

“I have never felt stronger!”

Pete Jacobs, World Champion Ironman Triathlete

GET STRONG!

The natural, no-sweat, whole-body approach
to **stronger muscles** and **bones**

Dr. Philip Maffetone

Foreword by Kate Ouellette-Cretsinger

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The guidelines put forth in this book should
only be used as a reference and only used in
the context of standard medical care
with your physician.

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Foreword

I've always been very active. There was a point in my life that on any given day I might do any — or any combination — of the following activities: Hiking all of the tallest peaks in New Hampshire (all 48 of them year-round), surfing, rock climbing, ice climbing, running, biking, and CrossFit five days a week. And I did it all on just four hours of sleep nightly! But this was not sustainable. After having injury upon injury for most of my young adult life, I did some self-reflection and realized there had to be a better way to stay active and fit without being in pain or having to modify my program because I was injured.

My life changed dramatically when I found the perfect balance of “less is better” paired with smart strength training, as explained in this book.

We modern humans live such stressful lives. We have busy work and family schedules. Many commute through hectic traffic to

our jobs, where we spend a lot of time sitting. Too often we eat poorly and then we don't get enough sleep. On top of all this we add another stress — our workout program. Often this is accompanied by additional stress — going to the gym, where our workout just adds to the load. The body cannot differentiate between good and bad stress. It can only quantify the amount. Most people have too much of it, and it is difficult to improve your strength under such conditions.

This book takes the stress out of strength training by reducing the nonsense we so often associate with working out. In fact, you don't have to change clothes, travel anywhere, join a gym or even spend that much time to get stronger.

Using this approach, my body composition has changed significantly. I've eclipsed some of my previous records, and most importantly — no more injuries! All of these benefits were accomplished by doing one movement over the course of the day, amounting to more total reps than what one could do in a typical workout session. The first day I incorporated this program, I did five easy reps in each set, which only took a moment. When I added up my daily total, I thought for sure I was going to be sore the next day. To my amazement, I wasn't sore and was ready to do it all over again the next day.

I feel amazing with this approach, with more defined muscles and stronger than ever. I have more time to do other things and

I'm less stressed because I'm not trying to find a spot in my day to cram in a traditional workout.

Whether you are an athlete or you want to age without becoming fragile, muscle and bone strength are extremely important — loss of both are large contributors to mortality and morbidity.

Dr. Phil Maffetone gives you everything you need in this book to help you become stronger and healthier with minimal time and minimal risk of injury. It does not matter what your fitness level is, or how old you are. Anyone can reap benefits from this program at home or in their office with minimum equipment.

Everyone has excuses before committing to a lifestyle change. With this program there are NO excuses. Just get strong!

— *Kate Ouellette-Cretsinger*
Certified MAF Health & Fitness Coach
Owner K8 4 Wellness

Introduction: Why I wrote this book

Our ancestors were physically active with strong muscles and bones. Today, most people on earth are no longer naturally active, or strong. Most of us can't return to nature, so the next best thing is strength training that produces very similar natural muscle and bone strength. This is much easier than you think. In fact, just picking up a weight, standing and holding it, then placing it back down begins the process of getting stronger throughout the body. This simple approach, along with other strengthening options, if you want them, is what this book is about.

As I write this, my muscles and bones are getting stronger. That's because I'm strength training. In between sentences or paragraphs, while pacing around the room thinking about the next topic, or waiting for the espresso machine, I'm getting in a

workout. It may not resemble one most people recognize, but this simple, quick, and easy routine is more than powerful enough to not only develop stronger muscles *and* bones, but also benefits the ligaments, tendons, fascia, cartilage, joints and other body structures.

Moreover, a single movement will accomplish this task.

After pushing the button on the espresso maker, I go to the corner of my office and lift a barbell chest-high, and perform an easy squat, going down only as far as my body is willing to go at that moment. I may do five more squats, and after placing the weight back down, I go grab my espresso and get back to writing. I may lift later on my way to get a glass of water, or between phone calls. By the end of a typical day or week the amount of strength training may have exceeded that done by most people who go to the gym for their traditional two-to three per-week sessions. And unlike most of those gym workouts, I have improved both muscle and bone strength throughout my body in a significant way without fatigue, soreness, pain or sweat.

I call this particular workout *MAF Slow Weights*, and devote an entire chapter in this book to it. Performing this same routine when I can, over the course of a day and week, will stimulate significant full-body muscle and bone strength. This book is about why this type of simple and easy strength training works

so well — and it gives you other options and knowledge to do it successfully.

My workout is part of my day. I don't change clothes, wear special shoes, drive anywhere, pay a membership or even get sweaty. It's simple: I don't want to bulk up or enter any weightlifting competition — I just want to improve overall health and fitness by making my entire body stronger.

The MAF Strength Training method is simple, safe, easy, effective, fast and free (you might have to buy some weights, but look in your basement or ask a friend and you may find what you need). It's a natural activity, developing strong muscles and bones similar to those conditioned through outdoor work, such as lifting and carrying logs or rocks, building a stone wall, or digging the garden. (I sometimes do that too.)

The art and science of MAF Strength Training is one of the simplest ways to build or preserve muscle and bone strength no matter your age. It requires little or no extra time. In fact, while I was thinking about how to write this paragraph I just did another single set of six simple squats.

Various optional techniques are discussed throughout this book to help you choose the approaches most enjoyable and appropriate for your body's particular needs.

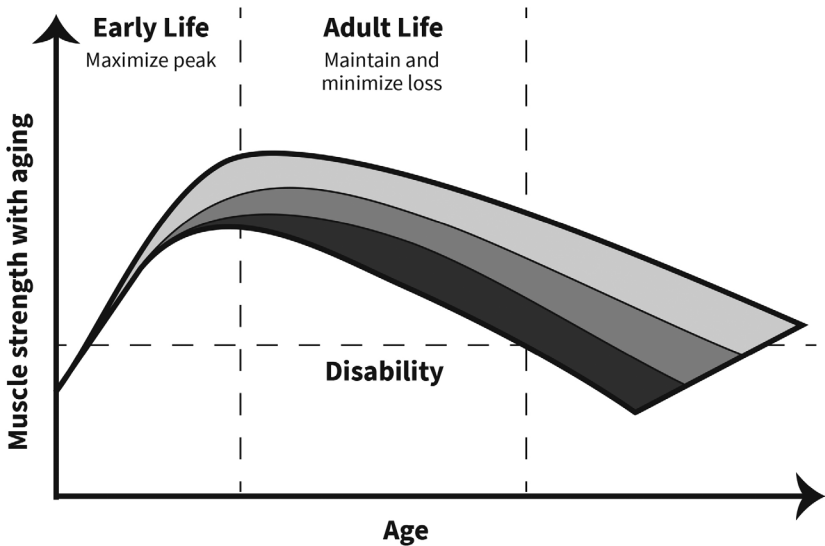
Some people still prefer the popular traditional strength-training approach. They want more muscle bulk, or like working out in a group or using various machines, or other methods. Or, their muscle loss is significant and they need to rebuild mass. Whatever the situation, you can still use the guidelines discussed throughout this book to obtain better health and fitness.

Weakness is widespread. In fact, modern humans may be weaker than any of our predecessors. It's not just those who are inactive. The problem of muscle and bone weakness is even true for those who regularly exercise, even athletes, competitive or recreational. This includes runners, cyclists, triathletes, walkers, and those who participate in other aerobic workouts. Likewise, for most of those playing tennis, racquetball, golf and other sports.

Muscle and bone weakness can cause or contribute to problems that range from simple or chronic injuries, physical disability or lower quality of life at any age, to frailty and loss of independence with aging. Muscle weakness is an important indicator of chronic disease and mortality.

Active or not, most people are aware of their diminished muscular strength. They feel older than they are, have aches and pains, and physical injuries. They can't lift, carry or grip things like they used to, and frequently experience fatigue or have low stamina. Most have not only lost strength but muscle mass as well. Bone

loss is common too, in men and women — osteoporosis and fractures are on the rise even in younger people. In fact, significantly increased rates of poor health and fitness worldwide are associated with the serious problem of muscle and bone weakness.



- Strongest muscles/bone; longer life
- Onset of disability; risk of weak muscle/bone; reduced longevity
- Disability; weak muscles/bones; shorter life

Muscle and bone strength increases from early age, peaking in our later 20s — this is when we can maximize strength. By age 30, strength begins declining, but we can maintain high levels with the right physical activities that minimize the loss of strength — a process that should continue as we age. In addition to improving quality of life, prevention of injuries and overall better health, those who are stronger tend to live the longest.

Many believe substantial muscle and bone weakness is part of aging — but it's actually part of *unhealthy* aging. While strength does diminish over the years, measurably starting around age 30 in men and women, it should not be too excessive to the point that we are impaired by it.

Weakness in muscles and bones can also promote problems in ligaments, tendons, joints, cartilage and fascia.

There are three ways muscles can weaken. The loss of muscle mass, which can reduce strength. And, the loss of strength regardless of mass. Or a combination of both.

Bones also can grow weaker from poor physical muscle activity.

There is a simple remedy — stay strong! Even if we didn't build as much strength when we were younger, it's not too late to start as we can not only maintain what we have, but muscle strength can quickly improve with the right training.

Many people are reluctant, hesitant, confused, even discouraged from gaining back their body strength to feel — and be — healthy, fit, and physiologically younger again. They may feel there is no time in the day to add another workout to an already busy life. Or, they're turned off about going to a gym and seeing all those muscular bodies and mirrors. Unfortunately, most

don't really know how easy it is to get stronger. That's why I wrote this book.

Why do we lose strength?

In the modern world, we don't use our muscles as much as our grandparents, or even our own parents. Reduced physical activity can also reduce our bone strength. We have not adapted well to a world of convenience and inactivity. Use it or lose it is particularly applicable to both muscles and bones. As we spend more time sitting, physical activity levels are reduced, and many suffer the consequences. This can even occur in those who exercise regularly too.

One might ask: Hasn't the fitness boom gotten more people off the couch? Yes, but that's not the whole story. While the percentage of people who exercise may be rising, overall physical activity has actually diminished. This is due to the fact that an exercise session of say, 60 minutes, may be offset by sitting and being inactive the rest of the day. In addition, people have gotten *unhealthier* overall. For example, poor eating habits, primarily junk food consumption, can offset the benefits of proper exercise as discussed later.

In the United States, for example, exercise rates have risen to include more than half the adult population who participate in strength and aerobic workouts. While this is the highest rate in

decades, it unfortunately parallels the rise in excess body fat, called *overfat*, now at its highest levels in history — affecting 91 percent of adults and about 70 percent of children in the U.S., with the rest of the world following closely behind. The result is that many still suffer from poor health and fitness, especially due to excess body fat, which can significantly affect muscles and bones.

Who has time?

I bet you don't have time in your busy schedule, don't want to get sore, or simply don't want to deal with the notion of “no pain, no gain.” The vast majority of people who do join a gym and start the tedious task of implementing weight workouts for all the muscle groups eventually give up. It's too much work, too little fun, and many people just don't feel the benefits. It's sometimes even embarrassing. While most forms of exercise may have beneficial effects, this book distills the process of strength training, focusing on the minimal amount of work needed to be successful.

If you enjoy visiting the gym or other facilities, you can still continue while tweaking your approach with the recommendations in this book to make it easier and more effective.

MAF Strength Training includes various exercise options such as *MAF Slow Weights* and similar routines, and always includes

an active warm-up and cool-down to leave you more flexible, all in a simple, easy and highly effective way that builds full body muscle and bone strength. It is without fatigue or pain, sometimes with almost no time commitment, even in the privacy of your home. Success starts *with the first easy workout*. That's because you enlist the brain to contract more muscle fibers, improving strength. This approach mimics the natural activity of humans throughout their existence — but only small numbers of people do this natural work today, leaving the rest of the world to get weaker.

Each chapter in this book addresses an important but simple concept directed at performing effective strength training. By the end of the book, you'll not only know *how* to train for stronger muscles and bones, but be able to figure out how to personalize your own workouts since you'll know *why* each of the characteristics of this program are so effective.

MAF stands for *maximum aerobic function*. It's a method I developed over the past 40+ years to help people manage their own health and fitness. The MAF Method incorporates physical activity, including strength training and aerobic conditioning, with natural food choices, and managing stress with the goal to improve fat-burning and reduce body fat. Benefits include increased energy and reduced risk of disease, along with all other health and fitness factors, including healthy aging. Improved brain function is

another important benefit of this approach — each muscle fiber we train to contract also stimulates better brain function.

Health is defined as all the body's systems working in harmony.

Fitness is the ability to be physically active or athletic.

Strong muscles and bones significantly affect both health *and* fitness.

As a summary, the MAF Strength Training approach is very different from traditional weightlifting routines. The chart below highlights these differences, with more details described throughout the book.

