SPORTWISSENSCHAFTLICHE
SOCIETE SUISSE DES
GESELLSCHAFT DER SCHWEIZ
SCIENCES DU SPORT

Seventh Annual Congres of the Swiss Society of Sports Sciences

Lausanne

12-13 February 2015

Programme
and
Book of Abstracts

SPORTWISSENSCHAFTLICHE GESELLSCHAFT DER SCHWEIZ
SOCIETE SUISSE DES SCIENCES DU SPORT

Programme du 7ème congrès annuel de la Société Suisse des Sciences du Sport 2015 à Lausanne

Mercredi, 11 février 2015		Lieu
9:00	**Workshop: Promotion de la relève**	
	Sciences sociales I (De)	Géopolis 2224
	Sciences sociales II (Fr)	Géopolis 2225
	Sciences naturelles (En)	CRC-DP Bugnon 7a
12:00	Déplacement au CSS-Dorigny	
12:30	**Lunch**	CSS-Dorigny
13:30	**Workshop: Promotion de la relève, suite**	
	Sciences sociales I (De)	Géopolis 2224
	Sciences sociales II (Fr)	Géopolis 2225
	Sciences naturelles (En)	CSS-Dorigny
17:30	Activité sportive commune	CSS-Dorigny
18:30	Apéro	CSS-Dorigny
19:00	Repas	CSS-Dorigny

Jeudi, 12 février 2015		Lieu
08:00	**Enregistrement (café / croissant)**	Hall IDHEAP
08:45	**Ouverture et bienvenue**	Aula IDHEAP
09:00	**Stand der Schweizer Sportwissenschaft**	Aula IDHEAP
09:20	**Keynote: Prof Jean Camy, Université PB, Lyon: "A state of the art of Sport Sciences in Europe: a 'Science Studies' viewpoint "**	Aula IDHEAP
10:05	**Podium discussion: Swiss Sports Science in an international perspective**	
10:30	**Pause/Visite de l'exposition**	Hall Géopolis 2e
11:00	**Présentations pour le prix de la relève**	
	Sciences sociales	Géopolis 2227
	Sciences naturelles	Géopolis 1612
12:00	**Lunch**	Hall Géopolis 2e
13:00	**Symposia invités**	
	Sciences sociales : **Empirischen Schulsportforschung**	Géopolis 2227
	Sciences sociales : **Psychological determinants of individual behaviour**	Géopolis 2121
	Sciences naturelles : **Balance training in children and elderly**	Géopolis 1612
14:30	**Posters**	
	Sciences sociales	Hall Géopolis 2e
	Sciences naturelles	Hall Géopolis 2e
15:30	**Pause/Visite de l'exposition**	Hall Géopolis 2e
16:00	**Sessions orales**	
	Symposium Arturo Hotz – Werk und Wirken	Géopolis 2121
	Sciences sociales	Géopolis 2227
	Sciences naturelles	Géopolis 1612
16:45	**Keynote: Prof Michael McNamee, University of Swansea, UK " Innovative sports medicine treatments and the placebo effect: ethical and epistemological considerations "**	Aula IDHEAP
17:30	**Remise des prix de la relève**	Aula IDHEAP
17:40	**Remise des prix pour la meilleure thèse en sciences du sport**	Aula IDHEAP
18:00	**Conférences des lauréats du prix pour la meilleure thèse**	Aula IDHEAP
18:30	**AG SSSS**	Aula IDHEAP
19:30	**Apéro**	Aula IDHEAP
20:00	**Dîner**	Resto Géopolis 1e

Vendredi, 13 février 2015		Lieu
08:30	**Keynote: Prof Ruth Loos, Mt Sinaï, New-York: " The genetics of physical activity "**	Aula IDHEAP
09:30	**Symposia invités**	
	Sciences sociales : **Professionnalization of sport organisations**	Géopolis 2227
	Sciences naturelles : **Altitude training – An update**	Géopolis 1612
11:00	**Pause/Visite de l'exposition**	Hall Géopolis 2e
11:30	**Symposia invités**	
	Sciences sociales : **Didactique en EPS**	Géopolis 2227
	Sciences naturelles : **Central fatigue or central fatigues ?**	Géopolis 1612
12:45	**Lunch**	Hall Géopolis 2e
13:30	**Symposia invités et Sessions orales**	
	Les Activités Physiques et Sportives dans les Curricula Suisses	Géopolis 2227
	Sciences sociales : **Table ronde coloniale**	Géopolis 2121
	Sciences sociales	Géopolis 2879
	Sciences naturelles	Géopolis 1612
15:00	**Pause/Visite de l'exposition**	Hall Géopolis 2e
15:30	**Keynote: Prof Francesca Amati, DP-ISSUL, Lausanne: " Effects of exercise on the age-related risk for diabetes "**	Aula IDHEAP
16:15	**Clôture du congrès**	Aula IDHEAP

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KEYNOTES

Jeudi / Donnerstag

A state of the art of Sport Sciences in Europe: a 'Science Studies' viewpoint

Prof. Emeritus Jean Camy
Université Claude Bernard Lyon 1, France

Innovative sports medicine treatments and the placebo effect: ethical and epistemological considerations

Prof. Mike McNamee
Swansea University, Wales

Vendredi / Freitag

The genetics of physical activity - insight from twin studies

Prof. Ruth Loos
Mount Sinai Hospital, NY, USA

Effects of exercise on the age-related risk for diabetes

Prof. Francesca Amati
Université de Lausanne, Suisse

Symposia Sciences Sociales / Humanwissenschaften

Jeudi / Donnerstag 13.00-15.00 : Perspektiven einer empirischen Schulsportforschung – Lehrerkompetenz, Unterrichtsqualität und deren Wirkungen (room 2227)

Coordination: Uwe Pühse

Der Arbeitskreis orientiert sich am „Angebot-Nutzen-Modell" von Helmke (2010) und beinhaltet vier Beiträge, die sich den Lehrerkompetenzen, der Unterrichtsqualität und deren Wirkungen widmen. Der erste Beitrag von **Baumgartner** setzt an der Herausforderung der einphasigen Ausbildung von Sportlehrpersonen an, die Studierenden effektiv auf die spätere Berufstätigkeit vorzubereiten (Shulman, 2005). Dazu wird die qualitative Ausprägung des *Standards Rückmeldung* (Oser, Bauder, Salzmann & Heinzer, 2013) von Sportlehrpersonen auf performativer Ebene diagnostiziert. Mittels Pre-Post-Control-Design wird untersucht, ob sich das Konstrukt der „Herausforderungen für die Lehrerausbildung" (Biedermann, 2011, S. 185) als bedeutsame Prädiktorvariable hinsichtlich der qualitativen Ausprägung des Standards Rückmeldung (Prognosevariable) erweist.
Der zweite Beitrag von **Messmer, Seiler und Lieberherr** beschreibt die Modellierung von Fachdidaktischem Wissen und Können von Sportlehrpersonen (PCK) und deren Erfassung in einem an Kompetenzen orientierten Forschungsdesign. Der dritte Beitrag von **Büchel** widmet sich der Wahrnehmung von Qualitätsmerkmalen im Sportunterricht auf Volksschulstufe. Dabei geht es um die Einschätzung von Unterrichtsprozessen aus Schülerperspektive. Die Erfassung von Schülerwahrnehmungen birgt den Vorteil, dass Langzeiterfahrungen, die sich auf unterschiedliche Situationen stützen, in die Beurteilungen einfliessen (Ditton, 2002). In unterschiedlichen Untersuchungen haben sich insbesondere die über die Klasse gemittelten Schülerangaben als durchaus verlässlich erwiesen (Gruehn, 2000).
Im vierten Beitrag von **Herrmann, Seiler, Pühse und Gerlach** werden die beiden primär motivationsfördernden Unterrichtsdimensionen Klassenführung und Schülerorientierung (Hamre & Pianta, 2010) im Sportunterricht erfasst. Anschliessend wird deren Wirkung auf die Anstrengungsbereitschaft der Schüler im Sportunterricht untersucht und dabei das Fachinteresse als zentraler Mediator hervorgehoben.
Der Arbeitskreis hat das Ziel verschiedene Fragestellungen der „Empirischen Schulsportforschung" aufzuzeigen und diese Themenfelder in der Sportwissenschaftlichen Gesellschaft der Schweiz zu etablieren.

Jeudi / Donnerstag 13.00-15.00 : Psychological determinants of individual behavior (room 2121)

Coordination: Roland Seiler, University of Bern

Individuals in sport show a variety of different behaviours. The purpose of this symposium is to highlight and explain some psychological determinants considered important for the understanding of the variability and to draw some conclusions for the world of sport.
One of the basic tenets in psychology is that behaviour in a given situation is considered to result from an interaction of individual and environment. Action theoretical models underline the role of individual goals people aim to achieve. An introduction will explain the

perspective of the acting individual and briefly present the framework for the integration of the following presentations.

Mirko Wegner's research focuses on the role of ***implicit motives. Implicit motives are individual to a high extent and affect a variety of parameters such as verbal behaviour, stress reaction, and involvement in sport or competition***.

The presentation of Philipp Röthlin is about ***the role of mindfulness in competitive situations in sport. The behaviour of interest is choking under pressure, which means a catastrophic decrease in performance***.

Denis Hauw investigates ***the behaviour based on the concept of situated action, where an individual perceives, assesses and values a situation based on individual action goals and plans***.

Vendredi /Freitag 09.30-11.00: Professionnalisation of sports organisations (room 2227)

Coordination: Prof. Emmanuel Bayle
International and national sports federations as well as their member organisations (usually sports clubs) are key actors within the sports system and have a wide range of relationships outside the sports system (e.g. with the state, sponsors, and the media). They are currently facing major challenges such as growing competition in top-level sports, democratisation of sports with “sports for all” and sports as the answer to social problems (integration, education, health, unemployment, etc.). In this context, professionalising sports organisations seems to be an appropriate strategy to face these challenges and solve current problems. Professionalisation of sports organisations is generally defined by the scholars as an organisational process of transformation leading towards organisational rationalisation, efficiency and business-like management (Chantelat, 2001). The symposium, based on an SNF project between Uni Lausanne and Uni Berne, aims to understand how to study professionnalisation of sports federations (at international and national levels) and their consequences notably in terms of governance and human ressource management.

K. Schlesinger T., Nagel S. (Uni. Berne) & Bayle E. (Uni Lausanne) ***Professionalisation of sports federations : a multi-level framework for analysing forms, causes and consequences***

Ruoranen K. Schlesinger T., Nagel S. (Uni Berne) ***Origins and representations of professionnalisation in swiss national sport federations***

Clausen J., Bayle E., Giauque D. (Uni Lausanne) ***Origins and representations of professionnalisation in international sport federations***

Debate and discussion with three CEO and experts of the management of international sport federations based in Lausanne.

Vendredi / Freitag 11.30-12.45: Didactique en EPS (room 2227)

Coordination : Prof. Dr. Vanessa Lentillon-Kaesnter, Prof. Dr. Jacques Méard, UER-EPS, HEP-VD

Marco Astolfi, ***Evolution de la formation pédagogique des maîtres d'éducation physique dans le Canton de Vaud***

Mélanie Allain, Daniel Deriaz, Nicolas Voisard & Vanessa Lentillon-Kaestner, ***L'évaluation sommative en EPS: étude comparative dans trois cantons de Suisse romande***

Vanessa Lentillon-Kaestner, ***Effets des formes de groupement en EPS sur la compétence physique perçue des élèves***

Jacques Méard, ***Le processus de décrochage scolaire en EPS : une approche culturaliste***

Adrián Cordoba, Bernard Poussin, Daniel Deriaz, Hervé Dénervaud & Benoît Lenzen, ***Mise en place des conditions de l'étude chez l'élève. Quels modes de dévolution dans l'enseignement des activités athlétiques et gymniques à l'école primaire et secondaire ?***

Vendredi / Freitag 13.30-15.00: Table ronde coloniale: Enjeux et paradoxes de la diffusion des sports en situation coloniale (room 2121)

Coordination: Prof Nicolas Bancel, Directeur GRISSUL, Unil, Lausanne

Daniel Denis, Professeur émérite de l'Université de Paris-Sud (Discutant).

Thomas David, Professeur, Institut d'histoire économique et sociale, Université de Lausanne (Modérateur).

Brice Fossard, Doctorant, Université de Paris 1, Université de Lausanne.

Stanislas Frenkiel, Chercheur Senior FNS, MER, ISSUL, Université de Lausanne.

Thomas Riot, Chercheur Senior FNS, ISSUL, Université de Lausanne.

Vendredi / Freitag 13h30-15.00: Les Activités Physiques et Sportives dans les Curricula Suisses, Table Ronde (room 2227)

Coordination: Marco Astolfi (ISSUL) et Pierre Pfefferlé (SSU, Lausanne)

Cette table ronde se déroulera en deux temps :

Dans un premier temps les personnes présentes auront la possibilité de présenter leur programme actuel de pratiques sportives enseignées dans le cadre du Bachelor et du Master. La présentation d'une durée de 5 à 7 minutes présentera le nombre le cours, d'heures, de crédits ECTS, les modalités d'évaluation, etc.

Dans un deuxième temps, le débat/échange pourra être articulé autour des questions suivantes :

1. Quels sont les éléments à considérer dans la démarche amenant à définir les disciplines sportives constituant le plan d'étude en sciences du sport ?
   Ce procédé permet-il de déterminer des disciplines fondamentales?
   Celles-ci sont-elles souhaitables ?

2. Dans l'acquisition des pratiques sportives, la quantité à une incidence sur la qualité des savoirs et des savoir-faire. Le volume d'apprentissage (et d'entraînement) est-il actuellement suffisant pour assurer à l'étudiant un minimum de compétences?
   La place (crédits/heures de cours) donnée aux pratiques sportives est-elle suffisante en fonction des exigences professionnelles futures ?

3. Dans le cadre du BA, doit-on avoir un tronc commun ou doit-on différencier les choix des pratiques sportives en fonction d'options (pré-) professionalisantes ?
   Dans le cadre du MA, doit-on demander la spécialisation d'une/de pratiques sportives ?

Symposia sciences de la vie / Naturwissenschaften

Jeudi / Donnerstag 13.00-15.00 : Balance Training in Children and Elderly (room 1612)

Coordination: Prof Wolfgang Taube (UNIFR), Dr Oliver Faude (UNIBAS)

Children as well as elderly people both show an increased risk of falling and, consequently, fall-related injuries as compared to healthy, young adults. Children, on the one hand side, need to develop the muscular and sensorimotor systems, which are relevant for the appropriate control of posture in varying situations. On the other hand side, seniors show a decline in neuromuscular performance as a result of ageing. Balance exercise interventions are thus considered important for both populations to reduce the risk of falling as well as injuries.
The proposed session shall give an overview on basic adaptations of the neuromuscular system as a result of specific training in children and the elderly. Further, the effect of compliance on training adaptations will be presented. The concluding presentations will particularly focus on the current scientific evidence on standard neuromuscular exercise interventions and new appealing approaches in children and elderly.

Wolfgang Taube (UNIFR), ***Central and Peripheral Adaptations to Balance Training***

Oliver Faude (UNIBAS), ***Compliance and Adherence to Balance Training Programs – Effects on Training Adaptations***

Martin Keller (UNIFR), ***Balance Exercise Interventions in Children***

Lars Donath (UNIBAS), ***Balance Exercise Interventions in Elderly***

Vendredi / Freitag 09.30-11.00: Altitude training – an update (room 1612)

Coordination: Prof Grégoire Millet (UNIL)

During this symposium « Altitude training – An update », the newest findings on hypoxic methods for performance enhancement are presented: The current panorama (Altitude or altitudes?) by Grégoire Millet; the differences between “Living High Training Low” in normobaric vs hypobaric hypoxia (Altitude or Hypoxia?) by Jonas Saugy; The repeated sprints training in hypoxia in cycling (Altitude or intensity?) by Raphael Faiss or in running (High or Fast?) by Olivier Girard; The new “living High Training Low and High” (High and Low?) by Franck Brocherie. Finally, the monitoring of adaptations in elite athletes in altitude (Altitude or training?) is presented by Laurent Schmitt.

G.P. Millet, O. Girard, R. Faiss, F. Brocherie, J. Saugy, L .Schmitt. ***From endurance athletes to team sport players : Recent updates and new perspectives in hypoxic training***

Saugy J.J., Schmitt L., Cejuela R. , Faiss R., Hauser A., Wehrlin J.P., Rudaz B., Delessert A., Robinson N., Millet G.P. ***Endurance training with "Live High-Train Low": comparison between Normobaric and Hypobaric Hypoxia***

R. Faiss, O. Girard, J. Wehrlin, G.P. Millet. ***From intermittent hypoxic training to repeated sprint training in hypoxia: a revolution?***

O. Girard, F. Brocherie, J.B. Morin, G.P. Millet. ***Running mechanics and spring-mass characteristics of treadmill repeated sprints in normobaric hypoxia***

F. Brocherie, G.P. Millet, A. Hauser, T. Steiner, J.P. Wehrlin, O. Girard. ***Optimizing aerobic and anaerobic fitness with 'Live High-Train Low and High' in team sports***

Schmitt L., Millet G.P. ***Practical use of HRV analysis in elite athletes to optimize the training in hypoxia***

Vendredi / Freitag 11.30-12.45: Central fatigue or central fatigues? (room 1612)

Coordination: Dr Nicolas Place (UNIL)

Fatigue is a complex phenomenon commonly reported by athletes or patients, although the underlying mechanisms might differ between the two populations. Fatigue is usually dissociated into two components: peripheral (muscular) vs. central (neural). In this symposium we will focus on central fatigue and discuss different techniques allowing studying how the central nervous system adapts to fatigue in healthy and clinical populations.

Nicolas Place (UNIL), ***Introduction to central fatigue(s)***

Kai Lutz (Department of Neurology, University Hospital Zürich), ***Identifying brain processes related to muscle fatigue by means of fMR***

Mickey Fan (UNIL), ***Central fatigue: a blood flow perspective***

David Benninger (Department of Neurology, CHUV, Lausanne), ***Central fatigue: contribution of TMS***

Symposium – Arturo Hotz

Jeudi / Donnerstag 16.00-16.45: Arturo Hotz – Werk und Wirken (room 2121)

Coordination: Ernst-Joachim Hossner (Universität Bern)

In dem Arbeitskreis wird an das wissenschaftliche Vermächtnis von Arturo Hotz erinnert, einem der einflussreichsten Schweizer Sportwissenschaftler der letzten Jahrzehnte, der. Das Lebenswerk des im Juli des vergangenen Jahres – viel zu früh – verstorben Arturo wird in vier Referaten von Freunden und wissenschaftlichen Wegbegleitern beleuchtet, in denen zentrale Facetten seines ganzheitlichen Wirkens zur Sprache kommen.

Urs Rüdisühli (EHSM Magglingen)
Arturo Hotz: der Sportpraktiker

Pius Disler (PH Luzern)
Arturo Hotz: der Sportpädagoge

Walter Mengisen (EHSM Magglingen)
Arturo Hotz: der Sporthistoriker

Ernst-Joachim Hossner (Universität Bern)
Arturo Hotz: der Sportmotoriker

Social Sciences, Oral communications and posters

Oral communications – 'Prix de la Relève – Nachwuchspreis'

Chair : Prof. Emmanuel Bayle, UNIL

Thursday 12.02.2015 11h-12h (room 2227)

- 11h-11h15: La naissance du mouvement du sport pour handicapés physiques en Suisse de 1956 à 1975 : Le modèle compétitif à l'origine d'une structure bicéphale. Cornaton J.
- 11h15-11h30: Beneficial effects of autonomy support and autonomy need satisfaction in military sports. Sieber V.
- 11h30-11h45: Conversion to bodybuilding. Coquet R.
- 11h45-12h: Decision-making processes in football clubs in relation to an external advisory program. Egli B.

Oral communications

Chair: Prof. Denis Hauw, UNIL

Thursday 12.02.2015 16h-16h45 (room 2227)

- 16h-16h15: Une approche biographique des coureurs suisses en fauteuil roulant. La fabrique d'une élite paralympique (1968-2014). Frenkiel S.
- 16h15-16h30: Changes in Mental Health in Compliers and Non-Compliers with Physical Activity Recommendations in Patients with Stress-Related Exhaustion. Lindegård A. et al.
- 16h30-16h45: Activity in trail running: analysis and performance enhancement. Rochat, N. et al.

Friday 13.02.15 13h30-15h

Chair: Prof. Anne Marcellini, UNIL, Angela Schweizer, UNIL (room 2879)

- 13h30-13h45: Muster motorischer Fähigkeiten und Fertigkeiten als Erfolgsprädiktoren im Juniorenleistungsfussball: Eine Studie auf der Grundlage des personorientierten Ansatzes. Zibung M. et al.
- 13h45-14h: Kognitive Faktoren als Erklärungsgrössen von Befindlichkeitsveränderungen während Seniorensportkursen. Molinari V. et al.
- 14h-14h15: Récits de vie de formateurs d'entraîneurs comme contribuant au processus de compréhension des situations d'apprentissage développées dans la profession. Jeanneret O.
- 14h15-14h30: The positional stability of motor skills and abilities for talent selection in elite youth football. Zuber C. et al.
- 14h30-14h45: Football et construction d'espoirs collectifs au Cameroun. Berthoud J.

- 14h45-15h: Sportmotorische Leistungsfähigkeit und schulische Leistung – Zum medierenden Effekt der exekutiven Funktionen. Egger F. et al.

Poster presentations

Chair: Dr. Ophélia Jeanneret, HEFSM

Thursday 12.02.2015 14h30-15h30 (hall Géopolis 2e)

- 25. Zum Potenzial der Integration von Migrantinnen in den Sport durch interkulturelle Vereine. Adler Zwahlen J. et al.
- 26. Le football en Suisse. Enjeux institutionnels, sportifs et économiques. Berthoud J. et al.
- 27. Enhancing Educational Opportunities in Physical Education and Sport through Didactic Engineering. Codemo C. et al.
- 28. Subjektive Theorien von Lehrpersonen zu Kompetenzen und Bereitschaften von Sport unterrichtenden Lehrpersonen der Vorschul- und Primarschulstufe. Oswald E. et al.
- 29. Die Bedeutung sportbezogener Strukturbedingungen im kommunalen Kontext für das Sportverhalten Jugendlicher und junger Erwachsener. Klostermann C. et al.
- 30. Coaches` subjective talent criteria. Jokuschies N. et al.
- 31. Zur Stabilität von Motiv- und Zielprofilen im Freizeit- und Gesundheitssport. Schmid J. et al.
- 32. Zur Bedeutung soziokulturell geprägter Wertvorstellungen für die Sportpartizipation Jugendlicher und junger Erwachsener – eine explorative Untersuchung anhand des Habitus-Ansatzes. Hayoz C. et al.
- 33. La re-valorisation touristique des ressources naturelles des stations de montagne par les pratiques sportives en vogue. Jaccard E.
- 34. Reduced depression experienced after 12 weeks of physical activity training in patients following surgery for aneurysmal subarachnoid haemorrhage. Colledge F. et al.
- 35. Die Effekte einer akuten Bewegungsintervention auf die Konzentrationsleistung von Primarschulkindern. Kamer M. et al.
- 36. The perception of critical situations involving football fans – how conflicts escalate or de-escalate. Brechbühl, A. et al.
- 37. Comparison of self-reported and measured physical activity in office employees equipped with sit-stand-desks. Wick K. et al.

Life sciences Oral Communications and Posters

Oral Communications – 'Prix de la Relève' / 'Nachwuchspreis'

Thursday 12.02.2015 11h-12h (room 1612)
Chair : Prof Wolfgang Taube – Dr Nicolas Place

- 11h-11h15: Influence of dietary and inorganic nitrate on oxygen consumption in trained men. *Flueck J.L.*
- 11h15-11h30: Altered brain activity during observation and motor imagery of balance tasks in the elderly: An fMRI study. *Mouthon A.*
- 11h30-11h45: The effects of wide pulse neuromuscular electrical stimulation on plantar flexion force in individuals with cerebral palsy. *Neyroud D.*
- 11h45-12h: Individual haemoglobin mass response to altitude training at 1800 m in elite endurance athletes. *Troesch S.*

ORAL COMMUNICATIONS

Thursday 12.02.2015 16h-16h45 (room 1612)
Chair: Dr Fabio Borrani (UNIL)

- 16h-16h15: Mechanics and energetics of running in minimalist and standard shoes: effect of running duration. *Fernández Menéndez A. et al.*
- 16h15-16h30: Is there a link between strength asymmetry and gait asymmetry as well as variability in seniors? *Hammes D. et al.*
- 16h30-16h45: Robustness of musculoskeletal simulation in strength training. *Schellenberg F. et al.*

Friday 13.02.15 13h30-15h
Chair: Dr Davide Malatesta (UNIL) (room 1612)

- 13h30-13h45: Blood shifts between the trunk and the extremities during exercise. *Uva B. et al.*
- 13h45-14h: Fatiguing lower limb and trunk musculature: impact on strength, balance and sprint ability in sportive young adults. *Roth R. et al.*
- 14h-14h15: The assessment of brachialis muscle activation with surface electromyography. *Staudenmann D. et al.*
- 14h15-14h30: Gender differences in power output and physiological responses during arm, upper body and whole body double poling. *Bucher E. et al.*
- 14h30-14h45: The heart rate-based lactate minimum test: Test protocol optimization. *Perret C. et al.*

- 14h45-15h: Variations of energy cost of ski mountaineering with speed and slopes: a laboratory study. *Praz C. et al.*

POSTER PRESENTATIONS

Thursday 12.02.2015 14h30-15h30 (corridor, 2nd floor)
Posters « Physiology» ; chair: Pr G Millet (UNIL)

1. Relationship between increased volume and force loss in calves after the most extreme mountain ultra-marathon in the world. *Vitiello D. et al*
2. Standing balance performance after a slackline training intervention in healthy seniors. *Kurz E. et al.*
3. Different neuromuscular adjustments during repeated sprinting in hot and cool conditions with maximal M-wave normalization of the EMG RMS amplitude. *Girard O. et al.*
4. Foam rollers use in strength training and conditioning: which scientific evidences in 2015 ? *Besson C. et al.*
5. Does attending a Burzelbaum kindergarten have an influence on the physical fitness of the children? *Imhof K. et al.*
6. AltitudeOmics: Effects of 16 days of acclimatisation to 5,260m on muscle deoxygenation during incremental exercise. *Bourdillon N. et al*
7. Heat stress does not alter constant velocity running mechanics following fatiguing repeated sprints. *Girard O. et al.*
8. Accuracy of Commercial Fitness Trackers Measuring Distance Covered on Foot. *Beeler N. et al.*
9. Are mechanical alterations similar during repeated running sprints in hot versus hypoxic environments? *Brocherie F. et al.*
10. Altérations du contrôle postural induites par une fatigue des fléchisseurs plantaires en hypoxie normobarique vs. hypobarique. *Degache F. et al.*
11. Should endurance athletes perform an 18-days 'live high-train low' training camp in hypobaric or normobaric hypoxia? *Hauser A. et al.*
12. Neuromuscular adjustments of the plantar flexors following match-play football in the heat. *Girard O. et al.*

Thursday 12.02.2015 14h30-15h30 (corridor, 2nd floor)
Posters « Biomechanics and Motor Learning » ; chair: Dr S Lorenzetti (ETHZ)

13. Effects of differences in construction on the performance of stability boots. *Bürgi S. et al.*
14. Comparison of spatio-temporal gait parameters between a portable gait analysis device and a treadmill. *Lichtenstein E. et al.*
15. Biomechanical Gait Cycle Analysis Of Different Ski Touring Systems. *Maculan R. et al.*
16. Ski jumping: Development of an instrumented vehicle to analyse imitation jumps. *Plüss S. et al.*
17. Estimation of force, stiffness and elastic energy based on kinematic data while running. *Staudenmann D. et al.*
18. Using inertial sensors to compute an alpine ski racing specific full body kinematic model – an application to track the distance between ankle joint and athlete's center of mass. *Ulrich B*. et al.
19. How can we further improve jump performance? Influence of combining augmented feedback with an external focus of attention and with reward. *Wälchli M. et al.*
20. Optimal lange Fixationen? Eine experimentelle Studie zu überlangen „Quiet Eye"-Dauern. *Klostermann A. et al.*
21. In experts, contribution of explicit and implicit processes to visuomotor adaptation is different than in novices. *Leukel C. et al.*
22. Peripheral perception in offside decision-making in football. *Schnyder U. et al.*
23. Practicing a finger tapping task in lucid dreams enhances performance during wakefulness. *Stumbrys T. et al.*
24. Funktionalität peripherer Wahrnehmung bei Trackingaufgaben. *Vater C. et al.*

Abstracts

(in alphabetical order of surnames)

Title:
Zum Potenzial der Integration von Migrantinnen in den Sport durch interkulturelle Vereine

Authors: Adler Zwahlen J[1], Weigelt-Schlesinger Y[1]
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Abstract:
Introduction:
Unter der Sportpartizipation von Migrantinnen wird ein privilegierter Zugang zu den Ressourcen der Teilhabe am Sportsystem einerseits und den Möglichkeiten der tatsächlichen Integration in das Sportsystem, andererseits verstanden (Seibert et al., 2013). Migrantinnen ist der Zugang zu Sportaktivitäten häufig versperrt. Ihre Situation ist mehrheitlich durch Diskriminierung, Konflikte und Grenzziehungsprozesse gekennzeichnet, denen Aspekte betreffend des Geschlechts und der Ethnizität inhärent sind. Wie die Sportpartizipation der Migrantinnen hinsichtlich der Bewegungsangebote sozialer Trägerschaften funktioniert, ist weder in der Migrations- noch in der sportbezogenen Integrationsforschung ein gängiges Thema.
Basierend auf dem Konzept *Boundary Work* (Lamont & Molnár, 2002) untersucht die vorliegende, explorative Studie, sportbezogene Partizipationsmöglichkeiten in einem interkulturellen Verein und dessen Potenzial für Migrantinnen zur Integration in den Sport. Dabei werden geschlechterbezogene und ethnische Grenzen unter die Lupe genommen.
Methods:
Es wurden acht halbstrukturierte Interviews mit sportaktiven Migrantinnen verschiedener Herkunft und zwei halbstrukturierte Interviews mit Leiterinnen des interkulturellen Vereins „Karibu“ in Zollikofen durchgeführt. Zusätzlich erfolgte eine Gruppendiskussion mit sechs Migrantinnen, die an Sportangeboten des Vereins nicht teilnehmen. Mittels qualitativer Inhaltsanalyse (Mayring, 2008) und dokumentarischer Methode (Bohnsack, Nentwig-Gesemann & Nohl, 2007) wurden geschlechtsbezogene und ethnische Grenzen abgeleitet.
Results:
Erste Resultate indizieren einerseits vielfältige, miteinander verwobene Grenzen hinsichtlich der Sportpartizipation, die das Geschlecht und die Ethnizität allgemein betreffen. Im Speziellen wirken „mütterliche“ Verpflichtungen, traditionelle Vorstellungen der Geschlechterrollen, Migrantenstatus, religiöse sowie herkunftstypische Einstellungen und Praktiken. Andererseits vermag der interkulturelle Verein Ressourcen bereitzustellen, damit diese Grenzen überwunden werden können. Dies geschieht z.B. mittels Einsatz kompetenter Mitarbeiterinnen; Kinderbetreuung; niederschwelliger, kosten-, zeitgünstiger Sportangebote und einer gleichberechtigten Teilhabe.
Discussion/Conclusion:
Interkulturelle Vereine können demnach den Zugang zu Sportangeboten für Migrantinnen erleichtern und diese möglicherweise nachhaltig in den Sport integrieren. Dies geschieht im Vergleich zu Sportvereinen, infolge wechselseitiger Anpassungsprozesse, bedarfsgerechter (Infra-)Strukturen und einer toleranten, integrationsorientierten Vereinskultur. Der auf Grenzziehung fokussierte Ansatz und die vorläufigen Resultate können neue Forschungsperspektiven im Bereich Sportorganisationen und Integrationspotenzial eröffnen.

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Title: Accuracy of Commercial Fitness Trackers Measuring Distance Covered on Foot

Authors: Beeler N[1], Roos L[1], Ammann R[1], Wyss T[1]
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Abstract:

Introduction:

Fitness trackers worn on the wrist or on the hip are currently popular lifestyle gadgets. These devices provide information about e.g. number of steps taken and caloric output. Additionally, some fitness trackers estimate the distance covered on foot. The accuracy of energy expenditure estimation by such fitness trackers was investigated elsewhere (Roos et al., 2014). However, only sparse information is available about the accuracy of distances covered on foot. Hence, the aim of this study was to investigate the accuracy of three commercial fitness trackers assessing distances covered on foot.

Methods:

The distances estimated by Jawbone Up (JBU; Jawbone, CA, USA), Withings Pulse (WP; Withings, MA, USA) and Fitbit Flex (FBF; Fitbit Inc., CA, USA) were compared to the values measured by the Local Positioning Measurement System (LPM; Inmotio Object Tracking BV, Amsterdam, Netherlands), which was the chosen reference method. Ten subjects (5 women, 5 men, age 40.9±15.6 years, height 1.7±0.1 m, weight 64.8±9.5 kg) wore the fitness trackers and the transponder of the LPM simultaneously while performing everyday activities (office work and household tasks) and gait activities (walking and running) for 10 minutes each. Distances estimated by the devices were registered for each activity. Data were analyzed using Pearson correlation and Oneway ANOVA with a Bonferroni post-hoc test. The root mean square errors were calculated for each device and activity class.

Results:

Apart from the FBF, significant correlations ($p<.001$) between the distances covered on foot measured by the fitness trackers and the reference method were found for the everyday activities ($r=.738$, .865; and -.002, for JBU, WP and FBF, respectively). In terms of distance estimations during gait activities, significant correlations ($p<.001$) were found for all tested devices and the LPM ($r=.947$, .967, and .855, JBU, WP and FBF, respectively). The JBU and the FBF showed an overestimation of the mean distance of 15.5±76.9% and 23.6±123.7% for everyday activities, respectively, while the WP underestimated distances by -40.1±32.4% compared to the LPM (185.7±109.9 m). The mean distances covered on foot during the gait activities (LPM: 1'200.9±395.4 m) were overestimated by JBU (9.8±20.8%) and the WP (17.5±18.48%), and on the contrary, underestimated by the FBF (-4.8 ±20.5%). Yet, these over- and underestimations were not significantly different from the reference values. The root mean square errors were higher for the everyday activities (53%, 41% and 90% for JBU, WP and FBF, respectively) than for the gait activities (16%, 19% and 16% for JBU, WP and FBF, respectively).

Discussion/Conclusion:

The mean distances measured by the devices are not significantly different compared to the LPM. However, the individual distances provided by the fitness trackers can deviate to a great extent from those measured by the reference method. To conclude, these results suggest that the investigated fitness trackers are feasible for measuring distances covered on foot during everyday and gait activities. Though, due to the big individual errors, these devices are not recommended for the use in a high performance environment.

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Title:
Foam rollers use in strength training and conditioning: which scientific evidences in 2015 ?

