Table 1: Physical characteristics of soccer players (SP; n=22) and control participants (CON; n=15). Values are mean + standard deviation.

|  |  |  |
| --- | --- | --- |
|   | SP (n=22)  | CON (n=15)  |
|  Age (years)  | 12.0+0.3\*  | 11.7+0.2  |
|   Stature (m)   | 1.51+0.06\*  | 1.47+0.06  |
|  Body Mass (kg)  | 40.2+5.9  | 43.3+12.1  |
|   BSA (m2)   | 1.29+ 0.12  | 1.32+0.18  |
|  Tanner (AU)   | 2+1  | 3+1  |
|  Maturity Offset (years)  | -3.8+0.5  | -3.9+0.6  |
|  Age at PHV (years)   | 15.8+0.7  | 15.7+0.6  |

\* *P* ≤ 0.05. Body surface area (BSA); peak height velocity (PHV)

Table 2. Left ventricular measurements at rest in soccer players (SP; n=22) and control participants (CON; n=15). Values are mean + standard deviation.

SP (n=22)

CON (n=15)

LVED (mm∙BSA

-

0.5

)

39

.

4

+

2

.

6

39

.

0

+

2

.

5

|  |  |  |
| --- | --- | --- |
| LVES (mm∙BSA-0.5)  | 26.7+1.8\*  | 25.2+2.5  |
| VSd (mm∙BSA-0.5)  | 6.8+0.6\* | 6.2+0.5 |
| PWd (mm∙ BSA-0.5)  | 6.3+0.8  | 5.8+0.7  |
| RWT (cm)   | 0.32+0.05  | 0.30+0.04  |
| LVEDV (mL·BSA-1.5)  | 51.3+9.0\*   | 44.6+5.8  |
| LVESV (mL·BSA-1.5)  | 17.6+3.5   | 16.1+2.7  |
| LVEF (%)  | 65.7+4.1  | 63.6+4.7  |

\* *P* ≤ 0.05. Left ventricular (LV) end diastolic dimension (LVED), LV end systolic dimension (LVES), interventricular septum (VSd) and posterior wall (PWd), Relative wall thickness (RWT), LV end-diastolic volume (LVEDV) and LV end-systolic volume (LVESV) and LV ejection fraction (LVEF).

Table 3. Cardiovascular measures at rest and maximal exercise in trained soccer players (SP) and control participants (CON). Values are mean ± standard deviation.

|  |  |  |
| --- | --- | --- |
|   | SP (n=22)  | CON (n=15)  |
| Heart Rate (bpm) Rest  |  66+9\*  |  75+12  |
| Maximum  | 189+7.0  | 186+9.0  |
|  SVIndex (mL·m-2) Rest  |   47+9\*  |   42+4  |
| Maximum  | 56+9  | 52+7  |
|  QIndex (L∙min-1∙m-2)  Rest  |   3.06+0.59  |   3.17+0.54  |
| Maximum  | 10.5+1.50  | 9.67+1.42  |
|  AVO2 difference (mL∙100 mL-1)  Rest  |   8.0+2.3  |   6.8+1.9  |
| Maximum  | 14.3+1.3   | 12.8+2.3   |
|  |  |  |
| SYSTOLIC FUNCTION Peak aortic velocity (cm∙s-1) Rest  |  138.5+19.7\*  |  118.7+22.3  |
| Maximum  | 250.0+25.1\*  | 215.7+33.1  |
|  S’adj (cm∙s-1∙mm-1) Rest  |   1.2+0.1  |   1.1+0.3  |
| Maximum   |  3.2+0.5\*   | 2.9+0.3   |
|  DIASTOLIC FUNCTION E (cm∙s-1) Rest  |    90+15.0\*  |   82+7  |
| Maximum  | 177+16  | 172+13  |
|  E’adj (cm∙s-1∙mm-1) Rest  |   1.92+0.38  |   1.70+0.48  |
| Maximum  | 3.31+0.43  | 3.14+0.38  |
|  E/ E’ Rest  |   6.3+1.5  |   7.1+2.1  |
| Maximum  | 7.0+1.2  | 7.5+0.9  |

\* *P* ≤ 0.05. Stroke volume adjusted for body surface area (SVIndex) and cardiac output also adjusted for body surface area (QIndex). Arterial venous oxygen difference (AVO2). Peak early diastolic filling velocity (E). Peak longitudinal mitral annular velocities in systole (S’) and early diastole (E’). Both E’ and S’ were adjusted (adj) for heart size by LV length. E/E’ was calculated as an estimate of LV filling pressure and thus preload.

Table 4. Cardiovascular measures at two relative exercise intensities in trained soccer players (SP) and control participants (CON). Values are mean ± standard deviation.

|  |  |  |
| --- | --- | --- |
|   | SP (n=22)  | CON (n=15)  |
| Heart Rate (bpm) RE (1)  |  106+14\*  |  103+16  |
| RE (2)  | 125+14  | 120+16  |
|  SVIndex (mL·m-2) RE (1)  |   59+12\*  |   50+5  |
| RE (2)  | 60+11  | 54+7  |
|  QIndex (L∙min-1∙m-2)  RE (1)  |   6.13+0.77\*  |   5.15+1.12  |
| RE (2)  | 7.20+0.92\*  | 6.49+1.14  |
|  AVO2 difference (mL∙100 mL-1)  RE (1)  |   11.4+1.5  |   11.5+2.4  |
| RE (2)  | 11.8+1.3   | 11.5+1.9   |
| SYSTOLIC FUNCTION  |  |   |
| S’adj (cm∙s-1∙mm-1) RE (1)  |   1.8+0.3  |   1.7+0.3  |
| RE (2)   | 2.0+0.4   | 2.0+0.3   |
|  DIASTOLIC FUNCTION E (cm∙s-1) RE(1)  |   129+12.0\*  |   113+10  |
| RE (2)  | 148+19\*  | 130+13  |
|  E’adj (cm∙s-1∙mm-1) RE(1)  |   0.25+0.04  |   0.23+0.04  |
| RE(2)  | 0.26+0.05  | 0.26+0.04  |
|  E/ E’ RE(1)  |   6.9+1.1  |   6.7+0.9  |
| RE (2)  | 7.5+1.4  | 6.9+0.9  |

\*P < 0.05. Stroke volume adjusted for body surface area (SVIndex) and cardiac output adjusted for body surface area (QIndex). Arterial venous oxygen difference (AVO2). Peak early diastolic filling velocity (E). Peak longitudinal mitral annular velocities in systole (S’) and early diastole (E’). Both E’ and S’ were adjusted (adj) for heart size by LV length. E/E’ was calculated as an estimate of LV filling pressure and thus preload. Relative Intensity 1(RE(1)) corresponds to 46.5%VO2peak in the control participants and 46.7% in the soccer players. Relative Intensity 2 (RE(2)) corresponds to 60.5%VO2peak in the control participants and 56.8% in the soccer players.