

Figure S1. WM areas with significantly pre- to post-season reduction in (A): MD; (B): AD; (C): RD reduction in the HS group (n=19, all $p < 0.05$, corrected). The two athletes who experienced concussion during the season were excluded from the analysis.

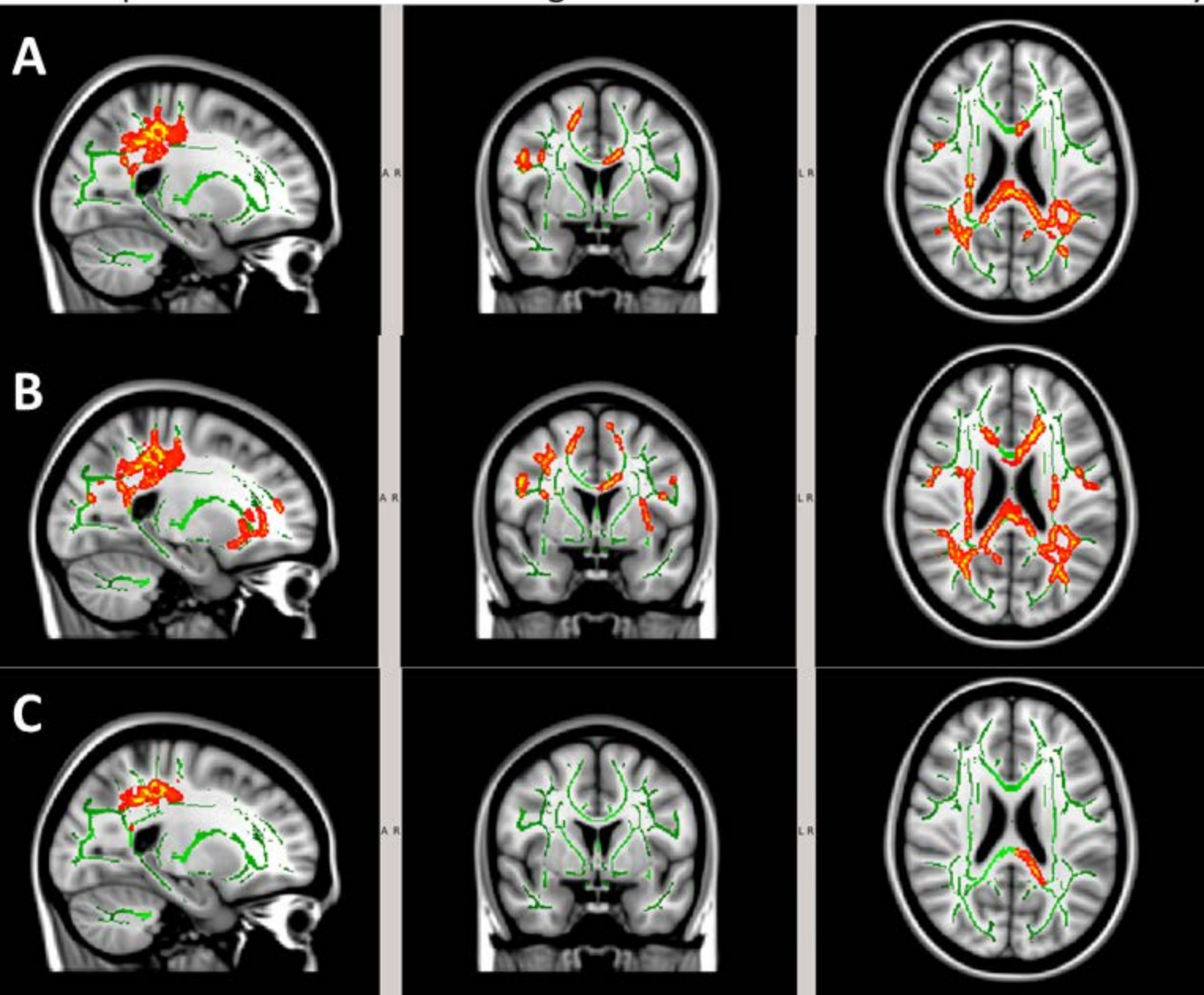


Figure S2. WM areas with (A) significant pre- to post-season reduction in AD; (B): significant pre- to post-season increase in FA in the YFB group (n=11, $p < 0.05$, corrected). One athlete who experienced concussion during the season was excluded from the analysis