	MAF Strength Training	Traditional Strength Training
Muscle Fatigue	Minimal	Significant
Soreness/Pain	No	Yes
Muscle Bulk	Minor	Major
Weight Gain	No	Yes
Stress Hormones	No	Yes
Recovery from Workout	3 minutes	24-72 hours
Increased Muscle Strength	Yes	Possibly Yes
Increased Bone Strength	Yes	Usually not
MAF HR Performance	Helps	Often impairs
Time Investment	Minimal	Considerable

Key differences between MAF Strength Training and traditional approaches.

Also note these two important points:

- When starting a strength program, even if you're familiar with it, always begin conservatively with less weight and repetitions. Take up to several weeks to gradually build up. In many cases, a barbell without added weight is adequate for becoming accustomed to proper movements; slowly add small amounts of weight every couple of weeks.

GET STRONG!

- If you're new to strength training, get some professional one-on-one guidance from a certified trainer or coach, physical therapist or other expert.

Beginning your journey to a stronger and healthier body is an exciting one. There is no better time to start than now.

— *Dr. Philip Maffetone*
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Let nature take its course

For most of humanity's history, nature took its course by ensuring our daily activities built and maintained adequate muscle and bone strength. Those who failed to do this simply did not survive. Today, however, most people worldwide are not naturally active, and weakness is a serious problem. But we can turn on the built-in capacity to get stronger by enlisting our natural abilities.

Case history

Maria was an active executive, mother of two teenagers, and regularly walked for exercise. Before starting a family, she had a very active life caring for horses and a big garden, and was always outdoors doing chores. But now, years later, her muscle strength had deteriorated, with a recent history of two stress fractures and numerous other physical injuries.

Before visiting my clinic, Maria joined gyms, bought strength equipment for home use, and tried a variety of workout programs but without success. One problem was finding the time to fit workouts into her busy week, but it always led to rushing through them. Another was her increase in nagging injuries, sometimes to the point of having to skip a workout, or a week or more of training. Her muscle bulk often increased as indicated by an additional five to 10 pounds of body weight, and she did not like the soreness and fatigue felt the next day.

Following an evaluation, I recommended a “slow weights” routine, and keeping a dumbbell weight both in her office and at home. Not only did her strength improve quickly, her energy increased, she was never sore, avoided weight gain, and, over several years never had an injury including a stress fracture. While Maria was not a professional athlete, her body still needed strong muscles and bones, but without the high level of training.

Case history

Professional triathlete Mike Pigg had just completed his most successful racing season. In fact, it was one of the greatest single seasons of any multisport athlete. Mike won most of his international races and finished strongly in several others, adding to his already lengthy list of accomplishments

including several championships. Not bad, since he was nearing the end of his long career.

That year's training schedule was special. But not in the way you might expect. It had included no weightlifting, or other anaerobic/hard work. As November approached, we discussed the upcoming "off" season, the period of rest and recovery following the last race until the onset of winter aerobic training.

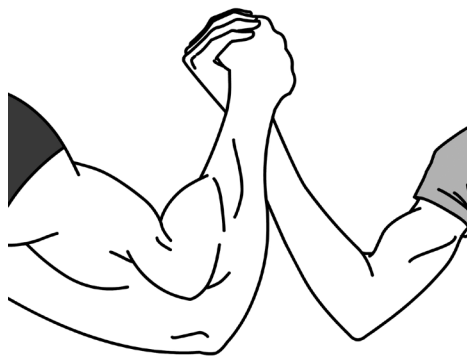
My recommendation to Mike was as unorthodox as the training schedule that had preceded it. After a few days of doing little or no training, I suggested he spend time lifting and dragging logs and chop wood, and perform other outdoor physical labor — basically, catching up on chores. It was quite a different training routine than running, biking and swimming for hours each day. Although this may seem overly simple, Mike was working out like our Paleolithic ancestors.

Natural strength

It turns out that developing good muscle and bone strength through regular, natural activities is ideal for building and maintaining overall health and fitness, whether we're competitive athletes or not. But we don't have to spend our days working outside

to accomplish it. Instead, we can create a training program that mimics the muscle and bone benefits of natural activities.

While our bodies are best adapted to the kinds of activities our ancestors did, most of today's strength programs are not natural. We live in a hectic society that's flooded with conveniences, and far removed from the natural, physically active life for which our genes are programmed. This distance from nature has given birth to the many workout programs designed to build muscle strength using free weights, machines or other devices. But instead of mimicking natural movement, most of these approaches are artificial, with more hype than help, and a high risk for injury or overtraining, including the potential to impair the function of the fat-burning aerobic system we rely on for endurance, physical



Big muscles are not necessarily stronger. Those with lean muscles actually can be stronger than those with big bulky ones.

support of the body, and optimal health. And, most of these popular programs don't improve bone strength.

Over the past 50 years, weightlifting traditions evolved in gyms and clubs for relatively small numbers of fitness enthusiasts and competitive athletes set on building high volumes of strength and muscle bulk through regular hard efforts. This is the image many non-exercising people have — sweaty gyms with mirrors, grunting, and a philosophy of no pain, no gain.

Not only is this unnecessary for obtaining strength, it comes with the risk of impairing health. Moreover, the large muscle mass typically created makes people appear very strong, which is not necessarily the case. The fact is, those with lean muscles actually can be stronger than those with big bulky ones. The reason for this is that muscle strength is associated with the brain's ability to contract more muscle cells or fibers; as discussed later, just because your muscles are big doesn't mean you're contracting many fibers for more strength.

Natural training

Letting nature take its course through MAF Strength Training is uniquely different from modern hyped-up workouts in key ways. Consider these differences between natural and unnatural strength training:

Using the whole body

Natural: Many physical activities our ancestors performed used their whole body — each and every action was a combination of movements. At minimum, they incorporated two important activities: picking up something with moderate weight, holding or carrying it, and putting it down. Raising an object like a small log above your waist or onto your shoulder employs bodywide muscle contractions, and it triggers bone strength.

Using whole-body movements instead of working individual muscles helps us perform as one single unit to express far more power than if the muscles were moving in isolation. In other words, even though you can make a single muscle very strong by isolating and exercising it, a team effort in which all the body's muscles are effectively involved in a movement is superior in producing an overall stronger body than working muscles in isolation.

Unnatural: Most strength equipment today tends to train a particular muscle or muscle group — such as the pecs, quads, hamstrings or abdominals. In nature, you would not usually isolate a single muscle repeatedly for any length of time. While some gym exercises, such as the squat, deadlift, and others, do incorporate the entire body, they are typically the domain of powerlifters. In this book, you will learn how to incorporate these kinds of whole-body movements, especially the squat, into a simple and easy routine that fits just about any lifestyle.

Increased variation

Natural: Every movement was slightly different. Every stone or log lifted enlisted slightly different motions. And the body adapted each movement to its current condition. It is not just the variety of different movements, but also the variation *within* repeated movements, that contributed to improved full body strength and also health.

Unnatural: Most present-day workouts attempt to replicate the very same movement in a very controlled environment. The various machines force you to train a muscle with exactly the same motion. Even each squat is taught to be performed identically each time, and the same from person to person. That's not natural; it's artificial.

Spread exercise throughout the day

Natural: Our ancestors didn't set aside time to exercise because their natural activity provided all their fitness needs. They didn't crunch their workout into a single session. Their lifestyle and livelihood depended on continued movement throughout the day.

Unnatural: Most active people today schedule training sessions, including the routine of changing clothes, getting into workout shoes and often commuting to a gym or club. Unfortunately, many people typically spend much of the rest of the day relatively immobile, sitting.

Minimize fatigue and soreness

Natural: Our ancestors spread most of their activities throughout the day, easily recovering from the efforts. They exerted themselves for relatively short periods, and rested as needed. The relatively mild fatigue and soreness this created was a stimulus that helped develop muscle and bone strength. This is accomplished naturally without *excess* fatigue or soreness, and certainly not pain, that bulks up muscles, requires much longer recovery, and can literally slow a person down due to the extra weight. The natural desire to avoid excess fatigue and soreness made perfect sense — tired/sore muscles are slower and weaker, and could put one's life in danger.

Unnatural: The current culture of *no pain, no gain* glorifies fatigue and soreness. It can bring weakness and pain, increasing the risk of injury; but it's seen as positive in our society, a sign of courage and mental strength. These results feel like we've gotten all we can out of our workout — if our body can't give any more, the proverbial 110 percent, then we worked out to the max, right?

That may be true during athletic competition, but it misses a crucial factor: The point of a workout is not to *exhaust* the body — but to *strengthen* the body, and not sacrifice health. When we get fooled into thinking that the point of a workout is to fatigue the body into soreness or pain, we weaken and risk damaging it, requiring longer recovery during which time our muscles are weaker and we must limit or avoid exercise.

This is why the addition of a strength-training program to existing training or any busy schedule like we all have is not always easy, and those who manage it often risk making an already busy day more stressful. This can defeat the purpose of exercise, and, especially for athletes, may possibly impair performance and contribute to the *overtraining syndrome*. (Overtraining can occur in anyone, and is a harmful exercise condition of impaired health and fitness.)

Maximum aerobic function

Natural: Early humans moved throughout their waking hours. When not lifting logs or stones, they were walking or jogging slow for hunting and gathering, developing better *aerobic* muscle fibers. Unlike the *anaerobic* power muscles, used for the occasional sprint or all-out power, the aerobic types provide long-term energy, support the bones and joints, burn fat for energy, and, due to their high volume of blood circulation that brings in nutrients and removes muscle byproducts, helps keep those important power muscles ready for action when needed. In short, they built *maximum aerobic function* — MAF, discussed later — thereby developing great strength *and* endurance to improve both health and fitness.

Unnatural: While most people in the world may be weak, they are also aerobically deficient. In addition to having excess body fat, many are inactive, and those who exercise often go through

the motion of building the aerobic system but often don't, or do so improperly. This may be due to running, cycling, even walking too fast, with too high a heart rate, following traditional fatiguing routines, not unlike traditional unnatural weightlifting programs. As discussed later, eating unnatural refined food worsens these problems. If we do so, we burn more sugar calories instead of fat calories and build excess body fat, get injured, fatigued and too hungry, develop hormone imbalance and other health problems, and impair fitness performance. Weak muscles and bone are part of this global problem.

Summary

- Following a natural health and fitness approach can lead to stronger muscles and bones.
- Lift relatively moderate weight objects in the course of natural movement, and/or during strength training.
- Avoid more than mild muscle fatigue during the process.
- Don't neglect maximum aerobic function (more about that later).

Making muscles and bones stronger

Muscle strength isn't really about the size of a muscle but the amount of muscle fibers employed during a strength activity. The brain and nervous system stimulate muscles. The brain sends impulses down through nerves that spark individual muscle cells, called *fibers*, to contract. The more fibers that are stimulated and contract, the more strength. Just having big muscles doesn't mean that more fibers will be stimulated or contract. That's why a skinny kid who can contract a lot of muscle fibers can be stronger than a big bulky athlete who can't contract large numbers of fibers.

Olympic weightlifters are an excellent example of natural strength. They want maximum strength from their bodies while minimizing bulk. Too much weight from bulk adds extra body weight that can

put them into a higher competitive weight category where competition may be more difficult. Apart from the heavyweight and super heavyweight categories, most Olympians are as lean as possible, but have very strong muscles and bones.

By comparison, bodybuilders have much bigger muscles because their competitions involve showing off large muscles; but they are relatively weaker in comparison to the Olympians' smaller muscles.



Following the lead of the strong skinny kid or the Olympic weightlifter isn't a mystery, or even a difficult condition to create: You just need to follow the natural guidelines to understand *why* the process works, and how easy it can be to develop strong muscles and bones.

Muscles and muscle fibers

Each skeletal muscle is composed of thousands of fibers. When the brain sends messages to muscles to contract or relax, these cells respond. Contracting together, the fibers cause the muscle to move and produce force. Likewise, for relaxation.

However, even very hard muscle contractions, including those considered *maximal*, almost never use the total amount of any muscle's fibers. This means that by training your brain to activate additional fibers, the same muscle can become stronger. This *biofeedback* effect is the basis of MAF Strength Training.

- Unlike whole muscles, individual fibers work like an on/off switch: Either they are completely at rest or completely contract.
- Because of this, strength isn't about how hard the muscle fibers are contracting, but by *how many* the brain has recruited to contract.
- When muscles get larger, it's primarily by the process of *hypertrophy* — an increase in fiber size, which may or may not significantly increase strength. This bulking can take weeks to months to develop.

- Increasing strength due to increased numbers of fibers in a contraction occurs immediately with MAF Strength Training, from the very first workout.
- Improving strength not only involves the brain and nervous system, but a good metabolism, especially in regulation of protein (requiring dietary sources, discussed later) and balanced hormones. In other words, good health.

So the body's first step for increasing strength is to stimulate more muscle fibers to contract.

