

Appendix 1 Results

Rich club organization

Rich-club organization in the all groups at connection density for 0.10

The increasing rich club coefficient (Φ_{norm}) >1 reflects the existence of the rich-club organization in the brain network over a certain range of degrees (k). Consistent with our main finding, for the FC networks, the group-average functional network during acute mTBI patients and HC groups revealed the rich-club organization with the normalized rich club coefficient (Φ_{norm}) increasing as a function of node degree (k) higher than 1. In the whole-brain network, the normalized rich-club coefficient (Φ_{norm}) was found to be significantly higher in mTBI group relative to HC, at the range of $k=20$ to $k=28$ ($P<0.05$) (Figure S2).

Rich-club organization in the all groups at connection density for 0.20

Again, consistent with our main finding, the result showed that the group-average functional network during acute mTBI patients and HC groups revealed the rich-club organization. In the whole-brain network, the normalized rich-club coefficient (Φ_{norm}) was found to be significantly higher in mTBI group relative to HC, at the range of $k=20$ to $k=58$ ($P<0.01$) (Figure S3).

Rich-club organization in the all groups at connection density for 0.25

Consistent with our main finding, rich club organization was evident in all groups with the Φ_{norm} increasing as a function of node degree (k) higher than 1 for the FC networks. In the whole-brain network, Φ_{norm} was found to be significantly higher in mTBI group relative to HC, at the range of $k=35$ to $k=72$ ($P<0.001$) (Figure S4).

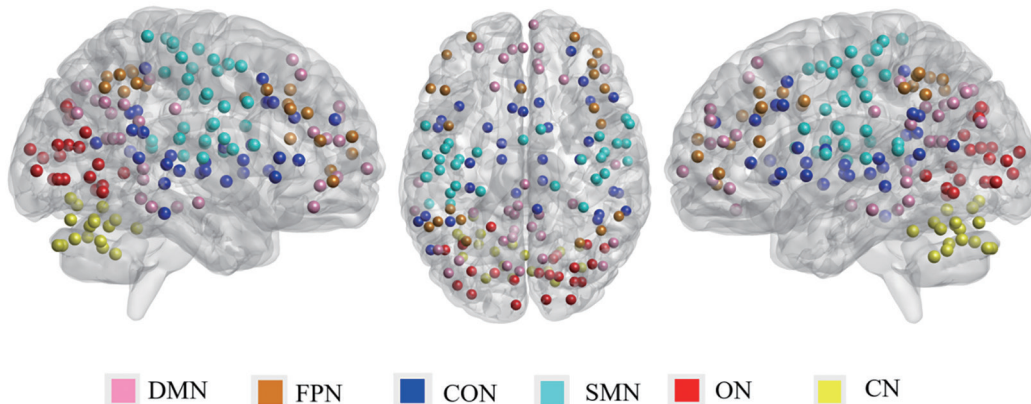


Figure S1 The regions of interest (ROIs) in the Dos-160 template. The different colors represented different brain functional networks. DMN: the default mode network, FPN: the fronto-parietal network, CON: the cingulo-opercular network, SMN: the sensorimotor network, ON: the occipital network, CN: the cerebellum network.

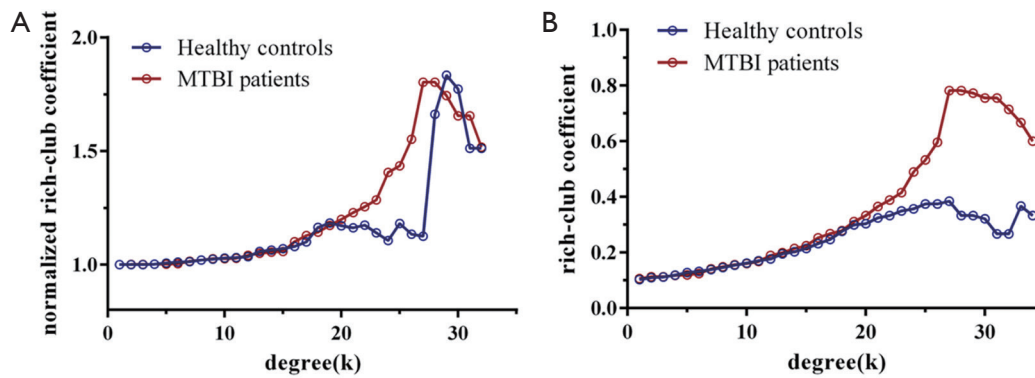


Figure S2 The rich-club organization in the all groups at connection density for 0.10. The group-averaged rich club coefficient and normalized rich club coefficient curves for mTBI patients (red) and healthy controls (blue).

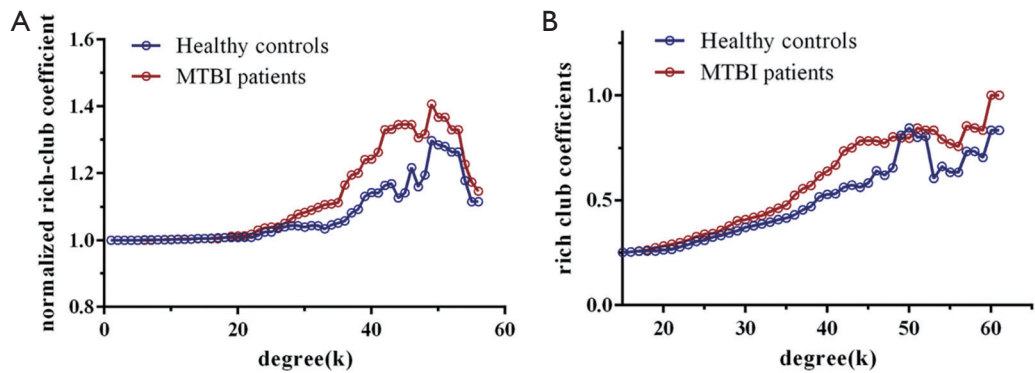


Figure S3 The rich-club organization in the all groups at connection density for 0.20 respectively. The group-averaged rich club coefficient and normalized rich club coefficient curves for mTBI patients (red) and healthy controls (blue).

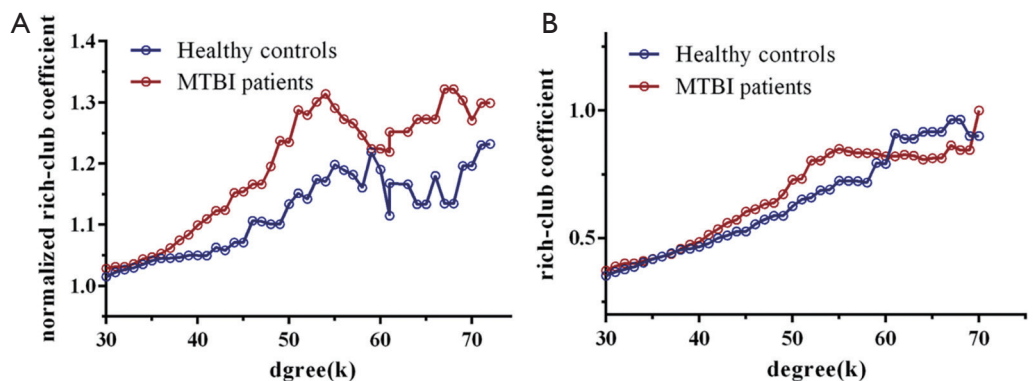


Figure S4 The rich-club organization in the all groups at connection density for 0.25 respectively. The group-averaged rich club coefficient and normalized rich club coefficient curves for mTBI patients (red) and healthy controls (blue).