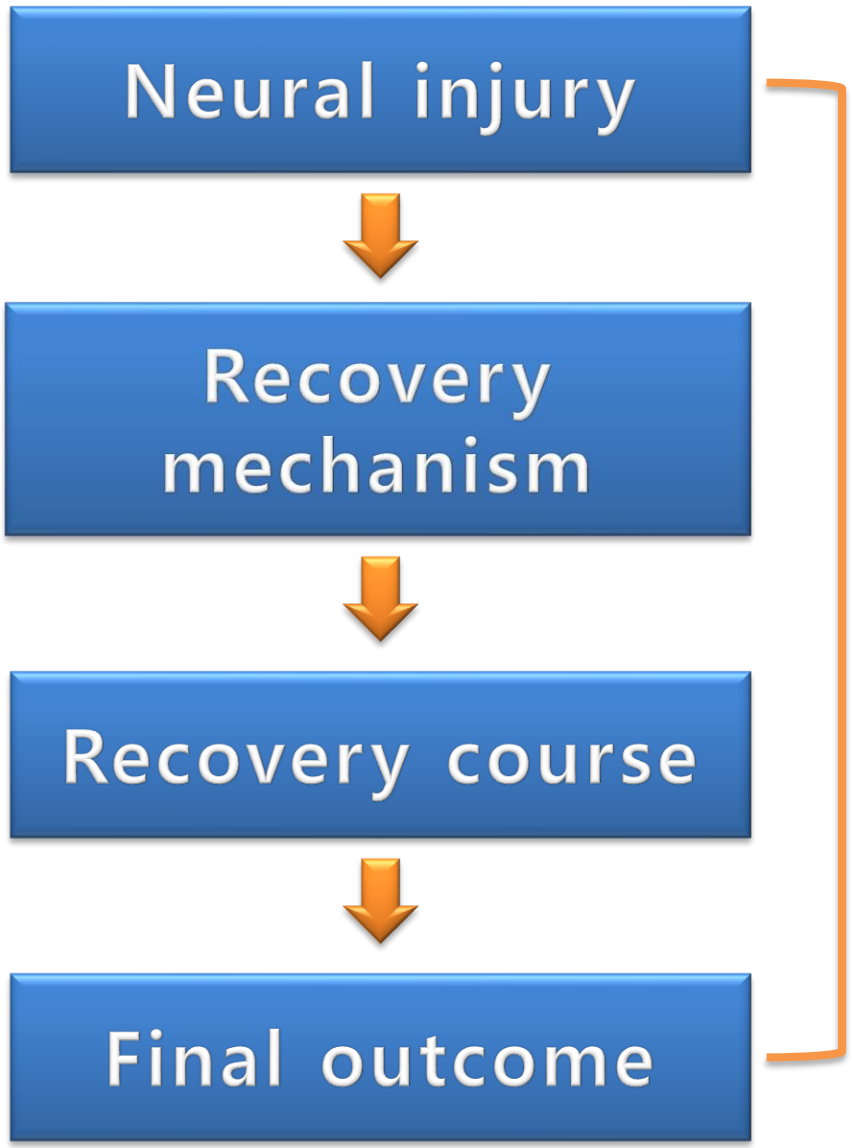
Brain Rehabilitation based on Neural Analysis

