



# Non-dominant hemisphere is more excitable compared to dominant hemisphere

Gautam Kamila<sup>1</sup>, Prashant Jauhari<sup>1</sup>, Suman Jain<sup>2</sup>, Biswaroop Chakrabarty<sup>1</sup>, R M Pandey<sup>3</sup>, Sheffali Gulati<sup>1</sup>

Centre Of Excellence and Advanced Research for Childhood Neurodevelopmental Disorders, Child Neurology Division, Departments of Pediatrics<sup>1</sup>, Physiology<sup>2</sup>, Biostatistics<sup>3</sup>, All India Institute of Medical Sciences, New Delhi, India

(Corresponding author: pjauhari0@gmail.com)



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## INTRODUCTION

- Human motor system is known to have clear hemispheric differences
- Neuroimaging studies (magnetic resonance morphometry) - representation of hand muscles is larger in the dominant hemisphere than the non-dominant hemisphere
- However, both in children and adults, limited evidence exists regarding the electrophysiological differences between the two hemispheres
- Real time cortical excitability can be assessed in a non-invasive and quick technique using Transcranial Magnetic Stimulation (TMS), which gives an estimate of the neurophysiological nature of the underlying neurons

## OBJECTIVE

- To compare the cortical excitability between the dominant and the non-dominant hemispheres, in typically developing children (TDC) and children with refractory epileptic encephalopathy like Electrical Status Epilepticus in Sleep (ESES), using TMS

## MATERIALS & METHODS

- Typically developing children aged between 5 - 12 years and similar age matched children diagnosed with ESES were enrolled in the study.
- TMS parameters: resting motor threshold (RMT) was measured over motor cortex of both the hemispheres, in the TDC group and ESES groups.
- Dominant hemisphere was determined by the Edinburgh Handedness Inventory-Laterality Quotient (EHI-LQ)

## RESULTS

- N = 20 (TDC); 20 (ESES)
- Mean age: TDC group (8.05 ± 1.76 years); ESES group (8.35 ± 2.41 years)

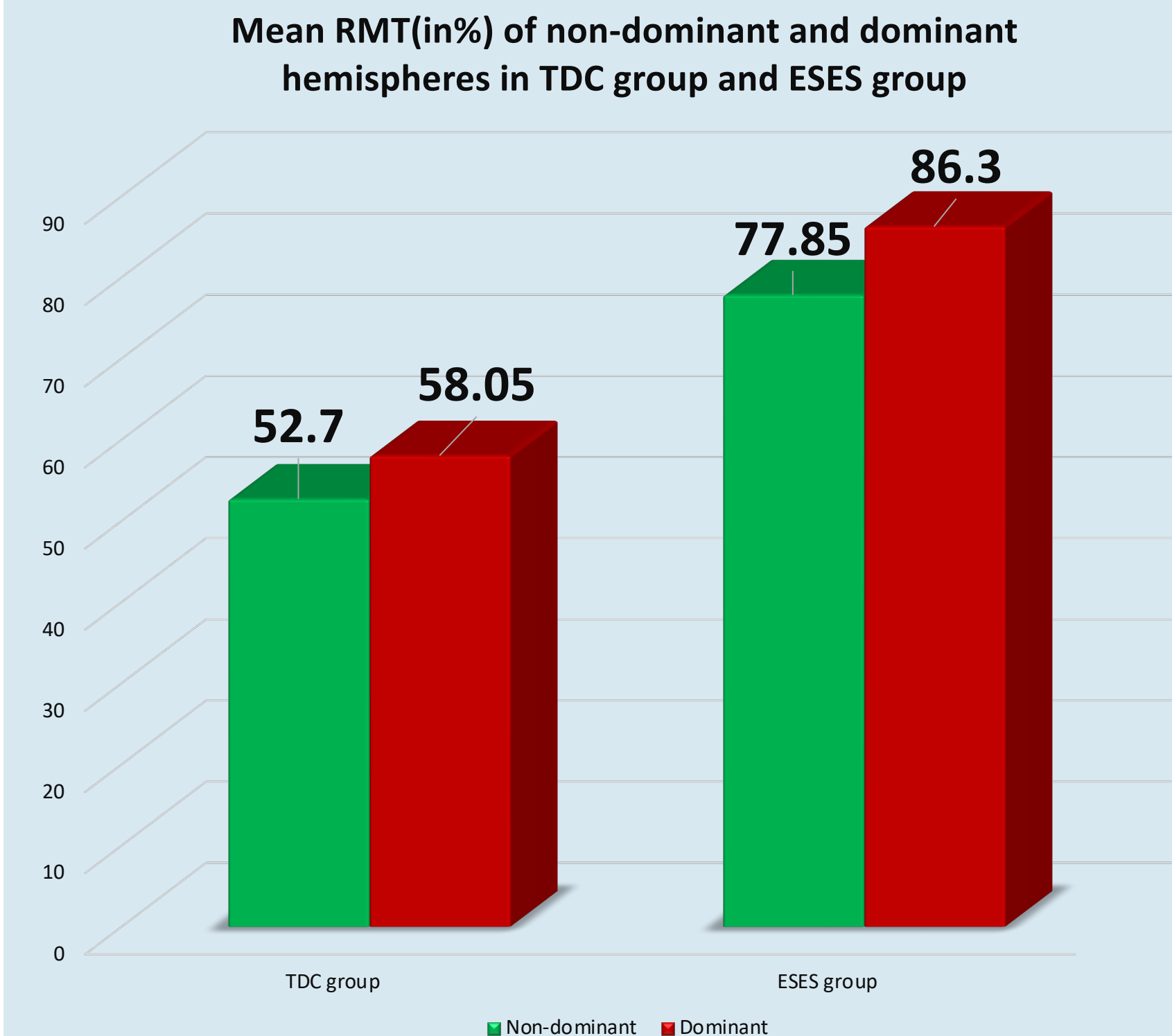


Figure 1: Difference in the mean RMT at the motor cortex of non-dominant vs dominant hemispheres in typically developing children group and ESES group, suggestive of a more excitable non-dominant hemisphere as compared to dominant hemisphere

## CONCLUSIONS

- Motor cortex of the non-dominant hemisphere is more excitable as compared to the dominant hemisphere, both in typically developing children as well as children with ESES
- The above findings might be indicative of different levels of cortical excitability between the two hemispheres in normal basal state of the brain which persists even in diseased state
- Further studies with larger sample size and correlation with functional studies of the brain are necessary to substantially prove this hypothesis

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