Sports Science to support the National Sport Federations

Services and projects in Sports Science

European Forum ASPC 14.-17.1.2018 Magglingen
Dr Markus Tschopp, Swiss Federal Institute of Sport
Magglingen – More than a training center
Section for Elite Sport (Staff = 60)

- Sport Physiology Group (Endurance Sports)
- Sport Physiology Group (Team Sports)
- Sport Physiology Group (Force Sports)
- Training Science
- Sport Psychology
- Sports Medicine
- Sports Physiotherapy
A scientific approach to support National Federations

Quelle: «The Hunt for Glory – Chapter 1»; https://www.youtube.com/watch?v=CfaKbrQLE0
General agreement with National Sport Federations

- Swiss Football Association
- Swiss Ski*
- Swiss Gymnastics Association*
- Swiss Ice Hockey Federation
- Swiss Athletics*
- Swiss Cycling*
- Swiss Triathlon
- Swiss Handball
- Swiss Swimming
- Swiss Shooting

*different disciplines*
Services for the National Federations

- Allocated Sport Scientist
- Allocated Key Account Manager
- Training infrastructure and hosting
Services for the National Federations

• Multidisciplinary services:
  • Performance diagnostics
  • Medical service
  • Training and competition analysis
  • Prevention and Rehabilitation
  • Sports Psychology
  • Consulting (eg. Talent identification and development, altitude training, strength and conditioning training, sports technology)
Services: Athlete development programs

- Short (seasonal) and longterm (talent, career) development
- Back to sport after injuries
- Pre and post preparation phase
- Talents: 1-4 times per year

- Close collaboration with coaches
- Embedded scientist/ coaches with scientific background
Footuro: interdisciplinary talent development program in football
Research and development

Responding to questions from the field
Applied research projects

- ‘ESSO’-Projects *(funded by Swiss Olympic)*
  - Beat the heat
  - Modelling the physical load in Ice Hockey
  - Play more: Game structure in youth football
  - Keeping athletes on the talent pathway
  - Shooting: the optimal mental state
  - …

- PhD-Students *(n=2-4, in collaboration with Universites)*
  - Physical KPIs in artistic gymnastics
  - Upper body strength in cross country skiers
  - Sports data analysis in team sports
Athletic training: Scientific support of the artistics gymnastics

Christoph Schärer, Klaus Hübner et al.
4 Weeks eccentric training

Christoph Schärer, Klaus Hübner et al.
Results

Christoph Schärer, Klaus Hübner et al.
Preparation for big events: Scientific support of Moutainbiking before Rio

**Speed** = \( \text{Physical performance} \) / \( \text{resistance} \)
Coefficient of rolling resistance of different tyres

Absalon
Kulhavy
Schurter

Continental Race King
Hutchinson Black Mamba
Schwalbe Racing Ralph
Continental Race + X-King
Specialized S-Works Renegade
Racing Ralph mit Schlauch
Máxix Ikon
Dugast Collé neu
Dugast Collé Latex
Bontreger XR1
Ritchey Shield

Beat Müller et al
### Results and practical relevance

Rollwiderstandskoeffizienten ($C_{rr}$) der untersuchten Reifen mit potentiellem Zeitgewinn/-verlust bzw. Einfluss auf die Leistung am Beispiel des MTB XCO Weltcups Lenzerheide 2015.

<table>
<thead>
<tr>
<th>Hersteller, Modell 29&quot;</th>
<th>$C_{rr}$</th>
<th>SD</th>
<th>CV</th>
<th>Zeitdifferenz [s]</th>
<th>Leistungs- differenz [Watt]</th>
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<td>Continental, Race King¹</td>
<td>0.0205</td>
<td>0.0003</td>
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<td>Specialized, S-Works Renegade¹</td>
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<td>0.0006</td>
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<tr>
<td>Schwalbe, Racing Ralph (mit Schlauch)</td>
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<td>Maxxis, Ikon¹</td>
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<td>Dugast, Collé (neu)</td>
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<tr>
<td>Dugast, Collé (Latex)</td>
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<tr>
<td>Bontrager, XR1¹</td>
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<td>Ritchey, Shield¹</td>
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<tr>
<td>MW</td>
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<tr>
<td>SD</td>
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</table>

**Anmerkungen**:¹ = Reifen als Tubless mit 90 ml Dichtflüssigkeit montiert; $C_{rr}$ = Rollwiderstandskoeffizient; MW = Mittelwert; SD = Standardabweichung; CV = Variationskoeffizient; Berechnungsbeispiel: MTB XCO Weltcup, Lenzerheide 2015; Wettkampfdauer = 1h 29min 33s; Durchschnittsleistung 291 Watt; Distanz = 29830 m; Anstieg = 997 m; Luftdichte = 0.996 kg/m³; Systemgewicht = 79.5 kg; $C_dA$ 0.512 m²; Antriebseffizienz = 97.7%.

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Education

• Evidence-based

• Swiss coach education
• Specific coach education courses of the National Federations
• Master of Science in Sports with Specialization in Elite Sports
Scientific support of the National Federations

Research and Development

Services

Education

High performance sport

Athlet
Coaches
National Federations
Swiss Olympic Association

Federal Office of Sport FOSPO
Swiss Federal Institute of Sport Magglingen SFISM
Key factors

- What is useful for the athlete and coach?
- Long-term collaboration
- On-field experience
- Coach education
- Multidisciplinary and sport specific approach
- Innovation
Aspects in the future

- Sharing knowledge
- More embedded sports scientists
- From the lab to the field
- Technology and data management
Thank you for the attention!