

Silent Period Transcallosal Inhibition

– Abstract –

Postexcitatory Silent Period and Transcallosal Inhibition by the Focal Magnetic Stimulation in Normal Children

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Objectives : Focal transcranial magnetic stimulation can suppress ongoing voluntary electromyographic activity in contralateral and ipsilateral hand muscles, these inhibitions are known as postexcitatory silent period (PSP) and transcallosal inhibition (TI). The purpose of this study was to determine the pattern of PSP, TI and cortically elicited muscle response in normal children below the age of 10 years (group A : n=5; mean age, 7.8 years) and above the age of 10 years (group B: n=5; mean age, 12.6 years)

Methods : We used focal transcranial magnetic stimulation for hand associated motor cortex, under the conditions of standard tonic voluntary contraction of small hand muscle

Results : PSP was detected in all subjects, mean duration was 130.3 msec in group A and 182.5 msec in group B. TI was totally absent in group A but detected in 4 subjects of group B and mean duration was 18.3 msec. The motor threshold for cortically elicited muscle response was 82% of maximal stimulus intensity in group A and 61% in group B. Onset latency of cortically elicited muscle response was not significantly different in two groups.

Conclusion : PSP duration was shorter and TI was totally absent in group A while PSP and TI in group B were nearly attained the adult value. We proposed that maturation of some direct corticospinal fiber occurred in early childhood but corticospinal and callosal mediated inhibitory function fully developed in late childhood, around the age of 10 years.

Key Words : Magnetic stimulation, Postexcitatory silent period, Transcallosal inhibition

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가 , 1.2
 , TI
 PSP
 가 ,
 , 2
 , 3
 , 4 100 μ V/div , TI
 , 6
 PSP 20% , 8
 Tanscallosal Inhibition(TI) ,
 , 7.8
 가 ,
 Postexcitatory Silent Period(PSP) , 10 10
 ,
 PSP , PSP , TI
 , 9-11 10 가 nonparametric
 , 12,13 Mann-Whitney U test , P 0.05
 ,
 SPSS(version 7.0) 가 .
 (excitatory response) , 14
 . 15
 , 16 가 21.5 \pm 2.8 msec,
 , 10
 22.4 \pm 3.6 msec 가 ,
 82 \pm 6.5%, 10 (A)
 (B) 61 \pm 4.8% B
 (p<0.05, Table 1). TI A
 , B 4
 36.4 \pm 2.4 msec , 18.3 \pm 3.4 msec
 . PSP , A
 130.3 \pm 5.6 msec , B 182.5 \pm 8.7
 msec (p< 0.05, Table 1, Fig. 1, 2).
 ,
 10 5 (A) 10
 5 (B) , 10
 , A 7.8 , B 12.6 .
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Table 1. The Values of Motor Threshold, Postexcitatory Silent Period and Transcallosal Inhibition in Two Groups.

Parameters	10	10
MT ¹	82±6.5%	61±4.8%*
PSP ² duration	130.3±5.6 msec	182.5 ± 8.7 msec*
TI ³ onset	–	36.4±2.4 msec
TI duration	–	18.3±3.4 msec

Values: mean±standard deviation

*p<0.05

1. MT : motor threshold

2. PSP : postexcitatory silent period

3. TI : transcallosal inhibition

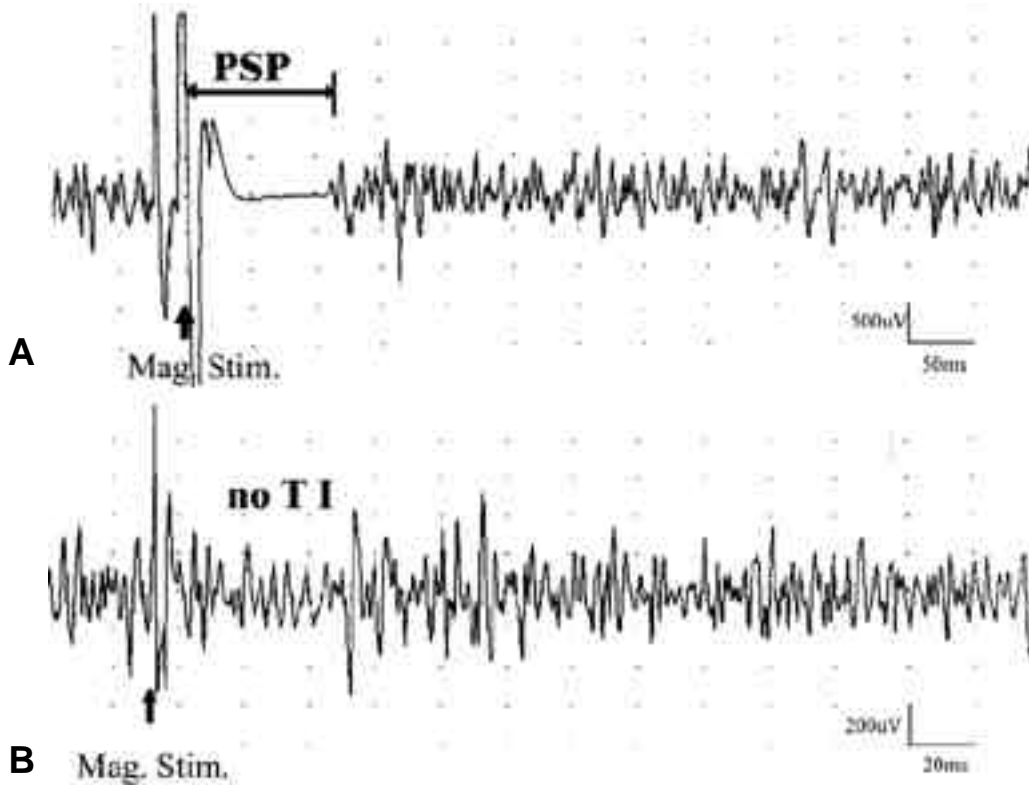


Fig. 1. Postexcitatory silent period and transcallosal inhibition in below the age of 10 years.

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