FIT TO LOG

IMPROVE PERFORMANCE. REDUCE INJURY.

A manual for people who work in the forest full of suggestions about how to stay alert and keep you injury free.

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fitSAFE SOLUTIONS INC

BC Forest Safety

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This program has been created in the hopes that it will help keep anyone from ever again having to carry a buddy out of the bush, or try to comfort those left at home.

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ABOUT THIS BOOK

The suggestions in this book are based on fifteen years of studying people who work hard, including fallers, tree planters, and others who move through the bush and have to make critical decisions. The recommendations were formulated using proven sports science principles; many of the components of the program were first developed to help competitive athletes achieve medal level performances. When you go to work every day you may not be looking to step up to the podium, but the same things that help an athlete achieve a high level of performance without getting hurt can help you get the job done and come home safely at night. **It's a program for the occupational athlete, specifically an injury prevention and performance enhancement program for fallers and others whose livelihood depends on physically demanding work in the bush.**

The program takes into account the amount of stress you experience every day, the number of hours travel that some of you have to deal with, the hours that you spend standing around in the cold or heat, the parts of your work that are boring, and the parts that are high-risk, and even how difficult it is for you to do the mundane tasks like grocery shopping or get your truck serviced.

The program will show you how to:

Improve your reaction time and keep your level of concentration and focus at their best all day long.

Adjust your diet to provide you with the energy you need during the day to work hard and stay vigilant.

Build and maintain your fitness and strength to improve your performance at work and help you avoid joint and muscle strains, and reduce pain if you have already suffered an injury.

Develop a lifestyle that enables you to make these desired changes and still meet meets the needs and constraints of *your* reality.

You can also take confidence in knowing that in every single case the fallers and other workers in the studies who made even just some of the changes recommended in this book were able to improve substantially. They had less fatigue, felt better, and had fewer injuries and incidents. *The program will work for you too*, but *only if you do it!*

Every time you make a healthy choice, you will be one step closer to where you want to be. It won't be easy, and will require some effort and discipline on your part, but if you stay with it you will be guaranteed to find yourself more alert and less likely to slip, trip or fall than ever before. You'll have fewer aches and pains and will be more solid and stronger at work and in all your recreational activities.

How long does it take for a tree to move unexpectedly, a branch to break and fall, or debris underfoot to give way? This program will increase your ability to react to an unexpected stimulus as much as two thirds of a second faster - and that could save your life.

Although this book is called *Fit to Log* it's not just about improving your fitness and performance at work. It's a manual for life. Have you watched a close relative or friend suffer through cancer or heart disease? Do you yourself struggle with chronic back pain or depression? In a study with over 6,500 people, the group of workers that followed the kinds of dietary and activity recommendations made in this book for just *two years* had 45% less heart disease, 70% less diabetes, 25% less cancer, 65% less back pain and 95% less depression than those that did not[1]. You CAN influence your future health.

"OK" you say," that's fine, but I don't have to worry about getting a disease or dying in an incident, it won't happen to me.". Then how about this one: Have you visited a friend in the hospital after an accident that put them in rehab for 3 months? If the answer is yes, then you should know your risk of musculoskeletal injury is proportional to fitness level, the fitter you are, the lower the risk[2]. It doesn't matter if you are looking at athletes or overweight warehouse workers - the relationship holds true. Core strength and leg strength are predictivefor risk of knee injuries[3], and regular exercise reduces the risk of sprain, back pain, and chronic pain in the knee and shoulder[2,4].

And perhaps most importantly, stabilizing blood sugar and staying hydrated can improve vigilance and decrease reaction time by up to 18% or two thirds of a second[5]. Just think about how being able to respond that much faster could save you when the unexpected occurs.

Stabilizing blood sugar and staying hydrated can improve vigilance and decrease reaction time by 18%. It could save your life.

BEFORE YOU START

If you haven't been exercising regularly it's important to check with your physician before beginning this or any other exercise program to make sure that you are not at risk for cardiovascular disease or have any other health concerns. Neither the author nor the sponsoring organizations are responsible in any way for any illness or injury that may result from this program, if you chose to follow it you do so entirely at your own risk. If you feel faint or experience pain while doing these exercises seek medical attention immediately.

Following the recommendations in this book will increase your ability to make good assessments and react quickly when the unexpected happens.

A POWER EATING: DIETARY RECOMMENDATIONS FOR LOGGING

DIETARY RECOMMENDATIONS

The food and drink that we consume provide us with the nutrients and energy we need to keep our bodies and our minds running.

Because the work you do is physically strenuous, and you are constantly making observations and evaluating hazards, providing your body with the right fuel at the right time becomes even more important than for the average person. In fact, your life depends on your ability to make good judgments, and to move quickly over an obstacle course of slash, debris, fallen trees and steep ground.

The correct diet can't solve all your problems but it can go a long way towards making your job less fatiguing and a whole lot safer.

- ☑ It can make a huge difference in how you feel at any given point in time.
- ☑ It can make sure that you have the energy to go hard when you need to.
- ☑ It can speed up recovery so you can do it all again tomorrow.
- ☑ It can provide the nutrients needed to build and repair tissue.

- ☑ It can help your immune system protect you against colds, flus and other illnesses.

Nobody wants to be sick at work or on your days off!

Most people make their food choices based on taste preferences, easy access, and how appealing the food looks and smells. Cost, ease of preparation, and need for refrigeration or warmth are also important. And for those of you living in camps, your choices are restricted to what the cook puts out. **No one can be forced to eat ONLY healthy food, but if you understand what the impact of food and drink is on your performance, you can at least make an informed decision.**

So what should you eat? The answer is that it depends on how much time there is to digest and absorb the food before beginning work, what kind of work you have to do, what the weather is like, what elevation you are at, what else has been going on in your life, and what your plans are for the rest of the day. Unfortunately there is no simple answer. But don't worry; if you get tuned in to how food works for high performance it all becomes pretty simple.

The key to knowing how to provide your body with the right fuel for best performance is to look at how the 3 different types of food (carbs, proteins and fats) fuel you up in different ways.

1 THE THREE TYPES OF FOODSTUFFS

CARBOHYDRATES (CARBS)

Carbs are energy foods. They are the main fuel if you want to move fast or generate power. They are also the only fuel that the nervous system (brain and nerves) and the immune system (white blood cells) can use. Without adequate carbs you can't concentrate, you lose coordination and feel irritable, and you can't repair damaged tissue or fight off infections.

Slow digesting carbs (low glycemic) are a key fuel for staying alert and making good decisions. During the research study, **reaction times were up to 18% faster and more accurate when blood glucose levels were stable** compared to when they were either very high or very low[5]. And given the number of critical decisions a faller makes every day, that 18% could save your life! Sports science studies have also shown again and again that performance is impaired when carbs are in short supply[6]. If you have been working hard for a couple of hours and you start finding yourself less able to concentrate, or move through debris without stumbling, taking in some carbs can magically restore your focus and balance. **Because glucose is the preferred fuel by both the nervous system and working muscle your concentration, agility, muscle speed, strength and endurance are all impaired when your glucose supply runs out.** Even mood is affected. And if you are exposed to an infection during the time period when glucose is low, the chance of you catching the flu or cold is increased[7].

The good news is that carbs are easy to digest, they take from 5 minutes up to just over an hour to digest, depending on their form (more on this below). The bad news is that we have only a very limited capacity to store carbs. **Glycogen, the storage form of carbohydrate,** is found in just 2 locations: muscle and liver. **The glycogen in muscle provides fuel for moderate to intense work. With a good diet there is enough carb in muscle to last for around 100 min of activity (longer if the work is easier; shorter if the intensity is high).**

The carbs in muscle stay in muscle and are never released back into the blood, so **the only sources of carbs to keep your brain focused and your reflexes working are diet and liver stores. Liver stores are depleted overnight,** which explains why your Mom always told you to eat breakfast!

Now comes the complicated part. Not all carbs are the same; the simplest forms are sugars, and glucose is the form of sugar that is used by the body's cells directly. But most carbs in foods are in the complex form of long chains of glucose, known as starch. **Generally, the less processed the food and the more fiber is present, the more the sugars will be in the complex form, and the more difficult it is for our digestive tract to free the glucose units.** Again, this can be good or bad, depending on your energy needs at any given time.

If you need energy NOW, you need a simple form of carbohydrate – either sugar, or easily digested starch such as white pasta, potatoes or rice. But we hardly ever need sugar that way, it would only be necessary if you had not eaten enough (or had eaten the wrong kinds of foods) and had to continue to do hard physical work.

The problem with taking in simple sugars when you are not in a high energy output situation is that when a lot of glucose enters your blood quickly it stimulates the release of the hormone insulin. The role of insulin is to lower blood sugar by transporting glucose into cells for use or storage. A good idea, but if **the carbs are not needed to fuel the working muscles, and muscle and liver glycogen stores are full, then the only place left for all that sugar is to convert it into fat** (which we can store in unlimited amounts).

Once converted to fat it can never be turned back into sugar, so your brain and reflexes are out of luck.

The release of insulin is based on how fast sugar enters your blood. Since simple sugars require essentially no digestion time, when you eat them blood sugar will increase at a very rapid rate, and a large amount of insulin will be released; often more than is actually needed to restore your blood sugar to a more normal level.

This can create a situation where so much sugar is removed from your blood that there isn't enough to supply your brain and peripheral nerves. At this point vigilance, judgment and reaction time can be dangerously impaired.

You might trip more often, or feel shaky, grumpy or anxious. And you know that feeling of needing a nap about 2 hours after lunch? That's exactly the time frame when insulin peaks and blood sugar bottoms out. **Falling has enough uncontrollable risks, why take a chance with ones that can be controlled by just paying a little attention to your diet?**

It doesn't make sense to place your life at risk because you didn't eat the right breakfast! For example, when you grab a coffee with a couple of packets of sugar and a sweet breakfast pastry and then drive for two hours out to the block you'll be increasing your risk of an incident or injury by about 70%. Within 5-10 minutes of eating sweets your blood sugar doubles and your pancreas dumps a large amount of insulin into your blood. A similarly large amount of glucose is removed from the blood into the liver, converted to fat and transported to your growing belly (maybe depositing a little inside your blood vessels along the way). Because the rise in blood sugar was so fast insulin overshoots and by the time you get to the block your blood sugar has dropped lower than if you had skipped breakfast altogether. At this point you are feeling pretty tired but pick up your gear and start hiking anyhow.

Twenty minutes later as you start your first cut your blood sugar is so low that you get the shakes. **At this point your ability to assess visual input and make correct decisions could be seriously impaired.** This condition is called hypoglycemia or more popularly "hitting the wall". (Check out page 224 to learn to recognize the signs and symptoms).

Should you eat sugar right now? The answer is yes, because if your muscles are working, the release of insulin is blocked. The quick dump of sugar into your blood will soon have your nervous system back up to speed and leave you feeling more alert and better able to assess hazards and react to unexpected events. **But if you aren't working hard, then STAY AWAY from sugar and go for a complex carb, protein based snack (see below).**

Fortunately, it's pretty easy to avoid this kind of dangerous situation. All it takes is eating to stabilize your blood sugar. So read on and learn how to reduce your risk of injury by 70% or more.

THE SHORT VERSION

Most of the time we don't need a huge amount of energy all at once or want the insulin that comes with a big hit of glucose. **Complex, high fiber carbs that release their glucose units slowly are a much better choice than simple sugars because they give you a nice steady supply of energy that you can use a bit at a time.** It takes about 1 hour to digest and absorb the glucose from high fiber complex carbs so you can think of them as timed release energy for your brain and reflexes.

Since you can't store large amounts of carbs, and they are so essential to your nerves, brain and muscles, you will need to top them up regularly during the day. Don't wait until you feel hungry, or start to experience some of the symptoms of hypoglycemia (see page 224). By then you will have already started to impair your ability to concentrate and react to the unexpected. So be proactive and every couple of hours have a small snack. (In the protein section below we'll talk about a way to stretch that out to 2-3 hours by including a little protein in your snacks). *The total amount of food you eat in a day should not go up,* but for best performance you need to spread it out so that you give yourself a nice supply of fuel all day. Too much food and you store it as fat, too little and you crash. But get it just right and you'll find yourself alert and full of energy all day. To stay vigilant and keep your reactions sharp snack every 2-3 hours on complex carbs with a little protein added. Check out page 35 for lots of suggestions for good snacks that are easy to make and carry with you during the day.

MATCHING FOOD INTAKE TO CONDITIONS

One quick bit to add here on how much food you should be eating. Cold exposure will increase the amount of carbs that you burn through in a day. And of course the amount of exercise you are getting makes a big difference. So plan ahead, if the forecast is for bad weather; or you are going to be doing a lot of work in difficult terrain, bring a little extra food. Alternatively, if the ground is easy and the hike is short, you won't need as many calories. This doesn't mean you shouldn't eat on the 2-3 hour time frame, because you still need to fuel your nervous system up by keeping

blood glucose stable. But each mini-meal can be smaller since your muscle won't be hogging the glucose the way it does when you are working hard. Keep an eye on how your pants are fitting. If they are getting too loose eat a bit more, too tight and it's time to cut back a little. Eliminate things like fruit juice and pop, alcohol and commercially prepared baked goods, but still follow the regular *small* snacking schedule to ensure your brain, nerves, muscles and white blood cells are getting the fuel that they need to keep you performing at your best. Again, pages 35 to 49 will give you lots of examples of amounts and types of snacks to keep your head in the game.

POST-WORK RECOVERY

There is one time when a big hit of insulin can be used to your advantage. Hard physical work of more than an hour's duration on 4 successive days will gradually use up the carbs stored in muscle (called glycogen). When muscle glycogen stores are low your arms and legs feel heavy and you can't generate much power. It's hard to replenish glycogen without resting, but the enzyme that synthesizes muscle glycogen is much more active in the first hour after physical work than at any other time**.** Eating a fast digesting carb right after work supplies the needed carbs and the insulin helps move it into muscle so that the glycogen can be replenished. Good choices are things like the sweet low fat baked goods on pages 81, breakfast cereals with milk, pasta with tomato sauce, bread and jam, fruit and yogurt or chocolate milk.

If you have a sweet treat within that first hour you can restore muscle glycogen every day. This trick will and keep your

muscles feeling strong through the whole week and still leave you energy left over for after work and days off.

THE SHORT VERSION

- About 60-70% of your daily caloric intake should come mainly from high fiber complex carbohydrates eaten in small amounts frequently (200-300 calories every two hours while working, a little more if you are exercising, a little less if you are sitting or standing).

- It's best to include a bit of protein in each snack (1:4 protein:carb ratio).

- Eat/drink 1.75 g fast digesting carb plus 0.5 g low fat protein for every pound of body weight in the hour following exercise to restore muscle glycogen levels. (This means an engineer weighing 145 lb needs about 200 calories of carbs and 50 calories of protein or two cups of low fat chocolate milk; a faller weighing 180 lb needs about 300 calories of carbs and 100 calories of protein or 2 slices low-fat high-protein banana bread from the recipe on page 83). Don't worry if these ideas don't tickle your taste buds, there are lots more ideas for snacks coming up on page 35.

PROTEINS

Protein, which is made up of units called amino acids, is more complicated than carbohydrate and takes longer to digest (about 2 hours). **When protein is part of a meal or snack, it slows down the digestion of carbs, providing a slow, steady release of fuel. So eating a little protein every 2-3 hours with each snack is a good strategy, it can help keep you from running out of energy.**

Protein foods are also important for strenuous activity. Walking downhill in particular causes muscle to lengthen under load as you resist gravity (called eccentric contractions), which are more likely to cause a little muscle damage. Since dietary protein supplies all of the building blocks for tissue building and repair, as well as all the enzymes needed for every process in the body, **your protein requirements are increased slightly when working on steep ground.**

Protein from animal sources like meat, fish, poultry, eggs, and dairy has all the amino acids your body needs to create new tissue and is referred to as complete protein. Some of these foods also contain substantial amounts of fat, which is a good reason not to overdo foods like cheese, beef and nuts.

Protein from tofu, dried beans, and lentils is also highly useful. These vegetable sources are sometimes said to have incomplete protein because they lack one or more of the essential amino acids. But eaten in combination with each other, vegetable proteins have what it takes (combine beans or tofu with whole grains over the course of your day to get “complete” protein). Vegetable

protein also has the advantage of being lower in fat and full of great vitamins and minerals and disease fighting fiber. And it's generally less expensive that animal protein foods.

You'll find lots of good high protein snack suggestions on page 35 and some recipes designed to give you the energy you need on page 56, along with some general information as to how to increase the protein content of your favorite snacks and meals.

Protein plays another important role: Because a constant source of glucose is so essential to body function, protein can be broken down and converted to glucose in the absence of adequate carb intake. If you aren't getting enough carbs and protein in your diet your body will digest your muscle to provide the needed glucose, causing muscle wasting. The best way to prevent it is to be sure to eat small amounts of carbs regularly during heavy periods of activity, especially when putting in long days.

THE SHORT VERSION

- Include a small amount of low-fat protein (about 1/4 protein to 3/4 carbs) in all your meals and snacks.
- To stretch your snacking schedule out from 1 hour with carbs alone to 2-3 hours, include some low fat protein in each snack.
- Combining protein and carbs will help make sure that you can repair and rebuild healthy tissues.

FATS

Fats are much denser in energy than either protein or carbs. One gram of fat will generate 9 calories, more than twice that of protein or carbs (one pound of fat generates 3500 calories!). **Fats also take longer to digest (3-4 hr) and will slow down the digestion of any other foods eaten at the same time.** Because fats are so slow to digest and release their energy, they really only fuel long, slow activities. For concentrated energy there is no better source, but you have to have time to use them.

The balance between having enough time to digest fats, and using fat as an energy source during a day of falling or walking a block is a tricky one. If you are moving at a constant rate where your breathing is deep but you could still carry on a conversation, fat can act as a fuel for your muscle. And since the delivery of fat to muscle from storage is slow, increasing the availability of fat in your blood seems like a good idea.

But, and it's a big but, there are still two problems with this model. One is that your brain and nerves can only burn carbs. The other is that whenever you want to do something strong, powerful or fast, you still need to burn carbs. And therein results the conflict. Increasing the fat content of a meal much over 15 – 20 % of caloric intake will slow down digestion too much to give you the needed supply of carbs. On the other hand, if fats are available for muscle fuel, the carbs can be reserved for those tissues that can't use fat – like your nervous system!

For people with a higher metabolic rate who have a tendency to burn through the daily carb/protein snacks more quickly than the average 2 -3 hour time frame, providing some fats in the morning can help let the muscles burn fats and save the carbs for the nervous system. And, if you have at least 3 hours between when you eat breakfast and when you start work you will have time to digest a higher fat meal. Choosing your fats carefully and eating them in small amounts can also help speed up their digestion a little. For example, coconut oil is higher in medium chain fatty acids (MCTs). Since they are shorter than the fats found in cheese, meats, cream and bacon, they are digested and absorbed faster.

So should you add some coconut oil to your diet? Unfortunately, there isn't enough research available yet to say yes or no. One study showed a positive effect on performance when the diet was supplemented with 6g of MCTs/day for 14 days together with carbs[8], but there were only 8 subjects, 7 of whom were women, and women do metabolize fats more efficiently than men. On the other hand, if you tend to be quick to burn through your food, and often feel the symptoms of hypoglycemia (see page 224 for a list of symptoms) it might be worth trying adding some MCTs to your diet.

Fats are also important because they provide the vitamins A, E, D, and K and the essential fatty acids that are necessary for many important functions like blood clotting, immunity, and tissue repair. These essential fatty acids are also known as omega-fatty acids, and there are two main types that we can only get through dietary fats.

Omega-3 fatty acids that are found in cold-water fish, canola, walnuts, and flax are anti-inflammatory. They are very important for health, but especially for people who get a lot of exercise as they are your natural source of ibuprofen. It's important to try and include a source of omega-3s in your diet every day. Omega-6 fatty acids are found in most vegetable oils, they are also important for health but because they are so prevalent in our diet you don't need to focus on them as much. Expensive oils aren't necessary, canola oil has just about the perfect balance between omega-3 and -6 and we can make omega-9 fatty acids in our bodies from other fats. Besides, omega-3s are very unstable and they lose their potency quickly, so fresh natural sources are really the best.

Eating cold water fish once or twice a week, sprinkling some fresh ground flax and wheat germ on your cereal, sandwiches and salads, putting a couple of slices of avocado on your sandwich occasionally, and using a little bit of canola or olive oil in your cooking will give you more than enough of the important fat based vitamins and fatty acids.

Fats to avoid: TRANS FATS and CHOLESTEROL

The fats that you want to avoid the most are trans fats. Trans fats are created during the hydrogenation process, when they take an unsaturated fat from a vegetable source (usually liquid at room temperature), and make it into a saturated fat so that it is solid at room temperature. Trans fats used to be found in many margarines, and commercial baked goods like cookies, cakes and crackers but now that we know how bad they are for your heart they are far less common.

Another fat that you need to be extra careful about is cholesterol because this is the main fat that **sticks to the inside of your blood vessels forming a substance called plaque**. Plaque narrows and stiffens blood vessels reducing blood flow and raising blood pressure (called atherosclerosis). High levels of cholesterol and low density lipoproteins (LDLs or 'bad cholesterol') are strongly linked to heart disease.



Most of the cholesterol (about 75%) is made in your body, people who have a family history of high cholesterol typically have to be treated with drugs to suppress cholesterol production. **A diet high in sugars promotes the synthesis of cholesterol in your body**, so there is yet again another reason to stay away from sugary foods. The other 25% of cholesterol is from dietary sources, so it's wise to **limit your intake of foods that are high in cholesterol like egg yolks, beef and cheese.**

Some of the LDLs and dietary cholesterol are balanced by having a high level of **physical activity as it increases the high density lipoproteins** (HDLs) in your blood. HDLs are also known as “good cholesterol” because it scavenges cholesterol from the inside of your blood vessels. Having more HDLs has a positive effect in lowering the bad cholesterol in your blood.

Scientists also used to say that all saturated fats were bad for you, but this has now been questioned. It’s probably alright for your heart to get a little saturated fat from nuts, meats and dairy products, but the main problem for active people is still that fats are so slow to digest that you need to limit how much you take in, at least during the times when you need to stay alert and want to move quickly and powerfully.

THE SHORT VERSION: FATS

- Use fats sparingly for accents rather than staples and favor unsaturated and omega fatty acid sources. Avoid saturated fats and trans fats (from hydrogenated oils) whenever possible.
- If you have a tendency to burn through your snacks in 2 hours or less you can try adding a bit of fat to your breakfast. Choose MCTs or make sure that you allow 3 hours for digestion before work.

THE SHORT VERSION: THE THREE TYPES OF FOODSTUFFS

- Be sure to eat a breakfast of complex carbs and a little protein to top up your blood sugar for a safe drive to work.
- Eat small complex carb and low fat protein snacks every 2-3 hours to stay alert and be able to go hard when you want to.
- It's very important not to wait until you are hungry or feel sluggish before you have a snack. By then your vigilance level will have already dropped and you will be at greater risk for an accident or injury.
- Make sure that muscle carbs are restored at the end of each day by consuming an easily digested carb and low fat protein snack within 1 hour of finishing physically active work.
- Choose healthy fats in small amounts and allow 3-4 hours for digestion

2 WHAT TO EAT

If you haven't already read it, check out the previous section on carbs, proteins and fats. Understanding about the types of foods will help you make choices that will give you the energy you need to do your job safely.

You'll find lots of ideas for meals and snacks in this section. It doesn't mean these are your only choices, but it should help you understand **what kinds of foods are best to keep you sharp and agile all day long.**

Remember that **people who ate small complex carb and low fat protein snacks every 2-3 hours during the work day had faster and more accurate reflex responses, injury rates went down, and performance went up.** Given that your life depends on staying alert and responding quickly to unexpected events, even if this is a different way of eating from what you are used to its probably worth giving it a try.

You'll also find some suggestions for emergency snacks: things you can eat if you've missed a meal, or worked much harder than you planned to, or if you find yourself hitting the wall (hypoglycemic) and need to get your blood sugar up in a hurry.

Note: The portion sizes are for an average sized person who is working moderately hard. Adjust upward or downward according to the information on energy output on page 226 or just based on whether you are gaining or losing weight.

BREAKFAST

Breakfast is an important meal, no matter what time of day or night that you get started. It's a chance to make sure that your brain has carbs and water to fuel your drive to the woods and/or the first couple of hours of work.

60 min

If you are the driver or are based in a camp, you'll need a breakfast that will be digested a little faster so that you have fuel for your nervous system during the drive or your first hour at work. Look for the items with the 60 min symbol as they are a little lower in protein and will provide you with fuel in just over ½ an hour after eating.

90 min

If you are a passenger or start work 1-2 hours after eating, then choose from the items marked with the 90 min symbol. They are a little higher in protein with just a small amount of fat and will take about 1.5 hours to digest.

If your preference is for a breakfast that is fast to prepare**,**
GOOD CHOICES are:

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60 min

1 cup low-fat, no sugar added yogurt mixed with 1 cup chopped fresh fruit and ½ cup cereal (see next item). Top your breakfast sundae with a tablespoon of wheat germ or ground flax seed, or wheat or oat bran for a fast and nutritious breakfast. Be sure you have chosen a 'no sugar added' yogurt, some have as much sugar as a regular sized chocolate bar.

If your preference is for a breakfast that is fast to prepare, **GOOD CHOICES** are:

60 min

1½ cups whole grain or bran cereal with 1 cup skim milk and a banana or a cup of berries: Look for cereals with less than 5 gm of sugar, and less than 190 mg sodium and at least 3 gm each of fiber and protein/serving. All-bran, Wheaties, Total, Shredded Wheat and even Multi-grain Cheerios are good choices to name a few. Check the nutrition labels, they'll tell you whether you are making a good choice or not.

90 min

If you use a milk with more fat like 1% and add ¼ cup dry non-fat milk (dissolve in the liquid milk first) you will convert the breakfast just above to a slower release meal. Dry milk powder is a great protein source.

60 min

Power smoothie: Mix 1 cup of skim milk, ½ cup low-fat no sugar added yogurt, ¼ cup dry non fat milk and 1 cup of any fresh or frozen fruit of your choice. Whirl in a blender and add 4 ice cubes, continue to process until smooth.

90 min → **120 min**

Convert this breakfast to a slower release choice by omitting the ice, and using 1% milk and yogurt and adding a tablespoon of wheat germ, ground flax seed OR coconut oil.

If you like to get up a little earlier and have a **cooked** breakfast, **GOOD CHOICES** are:

60 min

1 cup oatmeal, 7-grain, buckwheat or other cooked cereal: Cooked cereals are great sources of protein and fiber and until you start adding butter and cream they are very low in fat. Try them with a bit of skim milk, low-fat, low-sugar yogurt or chopped fresh fruit instead. Or raisins, apples and cinnamon (but go easy on the sugar).

60 min

2-3 pancakes (4 inch = 10 cm diameter): Try the recipe on page 79 and skip the butter and syrup. Instead top with low-fat, low-sugar yogurt and fresh fruit to fuel up for your day. These pancakes freeze well and can be re-heated in the toaster for a great quick breakfast.

90 min

1-2 whole eggs plus 3 egg whites and 1 piece dry whole grain toast: use a light hand when greasing the griddle, just a smear of oil or butter in a non-stick or cast-iron pan will work. Using egg whites keeps the cholesterol level down, and adding onion, garlic and other spices for seasoning instead of cheese and sausage will keep the fat content down. If you put the egg on top of the toast you won't even notice that the toast was not buttered, and you'll speed up the release of these carbs and proteins into your body to keep you alert. Using whole eggs and butter or peanut butter on the toast will slow digestion down to 3 hours.

If you like a fast meal, **OK CHOICES** are:

60 min

2-3 slices of whole grain toast: Topped with fruit puree or a smear of jam makes an ok choice, but it won't last much more than an hour unless you add a bit of protein. Peanut butter or other nut butters are mostly fat, they don't actually have much protein so better choices for a protein punch are low fat cottage cheese, non-fat cream cheese or one of the bean spreads from page 72.

90 min

½ cup granola with 2% or whole milk: Most people think granola is healthy but it's high in fat and sugar. Raisin Bran is another misleading cereal; it has more sugar and salt than Fruit Loops. And choosing 2% over skim milk adds as much fat as a teaspoon of butter while whole milk doubles that. If you like granola, try the recipe on page 80. It has more protein and less fat than commercial granola and if you use skim milk brings this meal back to a 60 min timed release.

90 min

Lower-fat breakfast meats: There are lower fat products like ham and turkey breakfast slices but they are high in salt and preservatives which have other health considerations (and they are expensive). If you are keen on meat for breakfast then try a little left over grilled chicken or turkey breast, sautéed in a drizzle of olive oil together with some chopped scallions and garlic, then make it into an omelet with 1-2 eggs and 2-3 egg whites, or try breakfast patties made using

the burger recipe on page 60. Make them half size and broil them the night before for a delicious breakfast sandwich on a small whole grain bun.

90 min

2 eggs fried with cheese: Frying your eggs in a teaspoon of butter and adding an ounce of cheese will slow the digestion of your breakfast down so that you won't be able to use it for fuel for about 3 hours (this is also the big problem with bacon). Even if you eat carbs together with all that fat, they won't be absorbed until the fats have been broken down, which means that you will be running on empty for the 3-4 hours it takes to digest all that fat. Instead try 2 poached eggs served on a whole grain bun with a slice of low fat cheddar, or better yet scramble the eggs with an extra egg white or two, onion, garlic and low fat cottage cheese. It melts nicely and gives you that cheesy flavor.

