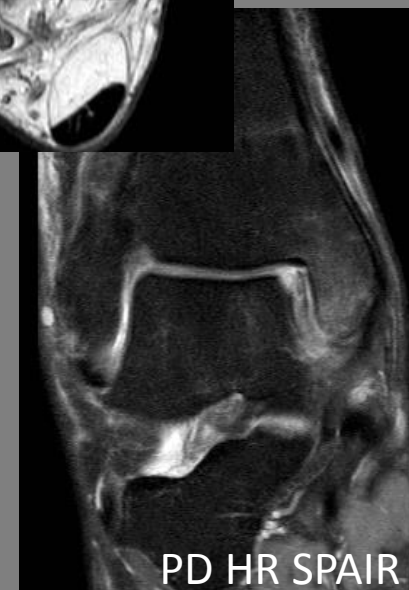
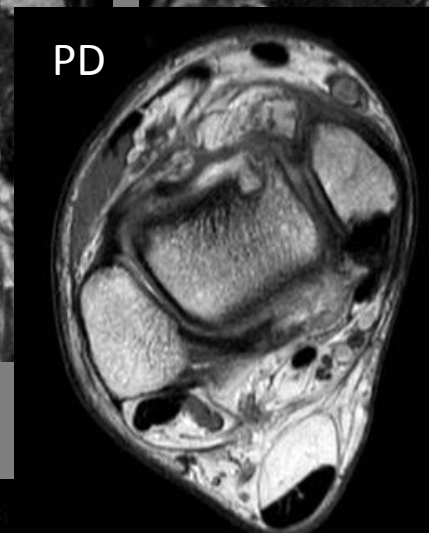
# HLEZNO 3T vazy + chrupavky

Coil: dS Head Neck 20ch

Sekvence	Rovina	Čas
PD	tra	1:44
T1	cor	2:20
PD	sag	2:54
PD SPAIR	sag	4:43 <b>x</b>
PD HR SPAIR	cor	4:01
<b>PD HR SPAIR</b>	<b>sag</b>	<b>4:43</b>
3D WATSf	sag	5:37

**Celkem**

**21:19**





**PD SPAIR**

sag

HLEZNO 3T vazy



Typ:	<b>PD</b>	Matrix ACQ:	252 x 208	TR ms:	3000
Sekvence:	TSE	Voxel ACQ mm:	0,60 x 0,72 x 2,5	TE ms:	30
Rovina:	Sag	Matrix REC:	352	Fáze:	AP
Vrstva mm:	2,5	Voxel REC mm:	0,43 x 0,43 x 2,5	PAT - SENSE:	1,2
FoV mm:	150 x 150	TSE factor:	16	<b>Čas:</b>	<b>1:42</b>
Různé:	BW(Hz): 431,3      SPAIR				

