

Berries and Cherries at the 2012 Annual Meeting of the European College of Sport Science

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Special features of this conference were the medieval venue, sport nutrition, electronic posters, access to videos of the plenary sessions, no studies of athletic performance amongst the awards for young investigators, and the role of the Australian Institute of Sport in Cadel Evans' 2011 Tour de France win. [Acute Effects](#): heated track-suit trousers, ischemic preconditioning, LHRH nasal spray, hops for PAP. [Nutrition](#): berries and cherries, green tea, beetroot juice, β -alanine, AIS supplement categories, multiple supplements, protein. [Performance and Game Analysis](#): ranking sports and countries, skiing turns, handball, golf, basketball, soccer, volleyball, rugby union. [Tests, Technology and Monitoring](#): automated analysis of swimming, pedal-based ergometry, bike-crank Q factor, GPS, acoustic feedback for rowers, training load, heart rate in overtraining, BMX test. [Talent Identification and Development](#): Olympic swimmers, group culture, handball. [Training](#): cold-water immersion, bare-foot netballers, injury prevention for soccer, live-high train-low and hot, ACL injury prevention, passive recovery, frequent resistance sessions, differential training for badminton, load-guided training, strength for endurance cyclists. [Postscript](#): sport scientist contributes to Bradley Wiggins' 2012 win of the Tour de France. **KEYWORDS**: competition, elite athletes, ergogenic aids, nutrition, performance, talent identification, tests, training. [Reprint pdf](#) · [Reprint docx](#)

Update 5 Oct 12: ECSS has now made the poster PDFs available via EDSS, the European Database of Sport Science. [Log in](#) as a member of ECSS to access them and the abstracts of the posters and podium presentations. Become a member of ECSS via the [membership page](#).

The medieval moated township of Bruges in Belgium was the magnificent choice for the **conference venue**, apparently neutral territory for the two Brussels universities that hosted the meeting. I managed to get my PhD students and myself into the hotel with the most character (i.e., the cheapest), and we eventually got used to the local custom of bathing with a hand-held shower. All hotels were only a few minutes' walk from the conference center, a converted medieval hospital with a special ambience. There were no serious clashes of topics in the parallel sessions, and chairs kept presentations on time, which allowed one to jump successfully between sessions. Congratulations to Romain Meeusen, Jacques Duchateau and their team!

For attendance and other logistics of this biggest and best in the international calendar, see the [debriefing page](#) and the [2012 conference website](#).

The title of this year's report reflects what for me emerged as one of the main themes, **sport nutrition**. The symposium that included the latest on the benefits of berries and cherries by Jo Bowtell was one of the high points. ([See below](#) to access it via ECSS.tv.) The Gatorade Sports Science Institute, under its new director Asker Jeukendrup, is also playing a big role in ECSS: Asker sponsored a symposium on the Science of Sports Nutrition the day before the conference, he has negotiated five years of sponsorship of ECSS at the highest (platinum) level, and he convened a meeting of ECSS members interested in forming a nutrition interest group. Contact [James Carter](#) to be included in future communications.

For the first time at an ECSS conference all **posters** were presented as PDFs on large screens. It worked, at least for the 10 chaired

parallel sessions that were presented separately in the 10 lecture theatres. Alas, the other 10 chaired parallel sessions were presented in one large room, so you needed bionic ears and eyes to get anything out of it. This problem was partly offset by the fact that all posters were available at every screen throughout the conference, but the rest of the program was so full of interesting presentations and networking opportunities that I didn't have enough time to view more than a handful of the poster PDFs. The chaired poster-session format at ECSS conferences also does not lend itself to personal interaction with authors. A simple solution would be to make the posters available either on the flash drive we get with the abstracts when we register, or on the Web either to ECSS members or only to conference registrants. Authors would have to include an email address or Skype identity on the poster. The same could be done for the oral presentations. Restricting access to conference registrants might even increase attendance. Yes, it means more work and expense for ECSS, but it seems a cost-effective way of furthering the educational aims of the college and recruiting members.