If you like a fast meal before work, **POOR CHOICES** are:

0 min

Nothing to eat: When you wake after not eating for 6 or more hours your stores of sugar for your brain are very low (they come from carbs stored in small amounts in your liver), especially if you were drinking alcohol the night before. The only way to make sure that your brain wakes up is to fuel up. Your truck won't run without fuel, why expect that your brain would?

200 min

High sugar and fat items like commercial muffins and pastries: Even most commercial bran muffins are full of fat and sugar. Those from one of the largest coffee specialty stores, or discount box stores pack 500-600 cals and 25-30 gm fat. If you eat it at 6:00 am it will still be sitting in your gut at 9:00.

If you like a cooked breakfast before work, **POOR CHOICES** are:

15 min → **200 min**

Waffles with butter and syrup: Very little nutrition, just fat and sugar calories. But even if you were to ultimately burn them off, the timing of their release is not very helpful. If you go for butter you will have that problem of the energy not being available until long after you need it, and if you skip the butter the rapid absorption of the sugar in syrup is going to cause a lot of insulin to be released. Unless you start physical activity within 15 minutes of eating your breakfast, the insulin will move the sugar into storage and about 2 hours later you'll crash.

200 min

Bacon, egg and cheese breakfast sandwich: Way too much fat unless you are a passenger catching a 3+ hour ride out to the woods. You don't want your driver to be falling asleep, so if he or she had the fat filled breakfast maybe you should offer to drive?

LUNCH / SNACKS

Snack on small amounts of complex carbs with a little low fat protein every 2-3 hours throughout the day to stay alert and keep your reflexes sharp.

If you haven't already done so, check out the section starting on page 10 to learn about what foods are carbs, proteins and fats. It will help you understand the suggestions below. You'll find tips for selecting both savory and sweet snacks whether you pack your lunch at home or in camp. Follow these guidelines to have the energy to work hard, stay alert and keep your reaction time at it's best, all day long.

THE SHORT VERSION

Your best safety strategy is to keep your blood stable. **By avoiding sugar highs and lows and giving your brain, nerves and muscles the fuel they need you'll be better able to concentrate, stay alert, react quickly and move powerfully.** You will make better decisions and won't feel nearly as tired at the end of the day. To do this eat small amounts (about 300 calories of complex carbs with fiber, together with a little low fat protein), every 2-3 hours.

Snacks that are **sweet: BEST CHOICES**

90 min

2 pieces of fresh fruit. Easy to prepare (just wash), pack (just put in your bag) and eat, and full of fiber and vitamins. The only thing lacking is some protein. So add a cup of 1% or skim milk to drink and you have a nutrient packed power snack! If you don't like milk, ½ - 1 cup of low fat, low sugar yogurt or low fat cottage cheese, or a small raisin bagel with a big dollop of non fat cream cheese will also give you the needed protein. Try for at least 3 servings of fruit/day.

90 min

A piece of low-fat low-sugar baked goods and 1 piece of fresh fruit. It takes a bit of time to prepare your own muffins, tea breads, power cookies and bars, but it's worth the effort when you get to eat them and know they are providing you with just the right combination of carbs and protein to help you stay alert and react quickly. See page 81 for some recipes and page 53 for instructions on how to convert your favorite sweet treats to power snacks.

90 min

2-3 slices multi-grain bread, bagel or bun spread with fat free cream cheese and a teaspoon of jam or a few raisins: Fat free cream cheese is a great source of protein and one teaspoon of jam only has 4 gm of sugar. There is enough fiber in the bread to slow down the release of the sugars so this makes a great sweet snack.

60 min

A granola bar: Of the commercial granola bars Kellogg's Fiber Plus and All-Bran Honey Oat Bars are probably the best of them. Read the labels and stay away from products with much more than 10 gms of sugar and 6 gms of fat if you can. Check out the comparison of a few popular brands on page 225 to see how your favorite bar measures up. Whichever you choose it's OK to have a granola bar snack once or twice a week, but they don't give you much in the way of vitamins and minerals and so are not your best choice. Protein and meal replacement bars like SoLo or Power Bar bars are much higher in protein and contain some vitamins and minerals, but they are also much more expensive. Better yet make your own from the recipe on page 85 and get the right combination of nutrients and fuel to keep you at your best.

60 min → 90 min

1 cup pudding, fat and sugar free: Made with skim milk, pudding gives you the benefits of a glass of milk but like calorie free soft drinks its main drawback is that these kinds of foods don't include other important nutrients like fiber and vitamins. Fold in ½ cup of cottage cheese, ½ cup plain low fat yogurt or ¼ cup dry skim milk powder plus either a tbsp of wheat germ, fresh ground flax or bran to increase the nutrient quality substantially. If you choose the regular sugar containing variety there will be about 18 gm of sugar, so unless you're already working hard you'll be hypoglycemic 2 hours later.

90 min → 200 min

Peanut butter and jelly on whole wheat: The protein in the peanut butter is good but the fat is not. Even the fat reduced peanut butters are about 75% fat, and will slow the release of the carbs in the bread too so that you'll be waiting for the energy to become available for about 3 hours. You can reduce the fat by purchasing a "natural" peanut butter, letting the oil separate to the surface and pouring most of it off. The solid residue of the peanuts has the taste, protein, fiber and vitamins but it will be hard to spread. To make it easier to handle, scrape it out of the jar and puree it in a blender with something to soften it like tofu, cooked dried beans (the peanut butter flavor will mask the taste of the beans/tofu) or even just some hot water. You can also blend in bananas or apples (with their vitamins and fiber) or even a little bit of honey or jam as the softener. Put the mixture into small containers and store it in the refrigerator, freeze any you won't use up within a few days as it won't keep for long with fruit or tofu blended in.

Snacks that are **sweet: POOR CHOICES**

200 min Commercial muffins, banana bread, cookies: You might think that a muffin is a better choice than a cookie but discount store muffins have more than 600 calories each, including half of your daily fat allowance. The fats in these items are often saturated and trans fats, both of which are bad for your health and they contain your entire daily allowance of sugar.

30 min Fruit cup: Be careful that you have chosen a variety packed in water. Even those labeled 100% fruit juice include extra sugars that you don't want. Same for commercially dried fruits, many are coated in sugar syrup before they are dried. See pages 221-224 for an explanation of what happens when you eat food with a lot of sugar and why it leads to hypoglycemia, a sure way to seriously impair your reactions.

15 min Soft Drink: Full of sugar and nothing else this is about the worst choice you can make. Within 10 minutes you'll get a big jump up in blood sugar and a big hit of insulin followed by a large drop in blood sugar. About 2 hours after drinking the soft drink your reactions will be seriously impaired. See pages 12-13 for an explanation of blood sugar and insulin.

Snacks that are **savory: BEST CHOICES**

90 min

Sandwich, bagel or wrap made with whole grain bread, a little lean meat or bean spread (see page 72 for some great recipes for bean spreads) and some vegetables. For protein your best choices are grilled chicken breast, thin slices of lean beef, salmon, tofu, beans, eggs or water packed tuna. Don't limit yourself to the old standards of tomato slices and lettuce; try peppers, cucumbers, sprouts, asparagus, zucchini and thin sliced mushrooms, onions and eggplant. Brush the vegetables with olive oil and roast for an hour in the oven or barbeque (low heat) for great flavor. Try different breads too, there are so many to chose from; pita, bagels, wraps and buns are all good, but make sure it's the whole grain item. Stay away from high fat add-ons like butter or margarine, mayo, cheese and sausage. Give the roasted vegetables a try; they have so much flavor and some moisture, so you'll find that you don't need to add anything else.

90 min

2 cups mixed greens salad with a chicken breast, tin of water packed tuna, marinated steamed tofu or small salmon filet. A salad made with fresh greens and just about any kind of vegetable is a nutrition packed snack. For dressing stay away from fat loaded mayo and salad dressings. Instead use a low calorie dressing (20 calories per tablespoon or less) or better yet make your own with a little balsamic vinegar, mustard and some spices. There are some easy recipes on page 75.

90 min

1-2 cups veggies and 2 tablespoons dip: For optimal health you need 8-10 servings of fruit and vegetables every day so bring along carrot, celery, pepper, and zucchini sticks and a handful of cauliflower and broccoli flowerets. Cherry tomatoes and snap peas make a nice treat too, and even fresh asparagus and string beans are good crunchy snacks when raw. Try some new vegetables like jicama root. Its sweetness is in the form of a soluble fiber not sugar, so it's a great sweet treat for diabetics! Dips can be messy, but a little protein is needed so try non fat cream cheese or pureed cottage cheese blended with herbs or one of the bean spreads on pages 72-74 as your dip.

Snacks that are **savory:** OK CHOICES

60 min → 200 min

1 cup spicy mix made with a few almonds and walnuts, pumpkin seeds, dry roasted soya nuts, pretzels, and cereals such as whole grain Cheerios and Shreddies. Combine the dry ingredients and then toss with a mix of the following: a little water and lime juice, chili, garlic and onion powders, Worcestershire sauce, hot sauce and any other spices that you like. Mix well to coat and spread on a baking sheet, then cook in a low oven (300°F) for 30 min stirring occasionally (without oil the cereal will be prone to sticking, so oil the cookie sheet lightly or use parchment paper). Your snack mix is done when it turns nice and crisp. The length of time required

to release the energy will depend on how many nuts and seeds you use; without them your mix is mostly carbs, with them you add a little protein and a fair bit of fat. A lower fat source of protein would be dried tofu cubes (see "Jerky" item below).

90 min

1 cup soup or stew in a thermos: Soups are satisfying and flavorful. See the recipe section on pages 70-71 for some suggestions for homemade soups. They are easy to make, inexpensive and much lower in fat than store bought soups. Get yourself a small wide mouth thermos and have a hot nutrition packed snack for lunch. It's especially nice when the weather is bad.

90 min

Jerky: Beef, venison, turkey, salmon and even tofu can all be dried for a great high protein low-fat snack. Get the local butcher to thinly slice a (raw) roast for you and make your own. It's easy, more economical and much healthier than the commercial versions. Choose your favorite marinade, cover the protein and refrigerate 24 hr. You can dry the jerky by laying it out in a single layer in a low oven, or in a food dehydrator; or smoke it over a pellet BBQ for added flavor. To make this snack give you the energy that you need it's best to add some carbs. A piece of fruit, handful of carrots, half a bagel or ¾ cup of cereal or spicy mix (see above) will give you the brain power you need to stay alert and agile. Two good characteristics when your life depends on it!!

90 min → 200 min 1-2 cubes of cheese (each 3 cm cubed) and 4 crackers: While cheese is a good source of protein and calcium it is mostly made of fat, making it just too high in calories to be digested in under 3-4 hours. Rather than making it a main part of a meal or snack, save your cheese as a flavor accent, like when you sprinkle a bit on top of your favorite pasta. If the sauce is well spiced, you can skip the cheese altogether. Adding cheese just because you normally do won't gain you much in flavor but will gain you a lot in fat. A better choice to top your crackers is to use low fat cream cheese blended with herbs, marinated steamed tofu cubes or one of the bean spreads on page 72. Add a slice of cucumber, pepper, radish or zucchini to increase the crunch and gain another serving of nutrient rich vegetables in the process. As for the crackers, good choices are products that are lower in fat and higher in fiber (Rye Crisp, Finn Crisp, Ryvita, Wasa and Kavli are the best choices, Triscuits are a little higher in fat and Stoned Wheat Thins are a little low in fiber).

200 min 12 almonds or other nuts: You hear a lot about how nuts are supposed to be healthy for you, and it's true that they contain some important vitamins, fiber and "good fats". But, they still take too long to digest during the day when you are working hard. Remember that they will also slow the release of any carbs you have eaten to keep your brain

alert. So like cheese, nuts should be saved for flavor and and garnish and perhaps a treat snack once or twice a week when you have time to digest them.

200 min

10-12 potato chips: There is no denying that the crunch and salt are satisfying, but you may as well just eat the oil and salt because the chip doesn't offer you much else. The baked versions reduce the fat content from 75% to about 50% which is still too high. And the low salt versions reduce the salt from 10% of your daily allowance to about half that. The baked veggie chips that advertise they are made from fresh vegetables are no different, they use just enough powdered vegetable to color a potato chip. Try the oven baked French fry recipe on page 55 instead of chips when you have a potato craving and switch to fresh veggies for crunch. The spicy bean dips will help satisfy the need for something salty and flavorful.

A steady supply of blood sugar during the day is essential. The only way to do this is by eating small amounts of complex carbs (with fiber) and protein every 2-3 hours. Not sugary or fatty foods. Do you know someone who got hit by a tree top or snag? If they had reacted even a half second faster do you think they could have avoided getting hurt? Eating right can speed up your reactions and give you the edge that you need to stay safe.

EMERGENCY RATIONS

Get caught out by poor weather or having to hike much further or in steeper terrain than expected? Or you've had a lot on your mind all morning, maybe something going on at home, or your shifts are messed up. Now you're hungry but you want to finish bucking your log before stopping for lunch. Or maybe you had to deal with some deadfall and have worked yourself well away from your pack. It doesn't feel like its worth walking all the way back to get something to eat when you are behind in production already. In each of these cases **blood sugar can drop so low that there isn't enough of the right fuel available for your brain and nerves to function properly. And unfortunately most of the time you won't even be aware that these changes are taking place. During studies with fallers, tree planters, ski patrollers, truck drivers, helicopter pilots and physicians, participants were up to 18% faster and more accurate in their responses to unexpected stimuli when their blood sugars were stable.** Just think about how much safer you would be if your ability to react to visual stimuli stayed at its best all day long, every day. How much less chance of missing a warning sign or slipping off a log you would be if you could react ½ a second faster?

Read through the description of hypoglycemia and how it affects performance on page 221, and learn to recognize the warning signs. It can help you keep your performance high when you are tired, and it might even save your life by helping to keep you alert and able to react quickly to unexpected visual stimuli.

Remember that these snack suggestions are for times when you are either already working hard and are running out of fuel, or you know your energy level is low and you have to start work within 10-15 min. It's ironic, but **the same food and drink that can save you from hypoglycemia while you are engaged in physical activity can drive you into hypoglycemia if you eat them when you are sitting around.** No need for energy gels. Each of these sweet snack suggestions will give you the same fast energy boost.

15 min

High sugar fruit drinks or energy drinks: Even "unsweetened" or "natural" fruit juices contain a lot of sugar and will cause a large release of insulin. However, if you *are already exercising or are going to start physical activity within 10-15 minutes* the release of insulin is blocked and the sugar in the drink will fuel your muscles, nerves, brain and immune system. Energy drinks also contain caffeine, so see page 188 to understand more how they work, and whether they are safe to use.

15 min

Dried fruit is pretty resilient. It can survive in the bottom of your pack or the pocket of your jacket. A couple of handfuls of raisins, dried apricots, figs or mangos in a ziplock is a great emergency source of energy to stay warm, make good decisions, and maintain your agility and coordination. It will also give you enough energy to make it home safely when conditions change and you end up working longer or harder than you came prepared for. For more lasting energy for your muscles, follow your mouthfull of sweetness with a hand full of nuts, but be sure to wait 15 to 20 minutes to give the sugar a chance to get into your blood first.

15 min

Hard candies (or low fat gummy bears and jelly beans): Indestructible, even if they get wet and you have to suck the wrappers off. These light weight little packets of instant energy can survive in your pocket until you need them.

30 min

A low fat, high sugar commercial granola bar makes a great emergency ration. Choose a bar that is lower in protein (under 4 g) and fat (less than 4 g), like Quaker Oats to Go and Nutrigrain cereal bars. These bars will release their energy quickly, but they tend to crumble when left in a pocket. Performance Bars and Cliff Bars are denser and nicely packaged so they can survive being buried under your water bottle, but they are expensive, and their protein content will make them slower to release their energy.

Remember that all these choices have a lot of sugar in them, so while they are a good source of immediate energy if you are about to start moving or already engaged in physical work, they are not good choices if you will be sitting for longer than 15 min.

150 min

What about a chocolate bar? Traditional energy food. Lots of sugar, so is chocolate your best choice? At about 50% fat the answer is no, it's going to take a while for the energy to become available unless you eat it in very small amounts (1-2 squares at a time), in which case it becomes a high sugar snack, absorbed within 15 min or so.

BUYING YOUR LUNCH TO GO

Packing a lunch is always possible for those who are based at a camp, but if you work from home what can you do when you haven't had a chance to get groceries or you just don't have time to pack your lunch and snacks? It doesn't mean that there aren't good options to be found

First choice is a build your own sub place, go for a whole grain bun, bread or wrap, no mayo or butter. For filling choose roasted or grilled chicken rather than fattier roast beef or hamburger. Pile on sliced tomato and lettuce, peppers and other fresh vegetables. And skip the cheese and potato chips, the fat content of each is too high. If you crave them wait until dinner time, they can digest while you sit around and watch the game on TV.

If you end up buying lunch at the gas station, look for fresh fruit and sandwich makings. Most of the time you can find whole grain bread or burger buns and sliced prepackaged turkey or chicken. It only takes a minute to throw the meat between the bread and while it won't be the best lunch you've ever tasted - if it keeps your vigilance level up it may save you from a serious injury.

Most convenience stores sell chocolate milk, small containers of yogurt, puddings and sometimes fruit cups. These make ok choices to save and use to top up your blood sugar while doing physical work, or as your post work carb replacement snack. Since their sugar content is high they are not good choices if you are sitting at a desk or in a vehicle. A better choice would be beef jerky or a small easy open tin of tuna or salmon and a slice of bread or piece of fresh fruit.

DINNER

If you've been able to maintain your blood sugar levels during the day, and have had your power snack just at the end of work, then you don't have to worry too much about using dinner to make sure that your glycogen stores (page 16) are good to go for the next day. (But remember that your muscle only stores a limited amount of the carbs that fuel any powerful movements. It's only in the first hour after the end of physical activity that there is that great opportunity to refill muscle with carbs so that you can work hard again tomorrow. See page 16 for more about restoring your muscle for sequential days of hard work.)

If you missed a few snacks during the day, or your all-important post-work snack, and this is the 5th day of working hard ground, you will be feeling a heaviness in your muscles due to lack of carbs (glycogen). Without the advantage of the increased activity of glycogen storage enzymes in the first hour after exercise ends, the only way to get carbs back into muscle is to eat a dinner with more than 70% carbs (Pasta, rice, potatoes, bulgar, cormeal, barley, quinoa, breads, fruits and vegetables). You'll have to keep the fat content low in order to be able to increase the carbs to reach this level.

If on the other hand you did meet your carb requirements during the day there is less concern about what you eat for dinner from the performance perspective. If you've been falling you'll have burned off about 1200 calories over and above what you need to maintain your current body weight. So go ahead and eat to replace at least some of that energy.

In the next section you'll find some recipes that are easy to make and economical, high in carbs and protein, and low in fat. They are delicious meals that will improve your health and help keep you alert and strong all day long.There's also a section on how to adapt your favorite meals, often you can reduce the fat and sugar in a recipe by half without affecting taste or texture.

• **The protein:** Choose from fish of all types, skinless chicken or turkey breasts, and lean cuts of beef and pork. Use beans and tofu for low fat

inexpensive protein that can replace or stretch the meat in just about any recipe. Cut away any visible fat deposits and choose a cooking method that doesn't add any fat like grilling, broiling, baking and stewing. You'll find tips on how to cook without fat in the section below along with some recipes.

• **The carb:** The usual dinner carbs are pasta, rice and potatoes and all of these are good choices, with a little adjustment.

Switching to whole wheat pasta and brown rice will add nutrients. If you don't like the texture or taste of the whole grain products then mix them half and half with white pasta or rice until you get used to the taste, and then gradually use less and less of the low fiber product. Or for a more economical way of getting fiber and vitamins, just add ¼ cup of oat or wheat bran and 2 Tbsp of wheat germ into the sauce. Likewise scrub your potatoes instead of peeling; the peel has most of the fiber and vitamins. There are also other grains that are easy to cook; try bulgur, cornmeal (polenta) and quinoa for a change. They each have their own flavor and texture and can help make your meals more interesting.

The big trick with all these items is what you put on top. Cream sauces, butter, sour cream and cheese are not good choices but the recipes below will all give you plenty of flavor and moisture to add to your carbs with a lot less fat.

- **The rest:** Veggies, veggies and veggies. Assuming that you've had 2-3 fresh fruit snacks and one veggie snack during the day you still have 4 servings to make up to reach your daily target. Salad or steamed vegetables with a little lemon or a sprinkle of sautéed onion and garlic, ginger and herbs are alternatives to butter and cheese toppings. Many of the recipes below will include a serving or two of vegetables in the sauces as well. Vegetables are such a great source of vitamins and minerals and the fiber will help fill you up and keep your gut working well.

Your day is long and your work is hard. There isn't a lot of energy left over for shopping, getting groceries and preparing tomorrow's snacks. But now that you understand the importance of supplying the right fuel at the right time, you can make your decisions knowing just how high the cost of the pizza lunch and afternoon soft drink really are. In the studies, vigilance, accuracy and speed of reaction were all up to 18% better when blood sugar was stable than when it fluctuated. Overall injuries and accidents were reduced by 70%. All you need to do is manage your energy supply by making the right food choices.

3 PREP MEALS WITHOUT ADDED FAT

The fat in most meals can be decreased without changing the taste or texture. Some baked items such as brownies and cookies require more fat, but you can still cut the oil, margarine or butter in them by a lot. The main advantage to keeping fat content down is that it will allow you to digest the food faster so you can use the energy while you are driving to work, moving through the bush and running a chainsaw.

When baking, the oil or margarine can usually be reduced to about ¼ - ½ of the amount called for by the recipe. Increase the liquid ingredients by the same amount you've reduced the fat using pureed fruit of any kind (apple sauce, cooked pumpkin or squash or mashed banana all work well), egg whites, or plain yogurt with good results. You can also add low fat cottage cheese, tofu, or dry skim milk powder to boost the protein content and wheat germ, grains, and a few nuts and seeds for extra nutrients. Rather than greasing the pan, sprinkle it with cornmeal, oats, flour, or ground nuts to prevent sticking. Reduced-fat baked goods go stale faster than the high-fat versions so just leave out enough for one day, and store any extras in the freezer.

Replace whole milk or cream by using skim milk for an easy fat save. If you are used to whole milk then make the transition easier by switching first to 2% for a week, then to 1% for a week, and finally to skim, or better yet use skim milk but add a tablespoon of dry non-fat milk to richen it up until you get used to the lighter taste.

Minimize fat in stews and other dishes that require pre-browning or sautéing by using a non-stick or seasoned cast iron pan. Brown the meat in a preheated hot pan in small batches, stirring constantly, and scraping the pan to keep it from sticking. Once all the meat has all been seared add some chopped onion and garlic and put the meat back into the pan. Keep stirring and scraping, and as the onion releases its juices the tasty brown bits stuck to the bottom of the pan will dissolve and coat the meat and onions for the best flavor and most tender meal you have ever tasted. Use in a crock pot or your favorite stew.

After your stew or soup has simmered, cool to harden the fat for removal. This works best if you make the broth base first and remove the fat before you add the vegetables. It might sound time consuming but it's pretty easy to do if you start your stew or soup the night before, simmer in a little water that evening and then leave in the fridge overnight. The next day when you get home from work you can remove the hard fat layer, bring the broth to a simmer and add some chopped vegetables. Half an hour later dinner is ready! Don't boil the meat or it will toughen.

Broiling or barbequing are also great ways to cook as they allow fat inside to the meat to melt off. If you like you can season and tenderize the meat with an oil free marinade or rub. Just start with something acidic like vinegar, lemon, lime or orange juice, wine or beer. Add some zip with spices and hot sauce, and let the protein absorb the flavors for up to 24 hours, then simmer the marinade to make a great sauce. The marinade also protects the meat from forming the chemicals created when meat is charred that can cause cancer.

Add beans to any recipe for fiber and to decrease the amount of meat you need. If you don't like beans, puree or mash them before adding to any sauce, soup or stew, they'll thicken it without changing the texture or taste. Other low fat alternatives are fish, prepared any way but fried, and vegetarian dishes. Just watch how much cheese, nuts and oil the recipe calls for.

Unfortunately cheese is very high in fat, so just use a little for toppings on pizza or lasagna. If you've used some herbs and roasted vegetables there will be so much flavor you won't miss the slow digesting cheese.

Delicious oven fries and roast potatoes can replace your french fry cravings. Rinse cut up potatoes in cold water to remove excess starch, then toss in a bowl with a teaspoon of olive oil for every 3 potatoes. Add lots of spices and coat well. Place the potatoes on cookie sheets without crowding too much and bake at 375°F for 45 min till crispy and golden – wonderful!

These suggestions will help you improve the health of your dinner, and instead of sitting in your gut till midnight, it will digest much faster than a high fat meal. You'll be able to get a good night's rest and restore your muscles for another day of hard work.

4 RECIPES

All of these recipes can be made ahead in large quantities and reheated. Let's face it - by the end of the day there isn't much energy left over to start cooking a meal. You need something that is fast and easy to prepare.

DINNER BRAISING VENISON OR PORK

Use this method to begin any stew, curry, or dish that requires tender chunks of meat.. Prepare the meat early in the day or even a full day before you need it.

INGREDIENTS:

¼ lb	(0.15kg)	Meat/person, cut into cubes and trimmed of fat
½		Medium onion/person, thinly sliced
½		Clove garlic/person, minced

DIRECTIONS:

1. Use a large non-stick or seasoned cast iron pan. Heat the pan on high heat before adding the meat and have everything ready to go.

2. Add the meat in small batches so it is all in contact with the bottom. Using a good egg flipper or wooden spoon stir the meat constantly, scraping the pan to keep it from sticking too badly (it will sear immediately and start to stick). Once the meat has all been seared add the onion and garlic and add all the meat back in. Keep stirring and scraping until the onion is soft and all the brown bits stuck to the bottom of the pan have been dissolved.

3. Add enough water to cover the meat, put in the crock pot or cover tightly, and simmer (not boil!). Cook until the meat is very tender (45 min - 2 hours). If you've done all this the night before then refrigerate it all overnight. Any fat in the broth will rise to the top and harden, and you can scrape it off before continuing on with your favorite recipe.

DINNER HUNGARIAN GOULASH

This recipe would also work very well in a crock pot

INGREDIENTS:

2 lbs	(1 kg)	Beef chuck or round cut into cubes
1 large		Onion (sliced)
2 cloves		Garlic (minced)
¾ cup	(180mL)	Ketchup
1 tbsp	(30mL)	Worcestershire sauce
2 tsp	(10mL)	Brown sugar
4 tsp	(20mL)	Paprika
½ tsp	(2mL)	Dry mustard
		Cayenne pepper to taste
1 ½ cups	(375mL)	Water
6 cups	(1.5L)	Hot cooked noodles

DIRECTIONS:

1. Begin with braised beef, add spices and water. Cover and simmer 2 hours in total (if you simmered the braised beef after browning you can cut this time down to ½ hour).
2. Serve over hot noodles (Cook noodles just to al dente and do not add any extra oil).

DINNER MUSTARD PEPPER MARINADE

INGREDIENTS:

2 tbsp	(30mL)	Dijon mustard
1 tbsp	(15mL)	Lemon juice
1 tbsp	(15mL)	Crushed peppercorns
½ tsp	(2mL)	Dried oregano
3 lbs	(1.5kg)	Lean beef

DIRECTIONS:

Combine all ingredients and rub over meat. Marinate overnight. Cook roast 20 min/lb, let stand 10 min. then slice thinly. Use left over marinade to make a sauce by adding 2 cups of beef low sodium broth (500 ml) and then simmering 15 min. Thicken with a little flour and water or mashed cooked beans.

BERBER MARINADE FOR BEEF

INGREDIENTS:

1		Medium onion, diced
3		Cloves garlic, minced
2 tbsp	(30mL)	Fresh ginger, minced
½ cup	(125mL)	Paprika
1 tbsp	(15mL)	Coriander seed
2 tsp	(10mL)	Cracked black peppercorns
2 tsp	(10mL)	Cardamom pods
1 tsp	(5mL)	Hot pepper flakes
1 tsp	(5mL)	Cinnamon
½ tsp	(2mL)	Whole allspice
¼ tsp	(1mL)	Ground cloves
¼ cup	(60mL)	Lemon juice
2 tbsp	(30mL)	Water

DIRECTIONS:

1. Cook spices together with onion, garlic and ginger in a dry skillet over medium heat for 2-3 minutes. Combine all ingredients in a blender and puree to a smooth paste. Spread over beef, poultry or seafood and marinate overnight.
2. Grill meat and slice thinly, serve with rice. Use the left over marinade to make a sauce by adding 2 cups (500 ml) of low sodium beef broth and then simmering 15 min. Thicken with flour and water.

