Examination of Suunto t6 regarding Validity and Reliability
Overview

1. Test Set Up
2. Presentation of Intermediate Results
   a) Correlation of VO$_2$-Values
   b) Correlation of AF-Values
3. Bland-Altman Plots
4. Comparison of energy-conversion-values with HF-Monitoring-Method
1. Test Set Up

<table>
<thead>
<tr>
<th>Testpersons</th>
<th>Male</th>
<th>female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relaxation phase</td>
<td>2 min lying</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 min sitting</td>
<td></td>
</tr>
<tr>
<td>1. Exertion phase</td>
<td>2 min cycling at 50 Watts on stationary bike</td>
<td>2 min cycling at 25 Watts on stationary bike</td>
</tr>
<tr>
<td>2. Exertion phase</td>
<td>1 min per exertion-level on stationary bike until exhaustion</td>
<td></td>
</tr>
<tr>
<td>1. Recovery phase</td>
<td>7 min at 50 Watts</td>
<td></td>
</tr>
<tr>
<td>2. Recovery phase</td>
<td>Until respiratory values reach the values of the relaxation phase</td>
<td></td>
</tr>
</tbody>
</table>
2. Presentation of Intermediate Results

HF-VO2-Correlation

\[
\begin{align*}
y &= 0.0366x - 2.7206 \\
y &= 0.0457x - 3.6286
\end{align*}
\]
a) Correlation of VO$_2$-Values

Korrelation Metamax vs. T6 bei VO2 in l/min

\[ y = 0.7844x + 0.2232 \]

\[ R^2 = 0.9697 \]
b) Correlation of AF-Values

HF-AF-Korrelation

\[ y = 0.2424x - 2.2133 \]

\[ y = 0.2264x + 0.2067 \]
Correlation of Metamax and Suunto t6 with AF

\[ y = 0.9544x + 0.7444 \]

\[ R^2 = 0.91770 \]
Intermediate Conclusion

- Oxygen consumption correlation between Metamax and Suunto t6: $r > 0.95$
- Respiration rate correlation between Metamax and Suunto t6: $r > 0.96$
3. Bland-Altman Plots

Bland-Altman Plot for VO$_2$
Bland-Altman Plot for AF
Bland-Altman Plot for VO₂ 2. Kalk.
Bland-Altman Plots of all Max-values

Maximum Values Ventilation 1. Calk (n=16)
Maximum Values Respiration Rate (n=16)
Maximum Values VO2 1. Calk (n=16)
Maximum Values VO2 2. Calk (n=16)
Intermediate Conclusion

- Suunto t6 provides for ventilation ± 12%, respiration rate ± 14% and oxygen consumption ± 9% reliable values during the maximum stress test until exhaustion.
4. HF-Monitoring-Method

HF-VO2-Korrelation

\[ y = 0,0425x - 3,3102 \]
\[ R^2 = 0,9682 \]
Comparison of Energy Consumption between HF-Monitoring und Suunto t6
Bland-Altman Plot for Energy Consumption
Intermediate Conclusion

- Suunto t6 provides in comparisons to HF-Monitoring-Method reliable values with a deviation of ± 7% during a maximum stress test until exhaustion
Deviations

Vergleich der Studien von Firstbeat und der Uni Bayreuth

- Atemfrequenz
- Sauerstoffaufnahme
- Ventilation
- Energieumsatz

Studie Firstbeat
Studie Bayreuth 1.kalk
Studie Bayreuth 2.kalk
Conclusion

- The correlation for respiration rate and oxygen consumption between Metamax and Suunto t6 is very high.
- Suunto t6 provides reliable values during a maximum stress test until exhaustion for ventilation, respiration rate - especially for oxygen consumption and energy consumption.
Thanks for your attention!