



# MAGNETOM Free.Max i nowy świat MRI: Hi-V MRI Pierwsze doświadczenia kliniczne

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Jachranka, 15.10.2022

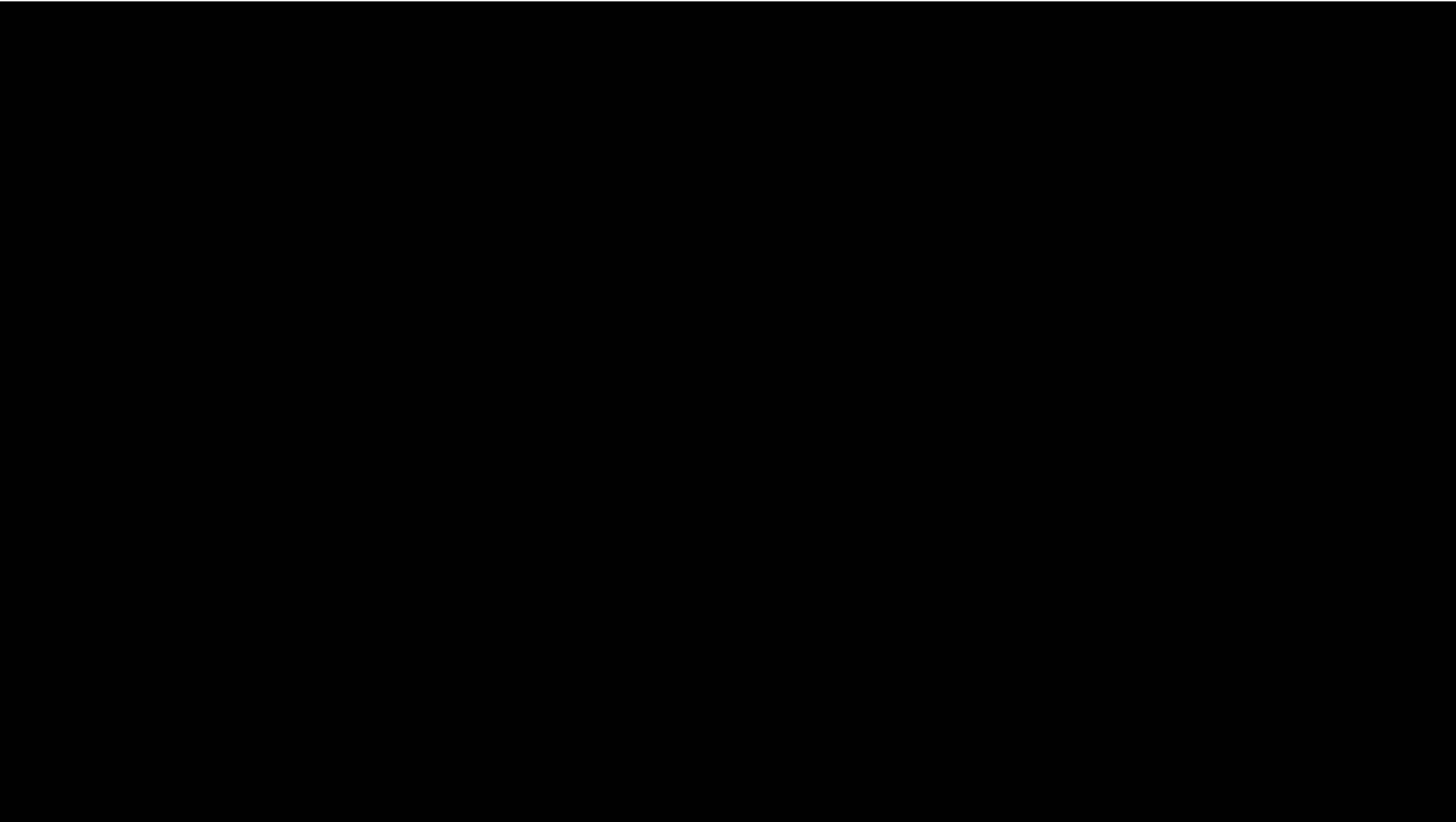


**SIEMENS**  
Healthineers

# Przełamujący bariery

MAGNETOM Free.Max



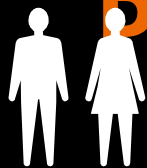


# Bariery

## Ograniczające dostęp do badań MRI

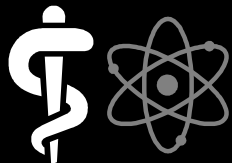


Ograniczona liczba i  
lokalizacja pracowni

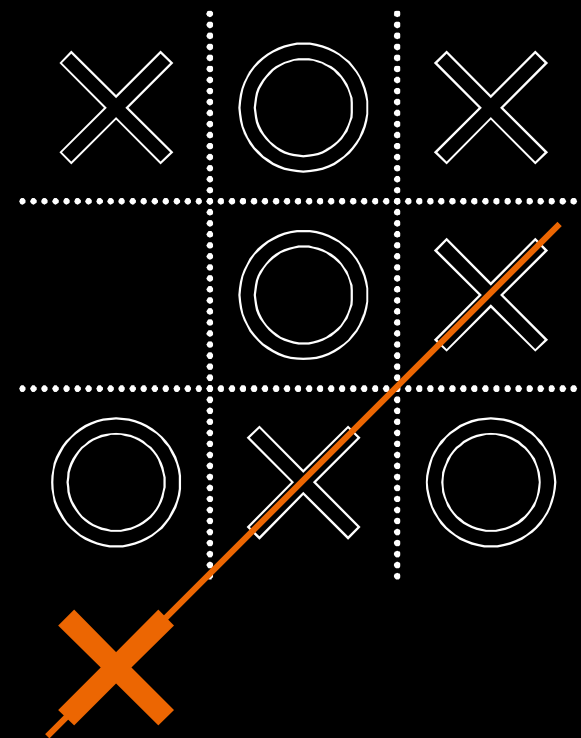


# Przełamać bariery

Wykluczone grupy  
pacjentów



Nietknięte aplikacje  
kliniczne





**SIEMENS**  
Healthineers

**Pierwszy na  
świecie MR  
z otworem  
80 cm**

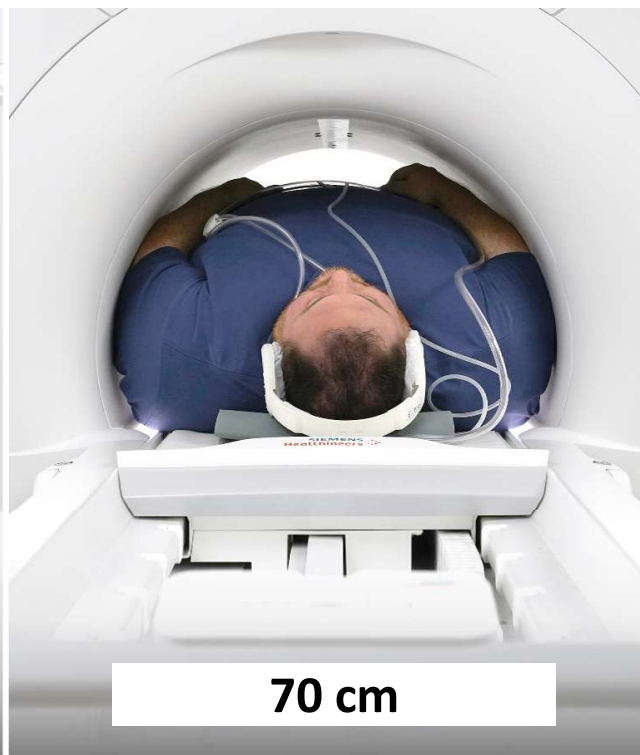
**320 kg**

**Obciążenie stołu pacjenta**

**MAGNETOM Free.Max**

**Pierwszy na świecie MR z otworem 80 cm**

**SIEMENS**  
Healthineers



SIEMENS  
Healthineers

# Cewki Contour

Komfort badania



# Technologia DryCool

## Wolność od helu

SIEMENS  
Healthineers

**0,7** litra  
ciekłego helu



- Szczelna konstrukcja magnesu
- Brak rury quench'owej
- Automatyczne stawianie pola





