Aerobic Exercise Decreases Cortisol Awakening Reaction in depressed inpatients

Christian Imboden 1,2, Johannes Beck 3, Markus Gerber 4, Uwe Pühse 4, Edith Holsboer-Trachsler 4, Anne Eckert 4, Martin Hatzinger 1
1 University of Basel and Psychiatric Services Solothurn, Switzerland
2 Private Clinic Wyss, Muenchenbuchsee Switzerland
3 University of Basel, Psychiatric Clinics (UPK), Center for Affective, Stress and Sleep Disorders (ZASS), Basel, Switzerland
4 University of Basel, Department of Sport Science and Health, Basel, Switzerland
5 University of Basel, Psychiatric Clinics (UPK), Neurobiology Laboratory for Brain Aging and Mental Health, Basel, Switzerland

c.imboden@privatklinik-wyss.ch

Background
Increased reactivity of hypothalamic-pituitary-adrenocortical axis (HPA-axis) has shown to be of high importance in depression [1]. There is quite robust evidence on the positive effect of Aerobic exercise (AE) on emotional and cognitive symptoms of depression [2, 3] but involvement of underlying biological systems such as HPA-axis are still poorly understood.

Methods
In-patients with a diagnosis of depression and a score >15 in the 17 item Hamilton Depression Scale (HDRS-17) were randomly assigned to either

• **AE**: endurance exercise on indoor bicycles (17.5kcal/kg/week) at 60-75% of maximal heart-rate

• **Controls**: a stretching and coordination program

Training was supervised and took place 3 times per week for 6 consecutive weeks.
All patients received multimodal antidepressant treatment including guidelines-oriented pharmacotherapy. Patients were recruited on the depression wards of the Psychiatric University Hospital Basel and the Psychiatric Services Solothurn between October 2013 and February 2016.

Results
17 female and 17 male patients with a mean age of 38.9 (±19.9) were recruited into the study (17 per group)

<table>
<thead>
<tr>
<th>Sample description</th>
<th>Intervention</th>
<th>Control</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>17</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>40.6 (8.8)</td>
<td>37.2 (13.5)</td>
<td>38.9 (11.3)</td>
<td>0.397</td>
</tr>
<tr>
<td>Sex [%f]</td>
<td>47.1</td>
<td>52.9</td>
<td>50.0</td>
<td>1.000</td>
</tr>
<tr>
<td>Smokers [%]</td>
<td>29.4</td>
<td>52.9</td>
<td>41.3</td>
<td>0.296</td>
</tr>
<tr>
<td>Duration of episode [weeks]</td>
<td>16.0 (16.0)</td>
<td>23.2 (25.5)</td>
<td>19.9 (21.1)</td>
<td>0.590</td>
</tr>
<tr>
<td>Prior depressive episodes [#]</td>
<td>1.6 (5.0)</td>
<td>3.4 (7.5)</td>
<td>2.6 (5.3)</td>
<td>0.280</td>
</tr>
<tr>
<td>Prior manic episodes [#]</td>
<td>0.2 (0.7)</td>
<td>0.0 (0.0)</td>
<td>0.1 (0.5)</td>
<td>0.325</td>
</tr>
<tr>
<td>Age at onset</td>
<td>35.7 (16.3)</td>
<td>28.9 (16.7)</td>
<td>32.2 (14.6)</td>
<td>0.168</td>
</tr>
<tr>
<td>BMI</td>
<td>25.7 (5.7)</td>
<td>25.7 (5.7)</td>
<td>25.7 (5.7)</td>
<td>0.273</td>
</tr>
<tr>
<td>HDRS17</td>
<td>22.4 (6.2)</td>
<td>20.7 (2.8)</td>
<td>21.5 (5.4)</td>
<td>0.191</td>
</tr>
</tbody>
</table>

Conclusions
Despite the small sample

• AE as add-on for depressed in-patients showed to have a positive impact on HPA-axis activity over the course of the 6 weeks intervention period

• Since HPA-axis activity plays an important role in the neurobiology of depression AE might be a possible treatment-option to facilitate HPA-axis normalization especially in subjects with dysregulation of HPA-axis activity

• However, AE had no additional effect on emotional symptoms. Since patients received a highly effective treatment regime this might be due to a ceiling effect

References

Disclosure
The study was supported by grants of the Gottfried & Julia Bangerter-Rhyner Foundation, the Helsana health insurance company and the canton of Solothurn.