

Additional file 1

Multisensory BCI Promotes Motor Recovery via High-order Network-Mediated Interhemispheric Integration in Chronic Stroke

Short title: Multisensory Feedback promotes poststroke recovery

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Figure S1 | Demonstration of Multi-FDBK-BCI therapy

Picture of demonstration of Multi-FDBK-BCI therapy, through the real-time analysis of EEG signals during motor imagery, when the participants imagined intent was detected, visual feedback of the movement of a virtual hand on the screen, proprioceptive feedback from a robotic wrist joint, and tactile feedback from a brush were provided

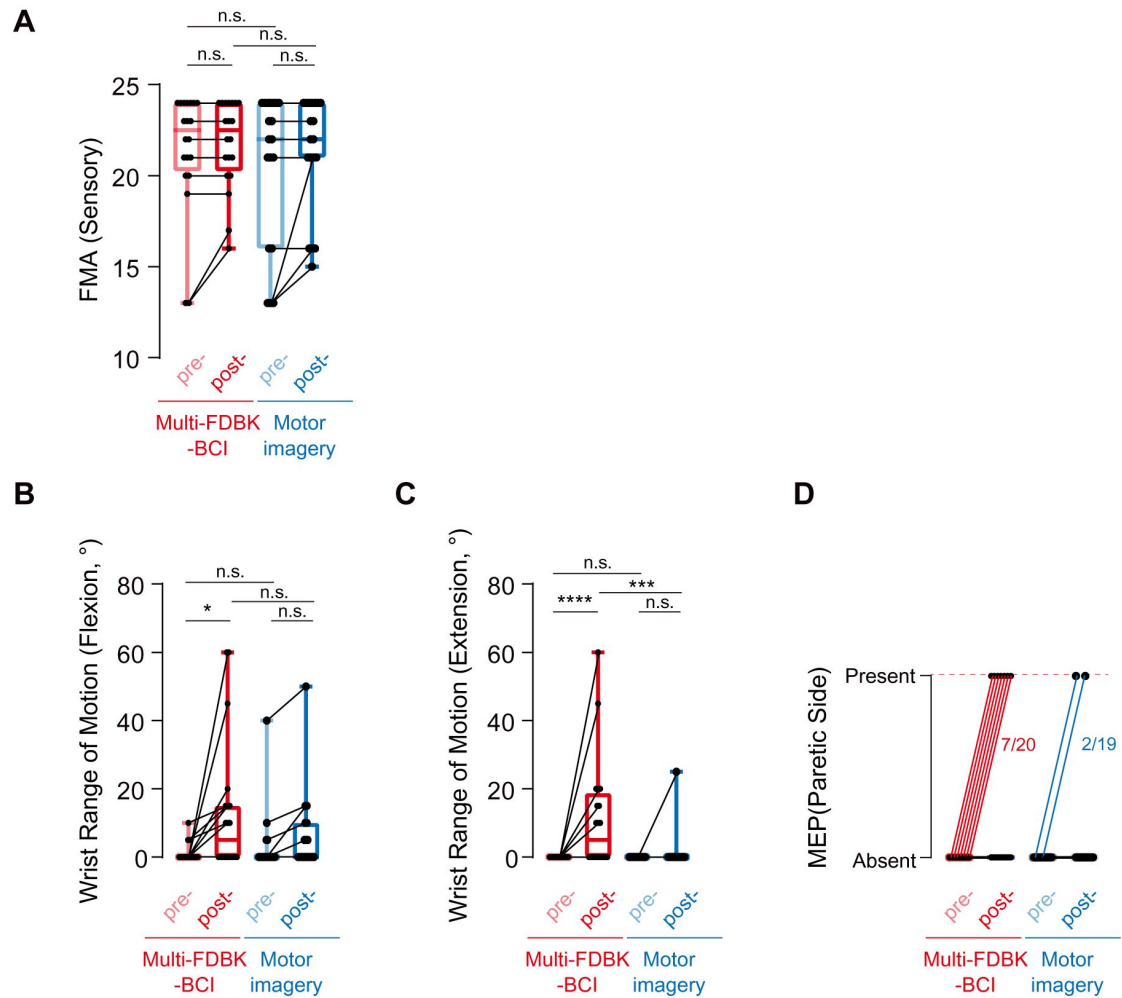


Figure S2 | Behavioral Assessment and MEP for chronic stroke patients with Multi-FDBK-BCI therapy and CMI therapy.

