

# TREATMENT OF MULTIPLE SCLEROSIS: A MODEL OF GLOBAL CARE

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# MULTIPLE SCLEROSIS

Chronic CNS disease characterized by dissemination in space and time

Frequent cause of neurological disability in young adults (about 110.000 cases in Italy with 3400 new cases per year)

High variability of signs and symptoms, within and between patients

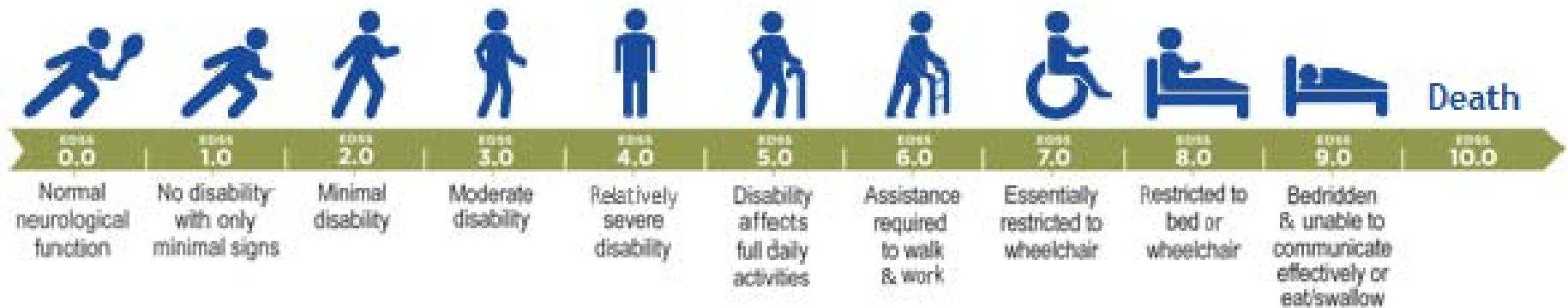
Multifactorial disease (immunity, genes, environment)

# MULTIPLE SCLEROSIS

← Disease stages →



## The Expanded Disability Status Scale (EDSS)



Time

- Disability
- MRI lesion load
- MRI activity

- Cognitive dysfunction
- Brain volume
- Relapses

# MULTIPLE SCLEROSIS



# MULTIPLE SCLEROSIS

## Evidence-based MDR



Archives of Physical Medicine and Rehabilitation

journal homepage: [www.archives-pmr.org](http://www.archives-pmr.org)

Archives of Physical Medicine and Rehabilitation 2016; ■: ■ ■ ■ - ■ ■ ■



REVIEW

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From the 'Health Sci  
Melbourne

Intervention	No studies, participants	Inpatient	Community	Long-term survivorship	GRADE*
Multidisciplinary rehabilitation	9 RCTs, 1 CCT, 954				Moderate
Physical therapy	76 trials (45 RCTs)				High
Progressive resistance training	6 RCTs, 6 non-RCTs, 289				Low
Strength training	5 RCTs, 2 CCTs 249				Moderate
Exercise therapy (walking)	35 RCTs, 1255				High
Exercise therapy (fatigue)	60 RCTs, 2952				High
Physical therapy (balance)	11 RCTs, 340				Low
Exercise therapy (depression)	15 RCTs, 591				Low
Exercise therapy (cognition)	8 RCTs, 644				Low

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# MULTIPLE SCLEROSIS

## What is done in FDG

Disease diagnosis and monitoring (outpatient and Day Hospital setting):

- Dedicated neurological clinic

- MRI

- Neurophysiology /lab tests

- Multidisciplinary consultancies (psychologist, ophtalmologist, urologist, etc.)

