



Supplementary Figure 4.

Line graphs showing the mean concentration of Glutamine (Gln) and Glutamine/Creatine (Gln/Cr), and Fractional Anisotropy (FA) and Radial Diffusivity (RD) in the same non-concussed (N=7) athletes playing two consecutive seasons (Except Gln/Cr, N=8). Standard error of the mean (SEM) is represented by vertical bars. Mean Gln levels (A) decreased ($F=4.7$, $P=0.047$) by 60% from the first in season to the second off season ($P=0.03$), and by 54% from the first off season to the second off season ($P=0.02$). Mean Gln/Cr levels (B) decreased ($F=4.8$, $P=0.04$) by 54% from the first in season to the second off season ($P=0.02$), and from the first off season to the second off season ($P=0.02$). The mean FA value (C) changed over time ($F=6.4$, $P=0.02$), with an increase between the first in season and second off season ($P=0.006$), and the mean RD value (D) changed over time ($F=5.1$, $P=0.04$), with a decrease between the first in season and second off season ($P=0.015$).