Those who increase muscle size through hypertrophy — bulking up — usually do so for looks, but in some sports the purpose is for increased weight, with larger muscles absorbing greater physical wear-and-tear (think of big football players or heavyweight boxers).

Fortunately for us, our muscles may be the most adaptable parts of our bodies, making the right strength training very effective, and immediate. Both men and women respond to strength training similarly, although due to gender differences in body and muscle size, and hormone levels, men generally overall have increased muscle size and strength.

A woman's world: more endurance, less fatigue

While men have more max power than women, men actually experience greater fatigue than strength-matched women when strength training. This means that women can perform muscle contractions for a longer duration than strength-matched men.

This is probably associated with women's potential for *endurance strength* — better fat-burning, which can improve overall endurance, with reduced propensity to fatigue.

Also associated is the rate of rise in women's heart rates that is less than men; i.e., a reduced rate of increased heart rate during submax, endurance workouts. In addition to fat-burning, this heart-rate effect is associated with better cardiovascular adjustments (adaptation) that occur at a lesser rate for women during training, and in test results showing a longer time to muscle failure.

Women also recover faster from strength workouts due to a more efficient clearance of metabolic byproducts.

MAF strength training

We train for strength by maximizing stimulation of the muscles and bones. This means not too much or too little. It's achieved by choosing the proper weight while minimizing fatigue and soreness. This includes:

- Using heavier — not heavy or light — weight (about 80% of your maximum capacity described below).
- Fewer repetitions per set (two to six).
- Longer rest between sets (three minutes or more).

Terminology: repetitions and sets

Strength training is typically divided into *reps* (repetitions) and *sets*. A rep is each individual movement, such as lifting a weight to your chest or performing a squat; a set is a group of repetitions that you do before a period of rest, so doing five squats is one set.

MAF Strength Training is so effective that one set, or even one rep, a routine that many people start with, can begin to stimulate muscle and bone strength.

How much weight?

There's no need to lift weight so heavy that it fatigues you excessively. This approach can easily raise the risk of injury. However, lifting weight that's too light may not develop sufficient muscle or bone strength.

Traditionally, and in scientific studies, the 1RM, or one repetition maximum, is the theoretical max weight you can lift one time. This lift is so strenuous and fatiguing that the muscles are unable to lift a second time. And, lifting 80 percent of this 1RM could be about the correct weight used for MAF Strength Training. For example, if the most weight you can lift only one time is 50 pounds, then about 40 pounds (80 percent X 50) is the weight you can lift about five or six times before noticeable fatigue develops.

I don't recommend you try performing a 1RM unless you are well trained or have professional assistance. Instead, simply experimenting by starting with lighter weight and increasing over days and weeks to say, six reps or before you start noticing fatigue, can usually accomplish similar results.

So the recommended number of reps would be up to five or six; in general, two to six. Some days you'll feel better and six will seem easier, and on days that you're busy or have less energy, two or three reps is still an effective workout. *Don't push it, keep it natural with what your body wants to do that day.*

This approach increases the brain's ability to contract more muscle fibers, and is without excess fatigue, does not create soreness or pain afterwards or the next day, and won't lead to excess muscle bulk.

- *Don't* add repetitions as you get stronger or because you don't feel as fatigued (you should always feel like you can perform more). This will *reduce* the effectiveness of the workout. *In short, as your brain and muscles fatigue more, fewer muscle fibers contract, leading to more size gains (bulk) and potentially fewer strength gains.*
- Instead, as you become stronger, add more weight rather than increasing reps.

How much recovery?

Recovery is rest. In relation to strength training, we need recovery within a single session between sets, between sessions during the day, and from day to day.

After performing a set of five or six reps, for example, it's important to rest sufficiently before another set:

- In MAF Strength Training, this requires at least three minutes. Use a watch or timer.
- You can take more than three minutes if you want — even 10 or 30 minutes, for example, or even a whole afternoon or full

day. Or, you can have several sessions throughout the day as long as you have at least three minutes or more of recovery between sets.

- This prevents excess fatigue and effectively prepares the body for the next set to be just as effective in triggering strength.

Day-to-day recovery is important too.

- Performing MAF Strength Training allows you to work out every day if you want because recovery is rapid.
- Recovery also means getting proper sleep, and is supported by eating well and other lifestyle factors discussed later.

In addition, whether performing *MAF Slow Weights* or other MAF Strength Training methods, the actual lifting movement itself should not be too slow — a brisk, continuous movement from beginning to end, performing one rep about every one to three seconds is a general guide. But also consider comfort without strain.

When adding muscle bulk is important

In some situations, muscle loss from aging or illness may require adding more bulk to your body. Or, if your goal is bodybuilding, or you're in a sport like football or boxing, or for appearance if you want to look more cool.

The loss of muscle and bone strength, and muscle mass, is a reality with age. Declines often become evident during the middle and late 30s. By our 60s and beyond, many people are very weak, and have lost too much muscle, especially those who are less physically active with reduced health. Excess muscle loss is known as *sarcopenia*, and is one of the most common causes of physical impairments later in life. It leads to further reductions in physical activity, bone loss, and increased joint, ligaments, tendon and other soft-tissue dysfunction contributing to injury and pain. The loss of muscle, and reduced muscle activity, can also impair brain function.

Sarcopenia can be accelerated by bed rest, immobility and muscle disuse, chronic inflammation, hormone imbalance, low protein intake, many commonly used prescription drugs (such as statins, and those used for blood sugar and blood pressure control) and over-the-counter drugs such as Ibuprofen. Excess body fat can predispose someone to sarcopenia. (Sarcopenia associated with excess body fat is called “sarcopenic overfat.”)

Muscles do more than move us — they are also necessary for structural support, optimal blood and lymph circulation, immune function, fat-burning and hormone production. So it's no surprise that low muscle strength and mass affects other aspects of health and fitness — and is a significant predictor of mortality.

Adding muscle bulk is accomplished by maximizing muscle stimulation. While this can increase stress during the workout, it can also be accomplished by maintaining low risk of injury by performing:

- Lighter weight (55-65 percent of your maximum).
- More repetitions per set (12-15).
- Less rest between sets (15-60 seconds).
- More recovery time between sessions: 48-72 hours.
- During this recovery period, other exercise should be moderated as muscles are weaker until recovery is completed.

By increasing repetitions, a percentage of the muscle's fibers get used repeatedly. As they fatigue and fail, new muscle fibers are recruited to continue powering the workout. When enough muscle fibers fatigue, the muscle as a whole begins to lose significant power, arriving at the *point of failure* (when the muscle can no longer lift the desired weight)—the muscle gets weaker due to the excess fatigue. This typically causes soreness later in the day and/or the next morning.

Training for more bulk is all about forcing the muscle to continue working even as it gets fatigued. This process damages the muscle, breaking it down. Recovery repairs it, requiring up to 72 hours.

Essentially, the body is building *bigger* muscles because it is over-compensating primarily to *muscle damage*, i.e., stress. The result can be positive — additional bulk — when we recover well, don't lift excessive weight or perform too many reps, while also getting adequate sleep and maintaining good nutrition.

For building bulk, keep in mind:

- The greater the fatigue and the more weakness and discomfort, the longer recovery time is required.
- The body produces stress hormones in order to cope with this type of workout. This significantly increases the need for more recovery — something many people neglect. This stress can also impair aerobic function (and fat-burning), and another reason (other than added bodyweight) why endurance athletes should generally avoid it.
- Without proper recovery from workouts, an accumulation of this and other stresses can contribute to *overtraining*, even in those who don't compete in sports.

So you can see that most people don't need or want to add bulk, and should avoid these types of workouts.

Looking cool: pushups

Among the most traditional muscle-bulking workouts is the pushup, a common calisthenic that relies on body weight to work out certain muscles. They particularly put bulk on the pectoral muscles, those in the upper chest just under the collar bone, and around the shoulders, while tensing others throughout the body. Most people are familiar with the workout from school days — while lying prone with our hands flat on the floor and balancing on the toes, we push our tight, straight body down toward the ground, then up again, and repeat.

Performing pushups regularly may serve little whole body purpose except to be able to do more pushups, and have some bulk in your muscles that many think looks sexy. I'm OK with that, as long as you don't cause pain and any significant soreness is gone by the next day or two. It won't help bones or significantly strengthen other muscles.

Those who have a diastasis (recti), which is an abnormal separation of abdominal muscle fibers often due to pregnancy (or sometimes occurs at birth), should avoid all pushups.

If you're just starting out performing pushups, and unable to do more than one, two or a few, consider these options:

- Do them from your knees instead of toes, which reduces the amount of body weight you have to push.
- Do *inclined* pushups while standing: place your hands on a kitchen counter or heavy desk and lean forward to about a 45-degree angle. This reduces body weight, and lowers stress on the wrists, shoulders, knees and abdominal muscles.
- Once you improve strength, switch to your toes for a more effective pushup.

To build bulk, you might have to go through a period of mild soreness, but avoid the pain; and train every third day to ensure good recovery. Start with the number of pushups you can comfortably perform, even if one. Slowly add to that as you get stronger and more comfortable.

Avoid pushups if they are not comfortable or you can't find the correct technique, or get help from a professional.

Bones

Our bones are the most neglected part of exercise today. While they respond by strengthening through physical activity, primarily from muscle contractions that mildly stress the bone, and from gravitational forces, most workouts don't result in stronger bones.

Just like muscles, bone loss is also a common problem with aging. Bone strength is related to the *peak bone mass* we create up to about age 30, when we begin losing it as the decades pass. The less peak bone we develop, the more we're likely to have too much bone loss, which can lead to osteoporosis, bone fractures and other problems at all ages in both men and women. (Along with exercise, peak bone mass and its loss during aging is also strongly associated with vitamin D, food and stress as discussed later.)

Fortunately, training to improve bone-strength, like that described in this book, can help at any age. In younger people, this approach can help build greater peak bone mass. And, it can help slow the rate of bone loss in those over age 30. In addition, improving muscle stress can help protect bones from fractures and other injuries.

Neglecting our muscles and bones typically affects middle and older-aged individuals, although today's younger people have weaker bones and muscles than previous generations.

Summary

- Strength begins in the brain, not the muscles! If you want more strength, train the brain to contract more muscle fibers.
- Training for strength means a shorter workout. In fact, you may be spending more time resting between reps than lifting.
- Do fewer sets than you think will make you tired.
- Maximize your rest between sets (three minutes minimally, longer if you want).
- *This can't be stressed enough:* Even an hour of rest between sets will not reduce your strength gains. Remember — it's NOT about how *tired* you feel after a workout. It's about how many muscle fibers your brain learns to contract at a given time, due to the amount of weight you lift successfully.
- Minimally, you only need to perform one movement to build full body muscle and bone strength.
- The right muscle strength training improves bones too.

The question of muscle fatigue

All physical activity can cause muscles to fatigue. This may be a minor amount that's not easily felt, or more significant fatigue that can lead to discomfort or soreness, weakness or pain. It can be sensed in one muscle group, or the whole body. To unlock your full body strength potential, an understanding of muscle fatigue and implementing simple strategies to regulate it are very important.

Traditional strategies for weightlifting include performing reps to the point where the muscles significantly fatigue during lifting, causing weakness that prevents additional reps. This leads to excess muscle soreness and sometimes pain the next day, and requires a relatively long recovery time of between 48 and 72 hours. This approach uses more repetitions, such as 10, 12, 14 or more during the lifts, with relatively lighter weights. As noted, this works for those wanting to build larger, bulky muscles. For the rest of us who just want stronger muscles and bones, it's not advised.

Excess muscle fatigue is harmful because it increases the risk for injured muscles, bones, tendons, ligaments and joints. While it's glorified in our no-pain, no-gain society, many people respond to fatigue's discomfort by medicating it. These pain killers can have serious side effects, and even slow muscle and bone repair as well as overall recovery.

Excess muscle fatigue can also create muscle weakness.

The weakness window

Typical weightlifting workouts cause excess fatigue and temporary muscle weakness which can become significant beginning near the end of a workout and last up to 72 hours. This *weakness window* can be a dangerous period of time. It can reduce the normal support and function of joints, ligaments and tendons, even bones and other muscles. This can impair posture and gait, which further increases the risk of a physical injury during the weakness window. It is especially concerning for those performing aerobic workouts like walking, running or cycling, those playing golf or tennis, and for those who sit too much.

Consider that even two of these kinds of weight workouts a week may mean four to six days of weakness, and the potential for significant injury risk!

In addition, the weakness window can increase stress hormones, impair endurance, reduce physical balance, increase the risk of falls (and fractures) and even worsen existing conditions such as chronic pain, chronic fatigue syndrome, or fibromyalgia.

The use of MAF Strength Training does not produce excess fatigue, so there's no weakness window to worry about.

The primary causes of excess muscle fatigue associated with exercise are usually one or both:

- Too much intensity (too much weight or reps during strength training, or higher heart rate during aerobic exercise).
- Too much volume (too much daily or weekly training time).