Prescription and administration of DMD and symptomatic treatments (THC/CBD)

- Approved therapies

- Clinical trials

Out- and in-patient rehab interventions (including home care):

- Exercise/physical/strength (including robot therapy and exergaming)

- Speech and swallowing therapy

- Occupational therapy

- Cognitive rehabilitation

- Pneumologic rehabilitation

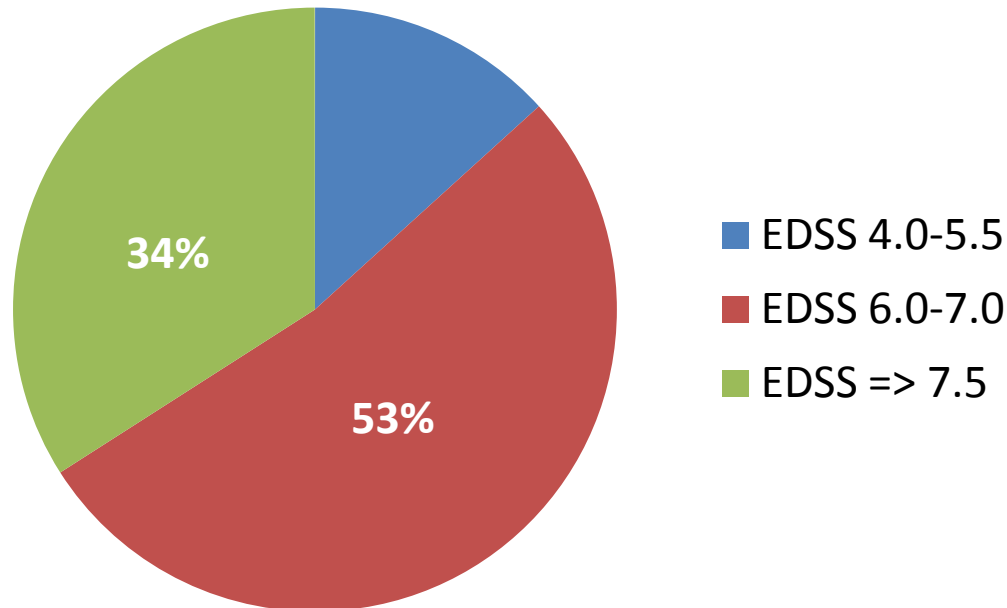
# MULTIPLE SCLEROSIS

## Inpatient MDR in FDG (year 2015)

Admissions: 294 patients (35% from other regions)

Mean admission duration: 37 days

### Disability at entry (n=226)



At discharge: Modified Barthel Index increase  $\geq 5/100$  in 135 patients (60%)

# MOTOR REHABILITATION

## Neural plasticity

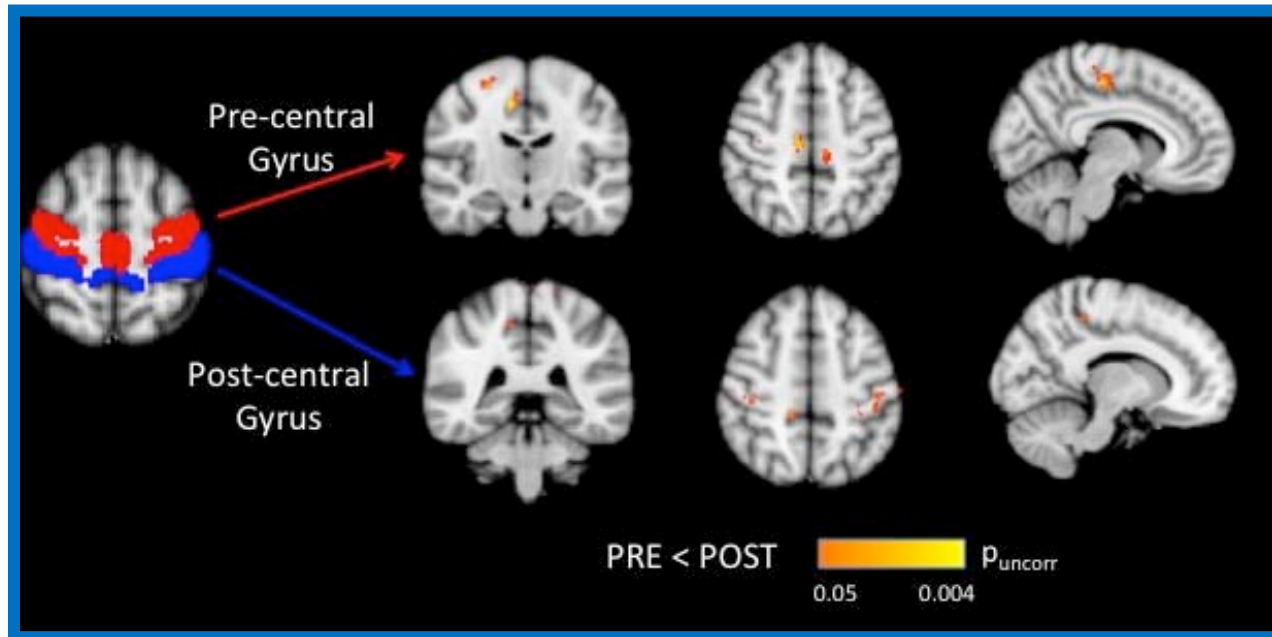
	T0 (Baseline)	T1 (1 month)	T2 (4 months)
Neurological examination (EDSS)	X	X	X
2 Minute Walking Test	X	X	X
Timed 25 Foot Walk	X	X	X
Dynamic Gait Index	X	X	X
Berg Balance scale	X	X	X
MS Walking Scale -12 item	X	X	X
Modified Fatigue Impact Scale	X	X	X
Brain MRI	X	X	X
Spinal cord MRI	X		

