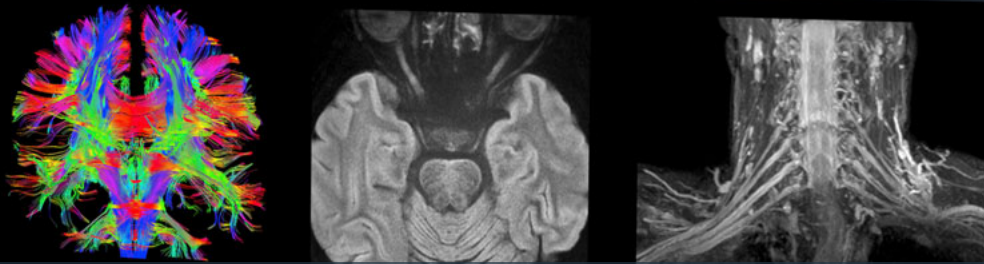


# MAGNETOM

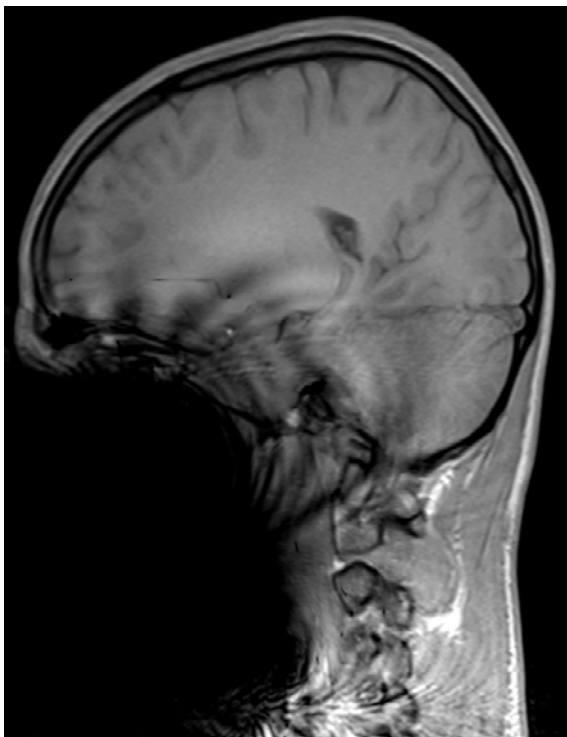


**Moins d'artéfacts, plus de résolution :  
comment les innovations font évoluer les pratiques  
cliniques en IRM Neuro et ORL ?**

42<sup>ème</sup> CONGRÈS ANNUEL de la SFNR

Graça Fernandes , Spécialiste Produit IRM

**Et si vous pouviez...**



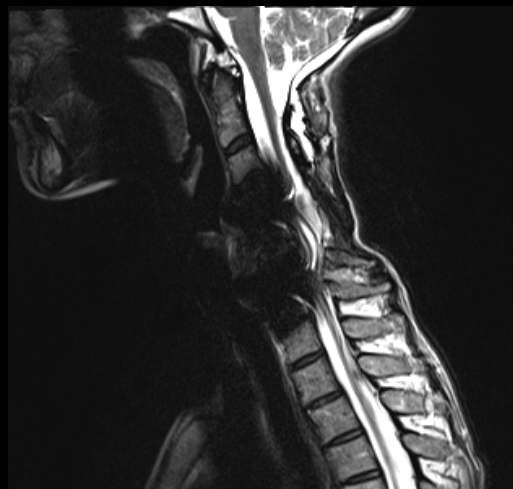
**...vous affranchir des artéfacts métalliques?**

## WARP en rachis

Réduction significative des artéfacts dus aux implants métalliques compatibles MR

Meilleure qualité image

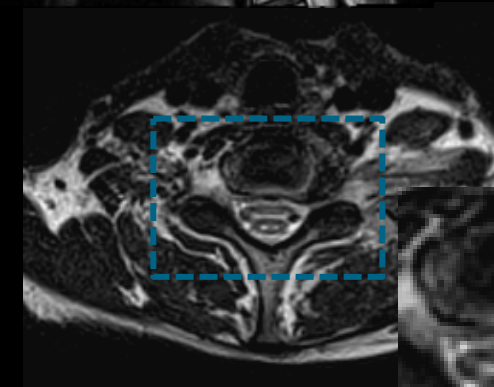
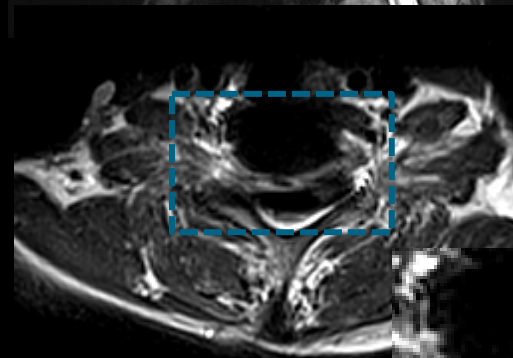
Meilleur niveau de confiance sur l'hypersignal suspect



T2 TSE

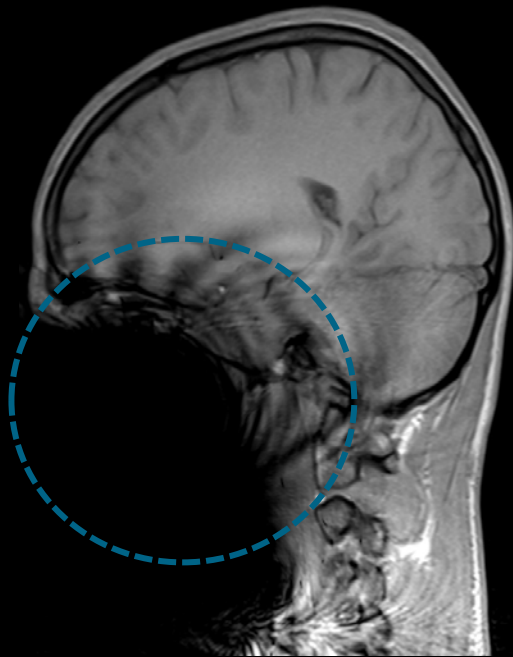


T2 TSE  
WARP

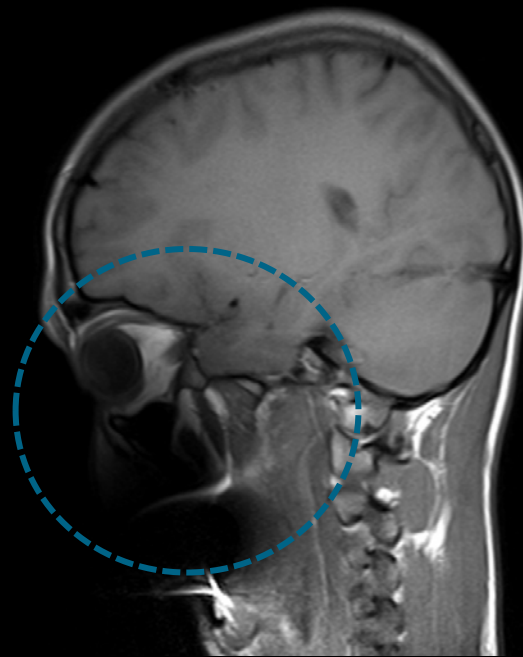


# WARP

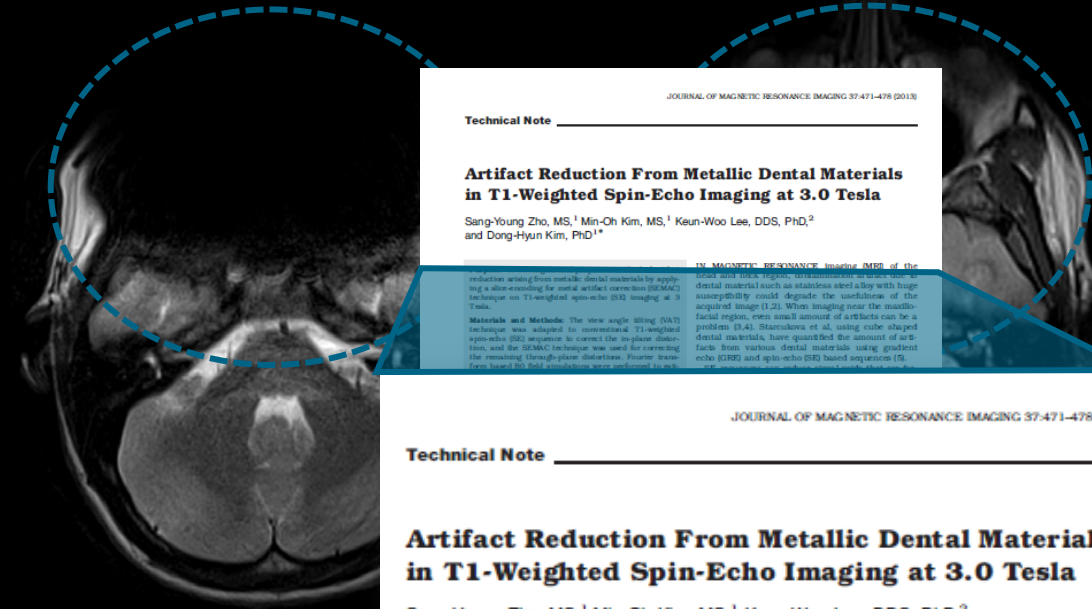
## Réduction des artefacts dus au matériel dentaire



T1 FLASH



T1 TSE WARP



T2 TSE

JOURNAL OF MAGNETIC RESONANCE IMAGING 37:471-478 (2013)

**Technical Note**

**Artifact Reduction From Metallic Dental Materials in T1-Weighted Spin-Echo Imaging at 3.0 Tesla**

Sang-Young Zho, MS,<sup>1</sup> Min-Oh Kim, MS,<sup>1</sup> Keun-Woo Lee, DDS, PhD,<sup>2</sup> and Dong-Hyun Kim, PhD<sup>1\*</sup>

**IN MAGNETIC RESONANCE imaging (MRI) of the head and neck, a rigid, nonferromagnetic dental material such as stainless steel alloy with huge susceptibility could degrade the usefulness of the acquired image (1,2). When imaging near the maxillofacial region, even small amount of artifacts can be a problem (3,4). Stanculova et al, using cube shaped dental materials, have quantified the amount of artifacts from various dental materials using gradient echo (GRE) and spin-echo (SE) based sequences (5, 6).**

**reduction arising from metallic dental materials by applying a slice-selecting for metal artifact correction (SEMAC) technique on T1-weighted spin-echo (SE) imaging at 3 Tesla.**

**Materials and Methods:** The view angle tilting (VAT) technique was adapted to conventional T1-weighted spin-echo (SE) sequence to correct the in-plane distortion, and the SEMAC technique was used for correcting the remaining through-plane distortions. Fourteen brain-based 30 teeth prostheses were prepared to sim-

**conventional two-dimensional SE images. The sizes of the dental materials are smaller than orthopedic implant devices; thus, some materials may not require the additional slice-encodings in SEMAC technique, and the VAT method itself might be suffice. In other words, if the B0 inhomogeneity is small, the through-**

JOURNAL OF MAGNETIC RESONANCE IMAGING 37:471-478 (2013)

**Technical Note**

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00107070; Online first number 00107070  
 \*Address reprint requests to D.-H.K., Department of Electrical and Electronic Engineering, Seoul National University, Seoul, Korea.  
 E-mail: donghyun@plaza.snu.ac.kr  
 Received May 20, 2012; Accepted July 24, 2012  
 DOI 10.1002/jmri.22765  
 View this article online at <http://onlinelibrary.wiley.com>

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\*The MRI restrictions (if any) of the metal implant must be considered prior to patient undergoing MRI exam. MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens.