ECSS has already made the **plenary sessions** and a **nutrition symposium** available on high-quality video to members. To view them you will have to log on at the [ECSS homepage](#) where you can then click on the ECSS.tv link. You may have problems getting to the video, depending on the security settings on your browser: on Internet Explorer I had to Ctrl-click "play", and I had to click "no" when prompted about accepting files delivered securely. With a slow connection you may also have to pause the videos occasionally to allow the download to get ahead. I recommend the talks by Jo Bowtell and Dave Martin—more on these below. Don't try to fast forward past the leading edge of the download or you will end up stuck at the beginning again!

Compared with last year's gala event, the **young investigator awards** were a low-key affair. There was also an unfortunate lack of any award to a presentation in which competitive performance or even a surrogate thereof was a dependent variable, and there was only one award where anything like sport performance was even a predictor. Check out the [winning presentations](#) to see for yourself. In my view sport performance should always be well

represented in the prize list, to give encouragement to those young sport scientists who will make a living by researching athletes or providing them with service. We are in a college of *sport science*, which includes but is not subordinate to *exercise science*. Click [Prizeworthy](#) for my nominations of young investigators who researched performance. I have included this link with the précis of the relevant studies below.

The **highest point** of the conference for this scientist of competitive sport was Dave Martin's case study of the first Australian to win the Tour de France, Cadel Evans. After an inspirational Aussie-centric video of the 2011 TdF (view it via ECSS.tv), Dave identified aspects of the AIS that may have contributed to Cadel's success: talented, growth-minded *athletes*; committed, motivated *coaches*; challenging, competitive *environment*; strong, compassionate *leadership*; committed, connected *sports medicine*; and exciting, inspiring *sport science*. Dave wove these factors in with the teachings of the Stanford psychologist Carol Dweck, who for US\$10,000 per hour may tell you how to make your athletes and support crew into learners with a *growth* mindset rather than non-learners with a *fixed* mindset. Apparently these are the new prerequisites for success, along with talent, hard work, and the motivation that comes from failure. Dave gave examples of research projects that probably resulted in small but important increments in Cadel's performance, and he concluded enigmatically with a quote from sport scientist Allan Hahn, recently retired from the AIS: like the value of the rain forest, the contribution of sport science may not be fully appreciated until after it's gone. I presume Dave via Allan was referring to the threat that sport science comes under whenever sports administrators go through their perennial restructuring exercises.

As per last year, ECSS has generously made the **conference abstracts** available even to non-members via a search form on the [Scientific Program page](#). Use the form to find abstracts using keywords from your field of interest. Use the form also to find the abstracts I refer to in this report, by pasting in the author's name and initial(s) shown in brackets [...] as the search term. The search form will stop working around mid-September, the start of the promotion campaign of the next congress. After

that you will need to [log in](#) as a member of ECSS to access individual abstracts via EDSS, the European Database of Sport Science. If you are not already a member of ECSS, join now: the annual fee is a bargain, especially for students. Find out more on the ECSS [membership page](#).

Minor complaints about the abstracts... Many have faulty formatting or duplication of headers, so the submission process needs improvement. The subheadings (Methods, Results, Conclusions) need to be in bold or upper case to make the abstracts easier to skim read. Some authors need to include more findings, less verbiage, and please, please, no author-defined abbreviations.

As usual I have restricted this conference report to **athletic performance**, and this year the findings had to be reasonably novel, clear and implementable to make the cut. I have also omitted several promising reports that did not include percent effects or enough data to allow estimation of percent effects, where relevant.

