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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

swiss olympic MEDICAL CENTER

Magglingen – More than a training center

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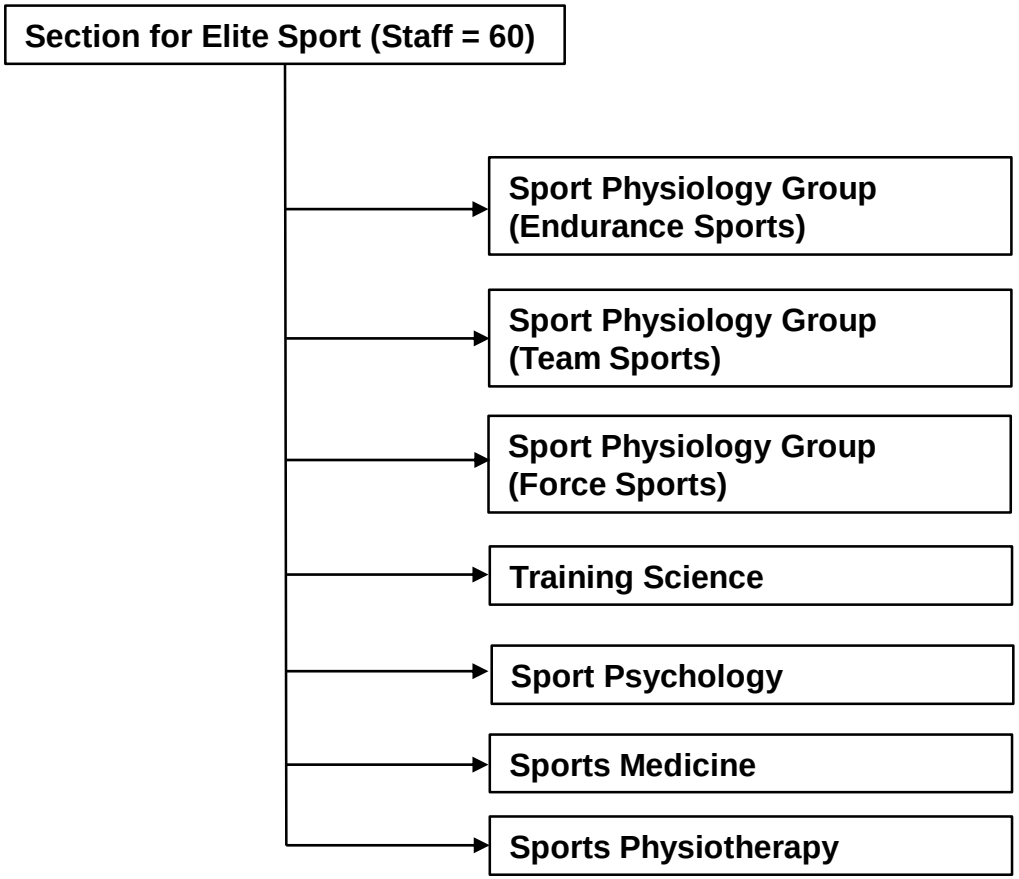

A scientific approach to support National Federations

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Quelle: «The Hunt for Glory – Chapter 1»; ttps://www.youtube.com/watch?v=CctaKbrQLE0

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

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Services for the National Federations

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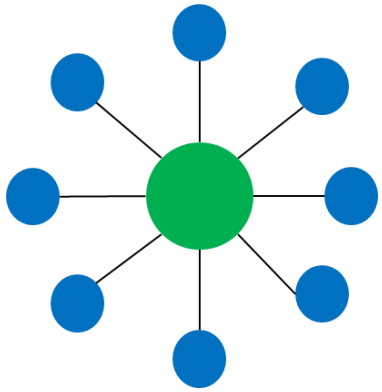
- Allocated Sport Scientist
- Allocated Key Account Manager

- Training infrastructure and hosting

Services for the National Federations

- Multidisciplinary services:



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  - 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

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- 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
- Embeded scientist/ coaches with scientific background

Footuro: interdisciplinary talent developpment 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 artistics gymnastics
  - Upper body strength in cross country skiers
  - Sports data analysis in team sports

