

The Future of Sport Science – ECSS Competition

Abstract

Sports science has helped the world witness ground-breaking achievements in recent years, leaving only more questions asked than answered. Sports scientists now have the attention of the world and we do not know what to do with it. Retaining the human element to sports science, of both the athlete and staff, can help us regain focus. The future of sports science will be difficult to keep up with due to a rapid evolution of technological advancement. Therefore, it is critical that we uphold scientific rigour and continue to individualise our support. The future is now. Are you ready?

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Imagine...

Imagine a world where ketogenic, high-carb, carnivore and vegan individuals live in harmony.

A world where learned scientific rigour and innate compassion to celebrate record-breaking human achievements co-exist - regardless of the shoe.

A world where the winner does not face accusations from the pointing of a needle.

A world where the summit of $\dot{V}O_{2\max}$ values is capsized.

A world where biomechanical laws are bent.

A world in awe of superhuman strength.

A world in awe of the superhuman mind.

A world where investing in science is money well-spent.

A world that tackles taboo topics head-first.

And trades reluctance to research for the strength to speak up.

A world where sports science does not dictate, but the athlete facilitates.

A world where mass media, rumour and business are overpowered by sportsmanship and community.

A world that substitutes instruction for the education of end-users.

A world which assumes no limits to human physical performance.

A world that seeks to understand the inner workings of an individual and does not see them as a mere data point.

A world where health and performance go hand-in-hand.

A world where the science to a method is not drowned out by trendiness.

A world that sees constructive criticism for the greater good of sports science.

A world that sees quality over quantity in research which floods into practice.

A world not afraid to challenge the status quo.

Yet not neglecting of seminal research and knowledge creation.

A world that views all sports science disciplines as equal.

A world where sports science is embedded in a technological revolution.

A world where team kit and job title take the back seat, and pride and honour prevail.

And instead, they represent a meaningful identity within strong support teams.

A world blossoming through international collaboration.

A world acknowledging that students do not just become teachers; they already are.

A world where it is acceptable to change your mind and take pride in doing so.

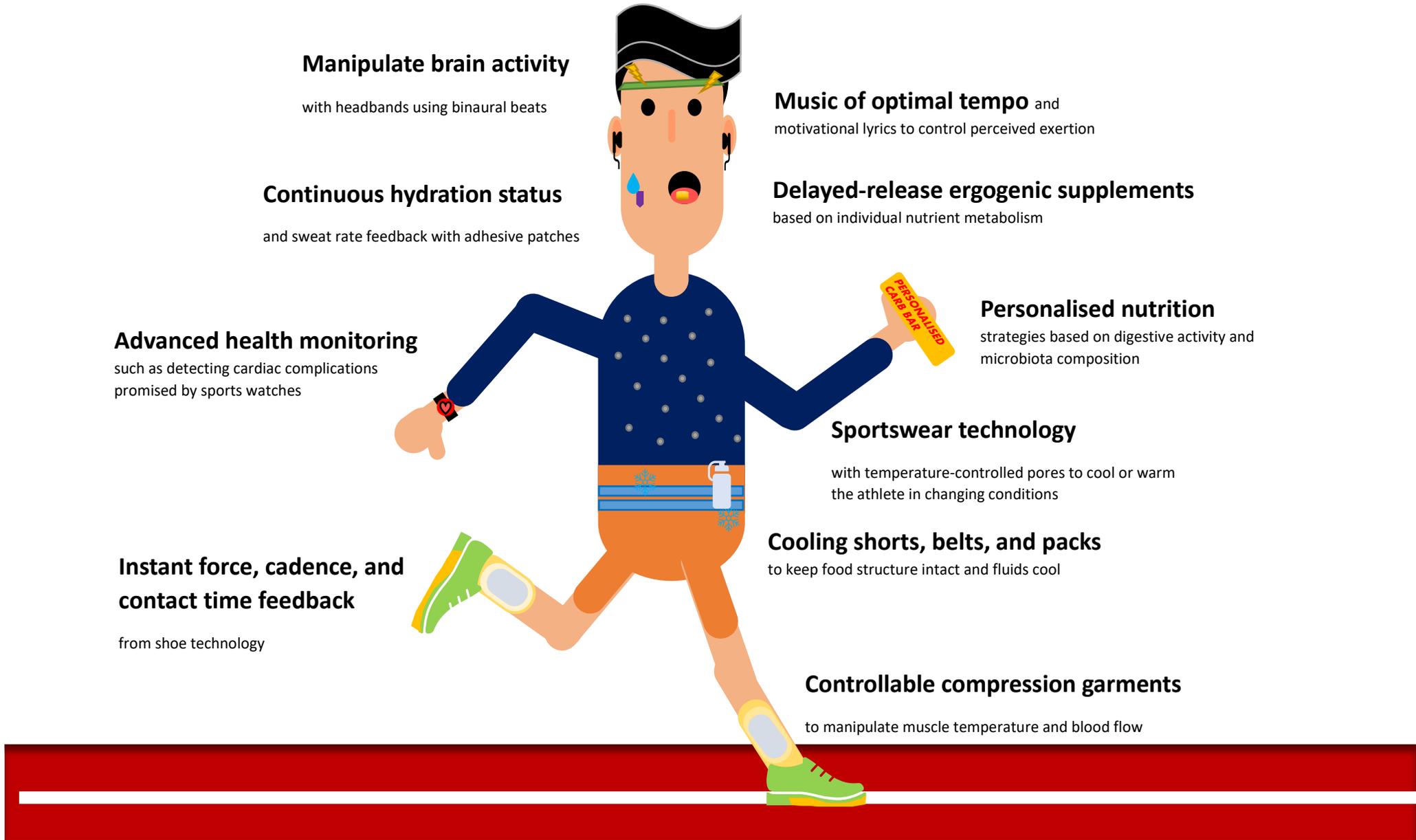
A world that listens to the sirens of esteemed researchers, avoiding misinformation.