Fatigue is, therefore, an important condition to monitor during all physical activity, especially strength training. This symptom could tell you that the weight you are lifting is too much, the reps are too many, the length of the workout is too long, or recovery too short.

Muscle training fatigue is an activity-induced reduction of strength, and necessary to induce neuromuscular adaption that leads to increases in strength. However, a relatively small amount of fatigue can accomplish your strength goals.

- Excess muscle fatigue occurs if you feel too much weakness, any type of pain, or you're not able to lift easily again in three or more minutes, an hour, or the next day.
- Of course, a pre-existing muscle, joint or other physical problem could cause fatigue or pain, and worsen from a strength-training workout, proper or not. This is the reason to avoid strength training when your health or fitness is impaired unless guided by a professional.

In addition to traditional or improper strength training, there are other causes of excess fatigue, often associated with soreness, weakness and pain:

- Work around home such as gardening, cleaning out the garage or basement, or other activities you're not used to, and that you tackle too aggressively.
- Endurance exercises such as jogging or running, cycling, swimming, dancing, fast walking, and activities like tennis or other racquet sports, even golf, bowling and other games if you're not used to them or perform too often or too hard.
- Fatigue of disuse. Sometimes our muscles fatigue due to immobility. Underused or over-rested muscles can get weak fast. Bed rest, an arm or leg in the cast, a long airline flight or other situations can accelerate the problem.

- Muscle tightness can wear a muscle out (like a sustained contraction). The ongoing tension can cause fatigue. This is common in people who sit too much, where attempted muscle adaptation leads to tightness resulting in fatigue.
- Foot muscle fatigue is common too. Typically felt at day's end, it's usually due to wearing bad shoes — those that don't fit well or are over-supported — or from leg and foot muscles that are weak to begin with.

No fatigue, no pain, no gain?

We have all been exposed to the *no-pain, no-gain* paradigm. The centuries-old social phenomenon, popularized 50 or more years ago during the exercise boom, erroneously infers that if it doesn't hurt we haven't trained long or hard enough. Excess fatigue is a common cause and symptom of no pain, no gain that precedes pain. No excess fatigue, no pain, yet, despite the myth, we still gain significant strength.

In my recent article with sociologist Rik Scarce, we wrote:

“No pain, no gain is such an accepted mindset that few dare question it. For many the brainwashing begins early, often in middle school PE class, where we are trained to believe that physical fitness is something to be gained only through painful workouts. From a societal standpoint this develops

into a herd mentality and is also applied to other areas of life, from education to work ethics and even to our relationships with others.”

Athletes and fatigue

In sports, the onset of fatigue during training leads to significant reductions in performance as measured in power output (such as watts while cycling or rowing) and pace (such as running). This occurs faster with higher intensity and higher heart rate. While this is a normal neuromuscular response mediated by the brain, those with very good aerobic development and fat-burning don't fatigue as much, or suffer as much reduced power or pace later in the workout. The same fatigue relationship occurs during competition, with the fit-test athletes fatiguing less and burning more fat.

Fatigue checklist

While the feeling of excess fatigue, weakness or pain should serve as a red flag, monitoring other symptoms can be helpful too. Using this simple checklist, answering “yes” to two or more of these bullet points may be a warning to take it easy, reduce training, increase recovery or seek professional help:

- You get less than 7 to 9 hours uninterrupted each night.
- You wake up feeling tired or physically uncomfortable.
- You feel little motivation for exercise.
- You do not get regular sun exposure on your skin (without burning).
- You feel ill, uncomfortable or excessively tired after training.
- Your exercise footwear is uncomfortable and your feet are typically tired after training or the end of the day.
- Your measured power or pace at the same heart rate is declining over time — or has not increased in more than a few months.

MAF strength training for neurological impairment

Whether a stroke, conditions such as cerebral palsy, multiple sclerosis or other brain or spinal cord injuries, the approach to improving muscle and bone strength discussed in this book can also be applicable to those with neurological impairments. While training with lighter weights is the most common training used in research and rehab, for fear of fatiguing patients excessively,

this approach leads to outcomes that are often not very promising. Using increased, more moderate weights as described here appears to have much more positive outcomes, especially when combined with biofeedback, the goal of which is also to encourage the brain to enlist more muscle fibers in each contraction.

Strength training, along with aerobic/endurance exercise, can also improve brain function in patients with neurologic injuries because input to the brain from muscle contractions can provide significant positive biochemical and physical effects.

Summary

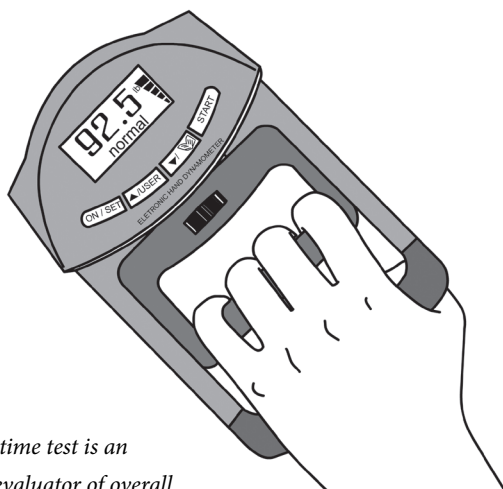
- Muscle fatigue is not necessarily bad, it's actually an important part of getting stronger.
- Healthy fatigue is mild, perhaps moderate when first starting on a new program, and is necessary to create the desired training effect in the body — stronger muscles and bones.
- Excess fatigue, however, and a mentality that fuels it — no pain, no gain — is harmful because it can increase muscle weakness and cause pain or overtraining.

How strong or weak are you?

Knowing whether you're getting stronger is an important part of strength training. To some degree, that is usually evident during the course of training itself — as we get stronger we have to add more weight to the workout. But without initially and/or periodically testing our strength we may not know for sure how well our program is working. Guessing is not a good evaluation.

As a result, I recommend some simple strength tests to monitor progress. These include *Grip Strength*, and the *Strength Sign*. For competitive athletes, I also recommend the *Jump Test*. These are not a necessity, but provide a good objective self-assessment. A clinician, coach or trainer may also perform these and other tests to assess and monitor your progress.

Test: grip strength



This long-time test is an excellent evaluator of overall health and fitness.

As a fundamental element of a complete physical examination for most people, this test measures the maximum isometric strength of the hand and forearm muscles. *But crucially, grip strength is a reflection of whole body function. Studies show that grip strength has a strong correlation with various aspects of health and fitness, including nutritional status, body fat, full-body muscle mass, athletic performance, and is a predictor of overall mortality.*

Grip strength is usually reduced if you're overtrained, sick, injured, hospitalized, or are otherwise unhealthy — or have muscle weakness, even in other areas of the body.

Home testing

The test requires a device called a *grip dynamometer*. This small machine that you squeeze with your hand accurately measures strength in pounds or kilograms.

Here are some guidelines on how to test your grip strength:

- Perform the test using the same hand each time (usually the most dominant hand, which is slightly stronger).
- Keep the wrist straight and with the elbow at right angles by the side of the body.
- Measure the same time of day. (First thing in the morning is best.)
- The test is best performed while standing.
- Squeeze for two to five seconds.
- *If gripping causes pain, avoid it.*
- Perform monthly or as often as you want without getting obsessed.

There's no particular number that's "normal," despite the ranges in the chart below, but consider that more grip strength typically means that you are getting healthier and more fit. Improvements in grip strength can signify training success, as well as recovery from overtraining, injury or significant illness.

Minimum grip strength measures for healthy men and women of different age groups using the dominant hand. The less dominant hand may be reduced about 2-4 lbs. or 1-2 kg. Measures in pounds (with kilograms in parenthesis).

Age	Men	Women
18 - 59	110 - 120 (50 - 55)	77 - 88 (35 - 40)
60 - 69	100 - 110 (45 - 50)	66 - 77 (30 - 35)
70+	88 - 100 (40 - 45)	55 - 65 (25 - 30)

In short, falling below these grip strength levels indicates increased risk of having weaker muscles and bones. And, the lower the grip strength, the less likely you are to be healthy and fit, and the higher your risk for a variety of ailments and illnesses.

While grip strength reduces with age, it should not diminish significantly because we can prevent much of this reduction by maintaining whole body strength and good health.

Test: the strength sign

This is the easiest evaluation of strength, and previously mentioned. The strength sign is the need to add weight to your lifts

as you become stronger. Your awareness that your strength is increasing is indicated because it gets easier, or too easy, to lift the same amount of weight in six reps, for example, compared to previous lifting. As a result, you have to add more weight to your routine to continue improving.

Make this change with a small amount of weight, adding more only when it's evident that it's easier to perform more than five to six reps. (For those familiar with and who use the MAF Test, it is similar in that you can perform more endurance work, such as running or cycling, over time at the same effort.)

It's important to remember:

- With proper training, you should gradually get measurably stronger.
- Strength gains may take place quicker in the first year.
- When this happens, you'll notice it's getting easier to reach your five or six reps — that's the time to consider gradually adding weight.
- Add weight carefully, sometimes starting with just a couple of pounds.
- Adding weight replaces the need to perform more repetitions.

If, for whatever reason, you go through a period when you don't perform any strength training, such as a few weeks or months, you may eventually lose some of the strength you gained. In this case, when getting back into training, *reduce* the amount of weight you previously used until you begin to get stronger again. Then you can increase the weight as needed. *Sometimes we think we're stronger than we are, relating to those days when we actually were stronger.*

Test: the jump test

Sometimes called the *vertical jump test*, this is an athletic evaluation of lower body strength. We should all have good strength in our lower limb muscles, which typically reflects good bone strength in the lower body too.

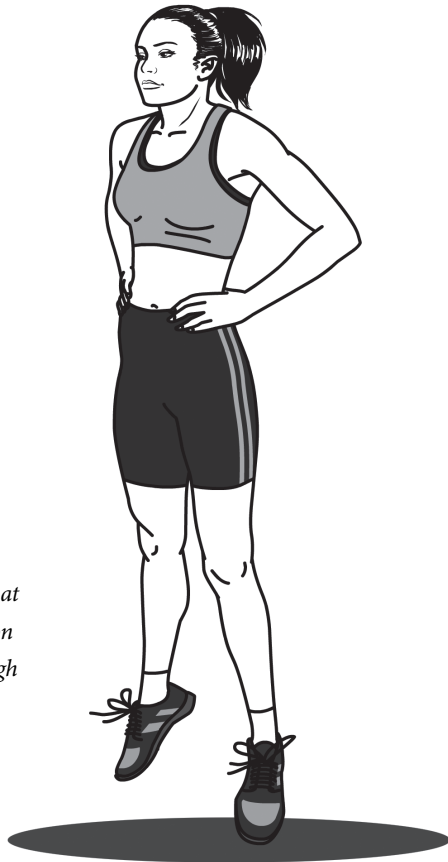
The jump test is important to perform by those who jog, run, cycle, or perform other aerobic workouts. Despite the large volume of endurance training, including activities like racing 5K, 10K, marathons, triathlons and other events, lower body muscles in endurance athletes are often surprisingly weak. This is due to how muscles contract during endurance training, and may further become impaired due to overtraining, frequent muscle fatigue or a dwindling strength loss with aging.

Many distance runners can't jump higher than 12 inches or so. This is well below the athletic average and significantly lower

than healthy sprinters and middle-distance runners — who can jump vertically well into the 20-inch range and beyond.

Professional trainers, coaches, physical therapist and others may be able to measure your jumping ability with a device in their facility, which relies on timing while jumping on a special mat shown in the image below.

*You can also
measure yourself at
home or a location
with a high enough
ceiling.*



Measuring jump height at home

To do a proper jump test, it's best to have someone help you mark your jump height:

- Standing next to a wall flatfooted and barefoot, reach your arm up as high as possible and mark the wall (or place a piece of tape) at the highest point of your fingertips.
- Jump up as high as possible (best to bend the knees to about 90 degrees before jumping) and make a second mark on the wall at your highest point.
- Perform three tests with a three-minute break in between and record the highest jump by measuring the difference between the low and high mark on the wall.

This is your vertical jump height. Record it, and perform the test every one to three months to monitor progress.