**T1****cor**

HLEZNO 3T vazy

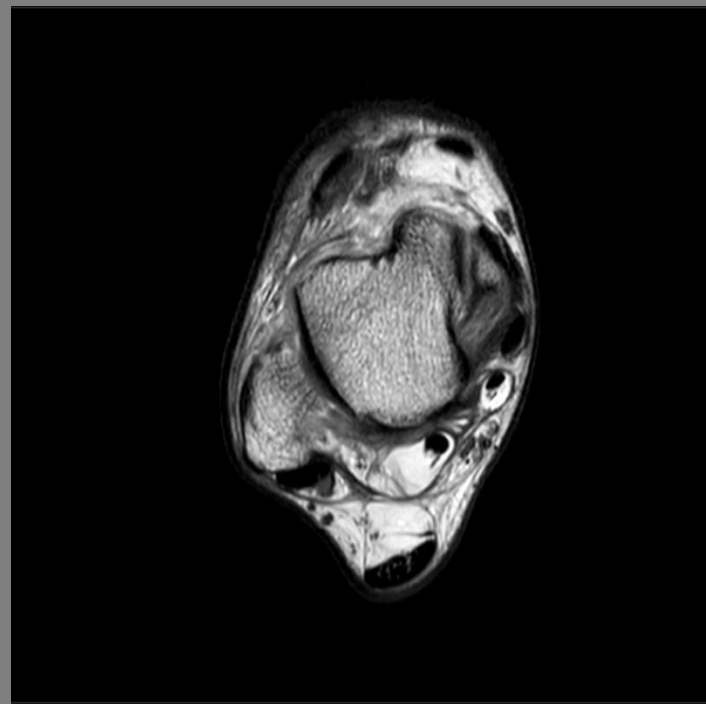
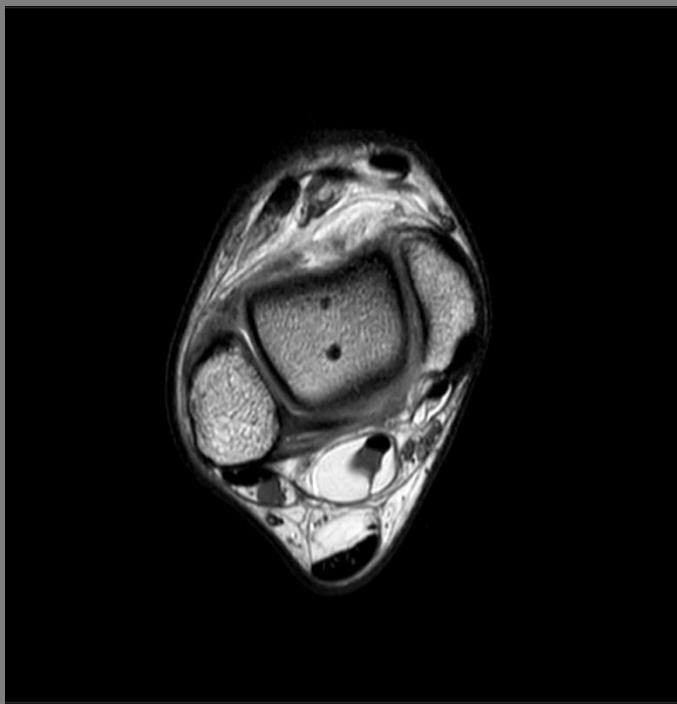


Typ:	<b>T1</b>	Matrix ACQ:	380 x 227	TR ms:	593
Sekvence:	TSE	Voxel ACQ mm:	0,42 x 0,53 x 2,5	TE ms:	20
Rovina:	Cor	Matrix REC:	432	Fáze:	RL
Vrstva mm:	2,5	Voxel REC mm:	0,37 x 0,37 x 2,5	PAT - SENSE:	1,2
FoV mm:	160 x 120	TSE factor:	5	<b>Čas:</b>	<b>2:20</b>
Různé:	BW(Hz): 365,5				

**PD**

tra

HLEZNO 3T vazy



Typ:	<b>PD</b>	Matrix ACQ:	332 x 248	TR ms:	3057
Sekvence:	TSE	Voxel ACQ mm:	0,45 x 0,60 x 2,5	TE ms:	30
Rovina:	Tra	Matrix REC:	512	Fáze:	AP
Vrstva mm:	2,5	Voxel REC mm:	0,29 x 0,29 x 2,5	PAT - SENSE:	1,2
FoV mm:	150 x 150	TSE factor:	16	<b>Čas:</b>	<b>1:44</b>
Různé:	BW(Hz): 362				

**3D WATSf**

sag

HLEZNO 3T vazy



Typ:	<b>3D FFE</b>	Matrix ACQ:	208 x 208	TR ms:	20
Sekvence:	GE	Voxel ACQ mm:	0,72 x 0,72 x 1,5	TE ms:	4,5
Rovina:	Sag	Matrix REC:	256	Fáze:	AP
Vrstva mm:	1,5	Voxel REC mm:	0,59 x 0,59 x 0,75	PAT - SENSE:	-
FoV mm:	150 x 150	TSE factor:	-	<b>Čas:</b>	<b>5:37</b>
Různé:	BW(Hz): 432,3    ProSet				