**Et si vous pouviez ...**

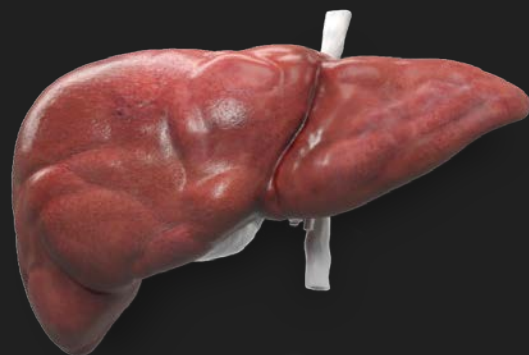
**...vous affranchir du mouvement?**

# STAR-VIBE

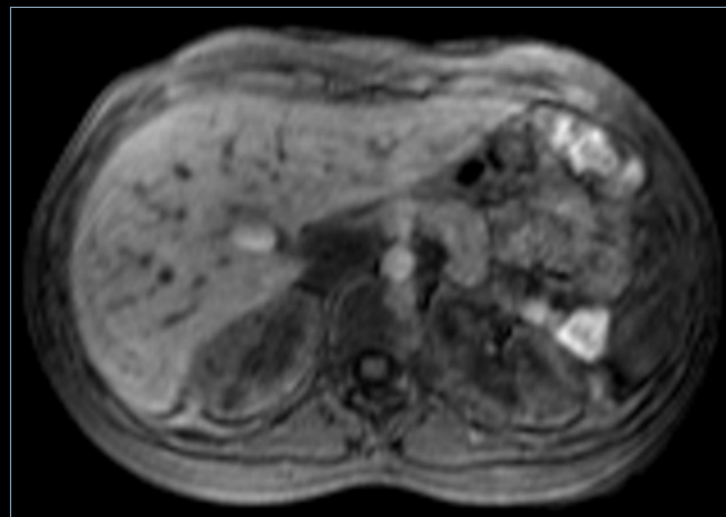
## Une nouvelle façon d'aborder l'abdomen

Imagerie injectée en  
respiration libre

STAR-VIBE utilise des  
trajectoires radiales,  
insensibles aux mouvements  
donnant une qualité d'image  
exceptionnelle en T1.



**FREEZEit**



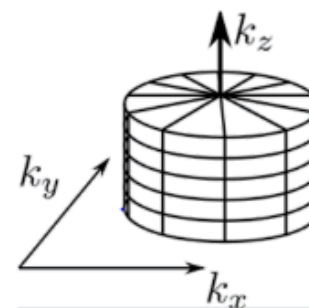
Conventionel



StarVIBE



in-plane



3D "Stack of Stars"

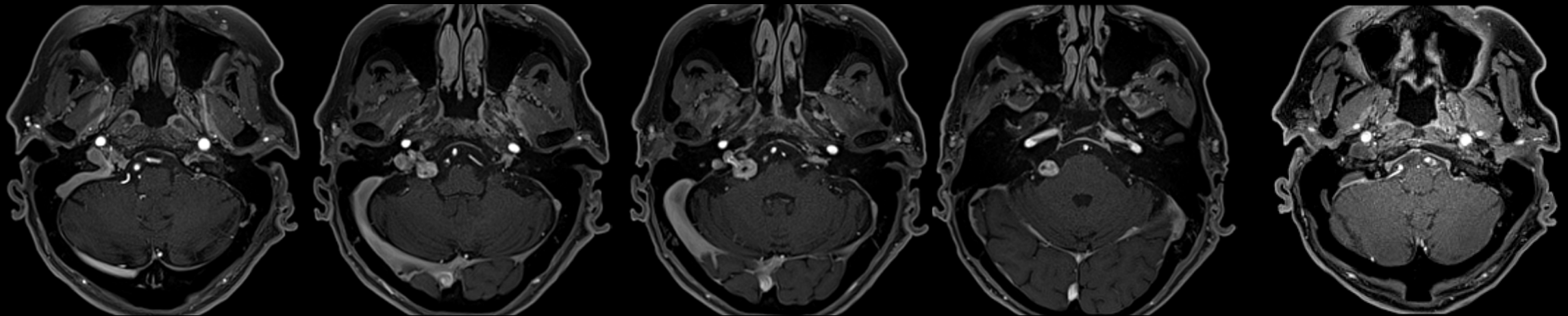
## StarVibe– Crâne



# StarVibe CAI

SIEMENS

85-year-old patient  
MAGNETOM Skyra  
StarVIBE

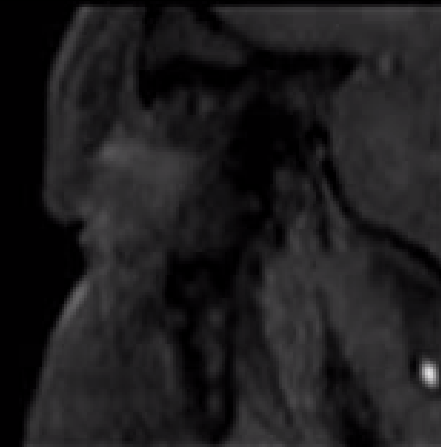
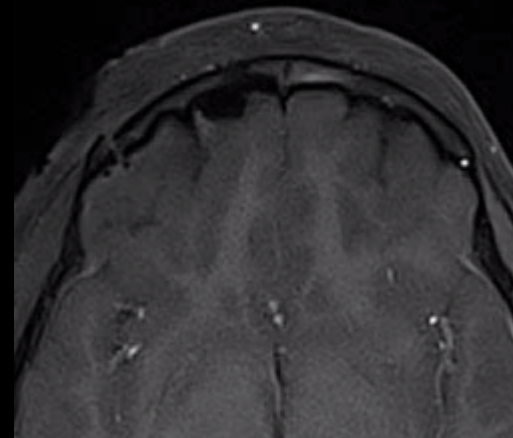
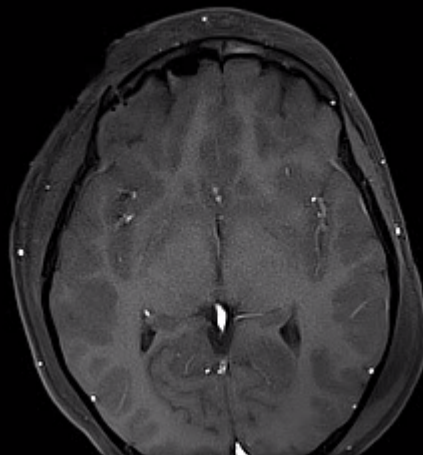
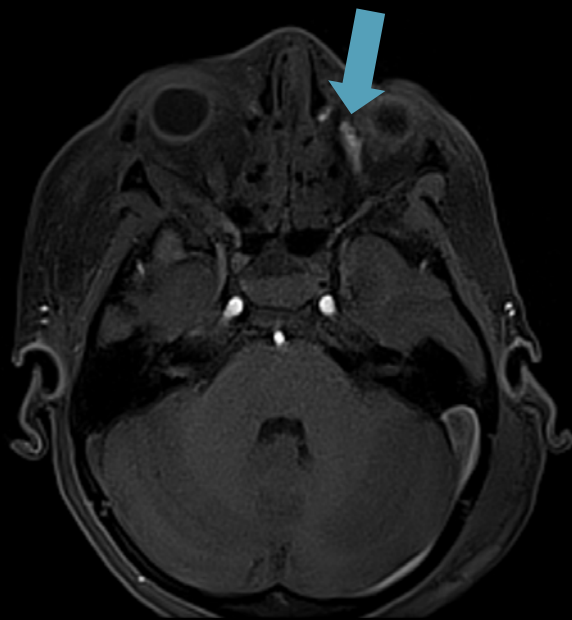


StarVIBE pc, IAC isotropic,  
SL 0.8 mm, slices 64,  
TA 3:06 min



# StarVIBE

## Imagerie de l'orbite sans artéfacts



**Homme 13 ans, avec Traumatisme au niveau de l'orbite**

StarVIBE, TA 6:37 min

MR Centre for Children at Royal Children's Hospital, Melbourne, Australia

## StarVibe- Tête cou

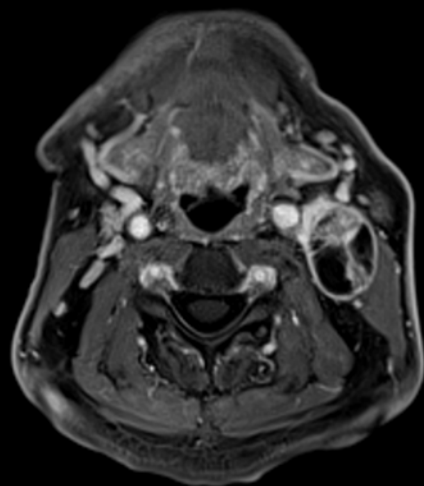
Tête cou



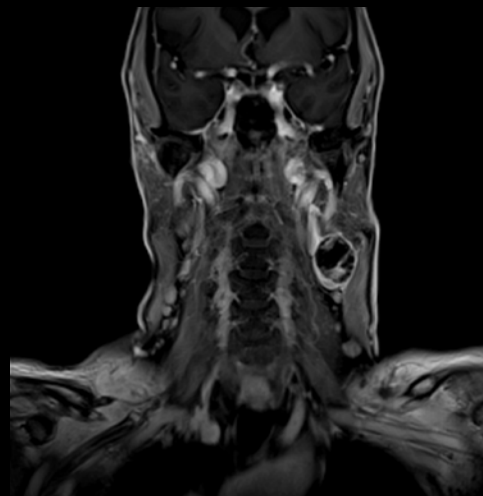
# StarVibe

## Tumeur du cou

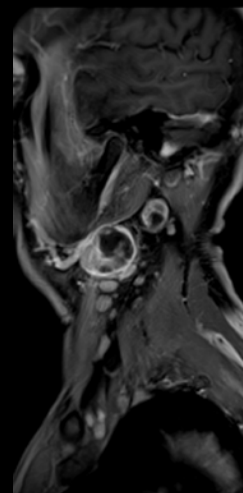
59-year-old male  
MAGNETOM Skyra  
StarVIBE



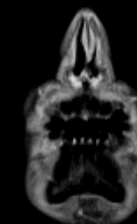
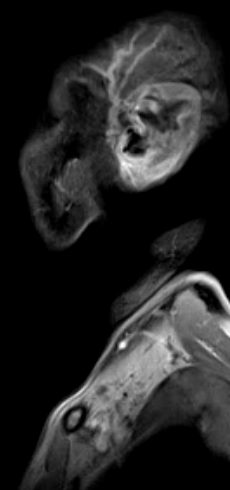
TA 5:23 min



TA 2:28 min



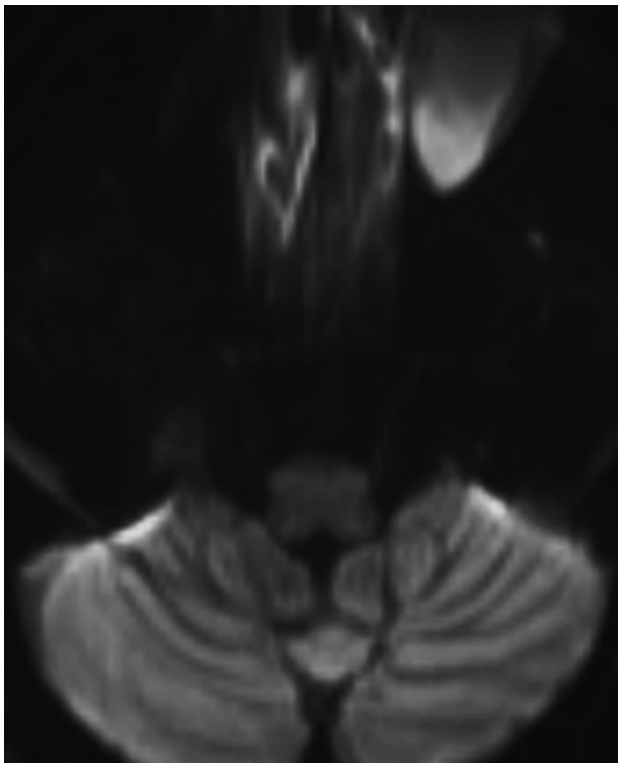
TA 1:59 min



StarVIBE FatSat, matrix 288, SL 2 mm (tra) and SL 3 mm (sag+cor)