Box plot (A-C) and line plot (D) for behavior changes (post- v.s. pre- Multi-FDBK-BCI therapy and CMI therapy), including (A) Fugl-Meyer Sensory assessment, (B-C) paretic wrist range of motion and (D) Motor Evoked Potential. Each dot indicated an individual chronic stroke patient (20 in Multi-FDBK-BCI therapy and 19 in CMI therapy). Statistical significance was determined using the non-parameter Dunn test. *, $p < 0.05$; ***, $p < 0.005$; ****, $p < 0.001$; n.s., no significance.

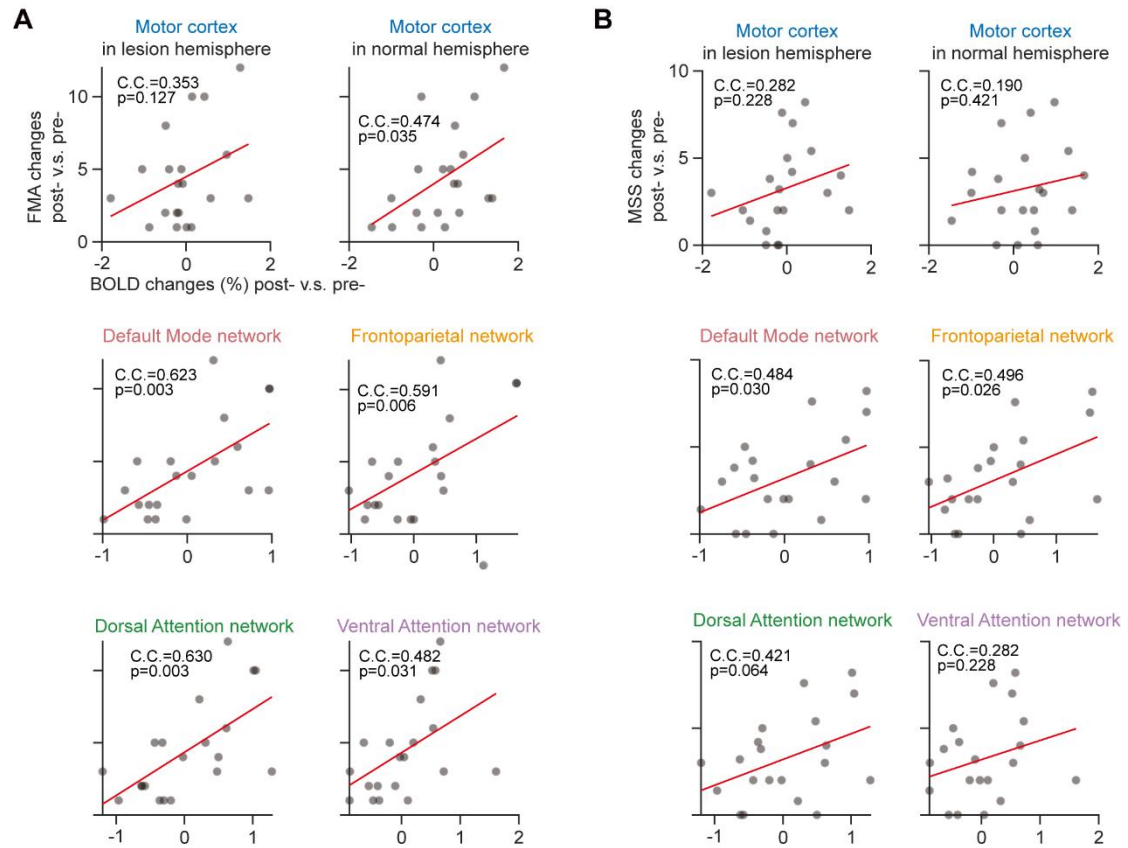


Figure S3 | Correlations between BOLD signal changes and FMA (A) or MSS (B) changes for chronic stroke patients.

