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## 4 | **free the mind, the body will follow**

### Expand your knowledge

This may seem like a strange way to begin a chapter about exercise, but we have to confess to a long-term love affair with wine. What started this was a book by Robert Parker that a friend gave us for Christmas one year.

You begin reading those wonderful descriptions of different wines from around the world and you want to try them. You taste a few, you read a bit more, then bit by bit you start to develop some knowledge around the subject and it becomes a hobby — a part of your lifestyle\*. Knowledge has its own way of breeding motivation.

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\* In case you're thinking that reading this gives you an excuse to become a drunk, hard luck, that's not the case. Most research says that a glass of wine a day is good for you — or even two for men. However it also states that if you drink more, there are health risks instead of benefits. We normally limit ourselves to one or two glasses a night, two or three nights a week.

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Fortunately, this principle doesn't only apply to indulgences. It's the same with any hobby, including sport and exercise. The greater your expertise, the more confidence and motivation you'll have, the better your results will be and the more you'll enjoy it — and therefore be likely to stick with it.

Exercise involves reading!

If you're just getting started, we recommend that you get hold of a good book on your chosen sport or fitness pursuit. You'll feel a lot more expert, which will help you get over any initial self-consciousness. You'll achieve better results because your energies will be correctly focused. You'll pick up some good pointers on technique, which will increase your enjoyment and lower your chance of injury. And perhaps best of all, you'll have an ongoing source of motivation to fall back on when you hit the rough spots that are common when you start out.

As part of your long-term programme, we recommend that you read all you can.

It's simple these days to go to an online bookstore and find the most popular or highly recommended texts. Amazon or Barnes and Noble have good ratings and reviews.

The publisher Human Kinetics specialises in sports and fitness. Most sports also have journals you can subscribe to. These provide a constant source of motivation and renewal of interest. The internet is packed with sites that offer inspiration, education and online forums where you can discuss challenges and share successes with others who are at your level.

In the general fitness field, we love books like *Younger Next Year* by Chris Crowley and Henry S. Lodge; *You, The Owner's Manual* by Michael Roizen and Mehmet Oz; and Miriam Nelson and Sarah Wernick's *Strong Women* series. They're written in an enjoyable, motivational style that makes us want to get out and exercise more.

The more you learn about something, the more that knowledge enriches your whole experience of doing it, and the greater your motivation, confidence and enjoyment.

Get coaching

Get as much coaching as you can, especially during the crucial beginning

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phases. Good coaches help minimise the period when you feel like a stupid learner! It doesn't have to cost much: as we noted in Chapter 2, tennis or golf coaches, ski instructors and even personal trainers all provide much less expensive group lessons as well as individual tuition. Experienced friends are great too: ask them for advice.

The other big benefit of coaching is that it helps you develop great technique.

### Great technique equals great results

The better your technique, the further you can go; the better you can be with the sport and the more enjoyment you can get out of it. As mentioned in Chapter 1, Tom Tellez, arguably the world's greatest track and field coach, was a stickler for technique.

Phillip Tom preached perfection. He would explain the optimal bio-mechanics of a movement. When you're running, for instance, your arms should swing forwards rather than across your body; if they swing too much across your body, you are directing force sideways instead of straight ahead. For optimum speed you want all your energy being directed straight ahead down the track.

He coached using images, which are the most powerful way to teach any sport. That's because, putting it simply, the part of our brains responsible for co-ordination works in pictures rather than words. Tom would talk about elbows bent at right angles, arms swinging like a pendulum from the shoulder. I remember him picking athletes up for something as small as a hand flapping during their arm swing, which would cause some minute amount of energy wastage.

Anyone who remembers seeing Carl Lewis run will know what I mean. Tom's athletes were poetry in motion and their results reflected that.)

### Good technique helps you avoid injury

Good technique also helps you to avoid injury, and serious injury is one of the things that can curtail your involvement in a sport. With any sport, if you want to be able to do it long term, great technique is an excellent base.

Some injuries are simply accidents, caused by a tackle or a fall. But many are

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over-use injuries, which come from repeating a simple movement thousands of times, incorrectly. As we age we become more and more susceptible to this, because our production of things like immune cells and tissue-regenerating hormones starts to slow down in our early 40s, making us slower to heal.

Our good friend, Auckland orthopaedic surgeon Garry Heynen, is one of the world's leading hip specialists, one of the developers of mini-incision hip replacement. He considers that much joint deterioration among active people is due to poor technique, often resulting from muscular imbalances around joints.

Garry points out that no movement is produced by a single muscle — there are at least seven muscles, for instance, involved in knee flexion and extension. He believes that people starting a new exercise programme or sporting activity over the age of 40 should begin by strengthening their muscles to balance joints. For this he recommends exercises like weight training, Pilates and yoga, emphasising the importance of strengthening opposing muscle groups.

An example of this might be, rather than just doing pushing exercises to develop our pecs, we also need to do pulling exercises that develop our upper back muscles and balance our shoulder joints. Or rather than just working on our abs, we should include back exercises. Try to build in leg flexion as well as leg extension, etc.