Acute Effects

Wow, 11 **cyclists** who wore electric insulated **track-suit trousers** switched on for 30 min following a warm-up produced 9% more peak power in a 30-s test than when they wore a normal track suit and 3% more than when the special track suit was switched off. [Faulkner, S] [Prizeworthy](#)

Wow, more evidence that **ischemic preconditioning** enhances performance. Here the authors blocked the blood supply to the legs of 13 **men** with sphygmo cuffs for four 5-min spells, after which the men performed a submaximal lactate-threshold test followed by a 5-km treadmill time trial. Compared with the crossed-over placebo condition, time-trial performance improved by ~2.0%. [Bailey, T] [Prizeworthy](#)

A nasal spray of luteinizing hormone releasing hormone (**LHRH**) every 90 min for 7 d nearly doubled serum total testosterone in 10 moderately trained **students**. Markedly reduced responsiveness of luteinizing hormone to intravenous LHRH may have to be the basis of a test to detect this illegal doping strategy. [Krusche, T]

A series of 10 maximal hops was an effective stimulus for **post-activation potentiation** of drop jumps (up by 12% vs control) in 7 **women** and 5 **men**. [Bergmann, J]. Compare with other PAP protocols.

Nutrition

In the sport nutrition symposium focused on plant products, Jo Bowtell explained how the polyphenols in **berries, cherries** and other colored fruit and vegetables consumed prior to and throughout a tournament will improve acute functional recovery by reducing oxidative damage and inflammation. Consumed chronically in megadoses, the purified anti-oxidants **vitamins C and E** are actually harmful for training-induced adaptation [e.g., Holden, G]. The effects of polyphenols in fruits and vegetables on training in athletes are unclear, but in a study of mice, the polyphenols equivalent to a human consuming 200 g per day of dark chocolate produced adaptations similar to those with training. Dose-response training studies in athletes are obviously next, perhaps with blackcurrants, which have way more polyphenols than anything else. [Bowtell, J]

In the same symposium Adrian Hodgson reviewed the evidence that regular consumption of **green tea** raises resting metabolic rate, increases fat oxidation, and reduces body mass by ~1 kg, but there is a lack of consistent evidence for effects on performance. [Hodgson, A]

Andy Jones, the third speaker in the symposium, provided plenty of evidence for an enhancement of endurance power output of ~2% when untrained or moderately trained subjects consume acutely the nitrate in **beetroot** and other vegetables. [Jones, A] But my reading of the evidence presented at this conference (see below) is that highly trained endurance athletes get little or no benefit and may even risk an impairment in performance, probably because nitrate mediates its effects via a mechanism that is maxed out with hard training.

Yes, sorry, but a crossover placebo-controlled study of 24 highly trained **cyclists** experiencing several protocols of **beetroot-juice** supplementation provided an unclear outcome in two 4-min time trials on average and a possible harmful effect of 1.2% for the better cyclists. [Hoon, M]

A symposium on nutritional supplementation included a summary of a recent conference on **β-alanine**. Main points: it works for exercise lasting 1-4 min, possibly by sensitizing contractile proteins to calcium ions rather than by increasing buffering capacity, and it gets taken up more efficiently when consumed with meals. [Derave, W]. On the basis of its ~1% effect on

2000-m time in a placebo-controlled trial following 4 wk of loading with 16 competitive **rowers** [Ducker, K], you could extend the period of exercise to 6-7 min. But wait, how come, if anything, 10 weeks of supplementation in a placebo-controlled trial with 48 elite **swimmers** had a possibly harmful effect on competition performance? [Chung, W] [Prizeworthy](#). The confidence interval leaves room for a small enhancement, but it's a worry nevertheless. In another study of 16 "trained" **swimmers** β -alanine improved 200-m performance by 1.2% [Coelho, D]. I think we're seeing the same story here as with nitrate: the more highly trained, the less the effect.

At the same symposium, Louise Burke explained the AIS policy on **supplements**, which she divides into categories A (these work) through D (banned, or at high risk of a positive doping test). Access the lists at the [AIS supplement page](#). [Burke, L]

Quantifying the effects of **multiple supplements** that usually work individually is the next big thing in sport nutrition. In the study of the effect of **β -alanine** on trained **swimmers**, there was a small but unclear additive effect when sodium **bicarbonate** was also consumed. [Coelho, D]

Caffeine and sodium **bicarbonate** have seemingly independent mechanisms for performance enhancement, yet in this crossover study of 8 well-trained **rowers** together they produced an enhancement in 2000-m rowing ergometer power of only 1.7% relative to placebo, substantially but presumably not clearly less than the 2.3% with caffeine alone [Carr, A]. I hope that the confidence limits—which Amelia didn't report—would allow for the expected additive effect.