Summary

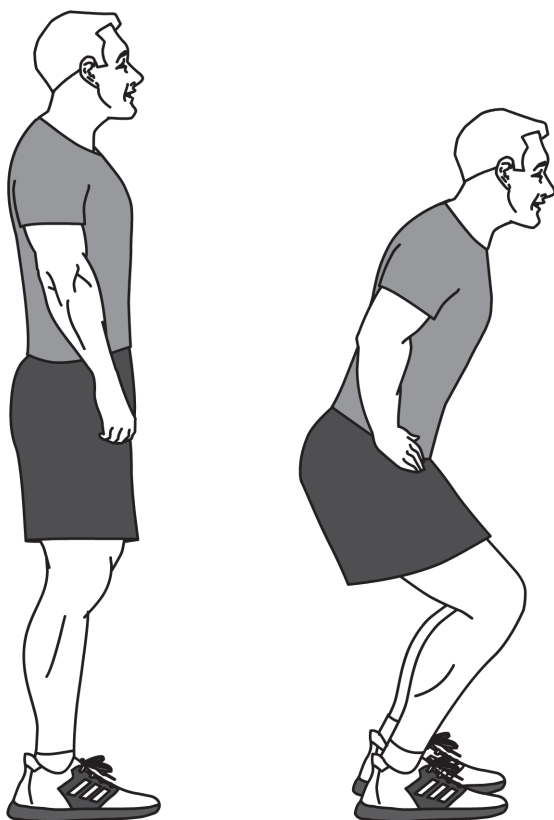
- Don't underestimate the simplicity of these three tests. They can help you monitor progress throughout the year and longterm.

Make the move

Along with standing, walking and lying down, humans have always used squatting for rest, play and work. We learn it as toddlers, when we're perfectly comfortable and stable in a full squat with only feet flat on the ground and butt resting on calves. But as adults, after sitting in chairs too much, wearing bad shoes, and losing strength, our muscles may no longer be able to obtain, or maintain, the natural full squat (sometimes called the back squat). And, with increasing weakness, many people are unable to easily perform even partial squats, which can significantly affect health and fitness.

It's important to emphasize that we don't have to perform a full squat (going down all the way) to successfully strength train. For most people, the full or deep squat is not only unnecessary but can increase the risk of injury. When in doubt, avoid it.

In fact, bending the knees halfway, to about 90 degrees (with thighs parallel to the ground), can activate more muscles than any other squat position. And the easier quarter squat, halfway between standing straight up and the half squat, is one most people can easily perform — if you can walk stairs you usually do



The quarter squat.

a quarter squat. It's also a great way to start a strength-training program, with gradual lowering of squat position as muscles get stronger. Most important is that we remain comfortable in each movement, especially when first starting out. (In fact, taking the stairs instead of the elevator can be a great complement to strength training.)

Even without lifting any weight, the squat stimulates many muscles, not just those in the pelvis, thigh, legs and feet, but the abdominals on our front and the back muscles. (Picking up a weigh obviously enlists much more muscle, including those of the upper body.)

This single squat movement, descending down by bending the knees, then ascending back up, is a key part of natural strength training. It's really the only one you need for full body strengthening of muscles and bones, helping to bend and pick up a weight, stand upright, then place it back down.

In addition to squatting, bending is obviously very important too. While we can squat without bending, both moves often go together as a natural fluid motion. And, they should always be performed slowly and not rushed.

Bending and squatting to pick up a weight off the ground is a key component of the single most important movement to perform

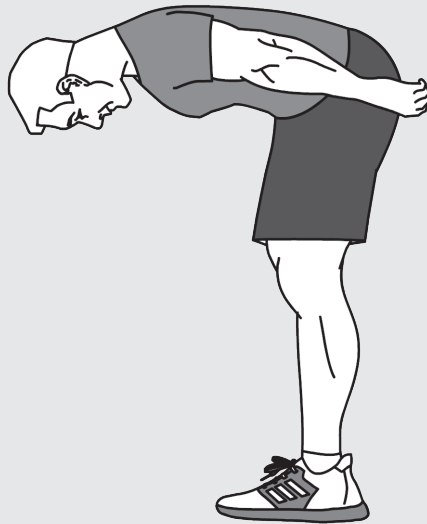
correctly. An important starting point for many people is just the squat, which can develop strength that enables the combined squat and bend to pick up some weight.

In this book I will not discuss all the weight-lifting techniques and terminology about squat, foot and other positions (there are dozens of options) and which muscles are most activated in what positions. These are well described in scientific studies. Instead, the goal here is to help people get strong in as simple, safe and easy a way as possible, which is all most people require for success.

The lost art

Unfortunately, natural bending and squatting is a lost art in our modern culture. Excess sitting and muscle weakness leads to poor posture, ineffective movement and pain. As a result, many people bend the spine too much and stress it excessively by using more back muscles. Instead, we should bend at the hips, with help from bent knees, keeping the spine relatively straight. (For this reason, movements like the traditional “toe touching” with locked knees that can overstretch hamstring muscles is something to always avoid.)

The hip joints are larger and more durable than the small spinal joints, and are moved by the more powerful muscles that attach to the pelvis such as the gluteus maximus in our butt and quadriceps in the front of the thigh. Knee bending brings us closer to the ground, taking tension off the hamstring and low back muscles. Rather than a curved spine when bending forward to grab a weight off the floor, the back should be relatively straight, and near horizontal. See the graphics below.



Bend at the hip joint and keep the back straight and horizontal.



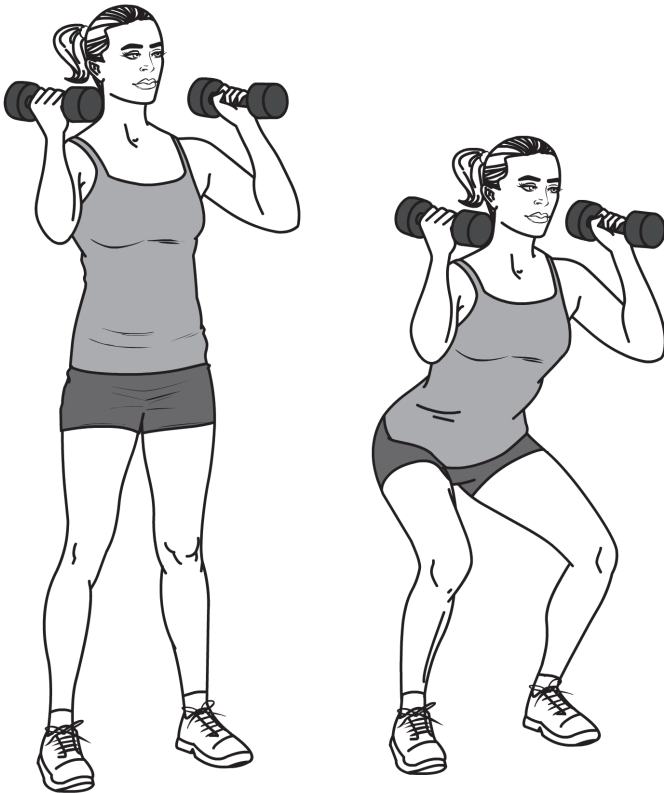
Rather than a curved spine when bending forward for lifting, the back should be relatively straight.

The natural bending motion used to pick up a weight combines the squat, butt and the back. I will first describe the simple squat, then discuss proper bending so we can combine them into one important movement that is the foundation of MAF Strength Training — it may be the only movement necessary for full body strength.

The simple squat

The squat stimulates many muscles that are important for everyday movement, exercise and athletic performance.

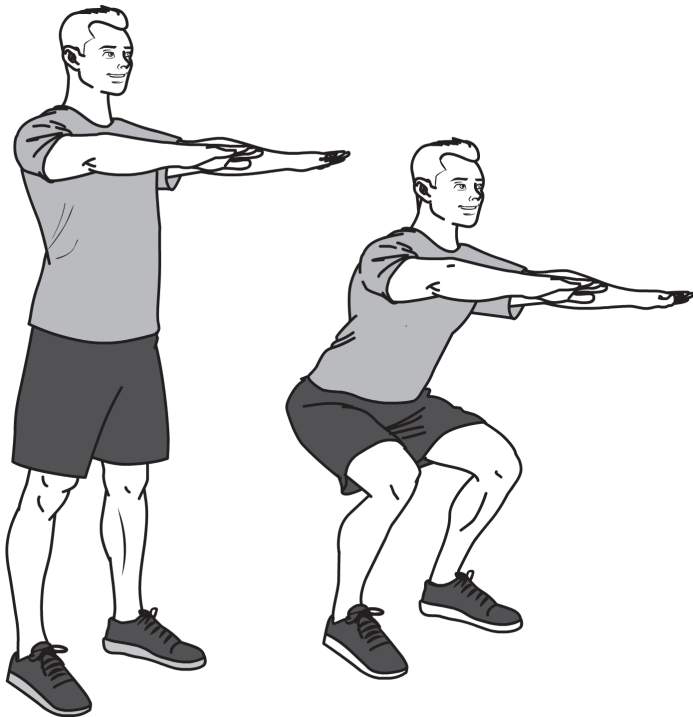
Bending the knees to bring the body straight down is a squat. Starting in the upright position, we push the butt out at the onset of the movement, keep the back straight, then bend the knees. This is pictured below.



The squat consists of two movements:

- Squatting down (descending).
- Rising back up (ascending).

In order to squat properly, which avoids stressing the low back and other muscles and joints, two key factors are important: moving or pushing the butt back, and keeping the spine straight.



To help maintain body balance during squats, you can hold your arms straight out in front of you, or your arms can be folded.

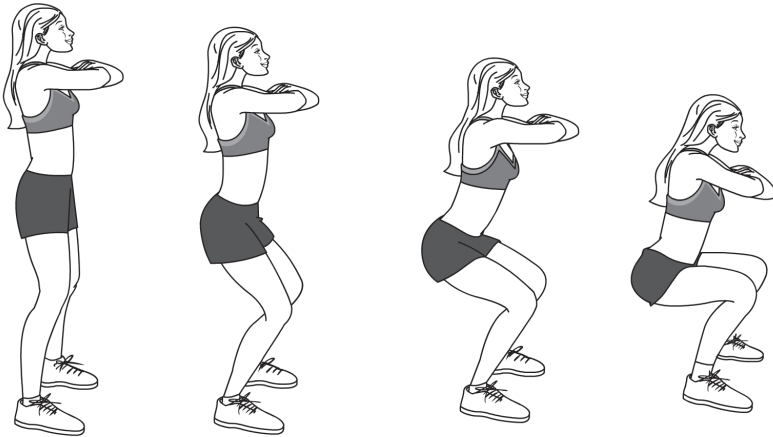
- The butt — the first movement is to stick it out; think about exaggerating this action.
- The spine — keep the back straight or, think of extending it slightly to prevent bending/flexing it.

While many envy the full squat positions of young children, or seasoned athletes, we don't have to obtain these postures for effective strength training. For most people, any squat position begins promoting strength in many muscles. While a squat with the knees at 90 degrees may contract more muscles, easier, shorter squatting to half this amount is still effective and very useful when starting your strength training. So you can start with as short a squat as is comfortable, and progress to lower, deeper squats as you get stronger. Remember too that squatting down is easier than getting back up, so modify your squat accordingly.

Here are some general guidelines to help you personalize the squat positions:

- A quarter squat, bending the knees only slightly.
- Half squat, bending the knees to go down about halfway (knees at 90 degrees)
- *Most importantly, don't perform squats by the numbers, (quarter, half) but by your comfort!*

The graphic below demonstrates different levels of squats.



This upright position is followed by three separate squat positions that don't exceed a half squat.

It's very important to first learn the squat movement by performing it without any weight. Perform this movement regularly — and as an exercise — until you can do it smoothly:

- Once, twice, three times or more each day, perform this movement as a workout. Start with one or two squats, or reps.
- Incorporate this action during your day, when sitting, standing from a seated position, picking up something, etc.
- If this movement causes soreness, later that day or the next morning, you've done too much.

- If there is pain associated with this movement, avoid it! You may need help from a practitioner who can find the cause of the pain.

Once you can squat well, add bending. This incorporates proper butt and back position with bending. By combining the squat with bending at the hips you will eventually be able to pick up a weight off the floor.

The butt-back bend

We developed basic bending naturally as infants when first learning how to stand and balance on two feet. As adults, this motion is the proper first stage of picking up something from below, whether from a coffee table or the floor. It's also an important movement when preparing to sit in a chair, toilet or other position, then to stand from the sitting position. During strength training, it's also a vital motion for effective lifting.

Conceptualizing basic bending is the first important feature of performing it properly. Once the brain understands the basics, it's easier to perform. While the butt and back movements were described above, I'll review them here as well. Think of these three steps:

- Butt — stick it out; think about exaggerating the action of pushing your butt backwards.

- Back — keep it straight or, think of extending the spine slightly to prevent bending/flexing it.
- Bend — by sticking out the butt with a straight back, the hips easily act like a hinge to move downward/forward.

Successfully moving in this fashion allows you to pick up something, a box, a piece of paper, a weight. See the graphic below.



A proper bend-squat is not only done during strength training, but for all movements in the course of our day to reduce back and body stress, prevent injury and pain, even train muscles, and make lifting any item easier.