There are simple protective things you can do with technique for most sports. For example:

- If you're running or walking, imagine there are headlights on your hips — you want to keep them perfectly aligned forward, on full beam. This is a powerful image that will tend to keep your legs tracking correctly, protecting you from knee and ankle injury.
- For aerobics, dance, weight lifting, walking, jogging, yoga and many other upright activities, imagine you're a puppet with a string coming out of your head that's pulling you upright. Keep your chest lifted, a *slight* curve in your lower back and your lower abdominals sucked in (think from time to time about sucking your pelvic floor inward and upward.) This posture will align your body correctly and protect you from many injuries.

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You can learn the techniques specific to your sport from a book, a coaching DVD or, better still, a real live teacher or coach. Tennis elbow, for instance, can be avoided with simple racquet grip adjustments that can be shown to you by a good club pro. Many racquet sport players also tend to move incorrectly around the court, risking hip injury by lunging at the last minute for balls instead of moving early into the right position. As well, there's a tendency to run around the court stiff-legged, especially when we get tired. Instead of absorbing shock naturally in our knees and ankles, we start to absorb it in our hips.

Even one match played with poor technique can cause hip soreness. Repeated thousands of times, this can lead to hip deterioration and eventually the need for a joint replacement. It's essential that tennis, squash and racquetball players learn good technique — body square on to the net, knees bent, weight on the balls of the feet — and a good pro will teach us drills that make sure this becomes ingrained. This is called unconscious competence — it just happens without you having to think about it.

There are essential techniques for all sports, which we need to learn if we want to participate in them on a lifelong basis.

In addition to good basic technique, players of vigorous competitive sports are turning more and more to stability or core training, which we'll talk about later in this chapter. They're finding that this gives them greater protection — even from accidents and contact injuries — *and* improves their performance.

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#### STRATEGY 14 EXPAND YOUR KNOWLEDGE

**Read everything you can get your hands on about your chosen activities and get as much expert help as you can from professional coaches or experienced friends. This will create motivation and results, and will enable you to keep exercising all your life.**

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We've devoted the rest of the chapter to increasing your fitness knowledge in areas that we believe will motivate you to work out, beginning with . . .

### Twenty-three reasons to exercise

There are thousands of studies out there that show the benefits of exercising. Lack of exercise, of course, is the main cause of obesity. But here are a few other reasons, some of them lesser known, that should help get you off the couch.

#### 1. Exercise staves off dementia

Exercise will reduce the possibility of developing dementia and Alzheimer's. In 2004, the *Journal of the American Medical Association (JAMA)* reported that the strongest factor in maintaining cognitive function as people get older was undoubtedly exercise.

In February 2006, the *Annals of Internal Medicine* reported that those who exercise the most are at least risk of developing Alzheimer's. The study reviewed all scientific data on age-related cognitive loss in 20,000 women over the age of 20 and found that exercise was the most protective factor in maintaining brain function.

In January 2006, the online edition of *Neurobiology of Ageing* revealed that research conducted at the University of Illinois with 54 post-menopausal women demonstrated that brain atrophy was not an inevitable consequence of ageing. There are several ways — like exercise, a good diet and staying mentally active — that can slow or stop the process. Dr Kirk Anderson, the author of the study, wrote that the women in the study who scored higher in cardiovascular fitness maintained greater brain tissue volume and better test scores than women who were less physically active.

Another issue of the *Annals of Internal Medicine* (17 January 2006) reported that a research survey involving 740 men and women aged 65 or older found that exercising three or more times a week can reduce the risk of dementia and Alzheimer's by up to 40 per cent.

The question here, of course, is just how this works. In Madrid, researchers at the Cajal Institute believe they've discovered how exercise fends off the risk

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of Alzheimer's and other diseases of the brain. In the December 2005 issue of *The Journal of Neuroscience*, they reported that regular exercise can double the production of megalin, a brain protein that ejects a potentially destructive protein called amyloid beta. Amyloid deposits are well known in Alzheimer's patients: they accumulate in clumps throughout the brain.

#### 2. Exercise makes older people stronger

There is a lot of research showing that declines in exercise efficiency and capacity of adults over 60 are reversible. The *Journal of the American College of Cardiology* (March 2006) reported on a study showing as much as a 30 per cent improvement in exercise efficiency and capacity after six months of regular exercise.

In a University of South Florida study, a group of people with an average age of 83.5 did 16 weeks of exercise; they made significant improvements in strength, mobility, balance and agility. How cool is that? It's never too late to get started.

#### 3. Exercise prevents breast cancer

In a 12-year study of 90,000 women in France, reported in the *Journal of Cancer, Epidemiology, Biomarkers and Prevention* (January 2006), researchers found a 38 per cent lower risk of breast cancer among women who reported five or more hours per week of vigorous physical activity.

What is particularly fascinating is that the threat is lower regardless of other risk factors like weight, family history, the use of hormone replacement therapy (HRT), or a woman's reproductive history. It didn't matter if women had a family history of breast cancer. This same study showed 'a linear decrease in the risk of breast cancer with increasing amounts of moderate and vigorous exercise activity'.

#### 4. Exercise makes you live longer

The pioneering Framingham heart study of 5206 people over a 46-year period found that of those who reached age 50, the group who engaged in high physical activity lived an average 4.2 years longer than the low physical activity group. The moderate group lived 2.3 years longer.