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Abstract:
Introduction:
Self-induced myofascial release (SMR) is a new technique to treat soft tissues restrictions (MacDonald et al., 2013). It consists for an individual to exert pressure on the soft tissues with his own body mass using a foam roller (a dense cylindrical pipe with a diameter of 10 to 15 centimeters and a length of 30 to 60 centimeters). By rolling back and forth the roller on the soft tissues, fibrous adhesions between the layers of fascia are broken up and soft tissues extensibility is improved (MacDonald et al., 2013). Their popularity is growing today and manufacturers warrant benefits on range of motion, including effects on connective tissue (fascia), performance and recovery. However, scientific literature on the topic is poor. The purpose of this study is to expose the current peer-reviewed data on the subject.
Methods:
A review of the literature was conducted on PubMed concerning papers published until september 2014. The terms „Foam roller", „Foam rolling", „Self myofascial release", „Roller massager" and „Myofascial rollers" were used. Studies were read and main outcomes were highlighted.
Results:
7 studies were found. SMR dos not seem to have effects on performance. Healey and al. found no difference on performance tests results (vertical jump height and power, isometric force, and agility) following 30 seconds applications of SMR on different muscular groups (Healey, Hatfield, Blanpied, Dorfman, & Riebe, 2014). SMR seems to enhance short term knee joint range of motion (ROM), especially if it is used in combination with a static stretching protocol (MacDonald et al., 2013; Mohr, Long, & Goad, 2014). SMR used after exercise seems to lower perceived muscle soreness and to maintain certain faculties (vertical height and ROM) (Macdonald, Button, Drinkwater, & Behm, 2014). SMR would reduce arterial stiffness and would improve vascular endothelial function (Okamoto, Masuhara, & Ikuta, 2014).
Discussion/Conclusion:
Nowadays SMR is widely used by amator and professional athletes. Moreover, it is cheap, easy to use and without known adverse effects. Only a few studies evaluate its effectiveness. Recent studies tend to show encouraging results on muscular flexibility, on recovery and on vascular function but not on performance. However, evidences on the subject are poor and more studies are needed about immediate and long term effects of SMR on performance, flexibility and recovery.

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Titre: Le football en Suisse. Enjeux institutionnels, sportifs et économiques.

Authors: Berthoud J[1]., Quin G[2]., Vonnard P[1].
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Abstract:

Introduction: Considérée par certains historiens[1] comme la « Petite Angleterre » du football pour son rôle dans la diffusion de la pratique sur le continent européen dès la fin du XIXe siècle, la Suisse est l'une des nations dont la place dans l'histoire du football est la plus méconnue, y compris auprès de ses propres citoyens. Ce constat est plutôt étonnant, notamment si l'on pense au rôle joué par de nombreux dirigeants helvétiques dans le développement du football européen et alors que le pays compte sur son territoire les sièges des deux principales organisations internationales qui gèrent l'organisation du football : la *Fédération Internationale de Football Association* (FIFA) et l'*Union des Associations Européennes de Football* (UEFA). Si depuis quelques années, sous la plume d'historiens comme Fabian Brändle, Christian Koller ou Pierre Lanfranchi, des travaux ont été menés (en allemand et en français), tant sur les rencontres internationales que sur les développements locaux du jeu. Si en 2008, un colloque sur l'histoire du football suisse a été organisé à l'Université de Lausanne, force est néanmoins de constater que les travaux sur le sujet restent épars et qu'il est difficile de les relier entre eux. Dès lors, le but de notre recherche est d'offrir une synthèse sur le développement du football suisse - de son arrivée à nos jours - qui doit permettre de faire ressortir les principaux enjeux institutionnels, économiques et sportifs de cette histoire. Plusieurs questions animent notre démarche telles que : *comment ce sport « britannique » a-t-il pu s'implanter durablement en Suisse jusqu'à en devenir le sport national ; quelles sont les grandes étapes du développement du football suisse ; quelle est la composition de son élite dirigeante ; quels sont les effets des dynamiques migratoires qu'à connu le pays depuis la fin du XIXe siècle sur le football helvétique ; quels rôles les différents acteurs économiques du pays ont-ils joué dans la structuration du football suisse ; à quel moment une pratique féminine du jeu s'est-elle développée.*

Méthode: Nous disposons en Suisse de très riches fonds d'archives sportives, en particulier en matière de football. Pour autant, ceux-ci n'ont jusqu'ici été que peu exploités. Pour ce projet, notre corpus se compose des documents officiels (principalement les procès-verbaux des assemblées générales et des comités exécutifs ainsi que la correspondance entre les membres) de l'*Association Suisse de Football* et des organismes internationaux (UEFA et FIFA). Cette documentation est complétée par une lecture attentive de plusieurs journaux sportifs (*Le Sport Suisse, La semaine sportive, Die Sport*) ainsi que par une large recension des livres commémoratifs des clubs et de l'association faîtière. Enfin, et dans le but d'approfondir spécifiquement certains éléments, des entretiens approfondis avec des personnalités ayant marqué le football suisse ces cinquante dernières années (comme H. Bangerter, M. Pont, M. Boll, H.-R. Hassler, E. Isoz, F. Rumo ou encore K. Kuhn) seront conduits.

Discussion: Le football constitue un fait social dont l'analyse permet de comprendre les transformations des mentalités suisses à travers le XXe siècle. Si le football est parfois un instrument de « géopolitique », il s'impose aussi comme un vecteur d'ouverture sur le monde et de construction nationale, jusqu'à incarner ces dernières années un modèle d'intégration des différentes vagues migratoires. Pour toutes ces raisons, une synthèse de l'histoire du football suisse est à la fois nécessaire et potentiellement réalisable. Notre contribution se donne pour ambition de poser quelques jalons de l'histoire du football suisse qui doit permettre de stimuler l'émergence de nouvelles recherches sur le sujet et d'offrir à un public plus large un récit sur l'histoire d'un jeu fortement lié au quotidien des habitants du pays.

1 L'emploi du masculin vaut pour le masculin et le féminin

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Title: Football et construction d'espoirs collectifs au Cameroun

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Abstract:

Introduction : Les récits de reconversions douloureuses de sportifs d'élite sont récurrents dans les médias. Aux difficultés de se réinsérer professionnellement s'ajoute généralement une difficulté de s'imaginer autre qu'un athlète de haut niveau. Malgré un avenir incertain, la carrière de sportif professionnel continue à susciter un intérêt, aujourd'hui de plus en plus globalisé. C'est notamment le cas des footballeurs africains, dont je souhaite comprendre les modalités d'engagement dans une carrière professionnelle, à partir de l'exemple du Cameroun.
De nombreux travaux se sont intéressés aux structures qui jouent un rôle dans le parcours footballistique et migratoire des footballeurs africains: académies (Darby et al., 2007 ; Darby et Solberg, 2010), clubs (Poli, 2011) et agents de joueurs (Frenkiel, 2014). Ces études ont permis de mettre en lumière le traitement particulier généralement réservé aux jeunes footballeurs africains tout au long de la chaîne migratoire. Néanmoins, les raisons qui expliquent pourquoi les jeunes africains choisissent de se diriger vers une carrière professionnelle sont peu connues. Elles ont par contre fait l'objet d'études dans le contexte européen et nord-américain. La plupart des travaux ont recours à deux concepts pour expliquer le mode d'engagement dans une carrière sportive : la socialisation et la vocation. Premièrement, l'environnement des athlètes est souvent basé sur le partage d'une « culture commune » et sur une prise en charge presque totale de leurs besoins (Wahl et Lanfranchi, 2002). Deuxièmement, comme cela peut aussi être le cas dans le monde artistique (Menger, 1999), la pratique du sport de haut niveau est souvent vécue sur le mode de la « vocation » (Roderick, 2006) ou du « désintéressement » (Bertrand, 2008). Pour reprendre les termes de Weber (2002), alors qu'un métier est un moyen de gagner sa vie, une vocation (*calling* en anglais) est une fin en soi qui n'implique pas de justification complémentaire. La majorité des travaux s'étant penchés sur l'engagement dans la pratique sportive concernent une population d'athlètes plus ou moins homogène, du moins en termes d'origine culturelle. Il semble ainsi intéressant de questionner l'usage des concepts de socialisation et de vocation dans la compréhension de l'entrée dans la carrière.
Au regard des nombreux travaux anthropologiques sur l'Afrique, il paraît légitime de penser que l'étude des conversions de footballeurs camerounais nécessite une approche complémentaire qui intègre leurs caractéristiques socio-culturelles et le contexte d'apprentissage du football au Cameroun. Je cherche ainsi à montrer comment se met en place une intériorisation de la croyance en un avenir professionnel au sein de la jeunesse camerounais. Je souhaite ensuite porter mon attention sur le choix de carrière, qui n'est pas uniquement le fruit d'un désir individuel, mais le résultat d'une construction avec les membres de la « grande famille » (Janin, 2003). Enfin, la troisième partie s'intéresse aux rôles des institutions qui donnent du crédit au projet de carrière footballistique, facilitant ainsi la conversion des jeunes footballeurs.
Methods : Les données de ce travail sont issues d'un travail d'ethnographie multi-situé (Marcus, 2010), effectué au Cameroun, en France et en Suisse. Ma méthode, tout comme ma problématique, s'est affinée au gré de ma récolte de données, respectant ainsi une démarche d'enquête inductive (Glaser et Strauss, 1967). Dans un premier temps, je me suis engagé dans un travail de recueil de récits de vie (Bertaux, 2010) auprès d'anciens footballeurs camerounais. Faisant face à la sensibilité du sujet de l'après-carrière, un important travail d'ethnographie est venu s'ajouter à mes entretiens, permettant de me rapprocher le plus possible des réalités du vécu des anciens joueurs. Une observation, parfois participante, a ainsi été mise en place dans la région parisienne, auprès d'une association de footballeurs camerounais « retraités » du football. Enfin, j'ai entretenu des relations plus régulières avec trois anciens joueurs rencontrés en France ainsi que plusieurs membres de leur famille, rencontrés à la fois en France et au Cameroun.
Results : La fin des années 1980 marque un changement dans la manière avec laquelle le football est perçu au Cameroun. D'intermédiaire permettant d'accéder à l'emploi, il se transforme progressivement en un but en soi. Ce changement de perception fait notamment suite à un contexte

économique peu favorable qui pousse les jeunes camerounais à délaisser un parcours scolaire qui ne garantit désormais plus une activité professionnelle. Inspirés par la réussite de quelques stars africaines en Europe, ils voient dans le football une manière d'atteindre une « nouvelle figure de la réussite sociale » (Banégas et Warnier, 2001). Le contexte d'apprentissage du football varie fortement entre l'Europe et l'Afrique ; les centres de formation et autres structures d'Etat dont il est question dans le modèle français par exemple sont encore souvent à un stade embryonnaire en Afrique. Ce constat remet quelque peu en question l'idée selon laquelle l'univers sportif serait un « monde à part » (Papin, 2007), séparé du reste de la société. Le milieu scolaire public, qui organise des championnats interclasses, ainsi que les terrains de quartier, sur lesquels sont organisés des tournois durant les vacances, sont quant à eux des espaces où les vocations peuvent se construire, non pas de manière isolée mais en interaction constance avec le milieu dans lequel ils grandissent. La carrière (Becker, 1985) des jeunes footballeurs camerounais semble en outre correspondre à des cheminements collectifs, impliquant tout l'entourage du joueur. S'engager dans une carrière de footballeur suscite des espoirs au sein de toute une famille, qui se rallie au projet sportif dès qu'elle en perçoit les potentielles retombées économiques et symboliques.

Discussion/Conclusion : La passion avec laquelle les jeunes camerounais s'engagent dans une carrière de footballeurs ne semble pas entrer en contradiction avec des intérêts individuels et collectifs. Il est toutefois difficile de parler d'engagement « désintéressé » lorsque l'on connaît le potentiel de « retour sur investissement » qu'un départ en Europe peut engendrer pour toute une famille.

Comprendre les conditions d'engagement des jeunes camerounais dans une carrière de footballeur, et en particulier les espoirs collectifs qui y sont associés, offre des éléments qui permettront de mieux saisir les difficultés posées par l'après-carrière. A la question de la reconversion professionnelle et du deuil identitaire qu'implique la fin de carrière, s'ajoute en effet la gestion des attentes familiales, souvent difficiles à combler.

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Title:
AltitudeOmics[2]: Effects of 16 days of acclimatisation to 5,260m on muscle deoxygenation during incremental exercise

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Abstract:

Introduction: In acute severe hypoxia (>4,500m), maximal oxygen consumption ($\dot{V}O_2max$) is impaired because of decreased cardiac output ($\dot{Q}c$) and arterial oxygen content (CaO_2). Despite normalisation of CaO_2 with chronic hypoxia, $\dot{V}O_2max$ remains similar to its acute hypoxic value. The Fick equation ($\dot{V}O_2 = \dot{Q}c \times (CaO_2 - C\bar{v}O_2)$) states that oxygen consumption ($\dot{V}O_2$) depends on $\dot{Q}c$, CaO_2 and tissue oxygen extraction, reflected in $C\bar{v}O_2$, mixed venous O_2 content. Near infrared spectroscopy (NIRS) allows inferring on muscle blood flow to $\dot{V}O_2$ ratio ($\dot{Q}m/\dot{V}O_2m$) and muscle deoxygenation. We hypothesized that acclimatisation to altitude would decrease $\dot{Q}m/\dot{V}O_2m$ and deoxygenation during incremental exercise.

Methods: 12 male and 9 female subjects performed cycling tests (3-min stages at 70, 100, 130, 160W and then 15W/min ramp to Max) at sea level (SL, 130m), upon arrival at 5,260m (ALT1) and after 15 days of acclimatisation (ALT16). Right vastus lateralis muscle deoxygenation profiles (NIRS, Oxymon, Netherlands) were fitted as double linear relationships with breaking points (BP), between deoxyhemoglobin (%SL HHb) and %SL$\dot{V}O_2$, from the first exercise stage to Max. For $\dot{V}O_2$ below BP, the slope of the %SL HHb vs. %SL $\dot{V}O_2$ relationship was interpreted as representative of $\dot{Q}m/\dot{V}O_2m$; above BP, a slope close to zero was interpreted as indicating oxygen extraction limitation.

Results: The %Sl HHb vs. %SL$\dot{V}O_2$ relationship below BP had similar slopes at ALT1 and ALT16 compared to SL, suggesting unchanged submaximal $\dot{Q}m/\dot{V}O_2m$ in hypoxia. Above BP, at SL and ALT1, slopes approached zero, suggesting oxygen extraction limitation. At ALT 16 slope above BP was positive, suggesting oxygen extraction reserve. The greatest muscular deoxygenation was observed at ALT1 (O_2Hb = -12.9, HHb = 15.1 µmol at 160W), whilst at ALT16 (O_2Hb = -6.9, HHb = 14.2 µmol at 160W) deoxygenation status returned towards SL values (O_2Hb = -8.2, HHb = 10.6 at 160W). Submax O_2Hb – HHb was lowered at ALT1 and had returned to SL levels at ALT16. O_2Hb – HHb at peak exercise was similar in all three conditions.

Discussion/Conclusion: Unchanged submaximal $\dot{Q}m/\dot{V}O_2m$ suggests maintained matching of muscle blood flow to metabolic rate. Similar slopes above BP in SL and ALT1 suggest oxygen extraction limitation. At ALT1 this occurred at lower $\dot{V}O_2$, indicating that increased muscle blood flow was not sufficient to compensate for decreased CaO_2. By contrast, positive slope above BP in ALT16 suggests oxygen extraction reserve. At ALT16 muscle deoxygenation returned back to SL values, explained by an increased CaO_2. Despite unchanged $\dot{V}O_2max$ with acclimatization at altitudes >4500m the factors limiting maximum aerobic capacity differ.

2 This study was part of the 'AltitudeOmics' project: Subudhi et al., PLoS One. 2014 Mar 21;9(3):e92191

Title:
The perception of critical situations involving football fans – how conflicts escalate or de-escalate

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Abstract:
Introduction:
Fan violence in the context of football matches is a prominent issue in today's western and Switzerland presents no exception. A lot of research has been conducted on reasons for fan violence, mostly with fans of national teams. A prominent model is the Elaborated Social Identity Model (ESIM; Drury & Reicher, 2000): ESIM highlights the importance of interactions between the involved groups and their effect on the development of social identities. Another model is the aggravation mitigation model (AM model; Hylander & Guvå, 2010) which illustrates factors that can contribute towards an escalation or non-escalation of group violence, such as the "categorization" of the opponent group. Despite these models, research about the individual perceptions, and in particular, what factors distinguish between an escalation versus a non-escalation of a potentially violent situation in domestic football, is as yet scarce. This explorative study examines perceptions of critical situations in the domestic football fan context in Switzerland.

Methods:
An explorative qualitative design was employed to gather data about critical situations (CS) around football matches of two clubs of the Raiffeisen Super League. A CS is defined as a setting in or around the football stadium where violence between football fans and another group could occur. Eight critical CS were identified and analysed. Fifty-nine narrative interviews with individuals involved in a CS, e.g. fans, police officers or security personnel, were conducted. Interviews were analysed using interpretative phenomenological analysis (IPA).

Results:
The involved opposing groups expressed group-specific perceptions. Furthermore a strong tendency to negatively stereotype the opponent group was observed. Provocative symbols, such as balaclavas or riot-gear uniforms, were considered as highly relevant for the interpretation of the situation. Successful communication and sufficient distance between opponent groups supported the appeasement of a CS. These findings also underline the importance of knowledge about the local fan culture. This culture serves as basis for the perception of legitimacy, which was assessed to be essential for a de-escalation of a CS by fans.

Discussion/Conclusion:
This study improves the understanding of fan violence in the domestic football context in Switzerland. Based on the results it is suggested to deploy security or police forces without riot gear but with the goal of seeking dialogue with the fans to increase the likelihood of a peaceful ending in a CS. The findings also support the applicability of the ESIM (Drury & Reicher, 2000) and the AM model (Hylander & Guvå, 2010) in the context of domestic fan violence. Due to possible differences in the local fan cultures in Switzerland, research in this area should be continued.

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Title:
Are mechanical alterations similar during repeated running sprints in hot versus hypoxic environments?

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Abstract:
Introduction:
The incidence of sporting events under important heat (environmental temperature >35°C) or hypoxia (altitude >2000 m) has increased. In team sports, these environmental conditions likely influence match outcomes through reduction in high-speed running and sprint distances. Controlled laboratory studies indicate that repeated sprinting is impaired in hot or hypoxic conditions compared to a control with earlier and larger performance decrements (Girard et al. 2011). Generally, these laboratory studies have used cycle ergometry as exercise mode, which prevent to understand the underlying mechanical basis of any change in sprint running performance. Furthermore, there is no direct comparison (same participants) of the effects of heat and hypoxia on repeated sprint ability, while description of sprint running mechanics has hitherto been limited to control test conditions (thermo-neutral / sea level environment) (Morin et al. 2011). We investigated alterations in running kinetics/kinematics and spring-mass characteristics during repeated running sprints performed in severely hot and hypoxic environments compared to neutral.
Methods:
Six male recreational sportsmen (team- and racket-sport background) performed five 5-s sprints with 25-s recovery on a sprint-treadmill (ADAL3D-WR, Medical Development – HEF Tecmachine, France). These were randomly conducted in neutral (25°C/45% rH) as well as hot (38°C/21% rH; end-exercise core temperature: ~38.6°C) and hypoxic (simulated altitude of 3600 m; end-exercise arterial oxygenation: 84%). Mechanical data consisted of measurement of running kinetics/kinematics and spring-mass characteristics for each sprint.
Results:
Heart rate and RPE increased across repetitions ($p<0.001$), independently of the condition, yet with higher ($p<0.05$) RPE values in the heat. Distance ran for 5 s during the first sprint was lower ($p<0.05$) in hot (23.0±2.0 m) compared to control (24.1±2.0 m) and hypoxia (24.0±2.2 m), while larger sprint decrement score (7.9±3.0% *vs.* 2.4±3.4% and 3.1±3.9%) and lower cumulated times (110.5±6.6 *vs*. 112.1±10.1 and 116.5±6.3 m) occurred in hypoxia *versus* hot and control. Contact and swing times lengthened from the first to the fifth sprint repetition ($p<0.001$), while centre of mass vertical displacement ($p<0.001$) and leg compression ($p<0.05$) increased with time. Propulsive power ($p<0.001$), stride frequency ($p<0.001$), mean horizontal forces ($p<0.01$), peak vertical forces ($p<0.05$), vertical ($p<0.001$) and leg stiffness ($p<0.01$) decreased with fatigue. Mean vertical and total forces, flight time and stride length changes were not significant ($p>0.05$). No main effect of the condition or any significant interaction between sprint number and condition was found for running kinetics/kinematics and spring-mass characteristics.
Discussion/Conclusion:
Preliminary evidence indicates that repeated sprint ability is impaired in hypoxic compared to control conditions and to a lower extent in a hot environment. However, fatigue-induced alterations in running kinetics/kinematics and spring-mass characteristics were not different between conditions.

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Title: Gender differences in power output and physiological responses during arm, upper body and whole body double poling

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Abstract:

Introduction:

In numerous endurance sports, male elite athletes outperform their female counterparts by approximately 10-12% (Thibault et al., 2010). Much of these gender differences have been attributed to inherent biological differences associated with higher maximal aerobic capacity, more muscle mass and lower percentage of body fat in males (Joyner, 1993). Recent performance comparisons in cross-country skiing have revealed gender differences of up to 20% in the double poling (DP) technique (Sandbakk, Ettema, & Holmberg, 2014). DP is one of the main cross-country skiing techniques and relies primarily on the upper body for propulsion. Therefore it can be expected that gender differences further increase when the upper body works in isolation. The main purpose of this study was to compare gender differences in power output, peak aerobic capacity and exercise efficiency between arm (AP), upper body (UP) and whole body poling (WP).

Methods:

Ten male (age: 21.4 ± 3.7 y.; VO_{2max}: 73.4 ± 4.8 ml/kg/min) and ten female (age: 22.9 ± 3.6 y.; VO_{2max}: 65.4 ± 4.7 ml/kg/min) trained and performance-matched cross-country skiers completed three 4-min submaximal exercise bouts followed by a 3-min all-out test on a modified Concept2 SkiErg in arm, upper body and whole body poling condition. Power output and physiological responses were measured during each test and body composition was determined using dual-energy X-ray absorptiometry. A two-way factorial ANOVA and a paired t-test were applied to determine the main effects of gender end exercise mode and to find differences between exercise modes.

Results:

During maximal 3-min DP, large increases in power output (Watt) were observed when trunk (60%) and legs (40%) were added, with females generating 69±12 W in AP, 110±19 W in UP and 152±28 W in WP and males generating 140±20 W in AP, 216±34 W in UP and 285±34 W in WP (all $p<0.01$). Males produced almost twice the power of females across all poling conditions and at the same time demonstrated significantly higher fractional utilization of maximal aerobic capacity. The relative gender differences progressively decreased with involved body mass (104, 97 and 87%). The power output-oxygen uptake relationship did not differ between genders, but was slightly elevated for arm compared to upper body and whole body poling.

Discussion/Conclusion:

The relative gender differences were greatest in isolated arm and upper body work. This finding coincided with the greater portion of muscle mass located in arms and trunk among males. Power output differences in mode and gender could partly be explained by differences in aerobic energy delivery capacity, but were relatively independent of the ability to convert metabolic energy into power. The current study demonstrated the significant role of the trunk and legs in DP and highlights the potential for arm and upper body strength and conditioning among female skiers.

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Title: Effects of differences in construction on the performance of stability boots

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Abstract:

Introduction:

Protecting the structures around the ankle joint from overstress is crucial for healing after serious ankle ligament injuries. Ankle and ligaments can be stabilized in an orthopedic shoe while keeping the patient mobile (Müller, 1996). The purpose of this study was to compare different stability boots using the fast testing method (FTM) (Roost et al. 2013).

Methods:

Six different models of stability boots were used in this study and named (A, B, C, D, E and F) according to their stiffness in plantar flexion. The stability boots were mounted on the FTM (Roost et al. 2013). The lacing pressure was controlled using balloon pressure sensors mounted on the instep and dorsal shank of the test foot. Bodyweight was simulated by applying a vertical force (700N) using a pneumatic actuator. Plantar flexion, dorsal extension, inversion and eversion in the ankle were performed five times each with each of the six different stability boots. Considering the measurement device, the difference between the four movements was either the rotational direction of the movement arm or the orientation of the boot. For each measurement the motor rotated the test foot until the applied torque, controlled by the maximal current input to the motor, balanced the internal torque produced by the boot. As the maximal current input to the motor was consistent for all the stability boots, the ROM of the test foot correlated with the stiffness of the boot. The applied torque for each anatomical movement was chosen to be consistent with the torque experienced during human gait. Prior to measuring the five trials in each rotational direction, the test foot was rotated over a predefined angle bigger than the one expected during the measurements. The purpose of this break in was to reduce the effects of shifting of the test foot within the stability boot during the five consecutive measurements.

Results:

Standard deviations of the maximal joint angles over the five measurements in the same condition lay between zero and five percent. The largest range in the mean maximal joint angles was found in dorsal extension (8.0°-14.9°), while the smallest range was found in eversion (2.8°-3.9°). Plantar flexion (3.9°-7.5°) and inversion (5.5°-8.5°) showed similar ranges for their means. The mean maximal plantar flexion angles were 3.9° (A), 5.5° (B), 6.0° (C), 6.0° (D), 6.3° (E) and 7.5° (F). The mean maximal dorsal extension angles were 8.0° (F), 10.7° (E), 11.1° (B), 11.7° (C), 13.1° (D) and 14.9° (A). The mean maximal inversion angles were 5.5° (B), 5.6° (D), 6.7° (E), 7.0° (F), 7.1° (A) and 8.5° (C) and the mean maximal eversion angles were 2.8° (E), 2.9° (B), 3.1° (A), 3.2° (D), 3.5° (C) and 3.9° (F).

Discussion/Conclusion:

The applied torque was much smaller for eversion and inversion than plantar flexion. The smallest range for eversion is due to the small applied torque and the high stiffness of the boots. The values were too similar to be able to detect any differences. The large range for dorsal extension can be explained with the high applied torque and differences in the boot construction. No boot was found to have an overall higher stiffness than any other boot. The function of the stability boots was defined by their design, material and construction.

This study is part of the KTI founded project with Künzli AG.

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Title: The professionalisation of international sport federations in Switzerland: its beginnings and the reasons behind it

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Abstract:

Introduction:

Within the last 20 years, international sport federations (IF) have become (so far) undefined hybrids: sport as a common good and with a societal mission, but also source of business and expandable markets. In the course of adaptation to new contexts, IFs' nature often changes.

Applying a systems-based approach, the study seeks to understand the beginnings as well as the external and internal reasons of professionalisation within IFs. From an internal point of view, one has to ask which internal factors promote or hinder processes of professionalisation? Who are the central actors/initiators of professionalisation processes and which events are essential for initiation process of professionalisation? In which way have member organisations (national/continental federations) influenced processes of professionalisation?

Some research can be found on the professionalisation of national sport federations and their organisational change (i.e. Amis, Slack & Hining, 2004; Griginov & Sandanski, 2008; Fahrner, 2008, 2009a, 2009b), the transition from volunteer staff to professional staff (i.e. Shilbury & Ferkins, 2011; Thibault, Slack & Hinings, 1991) as well as the consequences of professionalisation on governance (i.e. Ferkins, Shilbury & McDonald, 2005; Shilbury & Ferkins, 2008; Dowling, Edwards & Washington, 2014). There is very little research on governance, management and professionalisation of IFs (Arcioni & Bayle, 2012; Mittag & Putzmann, 2009). Moreover, in many studies, professionalisation is reduced to the perspective of paid staff. Our research aims to develop new perspectives to analyse and understand processes of professionalisation. In a first approach, we therefore want to understand the reasons behind the process of professionalisation in international sport federations.

Methods:

As part of an exploratory study, 9 semi-structured interviews have been conducted with experts (i.e. general secretaries, executive directors) from umbrella sport organisations such as SportAccord, WADA, ASOIF, as well as with sport leaders having left a considerable imprint in the world of sport federations during the last years.

The results of the interviews and official documents (annual reports, factsheets, criteria catalogues) have been compared with existing literature on the subject (revue articles, dissertations, reports, etc.) revealing important turning points in the professionalization process of IFs: in 1992, each of the 25 participating federations was allocated $1.5 Millions (first Olympic revenue-sharing); in 2012 (London Games), this tendency culminated in an all-time high totalling $526 Millions to be shared between 28 federations. Parallel to this, the commercialisation of mega events (sponsoring, TV rights) is a general trend visible amongst all federations (the UCI generated KCHF 16.6 via its World Championships in 2013). Depending on the strategy managers and executive boards adopt and the political context, federations develop different forms of professionalization (i.e. no top-down process of professionalisation of the international sporting and administrative headquarters to continental and national levels). First exploratory studies show that there is no systemic approach to the professionalization process of international sport federations.

Discussion/Conclusion:

1. Hypothesis: Sport federations' professionalisation is mainly focussed on international federations, with little or no expansion on continental and national level.
2. Hypothesis: Professionalisation processes and forms differ according to the style of governance.
3. Hypothesis: The professionalisation of sport federations' headquarters mainly concerns three departments: administration, marketing and legal department.

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Title: Reduced depression experienced after 12 weeks of physical activity training in patients following surgery for aneurysmal subarachnoid haemorrhage

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Abstract:

Introduction:

Although the chance of surviving an aneurysmal subarachnoid haemorrhage has increased steadily in recent decades, deficits in numerous areas are frequently experienced post-ictus, which can negatively impact life quality in the long term. (Baisch, Schenk, & Noble, 2011; Rinkel & Algra, 2011) Previous research has shown that mental well-being,(Wermer, Kool, Albrecht, & Rinkel, 2007) subjective sleep,(Schuiling, Rinkel, Walchenbach, & de Weerd, 2005) and memory(Sheldon, Macdonald, & Schweizer, 2012) are among the domains affected. There is evidence that regular physical activity can positively influence each of these aspects;(Penedo & Dahn, 2005) consequently, the aim of the present study was to shed light on the effects of exercise training on a broad range of parameters which may be deficient in aSAH patients.

Methods:

48 participants (M age=58.03 years, SD=12.57, 30 female, 18 male) took part in the study; one group had undergone surgery for a ruptured aneurysm (n=15), one group had undergone surgery for a meningioma (n=16), and the final group consisted of healthy controls (n=17). The rationale for including meningioma patients was to be able to assess the effects of exercise training on aSAH patients, controlling for the additional traumatic effects of having undergone brain. Following baseline assessments, all participants took part in 12 weeks of individualized exercise training. Data on depression, perceived stress, hypochondria, sleep complaints, rumination, satisfaction with life, and verbal memory were collected immediately following this phase, and once more 6 months later as follow-up.

Results:

The findings from repeated measures ANOVAs, applying the intention to treat principle with LOCF, show a significant time x group interaction for depression, perceived stress, and life satisfaction. While depression levels were reduced in both post-surgery groups, aSAH patient continued to display high perceived stress and poorer life satisfaction, while these domains improved in the meningioma group. No significant time x group interaction was found for hypochondria, verbal memory, sleep complaints or rumination, although descriptive differences were observed in these domains.

Discussion/Conclusion:

ASAH patients experienced reduced depression immediately following a 12 week exercise programme, but did not experience significant improvements in other domains. While the efficacy of exercise training in combatting depression was supported, implementation must be regular, and could usefully be enhanced by tailoring training to meet more specific improvement goals in the affected domains.

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Title:
Conversion to bodybuilding
Published in IRSS : http://irs.sagepub.com/content/early/2014/11/13/1012690214557102.abstract

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Abstract:
Introduction:

Many studies focus on the spectacular aspects of bodybuilding *subculture*, especially on the gender issues related to the hyper-muscular male body (*e.g.* Klein, 1993) or female body (*e.g*. Bunsell, 2013) and health issues (*e.g.* Monaghan, 2001). Without ignoring these enlightening works, this study takes another angle of view because of an enigma to be solved: why do some gym enthusiasts, who seem to be ordinary people, become 'orthodox' bodybuilders? Most gym enthusiasts remain, as in other domains of culture, 'simple consumer-spectators' (Lahire, 2014: 75) and only a fringe of this population shifts to the 'closed order of bodybuilding' (Brown, 1999: 84). As a consequence it should be interesting to shed further light on the transition between these separated statuses by considering carefully the temporality of the processes that lead some gym users to organise their existence around bodybuilding. This research perspective is also relevant to understand how bodybuilding *subculture* manages to bring together a heterogeneous community (Probert et al., 2007) and transcends, to some extent, age, gender and social background. We consider the pivotal phases identifiable in bodybuilders' careers (Becker, 1963) as conversions. In order to understand the conversion to bodybuilding, and according to Gooren's (2007) research on conversion phenomena, we focus on the relations between the following dimensions: (a) the relation that individuals have to their bodies, which is bound up with the logic of taste, (b) the interactions in the spatial and symbolic structure of the gym, and (c) the social configurations in which individuals are situated outside the gym.

Methods:

This study is based on data derived both from participant observations in a gym and from interviews with gym enthusiasts in French-speaking Switzerland. Our immersion in the gym world lasted a year and a half and enabled us to collect *in situ* qualitative data on the interactions among participants in the gym. We also conducted thirty semi-structured interviews. From the occasional user, willing to get fit or lose some weight, to the almost professional seasoned bodybuilder, our sample of interviewees is heterogeneous in terms of age, sex, marital status and occupation. One of the original features of our research is that we distinguish *a posteriori* two groups of gym-goers in our sample: a group of ordinary users and a group of converts. The differentiation of these two groups is linked to their goals, their degree of investment in the practice of weight training and their discourses, which reflect a greater or lesser proximity with the bodybuilding doxa.
The analysis was organised with a view to classifying and comparing certain themes identified previously in the introduction. In a second step, we discuss the pertinence of using the notion of conversion and we compare the dynamics that lead gym enthusiasts' careers through an abductive analysis to produce theoretical insights (Timmermans & Tavory, 2012).

Results:

I. TWO DISTINCT PATHS TO CONVERSION
The argument habitually mobilised to explain entry into a gym is a relation to the body that is experienced as problematic. Nevertheless, the initial motive, expressed by all our respondents, is far from entailing a future conversion, since 'joining a gym is different from sticking at it' (Crossley, 2006, p.46). The process of conversion sets in later and analysis of our respondents' life courses enables us

to identify the determinants of it. Towards a consonant conversion: The first path can be seen as extending previous socialisations that valorise strength and size of muscles. As such, this modality of conversion is explained in part by tastes that correspond to both practices and perceptions (Bourdieu, 1984). This path to conversion has a utilitarian dimension inasmuch as individuals see a coherence between their investment in bodybuilding and other social spheres. Towards an introspective conversion: the second path is socially more diversified. It more concerns individuals who feel they have become fragile in their personal lives and who experience the conversion to bodybuilding as a 'turning point' (Hughes, 1950) that enables them to recover a grip on life. The two conversion paths identified are ideal-types, in Weber's sense, between which the individuals interviewed are divided; some, indeed, may be situated at the frontier between the two categories.

II. FROM LAYPERSON TO CONVERT

Whatever the form of conversion, the mechanisms of adherence and the sense of election are similar. The conversion to bodybuilding results from an individual and collective effort strongly linked to the interactions and relationships that the individuals form with the community of converts. We have identified several stages leading to conversion. The discovery of the gym, as a first stage, corresponds to the identification of a local order (Goffman, 1983), which underlines his status for every outsider. In a second stage, the admission of certain laypersons to the community of bodybuilders can only take place through a system of co-option and a mutual recognition. The group of converts ignores novices who are judged too dilettante to be worthy of interest and/or valorises those who are strongly invested. More than inducing these signs of recognition by insiders, pre-converts are receptive to it. The third stage is characterised by progressive acculturation into the norms of the practice, which include the adoption of an ascetic lifestyle (a demanding training plan, a strict diet and pharmacopraxis). The accumulation of a physical capital, which is recognised inside the community, also provides other forms of capital (Brown, 1999).

III. THE EFFECTS OF CONVERSION

While the strength of the rituals of deference smooths the differences, or occasionally neutralises them, it does not prevent the later consequences from being differentiated. Our results show that these transformations inherent in the conversion to bodybuilding affect life courses in several different ways depending on the path to conversion that has been taken. While *consonant* conversions stabilise life trajectories by reinforcing an occupational status, *introspective* conversions inflect them significantly, especially for women due to their "gender outlaws" status (Shilling & Bunsell, 2009).