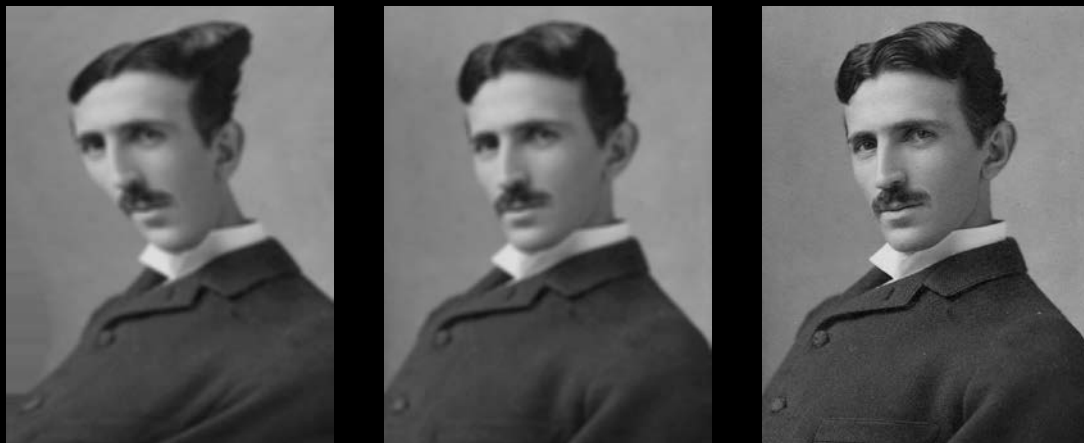
Ospedale Regionale Civico, Lugano, Switzerland

**Et si votre imagerie de diffusion ...**



**...avait une résolution proche de l'anatomie?**

# syngo RESOLVE

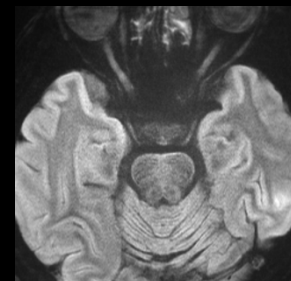


...supprimer les distortions...

...augmenter la résolution



syngo RESOLVE



- cervelet
- nerfs optiques
- rachis
- sein
- prostate
- ...

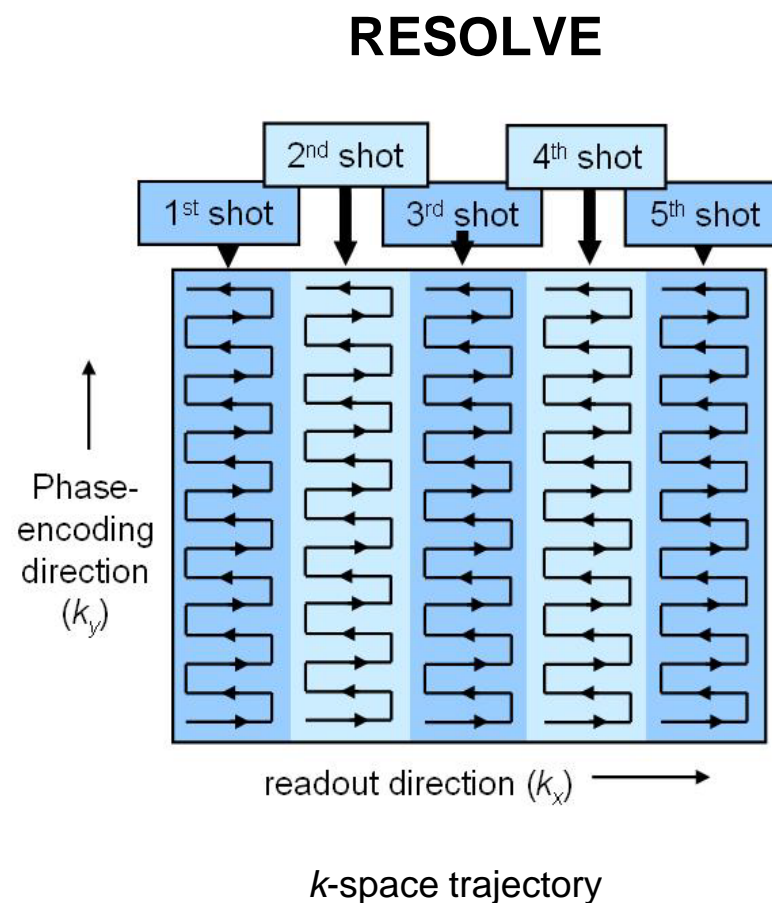
Nagoya University School of Medicine, Japan

# RESOLVE

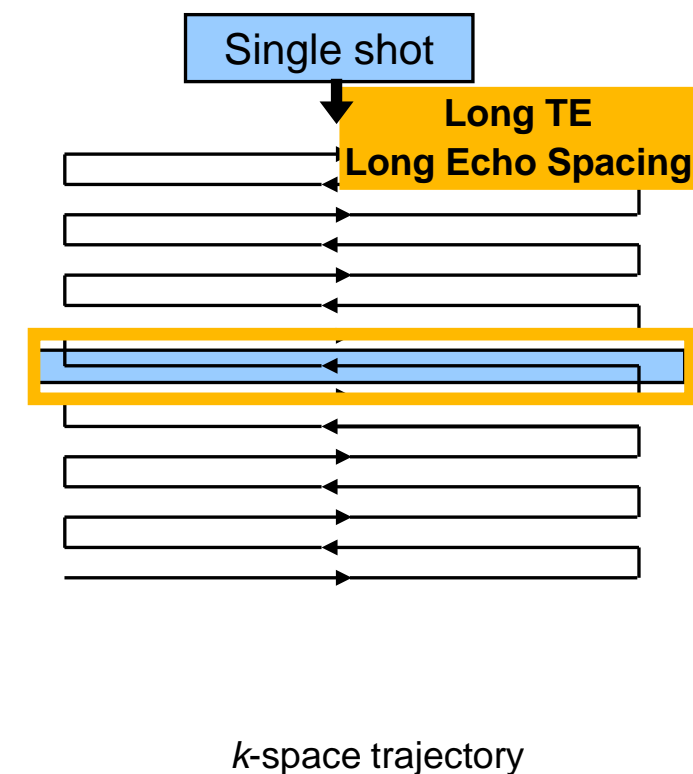
## Principe et Applications

- Readout-segmented, multi-shot diffusion-weighted EPI
- High-quality, high-resolution DWI and DTI
- Reduced susceptibility and blurring artifacts due to reduced TE and echo spacing
- Insensitivity to motion-induced phase errors
- Reduced SAR in comparison to TSE-based methods

Porter DA & Heidemann RM (2009). High resolution diffusion weighted imaging using readout-segmented echo-planar imaging, parallel imaging and a two-dimensional navigator-based reacquisition. *Magn Reson Med*, 62(2), 468-475.

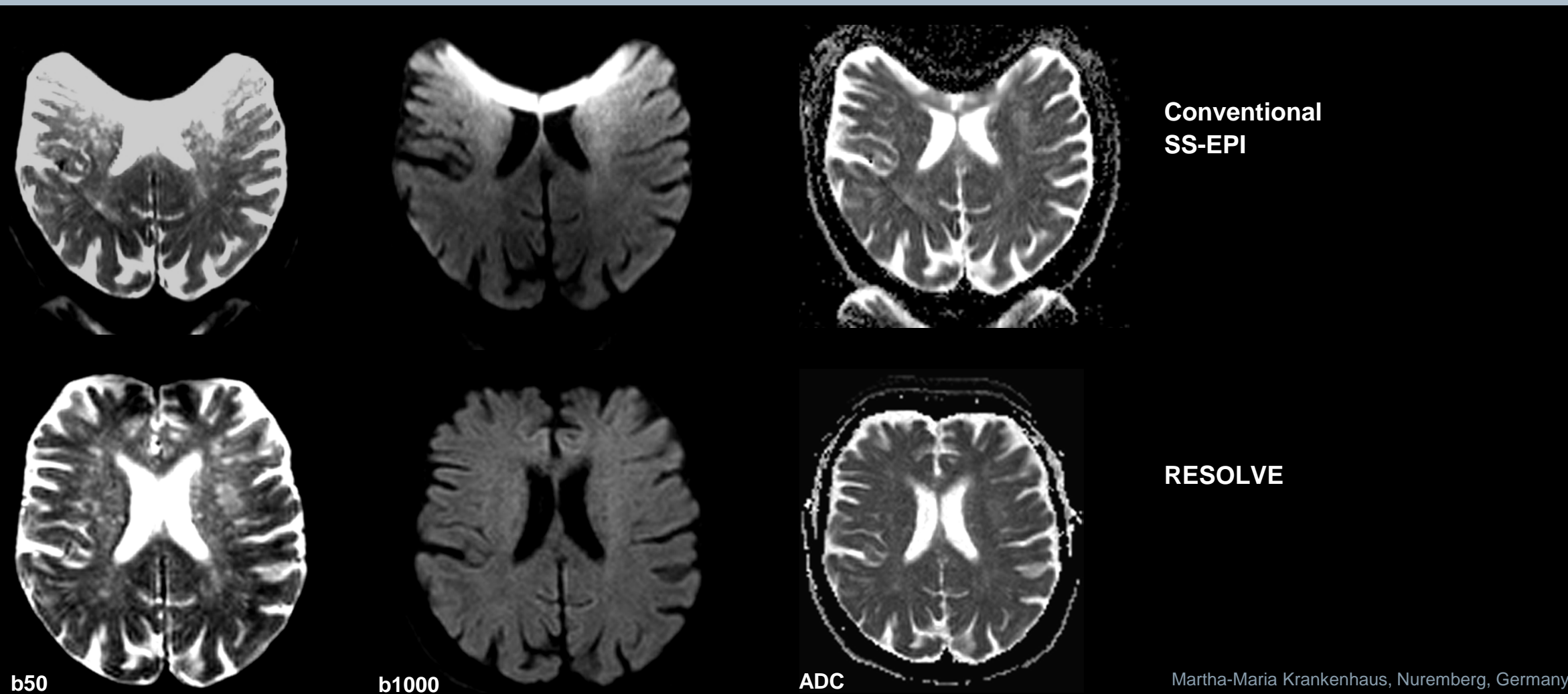


### EPI single shot Conventional



## RESOLVE

## Réduction significative des artéfacts métalliques en diffusion



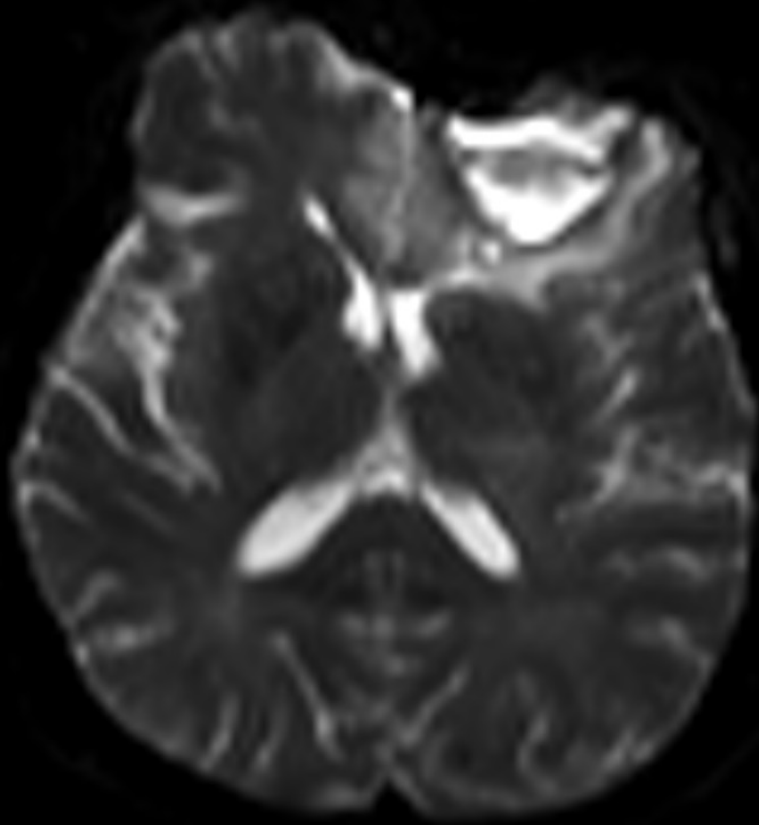
Martha-Maria Krankenhaus, Nuremberg, Germany