We're not talking here just about length of life: the same study showed that

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the high physical activity group had a better *quality* of life as well.

Another 2006 report in *JAMA* stated that people maintaining four simple health habits have a 69 per cent lower death rate from cancer and a 73 per cent lower death rate from heart disease. The most important habit was regular exercise. The other three factors were: not smoking; maintaining a Mediterranean-style diet with lots of fruit, vegetables, unprocessed grains, olive oil and fish; and taking a small nip of alcohol on most days.

### 5. Exercise helps your heart, whether you're fat or thin

This one's obvious, but the statistics are still scary and thinner people don't necessarily get off scot-free. In a special issue of the American Heart Association's *Circulation* magazine in January 2007, researchers noted that the incidence of heart disease among trim women who do not exercise is 150 per cent higher than it is in slender women who exercise regularly. There's a sliding scale, essentially, with trim women who exercise regularly at the top and those who are overweight and don't exercise at the bottom. Among obese women who do not exercise the incidence of heart disease is 340 per cent greater than it is among lean, active women. For women who smoke, are obese and do not exercise, the incidence of heart disease is 940 per cent greater than it is for lean, active, non-smoking women!

### 6. Exercise reduces abdominal fat — and fat is toxic

Another 2006 article in *JAMA* reported on research conducted at Northwestern University, involving 17,500 patients over 30 years. It found that being overweight in mid life substantially increased the risk of dying of heart disease later in life. The article said: '... fat tissue is a dynamic organ that is continually producing hormones and chemical messengers that increase the risk of blood clots and cause insulin resistance.'

In October 2005, the *Journal of Applied Physiology* revealed that a study conducted at Duke University Medical Centre had shown that just three hours of brisk walking a week could prevent the accumulation of deep abdominal fat. The build-up of abdominal fat was linked to a higher risk of type 2 diabetes, high cholesterol and heart disease. Exercise now, said the lead researcher, Dr Cris Slentz, and you might not be 20 pounds heavier in five years.

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### 7. Exercise heals

Regular exercise speeds the healing of wounds in older adults by up to 20 per cent, which reduces the risk of infection. An Ohio State University study — recorded in the *Journal of Gerontology* in 2007 — reported that among people aged between 55 and 77, the body's ability to heal wounds is faster in those who exercise than in those who don't. On average, complete healing occurred in 29 days for the exercisers against 39 days for the non-exercisers. This is important: the faster a wound heals, the less it is exposed, and the less chance there is that it will become infected.

### 8. Exercise improves your sex life

Good news all round. Daily exercise is strongly associated with better erectile function in men. *JAMA* reported in 2006 that male health professionals between 51 and 87 who exercise vigorously for half an hour a day are half as likely to suffer from erectile dysfunction as men with the lowest activity levels.

And for women? The November 2005 issue of the *Journal of Sex Research* reported on a study conducted at Penn State University which found that the more a woman sees herself as unattractive, the more likely she is to report a decline in sexual desire. These results support a link between body image and sexual response. The women with negative body images 'especially dislike their stomachs or abdomens, hips, thighs and legs'.

A month earlier, research presented at the North American Association for the Study of Obesity showed that women involved in a weight-loss programme experienced significant increases in both sexual desire and in feelings of being sexually attractive. After only moderate weight loss the percentage of women in the study who felt sexually unattractive fell from 68 per cent to 26 per cent. The percentage of women who experienced problems with sexual desire fell from 54 per cent to 39 per cent.

### 9. Exercise can prevent and even cure type 2 diabetes

A report in the November 2005 *Journal of the American Association of Occupational Health Nurses* noted one university study in which the majority of diabetic and pre-diabetic patients in a two-year diet and exercise programme were no longer diabetic.

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Young women who exercise in the year before they become pregnant greatly reduce their chance of developing gestational type 2 diabetes. *Epidemiology* reported in January 2006 that a study at the University of Washington found that women who exercised vigorously during that time frame reduced their chances by 81 per cent; women who exercised moderately reduced their risk by 59 per cent.

### 10. Exercise helps your joints

There's clear evidence that exercise is the best way to look after your joints, and can help repair them if you wind up with problems.

According to the Harvard Medical School's weekly health newsletter, there are six ways to prevent knee and hip problems like bursitis, tendonitis and osteoarthritis, and to treat them while they are mild. The first way is to stay active. The newsletter says: 'The knee was designed to bear weight, but it wasn't designed to go it alone. Strong flexible leg muscles take a great deal of pressure off this joint.' And there's more: 'Exercising your knee causes synovial tissue in the joint to produce synovial fluid, which lubricates the knee and nourishes cartilage.'

In February 2007, the website *www.webmd.com* noted that regular exercise confers many benefits on arthritis patients. One: it helps maintain normal joint movement; two: it increases muscle flexibility and muscle strength; three: it helps people to maintain a healthy weight, and in doing so reduces pressure on joints; four: it helps keep bone and cartilage tissue strong and healthy; and five: it improves endurance and cardiovascular fitness.