Discussion/Conclusion:

Conversions to bodybuilding are only intelligible if we pay particular attention to the diachronic evolution of the body perception, the interaction in the gym and the social configuration in which individuals are situated outside the gym. The meaning that individuals give to their conversion to bodybuilding lies in these relationships and in certain forms of conjunction between these three dimensions. More than highlighting the heterogeneity of bodybuilding devotees (Probert et al., 2007), our results explain it by two paths that raise questions about the theoretical models mobilised. By bringing to light the fact that the recruitment of bodybuilding devotees does not take place only in modest, low-skilled social categories, we show that the taste for bodybuilding cannot be understood solely through an approach in terms of dispositions (Bourdieu, 1984). The hold taken by the interactions in the gym is very strong and legitimates the theoretical perspectives of symbolic interactionism. These observations reveal the interest of articulating the theoretical models. In line with Mennesson (2000), we maintain that conversion to bodybuilding, as for boxing, 'depends on both disposition and situation' (2000, p.21). Although conversion to bodybuilding can hide social differences, it does not erase them, and the social consequences of these incorporated transformations during bodybuilders' careers differ according to the two paths we identify.

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Title:
La naissance du mouvement du sport pour handicapés physiques en Suisse de 1956 à 1975 : le modèle compétitif à l'origine d'une structure bicéphale

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Abstract:
Introduction: En 2012, les Jeux Paralympiques de Londres ont regroupé de nombreux athlètes venus de cent-soixante-quatre pays[3], attestant d'une croissance importante depuis les premiers Jeux Paralympiques[4] qui avaient réunis dix-sept pays à Rome en 1960. L'évolution du nombre de nations présentes lors de cette compétition révèle un fort développement de l'accès et de l'organisation du sport pour les personnes handicapées. Si la Suisse est présente dès les premiers Jeux Paralympiques, les pionniers helvètes se préoccupent essentiellement de la manière dont les enfants handicapés pourraient accéder au sport. C'est parce que cette priorité va évoluer que cela va créer de fortes dissonances entre eux. Ainsi, le fait que le mouvement suisse est aujourd'hui composé de deux entités institutionnelles distinctes ne doit rien au hasard. Cette division trouve son origine dans les années soixante, au moment où les acteurs du mouvement suisse cherchent à institutionnaliser leurs pratiques. En 1956, *Sport-Handicap* est la première association suisse à proposer et à organiser des activités physiques et sportives pour toutes les personnes handicapées physiques. Dix ans plus tard, en 1966, le *"Groupe Para"* de l'*Association Suisse des Paralysés* (ASPr) devient le point de ralliement des sportifs en fauteuil roulant lorsque ceux-ci ne se reconnaissent plus dans la ligne directive proposée par la *Fédération Suisse des Invalides* (FSSI), posant les prémices d'une longue opposition. Grâce à l'analyse couplée des archives de ces institutions et des témoignages des principaux protagonistes, nous analyserons les débuts du sport pour handicapés physiques en Suisse, puis ses premières évolutions. Cette approche, centrée sur les oppositions, sera l'occasion de mieux saisir pour quelles raisons ce mouvement sportif national est demeuré bicéphale.
Methods: Pour répondre à notre problématique, différents types de sources ont été recueillies puis analysées : des archives écrites et des sources orales. Au cours de leur analyse, elles ont été croisées afin d'établir les faits éclairant les dynamiques d'opposition étudiées.
Concernant les sources écrites, nous avons utilisé les archives des institutions : la presse fédérale de *Sport-Handicap* de 1956 à 1976 et de la *FSSI* de 1960 à 1976, les comptes-rendus des assemblées générales de ces deux structures et quelques correspondances. Nous avons également pu accéder aux archives personnelles conservées par les différents acteurs rencontrés : articles de presse, correspondances et photographies.
En ce qui concerne les sources orales, nous avons opté pour la méthode qualitative[5]. Nous avons ainsi effectué une série d'entretiens semi-directifs. Ces derniers sont réalisés à partir d'une trame de questions portant à la fois sur l'institution et sur les trajectoires de vie des personnes interrogées. Ainsi, ils offrent un cadre qui permet de rester centré sur ce que le chercheur étudie, tout en laissant la personne interrogée développer son point de vue, son ressenti, son histoire. Nous avons rencontrés trois acteurs, chacun impliqués soit à la FSSI, chez Sport-Handicap ou au club de Kriens et deux anciens athlètes ayant participés aux Jeux dès 1960. Ce type d'entretien permet de « reconstruire des pratiques, de mettre à jour des interactions sociales, des stratégies, et d'obtenir des opinions (…) sur un sujet donné. »[6].
Results: En 1956, *Sport-Handicap - Association d'éducation sportive des diminués physiques* voit le jour à Genève sur l'initiative du pasteur Hubert Grivel. Son objectif est de proposer des activités

[3] http://www.paralympic.org/results/historical (consulté le 8 décembre 2014).
[4] Le terme "Jeux Paralympiques" n'est utilisé qu'à partir de 1988 (Brittain Ian, *The Paralympic games explained*, Londres, Routledge, 2010, 172 p.). Mais de manière générique nous allons ici, utiliser ce terme afin de clarifier notre propos.
[5] Dumez Hervé, « Qu'est-ce que la recherche qualitative ? » in *Le Libellio d'AEGIS*, vol. 74, 2011, pp. 47-58.
[6] Alami Sophie, Desjeux Dominique et Garabuau-Moussaoui Isabelle, *Les méthodes qualitatives*, Paris, Presses Universitaires de France – Que sais-je ?, 2013, p. 57.

sportives aux enfants handicapés pour qu'ils puissent « jouir d'un développement normal »[7]. Il prend contact avec le Général Guisan, qui accepte de l'aider. Un *Comité de travail pour le sport des invalides* est alors organisé à Macolin, à l'école fédérale de gymnastique et de sport – qui relève du département militaire fédéral – afin de proposer un dispositif applicable rapidement. Ainsi, dès 1958, des cours pour devenir moniteur de sport pour personnes handicapées sont dispensés par Marcel Meier, un enseignant de sport de Macolin. Pour lui, le sport à destination des handicapés physiques ne doit pas être compétitif, mais orienté vers le « développement moral ». Sa conception semble très imprégnée de celle défendue par l'Armée durant la Seconde Guerre mondiale. En effet, le sport – principalement le ski pour protéger les chaines de montagne – est devenu un atout militaire important durant le conflit, car il permettait d'encourager l'esprit d'équipe et de cohésion (dans une perspective non compétitive). La formation proposée, créée et dispensée dans une école sous tutelle militaire, apparaît comme le prolongement de cette conception.

Du côté Romand, Hubert Grivel initie ses leçons de gymnastique avec quelques enfants dispensés de sport à l'école. Il se rapproche du centre Beau-Séjour à Genève et fait la connaissance de Marcel Vuilleumier, physiothérapeute, qui propose d'intégrer ses patients paraplégiques aux leçons du pasteur. Afin de permettre à chacun de participer, quel que soit son handicap, ils installent tout le monde dans des fauteuils. C'est ainsi que démarrent les entrainements de basket-fauteuil qui les mèneront jusqu'aux Jeux Paralympiques de Rome. A partir d'un même objectif de départ, deux types de pratique se développent donc : d'un côté une activité sportive anti-compétitive, de l'autre une pratique où la compétition devient le leitmotiv des jeunes pratiquants.

Dès 1960, la FSSI est créée. Le nom choisi indique l'orientation prise : la FSSI est résolument opposée à la compétition. Néanmoins, ce parti-pris ne convient pas à tous. Il est à l'origine de la séparation en deux entités. Si Toni Lustenberger est membre de l'association *Sport-Handicap* de Lucerne, souvent, lors des cours, « *il reste dans son coin parce qu'on ne sait pas quoi proposer à une personne en fauteuil roulant* » : « *Il y avait les aveugles, les amputés, tous dans la même salle. Ca ne marchait pas ! C'est pour cela qu'il a eu l'idée de créer à Kriens son propre club de sport pour les fauteuils roulants*[8]. » En 1966, Ernst Michel et Werner Waldispühl, tous deux paraplégiques, l'aident à créer le premier club sportif suisse réservé aux fauteuils roulants. Ils proposent à André Deville, beau-frère de Werner, enseignant et moniteur de ski, de les entrainer. Pour cela, il doit se former et suivre les cours de moniteur de la FSSI à laquelle le club est affilié. N'adhérant pas à la conception fédérale et aux cours de Marcel Meier, il interrompt toutefois brutalement sa formation. Selon lui, « *être compétiteur ça n'a rien à voir avec les muscles et les nerfs, c'est une question de la tête et du cœur ! Alors, si on enlève la possibilité à un handicapé… s'il est compétiteur… et bien, c'est ça qui est nuisible* ! »[9].

Ce point de vue est partagé par les membres du club de Kriens, qui décident de se séparer de la FSSI. Le club de Kriens étant affilié au "*Groupe para"* de l'ASPr, cette structure devient alors, jusqu'en 1975 et la création de l'Association Suisse des Paraplégiques (ASP), l'institution de référence pour le sport en fauteuil roulant. Face à l'accroissement du nombre de clubs et au désir de participer chaque année aux Jeux de Stoke Mandeville (la compétition internationale de référence pour le sport en fauteuil roulant), et tous les quatre ans aux Jeux Paralympiques, André Deville propose la création d'une Commission Sportive au sein de ce "*Groupe Para"*. En 1968, après les Jeux de Tel-Aviv, la décision est prise : chaque sport sera représenté par une personne de référence pour l'ensemble du pays. C'est le début de l'institutionnalisation du sport en fauteuil roulant en Suisse et, dans le même temps, du sport d'élite pour les handicapés physiques.

Discussion/Conclusion: Les Jeux de Toronto de 1976 obligent la FSSI à revoir sa conception. Les Jeux Paralympiques, jusque-là réservés aux seuls athlètes en fauteuils roulants, sont alors ouverts aux athlètes aveugles et amputés. Désormais, pour pouvoir exister pleinement sur la scène internationale du sport pour handicapés physiques, la Suisse doit intégrer cette modification au sein du fonctionnement de son institution principale[10]. Si les athlètes en fauteuil roulant poursuivent déjà ce but compétitif à l'ASP, la FSSI doit réajuster ses objectifs. Cela n'a toutefois pas d'impact sur la structure du mouvement, qui demeure encore aujourd'hui scindée en deux entités.

[7] Procès verbal de la réunion du comité de *Sport-Handicap* du 13 septembre 1956.
[8] Entretien avec André Deville, le 14 octobre 2014.
[9] *Idem*.
[10] La FSSI est reconnue en 1974 par Swiss Olympic alors qu'il faudra attendre 1994 pour l'ASP.

Title: Les altérations posturales induites par une fatigue des fléchisseurs plantaires sont-elles majorées par l'hypoxie hypobarique comparativement à l'hypoxie normobarique ?

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Abstract:
Introduction: La stabilité posturale est essentielle dans certaines situations sportives, cependant elle peut être altérée par l'exercice physique général ou local (Paillard, 2012). Des études antérieures (Baumgartner & Bartsch, 2002; Cymerman & al., 2001) montrent qu'en altitude, le manque d'oxygène déstabilise l'homme et que son équilibre est modifié. Une étude récente de Degache et al., (Degache & al., 2012) a également montré que le contrôle postural n'était pas altéré de la même manière en hypoxie normobarique qu'en hypoxie hypobarique. Or certains sportifs tels que les alpinistes sont soumis à la fois aux effets de l'hypoxie et de l'exercice. On peut supposer, qu'en altitude, l'exercice est un facteur supplémentaire d'altération de la stabilité posturale. Or, en alpinisme, un changement des conditions d'équilibre peut probablement être à l'origine de chutes.
Méthodes: Douze jeunes sujets sains âgés de 24 ± 3 ans ont été inclus durant 3 phases successives expérimentales randomisées. Chaque phase était composée d'une mesure du contrôle postural bipodal en condition statique yeux ouverts (YO) puis yeux fermés (YF) de 51.2 secondes avant et après une épreuve fatigante. L'épreuve de fatigue consistait à effectuer un maximum de flexions plantaires sur un *step* en 30 secondes et ceci répété 8 fois. Entre chaque série était effectuée également une mesure de posture YO de 25.6 secondes. Cette phase expérimentale a été réalisée en condition de normoxie normobarique -NN-, en condition d'hypoxie normobarique -NH- et en condition d'hypoxie hypobarique -HH-.
Résultats: L'ensemble des paramètres de stabilité posturale (surface, longueur, trajectoire et vitesse de déplacement du centre de pression) sont tous significativement différents (tous à $p<0.001$) en condition de post fatigue. De plus tous ces paramètres de postures sont significativement plus élevés en -HH- par rapport à la condition -NN- ($p<0.05$), alors qu'aucune différence significative n'a été relevé entre -NH- et -NN-. Une interaction significative a également été trouvée entre le facteur *« temps »* et le facteur « *condition »,* pour la longueur la moyenne de vitesse de déplacement du centre de pression.
Discussion/Conclusion:
Cette étude a permis de confirmer que le contrôle postural semble davantage perturbé par la condition en hypoxie hypobarique que par la condition d'hypoxie normobarique. En effet, déjà en condition de repos (avant la tâche fatigante), l'hypoxie hypobarique induit de l'instabilité postural (les valeurs sont significatives pour la surface et les longueurs de déplacement du centre de pression) alors qu'aucune valeur n'est significative pour dans la condition d'hypoxie normobarique. Ces résultats suggèrent que la pression barométrique aurait également un effet important sur le contrôle postural, tout comme le changement de la fraction d'oxygène. De plus, des interactions significatives entre le facteur « *fatigue »* et le facteur « *temps »* ont été trouvé pour plusieurs paramètres. Les effets posturaux de l'hypoxie hypobarique semblent donc majorés par une fatigue musculaire.

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Title:
Sportmotorische Leistungsfähigkeit und schulische Leistung – Zum mediierenden Effekt der exekutiven Funktionen

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Abstract:

Introduction:
Die sportmotorische Leistungsfähigkeit (SMLF) hängt nicht nur positiv mit der körperlichen Gesundheit zusammen, sondern gilt auch als Prädiktor für die schulische Leistung (SL) (van der Niet, Hartmann, Smith, & Visscher, 2014). Um die Frage zu beantworten, wie denn zwei auf den ersten Blick so distale Merkmale zusammenhängen sollen, werden unterschiedliche erklärende Variablen diskutiert, wobei die kognitive Stimulationshypothese die exekutiven Funktionen (EF) als mediierende Variable im Zusammenhang zwischen SMLF und SL postuliert. Die Annahme hierbei ist, dass die mit komplexen motorischen Kontrollprozessen einhergehende kognitive Beanspruchung bei einem wiederholten Ausführen von nicht-automatisierten sportbezogenen Handlungen zu einer Aktivierung und somit Förderung der EF führt (Best, 2010). EF, verstanden als höhere kognitive Prozesse, die ein zielorientiertes und situationsangepasstes Handeln erlauben, sind für den schulischen Erfolg von zentraler Bedeutung und gleichzeitig wichtige Prädiktoren der SL (Diamond, 2013). Obwohl diese Mediation seit einigen Jahren in der Literatur diskutiert wird, wurde sie bis heute noch nicht mit Hilfe längsschnittlicher Daten geprüft. Daher wird im Folgenden der mediierende Effekt der EF im Zusammenhang zwischen SMLF und SL getestet.

Methods:
Im Rahmen der Studie *Sport und Kognition 5.0* wurden insgesamt 237 Primarschulkinder (52.3% ; 11.31 ± 0.62 Jahre) zu drei Messzeitpunkten in ihrer SMLF (T1) und ihren EF (T2) getestet. Zusätzlich wurde die SL (T3) mittels objektiver Schulleistungstests (Mathematik und Deutsch) erhoben. Um die Hauptfragestellung zu prüfen, ob die SL vorwiegend mediiert über die EF durch die SMLF vorhergesagt werden kann, wurde eine bootstrapping-basierte Mediationsanalyse in AMOS 22 durchgeführt.

Results:
Das theoretisch abgeleitete Strukturgleichungsmodell (χ^2 (22, N = 237) = 30.357, p = .110; CFI = .978) weist eine zufriedenstellende Anpassungsgüte auf. Erwartungsgemäss zerfällt der Zusammenhang innerhalb des Mediationsmodells zwischen der SMLF und der SL, alsbald die EF ins Modell aufgenommen werden (β = .16, p = .634). Sowohl der Zusammenhang zwischen der SMLF und den EF (β = .38, p = .039), als auch der Zusammenhang zwischen den EF und der SL fallen signifikant aus (β = .91, p = .001) und ergeben dabei eine volle Mediation über den indirekten (p = .021) und totalen Effekt (p = .001).

Discussion/Conclusion:
Die erstmals vorliegenden längsschnittlichen Daten bestätigen den Zusammenhang zwischen SMLF und SL bei einer Mediation über die EF und decken sich mit den, aus einem querschnittlichen Design stammenden, Befunden von van der Niet et al. (2014). Zur Steigerung der schulischen Leistung sollten zukünftige Schulsportinterventionen die SMLF von Kindern erhöhen und dabei die EF bei der Auswahl von sportlichen Aufgaben mitberücksichtigen.

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Title:
Decision-making processes in football clubs in relation to an external advisory program

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Abstract:
Introduction:
Volunteers continue to be the most important resource of such. However, many Swiss sports clubs are reporting problems, particularly when it comes to recruiting and retaining. However, problems with volunteer activities in the clubs have noticeable consequences for the association too, for example with regard to talent promotion, ensuring that regular matches and tournaments can be held etc. Faced with these problems, sports clubs are obliged to introduce and implement changes to their volunteer management. Accordingly, sports associations are trying to fulfill their duties to their member clubs as an umbrella organization and to assist them in tackling the problem by offering them advice or providing them with the available regulatory knowhow (portfolios, checklists). It is often observed that standardized advisory input leads to differences in the way it is implemented and in the solutions to the problems. This means that such implementation processes are strongly linked to specific conditions under which they are reproduced in the club. According to Luhmann's organizational sociological considerations (2000), organizations (in this case, sport clubs) must be viewed as social systems consisting of (communicated) decisions. Accordingly, the implementation of external advisory input is associated with (complex) club specific decision-making processes, and these have to lead to appropriate decisions for handling the difficulties and problems with volunteers more effectively. Hence, the present study asks superiorly: How do decision-making processes in relation to external advisory work in sport clubs, and which characteristics can be identified?
Current sport club research has paid little attention to decision-making processes in relation to external advisory programs in which clubs are involved voluntarily. To bridge this gap, our study uses explorative case studies to analyze the decision-making processes in football clubs and focuses on the way in which clubs handle external inputs (as a kind of advisory impulse):
What processes, mechanisms, and factors underlying these club specific decisions can be explored in more detail? How can club specific decision-making processes and divergences as well as common ground in the way that clubs approach them be identified? In addition, what factors are crucial for developing sustainable advisory concepts and management tools?

Contextual Background:
Taking the sport clubs specific characteristics into account, an advisory tool was developed in the form of four workshops, serving as a type of a systemic advisory service (Bette, 2009). The advisory program therefore only aims to encourage the sports clubs to change from within, by making available suitable knowhow for their guidance and examples of possible actions (Bette, 2009). Schematically, the program was divided into three phases: orientation & initiation, communication & information and recruitment & retention.

Theoretical Framework:
The following considerations are based on applying concepts from behavioral decision-making theory, which assume that bounded rationality is a fundamental characteristic of decisions in organizations. Nonprofit organizations, in particular, are shaped by a specific mode of decision-making that Cohen, March, and Olsen (1972) have called the 'garbage can model'. The key concept in the garbage can model is the assumption that decision-making processes in organizations consist of four "streams": (a) problems, (b) actors, (c) decision-making opportunities, and (d) solutions. These four streams will now be applied to sport clubs.

Methods:
In order to map the decision-making processes in sports clubs in connection with an external advisory, a case study design was chosen. Case studies are particularly suitable when examining

questions about the whys and wherefores of a process and pursuing an explorative approach (Yin, 2009). The data used to analyze the decision-making processes in football clubs were collected in the course of the project MFiF (More Volunteers for Football Clubs). Case studies were conducted in order to map the organizational decision-making processes in sports clubs in the context of implementing external advisory programs. The in-depth analysis was carried out based on the streams of the garbage can model in ten Swiss football clubs. The aim of the method was reduce and defuse this problem. The people participating in the workshops on behalf of the clubs were the obvious choice for the expert interviews. Thanks to their good access to information and their comprehensive knowledge about the clubs and their procedures, these key individuals (experts) were able to describe the processes, in particular the decision-making processes, in the desired context during group or individual interviews. The interviews were analyzed based on Mayring's (2010) qualitative content analysis, because this approach guarantees a high level of intersubjective comprehensibility and comparability.

Results:
First, groups will be formed to distinguish between clubs which implemented the method and the volunteer recruitment measures to different degrees. Secondly, it is the aim to shed light on the characteristics of the decision-making processes during the different phases of the process and in the context of the external advisory program. Subsequently, we will establish which decision-making practices lead to new measures being adopted in the field of volunteer recruitment, and which decision-making practices promote the continuation of existing habits. Finally, the success of volunteer recruitment in the context of the advisory process in the participating clubs will be discussed in relation to the decision-making processes.

In terms of the implementation, differences and variations in degree can be observed. When grouping the clubs, the focus will lie particularly on the documents that were developed further and those drawn up independently, since these are visible and they form the basis for implementing the advisory input within the club. The clubs taking part in the MFiF project can be classified into three groups: group 1 – low implementation of the external input; group 2 – partial implementation of the external input; and group 3 – rigorous implementation of the external input.

In contrast to the other clubs, group 1 produced no written documents of the decisions made during the process. This led to problems setting and meeting deadlines, and coordinating the further procedure. Additionally, the lack of priority was typical of the clubs in groups 1 & 2. This was associated with deciding at short notice to take part in the project, and with a lack or a low level of involvement on the part of the club's board as a whole. The project teams in group 1 were often inadequate in their scope, sometimes only consisting of a single person. This meant that the project received little support within the club and was moved ahead more slowly as a result. Particularly those clubs which felt little pressure to act and which saw correspondingly little need for action largely rejected the external advisory program (group 1) or were delayed in implementing the program (group 2).

Typically, the third group assimilated the external input and developed and implemented it in its own distinctive way. Following the comprehensive analysis of its volunteer work and the design of a volunteer campaign, these clubs put together a promotional team which systematically approached club members and the parents of youth athletes and tried to recruit them for volunteer activities. Particularly in group 3, the leading individual adopted a coordinating role within the project group and delegated tasks to other members when necessary. This broad assignment of duties and the involvement of many different persons distinguished group 3 from other clubs.

The success, that means the number of newly recruited volunteers, ranges from 0 to 53. This shows that it is possible to markedly increase the number of volunteers in a comparatively short space of time, but that the use of external services supporting the club does not guarantee that new volunteers will be found. Only group 3 was able to access and to recruit a relatively high number of

new volunteers. Although the analysis shows, that also proven strategies lead to new volunteers, but in a moderate range.

Discussion/Conclusion:

This study reveals that there are differences in the decision-making processes and in the recruitment practices of football clubs in relation to external advisory programs. Although the football clubs received a standardized input, different solutions and implementation processes were observed. The typology showed that impeditive constellations, such as missing essential needs for change in volunteer management, low priority for the project within the club and too few people engaged, and therefore an excessive time burden, prevent implementation of the project. Whereas, the inclusion of a large number of engaged members, a well-instructed promotional team and the definition of target groups supported the implementation process and lead to more new volunteers.

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Title:
Mechanics and energetics of running in minimalist and standard shoes: effect of running duration

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Abstract:

Introduction:
Barefoot running leads to a modification of the strike patterns during the ground contact with a flatter foot placement. Recently, several studies have determined that these alterations cause a higher pre-activation of plantar flexor muscles enhancing the stretch shortening cycle and consequently an improvement in the running economy. Nevertheless, the appearance of fatigue with exercise duration may cause a decrease in muscle tuning resulting in a less absorption of impacts (Tam et al., 2014). Hence, the purpose of this study was to compare the mechanics and energetics of running between minimalist and maximalist shoes taking into account the effect of exercise duration.

Methods:
Sixteen male runners (24.8±3.3 yr; record on 10 km: 39 min 34 s) performed: 1) a submaximal incremental running test on a treadmill until respiratory exchange ratio reached 1.0 to determine the first ventilator threshold (TV_E) and 2-3) a 45-min constant running test at 95% TV_E on an instrumented treadmill (T150-FMT-MED, Arsalis) in minimalist and standard shoes (matched for their weight) in counterbalanced order and separated by at least 7 days. During the session 2 and 3, gas exchanges were measured continuously breath-by-breath (OxyconPro, Jaeger) and net energy cost of running (C_r) was assessed. Spatiotemporal parameters and mechanical works were computed using ground reaction forces in vertical, forward and mediolateral components, acquired by an instrumented treadmill over 10 consecutive strides at 10, 25 and 45 min. Mechanical efficiency of positive work production during running was calculated as the ratio of total mechanical work (W_{tot}) to C_r (Cavagna & Kaneko, 1977).

Results:
No significant shoe–time interactions were found for any of the variables of interest (P>0.05). There was no significant difference in C_r between minimalist and standard shoes (P=0.3) and this variable increased significantly during 45 min of running in both shod conditions (+3.3%; P<0.001). Stride frequency was significantly higher (+3.1%; P=0.001) and stride length significantly shorter (-2.8%; P=0.002) in minimalist compared with standard shoes. W_{tot}, the mechanical internal and external works were significantly higher in minimalist than in standard shoe running (+2.6, +3.6, +2.2%, respectively; P≤0.011). In minimalist shoe, the forward-lateral kinetic work ($W_{k,fl}$) was significantly greater (+8.5%; P<0.001) and the vertical work was significantly lower (-3.4%; P=0.004). For all biomechanical variables, there were no significant main effects of time (P>0.05). Mechanical efficiency was significantly higher in minimalist than in standard shoes (+3.9; P=0.014) and decreased significantly while running in both shod conditions (-3.3%; P<0.001).

Discussion/Conclusion:
The exercise duration does not imply alterations in running mechanics either with minimalist or maximalist shoes. However, our results indicate a W_{tot} in barefoot induced by an increase in $W_{k,fl}$, likely caused by a significant higher loading rate and braking/pushing impulses in barefoot condition as previously reported (Divert et al., 2005). The increased W_{tot} along with the similar C_r in both shod conditions leads to a higher mechanical efficiency in minimalist shoes, reflecting an enhancement in stretch shortening cycle in this condition. However, future studies are needed to investigate whether this improved efficiency is beneficial and maintained over long duration run in order to improve endurance running performance.

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Title:

Une approche biographique des coureurs suisses en fauteuil roulant
La fabrique d'une élite paralympique (1968-2014)

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Abstract:

Introduction:

Dans un contexte historique marqué dans la seconde partie du XXème siècle par les métamorphoses du handicap, l'évolution de la perception du handicap ainsi que la révolution du sport pour handicapés physiques, les performances et la régularité des coureurs suisses en fauteuil roulant lors des Jeux Paralympiques des années 1960 à nos jours sont remarquables. Avec 144 médailles reçues depuis 1976 dans les courses individuelles et en relais, un groupe de dix-neuf paraplégiques et tétraplégiques remporte 45 % du total des médailles distribuées à la Suisse aux Paralympiades d'été, toutes disciplines sportives confondues., nous envisageons donc de reconstruire les trajectoires de ces sportifs extrêmement performants. Le questionnement porte sur plusieurs points : de quels milieux socio-culturels sont-ils issus ? Dans quelles conditions ont-ils été accidentés puis découvrent-ils le sport et l'athlétisme en fauteuil ? Comment se façonne leur excellence sportive au quotidien ? Comment comprendre la construction de cette élite paralympique depuis une quarantaine d'années ?

Methods:

En recoupant sources orales et écrites, à savoir une quinzaine d'entretiens « récits de vie » avec ces médaillés et leur encadrement ainsi que trois revues institutionnelles du Groupe Suisse des Paraplégiques, cette contribution vise à reconstruire les trajectoires biographiques de ces sportifs d'élite méconnus.

Results:

Nous mettons en évidence plusieurs éléments structurant la fabrique de cette élite paralympique : une enfance et une adolescence sportive, une longue rééducation sportive au Centre Suisse des Paraplégiques de Genève, Bâle ou Nottwil, précédant une inscription rapide dans un club en fauteuil roulant. La politique sportive instaurée par l'Association Suisse des Paraplégiques depuis 1982 est elle aussi déterminante : elle favorise le façonnement athlétique de leurs corps athlétiques ainsi que le perfectionnement sportif grâce aux rencontres systématiques avec des « anciens du fauteuil ».

Discussion/Conclusion:

Les performances de ces dix-neuf athlètes et le développement du sport en fauteuil roulant en Suisse sont aussi liés à l'action visionnaire et acharnée de Guido Zäch, premier soutien des sportifs devenu un puissant lobbyste des blessés médullaires.

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Title:
Influence of dietary and inorganic nitrate on oxygen consumption in trained men

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Abstract:
Introduction:
The influence of dietary nitrate such as beet root juice (BR) on exercise performance is controversially discussed in sport science these days. It was shown, that nitrate may reduce oxygen consumption ($\dot{V}O_2$) during moderate-intensity and severe-intensity exercise (Bailey et al., 2009; Cermak, Gibala, & van Loon, 2012; Vanhatalo et al., 2010; Wylie et al., 2013). To date, it is not clear, if the ingestion of inorganic nitrate (NIT) has the same effect on oxygen consumption as BR. Secondly, it remains unclear, whether the same dose of NIT shows the same levels of plasma nitrate and nitrite concentrations in the blood as BR. Therefore, the aim of our study was to investigate, if the same dosage of BR and NIT reduces oxygen consumption equally and if the increases in plasma nitrite and nitrate concentrations are comparable.
Methods:
Ten healthy, trained men (median [minimum; maximum]; age: 33years [19; 46]; height: 182cm [170; 187]; body mass: 73.5kg [60.7; 78.0] and $\dot{V}O_{2peak}$: 60.2ml/min/kg [40.5; 67.0]) participated in this study. Participants were physically active for a minimum of three times 45min per week. A placebo-controlled randomized study design was applied. Before the start of the testing phase, subjects had to perform a ramp test on a cycling ergometer to measure $\dot{V}O_{2peak}$ and conducted afterwards a familiarization trial of moderate and severe intensity. In the intervention trials, subjects completed seven trials of 5min cycling at 50% $\dot{V}O_{2peak}$ and 8min cycling at 80% $\dot{V}O_{2peak}$ with a complete rest of 5min between the two exercise bouts. 3 hours before each trial, subjects ingested either a dosage of BR (3, 6 or 12mmol concentrated beetroot juice), of NIT (3, 6 or 12mmol sodium nitrate solution) or placebo (PLC, plain water). $\dot{V}O_2$ was measured continuously during the cycling exercise and data of the last minute of each exercise intensity was used for calculations afterwards. Blood withdrawals were taken before, 3 hours after ingestion and after the exercise performance for plasma nitrate and nitrite analysis. Gastrointestinal tolerance was checked by using a Visual Analogue-Scale ranging from 1 to 10 whereas 10 represented excellent tolerable. Gastrointestinal side effects were recorded if they occurred before or during the exercise test.
Results:
Moderate-intensity exercise at 50% $\dot{V}O_{2peak}$ showed no significant differences in $\dot{V}O_2$ between the seven interventions (p=0.186). The medians of $\dot{V}O_2$ for the BR dosages were 28.3ml/min/kg [21.8; 32.3] for 3mmol, 28.5ml/min/kg [20.5; 30.8] for 6mmol and 27.5ml/min/kg [22.0; 33.5] for 12mmol. The ingestion of NIT resulted in a median of 28.9ml/min/kg [21.3; 30.7] for 3mmol, 29.0 ml/min/kg [21.7; 30.8] for 6mmol and 28.9ml/min/kg [21.3; 30.7] for 12mmol, whereas the ingestion of PLC resulted in a $\dot{V}O_2$ of 29.6ml/min/kg [22.5; 21.6].
Severe-intensity exercise on the other hand showed a significantly lower $\dot{V}O_2$ between the seven different dosages (p=0.050). The Wilcoxon post-hoc test located the significant difference between the 6mmol BR trial and the PLC (p=0.028) trial as well as between the BR 6mmol trial and the NIT 6mmol trial (p=0.008). The 6mmol BR trial showed a lower $\dot{V}O_2$ than the NIT trial at the same dosage. Compared to PLC, the BR 6mmol trial showed a ~7% decreased $\dot{V}O_2$. Median for the different trials at severe-intensity were 47.4ml/min/kg [35.2; 50.0], 44.9ml/min/kg [33.7; 52.1] and 44.9ml/min/kg [34.2; 54.6] for 3mmol, 6mmol and 12mmol BR respectively. In the NIT trials the following medians were found: 46.8ml/min/kg [35.4; 51.7], 48.3ml/min/kg [34.7; 52.6] and 46.6ml/min/kg [33.4; 51.1]

for 3mmol, 6mmol and 12mmol NIT respectively. The median for the placebo trial was found to be 48.0ml/min/kg [34.3; 53.0].
The plasma nitrate and nitrite concentrations in the blood were significantly increased 3 hours after the ingestion of NIT and BR compared to PLC ($p<0.001$) and compared to baseline measurements before the ingestion of any supplement ($p<0.001$). The comparison of the same dosage BR and NIT with each other showed no significant differences for the 6mmol and the 12mmol trial whereas the 3mmol BR trial showed a significant higher plasma nitrite concentration compared to 3mmol NIT trial ($p=0.013$). The plasma nitrite concentrations were still significantly increase in all intervention trials except PLC ($p<0.001$).
Gastrointestinal tolerance was not significantly different between the different interventions ($p=0.172$) and was in general rated very high (range between 7 and 10). No gastrointestinal side effects occurred during the interventions.

Discussion/Conclusion:
Our study results showed that the ingestion of BR and NIT reduced oxygen consumption in severe-intensity exercise compared to the ingestion of placebo. Oxygen consumption at moderate-intensity exercise performance was not significantly altered but comparing the medians of the different trials, a reduction of $\dot{V}O_2$ with increasing nitrate ingestion was detected. These differences were very small and therefore no performance enhancing effect would be expected in moderate-intensity exercise at 50% $\dot{V}O_{2peak}$.
In the severe-intensity exercise at 80% $\dot{V}O_{2peak}$, only the ingestion of 6mmol BR induced a significantly lower $\dot{V}O_2$, the other dosages did just indicate a lower consumption compared to PLC. Astonishingly, a significant difference between the $\dot{V}O_2$ of the 6mmol BR and the 6mmol NIT was demonstrated, where the ingestion BR was followed by a decrease of $\dot{V}O_2$ in the severe-intensity exercise compared to PLC. In contrast, plasma nitrite concentration showed no significant difference between the two dosages. Therefore, we assume, that the absorption was similar for both nitrate sources.
In conclusion of these results, a lower oxygen consumption in all the interventions in the severe-intensity exercise was detected where only the 6mmol BR was significantly lower compared to PLC. Such a lower $\dot{V}O_2$ could possibly lead to a longer time to exhaustion at 80% $\dot{V}O_{2peak}$ due to a higher mitochondrial efficiency (Larsen et al., 2011) after the ingestion of nitrate. These suggestions have to be investigated in future studies. In addition, future studies are needed to investigate further more the differences between the ingestion of dietary and inorganic nitrate as there seem to be some small differences between the effect of BR and NIT in our study.