# MOTOR REHABILITATION

## Neural plasticity

	T0 mean (SD)	T1 mean (SD)	<i>p</i>
2 Minute Walking Test (meters)	75.6 (37.3)	91.5 (48.0)	<b>0.015</b>
Timed 25 Foot Walk(seconds)	13.9 (7.6)	13.3 (10)	0.665
Berg Balance scale	38.5 (12.1)	42.6 (10.9)	<b>0.001</b>
Dynamic gait index	14.6 (4.5)	16.7 (4.1)	<b>0.015</b>
Modified Fatigue Impact Scale	42.1 (18.3)	36.6 (21.7)	0.265
MS Walking Scale -12 item	31.7 (8.5)	27.5 (9.0)	0.095

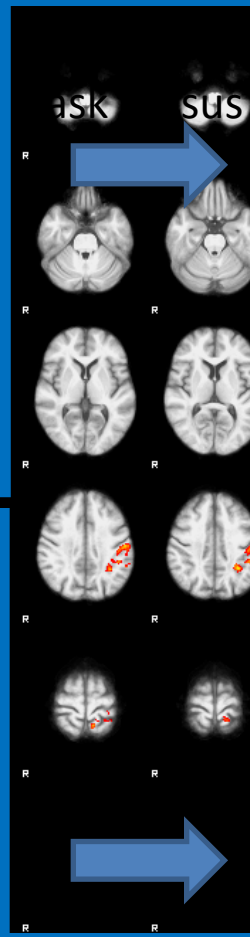
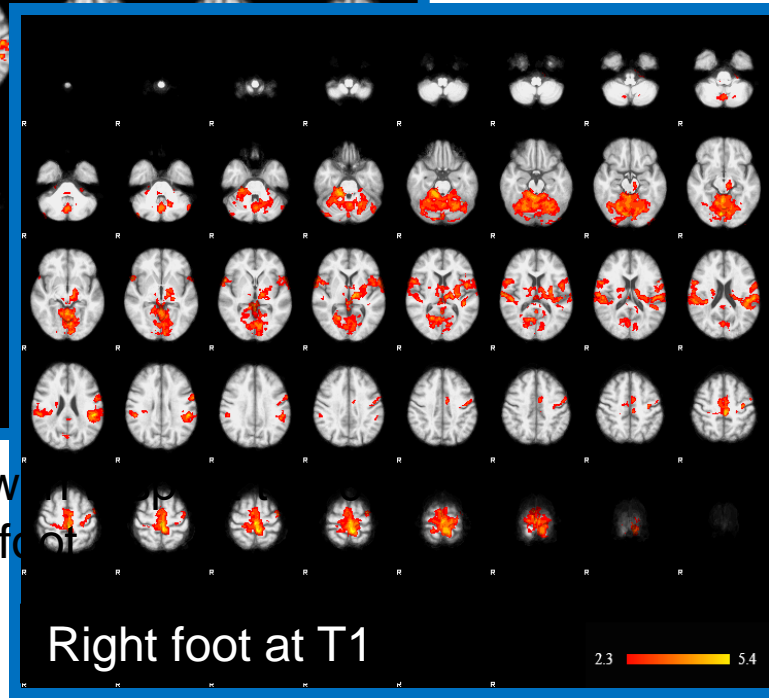
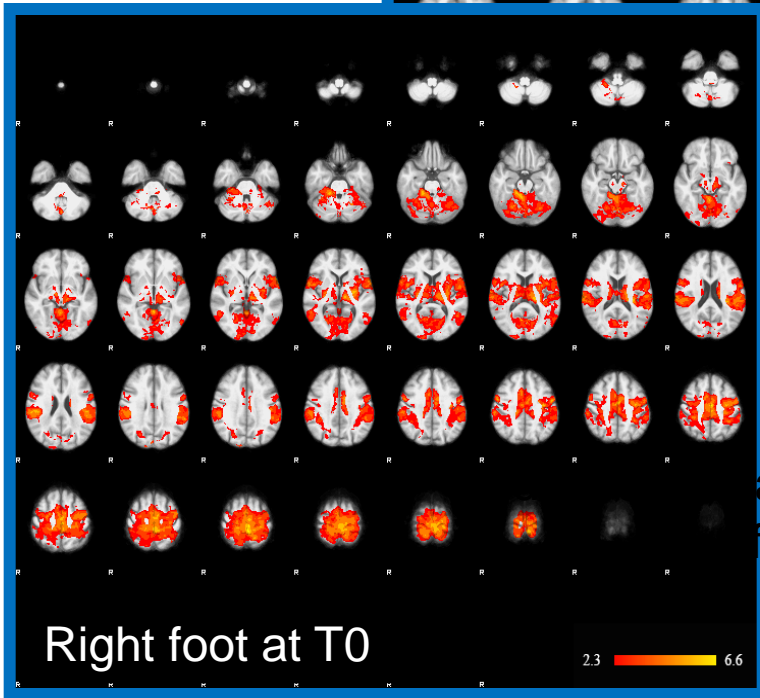
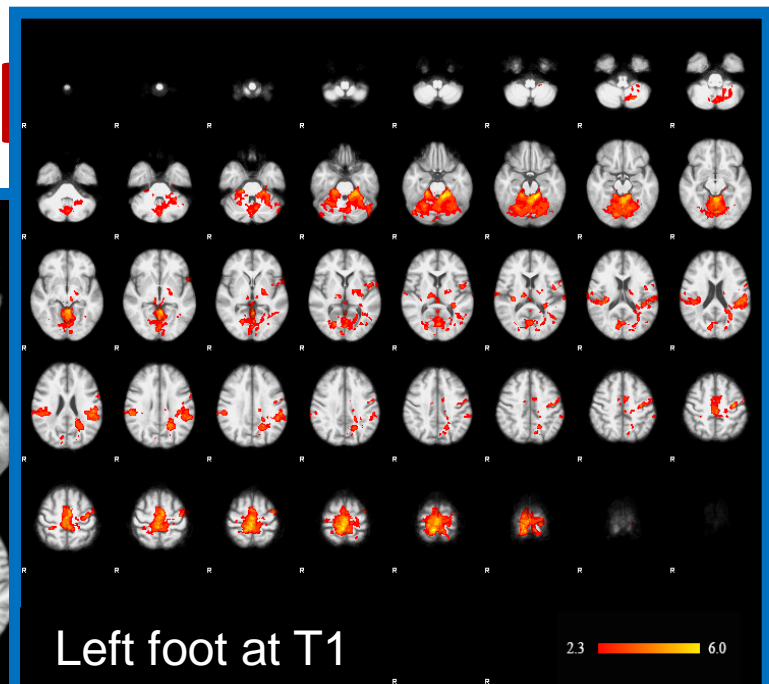
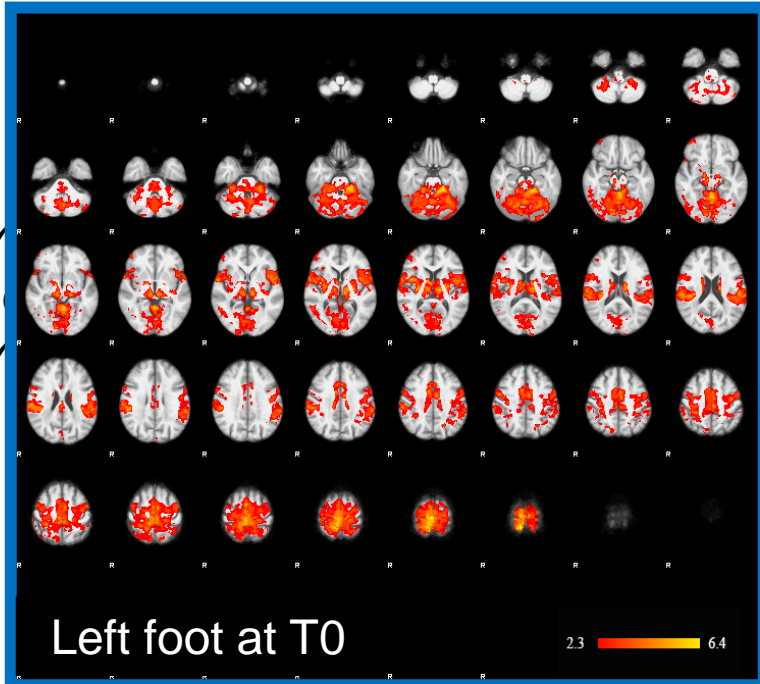
# Resting state fMRI



