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PART THREE

Sport & Exercise

28. Exercise makes you eat more food and gain weight

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It's time to ignore any advice you've heard about your sweat and hard work in the gym sabotaging your weight loss efforts by causing you to eat more. Every little bit of exercise can help shift unwanted flab.

So, is dieting the only way to lose weight, or does it all boil down to becoming more active?

Some argue weight loss is all about how much (or how little) a person eats, while others support the view that it's mostly a person's activity (or lack of it) that most affects weight loss or gain.

A more extreme view that occasionally surfaces is that exercise only drives an increased appetite for food, and the extra calories consumed surpass those burned during the exercise.

If this is really the case, the argument becomes 'Why even bother getting active at all?'

Before this myth is dispelled by a wealth of scientific studies, a simple observation shows it's false. Just look at any group of high performing athletes such as marathon runners, cyclists or swimmers. These athletes eat mountains of food each

day but all of this is used up in their training endeavours. Overweight and obesity is hardly an issue for athletes.

So, what does the science say?

A 2007 systematic review teased out the different effects that dieting and exercise can have on weight loss. The firm conclusion of the review wasn't exactly surprising: exercise has a modest, but consistent benefit on body fat reduction and this benefit is independent of dieting.

The authors also found evidence to support a 'dose' effect, with increasing amounts of exercise leading to greater weight loss: the more you move, the more you lose.

Giving a small amount of credence to this myth though, the review did note that exercise can generate short-term increases in hunger that can cause a person to eat more. But in the longer term, there is an overall decrease in a person's feelings of hunger.

Adding more evidence to debunk this exercise/weight-gain myth, a Cochrane Review concluded that exercise has a positive effect on body weight and cardiovascular disease risk factors in people who are overweight or obese, especially when combined with dietary changes.

Even if little weight is shed through this exercise, there are a myriad of health gains, such as reduced risk of cardiovascular disease, and improved bone and muscle health, mood, sleep patterns, and even reduced cancer risk.

Now for the painful part.

Current Physical Activity Guidelines for Australians of 30 minutes of moderate-intensity activity on most days of the week may not be enough to stave off long-term weight gain.

For people who are already overweight, research shows that even 60 minutes of physical activity each day may not be enough to halt weight gain.

For those breaking out in a sweat just thinking about that much activity, what it really means is we need to pay more attention to the food side of the energy balance equation.

29. Altitude training improves overall sporting performance

Peter Milburn
Griffith University

As 2012 AFL season drew closer to the grand final, clubs were already looking to off-season training opportunities to prepare players for 2013. Several high-profile clubs forked out big money to send players to altitude training camps in an attempt to gain a competitive edge.

But is it worth the effort? How much of an impact does altitude training have on overall performance?

Altitude training relies on forcing the blood's oxygen-carrying capacity to respond to reduced partial pressure of oxygen — the 'thinner air' at altitude. To do this, the red blood cells' haemoglobin mass increases, allowing blood to carry more oxygen to the muscles and resist fatigue.

This training style gained popularity following the dominance of Eastern African runners at the 1968 Olympic Games in Mexico City. East African athletes lived and trained at altitude, and therefore may have gained a competitive advantage through acclimatisation.

Since then, altitude training facilities have popped up around the world. And local fitness studios have also jumped on board, offering recreational athletes the opportunity to train in similar 'hypoxic' conditions, without the travel.

The reported benefits of altitude training are varied, ranging from improved ventilation, to better aerobic and anaerobic performance, increased power, reduced blood lactate (lactic acid), and increased muscular efficiency.

But these benefits have not been universally accepted, nor are they applicable to all athletes.

Types of training

There are many different altitude training strategies offered to achieve these results: 'live high-train high' (LHTH), as did the East African runners who lived and trained at altitude, and 'live high-train low' (LHTL), sleeping at altitude to gain the benefits but training at sea level to maximise performance.

New approaches include intermittent hypoxic exposure at rest (IHE) or during continuous training (IHT) sessions, interval training (IHIT) sessions, and even 'live high-train low and high' (LHTLH).

These ventures are expensive, so various alternative methods have been introduced to recreate this training environment. Hypobaric chambers — where either nitrogen is introduced into the air to reduce the oxygen concentration, or oxygen is removed from the air by filters to simulate air at altitude — are the most well known and can be found in high-performance training centres throughout Australia.

