



SOMMAIRE

- Imagerie Neuro
- Ostéo
- Sénologie
- Fœtal
- Cardio-vasculaire
- Oncologie



NOUVEL APPAREIL IRM 1.5T



De quoi se compose un système I.R.M.?

- L'aimant

PERMANENT!! 24/24h

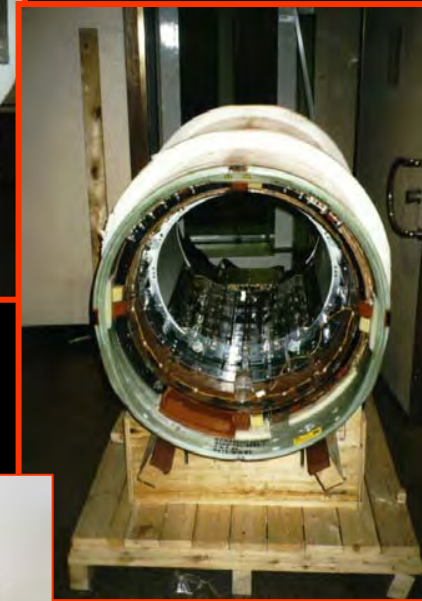
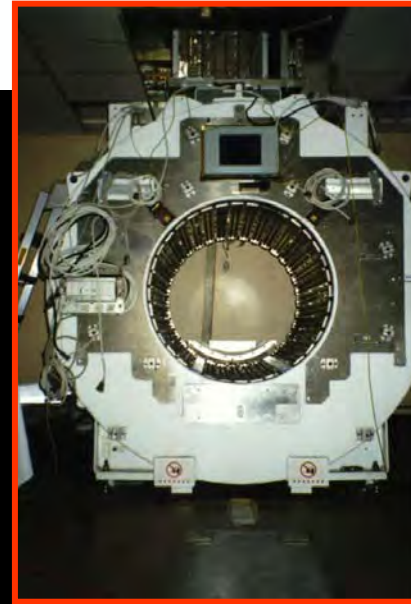


- Les bobines de gradients:

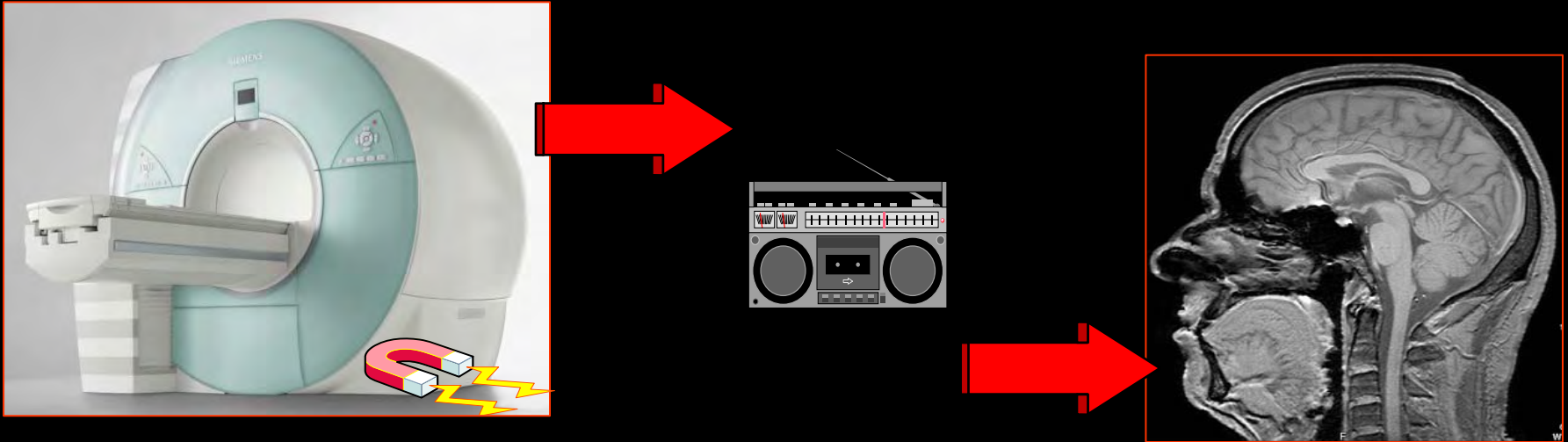
- Petits champs magnétiques superposés

- Les antennes RF:

Permettent l'émission et/ou la réception du signal I.R.M.



- Sous l'effet du Champ Magnétique et des ondes de radio-fréquence, les protons changent de position en émettant un signal



- C'est en amplifiant ce signal qu'il y a construction de l'image

CONTRE-INDICATIONS ABSOLUES ET RELATIVES

MAGNETOM



Wortzeichen:
Magnetfeld
Warning sign:
Magnetic Field



Signal station:
Champs Magnétique RMN
Símbolo de adverténcia:
RMN Champs Magnético



Wortzeichen:
Hochfrequenzfeld
Warning sign:
High Frequency Field



Wortzeichen:
Champs Haute Fréquence
Wortzeichen:
Campo de Alta Freqüéncia

Verbotsschilder:
 - Nicht einbringen: Herzschritzmacher, Implantate, etc.
 - Nicht einbringen: Defibrillatoren, Hörgeräte, Insulinpumpen, etc.
 - Gefahr von elektromagnetischen Störungen.
 - Gefahr von elektromagnetischen Störungen durch Implantate.
 - Gefahr von elektromagnetischen Störungen durch Implantate.
 - Gefahr von elektromagnetischen Störungen durch Implantate.



Verbotsschilder:
Keine Mobiltelefone
Verbotsschilder:
Keine Mobiltelefone



Verbotsschilder:
Keine Metallgegenstände
Verbotsschilder:
Keine Metallgegenstände



Verbotsschilder:
Keine Uhren
Verbotsschilder:
Keine Uhren



Verbotsschilder:
Keine Aerosole
Verbotsschilder:
Keine Aerosole



Verbotsschilder:
Keine scharfen Gegenstände
Verbotsschilder:
Keine scharfen Gegenstände



Verbotsschilder:
Keine Nahrung und Getränke
Verbotsschilder:
Keine Nahrung und Getränke



PUISSANT CHAMP MAGNETIQUE
PAS DE PACEMAKERS



PAS DE PACEMAKERS

remboursement INAMI pour chaque examen
équivalent à un examen CTscanner

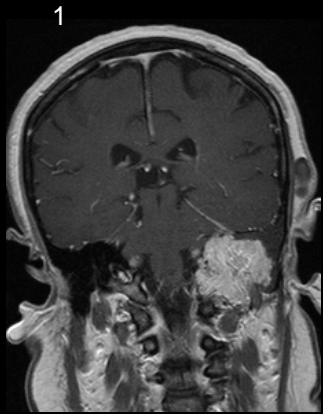
même ticket modérateur pour le patient

De nombreuses pathologies qui étaient investiguées par d'autres techniques en raison des délais importants **pourront bénéficier d'examens IRM, souvent plus précis et non irradiants.**

Le produit de contraste, parfois nécessaire, ne contient pas d'iode (**pas d'allergie**).

MR Applications

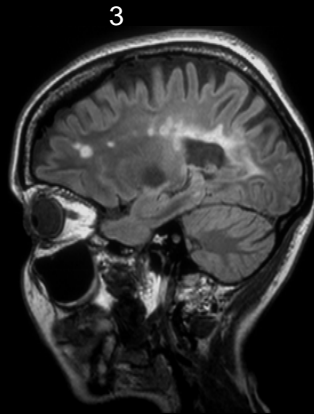
Standard but improved



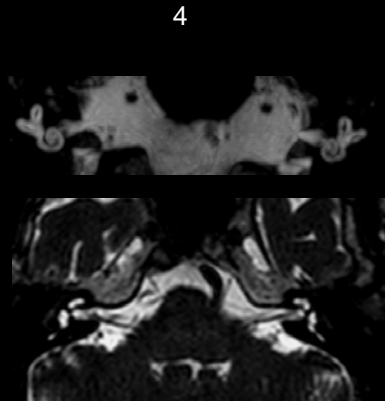
Post contrast T1W



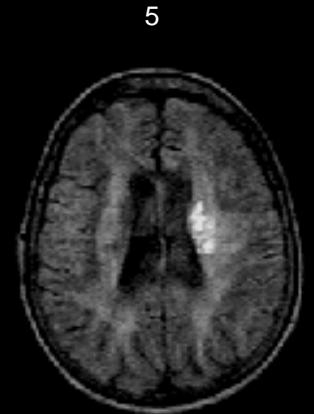
T2 W TSE Sag



Dark Fluid SPACE



SPACE



DWI



Non contrast
MR Angio



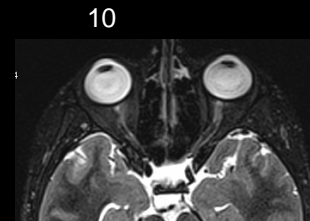
GRAPPA



MR Myelo



ce-MRA



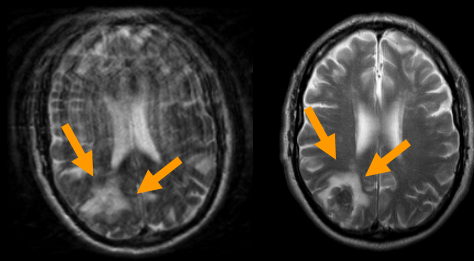
SPAIR



MEDIC 2D

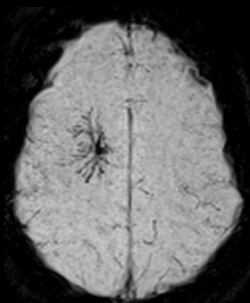
Improved MR Applications.

1



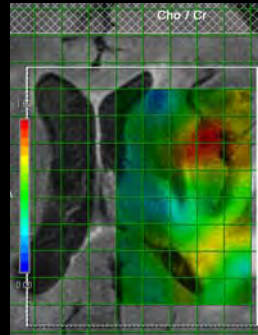
BLADE

2



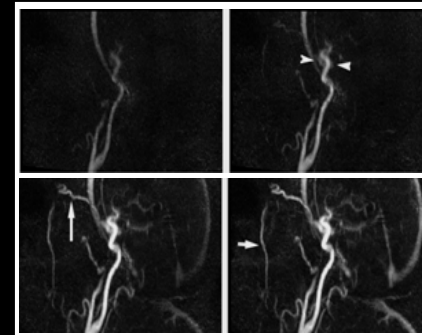
SWI

3



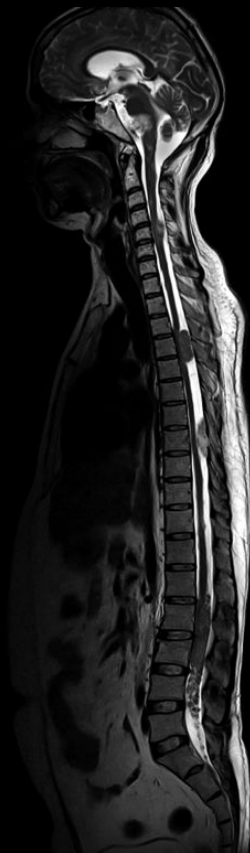
Matrix Spectroscopy

4



TWIST

5



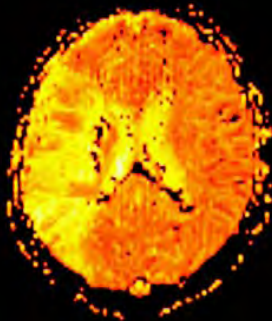
Compose

6



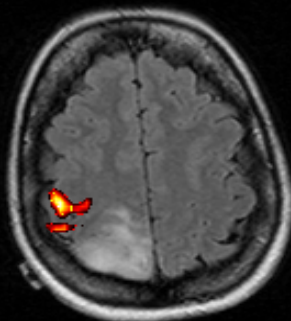
REVEAL

7



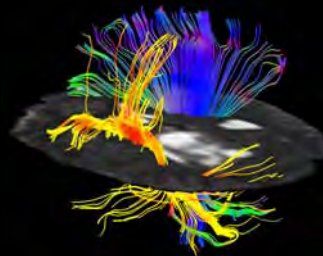
Perfusion

8



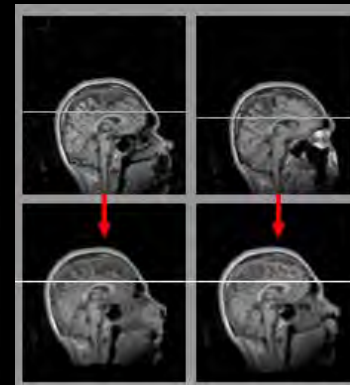
fMRI

9



DTI-Tractography

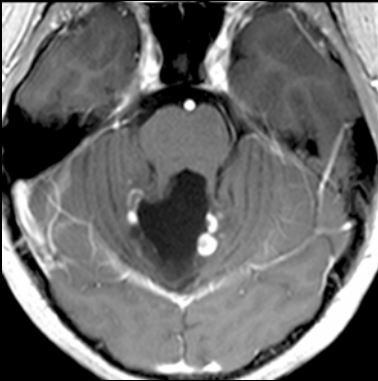
10



AutoAlign - Head

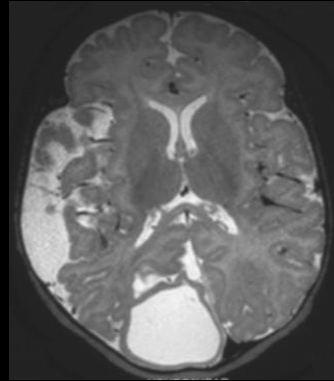
Role of MRI in intracranial disease

Tumor



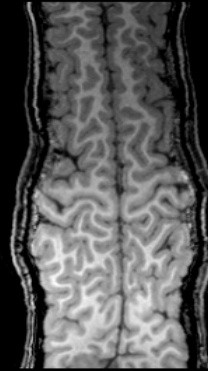
Pilocytic Astrocytoma residual tumor

Congenital disease



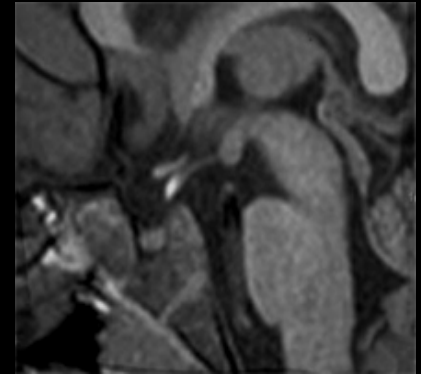
Congenital Astrocytoma Neonate*

Seizure



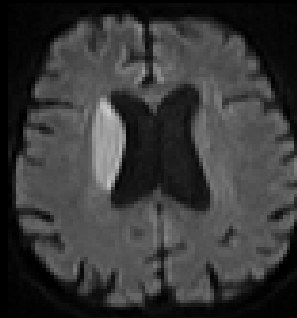
3D Curved reformatting for Epilepsy imaging

