A project in Research for Innovation – the overarching strategic research program of Halmstad University, supported by The Knowledge Foundation

Background and Motivation
For golfers at any level with an interest in improving performance, focus need to be on 3 skills aspects; improving technical, physical and psychological skills
Besides skills development, focus on; staying healthy and injury free.
Typically golf research is investigated within only one academic field (e.g., biomechanics, motor learning, psychology, engineering) and results are often not considered in a golf performance context.

We take an interdisciplinary approach combining physiological, technical and psychological viewpoints on performance and injury prevention in elite golfers.

Research Aim
General Aim: Investigate physiological, biomechanical and psychological aspects of elite golfers related to golf performance and injury susceptibility.

Specific Research Questions:
1. What select biomechanical, physiological, and psychological variables influence golf performance and/or injury susceptibility in young elite golfers?
2. Can intervention strategies based on physiological, psychological and biomechanical skills training improve golf performance and decrease injuries?
3. How can we translate and implement our biomechanical, physiological and psychological knowledge in golf performance and injury susceptibility into practical applications within the field of golfing making new methods, strategies, and products accessible for the golfing community?

Methods
Biomechanical measurements of golf swing kinematics, muscle activity and ball flight parameters.
Physiological measurements of strength, power, endurance, and flexibility Psychological measurements of stress and arousal . 9-week intervention, Various Data analyses

Results So Far

Table 1. Summary of segment angular velocities and segment angular accelerations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>R</th>
<th>p-value</th>
<th>R2</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHS (°/s)</td>
<td>107 (10)</td>
<td>0.78</td>
<td>0.01</td>
<td>0.96</td>
<td><strong>&lt;0.01</strong></td>
</tr>
<tr>
<td>PAV (°/s)</td>
<td>107 (10)</td>
<td>0.78</td>
<td>0.01</td>
<td>0.96</td>
<td><strong>&lt;0.01</strong></td>
</tr>
<tr>
<td>MSR (°/s)</td>
<td>107 (10)</td>
<td>0.78</td>
<td>0.01</td>
<td>0.96</td>
<td><strong>&lt;0.01</strong></td>
</tr>
</tbody>
</table>

Table 2. Linear regression model explaining Club Head Speed (CHS) variance for the Driver.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta coefficient</th>
<th>p-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSR</td>
<td>0.195</td>
<td>0.453</td>
<td>&lt;0.001</td>
<td><strong>&lt;0.01</strong></td>
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<tr>
<td>PAV</td>
<td>0.133</td>
<td>0.303</td>
<td>&lt;0.001</td>
<td><strong>&lt;0.01</strong></td>
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<tr>
<td>TGB</td>
<td>0.079</td>
<td>0.16</td>
<td>0.020</td>
<td><strong>&lt;0.01</strong></td>
</tr>
</tbody>
</table>

Publications
Parker J, MC. Olsson Are there stretch shortening cycle like actions in the shoulder and torso in upper body striking actions. UK Strength and Conditioning Conference, UK, 2013
Parker J, Halldinström, MC Olsson The relationship of the lead arm, upper torso, and pelvis with driver club head speed among elite golf players. Int J Golf Sci, 2014; 77

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