Improved performance?

Reports of performance improvements vary widely. Some studies show a 9% increase in endurance and power, along with a decreased build-up of waste in the muscles (lactate). Other studies show no improvement at all.

This is probably due to the variability in training conditions, such as altitude (ranging from training at less than 2,000 m to 5,000 m), duration of the camp (six days to four weeks), exposure (hours per day, sessions per week at altitude), the type of training used, and the characteristics of the participants (not all athletes respond to altitude training).

Despite this variability, even a 1% improvement in aerobic performance would have a substantial impact in endurance events such as cycling or running. In the 10,000 m race at the 2012 Olympics, for example, a 1% improvement would amount to approximately 16 seconds — the difference between finishing first and thirteenth.

But the benefits for team sports such as football are less well defined. There is almost a complete absence of investigation into the effects of altitude training in team sports such as football, where aerobic capacity is less important than individual endurance sports such as long-distance running or cycling.

Furthermore, any performance benefit of altitude training is likely to be short lived. Red blood cells have a short lifespan and are replaced frequently, so benefits occur within four weeks after returning to sea level and last for only a few weeks.

There's certainly no evidence altitude training will improve skills such as decision-making, running speed or the ability to kick goals. So there's a good argument that the funds spent by AFL clubs on sending players to altitude training camps could be better invested in skills development.

30. No pain, no gain

Peter Milburn
Griffith University

The value of regular physical activity to a person's wellbeing is unequivocal. But how much exercise do we need to maintain health, improve fitness or lose weight? And where is the line between healthy and harmful?

To maintain a healthy weight, Australia's dietary guidelines recommend adults do at least 30 minutes of moderate intensity physical activity — such as brisk walking, social tennis or swimming — on most days. But if we want to lose weight, and not cut back on food and drink, we need to do more.

The American College of Sports Medicine agrees adults should get at least 150 minutes of exercise a week, though it

explains this might be 20 to 60 minutes of vigorous exercise — which makes you huff and puff, such as jogging, aerobics, football and netball — three days a week.

The College guidelines also prescribe the quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal and neuromotor (or functional) fitness in healthy adults:

- For flexibility, adults should do stretching exercises at least two days a week, with each stretch being held for 10 to 30 seconds, to the point of tightness or slight discomfort.
- For resistance training, adults should train each major muscle group two or three days a week.
- For cardiovascular fitness, people should gradually increase the time, frequency and intensity of their workout.

The adage that if a little bit of exercise is good for me, then more should be better, still pervades the fitness industry. As does the 'no pain, no gain' myth, which came to prominence in the early 1980s via Jane Fonda aerobic workout videos. Fonda would also urge viewers to 'feel the burn' and exercise beyond the point of reasonable physical stress. These days the 'no pain, no gain' motto is used to show that physical development is the result of training hard.

We often judge the efficacy of our workouts by our level of soreness the next day. This type of pain is called delayed onset muscle soreness or DOMS, and occurs a day or two after exercise. It is most frequently felt when you begin a new exercise program, change your routine, or dramatically increase the duration or intensity of your workout. DOMS is a normal response to unusual exertion and is part of the body's adaptation process that leads to increased strength or endurance as muscle recover and hypertrophy.

But while discomfort is natural if you push yourself, pain is the body's protective mechanism, warning us to ease the intensity or protect an injured part of the body. Resisting this warning risks damaging tissue and may cause your body to over-compensate with other movements that can aggravate the injury and lengthen healing time. It's also likely to reduce your motivation to continue exercising.

Pain during exercise can also indicate underlying health problems and should be seen as a signal to stop exercising and seek professional advice:

- Chest pain during exercise is a red flag for potential heart problems.
- Exercise-induced bronchospasm (a sudden constriction of the bronchial muscles), even in non-asthmatics, may indicate an underlying respiratory problem.
- Joint pain may result from osteoarthritis or indicate meniscal (knee) injury, ligament or tendon microdamage.

If you do find yourself sore after a tough workout or competition, try some low-impact aerobic exercises to maintain your blood flow during warm-down. Other remedies such as massage or ice baths and the RICE (rest, ice, compression, elevation) combination may also ease muscle soreness.

