Awake & unrestrained PET neuro-imaging

MADA© PET

Motion ADAptive PET
What is MADA© PET?

Motion adaptive PET imaging solution

– Allows awake and unrestrained brain PET based on motion tracking and motion correction.
– Integrated and easy-to-use methodology
– Minimally invasive head tracking
– Software solution no additional hardware
– Applicable for many types of µPET scanners
Why MADA© PET?

Imaging typically requires **anesthesia** to avoid stress and/or motion artefacts during imaging.

However, anesthesia may introduce **confounding effects** such as:

- influence on the normal brain physiology (e.g. perfusion)
- interaction of anesthetic with target molecules
- interaction of anesthetic with radiotracer (e.g. metabolism)
- possible interference with disease development
How does MADA© PET work?

• Point source based head tracking using PET data

• Motion adaptive reconstruction software

Developed at the University of Antwerp
(Miranda A. et al., IEEE MIC 2015)
How does it work in practice?

- **awake imaging in conventional µPET scanner**
- **point sources for motion tracking**
- **dedicated holder to reduce stress**

**MADA© software**

Motion prevents reconstruction of a meaningful image.

MADA© PET compensates for subject motion and generates biologically relevant PET images.
### Phantom proof of principle

<table>
<thead>
<tr>
<th>Uncorrected Image</th>
<th>MADA© PET image</th>
<th>Static reference</th>
</tr>
</thead>
</table>

~ 22 MBq $[^{18}\text{F}]$FDG, Siemens Inveon, 10 min scan with motion followed by 20 min static reference scan. Random motion of the phantom was introduced by attaching it to a manually controlled pole.

**MADA© PET software compensates randomly-introduced motion of the phantom and generates very sharp images with about 1.25mm resolution.**
In vivo proof of principle

Uncorrected image

MADA PET image
MADA© software enables awake PET brain imaging

Static reference image

MR reference

~ 37 MBq [18F]FDG, Siemens Inveon, 20 min awake scan followed by 20 min static reference scan
Unique strengths of MADA PET

🧳 Enables neuro-imaging without anesthesia

✅ Easy-to-use and integrated methodology
  • No additional equipment
  • No additional calibrations

✅ Minimally invasive
  • No large and heavy markers

✅ Excellent image quality
Want to collaborate?

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