

RUNNING ON EMPTY

The Newsletter of the Bendigo University Athletics Club

VOLUME 2, ISSUE 4

JULY, 2008

Can running make you smarter?

Exercise is good for us. We know that it combats cholesterol, and it stops the pounds from piling on. Beyond the physical benefits of a run, a growing body of evidence suggests that getting breathless can also build the brain. "Spark: The Revolutionary New Science of Exercise and the Brain", which is published later this year, shows how even regular brisk walks can boost memory, alleviate stress, enhance intelligence and calm aggression. John Ratey, a professor of psychiatry at Harvard Medical School, and the book's author, says that exercise produces what he calls "Miracle-Gro" for the brain. "I can't understate how important regular exercise is in improving the performance of the brain," he says. "It's such a wonderful medicine."

Happiness. If the mere thought of trudging round ice-bound playing fields at school was enough to bring you out in a cold sweat, the idea that exercise makes us happy might sound perverse. Beyond the mood-lifting effects of fresh air and scenery, evidence suggests that running can also change the way our brains work to make us happier, or even stave off depression. Last December, scientists from Yale University wrote in the journal *Nature Medicine* that regular exertion affects the hippocampus, the area of the brain responsible for mood. Tests on mice showed that exercise activated a gene there called VGF, which is linked to a growth chemical involved in the development of new nerve cells. Tests show that this brain activation lifts a person's mood. Participants in one recent German survey were asked to walk quickly on a treadmill for 30 minutes a day over a 10-day period. At the end of the experiment, researchers recorded a significant drop in depression scores. Scientists are now working on a drug that mimics the effects of the VGF gene to market it as an alternative to conventional antidepressants.

Stress. If it feels as if a stressful day at work has turned your brain to mush, it might not only be down to overwork or a shortage of double espressos. We respond to stress as our ancestors did, by adopting a "fight or flight" response. Adrenalin and other hormones are released into our bloodstreams and our muscles are primed for response. The problem is that, these days, stress is more likely to be brought on by a job interview than an attack by lions, so the toxins that build up for a physical response have no outlet. The results can be good; the cardiovascular system is accelerated and we can work harder, but others are not so good; stress slows down the gastrointestinal system and reduces appetite, and can overexcite the brain, fuzzing our thought. By responding to or anticipating stress with exercise, blood flow to the brain is increased, allowing the body to purge the potentially toxic by-products of stress. According to Ratey, exercise also helps in the long term. "It builds up armies of antioxidants such as Vitamins E and C," he says. "These help brain cells protect us from future stress."

Intelligence. Observers of the game of football might refute the claim that exercise leads to greater intelligence – and they would be partly right, says Ratey. "Exercise doesn't make you smarter, but what it does do is optimise the brain for learning. "Physical activity boosts the flow of blood to the part of the brain that is responsible for memory and learning, promoting the production of new brain cells. Several schools in the US and the Netherlands have taken note. Pupils at Naperville Central High School near Chicago, for example, start the day with a fitness class they call "Zero Hour PE". Equipped with heart monitors, they run laps of the playground, and teachers say exam results have soared since the keep-fit initiative kicked off. Meanwhile, in Amsterdam, a test involving 241 people, aged 15-71, compared physical activity with the results of cognitive tasks. The researchers documented improved results among people who were more active, especially those in younger age groups. Yet more research suggests that exercise boosts intelligence in the very, very young. Experiments on rats at the Delbrück Centre for Molecular Medicine in Berlin showed that baby rats born to mothers who were more active during pregnancy had 40 per cent more cells in the hippocampus, the area of the brain responsible for intelligence. If the same is true in humans, we can expect Paula Radcliffe's baby, Isla, to be a genius; Radcliffe was training for the New York marathon until the day before she went in to hospital to be induced – and won the race just nine months after giving birth.

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When running at night always wear reflective clothing. You should also run facing traffic so that you can react if a motorist comes close. Try to stay off of busy streets and never assume that the motorist can see you.

Aggression. A few rounds with a punch bag or a game of squash are great ways to release pent-up aggression, but exercise does more than "get it out your system", says John Ratey. "People assume exercise reduces aggression by burning energy. In fact, exercise changes your brain so you don't feel aggressive in the first place." The frontal cortex is the part of the brain that decides whether you throw a punch or take something on the chin. Reduced activity in the region, a trauma or abnormal development can result in an inability to control violent urges. "This area makes us evaluate the consequences of our actions," Ratey says. "It's the part of the brain that puts the brakes on when the ref makes a terrible decision and you want to beat him up." Exercise increases activity in that area, boosting rational thought, which makes us less likely to lash out.

