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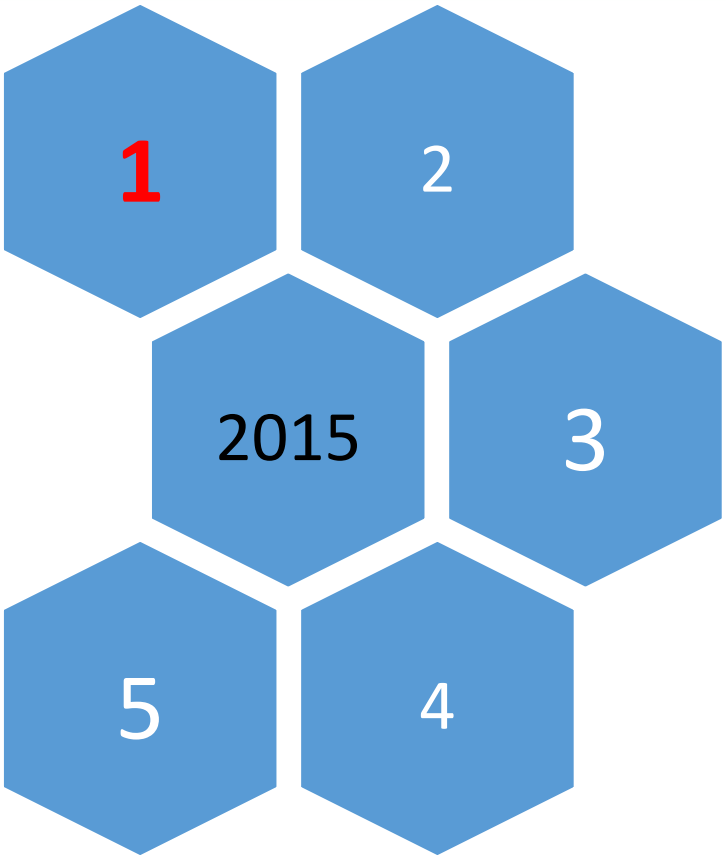
Top 5 Running Stories of 2015

Dr. Aashish Contractor
Head: Dept of Rehab Medicine and Sports Medicine
Sir H.N.Reliance Foundation Hospital, Mumbai


1
2
2015
3
5
4

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LCHF

'Moonshot' to Cure Cancer, to Be Led by Biden, Relies on Outmoded View of...

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WELL
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Heartburn Drugs Tied to Kidney Problems

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Straddling Conventional and Alternative Cancer Treatment

Medical Device Maker Failed to Report Infections, Senate Report Says

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PHYS ED

Should Athletes Eat Fat or Carbs?

By GRETCHEN REYNOLDS FEBRUARY 25, 2015 5:45 AM 167 Comments

PREVIOUS POST
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NEXT POST
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FOOD
Do antioxidants (not the ones Follow

European Journal of Sport Science, 2015
Vol. 15, No. 1, 13–20, http://dx.doi.org/10.1080/17461391.2014.959564

Routledge
Taylor & Francis Group

ORIGINAL ARTICLE

Rethinking fat as a fuel for endurance exercise

JEFF S. VOLEK[1], TIMOTHY NOAKES[2], & STEPHEN D. PHINNEY[3]

[1]*Kinesiology Program, Department of Human Sciences, The Ohio State University, Columbus, OH, USA,* [2]*Discovery Health Professor of Exercise and Sports Science, Department of Human Biology, University of Cape Town and Sports Science Institute of South Africa, Newlands, South Africa,* [3]*School of Medicine (Emeritus), University of California Davis, Davis, CA, USA*

Abstract

A key element contributing to deteriorating exercise capacity during physically demanding sport appears to be reduced carbohydrate availability coupled with an inability to effectively utilize alternative lipid fuel sources. Paradoxically, cognitive and physical decline associated with glycogen depletion occurs in the presence of an over-abundance of fuel stored as body fat that the athlete is apparently unable to access effectively. Current fuelling tactics that emphasize high-carbohydrate intakes before and during exercise inhibit fat utilization. The most efficient approach to accelerate the body's ability to oxidize fat is to lower dietary carbohydrate intake to a level that results in nutritional ketosis (i.e., circulating ketone levels >0.5 mmol/L) while increasing fat intake for a period of several weeks. The coordinated set of metabolic adaptations that ensures proper interorgan fuel supply in the face of low-carbohydrate availability is referred to as keto-adaptation. Beyond simply providing a stable source of fuel for the brain, the major circulating ketone body, beta-hydroxybutyrate, has recently been shown to act as a signalling molecule capable of altering gene expression, eliciting complementary effects of keto-adaptation that could extend human physical and mental performance beyond current expectation. In this paper, we review

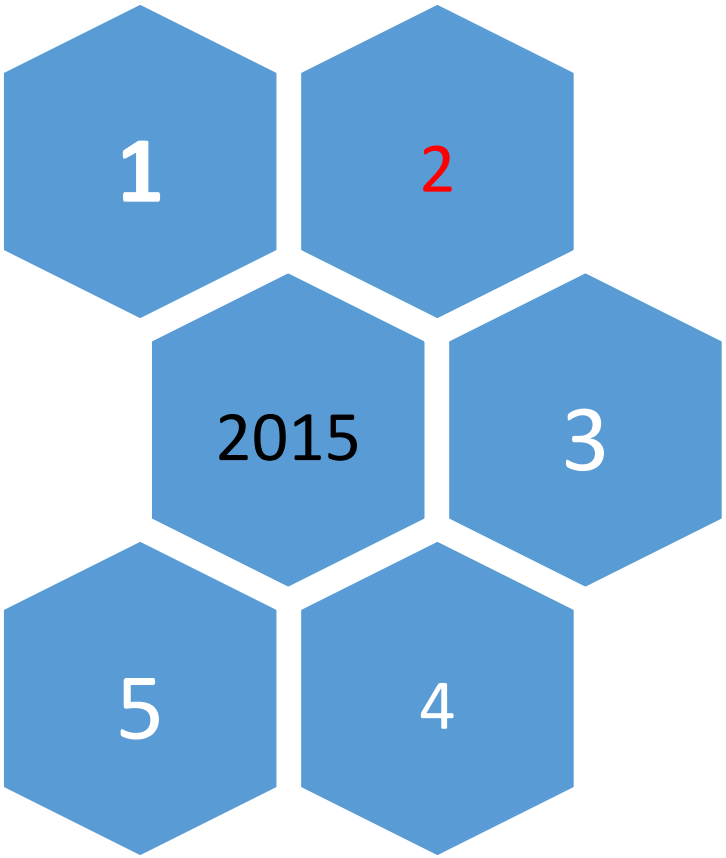
Table I. Body energy reserves by habitus (1000 kcal)

