

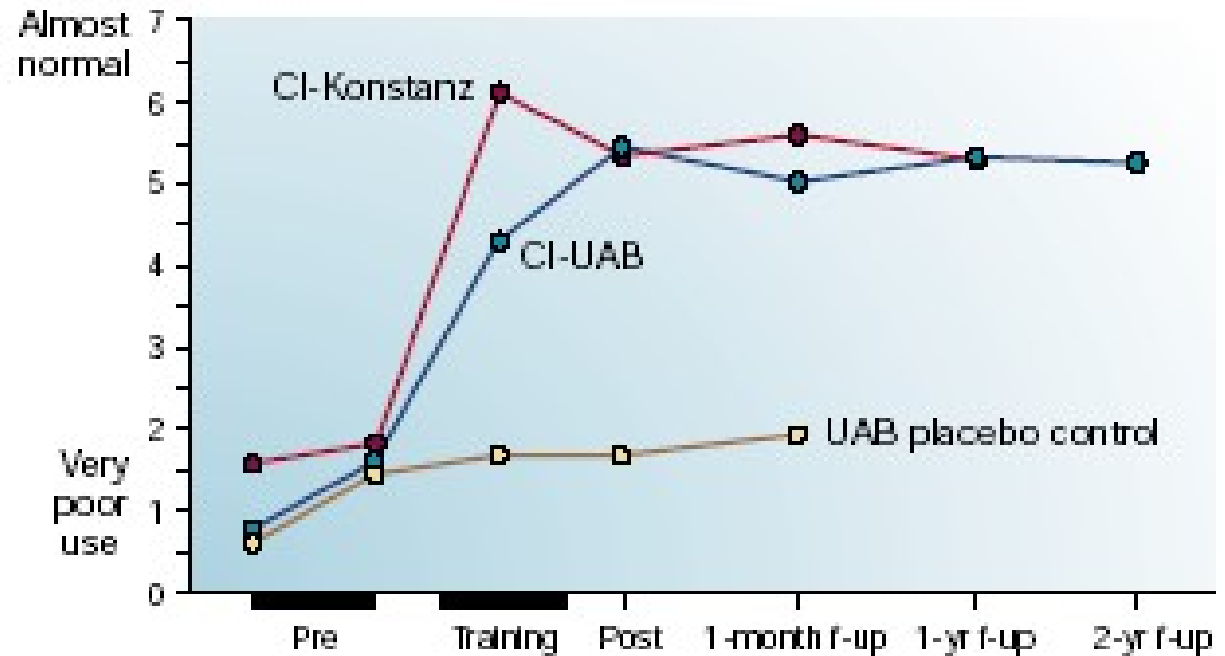
**Music-supported therapy induces
plasticity in the sensorimotor cortex
after chronic stroke**

Brain Stroke

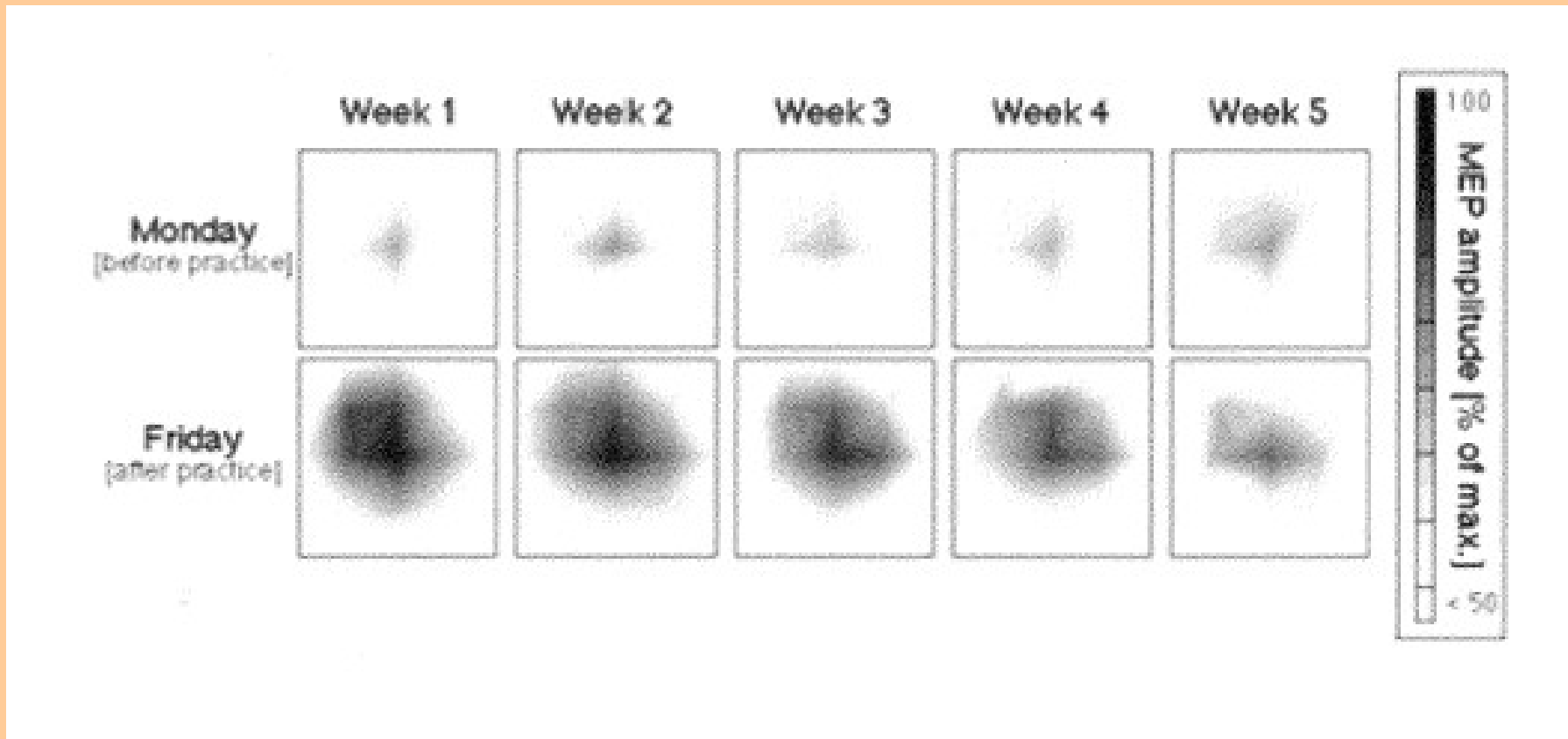
- It is ranked as the fourth common cause of death and first common cause of long term disability.
- There are 1410 cases of brain stroke in every million of Spanish population
- 50% of patients suffer from residual motor deficit (Vega et al., 2009)
- Social and economical costs and very low-quality of life for the patients.