DINNER CROCK POT PORK ROAST

INGREDIENTS:

3 lb.	(1.36kg)	Lean boneless pork roast, trim all fat away
1		Acorn squash
2		Sweet potatoes, peeled
1/2 cup	(125mL)	Unsweetened applesauce
3 Tbsp	(45mL)	Prepared horseradish
1 Tbsp	(15mL)	Cornstarch
1/2 tsp	(2mL)	Each ground allspice, cinnamon, cloves
1/4 tsp.	(1mL)	Pepper
1 cup	(250mL)	Low sodium chicken broth
1/4 cup	(60mL)	Raisins
1 tsp	(5mL)	Dried thyme leaves

DIRECTIONS:

1. Heat oil in a heavy skillet and sear roast on all sides. Cut acorn squash into 8 wedges and remove seeds but do not peel. Peel sweet potatoes and cut into chunks. Place squash and sweet potatoes in 6-7 quart slow cooker. Top with browned pork roast. In a small bowl, mix together applesauce, horseradish, cornstarch, spices, broth, and thyme. Pour into slow cooker.
2. Cover crockpot and cook on low for 7-9 hours until pork and vegetables are tender. 8 servings

DINNER BEST BET BURGERS

INGREDIENTS:

1 lb	(0.5kg)	Extra lean ground beef or firm tofu
1 lb	(0.5kg)	Ground chicken or turkey breast
1 egg + 2 egg whites		
½ cup	(125mL)	Dry breadcrumbs
2 Tbsp	(30mL)	Each wheat germ, ground flax seed and oat bran
½ cup	(125mL)	Pureed cooked mixed dried beans (see the recipe for Spicy beans on page 72 for instructions on how to prepare the beans)
¼ cup	(62.5mL)	Tomato paste or crushed tomatoes
1 tbsp	(15mL)	Low sodium soya sauce
2 tsp	(10mL)	Worcestershire sauce
1 tsp	(5mL)	Balsamic vinegar
1 tsp	(5mL)	Each chili powder, ground cumin and coriander
1		Medium onion chopped very fine
2		Cloves garlic minced
1		Green pepper chopped very fine

DIRECTIONS:

1. Mix all ingredients together very well. If it's too moist add a bit of whole wheat flour or some slightly under-cooked bulgur or barley to soak up some of the liquid. The mixture should be soft but not wet.
2. Shape into 10 patties. Grill on the barbeque or place on rack if broiling so that any fat can drip off. Cook well until no pink remains at all when burger is cut.
3. Serve on a toasted whole grain bun with thick slices of tomato and onion, lettuce, sprouts and sweet peppers

DINNER MEXICAN BEEF AND BEANS

INGREDIENTS:

1 lb	(0.5kg)	Lean ground beef
1		Large onion, chopped
6		Cloves garlic, minced
1 ½ cups	(375mL)	Cooked black beans (see cooking instructions on page 68)
2		Medium green peppers, cut in chunks
1		Large can diced tomatoes (28 oz or 796 mL)
1 cup	(250mL)	Frozen corn
2 tsp	(10mL)	Cumin, ground
2 tsp	(10mL)	Hot red pepper flakes
½ tsp	(2mL)	Black pepper
2 tbsp	(30mL)	Red wine vinegar
1		Handful of fresh cilantro, chopped

DIRECTIONS:

1. Cook meat until browned over medium heat and drain off any fat.
2. Add onion, garlic, and pepper chunks and cook for 5 minutes.
3. Add cooked beans and tomatoes and cook for 10 minutes more.
4. Add remaining ingredients and simmer for 15 minutes or until sauce is desired thickness (add cilantro during the final 5 minutes). Serve over rice or corn bread or wrap in tortillas.

DINNER LIME CURRY STIR FRY

INGREDIENTS:

1		Onion, chopped
1		Sweet red pepper, chopped
2		Carrots, chopped
2 cups	(500mL)	Other stir fry vegetables
2 tsp	(10mL)	Curry powder
1 tsp	(5mL)	Ground coriander
1 tsp	(5mL)	Ground cumin

MARINADE:

¼ cup	(60mL)	Low Sodium Soy sauce
1 tbsp	(15mL)	Brown sugar
2 tbsp	(30mL)	Fresh lime juice
2		Cloves garlic, crushed
1 tbsp	(15mL)	Fresh ginger, grated
¼ tsp	(1mL)	Hot chilies/ sauce

DIRECTIONS:

1. Marinate 454g (1 lb) shrimp, chicken, tofu or beef cut in strips.
2. Drain meat, reserving marinade.
3. Stir fry 2 min in 2 tsp canola oil. Set aside.
4. Stir fry vegetables 1 min, add spices and cooked whole wheat noodles (¾ cup per person), cook 2 min.
5. Add meat and marinade and cook 2 min longer.

It's also good without the noodles served as a wrap in whole grain tortillas.

DINNER QUICK AND EASY STIR FRY

INGREDIENTS:

1 lb	(0.5kg)	Lean beef, chicken breast, or firm tofu, cut in thin slices
4		Garlic cloves, chopped
3 tbsp	(45mL)	Fresh ginger, chopped
1 tsp	(5mL)	Hot red pepper flakes
2 tsp	(10mL)	Canola oil
1		Medium onion, chopped
2		Green and/or red peppers, cut in strips
1 cup	(250mL)	Mushroom, sliced
2 cups	(500mL)	Broccoli flowerets, green beans, or asparagus
½ cup	(125mL)	Cold water
½ cup	(80mL)	Low Sodium Soya sauce

DIRECTIONS:

1. In a large wok or deep frypan, heat garlic, ginger, and pepper flakes in oil.
2. Add meat slices and toss until cooked, push to the side.
3. Add veggies and toss until shiny. Add water, cover, and steam 5 minutes.
4. Add cooked meat back in along with soya sauce and heat through (about 2 minutes).
5. Serve over rice or noodles with a sprinkling of toasted sesame seeds.

HONEY ORANGE-SPICE SAUCE

INGREDIENTS:

1 lb	(0.5kg)	Lean beef, chicken breast, or firm tofu, cut in chunks
4		Garlic cloves, chopped
2 inches	(4.5cm)	Fresh ginger, sliced thinly
1		Medium onion, chopped
1 tin		Unsweetened with Pulp Frozen Orange Juice Concentrate, thawed + 2 tins water
2 tbsp	(30mL)	Honey
¼ cup	(60mL)	Low Sodium Soya sauce
¼ cup	(60mL)	Vinegar
2 tbsp	(10mL)	Lemon Juice
1 tsp	(5mL)	Curry powder

DIRECTIONS:

1. Mix all ingredients except the meat together and simmer for 15 min. If desired stir-fry the meat first, or just add directly to sauce. You can also use pre-cooked or left-over meat or chicken.
2. Simmer meat in sauce another 20-30 min until the meat is done, or heated through for tofu or pre-cooked meat (about 10 minutes).
3. Serve over rice or noodles.

DINNER TOMATO LEEK FISH

INGREDIENTS:

4		Fillets white fish of any type
1		Large fresh lemon
2		Cloves garlic, minced
1		Onion chopped
2		Large leeks
1	(796mL)	Large tin chopped tomatoes
2 tsp	(10mL)	Chili powder
1 tsp	(5mL)	Hot sauce
2 cups	(500mL)	Chopped vegetables (green beans or eggplant are good)

DIRECTIONS:

1. Wash the leeks very well and trim the tops of the green part where it's very tough. Slice the rest into rounds.
2. Grate the lemon peel and squeeze the lemon.
3. Heat a deep pan until a drop of water sizzles, then add the onion and garlic and stir constantly until the onion is soft, add the leeks and continue stirring on high heat until the leeks also soften.
4. Add the tin of tomatoes and juice, the lemon and the spices.
5. Heat to a simmer, then reduce the heat and place the fish on top and cover. Simmer 5 min and turn the fish.
6. Simmer another 5 min.
7. Serve with rice, this is great cold the next day for lunch!

DINNER MOROCCAN STEW

INGREDIENTS:

2		Large sweet potatoes or yams, peeled and cut into 1-inch cubes (6-8 cups or 1.5-2 L)
1		Large onion, diced (2-3 cups or 500-750 mL)
4		Garlic cloves, minced
4-6 cups	(1-1.5L)	Assorted chopped vegetables (celery, green pepper, zucchini)
4-6 cups	(1-1.5L)	Assorted cooked beans
2-3 19 oz	(562mL)	Cans stewed tomatoes
¼ cup	(60mL)	Lemon juice
1-2 tbsp	(15-30mL)	Each ground coriander, ground cumin, chili powder, curry powder
1 tsp	(5mL)	Black pepper, ground
¼ cup	(60mL)	Raisins
¼ cup	(60mL)	Peanut butter
6 cups	(1.5L)	Low Sodium Vegetable broth (to cover vegetables)
1		Handful fresh chopped cilantro

DIRECTIONS:

1. Simmer all ingredients together and serve over Couscous.

DINNER SPICY SESAME PASTA SAUCE

INGREDIENTS:

2 tbsp	(30mL)	Sesame seeds, toasted
1 tbsp	(15mL)	Garlic, minced
4 tbsp	(60mL)	Fresh ginger, minced
3		Scallions, minced
2 tbsp	(30mL)	Peanut butter
3-4 tbsp	(45-60mL)	Warm water
¼ cup	(60mL)	Low Sodium Soy sauce
¼ cup	(60mL)	Rice or wine vinegar
1 tsp	(5mL)	Hot sauce
1 tsp	(5mL)	Sugar

DIRECTIONS:

1. Whirl it all together in a blender and serve over hot pasta, veggies and tofu or bite-sized (cooked) chicken or beef strips.

DINNER LOW FAT LASAGNA

INGREDIENTS:

3		Large tins crushed tomatoes
1		Large onion, chopped
2		Cloves garlic, minced
2 tsp	(10mL)	Each oregano, basil, chili powder
1 cup	(250mL)	Celery chopped, finely
½ cup	(125mL)	Sweet peppers, chopped finely
1 cup	(250mL)	Cooked mixed beans, mashed or pureed (see the recipe for Spicy beans on page 72 for instructions on how to prepare the beans)
1 lb	(0.5kg)	Lean ground beef, chicken or tofu
2.2lbs	(1kg)	Low fat cottage cheese
9 oz	(255g)	Package chopped frozen spinach, thawed
2 tbsp	(30mL)	Parsley
1 tbsp	(15mL)	Dill
1+1		Egg + egg white
1 lg or 2 small		Packages whole wheat lasagna noodles (500g)

Grated mozzarella to cover sparsely

DIRECTIONS:

1. Cook lasagna noodles just to al dente stage, rinse in cold water.
2. Mix cottage cheese with eggs, spinach, parsley and dill until well blended.
3. Brown meat with onions and garlic, drain well. Place meat in a large pot and add tomatoes, remaining spices, beans and vegetables.
4. Fill the tomato tins with water and add it along with 2-3 more tins of water. Taste the sauce and if it's too acidic add 1 tsp sugar.
5. Bring to a boil and simmer for at least 1 hour.
6. Assemble lasagnas in deep pans, this recipe makes enough for one 8x11" plus one 8x8", or three 8x8" pans.
7. Start with a layer of sauce, then noodles, then cheese and another layer of noodles.
8. Cover with tin foil and bake at 325°F for 1 hour.
9. Remove foil and increase oven temperature to 425°F. Top lasagna sparsely with a sprinkle of grated low fat mozzarella and return to oven for about 15 min or until the cheese is browned and bubbly.
10. Let stand for 15 min before cutting.

THAI COCONUT CHICKEN

INGREDIENTS:

2 cup	(250mL)	Carrots, sliced
1	(250mL)	Large onion, chopped
4		Cloves fresh garlic, minced
2 tbsp	(30mL)	Fresh ginger, grated
2 tbsp	(30mL)	Fresh lime juice, plus grated rind
2 tbsp	(30mL)	Basil leaves, chopped
2 tbsp	(30mL)	Fish sauce
2 tbsp	(30mL)	Red curry paste*
½ 14oz can	(210mL)	Coconut milk (low fat)
3 cups	(750mL)	Mushrooms, sliced
2 cups	(500mL)	Chicken broth
2.2 lbs	(1kg)	Chicken breasts, boneless, skinless

*If you can't find red curry paste, substitute the following:

1 tbsp	(15mL)	Fresh ginger, grated
1 tsp	(5mL)	Fresh garlic, minced
1 tbsp	(15mL)	Fresh lemon juice, plus grated rind
1 tsp	(5mL)	Red chili paste or other red hot sauce

DIRECTIONS:

1. Slice the chicken into fingers
2. Heat a large heavy bottomed pot so that it sizzles when you sprinkle a drop of water. Add the cream off of the top of the coconut milk, and if desired another tsp of olive oil.
3. Add the chicken, onion, garlic and ginger - stir fry till chicken is browned, then add all the other ingredients, bring to a boil while stirring.
4. Lower heat to a gentle simmer and cook for 20 min to several hours (you can make this in a crock pot if desired).
6. Serve with rice or rice noodles.

DINNER CARROT LENTIL SOUP

INGREDIENTS:

1 tsp	(5mL)	Olive oil
4		Medium carrots, sliced
1/2		Medium onion, chopped
1		Clove garlic, chopped
2 tsp	(10mL)	Fresh ginger root, peeled and grated
1/2 tsp	(2mL)	Ground cumin
1/2 tsp	(2mL)	Curry powder
1/4 tsp	(1mL)	Salt
1/4 tsp	(1mL)	Pepper
3 cups	(750mL)	Low sodium vegetable stock or chicken stock
1/3 cup	(83mL)	Red lentils

DIRECTIONS:

1. Heat oil in soup pot. Add carrots, onion, garlic, ginger, cumin, curry, salt and pepper.
2. Sauté for 5 mins on medium high.
3. Add stock and lentils.
4. Stir, bring to boil.
5. Reduce heat to simmer for 30 mins, until tender.
6. Puree until smooth.

DINNER BEEF BARLEY VEGETABLE SOUP

INGREDIENTS:

1 tbsp	(15mL)	Olive oil
1 lb	(0.5kg)	Lean stewing beef cubes
3		Stalks celery, sliced
4		Medium carrots, sliced
1		Bunch broccoli
1		Medium onion, chopped
2		Cloves garlic, chopped
1		Can stewed tomatoes
3/4 cup	(180mL)	Barley
6 cups	(1500mL)	Low sodium beef broth
1 tsp	(5mL)	Thyme
1		Bay leaf
1 tsp	(5mL)	Parsley
1 tsp	(5mL)	Basil
½ tsp	(2mL)	Paprika
½ tsp	(2mL)	Salt
½ tsp	(2mL)	Pepper

DIRECTIONS:

1. Add olive oil to pan.
2. Add onion and garlic cloves, sauté.
3. Add beef cubes to pan and season with salt and pepper.
4. Add beef sauté to soup pot.
5. Add celery, carrots, broccoli, stewed tomatoes, barley, beef broth, thyme, bay leaf, parsley, basil and paprika.
6. Stir, bring to boil over med high heat.
7. Cover and simmer until tender.

SPICY BEANS

Go through the dried bean section at the store and select at least 6 different varieties. Mix ½ cup of each variety in a large pot. Rinse several times with cold water, and then let stand overnight covered in cold water. Change the water and bring to a boil, then let simmer several hours until the beans are soft. Drain well and freeze in 2 cup portions. You can add some beans made from this mix into most any recipe for an added source of low fat protein.

INGREDIENTS:

4-6 cups	(1-1.5L)	Drained cooked beans
3-4		Fresh limes (juice from) + grated rind
3 tbsp	(45mL)	Each of chili powder, coriander and cumin
4		Clove garlic, crushed
1		Onion chopped

DIRECTIONS:

1. Mix all ingredients and bring to a simmer, you may need to add about ½ cup of water to form a bit of sauce.
2. Simmer ½ - 1 hour, serve with tortillas, lettuce, other vegetables, and salsa.

Makes a great dip/sandwich spread as well.

LUNCHES HUMMUS (CHICK-PEA SPREAD)

INGREDIENTS:

¼ cup	(60mL)	Tahini (sesame paste - drain off the excess oil and discard)
1 tsp	(5mL)	Cumin
2		Large cloves garlic, crushed
1		Medium onion
2 tbsp	(30mL)	Lemon juice
3 tbsp	(45mL)	Hot water
1	(500 ml)	Can cooked chickpeas, drained or 2 cups mixed beans
1		Small handful chopped fresh parsley
to taste		Cayenne pepper

DIRECTIONS:

1. Blend all ingredients in a food processor until smooth. Serve with vegetables, pita bread or in a sandwich.

LUNCHES BABA GHANOUJ (and variations)

Follow the recipe for Hummus but use roasted eggplant and only 1 cup beans. Char the whole eggplant on a barbeque for a really wonderful smoky flavor, then scrape out the pulp and add to the other ingredients. You can also use roasted red peppers or spinach instead of eggplant for other great flavors.

ROASTED CARROT SPREAD

INGREDIENTS:

1 lb	(500g)	Scrubbed carrots halved (6 medium)
1		Head garlic (top cut off to reveal cloves)
1		Medium onion peeled and quartered
1 tsp	(5mL)	Olive oil
2 tbsp	(30mL)	Tahini (sesame paste - drain off the excess oil and discard)
1 tbsp	(15mL)	Plain low fat yogurt
2 tbsp	(15mL)	Non fat mayonnaise
1 cup	(250mL)	Cooked mixed beans (kidney, chickpea, navy, black, soya)
1 tsp	(5mL)	Grainy mustard
1 tsp	(5mL)	Curry Powder
1 tsp	(5mL)	Fresh Pepper

DIRECTIONS:

1. Rub carrots, onion and garlic head with oil and roast at 350°F for 1 hour until soft.
2. Slip garlic from the skin and place in a blender with all other ingredients. Process until smooth and well mixed, and thin with a little lemon juice or water until it reaches the desired texture.

CREAMY SALAD DRESSINGS: low fat, low salt

Start with the following, puree well in a blender

1/4 cup	(60mL)	Low fat cottage cheese
3 tbsp	(45mL)	Buttermilk or yogurt
2 tsp	(10mL)	Cider or balsamic vinegar

Then add one of the following sets of spices

GREEN GODDESS

1		Clove garlic, minced (or 2, if you like)
1/8 tsp	(0.6mL)	Hot red pepper sauce
1 tbsp	(15mL)	Parsley, chopped

SPICY MUSTARD

1-2 tsp	(5-10mL)	Hot Dijon mustard
1 tsp	(5mL)	Each thyme and sage
¼ tsp	(1.3mL)	Pepper

RANCH

1 tsp	(5mL)	Each oregano and basil
¼ tsp	(1.3mL)	Pepper

VINAIGRETTE SALAD DRESSINGS: low fat, low salt

PARSLEY-TOMATO VINAIGRETTE DRESSING

¼ cup	(60mL)	Tomato juice (low sodium)
1		Pinch of cayenne pepper
¼ cup	(60mL)	Red wine vinegar
½ tsp	(2mL)	Oregano, fresh
1 tbsp	(15mL)	Onion, minced
½ tsp	(2mL)	Black pepper
¼ cup	(60mL)	Parsley, chopped fresh
½ cup	(60mL)	Tomatoes, chopped, fresh
1		Garlic clove, minced

Place all ingredients in a blender or food processor. Process until smooth, store refrigerated for up to 3 days

RED PEPPER VINAIGRETTE

¼ cup	(60mL)	Unsweetened apple juice
¼ cup	(60mL)	Cider vinegar
2 tbsp	(30mL)	Onion
1		Clove garlic, pressed
pinches		Rosemary and thyme
½ tsp	(2mL)	Dried whole oregano
½ tsp	(2mL)	Dry mustard powder
½ tsp	(2mL)	Paprika
½		Roasted red bell pepper

Mix in a blender. Blend thoroughly and chill overnight. Store refrigerated for up to 3 days

TOMATO VINAIGRETTE

½ cup	(125mL)	Tomato, chopped
2 tbsp	(30mL)	Wine vinegar
½ tsp	(2mL)	Dried basil
½ tsp	(2mL)	Dried thyme
½ tsp	(2mL)	Dijon mustard

Mix in a blender. Blend thoroughly and chill overnight. Store refrigerated for up to 3 days

ORIENTAL VINAIGRETTE

¼ cup	(60mL)	Wine vinegar
2 tbsp	(30mL)	Low sodium soya sauce
1		Clove garlic, pressed
1 tbsp	(15mL)	Grated fresh ginger
½ tsp	(2mL)	Dijon mustard
1 tsp	(5mL)	Toasted sesame seeds

Mix in a blender. Blend thoroughly and chill overnight. Store refrigerated for up to 3 days

BREAKFAST — MUESLI (per person)

INGREDIENTS:

¾ cup	(180mL)	Rolled oats (mix rolled with instant)
1 tbsp	(15mL)	Raisins
1 tsp	(5mL)	Sugar
¼ cup	(60mL)	Plain low fat Yogurt
¾ cup	(180mL)	Milk
¼-½ cup	(60mL-125mL)	Fruit + juice

DIRECTIONS:

1. Mix all together (should be very thin consistency) and refrigerate overnight. It gets even better after sitting for a few days!

BREAKFAST — YOGURT SMOOTHIE

INGREDIENTS:

1 cup	(250mL)	Plain low fat Yogurt
¼ cup	(60mL)	Skim milk powder
1 tbsp	(5mL)	Wheat germ or ground flax seed
1 cup	(250mL)	Banana, orange, berries, melon
½ cup	(125mL)	Juice or milk

DIRECTIONS:

1. Whirl all ingredients together in a blender and enjoy. You can pretty much add any combination of fruit and liquid as suits your taste. Watermelon is excellent as is orange and banana or strawberries and banana. Try pineapple and coconut extract too.

This is an excellent post workout drink.

BREAKFAST — THE BEST PANCAKE RECIPE EVER

INGREDIENTS:

3		Eggs, beaten
3 cups	(750mL)	Flour (I use a mix of 1 cup (250mL) white, 1 cup (250mL) whole wheat and 1 cup (250mL) of: cornmeal, oats, whatever)
¼ cup	(60mL)	Wheat germ and ground flax seed
¼ cup	(60mL)	Bran
½ cup	(125mL)	Skim milk powder
2 tbsp	(30mL)	Baking powder
1 tbsp	(15mL)	Baking soda
2-3 cups	(500-750mL)	Water to make a thin batter
1-1½ cups	(250-375 ml)	Plain yogurt

DIRECTIONS:

1. Stir to mix well and then add plain yogurt - it will bubble and foam and makes lovely light pancakes.
2. Serve with fruit and yogurt as a topping.

BREAKFAST — EGG BURRITO

INGREDIENTS:

1		Whole egg
2		Egg whites
1 tbsp	(15mL)	Minced onion
1/8 tsp	(0.6mL)	Minced garlic
1 tbsp	(15mL)	Chopped lean chicken
1 tbsp	(15mL)	Grated low fat cheddar cheese
1 tbsp	(15mL)	Medium salsa
1 med		Whole wheat soft flour tortilla
1		Dash pepper

DIRECTIONS:

1. Drizzle 1/2 tsp olive or canola oil into non-stick fry pan and heat.
2. Add onion when it begins to sizzle and stir fry onion and garlic till soft.
3. Add chicken, eggs, cheese and salsa. Stir, cook till done + mixture is dry.
4. Drain any remaining liquid and wrap in tortilla, tucking ends in tightly so itcan be eaten with one hand.

LOW FAT GRANOLA

INGREDIENTS:

4 cups	(320g)	Rolled oats (old fashioned large flakes)
½ cup	(125mL)	Raw wheat germ
3 tbsp	(45mL)	Maple syrup or honey
1 tbsp	(15mL)	Canola or sunflower oil
1 tbsp	(15mL)	Water
1 tsp	(5mL)	Vanilla extract
½ cup	(35g)	Sliced or flaked almonds
¼ cup	(60mL)	Sunflower seeds
¼ cup	(60mL)	Wheat germ
2 tbsp	(30mL)	Sesame seeds
2 tbsp	(30mL)	Flax
2/3 cup	(80g)	Mixed dired fruit cut into small pieces (apricots, prunes, cherries, cranberries, raisins)

DIRECTIONS:

1. Preheat the oven to 140°C/275°F.
2. If using honey, heat slightly until it is very runny, mix in oil, vanilla extract and water in a large bowl.
3. Stir in the oats. If you don't mind things getting a little messy, use your hands to really mix it well.
4. Spread the mixture out on a large baking pan and place in the oven for about 30 minutes, stirring every 15 minutes so that it cooks evenly.
5. After 30 minutes, stir in the almonds, seeds and flax and cook for another 15 minutes. Remove from the oven, stir in the dried fruit while the granola is still warm and allow to cool.

Most recipes for baked bars, sweet breads, or muffins can be adjusted by decreasing the oil content by at least half and substituting either yogurt or pureed fruit (such as applesauce). You can also decrease the sugar by about 1/3. You can substitute about 1/4 the volume of flour with dry powdered skim milk and other goodies such as wheat germ, oat or wheat bran and ground flax. Extra eggs, or pureed tofu or cottage cheese will raise the protein content.

BAKING — BLUEBERRY SCONES

INGREDIENTS:

2 tbsp	(30mL)	Margarine (melt in bowl in microwave)
1/3 cup	(80mL)	Sugar
1½ cups	(375mL)	Flour
¾ tsp	(3.75mL)	Baking soda
¾ cup	(180mL)	Rolled oats
2 tbsp	(30mL)	Wheat germ/ground flax
¼ cup	(60mL)	Dried skim milk powder
1		Egg
1		Egg white
2/3 cup	(170mL)	Plain low fat yogurt
¾ cup	(180mL)	Frozen blueberries or dried cranberries or other chopped dried fruit

Zest of 1 lemon

DIRECTIONS:

1. Cut together margarine, sugar, flour and baking soda, then cut in oats, wheat germ, milk powder and lemon zest.
2. Mix together egg and yogurt and stir in, adding berries when nearly mixed.
3. Drop by the spoonful onto a baking sheet and bake at 350ºC for 20-25 min until lightly browned.

BLUEBERRY BRAN MUFFINS

INGREDIENTS:

2 ½ cups	(625mL)	Bran
2 cups	(500mL)	Whole-wheat flour
½ cup	(125mL)	Granulated sugar
1 tbsp	(15mL)	Baking powder
1 tsp	(5mL)	Baking soda
1		Egg, beaten
1		Egg white, beaten
2 cups	(500mL)	Buttermilk (or soured milk)
¼ cup	(60mL)	Skim milk powder
¼ cup	(60mL)	Wheat germ
1/3 cup	(80mL)	Vegetable oil
1/3 cup	(80mL)	Molasses
1 cup	(250mL)	Blueberries

DIRECTIONS:

1. Mix dry ingredients together in a large bowl, make a well in the center.
2. Crack the eggs into the well and pour all the liquid ingredients over the eggs. Mix the eggs into the liquid first and then the dry into the wet stirring just until moistened.
3. Spoon into muffin tins lined with paper cups.
4. Bake at 325° F for about 35 min then use a toothpick to check if the middle of the muffins are done.

LOW FAT BANANA BREAD

INGREDIENTS:

1 ½ cups	(325mL)	Mashed ripe bananas (3 large bananas)
1 tsp	(5mL)	Baking soda
½ cup	(125mL)	Low-fat plain yogurt
2 cups	(500mL)	Whole-wheat flour
2 tbsp	(30mL)	Canola oil
1 tbsp	(15mL)	Lemon juice
1		Large egg or 2 large (60g) egg whites
1 tsp	(5mL)	Lemon rind
½ cup	(125mL)	Light brown sugar
¼ tsp	(1.25mL)	Salt
¼ tsp	(2.5mL)	Baking Powder
1 cup	(250mL)	All-purpose flour
1 cup	(250mL)	Whole wheat flour
2 tbsp	(30mL)	Wheat germ
¼ cup	(60mL)	Raisins or chopped walnuts (optional)

DIRECTIONS:

1. Preheat oven to 350º F (180ºC) and place the rack in the center of the oven.
2. In a large bowl, mix the mashed bananas with the baking soda and yogurt.
3. Whisk in the all the liquid ingredients plus the eggs. Stir in salt, lemon peel and sugar, and then baking powder.
4. Stir in the flours and wheat germ, just until all the ingredients are moistened.
5. Pour into the prepared pan and smooth the top. Bake for about 45 - 55 minutes, or until a toothpick inserted in the center of the loaf comes out clean.
6. Remove from oven and place on a wire rack to cool. Wrap tightly to store.

This recipe also works well if you substitute unsweetened apple-sauce for the bananas, and cinnamon for the lemon peel

BLACK BEAN BROWNIES

INGREDIENTS:

1 X 15 oz	(500mL)	Tin black beans; rinse and drain
3		Eggs
3 tbsp	(45mL)	Canola oil
¼ cup	(60mL)	Cocoa powder
½ cup	(125mL)	Sugar
1 tsp	(5mL)	Vanilla
1 tsp	(5mL)	Instant coffee powder (use decaffeinated if desired)
2 tbsp	(30mL)	Chocolate chips (optional)

DIRECTIONS:

1. Preheat oven to 350°F.
2. Process all ingredients together until very smooth.
3. Bake 30 min or just until brownies appear dry on top and pull away from the sides of the pan.

HOME MADE POWER BARS

INGREDIENTS:

3 tbsp	(45mL)	Canola oil
2		Eggs
2		Egg whites
3 tbsp	(45mL)	Honey
½ cup	(125mL)	Orange juice concentrate unsweetened with pulp
½ cup	(125mL)	Whole-wheat flour
1 cup	(250mL)	Mixed diced dried fruits of your choice
½ cup	(125mL)	Mixed chopped walnuts, almonds, sunflower, sesame and pumpkin seeds
1 cup	(250mL)	Large flake oatmeal
½ cup	(125mL)	Dry skim or non-fat milk powder
¼ cup	(60mL)	Wheat germ, wheat or oat bran
¼ cup	(60mL)	Coconut and chocolate chips (optional)

DIRECTIONS:

1. Mix the first 5 ingredients together and then start adding the goodies: diced dried fruit (dates, raisins, figs, apricots), chopped or ground walnuts or almonds and seeds, low-fat dry skim milk powder, oats, wheat germ, bran and/or coconut. Oh yes, chocolate chips are nice! *If the dough gets too stiff add another egg or a bit more orange juice concentrate.*
2. Spread evenly in a greased 9-inch pan and bake at 300º F for about 40 min. Do not over brown.