State of the dietary-**protein** art: rapidly-digested proteins, especially whey protein, consumed during an anabolic "window" of up to 2 d following exercise stimulate muscle-protein synthesis via a leucine "trigger" (an increase in concentration of the amino-acid leucine above a threshold concentration). [Phillips, S]

"**Protein** ingested immediately prior to sleep is effectively digested and absorbed, thereby allowing athletes to optimize recovery from resistance-type exercise," at least for those athletes who want to increase or maintain muscle mass. Whether a bed-time protein snack is

the right strategy for endurance athletes needs to be researched. [Res, P]

Performance and Game Analysis

One of my PhD students had a poster showing that if you are currently on a certain **world rank**, say 7th, you have only one chance in 7 of ever being at the top. It's some kind of previously undiscovered law of nature. It also means a 7th place is worth 1/7th of a gold medal in the country **medal count**. [Malcata, R] [Prizeworthy](#)

It involved "high-end real-time kinematics and GNSS" (Global Navigational Satellite System—the European GPS), but the otherwise straightforward analysis of six **downhill turns** by 12 elite female **cross-country skiers** revealed differences in technique that depended on the ability of the skier. The skiers' maximal power in squats and jumps was also linked to their ability, amazingly for such a small sample size. [Bucher, S]

If you specialize in cross-country **skiing** [Stöggl, T], **handball** [Wagner, H] or **golf** [Wallace, E], there may be something for you in these three review-type lectures comprising a symposium on **biomechanics** in elite sport.

In this systematic study of small-sided **basketball** games, the number of elite junior players had the largest influence on the technical, physiological and high-intensity **movement patterns**. [Klusemann, M] A similar study provided useful information about small-sided games in elite youth **soccer** players. [Brandes, M]

Soccer analysts may find these three studies of **offensive play** in top teams useful. [Barbosa, A; Sarmiento, H]

Extensive analysis of **defensive actions** in national-level **volleyball** appears to have produced some valuable findings. [Joao, P] Check out the other five posters on volleyball in this session.

If **rugby union** is your game, you'll need to read this extensive analysis of what makes **tackles** successful. [Hendricks, S]

Tests, Technology and Monitoring

Automated kinematic analysis of elite **swimmers** is one step/stroke closer to practical realization, but you need markers on the swimmers and 10 underwater cameras. [Olstad, B]

Polar and Look have combined forces to make a **mobile ergometer** for **cyclists** with the strain gauge in the pedal cranks, but in compar-

ison with the industry-standard SRM cranks, it looks like there is too much systematic and random error. [Bruch, A]

The optimum horizontal distance between the cranks on a bicycle (the **Q factor**) for performance of a 24-min time trial differed between individuals in this crossover study of 10 trained **cyclists**, and changing the distance by 22 mm from the optimum reduced mean power output by ~4% within individuals. [Disley, B]

The GPSport SPI Pro X 15Hz **GPS units** are clearly inferior to the **Prozone** system for tracking sprinting of **footballers**, apparently because the GPS units record only at 1 Hz compared with 10 Hz for the Prozone. [Li, F]

Providing **acoustic feedback** about the within-stroke acceleration of the boat improved synchronization and coordination among the **rowers** and was perceived as functional and supportive in this study of the 47 members of the German national team. [Schaffert, N]

A "T2minute" method for monitoring **training load** appears to provide measures similar to those of Banister and Foster with elite **rowers**. [Tran, J]

There was a modest difference in a measure of **heart-rate variability** between 9 fully **over-trained athletes** and 10 control athletes, but I doubt if the differences were enough to be useful for diagnosis or monitoring recovery. [Kiviniemi, A]