Areas in which the functional connectivity significantly increases ( $p_{\text{uncorr}} < 0.01$ ) after the 4-week rehabilitation period. Changes were not maintained at 3 month follow-up.

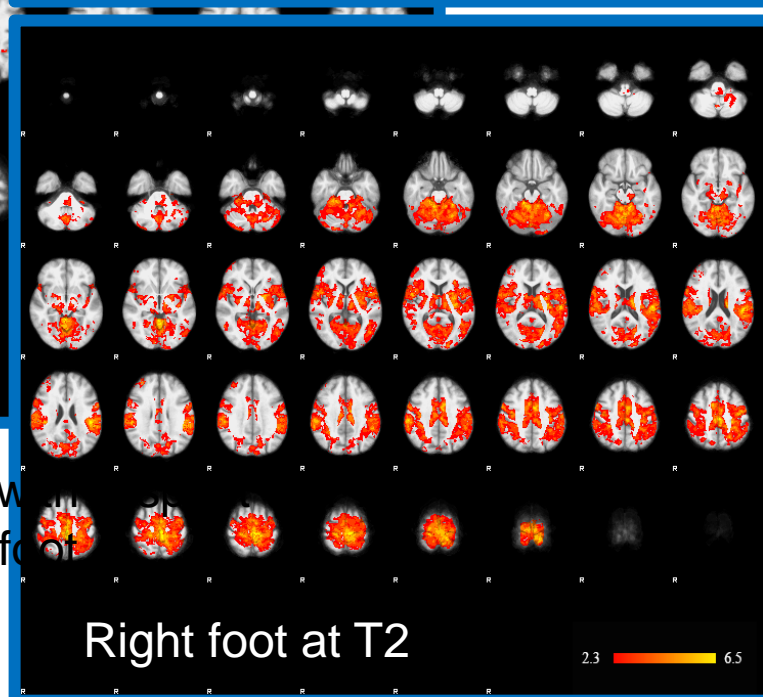