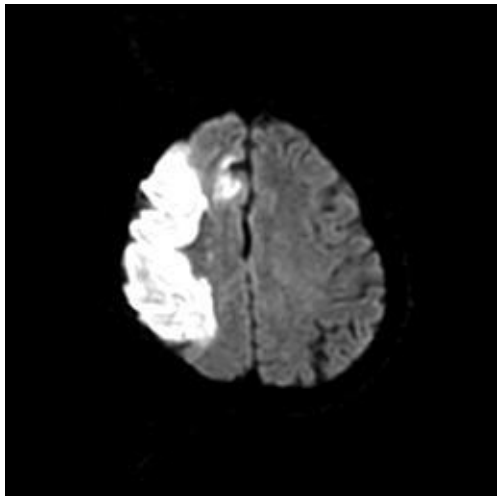
영남의대 재활의학교실

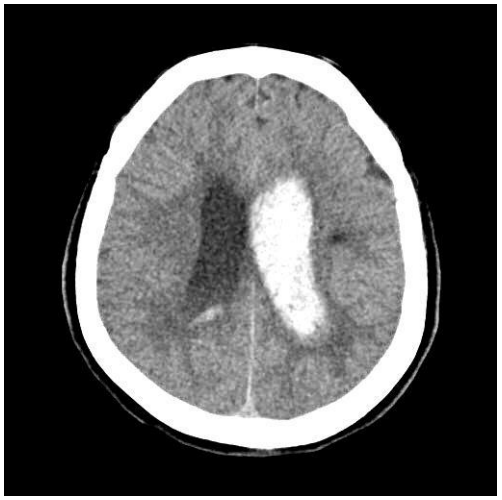
장 성 호

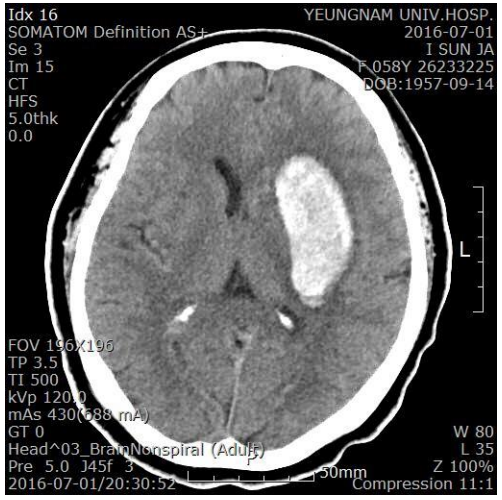