Sella



Non-descended post pituitary

Cerebrovascular disease



DWI

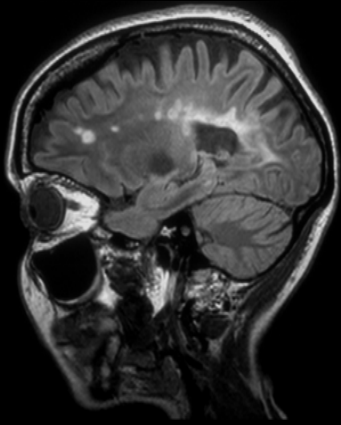


ADC

Stroke MR imaging

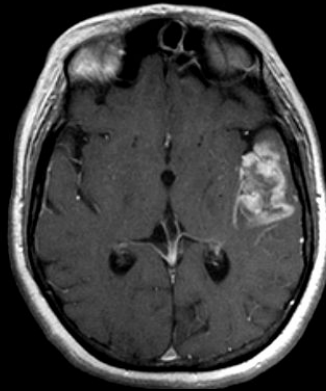
Role of MRI in intracranial disease

White Matter lesions



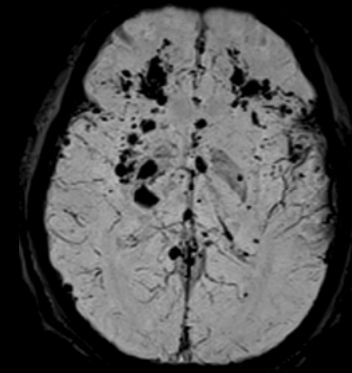
FLAIR 3D TSE

Infection



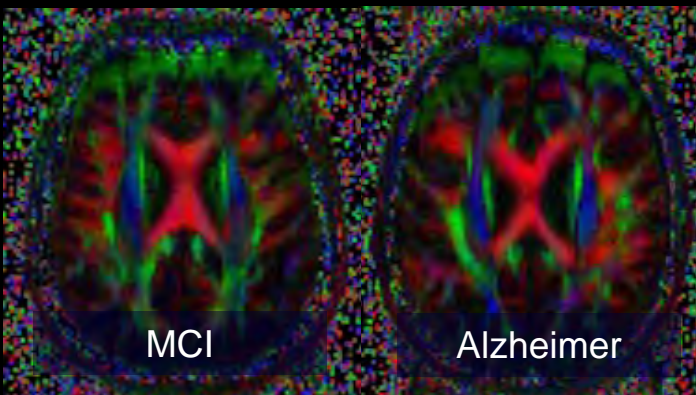
Inflammatory pseudo-tumor
near complete clearing of
lesion with steroids

Trauma



SWI (3D T2*)
in shearing injury

Aging brain



FA maps of DTI comparing Mild Cognitive impairment
and Alzheimer's disease

Directional maps in axial plane

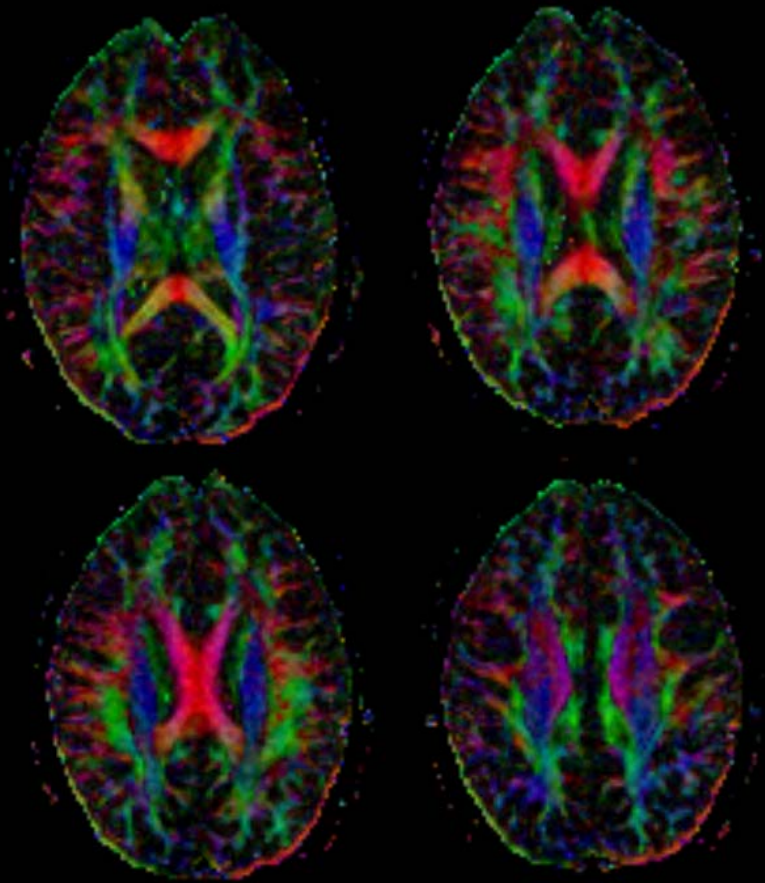
anisotropy maps demonstrate the discrete directions for each voxel as resolved relative to the x, y and z gradient directions