Basically, it said, 'a range of motion exercises progressively stretch the joints further until normal or near normal range is achieved and maintained. In addition to preserving joint function, exercise creates strong muscles, which helps keep weak joints stable and comfortable and protects them against further damage.'

Finally, exercise can maintain and even increase bone density. Researchers at the University of Arizona conducted a study which concluded that women involved in a routine of weight bearing and resistance exercises did not lose bone density over time — in fact they *increased* it by one to two per cent a year.

All of this means that you can help your body fight arthritis and enjoy a better quality of life as you age. In December 2005, *Arthritis and Rheumatism*

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reported on research conducted at Northwestern University with 3500 arthritis patients. Those who exercised regularly were much less likely to suffer from problems like losing the ability to climb stairs or being unable to bathe or get in and out of bed without assistance.

### 11. Exercise helps beat depression

Forget the pills. In cases of mild or moderate depression, exercise has been shown to be just as effective as antidepressants — and it's a lot cheaper. Hundreds of studies now show that regular exercise helps relieve anxiety, severe depression and chronic mental illness.

In January 2006, Great Britain's Mental Health Foundation recommended that doctors should be offering all patients with depression a programme of exercise to help combat their malaise.

A November 2005 report from Duke University in Durham, North Carolina reported that just ten minutes of regular, moderate exercise outperformed a leading antidepressant, Zoloft, in easing symptoms in young adults diagnosed with moderate to severe depression. 'Exercise seems to be at least as effective as standard antidepressant medications in reducing symptoms of patients with major depression,' noted the researchers.

Exercise can have a positive effect right away for people who have recently been diagnosed with a major depressive disorder. Researchers at the University of Texas, as reported in the December 2005 issue of *Medicine and Science in Sports and Exercise*, found that those who walked briskly on a treadmill for 30 minutes felt more vigorous and had a greater sense of psychological well-being. The article said that for mildly to moderately depressed patients, exercise could also lessen feelings of isolation and helplessness.

In November 2005, the *Harvard Mental Health Letter* pointed out that there were a large number of studies which showed that exercise could help some people overcome depression.

There's a myriad of possible explanations. People develop an enhanced body image with regular exercise. They get social support in exercise groups. Exercising distracts them from everyday worries, and they develop their self-confidence by meeting goals. Exercise may alter the circulation of neurotransmitters like serotonin, neuropeptide and, of course, boosts endorphins. You do indeed get a lift from exercise.

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### 12. Exercise helps you to survive bowel cancer

If you're thin and you exercise regularly, then your chances of surviving bowel cancer are higher. In January 2006, *Gut*, an international journal of gastroenterology and hepatology, reported on research from Alfred Hospital in Melbourne. Of 526 people with stage two and stage three bowel cancer, there was a 35 per cent greater chance of survival among those who exercised regularly before diagnosis and had healthy waist measurements (under 94 cm for men or less than 80 cm for women). 'This is a huge reduction [in the death rate],' said Dr Andrew Hayden, leader of the research team. 'We don't see reductions anywhere near this big with chemotherapy. We were surprised by the magnitude of the benefit.'

The Auckland Regional Public Health Service has said that physical activity plays a convincing role in protecting against bowel cancer. Physical activity 'increases insulin sensitivity and thus reduces the levels of circulating insulin, thereby diminishing its effects on tumour development and growth.' Physical activity aids in regular bowel movements and this reduces the time that the colon is exposed to potential carcinogens. It may also alter a number of inflammatory immune factors that influence bowel cancer risks.

### 13. Exercise saves you money on health care

On average, older Americans who exercise regularly spend \$2200 less a year on health care than those who don't exercise, according to a report in the January 2007 issue of the *Lansing State Journal*. The Partnership for Prevention adds that, on average, the annual health care costs for someone with a chronic condition such as diabetes or hypertension — both of which can be helped with a regular exercise regime and a good diet — are five times that of someone who doesn't have such a condition.

### 14. Exercise helps your back

People have always said that yoga is good for your back and now we have proof. In December 2005, the *Annals of Internal Medicine* published research from a study by the Group Health Cooperative Centre for Health Studies. In it, three groups of patients took part in three different therapies. Those patients who took part in 12-week yoga programme had better back function, and fewer of them used pain relievers.

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In California, a 2005 study of 314 patients with chronic back pain conducted at the Spine and Sport Foundation in San Diego showed that an exercise programme of eight to fifteen weeks was more effective in relieving pain and improving functionality than any form of passive treatment.

#### 15. Exercise improves your memory

A University of California at Los Angeles research project presented at the December 2005 annual meeting of the American College of Neuropsychopharmacology showed that a 14-day programme involving regular exercise, stress-reduction exercises and healthy nutrition was found to improve memory in older adults.

A study by researchers at Toulouse University in France, reported in October 2006 in the journal *Neurology*, concluded that overweight middle-aged adults scored more poorly on tests of memory, attention and learning ability than their thinner peers.

#### 16. Exercise helps to prevent prostate cancer

Research conducted by the University of California with a group of approximately 900 men showed that the higher their lean body mass, the lower their risk of prostate cancer. This was especially true of the most aggressive forms of prostate cancer. (As reported in the December 2005 issue of the *Journal of Urology*.)