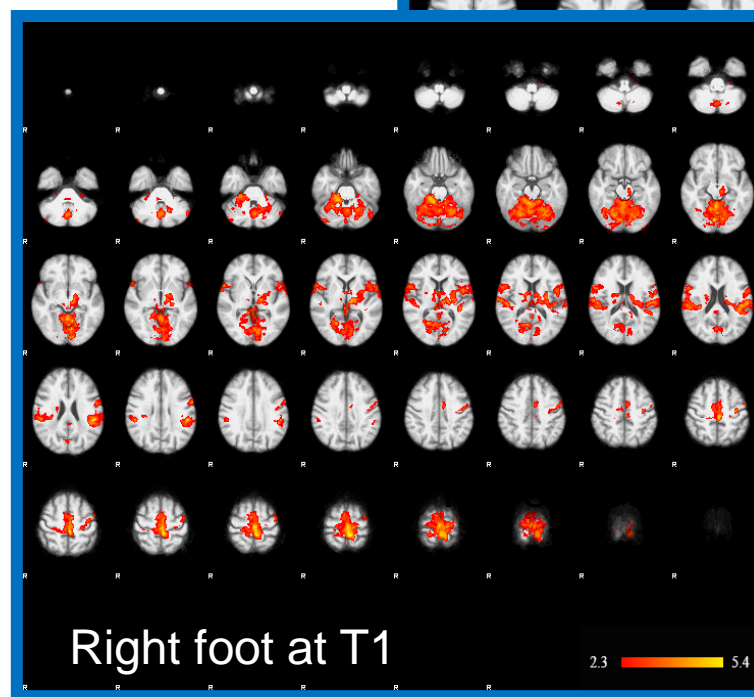
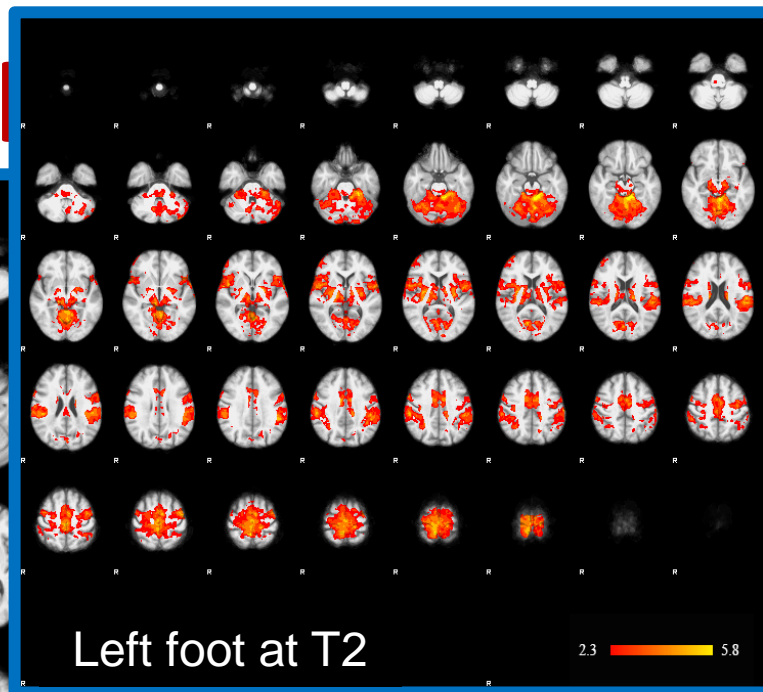
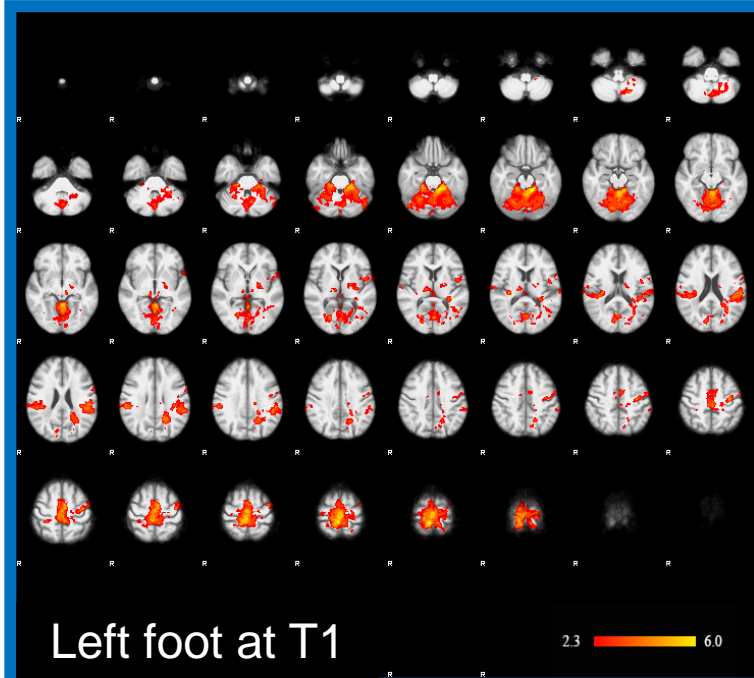
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for the right foot