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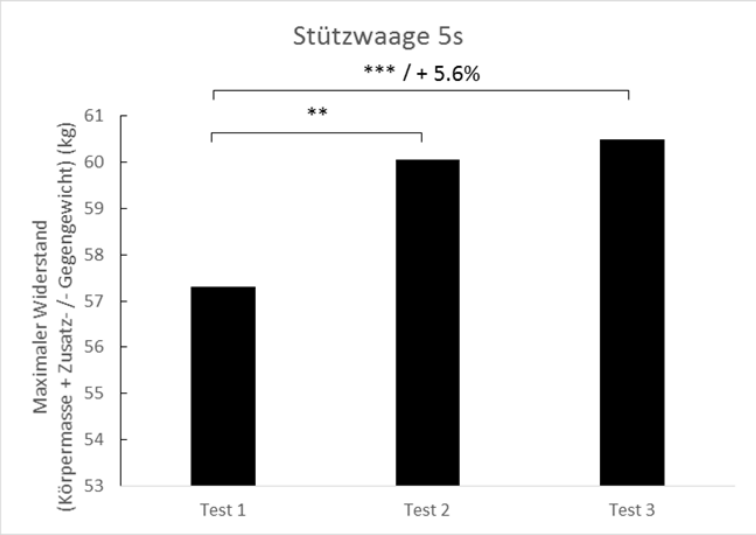
Athletic training: Scientific support of the artistics gymnastics

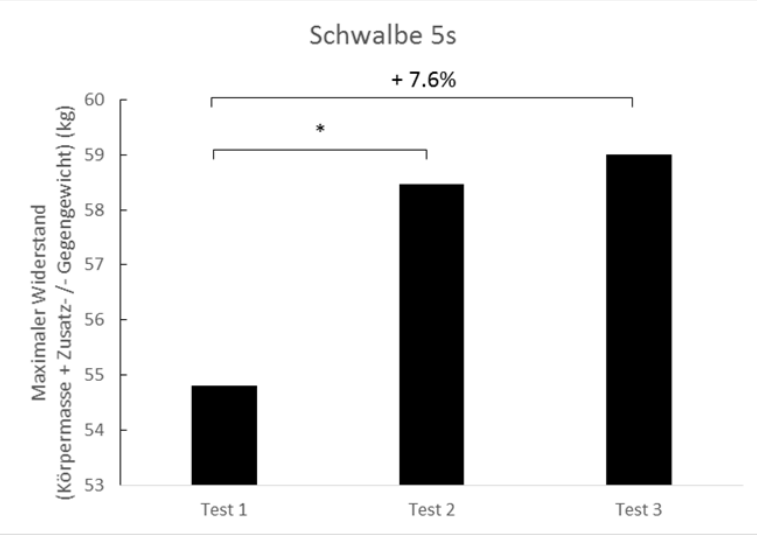
Christoph Schärer, Klaus Hübner et al.