**PD**

sag

HLEZNO 3T vazy



Typ:	<b>PD</b>	Matrix ACQ:	332 x 250	TR ms:	3000
Sekvence:	TSE	Voxel ACQ mm:	0,45 x 0,60 x 2,5	TE ms:	30
Rovina:	Sag	Matrix REC:	512	Fáze:	AP
Vrstva mm:	2,5	Voxel REC mm:	0,29 x 0,29 x 2,5	PAT - SENSE:	1,2
FoV mm:	150 x 150	TSE factor:	16	<b>Čas:</b>	<b>2:54</b>
Různé:	BW(Hz): 384,2				

**PD HR SPAIR****cor/sag**HLEZNO 3T vazy + **chrupavky**

Typ:	<b>PD</b>	Matrix ACQ:	600 x 166	TR ms:	3252
Sekvence:	TSE	Voxel ACQ mm:	0,23 x 0,22 x 3,5	TE ms:	25
Rovina:	Cor/ <b>Sag</b>	Matrix REC:	640	Fáze:	RL/ <b>AP</b>
Vrstva mm:	3,5	Voxel REC mm:	0,22 x 0,22 x 3,5	PAT - SENSE:	2
FoV mm:	140 x 85	TSE factor:	14	<b>Čas:</b>	<b>4:01</b>
Různé:	BW(Hz): 220,5      SPAIR				



**ZÁPĚSTÍ 3T std**  
**Coil: dS Wrist 8ch**

Sekvence	Rovina	Čas
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T1 HR	cor	2:18
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PD SPAIR	sag	3:26
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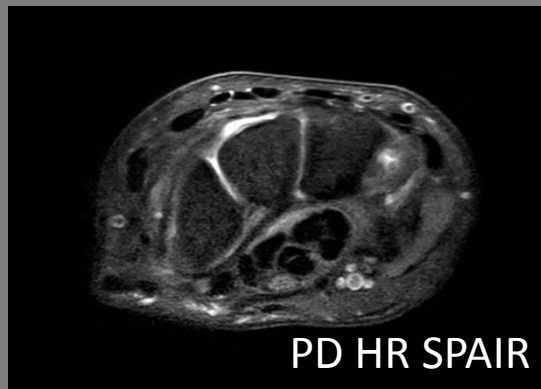
PD HR SPAIR	cor	3:15
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PD HR SPAIR	tra	2:51
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3D WATS	tra	4:18
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**Celkem**

**16:08**



# ZÁPĚSTÍ 3T artrografie

Coil: dS Wrist 8ch

Sekvence	Rovina	Čas
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T1 HR	cor	2:18
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PD HR SPAIR	cor	3:15
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3D WATS	tra	4:18
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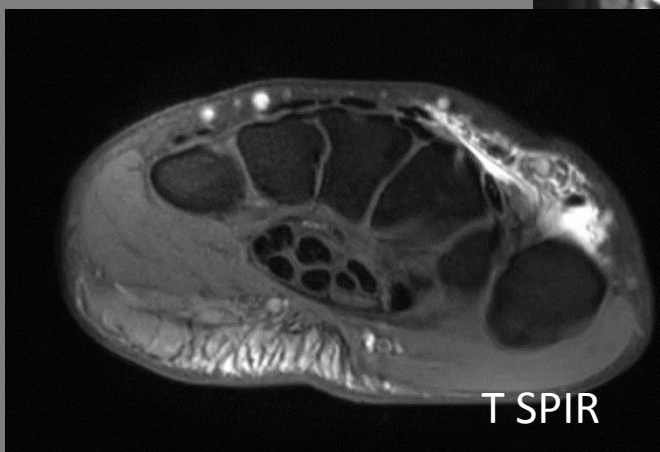
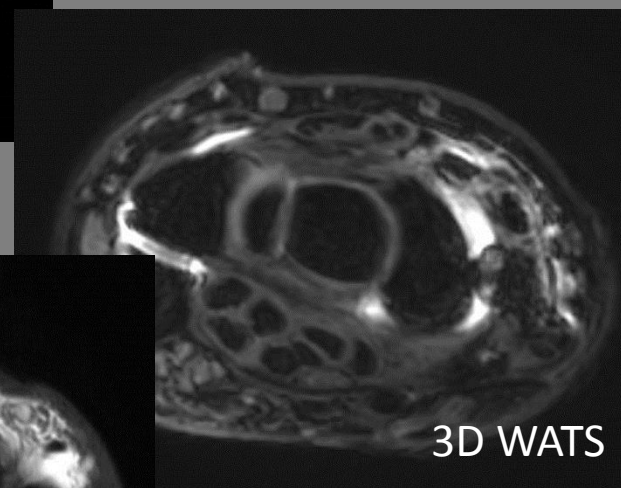
T1	sag	3:49
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T1 SPIR	tra	3:40
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T1 SPIR	cor	3:32
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**Celkem**