# SkyView

Instalacja w dowolnej lokalizacji



SIEMENS  
Healthineers

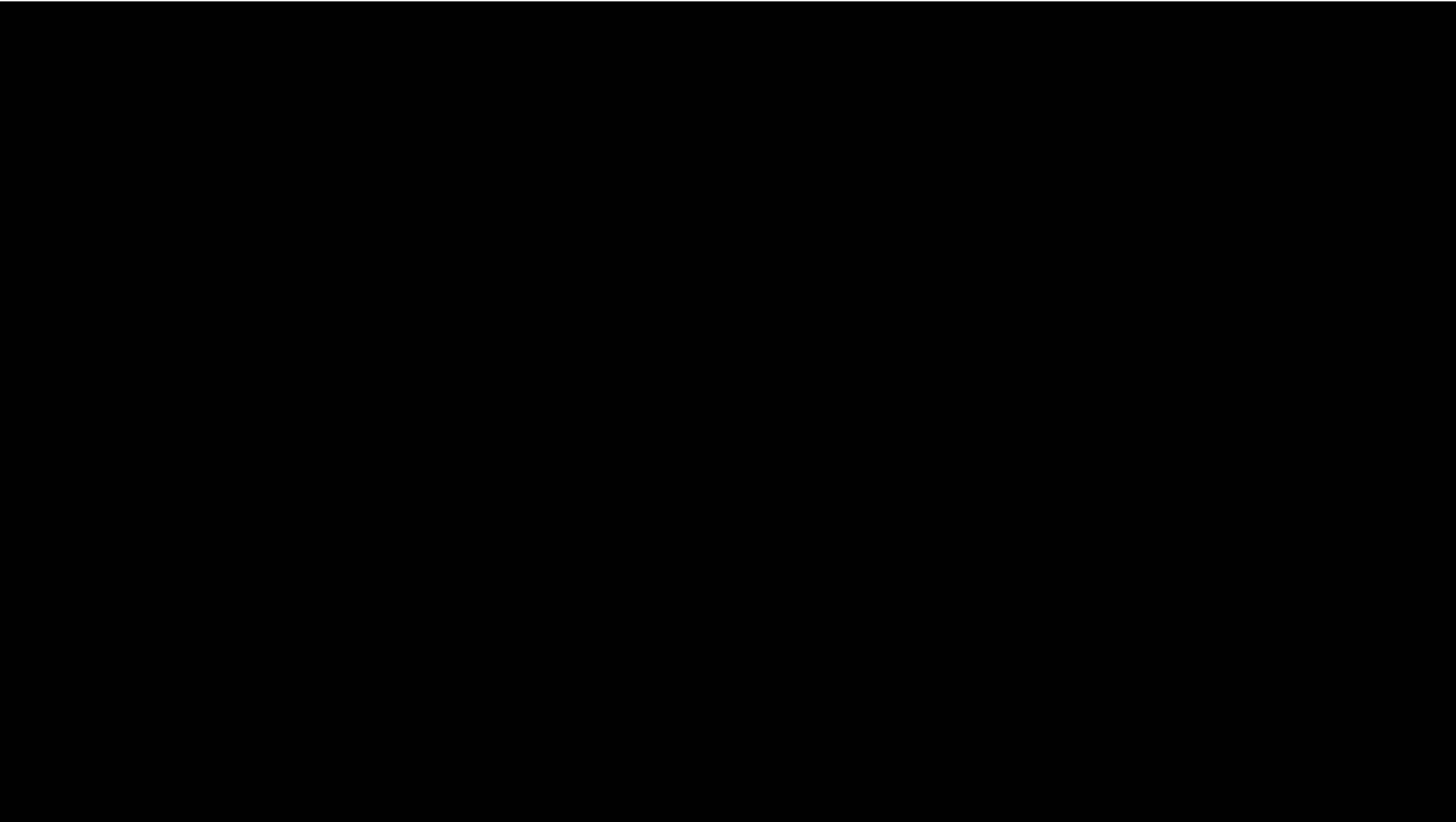
Artificial  
Intelligence

# myExam Companion

Inteligentna automatyzacja

Zawsze spójne wyniki bez względu na:

