Supplemental Table 1. Demographics, position, head impact kinematics, and biomarkers by high and low impact group.

|  |  |  |
| --- | --- | --- |
|  | Group |  |
| Variables | Low Impact(n=6) | High Impact(n=12) | p-value |
| Number of observations for analysis | 11 | 23 | - |
| **Demographics** |  |  |  |
|  Age, median (IQR) | 20.5 (20 - 22) | 20.5 (20 - 22) | 0.88 |
|  Body mass index, median (IQR) | 26.8 (26.3 – 28) | 30.5 (28.4 – 33.9) | 0.12 |
|  Years football experience, median (IQR) | 11.5 (5 - 15) | 10 (5.5 – 14) | 0.71 |
|  # of previous concussions, n (%) None  1 3 | 3 (50)2 (33)1 (147) | 6 (50)5 (42)1 (8) | 0.86 |
| **Position**, n (%) |  |  | 0.07 |
|  Linemen (OL, DL) | 1 (17) | 5 (42) |  |
|  Linebacker, Tight End | 0 (0) | 4 (33) |  |
|  Skill Players (WR, DB, RB, QB) | 3 (50) | 3 (25) |  |
| Special team | 2 (33) | 0 (0) |  |
| **Impact Kinematics**,median (IQR)† |  |  |  |
|  # of hits | 4 (1 – 8) | 32 (23 – 41) | <0.001 |
|  PLA (*g*) | 70 (41 – 148) | 899 (643 – 1083) | <0.001 |
|  PRA (rad/sec2) | 5514 (1671 – 22082) | 55 457 (39 423 – 74 601) | <0.001 |
|  Head injury criterion | 53 (10 – 77) | 631 (524 – 1202) | <0.001 |
| **Biomarkers,** median (IQR) |  |  |  |
|  Plasma NFL (pg/mL) | 8.6 (7.5 – 14.5) | 11.3 (10.1 –13.5) | 0.45 |
|  Plasma S100β (ng/mL) | 0.04 (0.004 – 0.07) | 0.03 (0.02–0.07) | 0.91 |
|  Plasma total tau (pg/mL) | 4.0 (3.4 – 5.3) | 4.2 (2.2 – 5.3) | 0.58 |
|  Near point of convergence (cm) | 4.7 (4 – 5.8) | 6.7 (4 – 8) | 0.48 |
|  SCAT symptom score | 0 (0-1) | 0.5 (0 – 2.5) | 0.32 |

Note. OL, offensive lineman. DL, defensive lineman. WR, wide receiver. DB, defensive back. RB: running back. QB, quarterback. PLA, peak linear acceleration. PRA, peak rotational acceleration. IQR=interquartile range. SCAT=Sports Concussion Assessment Tool 3. **†**Based on the sum from practice impact kinematic data collections (see methods section). Variables reported as n (%) were analyzed with Chi-square tests. Variables reported as median/IQR were analyzed with Wilcoxon-M.