Mikrostrukturelle forandringer i hjernen efter hjernerystelse

MR-skanninger i forbindelse med et behandlingsprojekt

Hammel Neurorehabilitation Centre and University Research Clinic, Hammel

Center of Functionally and Integrative Neuroscience (CFIN), Aarhus

Center of functionel disorders (FFL), Aarhus

AARHUS UNIVERSITET

CFIN

midt regionmidtjylland

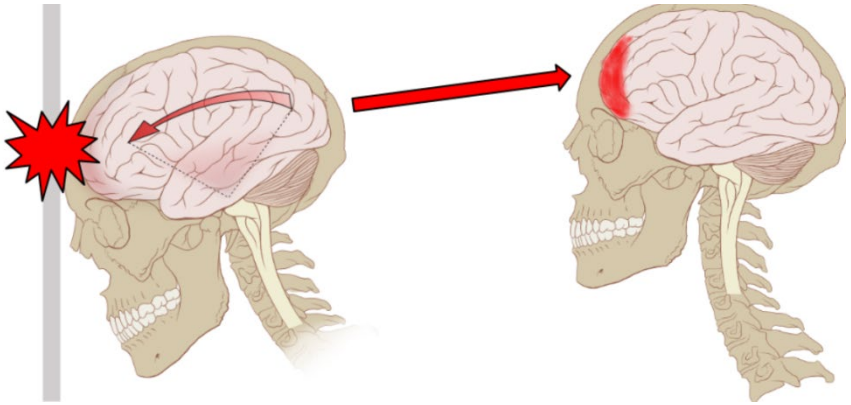
Agenda

- Baggrund
- Diffusions MRI og hjernerystelse
- Diffusions MRI resultater – behandlingsstudie
- Perspektiver

Baggrund

- > 25.000 om året (LPR 1997)
- X antal med med vedvarende symptomer
- Mere viden om årsager til vedvarende symptomer
- Mere viden om behandling

Akutte skadesmekanismer



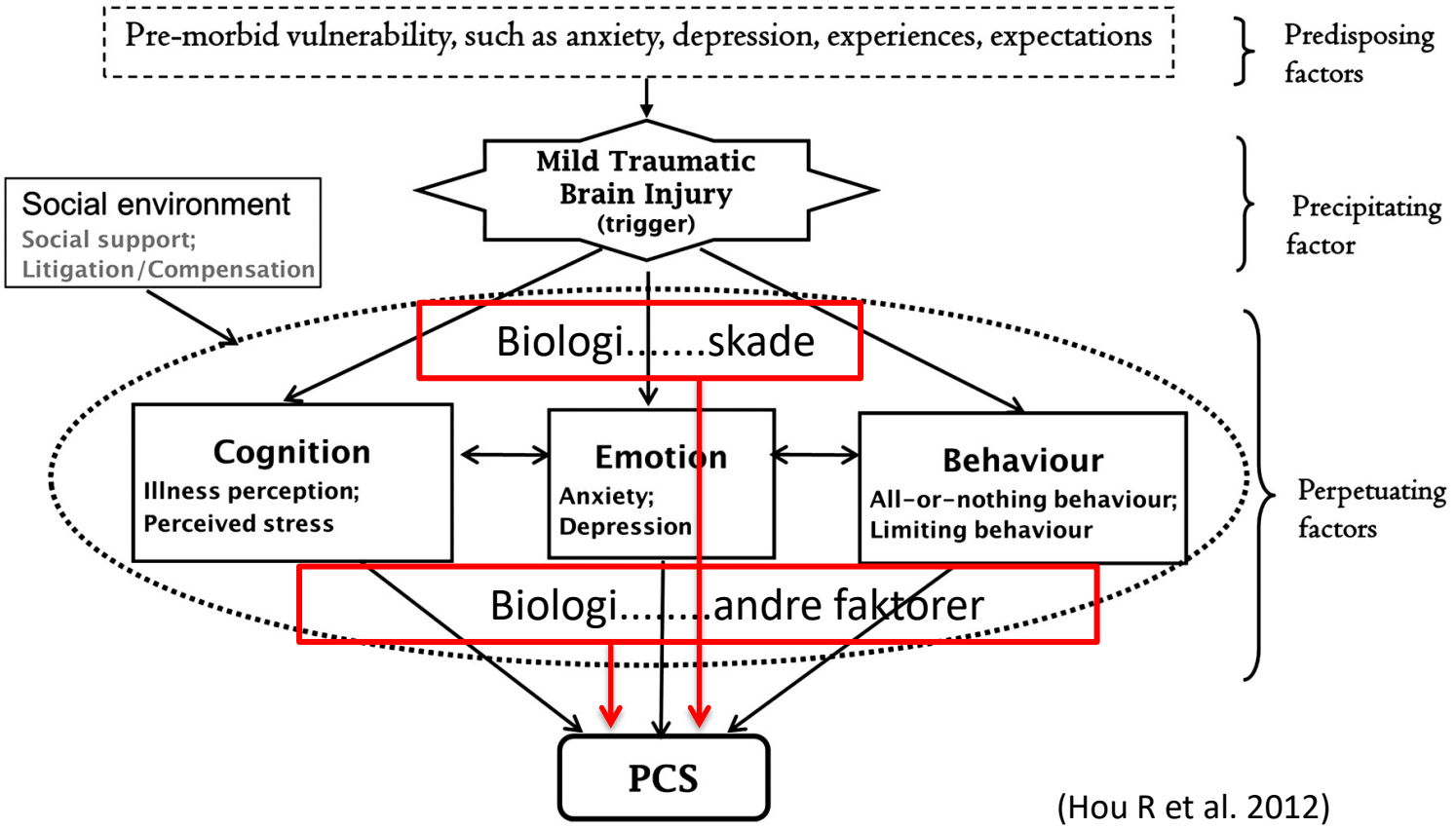
1. Placering
2. Intensitet
3. Accelerationer
4. Omfang