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Title:
Self-regulatory resources replenish faster after moderate to vigorous physical activity compared to sedetary activities, but only if sport motivation is high

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Abstract:
Introduction:
Self-control (or self-regulation) has been described as one of the most important and beneficial processes in the human personality structure (Tangney, Baumeister, & Boone, 2004). Consequently, self-control is one of the most widely studied constructs in the social sciences (Duckworth, 2011), and has been identified as a key antecedent in many theories and models of health-related behaviour (Hagger, Wood, Stiff, & Chatzisarantis, 2009). The purpose of the present study was to examine whether self-regulatory resources replenish faster after moderate to vigorous physical activity compared to sedentary activities. Moreover, the moderating role of participants' sport motivation was tested.
Methods:
An experiment was conducted with 152 vocational students (16-20 years; 18 females, 134 males). 69 participants were in the experimental group, 83 participants in the control group. Using a dual-task paradigm, the participants had to accomplish two tasks that require self-control: after baseline data assessment, the participants performed a letter recogniton test (20 min). Next, the experimental group engaged in 15 min running at moderate to vigorous intentsity (heart rate: 120-160 bpm); the control group performed sedentary activities (e.g. reading a newspaper, using the mobile phone). Subsequently, all participants performed the second self-control task consisting of the d2-concentration test. Participants' mood was assessed before and after every self-control task ; heart rate was measured between the two self-control tasks. A median split was used to categorize participants of the experimental group in two groups with high versus low sport motivation.
Results:
No baseline differences existed between the three groups in dispositional self-control and performance in the first self-control task. Mood similarly decreased during the first self-control task across all groups. Heart rate significantly increased during the recess among participants of the experimental group (independent of their sport motivation). Mood similarly increased during recess among all three groups. In the second self-control task, the experimental group with high sport motivation achieved the highest GZ-F scores in the d2-test (M = 433, SD = 58), followed by the participants of the control group (M = 411, SD = 61) and the participants of the experimental group with low sport motivation (M = 389, SD = 62), $F(2,150) = 3.68$, $p = .028$, $eta^2 = .051$. Participants of the control group felt most emotionally exhausted and depressed after the second self-control task, followed by the students of the exerimental group with low and high sport motivation, respectively.
Discussion/Conclusion:
The findings reveal that physical activity between two cognitively demanding tasks can contribute to the replenishment of self-regulatory resources, but that this relationship is moderated by participants' sport motivation. Thus, only students with high sport motivation achieved higher scores in the second self-control task. Students with low sport motivation scored even lower than participants of the control group, most likely because participating in physical activity further taxed their self-regulatory resources. Nevertheless, the reported mood was better after the end of the experiment in both experimental groups compared to the control group.

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Title:
Promoting Graded Exercise as a Part of Multimodal Treatment in Patients Diagnosed with Stress-Related Exhaustion

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Abstract:
Introduction:
Randomised controlled trials (Blumenthal, Michael, & Babjak, 2007; Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005; Mota-Pereira et al., 2011) have greatly contributed to the fact that both physicians and patients regard regular exercise participation as a highly valuable and effective treatment for mental health disorders (Parker & Crawford, 2007). Nevertheless, little is known about the adherence to physical activity recommendations for patients with stress-related mental problems in a clinical setting. Knowledge about what can be achieved within the clinical context, and how current treatments can be improved, is crucial for clinicians, researchers, educators, managers, and policy makers involved in nursing practice (Phillips, 2002). Therefore, the purpose of this study was to examine, by using patient cohort data, the changes in exercise habits during a 12-month multimodal treatment (MMT) period, in patients seeking specialist care for stress-related exhaustion.
Methods:
Longitudinal analysis of patient cohort data was carried out. The sample consisted of 169 patients (79% women; mean age = 42.7 years) who were referred to a stress clinic for stress-related exhaustion. All patients received multimodal treatment (MMT) with similar components. Two different approaches to promote exercise were used in the clinical work (general comprehensive instruction either with or without an 18-week coached exercise program). The self-reported overall exercise level was assessed at baseline and at three, six and twelve months after the first visit. Group by time effects were examined with repeated measures analyses of variance.
Results:
The frequency, duration and intensity of exercise increased substantially during the first three months of MMT. Although exercise levels tended to decrease thereafter, there was still a significant time effect at the 12-month follow-up showing that follow-up exercise levels were higher than at baseline.
Discussion/Conclusion:
This study shows that: (a) Exercise can be successfully promoted as a part of MMT in patients with stress-related exhaustion. (b) General exercise instructions and coached exercise are similarly effective in promoting exercise involvement. (c) Special efforts are needed to ensure that the initial gains in exercise are maintained and that patients can benefit from their enhanced exercise levels across longer periods of time.

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Title:
Neuromuscular adjustments of the plantar flexors following match-play football in the heat

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Abstract:
Introduction:
In tennis, maximal strength of the plantar flexors is similarly impaired following competition in hot and cool conditions (recovering within 24 h) and is mainly due to peripheral alterations, whereas explosive muscle strength and activation capacity are well preserved (Girard et al. 2014). Lesser is known, however, about plantar flexor neuromuscular adjustments after football in the heat. We assessed neuromuscular fatigue and recovery of the plantar flexors after playing football with or without severe heat stress, with special reference to rapid muscle torque characteristics.
Methods:
Neuromuscular characteristics of the plantar flexors were assessed in seventeen male players at baseline and ~30 min, 24 and 48 h after two 90 min football matches in temperate (~20°C and 55% rH) and hot (~43°C and 20% rH) environments. Measurements included maximal voluntary strength, muscle activation, twitch contractile properties, and rate of torque development and *soleus* EMG (*i.e.* Root Mean Square activity) rise from 0-30, -50, -100 and -200 ms during maximal isometric contractions for plantar flexors.
Results:
Core and muscle temperatures were ~1ºC higher after playing in the heat than in after playing in a temperate environment (core: 39.2±0.1 vs 38.3±0.1ºC; muscle: 40.3±0.1 vs 39.5±0.1ºC). Voluntary activation and peak twitch torque were equally reduced (-1.5% and -16.5%, respectively; $p<0.05$) post-matches relative to baseline in both conditions, the latter persisting for at least 48 h, whereas strength losses (~5%) were not significant. Absolute explosive force production declined ($p<0.05$) 30 ms after contraction onset, independently of condition, with no change at any other epochs. After normalization to maximal voluntary contraction torque and activation capacity, no noticeable changes in rate of torque development and associated *soleus* EMG activity rise were found.
Discussion/Conclusion:
In football, acute match-related neural (suboptimal muscle activation, recovered within 24 h) and muscular (impaired muscle contractility persisting at least 48 h) fatigue mechanisms were accompanied with only modest reductions in maximal muscle strength. Furthermore, changes in explosive force production were only seen in the very early phase of the contraction. Despite an additional increase (~1°C) in muscle and core temperatures after playing in hot conditions, the extent of match-induced neuromuscular adjustments in the plantar flexors are moderate and do not differ from those observed after competing in a temperate environment. This can partly be attributed to a reduction in total game distance and high intensity running in the heat (~25%; Mohr et al., 2012), allowing for similar metabolic disturbances in both environments (Nybo et al., 2013).

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Title:
Heat stress does not alter constant velocity running mechanics following fatiguing repeated sprints

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Abstract:
Introduction:
Despite the marked reductions in propulsive power (~20%) and knee extensor maximal strength (~30%) resulting from repeated running sprints, both low and high constant running velocity patterns following repeated sprinting have been shown to remain unaffected (Morin et al. 2012). However, these observations were obtained in temperate conditions and it is undetermined whether hot ambient conditions, which exacerbate thermal stress, would induce larger fatigue-induced alterations in constant velocity running mechanics. The aim of this study was therefore to examine the effects of repeated sprinting with or without heat stress on constant, submaximal velocity running mechanics and spring-mass behavior.
Methods:
Eleven male recreational sportsmen (team- and racket-sport background) performed three sets of five 5-s sprints with 25-s recovery and 3 min between sets on a sprint-treadmill (ADAL3D-WR, Medical Development – HEF Tecmachine, France) after a ~30-min warm-up. These were randomly conducted in both COOL (24.9±0.6°C, 45.3±7.8% RH) and HOT (37.6±2.3°C, 21.4±3.1% RH) conditions. For each session, running mechanics and spring-mass characteristics were measured (averaged of 10 s) at 10 and 20 $km.h^{-1}$ immediately before and 3 min after sprinting.
Results:
Rectal (38.9±0.2 *vs*. 38.8±0.3°C; $p<0.05$) and mean skin (37.2±0.7 *vs*. 32.7±0.8°C; $p<0.001$) temperatures together with thermal sensation (6.6±0.7 *vs*. 4.7±0.8; $p<0.001$) and thermal comfort (6.3±0.9 *vs*. 5.0±0.6; $p<0.001$) were higher following repeated sprinting in HOT than in COOL, whereas blood lactate concentration was lower (11.5±0.9 *vs*. 13.3±2.7 $mmol.L^{-1}$; $p<0.05$). Propulsive power (average set 1: 15.9±2.7 and 16.2±2.5 $W.kg^{-1}$; average set 2: 14.1±2.3 and 15.1±1.8 $W.kg^{-1}$; average set 3: 14.0±2.5 and 14.2±1.7 $W.kg^{-1}$ in HOT and COOL, respectively) decreased across sets ($p<0.05$) and was lower in set 2 in the heat ($p<0.05$). However, repeated sprinting did not induce any changes in constant velocity running pattern, whether at low (10 $km.h^{-1}$) or high (20 $km.h^{-1}$) velocity, as running kinematics (stride frequency, contact and flight times) and spring-mass behaviour (vertical and leg stiffness, peak vertical force, centre of mass vertical displacement and leg compression) were similar between conditions (lowest p value for the interaction between condition and time of 0.31 and 0.11 for 10 and 20 $km.h^{-1}$, respectively).
Discussion/Conclusion:
In line with previous observations (four sets of five 6-s sprints with 24-s recovery and 3 min between sets in temperate conditions; Morin et al. 2012), our results confirm that the completion of a multi-set repeated-sprint exercise bout in temperate conditions does not affect low and high constant velocity running pattern. Moreover, despite larger increases in body temperature and perceptual responses in the hot condition, running mechanics and spring-mass behavior remained unaffected.

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Title:
Different neuromuscular adjustments during repeated sprinting in hot and cool conditions with maximal M-wave normalization of the EMG RMS amplitude

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Abstract:
Introduction:
The repetition of maximal sprints with incomplete recovery induces a parallel decline between mechanical performance and the amplitude of the raw EMG signal (RMS activity), implying neural factors in the etiology of muscle fatigue (Girard et al. 2013). A shortcoming of this study, however, is the absence of control for potential modifications in sarcolemmal excitability (M-wave amplitude). Furthermore, passive hyperthermia leads to a disproportionate reduction in EMG over torque, shifting the torque / EMG relationship to the left (Racinais et al. 2013). We examined to which extent exercise-induced decline in RMS activity during repeated sprinting can be traced to changes in the peripheral transmission of the neural drive, and what is the influence of acute heat exposure.
Methods:
Ten males performed 10 x 6-s ''all-out'' sprints on a cycle ergometer (recovery = 30 s) in either a cool (24°C/30 %rH) or a hot (35°C/40 %rH) environment with concomitant recordings of power output (peak power output, PPO) and EMG activity (RMS activity) of *vastus lateralis* (VL) and *rectus femoris* (RF) muscles. Percutaneous femoral nerve stimulations were applied exactly 15-s into recovery after each sprint repetition to obtain VL and RF M-wave peak-to peak amplitudes.
Results:
Higher end-exercise skin (36.25±0.31 *vs*. 30.87±0.54ºC; $p<0.05$) and core (38.03±0.30 *vs*. 37.62±0.24ºC; $p<0.05$) temperatures occurred in hot compared to cool conditions. Average peak power output during the ten sprints was higher (+3.1 %; $P < 0.01$) in the heat. Raw RMS activity for both VL and RF muscles decreased ($p<0.001$) across repetitions, with lower ($p<0.05$) values in HOT compared to COOL. M-wave amplitudes didn't change with time but lower ($p<0.05$) values occurred in the heat for VL. While $RMS.M^{-1}$ ratio for VL decreased with time (no condition effect), it was lower in hot conditions for RF (no time effect) (both $p<0.05$). Neuromuscular efficiency (PPO/EMG ratio) for VL calculated from raw RMS data displayed main effects of time and condition, whereas only a tendency ($p=0.08$) for a main effect of time occurred when using RMS values normalized to M-wave. Neuromuscular efficiency for RF was unchanged either with raw or M-wave-normalized RMS values.
Discussion/Conclusion:
A strict control of potential changes in M-wave amplitude (*i.e*., calculating the RMS/M-wave ratio) is a prerequisite to conclude that reductions in the raw EMG activity actually imply that net motor unit activity of locomotor muscle became suboptimal. This recommendation is reinforced by the fact that neuromuscular adjustments differed between quadriceps muscles and environmental conditions.

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Title:
Is there a link between strength asymmetry and gait asymmetry as well as variability in seniors?

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Abstract:
Introduction: Fall-related injuries in seniors have been reported to be linked with decreased mobility and independency. Beside extrinsic fall risk factors (handrail, bumps, twilight), several intrinsic risk factors are discussed in the literature, such as strength or power asymmetry, gait asymmetry and gait variability. Commonly, these factors have been investigated independently. It remains, however, unclear whether strength asymmetries are linked to gait asymmetries and variability or even cause them. If so, interventions focusing on the reduction of strength asymmetries could be applied to lower the risk of falling. Small associations between knee extensor strength asymmetries, and gait asymmetry and variability were found by Laroche, Cook, and Mackala (2012) in older women. Assuming that leg press and plantar flexion are particularly important for gait-related movements, it is hypothesized, that such asymmetries are linked to asymmetry and variability of gait parameters.
Methods: Leg strength and gait were assessed in 48 healthy seniors (age: 70 ± 5 y, height: 1.68 ± 0.09 m, weight: 74 ± 14 kg). Unilateral (left and right) leg press and plantar flexion were tested on an isokinetic dynamometer (IsoMed 2000, D&R Ferstl, Hemau, Germany). Gait analysis was conducted on a one-dimensional ground reaction force measuring treadmill (FDM-T system, Zebris Medical GmbH, Isny, Germany) using a predetermined individual comfortable walking velocity. We calculated symmetry indices (SI) for strength and gait variables and coefficients of variation (CV) for spatial and temporal variability. A contemporary method of data analysis that uses confidence intervals in order to calculate the probability that a difference is practically meaningful was applied (Batterham & Hopkins, 2006) to compare two groups: symmetric and asymmetric participants were defined by dichotomizing the whole group by median split for leg press and plantar flexion force and rate of force development (RFD), respectively. The smallest worthwhile difference was considered as 0.2 of the between-subject standard deviation.
Results: Participants with an asymmetric plantar flexion RFD showed *very likely* higher variability in double support time (probability: 96%; mean difference CV: 1.5; 90% confidence interval: 0.2 to 2.9) and *likely* higher variability in cadence (84%; CV: 0.7; -0.1 to 1.4) and stride length (95%; CV: 0.8; 0.2 to 1.4). However, participants with an asymmetric plantar flexion RFD showed also *likely* lower asymmetry in push off force (84%¸ SI: -1.1; -2.9 to 0.7) and step time (80%; SI: -0.5; -1.5 to 0.4). Participants with asymmetries in plantar flexion force had *very likely* higher variability in step width (98%; CV: 7.5; 2.8 to 12.1) and *likely* higher asymmetry in weight acceptance force (80%; SI: 1.2; -0.1 to 2.4). However, they showed *likely* (76%, SI: -1.1; -2.9 to 0.7) lower asymmetry in step time. Furthermore, self-selected walking speed was *likely* (75%; -0.04; -0.09 to 0.02 m/s) lower in participants showing plantar flexion force asymmetry. Participants with an asymmetric leg press force showed *likely* higher cadence variability (78%; CV: 0.5; -0.1 to 1.1) as well as a higher variability in stride length (94%; CV: 0.7; 0.1 to 1.2). Results of participants with an asymmetric leg press RFD did not reveal any *very likely* or *likely* effects.
Discussion/Conclusion: Especially plantar flexion force and RFD showed interesting associations with gait asymmetry as well as gait variability, whereas associations with leg press force and leg press RFD seem to be fewer. Assuming that this relationship is of causal nature, the development of plantar strength symmetries might be an effective strategy to lower gait asymmetry and variability and eventually the risk of falling. However, this is yet to be determined in further intervention studies.

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Title:
Should endurance athletes perform an 18-days 'live high-train low' training camp in hypobaric or normobaric hypoxia?

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Abstract:

Introduction:
It seems to be apparent that short-term exposure (< 24 h) to normobaric hypoxia (NH) may evoke different physiological responses in comparison to hypobaric hypoxia (HH) (Millet et al. 2012), whereas it is still unclear for long-term exposures, i.e. altitude training camps. Therefore, the aim of the study was to compare hemoglobin mass (Hb_{mass}) and endurance performance changes in 18-days 'live high-train low' (LHTL) training camp in either HH or NH.

Methods:
Twenty-nine well-trained male triathletes were split into three groups (NH: n = 10, HH: n = 11 and control (CON): n = 7) and participated in an 18-days training camp. The two altitude groups trained at 1100-1200 m and slept at an altitude of 2250 m under either simulated (hypoxic chambers, 238.2 ± 10.6 h total hypoxia) or natural hypoxic conditions (316.5 ± 2.3 h total hypoxia). The CON group trained and lived at sea level (~1000 m). Hb_{mass} was measured in duplicate with the optimized CO-rebreathing method before, after and at day 13 (same hypoxic dose in HH (229.1 ± 1.3 h) and NH) of the training camp. Running (3-km run) and cycling (incremental cycling test) performance were evaluated prior and after the training camp. During the training camp training load were recorded continuously. Two-way ANOVA for repeated measures was calculated and to interpret the magnitude of changes Cohen's effect size (d)(Cohen 1988) was used.

Results:
After 18-days, both HH (886 ± 80 g vs. 927 ± 95 g, d = 0.5, P < 0.001, +Δ4.5%) and NH (955 ± 83 g vs. 994 ± 81 g, d = 0.5, P < 0.001, +Δ4.1%) increased their Hb_{mass} to a moderate extent, whereas the change for CON was small (945 ± 128 g vs. 963 ± 137 g, d = 0.1, P = 0.08, +Δ1.9%). Hb_{mass} change did not differ between the groups (P = 0.14), as well as after the same hypoxic dose (P = 0.89). However, individual Hb_{mass} responses differed with a large variation within NH and HH (-1.4% - 10.6%). Running performance changed with a moderate effect in the altitude groups (d = 0.5, P < 0.001, +Δ3.4 – 4.0%) and with a small effect in CON (d = 0.2, P = 0.031, +Δ2.1%)), but did not differ between the groups (P = 0.27). In cycling performance no changes were detected in any groups (d < 0.3, P = 0.5). Daily training load was the same between the three groups (d > 0.4, P = 0.21).

Discussion/Conclusion:
The present results indicate that changes in Hb_{mass} after 18-days LHTL and after same hypoxic dose in either NH or HH did not differ, as well as performance indicators. However individual Hbmass response demonstrated a large variability, which underline the importance of individual evaluation of Hb_{mass} responses to altitude training. Additionally, it has to be taken into account that the power of the test was too small for detecting significant differences between the groups. Overall, it can be concluded that it has no impact for endurance athletes whether they perform an 18-days LHTL training camp in NH or HH.

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Title: Zur Bedeutung soziokulturell geprägter Wertvorstellungen für die Sportpartizipation Jugendlicher und junger Erwachsener – eine explorative Untersuchung anhand des Habitus-Ansatzes

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Abstract:

Einführung:

In der Schweiz bestehen zwischen den verschieden Sprachregionen Unterschiede in der Sportpartizipation (Lamprecht, Fischer, & Stamm, 2014). In der italienisch- und französischsprachigen Schweiz wird weniger häufig Sport getrieben als in der Deutschschweiz. Diese sprachregionalen Unterschiede im Sportverhalten sind mit denjenigen der europäischen Nachbarländer vergleichbar. In den nordischen und westlichen Ländern wurde im Vergleich zu den östlichen und südlichen Ländern in Europa wiederholt eine höhere Sportpartizipationsrate aufgezeigt (European Commission, 2014). Zur Erklärung werden insbesondere soziokulturelle Faktoren als begünstigende oder behindernde Einflussfaktoren für den Zugang zum Sport diskutiert.

Theoretischer Ansatz:

Zur Erklärung des Sportverhaltens wird der praxeologische Ansatz des Habitus (Bourdieu, 1976) verwendet. Das theoretische Konzept des Habitus stellt ein historisch und kulturell variierendes Konstrukt dar, welches eine dynamische Vermittlerrolle zwischen der gesellschaftlichen Struktur- und der subjektiven Handlungsebene einnimmt. Der Habitus erfasst ein dauerhaftes Ensemble von Denk-, Wahrnehmungs- und Handlungsschemata, die gesellschaftlich bedingt sind und die individuellen Handlungen sowie die (Sport-)Praxis beeinflusst. Mit diesem kulturtheoretischen Ansatz von Bourdieu sollen die individuellen Wert- und Deutungsmuster bezüglich Sport und Bewegung, Körper, Gesundheit sowie Freizeit erfasst werden.

Methodisches Vorgehen:

Um die bewegungs- und körperbezogenen Deutungsstrukturen im Sinne von sportbezogenen Wertvorstellungen, Denk- und Wahrnehmungsschemata im Kontext sportlichen Handelns zu untersuchen, werden in der Deutsch- und Westschweiz wohnhafte sportlich aktive sowie inaktive Jugendliche und junge Erwachsene im Alter von 16 bis 24 Jahren mittels eines halbstrukturierten Interviews zu ihrer eigenen Sportpraxis sowie ihrer persönlichen Einstellung zu Sport, Bewegung, Körper, Gesundheit und Freizeit befragt. Zur Auswertung wird eine rekonstruktive Sozialforschungsmethode, diejenige der dokumentarischen Methode (Bohnsack, 2013) angewendet, da diese auf die Rekonstruktion von Habitusformen abzielt.

Ergebnisse und Diskussion:

Es können verschiedene sportbezogene Wertvorstellungen, Denk- und Wahrnehmungsschemata aufgezeigt werden, die mit der habituellen Sportpraxis zusammenhängen z.B. der Stellenwert des Sports d.h. inwiefern Sport als Bestandteil des Lebens oder als Teil der eigenen (körperlichen) Identität wahrgenommen wird. Zudem ist das Ziel der dokumentarischen Analyse aufgrund der bewegungs- und körperbezogenen Deutungsstrukturen unterschiedliche Habitustypen im Kontext des Sports aufzuzeigen. Soziokulturell geprägte Wertvorstellungen könnten einen Beitrag zur Erklärung der unterschiedlichen Sportpartizipationsraten in den verschiedenen Sprachregionen der Schweiz leisten. Da es sich um eine explorative Studie handelt, sind zur Verallgemeinerung der Befunde weitere Studien notwendig.

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Title:
Does attending a Burzelbaum kindergarten have an influence on the physical fitness of the children?

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Abstract:
Introduction: Childhood obesity increased over the last few years (Wang & Lobstein, 2006). In Basel-Stadt 13.6% of the kindergarten children are overweight, and 4% are obese (Stamm et al., 2014). A review from seven countries worldwide reported, that only half of the preschool children reached the physical activity recommendations of those days of daily 60 minutes of moderate-to-vigorous physical activity (Tucker, 2008). Numerous studies showed that physical activity interventions have a positive influence on physical fitness and overweight in children (Gordon, Tucker, Burke, & Carron, 2013; Morgan et al., 2013). Hence, the canton of Basel-Stadt developed a new project for kindergartens, called Burzelbaum in 2005 (Knecht, 2004). Besides healthy nutrition, kindergartens that took part in the project, committed to implement at least 1 hour of physical activity per day (Kirchhofer, Steffen, Müller, & Jauch, 2007). The effect of the Burzelbaum kindergartens on physical fitness and activity behaviour of the children has not objectively been evaluated, yet. Therefore, our aim was to examine associations between physical fitness, activity behaviour and the attendance of a Burzelbaum kindergarten in first grade children of the canton Basel-Stadt.

Methods: 324 first graders (7.3±0.4 years) were examined 9 month after leaving kindergarten. Anthropometrics were assessed by BMI and body fat. Physical fitness tests included a 20 m shuttle run, 20 m sprinting, jumping sidewards and balancing backwards. The flexibility of the back was measured using a Spinal Mouse (MediMouse, Idiag AG). Activity behaviour (activity level, time spent in a sport club (per week), time playing outdoor and time playing indoor (per day)), socioeconomic status (parental education, household income), nationality and the attendance of a Burzelbaum kindergarten were assessed by a proxy-reported questionnaire. ANCOVA, with age gender and BMI as covariates, and multivariate logistic regression was used for analyses.

Results: 51% of the children were attending a Burzelbaum kindergarten. After adjusting for age, sex and BMI, differences with a medium effect size were found in the 20 m shuttle run (Burzelbaum: 4.8 stages [CI95%: 4.6; 5.0], Non-Burzelbaum: 4.2 stages [4.0; 4.5], $p<0.001$, $d=0.4$). No differences were found in all other physical fitness parameters, flexibility of the back or activity behaviour ($0.2<p<0.9$). Burzelbaum kindergarten children performed better in 20 m shuttle run test compared to their counterparts after adjustment of activity behaviour, socioeconomic status, nationality and school (β-coefficient=0.3 [0.1; 0.5]; $p=0.003$).

Discussion/Conclusion: Children, that attended a Burzelbaum kindergarten, were better in 20 m shuttle run than their counterparts nine month after leaving kindergarten. The attendance of a Burzelbaum kindergarten is presumably not associated with the other physical fitness parameters. Similar results were found in the KISS study three years after intervention (Kriemler et al., 2010). The physical activity behaviour did not differ between Burzelbaum and other kindergarten children. We conclude, that physical activity interventions in kindergarten have a long-term effect on the endurance of children.

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Title: La re-valorisation touristique des ressources naturelles des stations de montagne par les pratiques sportives en vogue

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Abstract:

Introduction:

Entourées de ressources, parfois accueillantes et enchanteresses, parfois sauvages et même dangereuses, les stations de montagne diffèrent par leur lieu et par le territoire qui les hébergent. Destination de vacances pour les adeptes de sports d'hiver, elles se sont rapidement développées, proposant logements, restauration et activités sportives, et misant sur l'attractivité de leurs ressources naturelles. Cependant, en parallèle à une évolution de la demande et des pratiques sportives, *l'Or Blanc*, qui est encore aujourd'hui une composante essentielle de l'offre touristique sportive hivernale, n'est plus un actif sûr, obligeant les stations de montagne à entrer dans une phase de réflexion stratégique afin de diversifier leurs activités, et d'attirer des touristes durant les périodes hors-ski, grâce à entre autre la re-valorisation des ressources à disposition sur le territoire. Parallèlement à ces réflexions, on observe l'émergence ou du moins la popularisation de pratiques telles que la course à pied de montagne (ou trail) et le ski alpinisme, amenant une nette croissance du nombre d'évènements sportifs liés, et parfois même d'infrastructures spécifiques.

Au regard de ces constats, ce travail de recherche a pour objectif de comprendre comment des pratiques sportives peuvent être utilisées à des fins de développement touristique grâce à la re-valoristion des ressources du territoire.

Methods:

Une ressource naturelle ne pouvant être considéré comme un ressource pour un territoire, avant que celle-ci soit « intentionnellement considérée et construite par des acteurs du territoire » (Gumuchian, Pecqueur, 2007), nous analysons le processus qui amène à la valorisation des ressources et leur intégration dans les stratégies de développement, de et part l'émergence d'une pratique sportive. Nous nous intéressons au cas spécifique des stations de montagne intégrant dans leur offre touristique la pratique du trail et du ski alpinisme. Le cas de St.-Pierre de Chartreuse, première station française à inaugurer son domaine de trail et de ski de rando est analysé, grâce à des entretiens réalisés auprès du secteur commercial et public, mais également associatif, acteurs de ces stratégies.

Results:

Cette idée de station entièrement dédiée au trail vient de Benoît Laval, fondateur et directeur de la société Raidlight basée depuis 2011 à St.-Pierre de Chartreuse. Plusieurs acteurs du territoire ont alors mutualisé leur énergie et volonté pour créer ensemble cette station : la commune de St-Pierre de Chartreuse (acteur public), le Parc Naturel Régional de Chartreuse (colletivité d'acteurs publics, privés, associatifs), l'association des accompagnateurs en montagne de Chartreuse (acteur associatif) et la société Raidlight (acteur privé). Hebergée dans les locaux de Raidlight, sa vocation est d'être une entitié indépendante au service du territoire, membre aujourd'hui du Réseau national des Stations de Trail, puisque ce concept est en construction sur d'autres territoires. Cette même idée s'est également déclinée récemment pour le ski de randonnée ; un Espace ski de rando a vu le jour en 2013.

Discussion/Conclusion:

L'importance de la coopération des acteurs est clairement démontrée. Leur implication à tous niveaux du processus a permis la mise en place du projet et sa réussite. Ce regroupement de parties prenantes autour d'un projet commun est d'autant plus marqué, qu'une association d'acteurs privés, publics et associatifs a été créée dans le but de coopérer de la manière la plus efficiente, de valoriser des ressources naturelles du territoire et d'attirer une clientèle adepte des sports de nature et des beaux paysages. Cependant, il faut relever que ce type de coopération n'est pas sans obstacle, les logiques de chacun n'étant pas toujours identiques de part leur nature: privés, publics et associatifs. St.-Pierre de Chartreuse semble être un modèle de station ayant su intégrer à ses stratégies de développement à la fois des pratiques sportives tendances et l'ensemble de ses acteurs.

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Titre:
Récits de vie de formateurs d'entraîneurs comme contribuant au processus de compréhension des situations d'apprentissage développées dans la profession

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Résumé:

Introduction:
Cette étude vise à se demander de quelle manière un formateur d'entraîneurs acquiert son savoir. Cette réflexion se base sur la modélisation des situations d'apprentissage en formes guidées ou non-guidées (ICCE, ASOIF, & LMU, 2013) et est complétée par Pineau (1983, réed 2012) qui interroge sur la notion d'apprentissage de l'expérience et de la vie. L'auteur évoque la notion de triangulation en parlant d'un espace de formation de soi par soi, de soi aux autres et de soi au monde. A cela s'ajoutent les travaux de Dominicé (2007) qui évoquent les trois composantes biographiques que sont la double appartenance, la bifurcation et la complétude en lien avec la formation. L'objectif est de voir comment le récit de vie peut aider à amener à une meilleure compréhension des cheminements à long terme des formateurs d'entraîneurs.

Méthode:
Deux formateurs d'entraîneurs (H1 et H2) travaillant au sein de la Formation des entraîneurs Suisse ont pris part au projet. Il s'agit de deux hommes âgés de 38 et 51 ans. Des entretiens non-structurés basés sur la théorie des récits de vie ont été menés. Les premières données ont été récoltées en février et mars 2012 et les suivantes en juin 2014. Les données ont été traitées avec une analyse de contenu thématique sur la base de la théorie des situations d'apprentissage (ICCE, ASOIF, & LMU, 2013) et des composantes biographiques (Dominicé, 2007).

Résultats:
Les résultats, sous la forme d'un extrait de récit de vie des formateurs d'entraîneurs complété par une interprétation et un travail réflexif personnel (cf. tableau 1), démontrent que toutes les formes d'apprentissage ont pris place au travers de leurs vies et l'importance des apprentissages non-guidés et la gestion du non savoir sont indéniables, que ce soit lors de leur carrière de sportif, d'entraîneur puis de formateur d'entraîneurs.

Tableau 1 : *Gestion du non savoir.*

Extrait de récit de vie (H2)
« …Qu'est-ce que tu fais des choses que tu ne sais pas ? Parce qu'il y en a plein de choses vis-à-vis desquelles tu n'as pas de réponses ou de solutions. Tu dois être très humble vis-à-vis de tout ce qui se passe…Je me suis rendu compte, qu'il faut intégrer cet aspect dans la formation et arrêter de dire aux gens qu'il suffit de...Il faut donner aussi le courage aux gens de faire face à ce qu'ils ne savent pas…Un gars qui est brillant va s'en rendre compte».
Travail réflexif et interprétation
Comment gérer le fait de ne pas savoir dans une société où tout est à disposition de manière extrêmement rapide et facile. Or, accepter de ne pas tout savoir, c'est faire confiance à la vie et à l'incertitude.

Discussion/Conclusion:
Comme la littérature (ICCE, ASOIF, & LMU, 2013) le mentionne, toute situation vécue est potentiellement une source de progrès et de d'apprentissage dans une logique d'autoformation et d'émancipation. Ainsi, il conviendra de continuer de percevoir les processus d'apprentissage qui entrent en jeu en fonction de l'expérience acquise (formateur d'entraîneurs, formateur d'entraîneurs senior et formateur d'entraîneurs master) et ainsi mieux comprendre la profession.

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Title:
Coaches` subjective talent criteria

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Abstract:
Introduction:
In professional soccer, talent selection relies on the subjective judgment of scouts and coaches. To date, little is known about coaches´ "eye for talent" (Christensen, 2009, p. 379) and the nature of the subjective criteria they use to identify those players with the greatest potential to achieve peak performance in adulthood (Williams & Reilly, 2000). Drawing on a constructivist approach (Kelly, 1991), this study explores coaches´ subjective talent criteria. It is assumed that coaches are able to verbalise and specify their talent criteria, and that these are related to their talent selection decisions based on instinct.
Methods:
Participants and generation of data. Five national youth soccer coaches (M_{age} = 55.6; *SD* = 5.03) were investigated at three appointments: (1) talent selection decision based on instinct, (2) semi-structured inductive interview to elicit each coaches´ talent criteria in detail, (3) communicative validation and evaluation of the players by each coach using the repertory grid technique (Fromm, 2004).
Data Analysis. Interviews were transcribed and summarized with regard to each specified talent criterion. Each talent criterion was categorized using a bottom-up-approach (meaning categorization, Kvale, 1996). The repertory grid data was analysed using descriptive statistics and correlation analysis.
Results and Discussion
For each coach, six to nine talent criteria were elicited and specified. The subjective talent criteria include aspects of personality, cognitive perceptual skills, motor abilities, development, technique, social environment and physical constitution, which shows that the coaches use a multi-dimensional concept of talent. However, more than half of all criteria describe personality characteristics, in particular achievement motivation, volition and self-confidence. In contrast to Morris (2000), this result shows that coaches have a differentiated view of the personality characteristics required to achieve peak performance. As an indication of criterion validity, moderate to high correlations (.57 ≤ ρ ≤ .81) are found between the evaluations of the players according to the coaches´ talent criteria and their talent selection decision. The study shows that coaches are able to specify their subject talent criteria and that those criteria are strongly related to their instinctive selection decisions.

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Title:
Die Effekte einer akuten Bewegungsintervention auf die Konzentrationsleistung von Primarschulkindern

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Abstract:
Introduction:
Da es sich bei der Konzentrationsleistung um einen zentralen Prädiktor für den Lernerfolg und die akademische Leistung von Schülerinnen und Schülern handelt (Steinmayr, Ziegler, & Träuble, 2010), ist ihre Förderung im Kontext der Schule von hoher Relevanz. Obwohl von Vertretern der „Bewegten Schule" seit den 90er-Jahren positive Effekte von Bewegungspausen auf die Konzentrationsleistung diskutiert werden, mangelt es bisher an empirischer Evidenz. Die Resultate der wenigen Studien, welche zum Thema durchgeführt wurden, lieferten inkonsistente Befunde. Sie deuten jedoch mehrheitlich darauf hin, dass sich 10 bis 20-minütige Bewegungspausen kurzfristig positiv auf die Konzentrationsleistung von Primarschulkindern auswirken (Janssen, Toussaint, van Mechelen, & Verhagen, 2014). Ob diese Effekte auch durch kürzere und daher im Kontext der Schule praktikablere Interventionen erreicht werden können, ist bisher unklar. Deshalb wird im vorliegenden Beitrag untersucht, ob sich 5-minütige körperliche Aktivität positiv auf die Konzentrationsleistung von Primarschulkindern auswirkt.
Methods:
Im Rahmen einer randomisierten Kontrollgruppenstudie wurden insgesamt 97 Schülerinnen und Schüler von 5 fünften Klassen (M_{Alter}11.75±.47 Jahre; 44.3% Mädchen) untersucht. Die Experimentalgruppe absolvierte während 5 Minuten eine Bewegungspause, in welcher koordinativ anspruchsvolle bilaterale Ganzkörperübungen durchgeführt wurden. Die Kontrollgruppe hörte sich während dieser Zeit ein Hörbuch an. Vor und nach der Intervention respektive der Kontrollbedingung wurde mit dem Test d2-R (Brickenkamp, Schmidt-Atzert, & Liepmann, 2010) die Aufmerksamkeits- und Konzentrationsleistung erhoben.
Results:
Zweifaktorielle Varianzanalysen mit Messwiederholung zeigten für die Konzentrationsleistung eine signifikante Interaktion zwischen Gruppe und Testzeitpunkt (F(1, 95) = 3.80, p = .03 (einseitig), Eta^2= .04). Da es sich dabei um einen stärkeren Anstieg bei der Experimentalgruppe handelt, weist dieses Resultat auf die positive Wirkung der Bewegungspause hin.
Discussion/Conclusion:
Die Ergebnisse erweitern den Forschungsstand, indem sie zeigen, dass neben 10 bis 20-minütigen Bewegungspausen auch Bewegungspausen von kürzerer Dauer die Konzentrationsleistung von Primarschulkindern positiv beeinflussen. Es kann deshalb die Empfehlung abgegeben werden, im Kontext der Primarschule regelmässig Bewegungspausen von wenigen Minuten durchzuführen, um die Konzentrationsleistung der Schülerinnen und Schüler kurzfristig wiederherzustellen bzw. zu erhöhen. Ob die Verbesserung der Konzentrationsleistung auf die körperliche Aktivierung, die kognitive Beanspruchung der Bewegungspause oder die Kombination der beiden zurückzuführen ist, muss in weiteren Studien geprüft werden.