These researchers have developed a **BMX performance test**, but only with six riders? [Meurer, R]

Talent Identification and Development

The competition **performance trajectories** of the 2008 Olympic **swimming** semi-finalists and finalists in the 10 years before and the three years after the Olympics have got to be a valuable resource for any serious coach and swimmer. [Allen, S] [Prizeworthy](#)

"A characteristic of successful athletic **talent development** environments in Scandinavian countries is a strong group culture." With that background, the authors reported on a successful **soccer** environment, which "was centered on a strong relationship between prospects [sic—prospective athletes?] and a community of coaches, experts, team assistants and club house manager, a learning environment [that was] focused on teaching the players a holistic approach, self-awareness, and the ability to work very hard." [Larsen, C]

Tests included in the **talent identification** program of the German **Handball** Federation had poor ability to predict those nominated by national coaches in this study of 259 female and 283 male youth players. [Schorer, J]

Training

Cold-water immersion enhances recovery in the short term, but does it blunt training adaptations in the long term? Some of the important outcomes were unclear in this controlled trial of 34 competitive **cyclists**, but if anything there was benefit for those who recovered from hard training sessions and testing sessions with cold-water immersion compared with control warm-down during a simulated 4-wk grand tour followed by a taper. [Halson, S]

In a randomized controlled trial, 10 women **netball** players training in **bare feet** for 8 wk outperformed 10 who trained normally by small to moderate amounts in various fitness tests, presumably all performed in normal footwear. [Venter, R]

In an exceptionally well-designed parallel-groups study with an unprecedented sample size (42+39 amateur **soccer** players), the FIFA 11+ **injury-prevention program** performed three times per week for 9 wk produced substantial improvements in fitness and risk factors for injury compared with control training. [Impellizzeri, F]

Just 14 d of living high at simulated 2500-3000 m for 14 h per day in a **nitrogen house** and training low in the heat (32 °C) resulted in a spectacular 3% increase in hemoglobin mass 3 wk later in 17 Aussie-rules **footballers**. [Buchheit, M] Although there was no control group, the fact that this finding was not considered publishable by one of our good journals is further evidence of the inadequacies of the peer-review system. Previous studies have exposed athletes to altitude generally for 4 wk. It would seem that once you have set hematopoiesis in motion in the first two weeks, it keeps going, perhaps with additional stimulation from the heat.

Wow, twelve weeks of training aimed at a risk factor for **ACL injury** resulted in one lower-limb injury in the training group vs seven in the control group in this randomized controlled trial of 40 young female **soccer** and **handball** players. [Petersen, M]

I shouldn't report this study, because no data were provided, but the finding that **passive**

recovery is possibly better than active recovery for adaptation to a 2-wk high-intensity shock cycle in **triathletes** is too important to omit. [Wahl, P]

"Dividing total training volume into 6 **smaller sessions** was more effective than the traditional 3 sessions-per-week regime both for the increase in 1 RM in squat and bench-press, as well as for the increase in thigh muscle cross-sectional area" in this study of 16 mainly male experienced **powerlifters**. [Raastad, T]

There were no data, and it was a difference in significance rather than a significant difference, but you might like to get more information from the authors who showed that a "**differential**" **training** program was more effective than traditional training for the short serve in recreational and competitive **badminton** players. [Jaitner, T]

Training load guided by the Polar **heart-rate** technology made little difference vs usual train-

ing in this randomized controlled 8-wk trial of 24 male **runners**. [Bruch, A]

Submaximal and maximal **strength training** twice a week for two 4-wk blocks produced similar changes in lab measures of endurance performance in a randomized controlled trial of 17 highly trained **cyclists**. [Smit, A]

Postscript. Just before publication, Bradley Wiggins became the first Brit to win the Tour de France. Next year maybe we can look forward to a talk in Dave Martin style from Tim Kerrison, the sport scientist whose training Bradley Wiggins has credited with contributing to his win. See this [Daily Telegraph article](#).

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