Successful Rehabilitation

Rehabilitation Strategy



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L 35
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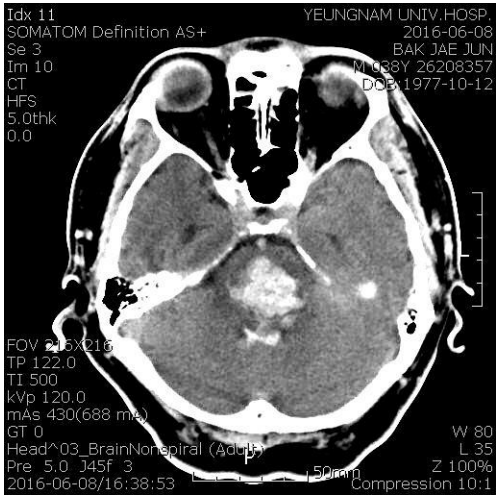
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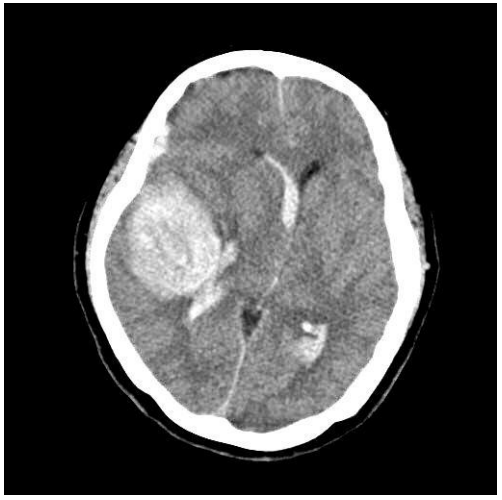