\*The MRI restrictions (if any) of the metal implant must be considered prior to patient undergoing MRI exam. MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens.

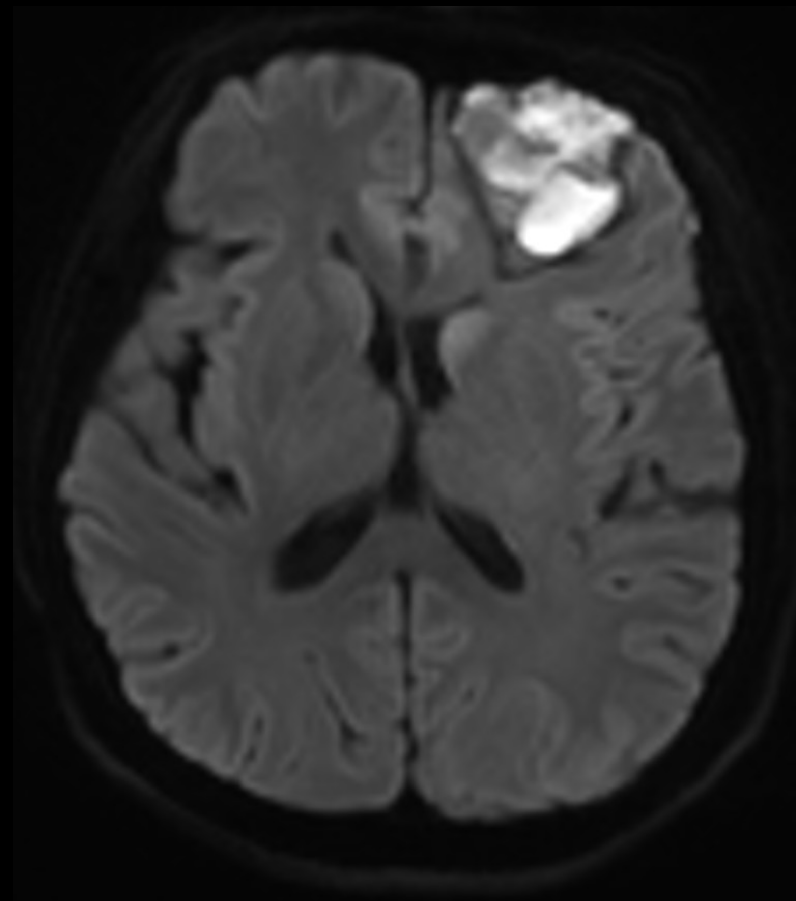
# RESOLVE

resultats plus précis pour la planification en radiothérapie

DWI standard



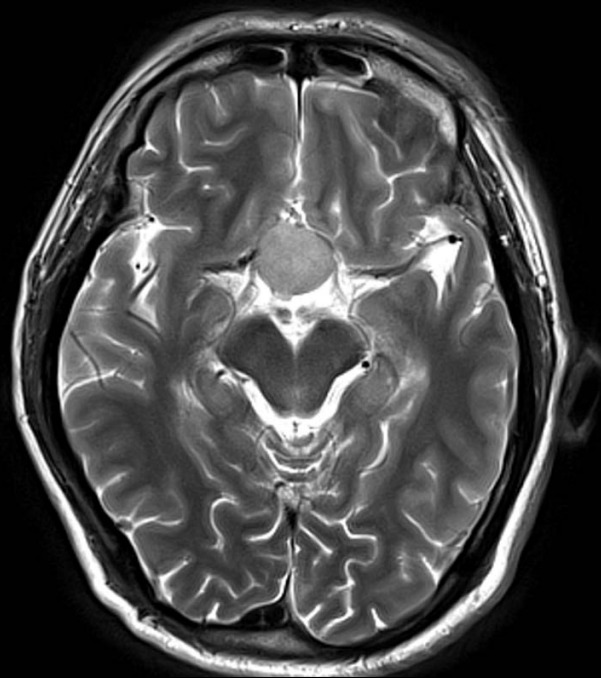
RESOLVE



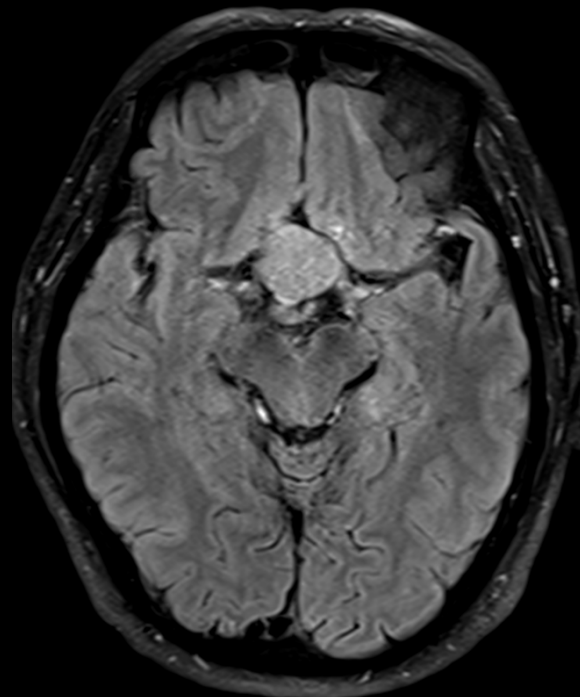


# RESOLVE

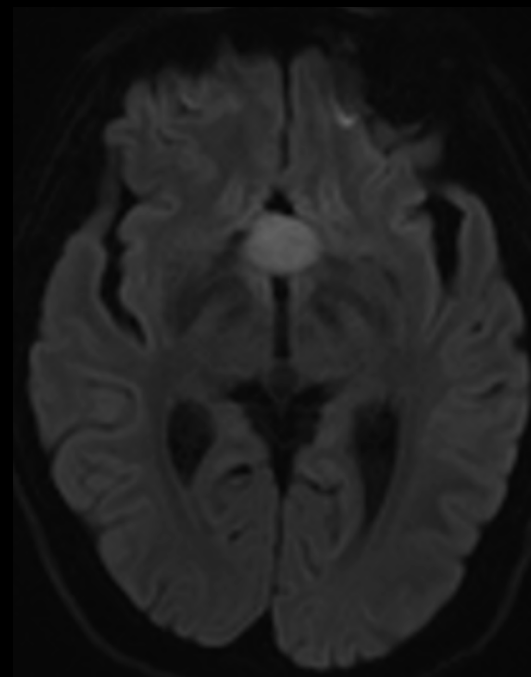
Excellente délimitation de la tumeur avec une bonne corrélation anatomique