**20:52**



**T1 HR****cor**

ZÁPĚSTÍ 3T std + artro



Typ:	<b>T1</b>	Matrix ACQ:	364 x 212	TR ms:	359
Sekvence:	TSE	Voxel ACQ mm:	0,22 x 0,33 x 2,5	TE ms:	15
Rovina:	Cor	Matrix REC:	400	Fáze:	AP
Vrstva mm:	2,5	Voxel REC mm:	0,20 x 0,20 x 2,5	PAT - SENSE:	2
FoV mm:	80 x 70	TSE factor:	7	<b>Čas:</b>	<b>2:18</b>
Různé:	BW(Hz): 184,6				



**PD HR SPAIR**

**cor**

ZÁPĚSTÍ 3T std + **artro**

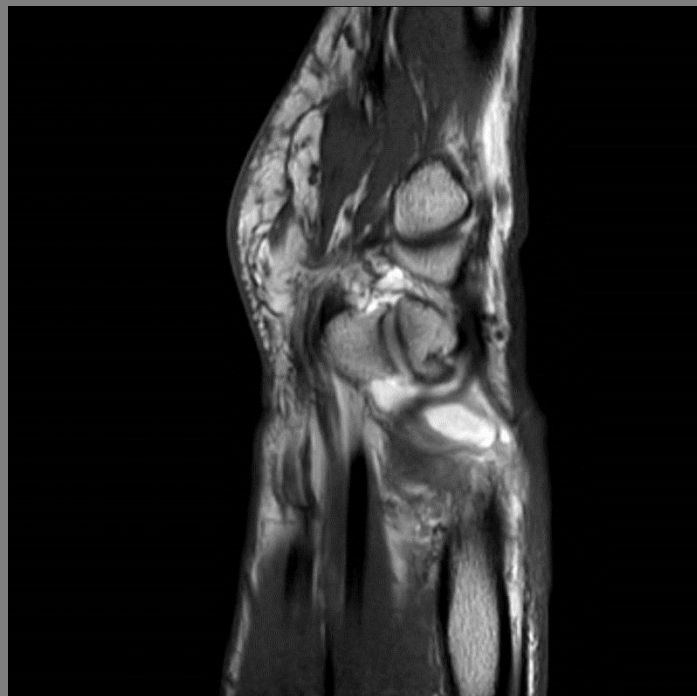


Typ:	<b>PD</b>	Matrix ACQ:	436 x 312	TR ms:	2633
Sekvence:	TSE	Voxel ACQ mm:	0,23 x 0,32 x 2	TE ms:	27
Rovina:	cor	Matrix REC:	768	Fáze:	AP
Vrstva mm:	2	Voxel REC mm:	0,13 x 0,13 x 2	PAT - SENSE:	2
FoV mm:	100 x 100	TSE factor:	13	<b>Čas:</b>	<b>3:15</b>
Různé:	BW(Hz): 203,3      SPAIR				