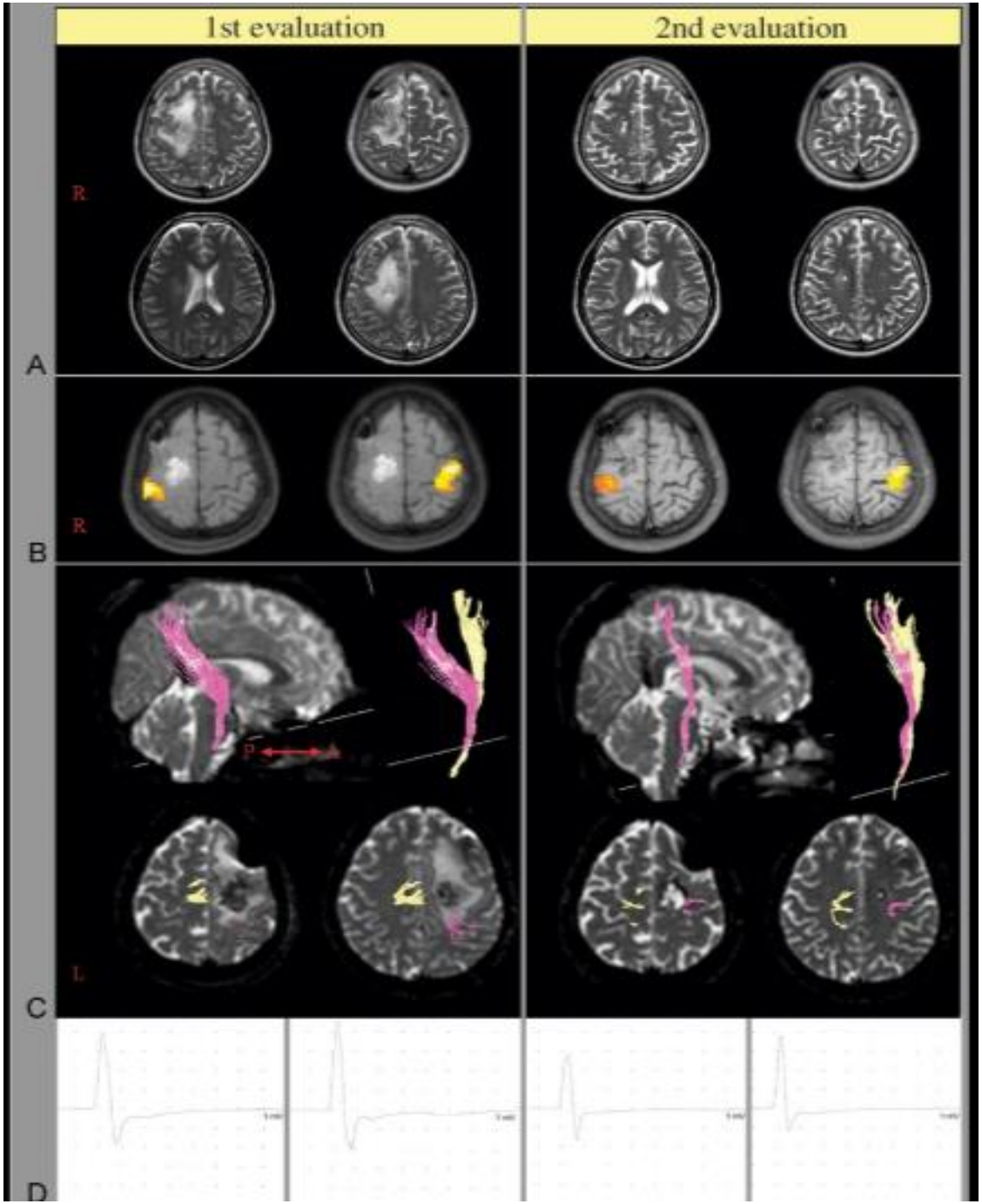
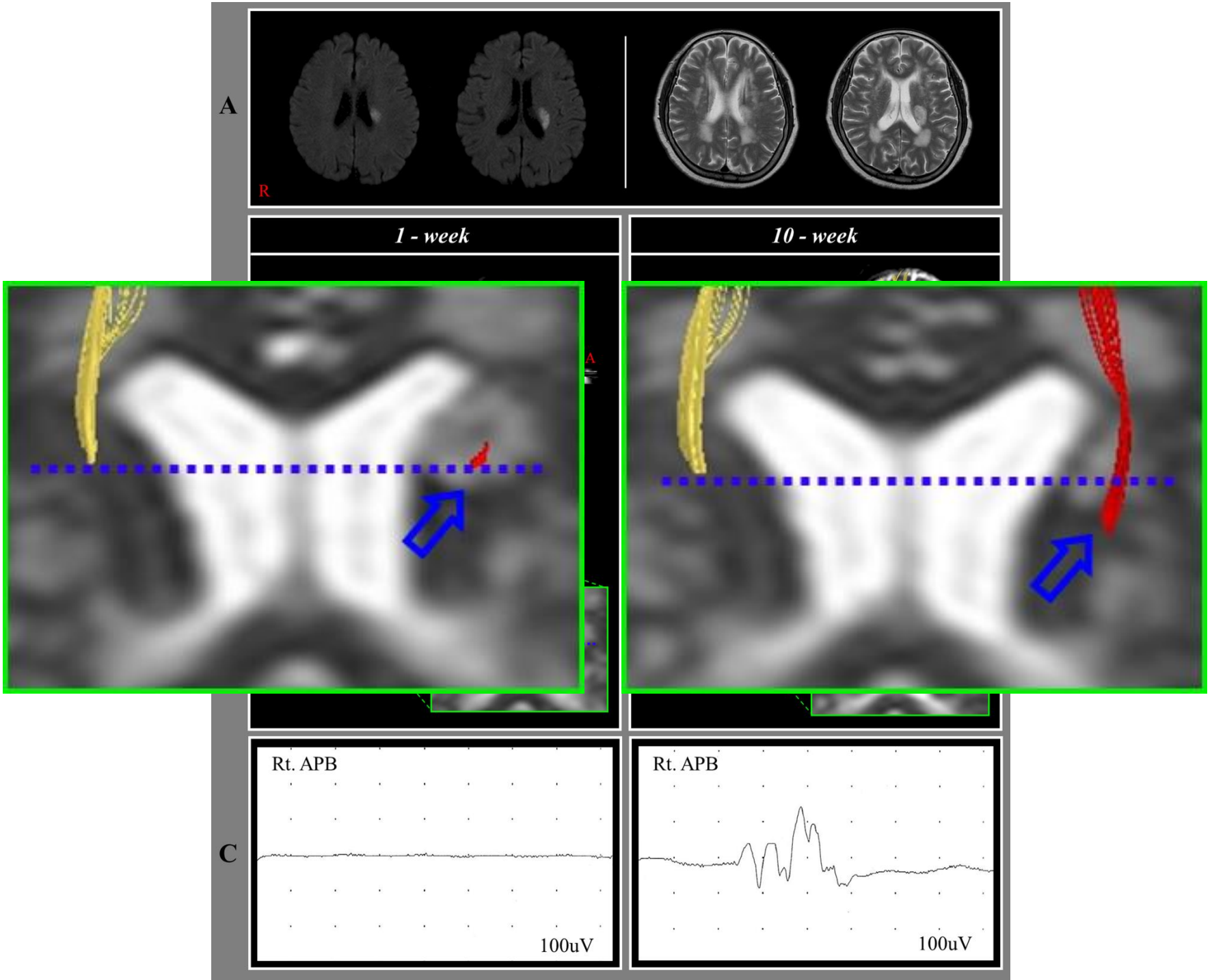
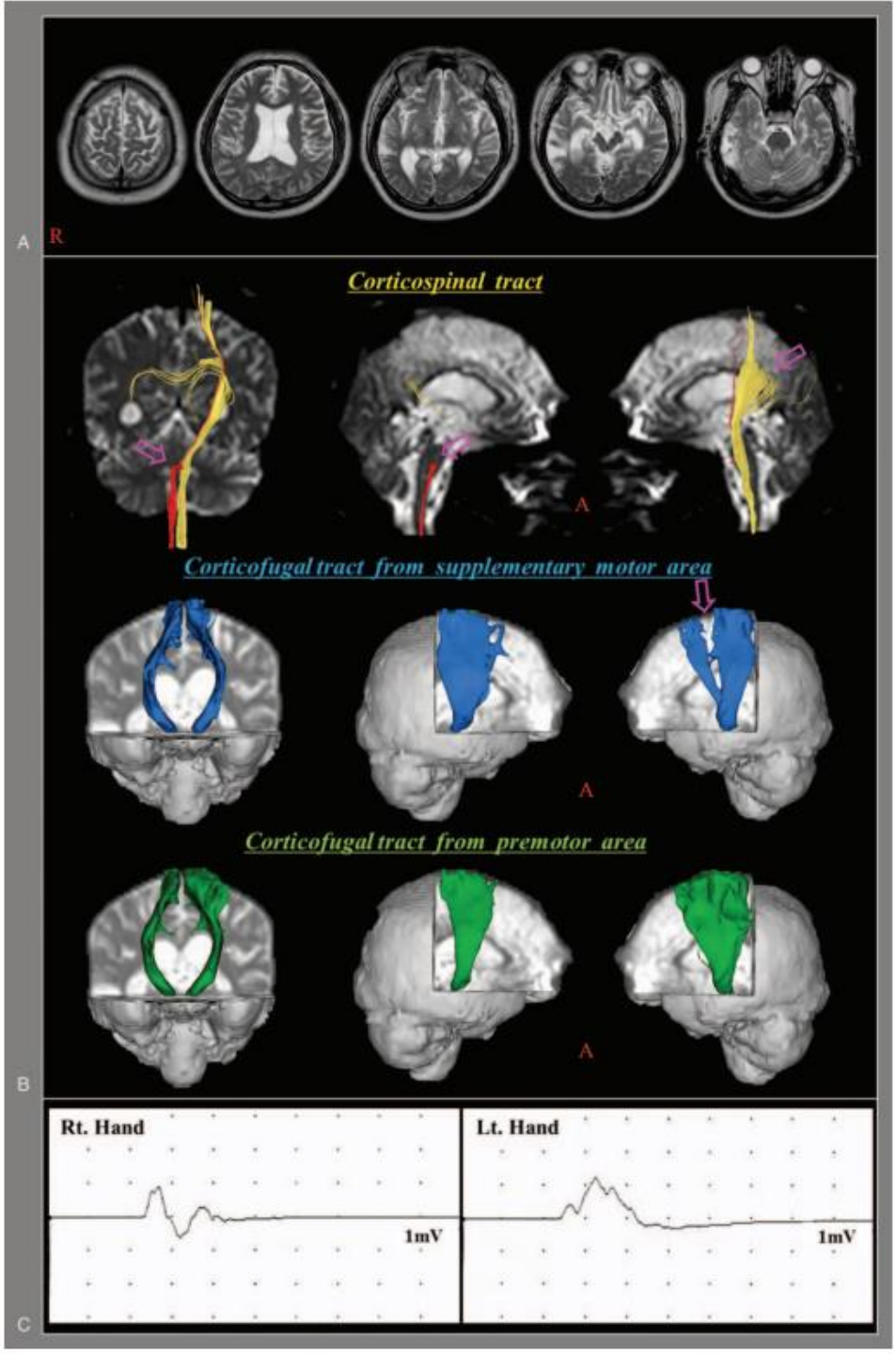