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

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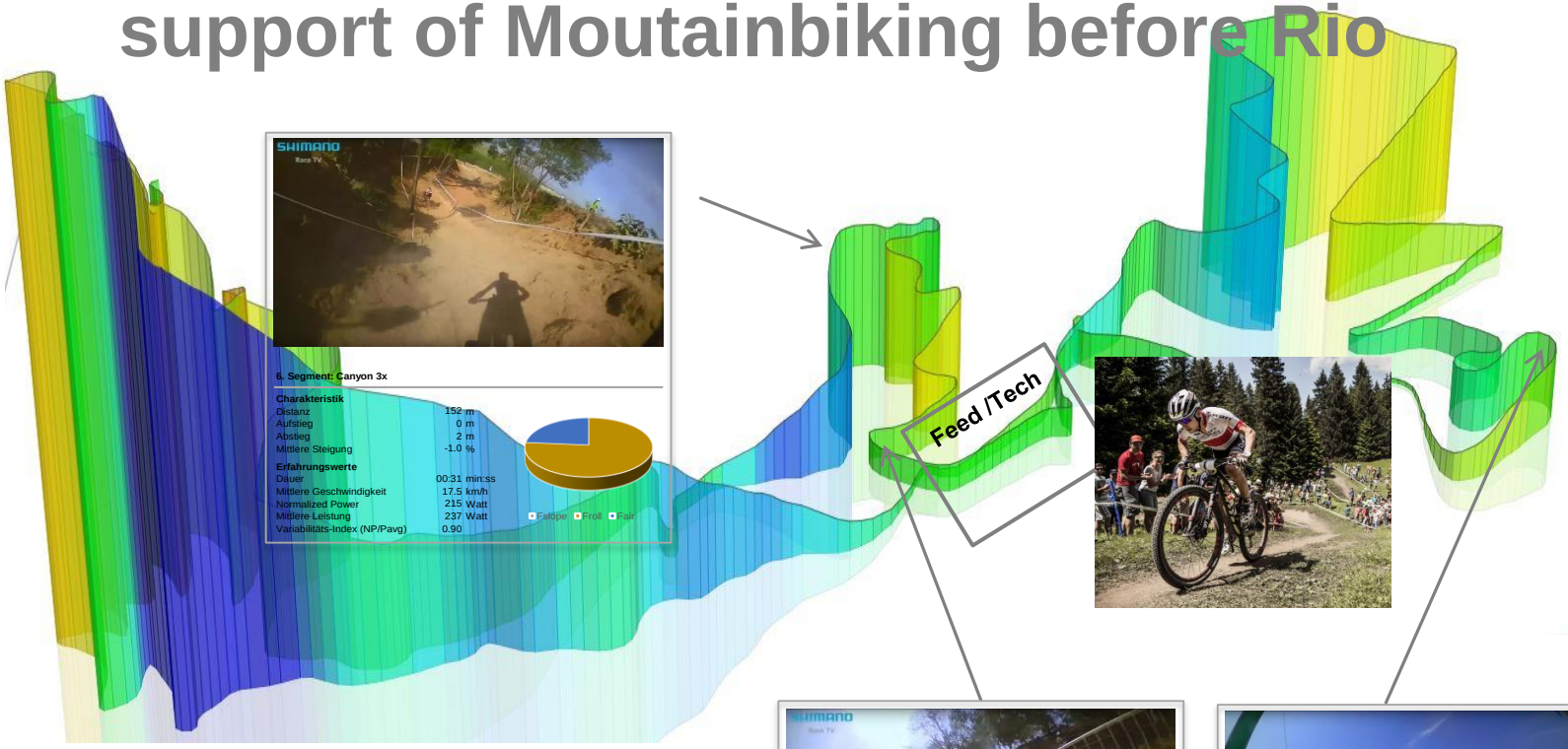
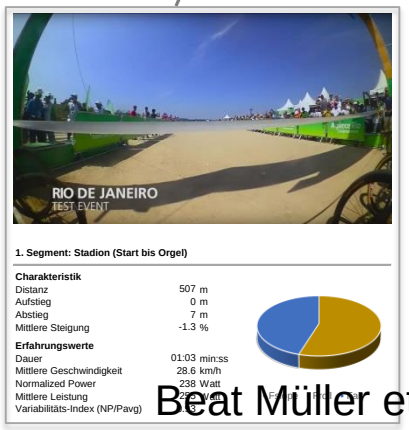
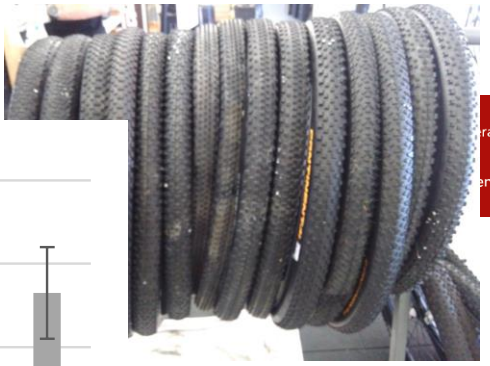