Memory. According to Ratey and other scientists in the field, a good workout does much to boost recall, especially as we clock up the years. "When we're exercising, we're using nerve cells in the brain which help build up what I call brain fertiliser," he says. Ratey is talking about new research that suggests exercise increases blood flow to the part of the brain responsible for memory, and improves its function. In MRI scans on mice, conducted last year by neurologists at Columbia University Medical Centre, the animals were shown to grow new brain cells in the dentate gyrus, which is affected in age-related memory decline. Research on humans is ongoing but Ratey is convinced that physical activity has a similar effect. He says: "Exercise does more than anything we know of to boost memory."

Addiction. Research by British scientists suggests that as little as five minutes of brisk walking can reduce the intensity of nicotine withdrawal symptoms. In the tests, researchers asked participants to rate their need for a cigarette after various types of physical exertion. Those who had exercised reported a reduced desire to smoke. "If we found the same effects in a drug, it would immediately be sold as an aid to help people quit smoking," said Adrian Taylor, the study's lead author at the University of Exeter. The principle is that exercise can stimulate production of the mood-enhancing hormone dopamine, which can, in turn, reduce smokers' dependence on nicotine. "Dopamine works by replacing or satisfying the need for nicotine," Ratey explains. Whether the findings will lead office-based smokers to dash out for a jog remains to be seen. After all, you wouldn't want to get addicted to exercise."

Training tips - Running in the heat

When the temperature rises about 10 degrees C, you're going to run more slowly and feel worse than you will at lower temperatures. By gradually preparing yourself for increased temperatures and taking action from the beginning of hot weather runs, you'll get a welcome dose of the good news. You'll learn how to hydrate yourself, what to wear, and when and how much your body can take in hot weather, all of which will help you recover faster and run better than others of your ability on hot days. While even the most heat-adapted runners won't run as fast on hot days as they can on cold ones, they won't slow as much, nor will they feel as much discomfort. Until the temperature rises to about 18 degrees C, most runners don't notice much heat build up, even though it is already putting extra burdens on the system. It takes most folks about 30 to 45 minutes of running to feel warm. Soon after that, if the temperature is above about 15 degrees C, you're suddenly hot and sweating. It's just too easy to start faster than you should when the temperature is between 15 and 20 degrees C because it feels cool at first. As the mercury rises above 15 degrees C, your body can't get rid of the heat building up.

This causes a rise in core body temperature and an early depletion of fluids through sweating. The internal temperature rise also triggers the rapid dispersion of blood into the capillaries of the skin, reducing the amount of that vital fluid that is available to the exercising muscles. Just when those workhorses are being pushed to capacity, they are receiving less oxygen and nutrients. What used to be a river becomes a creek and can't remove the waste products of exercise (such as lactic acid). As these accumulate, your muscles slow down. The best time for hot weather running is before sunrise. The more you can run before sunrise, the cooler you will feel, compared with how you'll feel later in the day. The second best time to run, by the way, is right after sunrise, unless the temperature cools off dramatically at sunset, which would make that time more favourable. In humid areas, however, it usually doesn't cool down much after sunset. Some tips on how to stay cool at 15 degrees C or above

- Slow down early – The later you wait to slow down, the more dramatically you'll slow down at the end and the longer it will take to recover from the run (especially in marathons). Walk breaks, early and often, help you lower the exertion level, which conserves resources for the end and reduces heat build up.
- Wear lighter garments – Loose-fitting clothes allow heat to escape. Don't wear cotton clothing. Sweat soaks into cotton, causing it to cling to your skin, increasing heat build up. Several materials will wick the perspiration away from your skin: Coolmax, polypro, etc. As moisture leaves your skin, you receive a cooling effect, and these types of materials are designed for this.
- Pour water over yourself – Up to 70 percent of the heat you can lose goes out through the top of your head so regularly pour water over your hair. Regularly pouring water on a light, polypro (or a similar material) singlet or tank top will keep you cooler.
- Drink cold water – Not only does cold water leave the stomach of a runner quicker than any type of fluid, it produces a slight physiological cooling effect – and an even greater psychological cooling effect. But don't drink too much either.

Injury Tips - Leg length discrepancy

There are two types of leg length discrepancies: congenital and acquired. Congenital means you are born with it. One leg is anatomically shorter than the other. Through developmental stages of ageing, the brain picks up on the gait pattern. The body usually adapts by tilting one shoulder over to the "short" side. A difference of under 7mm is not grossly abnormal, does not need a lift to compensate and usually does not have a profound effect over a lifetime. Differences over 7mm can take their toll on the spine and should probably be compensated for with a heel lift. In some cases, the shortage can be so extreme that it requires a full lift to both the heel and sole of the shoe. The acquired shortage is by far the most problematic. There are usually three problems always associated with acquired shortage:

- Ilio-tibial band syndrome (pain on the outside or lateral part of the knee).
- Piriformis syndrome (bottom pain, not to be confused with sciatica, where the pain runs down the back of the leg).
- Hip and/or lower back pain.