In terms of medication, non-steroidal anti-inflammatory drugs (such as aspirin, ibuprofen) can temporarily help reduce the effects of muscle soreness, though they won't speed up healing.

It's certainly not easy building up your fitness or losing weight, but the 'no pain, no gain' motto is based less on the science of exercise physiology than on outdated sports psychology; it's a recipe for injury.

When you feel pain during exercise, stop what you're doing and take stock of how you're feeling. If you think you

can, try returning to the activity you were doing, but if the pain persists, then stop for good.

31. Run barefoot to prevent injuries

Peter Milburn
Griffith University

The human species is one of the most efficient terrestrial animals. We adapted to run on dry riverbeds and grasslands, but development of modern society has strained the evolutionary process.

Footwear was initially introduced to protect the soles of the feet or provide traction or warmth. But as society has changed, footwear's role has adapted to provide cushioning for the hard cobblestones or pavement, broad protection for industrial tasks, and more recently, as a fashion accessory and performance optimiser.

A return to barefoot running has emerged as a subculture in recreational running, its devotees pointing to reduced injury rates and a more 'natural' running experience.

Perhaps the biggest impetus for the trend was Christopher McDougall's 2010 best-selling book, *Born to Run*. While based on the story of Mexico's Tarahumara Indians, who run ultra-endurance distances barefoot or in tyre-tread sandals, McDougall also concludes that running shoes have done little to prevent injuries over the past 40 years.

The popularity of minimal shoes, such as the Nike Free and Vibram FiveFingers, has further fuelled the debate about whether we should ditch our old-school sneakers.

Apart from the aficionados writing in the popular literature, a key proponent of barefoot running is Harvard University evolutionary biologist Dr Daniel Leiberman. He argues that habitually barefoot runners land more on the mid-foot or forefoot, which reduces the transient shock on contact.

Runners who wear shoes, on the other hand, land more on the heel and rely on the design of the shoe to absorb shock and control the foot during running.

But Leiberman suggests the issue is less about barefoot running being better than shod running and more about how we run.

Running barefoot encourages the runner to cushion the impact of landing by adjusting their running style to land with their toes down. The shock of landing is transmitted largely to the muscles at the back of the leg. As a result, barefoot and minimally shod running appears to reduce the risk of injury because they generate much lower collision forces.

But don't throw your running shoes away just yet. Barefoot runners must learn to change the way they run: landing more on the mid-foot or forefoot, rather than on the heel. Then the elastic structures within the foot will do the job they were designed to do. And the Achilles tendon and calf muscles will contract eccentrically to cushion this extra load.

For those new to barefoot running, the unaccustomed strain on muscles and tendons can actually lead to injury — exactly what the change to barefoot running was supposed to prevent.

The solution? Start out slowly on a safe surface (grass or sand) to toughen the sole of the foot and allow the soft tissue of the foot and ankle to adapt to the new loading strategy. Alternating running barefoot one day and shod the next will also decrease the risk of injury.

We all have different abilities to learn and to adapt to new skills: some will make the adjustment and thrive as barefoot

runners; others will struggle to make the change, particularly if they have irreversible structural problems with their tendons and muscles, caused by decades of wearing sneakers.

Unfortunately, ditching your sneakers isn't the silver bullet to preventing running injuries.

32. Wait thirty minutes after eating before you swim

Peter Milburn
Griffith University

The old saying that you should wait at least 30 minutes after eating before you swim is based on the idea that after a big meal, blood will be diverted away from your arms and legs, towards your stomach's digestive tract. And if your limbs don't get enough blood flow to function, you're at risk of drowning.

But is it sound advice, or just parents wanting a 30-minute break to relax after a big lunch? For a fuelled-up child wanting to get back in the water, this can seem like eternity.

It's true that digestion redirects some of the blood from the muscles to aid in the digestive process. With a reduced blood flow, there is potentially less oxygen available to the working muscle and stomach, which is a potential cause of cramping — though some researchers discount this theory.

Cramps are involuntary, spasmodic contractions of skeletal muscle during or after exercise, usually related to fatigue. But cramping during exercise is more likely due to a combination of factors, such as dehydration, electrolyte imbalance and neurological fatigue, which are unique to each person.