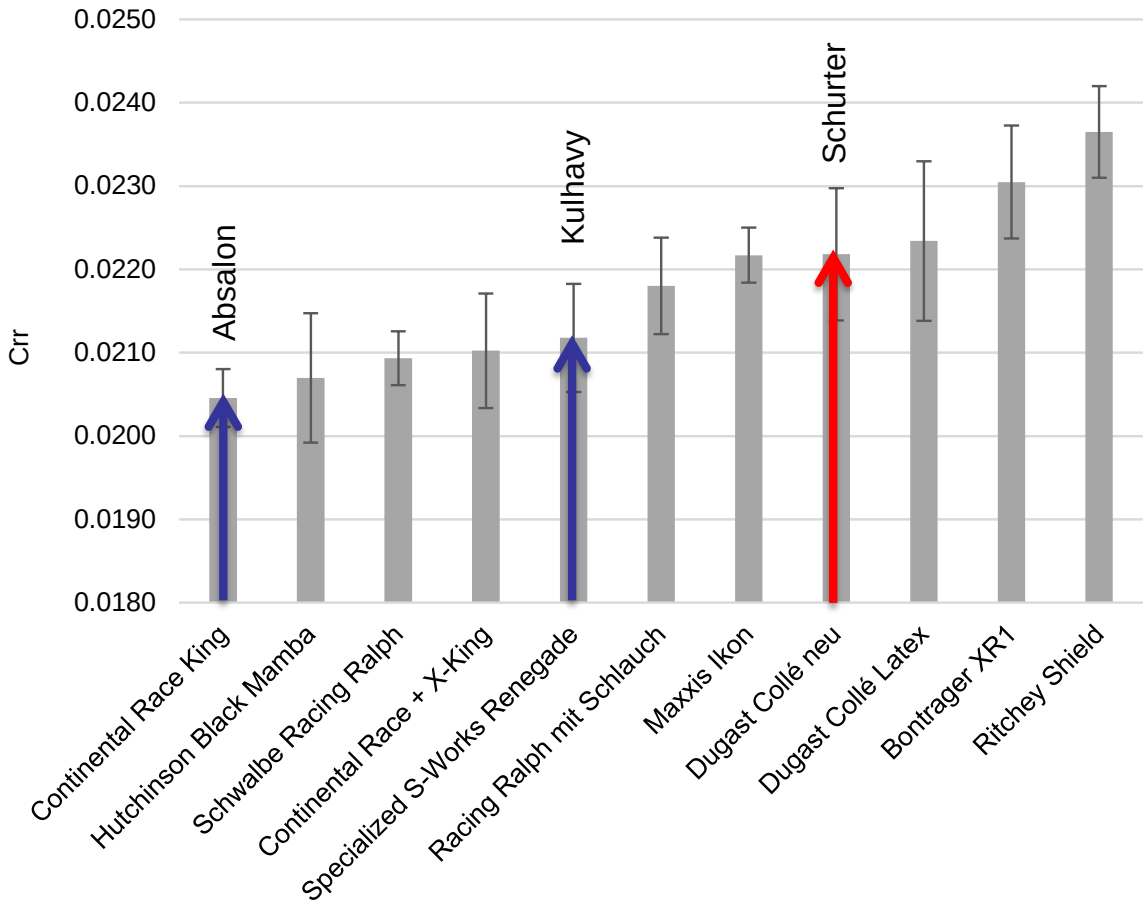


$$Speed = \frac{\text{Physical performance}}{\text{resistance}}$$

Beat Müller et al

Coeffcient of rolling resistance of different tyres





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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.

					Weltcup, Lenzerheide 2015	
Hersteller, Modell 29"	C_{rr}	SD	CV	C_{rr}-Abweichung zu Dugast Collé neu	Zeitdifferenz [s]	Leistungs-differenz [Watt]
Continental, Race King[1]	0.0205	0.0003	2%	-8%	-85	-8
Hutchinson, Black Mamba[1]	0.0207	0.0008	4%	-7%	-73	-7
Schwalbe, Racing Ralph[1]	0.0209	0.0003	2%	-6%	-61	-6
Continental, X-King[1]	0.0210	0.0007	3%	-5%	-57	-5
Specialized, S-Works Renegade[1]	0.0212	0.0006	3%	-5%	-49	-4
Schwalbe, Racing Ralph (mit Schlauch)	0.0218	0.0006	3%	-2%	-19	-2
Maxxis, Ikon[1]	0.0222	0.0003	1%	0%	-1	0
Dugast, Collé (neu)	0.0222	0.0008	4%	0%	01:29:33	291
Dugast, Collé (Latex)	0.0223	0.0010	4%	1%	0	1
Bontrager, XR1[1]	0.0230	0.0007	3%	4%	43	4
Ritchey, Shield[1]	0.0237	0.0006	2%	7%	73	7
MW	0.0218					
SD	0.0010					

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/m^3; Systemgewicht = 79.5 kg; C_dA 0.512 m^2; Antriebseffizienz = 97.7%.