Den akutte undersøgelse

- Neurologisk undersøgelse og sygehistorie
- Blodtest (S100 B)
- CT skanning
- Observation første døgn

(Roth 2013)

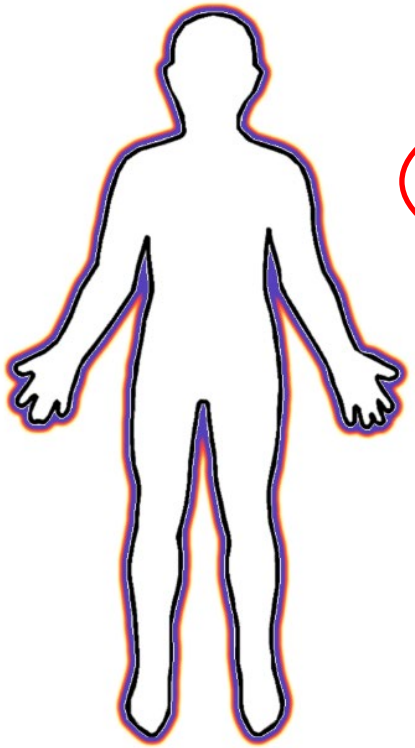
"Bio-psyko-social" forklaring på symptomer



(Hou R et al. 2012)

Hvordan undersøger vi de biologiske faktorer?