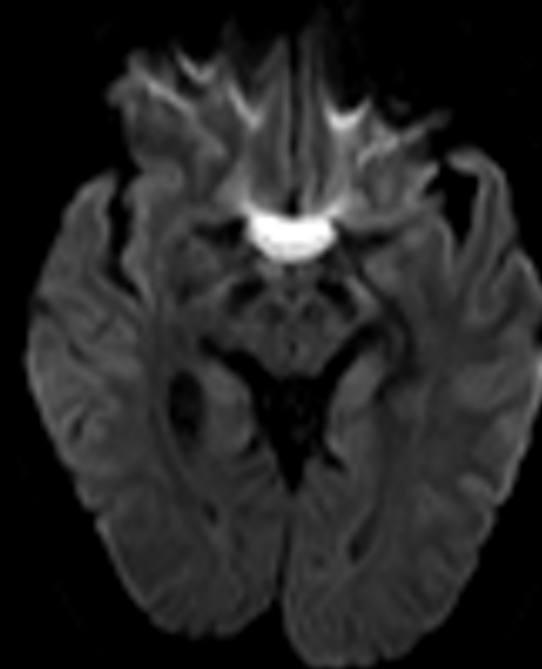
T2 TSE



T2 DarkFluid



RESOLVE b1000



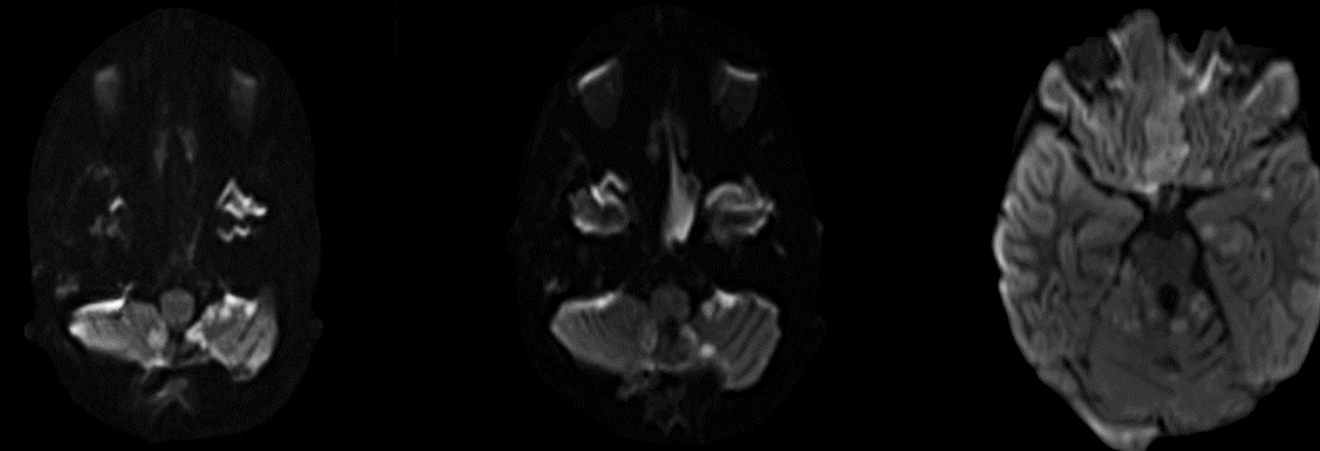
Conventional DWI b1000

Tongji Hospital, Wuhan, China

# RESOLVE

Haute qualité de diffusion y compris dans les zones difficiles

Clinical Case: 12 year old, medulloblastoma with metastases



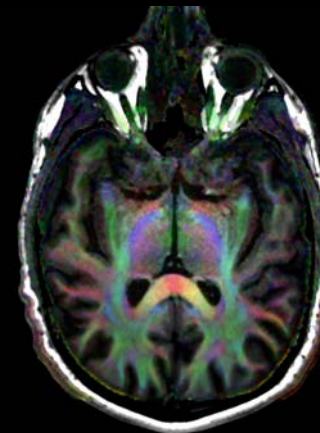
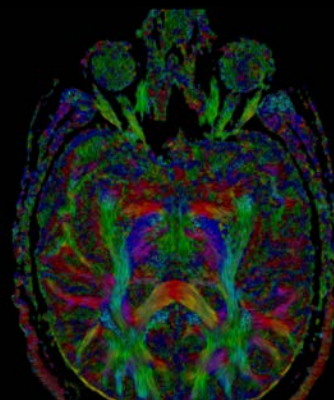
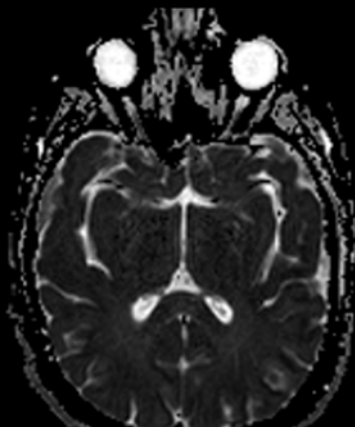
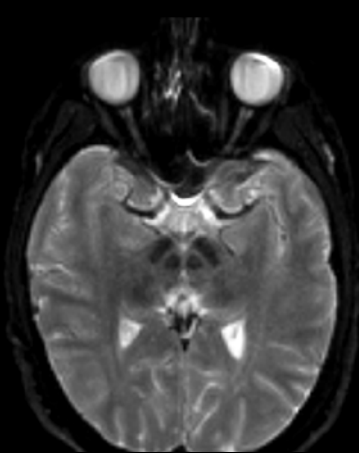
Conventional DWI  
b-value 1000, GRAPPA 2, matrix 160



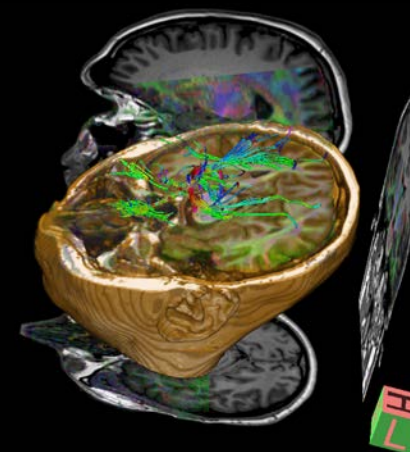
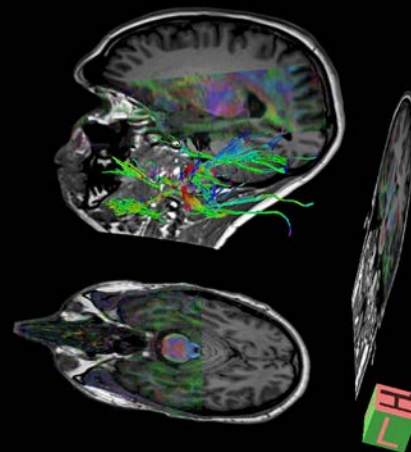
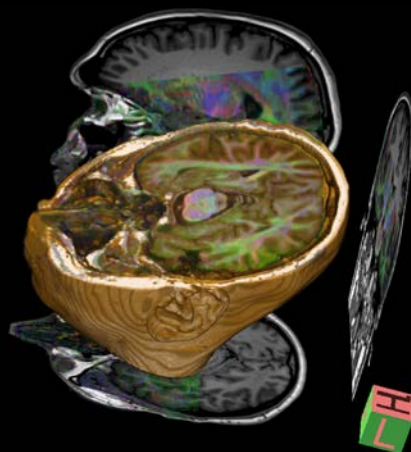
RESOLVE DWI  
b-value 1000, GRAPPA 2, matrix 224

Children's MRI Centre & RCH, Victoria, Australia

# MAGNETOM Skyra RESOLVE – Nerf optique



RESOLVE  
iPAT 2,  
b-value 0  
and ADC map



## RESOLVE

## Rachis DWI chez l'enfant désormais en routine clinique

“ La pertinence de l'imagerie pondérée en diffusion sur le rachis a été cliniquement limitée compte tenu des artéfacts de susceptibilité et le manque de résolution spatiale. La nouvelle technique d'EPI segmentée a amélioré la qualité des images DWI, permettant l'identification des métastases intradurales extramédullaires .

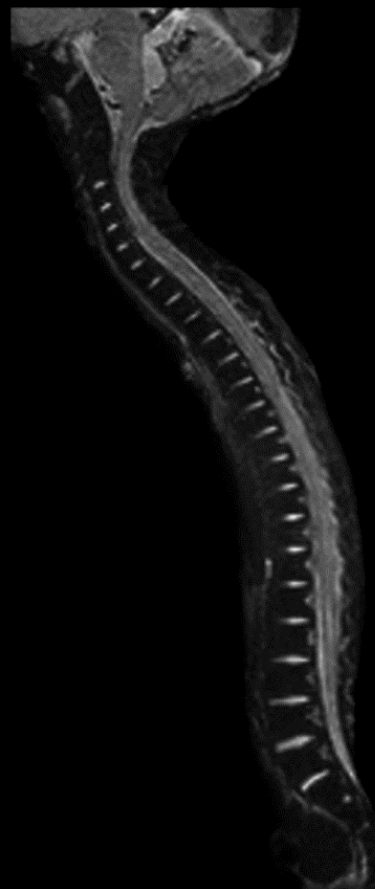
.\*\*

”

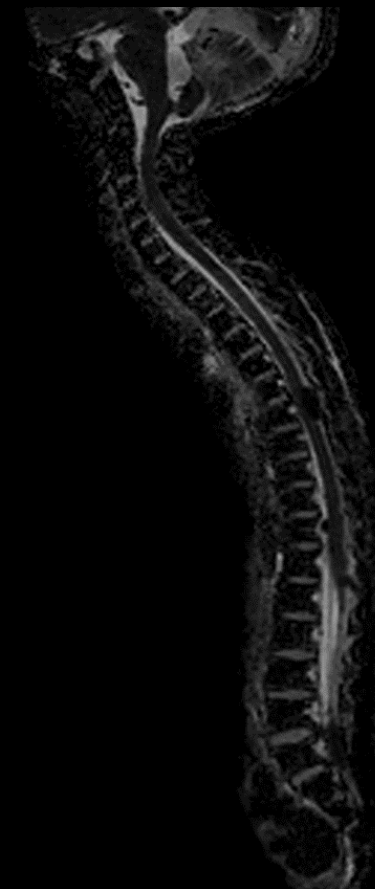
Hayes LL et al. (2012). Drop metastases to the pediatric spine revealed with diffusion-weighted MR imaging. *Pediatr Radiol*, 42, 1009-1013.



T2 TSE, 2 steps composed



RESOLVE DWI, b-value 5, 500 and ADC map, 2 steps composed, GRAPPA 2, matrix 192

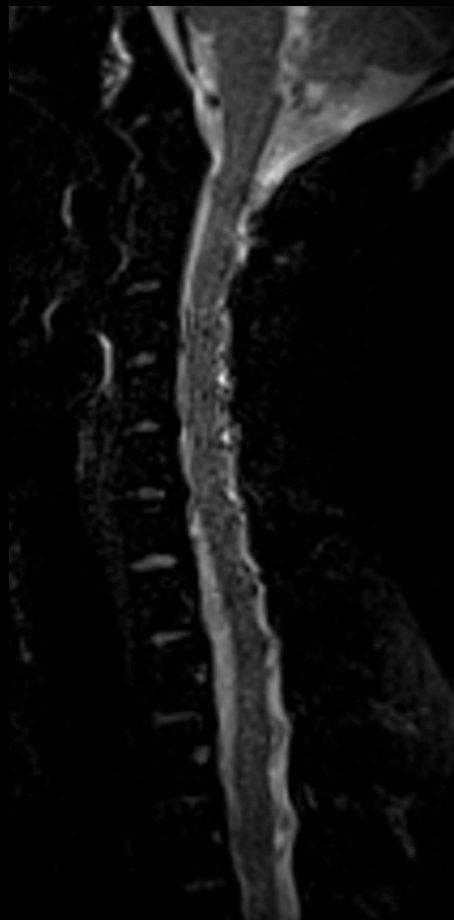


Children's Hospital of Atlanta, U.S.