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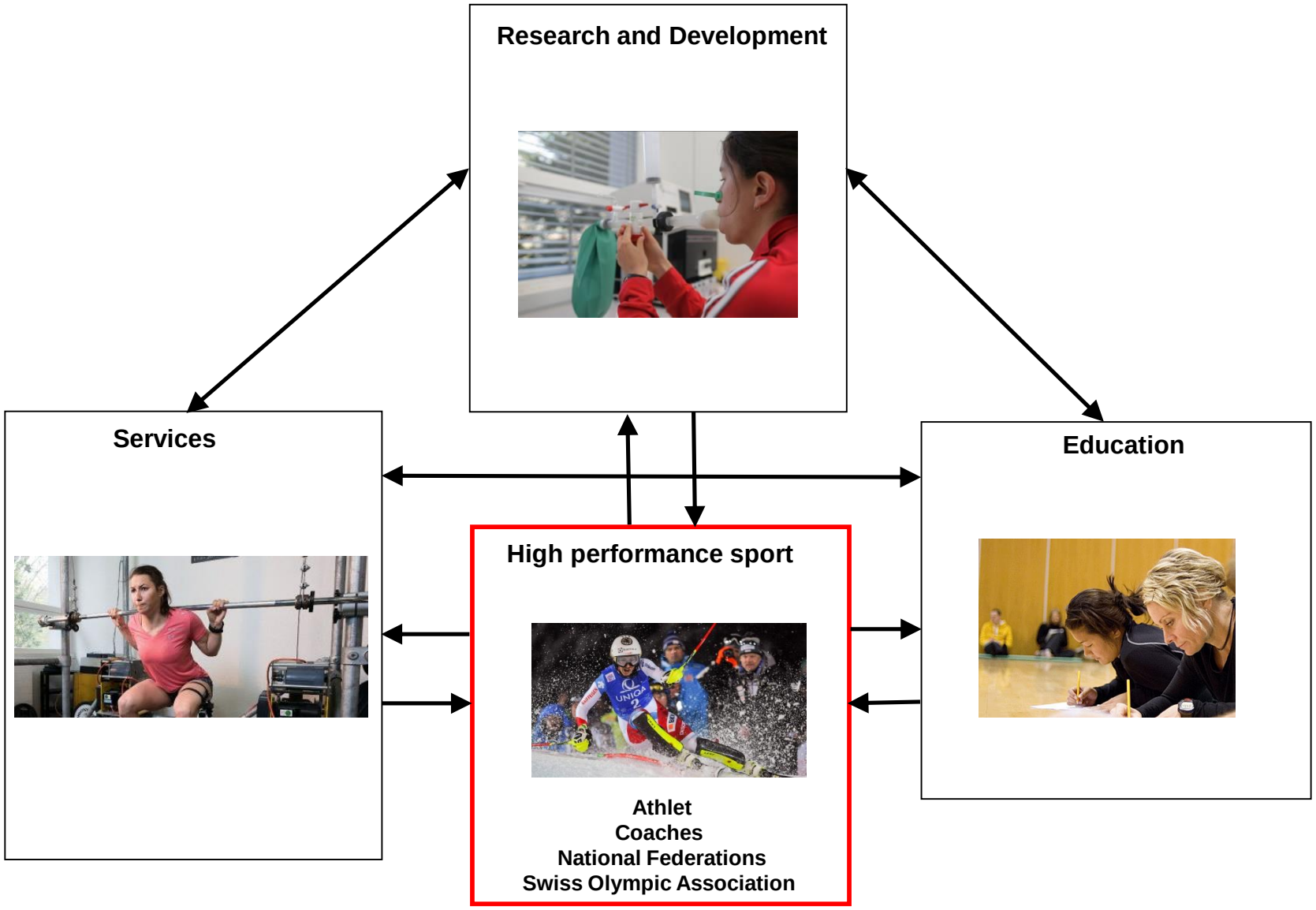
Education

- 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



Key factors

- What is usefull for the athlete and coach?
- Longterm collaboration
- On-field experience
- Coach education
- Multidisciplinary and sport specific approach
- Innovation

Aspects in the future

- Sharing knowledge
- More embeded sports scientists
- From the lab to the field
- Technology and data managment

Thank you for the attention!

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