Stress
- Hårcortisol



Hjerneaktivitet
- MEG/EEG/fMRI

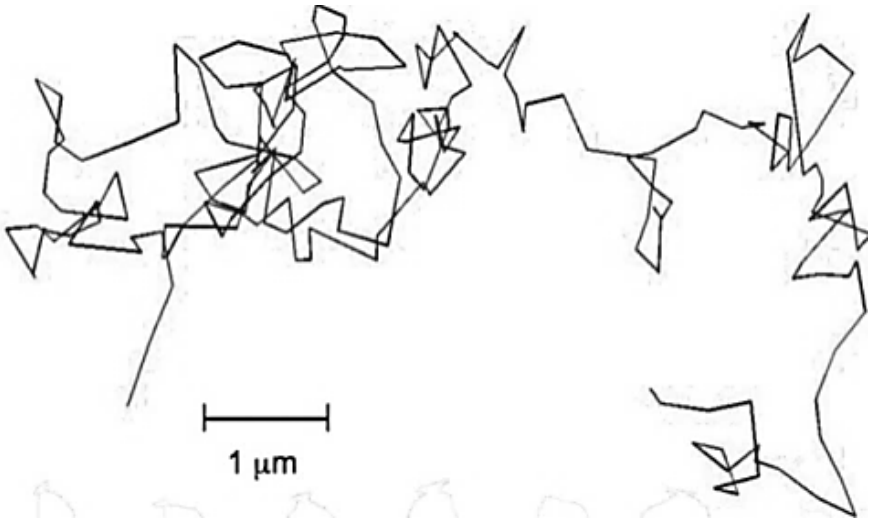
Hjernestrukturer
- diffusion MRI

Inflammation
- blodprøver

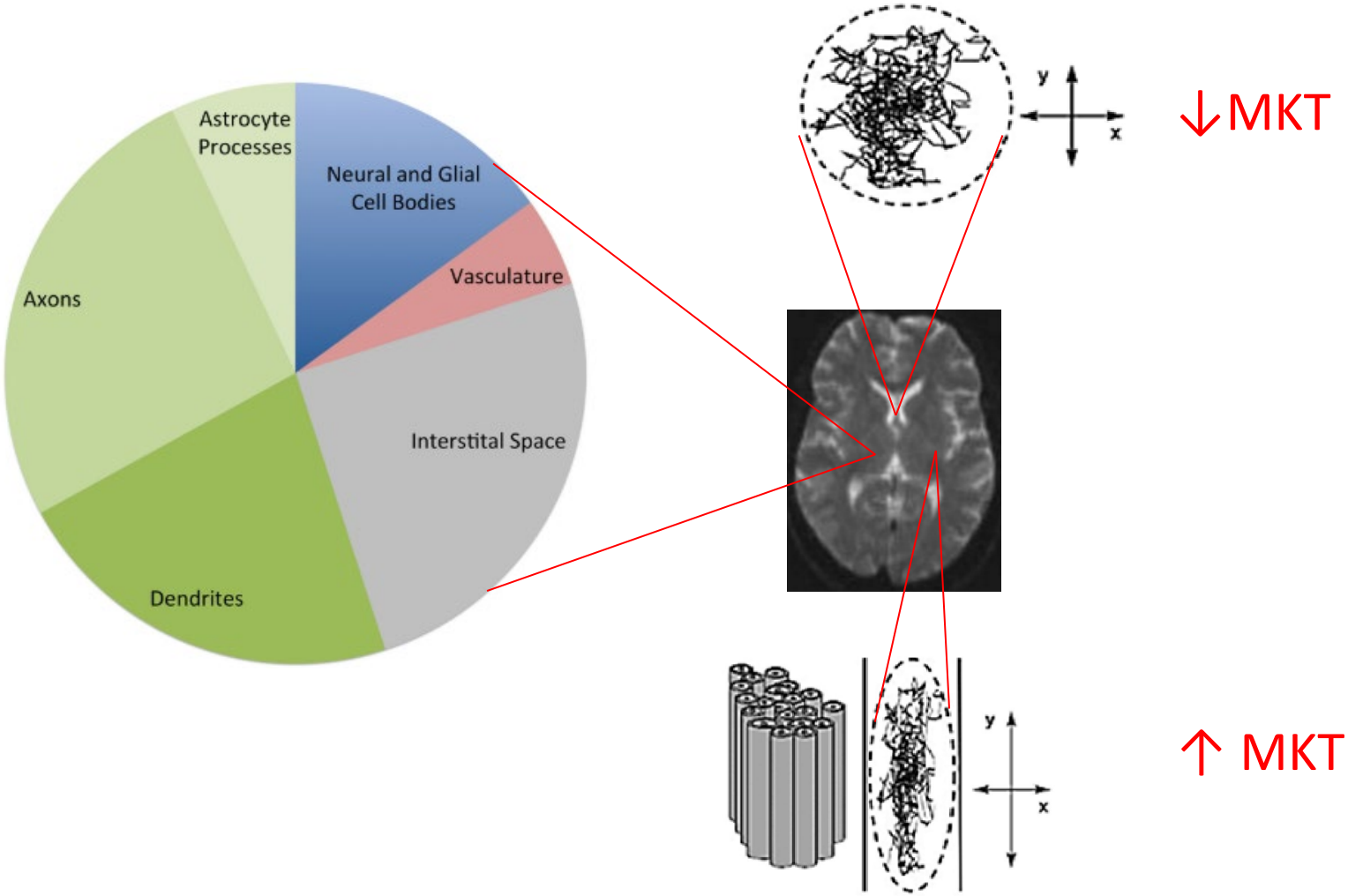
Individuelle faktorer
- Genetik

diffusions MRI

- Vandmolekylers egenbevægelse



diffusions MRI – hvad måler vi på?



diffusions MRI – hvor måler vi?

J Neurol Neurosurg Psychiatry. 2012 Sep;83(9):870-6. doi: 10.1136/jnnp-2012-302742. Epub 2012 Jul 14.