	Thin	Normal	Obese
Carbohydrate	2	2	2
Protein	25	30	35
Fat	30–60	100	200

Endurance Runners on Low-Carb Diet Burn Fat

- Endurance runners adapted to a low-carbohydrate diet can burn up to 1.54 g of fat per minute, which is at least 50% more than the highest previous estimate, researchers report.
- All athletes had completed a 50-mile race, all were men, average age was 33.5 years, and an average body mass index was 22.6 kg/m^2.
- Ten of the athletes habitually ate high-carbohydrate diets that were 28% fat, 15% protein, and 58% carbohydrate, and 10 ate low-carbohydrate diets that were 71% fat, 19% protein, and 11% carbohydrate. All had been on these diets for at least 6 months.

- There were no significant differences in the aerobic capacity between the two groups. However, on average, the high-carbohydrate group burned less fat per minute than the low-carbohydrate group (0.67 vs 1.54 g; $P < .0001$).


1
2
2015
3
5
4

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WEARABLE TECH

WEARABLE TECH

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- **On Your Wrist:** Using sophisticated optical and pressure sensors, GPS, and accelerometers, the next generation of wristbands can provide nearly continuous and complete body management
- Other wrist straps can now monitor hydration status, lactic acid accumulation, blood-glucose levels, body-fat percentage, blood pressure, stress levels

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- **On Your Body:** Adaptive “smart fabrics” can now measure vital signs, movement, and core body temperature. For instance, smart fabric that uses fiber-optic threads embedded directly into the clothing to measure motion—like your posture as you run or angle of your arms—and vital signs.

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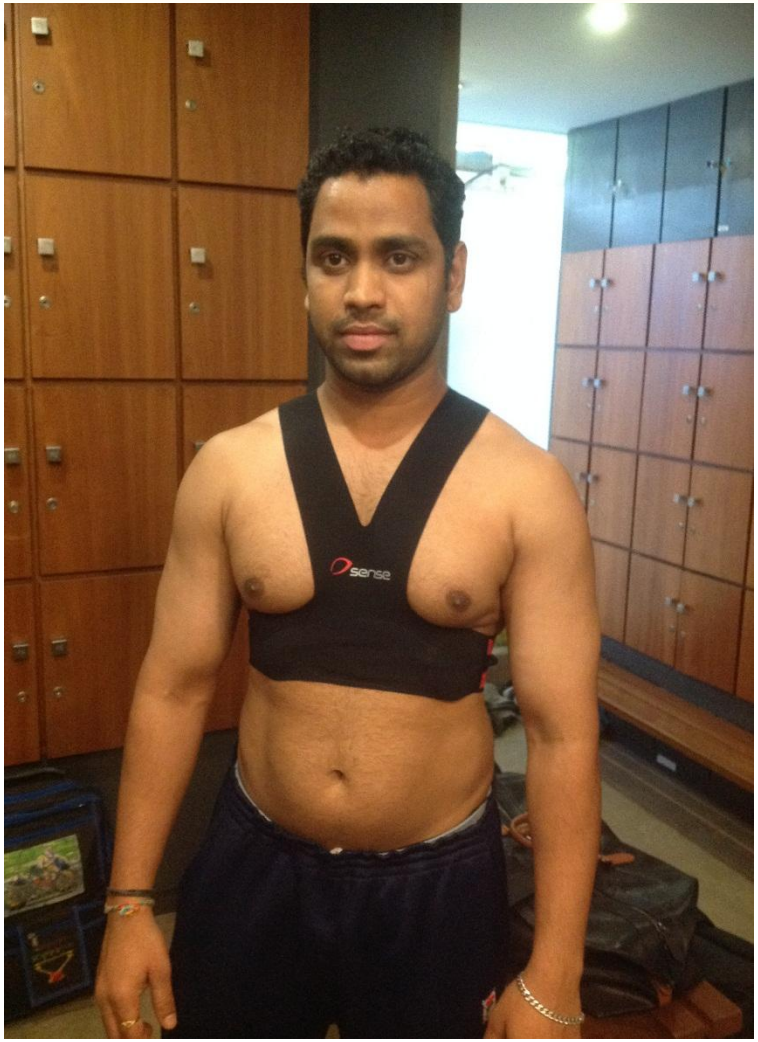