OATMEAL RAISIN COOKIES

INGREDIENTS:

3 Tbsp	(45mL)	Margarine or butter
¾ cup	(180mL)	Brown sugar
1		Egg
2		Egg whites
½ cup	(125mL)	Unsweetened applesauce, pureed orange or mashed banana
1 cup	(250mL)	Whole wheat flour
1 tsp	(5mL)	Baking soda
2 ½ cups	(675mL)	Rolled oats
2-4 tbsp	(30-60mL)	Combined wheat germ, oat bran, 7-grain cereal, chopped seeds or nuts as desired
½ tsp	(2mL)	Almond extract or 1 tsp (5 ml) Amaretto
1 Tbsp	(15mL)	Milk, water, or yogurt
½ cup	(125mL)	Raisins

GLAZE

½ cup	(125mL)	Icing sugar
1 tsp	(5mL)	Amaretto or ½ tsp (2mL) almond extract
1-2 tbsp	(15-30mL)	Water

DIRECTIONS:

1. Beat butter with brown sugar until sugar dissolves.
2. Beat in eggs, then pureed fruit, baking soda, and Amaretto.
3. Stir in flour, oats and other grains/nuts, and finally raisins. Dough should be stiff.
4. Drop by spoonful onto pan and bake at 350°F for 8 min.
5. Cool on pan and drizzle with glaze.

CARROT CAKE

INGREDIENTS:

1½ cup	(375mL)	Shredded carrots
¼ cup	(60mL)	Raisins
½ cup	(125mL)	Plain non-fat yogurt
¼ cup	(60mL)	Skim milk powder
½ cup	(125mL)	Unsweetened applesauce
¼ cup	(60mL)	Canola oil
1		Large egg
2		Large egg whites
1 cup	(250mL)	Sugar
2 tsp	(10mL)	Ground cinnamon
½ tsp	(2mL)	Each ground cloves and nutmeg
¼ tsp	(1mL)	Salt
1½ cups	(375mL)	Whole-wheat flour
1 cup	(250mL)	All-purpose flour
¼ cup	(60mL)	Wheat germ
1/3 cup	(80mL)	Warm water mixed with 1½ tsp (7mL) baking soda

DIRECTIONS:

1. Stir the carrots, raisins and spices together with all the wet ingredients except for the baking soda and warm water.
2. Then stir in the sugar, flours and the soda and water.
3. Pour into a 9-inch square non-stick pan and bake at 325° F for 1 hour or until a pick inserted into the center comes out clean.
4. Ice when cool with the recipe on next page:

CREAM CHEESE ICING

INGREDIENTS:

1½ cups	(375mL)	Icing sugar
¼ cup	(80mL)	Cornstarch
½ cup	(125mL)	Plain non-fat yogurt
¼ lb	(125g)	Non-fat cream cheese
2 tsp	(10mL)	Lemon or orange juice

DIRECTIONS:

1. Beat the cheese well, gradually beat in juice, the yogurt and then the sugar and cornstarch.
2. Thin to desired consistency with juice or yogurt.

This recipe also works well for chocolate frosting, just add about ¼ cup of dry cocoa powder.

CHOCOLATE CHIP OATMEAL COOKIES

INGREDIENTS:

½ cup	(125mL)	Margarine or butter
½ cup	(125mL)	Each white and brown sugar
2		Eggs
3		Egg whites
1½ cups	(375mL)	Low fat cottage cheese
½ cup	(125mL)	Each skim milk powder, wheat germ, bran
1 ½ tsp	(7mL)	Baking soda
1 tsp	(5mL)	Vanilla
2 cups	(500mL)	Flour
3 ½ cups	(875ml)	Rolled oats, or more to make a stiff dough
½ cup	(125mL)	Chocolate chips, chopped nuts, seeds or raisins as desired

DIRECTIONS:

1. Use a blender to puree the cottage cheese until very smooth.
2. Beat butter with sugars until dissolved, beat in eggs, then cottage cheese, baking soda, and vanilla.
3. Stir in flour, oats and other grains/nuts, raisins and finally chocolate chips. Dough should be stiff.
4. Drop by spoonful onto pan and bake at 350°F for 8 min. Do not overbake.
5. Cool on pan.

5 WATER AND HYDRATION

There has been a lot of publicity on hydration in the last few years. In truth, **getting hydration right is a real performance enhancer.** Headaches, fatigue and health risks follow drinking too little, but this is also true of drinking too much. The recommended rate of intake is about 250 ml, or one cup per hour. If you sweat a lot you will need more fluid than this; if you are not active or are working at an easy walking pace then you will need a little less.

Working in the bush during the summer requires some special attention to hydration. The combination of higher temperatures, restricted air flow due to personal protective equipment and limited access to fluids nearly guarantee dehydration unless specific attention is paid to ensuring adequate fluid intake is maintained. In a study with fallers during a relatively cool summer (average temperatures during June-August well below 20°C), most fallers only consumed about 2 liters of water during the workday - leaving most of them consistently dehydrated to a level where there was a measurable decrement in mental and physical performance. When fallers corrected their fluid intake to match losses, they reported having more energy, staying more alert and experiencing fewer headaches.

Sip water throughout the day to keep yourself hydrated, especially after a night of socializing!

There are big differences in how much different people sweat, but there is an easy way to check and see if you are staying hydrated. Because adequate hydration is so important for staying mentally sharp it's worth your while to try this out. All you have to do is monitor how much weight you lose with a day of work (or even a night of drinking). First empty your bladder and weigh yourself in your underwear on a good scale. Then weigh yourself a second time immediately at the end of the work day, (empty bladder, same dry underwear, and before eating your after-activity snack - see page 16 for this post work recovery tip). The difference in the before- and after-work weights represents water lost, 1 lb = 2 cups, 1 kg = 1 liter.

Try this trick out a few times a shift, it will give you a good idea of how much water you need to take into the bush - and drink!

So why is it that it's so easy to get dehydrated? First off when hiking through the bush or running a chainsaw you generate a lot of heat through muscular work. Your body needs to release this heat, so you sweat. If there is a good gradient for the sweat to evaporate, there isn't so much of a problem and you stay cool. But if the ambient temperatures are high, the air is very humid, or your PPE restricts air flow, it's much harder for evaporation to take place. And since you can't get rid of the heat you continue to sweat, and sweat, and sweat!

It also turns out that relying on thirst to tell us when to drink is not a very reliable indicator of the need for fluid. By the time you feel thirsty, you are down about a liter and as soon as you drink, the flow of liquid over the back

of your throat shuts off the sensation of thirst. This makes it unlikely that drinking to relieve thirst will keep you hydrated.

There is also a glitch in the system that your kidneys use to determine whether to conserve or excrete water. When you consume more than about a cup of water at once it causes a temporary dilution of the particulate level (osmolarity) of your blood. Your brain and kidneys think that this is representative of the condition throughout your body, so the kidneys will mistakenly excrete some of that water.

And given that a loss of only 2% of body weight can cause fatigue, headache and a reduction in performance, it's worth your while to pay attention to making sure that you follow good hydration practices.

So what are you supposed to do? First off, **get into the habit of always having a water bottle or hydration bag with you**.

And make sure to plan ahead and take plenty of water for the whole day into the block. It might be heavy to carry, but it will more than pay back the energy you put into transport by keeping you alert, energetic and headache free.

Your daily hydration program should start upon rising in the morning with breakfast or during the commute to the woods. This is especially important if you consumed more than a couple of servings of alcohol the night before.

Any time you consume fluid it's far better to take it in a little at a time, rather than guzzle a whole water bottle at once. Remember that when a lot of fluid is consumed at one time your body thinks it has too much water

and will excrete most of it. Although less convenient in terms of your work rhythm, getting into the habit of having a few swallows of water every half hour is a much better hydration strategy. If you carry a small 500 ml water bottle or hydration bag it makes this way of drinking much easier. Otherwise if you wait till you refuel your chainsaw to drink, you'll be much more likely to consume your fluid in larger amounts, and much more likely to stop drinking before you have replaced the lost water.

Of all the choices of what to drink, cold water is still your best bet. It doesn't cost anything, contains no additives, is thirst quenching, and when drunk in small amounts frequently is a great way to make sure you have enough fluid in your body. Unfortunately though, most people's first reason for drinking is the taste of something sweet. If you have a tendency not to drink much during the day, try adding a splash of grapefruit or cranberry juice, or lemon or lime slices to your water bottle. If it tastes good, you'll be more likely to keep on drinking.

In situations where you are sweating heavily (summer heat, full PPE, carrying a heavy load of gear) and your access to fluid is limited, or you are a salty sweater (check for white streaks on a dark shirt when your sweat dries) you might want to consider a sport drink. For the most part the North American diet is so high in salt that we don't need to worry about replacing the electrolytes lost in sweat, but the small amounts of sodium and sugar in a sport drink help you absorb the liquid faster and keep it in your body (it blocks your kidneys from excreting the water). The sodium also keeps you feeling thirsty, so you drink more.

Salt intake is restricted for health reasons in people with high blood pressure or high insulin levels, but in a study with workers in a plywood and veneer mill in Louisiana, daily intake of a sport drink for 3 weeks helped to protect workers against heat stress, and kept them more alert, without having any impact on blood pressure. If you have to work hard in the heat, and staying alert is critical as it is for fallers, choosing a sport drink to ensure adequate hydration is a good idea (unless you have salt sensitive hypertension).

If you do choose a flavoured drink, be very careful of how much sugar you get in your beverage. Even "natural" or "unsweetened" fruit juices have a lot of simple sugars that can drive you into hypoglycemia just when you need access to that fuel (see pages 12, and 221-224 for more on simple sugars, insulin, hypoglycemia and performance). And if you use a hydration pack the sugar will make the tubing manky in a hurry, unless you are very careful to wash it out every night.

One last note on hydration. Most of the time when we think about the need to stay hydrated we think about warmer ambient temperatures, but this is not always the case. When you are working hard and wearing clothing that restricts air flow as PPE does, your sweat rate can be surprisingly high, even in cooler temperatures. You also lose fluid through respiration, the moisture in your breath evaporates quickly in cold dry air. In addition, there are a couple of **key times when staying hydrated becomes more important in the cold. The first is after consuming a lot of alcohol or caffeine, since both these substances are diuretics and make you lose water (see page 188 for more information on this). The**

The second time that dehydration in the cold can potentially make a difference is when it is very cold out. The research is not absolutely clear, but it seems as though if you stay hydrated you are better able to maintain blood flow to your extremities (fingers and toes) and avoid frostbite.

And if you are working at higher elevations, making sure to stay hydrated will help you adjust to the lower oxygen pressure. As always, making sure you get enough fluid can help reduce the symptoms of fatigue, headache and loss of concentration.

THE SHORT VERSION

So fill up your water bottle or hydration pack with water and sip away for improved concentration, endurance and power. This is especially important if you've been out partying recently. It can take several days to rehydrate after binge drinking.

B SUPERCHARGE YOUR ENGINE: INJURY FREE POWER-PRODUCTION

SUPERCHARGE YOUR ENGINE: POWER IT UP + REMAIN INJURY FREE

GETTING STARTED

If you haven't been exercising regularly it's important to check with your physician before beginning this or any other exercise program to make sure that you are not at risk for cardiovascular disease or have any other health concerns. Neither the author nor the sponsoring organizations are responsible for any illness or injury that may result from this program, if you choose to follow the recommendations in this book you do so entirely at your own risk. If you feel faint or experience pain while doing these exercises seek medical attention immediately.

ARE YOU FIT ENOUGH to do your job?

IF YOU ARE OUT IN THE WOODS EVERY DAY

Depending on which job you do, the amount of physical strength and endurance, agility and flexibility required day in and day out can be very demanding. Fallers have a high workload, spending nearly 1/4 of their workday at heart rates above 130 beats/minute. They need to be able to carry about 15 lbs on their wedge belt and another 20+ lbs of chainsaw, bar and chain through what can be very difficult terrain, stepping up onto newly fallen timber for bucking. In addition, the constant requirement for arching and bending to peer at the canopy or the back cutplaces huge demands on the core musculature to support a loaded spine. In total this workload is about the same as running 12 km or

chopping wood for about 4 hours (without stopping) daily. And this all has to be done without any distraction of attention from the task at hand, which is safely bringing in the wood. To sustain this kind of daily workload requires a high degree of fitness and athleticism, one that can't be maintained without some active recovery and restoration during the work shift, or some maintenance fitness training during the down times. So read on for some great recovery strategies and quick and easy workouts that you can use to keep your hard won fitness topped up during down times.

IF YOU SPEND MOST OF YOUR TIME AT A DESK WITH OCCASIONAL DAYS IN THE BUSH

Most people live a pretty sedentary lifestyle. We use motorized transport, spend hours behind a computer, relax with a movie or video game, and then expect to be able to cover ground in the woods like we did 10 years ago. Unfortunately it doesn't work that way. Though there's always the odd individual who seems to be able to sit at a desk on a daily basis and still stay in top shape, most of us are not that lucky. Without some effort at building and maintaining fitness, we lose strength and endurance, and very likely put on a few extra pounds of fat. Then when it's necessary to go out into the bush we no longer have the physical work capacity to do the job without getting stiff and sore, or worse injured.

So how do you balance staying fit with all the other demands on your time? The answer lies in being efficient, and that's where sports science can come to the rescue. Just 20-40 minutes 4 times per week can keep you fit and strong, get rid of the creeping weight gain and improve everything from the quality of your sleep to the number of colds and flus you catch, not to mention your risk of developing heart disease, diabetes and cancer, to name just a few.

THE SHORT VERSION

The risk of musculoskeletal injury is directly proportional to fitness level, the fitter you are, the lower the risk of injury[2]. It doesn't matter what the task or type of exercise, **fitter people will be less likely to be injured** than unfit participants. Lack of core and leg strength are predictive of knee injuries[3], and regular exercise reduces the risk of sprains, back pain, and chronic pain in the knee and shoulder[2,4].

The suggestions in this book are not the only way to improve your specific fitness for working in the bush, but they are based on the latest in sports science and will be more efficient than most methods of fitness training. The program is designed so that no matter what your current level of fitness it will get you into shape quickly and give you the strength and endurance you need for your activities. If you are already very fit, you will find that these workouts will increase your strength and agility to a new level. And while these exercises are designed to specifically address the muscles and movements that are required for the work you do, they will transfer to other physical activities very well.

Stay fit for increased health and performance at work and play

A PAIN IN THE NECK: A special note to fallers

One of the big challenges for fallers is that you spend so much time with your neck tipped way back so that you can look up at the canopy. That position places a lot of stress on the vertebral discs in your neck (cervical region), which can eventually lead to constant pain and even numbness in your shoulders, arms and hands. While you can't do the job and not look up, you can do a few things to help reduce the stress on your discs.

1 Look down as much as possible. When you drop your chin you open up the spaces between the vertebrae in your neck and take the pressure off the discs. Do this for 10 seconds whenever you get the chance during the day, and again during the drive home and in the evening, even positioning your TV or computer screen so that you have to look down a bit to view them. In order to ensure that you are leaving as much space as possible for your cervical discs place your hand on the back of your neck on the 7th cervical vertebra (it's the first one you can feel - the big vertebra that sticks out at the base of your neck). When you drop your chin don't let it come forward, if you do you will feel the 7th vertebra pop out.

2 Do some neck strengthening and core work when you are on days off. Building up the muscles that surround your cervical vertebrae and using your core to support your upper back and head will also help to decrease the amount of pressure on the cervical discs. Check out the exercises in the following section for some ideas of what you can do to develop these key muscles.

3 Stretch to release the tired muscles in your neck and upper back. You should do this several times during the day and especially in the evenings. Consider it maintenance for this essential piece of equipment. See the section that follows on stretching for some specific exercises that you can do.

4 Think about your body position. When your body is close to the tree you have to drop your head way back to see the canopy. If your chainsaw is supported by the wood and/or your leg you can straighten your arms a bit and step back a little. This has two ergonomic advantages. With your arms straighter blood can flow through the muscles to your hands easier so you'll be less likely to get white finger. Secondly, if you bend your knees and shift your hips forward you can use your core to support your back and there is a lot less stress on your neck.

This faller is using his core to support his head while he bends from the knees. He does it because of an injury but you can do it before you damage your discs.

This faller is in the typical looking-up stance. The discs in his neck are fully compressed.

1 BASICS OF STABILITY

RETURN TO CENTER

It's been called a lot of different things including core strength, stability, and even qi, balance and agility. But recently this important facet of fitness, injury prevention and performance has taken on a new identity. Rather than the ability to resist force and stay centered, sport scientists have realized that the most important element is the ability to return to center when gravity, movement or an external force displaces you. This description especially suits working in the woods or running a chainsaw because walking efficiently through debris and slash is all about moving off center and coming back. Whether it's gravity, the force generated by a shift of the wood or changes in the terrain and ground density, these events displace your body from center. **The quicker you can return to center, or the further you can move off center and still recover, are what's going to make the difference between twisting a knee or back, putting out your shoulder, or even moving fast enough to avoid an overhead hazard.**

This section will give you some strategies for ways to include this type of training into your day, but whether you call it "stability" or "core", they need to be done on a regular basis by everyone. No matter whether you carry a chainsaw or use a mouse at work, we all develop bad habits when it comes to posture. Sore spots and where we focus our attention make it easy to forget where our spine and joints are best supported. These exercises will

"remind" you of where home base should be, and **will help you stay pain and injury free more than any other single thing you can do.** So make sure to plan to do them at least twice a week if you are falling or working in the bush daily, and five times a week if you are not. Each session only has to be five or ten minutes long.

THE SHORT VERSION

Stability exercises do not seem big and strong, but they are tough to do. The *focus must be on form,* because you are trying to **establish subconscious movement patterns that will help the right muscle contract faster at the right time.** If you do the movements incorrectly then you will learn to move incorrectly. When done right, **this work will help protect you from injury and give you a strong base** so that when load is added the right muscles contract nearly instantaneously to support your joints and generate high levels of power.

You can do these exercises any time you have a few minutes. They work great as part of a warm up or warm down; but are also really good for all those little breaks in your day when you don't have enough time to do anything specific, but you do have 5-10 min that are not filled up by a task. The time you spend waiting for your ride to show up or the phone to ring is perfect for a stability break. Many of the exercises don't need any specific equipment or space so they can be done where ever you are, outside or inside, in boots or in street shoes.

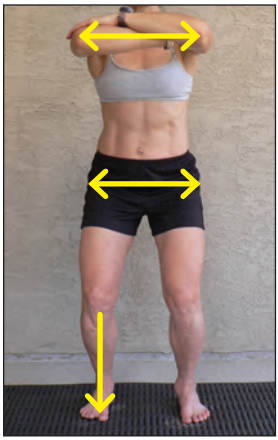
Try to chose different exercises each time (don't do the same exercise in each category every day). It's human nature to like to do things we are good at, but if you only ever do the exercises that you have already mastered, you won't ever increase your stability level. You can do them in any order, but before you add load or try them with your eyes closed, make sure you have mastered the basic form. Aim for 10 reps of each; if the exercise involves one leg at a time then do 10 reps each side. But if you are short on time and only manage 5 reps with exact technique there is still good benefit to the set, especially if you do it multiple times during the day.

KEY POINTS for technique

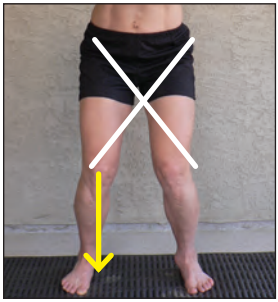
Start with good posture: Head up, shoulders back and down. Shoulders, knees, hips, and feet lined up. Weight should be balanced evenly over the center of the foot. Ensure the **spine is neutral** (thorax or upper back curved out slightly, lumbar or lower back curved in – see item 1, page 108) and the **core is activated** (see item 2, page 109). **Glutes and feet should also be activated** to hold knees from falling inward (see next page). If you can't reach this ready position easily then go to items 1 - 3, pages 108-112 and practice until you can. Use a mirror or get a friend to help you cue yourself till you can find this ready position. If you are planning on doing these exercises while at work you should practice finding the ready position in your caulks or work boots.

Use the moments that you pause to reset your posture back into neutral. That way when the load is increased you will place less stress on your joints.

Look for lines that are either perpendicular or parallel to the ground:



- *shoulders (one shoulder should not be higher than the other)*
- *hips (one hip should not be raised higher or dropped down from the other)*
- *hips (one hip should not be twisted backward from the other)*
- *knees should point in same direction as toes*
- *knees should not fall in toward inside of foot*
- *feet should not roll in to flatten arches*



- *knees and feet should not roll in*

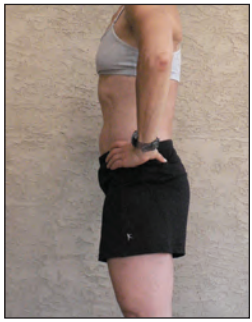
- *Use a loop of elastic banding around your thighs and press outward to encourage activation of the glutes.* ***This is extremely important for prevention of knee injuries***

NEUTRAL SPINE

1

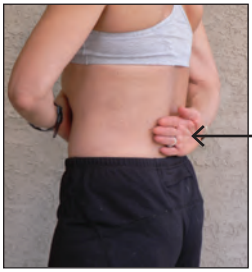
Hyperextension

Pelvic tipped forward



Neutral

The normal relaxed spine has a degree of curvature to it. For the muscles of the core to work properly you must begin in the correct position. Use a mirror or have a friend check that your upper back is slightly curved outward and your lower back is slightly curved inward. Take your position to the extremes of rounding and arching to feel the end points and then come back to the middle. When in the right position your hand should just nestle in the curve of the small of your back.



Your hand should just fit into the small of your back when your spine is in neutral

Then activate your lower abdomen as described in the next item below. No matter what exercise you are doing you work at keeping your spine in its' strongest form - the neutral position. See also exercise '3a' on page 112.

ABDOMINAL ACTIVATION 2

Relax your abdomen completely letting your belly hang out. Then beginning about half way down between your pubic bone and navel, draw inward and upward. Don't hollow or lock down, your lower belly should be tight, but not hollowed inward, and you should still be able to take a deep breath and move your rib cage. It helps to put your fingers on your lower abdomen at the point where you begin to activate the muscle. You can practice this anytime, and should do so until it becomes very easy to do. Eventually, your lower abdomen will stay more or less activated all the time

Once your lower abdomen is activated add in the pelvic floor; these are also called Kegel exercises. To get used to this movement start by sitting upright on a hard chair with your feet shoulder width apart, spine in neutral position and sit bones flat on the chair. Let your belly hang out and relax your crotch to feel the chair between your legs. Then reverse this process, as though you had to go to the bathroom but have to hold it. Your belly and buttocks should not move; the only muscle working is the sling of muscle underneath your pelvic organs. Guys should feel their testicles tighten and rise slightly. You can practice this sitting on the toilet while urinating until you get the hang of which muscle is working. Let the flow start, and then try to stop it completely.

Once you can activate the pelvic floor without moving any other muscles, practice by doing 10 contractions in a row. Do them slowly and deliberately, then quickly, and then do one contraction and hold for as long as possible.

THE SHORT VERSION

Being able to activate your pelvic floor together with activating the lower abdomen and a neutral spine will **make your core much stronger and will translate directly into less back pain.** It also helps if you have knee or shoulder pain because the way you load these joints depends on your posture. So while it takes some effort at first the pay back is well worth it. Not only will your joints feel better there is an added benefit of better performance whatever your work, your sport, or your activity - including sex. A strong pelvic floor can generate stronger orgasms.

You can practice **lower abdomen and pelvic floor activation** anytime but each stability session should begin with one or two of the exercises on this list. The first 5 exercises are ideal for while you are a passenger travelling to work, (or in that meeting you have to sit through)! Fallers, buckers and chokers be sure to do exercises 2d and 2e.

2a On/Off (Activate and relax the abdomen and pelvic floor 10 times). You can do this standing or sitting.

2b Activate and hold for 4 x 30 seconds. You can do this standing or sitting.

2c Activate and take 10 deep breaths, sucking air in and out to the bottom of your lungs without releasing the abdominal activation. You can do this standing or sitting.

2d Activate and twist about the waist facing the right and then the left 10 times. You can do this standing or sitting.

2e Activate and side bend each side 10 times. You can do this standing or sitting.

2f Activate and squat 10 times, , make sure you keep your knees over your toes (see page 107).

2g Activate and do a one legged squat. Do 10 reps each side.

2h Activate and do a one legged squat, extend the free leg to front and rotate it to the side (or the reverse). Do 10 reps each side.

2i Do any of items 2d – 2k with your eyes closed.

NEUTRAL SPINE AND ACTIVATED CORE

All of the exercises that follow are progressions from the basic form of finding a neutral spine and supporting it with an activated lower abdomen and pelvic floor. In each case movement or load is added, but the critical element is to ensure that the movements can be performed while keeping the core stable! If you can't maintian a neutral spine and activated core stop and go back to less load. The whole point is to learn to keep your core stable when you are working and your attention is on the task at hand, not on activating your core. To make it subconcious you have to practice doing it RIGHT!

3a Finding spinal neutral: Bend forward and place your hands on your knees. Arch your back, pushing the lumbar area down; then reverse into maximum upward curve. Go back to neutral where your thorax is slightly curved upward and your lumbar area is slightly arched downward (Use a mirror to check for correct position).

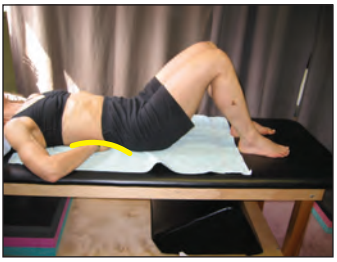
Endpoint arch

Endpoint curve

Neutral spine

3b Put your hands on your knees and find the neutral spine position. Do 5 repeats of the abdominal activation exercise including adding in the pelvic floor. Relax completely between each activation.

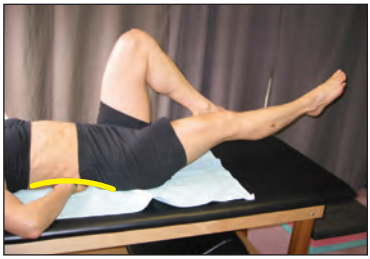
3c **Bent Knee leg lifts,** with neutral spine. There should just be enough room to tuck your hand in behind your lower back. Lift each leg 5 times.



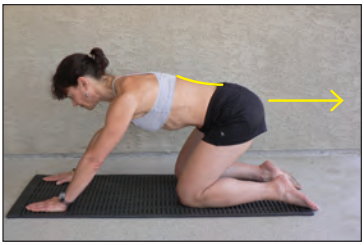
Make sure you keep your spine in neutral and use your core and pelvic floor to stabilize your lower back. You should not feel any change in the pressure on your hand from your lower back or any side to side shifting in your hips as you lift your leg. Lift one leg at a time.

3d When you can lift one leg at a time without shifting your back at all, keep the first leg in the air and lift the second leg up as well, then lower one at a time. Do 5 repeats lifting the right leg first and 5 lifting the left leg first. The pattern is up right, up left, down right, down left. Then switch leading with the left leg first.

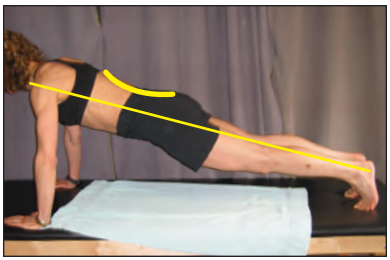
3e When you can complete 3d without shifting your back at all, keep the first leg in the air and lift the second leg up as well, then extend one leg at a time before lowering one at a time. Do 5 repeats lifting the right leg first and 5 lifting the left leg first. One repetition is up right bent knee, up left bent knee, straighten right leg, bend right leg, straighten left leg, bend left leg, lower right, lower left, and start again.

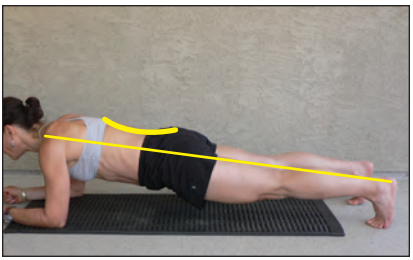


3f Kneel on all 4's with a neutral spine, and core and pelvic floor activated. Move hips backward as though you are going to sit on your heels but go **only as far as you can and still maintain neutral spine. This will only work if you keep your abdomen and pelvic floor engaged.** Stop as soon as lower back starts to round.

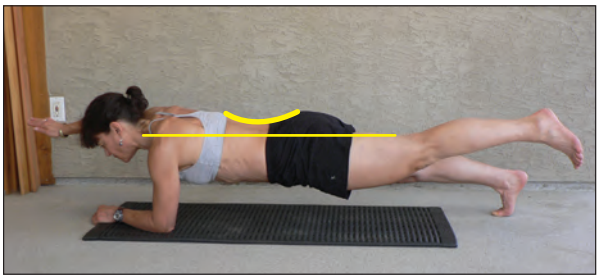


3g Plank with straight arms (easier) or on elbows (harder). Keep body level maintaining a neutral spine. Make sure your butt is not dropped down or up in the air. Hold 30 sec.





3h **Plank.** Keep body level, with neutral spine. Raise one arm OR one leg, do not allow any release of neutral spine or rotation of shoulders or hips. If you can do the exercise and hold for 60 sec with good form progress to raising one arm and the opposite leg. Keep shoulders and hips level.