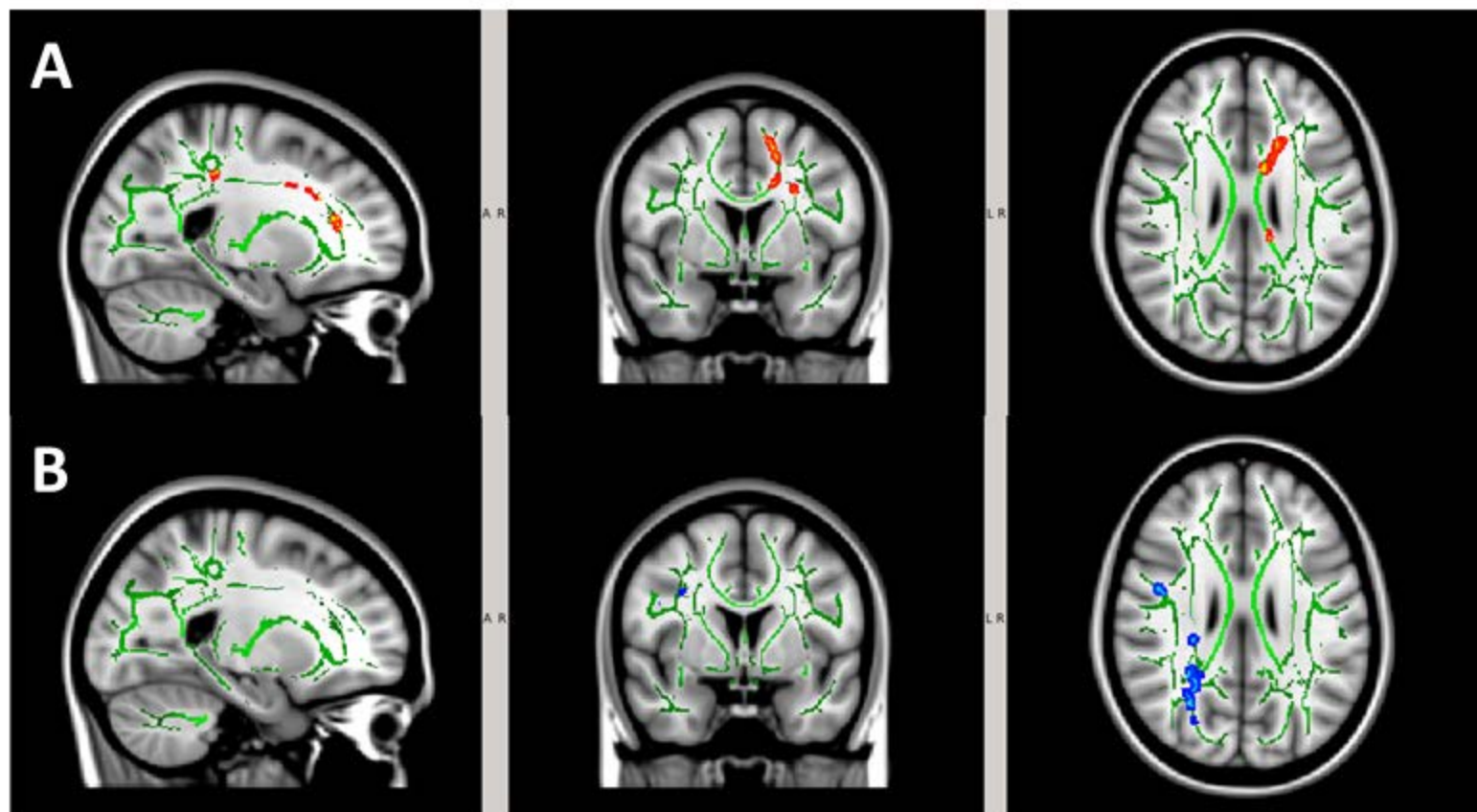


Figure S3. WM areas with significantly lower pre- to post-season AD reduction in YFB group when compared to the HS group (corrected $p < 0.1$, adjusted for head impact exposure during the season and time interval between last game/practice and post-season imaging).