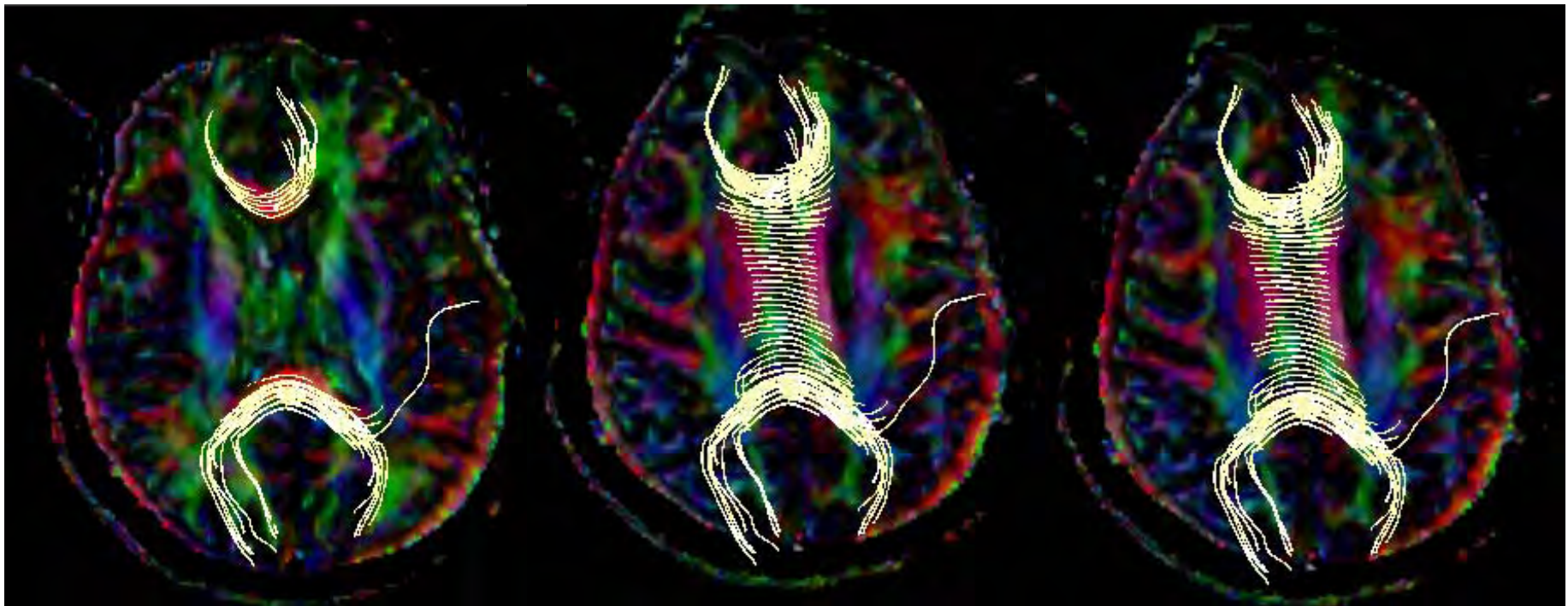
Color indicates: direction

➤ red, left-right

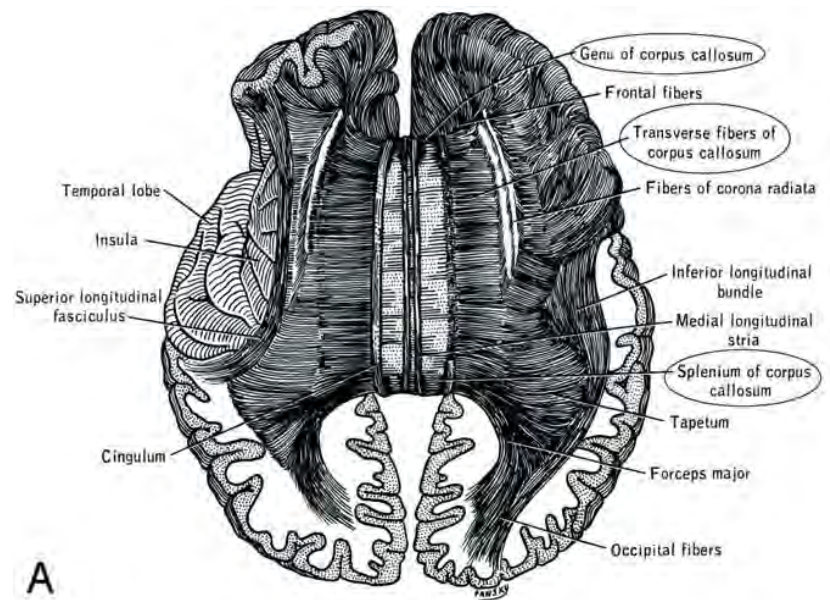
➤ green, anteroposterior

➤ blue, superior-inferior

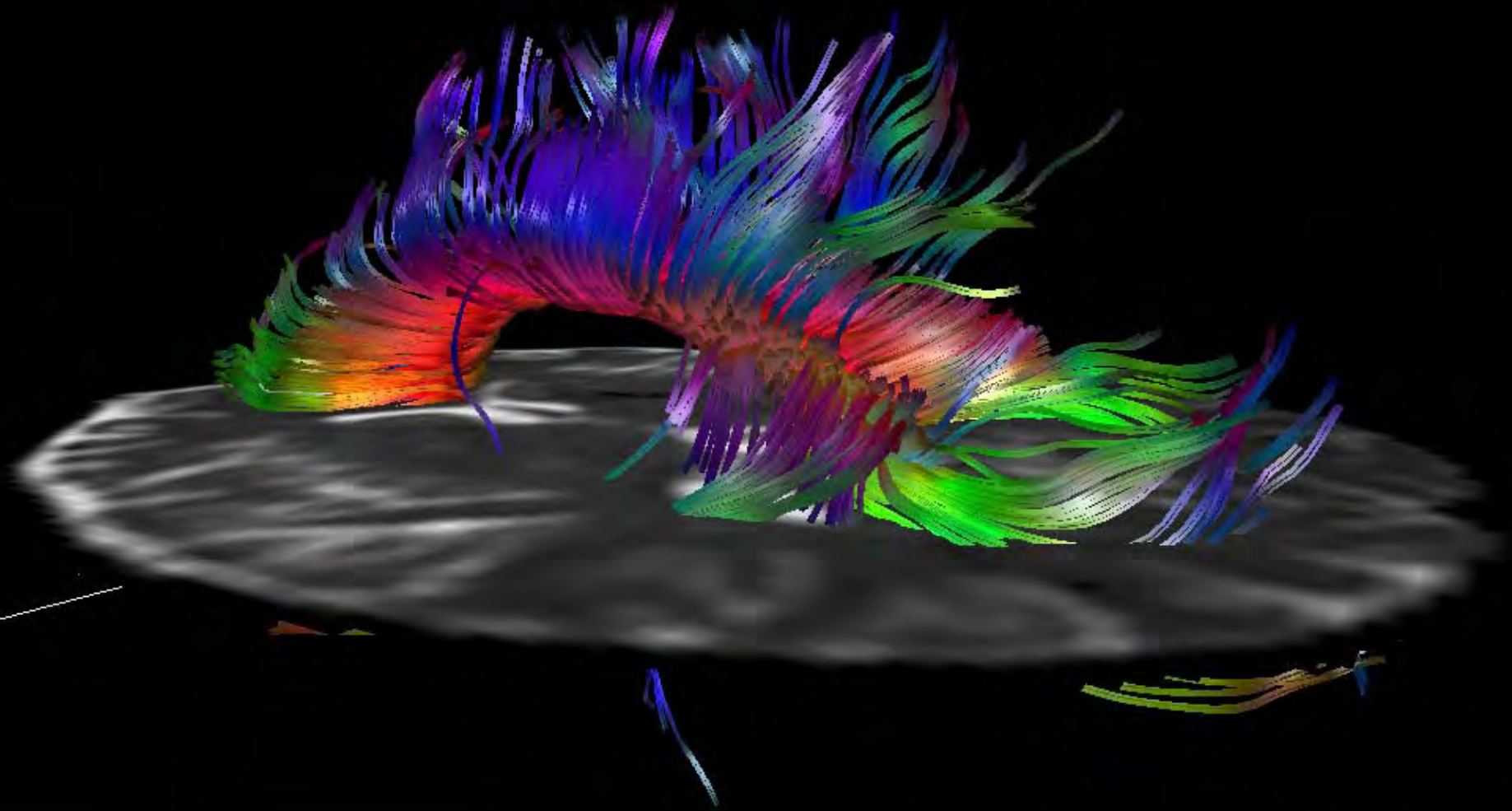


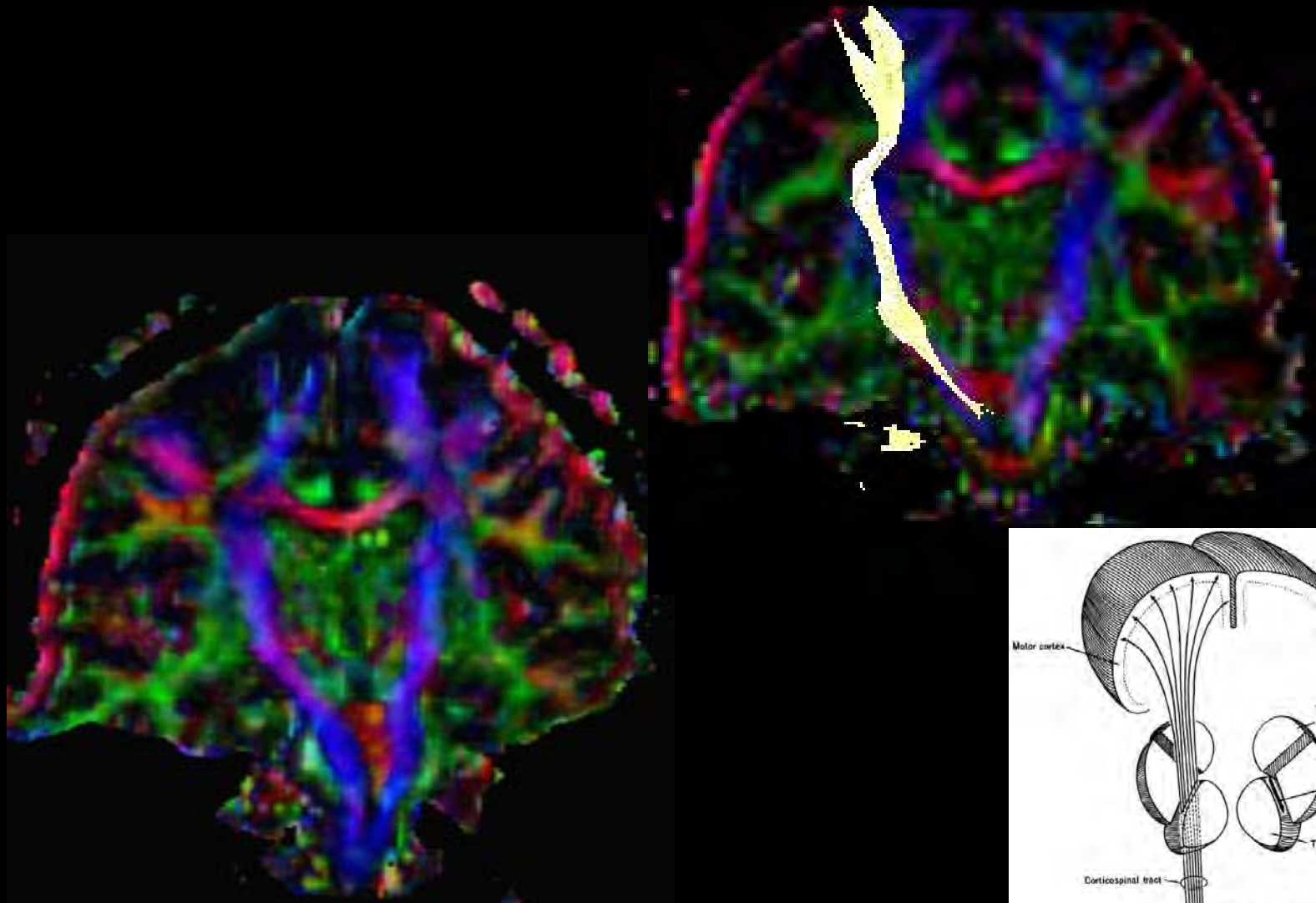


corpus callosum

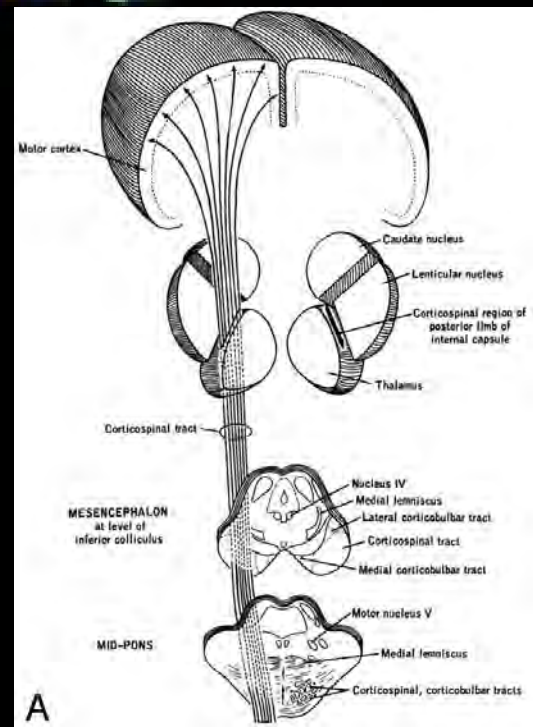


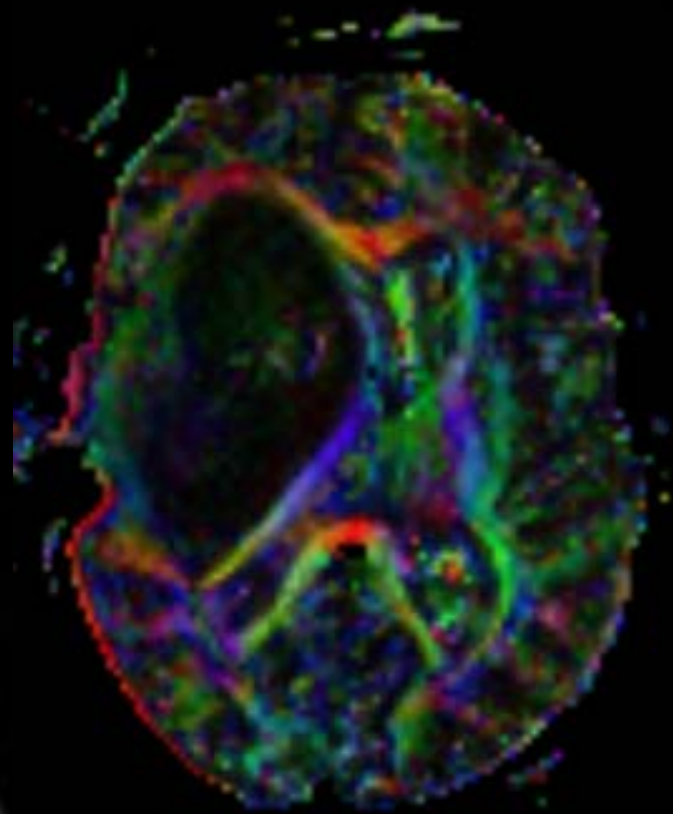
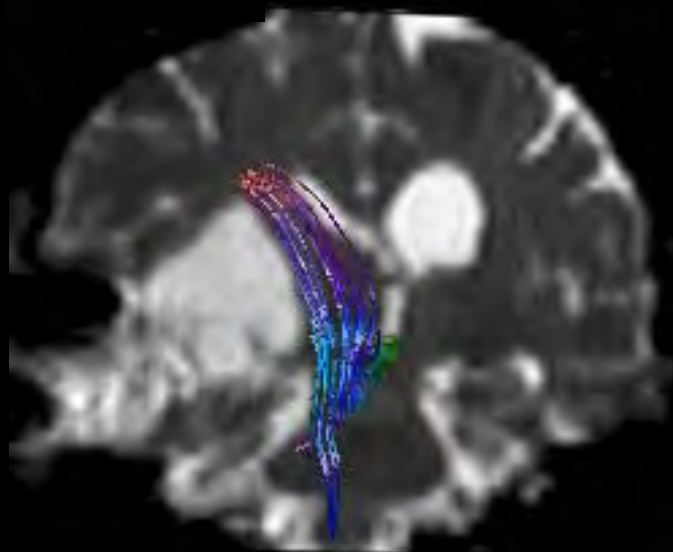
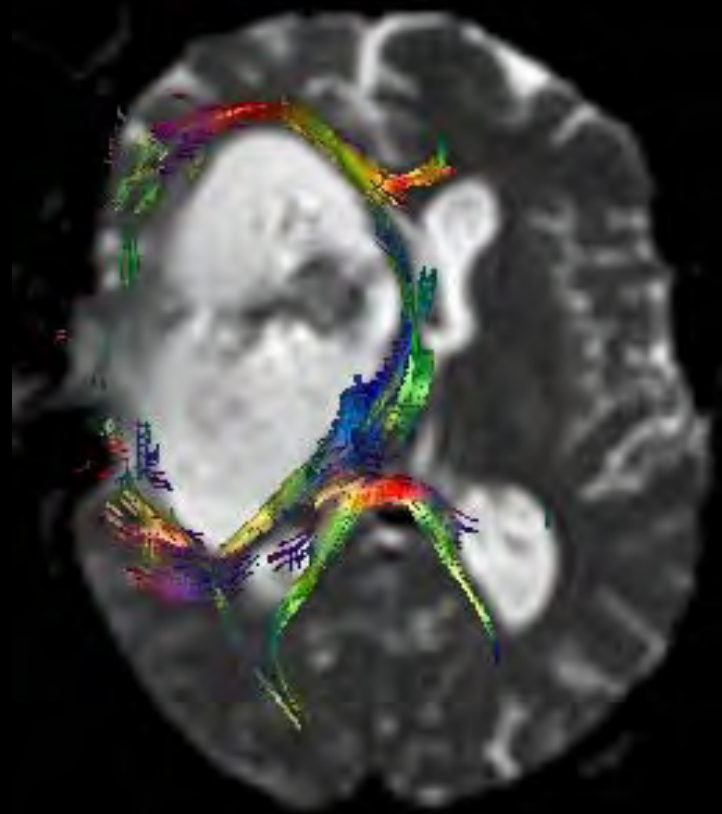






Corticospinal tracts

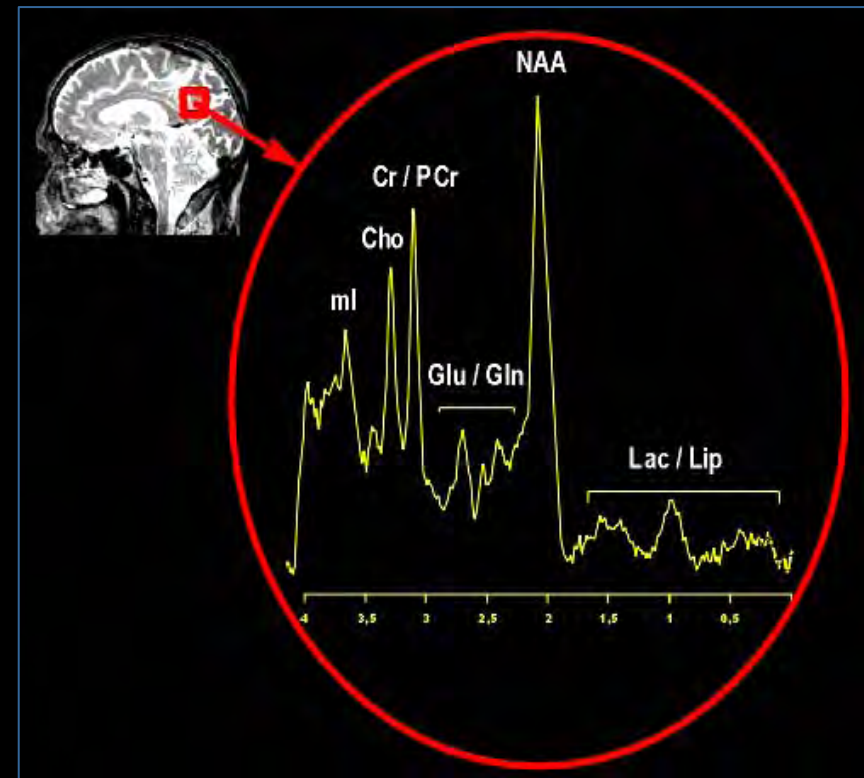




Spectroscopy

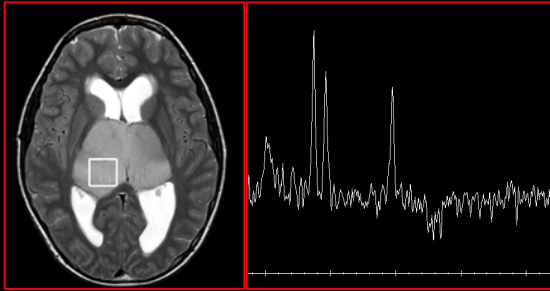
The different peaks of the spectrum indicate different metabolic components (Cho, Cr, NAA, mI, Lac...).

Their amplitude indicate the relative concentration.



Spectroscopy

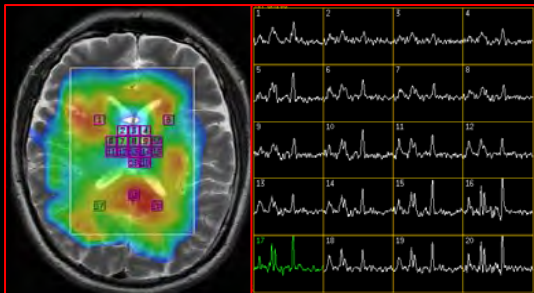
- Single Voxel or Monovoxel (MV)



High spectral resolution
Short acquisition time
Low spatial resolution

Multivoxel or Chemical Shift Imaging (CSI) or Spectroscopic Imaging

- Metabolic maps of the different compounds, with their spatial distribution



Low spectral resolution
Long acquisition time
High spatial resolution

Role of MRI in Brain tumors

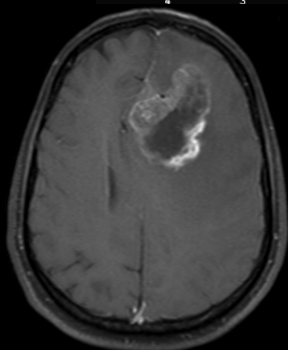
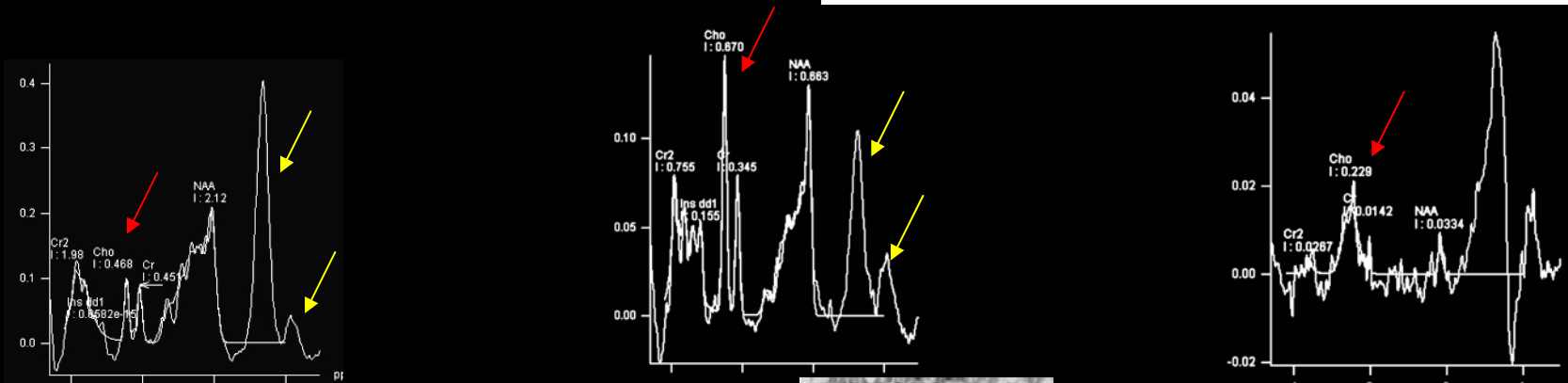
MR lesion characterization with spectroscopy

JOURNAL OF MAGNETIC RESONANCE IMAGING 20:187-192 (2004)

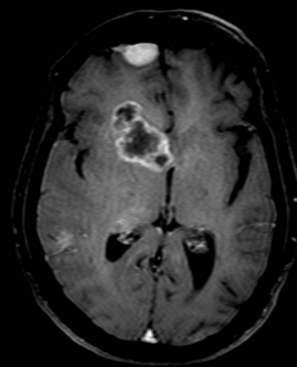
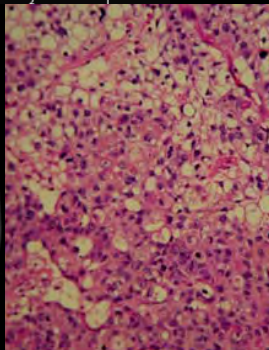
Original Research

Differentiation of Metastases from High-Grade Gliomas Using Short Echo Time ^1H Spectroscopy

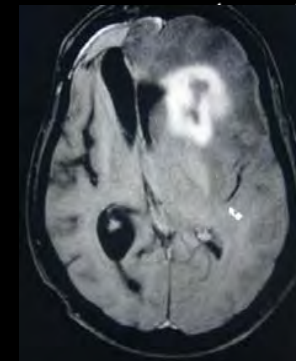
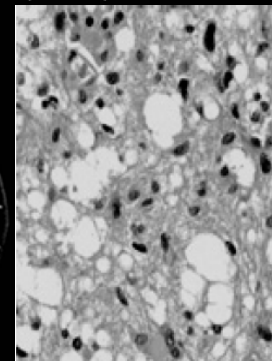
Kirstie S. Opstad, BSc,¹ Mary M. Murphy, MD,² Peter R. Wilkins, FRCPath,³
B. Anthony Bell, FRCS,² John R. Griffiths, DPhil,¹ and Franklyn A. Howe, DPhil^{1*}