THE SHORT VERSION

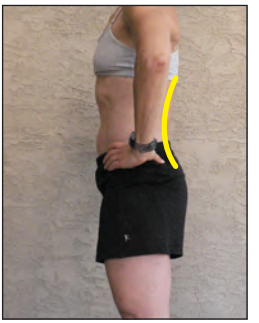
When a log rolls or you are making a back cut, you don't have time to think about your core. But when the muscles that support your joints fire automatically, you'll be able to maintain your balance and move quickly and powerfully!

NECK EXERCISES:

4

These are critical exercises for fallers, you spend so much time looking up at the canopy that making sure that your core can support your head while stabilizing your chainsaw is essential.

Begin by reviewing the basic information about posture on page 106. Imagine that a string is tied to the top of your head and someone is pulling straight up. You should feel your spine get longer as you take the load off your lower back.



Your shoulders should be down and back, but you should still be able to take a deep breath and move your ribs normally as you breathe in and out.

This is not military posture, there should still be a bit of outward curve in your upper back.

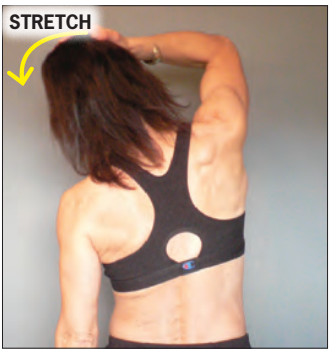
Now position your head so that the vertebrae of your neck follow in a straight line up from your back. The best way to do this is to look straight head and keep your chin level; it shouldn't be dropped down towards your chest, or lifted up so that your eyes are directed upwards. Put your finger on your chin and push straight back to bring your neck in line with your spine.

4a Let your chin come forward as though you were peering out of a windshield and then pull it back so that your spine is in neutral and your neck is in line with your spine. Remember to also keep your chest in neutral position. Do this movement 10 times.

4b Drop your chin down onto your chest and place your hands behind your head. Making sure that you keep your posture neutral and your core engaged, try to lift your head up - but use your hands to add as much resistance as you can tolerate without pain. Lift your head 10 times with each movement taking a count of 5. Make sure that you don't release your back to arch but rather use your core to support it and your neck muscles to do the movement.

4c Reverse the exercise above, this time start with your head tilted backwards and your hands on your forehead. The movement is to try and lift your head against the resistance of your hands. Once again make sure that your spine stays in neutral and that you don't arch through your back and shoulders. Do 10 repeats with each head raise taking a count of 5.

4d Strength in the sides of your neck is also important, so also use your hand on your head to provide resistance for contractions in the sideways directions and even on the diagonal. The stronger these muscles are, the better they will support your head while you peer up at the canopy or at the back cut.



Start with NEUTRAL BACK, ACTIVATED CORE, PELVIC FLOOR + HIPS

Looking after your shoulders starts with the same basic movements. If your back is supported then much of the work in of carrying and stabilizing your chainsaw or a cable can be done by the bigger muscles of the core and much less load is carried by the shoulder and arm.

The basic neutral spine and activated core position should always be your starting point. If you can't find spinal neutral easily see page 108 for a more complete explanation. Add in shoulder position by pressing your shoulders downward. Lift and open your chest slightly so that your shoulders do not curve in front of your body, but not so rigid that your upper back loses its slight outward curve (NOT military posture). Check to make sure that your head is lined up with your spine and is not jutting forward. Spend a bit of time in front of the mirror until you can find this position. As always, hold it there with an activated core, but make sure that you are not locked down, so that you can still take a deep breath, or rotate your upper body. ***Many of these exercises can be done while standing and waiting or while traveling to work.***

CAUTION: Do not add weight or elastic banding unless you can do these exercises with good form without any pain!! Adding load when the joint is not stable can cause injury!

5a **Shoulder shrugs.** Start with your neutral activated posture, Raise your shoulders up toward your ears and lower them back down. Then bring them forward, letting your back round up, and reverse the movement to pinch your shoulder blades together. Come back to the neutral position and repeat 5 times with each rep being a little bit bigger than the one before it. When you can comfortably return to center each time, try the movement as a circle; up, forward, down and back, and then reverse; back, up, forward and down. Try not to let your lower back release and arch as you move your shoulders. You will have to keep your core, pelvic floor and butt activated to control your spine while your shoulders move.

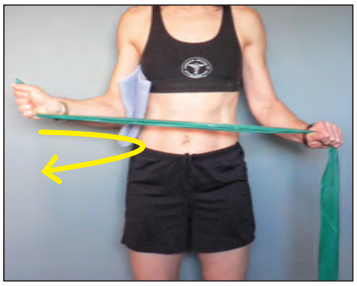
5b **Standing push-ups**. Stand about 2 feet away from a wall, tree or your truck with feet pointing straight ahead and legs shoulder width apart. Keeping your body in neutral position with good activation place both hands at shoulder height against the wall or other supporting object. Do 20 push ups with good form. If this is comfortable you can add load by "falling" onto your hands and pushing off them to return to the upright position. Make sure to concentrate on not letting your should move inside the joint, instead let the load transfer to the stronger muscles of your core. This is an essential exercise if you have suffered a rotator cuff injury!

5c **Contractions in the cab.** Any time you push against an object with your hand the force is transferred up through your shoulder into your core. You can practice these movements while waiting inside your truck or if you are a passenger. The first step is to sit up tall with your head level and activate your core, pelvic floor and butt. Then press your shoulders down slightly and make sure that you have a slight outward curve in your upper back. Now place your hands (or one hand at a time) onto the outside of the steering wheel and squeeze inward, keeping good posture and activation. Hold 20 seconds and then reverse, pulling outward for 20 seconds. Do 10 repeats. You can also use the dashboard, seats, or window (try them all) to create resistance in different directions, but always remember that the key is to practice adding load to your shoulder while keeping good posture and activation.

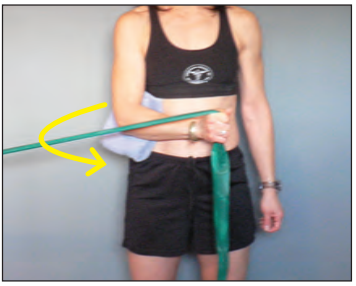
5d **Straight arm lifts.** Like the rotational movements the main challenge in these exercises is to keep your shoulder stable while your arm moves inside the joint. Use elastic banding or a small weight for added load. Do 15 reps with each arm in each direction, raising and lowering to the front, side and back, with a straight arm

You can also do these using both arms at the same time.

5e **Outward and inward rotation.** Do this exercise seated or standing, with or without an elastic band or Bungee cord or a weight. The main challenge is to keep your shoulder stable while your arm moves inside the joint. Putting a small towel between your elbow and your ribs will help to keep body position. You can hold the elastic banding in the other hand or tie it off onto a door handle. Do 15 reps each side pulling inward, and 15 pulling outward.

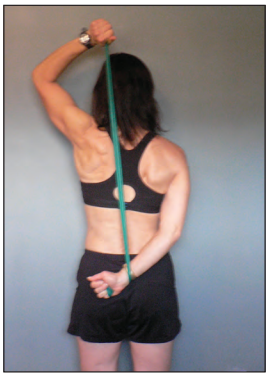


Outward pull



Inward pull

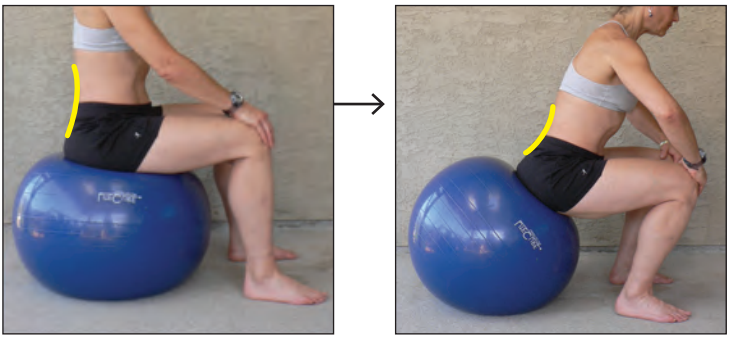
5f **Behind your back.** This is a more advanced exercise so make sure that you can keep your back and shoulders stable in exercises 5a – 5e before trying it. Start without the elastic band, and gently stretch by trying to touch your hands together. Make sure that your shoulder and back stay in proper alignment. Then use the banding to provide resistance to both arms as you straighten them out. Resist the pull of the elastic as you bring your hands closer together. Do 20 reps each side.



Start with **SPINE IN NEUTRAL + ABDOMEN ACTIVATED**

If you don't have an exercise ball you can do these exercises using a stool, chair, off of a set of stairs or the side of your couch. The idea is to work on maintaining a neutral spine and activated core while adding different kinds of challenge.

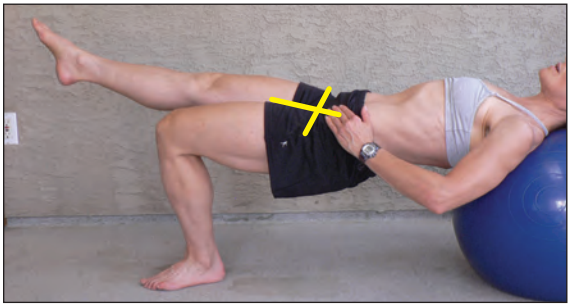
6a Sit on ball, neutral back. Tilt upper body forward from hips and roll off ball into squat, hold 30s.



6b **Plank with leg lift.**

6c **Push ups.** Try also on two balls.

6d **Supine bridge with leg lift.** Start with hands on floor and progress to hands crossed over chest, do not let hips twist.



6e Hamstring curl. Keep spine neutral while lifting body up from shoulder blades. Pull ball in under hips using hamstrings. Start with arms on the floor for stability and progress to arms crossed over chest.

6f **Side bridge + leg lift.** Hold 60s. Elbow or hand can also brace on half-roll, table or chair.

Start with NEUTRAL BACK, ACTIVATE ABDOMEN

Protecting your knees starts with a neutral spine and activated core because this position straightens out your pelvis so that the big muscles of your butt can contract effectively and your knees are loaded evenly. When force is applied by gravity or a moving surface underfoot the knee joint is at risk so it's very important that the muscles surrounding the knee are quickly activated to support the joint. Women are especially prone to letting the knee roll inward (valgus), which places added stress on the joint.

Before beginning the knee exercises ensure that your squat technique is correct.

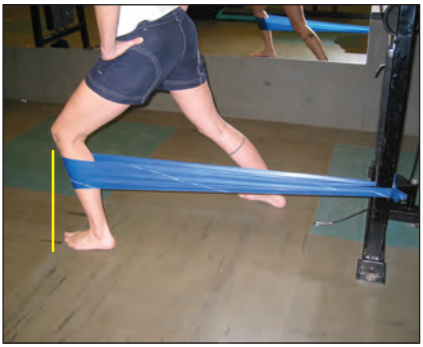
- Spine stays in neutral with lumbar curve
- Core stays activated to support spine
- Knee does not come forward of the foot (sit back as though you were going to sit on a stool. If you can't keep your balance put a thin book or board under your heels as illustrated in exercise 7a)
- Knees are held outward so that the foot and knee do not roll in (see the squat with elastic banding on page 107)

Squats don't have to be deep, in this case you are not trying to build strength as much as form, and most of the time when you are walking in the forest or stepping you won't have to do a full squat. Instead only drop to 90 degrees and concentrate on keeping your back in neutral and your knee lined up with your toe.

7a **Two leg squat**

7b **One leg squat**

7c **Forward Lunges.** These can be done in place or moving forwards as though walking. Other variations are to add weights, lunge out onto an unstable surface, or step out with a tether.

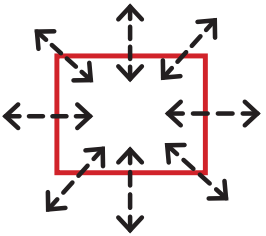


Make sure that your knee doesn't move forward of your toes.

7d Side Lunge. These can also be done in place, travelling sideways, with weights, onto an unstable surface, or with a tether.

7e **Step Ups:** How many times a day do you step up onto a log? The deal here is to focus on keeping your core activated and to learn to use the big muscles of your hip and legs rather than your back. Start with a step or bench that is shin high. Concentrate on stepping directly up and not letting your torso tip forward. If this is too easy you can increase the step height and add weight. Do 30 step ups on the right and 30 on the left.

7f **Diagonal 3 step run and stop.** Take 3 fast steps and stop focusing on keeping good posture and supporting the ankle and knee of the loaded leg. Work this one outward from the center of an imaginary box so that you load your leg moving forwards and backwards in all 8 directions.



2 AEROBIC POWER

This section covers general fitness of your heart, lungs and muscles. Whenever you do any physical work or exercise from washing your truck to hauling your gear up a steep slope, your body has to adjust to the increased level of demand. Just as you'd step on the gas pedal to increase your speed or when driving up a hill, your body has to increase the rate of fuel delivery and removal of wastes. And just as you need good brakes and suspension to get good performance on the road, you need the strength and support in your muscles and joints. By training, you can increase the efficiency and capacity of each of these systems. The faster you adjust and the more efficient you are at meeting the increased needs of working muscle, the greater the power you can generate and the less attention you will have to give to just getting through your day. With excess power to burn, the physical aspect of your work will be less tiring and your ability to respond quickly to changing conditions increased. **The result: less fatigue and fewer injuries, better vigilance and more energy throughout your day and evening.**

There are a lot of ways to build and maintain fitness. If you work in the bush year round or participate in a sport regularly, your baseline fitness will be very high. But most people don't have that kind of lifestyle or even much time in their lives for exercise, and yet to perform at a high level, your body has to be strong enough. This section will give you a series of workouts that you can use to build or maintain fitness that are based on the science of how your body adapts to exercise. It's not the only way to get fit, but it is very efficient, and will work for you *if you use it.*

The programs in this section are designed for people who are out in the woods every day. If you are more than 20 lbs overweight or very unfit see section C before continuing on with this section.

THE SHORT VERSION

To build fitness you need to show your body that it cannot do the current level of work without fatigue; work beyond your comfort level so your body knows it has to get stronger. That means that you have to do the two-day workout sets 2 or 3 times in 10 days, and every couple of workouts you need to increase the load. Once you have the fitness you want, or are only taking a few weeks off work, you only need to top up your fitness once in 10 days.

HOW TO CHOOSE which activity for the workout

The key to the workouts in this module is to achieve a high level of demand on your heart and lungs as quickly as possible, and then sustain it at maximum for the given work interval. You can do it using many different types of activity, but the more muscle mass involved the better. For example, chopping wood will raise your heart rate, but never as much as running because in wielding the axe you use only your arms, while in running your legs are also moving.

In addition chopping wood is sometimes limited by the strength of your arms, typically they fatigue before your heart and lungs. You know your body the best; you also know what activities you enjoy, and what you have access to at different times of the year. So you can choose which ever activity you want to use, as long as you can drive your heart and breathing rates up to high levels. Running, cycling, calisthenics, rowing, swimming, Nordic skiing, snowshoeing and skating are a few great choices.

WHAT IF YOU ALREADY PLAN TO BE RIDING your bike or some other activity?

Following this program will get you in shape far faster and to a higher level than anything else you have ever done. You can do it on a stationary bike, treadmill or circuit training but it absolutely does not have to be done in a gym. You can do these workouts anywhere, anytime, doing anything you like as long as you can sustain a hard effort for the time given in the workout. If you prefer to ride your mountain bike, find a good hill and ride your intervals as part of your ride. If you are going wake boarding then do your intervals swimming or on a steep bank near the beach, if you are taking your kids to the park, play tag or soccer and do some intervals of calisthenics. Sports like basketball and hockey are also good equivalents for the short interval program, but make sure that you keep the effort high, with short rests so that you don't fully recover between efforts.

GETTING STARTED

If you haven't been exercising regularly it's important to check with your physician before beginning this or any other exercise program to make sure that you are not at risk for cardiovascular disease or have any other health concerns. Neither the author nor the sponsoring organizations are responsible for any illness or injury that may result from this program, if you chose to follow the recommendations in this book you do so entirely at your own risk. If you feel faint or experience pain while doing these exercises seek medical attention immediately.

If you are more than 20 lbs overweight or have not been exercising regularly then begin with the exercise program in Part C on page 153 of this manual. The workouts in Part B are designed for those who are already working in the woods every day and have a good fitness base

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How to do a WORK INTERVAL

The workouts are set up in intervals. Instead of going out for more than an hour at a constant low or moderate rate, you can get the same fitness more efficiently by going really hard for a short period of time. "Really hard" means as hard as YOU can for the given time period. If the work interval is 20-30 seconds no pacing is involved, simply go really hard for the whole work interval. If the work interval is longer than 40 seconds and you go all out, you won't be able to finish the work interval at the same intensity so you will have to pace a little.

How to do a RECOVERY INTERVAL

Each work interval is followed by a short recovery period. The idea is not to completely recover, only just to allow enough recovery that you can generate a hard effort again. This way your heart and lungs continue to work hard during the rest interval, and your body learns how to recover quickly. As your fitness level increases, the work intervals gradually get longer, and the recovery intervals gradually get shorter. You may not feel much like moving during some of the recovery periods, but you will recover faster if you move a bit than if you lay still. Easy movement helps the muscle flush out the waste products and deliver new nutrients. This type of on/off work is very characteristic of sports like hockey, volleyball and basketball.

How to read the WORKOUT NOTATION

The notation for intervals is as follows: **4** x (20s max: 40s easy). This means go at maximal intensity for 20 seconds, followed by 40 seconds of easy work. The number '**4**' tells you to repeat the whole thing **4** times, for a total of 80 seconds of hard intensity and 160 seconds of recovery through easier work. Since all the workouts are based upon time, you can do them using any type of exercise that you want, as long as it meets the criteria explained above of raising your heart and breathing rates as much as possible. And since you are going for maximal effort the workouts adjust themselves for your fitness level; the fitter you are, the more work you do. **Because you have to push hard it's very important to make sure to warm up well before the workout, as well as a bit of a warm down after the workout.**

GETTING THE MOST OUT OF THIS MODULE:

The two day SEQUENCE

To get the most out of this module do the workouts in the 2 day workout sequence.

DAY 1: Day 1 sets up your body to adapt to the workout on day 2 much more efficiently. The first day of this 2 day sequence is the short interval consisting of between 20-40 seconds of maximal effort, followed by a short rest of 20-40 seconds of easy work. If you do it right you should feel a little tingling in your fingers due to the acidity of the lactic acid generated. This workout will cause you to produce a burst of anabolic hormones which creates a more effective response to the workout on the following day.

DAY 2: The second day of this 2 day sequence consists of longer intervals of 1-5 minutes of maximal work. These will drive your ability to work aerobically to a high level, giving you power, and access to the endurance that you have already built. The work to rest ratio should be 1:1, so if your hard interval is 3 minutes long, follow it with 3 minutes of easy work, and then repeat as indicated. The activity can be anything that engages most of the muscles in your body so as to get your heart rate and breathing way up there, as discussed earlier. As with the other workouts, start and finish the workout with 5 minutes of easier work, to make sure that your muscles are warmed up and ready for the hard work.

LEVEL I (if you haven't been active for more than 1 month)

WEEK 1

DAY 1: Warm up, 4 x (20s max: 40s easy), 5 min easy, 2 x (20s max: 20s easy) warm down

DAY 2: Warm up, 3 x (1 min max: 1 min easy), warm down

WEEK 2

DAY 1: Warm up, 4 x (30s max: 30s easy), 5 min easy, 2 x (30s max: 30s easy), warm down

DAY 2: Warm up, 2 x (2 min max: 2 min easy), 5 min easy, 2 x (1 min max: 1 min easy), warm down

LEVEL I (if you haven't been active for more than 1 month)

WEEK 3

DAY 1: Warm up, 6 x (20s max: 20s easy), 5 min easy, 4 x (20s max: 20s easy), warm down

DAY 2: Warm up, 3 x (1 min max: 1 min easy), 5 min easy
1 x 2 min all out, warm down

WEEK 4

DAY 1: Warm up, 6 x (30s max: 30s easy) 5 min easy,
2 x (20s max: 10s easy), Warm down

DAY 2: Warm up, 2 x (2 min max: 2 min easy), 5 min easy,
3 x (1min max: 1 min easy), warm down

WEEK 5

DAY 1: Warm up, 4 x (40s max: 40s easy), 5 min easy, 2 x (20s max: 10s easy), Warm down

DAY 2: Warm up, 3 x (2 min max: 2 min easy), warm down

WEEK 6

DAY 1: Warm up, 2 x (40s max: 20s easy), 5 min easy,
2 x (40s max: 20s easy), Warm down

DAY 2: Warm up, 2 x (3 min max: 3 min easy), 5 min easy,
1 x 2 min all out, warm down

LEVEL II (if you have been getting regular exercise for at least 1 month)

WEEK 1

DAY 1: Warm up, 4 x (20s max: 20s easy), 5 min easy,
4 x (20s max: 20s easy), warm down

DAY 2: Warm up, 3 x (1 min max: 1 min easy), 5 min easy,
3 x (1min max: 1 min easy), warm down

WEEK 2

DAY 1: Warm up, 4 x (30s max: 30s easy), 5 min easy,
4 x (30s max: 30s easy), warm down

DAY 2: Warm up, 2 x (2 min max: 2 min easy), 5 min easy,
2 x (2 min max: 2 min easy), warm down

WEEK 3

DAY 1: Warm up, 6 x (20s max: 20s easy), 5 min easy,
6 x (30s max: 30s easy), warm down

DAY 2: Warm up, 3 x (3 min max: 3 min easy), warm down

WEEK 4

DAY 1: Warm up, 6 x (30s max: 30s easy), 5 min easy,
4 x (30s max: 15s easy), warm down

DAY 2: Warm up, 1 x (5 min max: 3 min easy), 5 min easy,
3 x (1min max: 1 min easy), warm down

LEVEL II (if you have been getting regular exercise for at least 1 month)

WEEK 5

DAY 1: Warm up, 4 x (40s max: 40s easy), 5 min easy,
4 x (40s max: 20s easy), warm down

DAY 2: Warm up, 4 x (2 min max: 2 min easy), 5 min easy,
2 x (2min max: 2 min easy), warm down

WEEK 6

DAY 1: Warm up, 4 x (40s max: 20s easy), 5 min easy,
4 x (40s max: 20s easy), warm down

DAY 2: Warm up, 4 x (3 min max: 2 min easy), 5 min easy,
1 x (2min max: 2 min easy), warm down

Get in shape and the work of moving through the bush will be less fatiguing. You'll have more energy at the end of the day and you'll be far less likely to be hurt.

3 STRETCHING

Stretching is one of the most abused forms of exercise. When done incorrectly, it can lead to injury. But gentle stretching of warm and relaxed muscles can help reduce tension and restore length to tired and sore areas that feel tight and limit your ability to move freely.

Before ACTIVITY

In the morning when you wake up the discs between your vertebrae are full of fluid. It's not until you have been vertical for about 30 min that gravity pushes down on them enough that they lose some of this plumpness. **If you stretch first thing upon getting out of bed, the amount of pressure on the discs is greatly increased** – it's like a fully filled water balloon, much more likely to rupture than if the balloon is only partially full. This is especially important if you have had previous damage to a disc. The weakened structure is easily damaged, but taking the pressure off the disc when it is plumped up can give it a much greater chance to heal.

THE SHORT VERSION

The stretches that you do in the morning or before work should not be end range. The muscles and tissues are cold and rigid and should not be pushed to the point of pain. Gentle movements through the range of motion can help to warm up your muscles and circulate fluid through the joints. But **remember to wait about half an hour after you get out of bed** to protect your discs!

During ACTIVITY

Tired muscles will contract and shorten. If you find a muscle is starting to tighten up and hurt you can release it using the neural pathways. Our muscles are programmed to follow a contraction by a relaxation because this is how normal rhythmic movement takes place. When you walk, the quad contracts to extend your step and then relaxes as your hamstring takes over to lift your foot behind you. There are two ways you can use this pattern to get a muscle to relax.

A. CONTRACT/RELAX:

Contract the muscle that you want to stretch for 3 seconds. Then breathe and focus to relax. Repeat this cycle 3 times and then *without engaging the muscle* that you want to stretch, use your hands to pull the muscle into a full stretch position. Repeat the whole process several times increasing the stretch slightly with each cycle. The hamstring and quad stretches shown below are particularly good for this type of stretching.

B. CONTRACT THE OPPOSITE (ANTAGONIST) MUSCLE:

Contract the opposite (antagonist) muscle: When you lift a glass of beer your biceps muscle shortens and contracts; if your triceps muscle did not relax at this point, movement would not take place. So if you have a cramp in your calf, the best way to release it is not to stretch your calf, but rather to stick your foot under something immoveable and contract the front of your shin to try and lift the object. As the front of your shin contracts your calf has to relax.

After ACTIVITY

As with the during-activity stretches, tired muscles can be released using the neural pathways much more effectively than by passive stretching. If you are cold and stiff do a little gentle dynamic movement within your range of motion to warm the muscle slightly. Then use the contract/relax cycle to take the muscle to its true end range. Finish with a passive stretch by simply holding the muscle at its end range stretch for 30 sec or more. This is a great way to enhance recovery and get your muscles ready for another day of hard work.

Fallers and Buckers need good hamstring flexibility to be able to work in this position.

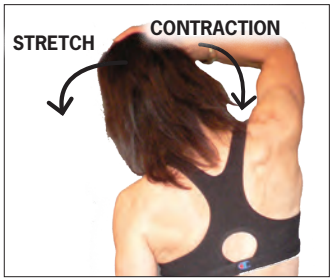
HEAD + NECK STRETCHES

When you do any neck exercises make sure that you are not shifting your chin forward but rather are dropping it straight down onto your chest. *This is a small but very important difference that will help protect the discs between the vertebrae in your neck.* You can check this easily by placing a hand on the back of your neck. When you drop your chin the 7th cervical vertebra (the first big knobby one) should NOT pop outwards.

Relaxing the back of your neck: This one is critical for fallers, you should do it at least 5 times per day. It only takes a few seconds and will release the tension that develops from the constant looking up at the canopy. Place your hands on your forehead and use them to resist pushing your chin towards your chest. Contract for 3 seconds, relax completely for 3 seconds, then repeat twice more.

Stretching the back of your neck: Place your hands behind your head and push down but don't let your head move, contracting the muscles in the back of your neck to push back against your hands. Contract for 3 seconds and then relax completely, using the weight of your hands to stretch the back of your neck. Repeat for a total of 3 contractions and 3 stretches. Hold the last stretch for 30 seconds.

Stretching the sides of your neck: Place your right hand on your head and push down to the left side but don't let your head move, contracting the muscles on the right side of your neck to push back against your hand. Contract for 3 seconds and then relax completely, using the weight of your hand to stretch the right side of your neck. Repeat for a total of 3 contractions and 3 stretches on each side. Hold the last stretch for 30 seconds.



Use these stretches to relax your neck and back at the end of the day.

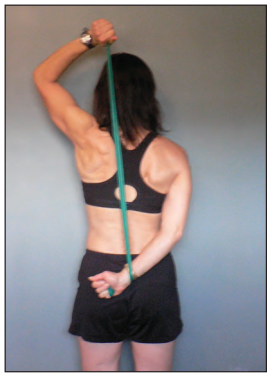
UPPER BODY STRETCH:

Although walking through the bush is mainly a lower body activity, carrying and stabilizing your chainsaw relies mainly on the upper body. To ensure that you don't start to develop back pain, or to lessen existing pain, look after your core. You should do the lower abdominal/pelvic floor activation from pages 109-110 at least 5 times every day. In addition, opening up the thoracic spine can be helpful. This stretch focuses on releasing the muscles that draw the shoulders forward and inward.

Begin by standing side-on to a wall or tree. Check that you are in good posture with a neutral spine and activated core and glutes. Place your hand against the wall as shown and step in sideways (closer to the wall) until you feel a mild stretch. Ensure that your shoulders and hips are facing square to the front. Contract your pectoral muscles by trying to push your hand against the wall, hold for 3 seconds, and then relax fully. Repeat this sequence twice more and after the third relaxation, step in towards the wall until you feel a stretch again. Repeat this process until the contract relaxation sequence does not stop the sensation of stretch. You are now at the true limit of your range of motion. Hold this position for at least 30 seconds and repeat the whole sequence with the other arm.

Step in towards the wall while the chest muscles are relaxed.

Shoulder stretches. Reach both hands behind your back as shown in the photo. Gently try to decrease the space between your two hands, but be sure not to let your back arch.



BACK STRETCHES

Do the stretch shown below. Do this stretch each time you refuel your chainsaw, finish it with the neutral position and an activated core.

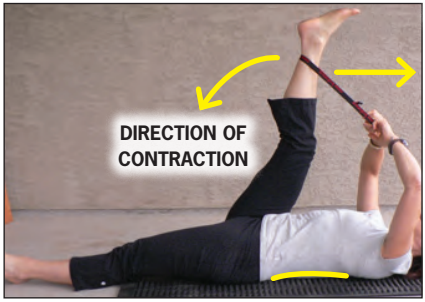
Endpoint arch

Endpoint curve

Neutral spine

STANDING HAMSTRING STRETCH: Keeping your hamstrings limber is important for fallers, buckers, chokerman and others that have to work bent over. This is a good stretch that you can use to release your hamstrings during the day as it it can be done standing in the bush and it makes use of the neural loop to get the muscles to relax. All you need is a log at the right height, the bumper of the truck works too. Lean forward *from the hips keeping your back in neutral.* To contract the hamstring push your heel down as though you are trying to lower your leg. As with the other active stretches, the sequence is to contract for 3 sec, relax for 3 sec and repeat 3 times, then staying relaxed gently lean forward to increase the stretch.