- doświadczenie personelu
- stan pacjenta
- obciążenie pracą

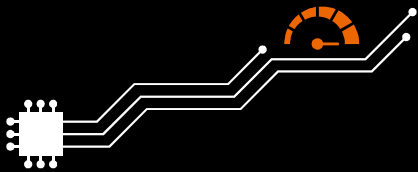


# Przemysleć ponownie fizykę MRI



# Digitalizacja Przekształca MRI...

Wzrost  
mocy obliczeniowej



Wydajne  
techniki akwizycyjne



Simultaneous Multi-Slice  
Compressed Sensing

Rekonstrukcje wsparte

AI

Powered by  
Artificial Intelligence



Deep Resolve Gain  
Deep Resolve Sharp

... pozwalają uzyskać więcej z mniej

**Moc  
digitalizacji**

Innowacyjny proces obrazowania

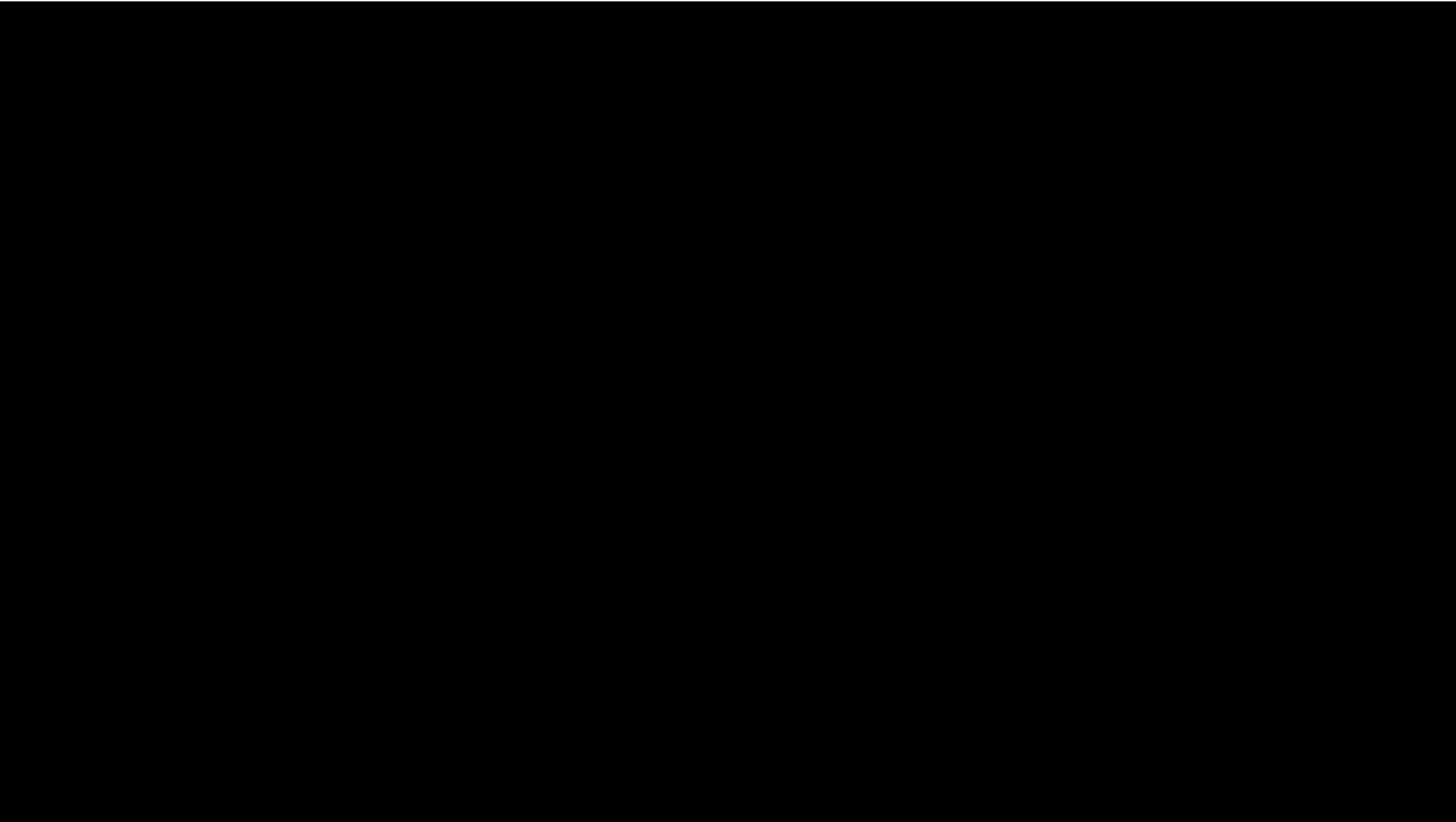
**+**

**0,55 T**

Nieodłączne korzyści kliniczne

**High-V MRI**

**"V" bez barier**





# Pierwsze doświadczenia kliniczne

MAGNETOM Free.Max





MAGNETOM Free.Max

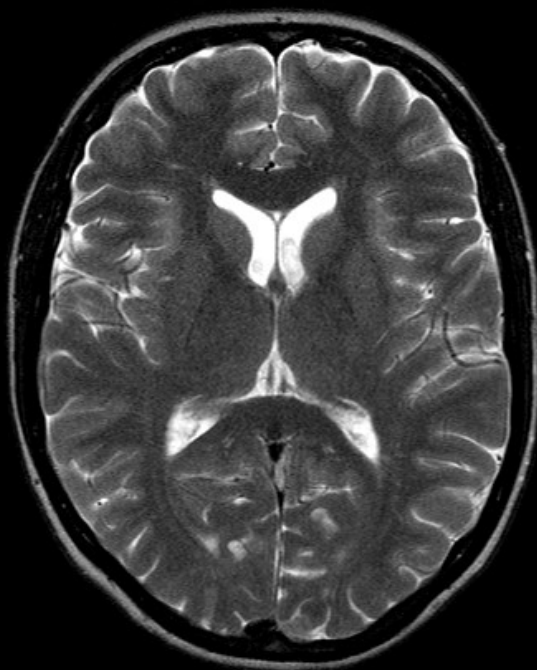
# Deep Resolve Gain



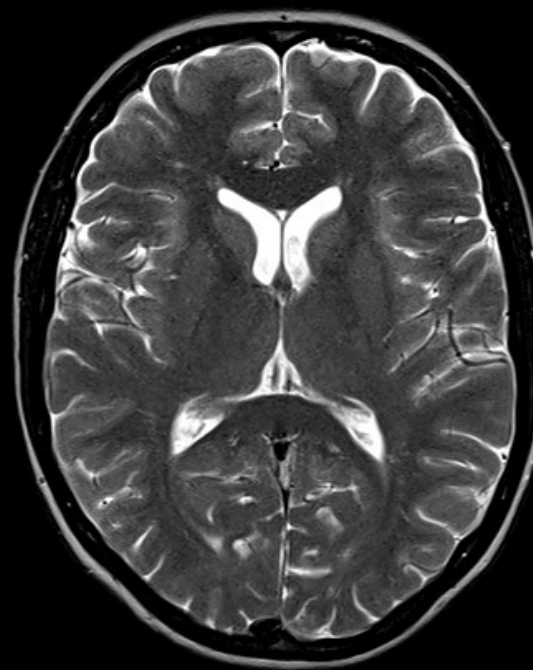
# Deep Resolve Gain

## T2 TSE

Standard

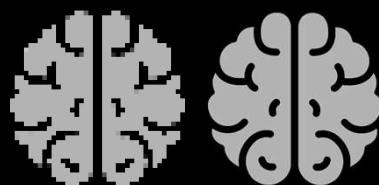


Deep Resolve Gain



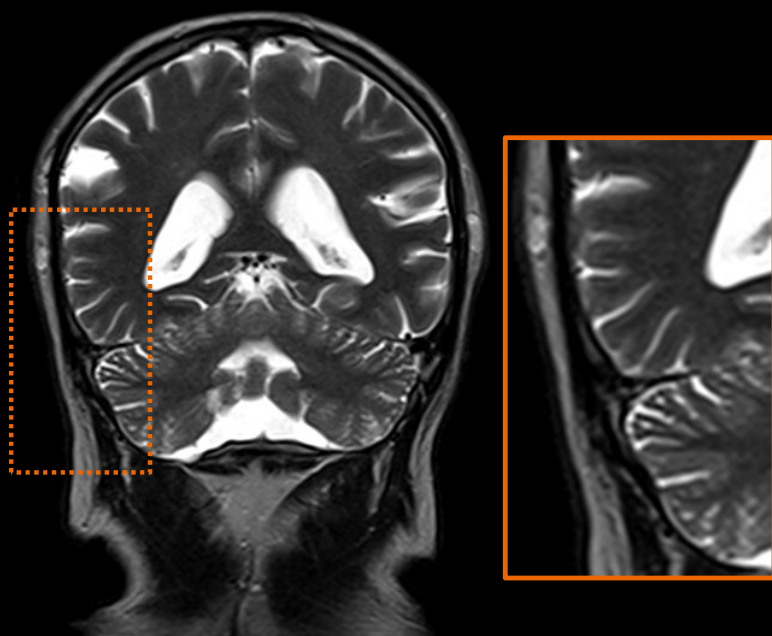
MAGNETOM Free.Max

# Deep Resolve Sharp



# Deep Resolve Sharp T2 TSE

Standard

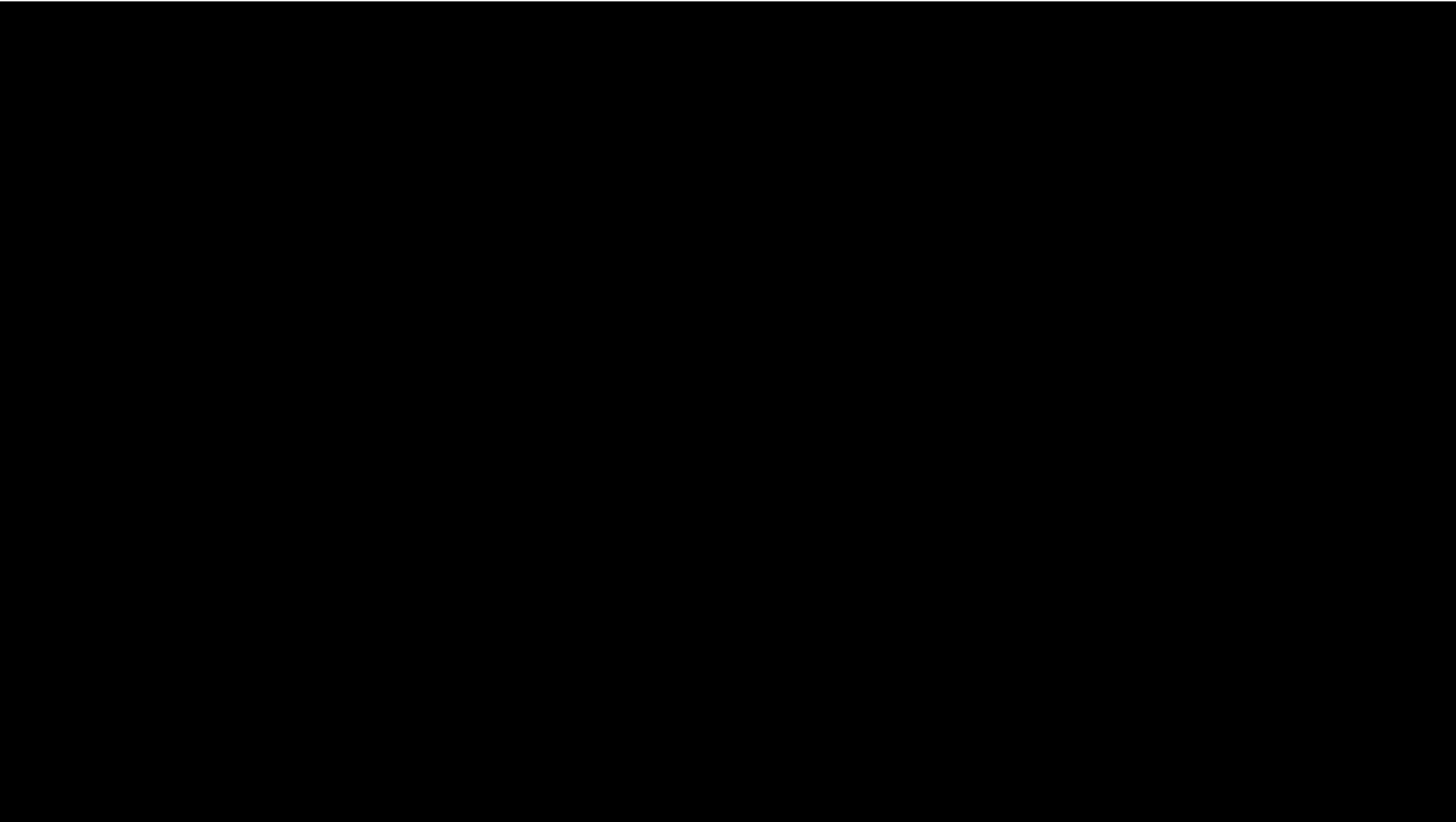


0,8 x 0,8 x 5,0 mm<sup>3</sup>

Deep Resolve Sharp



0,4 x 0,4 x 5,0 mm<sup>3</sup>



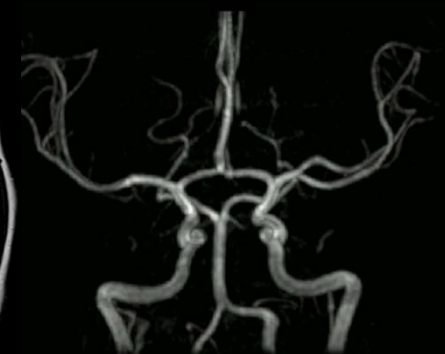
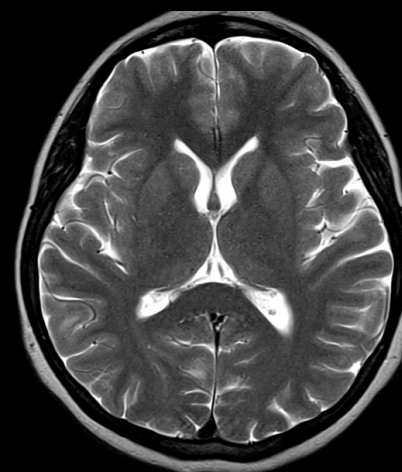
MAGNETOM Free.Max

**Neuro**

**Głowa-szyja**

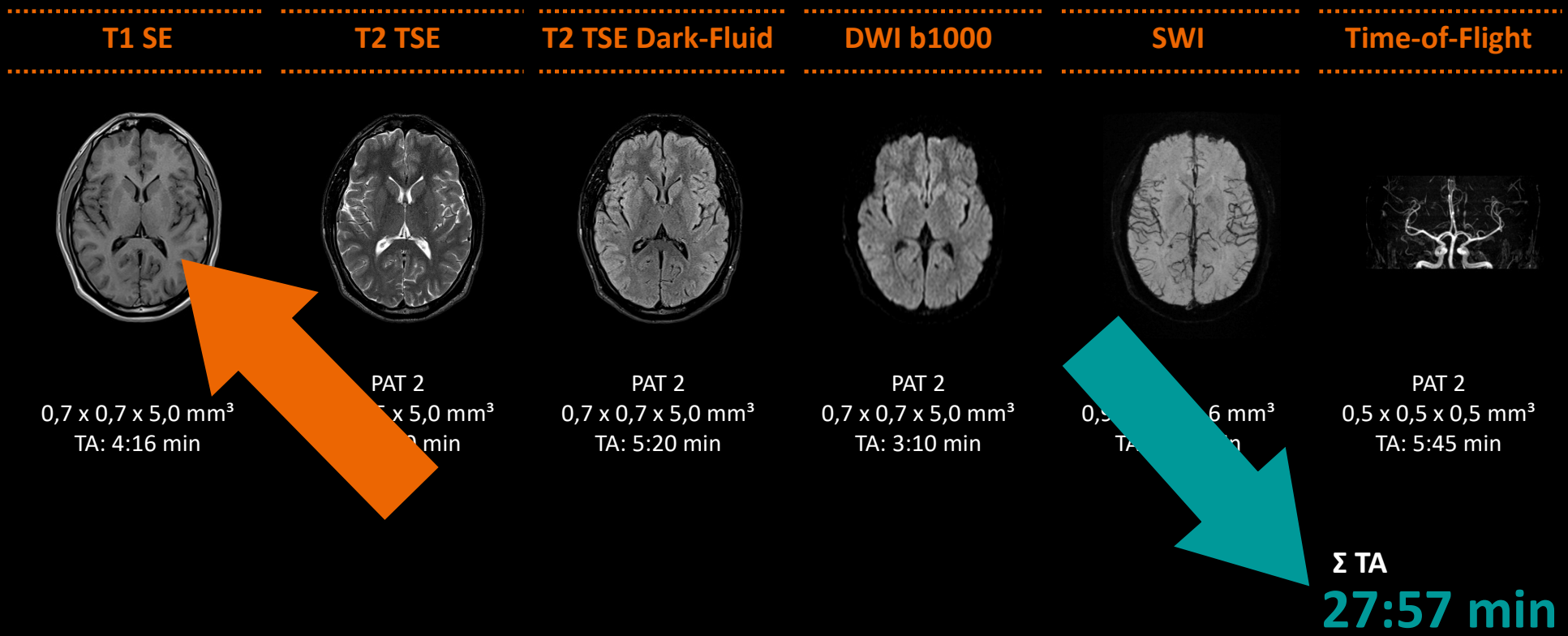
MAGNETOM Free.Max

**Neuro**  
**Głowa-szyja**



# Głowa

## Protokół pełny

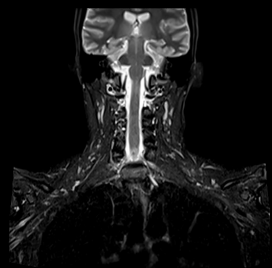




# Szyja

## Protokół pełny z SMS TSE

T2 TSE STIR



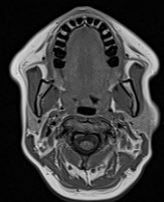
0,6 x 0,6 x 4,0 mm<sup>3</sup>  
TA: 5:17 min