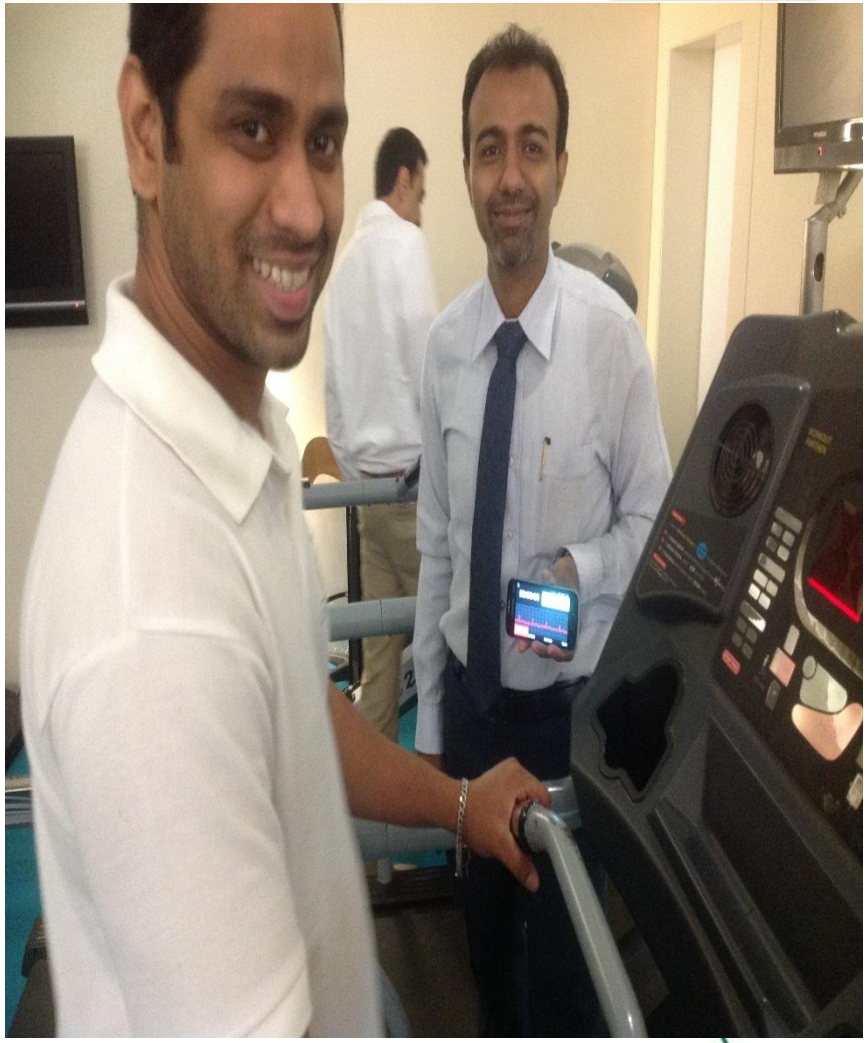

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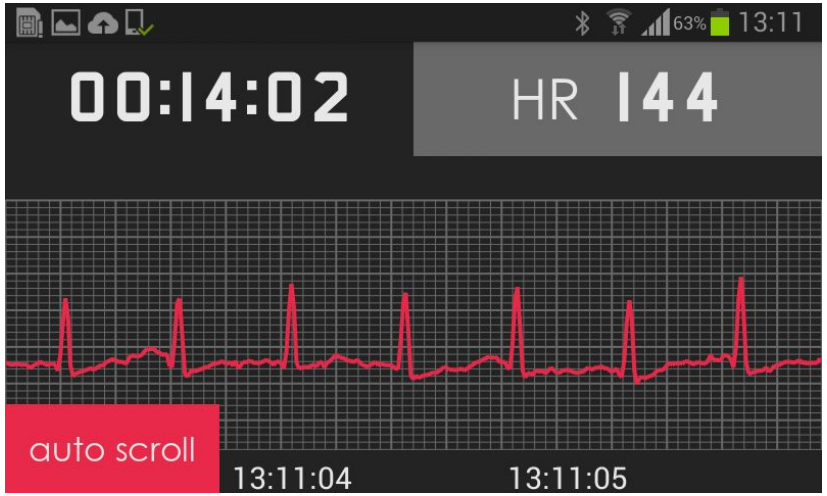