## RESOLVE

## Superior quality DTI of the cervical spine at 3T

GRAPPA 2, matrix 220, TA 3:48 min, MAGNETOM Skyra



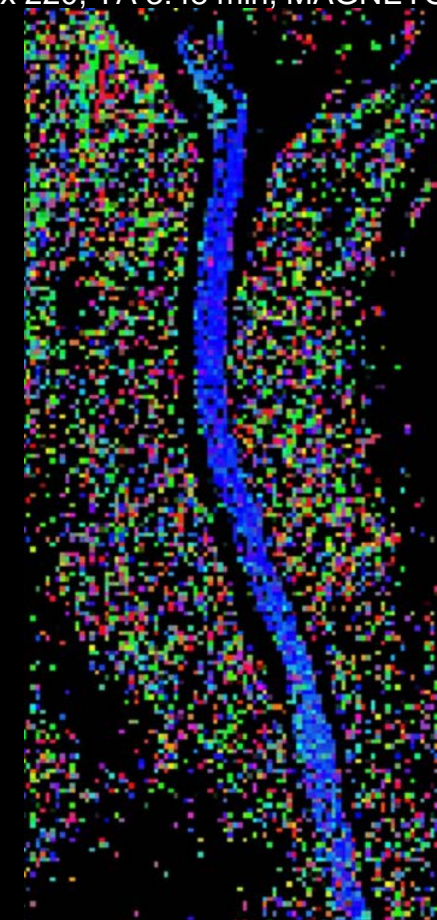
b0



b600



ADC

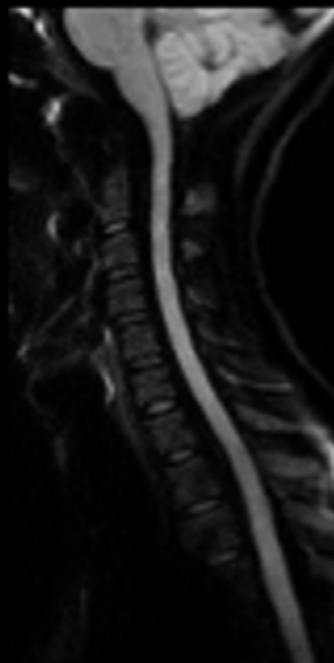


Color map

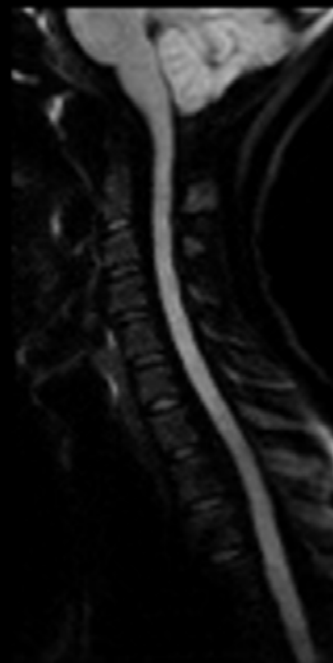
# RESOLVE

Rapidité d'acquisition grâce à l'acquisition partielle du plan de fourrier

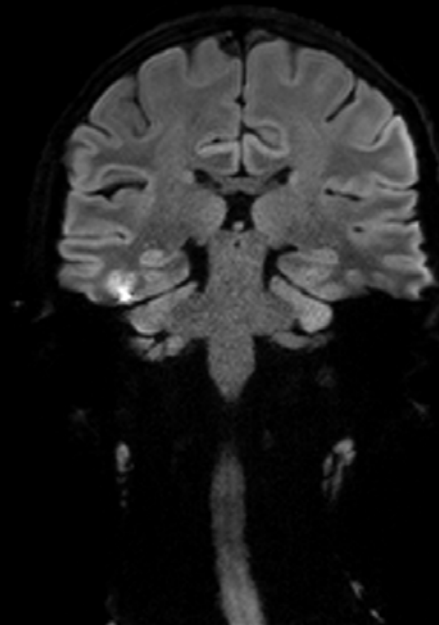
None 2:16



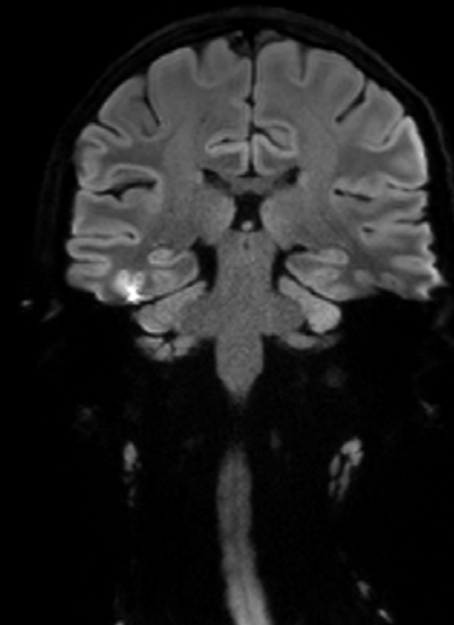
5/8 1:26 min



None 4:31 min



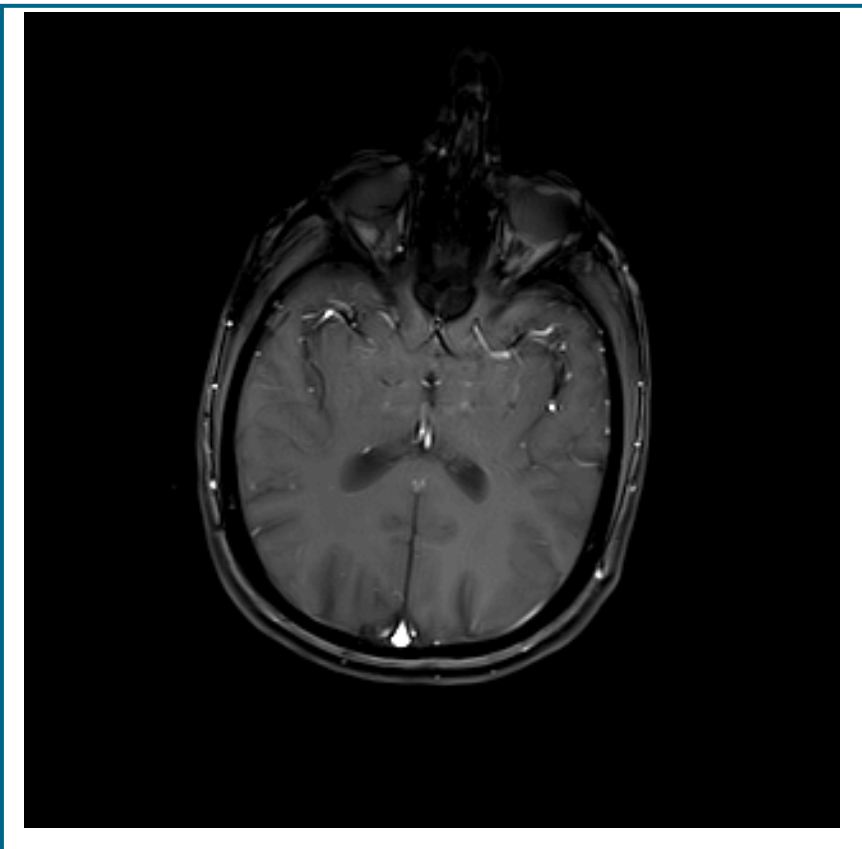
5/8 2:38 min



RESOLVE, 4-scan trace, Voxel 1.4 x 1.4 x 3.0 mm

RESOLVE, 4-scan trace, Voxel 1.0 x 1.0 x 3.0 mm

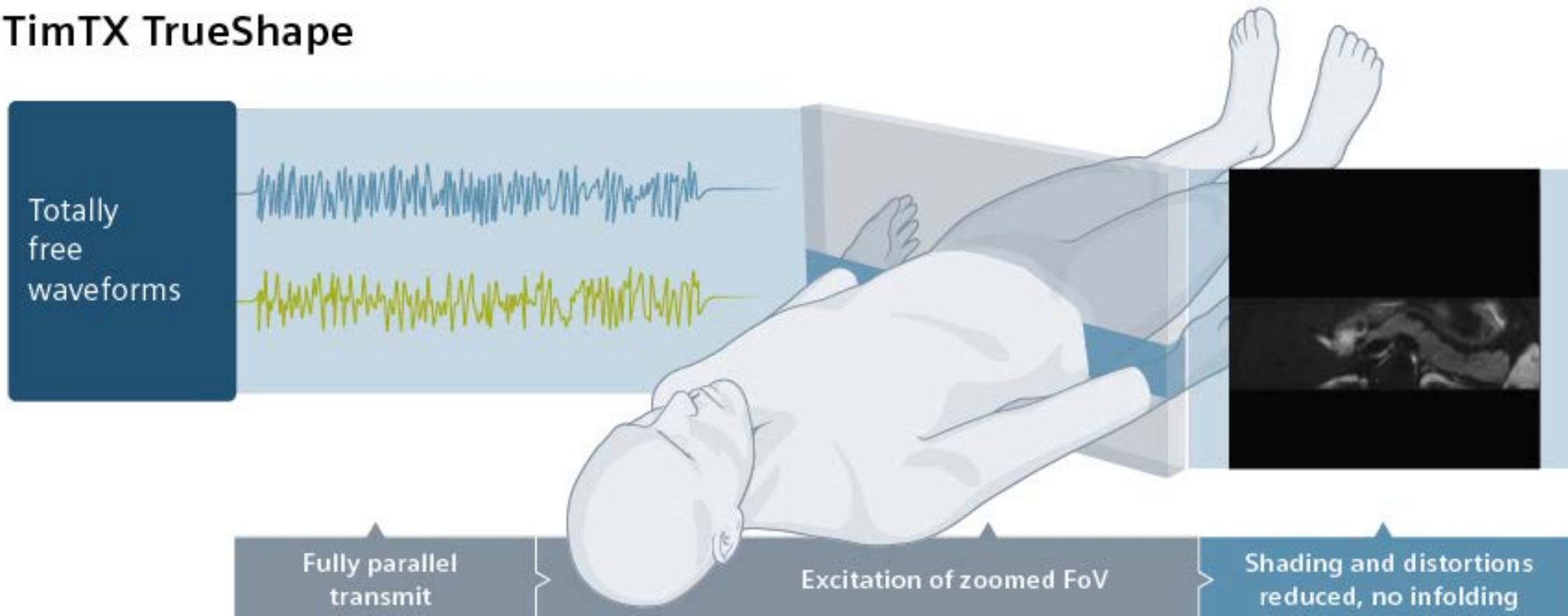
**Et si vous pouviez...**



**...zoomer en IRM?**

# Emission multicanaux et Excitation sélective : TimTX TrueShape

## TimTX TrueShape





## Emission multicanaux et excitation sélective 1ère application ZOOMit

“ ZOOMit can resolve diffusion changes in clinically important regions of the brain previously obscured by susceptibility artifact such as the medial temporal lobes

This may provide new surrogate imaging markers for epileptogenic seizure localization and early functional connectivity changes preceding Alzheimer's disease.\*\* ”

Timothy M. Shepherd, M.D./Ph.D.  
Assistant Professor, Neuroradiology  
NYU Langone Medical Center

# ZOOMit

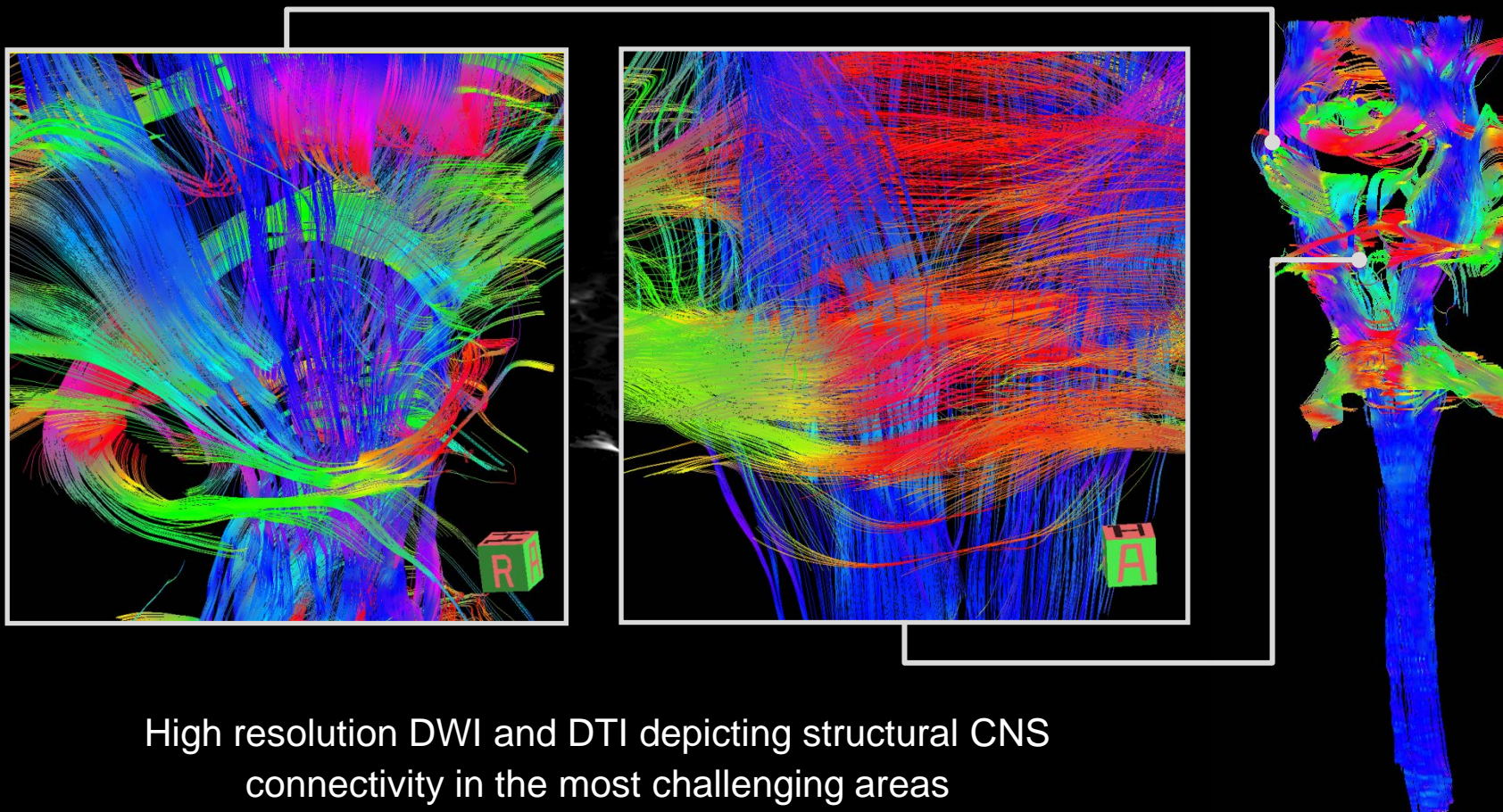
# Shape your Image



\* Available for Tim[204x48], Tim[204x64], Tim[204x128]

\*\* The statements by Siemens' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" setting and many variables exist there can be no guarantee that other customers will achieve the same results.