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Title:
What does Professionalization mean? Perceptions of Professionalization in Sport Federations

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Abstract:

Introduction:
Organisational changes in sports federations are often associated with a drift from a volunteer driven to an increasingly business-like phenomenon (Shilbury & Ferkins, 2011). This process of transformation is be called as "professionalization". Accordingly, professionalization seems to be an appropriate strategy for sport organisations in order to meet organizational pressure due to challenges of a more complex and dynamic changing environment adequately. Despite the increasing research interest and the attempts for systematization on the phenomenon of professionalization it still remains unclear what does the term professionalization exactly mean (Dowling et al., 2014). Thus, there is a lack of a consistent concept of professionalization that is needed in order to explore different facets and perspectives of this phenomenon more validly. Against this background following question emerged: What is the suitable concept of professionalization for analyzing the actual ongoing processes of change, adaption or transformation in sport federations?

Methods:
Dealing with this question, following two-step approach was choosen: (1) In a first step a scholar's perspective at professionalisation of sport organisations will be displayed in order to explore both the common ground as well as divergences and inconsistencies in previous approaches. Therefore, a literature review is indicated. (2) In a second step, and in contrast to previous studies we will consider a practical point of view by a so called second-order observation of experts to gain valuable insights into current thinking and acting towards professionalization in sport federations. In doing so, a hermeneutical approach is used, which is about understanding the meaning of contexts by grasping the everyday world, and draw insight and meaning from it (Shilbury et al., 2013). Accordance with hermeneutics, the explorative interpretive knowledge of expert interviews was used. The interviews were conducted with a sample of six selected experts, who have both dedicated insider knowledge and the overall view of all Swiss sport federations.

Results and discussion:
The summaries of literature review could be categorized into two research currents. The one defines professionalization as a structural process towards professional status of occupations. The other defines it in a broader sense as an organisational change towards a business-like approach. Whereas the first perspective there is a broad scientific consensus that second isn't that clear, however. Explorative analysis of interview data reveals different themes in relation to professionalization of sports federation. First theme deals with a changed philosophy as more strategic alignment towards for-profit, efficiency and quality orientation. Second theme refers to paid work associated with more competence orientation and balanced governance between paid and voluntary work. Third theme deals with acting shift towards more rationalization and efficiency by implementation of innovative management and communication tools. Based on findings of both our review of scholar`s perspective as well insights from experts we will provide – in the sense of synthesis – a more clear understanding of what does professionalization mean that can be useful in terms of further studies.

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Title:
Die Bedeutung sportbezogener Strukturbedingungen im kommunalen Kontext für das Sportverhalten Jugendlicher und junger Erwachsener

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Abstract:
Einführung:
Trotz vielfältiger Bemühungen der Sport- und Bewegungsförderung bestehen nach wie vor soziale Ungleichheiten hinsichtlich der Sportbeteiligung von Jugendlichen und jungen Erwachsenen. In der Schweiz unterscheiden sich darüber hinaus die Sportpartizipationsquoten in den jeweiligen Sprachräumen (z.B. Lamprecht, Fischer & Stamm, 2014). Zur Analyse dieses Phänomens erscheint die Betrachtung individueller Merkmale nicht ausreichend zu sein, sondern es sind auch sportbezogene Strukturbedingungen im kommunalen Kontext (z.B. kommunale Sportförderung, Sportangebote) in den Fokus zu rücken.
Theoretischer Ansatz:
Auf Basis des akteurtheoretischen Zugangs (Schimank, 2010) werden sportbezogene Kontextbedingungen, wie die Praxis der kommunalen Sportförderung als Gelegenheitsstrukturen betrachtet, die Anreize schaffen (z.B. neue Sportangebote) und zu Parametern individuellen sportiven Handelns (z.B. Wahl der Sportart) werden können. Die sportbezogenen Strukturbedingungen werden als Erwartungsstrukturen in einem Mehrebenenmodell konzeptualisiert.
Methodisches Vorgehen:
Die Mehrebenen - Perspektive erfordert die Erfassung und Verknüpfung individueller Daten (z.B. subjektive Wahrnehmung der Bedingungen, Sportverhalten) einerseits sowie struktureller Bedingungen andererseits. Die relevanten Faktoren werden im Rahmen eines Vergleichs von 33 systematisch ausgewählten Kommunen im Kanton Bern und Kanton Freiburg untersucht. In jeder Gemeinde wurden Individualdaten anhand einer Online - Befragung Jugendlicher und junger Erwachsener (Alter 15-30 Jahre) erfasst. Je nach Gemeindegrösse wurde entweder eine Vollerhebung durchgeführt oder eine einfache Zufallsstichprobe gezogen. Die sportbezogenen Strukturbedingungen wurden durch die Befragung von Personen aus der Gemeindeverwaltung (schriftlicher Fragebogen und Interview) und von Sportanbietern (Online-Befragung; Vollerhebung) differenziert erhoben.
Ergebnisse und Diskussion:
Da die Online-Befragungen der 15- bis 30-jährigen Einwohnern sowie der Sportanbieter erst Ende Dezember 2014 abgeschlossen sein werden, können derzeit nur erste Ergebnisse aus der Befragung der Gemeinde berichtet werden. Auf deskriptiver Ebene sind Unterschiede in der Einschätzung des Stellenwerts der kommunalen Sportförderung zwischen den Gemeinden erkennbar. Deutschsprachige Gemeinden (M=3.35, SD= .88) sowie Gemeinden mit mehr als 3 000 Einwohnern (3 001 bis 10 000 Einwohner: M=3.50, SD= .82; über 10 000 Einwohner: M=3.50, SD= .58) bewerten den Stellenwert der kommunalen Sportförderung höher als französischsprachige (M=3.00, SD= .82) und kleinere Gemeinden (M=2.77, SD= .83). Die Förderung des Breitensports wird von französischsprachigen (M=3.23, SD=1.42) sowie von kleineren bis mittleren Gemeinden bis 10 000 Einwohnern (bis 3000 Einwohner: M=3.25, SD=1.29; 3001 bis 10 000 Einwohnern: M=3.00, SD=1.31) etwas höher bewertet als von deutschsprachigen (M=2.72, SD=1.23) und grösseren Gemeinden (M=1.75, SD= .96). Weitere Analysen werden klären, inwieweit diese Unterschiede in der kommunalen Sportförderung auch mit unterschiedlichen Einschätzungen der örtlichen Sportbedingungen durch die Sportanbieter sowie dem Sportverhalten der Jugendlichen und jungen Erwachsenen zusammenhängen.

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Titel:
Optimal lange Fixationen? Eine experimentelle Studie zu überlangen „Quiet Eye"-Dauern

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Abstract:

Einleitung:
Im Zusammenhang mit der Leistungsdienlichkeit langer finaler Fixation (quiet eye, QE) wird vermutet, dass Leistungsverbesserungen nur für eine optimale Dauer zu beobachten sein sollten, also auch bei „überlangen" QE-Dauern die Leistung wieder abnimmt (u.a. Janelle et al., 2000; Klostermann, 2014). Jedoch liegen zu dieser Vermutung bislang keine empirischen Befunde vor, so dass in der hier präsentierten Studie Präzisionsleistung in einer Wurfaufgabe in Abhängigkeit von (auch) sehr langen experimentell kontrollierten QE-Dauern untersucht wurde.

Methode:
In einem Within-subject-Design hatten 20 Sportstudierende unter acht verschiedenen QE-Bedingungen (Onset in 400-ms-Schritten von -3200 ms bis -400 ms vor Bewegungsbeginn; 16 Versuche pro Bedingung in randomisierter Abfolge) mit retro-reflektierenden Bällen auf eine Großleinwand projizierte Zielscheiben möglichst mittig zu treffen. Die QE-Manipulation erfolgte über eine an den Bewegungsbeginn gebundene Zielscheibeneinblendung samt Wurfrhythmisierung durch Tonvorgaben. Aus den mit einem Vicon-T20-System (200 Hz) sowie einem integrierten mobilen Eyetracker (EyeSeeCam, 220 Hz) erhobenen Daten wurden die QE-Dauer (ms) und die Wurfleistung (radialer Fehler, mm) als abhängige Variablen berechnet und varianzanalytisch auf Unterschiede untersucht.

Resultate und Diskussion:
Für die QE-Dauer wurde ein signifikanter Haupteffekt gefunden, $F(7, 133) = 38.4$, $p < .01$, $\eta_p^2 = .67$, mit zumindest tendenziellen (-2000 ms vs. -2400 ms, -2800 ms vs. -3200 ms), größtenteils aber signifikanten QE-Anstiegen gemäß der experimentellen Manipulation (alle *p*s < .01), obgleich die jeweils angezielten QE-Dauern nicht erreicht und zum Teil deutlich unterschritten wurden (tatsächliche relativ zur angezielten Dauer im Mittel 59.95 %). Für den radialen Fehler ergab sich ein signifikanter Haupteffekt, $F(7, 133) = 8.5$, $p < .01$, $\eta_p^2 = .31$, welcher durch signifikant schlechtere Leistungen bei den Onsets -400 ms und -800 ms gegenüber allen anderen Onsets erklärt wird (alle *p*s < .05; ausgenommen -400 ms vs. -800 ms und -800 ms vs. -2400 ms). Somit wurde der „klassische" QE-Effekt schlechterer Leistungen infolge kurzer QE-Dauern repliziert; die Vermutung einer Leistungsverschlechterung bei überlangen QE-Dauern konnte jedoch – zumindest unter den infolge der Manipulation tatsächlich erzielten Werten – nicht untermauert werden.

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Title:
Standing balance performance after a slackline training intervention in healthy seniors

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Abstract:
Introduction:
Previous training studies employing a slackline (balancing over narrow nylon ribbons) revealed improvements of neuromuscular characteristics [1,2]. These studies were mainly completed in healthy adults [1,2] and children [3], respectively. Comparable slackline interventions in older subjects have not yet been conducted. The aim of this study was to examine standing stability and muscle activation before and after supervised slackline balance training in active seniors.
Methods:
Twenty-eight voluntarily participating seniors were either assigned to an intervention (INT, n=15, 7 ***males***, 8 ***females***, age: 54-70 years, height: 1.55-1.84 m, weight: 58-103 kg, BMI: 21-31 kg/m²) or a control (CON, n=13, 8 ***males***, 5 ***females***, age: 53-79 years, height: 1.56-1.83 m, weight: 59-109 kg, BMI: 19-33 kg/m²) group. Slackline training (18 sessions; three 20-minute sessions weekly) was performed on Gibbon Slackracks (ID Sports, Stuttgart). Balance performance was measured before (Pre) and after (Post) the intervention via 30 s of single-limb stance (SLS) on the right leg. Therefore, a force plate (GK-1000, Mittweida) was used. The best trial (lowest total center-of-pressure path length displacement) was considered for further analyses. Sway amplitude (RMS) and mean power frequency (MNF) in the sagittal and frontal planes served as outcome measures of standing stability. Slackline-specific intervention effects were assessed through right-sided SLS on the slackline. In-group differences were verified using non-parametric (standing time) and parametric (force plate and EMG outcomes) two-sample tests.
Results:
Slackline standing duration significantly improved after balance training in INT only (Pre: 3.7 s (2.0, 5.5); median (quartiles); Post: 8.1 s (4.5, 12.3); $P < 0.001$). While RMS on force-plate standing in anterior-posterior and medio-lateral directions did not change (INT: $P > 0.4$; CON: $P > 0.1$), MNF increased in the ant-post plane after slackline training (Pre: 1.90 Hz (0.21); mean (SD); Post: 2.06 Hz (0.26); $P < 0.01$).
Discussion/Conclusion:
A specific slackline training intervention mainly revealed task-specific neuromuscular adaptations in seniors. These studies are mainly in line with previous studies. Higher MNF with unaffected RMS in anterior-posterior direction suggest improved postural control after slackline intervention. Reduced co-contraction has been previously reported to account for this finding.

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Title:
In experts, contribution of explicit and implicit processes to visuomotor adaptation is different than in novices

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Abstract:
Introduction:
Motor learning may be based on explicit and implicit processes. Explicit processes are changes in motor performance caused by conscious decisions that require declarative knowledge about the task. In contrast, implicit processes are behavioral changes that are subconsciously driven. Recent studies argue that there exist at least two forms of implicit processes that differ with respect to the rate of learning and the retention of the acquired movement(s) (Smith et al., 2006).
In the present study that was recently reported at the SfN-meeting in Washington, we investigated contribution of explicit and implicit processes to visuomotor adaptation in subjects with different levels of expertise.
Methods:
Experienced handball players (N = 30) and novices (N = 30) were compared when performing standardized free throws. We used prismatic glasses to induce a visuomotor adaptation and performed three different experiments (subjects were equally assigned to the protocols): in experiment 1, we recorded the aiming strategy of the subjects that informs about contribution of explicit processes. In experiment 2, explicit processes to adaptation were blocked by verbal instructions about the throwing procedure, thus we assessed how adaptations were performed with solely implicit processes. In experiment 3, retention of the adapted throwing movement was tested while contribution of explicit processes was blocked like in experiment 2.
Results:
The results of experiment 1 indicate that contribution of explicit processes was significantly larger in experts than in novices. Results of experiment 2 showed that experts adapted significantly slower than novices when contribution of explicated processes was blocked. Finally, results of experiment 3 indicate that experts retained the adapted movement longer (i.e. slower forgetting) than novices.
Discussion/Conclusion:
These results have important implications. First, they suggest that the standard models of skill acquisition (e.g. Fitts and Posner, 1967), that propose a reduction of explicit and enhancement of implicit processes with increased levels of expertise, may require further critical considerations. Second, the results of experiment 2 and 3 suggest that experts use different implicit processes than novices. Adaptation took longer and retention was better in experts. Thus, one may speculate that learning in experts is optimized in a sense that acquired movements can be retained longer than in novices. A slower rate of learning by these implicit processes would be counteracted by a higher contribution of explicit processes in experts.

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Title:
Comparison of spatio-temporal gait parameters between a portable gait analysis device and a treadmill

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Abstract:
Introduction:
Gait analysis is considered an important tool for clinicians and other health professionals to assess gait patterns referring to functional limitations due to neurological or orthopaedic conditions. Several stationary devices are available to date. Mobile devices are, however, still needed. The RehaGait (Hasomed, Magdeburg, Germany) has been deemed appropriate to measure gait characteristics in field settings. Thus, the present study aimed at assessing the criterion validity of the RehaGait in comparison to a gold-standard stationary treadmill at different velocities and slopes.
Methods:
Twenty-two healthy participants (8 women, 14 men, age: 31 ± 3.7 years, BMI: 26.0 ± 7.0 kg/m^2) were tested on two days (1 week apart) at the same time of the day. Habitual walking speed of each subject was determined as the average of three trials of 10 m normal overground walking. Walking speed was assessed with photoelectric timing gates (Witty, Microgate, Bolzano, Italy). A familiarisation trial of 5 minutes treadmill walking at habitual walking speed was provided for each individual. All participants then performed 6 walking trials on a treadmill (Zebris FDM-T, Zebris medical, Isny, Germany) while wearing the RehaGait device. Walking velocity was set at habitual walking speed and habitual walking speed plus or minus 15%. Slope was set at 0% or 15% inclination. Testing order of these conditions was randomly assigned (5 minute break in-between the trials). Each individual had to walk 200 strides (double step) (~5 min). Spatio-temporal gait characteristics were simultaneously recorded by the treadmill and the RehaGait device. The validity of stride time (sec), stride length (cm) and stride frequency (sec^{-1}) were analysed using a published spreadsheet (Hopkins 2000). The typical error of the estimate (TEE) and the mean difference in percentage served as main validity parameters. Pearson´s correlation coefficient was calculated to establish whether the bias was random or not.
Results:
A mean difference of -0.14 – 0.06% was found for stride time and cadence, irrespective of velocities and slope conditions (TEE < 0.08 sec & 0.01 sec^{-1}, respectively). Pearson´s correlation coefficient between the two devices for each temporal gait parameter was excellent (r>0.99). Stride length showed better correlation coefficients during normal overground walking (r: 0.77-0.89) as compared to the 15% inclination (r: 0.59-0.72). TEEs were larger for inclined walking (15% slope) (8.6 – 11.4 cm) when compared to no slope (6.8 – 9.3 cm) for all speed conditions. Mean difference was highest for 15% slope and average speed condition (7.9 ± 12.1%) and smallest for even overground walking and 15% faster speed condition (-0.2 ± 6.0%).
Discussion/Conclusion:
When compared to a gold-standard device, the RehaGait device showed excellent agreement for temporal parameters, particularly for even overground walking. Spatial parameters seem to be slightly underestimated and reflect the criterion better on flat surface with no inclination and at higher speeds. The device`s software seems to nearly perfectly estimate temporal variables but not spatial ones. This might be explained by acceleration data reflecting time events very good whereas spatial data has to be derived from more complex calculations. This warrants further investigations due to gait analysis devices often being used in pathological populations and seniors, whose walking velocities are usually slower when compared to healthy subject.

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Title: Changes in Mental Health in Compliers and Non-Compliers with Physical Activity Recommendations in Patients with Stress-Related Exhaustion

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Abstract:

Introduction:

There is increasing evidence for the beneficial effects of physical activity (PA) in patients with mental disorders (Josefsson, Lindwall, & Archer, 2013; Rosenbaum, Tiedemann, Sherrington, Curtis, & Ward, 2014). Despite these promising findings, there is a lack of research regarding the long-lasting effects of a more physically active lifestyle in this group of patients. Given that clinical experience suggests that compliance with PA recommendations advised during treatment varies substantially across individuals (Blumenthal, Smith, & Hofmann, 2012; Schuch & de Almeida Fleck, 2013), it is of great interest to explore the potential association between high compliance to increased PA over longer periods of time and recovery from various mental symptoms in patients with mental health problems. In the present study, clinical data were analysed to examine if initially physically inactive patients, clinically diagnosed with stress-related exhaustion, taking part in 12-month multimodal treatment (MMT), differ at the 18-month follow-up regarding mental health, depending on whether they did or did not comply with PA recommendations resembling those of the American College of Sports Medicine.

Methods:

The study population consisted of 69 patients (65% women) who were referred to a stress clinic due to stress-related exhaustion. All patients received MMT. A major goal was to increase patients' PA levels. The patients received general comprehensive instructions including personal advice regarding the positive effects of PA on mental health and could self-select for an 18-week coached exercise program. Changes in mental health symptoms over an 18-month period were compared between non-compliers (n=26), mild compliers (n=22) and strong compliers (n=21) with the PA recommendations included in the MMT.

Results:

Non-compliers, mild and strong compliers did not differ regarding burnout, depression and anxiety at baseline. Although substantial improvements occurred in all groups, mild and strong compliers reported significantly lower burnout and depression levels at the 18-month follow-up than the non-complying group (p<.05). The general pattern of findings was corroborated, if standard cut-off criteria for clinical burnout were used.

Discussion/Conclusion:

Compliance with PA recommendations is associated with better mental health. Thus, the promotion of a more active lifestyle among patients with stress-related exhaustion should be implemented as a part of MMT, to achieve a more sustainable decrease of symptoms of burnout and depression.

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Title: Biomechanical Gait Cycle Analysis Of Different Ski Touring Systems

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Abstract:

Introduction:

Ski touring is a popular winter sport that combines hiking and skiing and requires a special ski binding. Unlike alpine ski bindings, a touring binding allows for free movement of the heel in order to allow a climbing motion and fulfill a walking pace. Having the skis mounted to the ski boot with a ski touring binding makes walking in deep snow easier because they prevent one from sinking into the snow. The aim of this research is to identify characteristic ski touring motions, compared to the natural hiking movement, as well as differences between ski touring systems.

Methods:

For this study thirteen experienced ski tourers performed the walking movement natural with shoes and with five different winter sport systems on a treadmill with 15° ascent. The tested systems were a snowshoe, a pin binding, a frame binding, a telemark system and a prototype of a newly developed ski touring boot called "TourBo". To capture the kinematics, the optoelectronic measurement system Vicon Nexus (Oxford Metrics Group, UK) was used to record the attached reflective skin markers and measure ankle, knee, hip and pelvis motion as well as the ski lifting and stride length. A detailed description of the measurement system can be found in (Bachmann, Gerber, & Stacoff, 2008). The exact positions of the skin markers and the measurement procedures are taken from (List, Gulay, Stoop, & Lorenzetti, 2012) and expert knowledge gained over the years.

Results:

Natural walking resulted in different ankle and hip joint angles and a different motion of the pelvis compared to the winter sport systems. Differences between the ski touring systems with respect to range of motion parameters were not found, however, the stride length was the largest with the new “TourBo” system. The tested ski touring systems did not differ with respect to the lifting of the ski while walking.

Discussion/Conclusion:

Direct comparison to related research is not possible since the only known study that presents the kinematics of the ski touring movement (Canclini, Baroni, Pozzo, Pensini, & Rossi, 2009), compared the ski touring and cross country skiing technique. As the “TourBo” setup shows no difference to the other ski touring systems with respect to hip and pelvis movement, the reason for the additional stride length is assumed to be a result of the free toe movement, which is not found in other systems. According to the research presented in (Wunsch, Kröll, Stöggl, & Schwameder, 2004), a lower stride frequency during running leads to a higher efficiency. If this correlation between stride frequency and efficiency could also be proven for the ski touring movement, the “TourBo” concept would have notable advantages compared to conventional ski touring bindings.

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Titel:
Kognitive Faktoren als Erklärungsgrössen von Befindlichkeitsveränderungen während Seniorensportkursen

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Abstract:
Einleitung: Obwohl der Gesundheitsnutzen von sportlicher Aktivität gut dokumentiert ist (z. B. American College of Sports Medicine, 2009), sind viele ältere Menschen zu wenig sportlich aktiv. In der Schweiz treiben beispielsweise 34% der Personen ab 65 Jahren selten oder nie Sport (Lamprecht, Fischer & Stamm, 2014). Zentral für ein regelmässiges Sportverhalten sind positive affektive Reaktionen beim Sporttreiben (Williams, 2008). Diese Befindlichkeitsveränderungen sind gemäss der Dual Mode Theorie (Ekkekakis, 2003) abhängig von der Belastungsintensität. Die Dual Mode Theorie unterscheidet drei Belastungsbereiche (Ekkekakis, 2003): (1) moderate Belastungen unterhalb der aeroben Schwelle (< 70% HF_{max}), (2) anstrengende Belastungen im aerob-anaeroben Übergangsbereich (ca. 70-89% HF_{max}) und (3) sehr anstrengende Belastungen oberhalb der anaeroben Schwelle (≥ 90% HF_{max}). Der Fokus für diesen Beitrag liegt aus zwei Gründen auf dem moderaten Belastungsbereich: Erstens werden für Sportaktivitäten im Seniorenalter moderate Belastungen empfohlen (American College of Sports Medicine, 2009) und zweitens zeigen Studien mit freier Intensitätswahl, dass ältere Personen moderate Intensitäten bevorzugen (Ekkekakis, Backhouse, Gray & Lind, 2008). Für den moderaten Belastungsbereich besagt die Dual Mode Theorie (Ekkekakis, 2003), dass Befindlichkeitsveränderungen homogen positiv ausfallen. Diese Befindlichkeitsveränderungen werden wiederum durch kognitive Faktoren, wie das Kompetenzerleben und sportbezogene Ziele erklärt.
Der moderate Belastungsbereich wurde bis anhin noch wenig untersucht. Mehrheitlich basieren die Erkenntnisse der Dual Mode Theorie auf anstrengenden oder sehr anstrengenden Ausdauerbelastungen mit jüngeren Erwachsenen im Laborsetting (z. B. Ekkekakis, Hall & Petruzzello, 2004). Auch die vorliegenden Arbeiten zur Erklärung von Befindlichkeitsveränderungen durch das Kompetenzerleben (Sudeck & Conzelmann, 2014) oder das Erreichen von sportbezogenen Zielen (Rose & Parfitt, 2007) untersuchten jüngere Stichproben. Studien zur Erklärung von Befindlichkeitsveränderungen während moderaten Belastungen im Seniorenalter liegen nicht vor.
Mit dem Begriff „moderat" werden in der Dual Mode Theorie alle Belastungen bis zur aeroben Schwelle zusammengefasst. Reed und Ones (2006) liefern allerdings Hinweise, dass sich eine differenzierte Analyse der Wirkung moderater Belastungen auf die Befindlichkeit lohnt. In ihrer Metaanalyse mit jüngeren Erwachsenen kommen sie zum Schluss, dass niedrige Belastungen (≤ 54% HF_{max}) zu unterschiedlichen Befindlichkeitseffekten führen als mittlere Intensitäten (55-69% HF_{max}). Aufgrund des bisherigen Studienmangels für das höhere Erwachsenenalter sowie basierend auf der aktuellen Befundlage wird in diesem Beitrag folgender Frage nachgegangen: Inwieweit moderiert die Belastung (niedrig vs. mittel) den Zusammenhang zwischen kognitiven Faktoren (Kompetenzerleben und sportbezogene Ziele) und der Befindlichkeit während Seniorensportkursen?

Methodik: In der Feldstudie wurden von Januar bis Oktober 2013 in Kooperation mit der Pro Senectute Region Bern acht Seniorensportkurse je zweimal besucht. Beim ersten Kursbesuch (T_1) wurden die sportbezogenen Ziele mit dem speziell fürs höhere Erwachsenenalter adaptierten Berner Motiv- und Zielinventar-HEA erhoben. Das BMZI-HEA umfasst 27 Items und erfasst sieben sportbezogene Ziele (Schmid, Molinari, Lehnert, Sudeck & Conzelmann, 2014). Um die einzelnen Ziele untereinander in Beziehung setzen zu können und die subjektive Bedeutsamkeit der einzelnen Ziele zu eruieren, wurde für die Analysen eine intraindividuelle z-Standardisierung durchgeführt.
Beim zweiten Kursbesuch (T_2) wurde die aktuelle Befindlichkeit (Valenz) vor, während und nach dem Kurs schriftlich erfragt. Hierfür wurde die Kurzskala „Basisdimensionen Stimmung" von Wilhelm und Schoebi (2007) eingesetzt. Des Weiteren wurde die wahrgenommene Beanspruchung mit einer deutschsprachigen Version der CR10-Skala von Borg (1998) während der Sportaktivität erfasst. Für die differenzierten Belastungsauswertungen wurden, basierend auf Borg und Kaijser (2006), der

niedrige (≤ 2) und der mittlere Belastungsbereich (2 < Wert ≤ 6) gebildet. Schliesslich wurde das Kompetenzerleben mit 2 Items anlehnend an die Flow State Scale (Jackson & Marsh, 1996) und die Magglinger Sport Enjoyment Scale (Birrer & Stirnimann, 2009) nach dem Sportkurs erhoben. Insgesamt konnten Daten von 108 Personen (*M* = 72.1 Jahre; *SD* = 4.9 Jahre; 69% Frauen) erfasst werden. Zwei Personen mussten aufgrund inkompletter Datensätze ausgeschlossen werden.
Die Daten wurden mit einer blockweisen linearen Regressionsanalyse je Belastungsgruppe ausgewertet. Das blockweise Vorgehen umfasste in Schritt 1 die acht Sportkurse (sieben Dummyvariablen). In Schritt 2 wurde der Befindenseingangswert eingefügt, da das Befindenseingangsniveau die affektiven Reaktionen auf Sportaktivitäten beeinflusst (Reed & Ones, 2006). Schliesslich wurden in Schritt 3 die kognitiven Faktoren, die sportbezogenen Ziele und das Kompetenzerleben, eingeschlossen. Zur Beantwortung der Fragestellung wurden die Regressionsgewichte (β) der Prädiktoren herangezogen, sowie die unstandardisierten Regressionsgewichte (*B*) der beiden Belastungsgruppen anhand der Konfidenzintervalle miteinander verglichen (Brandstätter, 1999).

Ergebnisse: Die Regressionsanalyse für die Valenz zeigt für beide Belastungsgruppen einen positiven Einfluss sowohl des Eingangswertes als auch des Kompetenzerlebens auf die Valenz während der Sportaktivität (Tab. 1). Bei den sportbezogenen Zielen ist bei niedriger Belastung ein negativer Einfluss der Wichtigkeit der Ziele Alltagskompetenz/Gesundheit und Stimmungsregulation und bei mittlerer Intensität ein positiver Einfluss der Wichtigkeit des Ziels Stimmungsregulation festzustellen. Die unstandardisierten Regressionsgewichte der genannten Ziele und des Kompetenzerlebens unterscheiden sich überzufällig zwischen den Belastungsgruppen.

Tab. 1: Blockweise lineare Regressionsanalysen zur Bestimmung des Einflusses von kognitiven Faktoren (sportbezogene Ziele und Kompetenzerleben) auf die Valenz während der Sportaktivität in Abhängigkeit der Belastungsintensität (mit Einbezug der Sportprogramme, Schritt 1)

	AV: **Valenz** während Sportaktivität					
	Niedrige Belastung			Mittlere Belastung		
Prädiktoren	Δ R^2	β	B [90% CI]	Δ R^2	β	B [90% CI]
Schritt 2	.48*			.31*		
Valenz Eingangswert		.75*	0.52 [0.41 0.63]		.53*	0.44 [0.29 0.59]
Schritt 3	.20*			.16*		
Alltagskompetenz/Gesundheit		-.38*	-0.64 [-1.05 -0.23]		.28	0.41 [-0.07 0.89]
Figur/Aussehen		-.11	-0.12 [-0.33 0.10]		.23	0.24 [0.00 0.47]
Stimmungsregulation		-.36*	-0.45 [-0.77 -0.13]		.29*	0.43 [0.10 0.76]
Positive Bewegungserfahrungen		-.21	-0.29 [-0.61 0.02]		.21	0.26 [-0.05 0.58]
Kognitive Funktionsfähigkeit		-.20	-0.29 [-0.60 0.01]		.29	0.36 [0.01 0.71]
Wettkampf/Leistung		–	–		–	–
Kontakt		-.21	-0.23 [-0.51 0.04]		.03	0.03 [-0.35 0.42]
Kompetenzerleben		.49*	0.69 [0.43 0.95]		.26*	0.36 [0.10 0.62]
Total R^2	.75*			.68*		

Anmerkung: Berichtet wurden die Regressionsgewichte des 3. Schrittes; – ausgeschlossen wurden Ziele bei einem Toleranzwert ≤ 0.1 (Kollinearitätsstatistik); *p < .05

Diskussion:
Die vorliegenden Befunde sprechen dafür, dass innerhalb der Dual Mode Theorie die Wirkung von moderaten Belastungen auf die Befindlichkeit differenzierter (niedrig vs. mittel) analysiert werden sollten. Diese Erkenntnis steht im Einklang mit den Befunden von Reed und Ones (2006) mit jüngeren Erwachsenen. Erwartungsgemäss weist das Kompetenzerleben in beiden Belastungsgruppen einen positiven Einfluss auf die Valenz während der Sportaktivität auf, wobei der Einfluss bei niedriger Intensität grösser ausfällt. Hinsichtlich der Ziele zeigt sich bei niedriger Belastung, dass je wichtiger einer Person gesundheitsorientierte Ziele (Stimmungsregulation, Alltagskompetenz/Gesundheit) sind, desto kleiner ist ihre Valenzveränderung während der Sportaktivität. Dieser negative Einfluss kann möglicherweise dadurch erklärt werden, dass bei niedrigen Belastungen der wahrgenommene Nutzen zur Zielerreichung zu gering ist (Rose & Parfitt, 2007). Erst bei mittleren Belastungen werden

die Erwartungen für eine Stimmungsregulation erfüllt, was sich in einem positiven Einfluss auf die Valenzveränderung widerspiegelt.
Für die Sportpraxis mit Personen im höheren Erwachsenenalter bedeuten die gewonnenen Erkenntnisse, dass besonders bei niedrigen Belastungen das Kompetenzerleben z. B. durch gezielte Feedbacks zur Aufgabenerfüllung (Bandura, 1977) gefördert werden sollte. Bei mittleren Belastungen ist es hingegen wichtiger, die persönlichen Ziele der Teilnehmenden zu kennen und deren Erreichung durch passende Anreize zu ermöglichen (Sudeck & Conzelmann, 2011).

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Title: Altered brain activity during observation and motor imagery of balance tasks in the elderly: An fMRI study

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Abstract:
Introduction: Aging induces structural and functional changes in the central nervous system that influence motor control in general and balance control in particular (Papegaaij, Taube, Baudry, Otten, & Hortobagyi, 2014). For manual motor tasks, greater cortical activity was seen in primary motor cortex (M1), premotor and prefrontal areas in elderly compared to young (Calautti, Serrati, & Baron, 2001; Heuninckx, Wenderoth, & Swinnen, 2008; Mattay et al., 2002; Wu & Hallett, 2005). This phenomenon of cortical disinhibition with aging was recently also shown for postural tasks by means of transcranial magnetic stimulation (TMS) over M1 (Papegaaij, Taube, Hogenhout, Baudry, & Hortobagyi, 2014). The current study aimed to further explore age-related differences in postural control by means of fMRI in order to detect not only cortical but also subcortical changes. For this purpose, subjects were asked to mentally simulate balance tasks by either motor imagery (MI), action observation (AO) or the combination of AO and MI (AO+MI) while lying in the scanner. In young subjects we have recently shown that such mental simulation of balance exercises is efficient to a) substantially activate motor centers responsible for postural control in the short-run (Taube et al., 2015) and b) improve balance performance in the long-run (Taube, Lorch, Zeiter, & Keller, 2014).

Methods: We used an fMRI design that we have recently introduced (Taube et al., 2015). Data from sixteen elderly subjects (7 females) between 66 and 80 years (mean ± SD = 72 ± 4.58) were compared with data from sixteen young subjects (6 females) aged between 20 and 37 years (mean ± SD = 27 ± 4.81). All subjects were asked to perform 3 mental simulations: 1) AO+MI, 2) AO, 3) MI. In AO+MI participants were instructed to imagine at a first person perspective a person displayed in a video whereas in AO they were asked to passively watch the video. During MI, participants had to close their eyes and imagined at a first person perspective that they were doing the balance task themselves. Two balance tasks were evaluated during mental simulation a) a static balance task (standing) and b) a dynamic balance task (a medio-lateral perturbation). MRI data were acquired with a 3T MRI scanner and analyzed with the Statistical Parametric Mapping SPM8 software (http://www.fil.ion.ucl.ac.uk/spm/) working on Matlab 2013b (MathWorks, Inc., http://www.mathworks.com, MA, USA). A full factorial model was used to analyze differences between elderly and young subjects.