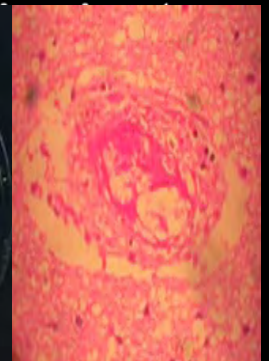
Metastasis



Glioblastoma

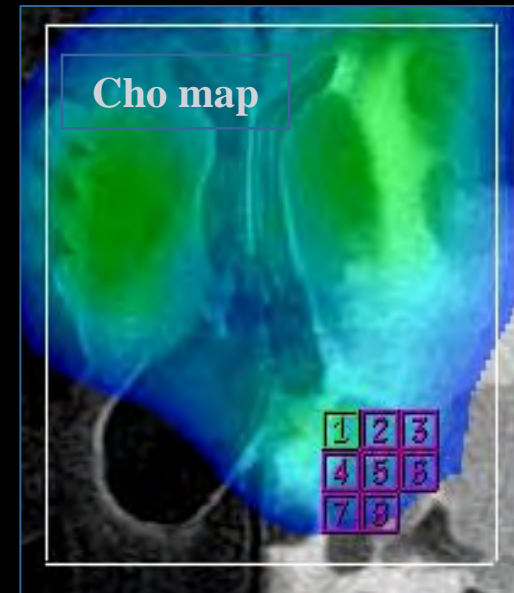
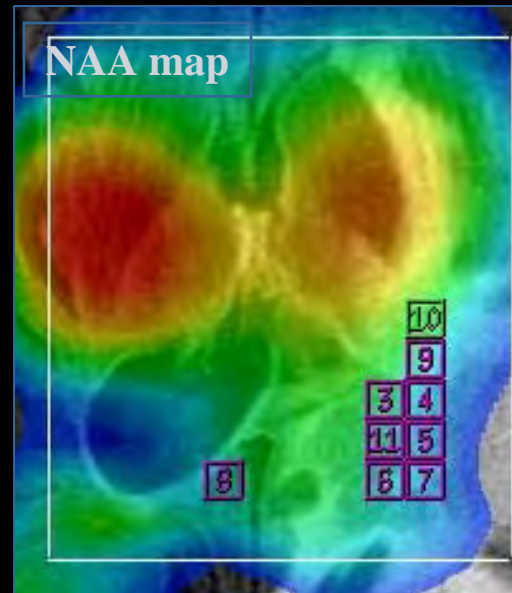
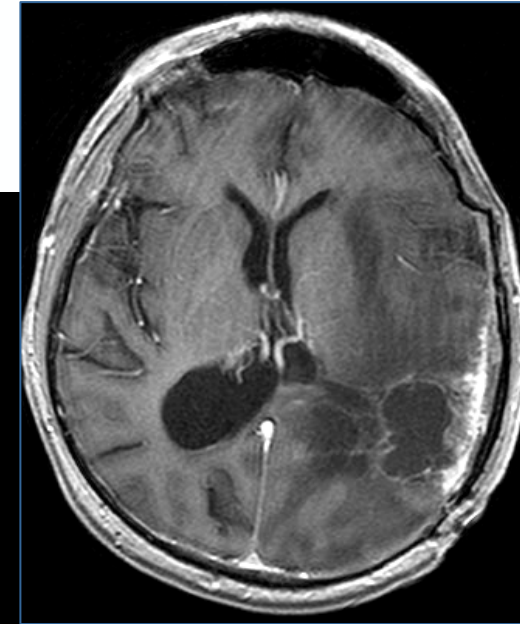
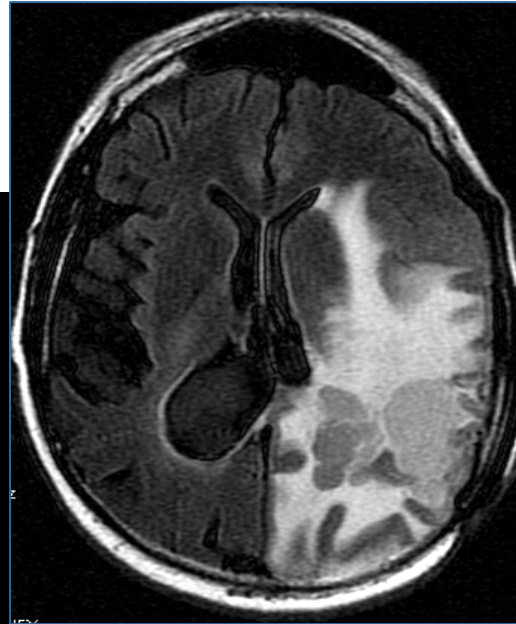


Radiation Necrosis



BRAIN TUMOURS

MRSI is useful for monitoring response to therapy (it can distinguish between radiation necrosis and recurrent tumour)



NAA



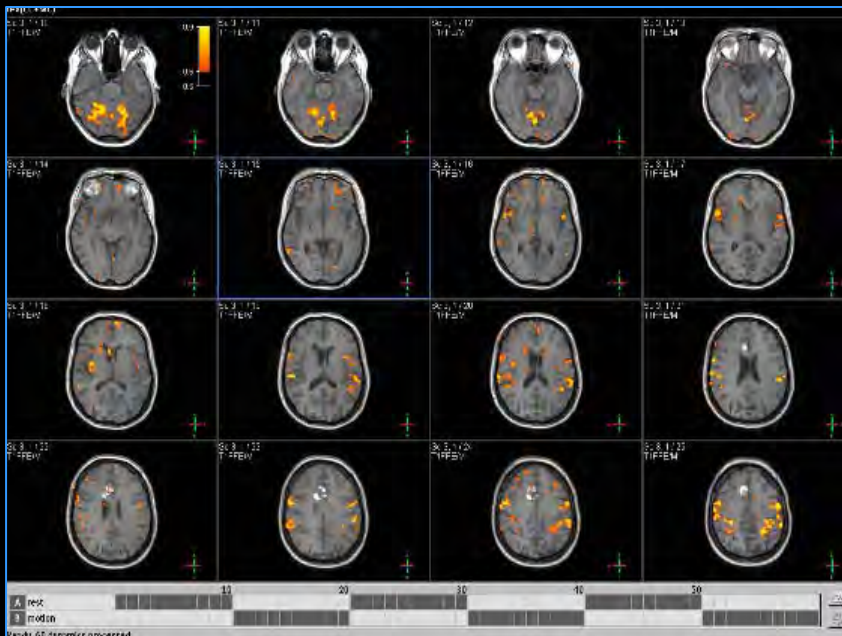
Cho



RADIATION NECROSIS

f-MRI

- technique capable of visualizing brain function
- visualize differential activity between 2 (or more) "brain states"
- signal modification are determined by the paramagnetic properties of deoxyHb \rightarrow T2* hypersignal in the activated areas

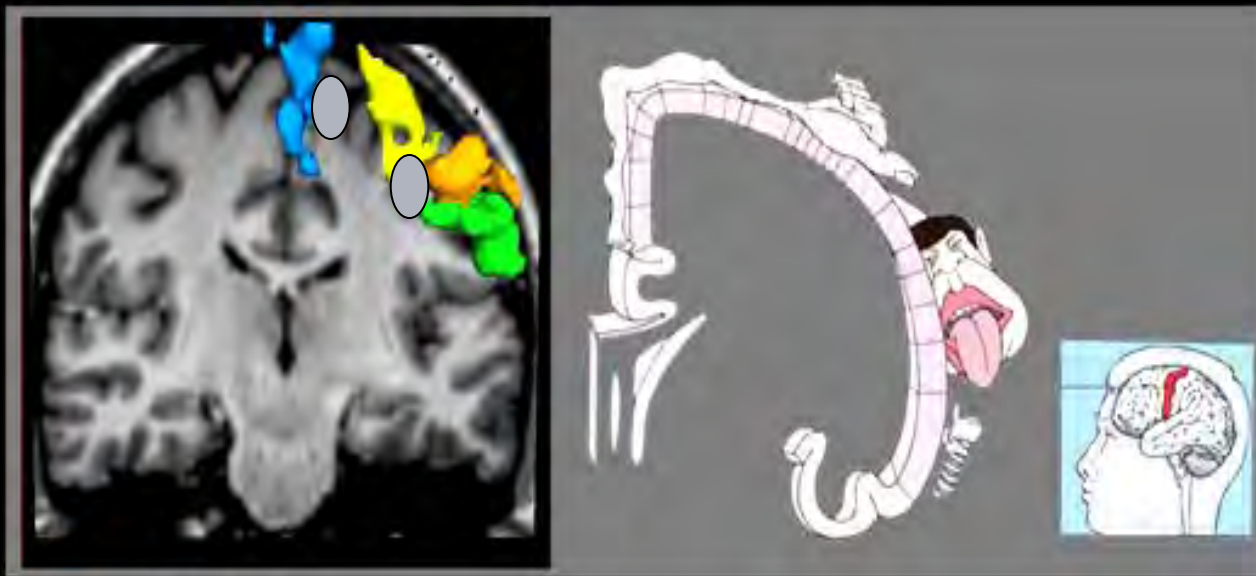


MOTOR FUNCTION
SENSIBILITY
VISUAL FUNCTION
LANGUAGE

.....

Motor paradigm

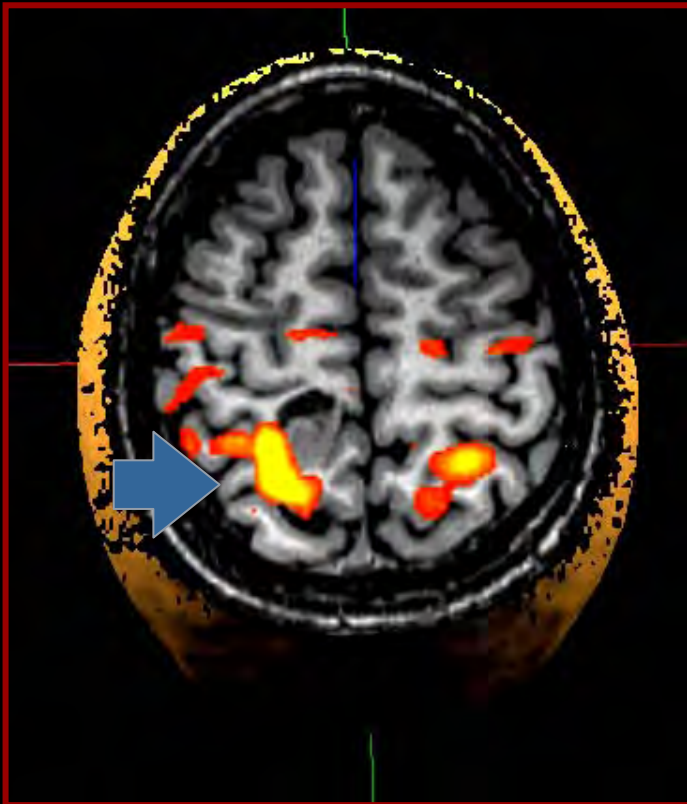
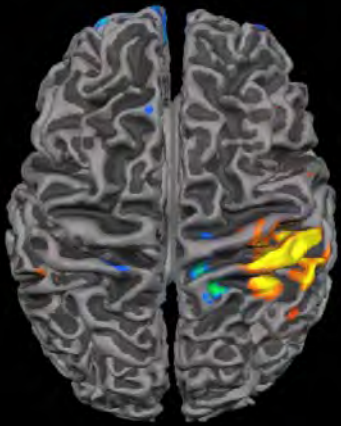
Movement of tongue, hand, lips or foot according to location of lesion



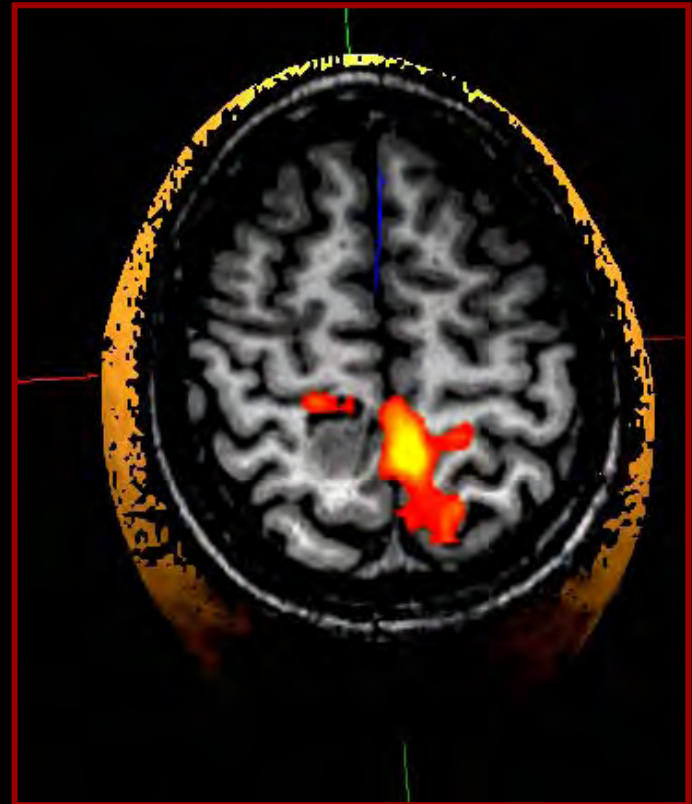
- FOOT
- HAND
- LIP
- TONGUE

"Homunculus of Penfield"

f-MRI → identification of areas that is important to spare during surgery



Tactile stimulation left leg-foot

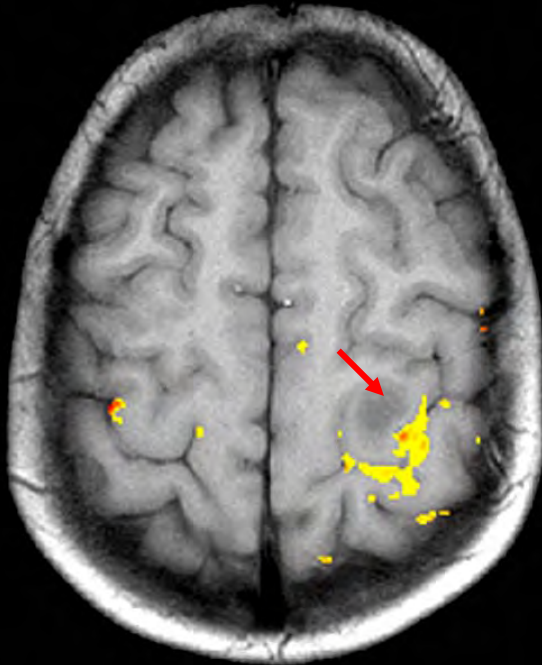


Tactile stimulation right leg-foot

BOLD (Blood Oxygen Level Dependent) fMRI for pre-surgical evaluation of risk

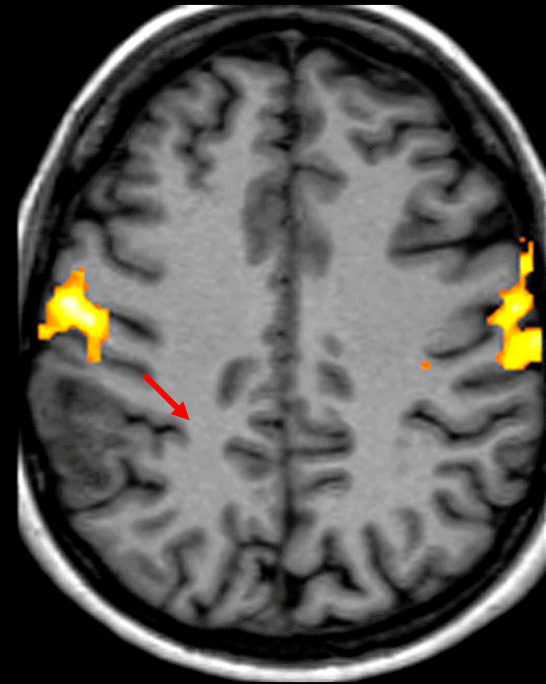
Right hand movements

- Adjacent to lesion (red arrow)



Tongue movements

- Distant from lesion (red arrow)