#### 17. Exercise is good for your career

Recently, *theladders.com*, an online recruiting company for the \$100,000+ employment market, reported that of 1000 senior executives in the United States, 75 per cent believed that 'physical fitness is critical for career success at the executive level'. Seventy-five per cent also said that in today's workplace, being overweight is a serious career impediment.

#### 18. Exercise prevents ovarian cancer

As with many cancers, exercise seems to have a preventative effect on ovarian cancer. In one study, women who exercised moderately and more often had a one third lower rate of ovarian cancer than those women who exercised less.

There are several biological mechanisms that explain the protective effect

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of physical activity on ovarian cancer. Physical activity may mediate levels of endogenous sexual and metabolic hormone and growth factors. Exercise may, through its effect on obesity, decrease the risk by reducing lifetime exposure to endogenous estrogens. Other possible mechanisms include enhancement of the immune system and improvement of the antioxidant defence systems.

### 19. Exercise is good for your bones

The International Osteoporosis Foundation's 2005 report entitled *Move it or Lose It* notes that weight-bearing and high-impact exercise is best for stimulating bone formation. Dr Helmut Minne — a leading German practitioner who serves on the IOF's board of directors — says: 'Exercise builds strong muscles which in turn build strong bones. Exercise also improves muscle control, balance and co-ordination and reduces the risk of falling or suffering a fracture during a fall.'

The report notes that bone is living tissue that requires weight-bearing and high-impact exercise like dancing, walking, jogging, sports or strength training to stimulate its formation. The new document also highlights a Finnish study that found that physically active young women enter adulthood with 40 per cent more bone mass than sedentary girls of the same age.

### 20. Exercise is good for your guts

The September 2006 issue of *Clinical Gastroenterology and Hepatology* reports that the number one predictor of abdominal pain, including irritable bowel syndrome, bloating, constipation and diarrhoea, is lack of exercise. Even obese people experience fewer symptoms of irritable bowel syndrome and less gut pain if they exercise, according to the authors of the study.

### 21. Exercise can prevent strokes

As reported in *Stroke*, a journal of the American Heart Association, research tracking 27,721 Finns aged 25 to 64 over 19 years found that the risk of all forms of stroke among men and women with high levels of physical activity was 26 per cent lower than it was among men and women with low levels of physical activity. The risk of intracerebral haemorrhage was 37 per cent lower for those in the more active group and the risk of sub-arachnoid stroke was 54 per cent lower for those involved in high levels of physical activity.

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### 22. Exercise is good for menopause

Dr Lila Nachtigall, Professor of Obstetrics and Gynaecology at New York University School of Medicine, says that regular exercise is the most effective means of moderating symptoms of menopause including hot flushes, night sweats, sleeplessness and irritability.

### 23. Exercise is essential for your arteries

This is one of the best-researched areas of exercise benefit. Literally thousands of studies over the past several decades have shown the protective effects of exercise against cardiovascular disease. The American Heart Association sums it up as follows: 'Physical inactivity is a major risk factor for developing coronary artery disease. It also contributes to other risk factors, including obesity, high blood pressure, high triglycerides, a low level of HDL ("good") cholesterol and diabetes. Even moderately intense physical activity such as brisk walking is beneficial when done regularly for a total of 30 minutes or longer on most days.'

A 2005 study at Indiana University, published in the *European Journal of Applied Physiology*, has shown that exercising after a high-fat meal not only reverses damage to arteries, but also improves their function compared to before the meal. Professor Janet P Wallace, co-author of the study, says that for a period of four to six hours after a high-fat meal (i.e. generally just in time for the next meal), our arteries look just like those of a person who has heart disease. The oxidation of high-fat meals causes stress markers that harm the arteries and contribute to heart disease, diabetes, Alzheimer's and cancer. 'What our study showed,' she says, 'is that when you exercise after that meal, it doesn't look like a sick artery anymore.'

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## ● PAIN VERSUS PLEASURE

As human beings we are motivated to change our behaviours for two major reasons. One is the pursuit of pleasure: I want a better house so I'll work overtime. The other is the avoidance of pain: if I don't pay the phone bill, it will be disconnected.

All of the medical evidence tells us that exercising rocks! It's

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great for us on so many levels. The pleasure of being outdoors, achieving goals, staying healthy, sharing time with friends and family, being part of a club or gym community . . . the list goes on and on. And yet some people just won't take action until they have a major health scare. Their doctor literally petrifies them into action: 'If you don't start exercising, you'll be dead before Christmas.'

While it's never too late, there are no guarantees that you'll recover from a big health issue. If you're not active, get going — now. And if you're already taking care of yourself, we urge you to invite people in your sphere of influence to join you.

More and more studies are published every week highlighting the benefits of exercise. We think it's important that we all understand more about how our bodies work and how best to look after them, for the *entire* duration of the journey.

The following is a more in-depth explanation the science around some of these benefits.

### The benefits of strength training

#### Anti-ageing

Being strong has all sorts of positive effects on our everyday lives. It makes us functionally more efficient — for example, able to pick up our children or carry the shopping more easily, and less likely to injure ourselves in doing so. As we age, this becomes more and more important; maintaining our strength enables us to keep enjoying our lives by comfortably performing daily activities, and protects us from falls and accidents that can send us into life-threatening downward health spirals.