Keeping the images shown in this chapter in mind, and thinking about the butt-back-bend details, here are the key points to bend down to pick something up:

- Stand up straight, look forward, with feet relaxed (facing forward or slightly rotated outward) about shoulder width or most comfortable.
- We first stick our butt back. Initially, we might have to exaggerate this action as it's a movement our muscles may not be used to performing. It might even make us feel a bit odd. The more self-conscious you feel, the more likely it's correct.
- Allow gravity to do much of the work, gently bringing you down while maintaining the butt and back position, and bending the knees.
- We can go down farther to reach our target, such as picking up a weight, by bending the knees more when the body is able, bringing us closer to the ground.
- As the knees bend they should remain facing forward or similar to the direction the feet are facing (and not be allowed to flare out).
- Always keep the feet flat on the floor and avoid raising the heels. (If in a full squat position, raising the heels is OK despite the tradition that the feet remain flat.)

- Avoid bending the head down at the onset of the hip bend, which may trigger spinal flexion and poor performance.
- Return to the upright position by performing the reverse action.

Summary

- Perform these easy movements several times throughout the day, always remaining comfortable.
- Continue practicing for a week or two, or more if you need it. You'll gradually be able to easily reach down farther as you become more flexible and stronger.
- Incorporate this natural movement into your daily routine, especially each time you sit down and stand up, or pick something up from below.
- Yes, you'll have to keep reminding yourself to do it right.
- Once you have developed enough comfort, flexibility and strength with minimal movement, you can perform a deeper squat, *if you choose*. Only then should you add weight.

A MAF strength training session

MAF Strength Training typically involves four key components in each workout that help promote health and maximize muscle and bone strength. This also circumvents excess fatigue, encourages the body to recover quickly, and allows you to train later the same day or the next day if you desire. They include:

- An easy, active aerobic warm-up.
- The strength part of the workout.
- An easy, active aerobic cool down.
- Recovery.

But before addressing these items in more detail, it's very important to review the amount of weight you can lift safely and effectively, which was introduced in Chapter 2.

How much weight?

Determining the current best weight for your strength training program is very important. This book provides guidelines to do this, but if you're unsure, a certified coach or trainer, physical therapist or other practitioner may be able to help you.

When starting your strength training, be conservative by only performing squats or using lower weight lifts until you are comfortable increasing the weight to your individualized level.

The amount of weight you determine for MAF Strength Training is used for all lifts, including *slow weights*. (And used when adapting to more traditional gym or club type workouts.) All three of these requirements are necessary:

- This weight is about 80 percent of the estimated maximum weight you can lift one time. (This is referred to as a *heavier* weight, versus traditional weightlifting with higher reps which uses *lighter* weight).
- If you are familiar with lifting, you may already know how much you can lift one time, or can experiment; then calculate 80 percent.
- If you are new to strength training, or not sure, 80 percent of your max one-time weight is also the amount of weight you can lift about six times before feeling undue fatigue. This

can also be calculated through experimentation by gradually adding weight to a bar over a period of a few days or weeks.

- Even more important, this amount of weight should not cause discomfort during the workout, and not cause any significant soreness the next day. Immediately afterwards, and the next morning, you should almost feel as if you didn't do much or any training. So if you're sore the morning after, your weight was too heavy. In this case, refrain from training until the soreness dissipates.
- Pain before, during or after lifting indicates you should avoid exercise until the cause of the pain is determined and corrected.

Now let's discuss the four parts of an MAF Strength Training session — the warm-up, the strength workout, the cool-down, and recovery.

The easy, active aerobic warm-up

The onset of physical activity should prepare the body for what is to follow: more robust physical activity. This involves light physical movement that increases circulation into the muscles, literally warming them. An active warm-up can include an easy walk, jog, bike, swim or other short aerobic workout that does not raise the heart rate much.

A *natural warm-up* occurs when we're physically active from the time we wake in the morning, performing chores, preparing food, and moving in ways that expends a similar amount of energy as going for a walk. Many people are naturally very active all day. If that's the case, you may already be warmed up and ready for your strength workout. However, if in doubt, add a bit more aerobic movement.

Some strategies to increase your daily physical activity include:

- Walk or pace during office time when you don't need to sit.
- Wander outdoors during your break.
- Add movement to your commute by parking farther away from the doorway, walking around the block or up the stairs rather than taking the elevator.

Use a standing desk.

Without warming up, the body isn't properly prepared to engage in strength training, possibly reducing benefits and risking injury.

A proper active aerobic warm-up takes 12 to 15 minutes to fully prepare the body and brain for strength training. Once warmed up, such as after a morning walk, maintaining this condition is easy by being naturally active and avoiding sitting or lying down too much. So a 7 a.m. walk could serve as a warm-up, and strength training may be performed later in the day.

In some situations, we may need more warming up, such as when first getting out of bed or after a long period of sitting. Those who perform longer workouts the day before may feel the need for a longer warm-up. Some people find that they always perform better with a longer warm-up because it improves gait, increases energy, and produces more flexibility. With aging, a longer warm-up can also be helpful. Longer aerobic warm-ups, such as 20, 30 to 40 minutes, can further build more endurance.

The power of an aerobic warm-up

Here are some of the important benefits of warming up:

- Increases the lungs' capacity to take in oxygen and exhale carbon dioxide.
- Increases flexibility in all muscles and joints.
- Mobilizes fat stores to increase fat-burning for more energy for muscles.

- Builds aerobic function (reduces body fat, improves health, etc.).
- Improves blood and lymph circulation in the muscles.

Stretching is not a warm-up

Because an aerobic warm-up increases flexibility, stretching is not only unnecessary, but not recommended. Stretching is a risky activity, potentially impairing muscle function and increasing vulnerability to injury. Instead, walking, jogging or running, cycling, swimming (or combinations of these) are the best warm-up exercises.

The strength part of the workout

The MAF Strength Training part of your workout is easy, consisting of three parts:

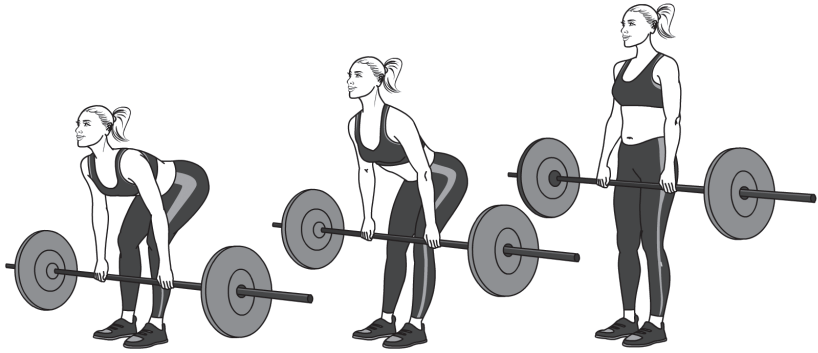
- Bend/squat down to pick up/lift a weight.
- Ascend back to an upright position.
- Place the weight back on the floor.

Based on your ability, you can extend this workout by squatting two to six times before placing the weight down again. This is the kind of slow weight workout I perform. I may lift the weight and bring it up to my chest while performing up to six reps. I may perform this again three minutes later, or an hour later, depending on the day, and do one, six or eight of these in a day, and perform them one, two or more days a week.

Below are a couple, are a couple of examples of how this workout can be done.



Even a quarter squat with lighter weight is a great beginning to a strength training routine.



As you get stronger, you'll be able to add more weight and/or deeper squats.

Other examples of common strength training routines include:

1. Natural strength training — as discussed earlier, examples include working outdoors as hobby or job.
2. Traditional formats, common in a gym or club environment using free weights performing squats (or deadlift). Here's a common example:
 - Reps: One to six reps in each set.
 - Sets: Up to four (more if time and energy permit).
 - Lifting should be done at a moderate pace but not rushed or too slow.

- Recovery between sets should be three minutes (timed), more if desired.
 - All movements should be smooth and natural.
 - As you get stronger, slowly increase the amount of weight rather than reps.
 - Three or more times per week as time permits.
3. Home workouts could combine any of the above in the course of a week, month or year.
 4. As previously described, *slow weights* is an option too, and further discussed in the next chapter.

An easy, active aerobic cool-down

The third step in the process is an active cool-down, which helps the body transition from the workout to the start of recovery, a process just as important as the warm-up or workout itself. This includes helping to metabolize the by-products of the workout.

The mirror image of a warm-up, this 12-15-minute process involves performing an easy aerobic activity in descending intensity as the minutes go by. A short easy walk works very well. A natural cool-down may work too — meaning that you go back to your active day of performing chores or otherwise moving.

Avoid sitting down for any significant time after the strength part of your workout, without cooling down first.

A cool-down is an important first stage of recovery from the workout, and is often neglected as people often are in a hurry to get back to their desk or feel there is no need for it.

Recovery

Rest and recovery from strength training is as important as the workout itself. This includes recovery between sets of lifting, and from one day to the next. As noted above, recovery from a set of lifts should be at least three minutes or longer. Rest between days involves proper sleep.

My longtime training formula is important to note here:

$$\text{Training} = \text{Workout} + \text{Recovery}$$

The more you work out, the more recovery is required. So factor in recovery time — between sets and sleep — or reduce the amount of workout time. Too little recovery is a common cause of overtraining.

The most important aspect of recovery is rest, which includes sleep. Seven to nine hours of uninterrupted sleep is ideal for health and fitness, but especially to recover from the previous day's activity that included strength training.

Summary

- Warm up at least 12 minutes, or be naturally warmed up.
- Work up to training with weight at 80 percent of your maximum, about six reps, with rest between sets of at least three minutes.
- Cool down at least 12 minutes, or be naturally active following your workout.
- Recovery includes seven to nine hours of uninterrupted sleep each night.

MAF slow weights

Most active people set aside specific periods of time during their week for strength training. The ritual includes changing into workout clothes and shoes, and often commuting to a workout location. While some have equipment at home, it can still take up a great deal of time, which most people don't have. Simply stated, the addition of a strength-training program to any busy schedule is not always easy, and those who try squeezing in one, two, or three more workouts risk making an already busy day more stressful.

In order to get around these potential difficulties, I've developed a system called *MAF Slow Weights*, highlighted in the introduction. It is a very practical and simple method for anyone to obtain strong muscles and bones — taking little or even no extra time. As a routine, slow weights has been the most popular and successful strength training approach I have seen throughout my career.

Slow weight training is basically strength training spread throughout the day, and crafted around a few special guidelines detailed below. There are at least three very important benefits of slow weights:

- It's easy to schedule (and may not even require much if any extra time).
- It creates very little physical stress (no soreness, pain, or any significant added bulk and weight).
- Yet you maximize strength gains (you begin getting stronger with the first workout).

MAF Slow Weights will yield the same — or more — strength-increasing benefits as working out in a gym, but without the time and cost. But if you really want to join a gym you can still use the concepts discussed in this book. And, unlike most weightlifting, this routine won't interfere with training of the fat-burning aerobic system, important for everyone, especially endurance athletes, and the specific factor associated with the health benefits of aerobic exercise.

To begin, think about all of the short periods of idle time you have throughout the day: all the times you're sitting and staring, dabbling on the Internet, watching TV or doing other activities where one can accommodate at least 15-30 seconds of lifting a weight.

Slow weights is all about taking this idle time and making something out of it. Here is a review of some key guidelines for successful slow weight training:

- Lower reps, about six per set; higher weight, about 80 percent of your maximum.
- Recover well between sets — at least three minutes, timed. More rest if you want depending on the day's schedule.

The actual lifting movement itself should not be too slow — a moderate, continuous movement from beginning to end, making sure that you perform one rep about every two to three seconds.

For example, while working on writing this section for about 20 minutes, I have performed two sets of slow weights, with about 10 minutes of rest between each. This morning between three phone calls I also did two sets, and, most likely, later there will be time for one, two or more sets.

Certainly, slow weights may be difficult for some people to integrate into their lifestyle, especially during daytime hours. Work schedules, carting the kids around, or other chores may not allow it. While some employers may not welcome you bringing in free weights, in many cases, one or two small dumbbells on the floor in a private office is a possibility. Here are some other options:

- Perform slow weights in the course of two, three or more hours throughout the evening.
- Weekend days can also work well for those with a busy week-day schedule.

The whole point of doing slow weights is that it's easy to find the time. You do the workout as part of your day, just like you would send a text or make a quick phone call. Because you are only taking a few moments for each set — lifting a weight about six times — then going about your other business until you can do another set, you won't sweat, get out of breath or need to sit and rest. How long you wait between sets is not important, as long it's at least three minutes. But it can be an hour or two, or more. Or not even until the next morning. It's a very short workout that most people can do easily within the framework of their existing schedule no matter how busy they may be on any given day.