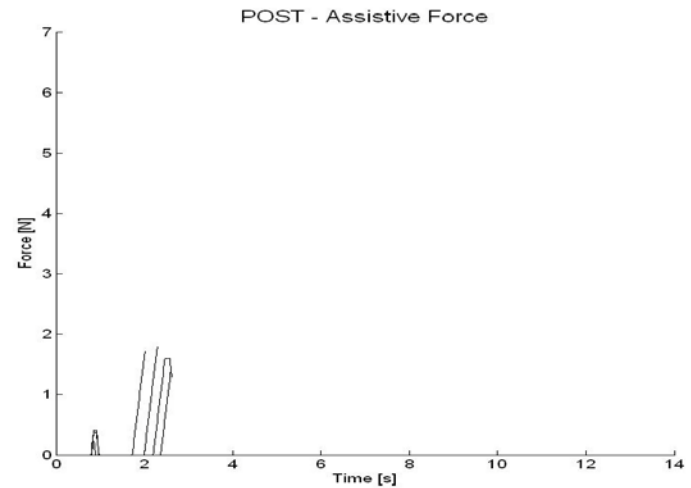
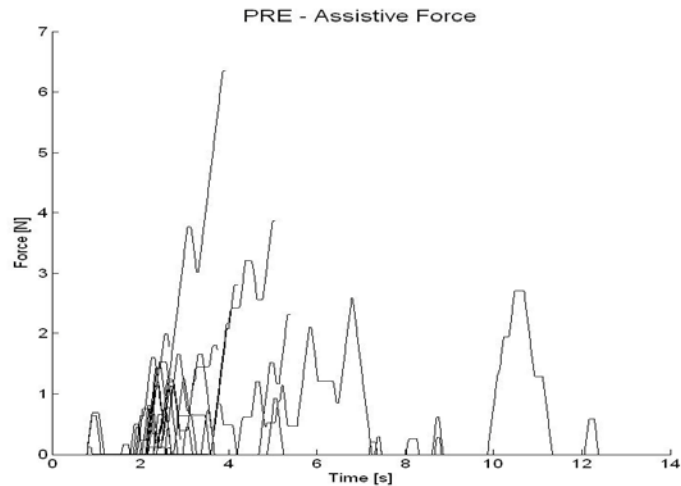
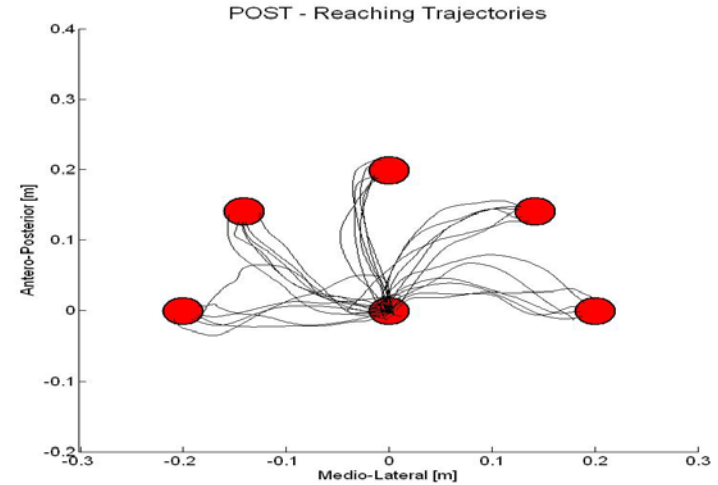
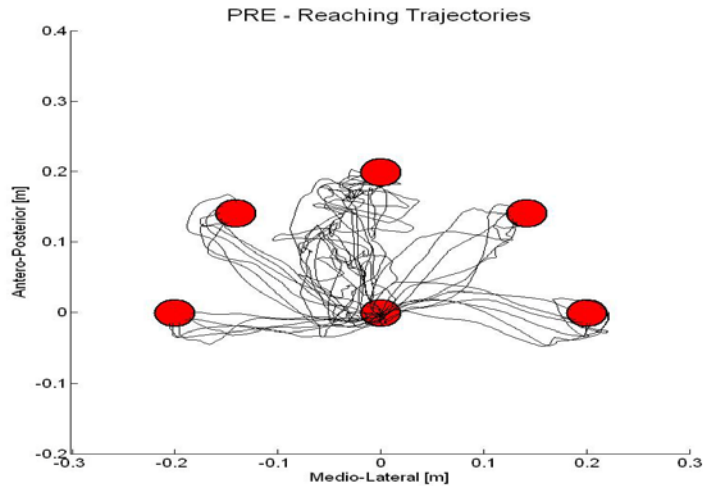
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ation at T2 w  
or the right foot