Role of MRI in spine imaging

C-spine



T-spine



Dark Fluid
T1 SPACE

T2 SPACE

L-spine



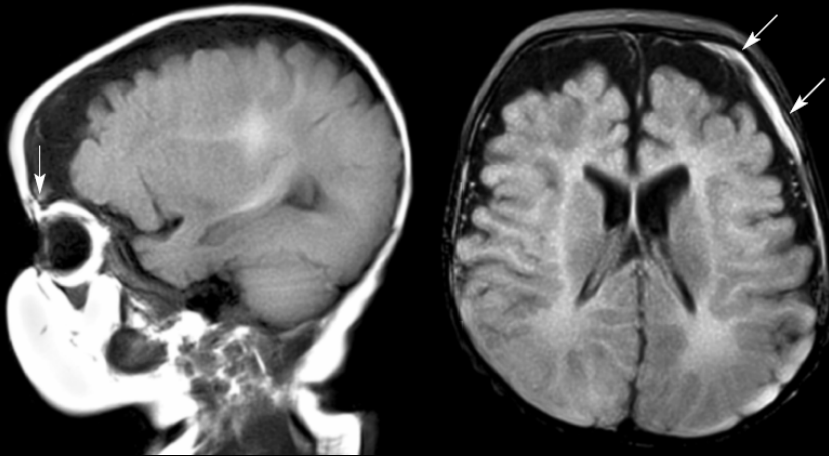
Ependymoma

Whole spine



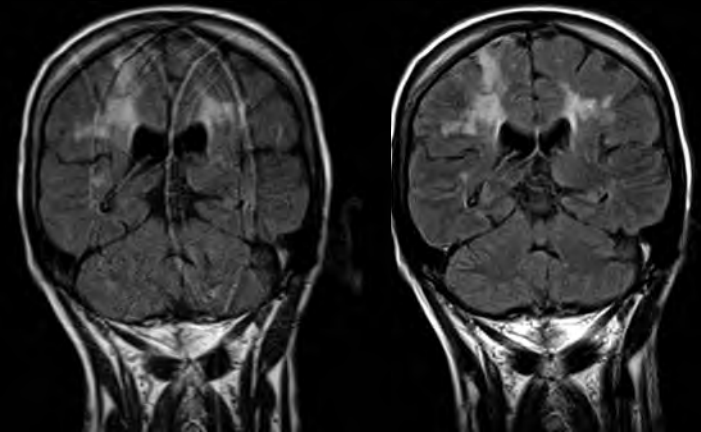
STIR SPACE
Whole Spine

BLADE



3 month-old unsedated pediatric* patient
fronto-temporal subdural hematoma
T1 sagittal and FLAIR axial, with BLADE

- Multiple contrasts
- Compatible with all orientations
- Compatible with iPAT



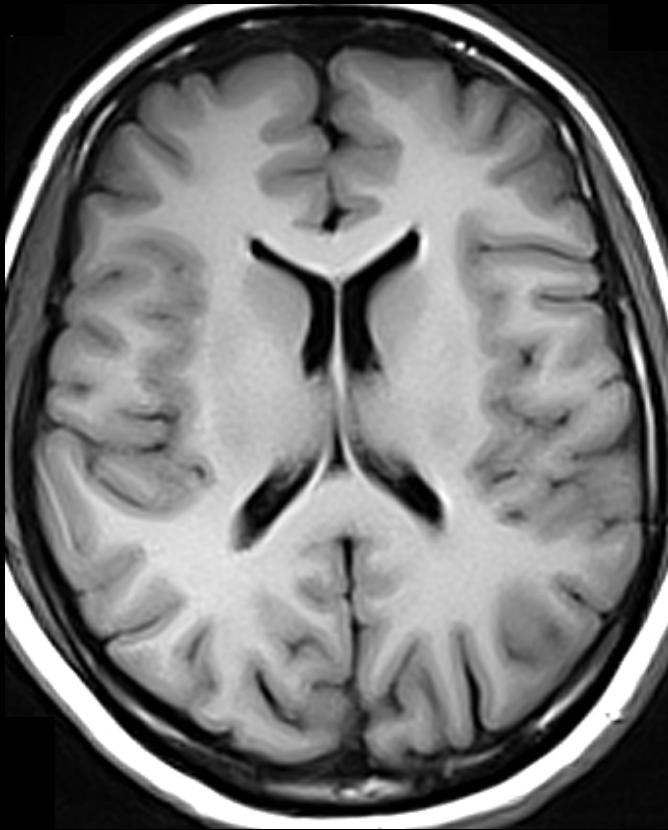
Conventional

BLADE

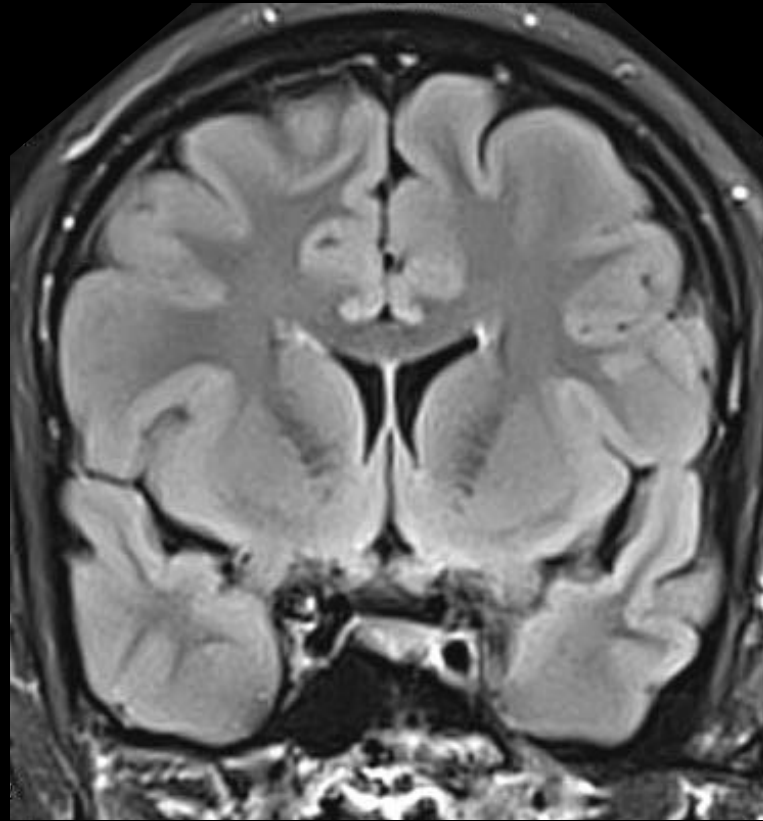
Stroke coronal, TA 1:53



BLADE

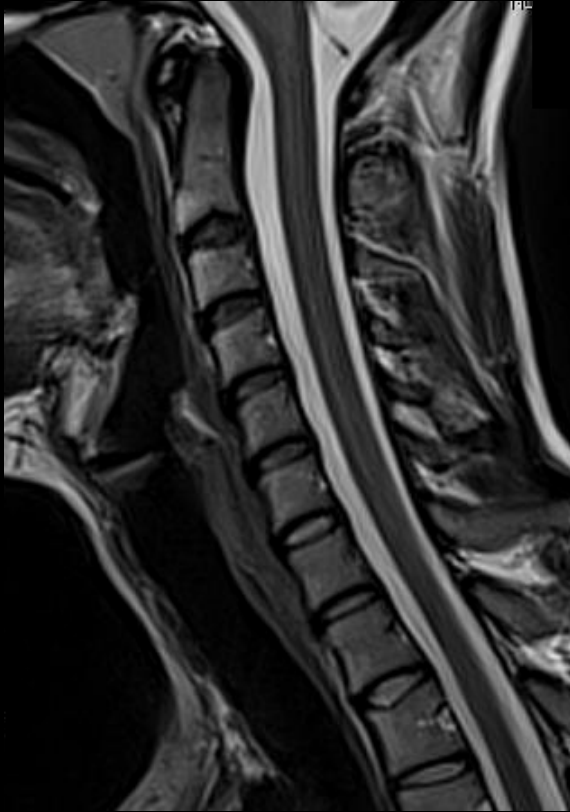


T1_tse_FLAIR_tra
slice thickness 4mm
BLADE

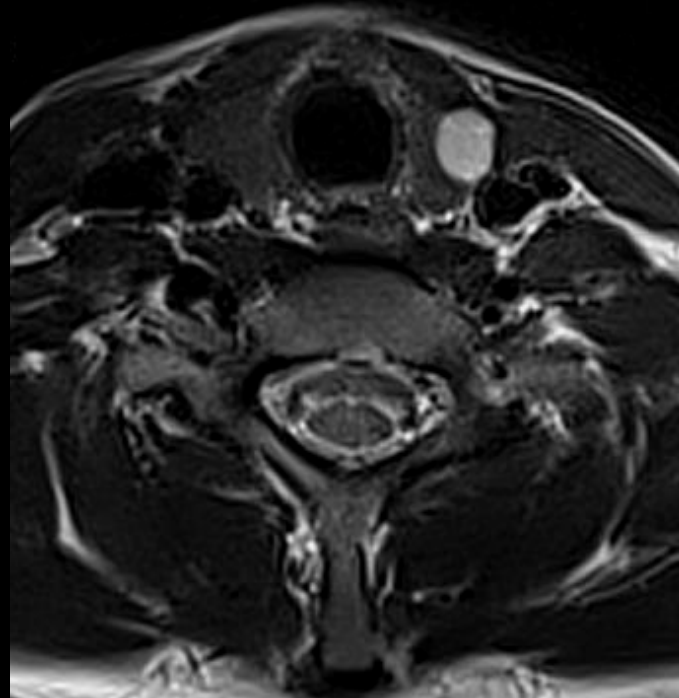


T2_tse_FLAIR_cor
slice thickness 4mm
BLADE

BLADE c-spine

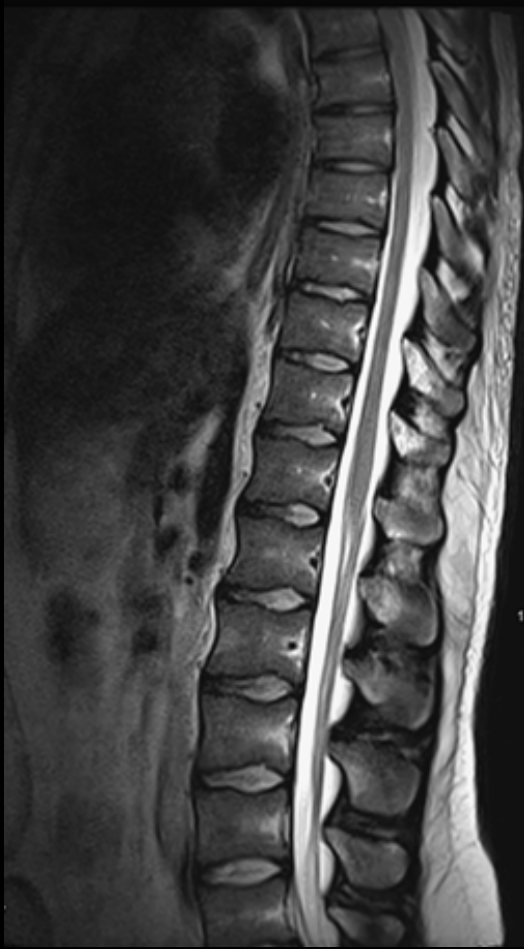


T2_tse_sag
BLADE



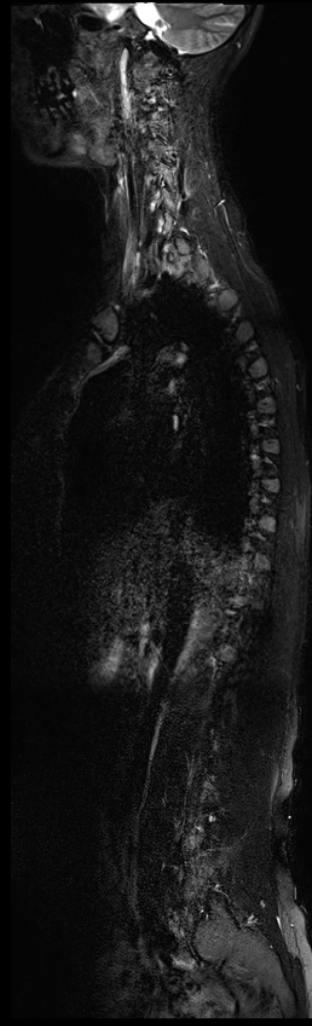
T2_tse_tra_p2
BLADE

T2 SPACE for T & C-spine imaging



1 mm Isotropic imaging in 4 min

T2 SPACE STIR whole spine imaging insensitive to flow.



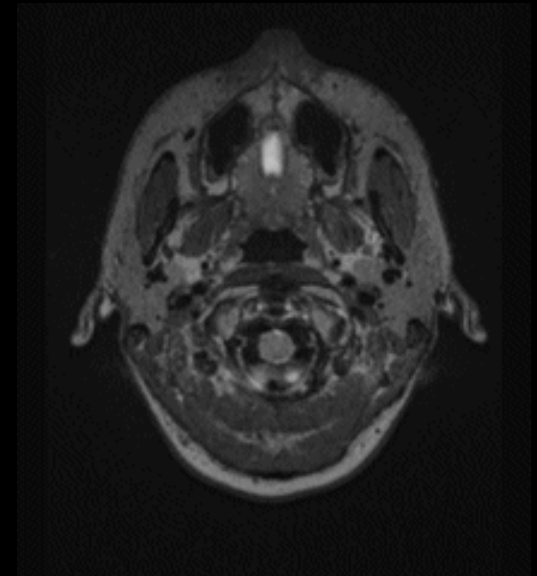
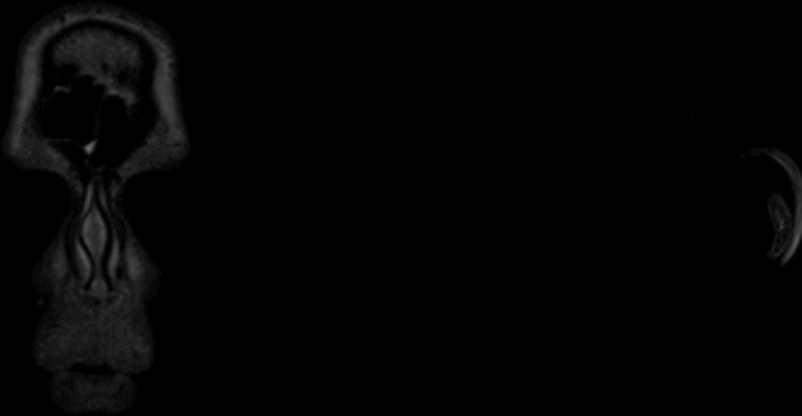
application
with 3 steps
total=14:15 min

Advances in MR Technology – Extended FoV

Extended FoV Without Patient Repositioning



T2 SPACE: Isotropic imaging Ultra-fast 3D imaging in T2



T2 SPACE with PAT 2 GRAPPA
0.9 x 0.9 x 0.9 mm³, TA 4:44 min for 256 slices

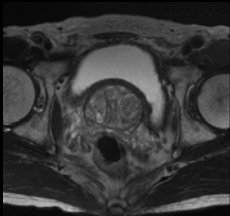
Unmatched performance with sub-millimeter resolution with shortest acquisition times

Processing instead of post-processing

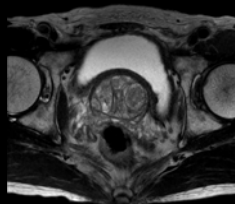
Inline Composing / Inline Image Filter

Inline Composing
Sets automatically images together for spines, MRA, whole-body, etc.

Inline Image Filter
Filters the images the way you want.