The truth is, we have enough blood to keep all our body parts functioning after a big meal.

Another suggested risk factor for swimming after eating is what's commonly referred to as a stitch (or exercise-related transient abdominal pain or ETAP in sports literature): sharp pain felt just below the rib cage. Stitches aren't well understood, but are thought to be caused by cramping of the diaphragm due to restricted blood flow from pressure from the lungs above and abdomen below.

With any vigorous exercise after eating, there could be some discomfort such as heartburn or vomiting, caused by unexpected reflux or involuntary regurgitation. This is more likely to occur when there's an increase in external pressure, such as while diving.

So what does the data say about the myth?

An examination of the Royal Lifesaving Association's Australian reports on drowning over the past few years gives no mention of lives being lost after eating. And neither the American Academy of Pediatrics, the United States' Consumer Product Safety Commission, nor the American Red Cross offer any guidelines or warning related to swimming after eating.

These organisations are far more concerned with the elevated risk of drowning due to drinking alcohol. Alcohol and drugs can severely impair judgement and physical ability, and increase the risk of spasm of the vocal cords if water enters the windpipe.

In the 2010-11 reporting period, 17% of all drownings in Australia were attributed to alcohol or drugs. Within the 18-to-34 age group, this figure was much higher — up to 45%. So it's important to be aware of the risk of alcohol and drugs when in, on and around the water.

While swimming on a full stomach can be uncomfortable and, if excessive, lead to vomiting, it's unlikely to put you at greater risk of drowning. This will be great news for kids, but less so for their parents wanting to rest after lunch.

Common sense, however, suggests that swimming is not the best way to settle that full stomach. If you're keen to get back to the water quickly, opt for foods high in simple carbohydrates. They're not only good for you, they digest far more quickly than the fat and protein in a barbecued steak.

33. Young athletes can train like adults

Peter Milburn
Griffith University

Public health experts, educators and the media constantly remind us that children should put down the video games and get active. But how much activity is really necessary to maintain health? And how much is too much for the younger person?

The National Physical Activity Guidelines for Australians aged two to twelve years recommend a combination of moderate to vigorous activities for at least 60 minutes a day. About 60% of school-aged children meet these recommendations.

A reasonably high proportion of Australian children participate in sport — around two-thirds of Australian girls and three-quarters of boys. But fitness levels are declining, which suggests participation alone isn't enough.

The number of sport-related injuries in children is also increasing. It's estimated that nearly half of all sports-related injuries in children and adolescents are caused by over-use. But it's unclear whether this is a result of poor skill, inadequate preparation for sport, or simply a consequence of changing lifestyles, where children are less able to enjoy free play.

Over-use injury

Over-use injuries of the bone, muscle and tendon can occur when these tissues are subjected to repetitive stress without sufficient time to heal or undergo the natural reparative processes. The risk is more serious in younger, pre-adolescent athletes because the growing bones can't handle as much stress as the mature bones of an adult.

A young gymnast, for instance, may develop spondyloysis (a stress fracture of the spine) through repetitive hyper-extension activities combined with high-impact landings.

Or a young swimmer may develop rotator cuff tendonitis (a painful condition that affects the shoulder muscles) through excessively loading the muscles at the extremes of flexibility.

Young distance runners who train excessively are at risk of osteochondrosis, a range of diseases to the parts of the bone where growth occurs and where tendons attach.

These risks are compounded by the young athlete's inability to associate vague symptoms such as soreness or a drop in performance with injury and communicate this to the coach.

Over-training injury

Over-training or burnout is an equally insidious injury among young athletes. It can present in many different forms — both physical and psychological.

The most commonly reported symptoms include chronic muscle or joint pain, respiratory tract infections, mood disturbances, personality changes, loss of appetite, decreased interest in training, and sleep disturbances.

The velocity of growth during adolescence places young athletes at greater risk of over-use injury, simply because their systems have not matured to the extent of an adult athlete. Rapid growth can also lead to muscle imbalance and reduced coordination, as soft tissue growth lags behind rapid bone growth.

Young athletes also have a greater susceptibility to heat exhaustion. The increasing popularity of endurance events such as triathlons, half-marathons and fun runs open young participants up to fatigue or weather-related exposure (both heat and cold) injuries. The simple advice is not too much and not too soon.