T1 TSE



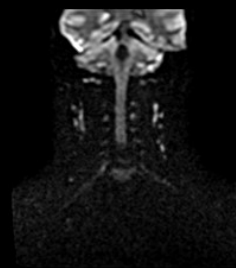
0,9 x 0,9 x 4,0 mm<sup>3</sup>  
TA: 4:11 min

T1 TSE



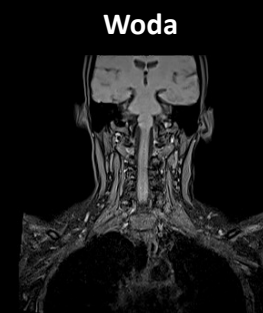
0,8 x 0,8 x 4,0 mm<sup>3</sup>  
TA: 3:03 min

DWI b800



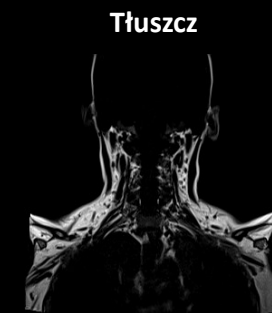
PAT 2  
1,2 x 1,2 x 4,0 mm<sup>3</sup>  
TA: 4:48 min

T1 TSE Dixon



Woda

PAT 2 SMS 2  
1,0 x 1,0 x 4,0 mm<sup>3</sup>  
TA: 4:52 min

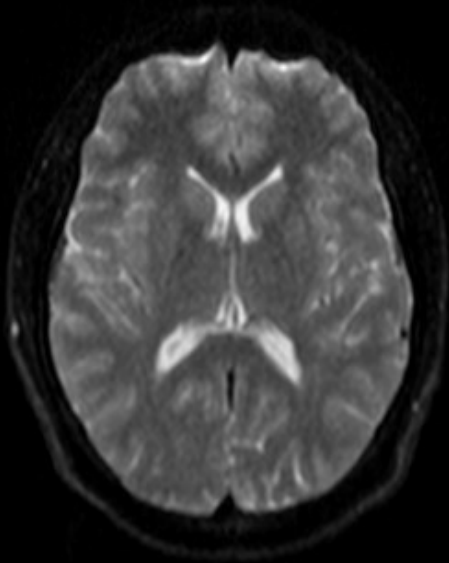


Tłuszcz

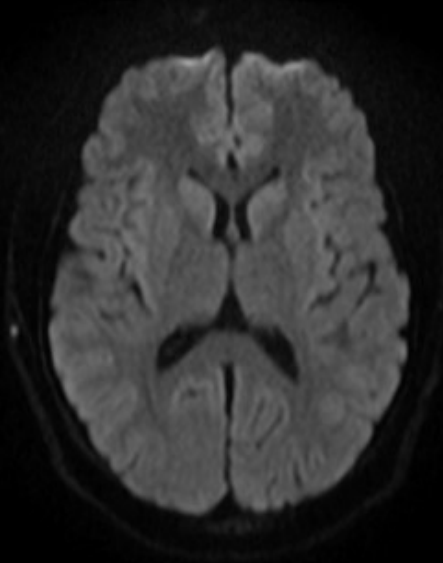
Σ TA  
**22:11 min**

# Neuro DWI

b0



b1000



ADC

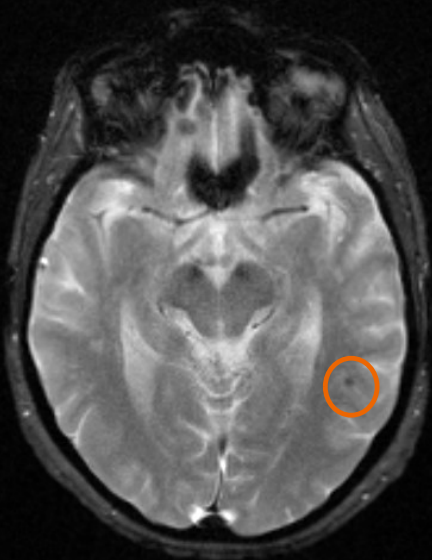


PAT 2  
TR = 4600 ms, TE = 95 ms  
0,7 x 0,7 x 5,0 mm<sup>3</sup>  
TA: 3:10 min

# Neuro

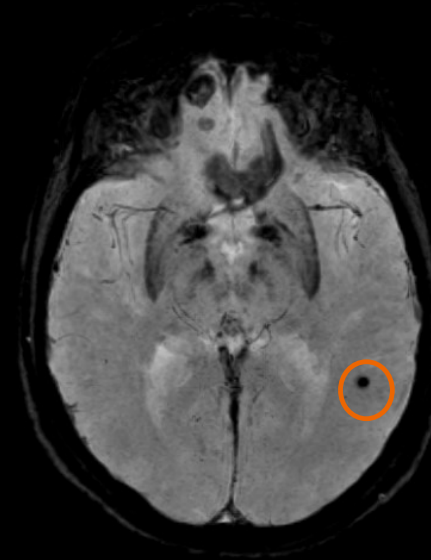
## EPI-SWI

T2\*w FLASH



TR = 1270 ms, TE = 50 ms  
0,9 x 0,9 x 5,0 mm<sup>3</sup>  
TA: 4:44 min

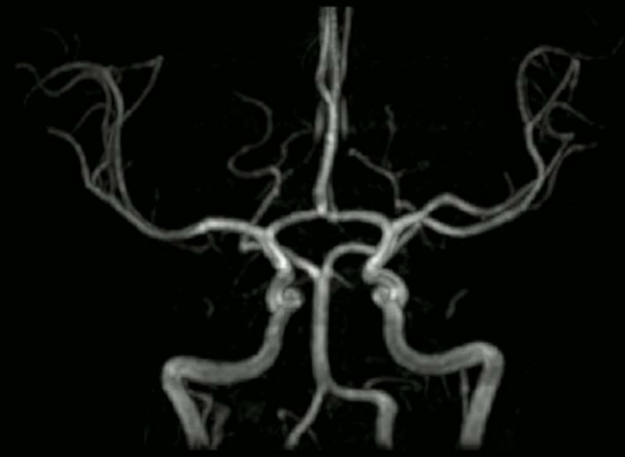
EPI-SWI



TR = 138 ms, TE = 55 ms  
0,4 x 0,4 x 2,5 mm<sup>3</sup>  
TA: 2:32 min

Neuro

Time-of-Flight MRA



PAT 2  
0,5 x 0,5 x 0,5 mm<sup>3</sup>  
TA: 6:08 min

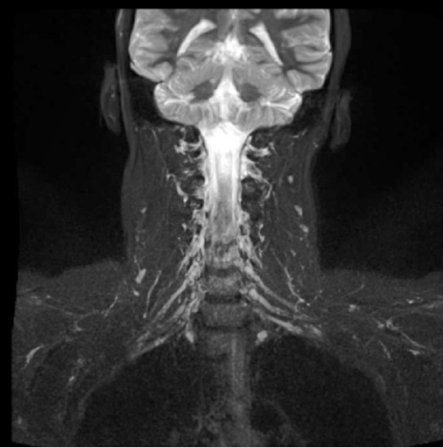
# Angio ceMRA



PAT 2  
1,2 x 1,2 x 1,2 mm<sup>3</sup>  
TA: 0:17 min

MAGNETOM Free.Max

# Kręgosłup



# Kręgosłup szyjny

## Protokół standardowy

T1 TSE



PAT 2  
0,4 x 0,4 x 3,0 mm<sup>3</sup>  
TA: 4:00 min

T2 TSE



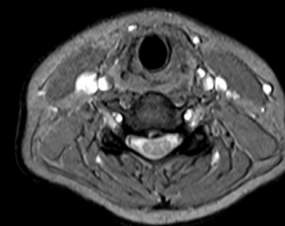
0,4 x 0,4 x 3.0 mm<sup>3</sup>  
TA: 3:59 min