Without



With Image Filter

Osteologie

Excellent SNR with the 4-channel Flex coils make them highly competitive with dedicated coils

T1 FatSat 320 3 mm

CP

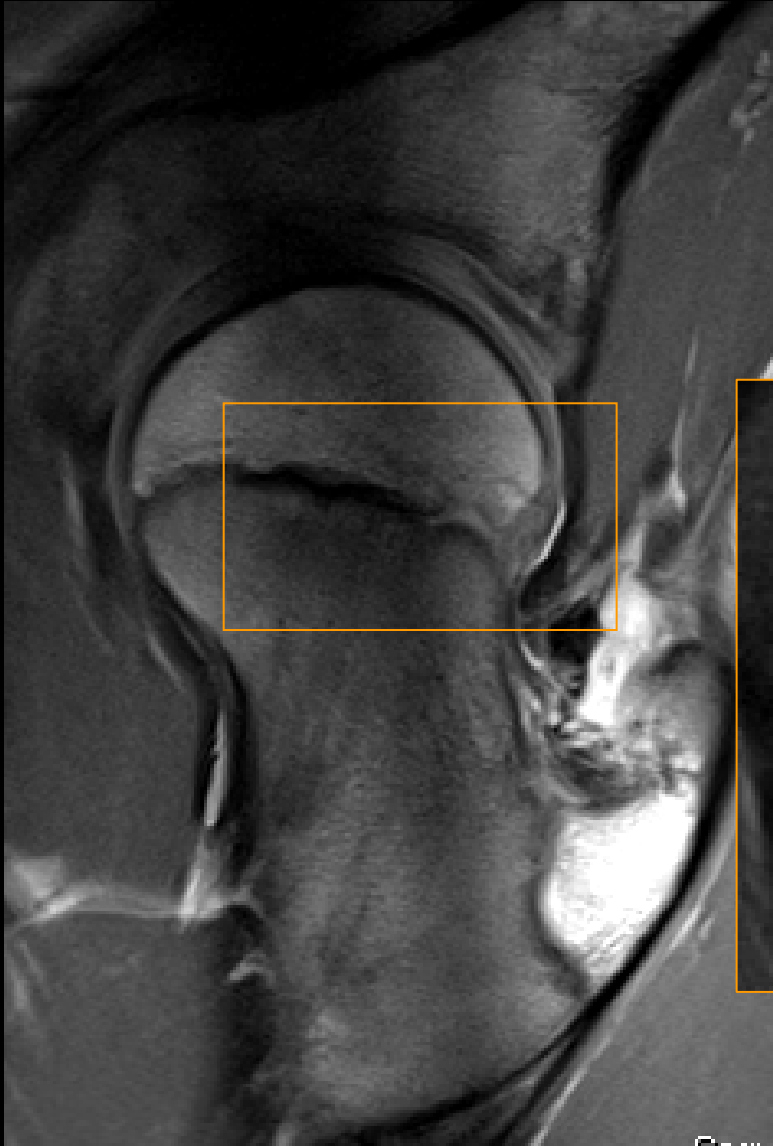
4-channel Flex large

8-channel Knee Coil



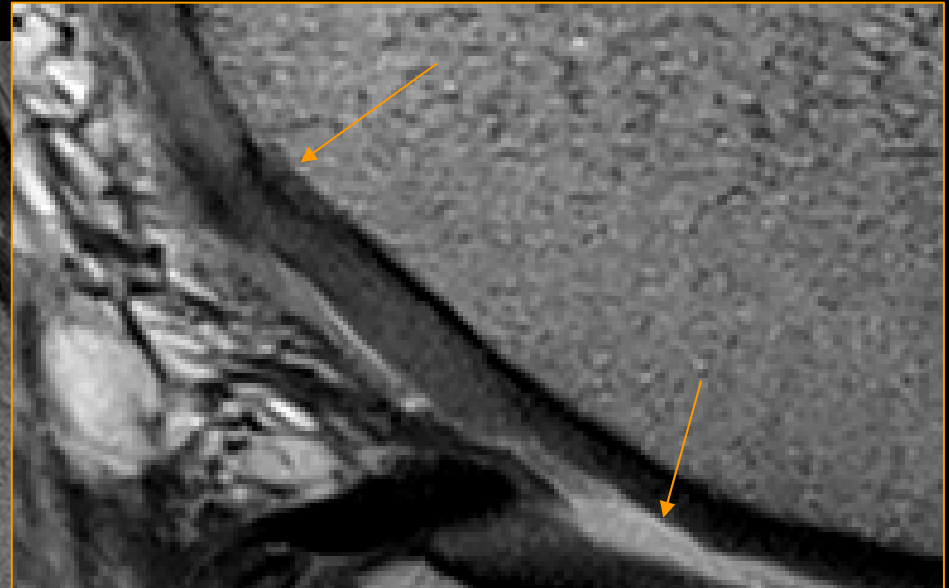
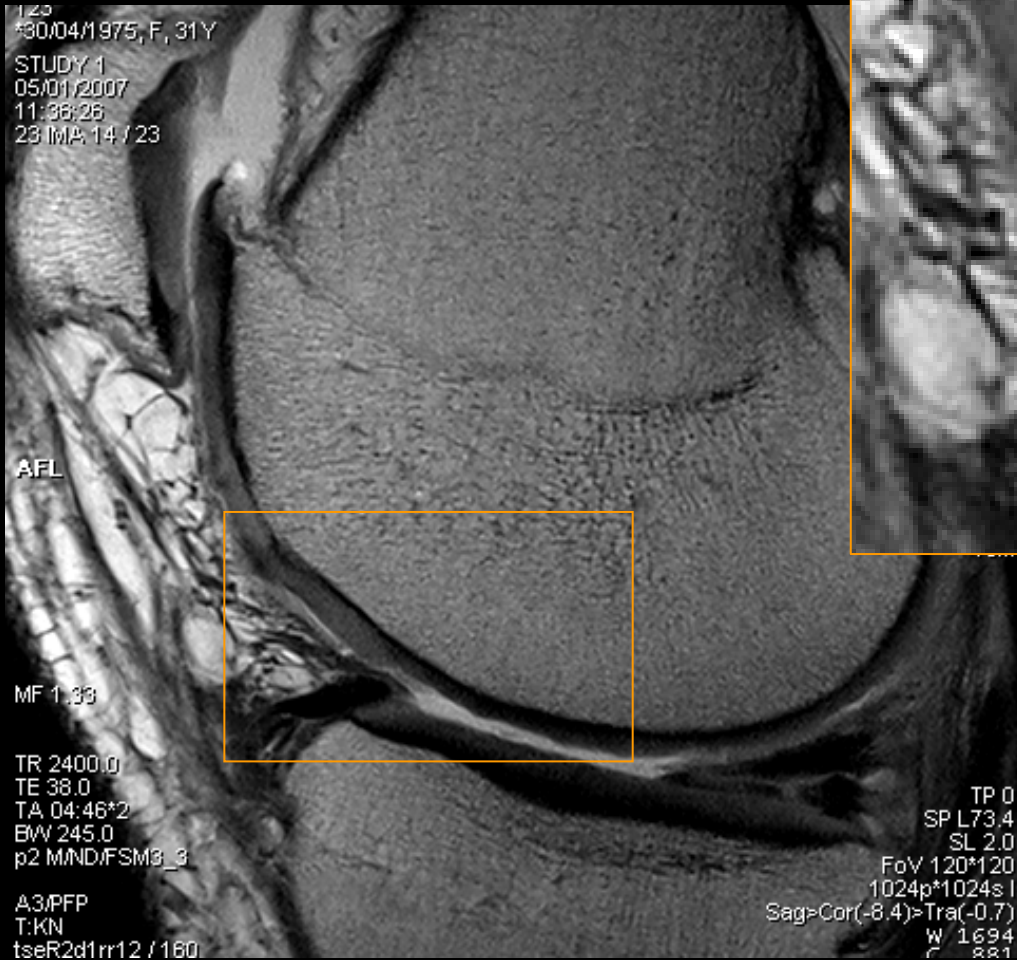
Early Detection: High resolution Imaging

Growth plate assessment for detection of early morphological changes leading to OA of the hip



PD TSE, 140 FoV, 0.3 x 0.3 x 3 mm, 5:10 min

Diagnostics: High resolution Imaging

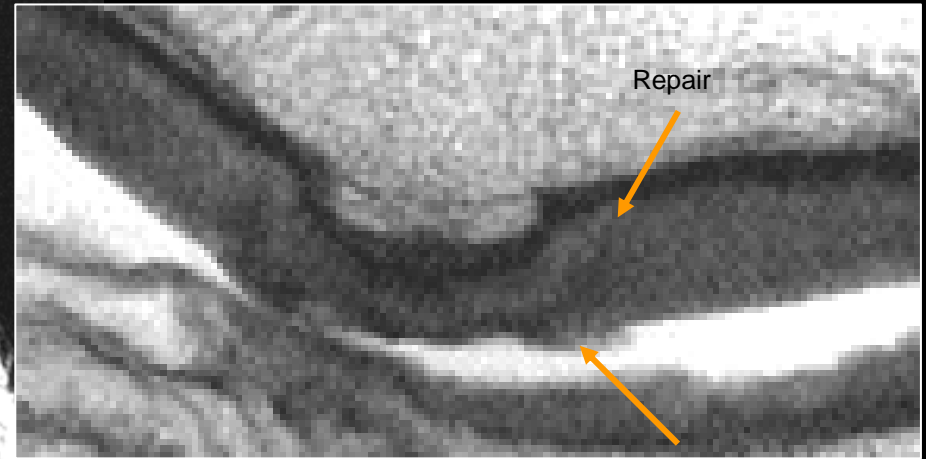
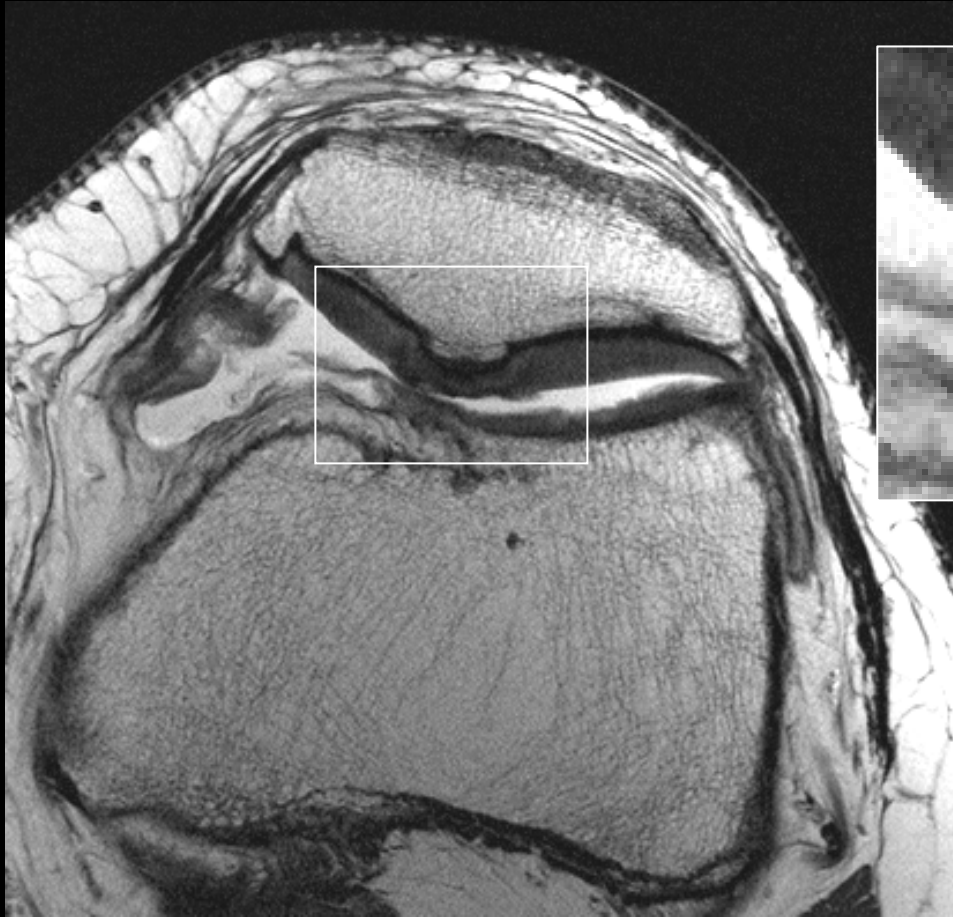


PD TSE (0.2 x 0.2 x 2 mm)
Severe Cartilage degeneration
with secondary OA signs

Diagnostics: High resolution Imaging



Follow Up: High Resolution Imaging



Cartilage Repair Patient

Assessment Integrity, Surface,
Signal Intensity and
Integration Surrounding Cartilage

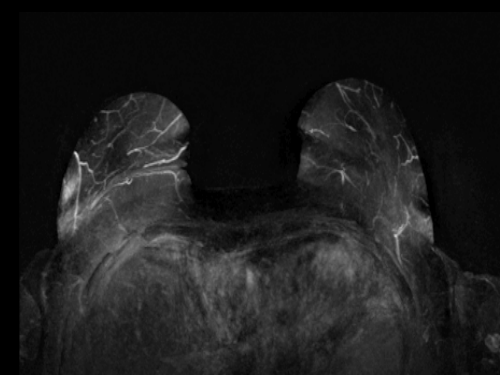
PD TSE
0.2 x 0.2 x 2 mm

Senologie

Protocols and Applications that support all your clinical needs

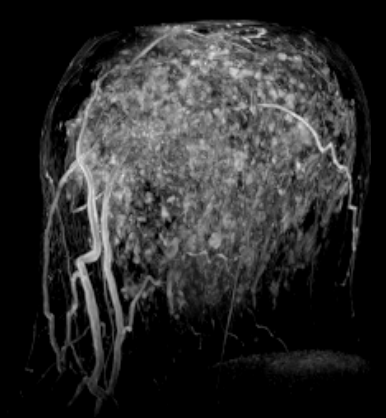
Breast Suite with

- General breast imaging
- Silicon detection

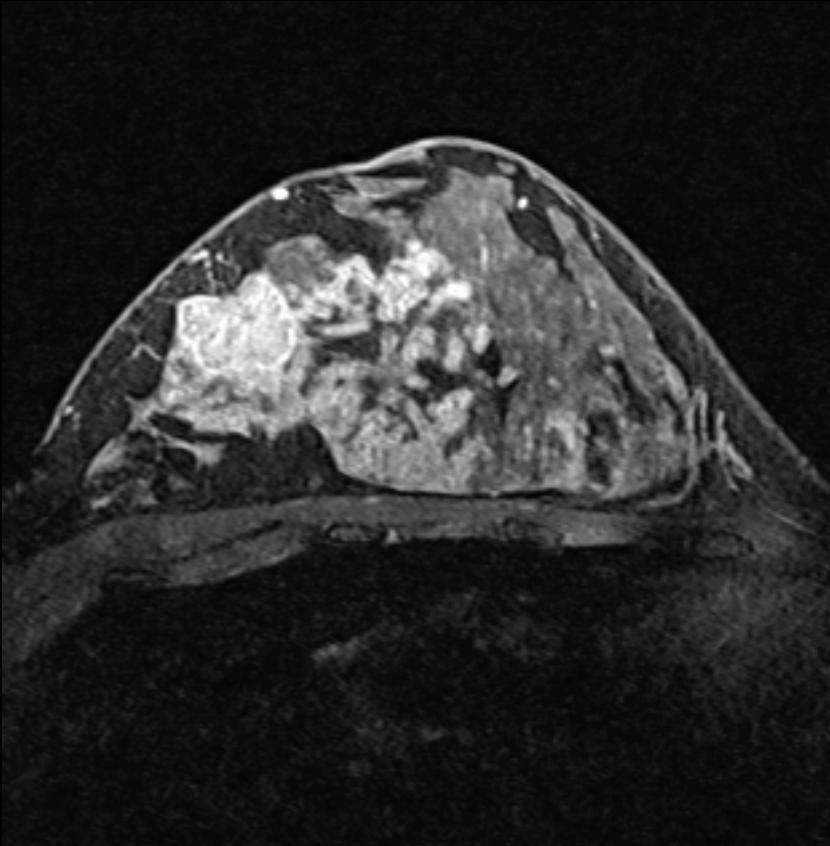


syngo MR Applications:

- *syngo* VIEWS
- *syngo* GRACE
- *syngo* REVEAL
- *syngo* BRACE
- *syngo* SPACE
- SPAIR



syngo Breast Suite with Click-n-Go Protocols including *syngo* VIEWS



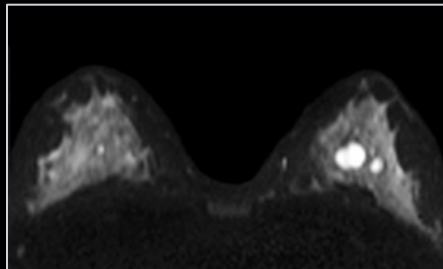
Delayed VIEWS,RADIANT,iPAT 2,rt DCIS , matrix
512, 3 mm @ 3 degrees 360°

With *syngo* VIEWS the best of two worlds meet. High resolution in short measurement time bring you right to diagnosis.