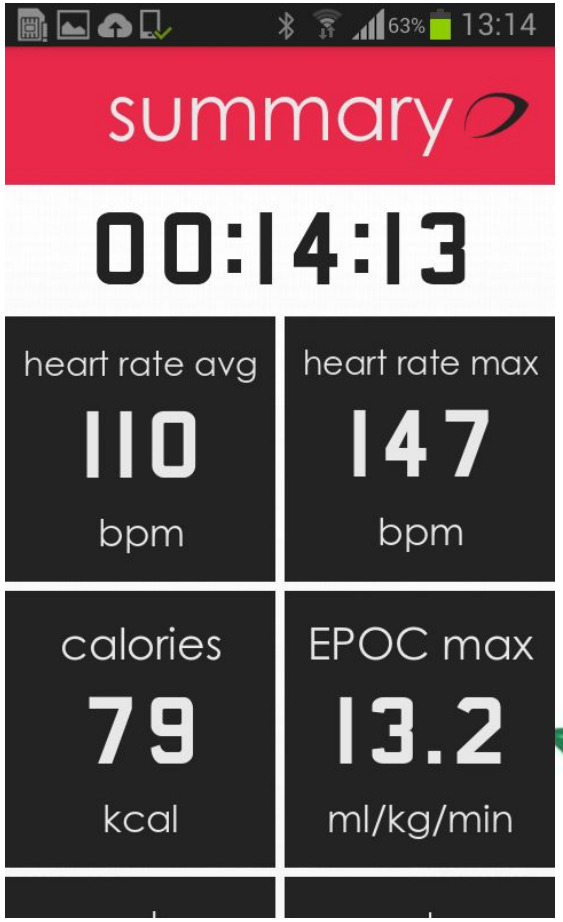

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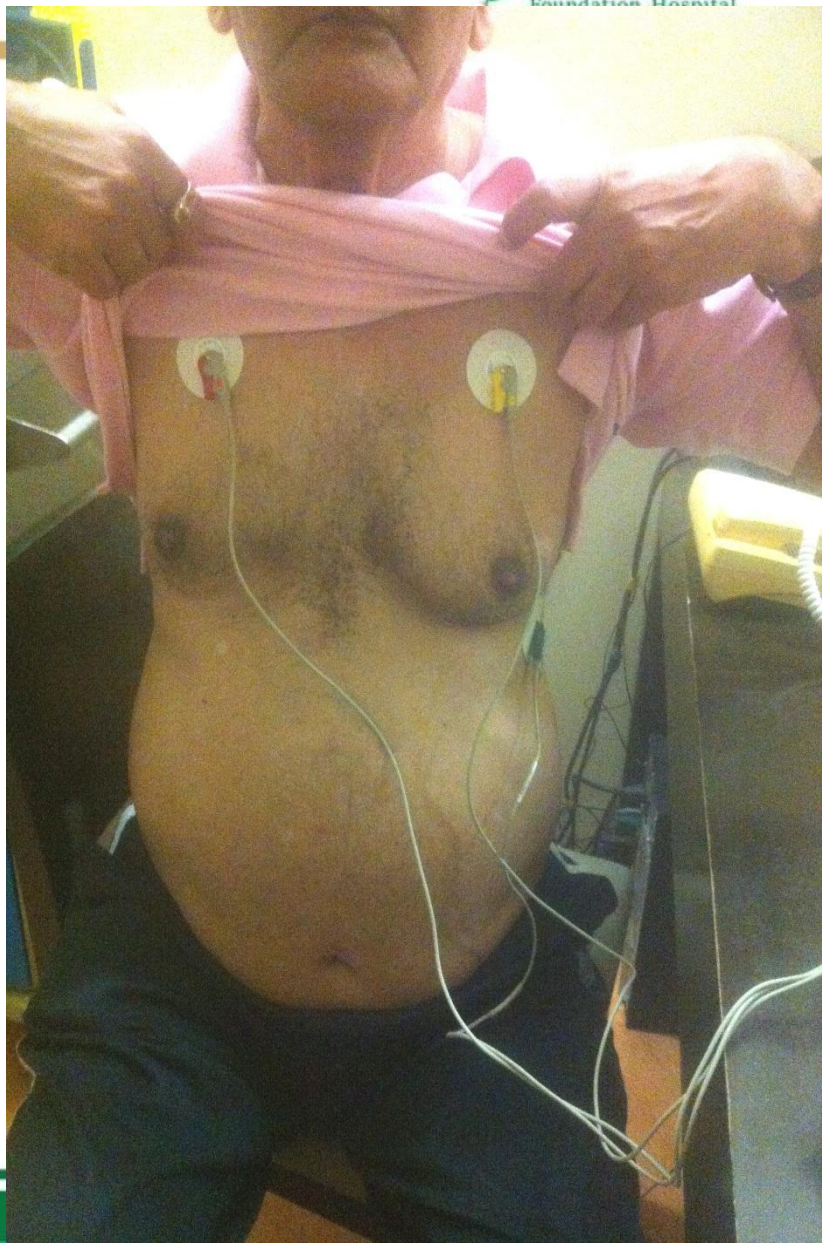

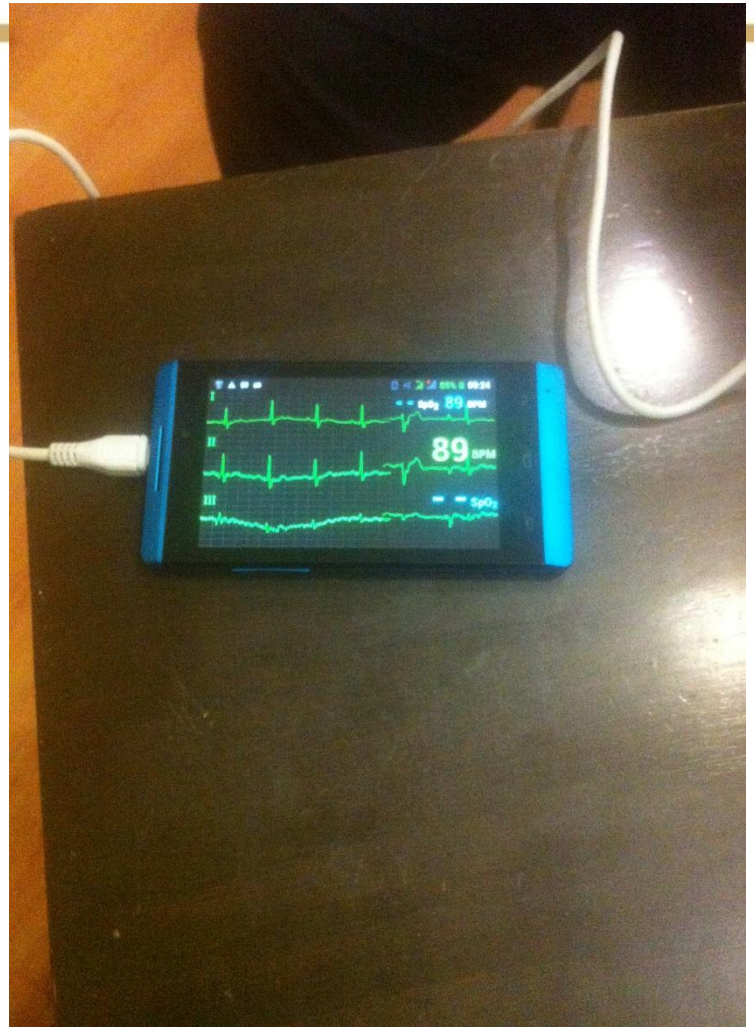
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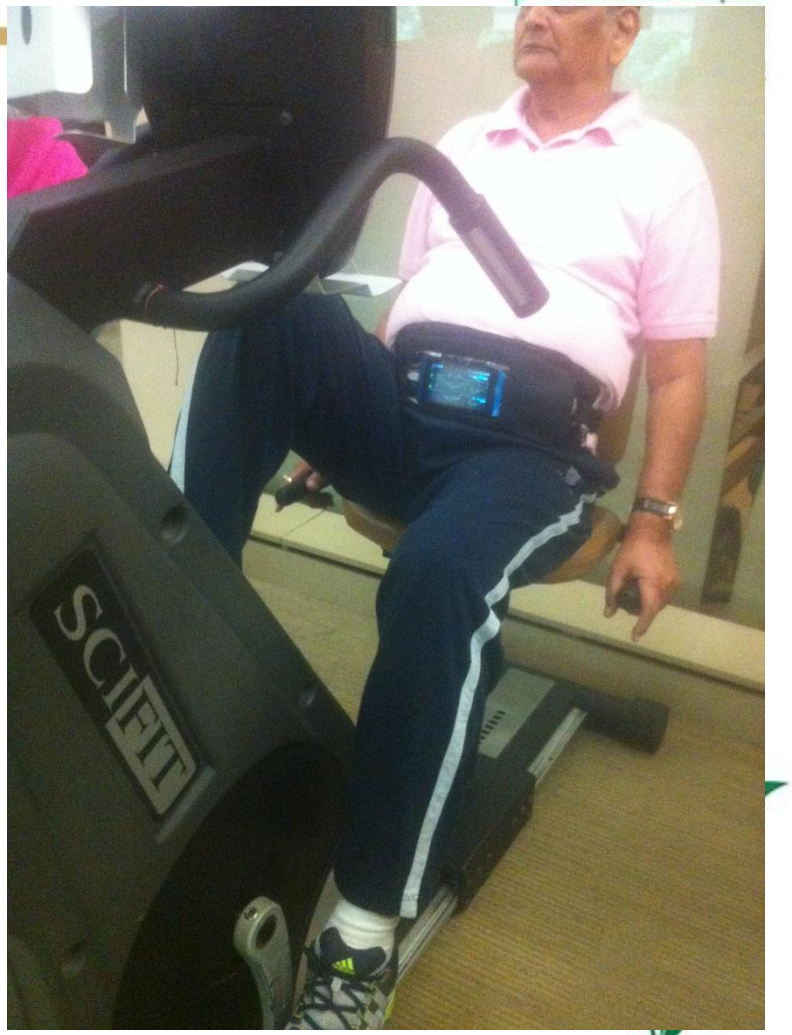
BPM