T2 TSE STIR



0,5 x 0,5 x 3.0 mm<sup>3</sup>  
TA: 5:20 min

MEDIC



PAT 2  
0,4 x 0,4 x 3.5 mm<sup>3</sup>  
TA: 5:42

Σ TA

**19:01 min**

# Kręgosłup piersiowy

## Protokół standardowy

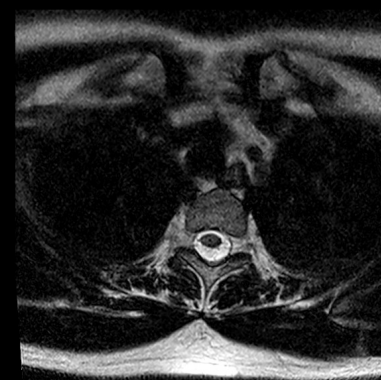
T1 TSE

T2 TSE Dixon

T2 TSE

Faza

Woda



0,8 x 0,8 x 4,0 mm<sup>3</sup>  
TA: 4:32 min

1,0 x 1,0 x 4,0 mm<sup>3</sup>  
TA: 4:49 min

0,3 x 0,3 x 2,0 mm<sup>3</sup>  
TA: 4:38 min

Σ TA

**13:59 min**



# Kręgosłup lędźwiowy

## Protokół standardowy

T1 TSE

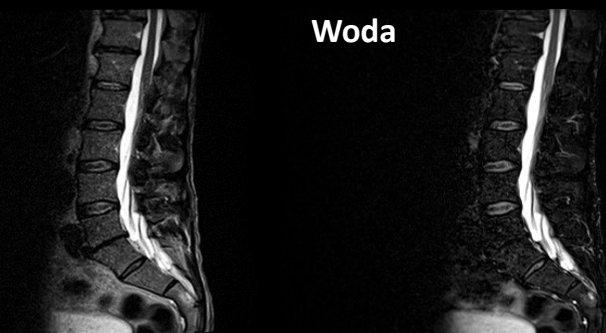


0,8 x 0,8 x 4,0 mm<sup>3</sup>  
TA: 5:07 min

Faza



T2 TSE Dixon



PAT 2  
0,9 x 0,9 x 4,0 mm<sup>3</sup>  
TA: 4:44 min

T2 TSE



PAT 2  
0,9 x 0,9 x 2,5 mm<sup>3</sup>  
TA: 5:01



Σ TA  
**14:52 min**

# Cały kręgosłup

## T1 TSE – protokół w 3 krokach

C

Th

L



PAT 2

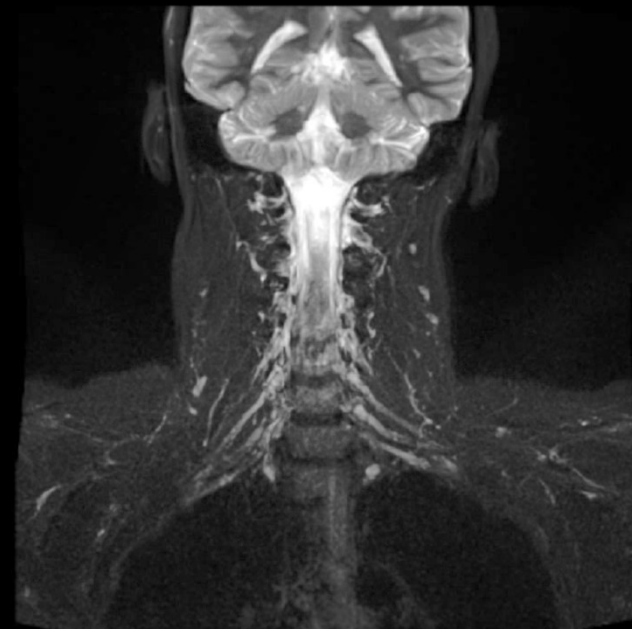
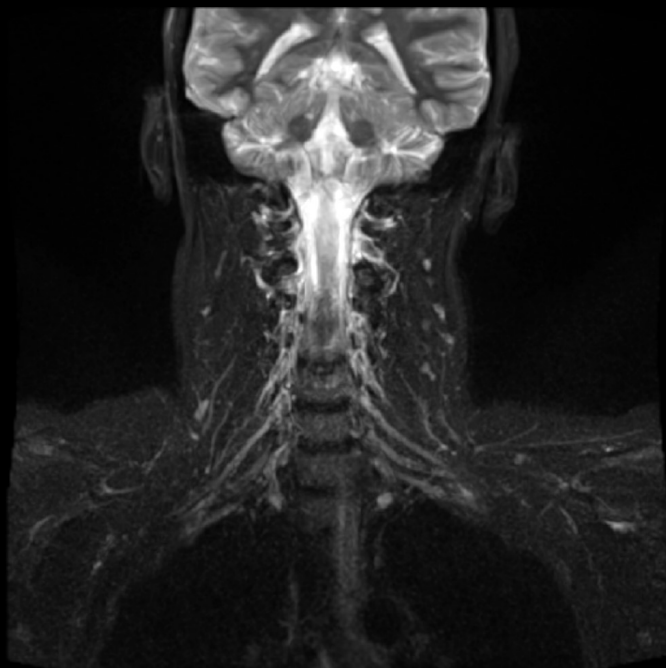
TR = 443 ms, TE = 14 ms

0,9 x 0,9 x 4,0 mm<sup>3</sup>

TA: 3 x 3:10 min = 9:30 min

# Kręgosłup szyjny

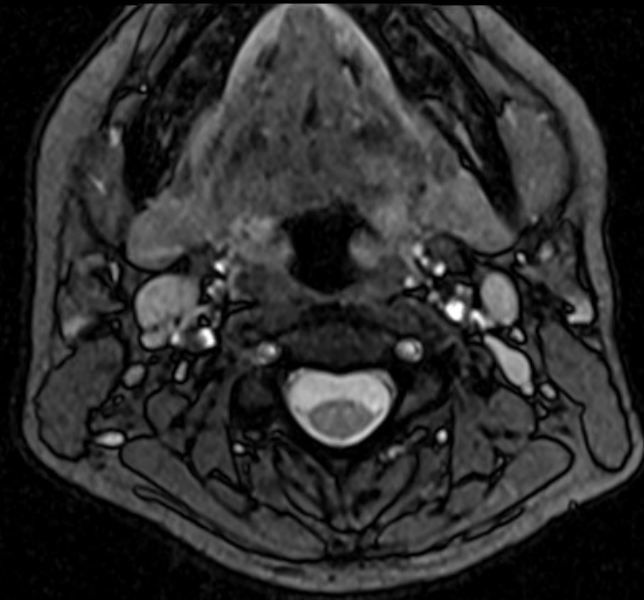
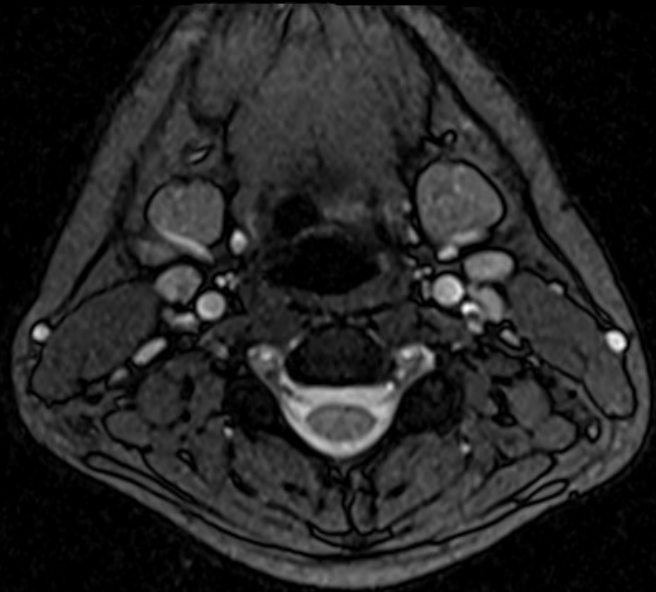
## T2 STIR BLADE



PAT 2  
TR = 5360 ms, TE = 116 ms  
0,6 x 0,6 x 4,0 mm<sup>3</sup>  
TA: 5:16 min

# Kręgosłup szyjny

## T2\* MEDIC



TR = 600 ms, TE = 39 ms  
0,4 x 0,4 x 3,0 mm<sup>3</sup>  
TA: 5:42 min

# Kręgosłup lędźwiowy

## TSE

T1



TR = 426 ms, TE = 13 ms  
0,8 x 0,8 x 4,0 mm<sup>3</sup>  
TA: 5:07 min

T2



PAT 2  
TR = 3500 ms, TE = 98 ms  
0,8 x 0,8 x 4,0 mm<sup>3</sup>  
TA: 3:47 min

# Kręgosłup lędźwiowy

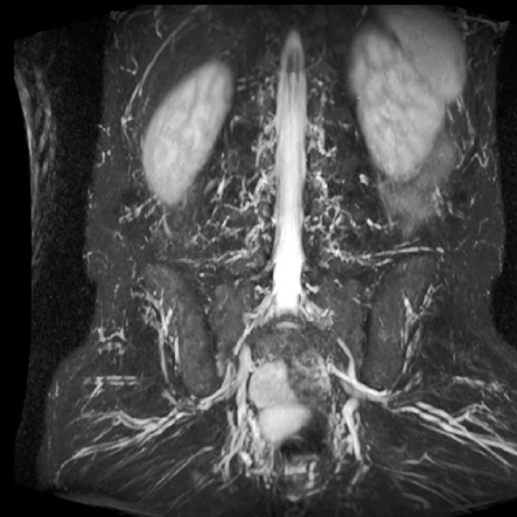
## T2 TSE STIR

Sag



TR = 5180 ms, TE = 48 ms  
TI = 110 ms  
0,5 x 0,5 x 4,0 mm<sup>3</sup>  
TA: 5:31 min

Cor



TR = 4530 ms, TE = 80 ms  
TI = 120 ms  
0,5 x 0,5 x 4,0 mm<sup>3</sup>  
TA: 2:52 min