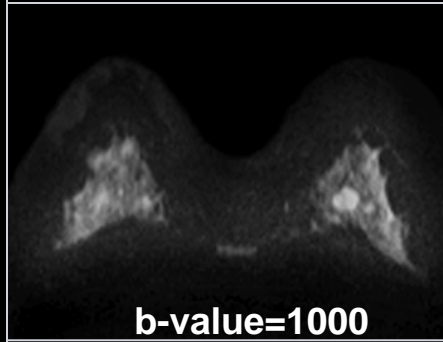
- Short measurement time
- High spatial resolution
- Isotropic and rotatable in any plane for perfect visibility of complete lesion extend

REVEAL

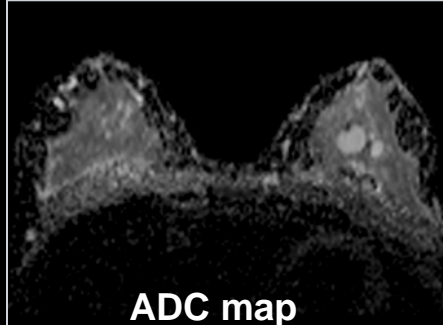
See more with Diffusion Weighted Imaging



b-value=500



b-value=1000



ADC map

syngo REVEAL shows more....

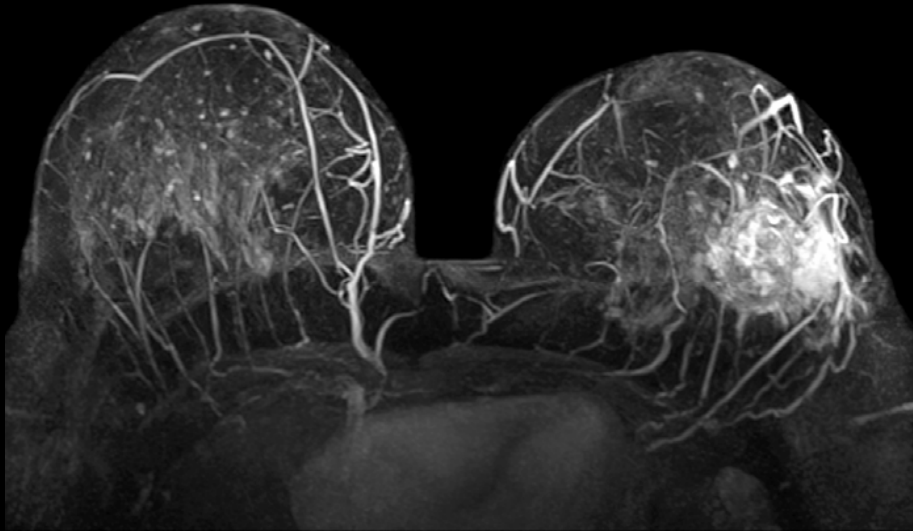
ADC map is processed automatically at the end of the scan with Inline Technology.

ADC map is giving additional information on cellular density of a lesion.

Low ADC maps tend to indicate lesion angiogenesis.

EPI Diffusion with GRAPPA2, TA 1:49 min, DCIS

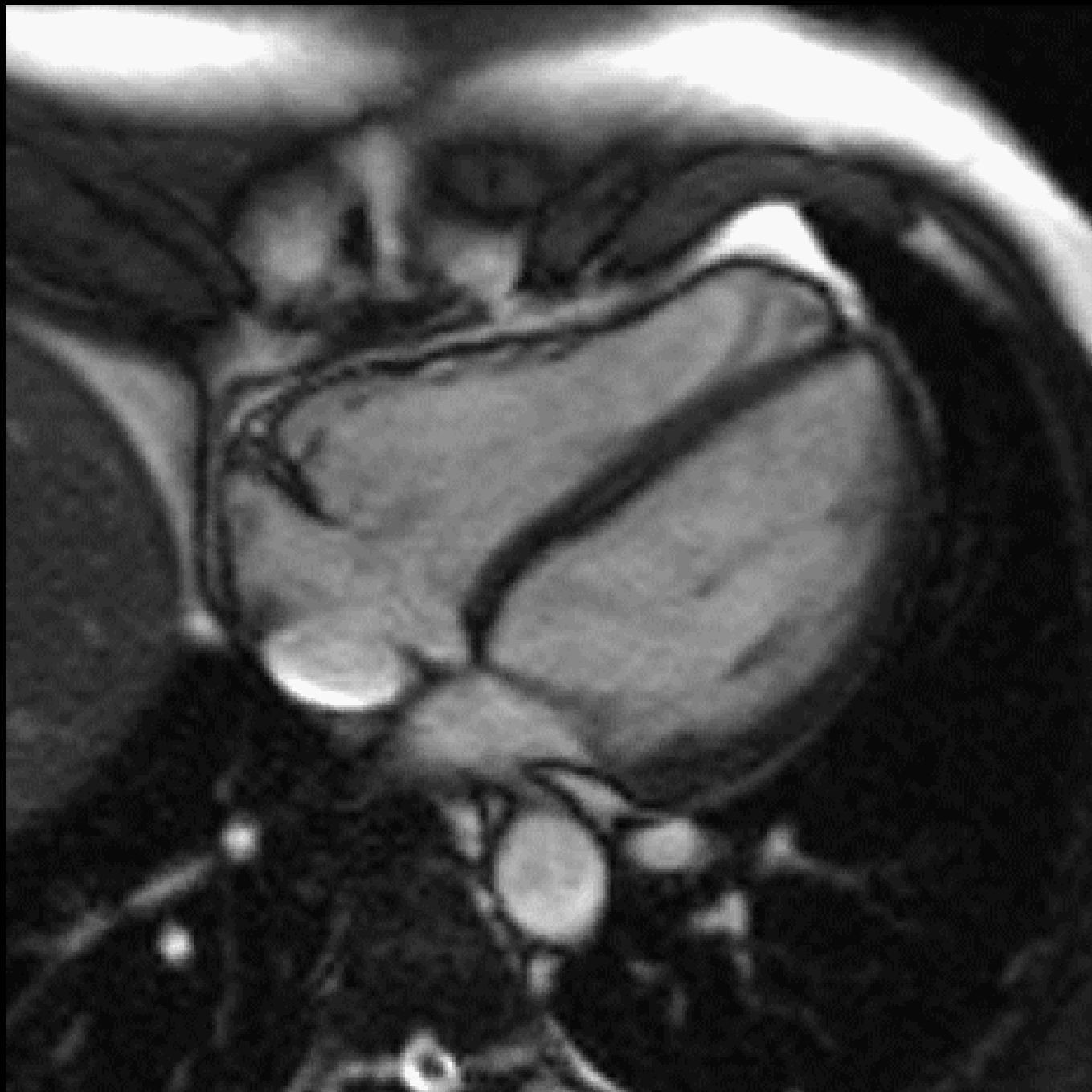
Inline Technology Processing instead of Post-processing

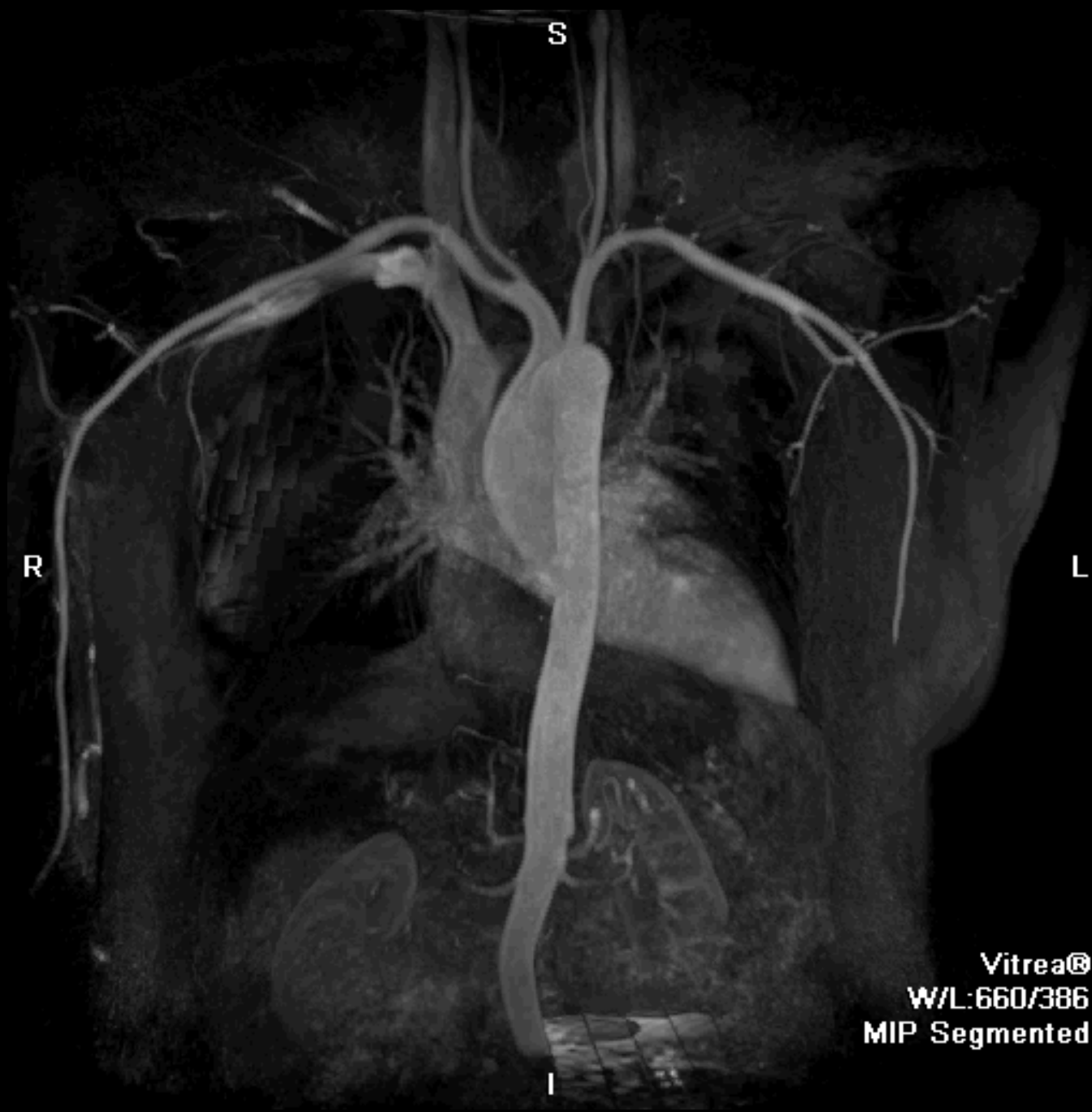


VIEWS transversal, MIP, matrix 448, lesion

- Inline technology makes your work flow...
- Automated subtractions
- Automated Color maps
- Automated MIP
- You do not have to spend any time on basic procedures.

IRM cardio-vasculaire





Vitrea®
W/L:660/386
MIP Segmented

Oncologie

Functional Imaging – *syngo* REVEAL – Body Diffusion

Inline ADC Maps

Multiple b-values

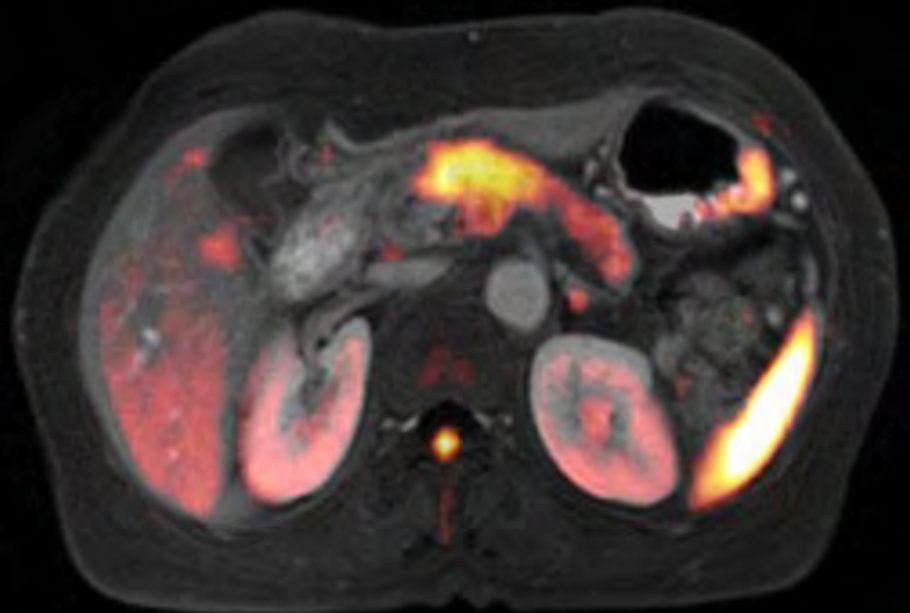
iPAT (GRAPPA)

PACE – Breath-hold or Free Breathing

syngo Image Fusion

Trace weighted image

b-values (600 – 1000 for overlay)