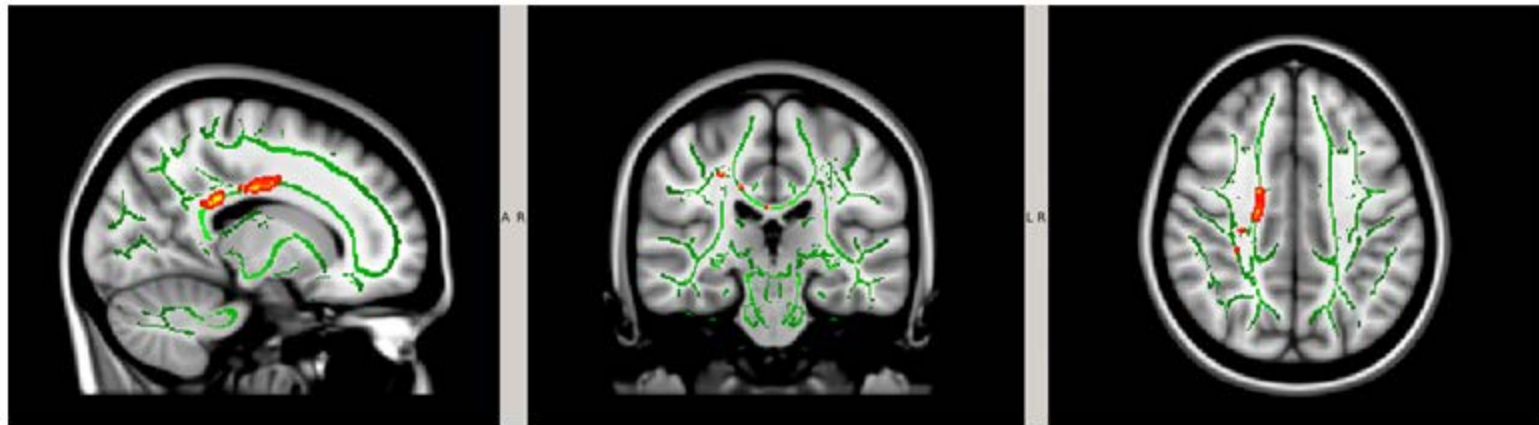


Table S1. Number of voxels in white matter with significant pre- to post-season DTI change in the HS group (including MD, AD, or RD reduction, corrected $p < 0.05$), YFB group (including AD reduction or FA increase, corrected $p < 0.05$), and number of voxels in white matter with trend level difference in pre- to post-season DTI change in the YFB group than the HS group (AD, corrected $p < 0.1$, adjusted for number of head impacts experienced during the season and the time interval between last game/practice and post-season imaging.)

	HS - Within Group			YFB - Within Group		Group Difference
	MD↓	AD↓	RD↓	AD↓	FA↑	AD
1 Middle cerebellar peduncle (MCP)	0	0	0	0	0	0
2 Pontine crossing tract (PCT, a part of MCP)	0	0	0	0	0	0
3 Genu of corpus callosum (GCC)	3	565	0	2	0	0
4 Body of corpus callosum (BCC)	989	1213	101	163	0	146
5 Splenium of corpus callosum (SCC)	729	604	219	28	7	99
6 Fornix	0	1	0	0	0	0
7 Corticospinal tract R (CST R)	0	0	0	0	0	0
8 Corticospinal tract L (CST L)	0	0	0	0	0	0
9 Medial lemniscus R (ML R)	0	0	0	0	0	0
10 Medial lemniscus L (ML L)	0	0	0	0	0	0
11 Inferior cerebellar peduncle R (ICP R)	0	0	0	0	0	0
12 Inferior cerebellar peduncle L (ICP L)	0	0	0	0	0	0
13 Superior cerebellar peduncle R (SCP R)	0	0	0	0	0	0
14 Superior cerebellar peduncle (SCP L)	0	0	0	0	0	0
15 Cerebral peduncle R (CP R)	0	47	0	0	0	0
16 Cerebral peduncle L (CP L)	0	0	0	0	0	0
17 Anterior limb of internal capsule R (ALIC R)	0	8	0	0	0	0
18 Anterior limb of internal capsule L (ALIC L)	0	57	0	0	0	0
19 Posterior limb of internal capsule R (PLIC R)	9	202	0	0	0	0
20 Posterior limb of internal capsule L (PLIC L)	0	14	0	0	0	0
21 Retrolenticular part of internal capsule R (RLIC R)	121	128	0	0	0	0
22 Retrolenticular part of internal capsule L (RLIC L)	103	125	0	0	0	0
23 Anterior Corona Radiata R (ACR R)	40	120	0	0	0	0
24 Anterior Corona Radiata L (ACR L)	1	560	0	104	0	0
25 Superior Corona Radiata R (SCR R)	373	622	0	0	56	47
26 Superior Corona Radiata L (SCR L)	118	280	80	170	0	0
27 Posterior Corona Radiata R (PCR R)	320	364	0	0	140	3
28 Posterior Corona Radiata L (PCR L)	276	306	36	40	0	0
29 Posterior Thalamic Radiation (include optic radiation) R (PTR (include OR) R)	181	379	0	0	49	0
30 Posterior Thalamic Radiation (include optic radiation) L (PTR (include OR) L)	110	169	0	0	0	0
31 Sagittal stratum (include ILF and IFOF) R	0	0	0	0	0	0
32 Sagittal stratum (include ILF and IFOF) L	0	0	0	0	0	0
33 External capsule R (EC R)	0	24	0	0	0	0
34 External capsule L (REC L)	0	443	0	0	0	0
35 Cingulum (cingulate gyrus) R	4	2	0	0	0	0
36 Cingulum (cingulate gyrus) L	54	53	0	0	0	0
37 Cingulum (hippocampus) R	0	0	0	0	0	0
38 Cingulum (hippocampus) L	0	0	0	0	0	0
39 Fornix (cres) / Stria terminalis R	0	0	0	0	0	0
40 Fornix (cres) / Stria terminalis L	0	0	0	0	0	0
41 Superior longitudinal fasciculus R (SLF R)	531	480	0	0	11	5
42 Superior longitudinal fasciculus L (SLF L)	445	424	0	0	0	0
43 Superior fronto-occipital fasciculus R (SFOF, R)	0	0	0	0	0	0
44 Superior fronto-occipital fasciculus L (SFOF L)	0	0	0	0	0	0
45 Uncinate fasciculus R (UF R)	0	0	0	0	0	0
46 Uncinate fasciculus L (UF L)	0	0	0	0	0	0
47 Tapetum R	3	2	0	0	1	0
48 Tapetum L	4	5	0	0	0	0

Note: ILF – Inferior Longitudinal Fasciculus; IFOF: Inferior fronto-occipital fasciculus.