Year-round training in multiple events is also becoming more common, in an attempt to improve the young athlete's performance in their chosen sport. But while it's important for young people to try a variety of sports and not specialise in one too early, children also need time to recover — physically and mentally.

Understanding risk

It's important to accept that young athletes are not small adults. Some of the factors that place a young athlete at risk are intrinsic (gender, maturity, anatomical alignment, fitness, flexibility, strength, muscle imbalance, coordination, nutritional status) and others are extrinsic (sport played, position, playing surface, coaching experience, weather).

While some risk factors can be modified (with footwear, suitability to participate, rules/administrative modifications) some others need to be recognised and accommodated for.

There is also considerable variability in both physical and psychological maturation in young athletes of the same age. So the intensity, duration and frequency of training can't be the same for all young athletes. This places greater emphasis on the coach and parents to be aware of the signs of over-training and burn-out and to intervene when appropriate.

There are, however, some general guidelines for training children and adolescents to reduce the risk of injury:

1. The training program should be specific to the individual.
2. The training should not be too specific to the sport. Ensure the training accentuates general fitness, avoids

excessive volume, and encourages the young athlete to engage in a range of sports to ensure they develop a greater range of motor skills.

3. Training should take into account the level of performance required of the athlete and length of the season, and involve periodisation (systematic cycling of training loads with rest periods) to allow them to recover both physically and psychologically.

The ultimate goal of sport is to promote physical activity and develop physical and social skills in the young athlete.

Unfortunately, that goal can get skewed towards those of the coach or parent, who see in the young athlete their own career aspirations or unfulfilled childhood dreams, at the expense of the child.

34. Knocked-out teeth are history

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It's common enough for a tooth to be knocked out on the footy field, in the playground, during a fight, or even a fall. The blood, shock and pain can easily cause you to panic but, as with most things, keeping calm will help.

Theories abound about the best course of action, but the first thing to remember is you can save an adult tooth that has been knocked out. And the sooner you act, the better. The likelihood of successful re-implantation diminishes dramatically after about 30 minutes.

The first thing you need to do is to look for all the teeth or fragments of teeth that have been knocked out. This might

mean searching a playing field or other teammates' or opponents' clothes — and sometimes even their heads, if it's been that sort of a collision!

Once you've found the tooth, be careful of the way you handle it — it needs to be picked up by the tooth crown and not by the tooth root.

Rinse it gently and briefly with saline (which can usually be found in first aid kits), or, failing that, with milk or under gentle running water. But be sure not to scrub the tooth — you're just trying to wash away any obvious dirt or other fragments.

Now, this advice often comes as a surprise, but what you should do next is put the tooth back in the gap of your mouth where it has been knocked out. This is called re-implanting and is the best course of action even if the crown is broken. Take care to re-implant it with the correct surface outwards; if possible, compare the tooth to the one next to it for a guide.

Re-implanting a front tooth isn't likely to cause pain because the area will still be numb following the local trauma. But if you can't re-implant the tooth because of pain, damage, or you're about to undergo a general anaesthetic, there are a couple of options for protecting the tooth.

Place the tooth into a small container or plastic wrap and add some milk or saline to keep the root from drying out.

Milk is a good medium for storing knocked-out teeth because cells from the root surface don't swell up and burst as they do when placed in water. It contains proteins that keep a constant acid-to-alkaline ratio, anti-bacterial substances, as well as sugars to keep cells growing.

If milk isn't available, saliva is better than nothing, so place the tooth inside the person's mouth, next to their cheek. Just make sure they don't swallow it — keeping their teeth together will help.

Remember that any storage is intended only to be for up to about six hours while you're on the way to the dental clinic. The dentist will then stabilise the tooth and review the situation for ongoing treatment; a root filling will be required once the trauma and soft tissue swelling heals.

When a tooth has been knocked out, the nerves, blood vessels and supporting tissues are damaged, too. The nerves and blood vessels can't always be repaired so root canal treatment will be necessary in most cases.

The good news is that the ligament connecting the tooth to the bone can reform once put back into place, as long as it's re-implanted soon after the trauma.

You're never going to eliminate bumps and knocks in organised sport but wearing a mouth guard will reduce the likelihood of suffering tooth and soft tissue damage when, or if, that next fall occurs.