HAMSTRING STRETCH 2: The contraction is to try and lower your leg while your arms resist. Contract for 3 sec then relax 3 sec, repeat 3 times and then when the hamstring is fully relaxed pull your leg in to your chest using your arms or a strap if you can't reach. Keep your chin down so your back stays in neutral (don't let it arch up), or place a small folded towel in the small of your back if you can't keep your spine in neutral.

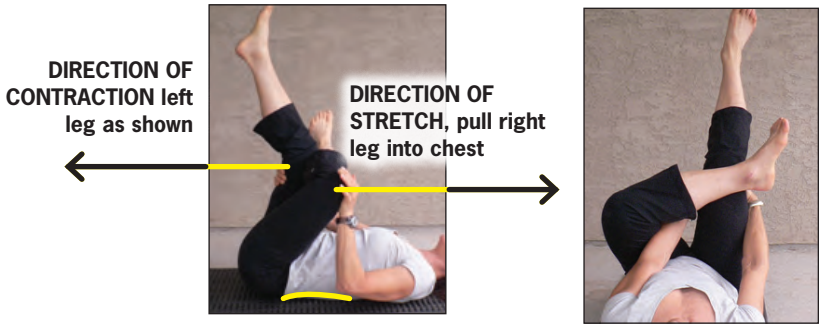


ITB + LATERALIS STRETCH:

This one hurts but is very effective at releasing the ITB (which gets very tight and leads to hip and knee pain). You can also roll across your butt to release the glutes. If it's too painful carry some of your weight on your arms, or place a towel under your leg for a bit of cushioning.

ABDUCTOR STRETCH:

Contraction is to push your (left) knee back (again, use the 3 x 3 sequence of contraction followed by full relaxation). When fully relaxed put both hands underneath your right thigh and pull your left leg in toward your chest. Then switch legs.



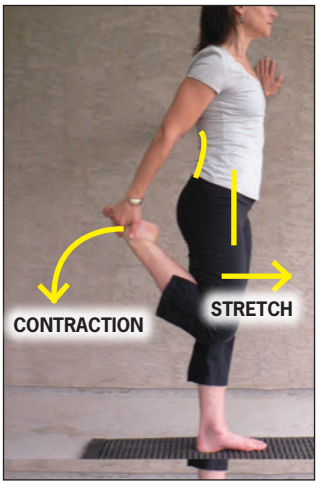
CALF STRETCH:

Contraction is to push your heel (left leg in photo) down into the ground (3 x 3). Relax and stretch calf by deepening the forward lean in the lunge. Repeat with bent back knee, and switch sides.

QUAD STRETCH:

Hold your ankle. Keep your knees together and push forward at the hips but be sure to keep your spine in neutral. The contraction is to try to straighten your leg against the hand holding your foot (3 x 3). Pull up on your foot and push your hips forward to increase the stretch.

Hold your ankle. Keep your knees together and push forward at the hips but be sure to keep your spine in neutral. The contraction is to try to straighten your leg against the hand holding your foot. Pull up on your foot and push your hips forward to increase the stretch.



C HOW TO SURVIVE TRADING IN YOUR BOOTS FOR A DESK

1 FITNESS FOR LIFE

If you now spend more time at your desk than you do in the bush this section is for you. The danger that you face is different from those lurking in the bush, but once it's out of control, inactivity is just as likely to kill you as an accident in the woods. It might take longer, but it's only a matter of time.

As it turns out there is a scientifically proven way to stay young and prevent diseases like diabetes, hypertension, depression and cancer. All you have to do is get 30 minutes of moderately vigorous activity per day. Get out of breath, work up a sweat, and it *will* protect you. Better yet, do it with your children and your partner and see them protected too. Don't you think it's worth the trouble?

It's true that there isn't much time in your day. You often get up before the sun and your day doesn't end much before its time for you to go to bed. The bulk of your time is spent sitting at a desk or in a truck so it's hard to find the time and the motivation to get some exercise. But as sure as your life depends on your physical ability in the bush, it depends on keeping up some exercise for this phase of your life. **The diseases that result from inactivity will eventually kill you if you don't take some action to prevent them.**

So right now, every single day, start looking for ways to move. If you want to take control of your life, **you have to find a way to make physical activity a part of it every day.** People often say they can't find the motivation. But you have to find that one point in reality that works for you. Is it wanting to see your kid get married? Being able to go on a hunt with your buddies? How about that physical relationship with your partner? Or being able to climb up into your truck without pain? Check out the next section for lots of suggestions as to how to stay motivated, but what ever it takes you MUST start moving more. Your very life depends on it.

It doesn't take a whole lot of time to get the health benefits of exercise. Just 30 minutes/day or even three, ten-minute sessions each day will do it. How often do you waste 10 minutes? Why not put it into your life bank? Because the rate of return on getting into shape is like winning the lottery. **There is no other way to get such great gains in health, energy and life.**

Getting more exercise will be hard at first, but after a while you will start to feel so much better that it will be something that you look forward to. It helps a lot if you can fit it into your day, like getting one of your 10 minute segments whenever there is a hold up at work. Even just getting out of your truck and doing a few exercises will help on days when you have a long drive. But it's very important that you actually work up a sweat, at some point during the day.

It might seem that asking you for this much time each day is a lot. But every minute you spend sweating gives you back time ten-fold. You'll feel better, have more energy, sleep much better, drive better and be happier. All you have to do is get started.

Here are two things that will really help you make these changes in your life. First, find an activity partner. Whether it's your partner, your kids or your buddy, somehow making the promise to someone else makes it harder to break. On the days that you don't feel like exercising they will get you to go, and being able to laugh and share the sweat with someone else makes it a lot more fun.

The second thing that will help you stick with an exercise program is to find some activities that you enjoy. For some people it's a game like basketball, or tennis, for others it's more solitary like walking/jogging, snow shoeing or cross country skiing, skating, rowing, swimming or biking. For others its circuit training or weight lifting. In the end it doesn't matter so much what you do, **the important thing is to raise your heart rate, get out of breath and work up a sweat.**

30 minutes/day. Every day.

In the next section you will find some ideas for work-outs for people who are starting from a very low fitness level. You can use these or make up your own, or a combination of the two. You can substitute biking, swimming, rowing, or skating for the walking and running. If you are going skiing or snow shoeing then just go a little faster, or uphill for the harder intervals. If you want to use weights that works too, just try to keep moving in between sets. If you want a longer workout then repeat the whole sequence two or three times. Remember that the only requirements are that you **work up a good sweat.** Try them before or after work, you will find that no matter how tired you are when you start your work-out, afterwards you will feel awake and full of energy.

Making change is never easy, and when you are first getting started it can seem like an impossible task. But **the choice is yours**. Just think about the fact that if you don't start to make these changes you are pretty much guaranteed to end up having a heart attack, a stroke or developing diabetes. Do you want a long, healthy life for you and your family?

WORKOUT 1: 10 min

- **Walk quickly for 2 minutes**, striding out and swinging your arms
- **Jog or speed walk for 1 minute** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Walk quickly for 30 seconds,** breathing slowly and deeply
- **Jog or speed walk for 2 minutes** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Walk quickly for 30 seconds,** breathing slowly and deeply
- **Jog or speed walk for 2 minutes** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
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- **Walk quickly for 30 seconds,** breathing slowly and deeply
- **Jog or speed walk for 1 minute** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Walk quickly for 1 minute,** breathing slowly and deeply

WORKOUT 2: 10 min

- **Walk quickly for 2 minutes,** striding out and swinging your arms
- **Step-ups for 1 minute** concentrating on keeping your core, pelvic floor and butt activated, step straight up, no wobbling or tipping over
- **Plank or other core exercise** from pages 113-115 for 30 sec, rest 10 sec, core for another 30 sec
- **Lunge walks for 1 min** concentrating on keeping your core, pelvic floor and butt activated, no wobbling or tipping over
- **Push-ups for 30 seconds,** without letting your butt lift or your shoulders drop through
- **Walk quickly for 30 seconds,** breathing slowly and deeply
- **Step-ups for 1 minute** concentrating on keeping your core, pelvic floor and butt activated, step straight up, no wobbling or tipping over
- **Triceps dips for 30 seconds,** keep core activated
- **Walk quickly for 30 seconds,** breathing slowly and deeply
- **Sideways lunges for 1 minute** concentrating on keeping your core, pelvic floor and butt activated, no wobbling or tipping over
- **Plank or other core exercise** from pages 113-115 for 30 sec, rest 10 sec, core for another 30 sec
- **Step-ups for 1 min** concentrating on keeping your core, pelvic floor and butt activated, step straight up, no wobbling or tipping over
- **Push-ups for 30 seconds,** without letting your butt lift or your shoulders drop through
- **Walk quickly for 1 minute,** breathing slowly and deeply

WORKOUT 3: 15 min

- **Walk quickly for 2 minutes,** striding out and swinging your arms
- **Jog or speed walk for 5 minutes** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Walk quickly for 30 seconds,** breathing slowly and deeply
- **Jog or speed walk for 5 minutes** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Walk quickly for 30 seconds,** breathing slowly and deeply
- **Jog or speed walk for 5 minutes** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Walk quickly for 1 minute,** breathing slowly and deeply

WORKOUT 4: 15 min

- **Walk quickly for 2 minutes,** striding out and swinging your arms
- **Jog or speed walk for 3 min** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Step-ups for 1 min** concentrating on keeping your core, pelvic floor and butt activated, step straight up, no wobbling or tipping over
- **Push-ups for 30 sec,** don`t let your butt lift or shoulders drop through (keep good form)
- **Jog or speed walk for 2 min** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Sideways lunges for 1 min** concentrating on keeping your core, pelvic floor and butt activated, no wobbling or tipping over
- **Push-ups for 30 sec** - good form
- **Jog or speed walk for 2 min** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Step-ups for 1 min** concentrating on keeping your core, pelvic floor and butt activated, step straight up, no wobbling or tipping over
- **Push-ups for 30 sec** - good form
- **Jog or speed walk for 2 min** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Lunge walks for 1 min** concentrating on keeping your core, pelvic floor and butt activated, no wobbling or tipping over
- **Push-ups for 30 sec** - good form
- **Walk quickly for 1 min,** breathing slowly and deeply

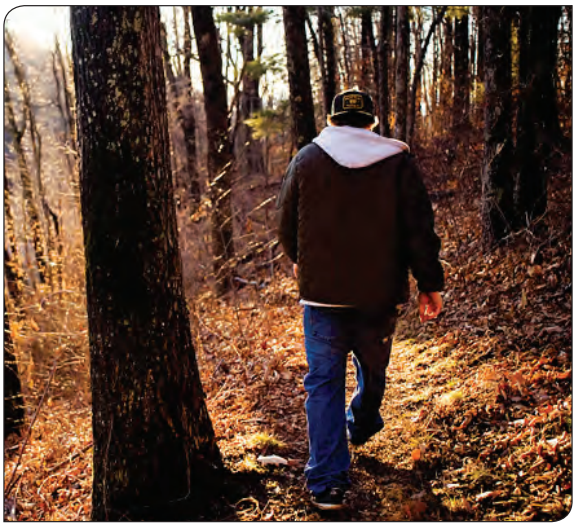
WORKOUT 5: 30 min

- **Walk quickly for 2 minutes**, striding out and swinging your arms
- **Jog or speed walk for 30 minutes** concentrating on breathing in for two foot strikes, and out for 2 foot strikes
- **Walk quickly for 1 minute,** breathing slowly and deeply

WORKOUT 6: **60 min** but only counts as 30min

(because you don't get out of breath)

- **Walk quickly for 60 minutes,** striding out and swinging your arms



WORKOUT 7: 10 min

- **Bike (spin) for 2 minutes, with just enough resistance** that you have to push a little but can keep your speed up over 80 rpm
- **Increase the resistance or cycle up a hill for 1 min**
- **Spin 1 min with lowered resistance,** breathing slowly and deeply
- **Increase the resistance or cycle up a hill for 2 min**
- **Spin 1 minute,** breathing slowly and deeply
- **Increase the resistance or cycle up a hill for 1 min**
- **Spin 1 minute,** breathing slowly and deeply
- **Increase the resistance or cycle up a hill for 2 min**
- **Spin 1 minute,** breathing slowly and deeply
- **Increase the resistance or cycle up a hill for 1 min**
- **Spin 1 minute,** breathing slowly and deeply

There is only one proven way to live longer and better. Its not a drug, and it doesn't cost any money. But it does require you to sweat for a minimum of 30 minutes per day. Guaranteed you will lose weight, lower your blood pressure, sleep better, have more energy, reduce your risk of diabetes and cancer and reduce back and knee pain. So... as they say – just DO IT! Get out of the truck, away from your desk and get some exercise!.

2 MAINTAINING CHANGE

Knowing what to do and doing it are two different things, so here is a list of strategies to help you make the right choice, every day.

• **Set reasonable goals.** It took a while and a lot of bad choices to get you to where you are now, so it's going to take more than a few days to get you back to health. Choose one thing first, for example increasing your physical activity. And then **start with just one change that takes you closer to that goal today.**

• Today choose one healthy food, move around for 10 min instead of sitting and you are on your way! One step at a time. **You don't have to do it all at once.**

• Keep a calendar in full view of your family or your co-workers. Every day that you make a healthy choice write it down. At the end of the month you will be able to **see your progress.**

• **Make a date with a friend.** If you have agreed to meet someone for a walk it's harder to stay on the couch. Having an activity partner means there are two of you to make sure you go, and besides when you talk as you walk the miles fly by.

• **Get your family involved,** it will be good for them too, and you will have fun with them along the way. Every time you make a good choice you will be doing something for the people who are most important to you.

- **Reward yourself for success.** Every day that you get your minimum 30 min of activity put a couple of bucks in the pot. At the end of the month you will have enough money to buy yourself something fun that you have been wanting.

- When you feel tired and un-motivated to exercise keep in mind that **activity is not optional**. It's just as critical for your health as food and water and should be as automatic as brushing your teeth. So **schedule it in**, 30 min every day.

- Get into the habit of looking for ways to i**ncrease how much you have to move**; park further away from the building, take the stairs, walk the long way around.

- **Get a dog,** it's surprising how many people won't walk for their own health but will make sure that they take their dog for a walk every day.

- **Join a class or a club.** If you pay for something you'll be less likely to skip it.

- **Set a goal.** Is there a hunting trip coming up that you want to be able to go on? If you know you want to drop 10 lb by a certain date it's easier to choose the apple instead of the donut.

• **Get your kids to call you.** If you know they are going to ask you if you got your exercise in today you will want to be able to say "Yes!" And besides, you will be teaching them how to stay healthy all their lives.

• **Think about the consequences.** Do you know someone your age who just had a heart attack? Got cancer? Kidney disease? You don't have to die before your kids grow up. **Lose that excess weight and get some exercise and your risk goes way down.**

• **Get help.** Make use of the internet (some good sites are listed with each topic in this book), contact your local health provider, or ask your supervisor. This is important and it's wise to get good information to help guide you.

• **Celebrate your wins.** Make your goals small enough that you can reach them in a few months. And when you do make sure that you reward yourself. You are doing the most important thing you will ever do for yourself and your family. **And it is within your reach, so get started today!**

Here is a checklist that can help remind you of some of the things you can do to improve your health. If it seems like too much, start by checking off at least one item every day. You can make your own lists too, and just include the things that you are working on this week, or that are particularly important for you. **If you are not sure what you should focus on then get some help.** Your physician or public health nurse are good places to start, or contact your supervisor and ask for some health resources to be provided for your next safety training session.

- ☐ Get at least 10 min of physical activity, three times today
- ☐ Don't smoke or chew during the day this week
- ☐ Eat small low fat and high complex carb snacks every two hours
- ☐ Have 2 servings of skim milk or low fat, low sugar yogurt today
- ☐ Eat a food high in fiber every day this week
- ☐ Walk up and down a flight of stairs 5 times today
- ☐ Choose fresh lean meat, poultry breasts, or fish for dinner and cook it without adding any fat 3 nights this week
- ☐ Limit yourself to just one drink of alcohol today
- ☐ Don't eat any cheese this week
- ☐ Drink a glass of water every hour or two today

- ☐ Get 20 min of vigorous activity after work twice this weeK
- ☐ Bring a healthy lunch from home 3 days this week instead of buying fast food
- ☐ Use just a little canola or olive oil instead of margarine or butter in cooking tonight

- ☐ Eat a food high in calcium (skim milk, low fat low sodium cottage cheese or low fat low sugar yogurt) every day this week.
- ☐ Don't eat any breaded or deep fried foods this month
- ☐ Get out of your chair or truck and move around at least once a day, every day this week
- ☐ Eat fresh or frozen unprocessed fruit and vegetables every day this week

- ☐ This week limit yourself to half the amount of condiments that you normally use (ketchup, mustard, soy, sauces, pickles, olives, gravies, and salad dressings)
- ☐ Eat a food high in vitamin C (fresh fruits and vegetables) every day this month

- ☐ Don't eat anything high in saturated fats and cholesterol today
- ☐ Rinse canned vegetables in cold water before using this month
- ☐ Go for an hour long walk with a good friend this weekend

- ☐ Bake something from unprocessed ingredients (see page 81 for recipes) this weekend
- ☐ Make a side dish from scratch rather than using a packaged flavored rice or pasta tonight
- ☐ Play a game of basketball, football, soccer, Frisbee or tag with your kids 3 times this week

- ☐ Eat a whole grain food with more than 2g of fiber/serving every day this month
- ☐ Make a home cooked meal from a healthy recipe (see page 56)
- ☐  Eat a cold water fish for lunch or dinner today
- ☐ Go for a walk tonight with a friend or family member
- ☐ Don't eat any cheese, sausage, bacon or deli meats this week
- ☐ Don't use any canned or dried soups, canned vegetables, frozen dinners or instant foods this week
- ☐ Eat a food high in potassium (potatoes, tomatoes, lima beans, brussels sprouts, spinach and bananas) every day this month

3 HEALTH ISSUES

One of the biggest health challenges that most people face is the amount of time spent sitting. The solution is to increase your physical activity. It will help decrease the risk of developing each and every one of these diseases. And if you already have any one of them, exercise will still help decrease the severity of your disease. So go get your heart rate up today!

OBESITY

Obesity is a life threatening medical condition that takes a long time to develop and a long time to cure. In 2011 the US Centers for Disease Control and Prevention announced that obesity rates in the United States had achieved a shocking 30% in 12 states. **In Canada, almost 70% of males over 45 are obese or overweight.** This is a very serious health problem.

Obesity occurs when there is a **combination of too many calories taken in through diet and too few calories burned through physical activity.** The excess calories are stored as fat and a person is considered to be obese when body fat exceeds 25% for men (32% for women) or the Body Mass Index (BMI) exceeds 30. Sometimes there is

genetic tendency to store or retain body fat, but no matter what the marketing department of the supplement companies tell you, nearly all obesity is caused by too many excess calories taken in for a long time.

People who are overweight have an increased risk of many diseases including high blood pressure, high cholesterol and blood lipids, heart disease and stroke, cancer, diabetes, gallbladder and liver disease, digestive disorders, obstructive sleep apnea and joint degeneration, and depression. Obesity decreases life expectancy by 6-7 years, especially when there are large fat deposits around the waist compared to the hips and thighs. There is no question that excess body fat is bad for your health and will shorten your life. But even a small weight loss will have a positive effect on your health. Just losing 5-10% of body weight will have significant health improvement (12-25 lbs for a 250 lb person).

This book contains a lot of information about how to change your lifestyle to improve your health and your work. The message is simple, **every time you think about eating or drinking something, consider what you want for your life. Every time you decide to sit rather than move, think about how you want to live or die.** Eating small amounts (about 200 calories) of high fiber complex carbohydrates like fresh fruits and vegetables and whole grain breads and pastas, together with low fat proteins like egg whites, skim milk, chicken breast, fish and game meats (prepared without added fat) and beans will provide you with the nutrients you need to work and live at your best (see page 27 for suggestions on what to eat).

Making sure that you get a minimum of 30 minutes of moderately vigorous activity 5 days a week, and more on the weekends will keep your heart and muscles strong and your brain sharp (see pages 97 and 151). **It's not easy, but it will work for you too, and it will be worth it, guaranteed.**

Keeping your expectations reasonable, and sticking with a **healthy moderate approach** to weight loss means that it will **take time to make the changes happen.** But doing it this way will work, and will **give you changes that will last.** Most quick weight loss schemes are short term. They are so limiting that they aren't good for you, and you can't stick with them for a long time. And worst of all when you come off them, everything you lost and more comes right back on. So check out the information on page 27 about what to eat, and on pages 97 and 151 about how to increase your physical activity, and on page 163 about how to stay motivated, and you will be ensured of **long term success.**

There are lots of diet plans out there, so make sure that the one you choose is based on good nutrition and healthy practices. These are a few good sources of information:

http://www.cdc.gov/chronicdisease/resources/publications/aag/obesity.htm

http://www.phac-aspc.gc.ca/hp-ps/hl-mvs/oic-oac/index-eng.php

http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/life-vie/obes-eng.php

DIABETES

Diabetes is a disease where you can't keep control of your blood sugar. **Normally blood sugar levels are kept within a very narrow range** because if it falls too low your brain and nerves can't function and if it rises too high it destroys the small blood vessels in your eyes, kidneys, fingers and toes and other organs in your body. The way you normally keep blood sugar under control is by hormones that are released when the level of sugar in your blood goes up (like after a meal or snack) or down (like when you are exercising or haven't eaten in a long time). The hormone responsible for lowering blood sugar when the levels rise too high is called "insulin" and it is made and released from your pancreas. Insulin opens a channel in your cells to allow the sugar to move from your blood into your cells where it can be stored.

Diabetes can develop two ways. Sometimes something goes wrong with the pancreas and it stops making enough insulin. This is called "juvenile" or "type I" diabetes. If you have type I diabetes you can help decrease how much insulin you need to take by being very careful to limit your intake of simple sugars. These are **sugars like the ones in soft drinks that are not inside fiber or bound to anything that requires digestion.** There is more information on this topic on page 12 and on page 221. When the sugars are **in this simple form they move into your blood very quickly and cause a big jump up in blood sugars.** Getting regular exercise also helps diabetics because staying in shape helps your muscle use sugar without needing insulin.

The more common form of diabetes is "type II" or "insulin resistance" diabetes. **This type of diabetes is caused by too many years of eating too much sugar and not getting any exercise, and it is one of the fastest growing diseases in Canada.** Because the intake of simple sugars causes blood sugar to rise quickly too often, there is always a lot of insulin around and after a while your body stops responding to it. It's like drug addicts who have to keep on taking more and more of the drug to get high. At this stage you are "pre-diabetic" or insulin-resistant. Your pancreas can still make enough insulin but your cells won't respond to it very well and blood sugar starts to stay too high. If this goes on for too long, eventually the pancreas burns out, and you can't even make the insulin any more. Once the pancreas fails the only way to keep your blood sugar from destroying your blood vessels is to buy and inject insulin every time you eat and drink, every day for the rest of your life.

Things that can increase your risk of diabetes in addition to a diet with a lot of sugared drinks and sweets in it, are a family history (can't do anything about that one), and lifestyle factors that you can influence, like obesity, smoking, sedentary lifestyle, and high cholesterol levels.

The good news is that it takes a long time for type II diabetes to develop, and if you start **controlling your diet and increasing your physical activity you can prevent the disease from progressing** to the stage where you need to take insulin. In studies with log haulers and fallers, **blood sugar levels were lower when they ate the complex carbohydrates and protein snacks in small amounts every two hours.** In case that's not enough to motivate you to try and improve your

diet keep in mind that they **reacted faster and made better choices with the diet that was low in simple sugars.** So doing the hard work it takes to change your diet you will not only save you from developing diabetes and other diseases it will also help keep you safe when you are on the road or in the woods.

Another way to decrease your risk of diabetes, stop the progression of type II diabetes and decrease the amount of insulin you need if you have diabetes is to increase your physical activity. When you exercise your muscle uses the sugar that is in your blood and when you get fitter your muscle is able to use sugar without insulin.

Diabetes is a serious disease that requires treatment to prevent permanent damage to your eyesight and kidneys. It is also a cause of heart disease, nerve damage and can impair your ability to concentrate and react. And it can also cause impotence.

So it's important to be aware of the symptoms of diabetes, such as unexpected weight gain or loss, and strong thirst and frequent urination. It can also cause fatigue, blurred vision and frequent infections. If you notice any of these symptoms you should have your blood sugar checked by your doctor immediately.

Remember that to a large extent type II diabetes is preventable, and even if you have pre-diabetes or type II diabetes you can **lessen the severity of the disease by getting your weight down to a healthy level, eliminating simple sugars from your diet, increasing your intake of fibre and fresh fruits and vegetables, and by increasing your physical activity levels**. You'll find information on what and when to eat on page 27 and information on increasing your physical activity on pages 97 and 151. And when you are wondering whether you can make these changes, think about whether you would like to actually be able to see 10 years from now. **If you don't control your diabetes you could go blind.**

For more information on diabetes have a look at some of these websites:

http://www.diabetes.ca/

http://www.phac-aspc.gc.ca/cd-mc/diabetes-diabete/index-eng.php

http://www.diabetes.com/

http://www.hc-sc.gc.ca/hc-ps/dc-ma/diabete-eng.php

http://www.idf.org/about-diabetes

http://www.cdc.gov/chronicdisease/resources/publications/aag/ddt.htm

http://www.ndep.nih.gov/

HYPERTENSION

Normal blood pressure for a healthy adult is 120/80 mmHg. The upper number is the systolic pressure; or the pressure in your arteries when your heart is contracting and pumping blood through your body. The lower number is the diastolic pressure, that's the pressure that remains in your arteries after the heart has finished pumping. It's the pressure that keeps the blood flowing while your heart is relaxing in between beats.

A number of things can contribute to elevated blood pressure. It tends to run in families and even if your blood pressure is normal now, **it generally increases with age as your arteries lose their elasticity. Stress, smoking, alcohol intake (more than 2 drinks/day) and obesity also raise blood pressure.**

The risk of cardiovascular (heart) disease and stroke is greatly increased as blood pressure goes up. Even if your blood pressure just **falls between 120/80 and 139/89 (called pre-hypertension) you are 3.5 times more likely to have a heart attack** than if your blood pressure is below 120/80. If you are pre-hypertensive you are being given a huge warning! Start following a healthy diet, getting some regular exercise and changing some of your other lifestyle habits (see below) today and you may be able to bring your blood pressure back down to normal levels. **If you wonder whether or not it's worth making some changes to your eating and activity habits think about 4 friends or relatives that have had heart attacks. The odds are that more than 3 of them**

were caused at least in part by elevated blood pressure. Kind of shocking isn't it?

Blood pressures of 140/90 mmHg or higher are considered to be high (hypertensive). Hypertension is very common - if you are over 55 you have a 90% chance of developing hypertension, even if your blood pressure is normal now. So the best thing to do is to prevent high blood pressure by adopting a healthy lifestyle. Right now, beginning today.

Hypertension is known as the "silent killer" because it often causes a lot of damage without any obvious symptoms. High blood pressure causes:

• Damage to the walls of the arteries which leads to **atherosclerosis or hardening of the arteries.** This is when blood vessels are stiffened and narrowed by deposits of cholesterol (plaque) on the walls of the vessels and you can't get enough blood to important places like your heart and brain.

• **Kidney damage and loss of vision** because the blood vessels in the kidneys and eyes are delicate and are destroyed by high pressure.

• Congestive **heart failure** because there is so much pressure in the blood vessels that the heart can't pump effectively.

• **Stroke** because the blood vessels leading to the brain are blocked by plaque or weakened and burst under the high pressure.

• Angina (**chest pain** due to poor blood supply to the heart) and heart attack because the blood vessels that supply blood to the heart are damaged and atherosclerotic and become blocked by plaque.

LIFESTYLE CHANGES

Many of the things that contribute to increased blood pressure are within your control. Have a look at the items in the list below and chose one to start working on today. Every single time you make a healthy choice you will be improving the odds of avoiding an early death. So get to work and start making the changes that will bring your weight down to a healthy level. Stop eating the foods that cause fat to clog your arteries and salt to increase your blood pressure. Get some exercise every day and avoid things like smoking and excess alcohol that can raise your blood pressure.

• **Weight loss** – bringing your weight down to a healthy level will lower your blood pressure. See the sections on dietary changes on page 27 and on increasing physical activity on pages 97 and 151 for some suggestions as to how to get started. There is also information on page 163 on how to maintain change when you start to lose your motivation.

• Increase your fitness level with a **regular exercise program of moderate activity,** such as brisk or uphill walking for 30-40 minutes per day, 5 days per week minimum. (See pages 97 and 151 for information on physical activity). Exercise has a very powerful effect on lowering blood pressure.

• **Reduce the amount of salt** that you get in your diet (see page 213 to learn more about sodium). In some people (especially overweight and those with high insulin levels) sodium causes you to retain water, and causes more pressure in your blood vessels when a lot of fluid is in the system.)

• **Decrease stress.** Life can be stressful, top that off with the long hours at work and poor sleep habits and the stress can get out of hand. Exercise and a healthy diet will help you regain control, but finding positive ways to relax your mind is also important.