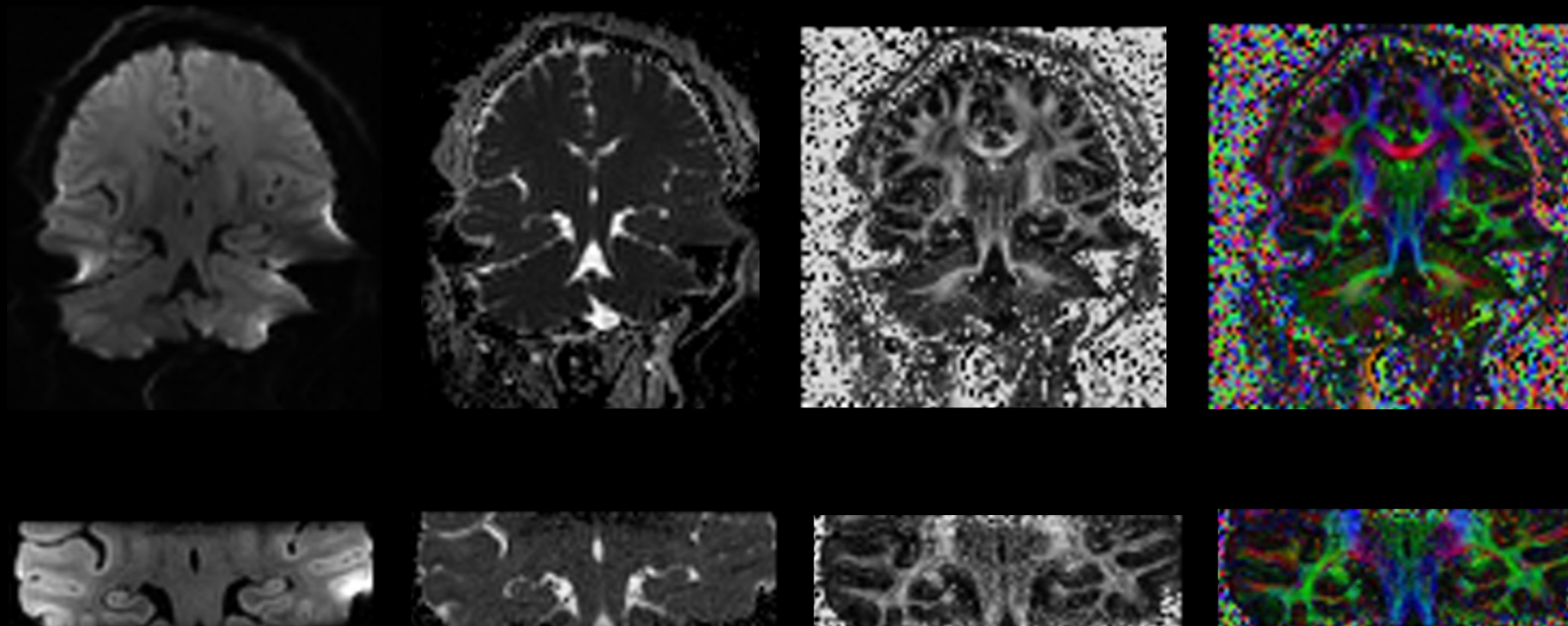
# ZOOMit Tronc Cérébral DWI/DTI en Haute Résolution



High resolution DWI and DTI depicting structural CNS connectivity in the most challenging areas

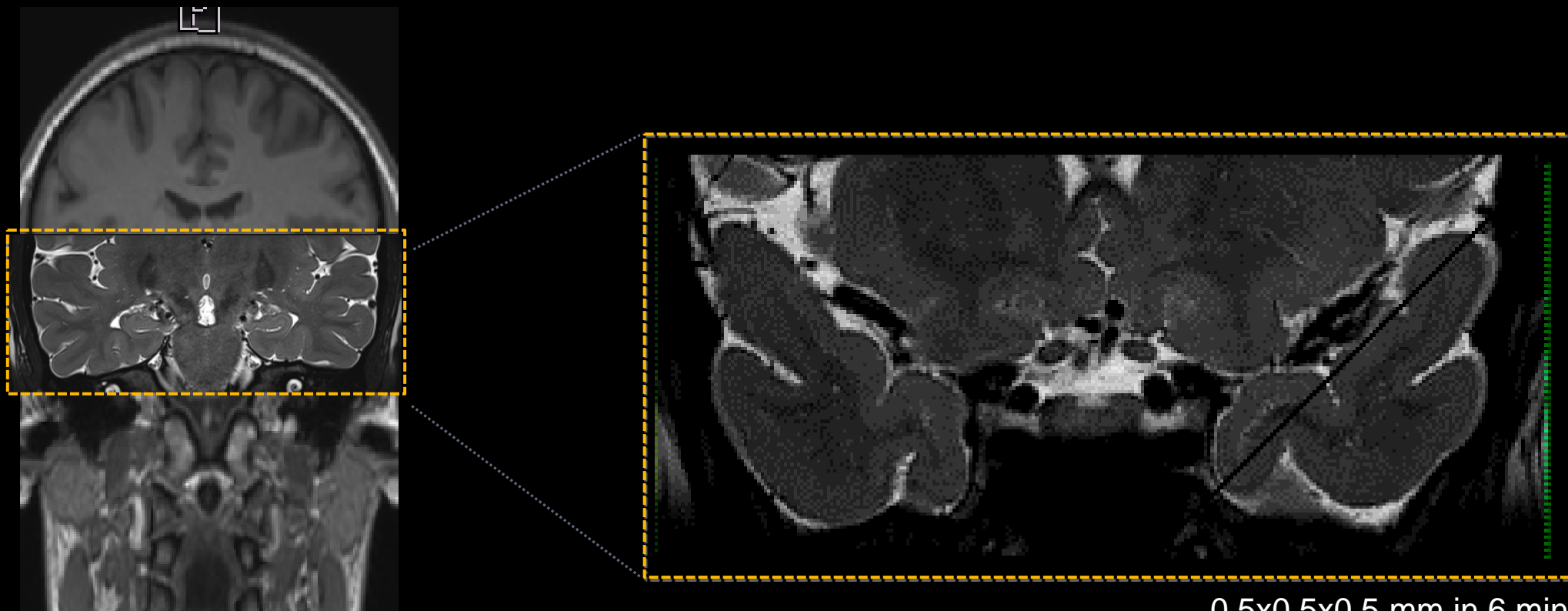
# ZOOMit Hippocampe

## Markedly reduced susceptibility artifacts for DWI



# ZOOMit Hippocampe

## Imagerie 3D Haute Résolution et Rapide

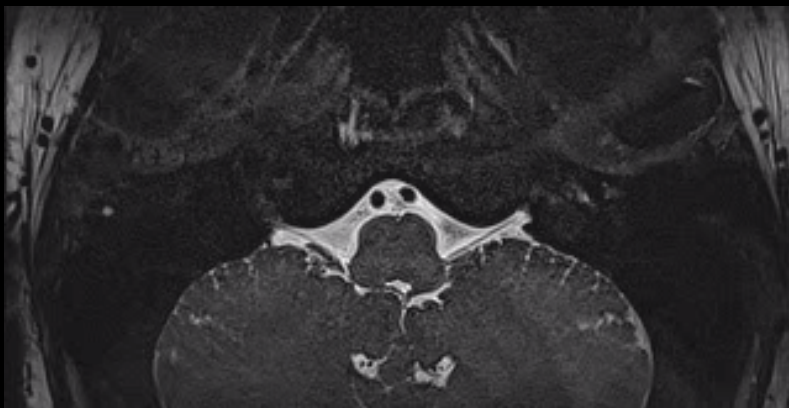


Visualize imaging details from hidden structures with  
ZOOMit and ZOOMit T2 SPACE restore

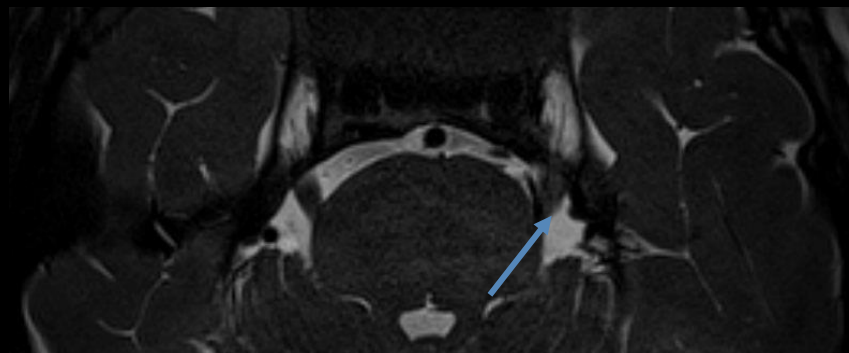
## ZOOMit SPACE et Antenne Tête/cou 64 canaux – CAI

### Qualité d'image élevée et Taq réduits

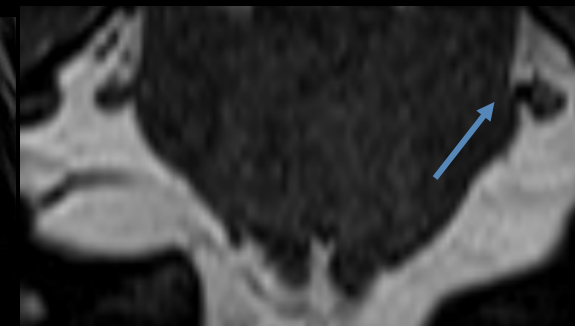
Patient with left trigeminal nerve paresthesia. Imaging revealed a neurovascular conflict between the left superior cerebellar artery and left trigeminal nerve.