Cortical Plasticity

Constraint-Induced Movement Therapy.



Transcranial Magnetic Stimulation & Music



- Auditory-Motor Coupling (Bangert et al., 2001)



NON-MUSICIANS

MUSICIANS

M vs N-M

Objectives

- Need of efficient techniques of motor rehabilitation
- To realize changes in sensorimotor reorganization through neuroimaging techniques

Main Hypothesis

Musical therapy induces plasticity in sensorimotor cortex in chronic patients after stroke

Material and Methods

15 chronic stroke patients (>6 months post-stroke)

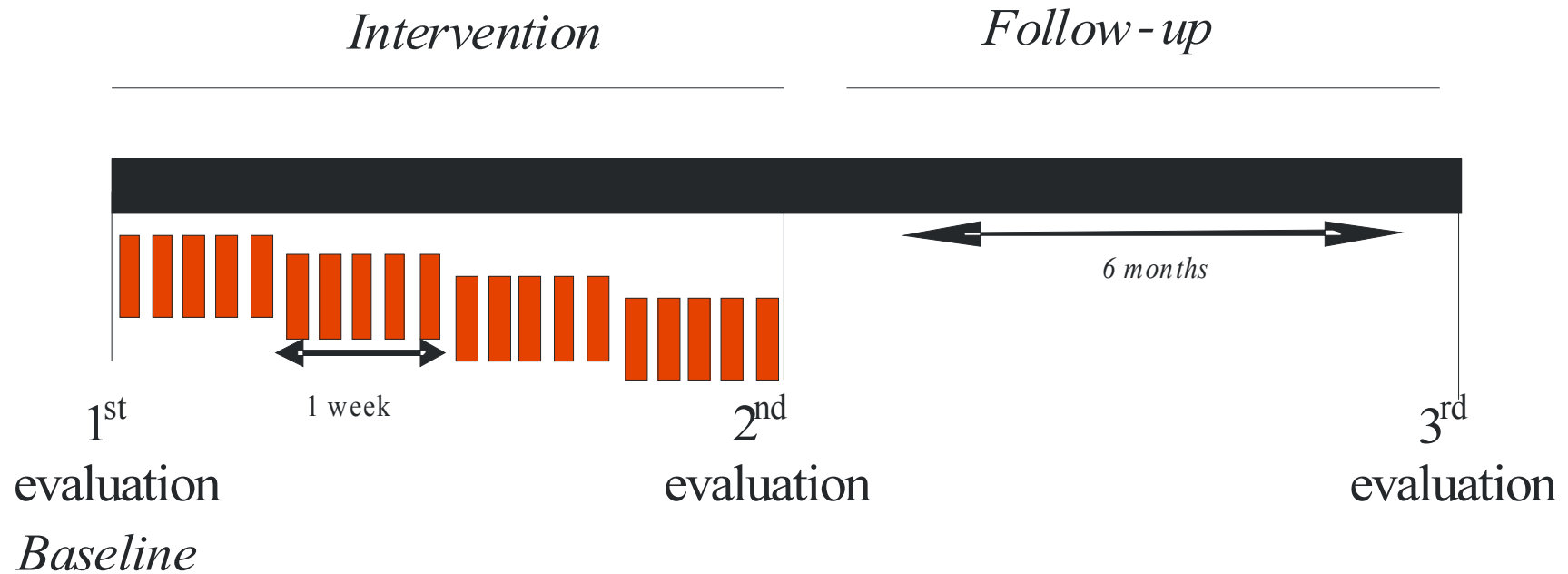
INCLUSION CRITERIA

- Hemiparesis
- Non previous stroke
- Age range 30-75 years old
- Finger and arm able
- Barthel index > 50
- Right Handed
- Signed Consent