Results:

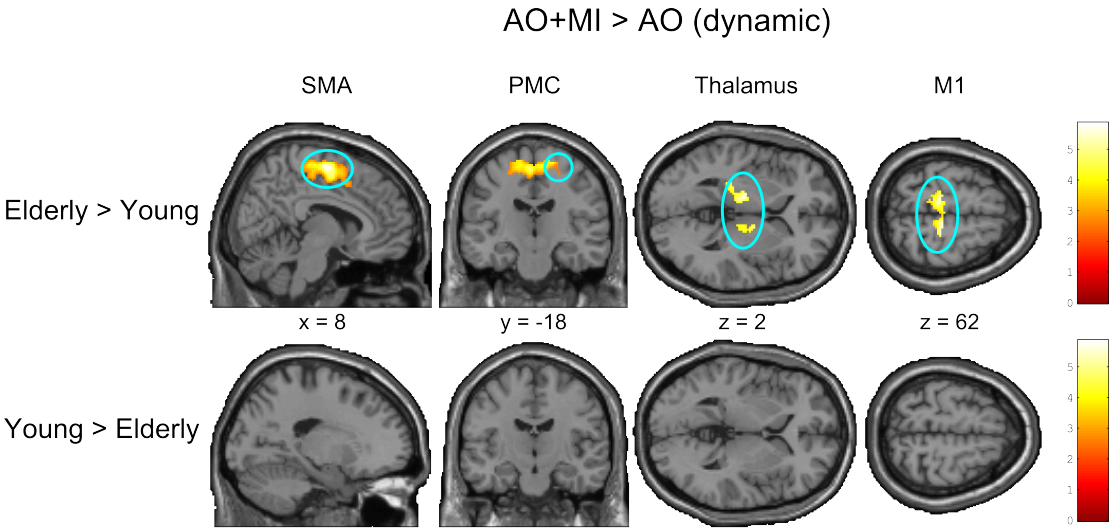

Figure 1: Differences in brain activity between young and elderly during AO+MI and AO of the dynamic task. Elderly displayed lager activation in supplementary motor area (SMA), premotor cortex (PMC), thalamus and primary motor cortex (M1). Young did not reveal higher activation than elderly when calculating this contrast (AO+MI > AO). Activations are shown with $p < .05$ FWE corrected at the cluster level. Color bar presents the significance level of the contrast. The coordinates (x, y, z) of each picture in MNI space are provided.

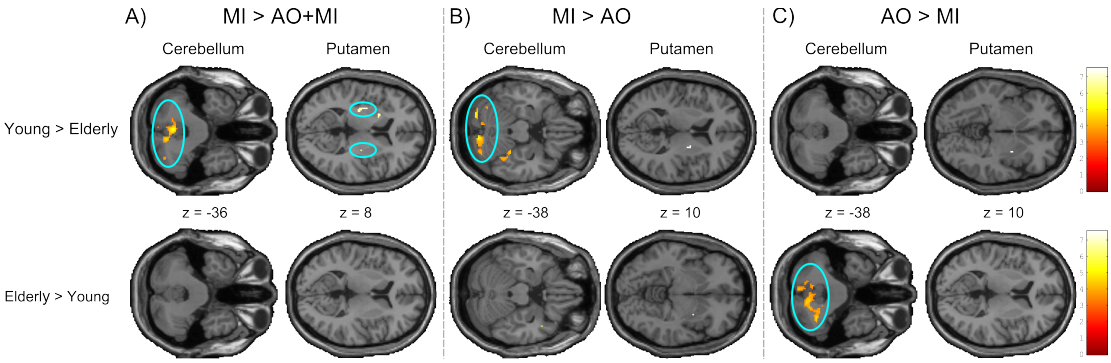

Figure 2: Differences in brain activity between young and elderly in three different contrasts when subjects simulated the dynamic balance task. (A) Contrasting MI with AO+MI (MI > AO+MI) revealed that young subjects activated more strongly the cerebellum and the putamen in the MI condition compared to elderly. (B) Similarly, the contrast MI versus AO revealed higher activity in the cerebellum in young than in elderly subjects. (C) In contrast, compared to the young, elderly exhibited greater activity in the cerebellum during AO than during MI. Activations in the cerebellum were detected with a whole brain analysis, while activity of the putamen was revealed by a ROI analysis based on the automated anatomical labeling (AAL) atlas (Tzourio-Mazoyer et al., 2002). Activations are showed with $p < .05$ FWE corrected at the cluster level. Color bar presents the significance level of the contrast. The coordinate (z) of each picture in MNI space is provided.

Discussion/Conclusion: Previous study have shown that execution of manual motor tasks induced greater activity in M1, prefrontal cortex and premotor cortex in elderly compared to young (Calautti et al., 2001; Heuninckx et al., 2008; Mattay et al., 2002; Wu & Hallett, 2005). Similarly, during AO+MI of hand movements, Nedelko et al. (2010) showed larger brain activity in PMC in the elderly. With respect to postural control, Papegaaij et al. (2014) demonstrated a reduction of intracortical inhibition in the elderly compared to young subjects and this decrease was negatively correlated with balance performance. Similarly, motor imagery of gait displayed higher activity of the SMA in the elderly (Allali et al., 2014). Thus, there is a common notion of increased cortical activity in elderly compared to young subjects for the execution and mental simulation of movements in general. Our results are well in line with this finding. Although elderly people showed very similar activation patterns than young ones when mentally simulating postural tasks, they nevertheless revealed increased activity in the SMA, PMC, M1 and the thalamus. However, greater cortical activity was only found for the conditions with visual input (AO+MI and AO; the latter is not presented due to space limitations). In the condition without visual input (MI), there was no facilitation of cortical areas in the elderly and they even demonstrated a decrease in activity in subcortical areas such as the putamen and the cerebellum. Our results therefore indicate that elderly people i) increase activity in cortical centers probably to compensate for age-related deteriorations in postural control and ii) depend more strongly on visual input than young subjects especially to activate subcortical brain centers such as the cerebellum and the basal ganglia.

The present study demonstrates for the first time that elderly subjects recruit more strongly cortical areas but less subcortical involvement during AO+MI and MI, respectively. The differences between mental simulation with and without visual input further supports the view that elderly people more strongly rely on visual guidance.

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Title:
Professionalisation of Sports Federations - A multi-level Framework for analysing Forms, Causes and Consequences

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Abstract:
Introduction:
International and national sports federations as well as their member organisations (usually sports clubs) are key actors within the sports system and have a wide range of relationships outside the sports system (e.g. with the state, sponsors, and the media). They are currently facing major challenges such as growing competition in top-level sports, democratisation of sports with "sports for all" and sports as the answer to social problems (integration, education, health, unemployment, etc.). In this context, professionalising sports organisations seems to be an appropriate strategy to face these challenges and solve current problems. This has led to a profound organisational change, particularly within sports federations, characterised by the strengthening of institutional management (managerialism) and the implementation of efficiency-based management instruments and paid staff. In this context the questions arise how sports organisations professionalise and what consequences this may have.

Theoretical framework:
The goal of our presentation is to review the international literature and develop an appropriate concept of professionalisation in sport federations. Our multi-level approach based on social theory of action integrates the current concepts and perspectives for analysing professionalisation in sports federations. We specify the framework for the following research perspectives: (1) forms, (2) causes and mechanisms, (3) consequences and (4) dynamics, and discuss the reciprocal relations between sports federations and their member organisations in this context. When analysing these different research perspectives, it is important to select or elaborate appropriate theoretical concepts to match the general multi-level framework

Discussion:
The elaborated multi-level framework for analysing professionalisation in sports federations is able to integrate most of the existing theoretical concepts and therefore, the broad range of endogenous as well as exogenous factors that might influence the professionalisation of sports organisations. Based on the theoretical framework, we can identify several consequences for the methodological design of studies intending to analyse the different perspectives of professionalisation in sports organisations: Data have to be collected on the different levels. Not only the forms of professionalisation and relevant structures of the organisations should be taken into account but also important characteristics of the environment (macro level) as well as members or member organisations, particularly key actors who might play a crucial role in gaining an understanding of professionalisation processes in sports organisations. In order to carry out a complex organisational research design, it seems necessary to focus on case studies – an approach that has become increasingly important in organisational research. Different strategies and methods of data collection have to be used within the case studies (e.g. interviews with experts within the organisations, questionnaire for selected people in the organisation, document analysis). Therefore, qualitative and quantitative research strategies have to be combined.

Title:
The effects of wide pulse neuromuscular electrical stimulation on plantar flexion force in individuals with cerebral palsy.

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Abstract:

Introduction:

Cerebral palsy (CP) is a disease caused by a non-progressive brain lesion which subsequently leads to muscle pathologies (1) resulting in muscle weakness defined as a low maximal voluntary contraction force (MVC) (2). This reduced MVC is associated with impaired quality of life (3). Neuromuscular electrical stimulation (NMES) may be a useful training/rehabilitation paradigm to prevent muscle force loss (4). Conventional (CONV) NMES programs typically consist in stimulating a muscle group at a frequency between 20 and 50 Hz with a pulse duration between 50 and 400 µs (5). Typically NMES leads to synchronous and random depolarization of intramuscular nerve branches but results in rapid fatigue development (6). Recently, a new NMES paradigm using wider pulses (1 ms duration) and higher stimulation frequency has gained popularity in healthy (7, 8) as well as in pathological (9, 10) populations. In addition to direct depolarization of motoneuron axonal terminal branches, this wide pulse (WP) stimulation paradigm may induce centrally-mediated motor unit recruitment (11) through stimulation of Ia afferents. The additional motor units recruited would thus lead to the development of a so-called "extra-force" (i.e. gradual force increase over time or following a high frequency stimulation burst). Interestingly, one of the main hallmarks of CP is the presence of an increased reflex excitability (12) relying on the Ia afferent pathway. The present study aimed at testing the hypothesis that the WP paradigm allows a proportional greater increase in force in CP patients as compared with healthy subjects.

Methods:

Subjects. Ten CP subjects (5 females, 20 ± 5 years, 54 ± 8 kg, 166 ± 7 cm) and 10 healthy control subjects (5 females, 20 ± 5 years, 70 ± 12 kg, 175 ± 8 cm) volunteered to participate in the study.
Protocol. Subjects performed 2 to 3 isometric MVCs before NMES to allow normalization of the subsequent evoked force. As constant and burst-like frequency stimulation pattern have been reported to elicit different responses in post-stroke patients (9), both type of paradigms were tested. Constant frequency WP (stimulation frequency: 100 Hz - pulse duration: 1 ms) and CONV (stimulation frequency: 25 Hz - pulse duration: 50 µs) protocols were performed in a counterbalanced way with a 2-min rest period between the two protocols. For both stimulation protocols, the intensity to elicit an evoked force corresponding to ~5% MVC was determined with 1-s trains at the targeted frequency and pulse duration (100 Hz-1 ms for WP and 25 Hz-50 µs for CONV). The 5% MVC force target was chosen to minimize antidromic collision (11). For each protocol, two to four contractions (10 s) were evoked. After having observed a 2-min break and setting the stimulation intensity to evoke ~5% MVC with a 25 Hz 1-s train with pulse duration of 1 ms, burst-like stimulations (2 s at 25 Hz followed by 2 s at 100 Hz followed by 2 s at 25 Hz, (13)) were then performed. Two to three trials were performed, with 2 min rests between trials.

All contractions were evoked via 2 electrodes (5 x 10 cm, Compex, Ecublens, Switzerland) positioned over the triceps surae muscle belly (14).
For constant-frequency stimulations, the different trials for each protocol and each subject were averaged. As an index of extra-force (central recruitment), the variation in force between the last second and the 2nd s (once a force plateau was reached) was calculated. For burst-like stimulations, the mean force developed during the last 1.5 s of each 25 Hz stimulation train was quantified and the relative variation between the two 25 Hz trains was calculated to assess the occurrence of extra-force production with this stimulation pattern (13).

Statistics.

Depending on the outcome of the normality test, unpaired t-tests or Mann-Whitney t-tests were performed to compare the two groups. Two-way split ANOVAs were performed for burst-like and constant-frequency stimulations (Group x Time (25 Hz preceding the 100 Hz vs. 25 Hz following the 100 Hz stimulation train for burst-like and 2nd s vs. last s of constant frequency trains)) mean force. To determine whether an extra-force was produced or not in response to constant frequency WP and CONV stimulation paradigms, Mann-Whitney tests were performed between delta force changes from the start to the end of the evoked contractions and 0 (15) for each group. α was set to $p<0.05$. Data are presented as means ± SD.

Results:

Constant frequency NMES

When force changes between the start and end of each contraction were considered, only a stimulation paradigm (i.e. WP vs. CONV) main effect was observed and thus the 2 groups' data were pooled (+56 ± 107% for constant WP vs. -1 ± 20% for constant CONV, $p<0.05$), whereas only a tendency for a significant difference was found for the group factor ($p=0.074$). To test for group response to constant frequency WP and/or CONV, extra-force production was compared to 0, for each group and each protocol. Whereas control subjects showed a significant force increase (+94 ± 124%, $p<0.05$) in response to WP, the CP group did not (+18 ± 74%, $p>0.05$). Regarding CONV stimulation, the CP group showed a significant force decrease throughout the 10-s contraction (-8 ± 13%, $p<0.01$) while no significant changes were observed in the control subjects for this stimulation paradigm (+5.5 ± 25%, $p>0.05$). Even though no extra-force production could be observed in CP when considering the group data, 3 CP patients showed a force increase of 50% or more with constant frequency WP (Fig. 1).

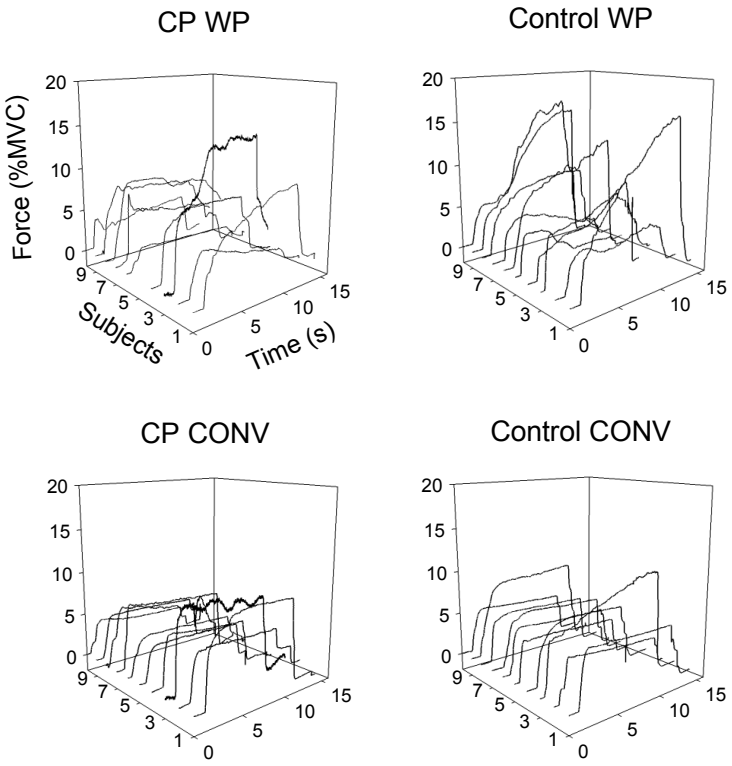

Figure 1. Typical traces for constant WP and CONV evoked contractions in CP and control subjects.

Burst-like NMES

When the burst-like stimulation was used, both groups showed a similar response ($p>0.05$). The force developed during the 25-Hz train following the 100-Hz train was significantly higher (+108 ± 110% in CP and +65 ± 85% in controls) than the one produced by the same train before the 100-Hz train ($p<0.01$). When considering individual data, 6 CP and 4 control subjects showed a force increase superior to 50% between the two bouts of low frequency stimulation (Fig. 2).

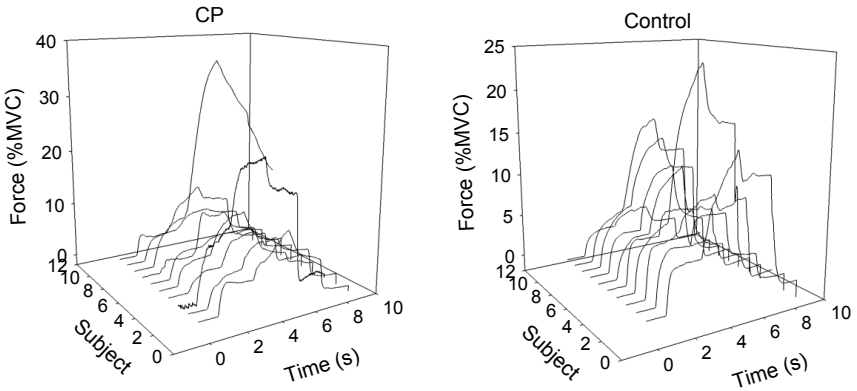

Figure 2. All individual traces for burst-like stimulation evoked force for CP and control subjects.

Discussion/Conclusion:

The present study was designed to assess, for the first time, whether an extra-force could be observed in CP patients in response to WP stimulation. Contrary to our hypothesis and in contrast to the control subjects, the CP group did not develop an extra-force in response to constant frequency WP stimulation. Interestingly, when the stimulation pattern switched from constant frequency to burst-pattern trains, both groups showed a similar extra-force production. However, an important inter-subject variability was found with both stimulation protocols for both groups. According to our results, WP stimulation and particularly burst-like patterns could represent efficient stimulation paradigms for some CP individuals as the induced extra-force might highlight a central recruitment of some motor units.

Acknowledgement

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O

Title:
Subjektive Theorien von Lehrpersonen zu Kompetenzen und Bereitschaften von Sport unterrichtenden Lehrpersonen der Vorschul- und Primarschulstufe

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Abstract:
Introduction:
Lehrpersonen benötigen für professionelles pädagogisches Handeln berufliche Kompetenzen. Aktuell wird in der Diskussion um Kompetenzen von Lehrpersonen vermehrt auf das Modell professioneller Handlungskompetenz nach Baumert und Kunter (2006, S. 482) Bezug genommen, dies allerdings meist ohne spezifische Berücksichtigung der zu unterrichtenden Fächer bzw. der Fachdisziplin. Das gilt insbesondere für bislang wenig untersuchte Kompetenzen von Lehrpersonen des Fachs Sport. Kompetenzen von Sport unterrichtenden Lehrpersonen lassen sich u.a. im Rahmen von subjektiven Theorien über den eigenen Fachunterricht erfassen, da diese handlungsleitende Kognitionen für die Unterrichtsgestaltung darstellen. Die vorliegende Studie untersucht vor dem Hintergrund des Modells professioneller Handlungskompetenz die subjektiven Theorien von Lehrpersonen über Kompetenzen und Bereitschaften von Sport unterrichtenden Lehrpersonen der Vorschul- und Primarschulstufe.
Methods:
Die Untersuchung beruht auf einem explorativen Mixed-Methods-Design, welches eine qualitative Delphi-Befragung und darauf aufbauend eine quantitative Fragebogenuntersuchung beinhaltet. In der zweistufigen Delphi-Befragung wurden Interviews mit Expertenlehrpersonen sowie Fachdidaktikerinnen und -didaktikern durchgeführt, mittels qualitativer Inhaltsanalyse ausgewertet und daraus Kompetenzen und Bereitschaften von Sport unterrichtenden Lehrpersonen abgeleitet. Die Kompetenzen und Bereitschaften wurden anschliessend in einer quantitativen Fragebogenuntersuchung von Lehrpersonen (N = 313) bezüglich ihrer Wichtigkeit eingeschätzt und mittels explorativer Faktorenanalyse auf ihre Struktur untersucht.
Results:
Auf Basis subjektiver Theorien von Lehrpersonen werden mittels Delphi-Befragung 58 Kompetenzen und Bereitschaften entwickelt, welche für Sport unterrichtende Lehrpersonen der Vorschul- und Primarschulstufe zentral sind. Diese sind fachspezifisch konnotiert und lassen sich den Aspekten des Modells professioneller Handlungskompetenz (Baumert & Kunter, 2006) zuordnen. Die Kompetenzen und Bereitschaften können aufgrund der Einschätzungen zur Wichtigkeit faktorenanalytisch auf 41 Kompetenzen und Bereitschaften reduziert und analog zu Baumert und Kunter (2006) eingeteilt werden in acht fachspezifische Kompetenzfacetten bezüglich des Professionswissens (Sportwissenschaftliches Wissen, Wissen über den Nutzen von Bewegung, Wissen über den Umgang mit Unfällen, Wissen über den Einsatz vielfältiger Bewegungsaufgaben, Wissen über die didaktisch-methodische Gestaltung des Sportunterrichts, Wissen über die Planung des Sportunterrichts anhand transparenter Ziele und Kriterien, Entwicklungspsychologisches Wissen, Wissen über die Organisation der Klasse) und in zwei Bereitschaftsfacetten (Sportives Selbstverständnis der Lehrperson, Absicht der individuellen Förderung der Schülerinnen und Schüler). Alle Kompetenz- und Bereitschaftsfacetten werden im Mittel als äusserst wichtig, wichtig oder eher wichtig beurteilt.
Discussion/Conclusion:
Die Ergebnisse stellen zentrale Kompetenzen und Bereitschaften von Sport unterrichtenden Lehrpersonen der Vorschul- und Primarschulstufe auf Basis von subjektiven Theorien dar. Sie lassen sich in das Modell professioneller Handlungskompetenz einordnen, weisen aber eine hohe fachspezifische Akzentuierung auf. Die Ergebnisse stellen eine mögliche Orientierungshilfe für die Gestaltung der Ausbildung von Sport unterrichtenden Lehrpersonen dar.

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Title:
The heart rate-based lactate minimum test: Test protocol optimization

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Abstract:
Introduction:
The knowledge of the maximal lactate-steady-state (MLSS) is useful to steer and monitor the training process of athletes. Unfortunately, the exact determination of MLSS needs several tests, which is not feasible for daily practice. A promising approach to accurately predict MLSS based on one single exercise test might be the use of the lactate minimum testing concept. Some years ago, the so-called heart rate-based lactate minimum test (LMT-HR) developed at our institute (Strupler et al., 2009) revealed a high correlation between lactate minimum (LM) and MLSS (Perret et al., 2012). However, despite this high correlation, MLSS was systematically underestimated by LM. Thus, the aim of the present study was to modify the existing protocol in order to improve the results of the original LMT-HR protocol.
Methods:
14 healthy non-smoking endurance-trained male athletes (age: 39.7±8.2y; height: 181±6cm; body mass: 79±7kg; VO2peak: 54±5ml/min/kg) randomly performed four different LMT-HR, i.e. the original test protocol plus three new test protocols, on a cycling ergometer. The new test protocols were modified by changing the starting workload, duration and/or the size of the workload increment during the second part of the LMT-HR. In addition, athletes performed several endurance tests in order to assess their individual MLSS.
Heart rate (HR), workload, lactate concentrations and oxygen uptake at LM of the different test protocols were compared to corresponding MLSS data.
Results:
As expected LM of the original LMT-HR protocol significantly underestimated MLSS concerning HR (154±8bpm vs. 165±7bpm), workload (208±31W vs. 224±19W), blood lactate concentration (3.4±1.2mmol/l vs. 4.6 ±1.3mmol/l) and oxygen uptake (39±4ml/min/kg vs. 42±3ml/min/kg), whereas two of three of the modified new LMT-HR protocols showed no statistically significant differences for all measured parameters comparing LM (HR: 162±7bpm and 162±8bpm; workload: 228±23W and 234±30W; lactate: 4.7±1.7mmol/l and 5.3±2.2mmol/l; oxygen uptake: 41±4ml/min/kg and 41±4ml/min/kg) with MLSS data.
Discussion/Conclusion:
It can be concluded that LM directly corresponds to MLSS in two of our modified new LMT-HR protocols; thus, these new protocols can be used in practice to accurately and easily predict MLSS in cycling based on one single exercise test.

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Title:
Ski jumping: Development of an instrumented vehicle to analyse imitation jumps

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Abstract:
Introduction:
Ski jumping is a complex sport in which many different factors have to be optimised in order to perform long distance jumps. Two important factors are the direction and the velocity during take-off from the ski-jump platform (Schwameder & Müller, 1995). Since, ski jumpers can only execute 12-14 jumps within one day, the so-called imitation jumps have been introduced as an essential exercise for the training. By means of this training method it is possible to perform many repetitions in a very short period of time. Imitation jumps are performed in two ways. Either the athlete starts the repetition from a standing position, or from a rolling vehicle. The motion pattern as well as the timing during imitation jumps from a rolling vehicle are very similar to jumps from a real ski-jump (Müller 2012).
Measurements of standing imitations with ten Swiss Ski athletes, showed an average vertical force asymmetry of 6% between the right and the left leg (Pauli, 2013). This asymmetry results in a twist of the body and need to be corrected at the very beginning of the flight phase leading to a shorter flying distance.
Several studies have analysed the take-off phase on the ski jumping platforms using vertical force plates. Some of these studies highlighted the correlation between the maximal force at the end of the take-off and the length of a jump (Komi & Virmavirta, 1997).
Up to now, the analysis of the imitation jumps on a vehicle was only based on visual and felt perception by the athlete and the coach. The used vehicle was a wooden plate equipped with four inline skate wheels. The applied force and power on the vehicle are crucial for the evaluation of the performance of imitation jumps. By means of the detection of important force and power parameters, as for example the asymmetry of the vertical force, imitations jumps can be quantified as well as optimized for every single athlete.
Therefore, the aim of this project was to develop an instrumented vehicle for the performance of imitation jumps. The vehicle consists of two force plates, which allow measuring the magnitude, direction and position of the applied forces for each foot. The data is recorded in real-time and transmitted wirelessly to a computer.

Methods:
The project requirements were defined together with the coaches from Swissski. As a basic function, it has to be possible to measure the magnitude, direction and centre of pressure for every foot. The data needs to be recorded in real-time and the whole system should work wirelessly. This includes the transmission of the data as well as the power supply of the vehicle by a battery. The vehicle should have a similar mechanical behaviour as the old wooden one.
Different conventional force plates were analysed in order to find a solution to build a mobile system. To keep the design as compact and light as possible it was decided to use six axis force sensors based on strain gauges. These sensors are measuring forces and torques in x, y and z direction, which allows calculating the resulting ground reaction force and the corresponding centre of pressure. The sensor data is collected by an amplifier and a 24bit A/D converter which is connected directly to a WLAN-router. In addition, an acceleration sensor has been added, to get the vehicles movement during and after the jump.
The construction of the vehicle was designed in NX 8.5 and verified in ANSYS Workbench 14. The applied loads in the simulation were 1kN in the vertical direction and 100N in both horizontal directions for each plate at the two inner corners at the front.
The data acquisition and analysis software was written in LabView 2013.

Results:

The final measuring system consists of a vehicle and a laptop. The vehicle is composed of a solid base with four inline skate wheels, two plates milled out of aluminium, two six-axis force sensors, a two axis acceleration sensor, an amplifier, an A/D-converter, a WLAN-router and a battery. The measurement and analysis software was programmed in LabView and includes a coach friendly graphical user interface. All requirements were reached satisfactorily.

The combination of the sensor and the amplifier has an accuracy of approximately 98%. The whole system is reading and transmitting the data with 1200Hz and allows measurements up to four hours with the used battery. To provide enough stability and due to the chosen sensors, the vehicle is heavier compared to the initial wooden platform. With the help of the acceleration sensor the anterior / posterior force can be quantified.

The programmed software can be used to collect new data as well as to analyse and compare data from previous sessions of different athletes. There are two different modes to make a measurement: Either an automatic, in which the software recognises a jump by itself and saves the same sequence and duration, or a manual, in which measurements of up to ten seconds are possible. A 3D view and a force graph allow real-time monitoring of the measured values.

There are multiple options to analyse the data. Different graphs show the force components of every foot by itself. A combination of the total force and the power together allows a comparison of the jumps with known data from standing imitations. The centre of pressure and the velocity of the body's centre of gravity are calculated for every data point during the jump.

Discussion/Conclusion:

The built vehicle is already well integrated in the training of the Swissski athletes. As coaches have many new available feedback parameters from imitation jumps, they can individualise the training session for every athlete. First measurements showed – even between the best athletes – big differences in the progression of the force as well as the centre of pressure during the imitation jumps.

The used custom made sensors are able to detect much higher forces than required, namely 15kN in the vertical direction and 3kN in horizontal directions. These high limits were unavoidable in order to be able to withstand maximal torques of 200Nm. Due to the fact, that strain gauge based sensors need a solid metallic body the torques were the limiting factors for the design. Additionally the good resolution of the 24bit A/D converter is able to compensate the big sensor range. These limitations do not have an influence on the performance of the athletes. The accuracy is sufficient due to the fact that the influence from external sources like rough floors is much higher than the measuring error.

In the near future, studies should be made to analyse the different parameters and look at their influence on the jump performance. Thus, it would be possible to identify specific weaknesses of athletes, measure the change of the performance due to training and allowing an efficient guidance for the training plan.

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Title:
Variations of energy cost of ski mountaineering with speed and slopes: a laboratory study

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Abstract:
Introduction:
We determined the energy cost and biomechanical parameters of uphill-simulated ski mountaineering at different speeds and slopes. The objective was to determine the optimal combination of speed, slope and ski mountaineering gait minimizing the energy cost of locomotion while optimizing performance.

Methods:
10 subjects experienced in ski mountaineering were tested on a treadmill with ski mountaineering bindings-mounted roller skis, ski boots and ski poles. Each subject performed nine 4 minute trials at 3 different slopes (10, 17 and 24%) and 3 different self-selected speeds per slope (slow, medium and fast). Energy cost of locomotion was determined with indirect calorimetry (expired gas analysis) during the last 30 s of each trial. Gait parameters were assessed with tri-axial accelerometers and gyroscopes attached to both skis.

Results:
The energy cost of ski mountaineering at 4kmh^{-1} increased linearly with slope (10, 17 and 24% respectively : 8.0±1.0, 10.1±0.6 and 11.3.±1.0 Jkg^{-1}m^{-1}). For the lower speeds the relationship between slope? and energy cost was linear and positive. The relationship between slope and energy cost per vertical meter (Jkg^{-1}m$_{vert}^{-1}$) was negative and exponential with an extrapolated minimum at a about ~30% slope. The relationship between speed and energy cost per vertical meter was also negative and exponential, with an extrapolated minimum at a speed higher than 6kmh^{-1} (the highest speed tested). With increasing speed, step length increased while step duration and the motionless phase duration decreased. With increasing slope, step length and the motionless phase duration decreased while cycle duration decreased.

Discussion/Conclusion:
Our findings suggest that to minimize the energy cost of locomotion in ski mountaineering while optimizing climbing performance, the combination of a steep path (~30%) and a relatively high speed (>6kmh) would seem optimal.

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Title:
Activity in trail running: analysis and performance enhancement

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Abstract:
Introduction:
The aim of this study is to analyze non-elite trail runners' activity and the psychological processes mobilized in trail running practice. We are attempting a) to identify typical features emerging from the various situations specific to trail running in which the runners are involved such as training, competition, recuperation, use of equipment, and b) to specify how these activities organize interactions between trail runners and their equipment, in order to provide transformative suggestions of enhancement in the conception of equipment for the Raidlight-Vertical company.
Methods:
Activity analyses are realized on the basis of two complementary theoretical and methodological frames: the course of action approach and ecological dynamics. Data collection is based on a multisourcing approach from the posts on the blogs and forums of Raidlight team website. Some of these posts are considered as valuable narrative data (Bargh, Mckenna, and Fitzsimons, 2002; Jones and Alony, 2008). We think it is possible to extract experience data from these narratives (Bruner, 1991; Smith and Sparkes, 2008). Thus, we are aiming to (1) depict courses of action in competition situation, including drops out and (2) identify issues frequently mentioned by the users in their trail running practice. Data collection must also be completed with questionnaires and interviews. The association of these different data sources can portray a representative fraction of the runners' real activity.
Narrative data will be processed through the course of action approach (Theureau, 2006) in order to identify difficulties with the use of equipment: then, these issues will be studied through the reorganizations of activity at a perceptive-motor level.
Results:
The content of these studies is not defined yet, since it depends on the results obtained from the course of action analyses. We are expecting nevertheless to observe that the use of poles, backpacks, flasks, etc. leads to the emergence of concerns demanding specific reorganizations of the global activity. Indeed, primary results of forums posts analysis portray concerns about backpack bouncing which tends to disturb the runner and constraint the hydration activity.
Discussion/Conclusion:
Perspectives for further studies would consist in analyzing the global activity using sensors in order to understand how these concerns impact on the runner's unconscious activity, such as coordination. Quantifying vertical oscillations of the plexus and the backpack seems to be a relevant object of analysis.
These studies have an ambivalent transformative target: on the one hand, they might provide help for training and races for Raidlight team members and on the other hand, they might contribute in the enhancement of devices developed by this equipment supplier.

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Title:
Fatiguing lower limb and trunk musculature: impact on strength, balance and sprint ability in sportive young adults

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Abstract:
Introduction:
Balance and sprint ability are both important prerequisites to perform on a high level in various sport activities [1]. In addition balance ability is also an important factor to prevent sport injuries [2]. Trunk musculature and lower limb muscles are both responsible to control and maintain the smooth body function in any sport performance. Though there is only little research done on the impact of exhaustion of either trunk musculature or lower limb musculature on balance and sprint ability. Therefore we conducted a randomized controlled cross-over study to quantify the impact of an isolated trunk muscle exhaustion in comparison to an isolated lower limb exhaustion on strength, balance and sprint ability in sportive young adults.
Methods:
24 healthy sport students (12 women; age 22.9 (SD2.6) y; weight 59.2 (10.3) kg; height 1.65 (0.09) m; 12 men; age 22.7 (3.0) y; weight 77.6 (8.5) kg; height 1.81 (0.06) m) completed in a randomized order either a trunk fatigue task, a lower limb fatigue task or a control condition at rest on three different days. Before and after each muscle fatigue task and the control condition several performance tests in the following order were conducted: Isometric strength testing (IST, trunk flexion, extension and rotation, knee extension and flexion; IsoMed 2000). After strength testing, static (tandem stand on a force plate, 30 s) and dynamic balance (Y-balance test) was conducted. Finally, a 20m-sprint, an agility test (CH-cross) and a prone plank test completed the testing. All tests were completed within 20 min. Before the first test day a familiarization trial took place. The fatigue task for the trunk was composed of 12-15 repetitive back extensions, followed by 12- 15 trunk flexions at 65-70% 1-RM, and a loaded (3kg) Russian twist. The fatigue task for the lower limbs included a single limb leg press (both legs), seated leg-curls at 65-70% 1-RM and repeated countermovement jumps for 45 s. Within one task the exercises were repeated as circuit training up to 20 min.
Results:
Statistically significant time (pre vs. post) * condition (control, trunk, limb) interaction effects were found for all parameters ($.03 < p < >0.001$; $.27 < \eta^2 < .82$) beside of trunk rotation to the left and right. Post hoc testing for pairwise comparison revealed significant differences between control and trunk (trunk extension, flexion and rotation strength, CH-cross-test, prone plank test, $.04 < p < >.001$) and control and limb (for all parameters, $.04 < p < >.001$, except for trunk extension, $p=.06$). Differences were also found between trunk vs. limb for the measured outcomes (p-value and relative differences between tasks post-pre-change): IST trunk flexion (>.001; 3 times higher with trunk fatigue), IST knee extension (.004; 4% higher in leg fatigue), Y-balance (.02; twice as high in leg fatigue), tandem stand (.004; 3 times higher in leg fatigue); CH-cross-test (.001; twice as high in leg fatigue), 20 m-Sprint (.005; twice as high in leg fatigue) and prone plank test (.001; nearly twice as high in trunk fatigue).
Discussion/Conclusion:
The present study showed that a 20 min exhaustion task focusing either the lower limbs or the trunk have a different impact on performance in balance or sprint ability. While leg fatigue has a high impact on nearly all measured outcomes, trunk fatigue contributes on performance on a lower but also relevant amount.

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2 Hrysomallis, C. (2011). Balance ability and athletic performance. Sports Medicine, 41(3), 221-232.