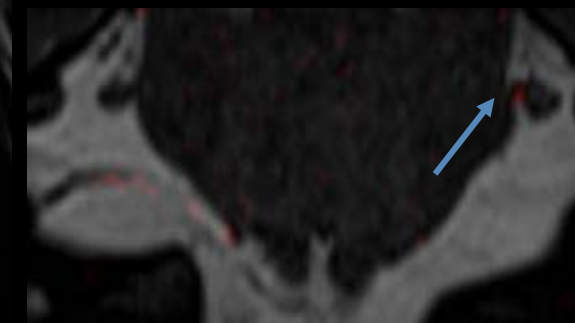
ZOOMit, 3D SPACE T2, matrix 320, FOV 82 x 260 mm, TA 2:57 min, SL 0.5 mm



Axial ZOOMit 3D SPACE T2 fused with TOF



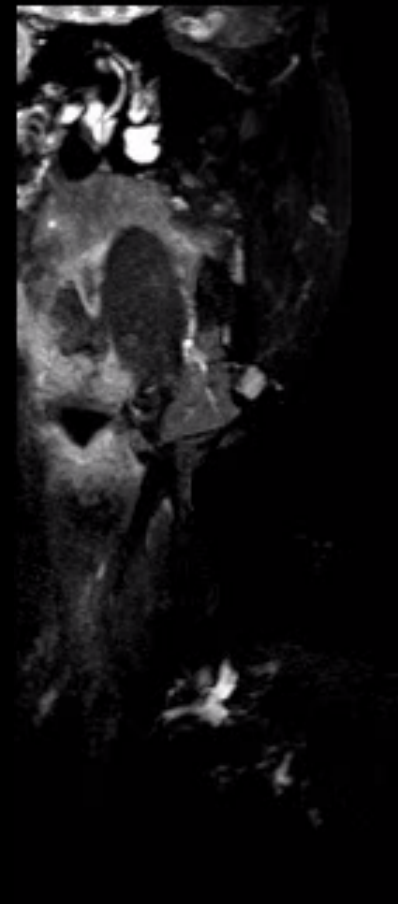
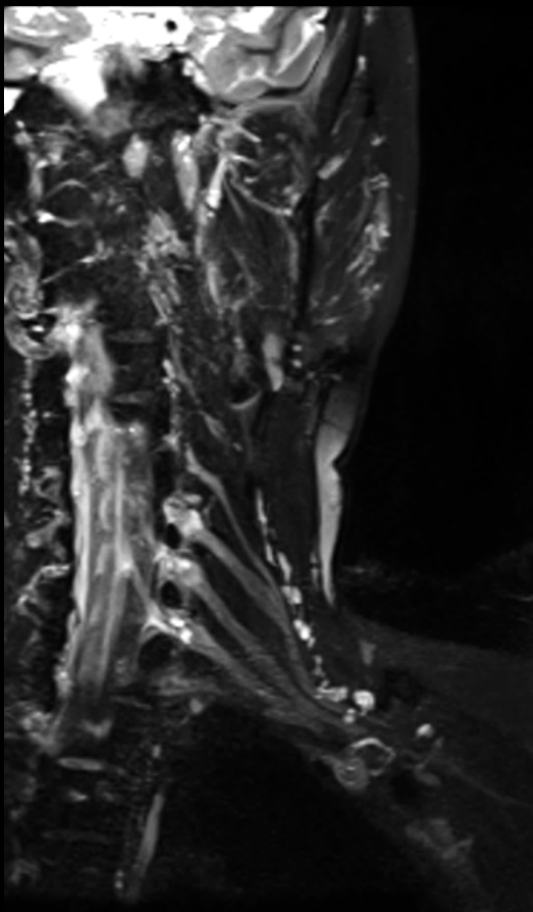
Coronal MPR ZOOMit 3D SPACE T2 fused with TOF



St Andrew's Hospital, Adelaide, Australia

## ZOOMit – Plexus Brachial Neurographie haute résolution

ZOOMit, 3D SPACE T2 IR,  
GRAPPA 2, matrix 320,  
TA 5:15 min

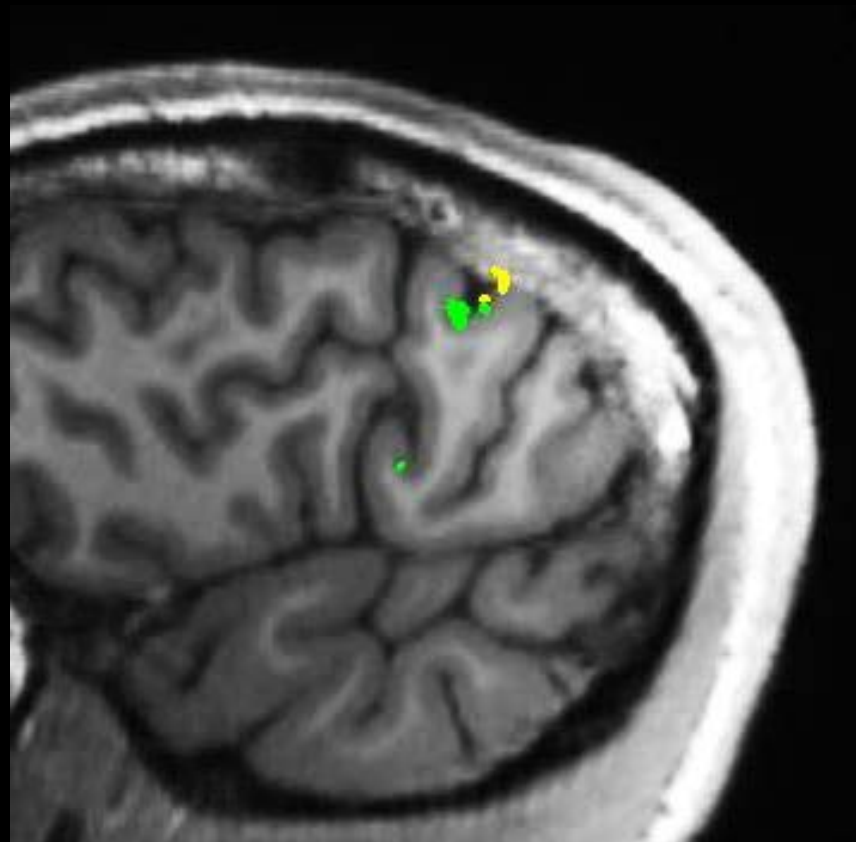


St Andrew's Hospital, Adelaide, Australia

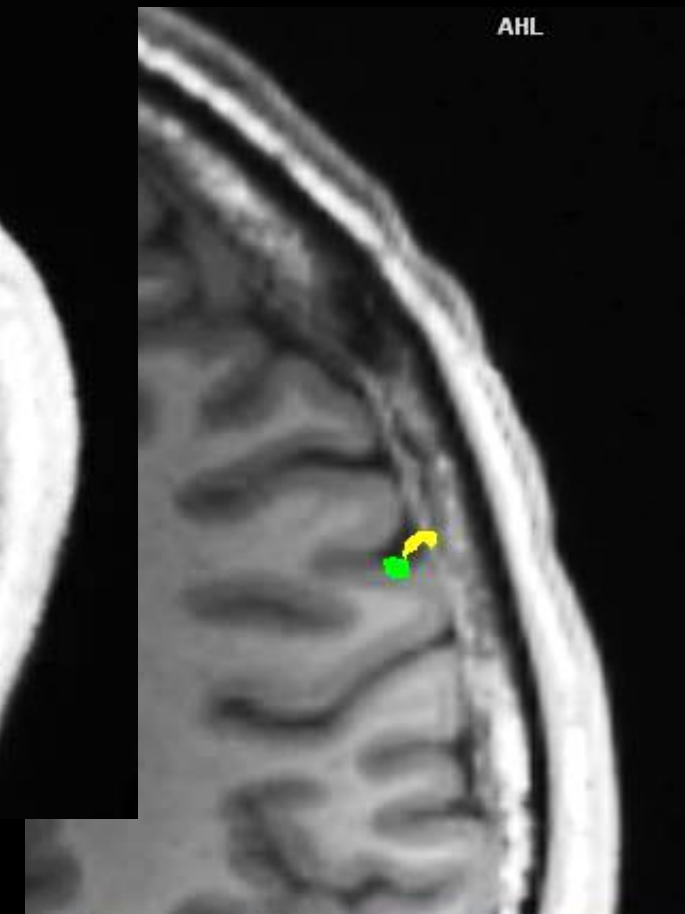
# IRMf haute résolution avec l'antenne 64 canaux et ZOOMit

## High-resolution BOLD

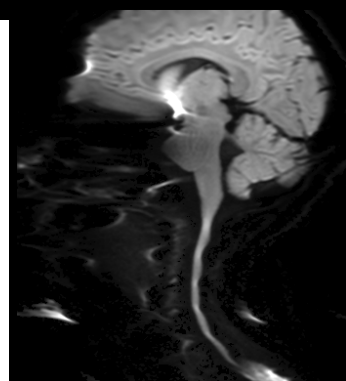
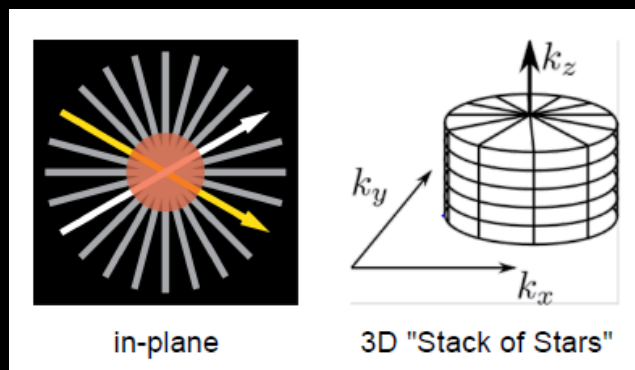
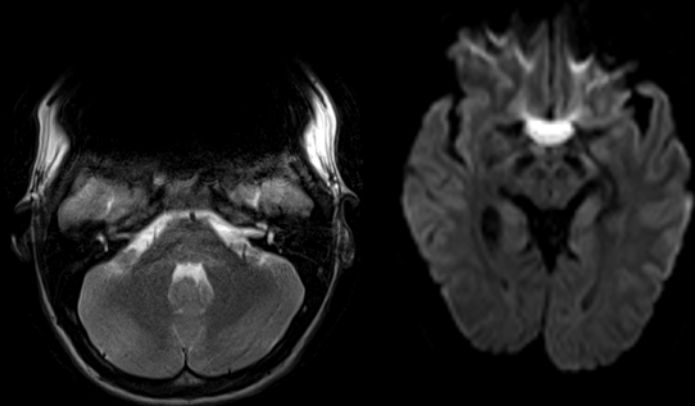
Selectively map functional regions of interest



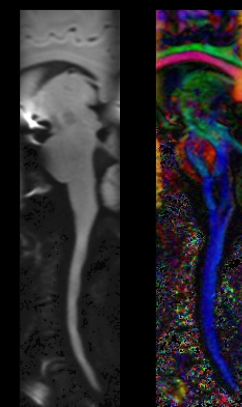
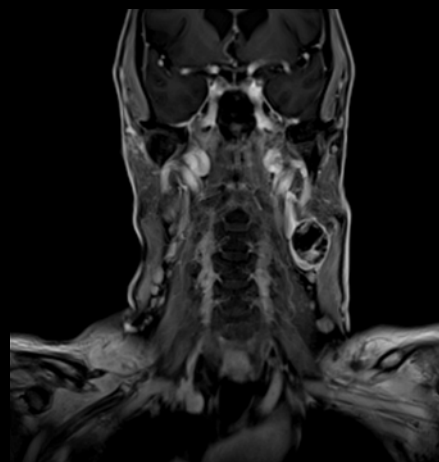
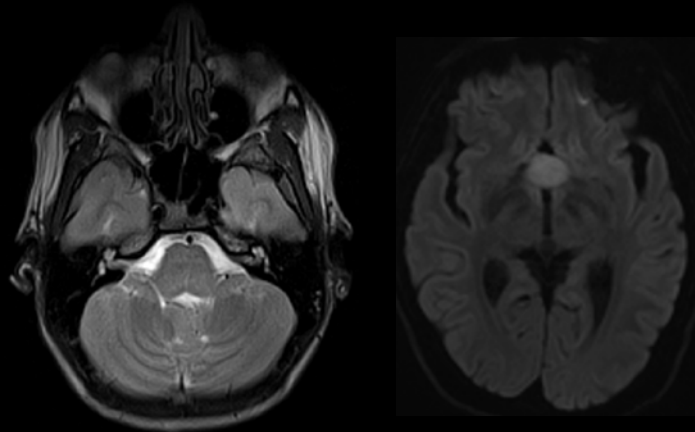
- Stimulation of little finger
- Stimulation of thumb



EPI BOLD, TR: 2000, TE: 30, Voxel: 1.5x1.5x2 mm



Conventional  
DWI



syngo ZOOMit  
DWI



**Merci de votre attention.**