SCIFIT

- **In Your Shoe:** When it comes to your running technique, there are now sensors for your feet that not only detect pronation or supination, but also tell you if your form is falling apart and whether you should adjust your pace, gait, or cadence to prevent injury.
- For example, the Lechal insole provides this feedback using active vibrations along pressure points. If you'd rather have the monitor directly on your foot, Sensoria introduced a smart sock (seen above) that measures excess stress on the wearer's foot while running and offers real-time input on how best to adjust via Bluetooth.

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Partners

Blog

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Textile Sensors

Each smart sock is infused with three proprietary textile sensors under the plantar area (bottom of the foot) to detect foot pressure.

Conductive Fiber

The conductive fibers relay data collected by the sensors to the anklet. The sock has been designed to function as a textile circuit board.

Magnetic Attachment

Each sock features magnetic contact points below the cuff so you can easily connect your anklet to activate the textile sensors.

Store

Light & Flexible

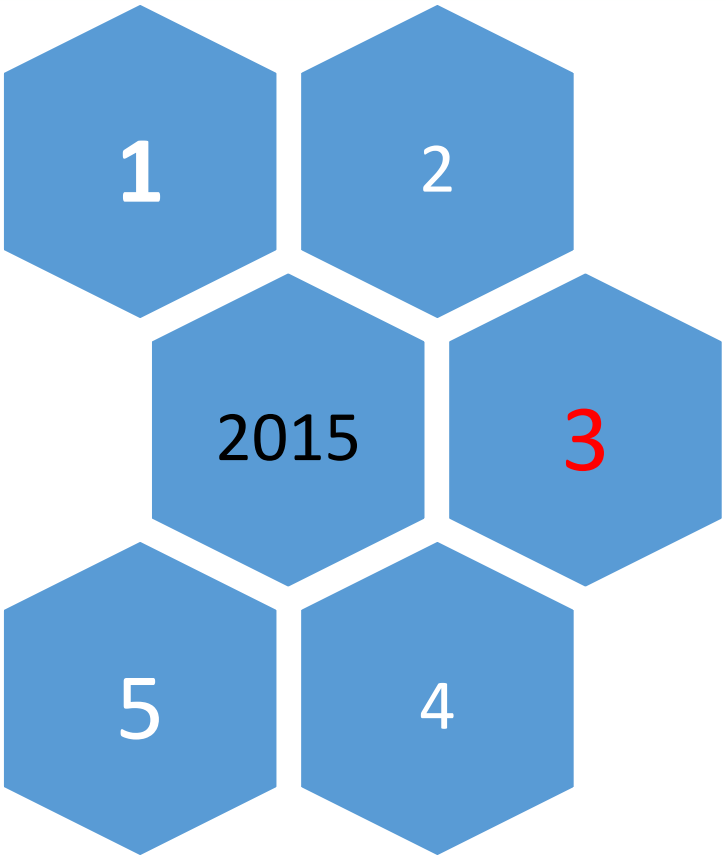
Weighing less than 1 ounce, the adjustable anklet has a one-of-a-kind

Bluetooth Smart

When connected to the sock, the anklet communicates continuously with the

Technology

The anklet battery supports active usage over 6 hours. It also contains a 3-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2015
3
5
4

How Much Does Genetics Really Affect Your Fitness?