It also increases the density of our bones, which means that we avoid the pains of osteoporosis and that if we do fall, we are less likely to break something. The maxim 'use it or lose it' becomes more and more real.

The good news is that many studies have proved that by exercising to maintain our strength, we are able to maintain optimal function until at least 85 years of age. Even people who have stopped exercising can make tremendous

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strength gains well into their 90s. A study at Tufts University involving an eight-week strength training programme by women aged 87 to 96 resulted in a tripling of strength and an increase in muscle size of 10 per cent!

Not only does resistance exercise make us function better and protect us from potentially life-shortening injuries, it makes us feel better and *actually age more slowly*. Likely reasons for this are that strength training stimulates the activity of our immune system and the production of many of the hormones responsible for cell regeneration, our normal production of which, as explained earlier, begins to slow down in our early 40s.

#### Back rehabilitation

Over the years, we and the members of our teams have seen thousands of people rehabilitate themselves from one of the most common physical miseries of post-industrial man — back pain — just by strengthening their backs with simple exercises like the old-fashioned barbell dead-lift. Certain types of weight training and Pilates work, often referred to as core or stability training, are increasingly being used in back rehabilitation in preference to surgery. This commonly involves exercises that are performed using different-sized stability balls, pulleys and other specialised equipment. It is a wonderful new field, administered by specialist trainers and physiotherapists, which is being used by athletes to increase their functional strength and balance; it is also changing people's lives by freeing them from pain and long-term loss of function through surgery.

Clinicians have recently adapted this type of therapy to sophisticated machines like the MedX Core Spinal Fitness System. American readers can find a doctor or therapist practising this and other non-surgical rehab systems at [www.aapmr.org](http://www.aapmr.org), the website of the American Academy of Physical Medicine and Rehabilitation.

Most local gyms or personal trainers will be able to give you a programme to strengthen your back and protect yourself against the likelihood of back pain. Just remember that, as stated earlier in this chapter, you have to create joint balance by strengthening opposing muscle groups. In the case of backs, this means strengthening the abdominal muscles as well as the back muscles — especially the lower, deeper abs known as the transverse abdominus and the internal obliques, which stabilise the spine.

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With any resistance exercises (even lifting the groceries), the heavier you lift, the more important it becomes to keep your lower abs sucked in and a slight curve in your lower back. This protects you from injury and strengthens these spine-stabilising muscles.

### Burning that spare tyre

What isn't so well known about strength training is that it's one of the most powerful long-term ways to burn fat. The reason for this is that it increases the size of the body's fat-burning engine. Simply put, muscle burns fat and the more muscle we have, the more fat we burn.

Fat loss is generally regarded as a result of the difference between the energy you put in and the energy you take out of your system. People often interpret this to mean the amount of calories ingested in the form of food versus the number consumed during exercise. But in reality there's a bit more to it.

### Muscle mass and Basal Metabolic Rate (BMR)

*Metabolism* is all the processes by which the body breaks down food and nutrients to build and maintain itself, and to produce energy. Our metabolic rate determines the rate at which we burn calories. It can be increased or decreased by a few well-known — and a few not so well-known — methods.

One of the best-known techniques for increasing our metabolic rate is simply eating breakfast (we'll talk about this in more detail in Chapter 5). Unfortunately this doesn't mean you can eat all day as a means of maintaining a slim figure! Eating-induced metabolic increases account for only 10 per cent of the calories we burn — about 200 per day for a woman and 250 for a man. We can easily consume more than that with a few snacks, so it's better to stick to just three regular meals per day.

Our *basal metabolic rate* (BMR) is the rate at which our bodies burn energy at rest. This varies from person to person, based on factors like sex, height, weight, age, ambient temperature, stress levels and muscle mass. It is responsible for 70 per cent of the energy burned during the average person's day, and helps explain how we burn 70 calories an hour while we sleep!

There are many websites that allow you to calculate your BMR; we Googled *basal metabolic rate* and entered our data into several. We found that Phillip, as

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a 1.93m, 52-year-old man weighing 90 kg, has a daily resting consumption of approximately 1900 calories. Jackie, a 1.68m, 47-year-old woman weighing 64 kg, burns around 1350. These are the calories we would burn each day *without exercise*.

The good news here is that it's possible to increase our BMR, and the most powerful means of doing this is to increase our lean muscle mass. Every 500 g of muscle burns approximately 50 calories per day, so we can quite easily achieve significant gains, without having to look like the Incredible Hulk.

Studies have shown that the average person can increase his or her BMR by 15 per cent simply by weightlifting three times a week for 20 minutes. For the average woman, this would mean an extra 300 calories burned per day; for the average man, 375 calories. Five hundred calories equates to half a kg per week in fat loss, so you can see where this is headed.

As noted in Chapter 1, a study of fitness classes by Auckland University's sports science department for Les Mills showed that BodyPump had the lowest immediate calorie-burning effect, but *by far* the highest long-term percentage body-fat loss. Other studies have produced similar findings.