EXCLUSION CRITERIA

- Multiple brain lesions
- Severe Perceptives and Cognitive Deficit
- Occlusion or stenosis
- Epilepsy
- Previous musical knowledge

Experimental Design



**Musical-supported
therapy**

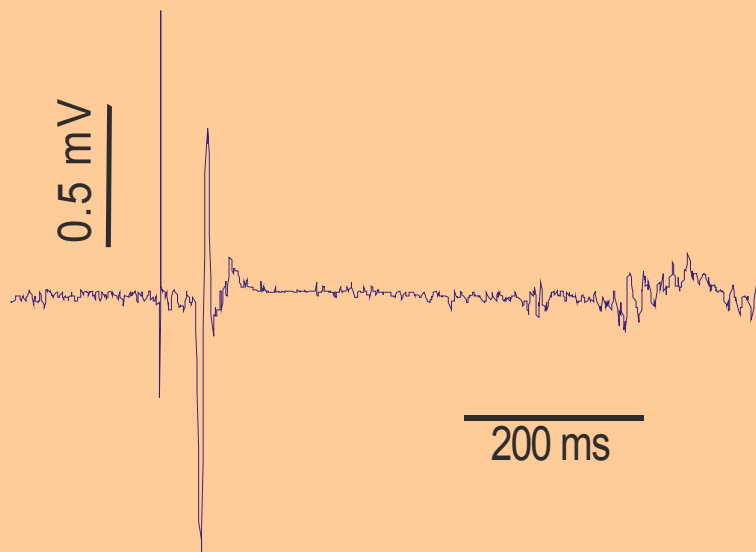
 = 30' session

Evaluation

- Motor function and abilities (Motor Test & Zebris 3D)
- Sensorimotor reorganization (fMRI & TMS)
- Motor and cognitive ERP's (EEG)
- Neuropsychological test
- Patient mood
- Quality of life
- General Inabilities (Attentional, Memory...)

Neuroimaging Techniques

- TMS:
 - Motor threshold (resting and active)
 - Recruitment Curve
 - Cortical Silent Period
 - Mapping of active location

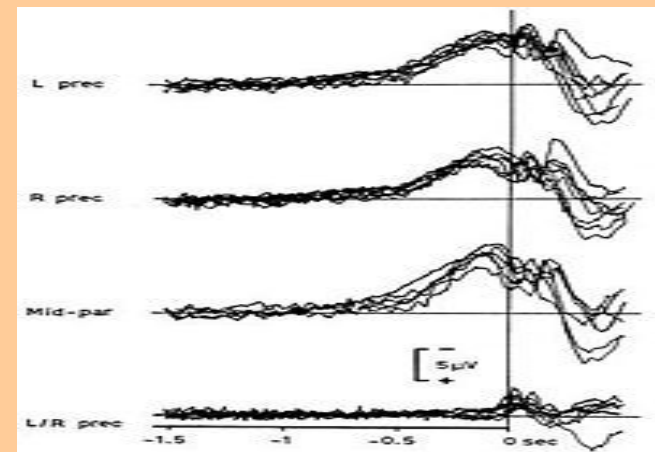
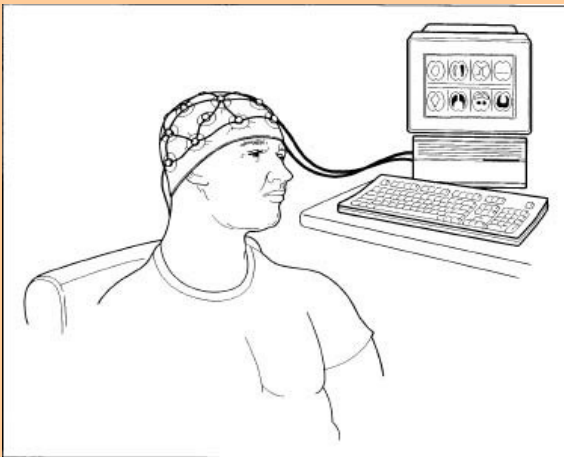


Neuroimaging Techniques

- FMRI & DTI
 - BOLD activation
 - Structural Changes
 - Path Changes
- Using fMRI we can check if the music learnt has some relation with the motor activation at the BOLD image.

Neuroimaging Techniques

- EEG
 - Motor ERP's
 - Bimanual Task
 - Reaction Time Task (CNV)
 - Readiness Potential
 - Time-Frequency changes



Problems and Difficulties

- They are PATIENTS
- Long therapy and evaluation process
- Family colaboration
- Low recover expectancy
- The patient motivation
- Difficult inclusion/exclusion criteria
- Problems with the data recording
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