MAGNETOM Free.Max

**MSK**

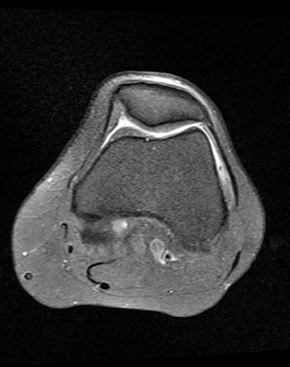


# Kolano

## Protokół standardowy z SMS TSE

PD TSE FS

T1 TSE



PAT 2  
0,3 x 0,3 x 3,0 mm<sup>3</sup>  
TA: 4:48 min

SMS 2  
0,3 x 0,3 x 3,0 mm<sup>3</sup>  
TA: 3:14 min

PAT 2  
0,3 x 0,3 x 3,0 mm<sup>3</sup>  
TA: 6:22 min

PAT 2  
0,2 x 0,2 x 3,0 mm<sup>3</sup>  
TA: 2:50 min

Σ TA

**17:14 min**



Bark

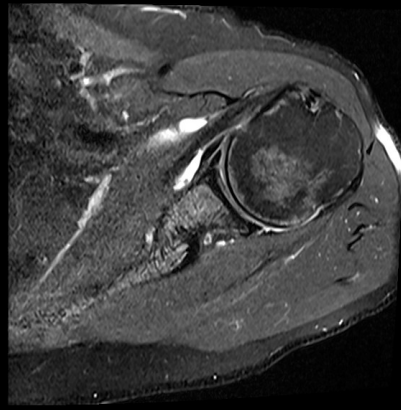
## Protokół standardowy

PD TSE FS

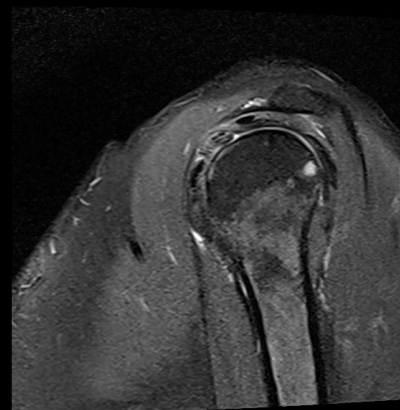
T1 TSE



0,3 x 0,3 x 3,5 mm<sup>3</sup>  
TA: 4:49 min



0,3 x 0,3 x 3,5 mm<sup>3</sup>  
TA: 4:57 min



PAT 2  
0,3 x 0,3 x 3,5 mm<sup>3</sup>  
TA: 4:57 min



PAT 2  
0,3 x 0,3 x 3,5 mm<sup>3</sup>  
TA: 3:42 min

Σ TA

**18:25 min**

# Biodra

## TSE

T1 TSE



TR = 3170 ms, TE = 95 ms  
0,4 x 0,4 x 3,0 mm<sup>3</sup>  
TA: 4:44 min

PD TSE

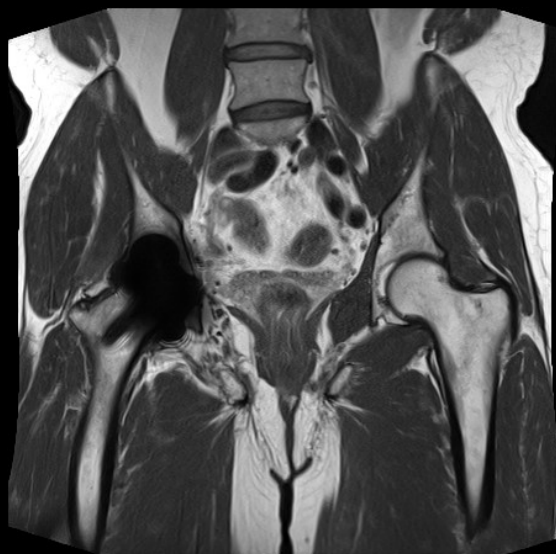


TR = 2420 ms, TE = 46 ms  
0,4 x 0,4 x 3,0 mm<sup>3</sup>  
TA: 4:16 min

# Biodra

## Obrazowanie implantów PD TSE

### Standard



SEMAC, PAT 3  
TR = 3110 ms, TE = 39 ms  
0,8 x 0,8 x 4,0 mm<sup>3</sup>  
TA: 6:51 min

### MAGNETOM Free.Max

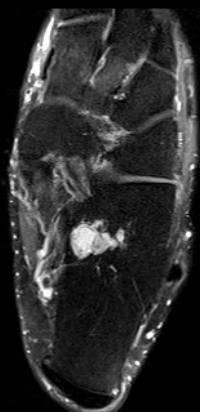


SEMAC, PAT 3  
TR = 2660 ms, TE = 31 ms  
1,0 x 1,0 x 4,0 mm<sup>3</sup>  
TA: 7:27 min

# Stopa TSE

PD TSE FS

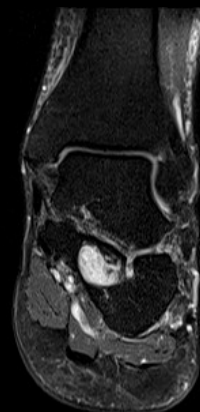
T1 TSE



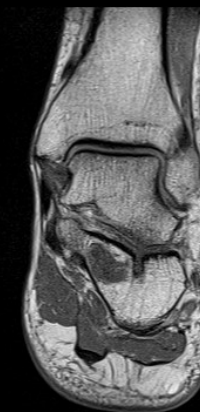
0,5 x 0,5 x 3,0 mm<sup>3</sup>  
TA: 4:18 min



0,5 x 0,5 x 3,0 mm<sup>3</sup>  
TA: 3:52 min



PAT 2  
0,5 x 0,5 x 3,0 mm<sup>3</sup>  
TA: 4:42 min



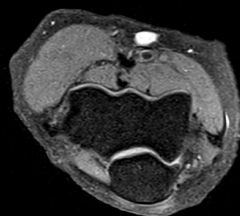
PAT 2  
0,5 x 0,5 x 3,0 mm<sup>3</sup>  
TA: 3:56 min

Σ TA  
**16:48 min**

# Łokiec

## TSE

PD TSE FS



PAT 2  
0,2 x 0,2 x 3,0 mm<sup>3</sup>  
TA: 3:23 min

T2 TSE



PAT 2 SMS 2  
0,2 x 0,2 x 3,0 mm<sup>3</sup>  
TA: 4:09 min

T2 TSE



0,2 x 0,2 x 3,0 mm<sup>3</sup>  
TA: 3:33 min

T1 TSE



0,2 x 0,2 x 3,0 mm<sup>3</sup>  
TA: 3:22 min

Σ TA  
**14:27 min**

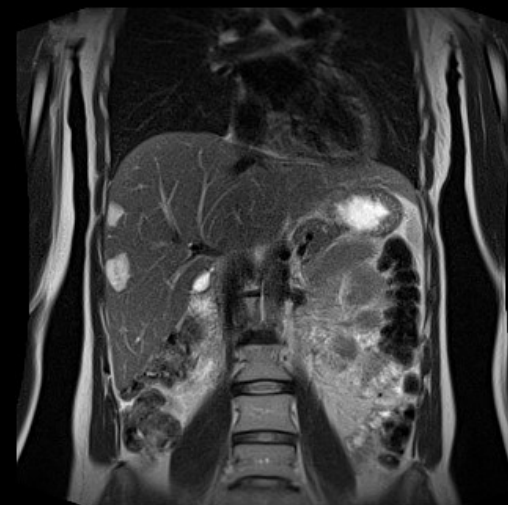
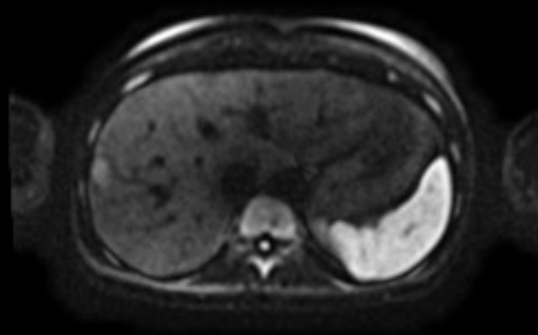
MAGNETOM Free.Max

**Jama brzuszna**



MAGNETOM Free.Max

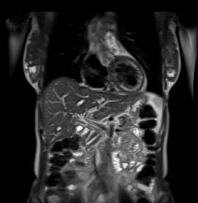
# Jama brzuszna



# Jama brzuszna

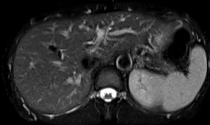
## Protkół < 10 min

### HASTE



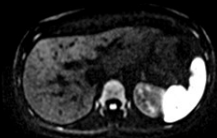
PAT 2  
Voxel size: 1,5 x 1,5 x 6,0 mm<sup>3</sup>  
TA: 1:43 min