**T1**

sag

ZÁPĚSTÍ 3T artro



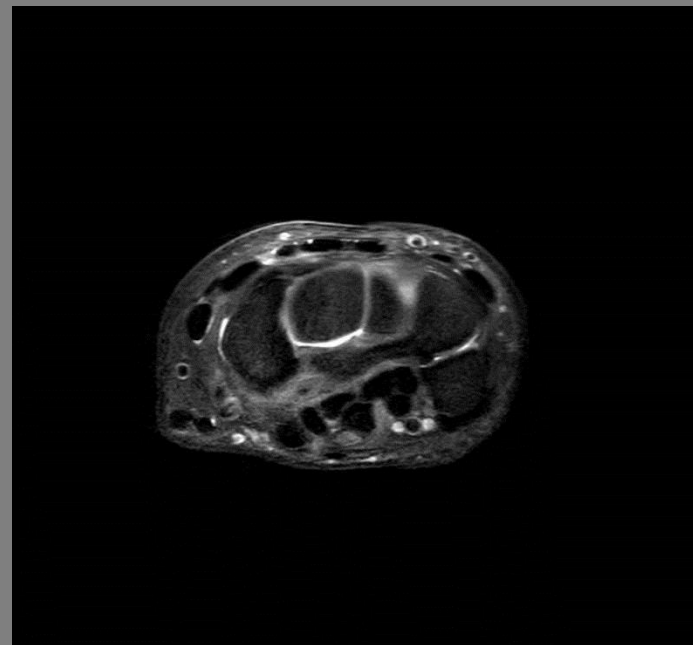
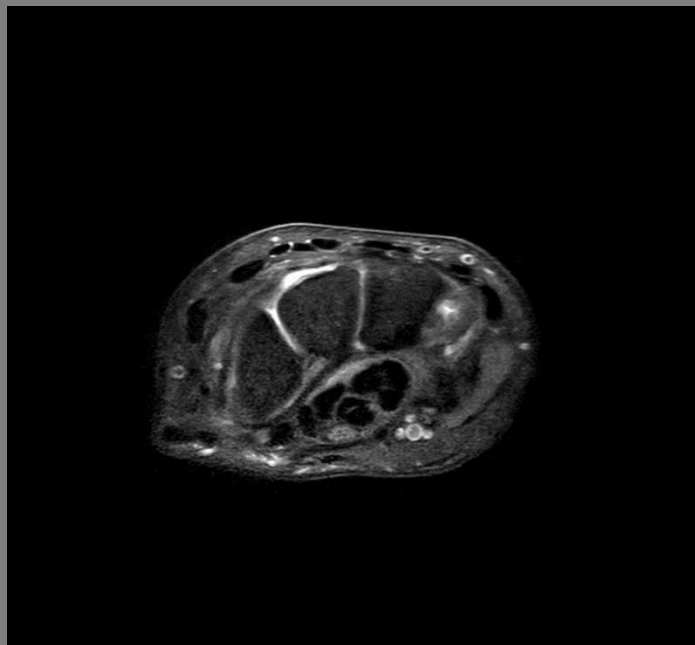
Typ:	<b>T1</b>	Matrix ACQ:	280 x 246	TR ms:	675
Sekvence:	TSE	Voxel ACQ mm:	0,36 x 0,41 x 2	TE ms:	11
Rovina:	sag	Matrix REC:	336	Fáze:	FH
Vrstva mm:	2	Voxel REC mm:	0,30 x 0,30 x 2	PAT:	1,2
FoV mm:	100 x 100	TSE factor:	3	Čas:	<b>3:49</b>
Různé:	BW(Hz): 249				