Title:
Cognitive Anxiety Mediates the Impact of Mindfulness on Choking under Pressure in Low-to-Moderate Mindful Elite Athletes

Authors: Röthlin P[1], Horvath S[1], Birrer D[1], & grosse Holtforth M[2]
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Abstract:
Introduction:
Trait mindfulness helps people to handle distress and improves their satisfaction with life (Hofmann, Sawyer, Witt, & Oh, 2010). In sports, mindfulness has been show to improve athletic performance (Gardner & Moore, 2012). However, researchers are still speculating about the underlying mechanisms (Birrer, Röthlin, & Morgan, 2012). The present research examines a model, which explains how trait mindfulness may enhance elite athletes' performance as indicated by lesser choking under pressure by generally reducing the probability of experiencing competition anxiety, as well as diminishing its negative impact when it occurs.
Methods:
Participants were 133 elite athletes (45.9 % male, M_{age} = 23.68, SD_{age} = 6.12, 30.8 % team sports, 94.7% national team members) from 23 different sports. They completed measures of trait mindfulness, competition anxiety, and choking under pressure. Mediation, moderation, and moderated-mediation effects of mindfulness and competition anxiety on choking under pressure were tested (Preacher, Rucker, & Hayes, 2007).
Results:
Bias-corrected bootstrap confidence intervals (CIs) based on 5000 bootstrap samples revealed a significant negative indirect effect of trait mindfulness on choking under pressure through cognitive competition anxiety (a_1b_1 = -.27, 95% CI [-.46, -.13]) but not through somatic competition anxiety (a_2b_2 = .00, 95% CI [-.11, .09]). The effect of cognitive competition anxiety on choking under pressure was moderated by trait mindfulness (trait mindfulness × cognitive anxiety = .35, p < .01). The conditional effects were .48, .35, and .22 at low, moderate, and high values of trait mindfulness, respectively (all ps < .05). In contrast, choking under pressure was not influenced by somatic competition anxiety or its interaction with trait mindfulness. The indirect effect of trait mindfulness on choking under pressure through cognitive competition anxiety was negative for athletes with low (-.43, 95% CI [-.70, -.20]) and moderate (-.27, 95% CI [-.47, -.14]) levels of mindfulness. However, this indirect effect was no different from zero for athletes with high levels of mindfulness (-.14, 95% CI [-.34, .02]). All the regression coefficients are reported in unstandardized form.
Discussion/Conclusion:
Our findings indicate that trait mindfulness helps elite athletes to perform when they need it most: Under pressure. In addition to reducing the risk of thinking about possible negative consequences, trait mindfulness may prevent these thoughts adversely affecting athletes' behavior, both contributing to decreasing the probability of choking under pressure. Apart from benefits off the sports field, instructing athletes to become more mindful might be a promising approach for applied sport psychologists to help athletes optimize their performance.

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SPORTWISSENSCHAFTLICHE GESELLSCHAFT DER SCHWEIZ
SOCIETE SUISSE DES SCIENCES DU SPORT

Title:
Psychological determinants of individual behaviour in sport

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Abstract:
Introduction:
Individuals in sport show a variety of different behaviours. The purpose of this symposium is to highlight and explain some psychological determinants considered important for the understanding of the variability and to draw some conclusions for the world of sport.
One of the basic tenets in psychology is that behaviour in a given situation is considered to result from an interaction of individual and environment. Action theoretical models underline the role of individual goals people aim to achieve. An introduction to this symposium aims at explaining the perspective of the acting individual to prepare for an extended understanding of individual differences in behaviour. This briefly presented framework should also help for the integration the concepts used in the following presentations.

Presentations:
Mirko Wegner's research focuses on the role of implicit motives. Implicit motives are individual to a high extent and affect a variety of parameters such as verbal behaviour, endocrinological reaction, and involvement in sport or competition.
The presentation of Philipp Röthlin is about the role of mindfulness in competitive situations in sport. The behaviour of interest is choking under pressure, which means a catastrophic decrease in performance.
Denis Hauw investigates the behaviour based on the concept of situated action, where an individual perceives and assesses a situation and make meaning. These are analysed in the course of action in the context of expert performance.

Discussion/Conclusion:
The Symposium intends to have a final discussion to highlight the importance of the different findings and concepts for application in sport.

SPORTWISSENSCHAFTLICHE GESELLSCHAFT DER SCHWEIZ
SOCIETE SUISSE DES SCIENCES DU SPORT

Title:
Beneficial effects of autonomy support and autonomy need satisfaction in military sports

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Abstract:
Introduction:
Autonomy is considered an important prerequisite for well-being within the framework of self-determination theory (Deci & Ryan, 1985; 2000). Positive effects of autonomy have been detected in various contexts, including in sports. Adie, Duda & Ntoumanis (2012) were able to show that autonomy-promoting behavior by sports teachers has a positive effect on well-being. Military sports represent a special setting in terms of autonomy. Military training school is characterized by a hierarchical structure that can be perceived as autonomy limiting. In military sports, the sports teacher has some leeway to grant or restrict autonomy. The present studies investigate the extent to which autonomy in military sports affects the well-being, health and motivation of military recruits. The two studies have different priorities. Study 1 examines the assumption that *autonomy-supporting behavior* by teachers in military sports has an impact on the recruits' experience of autonomy satisfaction. This in turn affects their well-being and health during military training. The aim of Study 1 is to replicate the findings of Adie and colleagues (2012) and apply them to the military setting. Study 2 examines the effects of autonomy experience in military sports from a differential perspective. It assumes that, in addition to the main effects of autonomy satisfaction, the effects on motivation and well-being during sports lessons are moderated by an implicit autonomy disposition.

Methods:
Study 1 (N = 129) examines the mediation hypothesis in recruits at the age of M = 20.28 years (SD = 1.66). The dependent variables, well-being and health, were measured at the end of military training school, together with perceived autonomy support from the sports teacher and autonomy need satisfaction. The questionnaires showed satisfactory reliability scores (Cronbach's α = .70 - .92). Study 2 was also conducted using paper-and-pencil questionnaires with 118 recruits aged M = 19.86 years (SD = 1.27). Basic need satisfaction, intrinsic motivation and satisfaction with teaching displayed good reliabilities (Cronbach α = .78 - .88). The moderator, implicit autonomy disposition, was assessed using the Picture Story Exercise (PSE, Schultheiss & Pang, 2007) which was evaluated using a specific key to code implicit autonomy dispositions (deCharms & Plimpton, 1994). The mediation hypothesis was evaluated using the Macro "Process" by Hayes (2013). The moderation hypothesis was calculated using hierarchical regression analyses.

Results:
The calculations of Study 1 indicate partial mediation and thus confirm the hypotheses. The perceived autonomy support leads via autonomy need satisfaction to less physical discomfort, b = -.21, BCa CI [-.34, -.08], less somatization, b = -.05, BCa CI [-.11, -.01], less stress, b =.-04, BCa CI [-.09, -.01], and less depression, b = -.05, BCa CI [-.12, -.01] and results in more positive affect, b =. 09, BCa CI [.04, .17] and more vitality, b = .20, BCa CI [.05, .35] in the everyday lives of the recruits. The following figures illustrate two examples of the mediation models.

Figure 1: Mediation model for the dependent variable physical discomfort (n=129). Illustration of unstandardized regression weights, * p < .05, ** p < .01, *** p < .001

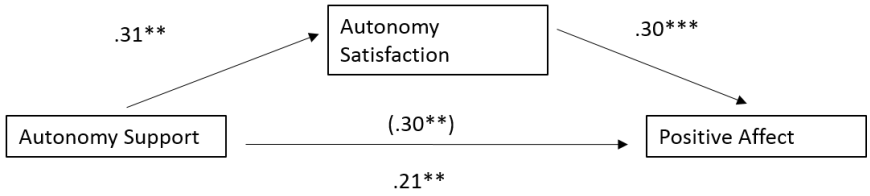

Figure 2: Mediation model for the dependent variable positive affect (n=129). Illustration of unstandardized regression weights, * p < .05, ** p < .01, *** p < .001

Study 2 shows that differences in the implicit autonomy disposition moderate the relationship between autonomy satisfaction (M = 3.63, SD = 1.32) and intrinsic motivation (M = 4.1, SD = 1.21) and flow experience during physical education (M = 44.94, SD = 9.98) and satisfaction with physical education in the military (M = 4.03 SD = 1.17).

As expected, the main effect of perceived autonomy satisfaction was significant, b = .67, s_{eb} = .09, p <.001. The interaction between perceived autonomy satisfaction and implicit autonomy disposition predicted intrinsic motivation during lessons, b = .23, se_b = .10, p <.05.

A similar pattern of results was also found for flow experience during sports classes for the main effect of perceived autonomy satisfaction, b = 3.43, se_b = .87, p <.001, and the interaction between perceived autonomy satisfaction and implicit autonomy disposition, b = 2.34 se_b = .92, p = <.05.

In addition, the main effect of perceived autonomy satisfaction on satisfaction with the sports education was significant, b = .63, se_b = .09, p <.001. The interaction between perceived autonomy satisfaction and implicit autonomy disposition also predicted satisfaction with teaching, b = .20, se_b = .10, p <.05.

An overview of the regression parameters can be found in Table 1.

Tab. 1 Hierarchical Regressions

	Variable	*b*	*SE B*	*t*	ΔR^2	*β*	*p*	*CI95*
Crit.	*Intrinsic Motivation*							
Step 1	Autonomy motive (AM)	-.012	.094	-.129	.30	-.010	.898	[-.198, .174]
	Autonomy satisfaction (AS)	.671	.093	7.205		.553	.000	[.486, .855]
Step 2	AM x AS	.231	.099	2.344	.03	.180	.021	[.036, .426]
Crit.	*Flow*							
Step 1	Autonomy motive	-.022	.866	-.026	.12	-.002	.980	[-1.738, 1.694]
	Autonomy satisfaction	3.42	.871	3.932		.340	.000	[1.700, 5.135]
Step 2	AM x AS	2.34	.922	2.538	.05	.219	.013	[.513, 4.168]
Crit.	*Satisfaction*							
Step 1	Autonomy motive	-.023	.092	-.250	.28	-.020	.803	[-.206, .160]
	Autonomy satisfaction	.631	.092	6.882		.538	.000	[.449, .813]
Step 2	AM x AS	.199	.097	2.048	.03	.160	.043	[.006, .391]

Discussion/Conclusion:

Study 1 shows that the perceived autonomy-supportive behavior of sports teachers has a positive impact on various health parameters and on well-being, and thus takes its place in the existing research in the context of self-determination theory. It is interesting that the positive effects of autonomy support have an impact on the daily lives of recruits. Study 2 extends the findings of the first study, showing that individual autonomy dispositions have an impact on the motivation and flow experience during military sports. These findings fit the research of Schüler and colleagues, which has

shown that the positive effects of basic need satisfaction interact with individual factors (implicit motive dispositions) (Schüler & Brandstätter, 2013; Schüler, Sheldon & Fröhlich, 2010). Taken together, the studies have a high practical relevance. They show that people benefit from the experience of autonomy in terms of health, satisfaction and motivation and that those benefits are not only limited to the sports setting, but also affect everyday life. Considering the motivation and satisfaction in the sport context itself, it is seen that differential motive dispositions moderate the positive motivational effects arising from the experience of autonomy. This differential approach is particularly interesting when motivation and satisfaction are examined in the sports setting itself. This approach would therefore be especially relevant in the promotion of sports, where the motivation to practice and dropping out play a role.

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Title:
Robustness of musculoskeletal simulation in strength training

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Abstract:

Introduction:
Musculoskeletal simulation software like OpenSim SimTK (Stanford University, Stanford, USA) offers many advantages such as the easy calculation of joint angles, joint and muscle forces of a strength exercise. However, to scale a model to subject's specific parameters such as the location of the joint centers (JC) as well as the way a musculoskeletal model should be run, is based on many input factors and mostly founded on users experiences. This input factors influence the kinematic and kinetic outcomes in a complex manner [1, 2]. Using different weightings of a data set to scale and run a simulation, the aim of this study was to quantify the robustness of a musculoskeletal simulation with respect of kinematic and kinetic measures during split squat.

Methods:
The data set consists of 3D kinematic and kinetic data of 11 subjects, 10 different types of execution of split squats with six repetitions [3]. Using OpenSim, inverse kinematics and dynamics were performed using 90 systematic different weighting concepts to scale and run the simulation. The concepts were created on altered skin marker weightings such as manual and automatic generated weightings based on skin marker artefacts, the in- or exclusion of functional defined centers of rotations (fCoR) and the in- or exclusion of pre-calculated joint angles by means of classical movement analyses [4]. Kinematically, the differences of the JCs as well as the differences in the range of motion (RoM) of ankle, knee and hip were compared to Schütz' data [3].As a kinetic parameter, the difference of the maximal external joint moment of knee and hip was chosen.

Results:
Kinematically, the results varied across the different concepts. The accuracy concerning the differences of the JCs was influenced with a factor of 5 across the different concepts. Values reached from 5.3 mm to 26.4 mm. Regarding the differences of the RoM of the movement, the values differed with a factor of 87 from 1.4% to 122%. Concerning the kinetic parameters, the values of the differences of the maximal moments differed from 0.07 Nm/kg to 0.23 Nm/kg.

Discussion/Conclusion:
This study quantifies the influence of weightings used in musculoskeletal simulation using 90 systematically different concepts with classical motion analysis. The outcomes differ with a factor up to 87 and show the importance of the right weighting systems to scale and run the simulation. For example, the inclusion of fCoRs in the scaling procedure of a model as well as in the running process of the simulation seems to be necessary to achieve accurate results. Therefore, the usage of fCoRs instead of just using anthropometric based data in a musculoskeletal simulation is highly recommended. Concerning the angles, the weightings of the skin markers and the in- / exclusion criteria of the precalculated angles seem to play a key role. Further on, the inclusion of all precalculated angles in the running process leads to similar RoMs compared to the classical analysis.
Based on these outcomes, statistical analysis can be done to determine the right input parameter to achieve the most accurate result. Future research can then be performed to calculate muscle forces in strength exercises using an optimization process in a proper way.

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Titel:
Zur Stabilität von Motiv- und Zielprofilen im Freizeit- und Gesundheitssport

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Abstract:

Einleitung:
Massnahmen der Sportförderung werden selten systematisch auf sportbezogene Motive und Ziele ausgerichtet, obwohl sie für das Wohlbefinden und die Aufrechterhaltung des Gesundheitsverhaltens bedeutsam sind. Sudeck, Lehnert und Conzelmann (2011) haben typische Motiv- und Zielprofile im Freizeit- und Gesundheitssport identifiziert. Diese „motivbasierten Sporttypen" bieten eine Möglichkeit, Menschen im mittleren Erwachsenenalter anhand ihrer Beweggründe zum Sporttreiben zu segmentieren und Fördermassnahmen darauf abzustimmen. Motive werden als zeitlich relativ überdauernde Dispositionen angesehen (Lehnert, Sudeck & Conzelmann, 2011). Empirische Nachweise für die längerfristige Stabilität von Motiv- und Zielprofilen im Freizeit- und Gesundheitssport fehlen allerdings bislang. Daher wird im vorliegenden Beitrag die zeitliche Stabilität von Motiv- und Zielprofilen über 15 Monate analysiert.

Methoden:
Die Basisstichprobe besteht aus 228 Hochschulangestellten (M_{Alter} = 48.1 Jahre, SD_{Alter} = 8.1 Jahre, 61% Frauen), welche im Rahmen des Projekts „Welcher Sport für wen?" im Mai 2008 (T_1) an einem Sport-Check teilnahmen (Sudeck et al., 2011). Am Sport-Check wurden die sportbezogenen Motive und Ziele mit dem Berner Motiv- und Zielinventar (Lehnert, Sudeck & Conzelmann, 2011) schriftlich erfragt. Bei 100 Personen (M_{Alter} = 46.8 Jahre, SD_{Alter} = 7.6 Jahre, 62% Frauen) konnte das Merkmal im September 2009 (T_2) erneut mittels Onlinefragebogen erhoben werden. Die Daten dieser Teilstichprobe wurden mit der LICUR-Methode (Bergman, Magnusson & El-Khouri, 2003) ausgewertet. Zunächst wurden zu beiden Messzeitpunkten typische Motiv- und Zielprofile clusteranalytisch bestimmt. Darauf aufbauend wurde analysiert, inwieweit sich die Cluster von T_1 und T_2 ähneln (strukturelle Stabilität) und welche Entwicklungswege zwischen den gefundenen Clustern überzufällig häufig begangenen werden (individuelle Stabilität).

Resultate und Diskussion:
Zu T_1 konnten neun typische Motiv- und Zielprofile identifiziert werden. Diese entsprechen mehrheitlich den motivbasierten Sporttypen von Sudeck et al. (2011). Zu T_2 wurden wiederum neun charakteristische Motiv- und Zielprofile ermittelt. Die Clusterlösungen der beiden Messzeitpunkte weisen eine grosse Ähnlichkeit auf. Die signifikanten Entwicklungswege zwischen T_1 und T_2 verdeutlichen, dass die Mitglieder eines Clusters überzufällig häufig zu einem Clusterpartner – d. h. einem Typen mit sehr ähnlichen Clusterzentroiden – übertreten. Die Ergebnisse sprechen insgesamt für eine hohe strukturelle und individuelle Stabilität von Motiv- und Zielprofilen im mittleren Erwachsenenalter. Eine Abstimmung von mehrwöchigen Sportangeboten und -beratungen auf die individuellen Motive und Ziele scheint aufgrund ihres zeitlich überdauernden Charakters folglich lohnenswert.

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Title:
Peripheral perception in offside decision-making in football

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Abstract:

Introduction:
High error rates in offside decision-making in football (26.2%, Helsen et al., 2006) might be explained by the gaze behaviour of assistant referees (AR) who fixate the offside line at the moment of the pass and perceive the pass peripherally only (Catteeuw et al., 2009). This assumption was tested in a virtual reality setting by systematically manipulating the position of the passer regarding the distance and angle to the AR, respectively.

Methods:
55 sport science students were assigned to three experiments. In any case, they had to watch 80 virtual-reality scenes in 4 blocks which were back-projected on a large screen (3.02 m x 1.68 m). Scenes were manipulated regarding the eccentricity (3°, 10°, 17°, 24°, 31°, equal numbers per block) of the passer (Experiment 1; n = 18), distances (8m, 16m, 24m, 32m, 40m, equal numbers per block) of the passer (Experiment 2, n = 19), or the to-be-fixated player, i.e., the last defender vs. the passer (Experiment 3; n = 18). The task was to determine the moment of the pass by pressing a button and making a verbal offside decision. Manipulations were checked via eye tracking. It was predicted that (1) large eccentricities and (2) greater distances of the passer reduce the accuracy of pass detection and response accuracy, and that (3) the moment of the pass is detected more precisely accompanied by a higher decision accuracy when fixating the passer compared with fixating the last defender.

Results:
Results of Experiment 1 show a main effect for eccentricity in response accuracy, $F(4, 68)= 8.33$, $p < .01$, $\eta_p^2 = .33$, and pass detection accuracy, $F(4, 68)= 38.41$, $p < .01$, $\eta_p^2 = .69$. Response accuracy increased and detection accuracy decreased when the eccentricity of the passer was small compared with larger eccentricities. In Experiment 2, a main effect for distance on response accuracy, $F(4, 72)= 9.54$, $p < .01$ $\eta_p^2 = .35$, and pass detection $F(4, 72)= 25.49$, $p < .01$, $\eta_p^2 = .59$, was observed. Response accuracy was higher when the passer was 8 m or 32 m away from the AR compared with other distances (16m, 24m, 40m) while pass detection accuracy decreased linearly with increasing distances. In Experiment 3, a main effect of fixation location on the pass detection was found, $F(1, 17)= 8.69$, $p = .01$, $\eta_p^2 = .34$, but no significant effect for response accuracy, $F(1, 17)= .51$, $p = .49$, $\eta_p^2 = .03$. Participants' pass detection was more accurate when fixating the passer compared with fixating the last defender.

Discussion/Conclusion:
The assumption that peripheral perception has an influence on offside decision-making could be confirmed. Larger angles between the passer and the offside line led to more decision errors, which could be explained by a less precise detection of the moment of the pass in the periphery. In regards to the distance manipulation, as expected, detection accuracy was higher when the passer was fixated. Regarding response accuracy, however, mixed results emerged indicating more correct decisions at 8 and 32m. Since the retinal image of passer and ball is bigger when the situation is near to the AR it should be easier to perceive the moment of the pass peripherally at 8m. However, decision accuracies were again higher at 32m what could either indicate that there is no distance effect or that there are two superimposed mechanisms indicating a "beneficial" distance of the observer to the critical situation (Mallo et al., 2012). This result will require further investigations.

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SPORTWISSENSCHAFTLICHE GESELLSCHAFT DER SCHWEIZ
SOCIETE SUISSE DES SCIENCES DU SPORT

Title:
The assessment of brachialis muscle activation with surface electromyography

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Abstract:
Introduction:
The brachialis muscle (BR) represents an important elbow flexor [e.g. 1] and its activity has so far mainly been measured with intramuscular electromyography (EMG). In contrast to the biceps brachii (BB) that inserts into the radius (biceps tubercle) and is thus active during elbow flexion and forearm supination, the BR inserts into the ulna and therefore exclusively contributes to flexion force [2]. Consequently, pure elbow flexion should result in activity in both BB and BR whereas elbow flexion with superimposed forearm supination (flexion+supination) should preferentially activate the BB – provided that recordings in BR are not contaminated by the neighboring BB muscle. Thus, the aim of this study was to examine whether the activity of the BR can be assessed with surface EMG without interference from the BB.
Methods:
With eight subjects we measured surface EMG of the arm flexor synergists BR, BB, and brachioradialis (BRR) during two isometric voluntary contraction types: 1) pure elbow flexion and 2) flexion+supination. The correlation coefficients between EMG amplitudes and flexion force (supination torque) were determined.
Results:
During pure flexion the activities of all synergists were similarly correlated with the flexion force ($r=0.96\pm0.02$; $p=0.075$, see Figure). During flexion+supination the activity of the BR was significantly distinct from the activity of the BB ($p<0.01$), with a 14% higher correlation for the BR with the flexion force and a 40–64% lower correlation with the supination torque. The BB predicted supination torque substantially better than the BR and BRR ($r=0.93\pm0.02$; $p<0.01$).
Discussion/Conclusion:
The muscles generating an elbow flexion are the BB, BR and BRR, with a major contribution from the BR. However, it was not clear so far, whether it is possible to record activity of the BB with surface EMG without interference from BR. The current results indicate a clear distinction between BB and BR as activity in these synergistic muscles was similarly well correlated to flexion force in the first contraction type (pure flexion) but different for the second contraction type (flexion+supination). It can therefore be concluded that the activity of the BR can be assessed with surface EMG without substantial interference from the BB.

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SPORTWISSENSCHAFTLICHE GESELLSCHAFT DER SCHWEIZ
SOCIETE SUISSE DES SCIENCES DU SPORT

Title:
Estimation of force, stiffness and elastic energy based on kinematic data while running

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Abstract:
Introduction:
Recording of ground reaction forces (GRF) provides crucial information to evaluate the running pattern. Furthermore, in combination with kinematic data, GRF can be used to determine the leg stiffness [1] and its elastic energy (Ee). However, although the assessment of these parameters is important, force recordings during running require complex laboratory settings with multiple imbedded force plates or instrumented treadmills. Consequently, this kind of approach is limited in its applicability. The aim of this study was to investigate the accuracy of estimating force, stiffness and Ee based on kinematic data of the COM, in comparing these values against GRF data.
Methods:
In 13 subjects we measured full body kinematics and GRF of two steps (two force plates) during running (v=3.0±0.3m/s). From the kinematics we assessed the COM in sagittal plane, which was low-pass filtered (Savitzky-Golay) and differentiated to obtain acceleration and – after taking into account the respective body mass – force F. During the stance phase we estimated the "leg length" as the distance between COM and the center of pressure and considered its length change (Δl) in sagittal plane during foot strike and maximally flexed leg [cf. 1]. During the same interval we considered the change in sagittal force (ΔF), which allowed quantifying leg stiffness during stance as $k=\Delta F/\Delta l$. Based on force and stiffness we estimated the elastic energy in sagittal plane as $Ee=1/2\cdot(F_1^2/k_1 + F_2^2/k_2)$ for leg1 and leg2. The accuracy of F, ΔF, k, and Ee was estimated by comparing kinematic-based to GRF-based data using correlation coefficients.
Results:
The kinematic approach estimated vertical force better (r=0.98±0.01) than the horizontal force (r=0.71±0.08, see Figure). The change in "leg length" Δl was 6.8±1.1 cm. The kinematic-based ΔF was significantly lower (9%) than the measured GRF (1.4±0.3kN vs. 1.6±0.3kN, $p<0.01$) and the kinematic-based leg stiffness-k was also significantly lower (10%) than the GRF-based data (22±5kN/m vs. 24±6kN/m, $p<0.01$). The kinematic-based Ee showed a considerable congruence with the vertical GRF-based values (r=0.97±0.02; see Figure).
Discussion/Conclusion:
Force, stiffness and elastic energy represent important parameters to evaluate running. The present study shows that these parameters can be estimated based on kinematic data. When considering the accuracy of this force estimation, the horizontal force was more difficult to estimate than the vertical force and strongly depended on the filter settings. However, as the vertical force is considerably larger than the horizontal force it will have a stronger effect on the further outcomes (k, ΔF, Ee). In this sense, Ee showed indeed a comparable accuracy than the vertical force (see Figure). It can be concluded that force, leg stiffness, and elastic energy can be estimated with kinematic data but the accuracy of this estimation depends strongly on the filter settings that are applied to the COM kinematics.

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Title:
Practicing a finger tapping task in lucid dreams enhances performance during wakefulness

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Abstract:
Introduction:
Motor practice in lucid dreams is a form of mental rehearsal where the dreamer can consciously rehearse motor skills in the dream state while being physically asleep (Erlacher, Stumbrys & Schredl, 2011). A previous pilot study showed that practice in lucid dreams can improve subsequent performance (Erlacher & Schredl, 2010). This study aimed to replicated those findings with a different (serial reaction) task (finger-tapping; e.g. Walker et al., 2002) and compare the effectiveness of lucid dream practice not only to physical but also to mental practice in wakefulness.
Methods:
An Online experiment was completed by 68 participants within four groups: lucid dream practice group (LDP), mental practice group (MP), physical practice group (PP) and con-trol (no practice) group (CG). Pre-test was accomplished in the evening, post-test in the next morning, while the practice was done during the night. The finger tapping task re-quires the participant to produce a sequence of five elements “as quickly and accurately as possible” for a period of 30 s. The average practice time of the lucid dream group (about 2 minutes) served as practice time for the MP and PP group.
Results:
All three practice groups significantly improved their performance from pre-test to post-test, but no significant improvements were observed for the control group (LDP: 20%, PP: 17%, MP: 12% and CG: 5%). Those improvements were also statistically significant; group x time interaction: $F(3,60) = 3.43$, $p = .023$. Post-hoc LSD pair-wise comparisons showed significant differences between the LDP and control group ($p = .003$), as well as between the PP and control group ($p = .031$), but not between other pairs of the groups.
Discussion/Conclusion:
This study thus corroborates the previous findings that practice in lucid dreams is effective in improving performance. Its effects seem to be similar to actual physical practice and mental practice in wakefulness. Future studies should establish reliable techniques for lucid dream induction and verify the effects of lucid dream practice in sleep laboratory conditions.

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Title:
Individual haemoglobin mass response to altitude training at 1800 m in elite endurance athletes

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Abstract:

Introduction:
Although it has been postulated that altitude training below 2000 m has no beneficial effect on mean haemoglobin mass (Hb_{mass}) in groups of athletes (Pottgiesser et al., 2009), numerous top-level endurance athletes prepare for important competitions at such low altitudes (e.g. in St. Moritz, Switzerland, 1800 m). Given the interindividual differences in the Hb_{mass}-response to hypoxia (Friedmann et al., 2005), it can be speculated that some individuals display a positive Hb_{mass}-response even at an altitude of only 1800 m. However, the assessment of individual Hb_{mass}-responses to altitude training is challenging, as adaptations can be concealed by the error of Hb_{mass}-measurement.
Using error-reducing duplicate measures of Hb_{mass}, we aimed to 1) determine whether the mean Hb_{mass} of elite endurance athletes is increased after 20 days of classical altitude training at 1800 m, 2) quantify the interindividual variation of the Hb_{mass} response and 3) identify individual "Hb_{mass}-responders".

Methods:
Seven male elite endurance athletes (six runners, one triathlete; all in the top eight positions of the Swiss national ranking in their respective disciplines) went through three consecutive three-week periods: 1) monitoring period (MON), 2) control period (CON) and 3) altitude period (ALT). Hb_{mass} was measured in duplicate between MON and CON (T_0), between CON and ALT (T_1) and after ALT (T_2), using a modified version of the optimized CO-rebreathing method (Naef et al., in press; Schmidt & Prommer, 2005). The athletes served as their own controls (comparison of adaptations between CON and ALT).
During MON and CON the athletes stayed and trained at sea level (< 1000 m), while during ALT (20 days) they stayed and trained in St. Moritz (1800 m). Throughout the entire study, the athletes followed their personal training programs, which were defined by the Swiss national coaches. In order to identify possible confounding effects of training load changes on Hb_{mass} (Garvican et al., 2010), training load during MON, CON and ALT was monitored according to Foster et al. (Foster et al., 2001).
To control the risk of doping-misuse during the study, haemoglobin concentration, haematocrit, reticulocyte percentage, serum transferrin receptor concentration, C-reactive protein concentration, serum erythropoietin concentration and serum ferritin concentration were measured. Based on this data, ON-he and ON-hes models (indexes for current misuse of recombinant human erythropoietin) as well as OFF-hr and OFF-hre models (indexes for recent misuse) were calculated according to Gore et al. (2003) (cut-off: false-positive rate of 1 in 10). To detect autologous blood transfusions, longitudinal changes of haemoglobin concentration, OFF-hr, Hb_{mass} and Hbmr (hybrid marker combining Hb_{mass} with reticulocyte percentage (Morkeberg et al., 2011)) were delineated using the third generation approach described by Sharpe et al. (2006) as modified by Morkeberg et al. (2011) (cut-off: z-score = 3.09).
Paired t-tests were conducted to evaluate the alterations of Hb_{mass} during CON and ALT as well as the difference between the percent change of Hb_{mass} ($\%\Delta Hb_{mass}$) during CON and $\%\Delta Hb_{mass}$ during ALT ($\%\Delta Hb_{mass,ALT-CON}$). The likelihood of the mean of $\%\Delta Hb_{mass,ALT-CON}$ being substantial (i.e. more extreme

than the smallest worthwhile change of Hb_{mass}, set to ± 2%) was calculated based on the distribution of $\%\Delta Hb_{mass,ALT-CON}$ (Hopkins et al., 2009). To detect significant individual effects, 95% confidents limits (CL) for $\%\Delta Hb_{mass}$ were derived from the present typical error (TE) of Hb_{mass} measurement. Since averaged duplicate measures reduce the TE by a factor of 1/√2, 95% CL were ± 1.96 · TE · √2 · 1/√2 = ±5%. Pearson's correlation was used to examine the relationship between training load change from MON to CON and $\%\Delta Hb_{mass}$ in CON as well as between training load change from CON to ALT and $\%\Delta Hb_{mass}$ in ALT. P-values < 0.05 were considered significant.

Results:

Mean Hb_{mass} at T_0, T_1 and T_2 was 936 ± 38, 945 ± 24 and 961 ± 51 g, respectively. Mean $\%\Delta Hb_{mass}$ was 1.1 ± 2.6% in CON (p = .35) and 1.6 ± 3.0% in ALT (p = .19). $\%\Delta Hb_{mass,ALT-CON}$ was 0.6 ± 4.4% (p = .74). The likelihood of $\%\Delta Hb_{mass,ALT-CON}$ being positive/trivial/negative relative to the smallest worthwhile change was 18%/76%/6%. Individual $\%\Delta Hb_{mass}$ ranged from -2.5 to 4.2% in CON and from -3.3 to 5.3% in ALT. The 95% confidence limits for individual $\%\Delta Hb_{mass}$ (±5.0%) were exceeded by subjects 5 (+5.3%) and 7 (+5.2%) in ALT (Figure 1). All values of analysed blood markers as well as calculated doping control scores were within the cut-off limits. In addition, no significant correlation was found either between the percent load change from MON to CON and $\%\Delta Hb_{mass}$ in CON (R = -0.30, p = .51) or between the percent load change from CON to ALT and $\%\Delta Hb_{mass}$ in ALT (R = -0.18, p = .70).

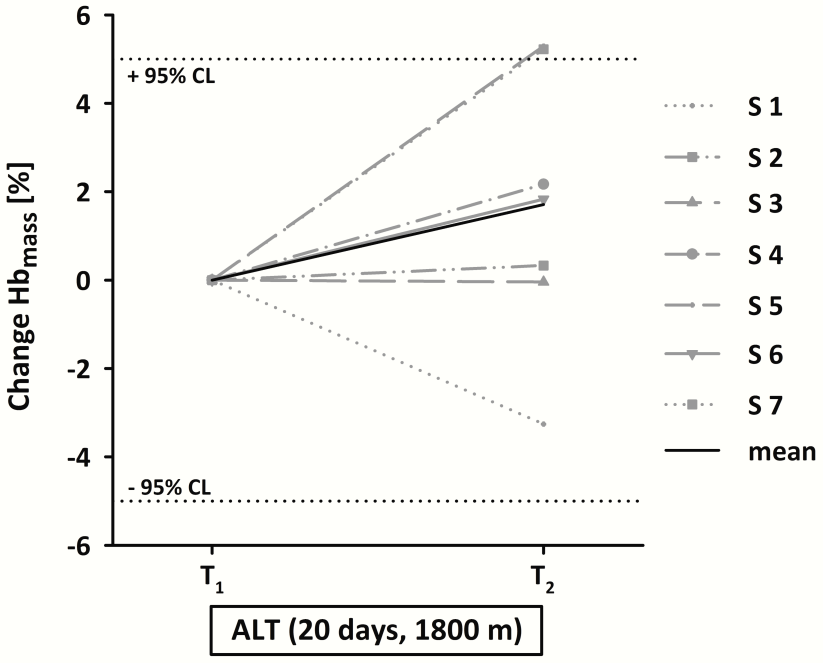

Figure 1. Mean and individual adaptation of haemoglobin mass (Hb_{mass}) during the altitude period (ALT). T_1 and T_2 = Timepoints of data collection. 95% CL = 95% confidence limits.

Discussion/Conclusion:

The main findings of the present study were that after the three-week training camp at 1800 m 1) the mean change of Hb_{mass} in the group of elite athletes was trivial, 2) individual Hb_{mass} adaptations displayed considerable variability and 3) two out of seven athletes showed a significant increase in Hb_{mass}.

Our data thus support the theory that the hypoxic stimulus of altitudes < 2000 m is too low to effect a relevant increase of the mean Hb_{mass} in a group of elite athletes. However, two subjects (athletes 5 and 7) displayed significant individual changes during ALT, while no significant changes were noted during CON. Since the effect of hypoxia on Hb_{mass} was probably not confounded by depleted ferritin stores (ferritin concentrations at T_0 and T_1 > 40 µg/l), doping abuse (doping control scores within

normal ranges) or changes in training load (very weak correlation between load changes and %ΔHb$_{mass}$), it can be assumed that athletes 5 and 7 are "true" Hb$_{mass}$-responders to the hypoxic dose of 20 days at 1800 m. It is important to note that the two subjects may not have been found to be Hb$_{mass}$-responders if Hb$_{mass}$ had not been measured in duplicate pre and post altitude. This is because 95% CL are ~30% (factor of √2) wider for single (±7%) than for duplicate (±5%) measures and thus complicate the identification of alterations in individual's Hb$_{mass}$.

We conclude that the analysis of the personal Hb$_{mass}$-response to altitude training is inevitable for elite athletes who want to efficiently integrate altitude training in their training process. To those athletes we recommend a) to enhance the chance of a Hb$_{mass}$ benefit by completing their altitude training at altitudes above 1800 m and b) to analyse the Hb$_{mass}$-response to an altitude stay using duplicate measures pre and post altitude. Like this, the hypoxic dose can be individually optimised and the personal altitude training strategy of an athlete can be developed.