Functional Imaging – syngo REVEAL – Prostate Cancer

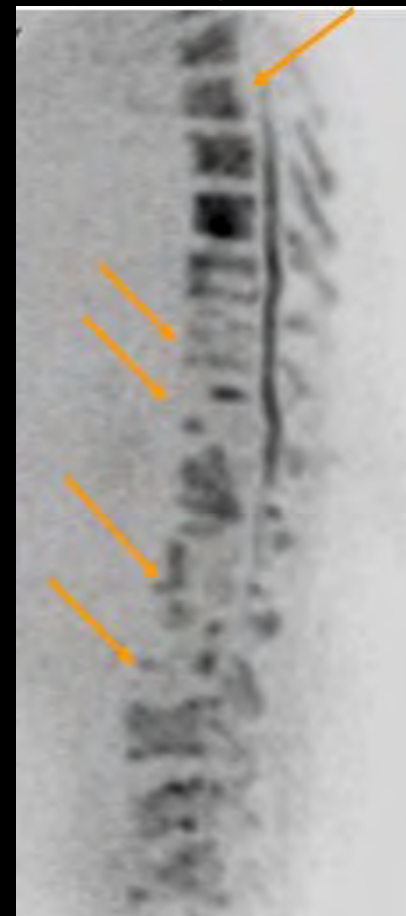
T2 imaging whole-body



T1 Post Contrast

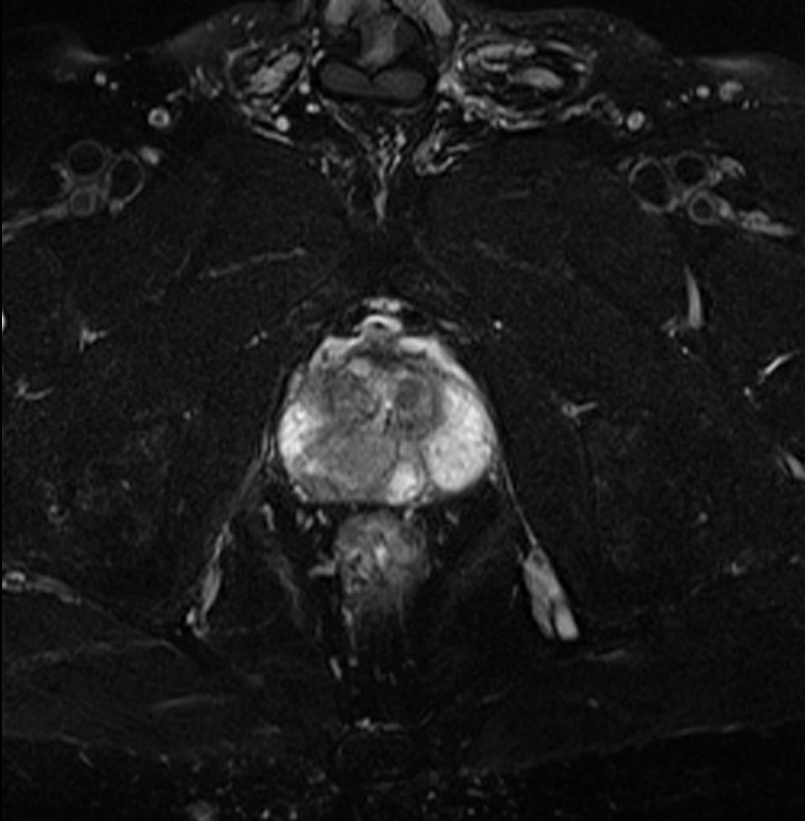


Pet-like syngo REVEAL



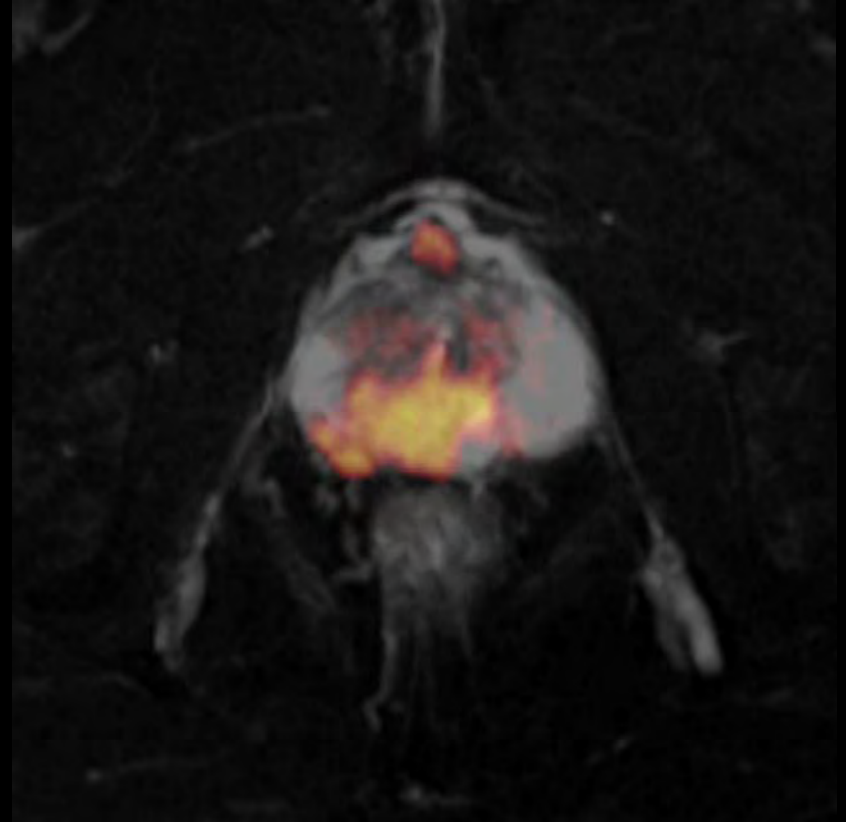
Functional Imaging – *syngo* REVEAL – Body Diffusion

T2 TSE with FatSat



syngo REVEAL

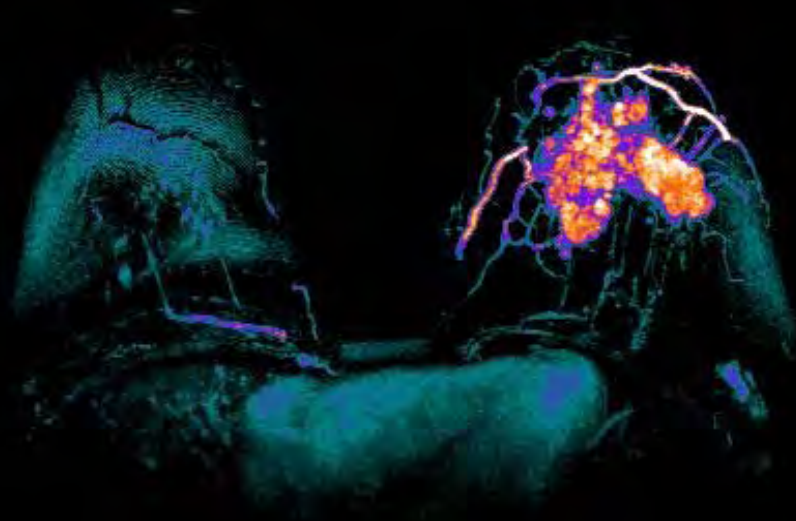
- Image Fusion with T2 TSE



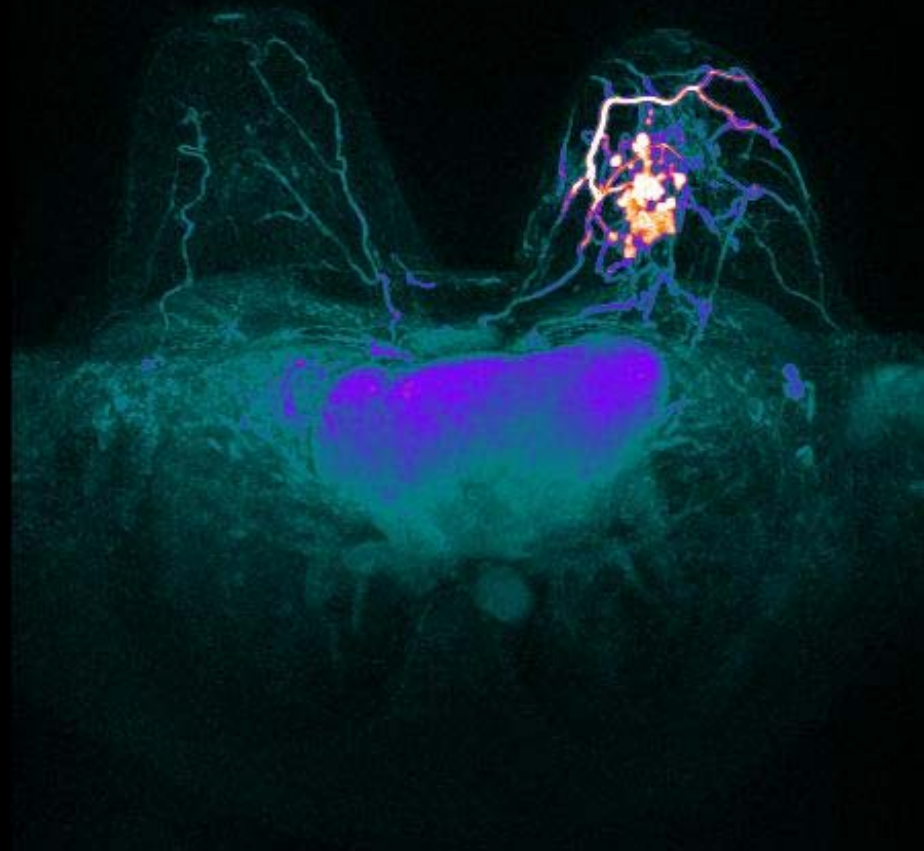
Role of MR Imaging to follow-up treatment response – Breast – Neo-adjuvant Chemotherapy

IEWS – Volume Imaging with Enhanced Water Signal

Pre-chemo



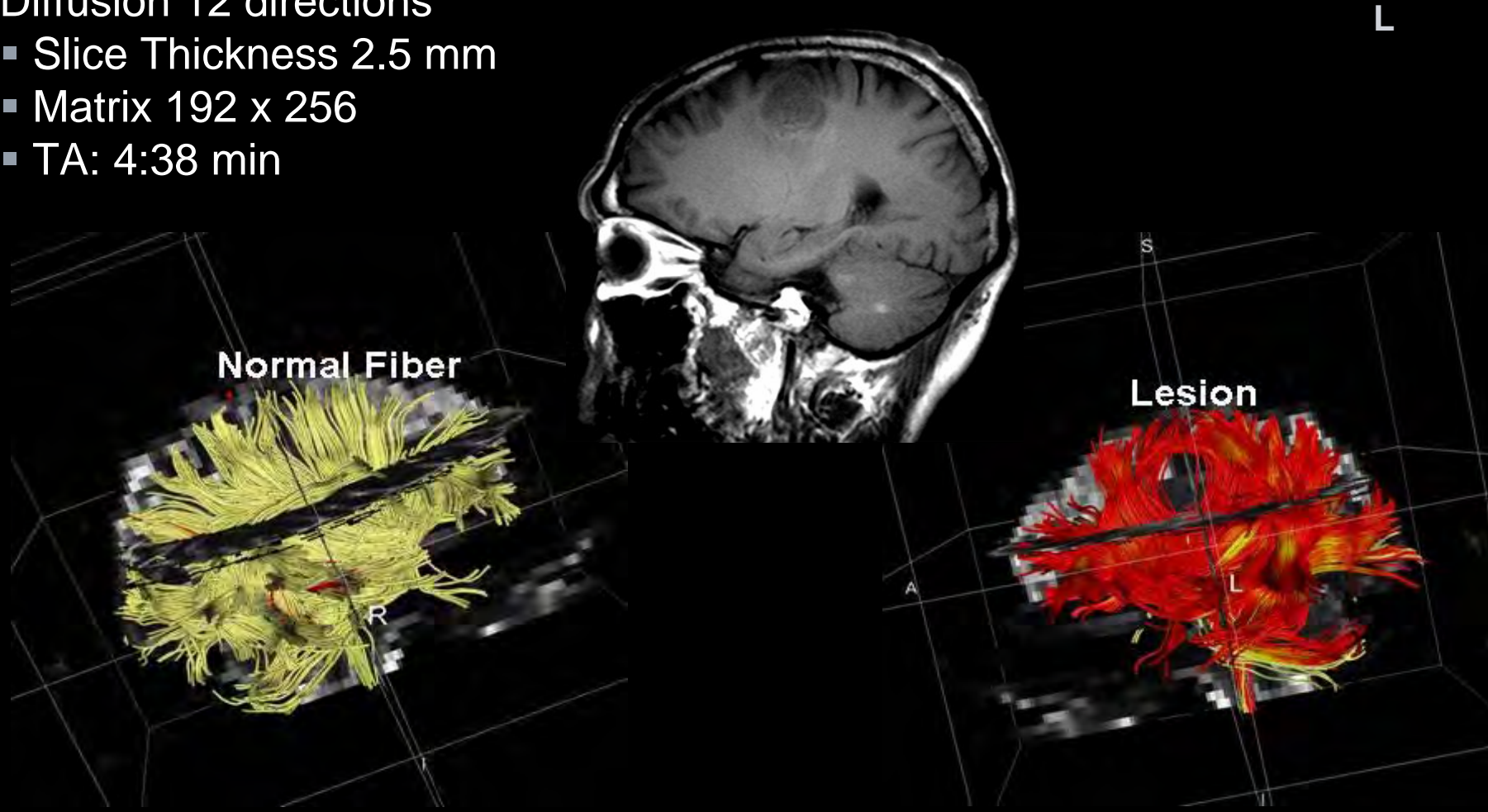
5 months Post-chemo



Advanced Applications – DTI Tractography – Diffusion Tensor Imaging Metastasis

Diffusion 12 directions

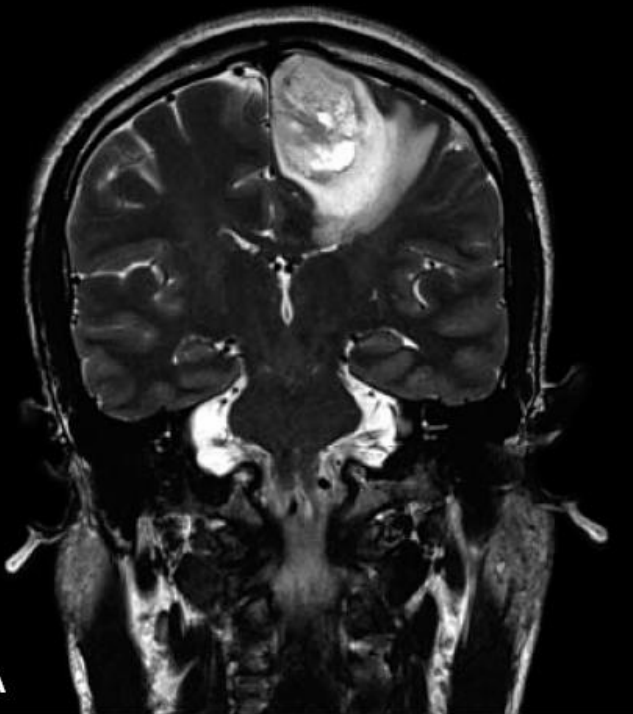
- Slice Thickness 2.5 mm
- Matrix 192 x 256
- TA: 4:38 min



Advanced Applications – BOLD (Blood Oxygen Level Dependent)

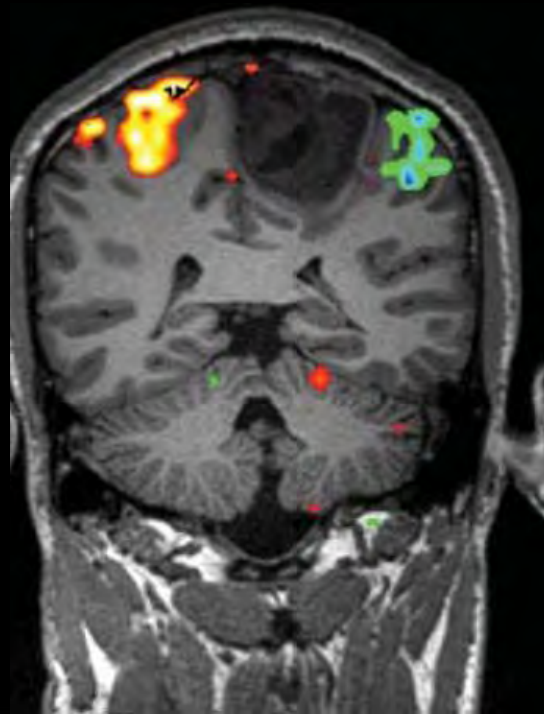
Brain Meningioma

T2 TSE Coronal

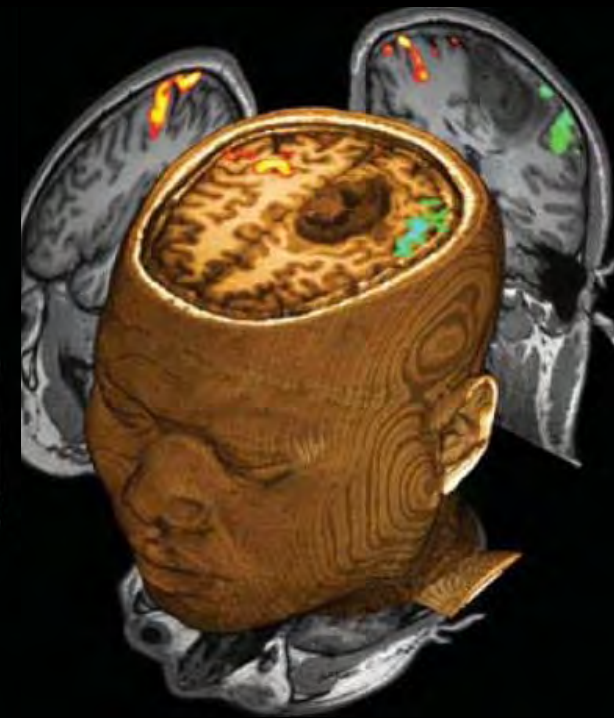


1A

Motor Cortex
BOLD Activation



Anatomical images &
fMRI – VRT image



MERCI POUR VOTRE ATTENTION

