# Effects of passive gait training on brain activity

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## Background

- Severe traumatic brain injury is a heavy problem worldwide
- Early mobilization is important in rehabilitation
- Passive gait training: proprioceptive stimulation as a result of upright body position and passive legs movements
- Electroencephalography (EEG) is a recording of a spontaneous electrical activity of nerve cells and the connections between them in the brain cortex
- The power spectral density (power spectrum) of the EEG reflects the "frequency content" of the signal or the distribution of signal power over frequency

## Aim

The aim was to determine changes in electrical brain activity as a result of passive gait training in patients with severe brain injury

## Results

Power spectrum analysis of baseline EEG:

- Higher power in the delta band
- Lower power in the alpha band in patients compared with controls

### After passive gait training:

- The decrease of the power was observed in both patients and healthy subjects
- Frequency ratios (alpha+beta/delta+theta) tends to increase in patients mostly because of the decrease in low-frequencies bands
- In healthy volunteers frequency ratios tends to decrease


Fig.1 Passive gait training of the patient in the tilt table with integrated stepping system.

## Methods

Three patients and three healthy volunteers.

Patients characteristics:

- Severe traumatic braininjury (Glasgow Coma Scale=3±0 on admission to the hospital)
- Ongoing impaired state of consciousness (Rancho Los Amigos Scale=2±0)
- Inclusion time 74±5 days after injury

## Set-up:

- Single training session (20 minutes) of passive gait training
- Sixteen channels EEG recording
- Power spectral density analysis of EEG
- Effect parameters: absolute and relative power in every frequency band; median power; frequency ratios

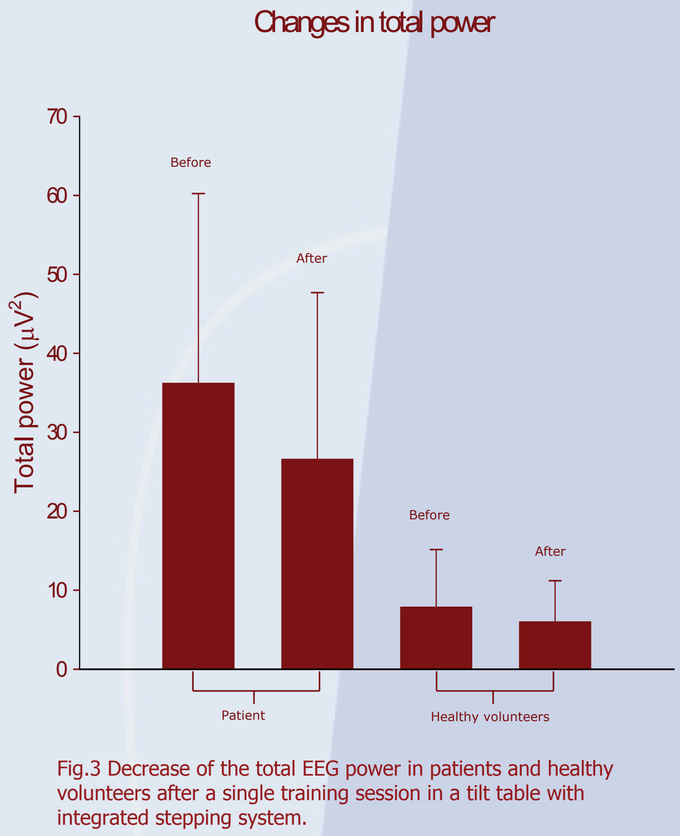


Fig.3 Decrease of the total EEG power in patients and healthy volunteers after a single training session in a tilt table with integrated stepping system.

## Conclusion

Our data indicate that power spectrum analysis of EEG appears to be a useful non-invasive method for measuring changes in electrical brain activity as a result of training. A prospective controlled study with larger sample size is ongoing to evaluate effects of training on tilt table with integrated stepping system in patients with severe brain injury.