Neural Analysis Techniques

- Evoked potentials
- **Diffusion tensor tractography**
- Functional MRI
- Functional NIRS
- Electroencephalography

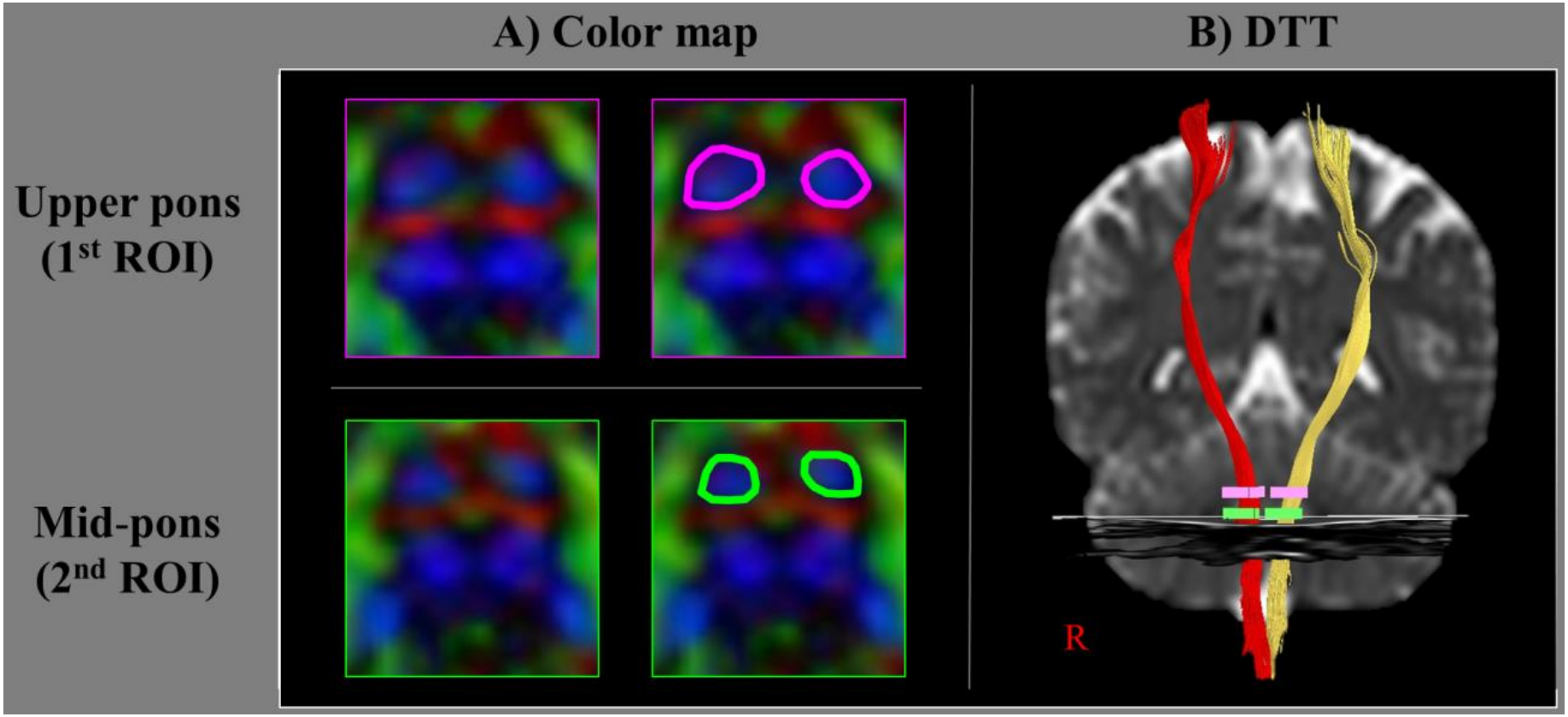

1st evaluation
2nd evaluation
A
B
C
D
R
R
L


A
R
1 - week
10 - week
C
Rt. APB
100uV
Rt. APB
100uV


A
R
Corticospinal tract
A
Corticofugal tract from supplementary motor area
A
Corticofugal tract from premotor area
A
B
Rt. Hand
1mV
Lt. Hand
1mV
C