Beth Skwarecki

12/10/15 10:00am - Filed to: FITNESS

36

13

Heritability of athletic traits

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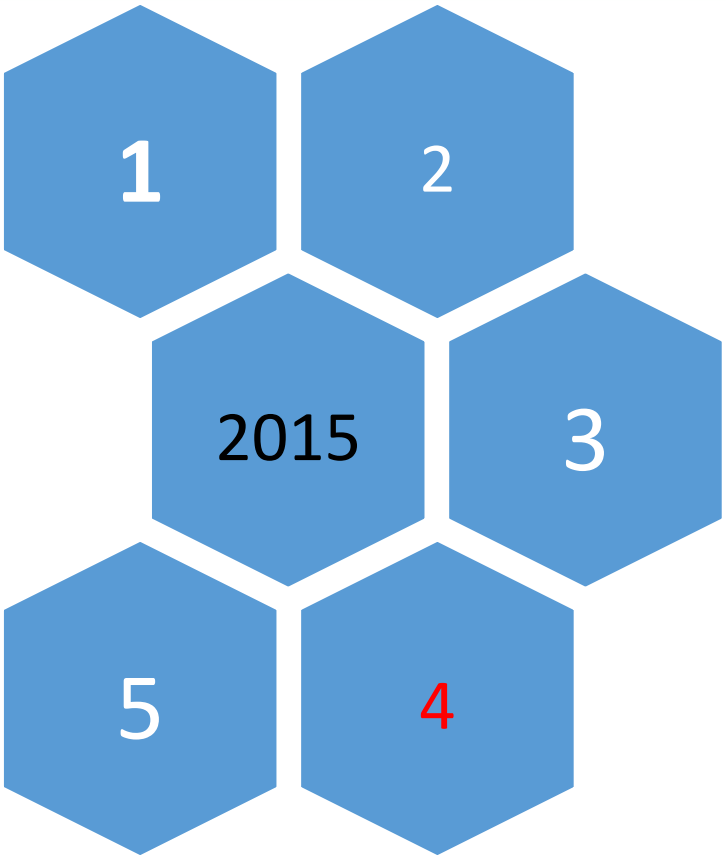
- The higher the heritability, the more you can blame genes, rather than training.
- Aerobic fitness: about 40-50% heritable
- Strength and muscle mass: about 50-60% heritable
- Your mix of “slow twitch” and “fast twitch” muscle fibers (basically, whether your muscles are better at endurance or sprinting): about 45% heritable
- Height: about 80% heritable
- Competing in sports, at all: 66% heritable.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5
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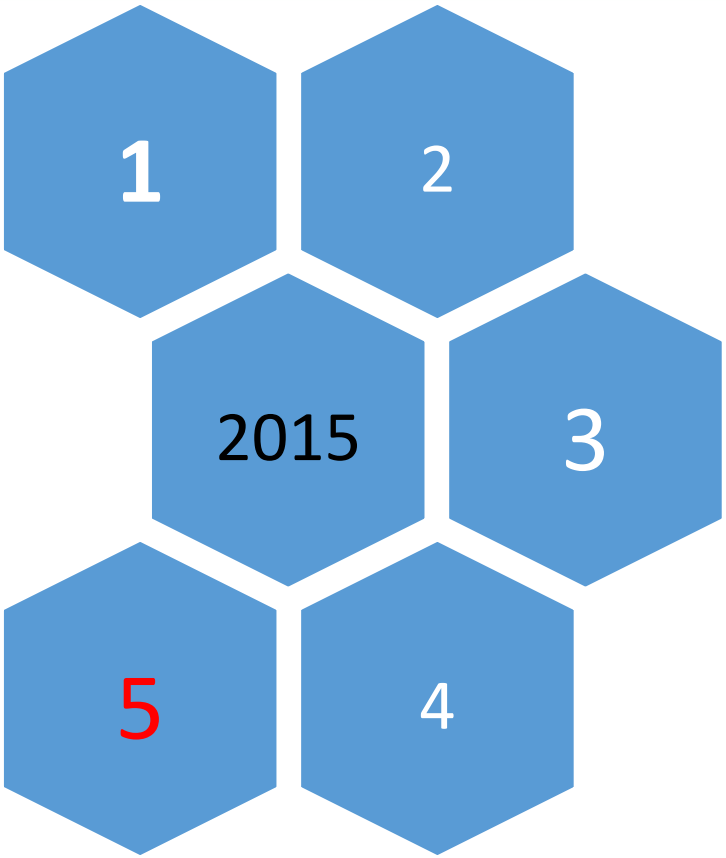
RUNNING SHOE TRENDS

To wear or not to wear?

Cushion or minimalist?

- Maximal is in

- **Feel the Foam**
  Comfort is increasingly king in running shoes, and companies are trying new methods to improve the feel underfoot.
- **Bring on the Bounce**
  Not long ago, we thought of shoes as either cushioned—providing comfort—or firm—giving a fast, responsive ride. Now, we're increasingly seeing companies marketing nuances in the cushioned end of the spectrum, promising shoes that offer responsive, bouncy cushioning as well as those with soft, coddling rides.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2015
3
5
4

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High intensity interval training- HIIT

HIIT

- Is an enhanced form of interval training, alternating periods of short intense anaerobic exercise with less-intense recovery periods.

- Usual HIIT sessions may vary from 4–30 minutes.

A typical HIIT session:

- A HIIT session often consists of a warm up period of exercise, followed by three to ten repetitions of high intensity exercise, separated by medium intensity exercise for recovery, and ending with a period of cool down exercise.
- The high intensity exercise should be done at near maximum intensity. The medium exercise should be about 50% intensity.
- The number of repetitions and length of each depends on the exercise, but may be as little as three repetitions with just 20 seconds of intense exercise.

Sports Med. 2013 Oct 16. [Epub ahead of print]

Sprint Interval Training Effects on Aerobic Capacity: A Systematic Review and Meta-Analysis.

Gist NH, Fedewa MV, Dishman RK, Cureton KJ.

Author information

Abstract

BACKGROUND: Sprint interval training (SIT) involving repeated 30-s "all out" efforts have resulted in significantly improved skeletal muscle oxidative capacity, maximal oxygen uptake, and endurance performance. The positive impact of SIT on cardiorespiratory fitness has far-reaching health implications.