Scatter plot for BOLD signal and behavioral changes (post- v.s. pre- Multi-FDBK-BCI therapy). Each dot indicated an individual chronic stroke patient (N = 20). The red lines represented the best linear fit. FMA, Fugl-Meyer assessment; MSS, motor status scale.

Table S1 Patients' characteristics, including lesion etiology

Patient	Gender	Age(years)	Diagnosis	Lesion site	Lesion side	Time since stroke (month)	Time for rehabilitation(month)
Multi-FDBK-BCI Training							
01	Male	43	Hemorrhagic	Subcortical	Right	8	8
02	Male	68	Ischemic	Subcortical	Right	16	16
03	Female	31	Ischemic	Cortical&Subcortical	Left	22	22
04	Male	42	Hemorrhagic	Subcortical	Right	20	20
05	Female	55	Hemorrhagic	Subcortical	Right	8	8
06	Male	65	Hemorrhagic	Subcortical	Right	11	11
07	Male	75	Ischemic	Subcortical	Right	8	8
08	Male	32	Hemorrhagic	Cortical&Subcortical	Right	7	7
09	Female	58	Hemorrhagic	Subcortical	Left	7	7
10	Male	56	Ischemic	Cortical	Left	6	6
11	Male	56	Ischemic	Cortical	Left	11	11
12	Male	48	Ischemic	Subcortical	Right	6	6
13	Male	61	Ischemic	Subcortical	Right	13	13
14	Male	66	Ischemic	Cortical	Right	7	7
15	Male	72	Ischemic	Subcortical	Right	6	6
16	Male	41	Hemorrhagic	Subcortical	Right	20	20
17	Male	32	Hemorrhagic	Subcortical	Right	6	6
18	Male	37	Hemorrhagic	Subcortical	Left	10	10
19	Male	42	Hemorrhagic	Subcortical	Right	31	31
20	Male	72	Ischemic	Subcortical	Right	17	17
Classic Motor Imagery Training							
CMI-01	Male	68	Ischemic	Subcortical	Right	13	13
CMI-02	Male	65	Hemorrhagic	Subcortical	Right	7	7
CMI-03	Male	75	Ischemic	Subcortical	Right	6	6
CMI-04	Male	32	Hemorrhagic	Cortical&Subcortical	Right	6	6
CMI-05	Male	61	Ischemic	Subcortical	Right	7	7
CMI-06	Female	50	Hemorrhagic	Subcortical	Right	18	18
CMI-07	Male	39	Hemorrhagic	Cortical&Subcortical	Left	6	6
CMI-08	Male	68	Ischemic	Subcortical	Left	6	6
CMI-09	Male	63	Hemorrhagic	Subcortical	Left	6	6
CMI-10	Male	45	Hemorrhagic	Cortical&Subcortical	Left	7	7
CMI-11	Male	33	Hemorrhagic	Subcortical	Right	7	7
CMI-12	Male	27	Hemorrhagic	Subcortical	Right	6	6
CMI-13	Male	46	Ischemic	Cortical&Subcortical	Right	10	10
CMI-14	Male	53	Ischemic	Subcortical	Right	6	6
CMI-15	Male	55	Ischemic	Subcortical	Right	6	6
CMI-16	Male	41	Ischemic	Subcortical	Left	6	6
CMI-17	Female	39	Ischemic	Subcortical	Left	10	10
CMI-18	Male	47	Ischemic	Subcortical	Left	6	6
CMI-19	Female	51	Ischemic	Subcortical	Right	36	36