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Title: Using inertial sensors to compute an alpine ski racing specific full body kinematic model – an application to track the distance between ankle joint and athlete's center of mass

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Abstract:

Introduction:

Vertical movements are an inherent characteristic of modern skiing technique and may affect performance in alpine ski racing [1], [2]. Consequently, they are extensively discussed within coaches' manuals and technical guidelines all over the globe [3]–[5]. Despite their functional role during the turn switch, they have also been suggested to increase the skier´s velocity within some very specific skiing situations [6], [7]. However, to date, the quantification of vertical movements while skiing remains very complex.

Traditionally, vertical movement has been analyzed using camcorder-based 2D or 3D kinematics. However, in order to obtain a 3D model of the skier multiple cameras are needed and the capture volume is restricted to a small number of turns. Moreover, data processing is highly time-consuming as the videos need to be labeled manually. Thus, different analysis systems have to be found that allow recording the skier's movement over an entire race. Solutions were proposed to use inertial sensors to obtain body posture information [8], [9]. Even though inertial sensors do not allow obtaining the absolute position of the skier, the relative position of body segments with respect to each other can be determined and used to construct a kinematic model. One application of this approach could be to track the distance between ankle joint and athlete's center of mass, which can be considered as an overall measure of vertical movement while skiing.

Therefore, the goal of the current study was, 1) to design a full body 3D skiing model based on inertial sensor data, 2) to apply this model to compute the vertical distance between the ankle joint and the athlete's center of mass and 3) to demonstrate the validity of this parameter to explain the overall vertical movement differences between the disciplines slalom and giant slalom.

Methods:

Six European Cup level athletes were recruited for the study. Three athletes performed two runs on a slalom (SL) course, while the other three athletes performed two runs on a giant slalom (GS) course. Both courses were set with regular gate distances (SL: 10m, GS: 25m) on a slope with a constant inclination of 25°. For each run, a central section of 8 SL turns and 4 GS turns was selected for the analysis, respectively. This study has been approved by the Ethics Committee of the Department of Sport Science and Kinesiology at the University of Salzburg.

The athletes were equipped with 7 miniature inertial sensor units (Physilog® IV, GaitUp, Switzerland) placed on the head, sternum, sacrum, thighs, and shanks as shown on Figure 1A. Before each run functional calibration movements were performed to align the sensor axes with the anatomical frame of the body segments [10]. An alpine skiing specific algorithm [9] was used to compute the segment orientations.

All joints were modelled as ball joints and normalized segment dimensions and weights were taken accordingly to [11]. The relative joint positions of hip, knee, ankle, trunk center, and neck were computed recursively using Eq. 1 (see Figure 1B) where the trunk center joint was defined as the origin of the model. Arm movement was hypothesized to play only a minor role and was therefore excluded.

$$\boldsymbol{p_{i+1}(t) = p_i(t) + R_s(t)\, d_s} \qquad \textit{Equation 1}$$

where $p_{i+1}(t)$ is the position of the $i+1$th joint at time t, $p_i(t)$ the position of the ith joint, $\boldsymbol{R}_s(t)$ the orientation of the segment between joint i and $i+1$ expressed in the global frame, and d_s the segment's dimension in its anatomical frame.

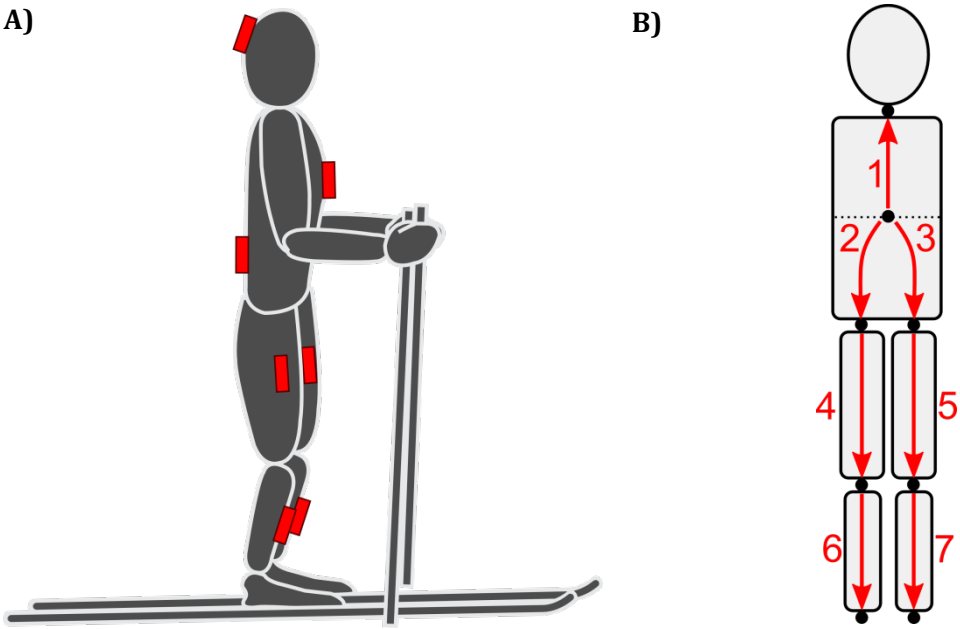

Figure 1: A) Sensor placement, B) full body kinematics model used to compute the joint positions relative to the trunk center.

The center of mass (CoM) for each segment was computed using Eq. 2

$$\boldsymbol{p_s^{CoM}(t) = p_i(t) + R_s(t)\, d_s^{CoM}} \qquad \textit{Equation 2}$$

where p_s^{CoM}(t) is the position of the CoM of segment s at time t, $p_i(t)$ the position of the segment's proximal joint, $\boldsymbol{R}_s(t)$ the segment's orientation expressed in the global frame, and d_s^{CoM} the distance vector between the proximal joint i and segment's CoM.
The athlete's CoM was computed using Eq. 3

$$\boldsymbol{p^{CoM}(t) = \frac{\sum(m_s\, p_s^{CoM}(t))}{\sum m_s}} \qquad \textit{Equation 3}$$

where m_s is the mass of segment s.
The vertical distance between the left / right ankle and CoM, v_{left} and v_{right}, was defined following Eq. 4 and normalized for body height.

$$\boldsymbol{v_{left}(t) = |p^{CoM}(t) - p_{left\ ankle}(t)|} \qquad \textit{Equation 4}$$

$$\boldsymbol{v_{left}(t) = |p^{CoM}(t) - p_{right\ ankle}(t)|}$$

The turn switches have been automatically segmented into right-left double turns by detecting the intersections of the left and right vertical distance curves. Each turn cycle was time normalized to 100%. Mean curves have been computed and maximum and minimum distances were extracted for each leg and discipline. Paired t-test was used to compare maxima and minima of left and right leg of the same subject and same run. Unpaired t-test was used to compare maxima and minima between the disciplines SL and GS. Significance level was set to 5%.

Results:
In total 24 and 12 right-left double turns were analyzed for SL and GS, respectively. Figure 1 shows the mean curves for the vertical distance between left / right ankle and CoM. Table 1 shows the maximum and minimum distances for each leg and each discipline.

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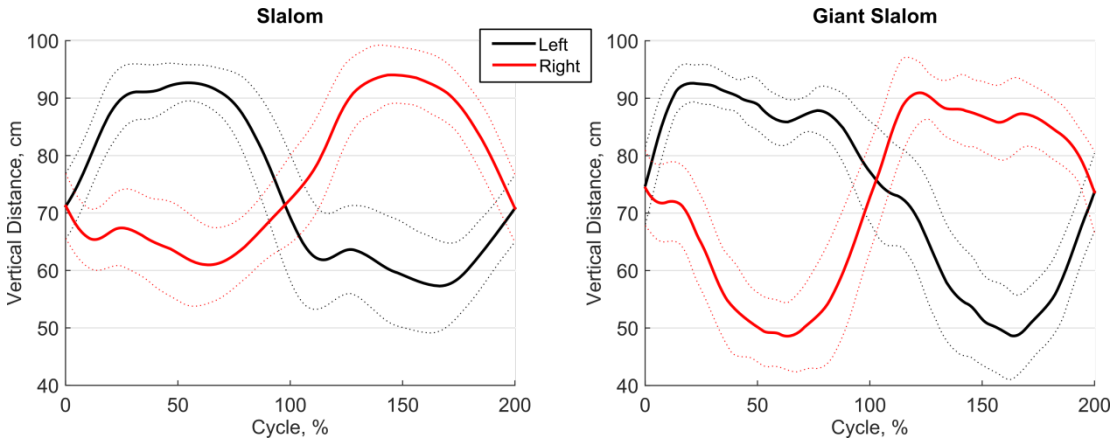

Figure 1: Vertical distance between left / right ankle and CoM over two turn cycles for the disciplines SL and GS. The thick curves are the mean vertical distance and the dotted curves delimit one standard deviation. The black color denotes the left side and the red the right side. 0%-100% right turn, 100%-200% left turn.

	Slalom		Giant Slalom	
	Mean	SD	Mean	SD
Left minimum vertical distance, cm	55.3*	7.9	47.2^{++}	7.2
Right minimum vertical distance, cm	58.3	6.5	46.4^{++}	6.7
Left maximum vertical distance, cm	94.0	3.7	94.5	2.9
Right maximum vertical distance, cm	95.2	4.6	93.1	4.2

Table 1: minima and maxima of the vertical distance between left / right ankle and CoM for the disciplines slalom and giant slalom. SD = standard deviation, * = left/right difference $p<0.05$, ** = left/right difference $p<0.01$, $^{+}$ = discipline difference $p<0.05$, $^{++}$ = discipline difference $p<0.01$

Discussion/Conclusion:

Inertial sensors were successfully used to build a full body kinematic model for alpine ski racing. The model allowed computing the vertical distance between left / right ankle and CoM with a high accuracy and precision. In a related validation study the vertical distance's accuracy (error mean) and precision (error standard deviation) were found to be 0.9cm and 3.0cm, respectively (Fasel et al., unpublished data). This study further supported the relevance and validity of the parameter by highlighting differences in the overall vertical body movements between the competition disciplines SL and GS. However, in order to verify the preliminary findings of a higher range of motion of the vertical distance in GS compared to SL, further more sophisticated studies should investigate this aspect within different course settings and/or slope inclinations.

One of the key advantages of the proposed system is the unlimited capture volume. It allows for the first time to measure overall vertical body movement for an entire race course. For the future, the model could be used to extract other posture related information such as the overall fore-aft position or the overall body inclination as well. The model could also be used for analyzing body coordination. Moreover, the model could be fused with a global navigation satellite system to provide information about instantaneous speed and skiing trajectory.

However, despite the great potential of the proposed method, its setup is still quite complex and may not be the most practicable approach for daily training as seven inertial sensor units per athlete are needed. Consequently, further studies should also aim at simplifying the model for these daily training purposes.

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Title:
Blood shifts between the trunk and the extremities during exercise

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Abstract:
Introduction:
During quiet breathing the increase in abdominal pressure due to the descending diaphragm leads to a small blood shift from the splanchnic vascular bed into the extremities[1]. We hypothesized that, during exercise, when abdominal muscle contraction increases abdominal pressure variations, this circulatory function of the diaphragm could be considerably enhanced.
Methods:
In 3 healthy subjects (1 woman, 2 males, 27, 28 and 45 years, 1.78±0.15 m, 71±12 Kg) changes in body volume (Vb) and in trunk volume (Vtr) were measured simultaneously by whole body plethysmography and optoelectronic plethysmography, respectively. The volume of blood shifts between the thorax and the extremities (Vbs) was determined as ΔVtr-ΔVb, during QB, at rest and submaximal constant exercise (repeated plantar flexion against an elastic resistance, ~54 Watt) with 3 different breathing modes: spontaneous (SE), rib cage (RCE, voluntary emphasized inspiratory rib cage breathing) and abdominal (ABE, voluntary active abdominal expiration breathing). Gastric (Pga) and esophageal pressure (Pes) were measured with balloon catheters. We calculated the average of ten Vbs swings at rest and during exercise and quantified the changes in Vbs baseline from quiet breathing to the three modes during exercise.
Results:
At rest, within-breath tidal Vbs averaged 0.12±0.06 L. During SE, RCE and ABE it averaged 0.24±0.10 L 0.39±0.18 L and 0.45±0.32 L respectively. From rest to SE and RCE baseline shifts indicated blood displacement from the extremities into the thorax (0.11±0.19 L and 0.66±0.99 L, respectively), while during ABE it was displaced from the thorax to the extremities (0.15± 0.04L). A bimodal time course found during quiet breathing suggested that Vbs is mostly determined by Pab dynamics. During exercise, intra-breath variations of Vbs were bimodal for all three breathing patterns. Although the Vbs patterns differed between subjects, it appeared to be uniquely determined by the individual variations in abdominal an pleural pressures. During RCE blood was sucked into the thorax by the large Ppl swings. Conversely during ABE, Vbs were driven by the increases in Pab due to diaphragm and abdominal muscle contraction, resulting in blood shifts from the thorax to the extremities.
Discussion/Conclusion:
Blood shifting between thoracic compartments and extremities is enhanced during exercise. The dynamics and partitioning of these blood shifts depends on breathing mode. Baseline shifts indicate abdominal blood volume recruitment, while intra-breath swings suggest dynamic impact on venous return to the heart. Our results reinforce and extend the notion that the respiratory muscles not only have a ventilatory function, but also modify cardiovascular function on a breath-by-breath basis. This enhanced dynamic redistribution of blood volume between thorax, abdomen and extremities during exercise might play an important cardiovascular role during exercise. It remains to be investigated if such effects are even more increased during heavier exercise and influenced by mode of exercise such as running due to vertical oscillation of abdominal content.

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Title:
Funktionalität peripherer Wahrnehmung bei Trackingaufgaben

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Abstract:
Introduction:
Beim Multiple-Object-Tracking müssen mehrere, sich bewegende Zielobjekte visuell verfolgt werden. Dabei scheint es vorteilhaft zu sein, den Blick zwischen den Zielobjekten zu verankern, um Bewegungsinformationen peripher wahrzunehmen (Fehd & Seiffert, 2010). Nach Prüfung dieser Annahme (Experiment 1) wurde getestet, wie gut und schnell auf Bewegungs- und Formveränderungen der Zielobjekte reagiert werden kann (Experiment 2), um die Funktionalität der peripheren Wahrnehmung zu überprüfen.

Methods:
14 Teilnehmer hatten die Aufgabe, zum Ende eines Einzelversuchs 4 aus 10 Vierecken wiederzuerkennen, die sich linear für 6 s in einem projizierten Quadrat bewegten. Dabei wurden 3 Geschwindigkeiten (6, 9 und 12°/s) in 9 Blöcken à 15 Versuchen präsentiert, um die Ergebnisse von Fehd und Seiffert (2010) zu replizieren. In Experiment 2 sollten Teilnehmer auf das Anhalten eines Targets oder dessen Formveränderung zur Raute (Manipulation: 0.5 s) mit Knopfdruck reagieren, bei ausbleibender Veränderung hingegen die 4 Zielobjekte wiedererkennen (3 Bedingungen in 10 Blöcken à 12 Versuchen). Durch die Bestimmung von Sakkadenlatenzen (definiert als Zeitraum zwischen Beginn der Objektveränderung und Sakkadenbeginn auf das Objekt) kann bestimmt werden, ob die Veränderung bereits peripher wahrgenommen wurde. Unter anderem aufgrund der Sensitivität der Netzhaut gegenüber Bewegungen wurde erwartet, dass Bewegungsveränderungen häufiger und schneller erkannt werden und dass häufiger bereits reagiert werden kann, bevor der Blick auf dem veränderten Zielobjekt ist.

Results:
Experiment 1 ergab einen signifikanten Haupteffekt für Geschwindigkeit, $F(2,26) = 62.66$, $p < .01$, $\eta_p^2 = .83$, mit höchsten Richtigkeiten bei 6°/s (58%). Ein Haupteffekt für Blickort, $F(2,26) = 76.40$, $p < .01$, $\eta_p^2 = .85$, zeigt, dass der Blick unabhängig von der Geschwindigkeit länger auf dem Centroid war als auf Targets und Distraktoren. Aufgrund der höchsten Richtigkeiten bei 6°/s wurde diese Geschwindigkeit in Experiment 2 eingesetzt und festgestellt, dass Bewegungsveränderungen häufiger erkannt werden (83 %) als Formveränderungen (59 %), $F(1,10) = 17.20$, $p < .01$, $\eta_p^2 = .63$. Unterschiede in Sakkadenlatenzen, $F(1,10) = 6.73$, $p = .03$, $\eta_p^2 = .40$, deuten auf eine periphere Wahrnehmung der Bewegungsveränderungen hin. Experiment 3 wird zeigen, ob Sakkaden das Monitoring stören.

Discussion/Conclusion:
Die periphere Wahrnehmung scheint immer dann funktional zu sein, wenn mehrere, für eine Aufgabe relevante Objekte gleichzeitig verfolgt werden müssen und wenn Veränderungen, besonders der Bewegung, schnell erkannt werden müssen. Weitere Untersuchungen sollen zeigen, ob diese Funktionalität der peripheren Wahrnehmung auch im Sport (z.B. beim gleichzeitigen Verfolgen mehrerer Gegenspieler) erkannt werden kann.

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Title: Relationship between increased volume and force loss in calves after the most extreme mountain ultra-marathon in the world

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Abstract:

Introduction:

Mountain ultra-marathons (MUM) have become increasingly popular in the last decade. Along with neuromuscular impairment and muscular weakness, inflammation and muscular damage, increased volumes of athletes' body extremities and/or limbs have been also reported after MUM[1,2,3]. A decline in muscle strength related to an increase in muscle thickness was reported after a damaging exercise in athletes[4], suggesting a direct impact of muscle volume expansion and muscular strength loss. However it remained unclear whether muscle volume expansion and muscle weakness are related. We hypothesized that muscle volume expansion is high in lower limbs and associated with muscle weakness after a MUM.

Methods:

Two groups (11 runners (TOR) and 8 control subjects (CON)) underwent testing Pre- and Post-MUM. The extent of contractile fatigue of the knee extensor (KE) and plantar flexor (PF) muscles was measured by supramaximal electrical stimulations. Bioimpedance was used to assess body composition.

Results:

Potentiated low- and high- frequency doublets (PS10 and PS100) of KE and PF decreased Post-MUM in TOR (PS10: -17%, $p < 0.01$ and -23%, $p<0.05$ and PS100: -16%, $p<0.01$ and -20%, $p<0.05$ for KE and PF, respectively). Hydration of the non-fat mass (NF-Hyd) and extracellular water volume (Ve) were increased Post-MUM (+11%, $p<0.001$ and +14%, $p<0.001$) in TOR but not in CON. Circumference of calves (+2%, $p<0.05$) but not thighs was increased in TOR only. Significant relationships were found between the percentage of (%) increase in Ve and NF-Hyd ,the % decrease in PS10 of the PF (r = -0.68, $p<0.05$ and r = -0.70, $p<0.05$ respectively) and the % increase of the calves circumference (r=0.72, $p<0.05$ and r=0.73, $p<0.05$) in TOR.

Discussion/Conclusion:

In the present study we report that running the most challenging MUM in the world induces an increase in extracellular mass, extracellular water volume and total hydration of the non-fat mass. After the MUM, contrary to the thighs, the calves circumference was significantly increased in TOR. For the first time, this study shows a significant relationship between the increase in total body hydration and extracellular water volume with (i) muscle weakness as quantified with PS10 in the PF and (ii) calves circumference between Pre- and Post-MUM. These results suggest that an increase in the calves volume is partly involved in muscle weakness after a MUM.

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Title:
How can we further improve jump performance? Influence of combining augmented feedback with an external focus of attention and with reward

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Abstract:
Introduction:
It is well accepted that augmented feedback (aFB) is beneficial to foster motor performance and motor learning (e.g. Lauber & Keller, 2014; Schmidt & Lee, 2011). With respect to jump performance it was recently demonstrated that jump height could not only be improved in the long-term when providing aFB during training compared to a situation without aFB but also in the short-term (Keller et al. 2014). Based on the observation of instantaneous effects of aFB on motor performance, the short-term effect of aFB was recently compared with the influence of applying an internal (IF) or external focus (EF) of attention (Keller et al. 2014). It is well established that an EF (attention directed at the movement effect) is generally superior compared to an IF (attention directed at the performer's body movements) or a neutral condition (NE; for review see Wulf, 2013). In line with this previous observation, EF resulted in better jump height than IF. However, aFB was even better suited to enhance jump performance than EF (Keller et al. 2014; in press). For the present study, we were curious if there are other or even better ways to instantaneously improve jump performance. As monetary reward was previously shown to improve motor performance of other movements in the short-run (Atkinson, 1964), we introduced in a first step a monetary reward condition (RE) to clarify whether there is also a gain in jump performance with RE. In a second step, we provided subjects with aFB, as this was the condition identified as being the most successful one so far, and combined aFB with an EF and with RE. We hypothesised that if the underlying mechanisms of aFB, EF and RE are independent, we should see most beneficial effects when combining these conditions.
Methods:
Twelve out of 20 adults (25.1±10.1 years, 1.74.±0.10 m, 69.7±11.6 kg; 6 female and 6 male) were already measured and completely analysed. These subjects were performing countermovement jumps (CMJs) on a force plate. For all aFB conditions, a light barrier beside the force plate was used to determine flight time duration and based on this aFB about the rebound height was calculated and displayed on a screen. Movement kinematics such as joint angles were analysed offline with a motion capture system. Furthermore, muscular activity was measured in five muscles in the right leg.
After warm-up, participants had to execute six to eight CMJs for familiarization. Before starting, participants were told to jump as high as possible in each single trial and to respect the additional instructions. Then each participant executed 16 series of six maximal CMJs distributed to the following six conditions: NE, aFB, RE, aFB+EF, aFB+RE and aFB+EF+RE. Each condition was repeated twice and the order was randomized for each participant. The only exception to this randomization was the NE condition that was evenly distributed throughout the experiment. Furthermore, two NE series at the beginning were not used for further analysis as they served as a reference for the reward condition. Before and in the middle of each series, verbal instruction of the current condition was given to the participants.
Results:
Participants showed the highest jump heights with aFB+EF (38.58±7.18 cm) and, as expected, the worst in the NE condition (37.12±7.41 cm; see Figure 1). A one-way ANOVA with repeated measures revealed significant differences between conditions ($F_{5,45} = 9.806$; $p < 0.01$; $n2p = 0.471$). Post-hoc analysis with Bonferroni corrected t-tests indicated clear differences between NE and aFB+EF ($p < 0.01$), NE and aFB+EF+RE ($p = 0.016$); aFB and aFB+EF ($p < 0.01$) and RE and aFB+EF ($p = 0.033$). Furthermore, comparing the aFB condition with the NE condition revealed significant differences ($p = 0.034$). However, it has to be noted that this t-test was not Bonferroni-corrected (i.e. by the factor of 15) as the other t-tests. A first analysis revealed no significant differences between conditions concerning force production (see Figure 2), muscular activity and jumping movement pattern.

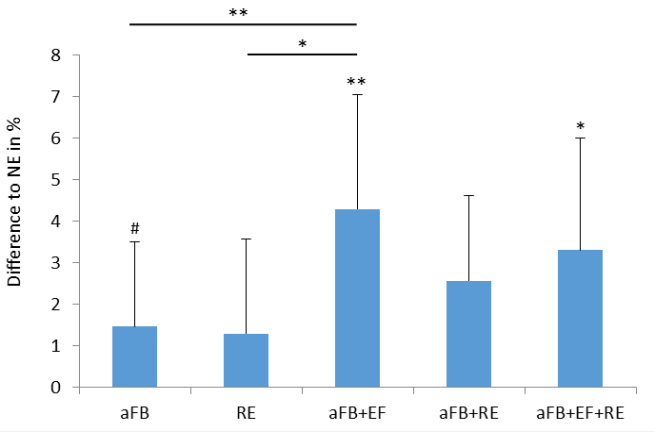

*Figure 1: Mean and standard deviation for jump heights of the different conditions. Values are indicated as percentage differences of the NE condition. * = p < 0.05; ** = p < 0.01 and # = p < 0.05 uncorrected.*

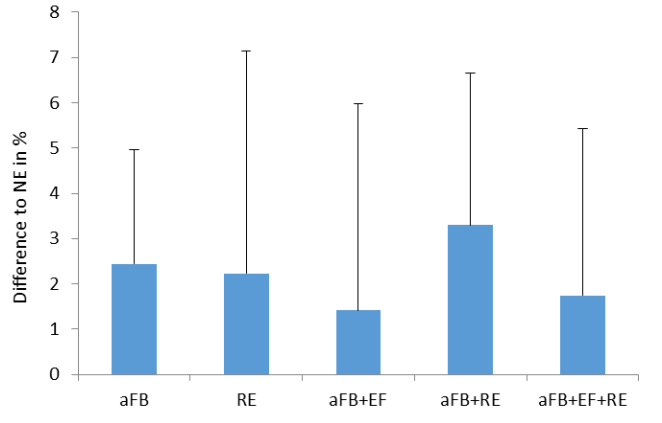

Figure 2: Mean and standard deviation for maximal force production of the different conditions. Values are indicated as percentage differences of the NE condition.

Discussion/Conclusion:

Augmented feedback was recently shown to improve jump performance compared to the NE condition and was thereby more efficient than EF and IF (Keller et al., in press). In line with this previous finding,

aFB was superior to the NE condition. However, it has to be stated that this difference was not significant for the present study when correcting for multiple testing (n=15). The uncorrected test is nevertheless displayed to show congruence with previous work with fewer conditions. Apart from that, two conditions (aFB+EF and aFB+EF+RE) showed significantly superior performance despite multiple corrections compared to the NE condition. The aFB+EF condition was, however, the only condition that was significantly superior compared to aFB and RE alone and may therefore considered to be the most efficient approach.

Although aFB+EF led to the greatest jump height, this could not be explained by the maximal force production data. Theoretically, we would have expected to see largest force production in the condition(s) with the largest jump height(s). However, the present study indicates that an enhanced effort, especially seen in the aFB+RE condition, does not automatically reveal better performance. The phenomenon that a monetary incentive may lead to an enhanced effort but not necessarily to an enhanced performance is well-known (for review, see Bonner & Sprinkle, 2002). Furthermore, monetary incentives are clearly an extrinsic RE whereas according to Lutz (Lutz et al., 2012) aFB can

be considered as intrinsic reward. In this context it was shown that extrinsic reward can undermine intrinsic mechanisms and therefore hinder performance enhancement (Callan & Schweighofer, 2008). On the contrary, the enhanced jump performance of aFB+EF and aFB+EF+RE indicates a positive impact of EF. As seen in Figure 2, participants invested less force in the EF conditions than in the other conditions but jumped higher. Thus, our data confirm the notion that an EF leads participants to a more efficient movement execution (Wulf et al. 2010). In addition, we show that the combination with aFB seems to be most efficient.

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Title: Implicit motives as determinants of individual behavior in sports and exercise

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Abstract:

Introduction:

Implicit motives are conceptualized as individual needs that repeatedly and spontaneously drive, orient, and select behavior towards certain classes of incentives (McClelland, Koestner, & Weinberger, 1989). Research on implicit motives thematically focuses on three classes of incentives: achievement, affiliation, and power. Individuals with a high *achievement motive* are concerned with improving their skills according to a personal standard of excellence. The *affiliation motive* is defined as a need for establishing, maintaining, and restoring positive social interactions with others. The *power motive* is perceived as the need to affect or control others' behaviors or emotions. It is hypothesized that implicit motives are linked to (1) *long-term behavioral trends* (e.g., participating in elite sports), that (2) they benefit well-being, motivation, and performance when situational incentives *fit* the individual's implicit motive (e.g., an achievement-motivated athlete feels better when a coach uses achievement-oriented instructions), and that (3) implicit motives are linked to the individual's *physiological responses* (e.g., the power motive is linked to testosterone reactivity).

Methods:

Correlational and experimental evidence will be presented for each of the three hypothesized characteristics of implicit motives in the field of sport and exercise. The studies presented employ projective measures to assess the strength of the individual's implicit motives and their predictive value for different outcome variables.

Results:

Regarding the prediction of (1) long-term behavioral trends studies in the field of sport point to unique implicit motive profiles of elite athletes when compared to recreational athletes (Gröpel, Schoene, & Wegner, in press), including for example, the prediction of tournament performance in team sports by the individual's implicit achievement motive (Wegner & Teubel, in press). Different studies were able to predict (2) athletes' well-being and motivation to continuously participate in sports, when, e.g., the individual's implicit motives match personal or coach's goals (Schüler & Wegner, in press) or when they match the individual's perception of a sport context as being satisfying for their basic needs (Schüler, Wegner, & Knechtle, 2014). Moreover, in contest situations, that also include aspects of social evaluations, implicit motives were shown to moderate the individual's hormonal response (e.g., cortisol; Wegner, Schüler, & Budde, 2014).

Discussion/Conclusion:

The existing empirical evidence for the prediction of sports-related behavior by means of implicit motives is promising. However, more experimental and longitudinal future research is needed.

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W

Title:
Comparison of self-reported and measured physical activity in office employees equipped with sit-stand-desks

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Abstract:
Introduction:
The decision to measure objective data or to rely on self-reported data has an influence on the economy and validity of measurements. Although self-reported information is less expensive, this information could possibly be biased.
The present study aims to examine the degree of bias between estimated and measured sitting, standing, and walking time in office employees who are equipped with a height-adjustable desk.

Methods:
The sample consisted of 38 office employees (8 males, 30 females, age: 40.8 ±11.4 years). They were asked to estimate their sitting, standing, and walking time using the Occupational Sitting Physical Activity Questionnaire (OSPAQ). The ActiGraph wGT3X-BT was used to measure their physical activity.

Results:
The intraclass correlation coefficients (ICC) concerning the estimated and measured data were low (walking: .04) to moderate (sitting: .51, standing: .64). The self-reported data yielded a significant underestimation of standing time (13.3% vs. 17.9%, $p < .01$) and an overestimation of walking time (12.7% vs. 5.0%, $p < .01$). Especially, older employees (> 39 years) underestimated their standing time, while underweight workers (BMI < 18) overestimated their walking time.

Discussion/Conclusion:
Self-reported data differ from measured data. In purpose to improve the validity of self-reported data, subjective and objective measures from representative samples could be used to develop a correction formula for the economic assessment of physical activity by subjective measures.

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none

Titel:
Muster motorischer Fähigkeiten und Fertigkeiten als Erfolgsprädiktoren im Juniorenleistungsfussball: Eine Studie auf der Grundlage des personorientierten Ansatzes

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Abstract:
Einführung:
Da die objektive Beurteilung der komplexen Spielleistung schwierig ist, spielen motorische Tests in der Talentselektion im Fussball eine bedeutende Rolle. Für die Talentdiagnose sollten solche Tests zukünftige Leistungsunterschiede vorhersagen können. Ob die gängigen technischen und konditionellen Tests diese Anforderungen erfüllen können, ist noch weitgehend ungeklärt (Lidor, Côté, & Hackfort, 2009). Da einzelne motorische Tests nur Teilbereiche der komplexen Spielleistung repräsentieren, kann darüber hinaus von Kompensationseffekten ausgegangen werden. Die beste Spielleistung muss daher nicht zwingend mit den besten Resultaten in allen Tests einer Testbatterie einhergehen. Um der Ganzheitlichkeit der Spielleistung gerecht zu werden, wird eine holistische Perspektive eingenommen und in Anlehnung an Bergman, Magnusson und El-Khouri (2003) ein personorientierter Ansatz gewählt. Bei diesem systemischen Ansatz wird das gesamte Mensch-Umwelt-System in verschiedene Subsysteme unterteilt, die sich ihrerseits wiederum aus sog. operierenden Faktoren konstituieren. Durch die unterschiedlichen Ausprägungen dieser interagierenden operierenden Faktoren lassen sich Muster erkennen, die im Zentrum der Analyse stehen. Somit können besonders erfolgversprechende Muster identifiziert und der Entwicklungsprozess beschrieben werden. Dieser Idee folgend wurde ein Subsystem *motorische Fähigkeiten und Fertigkeiten* definiert und analysiert.
Methode:
Die Stichprobe setzt sich aus n = 106 männlichen Nachwuchsspitzenfussballern zusammen, die zum ersten Messzeitpunkt (MZP 2011) verschiedenen Regionalkadern des Schweizerischen Fussballverbandes angehörten ($M_{\text{Alter, 2011}}$ = 12.26, SD = 0.29). Die Spieler nahmen an drei Testungen im Abstand von je einem Jahr teil (2011, 2012, 2013), an denen die motorischen Testungen (intermittierende Ausdauer, Schnelligkeit und Techniktests; insgesamt sechs Testformen) durchgeführt wurden. Ein Jahr später (2014) wurde analysiert, welche Spieler über eine nationale Talentcard, eine regionale oder keine Talentcard verfügten. Die Daten wurden mittels LICUR-Methode (**L**inking of **Clu**sters after removal of a **R**esidue, vgl. Bergman et al., 2003), einem musteranalytischen Verfahren für personorientierte Ansätze, ausgewertet.
Resultate:
Zu allen drei MZP liessen sich vier Muster identifizieren, die im Längsschnitt stabil bleiben (strukturelle Stabilität). Die Spieler weisen im Zeitverlauf intraindividuell überzufällig häufig strukturell ähnliche Muster auf. Beim dritten MZP zeigt sich ein Muster, aus dem überzufällig viele Spieler hervorgehen, die ein Jahr später zu der Gruppe der Erfolgreichsten (Talentcard national) gehören. Dieses Muster zeichnet sich aus durch durchwegs überdurchschnittliche, nicht aber überall beste, Testleistungen.
Diskussion:
Der überzufällig häufige Entwicklungsverlauf entlang strukturell stabiler Muster lässt auf Prognosetauglichkeit des Subsystems motorische Fähigkeiten und Fertigkeiten im Altersabschnitt zwischen 12 und 15 Jahren schliessen. Überdurchschnittliche, nicht aber zwingend herausragende Leistungen sowohl in den fussballspezifischen wie auch den konditionellen Tests scheint dabei besonders erfolgversprechend zu sein. Dieser Befund unterstreicht, dass in der Talentselektion und -förderung eine ganzheitliche Sicht (personorientierter Ansatz) angezeigt ist.

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Title:
The positional stability of motor skills and abilities for talent selection in elite youth football

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Abstract:
Introduction:
Positional stability is considered an important criterion for the viability of a talent predictor (Abbott & Collins, 2002). If the ranking order of a group of potential talents for a performance-related feature does not remain stable over a certain time period, that feature is not suitable as a means of predicting future performance. The use of motor tests is widespread in football. However, it is largely unclear whether they are suitable as instruments for predicting future success at a relatively early point in an athlete's career. To test this, the positional stability of a battery of football specific motor tests was determined over a period of 3 years.
Methods:
Starting in summer 2011, the technical skills and fitness-related abilities of 144 top junior-league football players (M_{age}, t_1 = 12.27, *SD* = 0.29) were measured at intervals of half a year, six times in total, using nine motor tests. Spearman's rank correlation was used to determine the positional stability of these tests as well as the two dimensions Football Technique and Fitness (Zuber & Conzelmann, 2012) over a period of 3 years, based on the test results at t_1.
Results:
The positional stabilities of the nine tests between t_1 and t_2 lie between $.25 \leq r \leq .79$. As expected, increasing the forecasting horizon to t_6 leads to a decline in positional stability to $.07 \leq r \leq .58$. Overall, the fitness-related abilities display higher positional stability than the football-specific skills. The dimensions Football Technique and Fitness only differed marginally, however, and both display medium positional stability.
Discussion/Conclusion:
It may be conjectured that technical skills display lower positional stability than fitness-related abilities because of their higher specificity and the lower re-test reliability of the tests using a ball. Overall, it emerges that technique tests should not be used individually as talent predictors, but that summarising them to form an overall technique score leads to a reasonably acceptable positional stability. This suggests that talent development needs to be viewed holistically, as has already been promisingly done by applying the person-oriented approach (Bergman, Magnusson & El-Khouri, 2003) to talent research (Zuber, Zibung & Conzelmann, 2014).

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