### HASTE FS



PAT 2  
Voxel size: 1,0 x 1,0 x 6,0 mm<sup>3</sup>  
TA: 2:25 min

### DWI



PAT 2  
Voxel size: 1,3 x 1,3 x 6,0 mm<sup>3</sup>  
TA: 4:21 min

b800

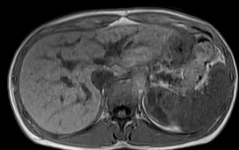
### HASTE MRCP



PAT 2  
Voxel size: 0,9 x 0,9 x 50,0 mm<sup>3</sup>  
TA: 0:02 min

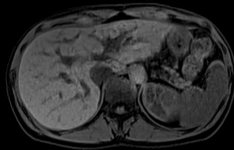
### T1 VIBE Dixon

Faza

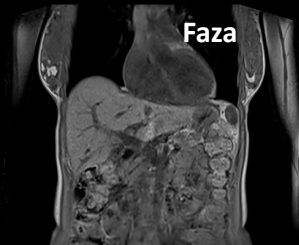


CAIPIRINHA 3  
Voxel size: 0,7 x 0,7 x 3,0 mm<sup>3</sup>  
TA: 4\*0:14 min

Woda



Faza



CAIPIRINHA 4  
Voxel size: 0,9 x 0,9 x 3,0 mm<sup>3</sup>  
TA: 0:16 min

Woda



Σ TA

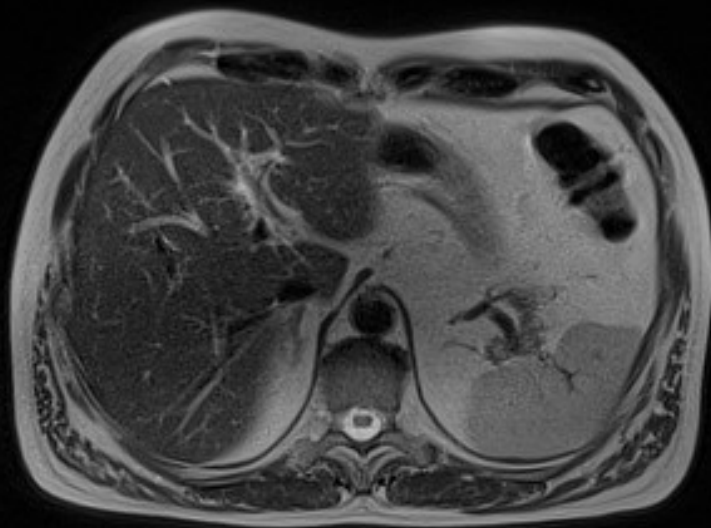
9:43 min



# Jama brzuszna

## T2 BLADE

Bez FatSat



PAT 2  
1,3 x 1,3 x 6,0 mm<sup>3</sup>  
TA: 2:46 min

Z FatSat

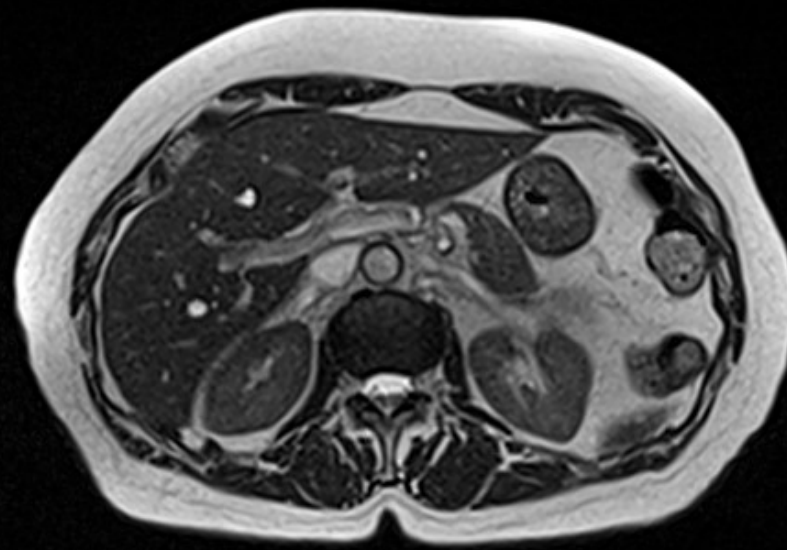
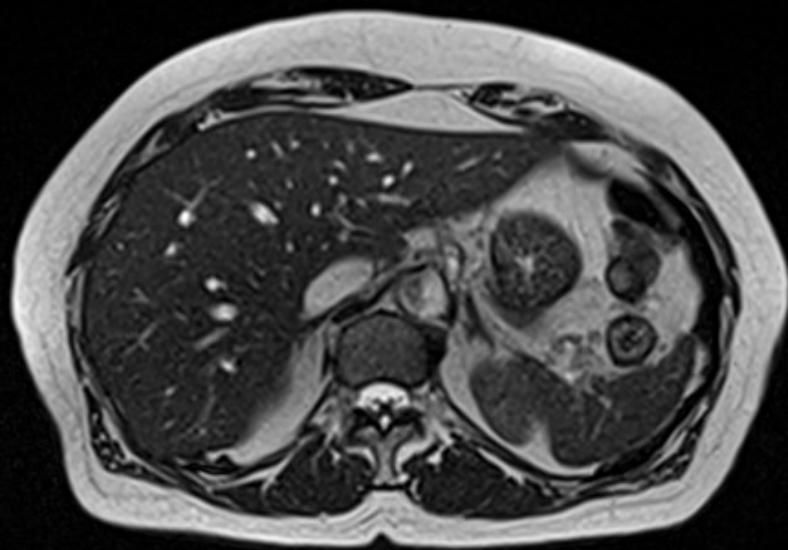


PAT 2  
1,3 x 1,3 x 6,0 mm<sup>3</sup>  
TA: 2:50 min

Jama brzuszna

TrueFISP, badanie na wstrzymanym oddechu

SIEMENS  
Healthineers

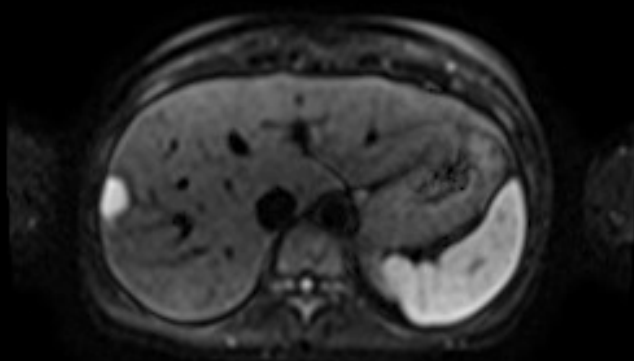


PAT 2  
0,7 x 0,7 x 6,0 mm<sup>3</sup>  
TA: 0:57 min

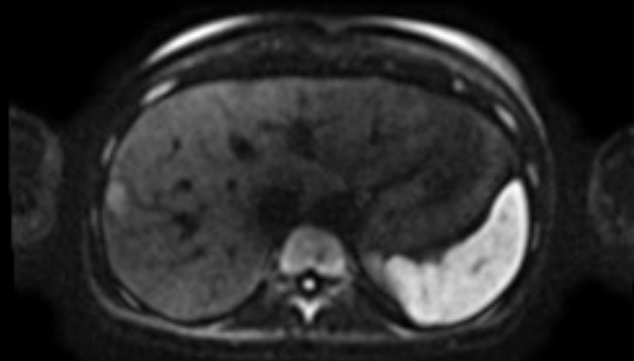
# Jama brzuszna

## DWI

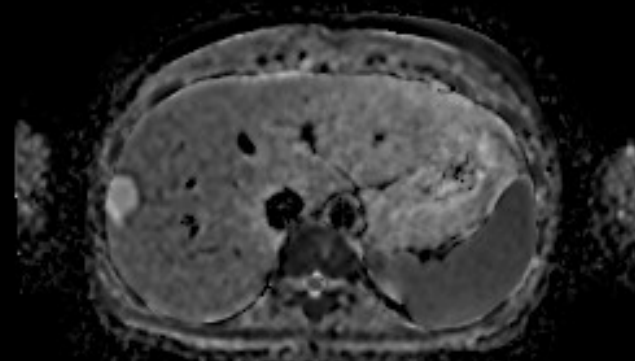
b50



b800



ADC



PAT 2  
TR = 4500 ms, TE = 72 ms  
1,5 x 1,5 x 6,0 mm<sup>3</sup>  
TA: 3:26 min

# Jama brzuszna

## T2 SPACE

MRCP



CS 6.5

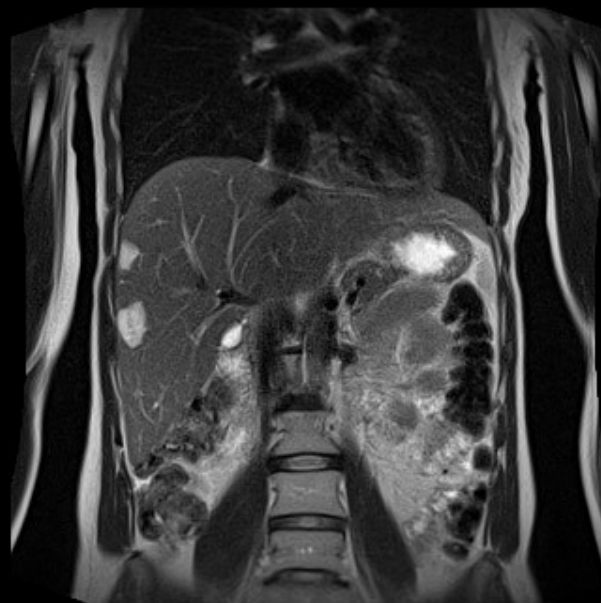
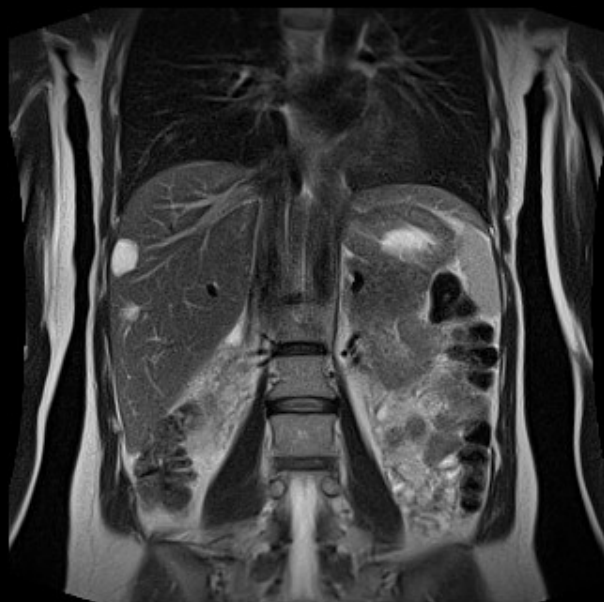
TR = 5317 ms, TE = 702 ms

1,2 x 1,2 x 1,0 mm<sup>3</sup>

TA: 4:21 min

# Jama brzuszna

## T2 BLADE



PAT 2  
TR = 4332 ms, TE = 91 ms  
1,2 x 1,2 x 6,0 mm<sup>3</sup>  
TA: 2:26 min

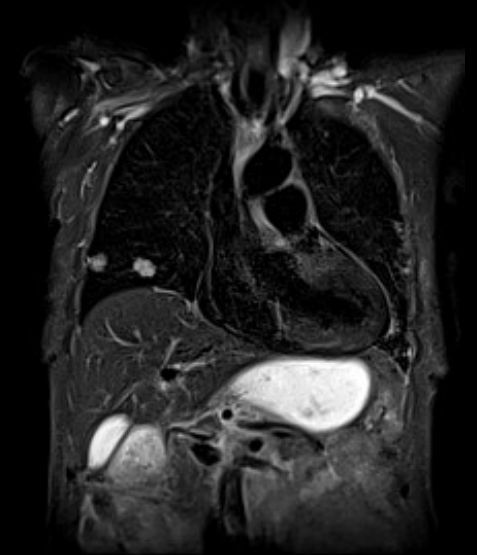
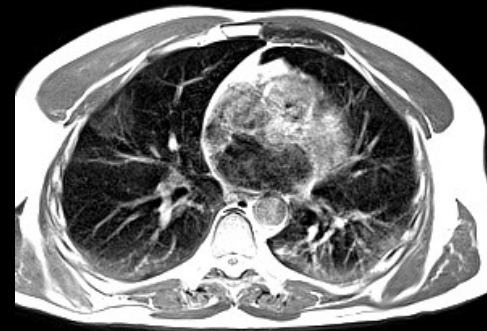
MAGNETOM Free.Max