• **Decrease the level of bad cholesterol (LDL)** in your blood by restricting the amount of sugar, saturated fat, and especially cholesterol in your diet. See page 53 for more information on how to do this. High blood cholesterol causes more fat to be deposited on the inside of your blood vessels. There is less room for the blood to get through, and so the heart has to raise blood pressure to force it by.

• Keep your intake of **alcohol to less than two** 12 oz beer/day (355 mL), or 5 oz (148 mL) of wine or 1.5 oz (44 mL of 80-proof distilled spirits). Alcohol contains a lot of calories; it raises blood lipids and has a direct effect

on elevating blood pressure. **People who consume more than 5 drinks per day are twice as likely to have high blood pressure than people who do not.** See page 192 for more information on alcohol.

- **Stop smoking.** Smoking is one of the few habits that is pretty much guaranteed to cause death. See page 189 for more information on smoking. Nicotine raises blood pressure because it damages the inside of your blood vessels and causes **atherosclerosis** (hardening of the arteries) and the **formation of blood clots.** These clots can block already narrowed blood vessels and cause a heart attack or stroke. Nicotine also causes the **same negative effects as mental stress** including elevated blood pressure and increased heart rate, further increasing your risk of heart attack. If you are a smoker don't worry - all is not lost; if you stop smoking your blood pressure and risk of heart attack and stroke will drop after only 6 months. You should also know that because these effects on blood pressure are caused by nicotine and not just smoking both **second hand smoke and chewing tobacco cause increased blood pressure as well.**

- **Prevention.** Make some positive changes in your life now, today. Make one healthy choice in your diet. Do one activity that involves physical exercise. Every moment counts, if you can bring your weight down to a healthy level you can stop the damage before it happens. And get your children involved to help them avoid the same health challenges.

Start today to make some positive changes in your life. A healthy diet and regular exercise will give you and your family a future

Check out these websites for more information:

http://www.nhlbi.nih.gov/health/dci/Diseases/hd/hd_risk.html

http://www.hypertension.ca/

http://www.cfp.ca/content/56/7/649.ful

STROKE

A stroke occurs when **blood flow to the brain is blocked and brain tissue dies** due to lack of oxygen and nutrients. The **most common reason for interruption of blood flow is atherosclerosis**, the build up of fatty plaque on the walls of the small arteries that supply the brain with blood. When high blood pressure, diabetes or smoking damage the artery walls and blood cholesterol and triglycerides are high, more fat sticks to the inside of the vessel and begins to block it. Sometimes plaque can break off and completely block the vessel – causing a stroke (or heart attack if the vessel leads to the heart instead of the brain).

Strokes are sometimes relatively mild, though there is almost always some lasting damage to the brain. But often the damage is bad enough that there is severe loss of function, and even death. In both Canada and the United States stroke is the **3rd largest cause of death and is a leading cause of serious (debilitating) long term disability.**

Your risk of stroke is greatly increased by:

- High blood pressure and heart disease
- Diabetes
- High levels of fats (cholesterol and triglycerides) and low levels of good cholesterol (HDL) in the blood
- Smoking and alcohol (more than 2 drinks/day)
- Obesity

But although these are all factors that greatly increase your risk of stroke, they are all also **things that you can influence by making the changes suggested in this book.** Improving your diet by **decreasing sugar, fat and salt intake, and increasing fibre and unprocessed fruits and vegetables** will greatly decrease your risk of stroke. **Stop smoking and limit your alcohol** intake; and perhaps most importantly **get a minimum of 30 min of vigorous physical activity at least 5 days/week.** And if you are not sure it is worth the hard work that it will take to make these changes...just think about someone you know who had a stroke, who can no longer talk, or walk or even use the washroom unassisted.

Some of the devastating effects of a stroke can be prevented if medical treatment is given within 60 minutes. So it's very **important to recognize the warning signs** that you may be about to experience a stroke. Some of the things to watch out for are:

- Sudden severe headache with no known cause
- Sudden dizziness or fainting
- Blurred vision or other changes in sight in one or both eyes
- Sudden change in hearing or taste or other senses
- Slurring of words when talking
- Dropping things or stumbling
- Confusion or loss of memory
- Muscle weakness, numbness, tingling in a limb on one side of the body

Sometimes a person will experience a "mini stroke" or transient ischemic attack (TIA). This occurs when a blood vessel is only partially blocked or the interruption of blood to the brain is only short term. It's a **very important warning that a stroke is very likely to happen in the near future.** The symptoms are the same as for a stroke but they only last a short time. If this happens to you or someone that you know, it's very important that they seek medical treatment immediately.

Age and a family history of stroke also increase your risk but even though these are not factors that you can do something about, making sure that you keep the risk factors that you can control at a low level is even more important as you age or if you have a genetic predisposition a for stroke. **While a stroke can cause a huge loss to you and your family, it IS something that you can prevent. So start today. Make one or two small changes in your eating and drinking habits,**

get some exercise, and stop smoking, and know that you have done something positive for yourself and your family.

For more good information check out these websites:

http://www.ninds.nih.gov/disorders/stroke/knowstroke.htm

http://www.stroke.org/site/PageServer?pagename=stroke

http://www.cdc.gov/stroke/

http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/diseases-maladies/stroke-vasculaire-eng.php

D APPENDICES

APPENDIX I: THE GOOD THE BAD AND THE UGLY: COFFEE, TOBACCO, ALCOHOL, and OTHER SUBSTANCES

COFFEE / COLA / ENERGY DRINKS

Drinks containing caffeine are not hydration fluids as they are diuretics (make you lose water); but caffeine is a strong stimulant, and can be used very effectively to wake you up when you are tired. On the down side, caffeine also places a greater load on your heart, raises your blood pressure, dumps fats into your blood stream, and acid into your stomach, so use it wisely. Most days you should limit yourself to two cups of coffee (200-300 mg caffeine total). Brewed coffee has between 80-140 mg caffeine per cup while an average cola contains only 45 mg caffeine (and a lot of sugar). Black and green teas also contain caffeine, but far less than coffee (about 20-40 mg/cup).

Different energy drinks contain different amounts of sugar and caffeine. At the low end some drinks have only as much caffeine as in one mild cup of coffee, at the high end there are shots that contain more than 300 mg caffeine. Most energy drinks' caffeine content seems to fall in the zone of

one cup of coffee, but many have other ingredients that contain additional caffeine or also act as stimulants, so the caffeine content doesn't really tell the whole truth. Additives like guarana, kola nut, yerba mate, and cocoa can substantially raise the amount of caffeine in the drink. Most of the drinks also pack in a fair bit of sugar, about 1½ times as much as a can of cola. That much sugar will give you a very short term rush, followed by a major crash, so using energy drinks is not a good long term strategy for health or performance. See pages 12 and 221 for more information on sugar highs and lows, and more information about the rare times when that kind of rush might actually be needed.

TOBACCO

Nicotine and other drugs in tobacco have strong effects on your body. Some of these make you feel good, but most are toxic to your health. Tobacco is the leading preventable cause of death; Forty-five thousand people in Canada die every year from tobacco related disorders, in the USA it is nearly ten times that number at 443,000 people. One in 5 deaths in the USA are due to tobacco use, and 85% of lung cancer is due to smoking. Although we know that smoking, chewing and even breathing second hand smoke is lethal, the addiction is so strong that most people find it very difficult to quit.

One of the worst effects of smoking is on the lungs. It irritates the airways and as tar builds up inside the lungs it eventually causes enough damage to the delicate tissue where gas exchange occurs that you can no longer supply your body with enough oxygen. And once that happens 60% of patients will

die within 1 year, with less than 15% surviving 5 years. Smoking cannabis has these same effects, and in some cases they are even worse, because the smoke is held in the lungs for longer.

In addition to causing cancer and destruction of lung tissue, smoking also causes heart disease. Smokers have a 70% greater chance of dying from heart failure than non smokers. Because smokers' lungs are not able to work as well, their hearts have to work extra hard to try and deliver what little oxygen gets into the blood from their damaged lungs. And nicotine also increases the development of atherosclerosis (plaque deposit and hardening of the arteries), which leads to high blood pressure and can even block small blood vessels that supply the heart (causing a heart attack) or the brain (causing a stroke). The risk of stroke is 50% higher in smokers. If that isn't enough bad news for you, smoking can also lead to impotence. (Course, if you can't breathe or pump your blood to where it needs to go the sex probably wouldn't be that much fun anyhow. And don't forget, you'll need a partner who enjoys the smell of cigarettes, yellow teeth and fingers).

But since these are all long term problems, they won't affect you right? Wrong. Smoking has a profound effect on physical performance[9]. Within seconds of smoking, heart rate increases and the diameter of the airways is narrowed, impeding the flow of air to the lungs. Inhaling smoke also exposes your blood cells to a lot of carbon monoxide, which blocks them from carrying that all important oxygen. Army recruits that smoked were slower, weaker, and suffered more injuries than matched controls who did not smoke[9].

QUITTING

Stopping smoking is not going to be easy, but there really is a very simple choice – a transient pleasure or death? There are lots of factors about life that we cannot control, but this is one that you can.

Because nicotine is so addictive it's wise to seek professional assistance to help with the quitting process. Don't waste your money on quick fixes, or low tar or light cigarettes, they are just as harmful as regular smokes. But there are some medications that can help, and many people find some counseling or support necessary.

When you do quit you'll find that there will be some real improvements relatively quickly. After about 2 weeks you should notice that the anxiety that is caused by the nicotine withdrawal lessens. After about 3 weeks you won't find yourself out of breath quite so often. And after one month you won't have as much coughing or mucus congestion in your throat. In 3 months your lung function starts to improve and in 9 months your chronic bronchitis will also be gone. Your risk of heart disease goes down after a year, and after 5 years your risk of cancer also starts to go down. Not a bad trade off for a couple of tough weeks.

There are many great resources to help you, so if you are interested in quitting tobacco use have a look at the following:
http://www.quitnow.ca/

http://www.cancer.org/acs/groups/cid/documents/webcontent/002971-pdf.pdf

http://www.hc-sc.gc.ca/hc-ps/alt_formats/pdf/pubs/tobac-tabac/orqa-svra/orqa-svra-eng.pdf

ALCOHOL

Although alcohol is intoxicating, it actually act as a depressant causing **impaired judgment, reducing attention and slowing reaction speed. Of greater concern is that balance, visual perception, speed, strength, and coordination are all reduced long after the alcohol has left your bloodstream.** So if you have had more than a couple of drinks it isn't just the way the alcohol impairs performance that evening but also the next few days that you need to consider.

And while the aftermath of the alcohol itself decreases mental and physical performance, its side effects can also cause long lasting impairment. Consuming the equivalent of 4 drinks will dehydrate you by about a litre; combining alcohol with energy drinks makes that even worse. The energy drink masks your perception of how affected you are by the alcohol, making it more likely that you will consume more alcohol, do more tabletop dancing, and sleep even less. And the caffeine in the energy drink will dehydrate you even further. In studies with college students it took up to a full week to restore hydration levels after binge drinking, and the risk of injury was increased for the duration of the dehydrated period[10]. **Eye to hand coordination, mental acuity and reflex responses were impaired for days afterward.**

Binge drinking also has pronounced effects on muscle. It impairs energy production and interferes with muscle synthesis. That means your muscle is weaker, takes longer to heal after even small injuries, and doesn't respond to training by building new muscle[10].

So if you consume more than a couple of beer make sure that you drink WATER to replace the fluid lost, before during and after consuming the alcohol. Eating a complex carb and protein snack before going to sleep and again for breakfast can also help a bit to mitigate some of the effects of alcohol. **Remember that your physical and mental performance will be impaired for up to a week following binge drinking, and that your risk of injury will be elevated for that entire time**. What a stupid shame to not have your head in the game just cause you had a few too many while watching the playoffs the night before.

Like many other drugs that affect the brain alcohol can be addictive and heavy users build up a tolerance. So even though heavy users do not get the same mental effects, serious damage to the liver and blood vessels is still taking place. Heavy alcohol intake greatly increases your risk of heart attack and stroke and even moderate consumption is strongly linked to many types of cancer.

Alcohol also increases the release of insulin (see page 12 for more information on insulin), and so can cause problems with blood sugar levels. It increases fat production, suppresses fat burning and causes increased plaque synthesis (fat deposited inside your arteries), fatty liver deposits and a replacement of muscle mass by fat tissue. Even though heavy drinkers get a lot of calories from alcohol they do not get the needed nutrients.

Once you become addicted your use of alcohol is not governed by normal constraints. It takes over with a loss of health, finances, friends and family. It's a very serious problem and if you think you might be addicted to alcohol you need to get help. Talk to your family, friends, supervisor or community advisors like a religious leader or health care provider. They can help.

Here are a few web resources for more information:

http://www.helpguide.org/mental/alcohol_abuse_alcoholism_help_treatment_prevention.htm

http://www.cdc.gov/chronicdisease/resources/publications/aag/alcohol.htm

MARIJUANA - CANNABIS

Since alcohol has such a negative effect on performance and you need to get a buzz on to relax, how about a little weed? It turns out it's not such a good idea either, especially in the bush.

Marijuana slows reaction time and impairs coordination and balance, all of which have a very detrimental effect on athletic performance, and which greatly increase the risk of injury. It alters judgment and decision making; not a good idea when your life depends on being able to correctly assess hazards and manage risks.

The active ingredient in cannabis, THC, can also increase heart rate by 20-100%, greatly increasing the cardiovascular load of a physical activity and making it feel much harder. Long term use can induce anxiety and paranoia

and suppress testosterone production in males (think lack of sex drive and loss of muscle mass). And since the smoke is held in the lungs for longer than cigarettes, the negative impact of smoking marijuana on your airways, lungs and red blood cells is even worse than cigarettes (See page 189 for more on the effects of the smoke on your lungs and ability to do physical activity). All in all not a good choice if you want to perform well at work and elsewhere.

For more information visit:

http://www.drugabuse.gov/tib/marijuana.html

http://www.medicinenet.com/marijuana/article.htm

COCAINE

Cocaine is extremely addictive; estimates are that as many as one in five users will develop a cocaine habit. **Before you get taken in by how much fun you think this stimulant can be, you should recognize just how quickly it can take over your life.**

Some of the attractive effects of cocaine are increased energy and mental alertness, but it is the pleasure of the first cocaine high that seems to become the need that the cocaine user continues to seek. Cocaine acts on the brain to increase levels of dopamine, a natural neurotransmitter that mediates feelings of pleasure. It prevents the natural dopamine made in your brain from being broken down, and it also causes more receptors to be made. You might think that these changes would make it easier to get a "natural high" off your home made dopamine, but it doesn't work that way. In short time the naturally produced amounts of dopamine are not enough

to create good feelings, and you don't feel *any* pleasure or joy without the drug. Cocaine also causes many of the same effects as epinephrine (also called adrenalin), the hormone that is produced under stress or when you get a rush from taking a risk; it constricts blood vessels, dilates pupils, and increases body temperature, heart rate, and blood pressure.

Side effects include headaches, abdominal pain and nausea, and appetite suppression, and in some cases heart attack or stroke. But the most obvious cost is that your life very quickly becomes devoted to getting that cocaine pleasure at the expense of everything else. So think carefully before experimenting with cocaine.

For more information check out:

http://www.drugabuse.gov/DrugPages/Cocaine.html

http://www.nida.nih.gov/ResearchReports/Cocaine/Cocaine.html

MDMA - ECSTASY

Unless you are consuming pure MDMA, ecstasy can be a mixed bag of chemicals, all harmful for your body. In saying this, 'pure' MDMA is anything but natural; chemically derived and produced, MDMA mainly works on the brain neurotransmitter serotonin. This is the same signalling molecule that anti-depressants try to increase because it's responsible for feelings of happiness, a sense of well being, and decreased anxiety. Ecstasy enhances the effects of serotonin two ways, it increases the amount of serotonin released inside your brain and also prevents the re-uptake of serotonin, so what is released naturally hangs around for longer.

There is no question that taking ecstasy is going to hype you up and make you feel good, but **you have to decide whether or not you are willing to damage the parts of your brain that make serotonin** because that IS what will happen. Sometimes all it takes is one use and you can have weeks of depression, poor memory, interrupted sleep, confusion, anxiety and paranoia. Physical effects include muscle tension, increased heart rate and blood pressure, nausea, blurred vision, faintness, and chills or sweating. Doesn't sound like it would be that much fun in the long term does it?

For more information check out:

http://www.nida.nih.gov/researchreports/mdma/MDMA3.html#effects

OXYCODONE AND OXYCONTIN

Oxy, oxies, oxycotton, OC s, killers, oceans, O's, oxycoffins, and Hillbilly Heroin are all street names for the pain-relievers Oxycodone and the more powerful OxyContin. These narcotics work by acting on the brain receptors for opiates, the same mechanism as morphine, codeine and heroin, and like these drugs are strongly addictive. A euphoric high is obtained by chewing the tablets, crushing and snorting the powder or dissolving them in water for injection.

Opiates are also strong respiratory suppressants, so they are effective at quieting a cough, but when taken in large amounts (especially when combined with alcohol) they can lead to lowering respiration so far that death results. They also cause drowsiness, dizziness and altered perceptions. These drugs are so powerfully addictive that if you have been taking them for pain medication you may have to gradually decrease your dosage to

avoid withdrawal symptoms such as restlessness, watery eyes, runny nose, sweating, chills, muscle or joint pains, weakness, irritability, anxiety, depression, difficulty sleeping, cramps and diarrhoea, nausea and vomiting.

This is a serious addiction and requires medical treatment.

For more information check out:

http://www.nlm.nih.gov/medlineplus/druginfo/meds/a682132.html

http://www.mayoclinic.com/health/drug-information/DR603249/DSECTION=side-effects

PSYCHEDELIC MUSHROOMS

Magic mushrooms produce a similar effect to LSD, but the trip tends to be shorter and milder (about four hours). They seem like a lot of fun, causing hilarity, euphoria, and excitement or relaxation (spacing-out). At high doses hallucinations can occur, with visual and/or sound distortions.

The down side is the potential for symptoms like stomach pain, nausea and vomiting and occasionally panic, anxiety and terror, and worsening of existing mental illnesses. Not to mention that if you accidentally get the wrong kind of mushroom, you can poison yourself and even die.

The primary effects of mushrooms come from several active alkaloids. Psilocin is responsible for most psychoactive effects, once again acting by mimicking the action of the brain neurotransmitter serotonin.

For more information see:

http://www.sciencedirect.com/science/article/pii/S0273230011000080

http://drugabuse.gov/infofacts/hallucinogens.html

APPENDIX II: NUTRACEUTICALS AND SUPPLEMENTS

It's a lot of work to prepare healthy meals. You have to think about it ahead of time, do the shopping, wash and chop vegetables, cook and clean up afterwards. Making a lunch each day means you have to get out of bed early in the morning and pack all that food and water around with you. Isn't it just easier to eat whatever is readily available from the camp kitchen or gas station store, and then pop a couple of vitamin pills that will give you everything you need?

The answer lies in what you think "easier" means. You only get one body, one chance to go through life. If you take care of it, not only will it last longer, it will allow you to do the things you want to do the way you want to do them. For example, it takes time to do your core exercises every day, a good 10 min that you have to set aside. But once you hurt your back or your knee or your shoulder, you may be looking at surgery, and hours and hours and hours of rehab. And for fallers, given that the statistics say that nearly 1/3 of you will suffer an injury every year, don't you think it's worthwhile to make use of a tool that can improve the speed and accuracy of response to an unexpected visual stimulus by 18%?

When it comes to giving your body the fuel and building blocks it needs to function well there are some elements in foods like vitamins and minerals that we know a fair bit about, but there are a whole slew of others that we are just beginning to identify and understand. Some we know are critical for good health at certain levels, while others may be good a low amounts and toxic at high concentrations, some might be beneficial under certain

circumstances but harmful in others. So how do you know what supplements to take?

To answer that question you have to keep in mind a number of things. First of all, scientists are still not sure exactly what the active nutrients are in many of the foods that are associated with good health. Second, the global neutraceutical industry is expected to exceed $243 billion by 2015. That's a lot of money that a lot of companies are chasing, and a lot of marketing taking place to convince you to buy something. Not only that, but there is still no regulation on what goes into the bottle that you are spending your hard earned dollars on. So third, remember that even if the scientific evidence says that a particular supplement is good for you, you can spend hundreds of dollars and end up taking something that your body can't use, or even worse, something that is actually toxic[12]. Fourth, you have to remember to take them.

In most cases the best strategy is to learn about how to prepare healthy food. Grab a friend and make the cooking a social event. Stock up on supplies when they are on sale and go for variety. Choose from the myriad fresh and frozen vegetables and fruits, grains and breads, pastas and meats, fish, beans, legumes and low fat dairy products. That way you know you will be getting all the good neutraceuticals that we know about, and the ones that we are still learning about. It's pretty hard to OD on broccoli, but it is very easy to OD on pills! Take a few minutes to care for your body, it will last a lot longer.

Below you will find a very brief introduction to some of the more popular supplements and what science has shown about whether they are good for you or not. For more information check out the following sites, they will give you objective evidence based information independent of funding from the supplement manufacturers (who might just be biased).

http://nccam.nih.gov/health/supplements/

http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1171305207040

http://www.scientificamerican.com/article.cfm?id=getting-to-know-nutraceut

ACIDOPHILUS

Lactobacillus acidophilus and Bifidobacterium spp. are two bacterial strains that are found in fermented food products that have been shown to be beneficial for health. The bacteria bind to the cells of the intestinal tract and help to prevent pathological bacteria from taking hold and causing sickness. They also help to keep the cells of the intestine healthy which may help to prevent colon cancer. The main problem with using Acidophilus as a supplement is that the bacteria are not always able to survive the packaging process, so one of the best sources is fresh live culture yogurt.

AMINO ACIDS

Amino acids are the basic component from which all proteins are built. There are about 21 different ones, all but 8 of them can be synthesized in your body as needed. The 8 that we can't make are called "essential" and we have to get them in our diet. Animal source proteins are called complete

proteins, because they contain all 8 essential amino acids. Vegetable source proteins are generally missing some of the 8, but if you eat grains and legumes within about 24 hours it is easy to also get all 8 essential amino acids from vegetable sources. The North American diet is generally very high in protein and it is very rare for a healthy person to be protein deficient in this culture.

Since muscles and energy producing enzymes are made of protein there is a lot of marketing directed toward convincing active people to purchase expensive protein or amino acid supplements. This is actually very wasteful because when you consume large amounts of amino acids they are simply degraded as an energy source (unless you are deficient in protein and that is very unlikely).

But there are a couple of situations where taking in a little extra protein can be helpful. Walking down hill and lowering your chainsaw makes the muscles of your arms and legs lengthen as they contract to resist gravity; this is like the negative phase of training with free weights and is called eccentric contraction. When you are first getting used to eccentric load it can cause small tears in muscle, and this is what makes you sore 24-48 hours after running downhill or your first few days out in the bush after a break of more than a couple of weeks. (it's not lactic acid after all, that is one of the great myths of exercise!). Increasing your protein intake a little during and immediately following eccentric work can help to speed up muscle repair. The other situation that can increase your need for amino acids is endurance activity where your carbohydrate intake is insufficient. Since carbs are the ideal fuel for nerve and brain function, your body will break muscle protein down to release certain amino acids to be converted into sugar for your

nervous system (we can't ever convert stored fat to sugar). But even if you find yourself in one of these two circumstances it still isn't necessary to use a protein powder or amino acid supplement. A much better and more economical strategy is to use the post-work recovery snack (page 16) to replenish your amino acid and sugar stores. Look at pages 27 to 52 for information on what to eat and when to eat it to ensure that you are getting the right fuel at the right time to restore your muscles!

CoQ-10

Coenzyme Q-10 is a naturally produced antioxidant with a very important role in energy production. The claims associated with supplementation are widespread, but there is very little evidence that it is effective at enhancing health or performance in healthy people. It is extremely rare for a person to be deficient in CoQ-10.

The couple of places where good quality studies have shown benefit from CoQ-10 are in people with heart disease, high blood pressure, Parkinson's disease and a few other very rare diseases. When used in conjunction with hypertension medication, CoQ-10 has been shown to further lower blood pressure over the use of medication alone. But if you are not on these meds using CoQ-10 is not an effective way to lower blood pressure. If administered immediately after a myocardial event or early in the progression of Parkinson's, CoQ-10 may have a protective effect. Have a look at this NIH based website for more good information: http://www.nlm.nih.gov/medlineplus/druginfo/natural/938.html

ECHINACEA

The controversy on the effectiveness of Echinacea as an immune system stimulant has been going on for many years. Generally the science backs up the claims that active Echinacea supplements increase the ability of white blood cells to kill infectious organisms, especially right after exposure to a bug. Be aware though, that there is no guarantee that the supplement you purchase will contain the necessary active ingredients[12]. Two other points of concern are that Echinacea seems to lose its effectiveness if you take it too long and too often (more than two weeks at a time), and it may also interact with other drugs. If you are taking a prescription medication make sure to check with your pharmacist as to whether Echinacea will interact with that drug, and if you are purchasing Echinacea be sure to choose a product with a lot number and an expiry date. Presumably this indicates that there is some level of quality control taking place by the manufacturer.

CREATINE

Creatine is a normal component of protein that is obtained from meat consumption or synthesized from protein precursors within our bodies. It is used by muscle to store very short-term energy (under 30 sec). Creatine monohydrate supplementation has been shown to minimally but significantly improve performance in very short duration activities when combined with the right training, but there is no benefit for performance in endurance events. The degree of the effect for sprint activities is so small it's unlikely to make a difference unless you are looking for millisecond level improvements in performance and much of the weight gain that accompanies

supplementation is due to water retention rather than muscle building. To date there have not been any long-term studies to determine the health effects of taking high levels of creatine for extended periods of time.

It is very unlikely that creatine would help your work in the bush, but very likely that it is a moneymaker for the companies that sell it!

EPHEDRA

Mahuang or Chinese ephedra (Ephedra Sinica) contains ephedrine and related compounds that have stimulant effects similar to those of adrenaline (epinephrine). These drugs make you feel energized, but no studies have actually shown that Ephedra improves exercise performance. On the down side, Ephedra has a number of nasty side effects including raising body temperature and increasing the risk of developing a heat injury in warm weather. Other adverse side effects of ephedrine include increased blood pressure, heart rate irregularities, insomnia, nervousness, tremors, headaches, psychoses, seizures, heart attacks, strokes, and death. Young healthy people taking this drug have experienced dizziness, lack of focus, irritability, and heart palpitations. To sum up: Lots of risks and no proven benefits, especially when you are engaged in an activity like falling that requires focus and good decision making.

GINKGO BILOBA

The research on Ginkgo Biloba has not been well controlled making it very difficult to determine whether the herb is effective or not. There does seem to be some evidence that it may help to improve cognition and memory in both healthy young people and in older people with age associated memory loss or with Alzheimer's, but the findings are not conclusive. One very large long term study looked at whether the use of a standardized supplement of Ginkgo for 6 years had any effects when compared to placebo. The findings showed no effect on memory loss or prevention of cancer or heart disease, but did show a positive effect for improving disorders associated with poor circulation like Reynaud's syndrome and peripheral vascular disease, which might be interesting for fallers or others working with their hands in colder climates. Although these effects are not certain one thing that is known for sure is that this herb interferes with some other medications, so if you are using a prescription drug to treat another disorder use this herb with caution.

GINGSENG

There are no controlled studies (where the participants did not know whether they were getting Ginseng or placebo) that show a positive effect of Ginseng on exercise performance. Also as with all herbal supplements, there are wide variations in the contents of different preparations even within Chinese ginseng (Eleutherococcus senticosus) based products. This makes it very difficult to compare the findings from studies using different herbs and different extracts. When extracts are administered directly to cancer cells in

culture there was an anti cancer effect, but there is no indication at this time that taking Ginseng extract will help to prevent cancer. There are also some studies that seem to show a positive effect of Ginseng on correcting erectile dysfunction and in some cases lowering of blood sugar in type II diabetics. But there are also studies that show that blood sugar was raised. **In contrast, we know for sure that stopping smoking, limiting alcohol intake, getting regular exercise and a diet rich in fruits and vegetables, fiber and low in fat does prevent cancer, lower blood sugar and enhance sexual drive. Take your pick, spend a lot of money on something that might be what it says it is, and might have a positive or negative effect, or put in a little effort and get the guaranteed outcome.**

GLUCOSAMINE AND CHONDROITIN SULFATE

These supplements are the basis of the modified sugars needed to make and sustain healthy cartilage. Since cartilage has very little in the way of blood supply, once it's damaged it rarely heals. Eventually, damaged cartilage degrades and the result is a very painful joint. There are many studies that have shown that when taken consistently Glucosamine and Chondroitin can be effective at slowing the progression and reducing the symptoms of knee osteoarthritis (but less so for the hip or other joints). It seems that the effect is greater when the two supplements are taken together, and there may also be a further benefit in taking omega-3 fatty acids along with glucosamine sulfate. Once again though, be cognizant of the fact that supplement production is not regulated and there is no

guarantee that the bottle you purchase has the advertised active product in it. Look for manufacturers that have been around for a while, and products that have a lot number and expiry date. It at least makes you think that they check the quality of their contents.

GREEN TEA

Used as an extract or tea brewed from the Camellia sinensis plant this is one supplement that has clearly been shown to have some positive benefit in certain limited situations. The caffeine in Green Tea can increase mental alertness, see page 188 for more information on the effects of caffeine. In addition, Green Tea has been used to effectively treat genital warts. There are also studies which show less conclusively that this supplement can be effective at treating the dizziness associated with low blood pressure, decreasing the risk of some cancers and Parkinson's disease, and possibly lowering blood lipid (fat) levels.