OBJECTIVE: The objective of this study was to perform a systematic review of the literature and meta-analysis to determine the effects of SIT on aerobic capacity.

METHODS: A search of the literature was conducted using the key words 'sprint interval training', 'high intensity intermittent training/exercise', 'aerobic capacity', and 'maximal oxygen uptake'. Seventeen effects were analyzed from 16 randomized controlled trials of 318 participants. The mean ± standard deviation number of participants was 18.7 ± 5.1. Participant age was 23.5 ± 4.3 years.

RESULTS: The effect size calculated for all studies indicates that supramaximal-intensity SIT has a small-to-moderate effect (Cohen's d = 0.32, 95 % CI 0.10-0.55; z = 2.79, P < 0.01) on aerobic capacity with an aggregate improvement of ~3.6 mL·kg^{-1}·min^{-1} (~8 % increase). The effect is moderate to large in comparison with no-exercise control groups (Cohen's d = 0.69, 95 % CI 0.46-0.93; z = 5.84, P < 0.01) and not different when compared with endurance training control groups (Cohen's d = 0.04, 95 % CI -0.17 to 0.24; z = 0.36, P = 0.72).

CONCLUSION: SIT improves aerobic capacity in healthy, young people. Relative to continuous endurance training of moderate intensity, SIT presents an equally effective alternative with a reduced volume of activity. This evaluation of effects and analysis of moderating variables consolidates the findings of small-sample studies and contributes to the practical application of SIT to improve cardiorespiratory fitness and health.

PMID: 24129784 [PubMed - as supplied by publisher]

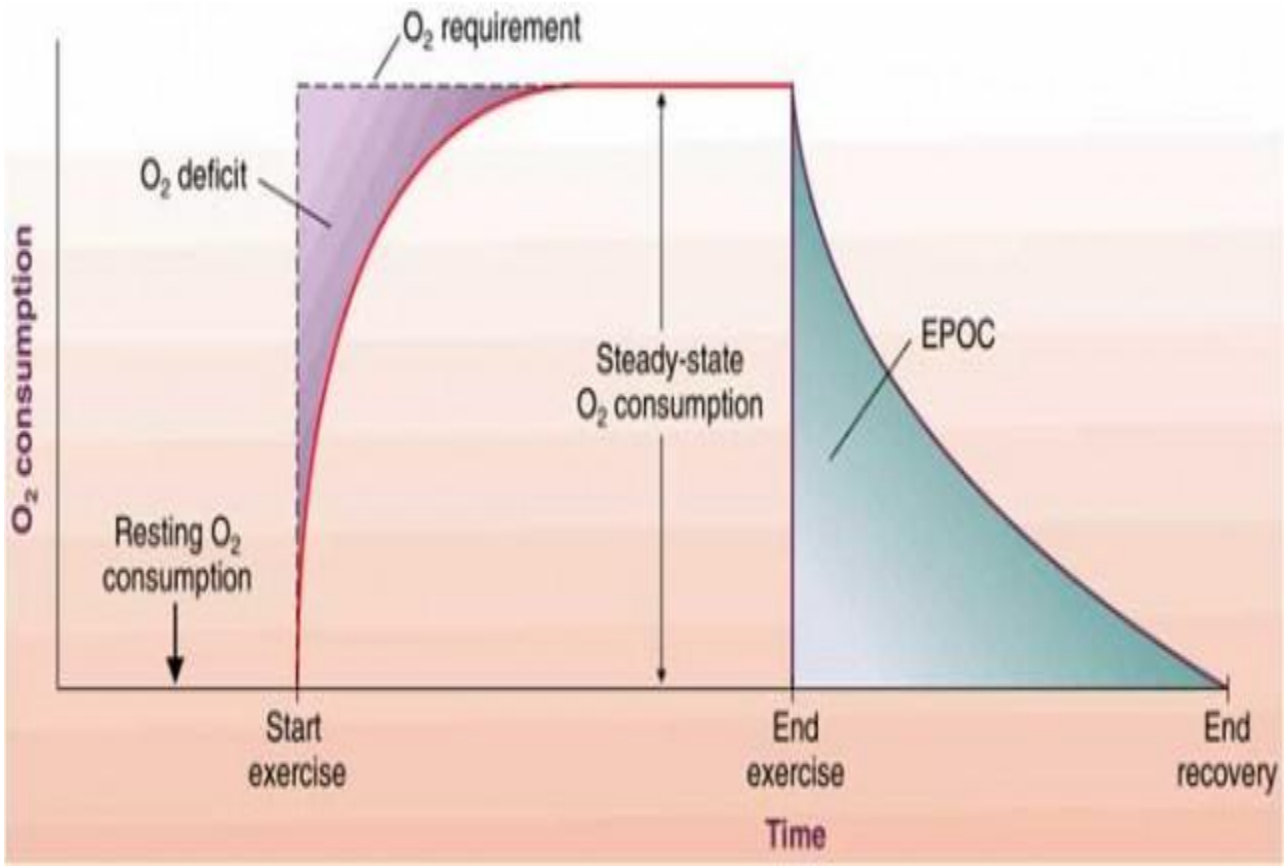
LinkOut - more resources

Conclusion:

- SIT improves aerobic capacity in healthy, young people. Relative to continuous endurance training of moderate intensity, SIT presents an equally effective alternative with a reduced volume of activity.

- According to some studies HIIT increases the resting metabolic rate (RMR) for the following 24 hours due to excess post-exercise oxygen consumption
- May improve maximal oxygen consumption (VO2 max) more effectively than doing only traditional, long aerobic workouts

E.P.O.C.



At mile 20 I thought I was dead.
At mile 22 I wished I was dead.
At mile 24 I knew I was dead.
At mile **26.2** I realized I had become too tough to kill.