In March 2006, the American Heart Association reported on a survey that had been funded by the National Institute of Health in the United States. In it, women doing strength training twice a week over a sustained period had much lower than expected increases in their abdominal fat. 'Strength training can prevent increases in body fat percentages and alleviate increases in the fat deposit most closely associated with heart disease,' the researchers wrote.

Provided that we don't increase our nutritional intake, a decent weight training programme will increase our net fat loss by up to half a kg per week. Our overall bodyweight won't necessarily change, because the muscle we put on may balance out the fat we shed, but we'll look much trimmer and more toned — and be stronger and healthier, too

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## STRATEGY 14 GET STRONG

**Sports like rowing and cycling have high strength components, as do many fitness classes. Weight training, Pilates and yoga provide the most controlled, balanced way to get strong, provided that they're carefully programmed. Strength training**

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**makes us live longer and feel better, and increases our ability to function in sports and in everyday life. It's also the fastest way to look taut, trim and terrific; who honestly doesn't want that?**

### Optimising your cardio component

For all the benefits of strength training, there are at least as many produced by cardiovascular or 'fitness' exercise. They include lower blood pressure; higher HDL ('good') cholesterol; lower LDL ('bad') cholesterol; decreased glucose-stimulated insulin secretion; improved heart and lung function; decreased stress, anxiety and depression; and, of course, lower body fat. All of these combine to dramatically lower your risk of suffering ailments like heart attacks and strokes. Higher fitness levels also increase your enjoyment of everyday life by giving you more stamina and more energy.

When the research really started coming through on the benefits of exercise, the recommendations were pretty tame . . . three gentle half-hour workouts a week were all that was prescribed. Publicity was given to facts like the conductors on British double-decker buses living several years longer than the drivers. More recent studies, however, suggest that those early recommendations were not enough. To deal with our 21st century Western diet and lifestyle, and to gain optimal benefits, we should be exercising almost every day for up to an hour, at a much higher level of intensity.

The latest American Heart Association guidelines urge all women to exercise for a minimum of 30 minutes per day. Women who need to lose weight or maintain weight loss are now advised to engage in 60 to 90 minutes of moderate-intensity activity on most, or preferably all, days of the week.

### The effect of intensity on calorie burning

In addition to the 70 per cent of calories the average person burns as a result of their BMR and the 10 per cent used up as a result of eating, we burn a further 20 per cent through daily exercise activities . . . everything from doing the washing to climbing stairs to simply fidgeting at our desks. This is an average percentage, though, which can be increased to a much higher figure.

At several BMR websites we were able to add our daily exercise quotas to our

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earlier BMR data and *roughly* calculate our actual daily calorie expenditure or *active metabolic rate* (AMR). In Phillip's case this was around 3300 calories and in Jackie's, approximately 2500. As very active individuals, these equated to 50-85 per cent more than our respective basal or resting metabolic rates. These are rough calculations and we wouldn't recommend doubling your calorie intake based on them, but they give an idea of the huge difference exercise can make to weight maintenance.

Various studies show the body's calorie consumption as a result of different sports and exercise activities ranging from 200 per hour to more than 1000. A study conducted by Auckland University for Les Mills International in 1997 showed calorie burns ranging from 250 to 850 for individuals participating in various Les Mills classes.

It's important to note that your rate of calorie consumption will depend on how much intensity you put in, of course, and as explained above, on other factors like your muscle mass. There's a virtuous circle here — the more exercise you do, especially if there's a strength component, the greater your lean muscle mass and the more calories you will burn as a result of the same amount of exercise! But what is the optimum level of intensity?

#### Aerobic vs. anaerobic

There's a lot of controversy over the ideal level of exercise intensity for fat burning. Some sources promote the idea that to burn fat you need to work at a low level of intensity. This is based on the theory that, biochemically, the body will burn fat as a primary fuel during low intensity exercise, but not during high intensity exercise.

There are different biochemical means by which our bodies produce the energy required for exercise. This is a very complex subject, but the simple version goes like this:

For very short, explosive bursts of movement, up to around two seconds, our bodies can use stored muscle energy called adenosine triphosphate (ATP). For another three to five seconds we can convert another compound stored in our muscles, creatine phosphate (CP), into ATP. Once the ATP and CP stores are depleted the body resorts to carbohydrate (stored in the blood as glucose and in the muscles and liver as glycogen) as its energy source. At a lower rate of intensity, our body has time to use protein, fats and carbohydrate, combined

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with oxygen, to produce energy.

Coming at it from the other end, this last energy production system is known as the aerobic system, and is the predominant system used when we exercise for sustained periods of lower intensity exercise such as jogging. When we start to increase the intensity, the second to last system, called the anaerobic system, starts to cut in. It's predominant when we're running, rowing or cycling flat out (or nearly so) for bursts of say 10 seconds to a few minutes. For shorter bursts of strength or explosive activity, such as weightlifting, wrestling or sprinting, the first two systems — collectively called the phosphate energy system — are dominant.