**PD HR SPAIR**

tra

ZÁPĚSTÍ 3T std

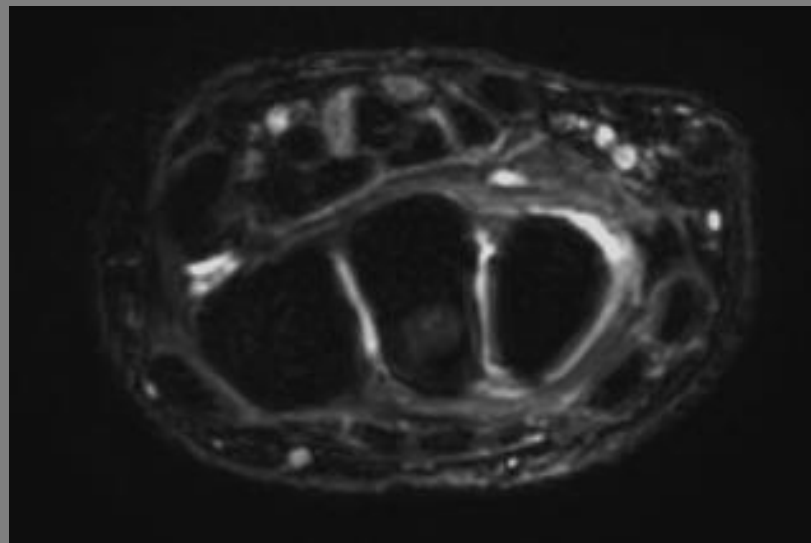
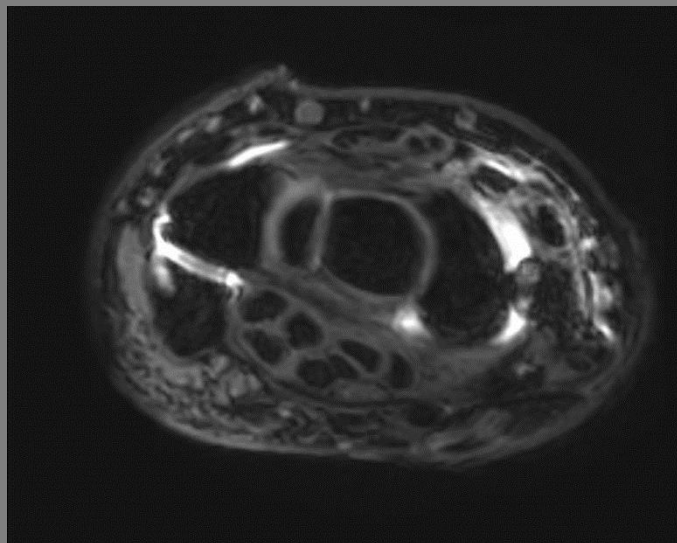


Typ:	<b>PD</b>	Matrix ACQ:	304 x 289	TR ms:	3420
Sekvence:	TSE	Voxel ACQ mm:	0,23 x 0,35 x 2	TE ms:	27
Rovina:	tra	Matrix REC:	704	Fáze:	AP
Vrstva mm:	2	Voxel REC mm:	0,14 x 0,14 x 2	PAT - SENSE:	2,8
FoV mm:	70 x 100	TSE factor:	13	<b>Čas:</b>	<b>2:51</b>
Různé:	BW(Hz): 195,8      SPAIR				

**3D mFFE WATS**

tra

ZÁPĚSTÍ 3T std + artro



Typ:	<b>3D FFE</b>	Matrix ACQ:	180 x 159	TR ms:	20
Sekvence:	GE	Matrix REC:	256	TE1/ $\Delta$ TE ms:	9,2/3
Rovina:	tra	Voxel ACQ mm:	0,44 x 0,45 x 1	Fáze:	AP
Vrstva mm:	1	Voxel REC mm:	0,31 x 0,31 x 0,5	PAT:	-
FoV mm:	80 x 71	TSE factor:	-	<b>Čas:</b>	<b>4.18</b>
Různé:	BW(Hz): 394,6 ProSet		Počet ech: 3		

**T1 SPIR****cor****ZÁPĚSTÍ 3T artro**

Typ:	<b>T1</b>	Matrix ACQ:	288 x 249	TR ms:	628
Sekvence:	TSE	Voxel ACQ mm:	0,35 x 0,40 x 2	TE ms:	9
Rovina:	cor	Matrix REC:	336	Fáze:	FH
Vrstva mm:	2	Voxel REC mm:	0,30 x 0,30 x 2	PAT:	-
FoV mm:	100 x 100	TSE factor:	3	<b>Čas:</b>	<b>3:32</b>
Různé:	BW(Hz): 255,3      SPIR				