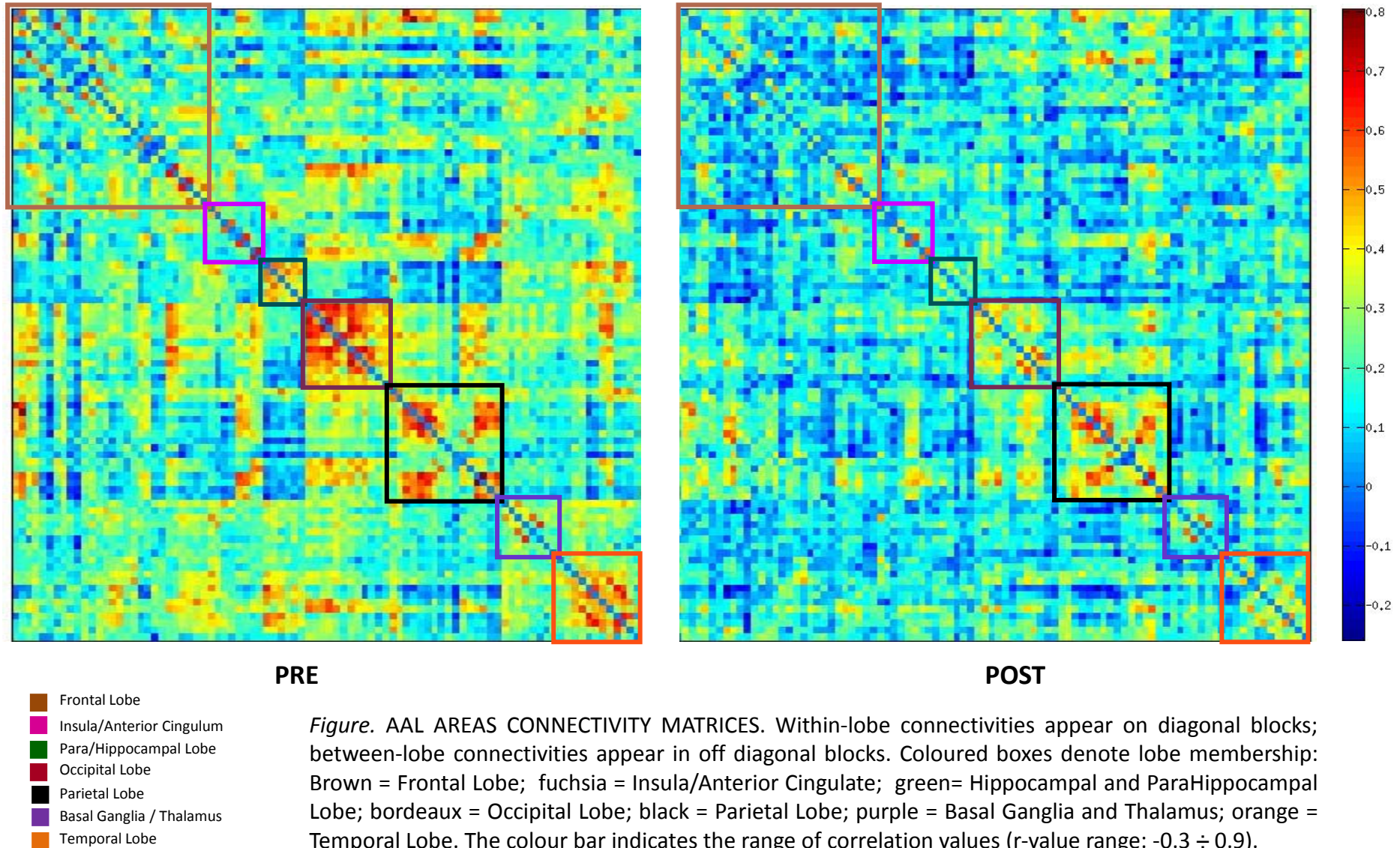
# MOTOR REHABILITATION

## Neural plasticity – Clinical case report



# MOTOR REHABILITATION

## Neural plasticity – Clinical case report



# CONCLUSIONS

Coupling MS neurological work-up and rehab is challenging, but rewarding

FDG is a unique environment where “old” and “new” approaches can be proposed and compared

Difficulties in everyday clinical practice remain and must not be forgotten

MS rehabilitation can be a model for personalised care and the answer to unmet needs