The argument that lower intensity exercise is better for fat-burning is based on the fact that we use fat for fuel only during aerobic energy metabolism. But this doesn't take the whole picture into account. While we don't use fat as a fuel as part of the immediate process of producing energy via the anaerobic and phosphate systems, during most higher-intensity exercise activities we are actually using a combination of all energy systems. The various systems oscillate and interchange as we chase the ball and recover; perform a hard interval followed by an easy one; or just waver back and forwards from our threshold during a run.

phillip It's actually impossible to exercise purely anaerobically for more than about 20–30 seconds. During my sports career I've taken part in lab tests in which I've been required to push to the anaerobic maximum. At the Institute of Sport in Australia they'd put gas analysis masks on us (to precisely measure our fitness) and have us pedal at absolutely top speed on an exercise bike for 60 seconds. After about 25 seconds you'd be completely spent and the last 30 seconds were the longest you'd ever experienced in your life. You'd effectively be blacked out for the last 15 seconds, with your legs barely turning over: they'd have to lift you off the bike and it would take 20 minutes to recover, during which they'd take blood samples every five minutes or so to add to the misery. )

More importantly, however, the phosphates and glycogen that we use via the first two systems don't just come out of thin air — they must be replenished *via the aerobic energy system* during recovery (both during and after the workout).

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Depending on the intensity and duration of the workout, the replenishment can burn more energy than the exercise did! Anaerobic metabolism is very inefficient. A molecule of glucose produces just two molecules of ATP anaerobically versus up to 36 aerobically. That can mean a whole lot of replenishment during recovery time — either during or after your sports game or fitness class.

Studies measuring what exercise scientists call *excess post-exercise oxygen consumption* (EPOC) have shown that our metabolic rate can be elevated for up to two days after an intense workout, as our bodies replenish their fuel stores, restore hormone balances, and conduct cell repair and growth.

The conclusion here is one that may seem obvious for the lay person, but has been strangely obscure for some experts: the harder you exercise, the more weight you will lose. Think of it like this: there aren't many fat sprinters. There is also plenty of evidence of higher intensity exercise, within limits, having a greater positive effect on our ageing, our immune system and our health.

### Finding balance

Exercise at a lower level, however, is still likely to give you benefits, and there are other great arguments for it. For most people, for instance, it is simply more palatable and therefore more likely to keep us active. While elite athletes may be prepared to put themselves through gruelling workouts in pursuit of Olympic glory, too much pain will scare most of us off.

We can find ways to disguise the pain; fun ways of exercising harder, like those described in Chapter 3. But even then there are physical limits to the amount of work we can absorb.

We get the maximum benefit when we work out fresh and are able to give it maximum effort. But most of us can only put our bodies through a couple of very tough workouts a week. After that we start to suffer the effects of overtraining, as we discussed in Chapter 1: diminishing returns and an increased risk of injury.

To maintain optimum health we need to work out almost every day. This means balancing our training cycle throughout the week with hard, medium and easy days as well as varied activities (see cross-training, Chapter 1) that allow us to optimise our programme.

● **SUMMARY OF PART ONE: ENERGY OUT**

At the end of the day, we need to find the ways that individually suit us to get as much exercise into our lives as we can. Choosing to exercise, and getting ourselves into great shape, is important on a micro and a macro scale. Living an active life will keep us healthier and happier, for longer. Our families will benefit and we'll set a good example for our children. But there's more to it than that. Being fit and healthy is becoming an act of social responsibility.

Federal forecasters in the US have conservatively predicted that by 2016 the cost of the American health system will have doubled to \$4.1 trillion dollars per year. With 75 per cent of this expenditure already going to the treatment of chronic illness, a huge percentage of this increase will be the result of inactive aging and obesity-based disease. Imagine how much more effectively we could spend any portion of that increase rather than on treating ourselves for preventable illnesses stemming from inactivity and excessive consumption.

Just a tiny fraction of that increase, \$40–\$60 billion a year, is the estimated additional foreign aid required to achieve the 2015 UN Millennium Development Goals, according to OECD figures. Those goals include:

- cutting in half extreme poverty and hunger
- achieving universal primary education
- eliminating gender disparity at all levels of education
- reducing the under-five mortality rate by two thirds
- reducing the maternal mortality rate by three quarters
- reversing the spread of HIV/AIDS
- cutting the proportion of people without access to clean water in half

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- significantly improving the lives of at least 100 million slum dwellers.

PricewaterhouseCoopers estimates that we could reduce carbon emissions sufficiently to stave off the effects of global warming by spending two to three percent of world GDP by 2050, i.e. by spending around one trillion a year in today's dollars; half the projected 2006–16 increase in US health costs.

**Choose to exercise as a way of ensuring the survival of our planet. Ride a bike, instead of being sole navigator on a suburban safari in your SUV.**

**Choose to exercise as an act of political will. Don't let yourself become the prisoner of a collapsing health system, in which one of the primary causes of death is poor medical treatment.**

**If you believe in a higher being, exercise because your designer came up with a wonderful body for your spirit to live in and you should look after it.**

**If you're an atheist, choose to exercise because it will help determine the kind of world you pass on to your children and your grandchildren.**

**And if you're overweight and feeling as though it's all too hard and you've left it too late, take comfort from the knowledge that we know thousands of people all over the globe who have found the courage to get started. Find hope in their stories and be encouraged by their success. We hope that some of the tools and techniques discussed in this part of the book will help you begin and continue your fitness journey.**