Diffusion tensor imaging studies of mild traumatic brain injury: a meta-analysis.

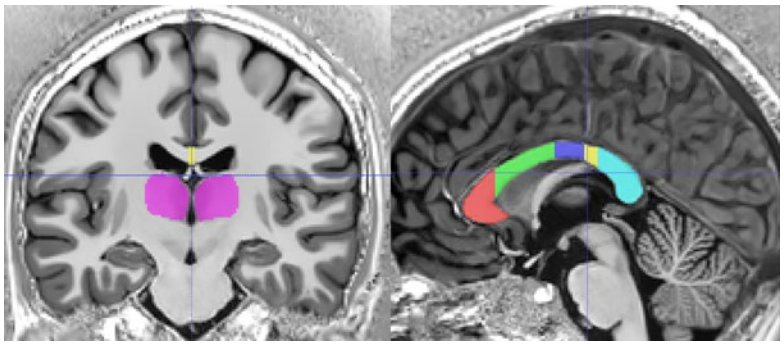
Aoki Y[1], Inokuchi R, Gunshin M, Yahagi N, Suwa H.

HOTSPOT ?

Neurosci Biobehav Rev. 2016 Jul;66:119-26. doi: 10.1016/j.neubiorev.2016.04.021. Epub 2016 Apr 28.

A voxel-based meta-analysis of diffusion tensor imaging in mild traumatic brain injury.

Aoki Y[1], Inokuchi R[2].