The acquired shortage is usually a pronation (rolling feet) problem. The reason is that, while you may look identical on both sides of your body, the left and right don't work exactly the same. The same goes for pronation. As you develop, the brain picks up on the patterns of two feet, recognizing the slight variation in gait. The body compensates by rotating one of the hip bones (called the ileum). The ileum can rotate either backward and downward (called PI Ileum for posterior inferior) or forward and upward (AS Ileum for anterior-superior). This pulls the leg higher into the hip socket, causing the leg to function short, changing the alignment of the muscles around the hip and spine. Unfortunately, this causes those muscles to work unequally and inefficiently, and ultimately causes pain.

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Who's running hot, and who's not

Who's hot

Jason Sim. After recording a 2.58 and seventh position at the Great Ocean Road marathon, Jason has backed up with a 2.42 and second place at the Traralgon marathon. Congratulations go out to Jason and his wife Amy on the birth of their daughter, Dylan Elizabeth.

BUAC invitation. A huge thank you to everyone involved with the organization of the invitation. Congratulations to Andrew Buchanan, Mike Bieleny, Jenny Buchanan, Lisa Wilkinson, John McCullagh, Madeline Evelyn, Nic Moloney, Dane Heiden and Ellie Wilson who ran well in their age groups.

Nic Moloney and Dane Heiden, who competed at regional and national levels last month.

Who's not

Belinda Neal. Refer to the article on page one for reasons why Belinda needs to take up running.

Future events

Events in Victoria

28/04 - 22/09 - Athletics Victoria Winter Series 3.8-21km
10 run series in Melbourne, open to all levels of runner.

(www.athsvic.org.au)

27/05 - 09/12 - Sri Chinmoy Races 10-42km
(www.srichinmoyraces.org.au)

07/10 - Melbourne Marathon 10/21/42km
(www.melbournemarathon.com.au)

09/01 - 31/12 - Victorian Road Runners 5 - 21km
(www.home.vicnet.net.au/roadrun)

Cool Running Website

(www.coolrunning.com.au/calender/vic)

Local Events

05/07 Junourtown Jog (500m, 1, 3, 8km) - a great run over bush trail and sealed roads.

12/07 Pearces Road Rally (500m, 1, 3.6, 7.5km) - a new run with a sealed handicap.

19/07 Glen Allen Memorial (1, 3, 15km) - an Athletics Bendigo run for those who may like to dabble in the longer distances. Many yellow and white tops at this run last year.

26/07 Picaninny Plod (500m, 1, 4, 7km) - an enjoyable run with a small, but cruel hill at the very end.

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Feel free to make suggestions for our newsletter. Ideas, news and the little bit of idle gossip help to fill these pages. Contact Pat Kenny on 5442 3431, or email mpken1@bigpond.com with any ideas or information. The more you contribute, the better this newsletter can be.

Newsletter Classifieds

Wanted: Bulla yoghurt containers for drinking cups (those types supplied with the water, after our races). Must be Bulla types as they are plastic and can be washed repeatedly. See Gavin Fiedler.

Training: remember Wednesday night training at Lake Weerona. Contact Wayne Forbes if interested.

Injury tips continued

This pain is most commonly felt with big mileage on the bike or while running. Non-athletes tend to notice it after carrying heavy loads in one hand. The pain can occur at the end of the activity or the next morning, with accompanying stiffness. In addition, this functioning shortage puts a mild tweak into the sacroiliac joint, further compounding the motion inefficiency. A visit to a physiotherapist will help, but only temporarily. To see if you have a functional shortage, stand in front of a mirror, relax and let your shoulders drop. If necessary, jump up and down from foot to foot to shake yourself out and let your shoulders fall into place. Look at yourself squarely. Is one shoulder lower than the other?

Step far enough back so you can place your thumbs on the bony points in front of your hips. Can you tell if one thumb is lower than the other? Is it on the same side as the lower shoulder? If so, chances are you have an acquired or functional shortage. This commonly happens on the same side as your dominant hand. Don't be surprised if you have an acquired shortage. Approximately 85% of the world's population exhibits this condition, and two-thirds of them experience pain related to it at some time in their lives. What can you do about it? Conditioning and stretching. An "over the counter" arch support to help reduce pronation (which in turn helps reduce the stress and strain of inefficient muscles) and preferably a "soft" lift of a quarter inch, which should be changed every six months.

Look at the heels of your shoes. If you've let them wear down too far, this can contribute to pain flare-ups and injuries.

Media watch



Greg Payne makes a good start in the Bendigo 2007 Lakeside Fun Run. He's certainly got the "race face" on.



High jinx involving Michael Hogan and some of the staff from St. John of God. "Hey there's a few empty beds in here, let's go find some patients!"