FACEBOOK.COM/BENEFITSOFGIVING (I <3 to run)

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Will too much exercise kill you?

- **The background:** A study of 53,000 patients at the Cooper Clinic in Texas produced a counterintuitive finding: Those who exercised the most were seemingly no healthier than those who didn't exercise at all. Instead, the biggest longevity benefits accrued to those who exercised "moderately," the equivalent of running less than 32 kilometres a week.

- **The update:** This debate continues to simmer, with several researchers questioning the methodology of the original study. One problem is the accuracy of self-reported exercise data. A better solution is to look at aerobic fitness (sometimes referred to as VO2 max), which can be measured objectively. A long-term study of 38,000 patients by researchers at Johns Hopkins University, published this year in the Journal of the American College of Cardiology, found that greater fitness was linked to greater longevity, with benefits that continued to increase even at the very highest levels of fitness.

MAYO CLINIC

REVIEW

Potential Adverse Cardiovascular Effects From Excessive Endurance Exercise

James H. O'Keefe, MD; Harshal R. Patil, MD; Carl J. Lavie, MD; Anthony Magalski, MD; Robert A. Vogel, MD; and Peter A. McCullough, MD, MPH

Abstract

A routine of regular exercise is highly effective for prevention and treatment of many common chronic diseases and improves cardiovascular (CV) health and longevity. However, long-term excessive endurance exercise may induce pathologic structural remodeling of the heart and large arteries. Emerging data suggest that chronic training for and competing in extreme endurance events such as marathons, ultramarathons, ironman distance triathlons, and very long distance bicycle races, can cause transient acute volume overload of the atria and right ventricle, with transient reductions in right ventricular ejection fraction and elevations of cardiac biomarkers, all of which return to normal within 1 week. Over months to years of repetitive injury, this process, in some individuals, may lead to patchy myocardial fibrosis, particularly in the atria, interventricular septum, and right ventricle, creating a substrate for atrial and ventricular arrhythmias. Additionally, long-term excessive sustained exercise may be associated with coronary artery calcification, diastolic dysfunction, and large-artery wall stiffening. However, this concept is still hypothetical and there is some inconsistency in the reported findings. Furthermore, lifelong vigorous exercisers generally have low mortality rates and excellent functional capacity. Notwithstanding, the hypothesis that long-term excessive endurance exercise may induce adverse CV remodeling warrants further investigation to identify at-risk individuals and formulate physical fitness regimens for conferring optimal CV health and longevity.

 ■ Mayo Clin Proc. 2012;87(6):587-595

Findings

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- Long term training for extreme endurance exercise MAY lead to myocardial fibrosis in a small subgroup
- This fibrosis may be a substrate for atrial and ventricular arrhythmias
- Intense endurance exericse often causes elevation in biomarkers of myocardial injury This is usually transient. Does it reflect pathology?

Radiology

Myocardial Late Gadolinium Enhancement: Prevalence, Pattern, and Prognostic Relevance in Marathon Runners[1]

Frank Breuckmann, MD
Stefan Möhlenkamp, MD
Kai Nassenstein, MD
Nils Lehmann, PhD
Susanne Ladd, MD
Axel Schmermund, MD
Burkhard Sievers, MD
Thomas Schlosser, MD
Karl-Heinz Jöckel, PhD
Gerd Heusch, MD, PhD
Raimund Erbel, MD
Jörg Barkhausen, MD

Purpose: To prospectively analyze the myocardial distribution of late gadolinium enhancement (LGE) with delayed-enhancement cardiac magnetic resonance (MR) imaging, to compare the prevalence of this distribution in nonprofessional male marathon runners with that in asymptomatic control subjects, and to examine the prognostic role of LGE.

Materials and Methods: Institutional review board and ethics committee approval were obtained for this study, and all subjects provided written informed consent. Two-dimensional inversion-recovery segmented k-space gradient-echo MR sequences were performed after administration of a gadolinium-containing contrast agent in 102 ostensibly healthy male runners aged 50–72 years who had completed at least five marathons during the past 3 years and in 102 age-matched control subjects. Predominantly subendocardial regions of LGE typical of myocardial infarction (hereafter, coronary artery disease [CAD] pattern) were distinguished from a predominantly midmyocardial patchy pattern of LGE (hereafter, non-CAD pattern). Marathon runners with LGE underwent repeat cardiac MR imaging and additional adenosine perfusion imaging. Runners were followed up for a mean of 21 months ± 3 (standard deviation) after initial presentation. The χ^2, Fisher exact, and McNemar exact tests were used for comparisons. Event-free survival rates were estimated with the Kaplan-Meier method, and overall group differences were evaluated with log-rank statistics.

Results: Of the 102 runners, five had a CAD pattern of LGE, and seven had a non-CAD pattern of LGE. The CAD pattern of LGE was located in the territory of the left anterior descending coronary artery more frequently than was the non-CAD pattern ($P = .0027$, Fisher exact test). The prevalence of LGE in runners was higher than that in age-matched control subjects (12% vs 4%; $P = .077$, McNemar exact test). The event-free survival rate was lower in runners with myocardial LGE than in those without myocardial LGE ($P < .0001$, log-rank test).

Conclusion: Ostensibly healthy marathon runners have an unexpectedly high rate of myocardial LGE, and this may have diagnostic and prognostic relevance.

Supplemental material: http://radiology.rsnajnls.org/cgi/content/full/251/1/50/DC1

Findings

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- 12 % of apparently healthy marathon runners had myocardial damage, as evidenced by delayed enhancement cardiac MR
- Age matched controls had 4 %
- Is it benign physiological adaptation ?

Take home messages

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- Long term exercise yields excellent health benefits
- Fitness confers protective benefits against death and disease
- However, fitness does not provide IMMUNITY
- The chances of having an accident are similar to driving a car
- You do not have to run marathons to reap the health benefits of exercise

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To Promote Running
for Good Health