Summary

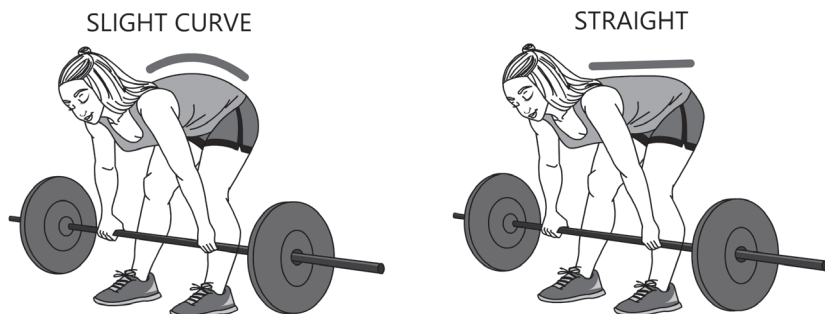
- Perhaps two, three or more times during the week, incorporate MAF Slow Weights into your day or evening schedule, whether it's at home, work or both.
- As little as one session can help build more muscle and bone strength.

More strength moves

Should you want to add other effective strength-training movements to your routine (and there is almost an unlimited array of these not discussed here), this chapter introduces two more of them. The deadlift and lunge are two commonly employed movements that also provide full-body benefits. Plus, I'll begin by describing some advanced squat workouts. *However, these movement options are not necessary to build full body muscle and bone strength.*

It is not the purpose of this chapter to discuss these more complex lifts in detail, but rather as an introduction. Please perform these exercises within the limits of your own individual capabilities, especially choosing a proper amount of weight and range of motion, to avoid injury to muscles, tendons, ligaments and joints. Seek professional guidance as necessary.

It is important to emphasize again the need for good movement, for safety and effective strength training. We must also be aware that these advanced, more difficult techniques may increase the risk of injury. A key to good body mechanics during lifting a weight off the ground is the spine — the back must be flat, not curved!



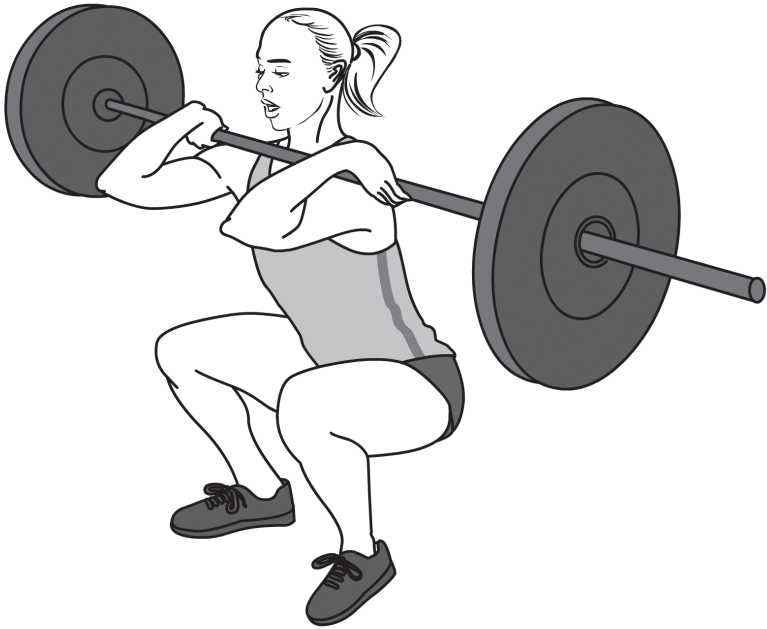
Remember: Avoid a curved spine. Keep the back straight.

Advanced squats

Front and back squats

In nature, we would more often carry stones and logs in front of us, sometimes on our shoulders, and less often behind our heads. In weightlifting techniques, this translates into performing the front squat more often, with the back squat used for more experienced lifters.

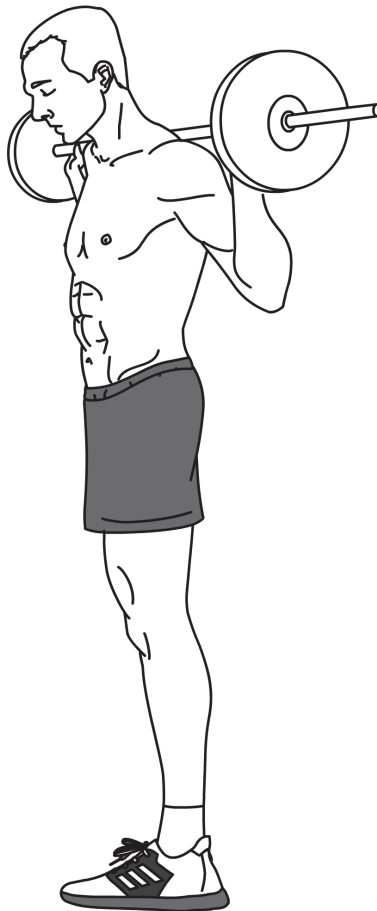
The front squat may be less popular but easier and more natural. You bring the weight to the level of your chest, sometimes sitting a barbell on your collarbone as shown in the image below.



An experienced, strong lifter in full squat.

The *back squat* is the version most experienced lifters are familiar with, placing weight behind their head and shoulders. It's more unnatural and difficult to balance, and should be reserved for

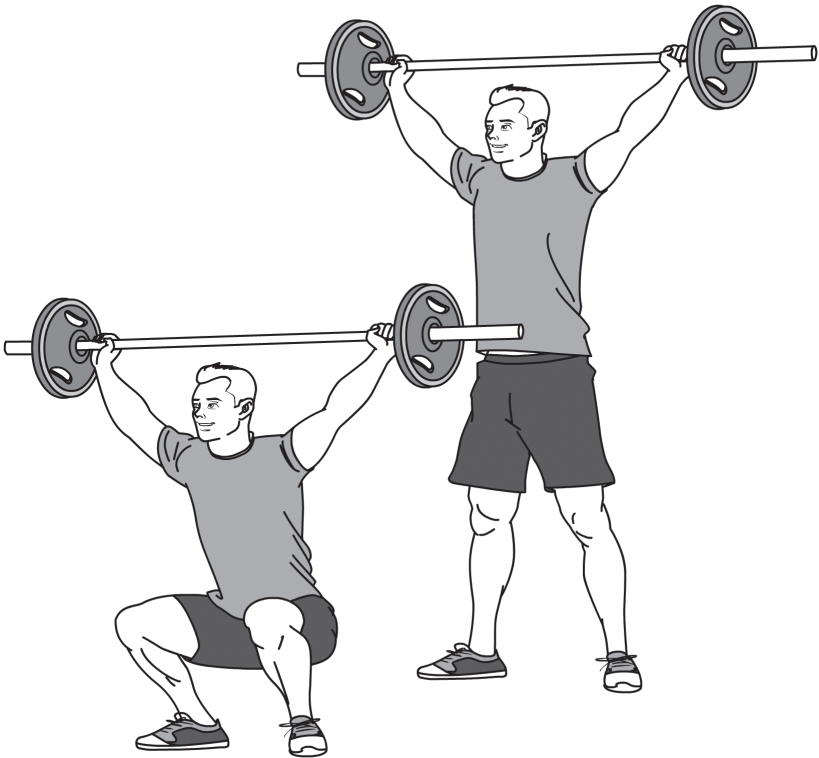
advanced lifters. There may be no significant muscle and bone benefits to the back squat except for enlisting different muscles that bring and hold the weight in the different position.



An experienced lifter preparing to squat.

The overhead squat

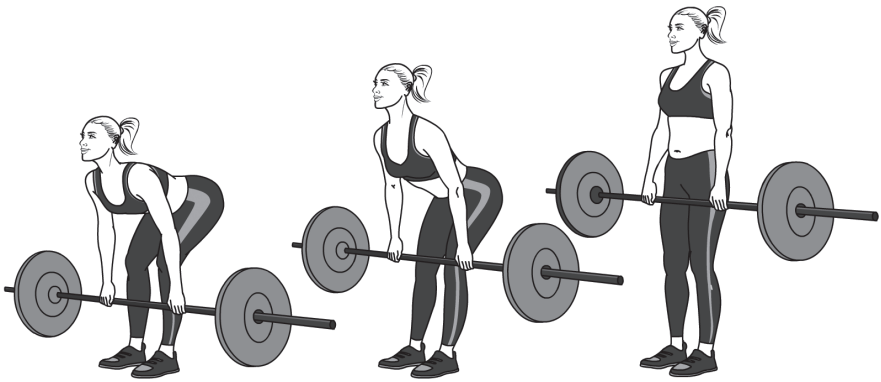
Also an advanced technique is to hold the weight over your head with your arms extended. The added challenge of balancing the weight above your head will help give you more of an arm and shoulder workout as demonstrated below.



An overhead lift combined with squat.

The deadlift

This routine seems simple enough. You pick up a weight from the floor, return to an upright position as in the image below, then put it down again. In fact, I previously described the deadlift without calling it by name.



The simple deadlift.

Here are more details about how to perform a deadlift:

- Stand with your feet pointing straight ahead and shoulder width apart, and a barbell flush against your shins.
- Properly squat down and grab the barbell.
- Rise up so that the barbell ends up resting against your thighs.
- Squat to lower the barbell to the same location on the ground in a smooth, controlled motion.

- Release the barbell, and stand up straight to end one rep.
- Six reps would be an example of one of my slow weight sets.

The lunge

This is typically considered more a lower-body workout because the basic lunge doesn't engage the upper body as much as pictured below. However, certain variations can make it an excellent upper-body workout, discussed as follows.



The lunge without weight.

Here's how to do the lunge without a weight as in the image on the previous page:

- Start out standing with both feet together.
- Step forward comfortably with one foot, opening your stance so that your legs end up in a V with one foot in front of you and one foot behind.
- Lower your body downward as much as you can comfortably, *without* leaning forward or back, arching or hunching your back, or leaning to one side.
- Lower your body and hold for 1 second.
- Return to the V-position (as in the second step).
- Step forward with your back foot (not backward with the front) to finish the lunge with both feet together.
- Repeat using the other foot.

Also note:

- If your flexibility is not as good, don't step as far out; as you develop more flexibility and strength, you may want to step farther out in front to make it more challenging.
- Notice in the image above that the front knee doesn't move past the front toes. Ideally, your shin should be vertical once you reach the bottom of the move.

- It's best to perform the lunge without weight initially until you get very comfortable performing it correctly. Only then can you add weight such as dumbbells or kettlebells as an option.
- As you lower your body, gradually transfer your weight from both feet towards the front foot. As you raise your body back up, gradually transfer your weight until you are supported evenly by both feet.
- Caution! The more you step forward, the more flexibility you'll need to lower yourself without losing form or overstretching. This is not a stretching exercise, and it's important to remain balanced and comfortable all along the way.

Summary

- For those who have successfully improved strength *without any injury or setbacks*, and can perform a squat with weight, and still want to add more variety to their training, the deadlift and lunge are good options.
- However, perform these without weights at first until comfortable, or find a trainer to help you with technique.

Food, stress and strength

Even an ideal strength-training program is only a part of the bigger picture of health and fitness. Two important lifestyle factors that can help improve muscle and bone strength include eating the right foods and better adaptation to various stresses. Both also play key roles in preventing injury.

Healthy food = improved strength

Natural foods provide the building materials — the nutrients — necessary to make strength training effective and safe (like all other aspects of health and fitness). This includes providing the energy required for an effective strength-training routine and for recovery.

Muscles and bones, along with ligaments, tendons and joints, require a vast array of nutrients as cells are continuously being repaired and replaced. This occurs most especially between

workouts as part of the recovery process. The best sources of these nutrients include high-quality natural food, and dietary supplements made from these foods.

Three types of nutrients make up healthy foods and are used for this process:

- Micronutrients: all the vitamins and minerals.
- Macronutrients: carbohydrates, proteins, fats and water.
- Phytonutrients: thousands of plant compounds that help our health and fitness in many ways.

There are really just two cuisines in the world today: natural food, which contain almost all the nutrients we require and is healthy, and junk food, which is harmful — enough to negate much of the potential benefits from strength training. While it may seem like there's a smorgasbord of opinions and debate, there is really a consensus among clinicians and scientists around the world that junk food is harmful.

What is junk food?

If you have to ask, you're probably eating it. Even small amounts can harm us. Call it fast food or packaged, the worst ones are most obvious — chips and cookies, colas, and other sugared

drinks, candy, and most other snacks. Also virtually all breakfast cereals, bagels, and rice cakes. Some are cleverly disguised, like sports drinks and so-called energy bars (which may be useful *during* athletic competition or longer and/or harder training, but not as a meal or snack). Deli foods, including cold cuts and other items are often junk food because they contain sugar, like most other packaged foods.

The worse junk foods include sugar and sugar-containing products, and virtually all flour and products containing it.

- Sugar is not just white or brown table sugar, but often disguised as sucrose, high-fructose corn syrup, cane sugar, rice syrup, beet sugar, maltodextrin and others.
- Refined flour quickly turns to sugar after eating. This includes all processed flours (even those claiming to be whole grain) from wheat, corn, soy and others.

It's important to read ingredient lists, and when ordering from a deli or restaurant ask about the ingredients.