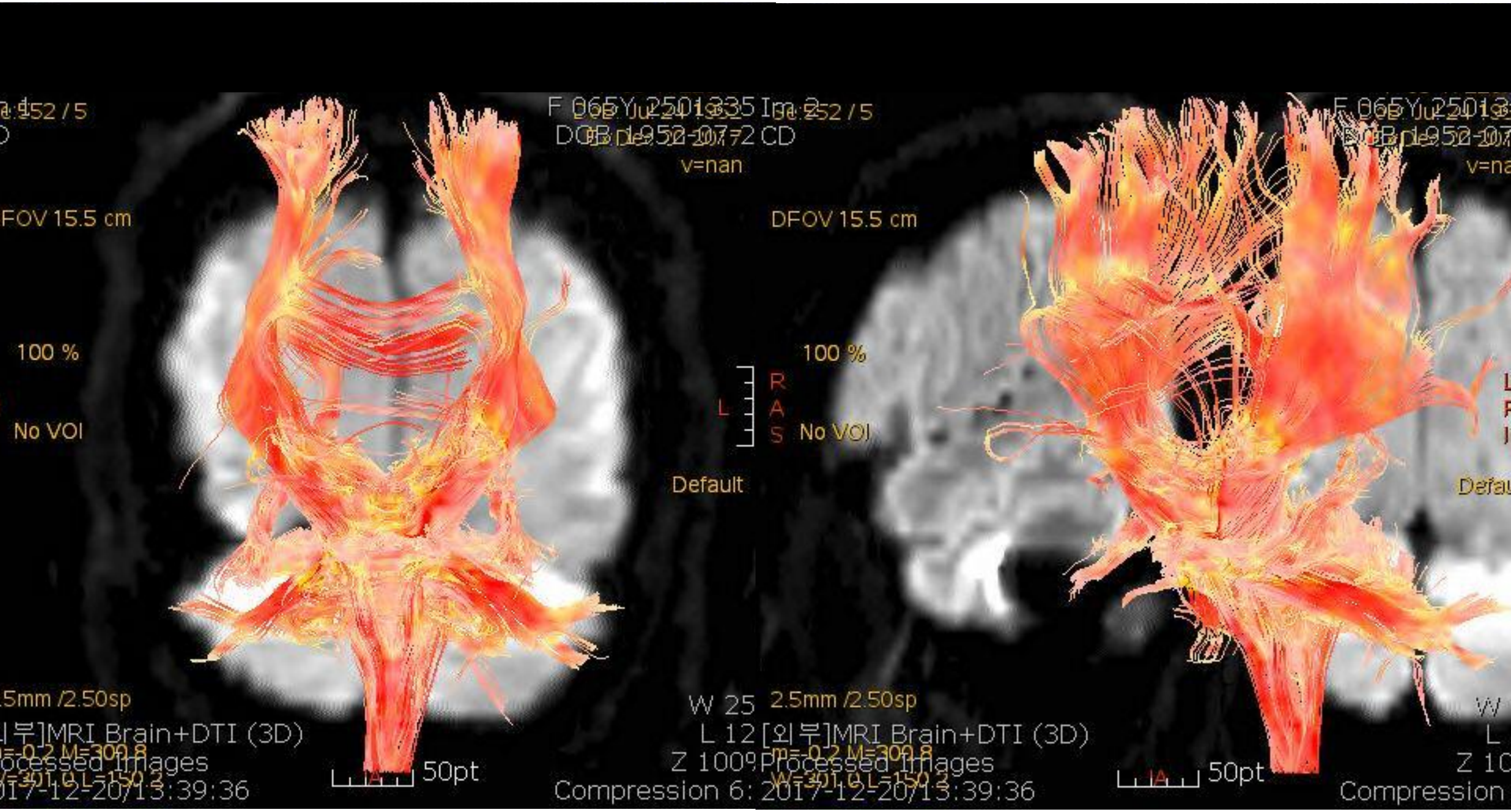
DTT로 reliable하게 분석할 수 있는 Neural tracts

- Motor: Corticospinal tract, Corticoreticulospinal tract, Corticofugal tract from secondary motor area, Corticobulbar tract
- Somatosensory: Medial lemniscus, Spinothalamic tract
- Movement: Dentatorubrothalmic tract, Corticopontocerebellar tract
- Consciousness: Ascending reticular activating system
- Cognition: Papez circuit, Fornix, Cingulum, Prefronto-thalamic tract, Prefronto-caudate tract
- Vestibular: Cortico-thalamo-vestibular tract, Vestibulo-cerebellar tract, Vestibulospinal tract
- Visual: Optic radiation
- Auditory: Auditory radiation, Auditory tract
- Language: Arcuate fasciculus
- Cranial nerves: CN 3, 5, 9, 10
- Others: Superior longitudinal tract, Inferior longitudinal tract, IFOF, Uncinate fasciculus, SCP, MCP, ICP, Corpus callosum



Analysis conditions: 1) Fractional anisotropy, 2) Angle

Repeatability & Reproducibility: 0.9~1.0



DFOV 15.5 cm
100 %
No VOI
v=nan
L
R
A
S
Default
2.5mm /2.50sp
[외부]MRI Brain+DTI (3D)
50pt
2017-12-20/13:39:36
DFOV 15.5 cm
100 %
No VOI
2.5mm /2.50sp
[외부]MRI Brain+DTI (3D)
Processed Images
50pt
2017-12-20/13:39:36

Neural analysis for successful neuro-rehabilitation

- **Diffusion tensor tractography**