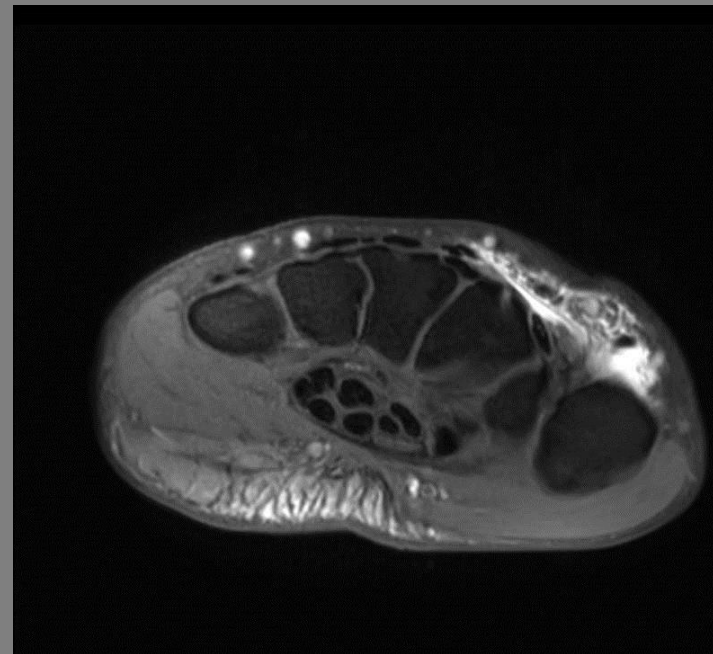
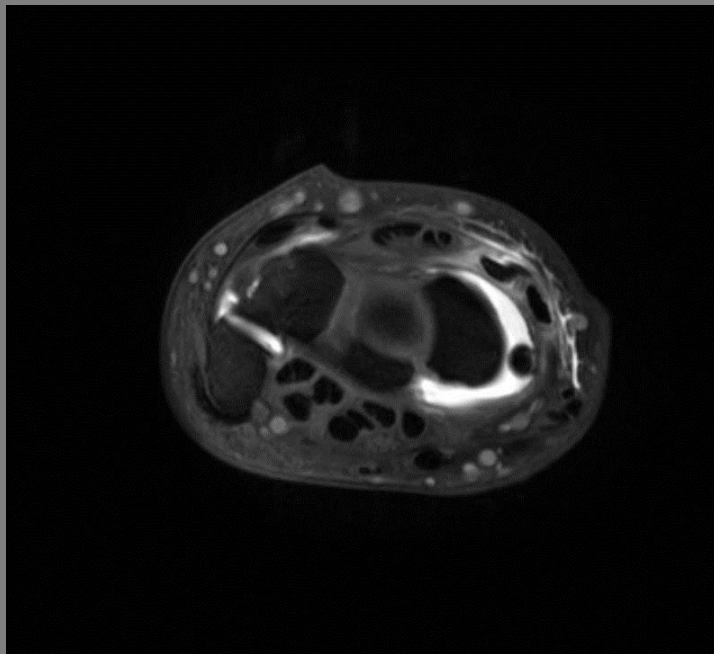




**T1 SPIR**

tra

ZÁPĚSTÍ 3T artro



Typ:	<b>T1</b>	Matrix ACQ:	280 x 246	TR ms:	648
Sekvence:	TSE	Voxel ACQ mm:	0,36 x 0,41 x 2	TE ms:	11
Rovina:	tra	Matrix REC:	336	Fáze:	RL
Vrstva mm:	2	Voxel REC mm:	0,30 x 0,30 x 2	PAT:	-
FoV mm:	100 x 100	TSE factor:	3	<b>Čas:</b>	<b>3:40</b>
Různé:	BW(Hz): 194,1      SPIR				



**PD SPAIR**

sag

ZÁPĚSTÍ 3T std



Typ:	<b>PD</b>	Matrix ACQ:	308 x 166	TR ms:	3128
Sekvence:	TSE	Voxel ACQ mm:	0,26 x 0,29 x 2,5	TE ms:	30
Rovina:	sag	Matrix REC:	400	Fáze:	RL
Vrstva mm:	2,5	Voxel REC mm:	0,20 x 0,20 x 2,5	PAT:	1,5
FoV mm:	80 x 49	TSE factor:	18	<b>Čas:</b>	<b>3:26</b>
Různé:	BW(Hz): 238,7 SPAIR				