There are some situations though where the caffeine in Green Tea can cause problems and it can also interact with other drugs or supplements to cause negative effects.

The following NIH website is a good source of information if you want to consume Green Tea in amounts greater than one or two cups/day.
http://www.nlm.nih.gov/medlineplus/druginfo/natural/960.html

MELATONIN

Melatonin is a hormone produced by your body in response to darkness; that acts to help regulate sleep cycles. It has been used to treat some sleep disorders, but there is less evidence that it helps with jet lag or shift work. Like most supplements Melatonin has been shown to interact with other drugs or supplements, especially sedatives, birth control pills and diabetes medications. And buyer beware, there is no regulation on the production of this product.

The NIH website is a good source of information:
http://www.nlm.nih.gov/medlineplus/druginfo/natural/940.html

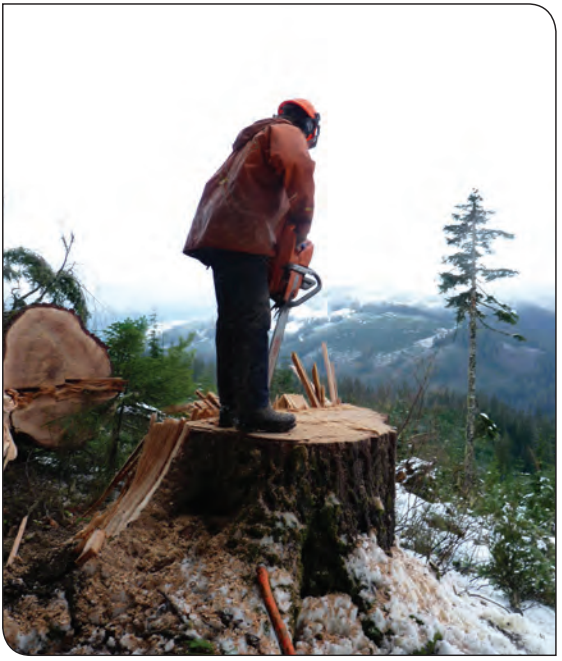
ST. JOHN'S WORT

Research shows that taking St. John's Wort can help with the symptoms of *mild* depression, and as an ointment it may be effective at speeding healing. If used with other herbs it may also help to treat the symptoms of menopause. Once again though, be careful using this supplement as it can interact with other common medications including decreasing the effectiveness of birth control pills, and you may or may not be purchasing an active supplement in the advertised strength.

Check the following website for other drug interactions
http://www.nlm.nih.gov/medlineplus/druginfo/natural/329.html

SPIRULINA

Spirulina or Blue-green algae has been marketed as a highly nutritious protein source with immune boosting effects. In actual fact the protein in this supplement is no better than that found in any animal based foods. Spirulina is also high in B-vitamins and iron, but neither is in a readily absorbable form and some spirulina from natural sources can be contaminated with very toxic microcystins. In experiments with isolated cells, spirulina does appear to enhance the activity of the immune system. However, to date, no quality studies have shown any health or performance benefits in humans when taking the supplement. This might be one to keep an eye on though as the immune boost could turn out to be beneficial.



VITAMINS + MINERALS

MULTIVITAMINS

Most vitamins and minerals are required in only very small amounts. A normal mixed diet with a variety of fresh fruits and vegetables, whole grains, milk products, and meat or vegetarian alternatives will provide an ample supply of all of the known vitamins and minerals, as well as the protective substances that are still being identified. And the cost of a multivitamin is high compared to apples, carrots and spinach.

B VITAMINS

The need for B vitamins is increased slightly with increased levels of physical work because they are active in the processes of energy production, but supplements are not usually needed since whole grains can supply ample amounts of these vitamins. With your good intake of whole grain complex carbs it all works out nicely. There is no good evidence that taking high levels of B vitamins is required under times of increased duress, it just produces expensive urine.

CALCIUM

Everyone needs to ensure adequate calcium intake (about 1000 mg per day) for maintenance of bone mass. It's important for women because once they reach menopause and estrogen production drops, calcium is lost from bone. Even though the decline in hormone levels is not nearly so drastic in males,

older men also lose bone. That's why building up as much bone as possible as a young adult helps to prevent osteoporosis. Unfortunately, calcium rich dairy products also often have high fat content as well, so look for fat-reduced versions of milk, yogurt, and cheeses. And if you are lactose intolerant or shy, this is one time that supplementation is necessary.

VITAMIN D

Over the past 5 years many studies have found low Vit D levels in a whole spectrum of diseases, leading to the belief that Vit D supplementation was important for good health. However a very recent review of all of these studies has shown that supplementation with Vit D does not prevent these disease states. It seems rather that low Vit D levels are a result of poor health rather than a cause. It is clear though, that Vit D is important for strong bones. In Canada milk is supplemented with vitamin D (175 IU/ glass), which makes milk the ideal drink for strong bones as it provides two important items for bone strength, Vit D and calcium as well as being a great source of protein. The only way to get "natural" vitamin D is through exposure of your skin to sunlight. But between the shading of the canopy and your long sleeved PPE, it's debatable whether your skin sees much sunlight so it's not a bad idea to try to consume 2 cups of milk/day.

ANTIOXIDANTS

The increase in oxygen consumption during exercise can generate increased reactive oxygen species such as free radicals, so there may be an increased need for antioxidants in fallers and others who do hard physical work for long hours. Vitamins A, C, and E, Beta-carotene, and selenium can help to

prevent the free radicals from causing damage. But no studies have ever shown definitive proof that taking supplements prevents the diseases that we think are caused by this kind of damage. One of the benefits of aerobic exercise is that it also increases the production of natural antioxidants inside your own body in the exact locations where the reactive oxygen species are produced. This gives much better protection than a supplement taken as a pill ever can.

It is important though to **ensure that you get a good supply of the elements that your body needs to make the natural antioxidants. You get those from a diet rich in fresh fruit and vegetables.**

SALT

Table salt, sea salt, and seasoning salts are the obvious sources of sodium in our diets, but **almost 80% of the salt in the average person's diet comes from salt used in prepared foods as a preservative.**

We do need a small amount of sodium because it is important for fluid balance and essential to muscle and nerve function. Unfortunately though, **most of us eat more than double the amount of sodium that is needed for health** (The recommended intake for sodium is 1500 mg or just over half a teaspoon of salt in total per day, the upper limit is 2300 mg). Taking in too much salt creates a different problem - it increases blood pressure in some people, and that leads to strokes, heart disease, and kidney disease.

If you don't sweat on a daily basis, are obese or do have a predisposition for heart disease, hypertension or diabetes (or you have one of these diseases) you need to pay attention to this section!

Most foods are now labeled with sodium or salt content. Those labeled "Low in Sodium" must have less than 5% of the Daily Value (recommended intake) or less than 120mg/serving. If the food contains more than 15% of the Daily Value or higher than 360mg/serving it must be labeled "High in Sodium" and it should be avoided).

Nutrition Facts

Serving Size 3 oz. (85g)

Amount Per Serving	As Served
Calories 38	**Calories from Fat** 0
	% Daily Value
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0g	0%
Sodium 0g	2%
Total Carbohydrate 0g	3%
Dietary Fiber 0g	8%
Sugars 0g	
Protein 0g	

Vitamin A 270%	•	**Vitamin C** 10%	
Calcium 2%	•	**Iron** 0%	

Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	80g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

There are numerous studies that show that **decreasing the amount of salt in the diet can lower blood pressure significantly.** It takes a while to get used to a diet in low salt, but the payback is huge. Think about someone you know who has had a stroke - bet they wish they had forgone that high salt diet!

Here are some good resources for more information on health and salt:

https://www.nhlbi.nih.gov/hbp/prevent/sodium/sodium.htm

http://www.sodium101.ca/

If you are overweight, have even moderately elevated blood pressure or you or your family have a history of high blood pressure or heart disease, you need to limit your salt intake.

- Use fresh or frozen unprocessed foods over tinned or packaged options.
- Choose foods labeled "sodium free", "no sodium added", "or low in sodium".
- Use pepper, vinegar, lemon, herbs, and spices to flavor your foods instead of salt. It takes a little while to get used to the taste of less salt, but after a little while your taste buds adapt and food will be flavorful again.
- Don't add salt in cooking or when preparing foods.
- Restrict how often you eat restaurant or fast foods.
- Increase the amount of potassium in your diet (potatoes, tomatoes, lima beans, brussels sprouts, spinach, yogurt and bananas are great sources).

IRON

Iron is critical for transporting oxygen in blood and muscle, and for converting food energy into a form that can be used by every process in your body. Generally people don't need to consume much iron because most iron in the body is pretty effectively recycled. But because iron is so necessary to energy production it is important for physically active people to make sure they have adequate iron stores.

About 30% of people who get a lot of exercise regularly have low iron stores. If you do not eat red meat (the form in plant sources is much harder to absorb and use), or you sweat unusually heavily you may be more likely to be iron deficient. If you suspect you may be low in iron, ask your doctor for a blood test to determine *serum ferritin* levels, the value should be about 20-30 µg/L (this is revised upward from the "clinical" normal of 11 µg/L because you are physically active). Another situation where it is important to check your ferritin level is if you have been living at a lower elevation and have just moved to the mountains (to an elevation of above 5000 ft or 1500m). There is an increased need for iron during the first month of adaptation to the higher elevation. **But never take an iron supplement without knowing whether you need it, too much iron can be toxic.**

Even without a blood test you can make sure you get the best supply of dietary iron possible. The iron in red meat (called heme iron) is especially well absorbed. Only small amounts added to stir fry or pasta sauce are necessary to keep iron stores topped up. When vegetables, grains and supplements are used as iron sources it's much harder to absorb the mineral, but there are a few tricks that can help. Dark green leafy

vegetables, raisins and molasses are all high in iron and if you cook them in cast iron, the pot adds a little more iron. Add in Vitamin C rich foods (tomato sauce, orange juice) to convert the iron to a more absorbable form and avoid tea, coffee or milk at your iron rich meal, they contain substances that can block iron absorption.

APPENDIX III: SUGAR + SUGAR SUBSTITUTES

All sugars are created equal, it doesn't matter if it's brown or white, corn or maple, raw or processed, cane or beet. A sugar is the smallest unit of a carbohydrate and because it doesn't need to be broken down any further it's absorbed as is. When you drink beverages containing sugars (whether soft drinks or fruit juice) they appear in your blood within 5-10 minutes, and cause a much larger amount of insulin to be released than if that sugar was encased in fibre or part of a more complex carbohydrate. A lot of insulin can drive you into hypoglycemia just when you need access to that fuel (see pages 12 and 221 for more on simple sugars, insulin, hypoglycemia and performance).

Another reason to avoid simple sugars is that there aren't any significant quantities of vitamins or minerals in sugars, no matter what their source. (True raw sugar is not allowed to be sold in Canada and the United States, because it is so contaminated with bacteria and insects. The "raw" sugar you can purchase is already highly processed). The same is true for "natural sugars" like concentrated fruit juice, honey, maple syrup, or agave nectar. The one possible exception is molasses; 1 tablespoon contains as much potassium as a banana and about ½ as much iron as you get from eating one slice of beef, plus some other minerals like copper and magnesium, and even some B vitamins. But the flavour is very strong and it hasn't caught on as an alternative sweetener for beverages.

Artificial sweeteners are products that are designed to sweeten without adding calories to your diet. All of the calorie free sweeteners available in

Canada and the USA are safe for consumption in normal amounts. There is no true proof that they can cause cancer or are harmful in any way. The main concern with their use is that they may encourage people to stick with diets that are not healthy rather than eating plenty of fruits, vegetables, whole grains and low-fat protein.

Sugar alcohols are also used to sweeten many processed foods, they are substances like xylitol and usually end in -ol. They are lower in calories than sugar but they are not calorie free and they can cause gas and diarrhoea if you eat too much of them. Stevia is included in this group of sweeteners. They have a smaller effect on blood sugar and insulin than sugar, but they still cause small increases because they are still carbohydrates.

Including sugar in moderation in a well balanced diet that includes 7-8 servings of fruits and vegetables for women and 8-10 servings for men is fine for a healthy population of physically active people. The problems arise when the amount of simple sugars in the diet increases to the exclusion of more nutrient dense foods, and cycles of fast rising blood sugar are followed by periods of hypoglycemia.

When simple sugars are consumed regularly without physical activity the constant exposure to high insulin levels leads to the development of insulin resistance, and type II diabetes. This disease is one of the fastest rising in the world. Currently, 1 in 10 Americans aged 20 or older has type II diabetes and a frightening 3.5 in 10 have pre-diabetes (at this stage improving diet

and lifestyle can still control the disease). What is even worse is that type II diabetes is also starting to appear in children aged 10-19. The statistics for Canada are not much better (8.7% of Canadians have diabetes).

Building healthy lifestyle patterns is a great idea, however old (or young) you are! Eating a diet rich in complex, high fibre carbs, fresh fruits and vegetables, low fat protein from animal and vegetable sources, and low fat dairy products will keep you more alert, improve your reaction time and help you make better decisions. In studies with other active workers it reduced the incidence of injuries by 70%[11].

Why not give it a try?

APPENDIX IV: HYPOGLYCEMIA

The system that controls movement, reactions, balance, agility, thought, decision making, processing of visual input and memory is the Nervous System. It's pretty clear that to drive, work and fall well, the Nervous System needs to be functioning at a high level. One simple thing that you can do to make sure that you make the best of your motor (nerves) and cognitive (brain) abilities is to keep that system fueled up properly.

The preferred fuel for your nervous system is blood sugar (glucose). Normally, because glucose is so critical for your body's ability to function, its level in the blood is very tightly controlled. But there are two situations where blood sugar can drop low enough that your brain and nerves cannot function well. When this happens it's called "hypoglycemia" and your ability to stay alert, assess hazards, make decisions and control movement will all suffer - making you subject to poor movement patterns, bad decisions and slowed reflexes…. a clear recipe for injury and for a faller, perhaps death.

In studies with fallers, tree planters, drivers and physicians; reaction times, memory, decision making, and response to visual cues were all impaired when blood sugar levels were variable. **Participants performed 18% faster and more accurately when they followed the eating and hydration recommendations you will find in this manual.** Stabilizing blood sugar had a measurable and significant effect on speed and accuracy for each of these parameters. In some cases the difference was nearly 2/3 of a second. Imagine how reacting so much faster would protect you from injury! Paying attention to making sure that you eat well and stay hydrated is a pretty easy way to mitigate the risks that you face every day.

The two situations where blood sugar has a tendency to drop are as follows. The first occurs because the ability to store glucose in the body is limited; an overnight fast will leave your stores too low to keep your blood sugar stable. During the day if you eat high fiber complex carbs and low fat protein regularly, you'll keep your blood sugar topped up. But if you skip breakfast or don't eat anything during the day, your blood sugar can drop low enough that you will become irritable, make bad decisions, lose coordination and your reflexes will slow.

A more common scenario than not eating at all is probably the most frequent eating mistake that people make. A lot of convenience foods are high in sugars, like sweet breakfast cereals, hot chocolate, cookies, commercial muffins, cinnamon buns, granola bars, soft drinks or sweetened

juices. The sugars in these items move into your blood very quickly and cause a sharp rise in blood sugar which is perceived by your body as being too much too soon. To lower blood sugar back down you release the hormone insulin, but the sharply rising blood sugar level stimulates the release of more insulin than is actually needed, and blood sugar levels plummet. That's why you feel tired and find it hard to focus about 2 hours after eating a sugary snack. The high insulin has moved too much sugar out of your blood and you are approaching hypoglycemia. (Have a look at pages 12-14 for some examples of situations where you might find yourself hypoglycemic and some suggestions as to what to eat or drink to restore your blood sugar).

It's important to learn to recognize the symptoms of hypoglycemia. The loss of concentration, reduced attention and coordination and slowing of reflexes can translate directly into injuries or a serious incident. If you feel any of the following you know it's time to pull out that snack stored in your pocket or pack and fuel up for optimum performance and injury prevention. And just in case you are wondering whether or not it will really make a difference, keep in mind that a program for a high work output industry (treeplanting) instituting regular high complex carb and low fat protein snacks (including the post-work snack) helped to decrease injuries from over 20% to less than 2%[4]. Planters were also able to increase production when they gave their bodies the fuel that their muscles and nerves needed.

And a similar program for ski resort employees has also brought injuries down by 70%[11]. Given that a study with fallers showed that blood glucose levels were below fasting for the majority of the day the evidence is pretty clear, for a small change in your eating pattern you can significantly reduce your risk of an incident.

HYPOGLYCEMIC SYMPTOMS

- Hunger
- Anxiety
- Irritable
- Nausea
- Tremor
- Sweating
- Elevated Heart Rate
- Fatigue
- Dizzy or Light Headed
- Headache
- Visual disturbance
- Drowsiness
- Inability to concentrate
- Confusion

One last comment about consuming a lot of simple sugars. Not only does it challenge your ability to keep your blood sugar stable, the constant high exposure to insulin leads to Type II diabetes. See page 172 for more information on this disease.

Paying attention to your diet will payback tenfold. Pack yourself healthy snacks that are high in complex carbohydrates, fibre and low-fat protein. Consume plenty of fresh fruits and vegetables throughout the day. Stabilize your blood sugar and not only will you have a much better chance of making it through the season injury-free, you'll be working at a higher level than ever before.

APPENDIX V: COMPARISION OF COMMERCIAL GRANOLA BARS

Name	calories	gm fat	gm protein	gm sugar	gm fibre	mg sodium	serving size
Best Choices							
2:1 Protein Bars-Oatmeal	265	5	30	9	5	200	74 g (1 bar)
Clif Bar-Chocolate Chip	240	5	10	22	5	140	68 g (1 bar)
Fast Digesting							
Quaker Oats-Chewy Low Fat Oatmeal Raisin	90	1.5	1	7	1	80	28 g (1 bar)
PowerBar-Oatmeal Raisin Performance Bar	230	2.5	10	20	3	110	65 g (1 bar)
Quaker Oats-Oatmeal to Go Raisin	220	4	4	19	5	230	60 g (1 bar)
Special K-Strawberry Bars	90	1.5	1	9	1	95	23 g (1 bar)
Nutri-Grain Cereal Bars Apple Cinnamon	140	3	1	13	1	105	37 g (1 bar)
All-Bran Honey Oat Breakfast Bars	130	3	2	11	5	170	35 g (1 bar)
Medium Digesting							
Vector Energy Bar-Chocolate Chip	230	7	9.1	18	3	85	55 g (1 bar)
Fibre One Chewy Bars-Oats & Chocolate	140	4	2	10	9	95	40 g (1 bar)
Detour Chocolate Caramel Bar	170	4.5	15	6	1	160	43 g (1 bar)
Special K Protein Meal Replacement Bar-Double Chocolate	190	5	10	17	2	150	45 g (1 bar)
Nature Valley-Trail Mix Fruit & Nut	140	4	3	13	2	65	35 g (1 bar)
ZonePerfect Dark Chocolate Nutrition Bar	190	6	12	14	1	210	45 g (1 bar)
Slim-Fast High Protein Meal Bar-Chocolate Chip	190	6	15	11	2	260	48 g (1 bar)
Quaker Oats-Chewy Chocolate Chip with 25% Less Sugar	100	4	1	6	3	50	24 g (1 bar)
Kellogg's Fibre Plus Antioxidants Chewy Bars: Chocolate Chip	120	4	2	7	9	55	36 g (1 bar)
Nature Valley Oats 'N Honey	190	6	4	12	2	160	42 g (2 bars)
Kellogg's Fibre Plus Antioxidants Chewy Bars-Chocolate Chip	120	4	2	7	9	55	36 g (1 bar)
Kashi-Honey Toasted 7 Grain Granola Bars	180	6	6	8	4	160	40 g (1 bar)
SoLo Low Glycemic Nutrition Bar-Chocolate Charger	200	7	11	17	4	120	50 g (1 bar)

For a well balanced and inexpensive Power Bar make your own using the recipe on page 85.

APPENDIX VI: DIETARY INTAKE - how much ?

When a person performs strenuous work, more fuel is needed over and above the amount used in sedentary life (desk job, equipment operator). A very rough estimate of the number of calories consumed during physical work/exercise can be made as follows:

1. Take body weight in kg (including backpack, vest or chainsaw and belt weight) and multiply by the number of hours of activity (the number of hours spent *hiking, falling, lifting and other activities where your heart rate is increased and your breathing is deepened*), NOT including travel time, time spent waiting around, or time where the workload is so low that your breathing and heart rate are not elevated.

2. Multiply that number by the appropriate Intensity Factor from the table below.

Intensity	Women	Men
Easy aerobic (Walking, breathing is a little deeper, but very comfortable)	(2)	(4)
Moderate aerobic (Walking at a comfortable pace, breathing deeply but still able to carry on a conversation)	(3)	(5)
Hard (Hiking fast on steep ground, climbing through debris while carrying a heavy load, lifting or pushing hard, breathing very deeply)	(4)	(6)
Maximal (Breathing very hard, as if running fast, could not talk)	(5)	(7)

If you don't want to lose weight, add the calculated number of calories expended during the activity to the base amounts needed to maintain your

weight when not physically active (see next page). If you do want to lose weight then eat about 300-500 calories/day less than the total number of calories you need to take in to maintain you current weight.

According to the Dietary Reference Intakes, for calorie intake during normal life men aged 19-24 years old need 2700 kcal/day on average and women in the same age group need about 2400 kcal/day to maintain their current weight. Men aged 25-50 years need about 2500 kcal/day and women in this age group need about 1800 kcal/day, again, to maintain their current weight. These are very rough estimates; there is a more accurate formula you can use at the following web address:
http://www.hc-sc.gc.ca/fn-an/nutrition/reference/table/index-eng.php#eeer

The next table gives some examples of *total* calories needed during a day of working in the bush. During the study with fallers, recorded heart rates indicated that about 2 hours were spent at a walking pace (heart rates 100-120 beats/min, about 45 minutes were spent at the equivalent of an easy jog (heart rates between 121 -130 beats/min and about 30 minutes were spent at each of the higher work loads (heart rates between 131 -140 and 141-160 beats/min). Thus, using the average heart rates and the intensity factors from the table on the previous page a faller weighing 80 kg would have to consume 4160 calories to fuel a day of cutting. Interestingly the data actually recorded on fallers indicated that they were burning 1200-1500 calories over and above the base caloric intake required to maintain body functions at rest, the same value as that given by the calculation as shown on the next page.

Base caloric intake	2400	2700
Easy aerobic	2*60*2 = 240	4*80*2 = 640
Moderate aerobic	3*60*.75 = 135	5*80*.75 = 300
Hard	4*60*.5 = 120	6*80*.50 = 280
Maximal	5*60*.50 = 150	7*80*.50 = 140
Total intake to maintain weight	2400+240+135+120+150 = 3045	2700+640+300+280+140 = 4160

In actual practice, the fallers in the study ate about 3800 calories/day. That this was insufficient to meet their energy needs was confirmed by the finding that they all lost weight over the 3 months of the study.

You can use these numbers when planning how much food to pack for the day. There are lots of great resources available on the internet now to determine what the nutrient value of foods are, but each of the snacks listed in the What to Eat section (pages 27 to 52) is around 300-400 calories.

Check out these free sites:

http://nutritiondata.self.com/

http://caloriecount.about.com/foods

APPENDIX VII: REFERENCES

1. From a study by Dr. Nico Pronk and his group at Health Partners in Minneapolis. Dr. Pronk has been studying ways to improve the health of workers for over 20 years. In his study he tracked the health of workers at a large company with thousands of employees. Workers were encouraged to do 4 things: increase their physical activity levels, increase their intake of fruits and vegetables, decrease their alcohol intake and stop smoking. After two years workers that made at least 3 of these changes in their lifestyles had many fewer health claims. This means that in just two short years you can reduce your risk of diabetes by 75%, stroke and heart attack by 65%, cancer by 25% and depression by 95%. And added benefit of making these changes was a significant reduction in back pain! Pronk et al 2010. Pop Health Manag. 13: 289-295.

2. Minnesota Medicine Sept 2007 reported on a study where police officers were asked to self report on their fitness levels, injuries and chronic pain. The higher fitness group was less than half as likely to report back pain and about ¼ as likely to have experienced a sprain at work. Obese officers were more than 3 times as likely to suffer a back injury. http://www.minnesotamedicine.com/PastIssues/PastIssues2007/September2007/ClinicalNableelSeptember2007.aspx

3. This study was done on Austrian alpine ski racers over a ten year period and presented at the IOC World Conference on Prevention of Injury & Illness in Sport in Monaco in 2011. Skiers with stronger cores and legs were less likely to injure their anterior cruciate ligament. Br J Sports Med 2011;45:310-311 doi:10.1136/bjsm.2011.084038.3. Other studies have shown that when you train women to increase their hip stability there are far fewer ACL injuries.

4. Tree planters who followed a preseason training program that included both aerobic conditioning and proprioceptive exercises were able to increase productivity while decreasing injury rates significantly. Planters made about $50/day more and the injury and illness rate in the intervention group was 40% lower. Increasing carbohydrate at regular intervals during the day had similar effects. Roberts 2009. ACSM'S Worksite Health Handbook A Guide to Building Healthy Companies. 2nd Ed. N. P. Pronk, Ed. Human Kinetics, Cha. 35. Pp.309-316, 2009.

5. Forty log haulers in BC and the Pacific Northwest were studied on a day when they ate their normal diets (very high fat and sugar) and on a day with a similar work schedule and driving conditions when they ate small snacks every two to three hours. The composition of the snacks was 2/3 to 3/4 high fiber complex carbs with approximately 1/4 to 1/3 low fat protein. The snack diet decreased blood sugar variability and improved reaction time, cognitive processing, memory and decision making by 15-18%. Chapter 23. Implementing Physical Activity Strategies. National Physical Activity Plan, Human Kinetics, Inc., Champaign, II, In Press, 2014.

6. This review article was written by two of the really big names in sport science. The paper covers the need to maintain carbohydrate supply for high levels of physical performance. Sports Med. 1992 Feb;13(2):86-92.

7. The immune system is suppressed when fat intake is high and also when carbohydrate intake is low. This paper reviews how the immunosuppressive effect of low carbohydrate stores is made even worse by prolonged physical exertion. Can J Appl Physiol. 2001;26 Suppl:S23-35.

8. This study showed a benefit on exercise performance following 14 days of supplementing 1 man and 6 young women with 6g of MCT's/day. Note that women metabolize fat differently than men, both were also getting carbs during the exercise tests and the study has not been repeated since it's publication in 2009. J Nutr Sci Vitaminol (Tokyo). 2009 Apr;55(2):120-5.

9. This group does a lot of research into fitness training and injury risks with army personnel in the United States. Their studies are well controlled with large sample sizes. In this series of studies they looked at the impact of cigarette smoking on physical performance and risk of injury, as well as longitudinal changes. Over a 4 year time span, smokers lost more endurance and strength than non-smokers, irrespective of other influences. Med Sci Sports Exerc. 2001 Jun;33(6):946-54.

10. http://www.uhs.uga.edu/aod/athletic-performance.html This website is a University Athletic Department review of the effects of alcohol on athletic performance. The list of references for the article includes the position stand of the American College of Sports Medicine among other good sources. These position papers are written by the top researchers in the field.

11. A study with 75 ski patrollers, instructors and lift operators at 5 ski resorts in western Canada showed that following the dietary and hydration recommendations and spending a bit of time working on posture and core strength could reduce injuries by an average of 70%. Five matched resorts that did not use the program experienced and increase of 10% over the same time frame. http://www.hindawi.com/journals/bmri/2013/121832/

12. In a 2013 study conducted at Guelph University DNA testing was used to examine 44 herbal products. Sixty nine percent of tested samples contained product substitutions, contaminants and fillers that were not listed on the label, some of which were toxic. BMC Medicine 2013 11:222.

APPENDIX VIII: THE RESEARCH PROJECT

The *Fit to Log* program was based 15 years of research into people who work hard including a study with fallers in the interior of BC. In each and every case the stabilization of blood sugar and an increase in postural awareness and core strength has lead to a measurable enhancement of reaction time and decision making and a significant decline in injuries and accidents.

The study with fallers showed that most participants did not know how to eat and drink to stay alert while at work, or for good health in general. The average diet did not meet the requirements for many important nutrients (including water), and was much too high in fats and sugars. The pattern of food intake was also problematic, in that nearly all fallers were hypoglycemic throughout the day. The insufficient energy supply was evident with productivity falling off in the hour prior to lunch and during the late afternoon. Fallers were also found to be consistently dehydrated with sweat losses exceeding fluid intake on a regular basis.

The full research report can be found in "Assessment of Workload During Manual Timber Harvesting". In: Hard Work: Physically Demanding Occupations, Tests and Performance. Human Kinetics, 2008 Med Sci Sport Ex Vol 38:S173 2006.

Based on these data *Fit to Log* was created to teach people how to eat for good energy and to provide them with a simple program of exercises to increase fitness with a focus on core and joint stability. Fit to Log is the fourth program in the Fit to Work series. In each case the program has significantly reduced injury and incident rates by at least 40%.

IF YOU HAVE QUESTIONS OR COMMENTS, CONTACT DELIA

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To print a pocket sized document that includes the key points made here visit: www.selkirk.ca/fittolog

Photos courtesy of D. Roberts and the BCFSC
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