Imagine...is this just a dream and, now, too late...or is this a world you could create?

A Call to Arms – The Future of Sports Science is Now

Recreational or elite, clinical or sport-specific. Let us see international friendships forged via Zwift. Paralympic heroes in fresh blades and innovative chairs. Males and females competing side-by-side. People of all ethnicities coming together to diversify both the playing field and audience. For all the recorded critical power, running economy, previous personal bests and physical data in the world mean nothing when the best performance is demanded. Let us see charity and good will that inspires the next generation of athletes and spectators. Be that through a personalised video message, home-delivered sports jersey, or event tickets for a true VIP experience. The 100-metre men's world record could be broken. The women's 3000-metre world record could be broken. The marathon world record could be broken. Yet each broken piece leads to the fusion of excitement, awe, inspiration, subsequent participation...and so the cycle continues. Can sports science support space flight? We already are. Can sports science help open conversation on menstruation? We already are. Can sports science bolster weight management campaigns? We already are. More research is always needed. The go-to "future directions" of research is to do more, more, more! Yet such a statement, lacking substance, deserves its final encore. Forget the days where a small sample size and lack of elite participants is the only critique of which researchers can muster. For what is 'elite' anyway? Sports science has become caught in a social media crossfire, with petty arguments and inferences drawn from posts on the Twittersphere (Burke, 2017). We are better than that. We now have the attention of the world and do not know what to do with it. Stop. Think. Focus. What is the practical meaningfulness of a statistical outcome to a coach? Do our results facilitate behaviour changes at the ground level? Can we collaborate to collect data beyond Universities and merge datasets of athletes of different nationalities? The evolution of sports science; strength and conditioning, physiology, psychology, technology, biomechanics, nutrition, and more is occurring at lightning speed. Gone are the days of working alone. Here are the days of multidisciplinary action. The days when we can optimise nutrition protocols to enhance sleep physiology (Halson et al., 2020). The days when renowned researchers can rally around one athlete to smash world records and bring the limits of human physiology discussed (Joyner, Ruiz & Lucia, 2011) into question. The sports science of the future will simply allow one choice: a metaphorical Transformer of technology or no-tech lone wolf? We should be excited by such novelty, yet still in awe of the seminal work of our predecessors who strived to teach us the fundamentals of exercise physiology with resourcefulness, through inventive protocols such as single-leg

cycling to investigate changes in muscle glycogen (Hardman & Williams, 1989). Upholding scientific rigour, our advances will allow an athlete to benefit from instant sweat rate and hydration analysis, sports watches that can detect health complications, individualised nutrition with insights from the intestinal microbiota to the external food environment, sportswear and technology to reduce injury risk and allowing inclusivity of Paralympic athletes (Figure 1). Likewise, the sports science of the future allows an individual to choose to have none (Figure 2). For what evidence do we have to buffer the intuition of the individual alone? There is a time and a place for both technological innovation and human intuition. No watch. No heart rate monitor. No 'optimal' anything. Just ourselves and nature. This is the sports science of the future. Which side will you take? Neither. This is the point. Choice. Goals and feelings towards sports science change and our practice should do so accordingly. One year you may prefer to be a Transformer, the next, a no-tech lone wolf. There is no right or wrong. There will always be more questions asked than answered. And that, I must admit, is a journey on which we are privileged to be on. To my fellow sports scientists of the future. The future is now. Are you ready?



Manipulate brain activity

with headbands using binaural beats

Music of optimal tempo and motivational lyrics to control perceived exertion

Continuous hydration status

and sweat rate feedback with adhesive patches

Delayed-release ergogenic supplements based on individual nutrient metabolism

Advanced health monitoring

such as detecting cardiac complications promised by sports watches

Personalised nutrition strategies based on digestive activity and microbiota composition

Sportswear technology

with temperature-controlled pores to cool or warm the athlete in changing conditions

Instant force, cadence, and contact time feedback

from shoe technology

Cooling shorts, belts, and packs to keep food structure intact and fluids cool

Controllable compression garments

to manipulate muscle temperature and blood flow

Figure 1. The athlete of the future: a metaphorical Transformer of technology.



Figure 2. The no-tech lone wolf. The future of sports science can still facilitate meaningful outcomes with little intervention.

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References

Burke, L. M. (2017). Communicating sports science in the age of the Twittersphere. *International journal of sport nutrition and exercise metabolism*, 27(1), 1-5. <https://doi.org/10.1123/ijsnem.2017-0057>

Halson S. L., Shaw G., Versey N., Miller D. J., Sargent C., Roach G. D., Nyman L., Carter J. M., & Baar K (2020). Optimisation and Validation of a Nutritional Intervention to Enhance Sleep Quality and Quantity. *Nutrients*, 12(9), 2579. <https://doi.org/10.3390/nu12092579>

Hardman, A. E., & Williams, C. (1989). Increased dietary carbohydrate and endurance during single-leg cycling using a limb with normal muscle glycogen concentration. *Journal of sports sciences*, 7(2), 127–138. <https://doi.org/10.1080/02640418908729831>

Joyner, M. J., Ruiz, J. R., & Lucia, A. (2011). The two-hour marathon: who and when? *Journal of applied physiology*, 110(1), 275-277. <https://doi.org/10.1152/jappphysiol.00563.2010>