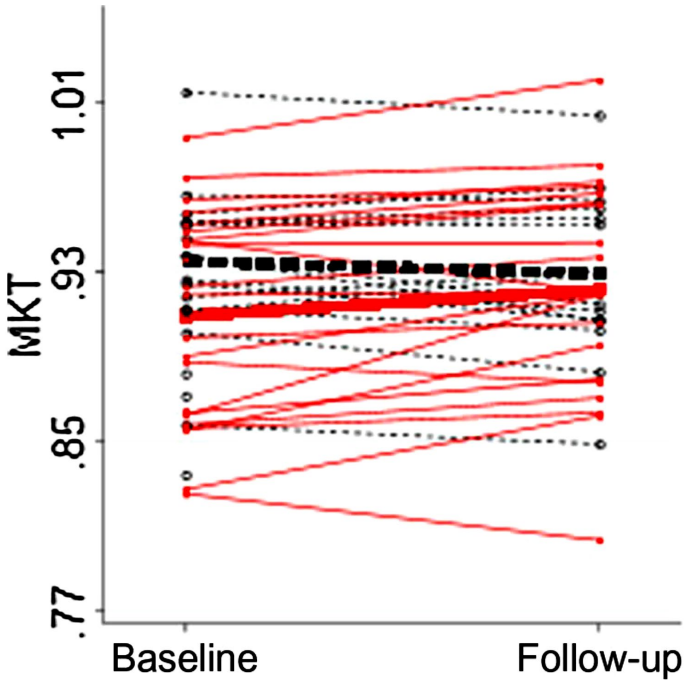
Resultater fra behandlingsstudiet

MRI resultater fra RCT

	GAIN (n=23)	Kontroller (n=19)
Alder	22.8 (3.9)	23.9 (3.8)
Køn	18/5	14/5
Tid siden uheld ved baseline	141 (36)	127 (43)

MRI resultater fra RCT

- MKT forøgelse i corpus callosum i GAIN gruppen

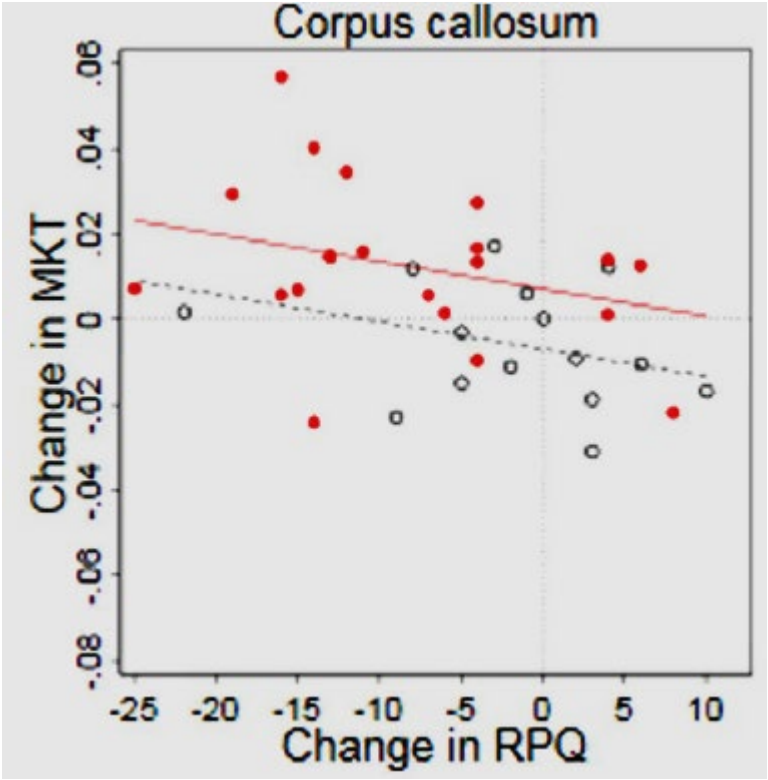


P=0,003

(Næss-Schmidt 2020)

Er ændring i MKT og symptomer relateret?

- Ændring i MKT var ikke signifikant associeret med symptomer



P=0.059

(Næss-Schmidt 2020)

Hvad skyldes ændringen i MKT så?

- Studiestørrelse

- Andre faktorer der kan påvirke corpus callosum
  - Adfærd?

Review article

Exercise effects on depression: Possible neural mechanisms

Swathi Gujral[a,b,*], Howard Aizenstein[c], Charles F. Reynolds III[c], Meryl A. Butters[c], Kirk I. Erickson[a,b]

  - Psykologiske faktorer?

Microstructural brain abnormalities in medication-free patients with major depressive disorder: a systematic review and meta-analysis of diffusion tensor imaging

Jing Jiang, MM;* You-Jin Zhao, MM;* Xin-Yu Hu, MD; Ming-Ying Du, MD; Zi-Qi Chen, MD; Min Wu, PhD; Kai-Ming Li, PhD; Hong-Yan Zhu, MD; Poornima Kumar, PhD; Qi-Yong Gong, MD, PhD

Perspektiver

MRI

- Større studie
- Andre MRI metoder

Andre mekanismer

- Genetik – individuel variation i MRI data (Blokland 2012)
- Det autonome nervesystem (Pertab 2018)