Fortunately, virtually all junk food can be replaced with healthy food in the form of vegetables and fruits, nuts and seeds, meats and fish, eggs and cheese, lentils and beans, and others. Healthy eating means planning ahead and carefully shopping so you always have only healthy food at home and work, and when traveling.

While a healthy diet provides thousands of important nutrients, it's worth highlighting some of them here because they are essential for strength training success.

Protein

As most already know, protein is a key nutrient for the muscles. But unfortunately, many people don't get enough. Optimal protein intake can usually be accomplished by consuming 20-40 grams of protein in each meal or substantial snack. The International Society of Sports Nutrition recommendations for those performing regular strength training is 2 grams of protein per kilogram of body weight each day (give or take). For a 160-pound person (75 kilograms), this may be up to 150 grams of protein per day.

Examples of Daily Protein Needs

Food needed for daily protein intake of:

- 128 grams — three eggs and cheese at breakfast, a salad for lunch with a hefty serving of turkey, and salmon for dinner.

- 106 grams — two eggs for breakfast, a chef's salad for lunch, and a sirloin steak for dinner.
- 90 grams — two eggs at breakfast, tuna salad for lunch, and lamb for dinner.

You can estimate your own needs for grams of protein, between or above, by using these examples.

The most nutritious, digestible protein foods containing all amino acids (the building blocks of protein) include whole eggs, fish, meat, and dairy. Nuts, seeds, beans, lentils and other plant foods can also contribute but don't have all the amino acids. For those who want to use healthy protein supplements, egg white powder and whey powder concentrate are the best. These are discussed in the next chapter, which also includes healthy protein shake and energy bar recipes.

Healthy fats

Natural dietary fats help regulate recovery from strength training as part of the body's balance of inflammatory and anti-inflammatory chemicals. Too much inflammation can contribute to

muscle, bone, joint and other impairment, contributing to pain, injury, fatigue, poor physical performance.

First, include healthy fats in your daily diet:

- EPA-rich oils from cold-water fish or fish-oil supplements.
- Fats from extra-virgin olive oil, coconut oil, avocado, butter, heavy cream, lard.

Second, strictly avoid harmful fats:

- All vegetable oils including corn, safflower, peanut, soy, sunflower, cottonseed and canola oils.
- Higher doses of omega-6 fats found in borage, primrose, black currant and hemp oils.
- Hydrogenated and other trans fats.

Vitamin D

The sunshine vitamin can significantly improve muscle and bone health, increasing the strength and preventing loss of each. As such, vitamin D can speed recovery, and help prevent injuries and falls (not to mention improve brain and immune function, among its many benefits).

Two sources of vitamin D we should obtain regularly are:

- Sun exposure (without burning), as a primary source of D.
- Foods sources of natural vitamin D such as liver, or dietary supplements containing vitamin D3. (Vitamin D2 is the plant source and less effective.)

Fortunately, vitamin D status is easily evaluated with a blood test. Despite this, low vitamin D levels are a serious problem common in populations throughout the world.

Antioxidants

These natural compounds help the body fight against the corrosive effects of the free radicals that form in greater amounts during exercise. Many micro-, macro- and phytonutrients are essential for our antioxidant system, a key component of aerobic muscle fibers.

- The best source of antioxidants is a healthy diet that includes up to 10 servings of plant foods, including fresh vegetables and fruits, and nuts and seeds.
- *Avoid synthetic vitamins common in antioxidant dietary supplements.* They may not only be ineffective, but can paradoxically worsen the oxidative stress produced by free radicals, impairing your strength and aerobic training.

Stress adaptation

Not all stress is negative. While it can evoke an *alarm* reaction in the brain and body, the outcome of stress may be healthy, as seen in the proper adaptive benefits of strength training. By *mildly* stressing muscles and bones — then recovering — strength improves. However, excess stress, or the accumulation of various stressors, can impair muscle and bone function, and reduce or even prevent exercise benefits.

There are three kinds of stress, with each potentially affecting the others:

- Physical
- Biochemical
- Mental-emotional

Physical stress

- Muscle and bone weakness.
- Overworking your muscles.
- Shoes that don't fit right or are too thick and oversupported.
- Dental problems in teeth or gums.
- Muscle imbalance triggering poor posture and gait.

- Eye strain.
- Too much sitting.

Biochemical stress

- Junk food.
- Excess body fat.
- Too many or too few calories.
- Other nutrient imbalance.
- Excess caffeine, alcohol or other drugs.
- Environmental chemicals from food, water and indoor air pollution.
- Oxidative stress from too much hard exercise or environmental pollution.
- Chronic inflammation.

Mental-emotional stress

- The types most people associate with stress.
- Feelings of excess tension.
- Anxiety, depression.

- Mood disorders.
- Pain.
- Mental fatigue.
- Poor cognition, including perception, learning, concept formation and decision-making.

Stress can come from anywhere: your job, family, other people, your memory and emotions, infections, allergic reactions, physical trauma and exertion, even the weather.

Stress is first sensed in the brain, which responds by sending signals to the pituitary gland, which communicates with the adrenal glands, triggering the release of stress hormones. In excess, this response can adversely affect the whole body, including how individuals respond to exercise.

An important key to reducing the harmful effects of stress is to first recognize them. This is easier than you think, and can be accomplished when we take some time to make a list of our physical, biochemical and mental-emotional stresses. Then, work on eliminating those which are most easily addressed. For example, it's easy to get new shoes, visit the dentist, or improve our diets. By eliminating or reducing various stresses, we can help the body better adapt to stresses that cannot be easily changed.

Summary

- Eliminate junk food, especially refined carbs, and replace it with healthy, natural foods.
- Eat adequate high-quality protein and healthy fats each day.
- Consume up to 10 servings of plant foods: vegetables, fruits, nut and seeds, legumes.
- Recognize and eliminate as much stress as possible.

Protein power recipes

Protein foods are easy to find and prepare, providing adequate intakes of this most important nutrient for strong muscles and bones. There are many recipes for meat, fish and other protein foods on my website (philmaffetone.com), but for those who want to supplement their diets with additional healthy protein, this chapter provides recipe ideas I've been using personally and recommending to patients throughout my career.

While whole fresh eggs may be the best healthy and inexpensive complete protein food, *egg white powder* (or whole egg powder) may be the ideal dietary protein supplement. As you'll see below, these ingredients are easy to work into energy bar and shake recipes. An alternative is another very nutritious protein product, *whey powder* (use products labeled as *whey concentrate*, and avoid the highly processed *whey isolates* or *caseinate*). Both egg and whey are a far superior protein source than any other powders. I use all organic ingredients.

Phil's bars

The *healthiest* energy bars are those you make fresh at home. They're also much less expensive, make great snacks, desserts and travel food as they will last many days, even without refrigeration. And, they're quick and easy to make.

My traditional *Phil's Bar* is low-carbohydrate, and there is also an even lower carbohydrate version. Much of the carbohydrate in each recipe is in the form of fiber and not absorbable. And they can be adjusted for even lower carbohydrate or higher protein, and have various flavor options based on your preferences and needs.

To make 12 Traditional Phil's Bars:

- Raw almonds : 3 cups (450 g)
- Egg white or whey concentrate powder: $\frac{2}{3}$ cup (60 g)
- Cacao powder (unsweetened): $\frac{1}{4}$ cup (22 g)
- Shredded coconut (unsweetened): $\frac{1}{2}$ cup (35 g)
- Honey: $\frac{1}{3}$ cup (110 g)
- Hot water: $\frac{1}{3}$ cup
- Vanilla: 1-2 teaspoons

Based on the types of ingredients, the per bar estimates include:

- Calories 285
- Carbohydrate 12g (mostly fiber)
- Protein 12g
- Fat 21g

Phil's Bar — Lower Carb

- Raw almonds : 3 cups (450 g)
- Egg white or whey concentrate powder: $\frac{2}{3}$ cup (60 g)
- Cacao powder (unsweetened): $\frac{1}{4}$ cup (22 g)
- Shredded coconut (unsweetened): $\frac{1}{2}$ cup (35 g)
- Honey: $\frac{1}{4}$ cup (110 g)
- Hot water: $\frac{1}{4}$ cup
- Vanilla: 1-2 teaspoons

Based on the types of ingredients, the per bar estimates include:

- Calories 300
- Carbohydrate 10g (mostly fiber)
- Protein 13g
- Fat 23g

Instructions for both versions:

- Grind dry ingredients (a good food processor works well).
- In a separate bowl mix honey and hot water, then mix in vanilla.
- Blend wet and dry ingredients, and mix well (you may have to mix by hand).
- The batter should be very firm: if too wet, add some dry ingredients; if too dry add more liquid.
- Adjust water/honey ratio for less or more sweetness.
- Shape into bars (they can be wrapped with parchment paper).
- You can also press the batter into a dish (about one-half to one-inch thick) and cut into bars, or roll into balls.

Best kept refrigerated but will typically last a week or more out of the refrigerator.

Phil's Bar options:

- Add various other healthy nuts: pecans, macadamia, cashews or combinations.
- In addition to vanilla, natural peppermint, almond, orange or other extracts/oils can be used.

- Fresh lemon, lime or orange peel can be added before grinding.
- Modify based on your needs, tastes and desires!

Phil's shakes

Also called smoothies, this longtime recommended snack, meal and/or protein supplement is quick, easy, healthy and delicious. It's also a way to consume more nutrient-dense superfoods, like psyllium, fresh turmeric, raw sesame seeds, blueberries, and others. Here's the basic shake:

- Whole eggs* or equivalent protein desired as egg or whey powder.
- Raw vegetables (a serving of spinach, carrot, beet, etc.).

* While I sometimes use raw eggs, here's a way to pasteurize them:

- Place a dozen or so in a pot and cover with cold water and a lid, and put on the stove (high heat) for about five minutes (if you live at higher altitudes it will take longer). This pasteurizes the shell and begins whitening the whites. They should still be very soft-boiled.
- Quickly pour off the hot water and add cold water for about five minutes so they don't cook further.
- Take out of water and let dry.
- Keep refrigerated.

GET STRONG!

- Raw unhulled sesame seeds, 1 tablespoon.
- Serving of blueberries or strawberries (or other fruit).
- Water as needed (up to 4 or more ounces depending on texture and taste — the more eggs the less water), and/or heavy cream.

Healthy, tasty options:

- A small piece of fresh turmeric and/or ginger.
- A spoon of unsweetened cacao powder or whole cacao.
- Psyllium fiber.
- Whole raw almonds.
- Unsweetened yogurt instead of water for additional protein.
- For a very-low carbohydrate shake, avoid fruit and carrot, and use a smaller amount of berries.

Protein foods that travel well

One of the common problems with travel, whether an extended trip or long commute, is finding nourishing food. The simple remedy is to bring your own. Whether spending the afternoon on the road, traveling by plane, or on a long train trip, many foods

travel well too. Be sure to salt ahead of time, and bring utensils. Here are some:

- Nuts: raw almonds or macadamia.
- Boiled eggs (peel ahead of time).
- Salads. Store in a tight fitting container, add mixed vegetables, olive oil and vinegar, and add cheese, eggs, meats or fish.
- Vegetables — not just carrot and celery sticks, but cucumbers, red peppers and others. Add almond butter or cream cheese.
- Fresh fruit and cheese. Apples travel best, as does most cheese.
- Plain unsweetened yogurt or sour cream with fresh fruit mixed in (ahead of time).

Many of these can also be purchased in food stores, delis and restaurants — but check ingredients!

Don't forget leftovers! Always make extra food when cooking so you have leftovers for snack, another meal or travel food.

Additional reading

My website posts regular articles, podcasts and other information about the topics discussed in this book, and others. Please visit *philmaffetone.com*

The MAF Method is a free ebook available for download on *philmaffetone.com*

If you're an athlete, someone who prizes their fitness, or you have a specific fat-loss or health goal, MAF Foundations is an e-learning course that provides you with the tools and strategies to help you apply the method, breaking through challenges and setbacks along the way.

philmaffetone.com/maf-foundations/

The Big Book of Endurance Training and Racing by Dr. Philip Maffetone (Skyhorse, 2010). Written primarily for competitive athletes.

The Big Book of Health and Fitness by Dr. Philip Maffetone (Skyhorse, 2012). Written primarily for everyone interested in overall health and fitness.

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“I have never felt stronger!”

Pete Jacobs, World Champion Ironman Triathlete

Strength begins in the brain, not the muscles! If you want more strength, train the brain to contract more muscle fibers.

Training for strength means a shorter workout. In fact, you may be spending more time resting between reps than lifting.

Even an hour of rest between sets will not reduce your strength gains. Remember – it’s NOT about how tired you feel after a workout. It’s about how many muscle fibers your brain learns to contract at a given time, due to the amount of weight you lift successfully.

Minimally, you only need to perform one movement to build full body muscle and bone strength.

The right muscle strength training improves bones too.

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