Płuca



MAGNETOM Free.Max

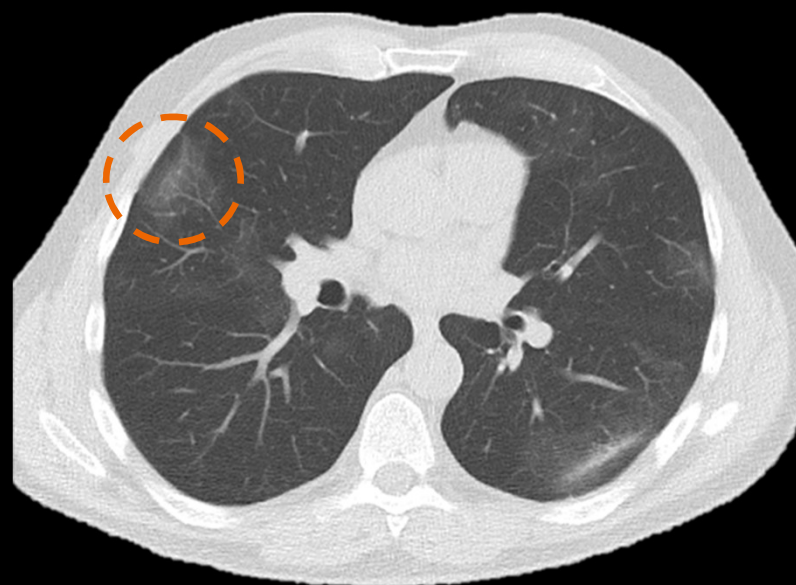
**Pluca**



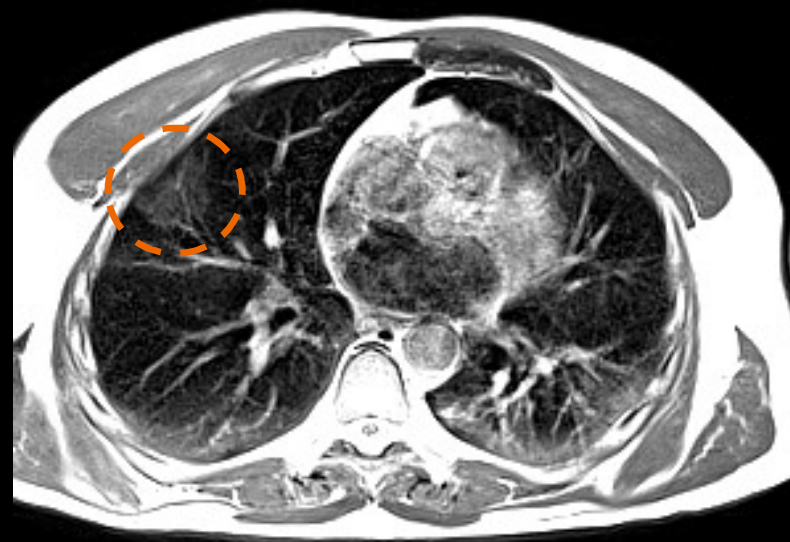
# Płuca

## PD BLADE z bramkowaniem oddechowym

CT



MAGNETOM Free.Max



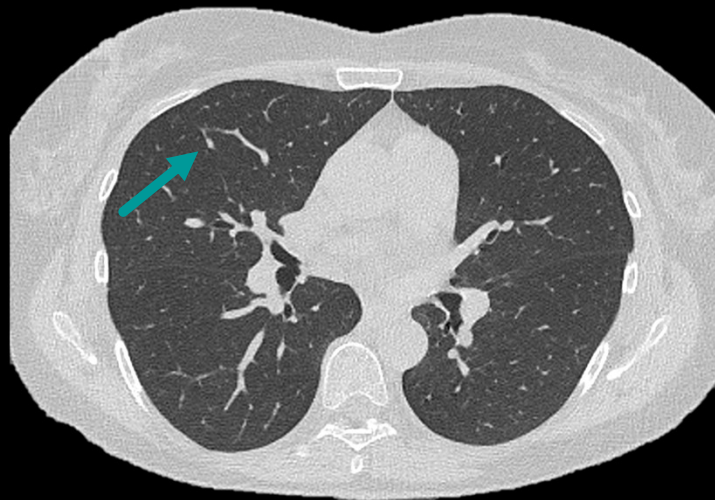
TE = 43 ms  
Voxel size: 1,1 x 1,1 x 6,0 mm<sup>3</sup>  
TA: 7:27 min



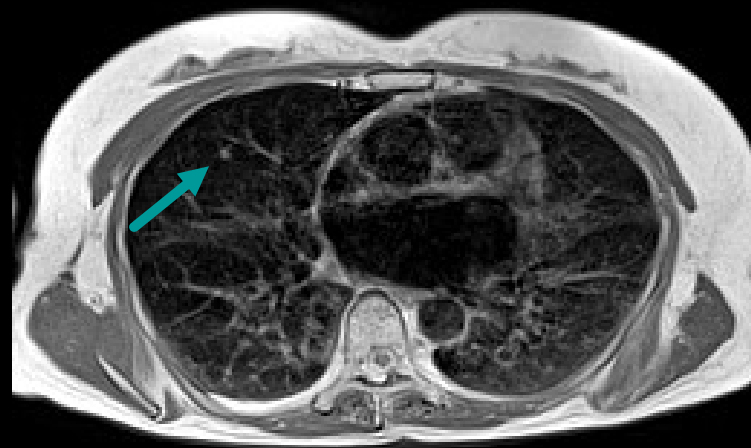
Płuca

**CT vs. MAGNETOM Free.Max**

CT



MAGNETOM Free.Max



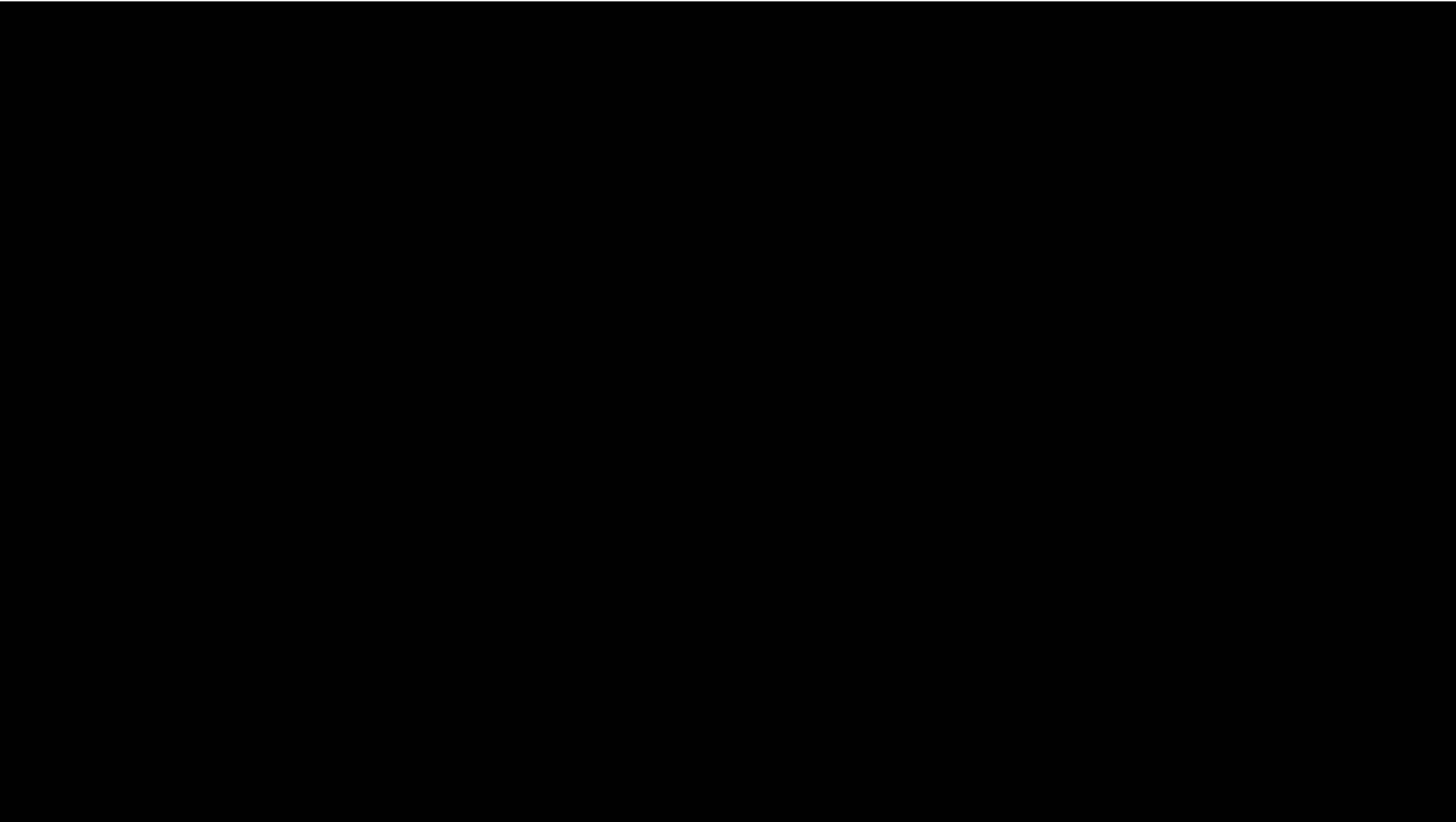
Płuca

**T2 BLADE STIR**

SIEMENS  
Healthineers



TR = 4834 ms, TE=74 ms  
1,5 x 1,5 x 6,0 mm<sup>3</sup>  
TA: 7:04 min





# Przełamiemy bariery?

MAGNETOM Free.Max

